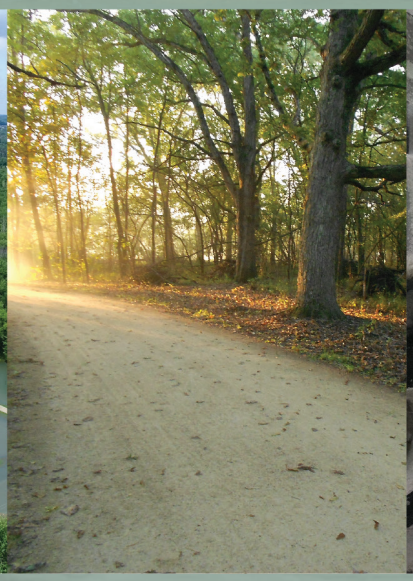
Des Plaines River Watershed-Based Plan



June 2018

Des Plaines River Watershed-Based Plan

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Lake County Stormwater Management Commission
500 W. Winchester Road
Libertyville, Illinois 60048

Watershed-Based Plan Assistance From:

Northwater Consulting
Project Managers: Jeff Boeckler & James Adamson
960 Clocktower Dr. Suite F
Springfield, Illinois 62704

Technical Communications Consulting, Inc.
Project Manager: Andi Dunn
812 Wisconsin Avenue
Oak Park, IL 60304

Executive Summary Assistance From:

LaVidaCo Communications
Project Manager: Laura Stanton
613 S. Central Avenue
St. Louis, MO 63015

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STORMWATER MANAGEMENT COMMISSION

ACKNOWLEDGEMENTS

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Several agencies and individuals provided significant contributions to this watershed-based plan including the Des Plaines River watershed (stakeholder) planning committee whose members include representatives from municipal, county, state and federal agencies, homeowner and lake associations, agricultural producers, and interested groups and individuals from the watershed. Of particular mention is Mike Warner, Mike Prusila, Patty Werner, Jeff Laramy, Ashley Warren, Ernesto Huaracha, Jacob Jozefowski, Sharon Osterby, and Neil Schindelar of SMC; and Mike Adam and staff of the Lake County Health Department. Jeff Boeckler and James Adamson of Northwater Consulting contributed significant support to SMC with analyzing data and writing sections of the plan report. Andi Dunn of Technical Communications Consulting performed editing and formatting on the watershed-based plan. SMC was the grant manager for this report. Strong partnerships with the DRWW and local subwatershed planning committees: Bull Creek – Bulls Brook Watershed Council and Buffalo Creek Clean Water Partnership created a more comprehensive watershed-based plan through outreach to the watershed and technical assistance.

In addition to those who were already mentioned, technical information was presented at watershed planning committee meetings by Lake County Health Department, DRWW, Libertyville Open Space District, Lake County Emergency Management Agency, North Shore Water Reclamation District, Village of Libertyville, Lake County Public Works, Village of Lindenhurst, Conserve Lake County, Lake County Forest Preserve District, Mundelein Park District, Tempel Farms, Diamond Lake Preservation Alliance, Loch Lomond Property Owners Association, Third Lake Management Committee, Gages Lake Lakes Committee, Libertyville-Mundelein Historical Society, Prairie Crossing Charter School, Lake County Department of Transportation, Northwater Consulting, Village of Buffalo Grove, Illinois Department of Transportation, Illinois Tollway Authority, Village of Gurnee, Bull Creek – Bulls Brook Watershed Council and the Buffalo Creek Clean Water Partnership.

The North Shore Water Reclamation District, Lake County Central Permitting Facility, Ryerson Woods Visitor Center, Mundelein Park District, Tempel Farms, Lake County Department of Transportation, Lake County Forest Preserve Operations & Public Safety Facility, Libertyville City Hall, Village of Buffalo Grove Council Chambers graciously supported the watershed planning effort by providing meeting spaces for the watershed planning committee. *Most of all we would like to recognize the project partners and watershed stakeholders whose interest in protecting, restoring, and enhancing the Des Plaines River watershed planning area has been critical to the success of this plan. The following individuals and organizations participated in watershed planning committee meetings from March 2016 – February 2018:*

Cover photos taken by SMC, LCDOT and Paul Klonowski

LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Aaberg	Nathan	Liberty Prairie Foundation
Abderholden	Frank	News-Sun; Sun-Times
Adam	Mike	Lake County Health Department
Adler	Beth	Des Plaines River Watershed Workgroup
Aldridge	Margie	Resident
Aldridge	Warren	Resident
Amidei	Moses	Village of Wadsworth
Anderson	Dan	Buffalo Grove Park District
Anderson	Ders	Openlands
Anderson	Jim	Lake County Forest Preserve District
Baade	Tony	Loch Lomond Property Owners Association
Baczek	Evan	DuPage Stormwater Management
Bailey	Clint	United States Geological Survey
Balaban	John	North Branch Restoration Project
Barner	Allie	Natural Resource Conservation Service
Barry	Jenny	Libertyville-Mundelein Historical Society
Bartholomew	Bob	Resident
Bartholomew	Pat	EHS Services
Bartolai	Alana	Lake County Health Department
Batista	Santos	Illinois Department of Transportation
Batz	Bill	Prairie Crossing Charter School
Beilfuss	Ed	Carillon North Homeowner Association
Benavides	Dominic	Resident
Benavides	Kristen	Resident
Benjamin	Grant	Long Lake Improvement & Sanitation Association (& Sierra Club)
Berg	Keith	Mundelein Resident
Berns	Leslie	Lake County Forest Preserve District
Bicking	Steve	HR Green
Billington	Craig	Forest Preserve District of Cook County
Blake	Kelly	Integrated Lakes Management
Bland	Jim	Sierra Club
Blank	Richard	Resident
Boeche	Adam	Village of Mundelein
Boeckler	Jeff	Northwater Consulting
Bouchard	Chris	RHMG
Bounds	Dan	Baxter & Woodman
Brady	Cathy	McDonald Creek
Brady	Kathy	Prospect Heights Resident
Brandes	Ryan	Lindenhurst Environmental Committee
Broderick	Colleen	Wildwood Park District
Brown	David	Village of Vernon Hills
Buckardt	Nan	Lake County Forest Preserve District
Bundalo	Cindy	Wildwood Valley Lake
Bundalo	Dan	Wildwood Park District
Burger	Jeanette	Long Grove Resident
Burke	Caitlin	Gewalt Hamilton
Burke	Michael	Christopher B. Burke Engineering
Byers	Steven	Illinois Nature Preserve Commission
Byrne	Rob	Village of Lincolnshire

LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Cahill	Jack	Squaw Creek Clean Water Alliance
Calabresa	Carol	Lake County Public Building and Development
Caldarella	Christie	HR Green
Carrier	Kevin	Lake County Department of Transportation
Charland	Gloria	Sierra Club
Chefalo	Tom	Lake County Public Building and Development
Chesek	Fritz	Resident
Chung	Fred	Village of Libertyville
Clayton	Michael	Riverwoods Preservation Council
Cline	Andrea	Geosyntec Consultants
Coggin	Ed	Weston Solutions
Comber	Donna	Carillon North Homeowner Association
Cooper	Jeff	Village of Libertyville
Corona	Joy	Bleck Engineering Co., Inc.
Craig	Evan	Sierra Club
Crane	Julie	Lake County Stormwater Management Commission
Crombie	Cameron	Lake County Health Department
Cubberly	Chris	Tempel Organics
Culhane	Paul	Upper Des Plaines River Ecosystem Partnership
Curran	Jerry	WRI
Custic	Melissa	The Morton Arboretum / Chicago Region Trees Initiative
Cwiak	Dave	Vernon Hills Park District
Dane	Leonard	Deuchler Environmental, Inc. (DEI)
Davis	Christine	Illinois Environmental Protection Agency
Davis	Eileen	Lake County Forest Preserve District
Deigan	Geoff	Prairie Crossing Charter School
Denny	Greg	Diamond Lake Preservation Alliance
DeVore	Sheryl	Lake County News
Dicke	Faith	Crooked Lake (East Shore)
Dittrich	Wally	Village of Lincolnshire
Doolittle	Tom	Grubb School Drainage District
Dorn	Brian	North Shore Water Reclamation District
Doyle	K.C.	Lake County
Drabicki	Scott	Village of Gurnee
Dutton	Meghan	Sierra Club
Eckebrecht	Mark	Beach Park Resident
Ells	Robert	City of Lake Forest
Ende	Jeff	Village of Barrington
Ettinger	Albert	Sierra Club
Ettinger	Frank	Resident
Ferretti	Timothy	Auto Parts City
Firnbach	Scott	Village of Round Lake Park
Flood	Rob	Gages Lake, North Shore Water Reclamation District
Formica	Matt	Village of Lindenhurst
Frable	Erika	Hawthorn Woods
Frank	Brian	Lake County Planning, Building & Development
Fritz	Dean	Wildwood Park District
Furlan	Frank	Waukegan & Round Lake Park
Gallagher	Ed	District Director for State Senator Melinda Bush

LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Gallett	Michael	Village of Kildeer
Garrigan	Michael	Village of Antioch
Gaytan-	Maria	House of Representatives
Gedville	Todd	Vernon Township
Geiselhart	Chris	Bull Creek - Bulls Brook Stakeholder
Geiselhart	Paul	Lake County Audubon
Geisenhoffer	Colin	United States Environmental Protection Agency Region 5
Gerleman	Doug	Go Green and Northbrook Environmental Committee
Giertych	Al	Lake County Department of Transportation
Godshalk	James	Lincolnshire Resident
Goldberg	Aaron	NEIU.edu
Grabowski	Cara	Natural Resource Conservation Service
Gray	Jean	Grandwood Park Resident
Gray	Keith	Mettawa Open Lands
Gretz	Helen	Lake County Forest Preserve District
Griffith	Scott	Lake County Stormwater Management Commission
Grosuewer	Brad	Resident
Gurak	Ron	Long Lake Improvement & Sanitation Association
Hansen	Jeff	Village of Lake Bluff
Happ	Jonathan	Libertyville Township
Harrison	Betty	Village of Lake Zurich
Hart	Sandra	Lake County Board Dist. 13
Hedblom	Mary	Mundelein Resident
Heilemann	Rosemary	League of Woman Voters - Lake County
Heinz	John	Christopher B. Burke Engineering
Hernandez	Charles	Village of Lindenhurst
Herr	Mr. & Mrs. P.	Residents
Hey	Donald	Wetlands Research Inc.
Hickory	Arlene	Citizens Act to Protect Our Water
Hicks	Bob	Resident
Himmelstein	Hal	Resident and Volunteer Steward
Hines	John	Loch Lomond Property Owners Association
Hockman	John	Riverwoods Resident
Homola	Sandy	Exp Global Inc.
Huaracha	Ernesto	Lake County Stormwater Management Commission
Hudson	Holly	Chicago Metropolitan Agency for Planning
Hurtade	Juan	Resident
Husemoller	David	College of Lake County
Isaacson	Kim	University of Illinois Extension
Ivey	Chuck	Arlington Club Condo Association
Jacobson	Rick	Jacobson Golf Course Design
Jakubicek	Frank	Illinois Department of Natural Resources-Fisheries
Jalowiecka	Monika	Village of Round Lake Beach
James	Kirsten	Hey and Associates, Inc.
Janes	Brandon	Village of Deerfield
Jensen	Lynora	Master Naturalist & Forest Preserve of Cook County volunteer
Jeske	Brian	Mundelein Park District
Johannesen	David	James Anderson Co.
Johnson	Chris	Sierra Club

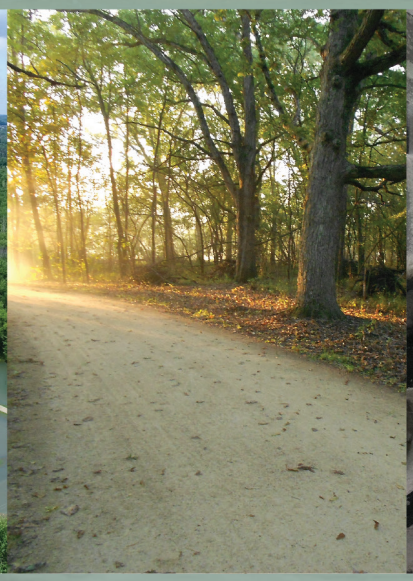
LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Johnson	Ken	Conservation Design Forum
Joyce	Brian	City of Lake Forest
Jozefowski	Jacob	Lake County Stormwater Management Commission
Kanapareddy	Ramesh	City of Highland Park
Kendzior	Paul	Village of Libertyville
Kerkman	Randy	Village of Bristol
Kerrigan	Kevin	Lake County Dept. of Transportation
Kessen	Jay	AMEC Foster Wheeler
Kirby	Jim	Resident
Klick	Ken	Lake County Forest Preserve District
Klonowski	Paul	Resident
Knysz	Marcy	Manhard Consulting
Koch	Greg	Metropolitan Water Reclamation District of Greater Chicago
Kolar	Trish	Resident
Kolb	Peter	Lake County Public Works
Kowalski	Marian	Wildwood Park District
Kratzev	Joe	Metropolitan Water Reclamation District of Greater Chicago
Krocza	Rick	Vernon Hills Park District
Kubillus	Sandy	Integrated Lakes Management
Kuntz	Darrell	Lake County Div. of Transportation
Kuykendall	Scott	McHenry County
Lageman	Jon	United States Geological Survey
Lamb	James	Middle Fork Engineering CAG
Lannin	Sue	Resident
Laramy	Jeff	Lake County Stormwater Management Commission
Larson	Andrea	Manhard Consulting
Leach	Nick	Village of Gurnee
Lebbos	Ed	Bollinger, Lach & Assoc., Inc.
Lee	Rita	Illinois Department of Natural Resources -OWR
Leffingwell	Larry	Tempel Farms
Lineham	Jack	Village of Gurnee
Linshall	M.	Self
Lisette	Ray	Arlington Club Condo Association
Little	Barbara	Village of Deerfield
Lodesky	Joe	Resident
Lofstrom	Michael	Vernon Township
Lundy	Marj	Lincolnshire Resident
Machado	Kathie	Resident
Maine	Ann	Lake County Board
Maldnado	Jackie	Round Lake Park Resident
Marencik	Joe	Ecological Services, LLC
Marrin	Anne	Village of Fox Lake
Marrs	Joseph	Cedar Crossing HOA
Martini	Judy	Lake County Board Dist.5
McDonough	Lisa	Resident
McFarlane	Austin	Lake County Public Works
McJohn	Joe	Self
McNeill	Darcy	Lake County Stormwater Management Commission
Meents	Haley	Lake County Stormwater Management Commission

LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Meier	Robin	Loch Lomond Resident
Melara	Alvaro	Congressman Brad Schneider
Miceli	Kathy	Sierra Club & Lake County Forest Preserve River Steward
Miceli	Tom	Sierra Club & Lake County Forest Preserve River Steward
Michado	Kathie	North Libertyville Estates Community Association
Milne	Geoff	Tempel Farms
Milner	Bill	Illinois Department of Natural Resources -OWR
Mitros	Mary	DuPage County
Moffat	Cory	Resident
Monico	Darren	Village of Buffalo Grove
Morthorst	Tom	Village of Third Lake
Mosca	Vince	Hey & Associates Inc.
Moss	Glen	Resident and Volunteer Steward
Nathan	Walter	Riverwoods Resident
Neal	Marty	Libertyville Township Highway Dept.
Nehila	Jeff	Grayslake Park District
Neilson	April	Sierra Club/ ILM Environments
Nelson	Anna	Valley Lake Wildwood Park District Committee Member
Nelson	John	Lake County Forest Preserve District
Nelson	Kristina	Wildwood Resident
Neu	Dave	Conserve Lake County
Newport	Bob	Metropolitan Planning Council
Nickels	John	Resident
Nimmo	Al	Midwest Construction Products
Novotney	Mike	Lake County Stormwater Management Commission
O'Connor	Jen	Resident
O'Connor	Kathleen	Libertyville Township & BC-BB Watershed Council
Olsen	Darren	Christopher B Burke Engineering
O'Neill	Brian	Burns and McDonnell
Osterby	Sharon	Lake County Stormwater Management Commission
Paap	Kathy	Donald Hey & Wetlands Research Inc
Palka	Rafal	Village of Lindenhurst
Panther	Reed	Tollway
Papa	Jan	Bluestem Ecological Services
Papp	Kathy	Wetland Research Inc.
Paradoski	Gary	Aqua Vitae
Peck	Todd	Zion Park District
Pedersen	Alfred	Resident
Pedersen	Linda	Lake County Board
Perry	Geoff	Gewalt Hamilton Assoc., Inc.
Peterson	Maria	Resident
Pfeil	Robert	Libertyville Resident
Phillips	Katrina	Sierra Club
Pieper	Jason	Lake County Public Works
Pippen	Scott	Village of Lincolnshire
Polzin	Tom	Hey & Associates
Popelle	Joe	Long Lake Improvement & Sanitation Assn.
Pribyl	Susan	Squaw Creek Clean Water Alliance
Prusila	Mike	Lake County Stormwater Management Commission

LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Raffel	Larry	Wheeling Park District
Ratz	Rob	Lake County Forest Preserve District's Des Plaines River Steward Program
Raube	Dennis	Lindenhurst Resident
Reed	Bud	East Skokie Drainage District
Resnick	Margaret	Mundelein Park District
Reynolds	Mike	Village of Buffalo Grove
Riccio	Emily	Tempel Lipizzans
Rice-Davis	Chelsey	Congressman Schneider's Office
Ringa	RJ	Long Lake Improvement & Sanitation Assn.
Roberts	Jesse	Senator Mark Kirk Rep.
Robinson	Joe	North Shore Water Reclamation District
Rockstroh	Monica	Christopher B Burke Engineering
Rodriguez	Gabriel	Vernon Hills Park District
Rogers	Carol	Warren Township High School
Rospopo	James	USDA Natural Resources Conservation Service
Ruscoe	Mark	City of Prospect Heights
Ryan	John	Land & Water Resources, Inc.
Salemi	Joseph	North Lakeshore Realty Co.
Sauter	Holly	Metropolitan Water Reclamation District of Greater Chicago
Schilling	Steven	Deigan & Associates
Schimanski	David	Village of Deerfield
Schindelar	Neil	Lake County Stormwater Management Commission
Schirn	Wayne	Arlington Club Condo Association
Schneider	Fred	Resident
Schultz	Sarah	Environmental Action Team
Scott	Les	Resident and Volunteer Steward
Shafer	Barbara	My Neighbor in Libertyville
Shatkin	Judy	Resident
Shimberg	David	Riverwood Resident
Shimbey	David	Plan Commission Riverwoods
Shirani	Agar	Illinois Dept. of Transportation
Shockley	Kermit	Illinois Dept. of Transportation
Skibbe	Mike	Village of Buffalo Grove
Skrukrud	Cindy	Sierra Club
Smith	Brian	AECOM/Tollway
Snarr	Jack	Resident
Snyder	Rebekah	Lake County Forest Preserve District
Sobol	Fred	Libertyville Resident
Soliz	Maggie	Applied Ecological Services
Stauber	Camille	Sustainable Places Inc.
Stefani	Bill	Lake County Tech Campus
Steffen	Eric	Lake County Public, Building & Development
Stockley	Mark	Village of Fox River Grove
Straughan	Stacey	Waukegan Harbor Citizens' Advisory Group
Surroz	Sarah	Conserve lake County
Sweeney	Ross	Resident
Szafranski	Geoff	Vernon Hills
Takizana	Homnomi	Openlands
Talbett	Michael	Village of Kildeer

LAST NAME	FIRST NAME	ORGANIZATION/ENTITY
Thomsen	Stephanie	Strand Associates, Inc.
Tierney	John	Baxter & Woodman
Traynoff	Kelcey	Lake County Stormwater Management Commission
Ueltzen	Matt	Lake County Forest Preserve District
Urbanozo	Gerard	Lake County Health Department
Vancil	Susan	Lake County Stormwater Management Commission
Varga	Ernest	McHenry County
Vella	Steven	Libertyville Public Works
Vogel	Randy	Land & Water Resources, Inc.
Wade	Joe	City of Prospect Heights
Wagner	Bryan	Illinois Tollway
Warner	Mike	Lake County Stormwater Management Commission
Warren	Ashley	Lake County Stormwater Management Commission
Weidenfeld	David	Village of Buffalo Grove
Weik	Ken	Resident
Weinen	Kitty	Senator Mark Kirk Rep.
Weiss	Jeff	Buffalo Creek Clean Water Partnership
Werner	Patty	Resident
Weskerna	Ed	Lake County Soil & Water Conservation District
Western	John	Audubon Society
Williams	Chris	Village of Lake Villa
Williamson	Nancy	Illinois Department of Natural Resources
Wilson	Donald	Resident and Volunteer Steward
Wittenberg	Bill	Resident
Witthuhn	Vern	Strand Associates
Wojcik	Thomas	Resident
Wolff	Michael	Lake County Grading Company
Wolfgram	Jeff	Village of Wheeling
Woolford	Kurt	Lake County Stormwater Management Commission
Yamin	Yamin	James Anderson Company
Yoder	Chris	MBI
Yun	Charles	Resident
Zehner	Steve	Robinson Engineering
Zemaitis	Mike	Lake County Div. of Transportation
Zink	Sarah	Integrated Lakes Management

Des Plaines River Watershed-Based Plan



EXECUTIVE SUMMARY • June 2018

INTRODUCTION:

Why a Watershed-based Plan?

Water is elemental to our lives. Plants and animals, including humans, are largely composed of water, and generally require clean water to survive. Our communities, food systems, energy sources, and countless products that we consume everyday are dependent upon water. Despite this dependence, water is often taken for granted until it negatively affects us, usually due to short supply, inundation, or pollution.

This watershed-based plan is important because it specifically addresses water-related issues in communities within the Des Plaines River Watershed Planning Area. Clean and abundant water, healthy streams and lakes, and safety from flooding are important to residents and business and therefore play a significant role in the quality of life, health and economic vitality of our communities. Clean and healthy watersheds are assets that make communities more desirable for residents and businesses; however, flooding can damage property and result in local economic impacts. Lakes, rivers, and streams in the planning area provide recreational destinations for watershed residents as well as tourists and are a highly visible indicator of watershed health. These waterbodies support a diverse variety of water-dependent plants and animals and are critical to local ecosystems.

Your actions help to:

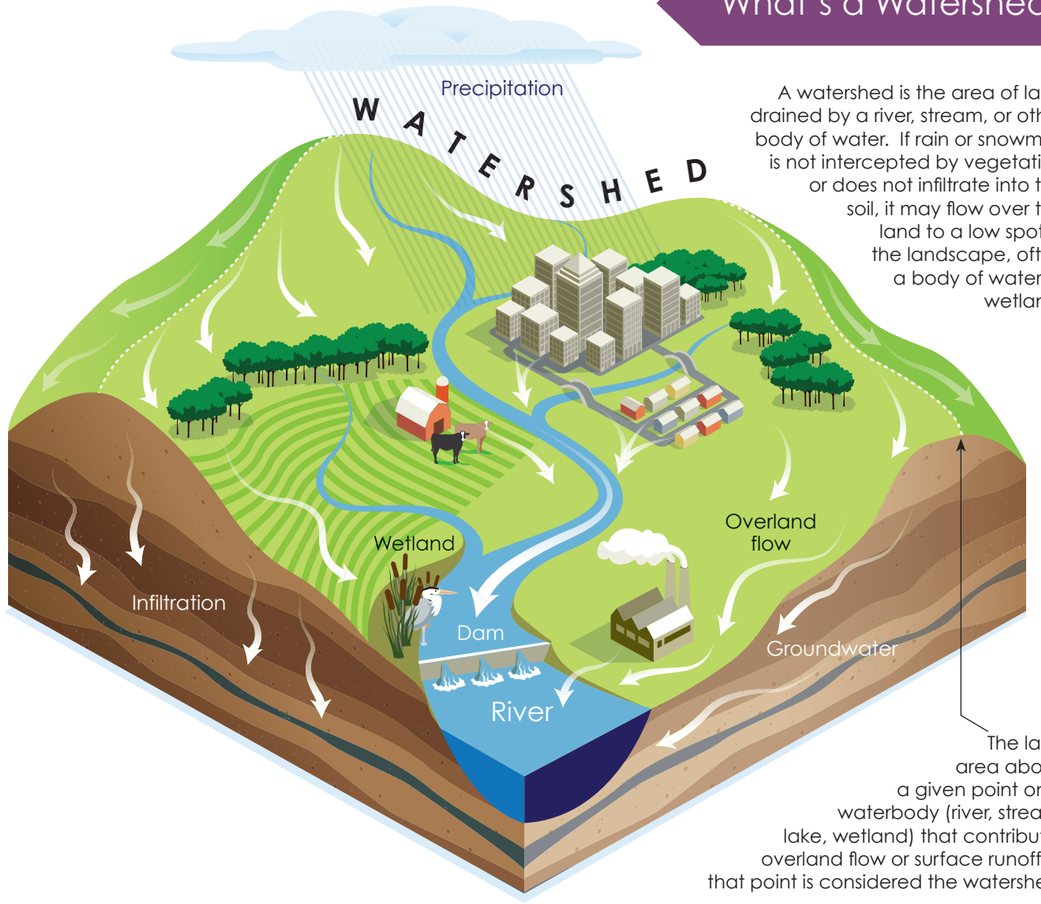
- keep water in our rivers, streams, lakes and wetlands clean
- reduce the impacts of flooding
- protect and enhance natural resources
- maintain "green" and "grey" infrastructure
- increase awareness of watershed issues and opportunities

Water does not generally flow according to political boundaries. Consequently, we recognize the watershed as the appropriate scale to address most water resource issues, which often involve multiple political jurisdictions. The Des Plaines River watershed planning process brought together numerous watershed stakeholders to provide input towards the management and enhancement of water resources in the planning area.

During this planning process, critical data was obtained from record flooding that occured in 2017, as well as a comprehensive water quality monitoring effort conducted on watershed streams.

This watershed-based plan utilizes these sources of up-to-date information as well as historical data to provide a comprehensive summary of existing watershed conditions and trends. It recommends actions stakeholders can take to protect resources that are in good condition and restore those that have been degraded. As a resident, landowner, business or community official, you make a difference.

What's a Watershed?



A watershed is the area of land drained by a river, stream, or other body of water. If rain or snowmelt is not intercepted by vegetation or does not infiltrate into the soil, it may flow over the land to a low spot in the landscape, often a body of water or wetland.

The land area above a given point on a waterbody (river, stream, lake, wetland) that contributes overland flow or surface runoff to that point is considered the watershed.

Des Plaines River Watershed Planning Area Vision Statement

The Des Plaines River watershed planning area will be a destination valued by residents, businesses, and governments that join together to actively engage in education and participate in improving water quality. Stakeholders will preserve and enhance regional green infrastructure, resulting in cleaner streams and lakes, better plant and animal biodiversity, and reduced flood damage – while balancing a sustainable native landscape with development and economic growth.

AT A GLANCE:

Des Plaines River Watershed Planning Area

The Land

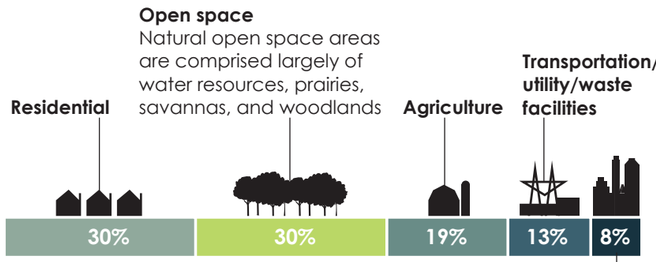
240 miles of rivers and streams

53 named lakes

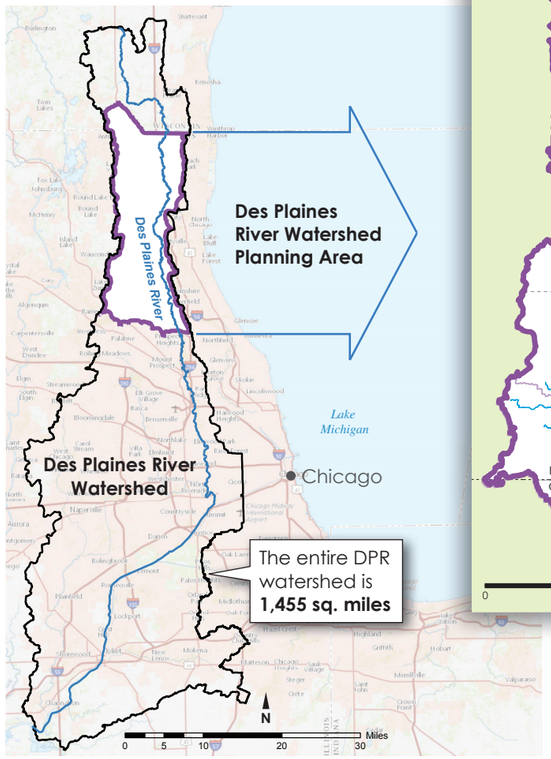
17,000 acres of wetlands

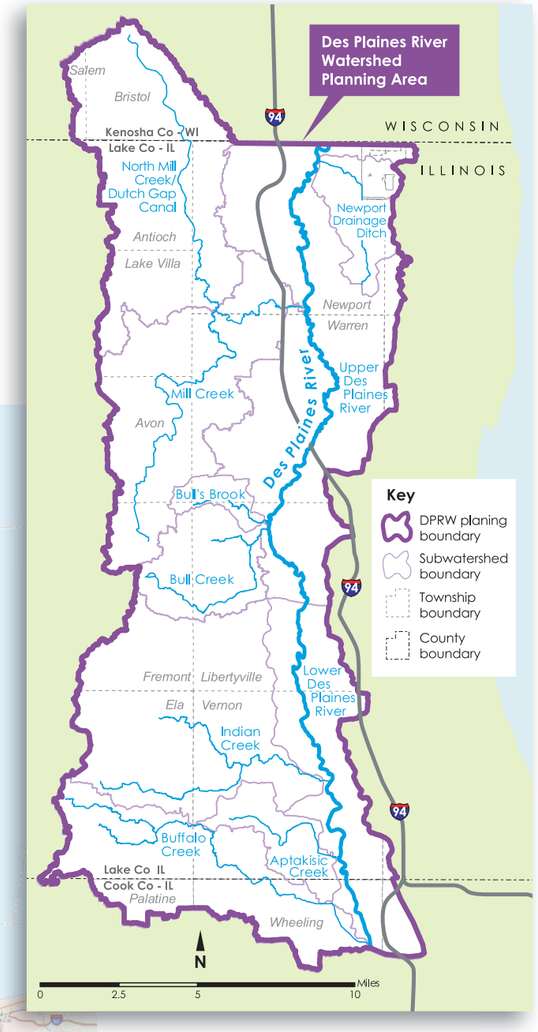
The Des Plaines River Watershed-Based Plan covers 235 square miles in Lake and Cook Counties in Illinois and Kenosha County in Wisconsin. This planning area is part of the much larger Des Plaines River watershed, which covers 1,455 square miles in Southeastern Wisconsin and Northeastern Illinois and is part of the Illinois and Mississippi River Basins. The planning area is divided into 10 smaller "subwatersheds": the Upper Des Plaines River, Lower Des Plaines River, Newport Drainage Ditch, North Mill Creek-Dutch Gap Canal, Mill Creek, Bull's Brook, Bull Creek, Indian Creek, Aptakisic Creek, and Buffalo Creek.

What's in the planning area:



Commercial, industrial, government/institutional, and office/research parks together encompass less than 10% of total watershed area but may have significant impacts on water resources, particularly where these uses are geographically concentrated.





The Des Plaines River Watershed-Based Plan is the first "umbrella" plan developed by SMC, in that it includes and updates five previous plans for smaller subwatersheds within the planning area: Bull Creek-Bull's Brook, Buffalo Creek, Indian Creek, Mill Creek, and North Mill Creek-Dutch Gap Canal, and completes planning for the remaining subwatershed areas with no previous watershed plans.

The People

400,000 approximate population in 2010

39 municipalities

15 townships

THE PLANNING AREA: A SPECIAL PLACE

The natural landscape of the planning area was formed by the retreat of a continental ice sheet more than 10,000 years ago. This process resulted in the low moraine ridges, kettle lakes and depressions, and outwash plains that give shape to the water resources and natural communities we see in the watershed today, including more than 50 lakes and 240 miles of river and streams. The planning area has a diverse mix of land uses with relatively large areas of natural and recreational open space interspersed with residential neighborhoods, commercial districts, and employment centers. Agriculture remains a major land use activity in the northern half of the planning area. The rural character in this part of the planning area has been identified as an important attribute by stakeholders.

Within the open space network are significant "ecological complexes" of more than 10,000 acres: one complex in the northern end of the planning area extending from Rollins Savanna to Red Wing Slough and one complex that runs along the Des Plaines River. These natural areas store and cleanse stormwater, provide important habitat for an array of plants and wildlife, and offer a myriad of recreational opportunities.

The Des Plaines River corridor is an archetype of "green infrastructure", providing an array of benefits including floodplain protection and flood damage reduction, open space and habitat preservation, and an unbroken recreational trail connection from north to south through the planning area. The planning area contains dozens of natural lakes and thousands of acres of wetlands resulting from the last glaciation. These lakes and wetlands often are a source of baseflow to streams, provide important habitat to native and threatened/endangered plants and wildlife and offer abundant recreational opportunities. The benefits of natural waterbodies are augmented by impounded and excavated lakes in the planning area that have been constructed over the years.

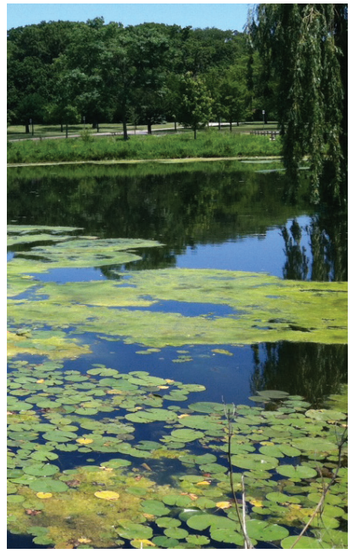
OUR FINDINGS:

A System Under Stress

Many rivers, streams and lakes in the planning area are impaired by nutrients, chloride, bacteria, and other forms of pollution. Pollution enters water bodies through stormwater runoff from urban and agricultural lands; from erosion of upland soils, streambanks, and lakeshores; and in permitted discharges of treated wastewater.

Fish and aquatic invertebrates found in rivers and streams indicate degraded water quality and aquatic habitat. Lakes have expanding populations of invasive aquatic plants and mussels, as well as high levels of nutrients, which can result in algae blooms. These algae blooms can produce harmful effects to people and aquatic life, limit recreational activities, and reduce the aesthetic quality of lakes.

Record flooding on the Des Plaines River in July of 2017 was accompanied by urban flooding in many areas outside of mapped flood hazard areas. Intense rainfall overwhelms older or undersized infrastructure. While wetland loss is not occurring at the rate it once did, wetland coverage is greatly reduced from its former extent. The capacity of wetlands to provide benefits such as flood water storage, uptake or retention of pollutants such as nutrients and sediment, and provision of baseflow to lakes and streams is correspondingly reduced.



Clockwise from top left: Algae bloom at Butter Lake; Watershed stakeholders providing feedback towards the plan; Fourth Lake Forest Preserve; volunteers cutting and pulling up sod to install native vegetation along Mill Creek.

WHAT'S AT RISK IN THE PLANNING AREA?

The amount of impervious surface in the planning area is projected to increase in the future. Increased imperviousness of the landscape results in a greater volume of stormwater runoff that must be detained or infiltrated in order to avoid an increase in downstream flood elevations. Additionally, impervious surfaces such as roads and parking lots are linked to urban pollutants such as chloride and polycyclic aromatic hydrocarbons (PAHs), which are becoming more prevalent in the planning area. Future pollutant loading scenarios based on municipal and county comprehensive plans suggest that nutrient and chloride pollution loads could increase dramatically in the future. If severe weather events such as those that resulted in the July 2017 flood become more frequent in the future, flooding in urban areas and along floodplains will be exacerbated.

Stressors

Specific watershed stressors include:

- **Nutrients, chloride, organic enrichment, and sedimentation/ siltation** are major causes of impairment in rivers and streams. Nutrients, sediment, and bacteria are major causes of water quality impairment in lakes.
- **Erosion** degrades water quality and aquatic habitat.
- **Chloride levels** are steadily rising in rivers, streams and lakes.
- There are **thousands of flood-prone structures**. Although 4,000+ structures are in mapped floodplains, many of the 2,000+ structures flooded in 2017 are outside mapped floodplains.
- Both **traditional and "green" stormwater infrastructure** may be insufficient for runoff volume or need repair.
- **More than half of the wetland acreage in the planning area has been lost** since European settlement.
- **Stakeholders** are generally unaware of the watershed stressors or do not have the experience or resources necessary to take action.
- **More collaboration** among jurisdictions is needed to address many of the watershed problems and take advantage of watershed opportunities.

ARE YOU A WATERSHED STAKEHOLDER?

Watershed stakeholders that contributed to the planning process include municipalities, townships, county agencies, wastewater treatment plant representatives, and the broader community of homeowner associations, businesses, non-profit organizations, institutions, and residents living, working or providing interest in the planning area.

Take Action!

10 in 10

TEN ACTIONS FOR STAKEHOLDERS TO TAKE IN THE NEXT TEN YEARS

1. **Adopt the watershed-based plan and implement high priority actions and/or projects,** including the allocation of funding for project implementation and maintenance.
2. **Determine a lead watershed organization to guide watershed plan implementation,** implement the education and outreach strategy, provide technical assistance to watershed stakeholders, and coordinate multi-partner projects.
3. **Municipalities and counties work collaboratively** and proactively to mitigate flood problem areas.
4. **Utilize low-impact development and stormwater best management practices** in new development and retrofit/maintain existing development to reduce and filter stormwater runoff from impervious areas.
5. **Restore wetlands,** particularly where they will provide additional flood storage and water quality benefits.
6. **Stabilize the worst "severe" eroding streambanks and lake shorelines** using techniques that provide water quality and aquatic habitat benefits.
7. **Stabilize eroding fields,** implementing nutrient management plans and implementing best farming practices to reduce soil loss.
8. **Reduce the amount of chloride in runoff** by implementing winter maintenance "de-icing" best practices and providing educational trainings and materials.
9. **Reduce phosphorus loads in runoff** through best management practices, projects, and programs.
10. **Use the results of watershed monitoring programs** to strategically target projects, develop programs, and update this watershed plan.

The Des Plaines River Watershed-Based Plan was completed following guidance from the Illinois Environmental Protection Agency and U.S. Environmental Protection Agency. Funding for this plan was provided, in part, by the Illinois Environmental Protection Agency through Section 319 of the Clean Water Act and the Lake County Stormwater Management Commission.

LAKE COUNTY

STORMWATER MANAGEMENT COMMISSION

Cover photo taken by Paul Klonowski.
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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 1

BCCWP – Buffalo Creek Clean Water Partnership
BMP – Best Management Practices
CMAP – Chicago Metropolitan Agency for Planning
CWA – Clean Water Act
DPR Planning Area – Des Plaines River Watershed Planning Area
DRWW – Des Plaines River Watershed Workgroup
HUC – Hydrologic Unit Codes
IDNR – Illinois Department of Natural Resources
Illinois EPA – Illinois Environmental Protection Agency
LCFPD – Lake County Forest Preserve District
LCHD – Lake County Health Department
SMC – Lake County Stormwater Management Commission
TMDL – Total Maximum Daily Load
UDPREP – Upper Des Plaines River Ecosystem Partnership
USACE – United States Army Corps of Engineers
USEPA – United States Environmental Protection Agency
USGS – United States Geological Survey

1 INTRODUCTION

1.1 WHAT IS A WATERSHED?

A **watershed** is the area of land drained by a river, stream, or other body of water (see Figure 1-1 for a diagram of a watershed system). Other common names given to watersheds include **drainage basins** and **catchments**.

As simple as the definition sounds, a watershed is actually a complex interaction between ground, climate, water, vegetation, and animals. In today's developed watersheds, other elements such as sewage, agricultural drainage, **impervious surfaces**, stormwater, and erosion can all be detrimental to the health of the watershed.

The health of a waterbody is a direct reflection of how the land in the watershed is used and managed. Some of the benefits of a healthy watershed are: improved water quality, fewer flooding problems, enhanced wildlife habitat, recreational opportunities, and better quality of life.

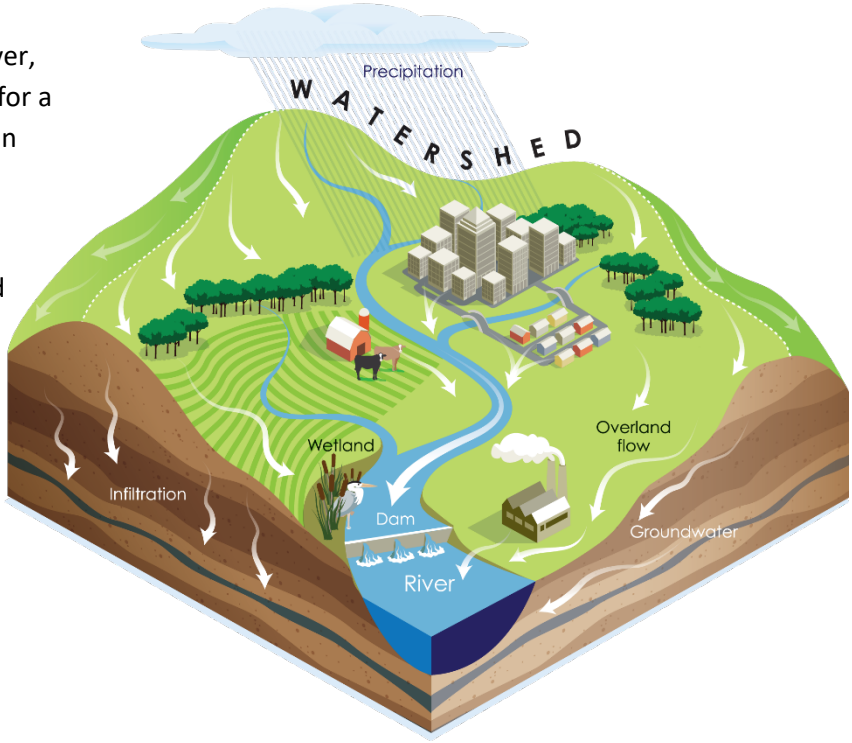

Figure 1-1: Diagram of a Watershed

WATERSHED: Land area that drains water to a given point, usually a river, stream or lake. The land area above a given point on a waterbody (river, stream, lake, wetland) that contributes runoff to that point is considered the watershed.

DRAINAGE BASIN: Synonymous with "watershed," though often used to describe the watersheds of larger rivers or hydrologic systems (e.g., the "Mississippi River drainage basin" or "Great Lakes drainage basin").

CATCHMENTS: Small unit of a watershed or subwatershed that is delineated and used in watershed planning efforts because the effects of impervious cover are easily measured, there is less chance for confounding pollutant sources, boundaries have fewer political jurisdictions, and monitoring/mapping assessments can be done in a relatively short amount of time. The 432 catchments in the DPR planning area have an average size of 0.5 square miles, with a range of 0.03 – 2.2 square miles.

SUBWATERSHED: A SMALLER BASIN WITHIN A LARGER DRAINAGE AREA THAT ALL DRAINS TO A CENTRAL POINT OF THE LARGER WATERSHED. THE 10 SUBWATERSHEDS IN THE DPR PLANNING AREA HAVE AN AVERAGE SIZE OF 23.5 SQUARE MILES, WITH A RANGE OF 2.8 – 50.9 SQUARE MILES. SEE CHAPTER 3, SECTION 3.4.1 FOR MORE INFORMATION ABOUT THE DPR PLANNING AREA 10 SUBWATERSHEDS.

IMPERVIOUS SURFACES: A surface that does not allow water to infiltrate to the soil layer, including pavement, rooftops, and roads.

1.1.1 WHY A WATERSHED-BASED PLAN?

Water is elemental to our lives. Plants and animals, including humans, are largely composed of water, and generally require clean water to survive. Our communities, food systems, energy sources, and countless products that we consume everyday are dependent upon water. Despite this dependence, water is often taken for granted until it negatively affects us, usually due to short supply, inundation, or pollution.

This watershed-based plan is important because it specifically addresses water-related issues in communities within the Des Plaines River watershed planning area. Clean and abundant water, healthy streams and lakes, and safety from flooding are important to residents and business and therefore play a significant role in the quality of life, health and economic vitality of our communities. Clean and healthy watersheds are assets that make communities more desirable for residents and businesses; however, flooding can damage property and result in local economic impacts. Lakes, rivers, and streams in the planning area provide recreational destinations for watershed residents as well as tourists and are a highly visible indicator of watershed health. These waterbodies support a diverse variety of water-dependent plants and animals and are critical to local ecosystems.

Water does not generally flow according to political boundaries. Consequently, we recognize the watershed as the appropriate scale to address most water resource issues, which often involves multiple political jurisdictions. The Des Plaines River watershed planning process brought together numerous watershed stakeholders to provide input towards the management and enhancement of water resources in the planning area. During this planning process, critical data was obtained from record flooding that occured in 2017, as well as a comprehensive water quality monitoring effort conducted on watershed streams. This watershed-based plan utilizes these sources of up-to-date information as well as historical data to provide a comprehensive summary of existing watershed conditions and trends. It recommends actions stakeholders can take to protect resources that are in good condition and restore those that have been degraded. As a resident, landowner, business or community official, you make a difference.

1.2 DES PLAINES RIVER WATERSHED PLANNING AREA

1.2.1 DES PLAINES RIVER WATERSHED

The Des Plaines River watershed covers 1,455 square miles (or 931,489 acres) in northeastern Illinois and southeastern Wisconsin. The Des Plaines River begins near Union Grove, Wisconsin and flows south through Racine and Kenosha Counties in Wisconsin and Lake, Cook, and Will Counties in Illinois. The river joins the Chicago Sanitary and Ship Canal in Lockport, Illinois and flows west through Joliet, before converging with the Kankakee River to form the Illinois River. The Illinois River then flows into the Mississippi River, which flows south to the Gulf of Mexico. The drainage area of the Des Plaines River Watershed was increased by 673 square miles when there was a diversion of Lake Michigan water through the Chicago Sanitary and Ship Canal and the Cal-Sag Channel in the early 1900's (Pescitelli, 2013). Since January 17, 1900, there has been limited diversion of water from Lake Michigan through the Chicago Sanitary and Ship Canal to the Illinois River (Healy, 1979).

1.2.2 DES PLAINES RIVER WATERSHED PLANNING AREA

The Des Plaines River Watershed-Based Plan covers 16% of the Des Plaines River watershed, or approximately 235 square miles (150,361 acres). Hereinafter referred to as the Des Plaines River (DPR) planning area, this area encompasses portions of central Lake County, Illinois; southern Kenosha County, Wisconsin; and northern Cook County, Illinois, with portions of 39 municipalities and 15 townships (see Figure 1-4), 240 miles of stream, 17,000 acres of wetland, and 53 named lakes. Figure 1-3 depicts the size and location of the Des Plaines River Watershed compared to the DPR planning area. The DPR planning area is comprised of eleven 12-digit HUCs (see Table 1-1).

The Des Plaines River Watershed-Based Plan is an "umbrella" watershed-based plan because the 235 square-mile planning area includes 10 subwatersheds. The following five watershed-based plans have been completed for six subwatersheds of the DPR planning area in Lake County: the Bull Creek/Bulls Brook Watershed Based Plan (2009), Indian Creek Watershed Based Plan (2009), North Mill Creek-Dutch Gap Canal Watershed-Based Plan (2013), Mill Creek Watershed and Flood Mitigation Plan (2014), and Buffalo Creek Watershed-Based Plan (2016).

Four subwatersheds do not have watershed-based plans completed: Newport Drainage Ditch, Upper Des Plaines, Lower Des Plaines, and Aptakisic Creek. This "umbrella" plan updates or completes watershed-based planning for all ten subwatersheds (see Figure 1-2 for the DPR planning area subwatersheds planning status as of March 2016). This umbrella plan also guides local stakeholders to implement best management practices (BMPs) that provide cost and pollution effective solutions to surface water quality impairments.

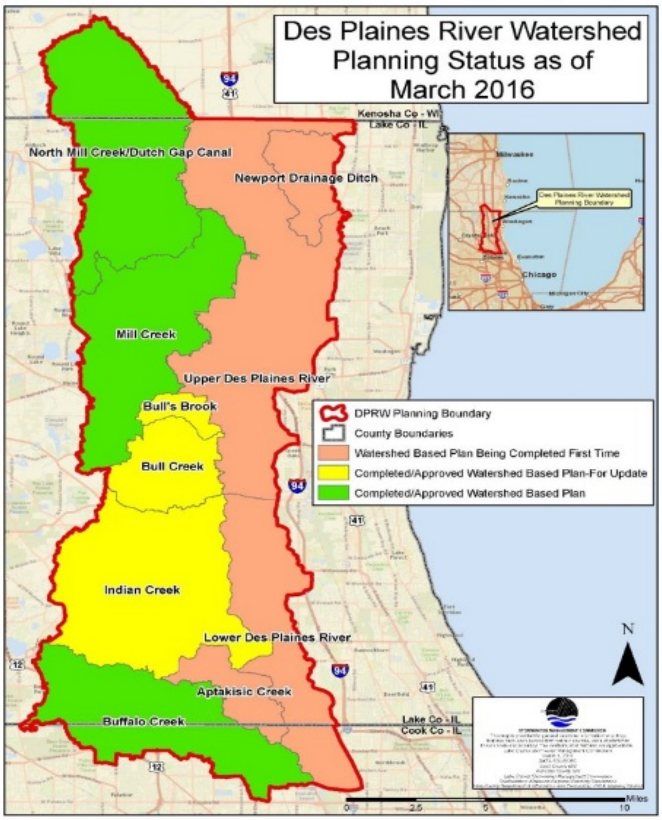

Figure 1-2: Des Plaines River Watershed Planning Status

NOTEWORTHY: HYDROLOGIC UNIT CODE (HUC)

A hydrologic unit can accept surface water directly from upstream drainage areas, and indirectly from associated surface areas such as remnant, noncontributing, and diversions to form a drainage area with single or multiple outlet points. Hydrologic units are only synonymous with classic watersheds when their boundaries include all the source area contributing surface water to a single defined outlet point. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to twelve digits based on the six levels of classification:

- 2-digit HUC first-level (region)
- 4-digit HUC second-level (subregion)
- 6-digit HUC third-level (accounting unit)
- 8-digit HUC fourth-level (cataloguing unit)
- 10-digit HUC fifth-level (watershed)
- 12-digit HUC sixth-level (subwatershed)

Table 1-1: Des Plaines River Subwatersheds & 12-digit HUCS

SUBWATERSHED	12-DIGIT HUC	HUC NAME
North Mill Creek	071200040201	North Mill Creek
Mill Creek	071200040202	Mill Creek
Buffalo Creek	071200040502	Wheeling Drainage Ditch
Indian Creek	071200040501	Indian Creek
Bulls Creek	071200040302	Bull Creek – Des Plaines River
Bulls Brook	071200040302	Bull Creek – Des Plaines River
Upper Des Plaines River	071200040302 071200040301	Bull Creek – Des Plaines River Sterling Lake – Des Plaines River
Lower Des Plaines River	071200040503	McDonald Creek – Des Plaines River
Newport Drainage Ditch	071200040301 *071200040104*	Sterling Lake – Des Plaines River *Jerome Creek-Des Plaines River (only part of this HUC is in the planning area)*
Aptakisic Creek	071200040503	McDonald Creek – Des Plaines River

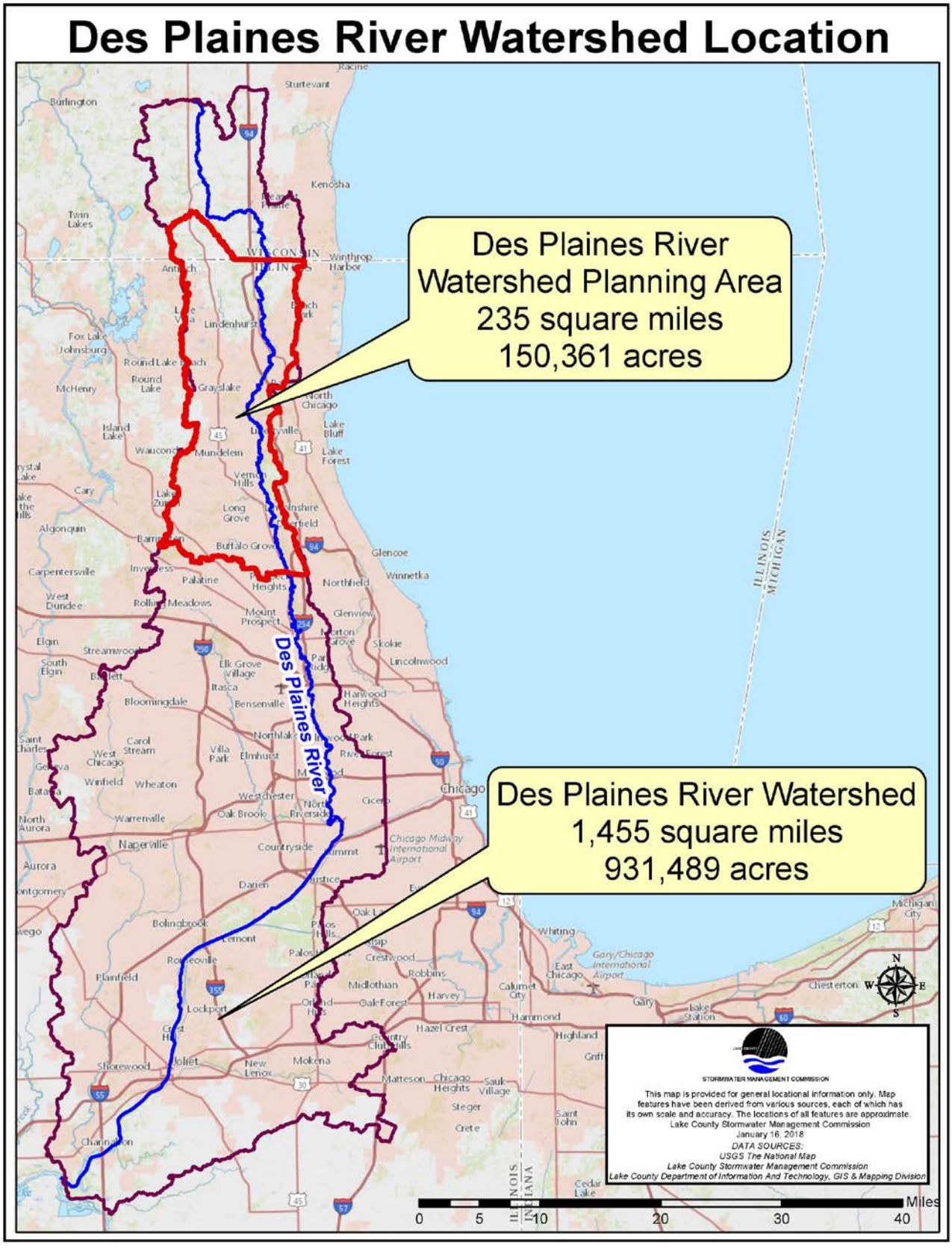

Figure 1-3: Des Plaines River Watershed Location Map

1.3 WATERSHED PLAN PURPOSE

Lake County Stormwater Management Commission (SMC) took the lead to develop a watershed-based plan for the DPR planning area. The purpose of this effort was to develop a plan to reduce the impacts of water pollution and flood damage; restore watershed lakes, streams, and wetlands to a healthy condition; and provide opportunities for watershed stakeholders to have a significant role in the process. This watershed-based plan does not address groundwater quality issues, focusing instead on stormwater and surface water runoff.

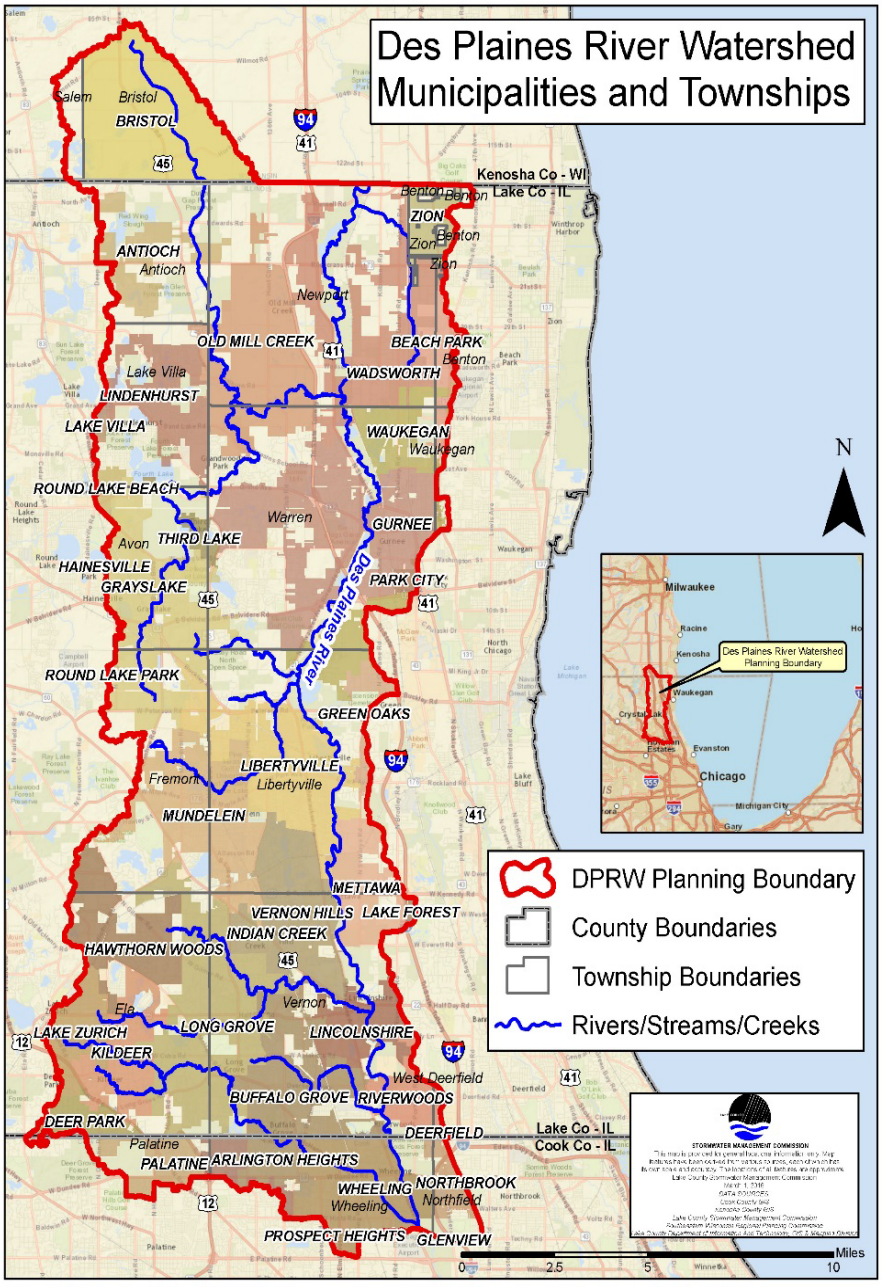

Figure 1-4: Des Plaines River Watershed & Des Plaines River Watershed Planning Area

A broad representation of watershed stakeholders participated in the planning process and developed and supported this plan. A significant objective of this planning effort and the implementation of the plan going forward is to return the 61 waterbodies in the DPR planning area that are listed as **impaired** on the 2016 Illinois 303(d) list of impaired waters to conditions that fully support their designated uses (Illinois EPA, 2016). Figure 1-5 depicts the waterbodies that are impaired in the DPR planning area.

This plan identifies BMPs to remedy or mitigate water quality impairment, flood damages, and the loss or degradation of natural resources.

The plan also recommends watershed stakeholders implement actions to preserve, manage, and restore natural resources, as well as prevent actions that will cause

IMPAIRED WATERS: The Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with current pollution control technologies alone.

or exacerbate unintended water quality and flood damage problems. Watersheds do not generally coincide with political boundaries, so watershed planning improves coordination and cooperation among communities and the land and water resources they share and impact.

1.4 WATERSHED PLAN REQUIREMENTS, PROCESS, AND ORGANIZATION

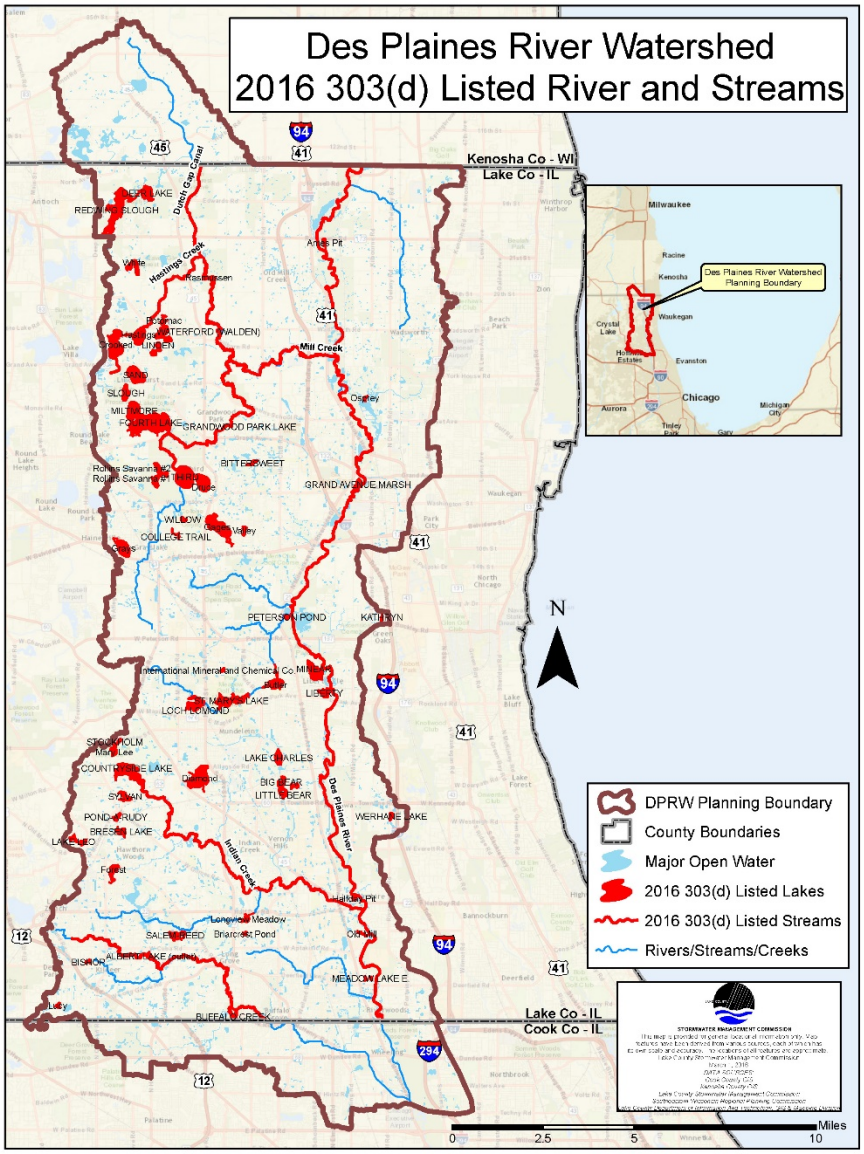

Figure 1-5: Des Plaines River Watershed 2014 303(d) Impaired Waters

The primary scope of this project is the development of a comprehensive watershed-based management plan for the 235-square mile DPR watershed planning area that identifies actions to improve water quality and reduce flood risks. The planning approach was designed to help stakeholders from multiple jurisdictions and with various interests to better understand and become engaged in the watershed. The desired planning outcome is to spur implementation of watershed improvement projects and programs that will accomplish the goals and objectives established in this plan. SMC worked with numerous stakeholders, including public agencies, local units of government, landowners, and private sector professionals with interests in the watershed. SMC engaged Northwater Consulting to assist in developing a watershed-based plan for the DPR planning area.

This Des Plaines River Watershed-Based Plan updated and incorporated the action plan recommendations of the five subwatershed watershed-based plans already completed. The most recent watershed-based plans for Mill Creek and Buffalo Creek are supplemented by this plan and contain new action recommendations within those watersheds. The Des Plaines River Watershed-Based Plan serves as a 10-year update to the three older watershed-based plans (North Mill-Dutch Gap Canal, Indian Creek, and Bull Creek-Bulls Brook) and satisfies the recommendations for periodic updates included in those watershed-based plans. These five watershed-based plan executive summaries and links to the watershed-based plans are included in the Appendices **(Appendix O**).

DES PLAINES RIVER WATERSHED-BASED PLAN - 2018

Development of the Des Plaines River Watershed-Based Plan was funded, in part, by the Illinois EPA through Section 319 of the Clean Water Act (CWA). Section 319 grants are also awarded to projects to protect water quality in Illinois. Projects must address water quality issues relating directly to nonpoint source pollution. Funds can also be used for the implementation of watershed management plans including the development of information/education programs and for the installation of BMPS. Section 319 funds give higher priority to applications that are implementing a site-specific action plan recommendation (project) in an approved watershed-based plan or TMDL implementation plan that meets the watershed-based plan requirements. A portion of the Section 319 funds does fund projects that are not recommendations in an approved watershed-based plan, but higher priority is allocated to projects within the watershed-based plans. The Des Plaines River Watershed-Based Plan follows Illinois EPA guidance and is designed to meet the nine elements required by the USEPA for a watershed-based plan.

NOTEWORTHY – USEPA'S NINE ELEMENTS OF A WATERSHED –BASED PLAN

1. Identification of the causes and sources, or groups of similar sources, of pollution that will need to be controlled to achieve the pollutant load reductions estimated in the watershed-based plan;
2. Estimate of the pollutant load reductions expected following implementation of the management measures described under number 3 below;
3. Description of the nonpoint source management measures that will need to be implemented to achieve the load reductions estimated under number 2 above, and an identification of the critical areas in which those measures will be needed to implement the plan;
4. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement the plan;
5. Public information/education component that is designed to change social behavior;
6. Plan implementation schedule;
7. Description of interim, measurable milestones;
8. Set of criteria that can be used to determine whether pollutant loading reductions are being achieved over time;
9. Monitoring component to evaluate the effectiveness of the implementation efforts over time.

Pursuant to its mission and authority for stormwater management and watershed planning (55 ILCS 5/5-1062), SMC develops watershed-based plans and follows the adoption process outlined below (for Lake County portions of the planning area):

1. *Draft version of the watershed-based plan is submitted to the Illinois EPA, Illinois DNR-Office of Water Resources, and Chicago Metropolitan Agency for Planning (CMAP) for review*
2. *SMC Board approves a 30-day public comment through a public hearing and local publication*
3. *SMC revises the draft watershed-based plan based on comments received*
4. *Illinois EPA determines the plan meets the watershed-based planning guidance*
5. *The plan is brought before the Lake County Stormwater Management Commission & Lake County Board for adoption as an amendment to the Lake County Comprehensive Stormwater Management Plan.*
6. *SMC seeks community adoption of the watershed-based plan from the DPR planning area entities.*

1.5 PREVIOUS AND RELATED STUDIES AND PLANS

Floodplain, biological, habitat, water quality, and demographic/geographic data for this plan were compiled from several previous and concurrent studies of the watershed. This information was collected, analyzed, summarized, and supplemented with newly collected field data, and was then used to reach conclusions regarding the condition of the resources in the watershed. Field studies completed in association with this planning effort include: detailed stream and detention basin inventories performed by SMC and an expansive biological and water quality monitoring of the DPR watershed performed by the DRWW and the Illinois EPA. References for previous reports and studies and summaries of field data collected and reports compiled specifically for this planning effort are listed below in Table 1-2.

NOTEWORTHY – DRWW

The Des Plaines River Watershed Workgroup (DRRW) is a voluntary, dues-paying organization with a mission to bring together a diverse coalition of stakeholders to work together to preserve and enhance water quality in the Des Plaines River and its tributaries within Lake County, Illinois. The goal of the DRWW is to improve water quality in the Des Plaines River and its tributaries through monitoring, project and best practices implementation, and education and outreach that will achieve attainment of water quality standards and designated uses for the watershed. The DRWW officially formed in 2015 with the intent of improving water quality through a collaborative, locally led process.

Table 1-2: Previous Studies and Plans

PREVIOUS & RELATED STUDIES/PLANS	YEAR COMPLETED	AUTHOR/OWNER
Floodplain Studies	Newport Drainage Ditch (2003), Mill Creek (2014) & Bull Creek (2006)	Hey & Assoc., USGS, MWH Global, SMC, Bleck
Lake County Wetland Restoration and Preservation Plan	2018	SMC
Lake County All-Natural Hazards Plan	2017	SMC
Lake County Green Infrastructure Model and Strategy	2016	LCPFD
Lake County Flood Problem Areas Inventory	2016	SMC
Upper Des Plaines River & Tributaries (Des Plaines Phase II Report)	2015	USACE
Buffalo Creek Watershed-Based Plan	2015	SMC, BCCWP, Cardno, TRC Companies Inc., Bleck Engineering Company Inc. and Living Lands Conservation Company
Mill Creek Watershed and Flood Mitigation Plan	2014	SMC & Northwater Consultants
North Mill Creek-Dutch Gap Canal Watershed-Based Plan	2011	SMC & Northwater Consultants
Indian Creek Watershed-based Plan	2009	SMC, Applied Ecological Services, Inc. and Futurity, Inc.
Bull Creek-Brook Watershed-Based Plan	2009	SMC, Applied Ecological Services, Inc. and Depke Design
Des Plaines Strategic Subwatershed Implementation Plan	2004	IDNR/UDPREP

PREVIOUS & RELATED STUDIES/PLANS	YEAR COMPLETED	AUTHOR/OWNER
Des Plaines River Wetland Restoration Study	2001	Hey & Assoc., SMC
Lake County Lake Reports	2000	LCHD
Upper Des Plaines Flood Damage Reduction Study	1999	USACE
Upper Des Plaines River Area Assessment	1998	IDNR

1.6 USING THE PLAN

1.6.1 WHO SHOULD USE THIS PLAN?

This plan will be of limited use without the commitment of watershed stakeholders to improve, restore, manage, and steward watershed resources. Municipal and county agencies and elected officials, as the primary land use, development, and infrastructure authorities in the watershed, will have a significant amount of influence and responsibility for implementing this plan. These public agencies represent the interests of their constituents and are strongly influenced by every community resident or landowner. Therefore, each community member has the potential to influence the actions that occur in the DPR watershed through active participation.

State and federal agencies, elected officials, and private organizations, such as lake associations, homeowner associations, and private conservation organizations, will also play an important role. State and federal agencies can support the implementation of this plan by approving projects in a timely fashion, supporting projects with funding, and providing technical information, tools, and resources to assist local authorities and watershed organizations in their efforts. Private associations and organizations have the ear and influence of their members and can provide significant contributions to land and water protection. Individual watershed residents and landowners must also accept responsibility for managing their own land and water resources responsibly and for working with others to implement this plan.

All jurisdictions, organizations, businesses and institutions, private landowners, and residents will have to work together to successfully protect and restore the watershed. The power of water is immense, as anyone who has experienced flooding can attest. The flow of water also does not respect property lines or jurisdictional boundaries; therefore, everyone needs to share the long-term stewardship responsibility and the costs and benefits of watershed improvements.

The success of plan implementation will also be determined by the ability of stakeholders to organize to coordinate, communicate, and manage activities in the watershed. Watershed organizations are generally formed from the organizations and/or individuals who participated in the watershed planning process. Watershed organizations often become the drivers of implementing the watershed plan and provide educational outreach to the community. A watershed organization will be the primary mechanism to engage the general public in watershed activities, to support the implementation of the watershed plan, and to voice their concerns and celebrate their successes in restoring watershed resources.

1.6.2 How To Use This Plan

For those unfamiliar with watershed planning, this document may appear overwhelming. There are pages of information to navigate, containing numerous tables and maps reporting the condition of the watershed, and many costly recommendations that a lone individual cannot likely implement. These recommendations are for public agencies to consider. But there are also a number of straightforward actions that individuals can take to improve the watershed. Every action, no matter how small, when undertaken by many or key landowners can have a positive impact on improving the watershed. For a general understanding of what this plan is about, please read the Executive Summary, which also includes a list of top priority actions for the next ten years. For additional details, browse the table of contents and advance to the section you are interested in.

To find out…

- What this plan is intended to accomplish, read about the watershed issues, opportunities, goals, and objectives for improving watershed health and improving water quality in **Chapter 2**.
- Detailed information about watershed resources and conditions, read the section(s) of interest in **Chapter 3**.
- What the problems are facing the watershed, **Chapter 4** includes a summary and analysis of watershed problems that need to be addressed by the action plan.
- Detailed information about flooding, including the flood events, flood problem inventory, and strategies for flood damage reduction, turn to **Chapter 5**.
- What kind of actions can be taken to improve the watershed, the action plan in **Chapter 6 and Appendix N** includes a watershed-wide programmatic action plan that includes general recommendations; and a site-specific action plan directed to critical areas of the watershed that identifies actions that can improve water quality in specific areas. A web application has been created (https://tinyurl.com/ycthwx9x) that allows watershed stakeholders to access the site-specific action plan recommendations in the DPR planning area through a mapping tool.
- What kind of funding may be available to provide cost share for implementing watershed improvement projects, refer to the funding sources in **Chapter 7**.
- What sort of outreach and education is needed so that watershed stakeholders understand the watershed problems, their role in the watershed, and have the capability to implement the Action Plan, refer to **Chapter 8**. SMC will continue to coordinate the stormwater activities in the watershed planning area to improve water quality, reduce flood damage, and restore and enhance the natural drainage systems.

1.7 REFERENCES

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CHAPTER TWO: WATERSHED ISSUES, OPPORTUNITIES, GOALS, AND OBJECTIVES

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 2

APMP – Aquatic Plant Management Plan
BMP – Best Management Practices
CLC – College of Lake County
DPR planning area – Des Plaines River Watershed Planning Area
DRWW – Des Plaines River Watershed Workgroup
FEMA – Federal Emergency Management Agency
GSS – Grade Stabilization Structure
HOA – Homeowners Association
Illinois EPA – Illinois Environmental Protection Agency
PAH – Polycyclic Aromatic Hydrocarbons
RMP – Resource Management Plan
SMC – Lake County Stormwater Management Commission
SMU – Subwatershed Management Unit
TMDL – Total Maximum Daily Load
TSS – Total Suspended Solids
USGS – United States Geological Survey
VLM - Volunteer Lake Monitoring
WASCOB – Water and Sediment Control Basin
WI – Wisconsin
WRAPP – Wetlands Restoration and Preservation Plan

2 WATERSHED ISSUES, OPPORTUNITIES, GOALS, AND OBJECTIVES

2.1 WATERSHED ISSUES

One of the first tasks the Des Plaines River watershed committee (watershed planning committee) undertook was to identify issues that the Des Plaines River Watershed-Based Plan should address and opportunities or strategies to address those issues. Participants (watershed stakeholders) at the March 17, 2016 kick-off planning meeting (see **Appendix A** for stakeholder meeting minutes) identified issues and voted to determine priorities at the April 28, 2016 planning meeting. Watershed stakeholders received 10 votes each for watesrhed issues (multiple votes could be used on one topic/issue).

WATERSHED PLANNING COMMITTEE**:** A committee comprised of SMC staff and watershed stakeholders (including the Des Plaines River Watershed Workgroup), with a goal of creating an umbrella watershed-based plan for the DPR planning area and reducing nonpoint source pollution. See Section **2.4** compiled by previous watershed-based plans in the DPR planning area and watershed stakeholders.

Issues related to water quality received the most votes, followed by issues rela ted to regional green infrastructure and natural resources. Flood damamge reduction and stormwater infrastructure issues received a similar number of votes and when combined slightly exceeded water quality issues. A full list of the issues/concerns of watershed stakeholders is available in Table 2-1. Issues were grouped into categories by topic and later organizied into goal categories. It is important to note that although watershed stakeholders voted on issues in certain categories, many issues listed in Table 2-1 could apply to several of the categories.

Table 2-1: Specific Issues/Concerns Identified by Stakeholders

The "X" symbol indicates the Category the issue was voted on by the watershed stakeholders and the "*" symbol indicates other categories the issue can apply to as well.

# OF VOTES	WATERSHED ISSUES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENTS	REGIONAL GREEN INFRASTRUCTURE & NATURAL RESOURCES	FLOOD DAMAGE REDUCTION	FUNDING, INSTALLING, & MAINTAINING STORMWATER INFRASTRUCTURE	COMMUNITY & AGENCY COORDINATION (NOT A VOTING CATEGORY)	SUSTAINABLE AGRICULTURE SYSTEMS (NOT A VOTING CATEGORY)	EDUCATION & OUTREACH
21	Not enough wetlands preserved and restored	*	X	*		*	*	
20	Road salt creating chloride pollution	X	*		*	*		*
15	Condition of stormwater infrastructure (pipes, detention basins, etc.), *Example: North Libertyville Estates*	*		*	X	*		
13	There is a disconnect for some public works agencies between improving stormwater conveyance and the negative impacts of stormwater on lakes and streams	X			*	*		*
13	Undesirable or invasive aquatic plants & animals	*	X			*	*	*
13	Damages from flooding and lack of flood control measures	*	*	X	*	*		*
13	Too much stormwater runoff from impervious surfaces	*	*	X	*	*		*
12	Phosphorus pollution	X	*		*	*	*	*
12	Lack of stream or river maintenance	*		*	X	*		*
9	Loss of old growth trees (oaks)	*	X			*	*	*

# OF VOTES	WATERSHED ISSUES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENTS	REGIONAL GREEN INFRASTRUCTURE & NATURAL RESOURCES	FLOOD DAMAGE REDUCTION	FUNDING, INSTALLING, & MAINTAINING STORMWATER INFRASTRUCTURE	COMMUNITY & AGENCY COORDINATION (NOT A VOTING CATEGORY)	SUSTAINABLE AGRICULTURE SYSTEMS (NOT A VOTING CATEGORY)	EDUCATION & OUTREACH
8	Impacts of water quality on recreational opportunities (poor water quality limits recreational opportunities such as fishing)	X	*			*		*
8	Public does not understand the issues					*		X
6	Lake shoreline erosion	*	*		X	*		*
5	Coal tar sealant pollutants	X	*		*	*		*
5	Invasive plant issues (teasel)	*	X			*	*	*
5	Insufficient capacity of stormwater infrastructure for increasing growth	*	*	X	*	*		*
5	Dams and dam removal	*	*	*	X	*	*	*
5	Education of general public on invasive species and the water quality impacts of native fauna	*	*			*	*	X
3	Not enough volunteer efforts on rivers and adjacent forest preserve areas	*	X			*		*
3	Understanding conflicts and owner responsibilities (Social issues with fellow neighbors)	*	*			*		X
2	Lack of TMDL information - (*Wheeling drainage ditch/reach*)	X				*		*
2	Public understanding of agency roles					*		X

# OF VOTES	WATERSHED ISSUES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENTS	REGIONAL GREEN INFRASTRUCTURE & NATURAL RESOURCES	FLOOD DAMAGE REDUCTION	FUNDING, INSTALLING, & MAINTAINING STORMWATER INFRASTRUCTURE	COMMUNITY & AGENCY COORDINATION (NOT A VOTING CATEGORY)	SUSTAINABLE AGRICULTURE SYSTEMS (NOT A VOTING CATEGORY)	EDUCATION & OUTREACH
2	Who to Call…for questions? Where is this located?					*		X
1	River flooding impacts on adjacent lakes (*east side of Lake Minear, invasive species impacts)*	X		*	*	*		
1	Not resilient to climate change	*	X	*	*	*	*	*
1	Need additional USGS stations	*		X	*			
1	Lack of understanding of impacts coming from leaching septic fields	*			*	*	*	X
0	Lack of coordination for mosquito abatement and improper drainage; stagnant water as a source of mosquitos	*	*	*	X	*		*
0	Recreational conflicts – canoeing vs. speedboats	*	*			X		*

2.2 WATERSHED OPPORTUNITIES

Following the identification of watershed issues, stakeholders provided input on what opportunities or strategies they thought would address watershed issues. Stakeholders also considered what was desirable about the watershed and identified these characteristics as opportunities for preserving for the future. Watershed stakeholders received 10 votes each for voting on watershed opportunities and strategies (multiple votes could be used on one topic).

Stakeholders voted most often for education and outreach and community and agency coordination as the opportunities and strategies to address watershed issues. Importantly, education and outreach to individual landowners on a variety of topics received the most votes of any single opportunity or strategy. Regional green infrastructure and natural resources and stormwater infrastructure also received a large number of votes. The opportunities and strategies identified by stakeholders are listed in Table 2-2. It is important to note that although watershed stakeholders voted on watershed opportunities in certain categories, many opportunities listed below could apply to several of the categories.

Table 2-2: Specific Opportunities and Strategies Identified by Stakeholders

The "X" symbol indicates the Category the issue was voted on by the watershed stakeholders and the "*" symbol indicates other categories the issue can apply to as well.

# OF VOTES	WATERSHED OPPORTUNITIES & STRATEGIES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENT	REGIONAL GREEN INFRASTRUCTURE AND NATURAL RESOURCES	REDUCE FLOOD DAMAGE	FUNDING, INSTALLING & MAINTAINING STORMWATER INFRASTRUCTURE (GRAY AND GREEN)	COMMUNITY & AGENCY COORDINATION	SUSTAINABLE AGRICULTURE SYSTEMS	EDUCATION & OUTREACH
29	Educate individual landowners on: maintaining stormwater management systems best management practices yard waste management water quality and water resources flood damage reduction phosphorus reduction (countywide ban) stream erosion & lakes management ecosystems more (public) postings for resident participation in programs or projects technical references	*	*	*	*	*	*	X
18	Clearing debris and restoration of natural areas – *i.e. North Libertyville Estates retention: erosion, cattails, drainage*	*	*	X	*		*	

# OF VOTES	WATERSHED OPPORTUNITIES & STRATEGIES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENT	REGIONAL GREEN INFRASTRUCTURE AND NATURAL RESOURCES	REDUCE FLOOD DAMAGE	FUNDING, INSTALLING & MAINTAINING STORMWATER INFRASTRUCTURE (GRAY AND GREEN)	COMMUNITY & AGENCY COORDINATION	SUSTAINABLE AGRICULTURE SYSTEMS	EDUCATION & OUTREACH
17	Restoring wetlands to a sustainable functional system	*	X	*	*		*	
14	Smarter management of stormwater runoff	*	*	*	X	*		*
13	Utilizing land along tributaries for storage and treatment of stormwater – (green infrastructure)	*	*	X	*		*	
13	Coordination/consistent efforts for future and current land use (green infrastructure planning tools)	*				X		*
12	Expand preserved open space, trees and plants (including old growth trees), wildlife (corridors), and habitat	*	X				*	*
11	Sustainable farm practices	*	*				X	*
10	Plant native plants in buffers along the Des Plaines River	*	X	*		*	*	*
10	Having more intense modeling of the impacts of planned land uses	*				X		*
9	Educate local public work departments on chloride (road salt) reduction practices	*	*		*	*		X

# OF VOTES	WATERSHED OPPORTUNITIES & STRATEGIES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENT	REGIONAL GREEN INFRASTRUCTURE AND NATURAL RESOURCES	REDUCE FLOOD DAMAGE	FUNDING, INSTALLING & MAINTAINING STORMWATER INFRASTRUCTURE (GRAY AND GREEN)	COMMUNITY & AGENCY COORDINATION	SUSTAINABLE AGRICULTURE SYSTEMS	EDUCATION & OUTREACH
8	Manage invasive species: flora and fauna (i.e. teasels)	*	X			*	*	*
8	Need additional funding for restoration efforts	*	*		X	*		*
6	Determine pollutant contribution from wastewater treatment plants to streams	X			*	*		
6	Expand Lake County Forest Preserves	*	*			X	*	*
6	Better enforcement of existing regulations	*				X		*
6	Removing drain tiles to ditches upstream	*	*			*	X	*
5	Retrofitting of detention basins	*	*	*	X		*	
5	Better coordination and partnerships among agencies, municipalities and landowners for watershed projects *(i.e. Lincolnshire drive berm, Conservation @ Home, river management with adjacent landowners, multiple groups – bigger scope)*	*	*			X		*

# OF VOTES	WATERSHED OPPORTUNITIES & STRATEGIES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENT	REGIONAL GREEN INFRASTRUCTURE AND NATURAL RESOURCES	REDUCE FLOOD DAMAGE	FUNDING, INSTALLING & MAINTAINING STORMWATER INFRASTRUCTURE (GRAY AND GREEN)	COMMUNITY & AGENCY COORDINATION	SUSTAINABLE AGRICULTURE SYSTEMS	EDUCATION & OUTREACH
5	Promote pollution prevention – (i.e. give a hoot, don't pollute)	*	*			*		X
4	Villages adopt ordinances to manage phosphorous	*	*			X		*
4	CLC or other institutions provide technical education	*	*	*	*	*	*	X
4	Use social media to educate corporations, agencies, the public, and municipalities to encourage the implementation of BMPs and participation in restoration efforts	*	*			*		X
3	Create a Stream Management Program – "Adopt a Stream"	*		*	X	*		*
3	Creating better standards for BMPs for roadways and drainage projects	*	*	*	X	*		*
3	Having enough resources to implement programs/services – new ways to fund and stormwater management as utility	*			X	*		*
3	Engage community action – stewardship and volunteering (having a bigger voice)	*	*			X	*	*

# OF VOTES	WATERSHED OPPORTUNITIES & STRATEGIES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENT	REGIONAL GREEN INFRASTRUCTURE AND NATURAL RESOURCES	REDUCE FLOOD DAMAGE	FUNDING, INSTALLING & MAINTAINING STORMWATER INFRASTRUCTURE (GRAY AND GREEN)	COMMUNITY & AGENCY COORDINATION	SUSTAINABLE AGRICULTURE SYSTEMS	EDUCATION & OUTREACH
3	Expand and preserve small scale farming	*	*			*	X	*
2	Using permeable pavement in development and redevelopment (improving infiltration)	*	*		X			*
2	Work with nurseries to provide attractive designs for using native plants for stream buffer and bank stabilization	*	*	*	X		*	*
2	Expand stormwater infrastructure funding and technical assistance *(HOAs, etc…)*	*	*		X	*		*
2	Funding support for developing better regulations to control impervious surfaces	*		*	X	*		*
2	Watershed involvement with Illinois EPA on Nutrient Loss Strategy	*				X	*	
2	Educate students on flood reduction, restoration, recreational value *(i.e. Gowe Beach)*	*	*	*		*		X
2	Making public service a high school education requirement	*				*		X

# OF VOTES	WATERSHED OPPORTUNITIES & STRATEGIES	GOAL CATEGORIES						
		WATER QUALITY IMPROVEMENT	REGIONAL GREEN INFRASTRUCTURE AND NATURAL RESOURCES	REDUCE FLOOD DAMAGE	FUNDING, INSTALLING & MAINTAINING STORMWATER INFRASTRUCTURE (GRAY AND GREEN)	COMMUNITY & AGENCY COORDINATION	SUSTAINABLE AGRICULTURE SYSTEMS	EDUCATION & OUTREACH
1	Local communities and residents have a role in water quality improvements	*	*			X	*	*
1	Provide liaison to assist with permitting processes	*			*	X		
1	Identify watershed champions in each community	*				X		*
0	Better water quality would attract more wildlife *(more indicator species (i.e. eagles))*	X	*			*		*
0	Revise existing regulations and codes to create more uniformity	*				X		
0	Better access to headwaters – (*Wisconsin - different ways of doing things*)	*				X		

2.3 WATERSHED VISION

The watershed planning committee participated in an exercise to develop a vision statement for the watershed. The vision serves to focus the aim of the group. While different groups implementing the plan may have different goals and objectives, the achievement of all should fit under the overarching vision statement.

The vision statement exercise began by asking the following questions:

1. What matters to you most about where you live in the DPR planning area?
2. What positive changes would you like to see in the watershed?
3. What is your dream for our watershed community? (How would the watershed look if the watershed plan is successful?)
4. Who will be involved in helping achieve the watershed vision over the next 10 years?

The watershed planning committee (during this vision statement exercise) was divided into four facilitated breakout sessions to discuss the answers/phrases to the vision statement exercise; see Table 2-3 for voting results of the vision exercise. Each session voted on their preference of vision phrases to share with the overall watershed planning committee. The watershed planning committee was then able to vote on which group's (1-4) vision statement exercise phrases should be included (or combined) into the Des Plaines River Watershed-Based Plan vision statement.

Table 2-3: Des Plaines River Watershed Plan Stakeholder Vision Exercise Results

VOTE RESULT (%)	WHAT MATTERS TO YOU MOST ABOUT WHERE YOU LIVE IN THE DPR PLANNING AREA?	WHAT POSITIVE CHANGES WOULD YOU LIKE TO SEE IN THE WATERSHED?	WHAT IS YOUR DREAM FOR OUR WATERSHED COMMUNITY? (HOW WOULD THE WATERSHED LOOK IF THE WATERSHED PLAN IS SUCCESSFUL?)	WHO WILL BE INVOLVED IN HELPING ACHIEVE THE WATERSHED VISION OVER THE NEXT 10 YEARS?
0%	**Group 1:** My community (restoration of pond) – debris, sediment, erosion in rivers, lakes and streams	**Group 1:** Better water quality	**Group 1:** Unpolluted water and more natural areas	**Group 1:** Individual responsibility
21%	**Group 2:** Flood control measures to limit property damage	**Group 2:** Accommodate wetland restoration to establish native vegetation and improve habitat diversity.	**Group 2:** River as a destination	**Group 2:** Government, businesses, public and private entities, and residents.

VOTE RESULT (%)	WHAT MATTERS TO YOU MOST ABOUT WHERE YOU LIVE IN THE DPR PLANNING AREA?	WHAT POSITIVE CHANGES WOULD YOU LIKE TO SEE IN THE WATERSHED?	WHAT IS YOUR DREAM FOR OUR WATERSHED COMMUNITY? (HOW WOULD THE WATERSHED LOOK IF THE WATERSHED PLAN IS SUCCESSFUL?)	WHO WILL BE INVOLVED IN HELPING ACHIEVE THE WATERSHED VISION OVER THE NEXT 10 YEARS?
37%	**Group 3:** Protect and improve natural resources, water quality and habitat.	**Group 3:** Improved biodiversity	**Group 3:** Residents demand and value quality water resources and recreational opportunities	**Group 3:** Partnership between public and private stakeholders to improve education and planning
42%	**Group 4:** Sustainable planning and implementation for environmental health to achieve clean, healthy water, preservation of regional green infrastructure, etc.	**Group 4:** Comprehensive community education and outreach to foster support for and participation in improvements/changes.	**Group 4:** Sustainable landscaping with balance between built environment (development) and natural environment. Cleaner lakes, better streams, more secure biodiversity, and large sections of stream meeting aquatic life criteria	**Group 4:** Everyone

The participant responses to the exercise resulted in the following vision statement for the DPR planning area:

> ***The Des Plaines River watershed planning area will be a destination valued by residents, businesses, and governments that join together to actively engage in education and participate in improving water quality. Stakeholders will preserve and enhance regional green infrastructure, resulting in cleaner streams and lakes, better plant and animal biodiversity, and reduced flood damage – while balancing a sustainable native landscape with development and economic growth.***

2.4 WATERSHED GOALS AND OBJECTIVES

The watershed planning committee generated and prioritized seven (7) watershed goals to address watershed stakeholder issues/concerns. Establishing these watershed goals allowed the watershed planning committee to develop objectives and outcomes for each goal. The goals were central to the development of the watershed action plan (**Chapter 6**). The goals and objectives reflect watershed conditions, address watershed stakeholder priority issues, consider expected future changes, and meet current and possible future funders' expectations.

Over the period of the planning year, measurable indicators were assigned to each goal to help measure future progress toward meeting each goal as the watershed action plan is implemented. The action plan contains recommended:

- Programmatic actions that address flooding; water quality; stormwater management and drainage; natural resources; and education, outreach, coordination, and implementation goals; and
- Site-specific actions that recommend BMPs for specific problem locations identified during inventories and assessments.

Chapter 7 Plan Implementation and Evaluation and **Appendix M Evaluation Scorecards** examine the watershed plan goals by looking at their performance and progress. These sections evaluate milestones related to measurable indicators for the watershed goals and objectives.

NOTEWORTHY: WHAT ARE GOALS VERSUS OBJECTIVES?

GOALS:

- Mini vision statements or targets for the watershed plan.
- The desired change or outcome you wish to achieve.
- Driven by stakeholder issues and problems identified by the watershed assessment.
- Ideally will be clear, concise, and measurable.

OBJECTIVES:

- Specific, more precise steps needed to attain goals.
- Position reached or purpose achieved by some activity by a specific time.
- Objective outcomes should be measurable, attainable, relevant, and time-based.
- There may be multiple objectives to achieve a goal(s).

2.4.1 Watershed Goal #1: Water Quality Improvements

GOAL: Improve water quality and prevent future pollution impacts to streams, lakes, ponds, and wetlands within the DPR planning area.

OUTCOME: *Overall water quality is improved. Water bodies will fully support their designated uses (are not impaired).*

Figure 2-1: Butler Lake algae

OBJECTIVES:

a) Develop and implement a watershed monitoring program to collect and assess physical, chemical, and biological water quality data on streams and lakes on a regular basis.

   Indicator: Watershed stream annual monitoring program support. Implementation of watershed monitoring program for lakes.

b) Continue to monitor water quality in the DPR planning area and develop strategies to address water quality impairments and causes of impairments.

Indicator: Number of water bodies removed from the Illinois EPA's impairments list.
Number of causes of impairment removed.

c) Reduce the quantity of road salt (sodium chloride) needed for safe and cost-effective winter maintenance to reverse the current trend of rising chloride levels in water bodies.

Indicator: Winter Maintenance Program establishment including: policy and manual development, de-icing workshop attendance and certification.

d) Reduce phosphorus loads by:

- Using conservation practices on all agricultural fields to reduce soil loss;
- All municipalities and the County pass ordinances that restrict the use of lawn fertilizer with phosphorus;
- Implementing effective leaf cleanup and composting programs;
- Removing phosphorus from wastewater discharges;
- Upgrading poorly functioning septic systems; and
- Addressing re-suspension of phosphorus in lakes where feasible.

Indicator: Number of local units of government that adopt a phosphorous ordinance.
Number of exceedances of permitted phosphorus concentrations from wastewater treatment plant effluent.
Number of agricultural BMPs implemented that target phosphorous.
Number of upgraded septic systems.
Number of municipalities that have codes that allow or require green infrastructure for stormwater management.

e) Where appropriate, remove or retrofit impoundments, dams, and weirs in streams to support fish passage and migration, natural baseflow conditions, and to improve dissolved oxygen levels.

Indicator: Number of dams and impoundments removed or retrofitted.

f) Reduce sediment and excessive debris accumulation in surface waters by reducing streambank, shoreline, and construction-related erosion throughout the watershed.

Indicator: Reduction in concentrations of total suspended solids (TSS).
Linear feet of streambank and shoreline restored.

g) Reduce or eliminate harmful algae blooms in lakes.

Indicator: Number of algae blooms reported. See Figure 2-1 for an example of an algae bloom in Butler Lake.

h) Reduce fecal coliform pollution by regulating septic system construction and maintenance, requiring regular maintenance, and enforcing ordinances that require proper cleanup and disposal of pet waste.

Indicator: Percentage of identified sources of fecal coliform addressed.

i) Reduce the use of coal tar sealants for parking lots and driveways.

Indicator: Concentration of PAHs detected in water quality/sediment monitoring efforts.

j) Prepare pollution prevention plans to address emergency response for potential catastrophic environmental events, such as pipeline leaks and flooding.

Indicator: Number of MS4 communities maintaining a database of pollution prevention plans that address emergency response to catastrophic events.

k) Minimize runoff volumes, velocities, and pollutants to waterways by utilizing wetlands, natural landscapes, and stormwater BMPs such as infiltration and pollutant filtration systems.

Indicator: Number of action recommendations completed.

2.4.2 Watershed Goal #2: Regional Green Infrastructure and Natural Resources Improvements

Figure 2-2: Parking lot bioswale with native vegetation

GOAL: Protect, enhance, and restore natural resources (soil, water, plant communities, and fish and wildlife) by employing good natural resource management practices. Using green infrastructure on public and private properties to maintain, enhance, or restore natural hydrology, native plant and wildlife communities, provide buffers for streams, lakes, wetlands, and high-quality areas (see Figure 2-2). Expand environmental corridors to provide ecological, educational, and recreational benefits.

OUTCOME: *Natural resources are protected, establishing a series of interconnected hubs and corridors that work to preserve and enhance the high-quality natural areas of the watershed.*

OBJECTIVES:

a) Protect and expand ecological quality of aquatic and terrestrial resources by improving water quality and eradicating invasive species, while preserving and protecting threatened and endangered species and ecosystems.

Indicator: Number of water bodies removed from the Illinois EPA's impairments list.
Number of causes of impairment removed.
Area of open space identified and preserved for environmental and recreational natural areas.
Acres of invasive species removal/management projects.

b) Restore degraded terrestrial and aquatic (lakes, wetlands, and streams) resources using restoration best practices to improve habitat.

Indicator: Area of degraded natural communities restored.

c) Maintain, expand, or restore high-quality native plant buffers along rivers, streams, lakes, and wetlands.

Indicator: Length of native plant buffers along water bodies maintained, expanded, and/or restored.

d) Preserve, restore, and create wetlands areas with a target of a minimum 10% wetland land cover per subwatershed.

Indicator: Acres of wetlands enhanced and/or restored.

e) Identify and preserve natural areas that provide important ecological, environmental, educational, and recreational activities, such as swimming, hiking, fishing, biking, riding, canoeing, and bird watching.

Indicator: Area of open space identified and preserved for environmental and recreational natural areas.

f) Identify and connect environmental corridors across community, county and state lines, and create trail connections between new and existing parks and forest preserves where appropriate.

Indicator: Number of new trail connections.

g) Assess current fish population and reduce or eradicate common carp and other invasive aquatic species in lakes.

Indicator: Number of lake management plans developed to address aquatic resource trends based on lake reports.
Number of lake management plan project recommendations implemented

h) Develop an aquatic plant management plan (APMP) for lakes and streams that targets the reduction of invasive species and promotes native plant diversity.

Indicator: Number of lakes with Aquatic Plant Management Plans (APMP).

i) Reduce/eliminate presence of invasive species in the watershed, particularly in riparian and buffer areas.

Indicator: Acres of invasive species removal/management projects.

j) Reintroduction of extirpated native species as water resources or ecosystems improve (such as blanding turtles).

Indicator: Number of successful reintroductions of threatened and endangered native species into natural habitats.

2.4.3 Watershed Goal #3: Flood Damage Reduction

GOAL: Reduce current flood damage in the DPR planning area and prevent future flooding from worsening in the watershed and along the Des Plaines River downstream of Lake County.

OUTCOME: *Flood damages are reduced to the maximum extent achievable and impacts to residents, businesses, institutions, governments, and natural resources in the DPR planning area are minimal.*

Figure 2-3: Sandbagging efforts to reduce flooding

OBJECTIVES:

a) Create additional flood storage at regional wetland restoration or flood storage sites in Illinois and Wisconsin to reduce flooding and prevent downstream erosion.

Indicator: Area of new or restored flood storage sites.

b) Reduce existing flood damage and number of flood problem areas through the implementation of flood mitigation projects. See Figure 2-3 for sandbagging efforts at Gurnee Grade School during a flood event.

Indicator: Number of flood problem areas positively affected by flood mitigation projects implemented.

c) Residents protect themselves from the impacts of flood damage by obtaining flood insurance and installing individual property mitigation measures.

Indicator: Number of flood insurance policies in the watershed communities.
Number of Lake County Floodproofing Workshop attendees.

d) Use infiltration and evapotranspiration provided by green infrastructure to reduce volume of runoff and flood damage.

Indicator: Number of action recommendations completed.

e) Identify and install overland flow routes for all detention facilities and flood prone and depressional areas where needed.

Indicator: Number of mapped overland flow routes.

f) Require more specific/stringent maintenance and drainage easement requirements for stormwater features in new developments and re-developments.

Indicator: Number of municipalities that have codes that allow or require green infrastructure for stormwater management.

g) Maintain and increase local drainage system capacity to mitigate flood damage and improve resiliency for changing precipitation patterns.

Indicator: Number of local drainage system improvement projects implemented.

h) Remove excessive debris loads in channels to maintain conveyance and reduce streambank erosion.

Indicator: Number of communities with established stream maintenance programs.

i) Support updating of outdated floodplain maps to accurately identify current flood hazard areas.

Indicator: Number of updated FEMA floodplain maps (less than 10 years old).

j) Purchase and remove structures that are chronically damaged by flooding through the voluntary buyout program.

Indicator: Number of Voluntary Floodplain Buyouts.

k) Reduce the number of flood damage claims from major flood events.

Indicator: Number/value of claims filed each year per community in the watershed.

2.4.4 Watershed Goal #4: Funding, Installing, And Maintaining Stormwater Infrastructure

GOAL: Reduce the volume and improve the quality of stormwater runoff by installing appropriate gray or green stormwater infrastructure and improving the condition of existing stormwater infrastructure.

OUTCOME: *Reduce stormwater runoff volume and the pollution reaching and negatively impacting water bodies and natural resources and causing flood damage.*

Figure 2-4: Protected culvert
A trash rack reduces debris and stone riprap reduces erosion.

OBJECTIVES:

a) Reduce the rate and volume of stormwater runoff from developed areas and new developments by minimizing impervious cover and implementing stormwater green infrastructure practices that reduce runoff volumes, velocities, and pollutants to waterbodies – through infiltration, evapotranspiration, and storage of rainwater on-site.

Indicator: Number of action recommendations completed.

b) Expand funding opportunities, including alternative funding mechanisms, technical assistance, and maintenance resources, for improving stormwater green infrastructure and BMPs.

Indicator: Number of cost-sharing programs available in the DPR planning area
Amount of grant funding available for stormwater green infrastructure and BMPs.

c) Develop standards/guidelines for use of green infrastructure for stormwater management in site planning and design, including strategically connecting to off-site green infrastructure.

Indicator: Number of municipalities that have codes that allow or require green infrastructure for stormwater management.

d) Increase education and political desire to provide funding and technical analysis for improving local and countywide regulations pertaining to impervious surface stormwater runoff and BMPs.

Indicator: Number of local, county, and state representatives provided educational outreach materials for improving local and countywide regulations.

e) Increase funding committed for in-the-ground stormwater BMPs.

Indicator: Funding increase for in-the-ground stormwater BMPs.

f) Retrofit and maintain existing stormwater management structures, such as detention basins, to provide water quality, natural resource and flood prevention benefits, and ensure design standards for new basins incorporate multiple benefits. See Figure 2-4 for an example of a protected culvert with a trash rack which reduces debris and stone riprap that reduces erosion.

Indicator: Number of existing stormwater management structures retrofitted.
Number of developments built using conservation design principles and/or green infrastructure.

g) Clear, repair, or replace blocked, damaged, and failing culverts, outfall pipes, swales and ditches, and other stormwater conveyance infrastructure to maintain conveyance and reduce erosion.

Indicator: Potential maintenance needs identified in future stream and detention basin inventories.

h) Establish and implement a watershed-wide stream and river maintenance program using the American Fisheries Society standards as guidelines.

Indicator: Number of communities with established stream maintenance programs.

i) Design and install stormwater BMPs to capture and treat roadway stormwater runoff.

Indicator: Lane miles of roadway retrofitted or constructed with BMPs.

j) Identify who is responsible for maintenance activities for stormwater gray/green infrastructure practices.

Indicator: Number of informational guides on roles and responsibilities for stormwater gray/green infrastructure maintenance distributed.

k) Utilize modeling and monitoring to evaluate whether design predictions and the performance goals for stormwater infrastructure are being achieved.

Indicator: Number of compliant site inspections performed during the 10-year operation and maintenance period for Illinois EPA 319 grant funded projects.

2.4.5 Watershed Goal #5: Community And Agency Coordination

GOAL: Improve coordination, research, and decision-making among public, private, and non-profit entities to help achieve watershed plan goals and objectives.

OUTCOME: *Watershed stakeholders coordinate and utilize all of their local resources to implement watershed improvement projects.*

Figure 2-5: Multi-partnership project groundbreaking ceremony
Groundbreaking Ceremony for the Lake County Central Permit Facility and Consolidated Environmental Lab in Libertyville, Illinois.

OBJECTIVES:

a) Watershed communities adopt the Des Plaines River Watershed-Based Plan.

Indicator: Number of municipalities, counties, and natural resource agencies that adopt the Des Plaines River Watershed-Based Plan.

b) The DRWW will continue to monitor water quality and develop strategies to address water quality impairments in the DPR planning area.

Indicator: Watershed stream annual monitoring program support.

c) Establish a watershed organization or committee with funding and support to guide watershed plan implementation, provide technical assistance to watershed stakeholders, and coordinate multi-partner projects (see Figure 2-5 as an example of a multi-partnership project).

Indicator: Establishment of lead organization (watershed planning committee) with budget and executive committee.
Number of projects advanced/undertaken with the support of the watershed planning committee.

d) Communities and organizations will designate a representative and participate in the watershed committee.

Indicator: Communities and organizations have designated an individual or board member(s) representative to participate on the watershed planning committee.

e) Land use planning jurisdictions will consider the watershed plan recommendations when developing local comprehensive plans and making land use decisions.

Indicator: Number of municipalities implementing watershed site-specific and programmatic actions.

f) Strengthen and better enforce consistent regulations and standards intended to protect and preserve watershed natural resources.

Indicator: Number of communities that have ordinances and programs that protect and preserve watershed natural resource areas.
Number of municipalities that have codes that allow or require green infrastructure for stormwater management.

g) Increase citizen scientist monitoring through River Watch and VLM programs.

Indicator: Number of RiverWatch sites/lakes enrolled in volunteer/citizen scientist river and lake monitoring programs.

h) Watershed committee annually assesses progress on plan implementation and provides updates to the watershed-based plan every 10 years.

Indicator: Number of watershed stakeholders providing feedback for the watershed report cards.

2.4.6 Watershed Goal #6: Sustainable Agriculture Systems

GOAL: Watershed stakeholders participate in farmland preservation programs and implement sustainable agricultural practices to accomplish other watershed goals and objectives.

OUTCOME: *The plan encourages farmland preservation and sustainable agriculture practices in the watershed.*

Figure 2-6: Grassed waterway installed as an agriculture BMP
Photo Credit: NRCS New York Photo Gallery (https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=nrcs144p2_027319)

OBJECTIVES:

a) Install and expand agricultural BMPs, including drainage and tillage, to reduce sediment, chemical, and nutrient transport to water bodies in the DPR planning area.

Indicator: Number and area of agricultural BMPs installed.

b) Create and implement Resource Management Plans (RMPs) for all farms, equestrian facilities, and nurseries in the watershed.

Indicator: Number or percent of farms, equestrian facilities, and nurseries with RMPs.

c) Maintain BMPs to reduce sediment transport to water bodies and investigate opportunities for showcasing end-of-tile water quality BMPs at a demonstration site.

Indicator: Number of high priority sediment reduction agriculture BMPs installed.
Demonstration site established and monitored.
Length of drain tile removed or disabled.

d) Investigate opportunities for a farmland preservation program (Illinois and Wisconsin portions of the watershed may require separate programs), and partner with existing farmland protection groups to share knowledge and provide support.

Indicator: Number of county and municipal agencies that have adopted a farmland preservation program(s).

e) Conserve soils by using erosion control measures on farms and utilizing farming best practices to reduce erosion. See Figure 2-6 for an example of a grassed waterway BMP.

Indicator: Acres of cover crops or crop residue left on fall agricultural fields.

Acres of waterway, wetland, water and sediment control basin (WASCOB), field border, filter strip, grade stabilization structure (GSS) and other erosion control agriculture BMPs that are implemented, enhanced, or restored.

f) Expand sustainable local agricultural production, including small scale and local farming to preserve prime farmland (i.e., native plant nurseries and Farm to Table initiative).

Indicator: Number of prime farm acres in production.

2.4.7 Watershed Goal #7: Education And Outreach

GOAL: Provide watershed stakeholders with the knowledge, skills, and motivation needed to take action to implement the watershed plan. Watershed stakeholders include (but are not limited to): residents, property owners, property owner associations, government agencies, jurisdictions, and developers.

OUTCOME: *Stakeholders have adequate information and knowledge of resources to implement the watershed plan.*

Figure 2-7: Watershed planning committee
Stakeholders developed watershed goals and objectives.

OBJECTIVES:

a) Educate and provide information and training to riparian and lakeshore landowners on best practices for stream and lake shoreline restoration and maintenance that will reduce erosion and increase water quality.

Indicator: Number of landowners that receive information about best practices for stream and lake. shoreline restoration and maintenance.

b) Conduct a watershed outreach campaign to inform and engage the public about watershed issues, landowner responsibilities, and available resources. See Figure 2-7 watershed planning committee meeting.

Indicator: Number of people reached by watershed outreach campaign.

c) Educate local government officials and agencies, consultant and contractors working in the watershed, landscapers and nurseries, and landowners on road salt alternatives and application BMPs to minimize the use of road salt by public and private snow removal providers.

Indicator: Number of public agencies and local private contractors attending the annual Lake County De-icing Workshop.
Number of public agencies with winter maintenance responsibilities that use alternative de-icing products.

d) Educate the general public on the importance of watershed health (water quality, flood prevention, soil conservation and agricultural production, green infrastructure, and water-based recreation) to the economy, culture and quality of life in communities.

Indicator: Number of property owners that receive information about the importance of watershed health.

e) Utilize trainings, workshops, public meetings, newsletters, websites, media, campaigns, and stakeholder word of mouth to provide watershed stakeholders opportunities to participate in watershed programs and projects.

Indicator: Number of landowners that receive information about watershed programs and projects.
Number of workshops.
Number of action recommendations completed.
Continuous increase in number of contacts on the SMC Des Plaines River watershed contact database.

f) Develop and implement a pollution prevention campaign to educate residents, businesses, developers and homebuilders on source control and runoff reduction measures that may be used on their properties. These measures can be used to reduce or eliminate pollution inputs associated with landscape maintenance and agricultural production.

Indicator: Pollution prevention campaign established.

g) Facilitate public training and engage schools and youth groups (students), lake associations, and homeowner associations to volunteer for lake, stream, and natural area stewardship and maintenance.

Indicator: Number of volunteers for lake, stream, and natural area stewardship and maintenance.

h) Promote the use of native plants and the removal of invasive plants by establishing demonstration sites and training.

Indicator: Number of native plant demonstration sites established, and trainings held.

i) Provide communities with the tools they need to prevent flood damage from worsening by using the "no adverse impact standard" and maintaining floodplain as open space.

Indicator: Number of communities that adopt the "no adverse impact standard."

j) Provide outreach and workshops for the public affected by flood damage to educate them on the causes of flooding, flood mitigation practices, and what can be done to prevent local and regional flood damage.

Indicator: Number of educational flyers or mailings to high flood risk property owners about flood mitigation measures.
Number of clicks (overall activity) on SMC website flooding resources.

k) Install signs at each lake to educate riparian and lakeshore landowners and lake users on ways to reduce the spread of aquatic invasive species.

Indicator: Number of educational signs regarding aquatic invasive species installed.

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 3

ADID – Advance Identification
ALK – Alkalinity
BCCWP- Buffalo Creek Clean Water Partnership
BMP – Best Management Practices
BOD – Biological Oxygen Demand
CCDOT - Cook County Department of Transportation
CFU- Colony Forming Units
Cl^- Chloride
CMAP – Chicago Metropolitan Agency for Planning
COM - Commercial and Services
COND – Specific Conductivity
CWA – Clean Water Act
CWP – Center for Watershed Protection
DEM – Digital Elevation Models
DO - Dissolved Oxygen
DPR – Des Plaines River
DRWW- Des Plaines Watershed Workgroup
DST- Decision Support Tool
DTM - Digital Terrain Models
E. coli- Escherichia coli
fIBI- Fish Index of Biotic Integrity
FLU – Future Land Use
FPDCC - Forest Preserve District of Cook County
FQI – Floristic Quality Assessment
GIMS- Green Infrastructure Model and Strategy
GIS – Geological Information System
GPS – Global Positioning System
HOA - Homeowner Associations
HQAR- High Quality Aquatic Resources
HSG – Hydrologic Soil Groups
HUC - Hydrologic Unit Code
IDNR – Illinois Department of Natural Resources
IDOT – Illinois Department of Transportation
Illinois EPA – Illinois Environmental Protection Agency
INAI – Illinois Natural Areas Inventory
INT – Institutional
IPS- Identification and Prioritization System
IWLC- Isolated Waters of Lake County
IWW - Industrial, Warehousing and Wholesale
LCDOT – Lake County Department of Transportation
LCFPD – Lake County Forest Preserve District
LCHD-ES – Lake County Health Department – Ecological Services
LCWI- Lake County Wetland Inventory
LiDAR - Light Detection and Ranging
LRR- Lateral Recession Rate

MGD – Millions of Gallons Per Day

mIBI- Macroinvertebrate Index of Biotic Integrity

MS4s - Municipal Separate Storm Sewer Systems

MWRD- Metropolitan Water Reclamation District

NAVD88 – North American Vertical Datum of 1988

NH_3-N – Ammonia

NLCD – National Land Cover Database

NO_{2-} - Nitrite

NO_{3-} - Nitrate

NOI – Notice of Intent

NPDES - National Pollutant Discharge Elimination System

NPS – Nonpoint Source

NRCS – Natural Resource Conservation Service

NSWRD – North Shore Water Reclamation District

NWI- National Wetlands Inventory

PAH- Polycyclic Aromatic Hydrocarbons

PCB - Polychlorinated biphenyl

PRW- Potentially Restorable Wetlands

RAP-M - Rapid Assessment Point Method

RES - Residential

s.u. – Standard Unit

SCS- United States Department of Agriculture Soil Conservation Service

SECCHI - Secchi Disk Depth

SEWRPC - Southeastern Wisconsin Regional Planning Commission

SMC – Lake County Stormwater Management Commission

SMU – Subwatershed Management Unit

SRP – Soluble Reactive Phosphorous

SWPPP – Stormwater Pollution Prevention Plan

TAG- Technical Advisory Group

TCU - Transportation, Communication, and Utilities

TDS - Total Dissolved Solids

TKN – Total Kjeldahl Nitrogen

TMDL – Total Maximum Daily Load

Tollway – Illinois Tollway Authority

TP – Total Phosphorus

TS - Total Solids

TSS - Total Suspended Solids

TVS - Total Volatile Solids

USDA – United States Department of Agriculture

USEPA – United States Environmental Protection Agency

USFWS- U.S. Fish and Wildlife Service

USGS – United States Geological Survey

WDO – Lake County Watershed Development Ordinance

WI DNR - Wisconsin Department of Natural Resources

WISDOT - Wisconsin Department of Transportation

WOUS - Waters of the United States

WRAPP- Lake County Wetland Restoration and Preservation Plan

WWTP- Wastewater Treatment Plant

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3 WATERSHED CHARACTERISTICS ASSESSMENT

3.1 WATERSHED SETTING

The Des Plaines River watershed originates as a small prairie stream in southern Racine County, Wisconsin and flows southward for approximately 133 miles joining the Chicago Sanitary and Ship Canal in Lockport, Illinois and converging with the Kankakee River about 10 miles southwest of Joliet to form the Illinois River; a major tributary of the Mississippi River (Figure 3-1). The Illinois River flows about 334 miles through the State of Illinois and joins the Mississippi at Grafton, about 25 miles north of St. Louis, Missouri. The Mississippi flows another 1,169 miles to the Gulf of Mexico. The Des Plaines River is part of a historic water route linking the Great Lakes to the Mississippi River for travel and commercial trade.

Figure 3-1: Tributary Drainage Area to the Mississippi River Basin

This report focuses on the Des Plaines River Watershed-Based Plan planning area of the Upper Des Plaines River Watershed. The planning area includes the Dutch Gap Canal/North Mill Creek Watershed in Kenosha County, Wisconsin and the entire Des Plaines River watershed in Lake County, Illinois, to the confluence of the Des Plaines River and Buffalo Creek in Cook County, Illinois. All figures and tables focus only on this planning area within the Upper Des Plaines River Watershed, hereinafter referred to as "DPR planning area". The DPR planning area is approximately 235 square miles (150,361 acres). Fourteen square miles (8,717 acres) of the DPR planning area boundary are in Kenosha County, Wisconsin, 203 square miles (130,242 acres) are in Lake County, Illinois and 18 square miles (11,402 acres) are in Cook County, Illinois.

3.1.1 GEOLOGY- THE WATERSHED STAGE

LOESS: Small sediment formed by the accumulation of wind-blown dust.

OUTWASH: Deposits of sand and gravel carried by running water from the melting ice of a glacier and laid down in stratified deposits.

TILL: Unsorted glacial sediment.

The Des Plaines River watershed is shaped by surficial geology formed during the most recent glacial period known as the Wisconsin stage of the Pleistocene Era or "Ice Age" that began approximately 85,000 years ago and ended 10,000-14,000 years ago. During this time, 80% of Illinois was covered with one or more sheets of glacial ice (Neely and Heister 1987). Although the DPR planning area was most likely glaciated repeatedly during the Ice Age, the retreat and re-advance of the Lake Michigan lobe of the North American ice sheet during the Wisconsin glaciation resulted in almost all the surficial geologic features present today (Figure 3-2) (Barnhardt et al., 2015). These features are composed of materials deposited less than 30,000 years ago and include **loess, outwash valley deposits,** and **till**. Glacial till deposits range from a few feet to more than 250 feet in thickness. Topographic features in the Des Plaines River Watershed are largely a result of the movement of the Lake Michigan lobe of

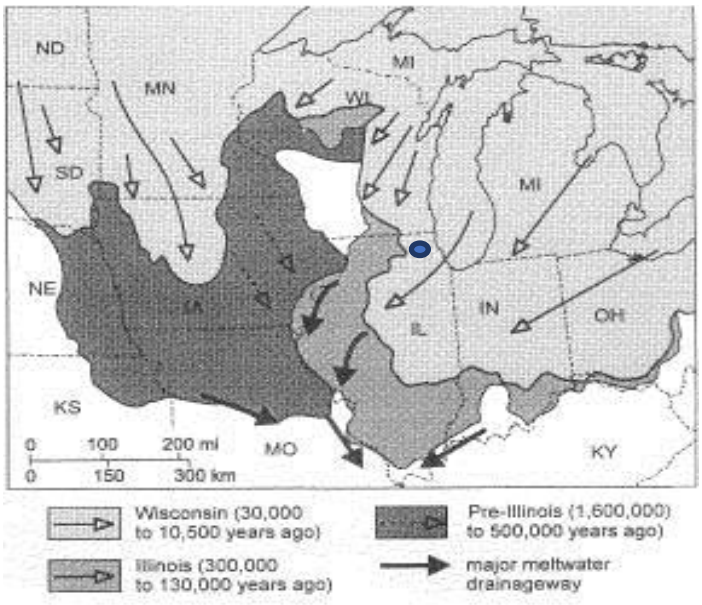


Figure 3-2: Geology of the Midwest
The blue circle represents the approximate location of the planning area. This area has been affected by all three phases of glaciation; most recently the Wisconsin Period (Fryxell 1927).

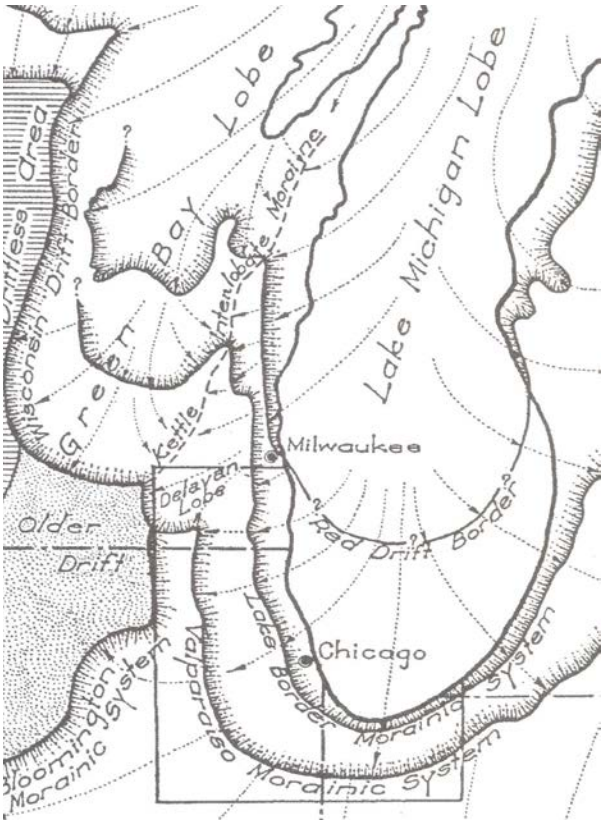


Figure 3-3: Moraine Deposits Developed from Advancing and Retreating Glaciers
The latest deposit is the Wisconsin glacier (Fryxell 1927). The red circle represents the approximate location of the planning area.

the ice sheet, which extended as far south as Shelbyville, Illinois. Its retreat resulted in the deposition of moraines and till plains. The recessional **moraines** that formed at the ice margin following stages of retreat and re-advance presently appear as concentric belts of low topographic ridges around southern Lake Michigan and the Chicago region and generally parallel to the modern Lake Michigan shoreline (Figure 3-3). Recessional moraines in the DPR planning area are oriented along north-south axes, resulting in the general pattern of north-to-south flow of major streams in the landscape today. These parallel ridges are known as the Valparaiso and Lake Border moraine systems. The unsorted till deposited by the glacier between the moraines ranges from relatively flat to **hummocky** and is pock-marked with depressions containing younger peat, muck, **marl**, and organic materials. The till west of the Des Plaines River tends to be clayey, resulting in less permeable soil.

MORAINE: Low ridge formed by till deposited at the margin of a stagnant or retreating glacier.

HUMMOCKY: Extremely irregular surface.

MARL: A loose or crumbling earthy deposit that contains a substantial amount of calcium carbonate.

Meltwater from the retreating glacier carved the valley in which the Des Plaines River flows today. This meltwater also carried and deposited tremendous amounts of outwash sand and gravel, partially filling the Des Plaines River valley. The numerous sand and gravel mining operations along the Des Plaines River and their remnant quarries are a reminder of the origin of this river valley sediment. Much of the surface of the landscape is or was covered by a relatively thin layer (<2 feet thick) of sediment called loess, which is material deposited on glacial landforms by the wind. The geologically-youngest natural landforms are formed by sedimentation on the floodplains of the Des Plaines River and its tributary streams.

The bedrock of the DPR planning area is composed primarily of dolomite, limestone, sandstone, shale, and coal. Fossils indicate that bedrock was formed during a geologic period known as the Silurian that began approximately 440 million years ago. Rock formed during this period is found at the surface only in the northern third of the state. Today, these rock formations are economically important because they yield limestone and other important minerals.

Figure 3-4: Mud Lake Excavation Site

3.1.2 The Watershed Over Time

Following the most recent glacial retreat, the Des Plaines River watershed was colonized by a succession of flora, fauna, and human cultures. There is paleontological evidence of Pleistocene megafauna and archaeological evidence of prehistoric human occupation in the watershed shortly after deglaciation, supported by the discovery of remains of a mammoth near Mud Lake in Bristol, Wisconsin (Figure 3-4). Marks on the mammoth bones, which date to 13,530 – 13,440 years before present, indicate the animal was butchered and provide an estimate of the temporal extent of human presence in the watershed (Milwaukee Public Museum, No date). In July 1992, mastodon bones were discovered in Wadsworth, Illinois. While digging a lake on their property, Van Zelst, Inc. Landscapers excavated mastodon bones, eastern elk bones and remnants of an ancient spruce forest. The find was identified by scientists from the Illinois State Museum, where the majority of the find was donated. One of the spruce logs was donated to and is on exhibit at the Lake County Discovery Museum.

Prior to European settlement of the area, Native American cultures including the Potawatomi, Sauk, Fox, Chippewa, and Ottawa occupied the region. The names of local Potawatomi leaders Aptakisic and Mettawa are still used as place names in the DPR planning area, and the names Half Day (a translation of "Aptakisic") and Indian Creek (named after the Potawatomi villages along the creek) are also a testament to their presence.

The Des Plaines River was called the "soft maple tree river" or "river of the tree from which water (sap) flows" by the Native American tribes encountered by the early French traders. This was rendered "She-shik-ma-o", "She-shick-ma-wish-sip-pe," or similar in early histories and gazetteers of the watershed (Lapham, 1846; Beckwith, 1884; White, 1911). The same tree was called "plaine" by the French, as it was apparently reminiscent of European plane trees. The name of the river was historically recorded as "Aux Plaines", "Au Plein", "O'Plain", and ultimately "Des Plaines". The older name is reflected in the name of O'Plain Road, which ended at O'Plain Bridge, the former name for the settlement that became Gurnee, Illinois. Over time, the meaning of the French "Plaines" became conflated with a similar word for "prairie/plain" giving rise to a folk

NATURAL COMMUNITY: An assemblage of plants and animals interacting with one another and their physical environment.

PRAIRIE: An extensive flat or rolling area dominated by grasses. Prairie grasslands once covered much of central North America.

SAVANNA: A type of woodland characterized by open spacing between trees and intervening grassland.

WETLAND: Low-lying land that is saturated or inundated with water to an extent that plants that are adapted to living in wet conditions grow there. Marshes, swamps, bogs, sloughs, wet prairie, rivers, streams, ponds and the edges of lakes are typically classified as wetlands.

MARSH: Low-lying land area that is usually saturated or inundated with surface or ground water that is dominated by herbaceous plants.

WOODLANDS: Land that is mostly covered with trees and shrubs.

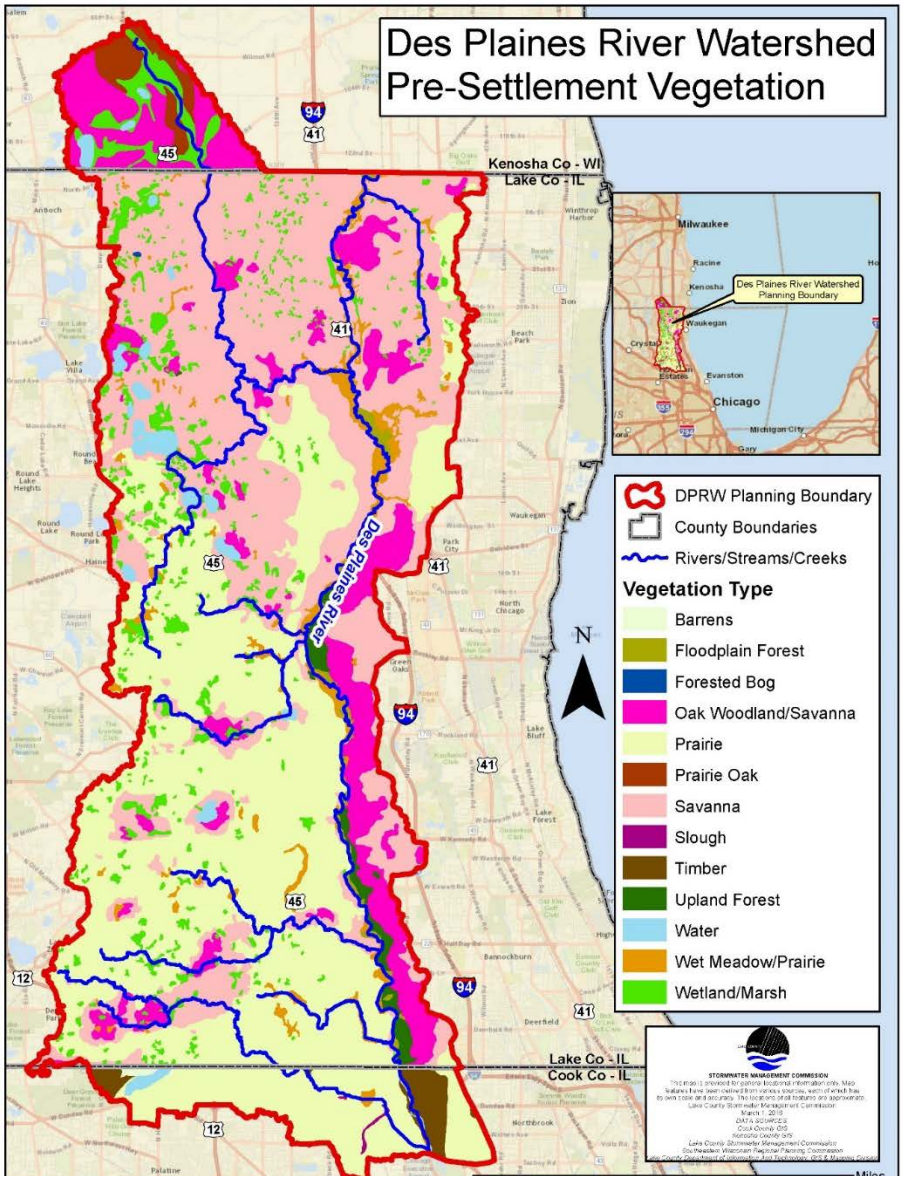


Figure 3-5: Pre-European Settlement Plant Communities

etymology that the name means "river of the prairie/plains", but historical sources are consistent in attributing the French name to the species of tree.

The landscape of the Des Plaines River watershed included numerous **natural communities** (ex. oak **savannas and prairies)**, some of which were adapted to periodic disturbance by fire. There is large body of literature on the fire ecology of these communities and it is likely that fires resulted from both natural causes (lightning) as well as being ignited by Native American peoples (Fahey et al., 2015). Vegetation maps of the Des Plaines River Watershed at the time of European settlement indicate there were natural communities such as savannas, **wetlands/marsh,** prairie, floodplain forest and oak **woodland** as shown in Figure 3-5. Most of the watershed at that time was a landscape of

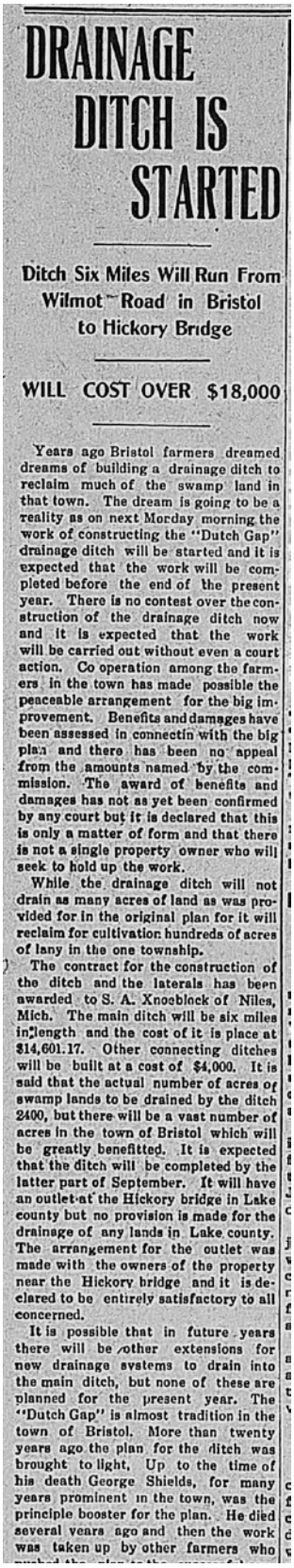
predominantly prairie and savanna with areas of oak woodlands and marshes. Savanna dominated the northern half of the watershed and prairie dominated the southern half. Oak woodlands lined the east side of the river and marshes and other wetlands were interspersed throughout. These natural communities likely worked in unison to infiltrate and treat precipitation, which minimized surface runoff leaving the watershed. The natural drainage system was largely composed of marsh/prairie rather than defined stream **channels**, with several glacial lakes dotting the moraine west of the Des Plaines River. Examples of Pre-European settlement landscapes in the DPR planning area are shown in Figure 3-6.

CHANNEL: Any river, stream, creek, brook, ditch, gully, ravine, swale or wash, into which surface or groundwater flows, either perennially or intermittently.

Following European settlement in the early 1800's, most of the DPR planning area was altered for agricultural purposes. This resulted in the clearing of woodlands and prairies and installation of drain tiles to convey water off the farmland and into natural and constructed stream channels to create farmland. Dutch Gap Canal, Hastings Creek, Avon-Fremont Drainage Ditch, Newport Ditch, Seavey Drainage Ditch and Aptakisic Creek are examples of excavated channels designed to drain wetlands and the surrounding uplands for farmland in the early 20th century.

The construction and cost of many of these ditches is documented in local newspaper articles from 1900-1920. An article documenting the construction of Dutch Gap Canal is included as Figure 3-7 (The Antioch News, 1916). Drainage districts were created to pay for these projects, some of which still exist today. The ditches usually followed the path of sloughs or elongated slow-moving wetlands with no defined stream channel. The ditches were excavated from these wetlands, lowering the water table and draining the surface soils for conversion to cropland. As urban and suburban development in the watershed increased, these ditches also became a component of the urban drainage system, conveying both stormwater and treated waste water through the landscape.

Figure 3-6: Pre-European Settlement Landscape



DRAINAGE DITCH IS STARTED

Ditch Six Miles Will Run From Wilmot Road in Bristol to Hickory Bridge

WILL COST OVER $18,000

Years ago Bristol farmers dreamed dreams of building a drainage ditch to reclaim much of the swamp land in that town. The dream is going to be a reality as on next Monday morning the work of constructing the "Dutch Gap" drainage ditch will be started and it is expected that the work will be completed before the end of the present year. There is no contest over the construction of the drainage ditch now and it is expected that the work will be carried out without even a court action. Co operation among the farmers in the town has made possible the peaceable arrangement for the big improvement. Benefits and damages have been assessed in connectin with the big plan and there has been no appeal from the amounts named by the commission. The award of benefits and damages has not as yet been confirmed by any court but it is declared that this is only a matter of form and that there is not a single property owner who will seek to hold up the work.

While the drainage ditch will not drain as many acres of land as was provided for in the original plan for it will reclaim for cultivation hundreds of acres of lany in the one township.

The contract for the construction of the ditch and the laterals has been awarded to S. A. Knoeblock of Niles, Mich. The main ditch will be six miles in length and the cost of it is place at $14,601.17. Other connecting ditches will be built at a cost of $4,000. It is said that the actual number of acres of swamp lands to be drained by the ditch 2400, but there will be a vast number of acres in the town of Bristol which will be greatly benefitted. It is expected that the ditch will be completed by the latter part of September. It will have an outlet at the Hickory bridge in Lake county but no provision is made for the drainage of any lands in Lake county. The arrangement for the outlet was made with the owners of the property near the Hickory bridge and it is declared to be entirely satisfactory to all concerned.

It is possible that in future years there will be other extensions for new drainage systems to drain into the main ditch, but none of these are planned for the present year. The "Dutch Gap" is almost tradition in the town of Bristol. More than twenty years ago the plan for the ditch was brought to light. Up to the time of his death George Shields, for many years prominent in the town, was the principle booster for the plan. He died several years ago and then the work was taken up by other farmers who

Figure 3-7: The Antioch News newspaper article on the Dutch Gap Canal

While a significant portion of the northern part of the DPR planning area remains in farmland, many communities have expanded with primarily residential development since the mid-20th Century. Communities were established along the Chicago-Milwaukee Road (now Milwaukee Avenue) as European settlement began in the mid-1800s. Subdivisions of small, often seasonal cottages were constructed in the early 20th Century around the lakes in the watershed as tourist destinations and weekend getaways for people from Chicago as well as residents of the suburbs in eastern Lake County. Suburban development steadily increased after World War II, peaking in the 1990s and carried through much of the 2000 decade, resulting in newer suburban villages mixing with the older rural areas of the watershed.

The DPR planning area includes several high quality and remnant natural areas and is identified as a "Conservation Opportunity Area" in the Illinois Wildlife Action Plan. The restored Rollins Savanna Forest Preserve is a good example of the interspersion of prairie, savanna and wetland/marsh complexes that once existed in the watershed. Remnant oak woodlands can be found along the crests of the moraines on the eastern and western boundaries of the watershed, while excellent examples of Northern Flatwoods have been preserved east of the Des Plaines River in the southern end of the watershed. For more information on the DPR planning area natural communities see Section 3.10 Natural Areas.

3.1.3 WATERSHED SIZE

The Des Plaines River watershed stretches 1,455 square miles (or 931,489 acres) in northeastern Illinois and southeastern Wisconsin. The Des Plaines River begins near Union Grove, Wisconsin and flows south through Racine and Kenosha Counties in Wisconsin and Lake, Cook, and Will Counties in Illinois. The river joins the Sanitary and Ship Canal in Lockport, Illinois and flows west through Joliet, before converging with the Kankakee River to form the Illinois River. The Illinois River then flows into the Mississippi River, which flows south to the Gulf of Mexico. The drainage area of the Des Plaines River Watershed was increased by 673 square miles when there was a diversion of Lake Michigan water through the Chicago Sanitary and Ship Canal and the Cal-Sag Channel in the early 1900's (Pescitelli, 2013). Since January 17,1900, there has been limited diversion of water from Lake Michigan through the Chicago Sanitary and Ship Canal to the Illinois River (Healy, 1979). The area included in this watershed plan ("planning area") covers approximately 235 square miles (150,361 acres) in southern Kenosha County, Wisconsin and Lake and northern Cook Counties in Illinois (Figure 3-8).

3.1.4 Watershed Location

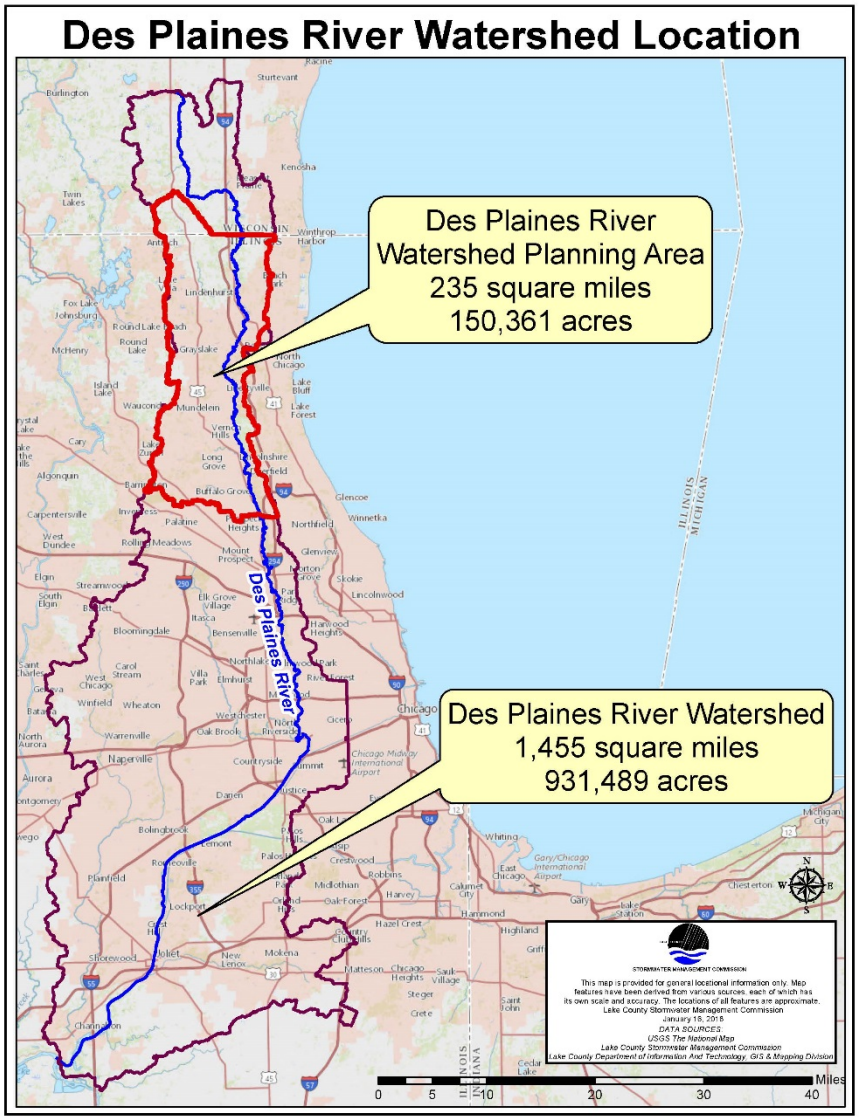


Figure 3-8: Des Plaines River Watershed Planning Area Subwatershed

The DPR planning area drains from north to south, with its headwaters in largely agricultural (rural) areas in Racine and Kenosha Counties in Wisconsin. The DPR planning area landscape becomes progressively more suburban and urban as the Des Plaines River flows south through Lake and Cook Counties in Illinois. The watershed planning area includes the North Mill Creek/Dutch Gap Canal Watershed in Wisconsin, defined subwatersheds in central Lake County, Illinois, and extends southward into northern Cook County, Illinois to the confluence of Buffalo Creek (Wheeling Ditch) with the Des Plaines River.

3.1.5 Geographic Boundaries

The boundaries of the DPR planning area are defined by topographic features formed by the retreat of the continental ice sheet during the Wisconsin glaciation and subsequent geologic processes. Additionally, the total area of the Des Plaines River watershed has increased due to drainage and diversion of runoff and streamflow from the Chicago and Calumet River watersheds, which historically drained to the Great Lakes. Because the Chicago and Calumet diversions are located downstream of the DPR planning area, they are not discussed further. The remainder of this section discusses the boundaries of the 235-square mile DPR planning arealocated in southern Kenosha County, Wisconsin, Lake County and northern Cook County, Illinois.

Generally, the DPR planning area and subwatershed boundaries used in this report are the same as those used for previous watershed-based plans or are unchanged from the Lake County subwatershed boundaries delineated by the SMC in the early 1990s. The western boundary of the DPR planning area is based on the boundaries used for the North Mill Creek/Dutch Gap Canal, Mill Creek, Bull Creek/Bull's Brook, Indian Creek, and Buffalo Creek watershed-based plans. The eastern boundary from the Illinois-Wisconsin state line to

approximately Wadsworth Road is based on the boundaries used in the Kellogg Creek and Dead River watershed-based plans. The remaining eastern boundary is based on the Stormwater Management Commission watershed boundary delineation and the boundaries used for the 2008 North Branch of the Chicago River Watershed-Based Plan. The southern boundary west of the Des Plaines River is the southern boundary of the Buffalo Creek watershed; east of the Des Plaines River it was delineated as based on available topography for the catchment directly east of the confluence of the Des Plaines River and Buffalo Creek.

The most evident landscape features associated with the DPR planning area and subwatershed boundaries are recessional moraines, the crests of which define a significant portion of these boundaries. The eastern boundary of the DPR planning area is formed by different components of the Lake Border moraine system. North of Illinois Route 132 (Grand Avenue), the Highland Park moraine forms the boundary between the Des Plaines River watershed and the Lake Michigan watershed. Illinois Route 131 (Green Bay Road) generally marks the watershed divide, which is also a sub-continental watershed divide between the drainages of the St. Lawrence and Mississippi Rivers. South of Illinois 132, the watershed boundary crosses intermorainal lowlands, which are troughs between the Lake Border moraines running from Greenleaf Creek in the DPR planning area to the headwaters of the Skokie and Middle Forks of the North Branch of the Chicago River. From Illinois Route 120 (Belvidere Road) to Illinois Route 60 (Town Line Road), the Deerfield moraine forms the eastern boundary of the watershed. At Illinois Route 60, the boundary crosses another intermorainal trough, extending from an unnamed tributary to the Des Plaines River in Mettawa to the headwaters of the West Fork of the North Branch of the Chicago River in Lincolnshire. South of Illinois 60, the eastern watershed boundary is formed by the Park Ridge moraine. The western boundary of the watershed is formed by the crest of the Valparaiso moraine system. This moraine is larger and higher than the Lake Border moraines and is marked by numerous glacial “kettle” lakes. The southern boundary of the DPR planning area follows the southern boundary of the Buffalo Creek watershed through northern Cook County, Illinois to the confluence of Buffalo Creek (Wheeling Ditch) and the Des Plaines River in Wheeling, Illinois. Figure 3-9 depicts the DPR planning area glacial moraines.

The USGS has developed a coding system for hydrologic systems that is used throughout the United States by numerous federal, state, and local agencies and organizations. Each watershed unit is assigned a HUC, with the number of digits in each code dependent upon watershed size and its relationship to larger watersheds to which it belongs (if any). Table 3-1 includes the applicable HUCs for the DPR planning area and Figure 3-10 shows all of the HUC 12 watersheds in the DPR planning area.

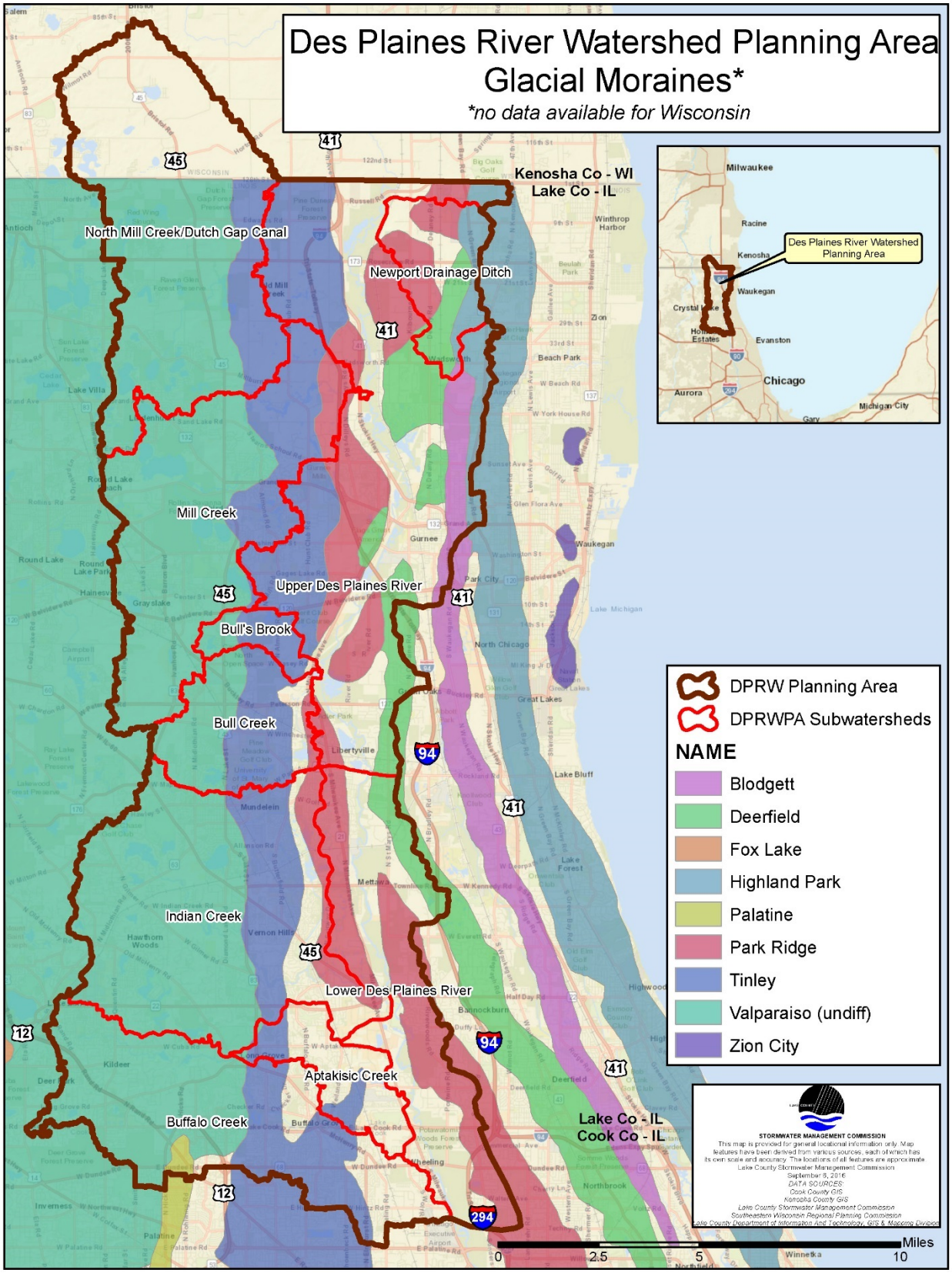


Figure 3-9: Des Plaines River Watershed Planning Area Glacial Moraines

Table 3-1: Hydrologic Units and HUC Designations for the Planning Area

HUC	HUC NAME	HUC LEVEL (NUMBER OF DIGITS)	CORRESPONDING PLANNING AREA SUBWATERSHED NAME(S)
07*	Upper Mississippi	HUC 2	All
0712*	Upper Illinois River	HUC 4	All
07120004*	Des Plaines	HUC 8	All
071200040104*	Jerome Creek-Des Plaines River	HUC 12	Upper Des Plaines River
071200040201	North Mill Creek	HUC 12	North Mill Creek/Dutch Gap Canal
071200040202	Mill Creek	HUC 12	Mill Creek
071200040301	Sterling Lake-Des Plaines River	HUC 12	Upper Des Plaines River, Newport Ditch
071200040302	Bull Creek-Des Plaines River	HUC 12	Upper Des Plaines River, Bull Creek-Bull's Brook
071200040501	Indian Creek	HUC 12	Indian Creek
071200040502	Wheeling Drainage Ditch	HUC 12	Buffalo Creek
071200040503*	McDonald Creek-Des Plaines River	HUC 12	Lower Des Plaines River, Aptakisic Creek

*The DPR planning area includes portion(s) of these hydrologic units

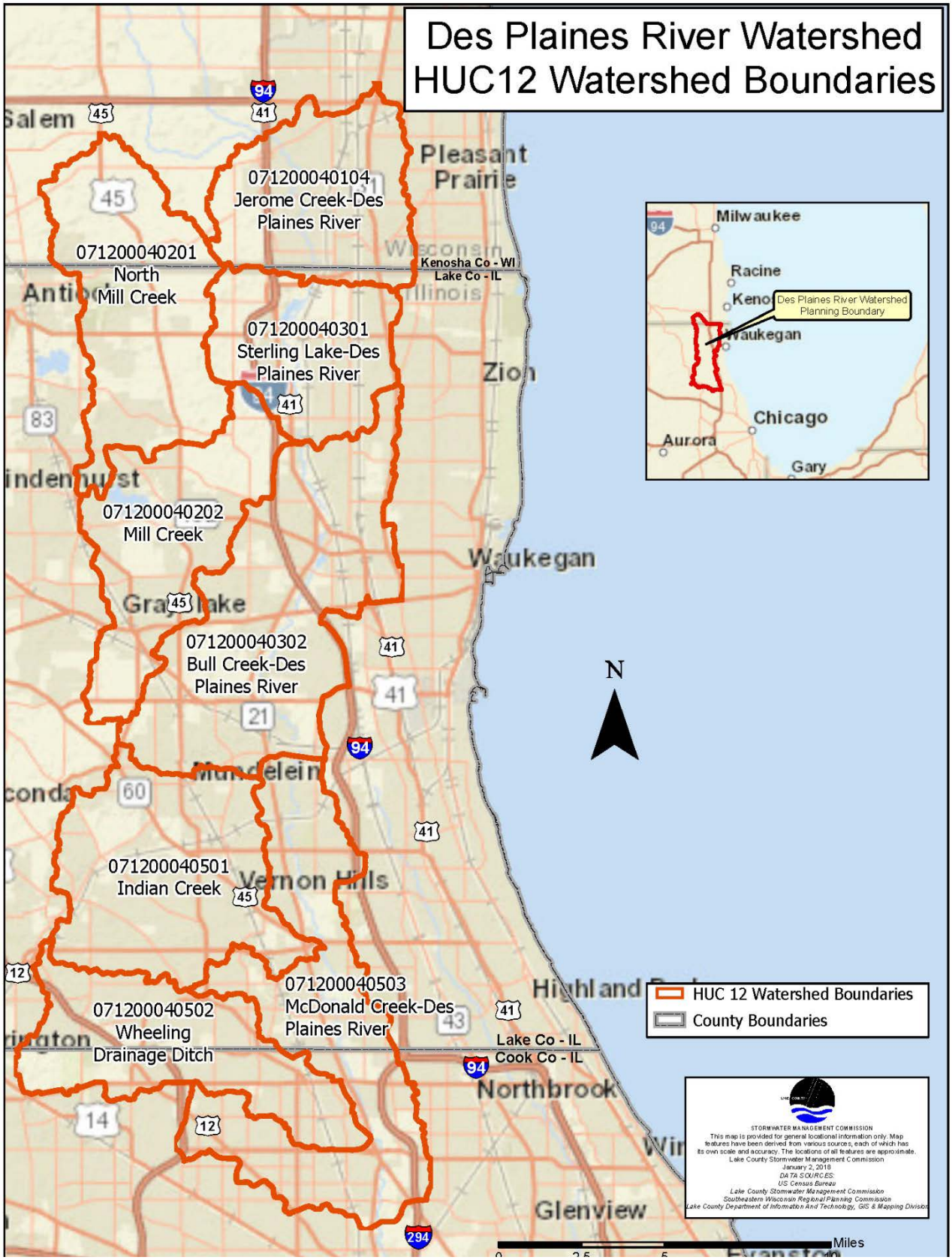


Figure 3-10: Des Plaines River Watershed Planning Area HUC 12 Watersheds

3.1.6 Climate and Precipitation

The DPR planning area is situated midway between the western Continental Divide and the Atlantic Ocean, and it is often underneath the polar jet-stream, which creates low pressure systems that bring clouds, wind and precipitation to the region. The DPR planning area's mid-latitude position results in seasonal variations in the regional solar energy input causing warm summers and cold winters.

The DPR planning area is classified as a warm continental climate, meaning the coldest month has an average temperature below freezing, the warmest month has an average temperature above 72 degrees Fahrenheit, and there is not a pronounced wet or dry season. The presence and density of buildings, roads, parking lots and industrial activities also influence the climate in comparison to surrounding rural areas, often increasing the temperature (National Climatic Data Center, 2009).

Lake Michigan influences the climate of the DPR planning area. Lake Michigan's large thermal mass moderates both the heat of the summer and the cold of the winter. Weather data also suggests that Lake Michigan increases general area cloudiness, decreases summer precipitation, and increases winter precipitation (National Climatic Data Center, 2009).

Climate Normals: 30-year averages of climatological variables including temperature and precipitation.

The Illinois State Climatologist Office tracks **climate normals** for numerous sites in Illinois. The monthly mean temperature normals and monthly precipitation normals for several sites in or near the DPR planning area are summarized in Table 3-2 and Table 3-3, respectively. As indicated by the climate classification for the region, winters are cold, with average temperatures below freezing while summers are relatively warm or hot. The influence of Lake Michigan on local climate is most evident at the Waukegan Regional Airport. Compared to the other stations in Table 3-2, Waukegan has among the warmest mean temperatures in December, January and February and the coolest mean temperatures in June, July, and August. The warmest site year-round appears to be Chicago Executive/Palwaukee.

Table 3-2: Mean Monthly Temperature Normals (Degrees Fahrenheit), 1981-2010

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN.
Antioch	21.5	25.2	35.3	47.3	57.7	67.7	72.3	71.0	63.4	50.9	39.0	25.9	48.2
Barrington	20.6	25.0	35.2	47.5	57.8	67.6	72.1	70.2	62.3	50.3	38.4	25.2	47.8
Chicago Executive/Palwaukee	23.7	27.8	37.5	47.8	58.3	68.4	73.6	72.3	64.3	52.2	40.0	28.0	49.6
Lake Villa	22.2	25.9	36.0	47.5	58.0	67.8	72.6	71.2	63.3	51.2	39.0	26.2	48.5
Mundelein	20.9	25.1	35.2	46.9	57.6	68.0	72.3	70.7	62.8	50.8	38.3	25.1	47.9
Waukegan Regional	23.0	25.9	35.2	46.1	55.7	65.7	71.3	69.9	62.2	51.0	39.1	27.5	47.8

(Illinois State Climatologist's Office & National Climatic Data Center, 2010) Data provided by the Illinois State Climatologist's Office, a part of the Illinois State Water Survey (ISWS) located in Champaign and Peoria, Illinois, and on the web at www.isws.illinois.edu/atmos/statecli.
Note: Mean monthly temperature normal data not available for Gurnee

Table 3-3: Mean Monthly Precipitation Normals (Inches), 1981-2010

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN.
Antioch	1.60	1.48	2.09	3.21	4.24	4.71	3.57	4.08	3.54	3.09	2.75	2.32	36.68
Barrington	1.90	1.89	2.29	3.56	4.24	3.85	3.78	4.86	3.40	3.10	3.04	2.26	38.17
Gurnee	1.80	1.82	2.35	3.59	3.96	3.69	3.79	2.90	3.29	2.85	2.90	2.28	35.22
Lake Villa	1.99	1.76	2.55	3.79	3.88	3.86	4.03	3.65	3.21	2.83	2.83	2.39	36.77
Mundelein	1.53	1.97	2.55	3.21	4.21	4.05	3.82	4.19	3.48	2.92	2.65	1.97	36.55

(Illinois State Climatologist's Office & National Climatic Data Center, 2010) Data provided by the Illinois State Climatologist's Office, a part of the Illinois State Water Survey (ISWS) located in Champaign and Peoria, Illinois, and on the web at www.isws.illinois.edu/atmos/statecli.

Note: Monthly precipitation normal data not available for Chicago Executive/Palwaukee or Waukegan Regional

Illinois exhibits wide variability in annual precipitation. Average annual precipitation varies by about 3 inches among sites in or near the DPR planning area. Despite the spatial variability of annual precipitation, seasonal variations in precipitation are similar between sites within or near the planning area, with comparatively wetter summers and drier winters. Annual snowfall totals are typically higher than annual precipitation, due to the low density of snow compared to liquid water. The wetter summer months are the result of thunderstorm-derived precipitation. These storm events tend to distribute rainfall variably and it is not uncommon for heavy rainfall to occur in some parts of the DPR planning area while other parts receive little to no precipitation. The spatial variability of this precipitation source may account for some of the overall variation in the normal rainfall amounts across the sites in Table 3-3.

The variety of climate and weather conditions creates diverse watershed conditions. For example, during winter months the watershed experiences precipitation in the form of snow, this precipitation may affect flooding if there is a sustained warm period following heavy snow accumulation. Likewise, rain on frozen ground or snow melt in spring combined with rain may also result in stream and localized flooding.

During spring, the DPR planning area will usually experience warming temperatures and wet weather conditions. In contrast, during fall, the watershed experiences cooling temperatures and precipitation frequency decreases. There have been prolonged "wet" periods of above-average annual precipitation, most recently during the 1970s and 1980s. There have also been major multi-year droughts in the 1930s and 1950s. Illinois has rainstorms which cause 40 or more flash-floods annually, each with several inches of rainfall in a few hours, in localized areas. In July 2017, this type of rainstorm delivered up to 8 inches of rainfall in less than 24 hours in some portions of the watershed planning area, resulting in localized flash flooding as well as a record flood crest elevation on the Des Plaines River.

3.1.7 Spatial Relationship of Water Resources

Water resources (streams, lakes, and wetlands) in the DPR planning area tend to be spatially distributed by the underlying surface topography and later anthropogenic influences (ditching, mining, impoundment, tile drainage, storm sewer networks, etc.). In general, tributary subwatersheds west of the Des Plaines River tend to have longer and more **dendritic stream systems** Figure 3-11). East of the Des Plaines River, stream systems tend to be shorter with fewer tributary branches. The north-south trending recessional moraines influence channel orientation in portions of North Mill Creek, Mill Creek, Bull Creek, Indian Creek, and Buffalo Creek. Wetland sloughs were common in the inter-morainal lowlands, prior to draining to increase cultivatable land. Newport Ditch, Dutch Gap Greenleaf Creek, and Seavey Drainage Ditch are examples of channels constructed to drain intermorainal lowlands.

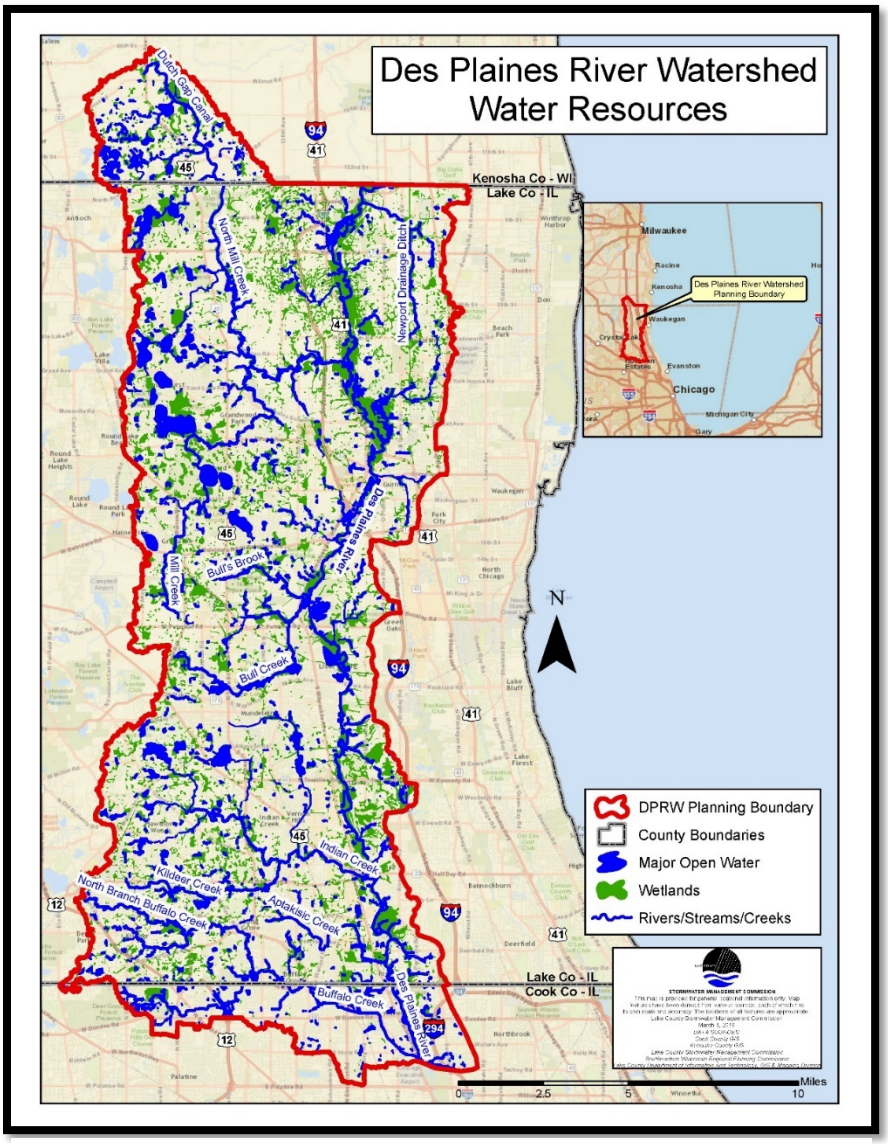


Figure 3-11: Water Resources in the DPR Watershed Planning Area

Several lakes in the DPR planning area are **kettle lakes** or **glacial sloughs**. These naturally-formed lakes are typically located higher in the moraines west of the Des Plaines River and are often near subwatershed boundaries. The hydrology of these lakes and their hydrologic connection to other water resources has been modified by humans. Many lakes have adjustable or fixed spillways, dams or culverts constructed at their outlets. Likewise, flow into the lakes has been modified by ditching and drainage projects as well as by storm

Dendritic Stream Systems: In a dendritic system, there are many contributing streams (similar appearance to the twigs of a tree), which are then joined together into the tributaries of the main river. They develop where the river channel follows the slope of the terrain.

Kettle Lakes: Shallow, glacial lakes that are formed when partially buried ice blocks from glaciers melt creating a depression that fills with water.

Glacial Sloughs: Shallow, wetland-type lakes that are formed during glacial retreat.

sewer networks that discharge to lakes. Many of the natural lakes in the watershed have a surface or culvert connection to another lake, stream, or wetland. Crooked, Hastings, Gages, Third, Fourth, and Diamond Lakes are examples of natural lakes in the planning area. Gray's Lake is unique because it is a natural lake of glacial origin that was historically part of the Fox River watershed, but overflow from the lake is now diverted through a storm sewer system to Mill Creek in the Des Plaines River watershed.

As discussed in section 3.1.1, the Des Plaines River is in a valley partially filled with glacial outwash sediment. Aggregate mining operations utilize this resource and have created numerous former quarry lakes near the Des Plaines River such as Lake Sterling, Lake Carina, Lake Minear and Independence Grove. Similarly, the construction of the Interstate Highway system through Lake County required large amounts of fill material, resulting in numerous borrow pits along its length. These borrow pits have filled with water and have become a component of the hydrologic system in the watershed.

Several additional lakes in the watershed were created for purposes other than quarrying: primarily aesthetic purposes, recreation, or stormwater management and flood control. These lakes were often constructed through a combination of excavation of low-lying areas near streams and wetlands and subsequent impoundment with construction of a dam or spillway. Lakes constructed directly on a stream system are sometimes referred to as "online" impoundments. Examples of online impoundments in the DPR planning area include Grandwood Park, St. Mary's, Loch Lomond, and Countryside Lakes. Buffalo Creek Reservoir is also an online impoundment that serves as a flood control reservoir. The dam on Rasmussen Lake, an online impoundment of North Mill and Hastings Creeks, is being removed (as of 2017) and the lake will revert to a free-flowing stream. Examples of other constructed lakes in the DPR planning area include Linden, Potomac, Valley, and Harvey Lakes.

Wetlands cover approximately 17,000 acres of the DPR planning area and can be found virtually throughout the watershed, except in locations where they have been drained, filled, or converted to another land cover type. While wetlands are typically lower in elevation than the immediately surrounding lands, they are found in a variety of topographic positions, ranging from isolated depressions on the crests of moraines to gently sloping drainageways across the landscape, to bottomlands in floodplains and along lake shores. Similarly, wetlands can be found throughout the hydrologic network of the watershed. Geographically isolated wetlands are located in depressions surrounded by uplands and do not have regular surface connections to other water bodies or wetlands. Headwater wetlands are located along the upper-most stream reaches, while larger wetland complexes often have larger tributary areas and may have more regular hydrologic connections to other water features. Rivers, streams, and lakes typically have wetlands of some form associated with them. Descriptions of more common wetland types can be found in Section 3.11.

Ponds and detention basins are the most numerous constructed water features in the DPR planning area and can be found throughout the landscape. Ponds have historically been constructed by excavation or impoundment for a variety of purposes in the DPR planning area including agriculture, borrow pits, wastewater treatment, wildlife management, fish/fishing, golf course features, and residential aesthetics. Constructed ponds are often associated with a natural source of hydrology such as a wetland or stream but may also be located in upland areas that would otherwise be dry. Detention basins, a specific type of pond, are associated with urban and suburban development beginning in the second half of the twentieth century. Detention basins can be wet (ponds), wetland-bottom, or dry and are specifically designed to reduce peak

runoff discharges from developed sites. Prior to watershed development regulations, detention ponds were constructed in both upland and wetland locations. Regulations now discourage or prohibit the construction of stormwater detention facilities in wetlands, which are typically constructed in upland areas in more recent developments. Detention basins are a component of the designed drainage system and stormwater infrastructure, and typically have a direct or eventual hydrologic connection to rivers, streams, lakes, and wetlands through stormsewers, drainage ditches, and other detention basins. The stormsewer network and detention basin inventory are further described in sections 3.14 and 3.15, respectively.

3.2 TOPOGRAPHY

Topographic data is used in the planning process to develop floodplain maps, water quality models, flood mitigation recommendations, catchments, **DEMs** and regionally significant depressional storage areas.

DIGITAL ELEVATION MODELS (DEMS): A digital cartographic/geographic dataset of elevations in xyz coordinates. DEMs are derived from hypsographic data (contour lines) and/or photogrammetric methods using USGS 7.5-minute, 15-minute, 2-arc-second (30- by 60-minute), and 1-degree (1:250,000-scale) topographic quadrangle maps.

Figure 3-12 represents the DPR planning area boundary and topography from a compilation of three data sets: the 2010 Kenosha County DTM, 2007 Lake County DTM, and 2008 Cook County DTM. The Dutch Gap Canal/North Mill Creek, Mill Creek, Bull Creek, Indian Creek, Aptakisic Creek, and Indian Creek tributaries all drain into the Des Plaines River main stem from the west. The Newport Drainage Ditch is the only major tributary draining into the main stem from the east. The lowest elevation in the DPR planning area is 630 feet (NAVD88) above mean sea level at the northwest corner of the confluence of Buffalo Creek and the Des Plaines River (just north of Chicago Executive Airport in the Village of Wheeling). The highest elevation in the DPR planning area is 919 feet (NAVD88) above mean sea level is the western edge of Hawthorn Woods County Club (just east of Old McHenry Road in the Village of Hawthorn Woods) on the western edge of the planning boundary.

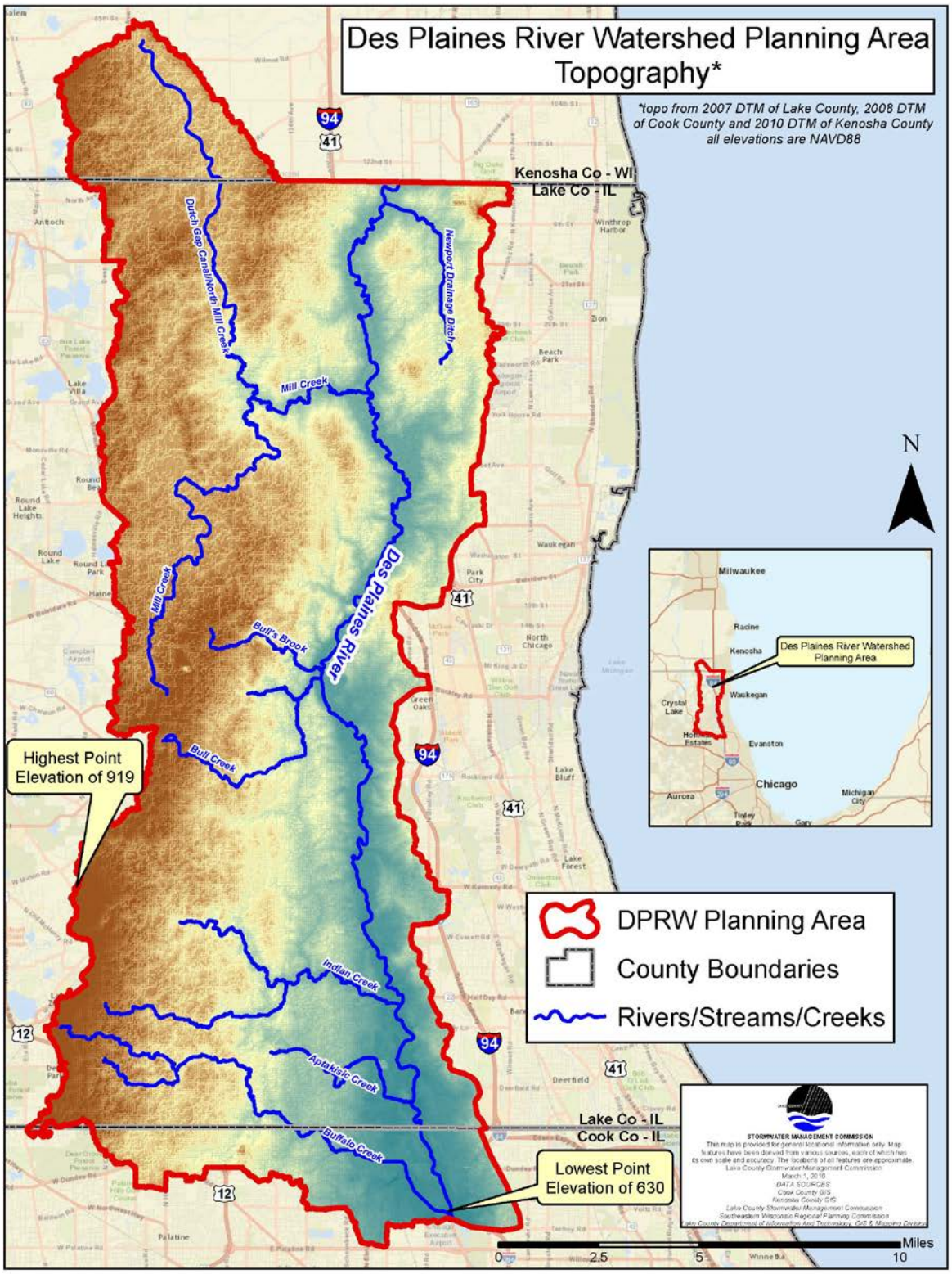


Figure 3-12: Des Plaines River Watershed Topography

3.3 SOIL

Deposits left during the last glacial period are the raw materials of present soil types in the DPR planning area. A combination of physical, biological and chemical variables, such as topography, drainage patterns, climate, erosion and vegetation, have interacted over centuries to form the variety of soils found in the watershed. These soils were formed under wetland, forest and prairie plant communities, and they are identified by a name associated with each series or class of soils with similar characteristics. A soil series name generally is derived from a town or landmark in or near the area where the soil series was first recognized, although naming conventions vary by county.

Soils determine the water-holding capacity and include both the erosion potential and **infiltration** capabilities. Soil characteristics indicate the way soils in an area will interact with water in the environment, and therefore are useful in watershed planning. These soil characteristics can help guide where restoration and BMPs are likely to be successful and where there may be constraints to project implementation.

INFILTRATION: That portion of rainfall or surface runoff that moves downward into the subsurface soil.

SOIL PHASE: A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

The USDA NRCS has produced a detailed (current) soil survey for Lake, Kenosha and Cook County. These soil surveys contain information regarding the physical and chemical properties, as well as, information regarding human use for each soil series and **soil phase** in the watershed. The soil surveys were utilized to extract detailed soil data for the DPR planning area. Table 3-4 includes the major soil series (more than 3% in the watershed) present in the DPR planning area and the amount of watershed occupied by each.

Table 3-4: Major Soil Types in the DPR Planning Area

SOIL SERIES	SOIL SERIES NAME	ACRES	HYDROLOGIC SOIL GROUP	HYDRIC RATING (Y/N/Partial)	% OF WATERSHED
Mzd(WI)/530	Ozaukee	28,293.80	C	N	18.82%
Me(WI)/531	Markham	14,656.23	C	N	9.75%
At(WI)/232	Ashkum	10,945.30	C/D	Y	7.28%
Ph(WI)/153	Pella	8,943.95	B/D	Y	5.95%
Et(WI)/146	Elliott	8,005.99	C/D	Partial	5.32%
Va(WI)/223	Varna	7,327.18	C	N	4.87%
W	Water	6,034.31	N/A	Y	4.01%
Bc(WI)/298	Beecher	5,940.64	C/D	Partial	3.95%
802/805	Orthents	4,989.41	C/D	N	3.32%
Ht(WI)103/1103/4103	Houghton muck	4,954.37	A/D	Y	3.29%
Other Soil Series (>3% of the watershed)		*50,269.83*	--	--	*33.43%*
	TOTAL:	**150,361**			**100%**

*Partial Hydric: At least some components of the soil are hydric.

3.3.1 Hydric Soils

Hydric soils form in areas of the landscape that are seasonally or permanently saturated with water. These conditions are conducive to the growth of hydrophytic vegetation; therefore, the presence of hydric soils is indicative of present or historical wetland conditions or may indicate areas of depression. Areas with hydric soils and drained hydric soils that do not presently contain wetlands may be utilized for wetland restoration.

Hydric Soils: A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. These conditions alter the physical, biological and chemical characteristics of the soil, thereby influencing the species composition or growth, or both, of plants on those soils.

Hydrophytic Vegetation: Plants that tolerate or require saturated soil or standing water

Figure 3-13 and Figure 3-14 map hydric soils in the DPR planning area. Hydric soils cover approximately 35,820 acres (24%), while non-hydric soils cover about 114,541 acres (76%) of the watershed. Most of the streams, lakes, and other surface waters in the watershed have hydric soils. Additionally, smaller pockets of hydric soils are well-distributed throughout the watershed.

3.3.2 Soil Erodibility

Soil erodibility is largely determined by the tendency of soil particles to become detached and mobilized by water and the ground slope. Highly erodible soils in the watershed are highly susceptible to erosion by water due to a combination of slope, particle size, and cohesion, but they are not prone to erosion by wind. Highly erodible soils are considered in the watershed-based plan because erosion from these soils can potentially end up in surface waters, contributing to high amounts of total suspended solids and sediment accumulation in streams and lakes.

The movement or loss of soil resulting from erosion may also cause damage to property as buildings and infrastructure are undermined. The removal and disposal of sediment accumulated in lakes, ponds, detention ponds and the storm drainage system can be an expensive maintenance activity.

NOTEWORTHY: Soil Erodibility and Pollution

Soil characteristics, especially the tendency of soil particles to become detached and mobilized by water runoff, have considerable impact on water quality. For instance, sandy soils are more prone to erosion than clayey soils, although pollutants are more likely to be attached to clay particles.

It is important to map highly erodible soils because they represent areas that may contribute large amounts of total suspended solids (TSS) to streams and lakes. High TSS levels can result in stream degradation as a result of silt deposition and pollution. Some pollutants frequently attach to TSS particles and wash into lakes and streams, polluting the water and sediments and decreasing water clarity.

In the DPR planning area, 20,569 acres (14%) are classified by NRCS as highly erodible soil. This suggests that a substantial amount of the soils in the watershed have the potential to negatively impact water quality. Highly erodible soils do not include hydric soils and are represented by hydrologic soil groups “B” and “C”. Erodible soils along lakeshores, stream channels, and disturbed land surfaces (e.g. active croplands and construction sites) are most susceptible to erosion. A large portion of the highly erodible soils in the DPR planning area are associated with open water (Figure 3-15 and Figure 3-16). Stabilization practices near shorelines and stream channels could substantially reduce erosion. Additionally, land developers are required to follow the NPDES and the Lake County WDO regulations regarding soil erosion and sediment control measures during construction.

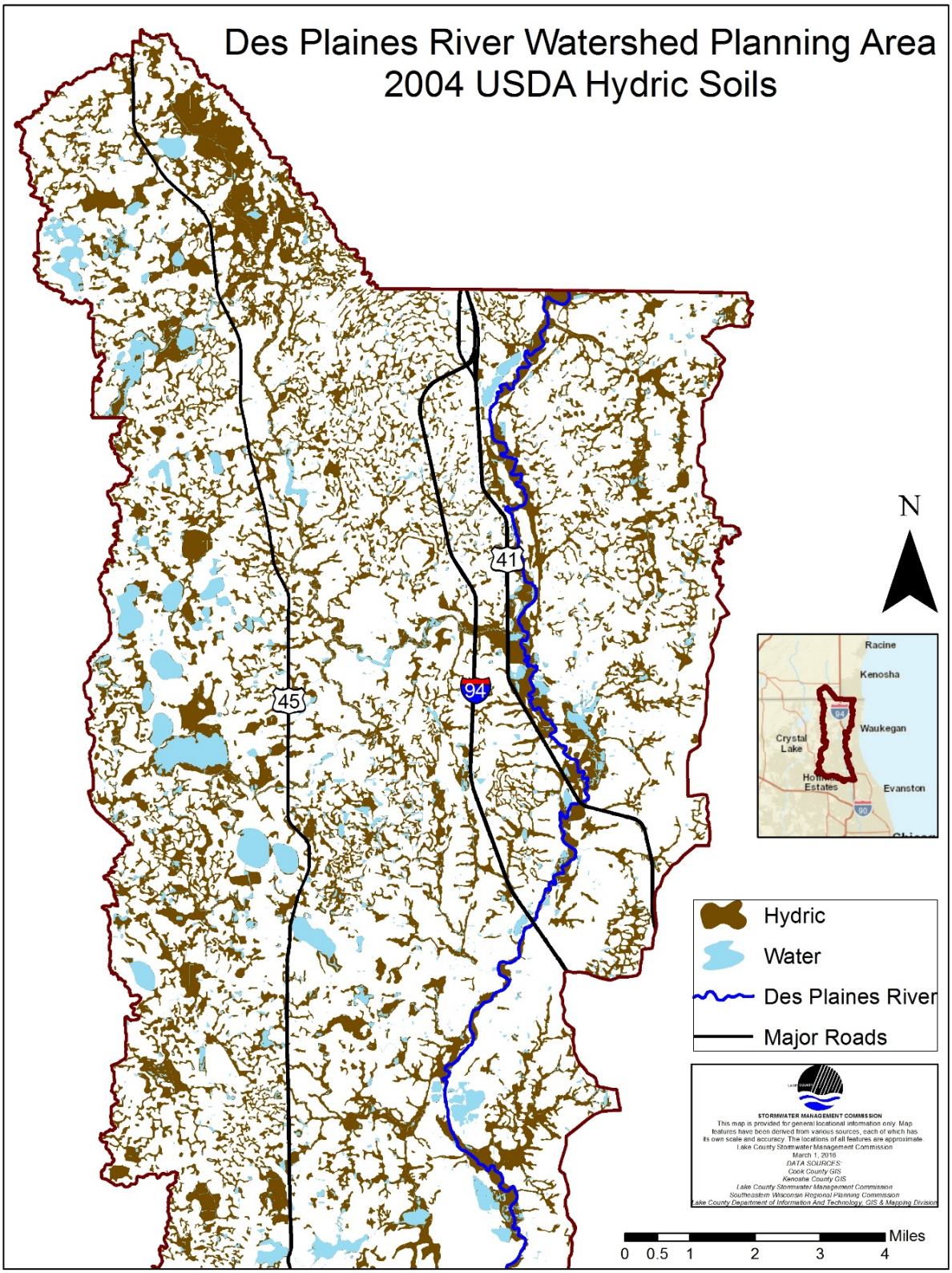


Figure 3-13: Hydric Soils – Northern Portion of the Des Plaines River Watershed Planning Area
NRCS 2012 Lake County Soil Survey, 2004 Kenosha County Soil Survey and 2011 Cook County Soil Survey

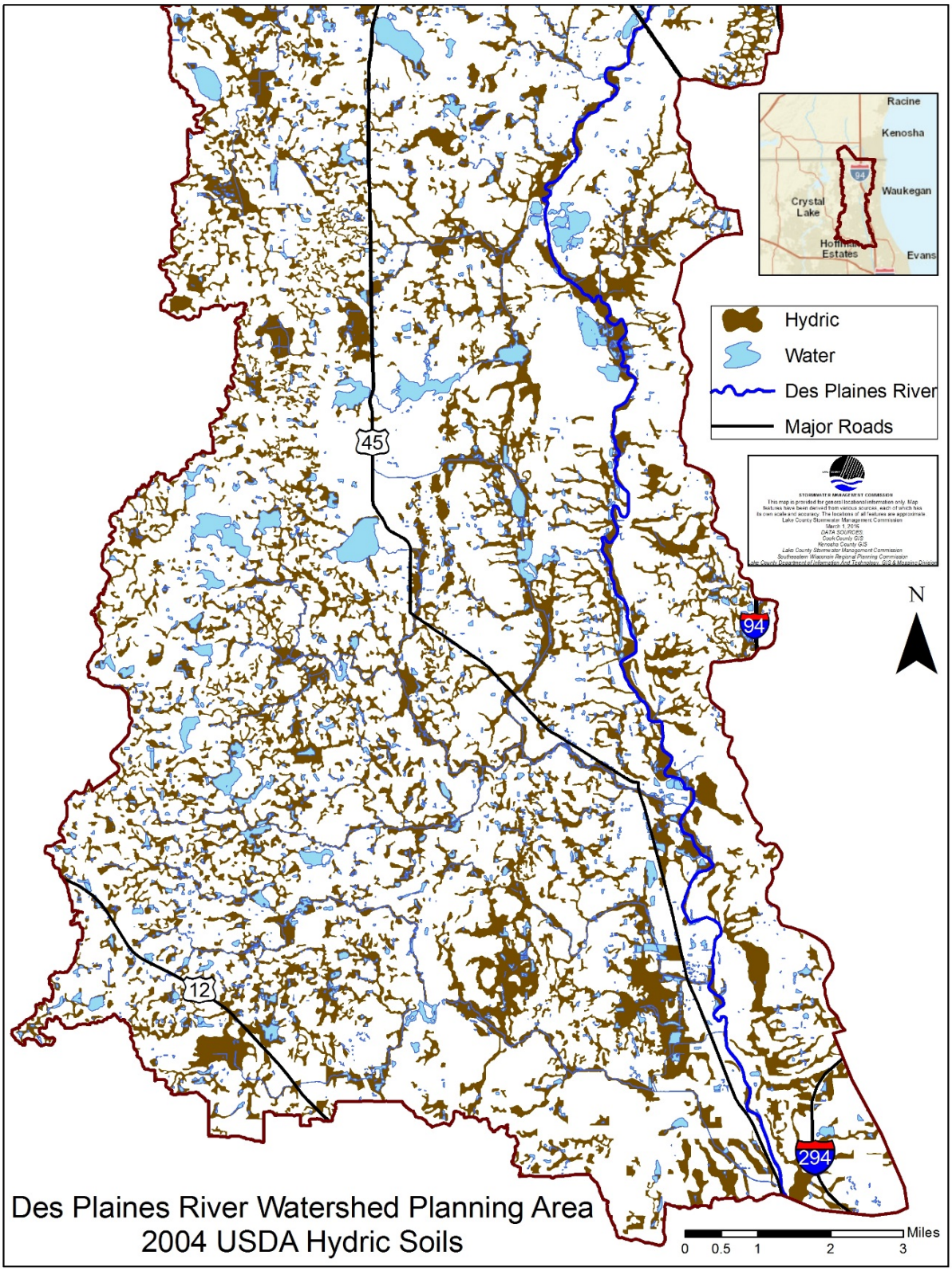


Figure 3-14: Hydric Soils – Southern Portion of the Des Plaines River Watershed
NRCS 2012 Lake County Soil Survey, 2004 Kenosha County Soil Survey and 2011 Cook County Soil Survey

3.3.3 HYDROLOGIC SOIL GROUPS

The NRCS broadly classifies soils based on their drainage characteristics into four different hydrologic soil groups (HSGs). The classification considers soil texture, drainage description, runoff potential, infiltration rate and transmission rate (permeability). Group A is comprised of the most permeable soil types (i.e., sandy soils) and has the least runoff potential while group D includes the most impermeable soil types (i.e. clay) and has the greatest runoff potential. HSGs should be considered when identifying potential stormwater best management practice and retrofit opportunities. The main HSGs are separated into four categories: A, B, C, and D; see Table 3-5 for HSG permeability and surface runoff characteristics.

Table 3-5: Hydrologic Soil Groups and Corresponding Attributes

HSG	SOIL TEXTURE	DRAINAGE DESCRIPTION	RUNOFF POTENTIAL	INFILTRATION RATE	TRANSMISSION RATE	SPATIAL PATTERN IN WATERSHED	ACRES (% OF WATERSHED)
A	Sands (and Gravels), Loamy Sand, or Sandy Loam	Well to Excessively Drained	Low	High	High (greater than 0.30 in/hour)	Typically adjacent to wetlands or open water	112 (<1%)
B	Silt Loam or Loam	Moderately Well to Well Drained	Moderate	Moderate	Moderate	Along larger streams and water bodies – riparian areas	2,850 (1.9%)
C	Sandy Clay Loam	Somewhat Poorly Drained	High	Low	Low	Upland areas	66,788 (44.4%)
D	Clay Loam, Silty Clay Loam, Sandy Clay Loam, Silty Clay, or Clay	Poorly Drained	High	Very Low	Very Low	Tops of moraines and ridges	11,271 (7.5%)
						Total:	81,021

There are also areas of the watershed with combined soil groups such as: HSG-A/D, HSG-B/D and HSG-C/D and N/A – water, landfills, urban areas, etc. (totaling 41.5% of the watershed). These combined soil groups are a combination of soil types and exhibit a combination of permeability and surface runoff characteristics. The soil characteristics can change depending on saturation, slope and time of year. If these soils can be adequately drained (with underground drain tiles or other techniques), then they are assigned to dual hydrologic soil groups based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the un-drained condition.

Runoff curve numbers classify the runoff potential of different soil types with different types of land cover. The curve numbers are a function of HSGs, land cover or usage and antecedent soil moisture conditions. The curve number value ranges from 0 - 100. Lower runoff curve numbers indicate low runoff potential, while larger runoff curve numbers indicate increased runoff potential. Overall, soils in the DPR planning area are not well drained.

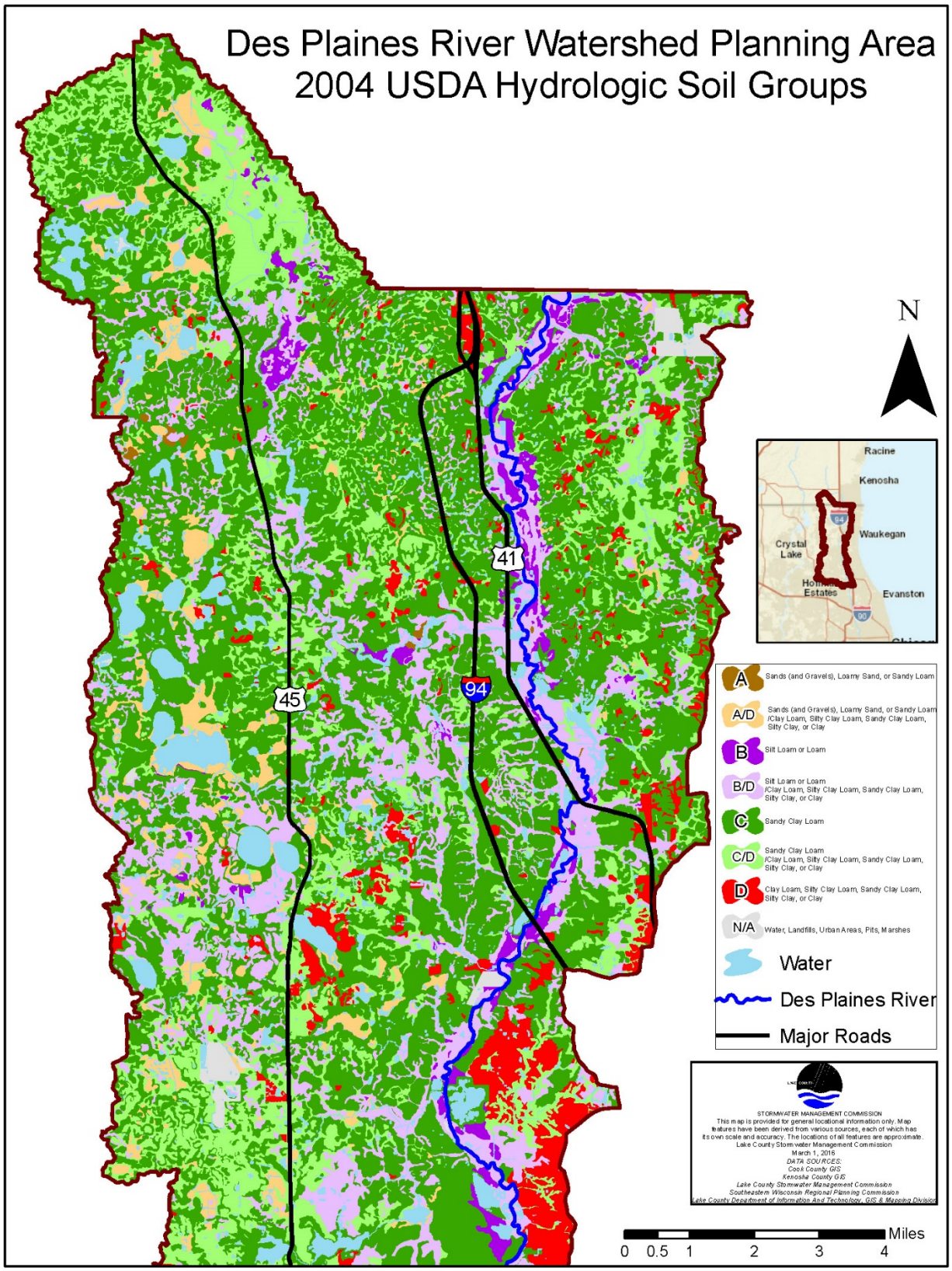


Figure 3-15: Hydrologic Soil Groups – Northern Portion Des Plaines River Watershed Planning Area

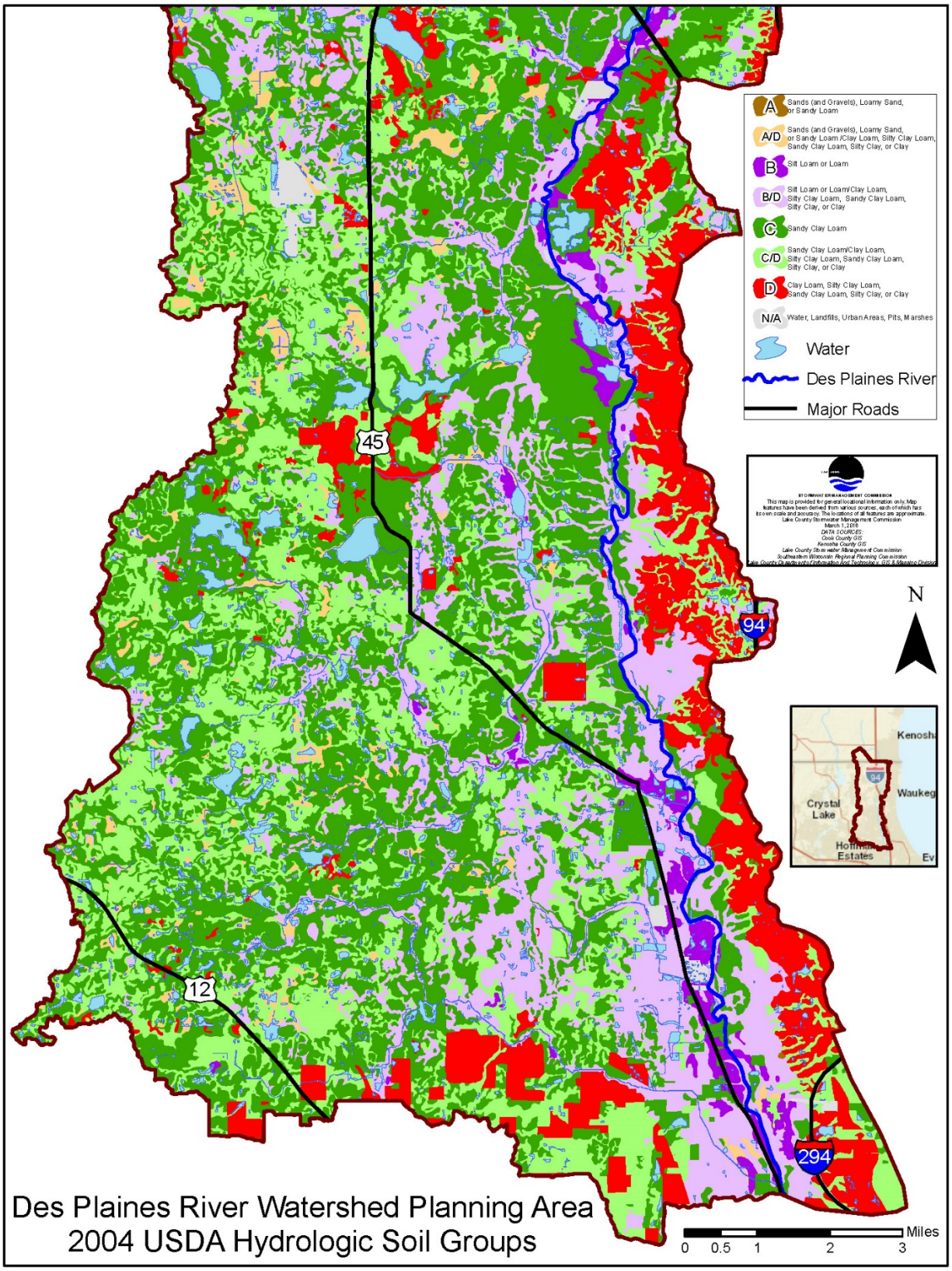


Figure 3-16: Hydrologic Soil Groups – Southern Portion Des Plaines River Watershed Planning Area

3.4 WATERSHED HYDROLOGY

Hydrology is the study of the occurrence, circulation, distribution, and properties (e.g., quality) of water. Earth's water is constantly being cycled between oceans, the atmosphere, and land through different pathways at different rates. The movement of the earth's water through these various pathways is called the hydrologic cycle. Although the hydrologic cycle is inherently complex, one can gain a general understanding of how it works by envisioning the following process. Clouds form over the ocean due to the evaporation of water. Wind carries the clouds ashore where they produce rain. Excess rainfall (i.e., stormwater runoff) flows into lakes, rivers, wetlands, and groundwater. Over time, water stored in the lakes, rivers, and wetlands, either evaporates back into the atmosphere or flows back into the ocean, beginning the cycle anew.

Primarily, hydrology involves studying the flow of water through the various hydrologic pathways that can be found within a geographical region or area. These pathways connect every component of the landscape and can generally be divided into surface and ground water hydrologic pathways. Surface water includes all hydrologic pathways at or above the earth's surface, including precipitation, evapotranspiration and surface water flow. Ground water includes all hydrologic pathways below the earth's surface including, infiltration, interflow, and groundwater flow. Hydrology is the study of surface water pathways, and hydrogeology is the study of ground water pathways. Primary areas of study within the science include developing methods for directly measuring flows through the various hydrologic pathways and developing and/or applying models for estimating flows through the various hydrologic pathways. When applied to a watershed, hydrology typically involves studying the flow of water between the surface water hydrologic pathways that connect the air, land, lakes, rivers, and wetlands found within the watershed.

NOTEWORTHY: HYDROLOGIC CYCLE

The hydrologic cycle describes the continuous movement of water on, above, and below the surface of the earth. The total mass of water on earth remains relatively constant over time, but the amount of water in each of its three primary states: solid (i.e., ice), liquid (i.e., water), and gas (i.e., water vapor), is variable depending on a wide range of climate-related variables. Water moves from one state to another through various hydrologic pathways, such as evaporation, transpiration, condensation, precipitation, infiltration, surface water flow, and interflow (i.e., shallow groundwater flow). As water moves between states, energy is exchanged, which affects temperatures on the surface of the earth. For example, when water evaporates, energy is absorbed, and the surface of the earth is cooled through the process of evaporative cooling. When water condenses, energy is released, and the surface of the earth is warmed. These energy exchanges, which occur on a global scale, powered by solar energy, have a significant influence on the earth's climate, as does water, in its three primary states (e.g., water vapor absorbs and emits energy back toward the surface of the earth; however, when water vapor forms into clouds, it reflects a significant amount of solar radiation back into space). Water and the hydrologic cycle are responsible for earth's mild climate and makes life possible on earth.

Hydrology and hydraulics are terms used to describe the effects of precipitation including infiltration, runoff, and evaporation on land surfaces that drain to streams and lakes. Hydrologic studies of watersheds usually typically determine how topography naturally delineates the land into watersheds, subwatersheds and smaller catchments. Hydraulics is the branch of science that deals with practical application of liquid in motion.

3.4.1 SUBWATERSHEDS

Table 3-6 and Figure 3-17 display the major **subwatersheds** in the DPR planning area. There are 10 subwatersheds ranging in size from approximately 3 square miles (Bull's Brook) to 51 square miles (Upper Des Plaines River) with an average size of 23 square miles.

SUBWATERSHED: Topographic perimeter of the catchment area of a stream tributary. Watersheds are broken down into these smaller geographic units.

The subwatersheds in the DPR planning area are roughly equivalent to USGS HUC 12 boundaries in size; however, the subwatersheds in the DPR planning area are not official USGS HUC boundaries. The subwatersheds in the DPR planning area were originally derived from HUC boundaries in the late 1980s. These boundaries have been altered as more detailed data, such as remapping from floodplain studies and higher resolution topographic data, has become available.

Table 3-6: Des Plaines River Subwatersheds

SUBWATERSHEDS	SQUARE MILES	ACRES	% OF WATERSHED
Aptakisic Creek	6.83	4,374.3	3%
Buffalo Creek	27.2	17,392.8	12%
Bull Creek	11.2	7,136.4	5%
Bull's Brook	2.84	1,816.8	1%
Indian Creek	37.7	24,151.4	16%
Lower Des Plaines River	22.8	14,607.2	10%
Mill Creek	30.9	19,783.0	13%
Newport Drainage Ditch	7.8	5,018.1	3%
North Mill – Dutch Gap Canal	36.8	23,532.3	16%
Upper Des Plaines River	50.9	32,548.6	22%
TOTALS:	**235**	**150,361**	

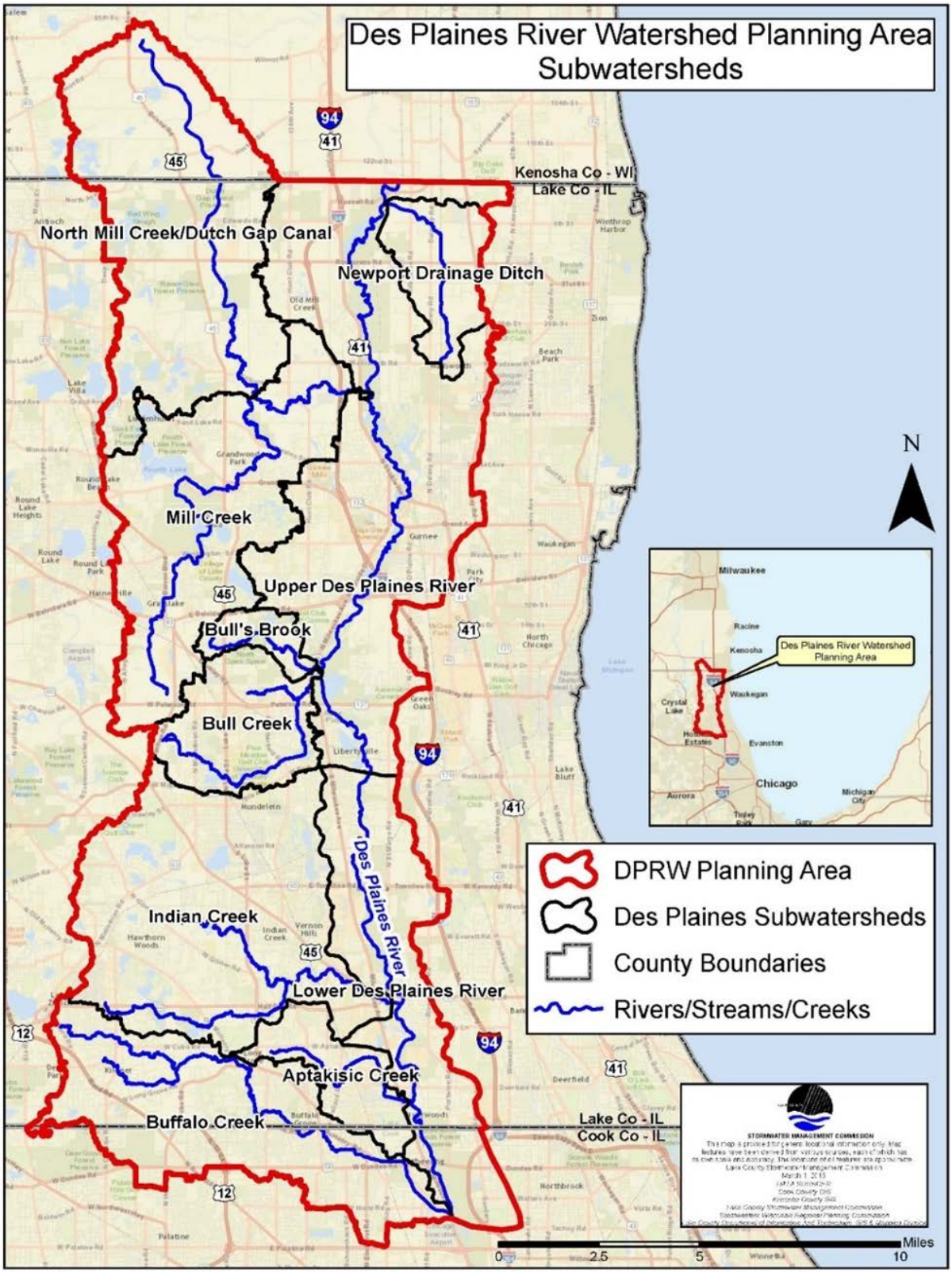


Figure 3-17: DPR Planning Area Subwatershed Map

3.4.2 CATCHMENT

The DPR planning area consists of 432 catchments ranging in size from 18 to 1,432 acres, with the average (mean) size of 348 acres. As part of the watershed delineation discussed in Section 3.4.1, the DPR planning area was further divided into 432 catchments using 2011 LiDAR data from Kenosha County, WI, 2007 LiDAR data from Lake County, IL, and 2008 LiDAR data from Cook County, IL. The LiDAR datasets were used to produce a seamless raster and basins were developed using models in ArcGIS. The boundaries developed in GIS were further augmented and refined using the latest aerial photography as well as other datasets such as water, roads, and culverts. Catchments of individual lakes ("lake-sheds") that were previously delineated by the LCHD were maintained as much as possible. The catchments represent surface drainage only and do not account for sub-surface (storm sewers or drain tile drainage) areas.

Table 3-7 and Figure 3-19 summarize the delineated catchments by subwatershed.

CATCHMENTS: Small unit of a watershed or subwatershed that is delineated and used in watershed planning efforts because the effects of impervious cover are easily measured, there is less chance for confounding pollutant sources, boundaries have fewer political jurisdictions, and monitoring/mapping assessments can be done in a relatively short amount of time. See Figure 3-18.

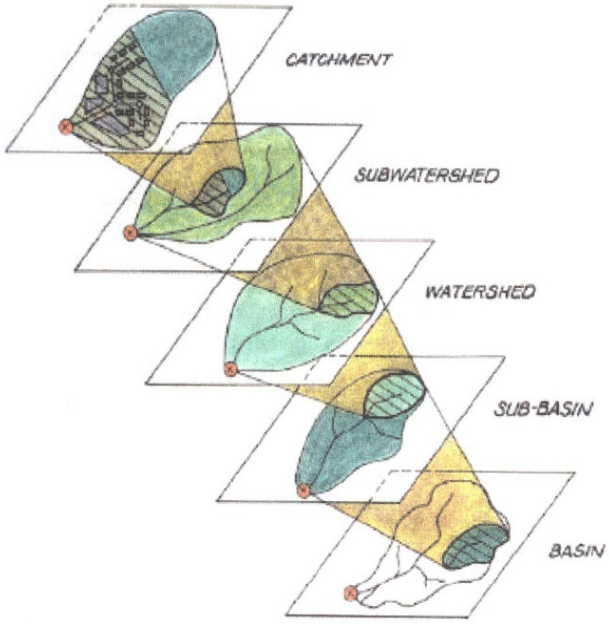


Figure 3-18: Defining Watershed, Subwatershed, and Catchment/Subwatershed Management Unit Boundaries

Table 3-7: Subwatershed Catchment Compilation Data

SUB-WATERSHEDS	NUMBER OF CATCH-MENTS	TOTAL ACRES	AVERAGE (MEAN) ACREAGE OF CATCH-MENTS
Aptakisic Creek	9	4,374	486
Buffalo Creek	43	17,393	404
Bull's Brook	6	1,817	303
Bull Creek	21	7,132	340
Dutch Gap/North Mill Creek	63	23,532	374
Indian Creek	64	24,152	377
Lower Des Plaines	58	14,607	252
Mill Creek	58	19,783	341
Newport Drainage Ditch	16	5,018	314
Upper Des Plaines	94	32,553	346
TOTAL:	**432**	**150,361**	

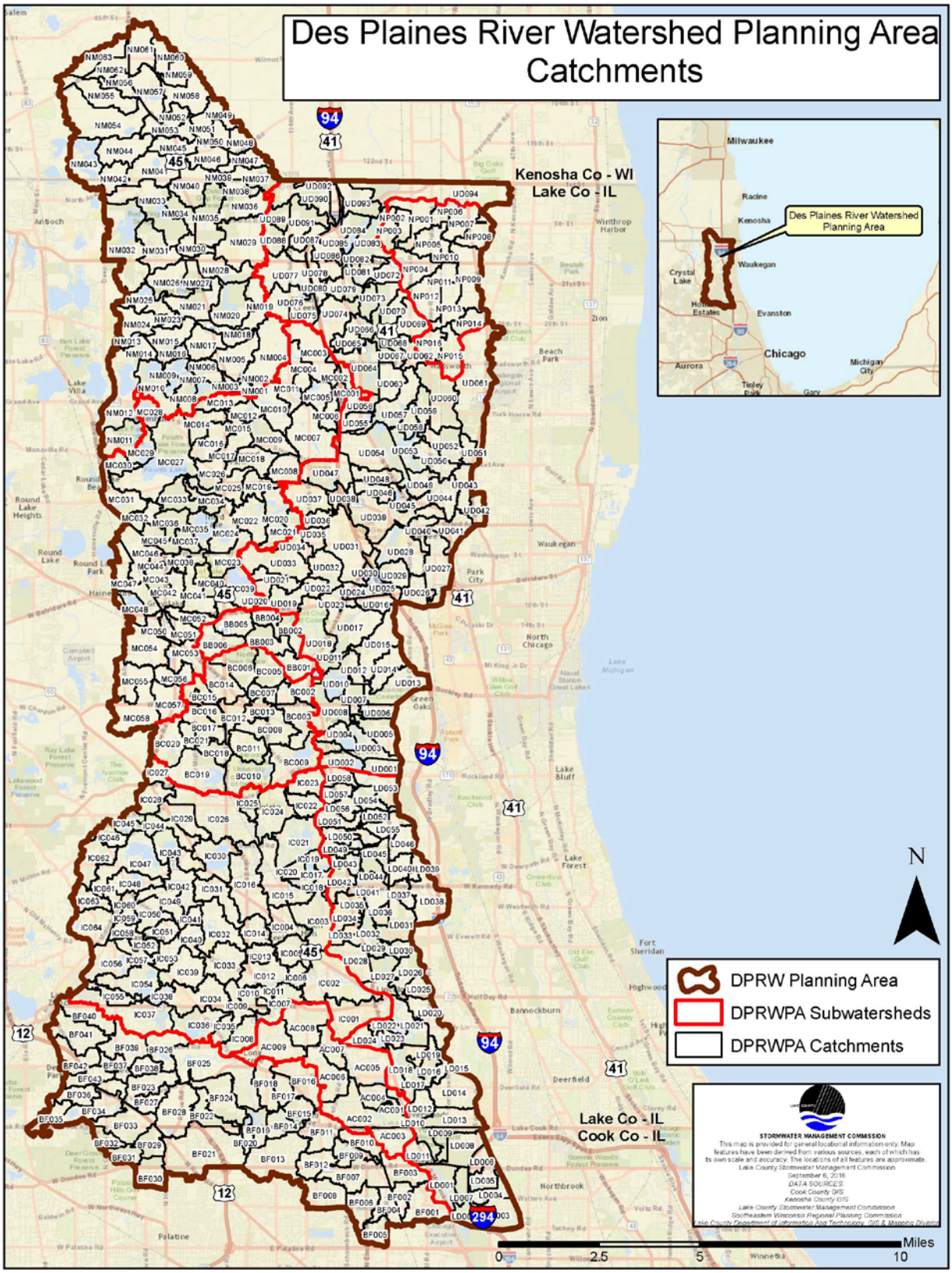


Figure 3-19: Des Plaines River Watershed SMU and Catchment Map

3.4.3 STREAM HYDROLOGY

Discharge (volume of flowing water) in the DPR planning area is derived from three general sources of flow:

- baseflow and interflow, the discharge of groundwater and shallow subsurface flow to lakes, streams, and wetlands.
- overland flow and surface runoff, discharge of water flowing over the ground surface as a result of direct precipitation, snowmelt, ground saturation, or other sources of water. Flow in streams, surface waters and wetlands is included in this category.
- treated effluent and return flow, discharge of water that has been used for some human activity such as treated wastewater from public water supplies or industrial uses, cooling and process water, and irrigation. Treated wastewater effluent is a significant source of overall streamflow in the planning area. Return flows from cooling, industrial processes, and irrigation are not significant.

Under pre-settlement landscape conditions, discharge during much of the year in all streams within the watershed was driven by baseflow, interflow, and tributary flow (runoff) from other water bodies. Runoff from precipitation had a less pronounced effect on stream discharge compared to present conditions. As the DPR planning area has developed, baseflow and interflow has almost certainly been reduced with surface runoff contributing a greater proportion of the volume of annual discharge (see Section 4.1). Tiling, channelization of streams, and ditching of wetlands and low-lying areas lowered shallow groundwater levels in some areas. Consequently, stream hydrology in the DPR planning area has been extensively altered since European settlement.

Additionally, the DPR planning area receives hydrologic inputs from the Great Lakes basin through public water supply systems that transport potable water from Lake Michigan to systems within the DPR planning area. Much of the wastewater that the WWTPs in the DPR planning area receives is derived from Lake Michigan, then is treated, and discharged to the Des Plaines River or its tributaries. Hastings Creek, Mill Creek, lower Aptakisic Creek, and the Des Plaines river receive significant flow inputs from WWTP discharges within the DPR planning area, while additional streams (but not all) receive relatively small inputs from WWTPs. These inputs are most noticeable during periods of baseflow or low flow, when “natural” sources of streamflow are augmented by flows from WWTP discharges. For example, Figure 3-20 depicts the flow duration curves for the Des Plaines River at Gurnee stream gage for water years 1945-1975 and 1976-2017, corresponding the periods before and after the introduction of two WWTP effluent discharges upstream of this location. The curves indicate an increase in discharges for both high and low flows after 1975. The 90% and 75% probability exceedance low flows increased 3900% (from 1 to 40 cubic feet/second) and 786% (7 to 62 cubic feet/second), respectively. The addition of WWTP effluent flows to the Des Plaines River is also discussed in section 3.17.

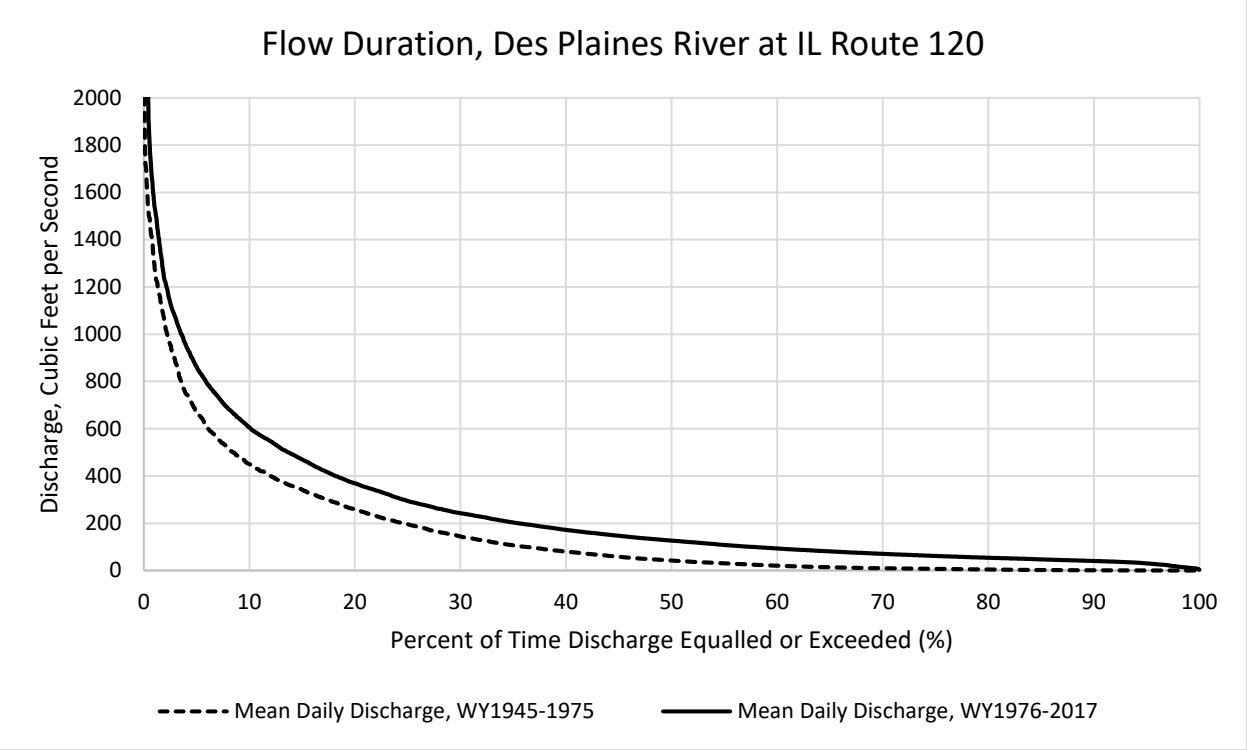


Figure 3-20: Flow duration curves for Des Plaines River at IL Route 120 for the periods water years 1945-1975 and water years 1976-2017
(Data from USGS).

The cumulative effects of watershed hydrologic changes can also be discerned by comparing hydrographs (change in discharge over time) for different stream segments in the DPR planning area. Figure 3-21 shows the annual hydrograph for the 2014 water year (October 1, 2013-September 30, 2014) for three locations on the Des Plaines River (above) and three locations in the North Mill Creek/Dutch gap Canal subwatershed (below). The dashed lines represent locations that receive runoff from more rural, less developed watersheds (North Mill Creek at IL Route 173 and the Des Plaines River at Russell Road).

These locations tend to have less pronounced peaks in response to runoff. Also note in the lower hydrograph that North Mill Creek at IL Route 173, with a watershed of more than 20 square miles, tends to have very low baseflow during the first five months of the record (<1 cubic foot/second). Hastings Creek at Miller Road has a watershed of less than five square miles, but baseflow at this location is augmented by WWTP discharge and rarely dropped below 1 cubic foot/second. Following a runoff event in March, peak discharge in North Mill Creek at IL Route 173 was more than twice the peak in Hastings Creek, owning to the differing in watershed size.

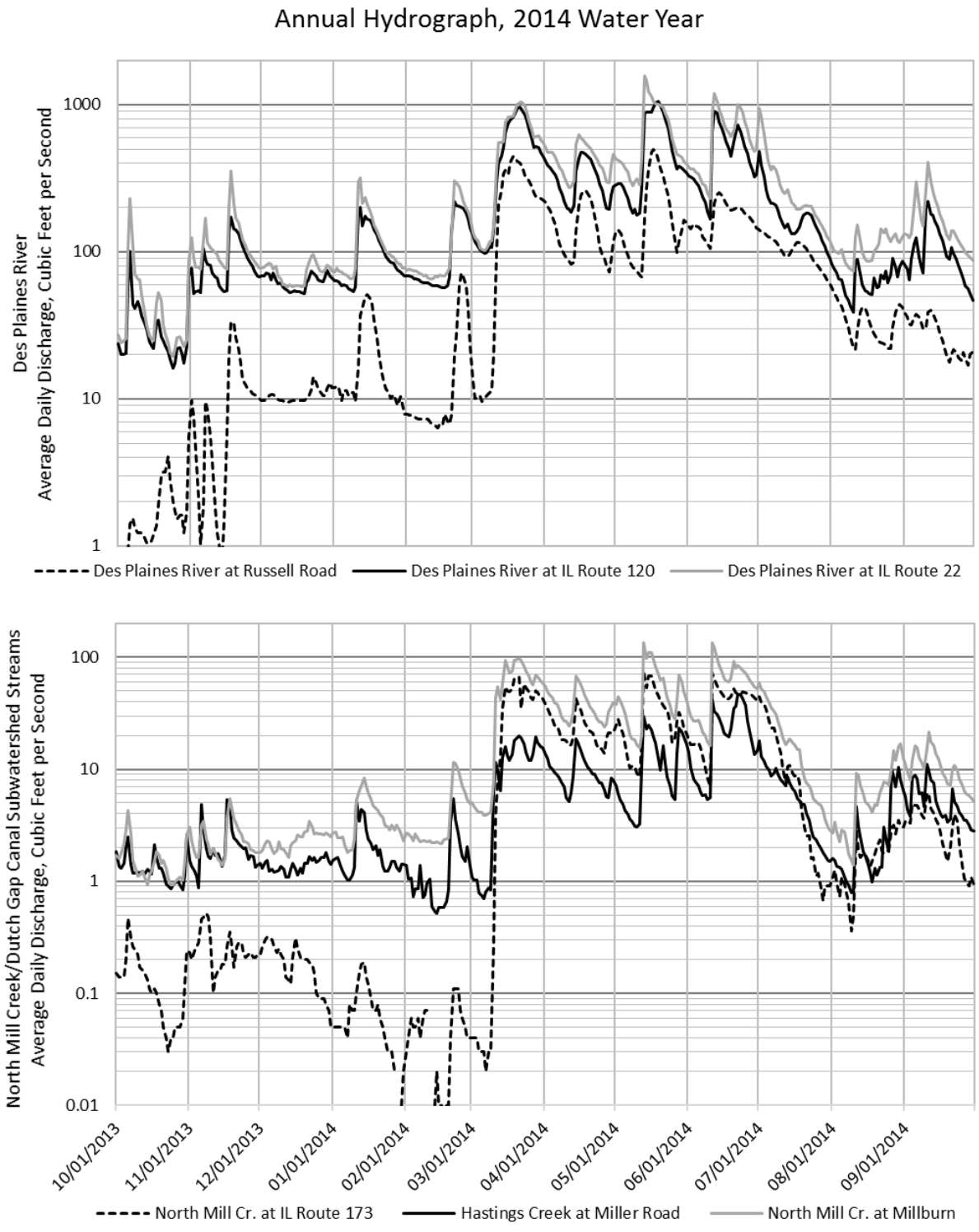


Figure 3-21: Annual hydrographs for water year 2014 at selected locations on the Des Plaines River (above) and in the North Mill Creek/Dutch Gap Canal watershed (below)
(Data from USGS).

Changes in stream hydrology are also evident over much shorter time periods. Figure 3-22 shows a comparison of 7-day hydrographs for the Des Plaines River at Russell Road and IL Route 120, Mill Creek at Hunt Club Road, and Hastings Creek at Miller Road over the period of August 1-8, 2014. The Des Plaines River at IL Route 120 and Hastings Creek at Miller Road are strongly influenced by upstream WWTP discharges, evidenced by the regular daily swings in discharge compared to the other locations with less or no WWTP effluent discharged upstream (Des Plaines River at Russell Road and Mill Creek at Hunt Club Road).

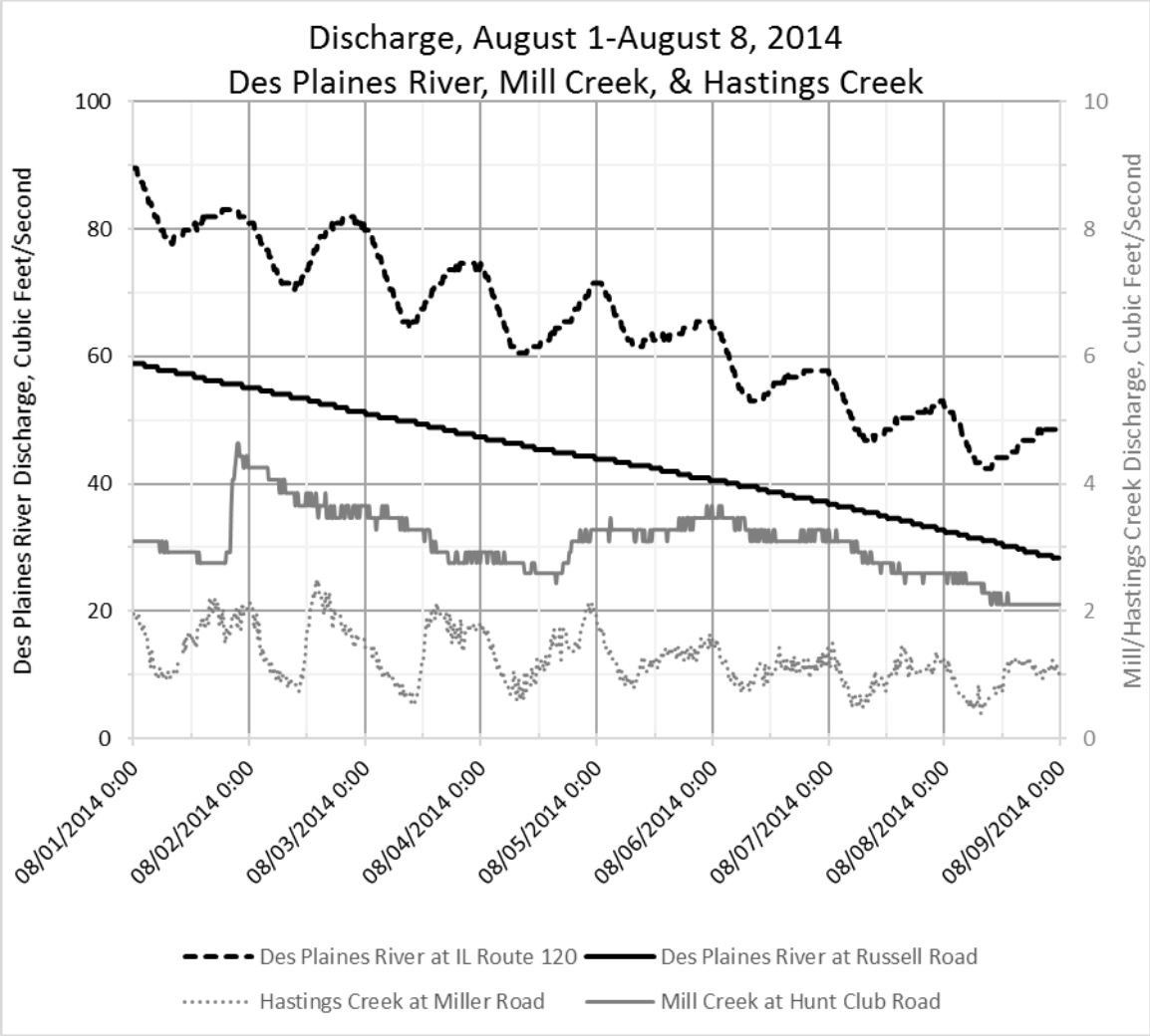


Figure 3-22: 7-day hydrograph for the Des Plaines River at Russell Road and IL Route 120, Mill Creek at Hunt Club Road, and Hastings Creek at Miller Road.
Note: Discharge values for Mill and Hastings Creeks are shown on the secondary vertical axis on the right-hand side of the chart (Data from USGS).

There are numerous **stream classification systems and characterization terms** in use by the community of engineers, watershed and natural resource managers, and researchers engaged in watershed planning. This plan recognizes the utility of these systems and terms but does not specify or apply them to streams in the planning area. In particular, the concepts of stream order and headwater streams are recognized as potentially significant to determining the feasibility of attaining certain water quality thresholds (such as indices of biotic integrity). The DPR planning area likely includes many streams that meet one or more

definitions of "headwater", specifically as headwaters of tributaries to the Des Plaines River. The spatial position of streams, permanence of flow, and the effect of anthropogenic changes to watershed and stream hydrology will require additional scrutiny and agreement among watershed managers, policy-makers, and regulators if these types of classifications are intended to define future watershed goals.

NOTEWORTHY: STREAM CLASSIFICATION

Numerous classification systems and characterizations for streams exist and are generally based on drainage area size, stream network pattern, stream channel morphology, spatial relationship to other streams, and discharge characteristics.

Stream order is a common method used to classify streams (usually hierarchically) within a drainage network but is dependent on underlying cartography. Similarly, it is generally agreed by hydrologists, ecologists, and watershed managers that "headwater" streams are of significance, though there is not a universal definition. Fritz, Johnson, and Walters (2006) have summarized the issue of stream order and headwater characterization well:

> "Stream order is a measure of stream position within a drainage network system (Horton 1932, Strahler 1945, Shreve 1966). Headwater streams are typically considered to be first- and second-order streams (Gomi et al. 2002, Meyer and Wallace 2001), meaning streams that have no upstream tributaries (i.e., "branches") and those that have only first-order tributaries, respectively. Use of stream order to define headwater streams is problematic because stream-order designations vary depending upon the accuracy and resolution of the stream delineation (Mark 1983, Hanson 2001). Lack of agreement among maps with different mapping resolution is common when identifying headwater stream[s], determining stream order, and determining total stream [length]... The smallest headwater streams are not designated as channels on topographic maps and may be difficult to discern in aerial photographs. Thus, stream order designations based on maps are typically underestimated (Hughes and Omernik 1983), prompting some investigators to characterize such streams as zero-order streams (e.g., Brown et al. 1997). Most "blue line" designations on topographic maps are not based on field studies, but are "drawn to fit a rather personalized aesthetic" of the cartographer (Leopold 1994) or drawn with standards that exclude a proportion of headwater channels (Drummond 1974)."

3.5 WATERSHED JURISDICTIONS AND DEMOGRAPHICS

3.5.1 UNITS OF GOVERNMENT

The DPR planning area has numerous political jurisdictions; including municipal, township, and other local, state, and federal elective and agency jurisdictions. The boundaries of these jurisdictions are seldom drawn to coincide with watershed boundaries. Seventy one percent of the DPR planning area is incorporated, within 39 municipalities (totaling 106,577 acres). The Village of Gurnee is the largest municipality by area with 8,636 acres, or about 5.7% watershed coverage. The next largest municipality is Long Grove which occupies 8,036 acres, or about 5.3% of the watershed. Twenty nine percent of the DPR planning area is unincorporated, made up of fifteen townships (totaling 43,783 acres). Newport Township is the largest township by area with 8,951 acres, or about 6% watershed coverage. The next largest township is Warren Township with 8,290 acres, or about 5.5% of the watershed. Municipalities and townships in the DPR planning area are shown in Figure 3-23and Table 3-8**.**

Table 3-8: Municipalities and Townships in the DPR Planning Area

NAME	ACRES	% OF THE WATERSHED
Antioch	2,129.3	1.4%
Antioch Township	4,498.3	3.0%
Arlington Heights	954.2	0.6%
Avon Township	1,841.9	1.2%
Beach Park	1,363.9	0.9%
Benton Township	262.4	0.2%
Bristol	7,666.8	5.1%
Buffalo Grove	5,959.4	4.0%
Deer Park	1,169.7	0.8%
Deerfield	43.0	0.0%
Ela Township	2,351.9	1.6%
Fremont Township	3,644.2	2.4%
Glenview	1.9	0.0%
Grayslake	6,821.7	4.5%
Green Oaks	772.6	0.5%
Gurnee	8,636.4	5.7%
Hainesville	2.4	0.0%
Hawthorn Woods	3,558.4	2.4%
Indian Creek	170.7	0.1%
Kildeer	2,829.4	1.9%
Lake Forest	107.0	0.1%
Lake Villa	217.0	0.1%
Lake Villa Township	3,583.3	2.4%
Lake Zurich	2,023.3	1.3%
Libertyville	5,866.7	3.9%
Libertyville Township	4,600.9	3.1%
Lincolnshire	2,161.8	1.4%
Lindenhurst	3,118.5	2.1%
Long Grove	8,035.7	5.3%
Mettawa	2,705.5	1.8%
Mundelein	5,931.4	3.9%
Newport Township	8,950.8	6.0%
Northbrook	913.9	0.6%
Northfield Township	527.0	0.4%
Old Mill Creek	6,901.6	4.6%
Palatine	1,488.3	1.0%
Palatine Township	780.1	0.5%
Park City	259.7	0.2%
Prospect Heights	206.9	0.1%
Riverwoods	1,618.2	1.1%
Round Lake Beach	406.2	0.3%
Round Lake Park	37.3	0.0%
Salem Lakes	1,012.1	0.7%
Third Lake	551.0	0.4%
Vernon Hills	5,046.8	3.4%
Vernon Township	3,621.4	2.4%
Wadsworth	6,267.3	4.2%
Warren Township	8,289.8	5.5%
Waukegan	3,728.4	2.5%

NAME	ACRES	% OF THE WATERSHED
Waukegan Township	124.9	0.1%
West Deerfield Township	7.6	0.0%
Wheeling	4,606.8	3.1%
Wheeling Township	698.6	0.5%
Zion	1,285.6	0.9%
TOTAL:	**150,361**	**100%**

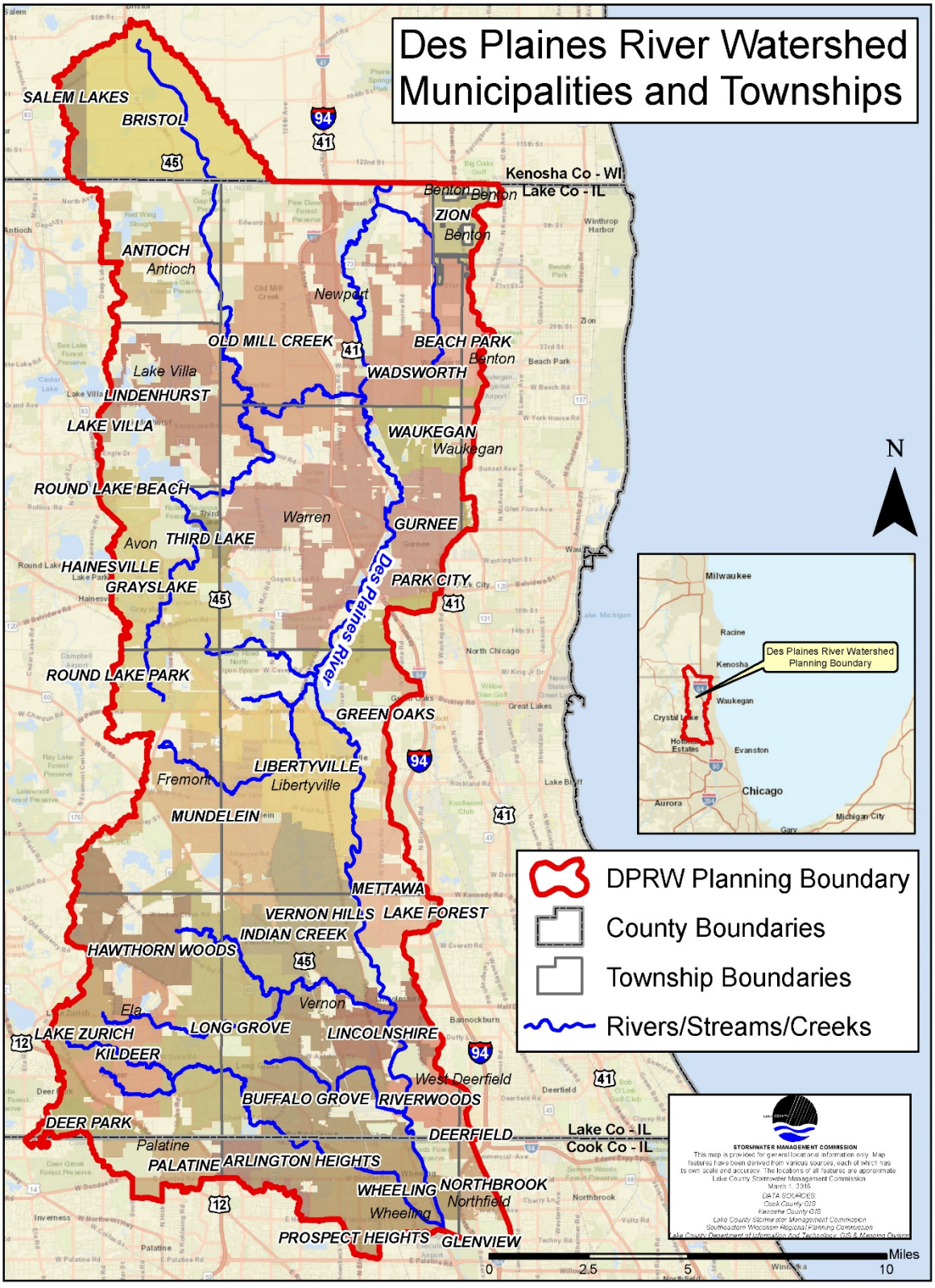


Figure 3-23: DPR Planning Area Municipalities and Townships

3.5.2 Roles and Responsibilities of Each Unit of Government

One of the challenges of creating and implementing watershed plans is that a watershed usually includes multiple jurisdictions that have varying interests, resources, and responsibilities. This variability can be beneficial if the jurisdictions actively work together to collaborate on policies, projects, and practices, but frequently it presents watershed coordination challenges for efficiently implementing BMP projects and for providing program, policy, and regulatory consistency. In some cases, independent actions by one community or jurisdiction can have a detrimental impact on watershed neighbors, or a good project may not be as effective as it could have been if resources had been pooled to expand the scope of the project to cover a broader area of the watershed, thereby providing economies of scale.

Watershed planning brings communities together to protect and improve the land and water resources that they share and impact. Watershed activities and projects offer many opportunities for communities and other government agencies to operate outside of their traditional "silos." When communities meet regularly as a watershed group, it provides opportunities to share information and coordinate activities. For instance, when a community or agency develops or updates a comprehensive plan, disagreement and costly competition among agencies/jurisdictions can be averted if the watershed plan and the plans of neighboring communities and sister agencies (such as parks departments or districts) are considered. This level of coordination benefits the watershed. As an example, a municipality may receive a development proposal for a land parcel that the local parks department has identified as environmentally sensitive and has included in their long-term conservation plan. Although the underlying zoning for the land may allow the proposed development, both the community and the developer are likely going to face challenges from competing interests, and with land development standards so that it does not negatively impact the features that made it environmentally sensitive. Sharing information about the land during the comprehensive planning process can prevent these kinds of problems.

3.5.3 POPULATION

Based on the 2010 decennial census, the total population within the DPR planning area is approximately 399,207 as shown in Figure 3-24.

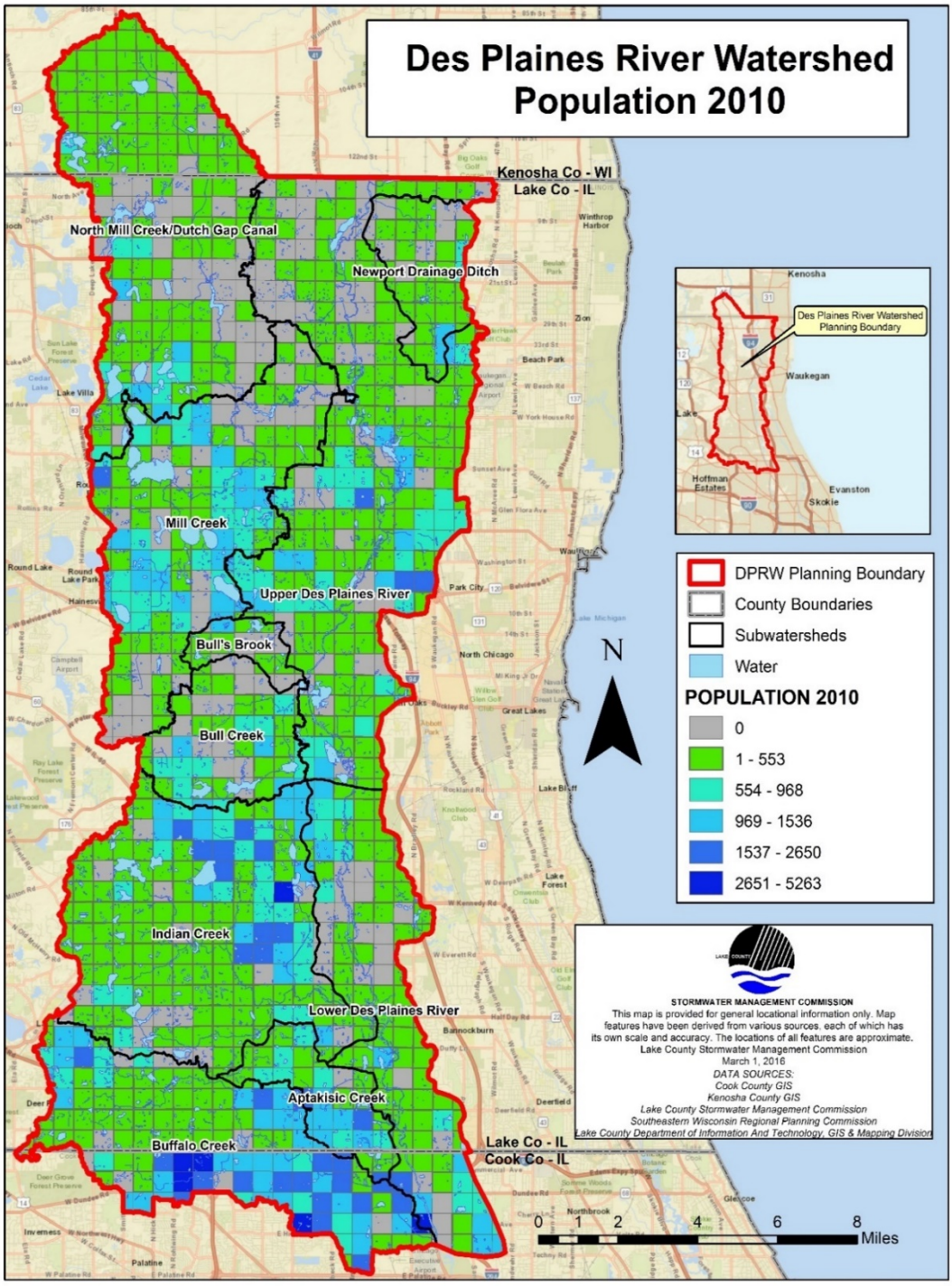


Figure 3-24: Population in the DPR Planning Area (2010)

Note: Each "square" on the map represents a quarter section of the Public Land Survey System. The data sources of CMAP and SEWRPC represent this data in quarter sections.

3.5.4 Population Change

Population is forecasted to increase from 399,207 to 506,234 (21%) by 2040 (Figure 3-25**)**.

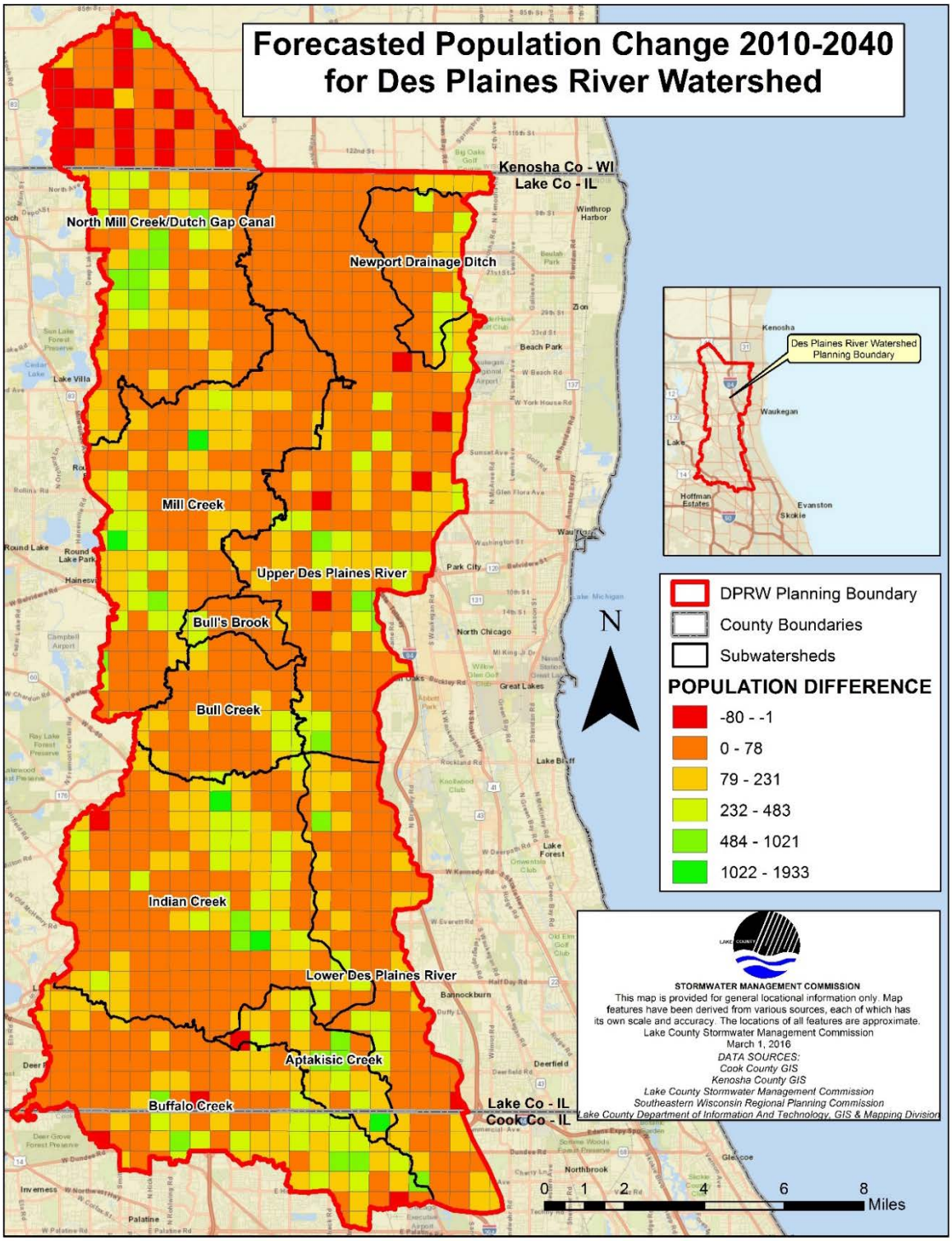


Figure 3-25: Population Change in the DPR Planning Area (2010-2040)

Note: Each "square" on the map represents a quarter section of the Public Land Survey System. The data sources of CMAP and SEWRPC represent this data in quarter sections

3.5.5 GROWTH FORECASTS

The population change that is described in Section 3.5.4 is expected to increase the number of homes in the watershed, especially in those areas where population growth is expected to increase the most (see Figure 3-25 and Figure 3-26). There is a 37,038 (20%) increase in the number of households predicted within the watershed. As of 2010, there were approximately 195,067 jobs in the DPR planning area, but CMAP forecasts employment to increase by 23% by the year 2040 (Figure 3-27). The CMAP population and employment forecast is based on a model that accounts for local future development and land use plans, as well as other land use, demographic, and economic variables and trends. Due to the DPR planning area incorporating only a small portion of the entire CMAP population forecast area, the results should be considered as an example or indicator of how the watershed could develop over the next few decades. This plan does not draw conclusions or recommendations from any single evaluation unit (square) in the forecast map. No forecast data for household and employment was available for the Wisconsin portion of the DPR planning area.

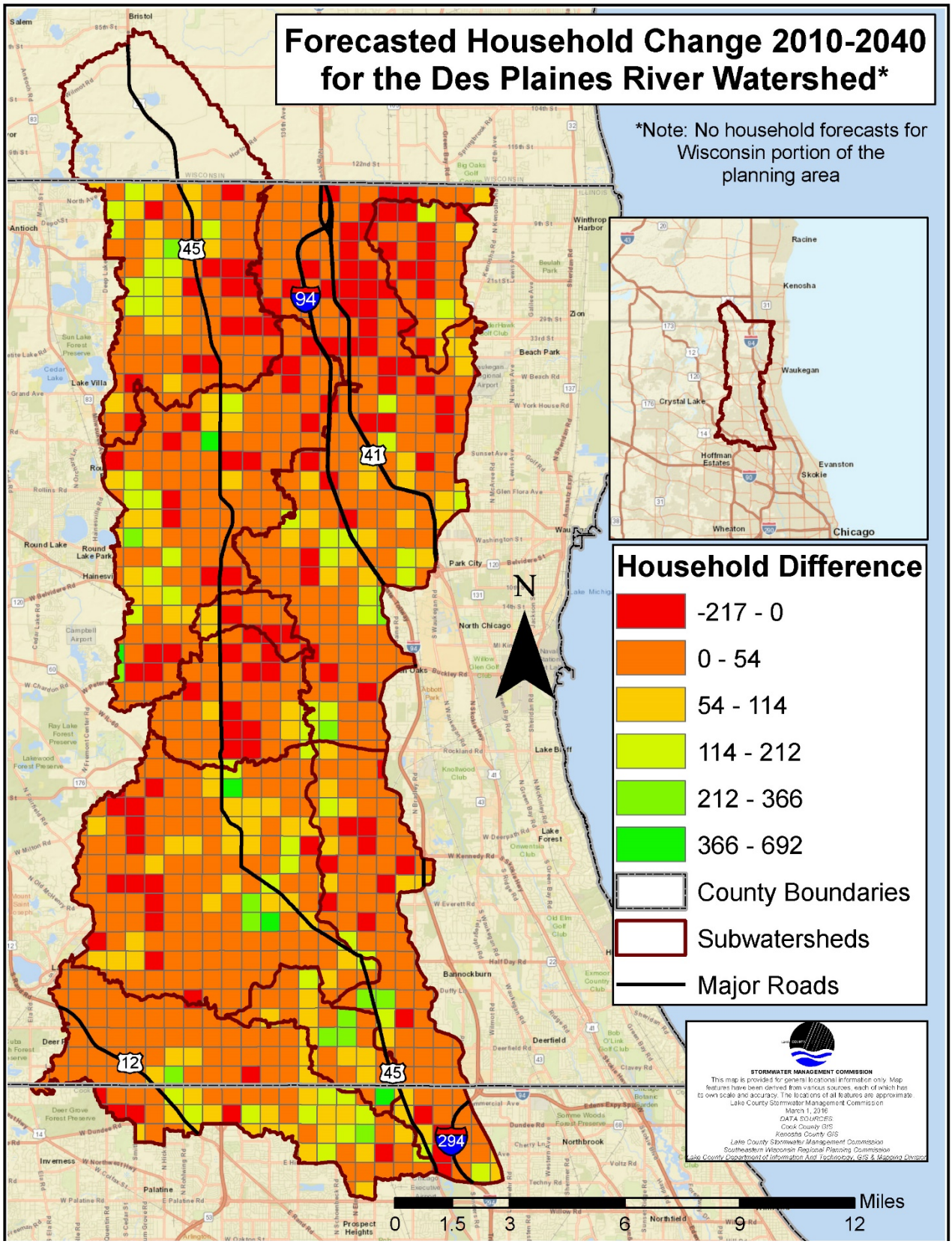


Figure 3-26: Forecasted Household Change in the DPR Planning Area (2010)

Note: Each "square" on the map represents a quarter section of the Public Land Survey System. The data sources of CMAP and SEWRPC represent this data in quarter sections.

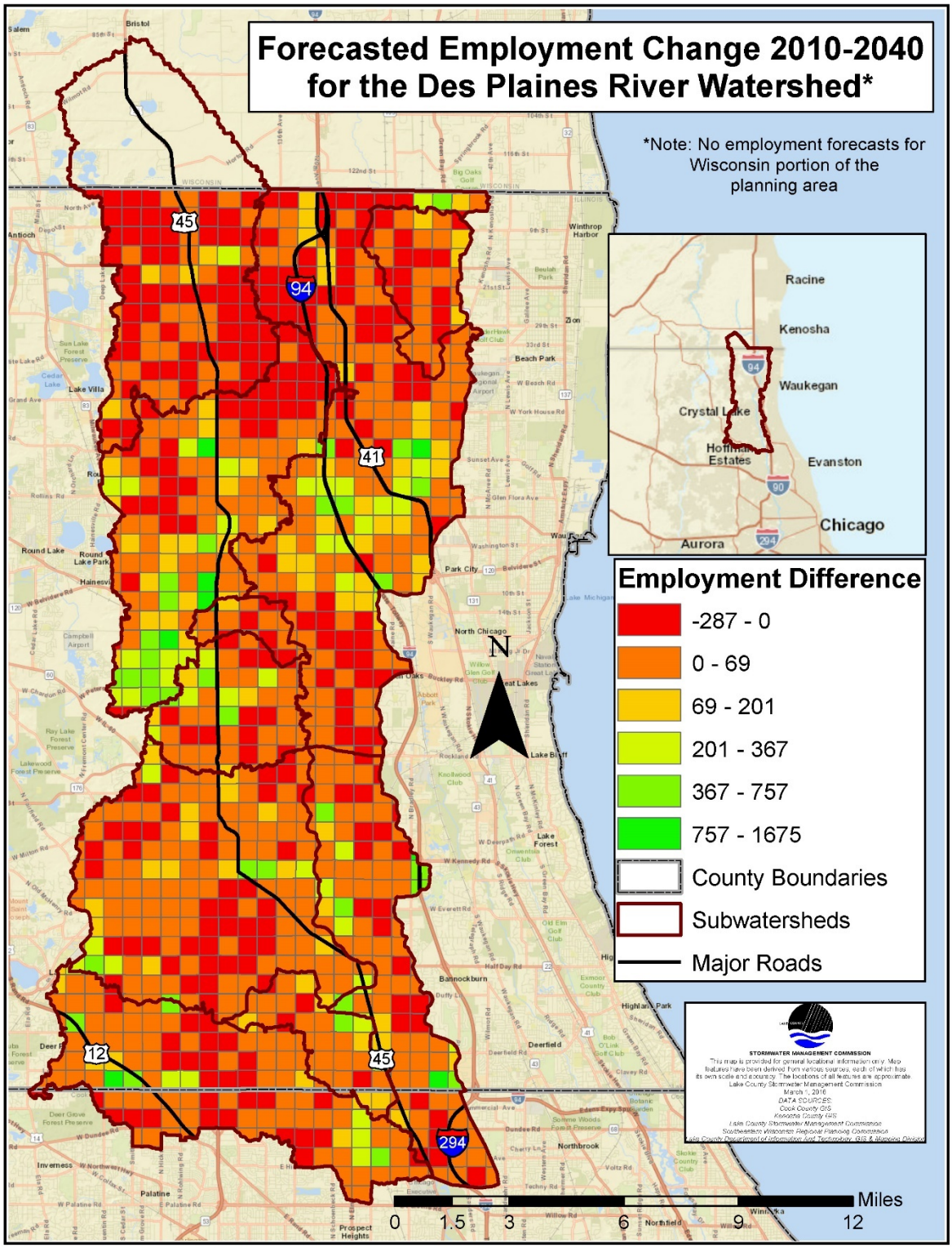


Figure 3-27: Forecasted Employment Change in the Des Plaines River Watershed

Note: Each "square" on the map represents a quarter section of the DPR planning area. The data sources of CMAP and SEWRPC represent this data in quarter sections.

3.5.6 Median Age

Median age is a statistic that provides information on the age distribution of a population. When considered with other factors this information can inform estimates of future consumption, mobility, and development patterns, which impact water resources. The median age in the DPR planning area in 2010 was 41.7, compared to the median age of 37.4 from the 2016 census data for the State of Illinois (U.S. Census Bureau, 2010). Median census block age ranged from 0.0 (no population) to 87.9 in the planning area. The 2010 median age by census block is displayed in Figure 3-28.

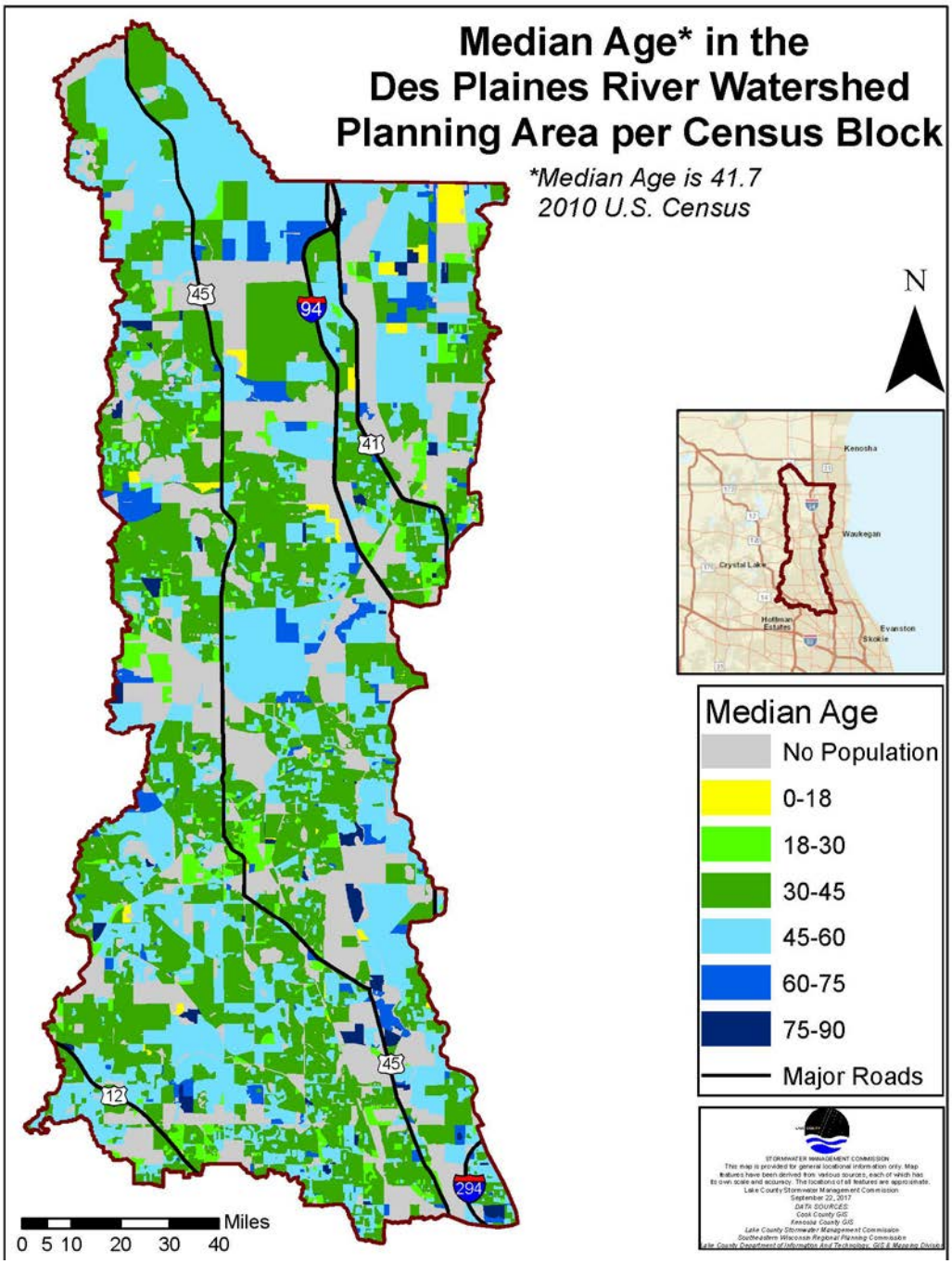


Figure 3-28: Median Age in 2010 in the DPR Planning Area

3.5.7 Median Income

According to the U.S. Census Bureau's 2007-2011 American Community Survey, the median household income for the DPR planning area is $85,536 (Figure 3-29) compared to $59,196 which was the median household income for the State of Illinois in 2016 (U.S. Census Bureau, 2016). The Census Bureau includes incomes of people 15 or older in income calulations. Median incomes are used as measures because the values are less skewed by extremely high or low outliers.

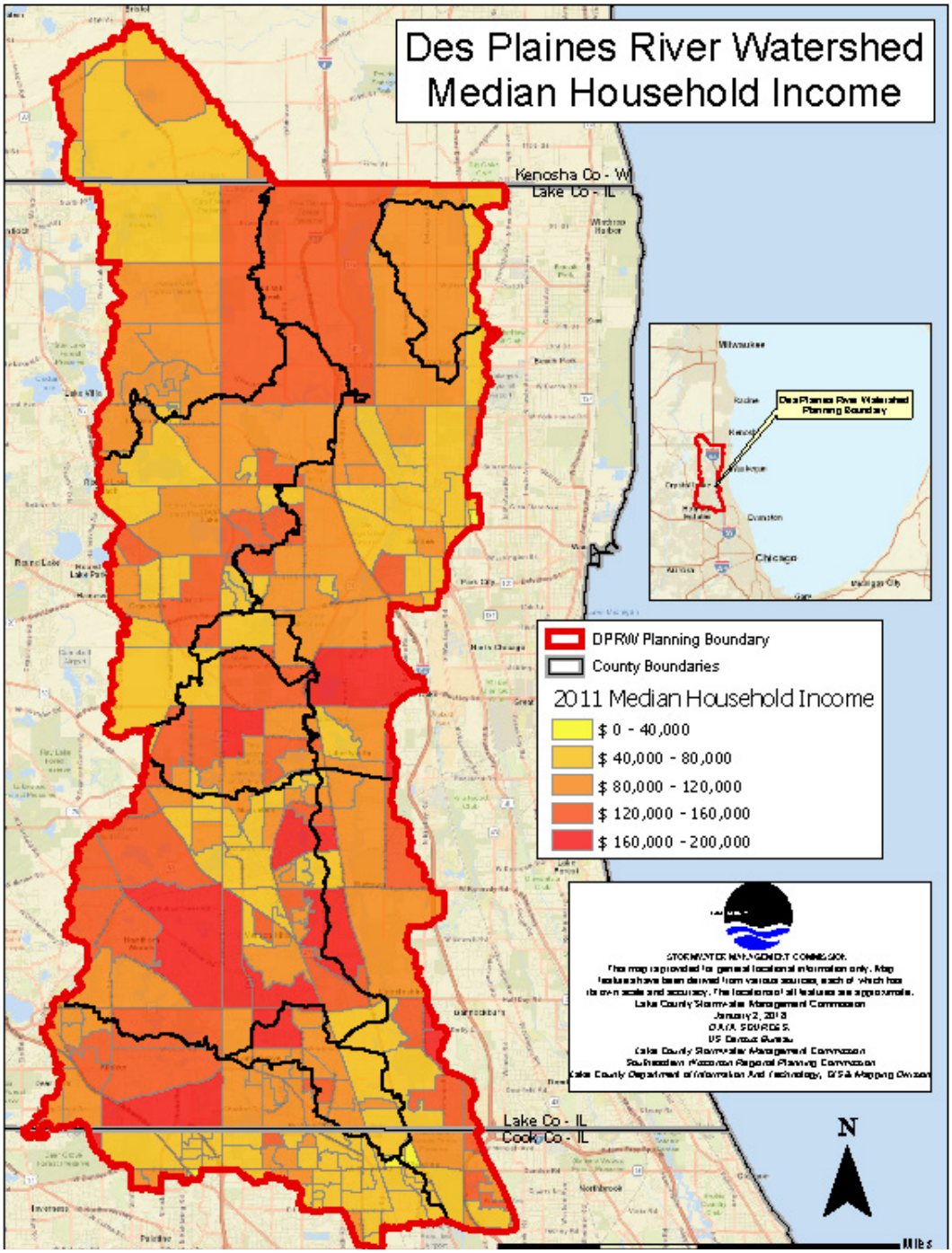


Figure 3-29: Median Income from 2007-2011 in the DPR Planning Area

3.5.8 EMPLOYMENT

The number of employed people per census block is closely related to the population. As with population, there is a higher density on average in the southern part of the watershed. The number of employed people per block in the DPR planning area ranges from 0 to 7,586 with an average of 187. The distribution of employed people in the DPR planning area is shown in Figure 3-30.

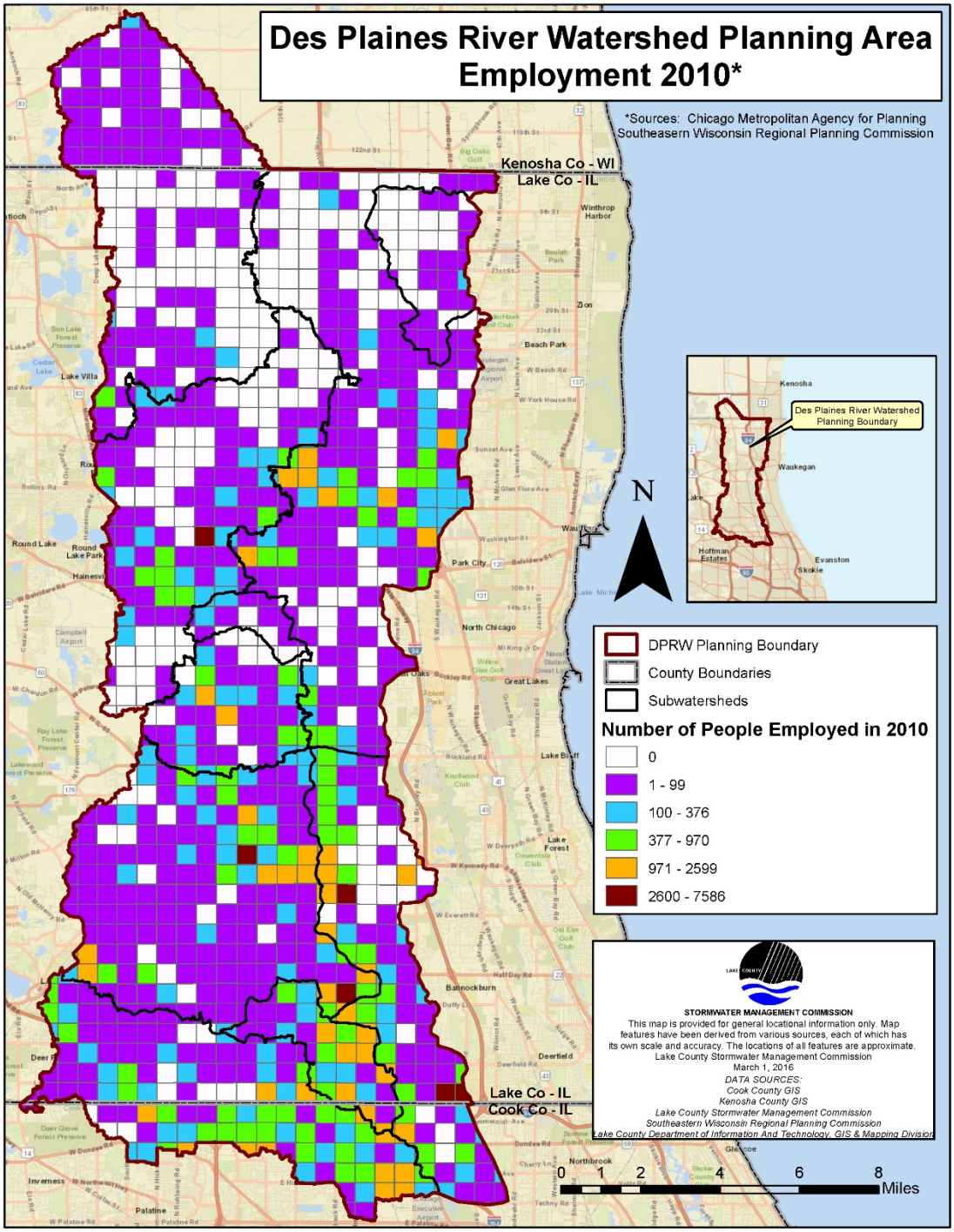


Figure 3-30: Employment in 2010 in the Des Plaines River Watershed

3.6 LAND USE AND LAND COVER

3.6.1 HISTORIC LAND COVER

Pre-settlement vegetation within the DPR planning area was evaluated in the Final Report Region 5 Wetland Management Opportunities and Marketing Plan, using CMAP's Green Infrastructure Vision dataset and the Illinois Natural History Survey's Historic Vegetation database.

Prior to European settlement, the land cover was predominately savanna and oak savanna in the northern portion of the watershed and prairie in the southern portion of the watershed. Based on this analysis, pre-European settlement land cover included approximately 12,873 acres of wetland (indicated below as marsh, wet meadow/prairie and wetland) within the DPR planning area. The pre-European settlement land cover is listed on Table 3-9 and shown in Error! Reference source not found.. Following European settlement, most of this land was converted to agricultural uses, followed by residential and commercial land uses.

Table 3-9: Historical Land Cover

VEGETATION TYPE	ACRES	% OF WATERSHED
Prairie	60,841	40.46
Oak Savanna / Savanna	55,820	37.13
Oak Woodlands	11,795	7.84
Marsh	6,119	4.07
Wet Meadow/Prairie	4,612	3.07
Water	2,436	1.62
Wetland	2,025	1.35
Prairie Oak	1,811	1.20
Timber	1,644	1.09
Upland Forest	1,453	0.97
Floodplain Forest	756	0.50
Oak Forest	347	0.23
Pond/Lake	223	0.15
Barrens	133	0.09
Scattering Timber	108	0.07
Wet Prairie	101	0.07
Slough	80	0.05
River/Creek	39	0.03
Forested Bog	15	0.01
TOTAL	**150,361**	**100**

SLOUGH: A swamp or shallow lake system, usually a backwater to a larger body of water.

BARRENS: An area with vegetation that is scattered with stunted woody growth and an exposed infertile substrate that supports species adapted to fire and drought and occurs in areas climatically suitable for forest growth of large trees.

LAND USE: The type of human activity that takes place on a particular area of land.

LAND COVER: The physical material that covers the surface of the Earth. Such categories include forest, urban, water, prairie, etc.

3.6.2 EXISTING LAND USE IN THE DPR PLANNING AREA

Existing **land use** of the DPR planning area was determined using land use data from CMAP (Cook County), Lake County GIS (Lake County), and SEWRPC (Kenosha County). To ensure land use and **land cover** represented the most recent watershed conditions, this layer was updated by interpreting aerial imagery. Any observed discrepancies between the imagery and the land use/cover data, such as where development has recently occurred, were noted and corrected. Additionally, land use categories were simplified by grouping and re-

naming similar land use codes and by extracting land cover designations from land use (i.e., cropland in a forest preserve was separated into row crops and open space conservation). Open water and wetland areas were excluded from analysis to allow for comparison to future land use projections. Table 3-10 includes land use/cover categories, including acreage and overall percentage, and Figure 3-31 illustrates land use in map format.

The residential (single-family and multi-family) land use class accounts for the greatest area of the watershed with 38,861 acres (28.7%). Total open space, including all open land (agricultural, private/public open space, forest/grassland/beach) comprises 41,416 acres or 30.6% of the watershed. Total developed land, including residential, commercial/retail/mixed use, government/institutional, industrial, office and research parks, transportation, and utilities accounts for 68,707 acres or 50.8% of the watershed. The developed land uses in the watershed contain varying degrees of impervious cover.

Table 3-10: Land Use Type

LAND USE TYPE	TOTAL AREA (ACRES)	PERCENT OF WATERSHED
Agriculture	25,236	18.6%
Residential	38,861	28.7%
Transportation/Utility/Waste Facility	18,013	13.3%
Government/Institutional	3,047	2.3%
Industrial	3,710	2.7%
Office and Research Parks	1,230	0.9%
Retail/Commercial/Mixed Use	3,845	2.8%
Public/Private Open Space	41,416	30.6%
Total:	135,358*	100.0%

*Total watershed acres differ from previously stated values because open water was excluded in this analysis.

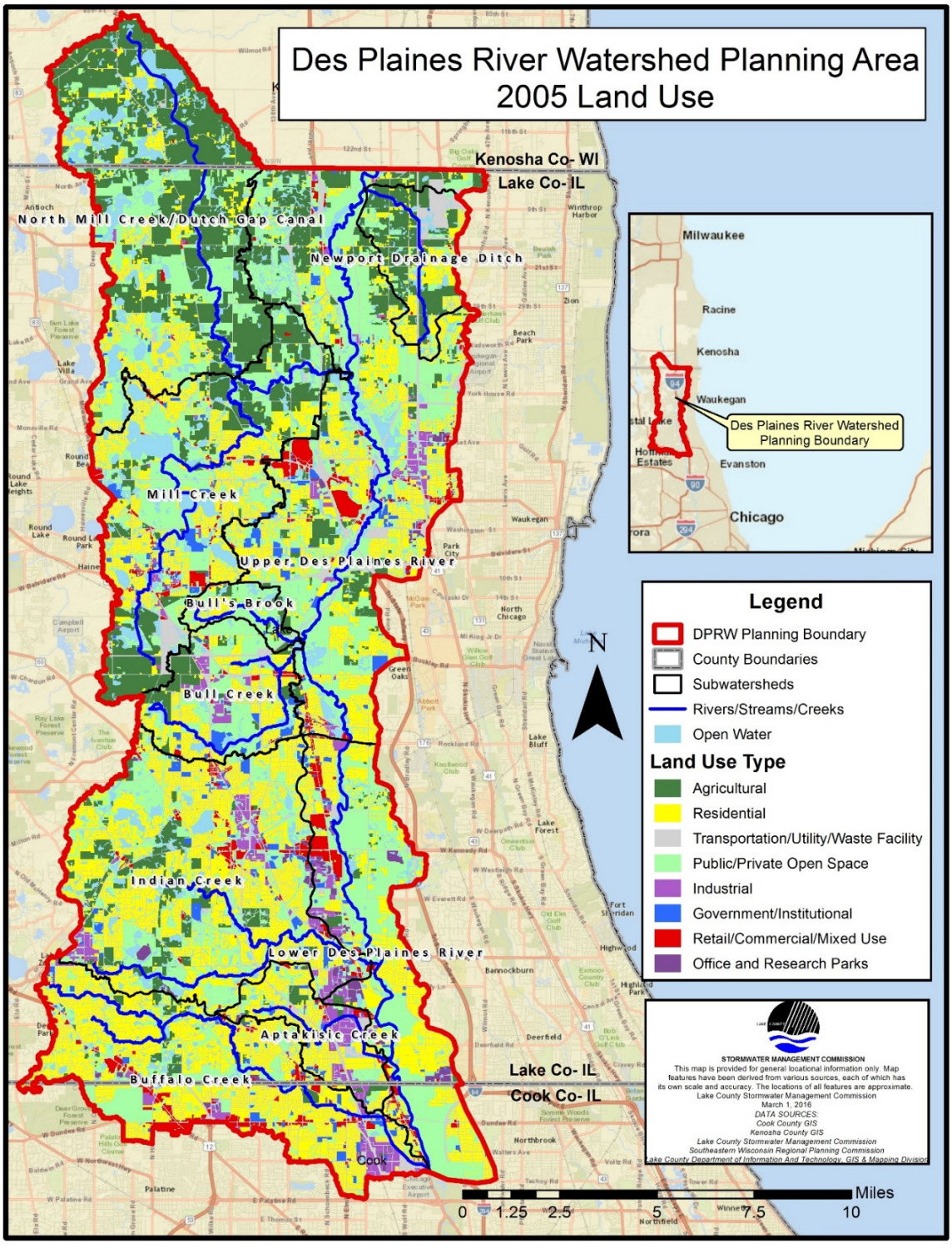


Figure 3-31: Current Land Use in the DPR Planning Area

3.6.3 Existing and Projected Future Percent Imperviousness

3.6.3.1 Existing Imperviousness

Impervious cover is the direct result of altering a native soil's permeability by replacing natural surfaces with impermeable/impervious surfaces. Impervious surfaces such as buildings, roads, parking lots, sidewalks, and compacted open space, which are common in urban areas, prevent precipitation from infiltrating into the ground. This increases direct storm water runoff and **nonpoint source pollution** stressors into wetlands, ponds, streams, and rivers, thereby impacting local water quality (USEPA Impervious Surface Growth Model, 2017).

Nonpoint Source Pollution: The cumulative effect of rainfall runoff that flows over or through the land and collects pollutants and nutrients prior to entering waterways. The cumulative effect of this pollution throughout the watershed represents the contribution of nonpoint source pollution.

Analysis of impervious surface impacts in the DPR planning areawas conducted using planimetric GIS datasets that were derived and interpreted from LiDAR acquired data. These datasets delineated the measured area or constructed footprint of major contributors to impervious surfaces including buildings, roads, and parking lots. Impacts of construction and development that were not included in the planimetric datasets include driveways, private roads, sidewalks, gravel surfaces (trails, parking lots, road shoulders), railroad right of ways and embankments, select built structures, and compaction of soils. Planimetric data used in this analysis was developed by Lake County GIS, Cook County GIS, Kenosha County GIS and SMC. The results of the planimetric impervious cover analysis are summarized in Table 3-11 and Table 3-12 and displayed in Figure 3-32.

Table 3-11: Building footprints by subwatershed

SUBWATERSHED	SQUARE FEET	ACRES	% of SUBWATERSHED
Aptakisic Creek	22,981,641	528	12.06%
Buffalo Creek	71,670,733	1,645	9.46%
Bull's Brook	1,473,228	34	1.87%
Bull Creek	19,540,266	449	6.29%
Indian Creek	75,491,315	1,733	7.18%
Lower Des Plaines River	41,593,383	955	6.54%
Mill Creek	39,279,318	902	4.56%
Newport Drainage Ditch	4,895,433	112	2.24%
North Mill Creek/Dutch Gap Canal	17,710,571	407	1.73%
Upper Des Plaines River	63,340,225	1,454	4.47%
TOTAL:	**357,976,113**	**8,219**	**5.47% of Planning Area**

Table 3-12: Edge of pavement footprints by subwatershed

SUBWATERSHED	SQUARE FEET	ACRES	% of SUBWATERSHED
Aptakisic Creek	28,500,470	654	14.96%
Buffalo Creek	74,864,556	1,719	9.88%
Bull's Brook	2,756,199	63	3.47%
Bull Creek	30,035,119	690	9.67%
Indian Creek	101,700,324	2,335	9.67%
Lower Des Plaines River	66,380,027	1,524	10.43%
Mill Creek	60,257,147	1,383	6.99%

SUBWATERSHED	SQUARE FEET	ACRES	% of SUBWATERSHED
Newport Drainage Ditch	7,350,135	169	3.36%
North Mill Creek/Dutch Gap Canal	23,708,618	544	2.31%
Upper Des Plaines River	117,261,840	2,692	8.27%
TOTAL:	**512,814,435**	**11,773**	**7.83% of Planning Area**

Impervious surface coverage was also determined from the 2011 NLCD impervious cover model (https://www.mrlc.gov/nlcd2011.php). The data used to develop the NLCD impervious cover model was derived from Landsat Enhanced Thematic Mapper+ and classified land use data. The percentage of impervious cover was calculated in 30 meter 2-pixel units of geography. This is measured by multiplying the watershed area classified as: urban (i.e. low, medium, and high density residential; commercial; industrial; etc.) by the appropriate impervious surface coefficient for each land use type, then averaging the value of imperviousness within a 30 meter 2-pixel unit of geography, ranging from 0-100% impervious cover. The NLCD impervious surface data set is an aggregated total impervious area value for each pixel rather than individual impervious features. Results of the NCLD impervious cover model in the DPR watershed are shown in Figure 3-33.

Research conducted in many geographic areas, concentrating on many different variables, and employing widely different methods, has yielded a similar conclusion - stream degradation occurs at relatively low levels of imperviousness, with 10% imperviousness impacting water quality and greater than 30% imperviousness severely degrading water quality (Schueler, 1994). The impervious cover data is presented as a percentage of impervious surfaces within the DPR planning area in three categories (Table 3-13):

- 0.0-9.0 % (Open Space with little to no development)
- 10-29% (Residential and small scale development) and
- 30-100% (medium to large scale development).

Table 3-13: Breakdown of NLCD Percent Impervious Cover within each Subwatershed

SUBWATERSHED	NLCD PERCENTAGE (0-9%)		NLCD PERCENTAGE (10-29%)		NLCD PERCENTAGE (30-100%)	
	ACRES	% of Subwatershed	ACRES	% of Subwatershed	ACRES	% of Subwatershed
Aptakisic Creek	495	11.3%	1,044	23.9%	2,645	60.5%
Buffalo Creek	3,362	19.3%	4,697	27.0%	8,729	50.2%
Bull's Brook	1,256	69.1%	260	14.3%	211	11.6%
Bull Creek	2,751	38.6%	1,704	23.9%	2,291	32.1%
Indian Creek	6,494	26.9%	7,606	31.5%	8,612	35.7%
Lower Des Plaines River	6,939	47.5%	2,71	18.6%	4,377	30.0%
Mill Creek	9,966	50.4%	2,856	14.4%	5,374	27.217%
Newport Drainage Ditch	3,569	71.1%	669	13.33%	688	13.7%
North Mill Creek/Dutch Gap Canal	18,608	79.1%	1,574	6.7%	1,860	7.9%
Upper Des Plaines River	17,387	53.4%	5,503	16.9%	8,167	25.1%
Total	**70,828**	**47 % of DPR Planning Area**	**28,624**	**19 % of DPR Planning Area**	**42,954**	**29% of DPR Planning Area**

(open water not included in acre totals)

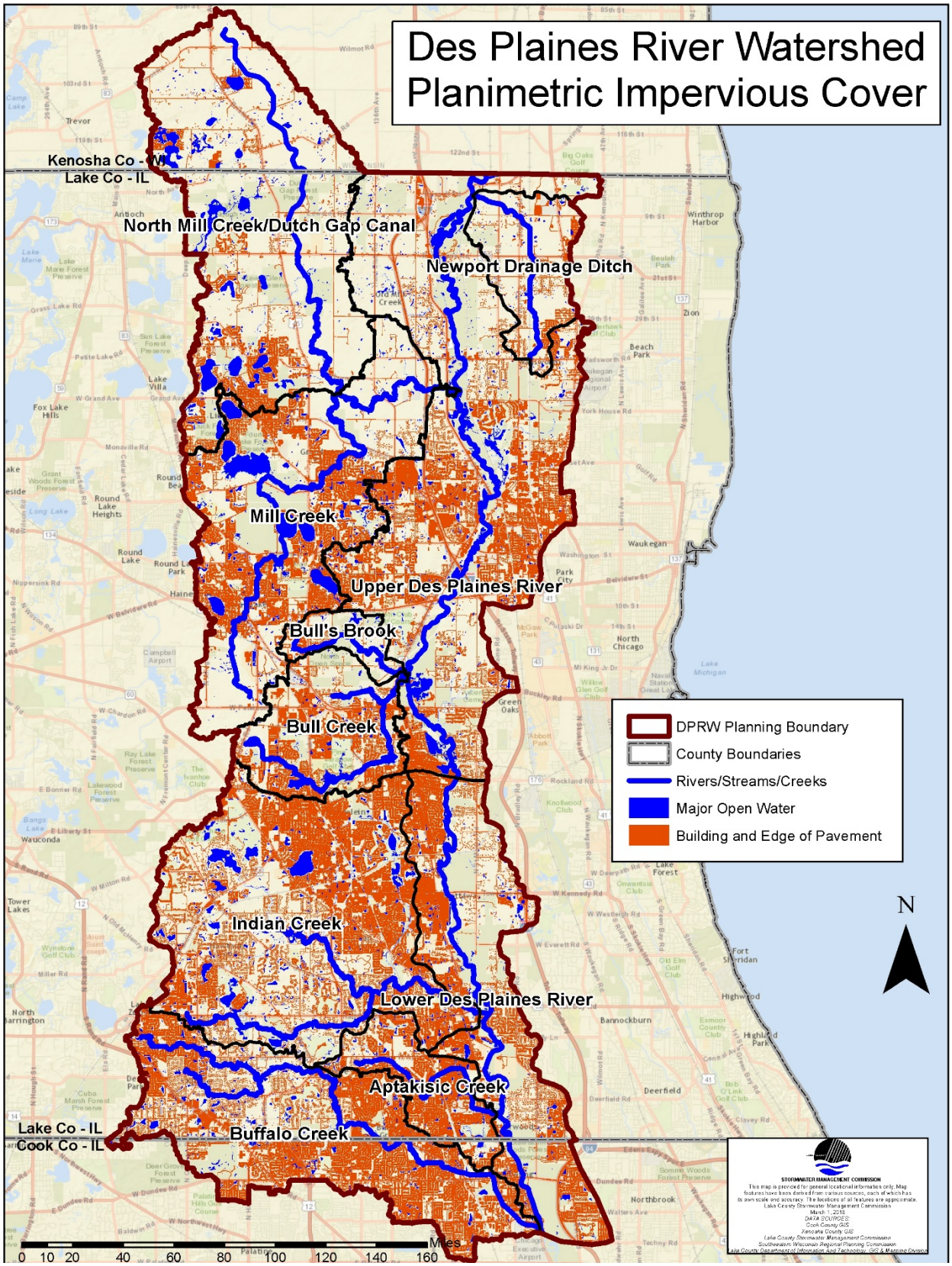


Figure 3-32: Planimetric Imperviousness of Table 3-11 and Table 3-12

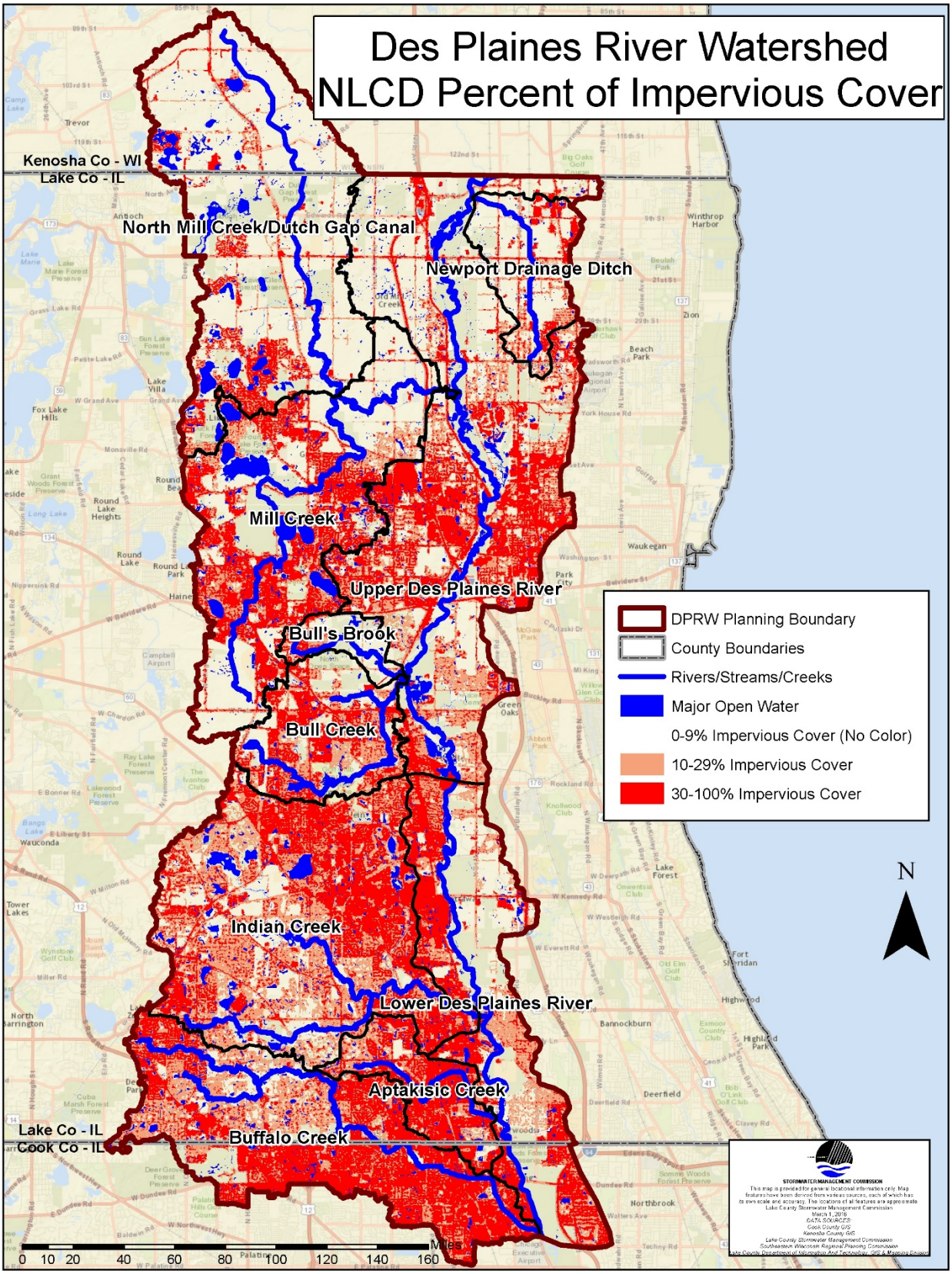


Figure 3-33: NLCD 2011 Imperviousness of Table 3-13 Data

3.6.3.2 Projected Future Land Use Imperviousness

The analysis and summation of existing impervious cover within the DPR planning area addressed the known current extent of impervious cover. To understand how potential future urbanization and land use expectations will impact water quality and overall watershed impervious cover, the analysis on current land use was used to characterize future land use impacts on impervious cover. Water quality can be improved by reducing impervious surfaces, promoting subsurface water absorption in future development, and decreasing existing impervious surfaces.

This assessment of future impervious cover used the following general land use categories: Industrial; Warehousing and Wholesale; Commercial and Services; Institutional; Residential; Agricultural Land; Forest, Grassland and Wetlands; Open Space; and Transportation, Communication, and Utilities. FLU parcels that are projected to change from low to high percentage of impervious cover are summarized in Table 3-14. The correlation of impervious cover to land use was analyzed based on the current percent impervious cover and current land use data. Based on the analysis from the existing impervious cover, the value of impact was used to determine the FLU impervious cover. Chapter 4 will have additional detail of impervious cover impacts, Table 3-15 and Figure 3-34 represent the geospatial analysis of the combined imperviousness data in relationship to current land use general categories. The data presented in Table 3-15 aligns with other research in that undeveloped land uses have less impervious cover (agriculture, naturally vegetated areas, and open space) and more developed areas have more impervious cover (Commercial, Industrial, and Transportation). Institutional land uses tend to have more campus setting environments with a mix of development and open space, which the data supports.

Table 3-14: Proposed Acreage of Future Land Use Changes Known to Impact Impervious Cover

SUB-WATER-SHED	AGRICULTURAL LAND					FOREST, GRASSLAND, AND WETLANDS					OPEN SPACE				
	COM	IWW	INT	RES	TCU	COM	IWW	INT	RES	TCU	COM	IWW	INT	RES	TCU
Aptakisic Creek	0	17	0	44	0	46	46	5	96	26	9	19	0	29	0
Buffalo Creek	147	3	3	247	0	257	5	8	758	11	27	0	2	222	0
Bull Creek	49	344	176	82	81	68	189	312	328	46	3	3	328	28	0
Bull's Brook	22	0	0	83	19	45	0	3	40	26	0	0	2	14	0
Indian Creek	431	47	0	1,531	4	542	254	80	2,016	112	58	22	8	782	0
Lower Des Plaines River	95	31	0	126	0	425	15	52	1,176	11	171	0	3	36	0
Mill Creek	559	511	37	1,856	173	575	195	193	1,175	117	14	6	36	233	0
Newport Drainage Ditch	252	106	0	1,224	3	132	44	0	605	34	9	0	0	17	0
North Mill Creek/Dutch Gap Canal	822	153	166	3,346	8	213	3	43	1,315	19	1	2	16	271	0
Upper Des Plaines River	1,277	86	129	1,440	11	1,311	371	224	2,494	203	45	5	25	276	0
Study Area	3,655	1,297	511	9,977	301	3,615	1,122	921	10,002	606	336	58	420	1,907	0

Note: Excluded from the Future Land Use Imperviousness Analysis are developed parcels that have a future land use zoning change. Developed parcels will be considered impaired or degraded in terms of impervious cover and therefore are not included in the analysis. Values in table represent acres of impervious cover. COM = Commercial & Services, IWW = Industrial, Warehousing and Wholesale, INT = Institutional, RES = Residential & TCU = Transportation, Communication, and Utilities

Table 3-15: Anticipated Future Land Use Impervious Cover Acreage by Subwatershed

SUBWATERSHED	LAND USE ACERAGE					
	COMMERCIAL AND SERVICES	INDUSTRIAL, WAREHOUSING, AND WHOLESALE	INSTITUTIONAL	RESIDENTIAL	TRANSPORTATION, COMMUNICATION, AND UTILITIES	TOTAL ACRES IN SUBWATERSHED
Aptakisic Creek	43.5	18.4	4.6	130.3	18.2	215.0
Buffalo Creek	295.0	36.8	4.3	1,128.0	8.1	16,790.1
Bull's Brook	55.3	0.0	3.0	161.4	44.7	264.3
Bull Creek	89.8	404.3	684.9	385.1	112.1	1,676.3
Indian Creek	798.9	177.5	66.7	3,678.6	89.7	4,811.4
Lower Des Plaines River	471.6	28.4	39.5	1,181.5	6.3	1,727.4
Mill Creek	974.8	653.7	216.9	3,197.7	265.5	5,308.6
Newport Drainage Ditch	345.5	104.9	0.0	1,844.1	35.5	2,330.0
North Mill Creek/Dutch Gap Canal	1,001.6	153.3	219.8	4,746.1	23.7	22,046.0
Upper Des Plaines River	2,412.0	290.3	315.5	3,940.7	186.5	7,144.9
Total Land Use Acres	6,487.9	1,867.5	1,555.1	20,393.5	790.4	62,313.9

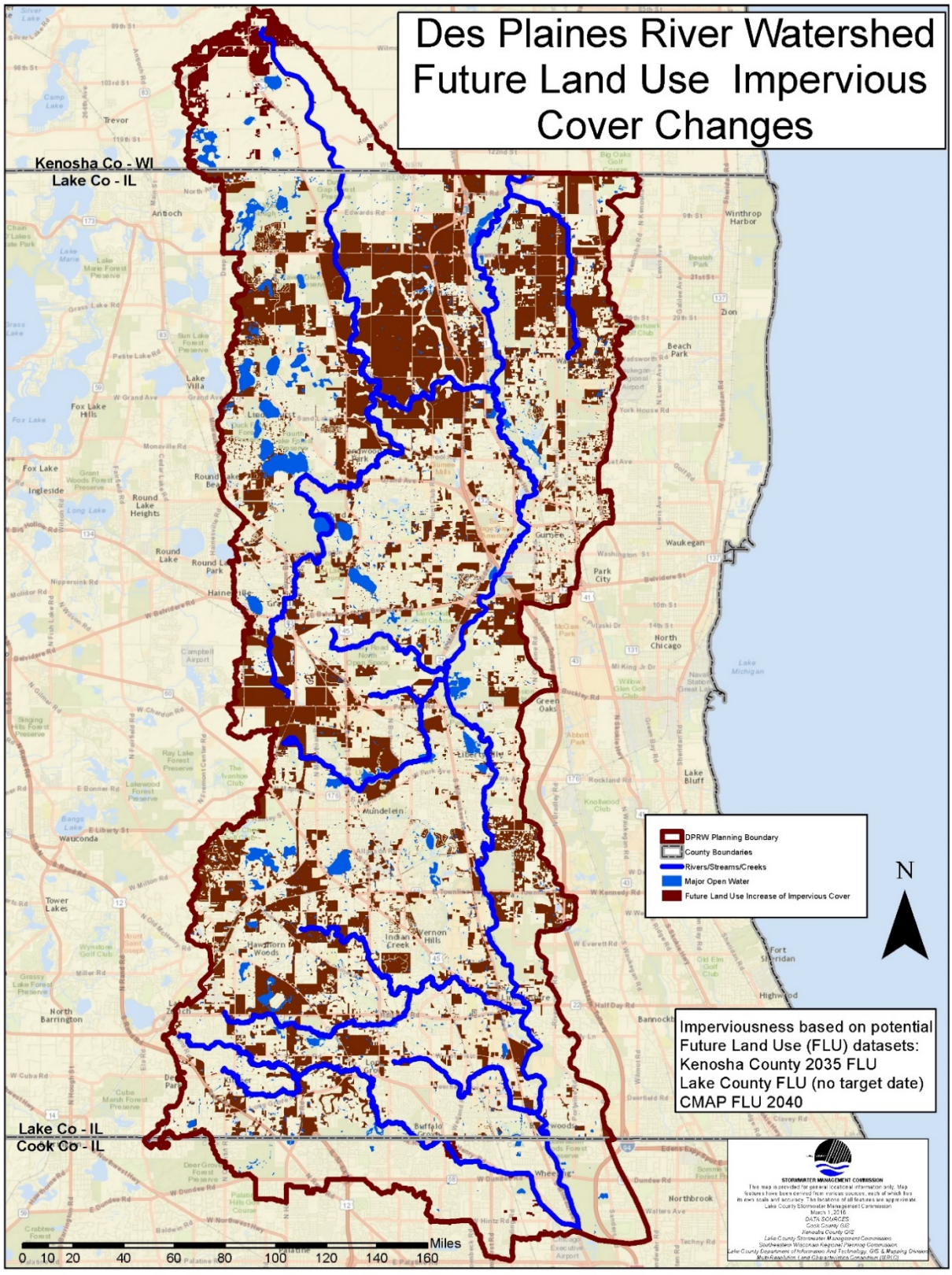


Figure 3-34: FLU Imperviousness increase, Table 3-14 and Table 3-15 Data

3.6.4 Future Land Use Projections

FLU projections were based on a review of municipal, county, and regional future land use maps. The FLU datasets utilized in this study have varying projected future uses (by parcel): Lake County has no projected date, CMAP projections are to 2040 and Kenosha County projections are to 2035, generally FLU plans have a 20-year basis. Table 3-16 shows projected changes in land use by land use type and Figure 3-35 maps future land use predicted for build-out conditions in the watershed. The data indicates a substantial decrease in area for Agriculture and Public/Private Open Space land uses and a substantial increase in area for Residential, Government/Institutional, Industrial, Office and Research Parks, and Retail/Commercial/Mixed Use land uses, with a total change of 25,566 acres (21%) from undeveloped lands (Agriculture and Public/Private Open Space) to developed lands predicted.

Table 3-16: Projected Land Use Change by Land Use Type in the DPR Planning Area

FUTURE LAND USE TYPE	TOTAL AREA (ACRES)	PERCENT OF WATERSHED	PERCENT CHANGE FROM CURRENT TO FUTURE
Agriculture	9,056	6.7%	-64.1%
Residential	57,508	42.5%	48.0%
Transportation/Utility/Waste Facility	15,778	11.7%	-12.4%
Government/Institutional	4,259	3.1%	39.8%
Industrial	7,067	5.2%	90.5%
Office and Research Parks	3,988	2.9%	224.2%
Retail/Commercial/Mixed Use	8,672	6.4%	125.5%
Public/Private Open Space	29,006	21.4%	-30.0%

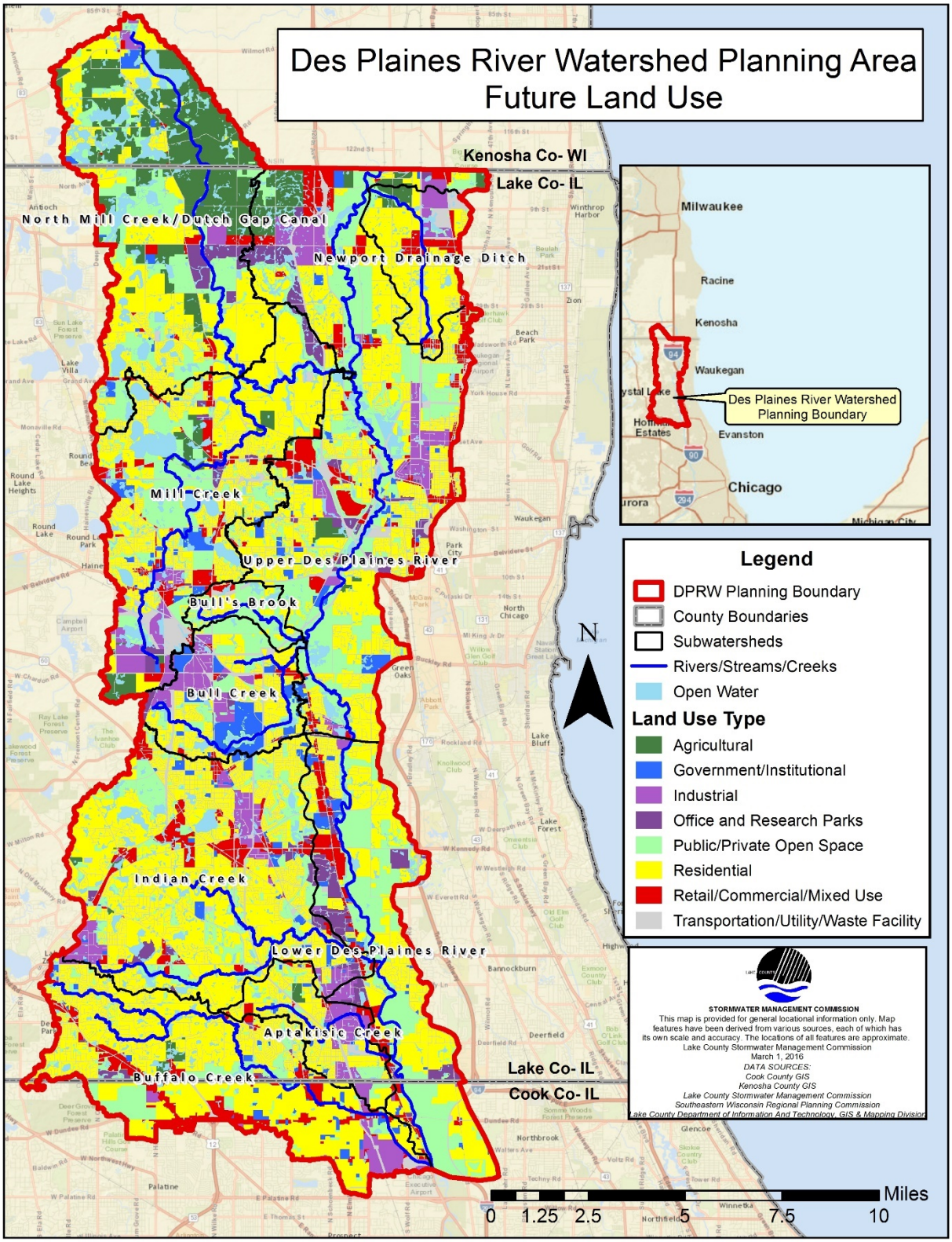


Figure 3-35: Future Land Use Projections in the DPR Planning Area

3.7 TRANSPORTATION

The DPR planning area includes 1,886 miles of roads and 442 miles of trails that make up the existing network of transportation corridors. Although not analyzed in detail in this section, other important components of the transportation network include the commuter rail lines, public bus transit system, parking lots, rail stations, and the public works and transportation maintenance yards that support the roads, trails and railroads in the watershed.

3.7.1 TRANSPORTATION AND NONPOINT SOURCE POLLUTION

Transportation corridors in the DPR planning area connect residents to points within and outside of the watershed. "Car habitat"; the combined area of roads, parking lots, driveways and garages is significant in the watershed. Parking lots and roads are the largest components of car habitat and can have a significant influence on stormwater runoff and water quality.

Studies have shown that streets are a major source of nonpoint source pollution in urban settings. Several factors contribute to high pollutant loading from streets. Streets are most often connected to the drainage system and tend to be the collector of stormwater runoff and pollution from sidewalks, driveways, lawns and rooftops as well as from emissions and leaks from vehicles, atmospheric deposition and winter road maintenance practices. The design, construction, and maintenance of transportation facilities and corridors can have substantial beneficial and detrimental impacts on human and watershed health.

3.7.1.1 Winter Maintenance Activities

Large quantities of road salt (mainly sodium chloride) are used for winter maintenance by public and private entities to remove snow and ice from the roads, parking lots and sidewalks. The proliferating use of road salt for winter deicing measures is a significant contributor to increasing trends in chloride pollution in waterbodies. Utilizing BMP's when storing, transporting, and applying de-icing chemicals is an essential step in reducing chloride pollution.

To assess the current winter maintenance practices in the watershed, SMC conducted a winter maintenance survey of jurisdictions within the DPR planning area through personal communications, website research and collected questionnaire data from 2016-2017. This data was used to identify current transportation policies and winter maintenance BMPs being used within the watershed. SMC collected information from 56 jurisdictions in the DPR planning area (information obtained pertains to the entire jurisdiction, including areas outside of the DPR planning boundary). The winter maintenance survey indicated that 50% of the jurisdictions have a winter maintenance policy, 30% of jurisdictions have a winter maintenance manual, and 73% of the jurisdictions have attended Lake County's Annual De-icing Workshop. Appendix B Des Plaines River Snow & Ice Removal Policies & Procedures summarizes transportation policies and winter maintenance BMPs for the assessed jurisdictions.

NOTEWORTHY: LAKE COUNTY DEICING WORKSHOP

A Lake County winter maintenance education & training program for public and private winter maintenance entities and their employees winter road maintenance best practices. Since 2009, the de-icing workshop has totalled over 1,200 attendees.

3.7.2 Transportation Infrastructure

There are multiple arterial roads, highways, railways and a trail system in the DPR planning area (Figure 3-36 and Figure 3-37). U.S. Highway 45 is the main north-south highway bisecting the watershed. Several major highways such as State Highways 173, 132, 120 and 22 run roughly east-west between the watershed boundaries.

The Metra North Central Service, Milwaukee District North lines bisect the watershed, with multiple stations located throughout the watershed, providing an alternative mode of transportation for commuters to and from downtown Chicago.

Figure 3-36: Lake Street, from Illinois Route 83 to Shorewood Road; Grayslake, Illinois

Figure 3-37: Hawley St. between Midlothian Road and Seymour Avenue; Mundelein Illinois

3.7.2.1 Roads

Multiple local and state entities manage the approximately 1,886 miles of roadway within the DPR planning area, as shown in Figure 3-38. The transportation network in the DPR planning area is composed of several main thoroughfares that are maintained by multiple agencies in two states. The roadway network includes local roads, township roads, county roads, and state highways. The largest stretches of existing major roadways in the DPR planning area are U.S. Route 45, which is 37.6 miles long and Interstate 94, which is 24.4 miles long.

Roadway Jurisdictions:

- *Lake County, Illinois: Roads and roadway planning are the responsibility of multiples entities including the LCDOT, IDOT, Tollway, LCFPD and individual townships and municipalities.*
- *Cook County, Illinois: Roads and roadway planning are the responsibility of multiples entities including the CCDOT, IDOT, Tollway, FPDCC and individual townships and municipalities.*
- *Kenosha County, Wisconsin: Roads and roadway planning are the responsibility of multiples entities including WISDOT, Kenosha County Division of Highways and individual townships and municipalities.*

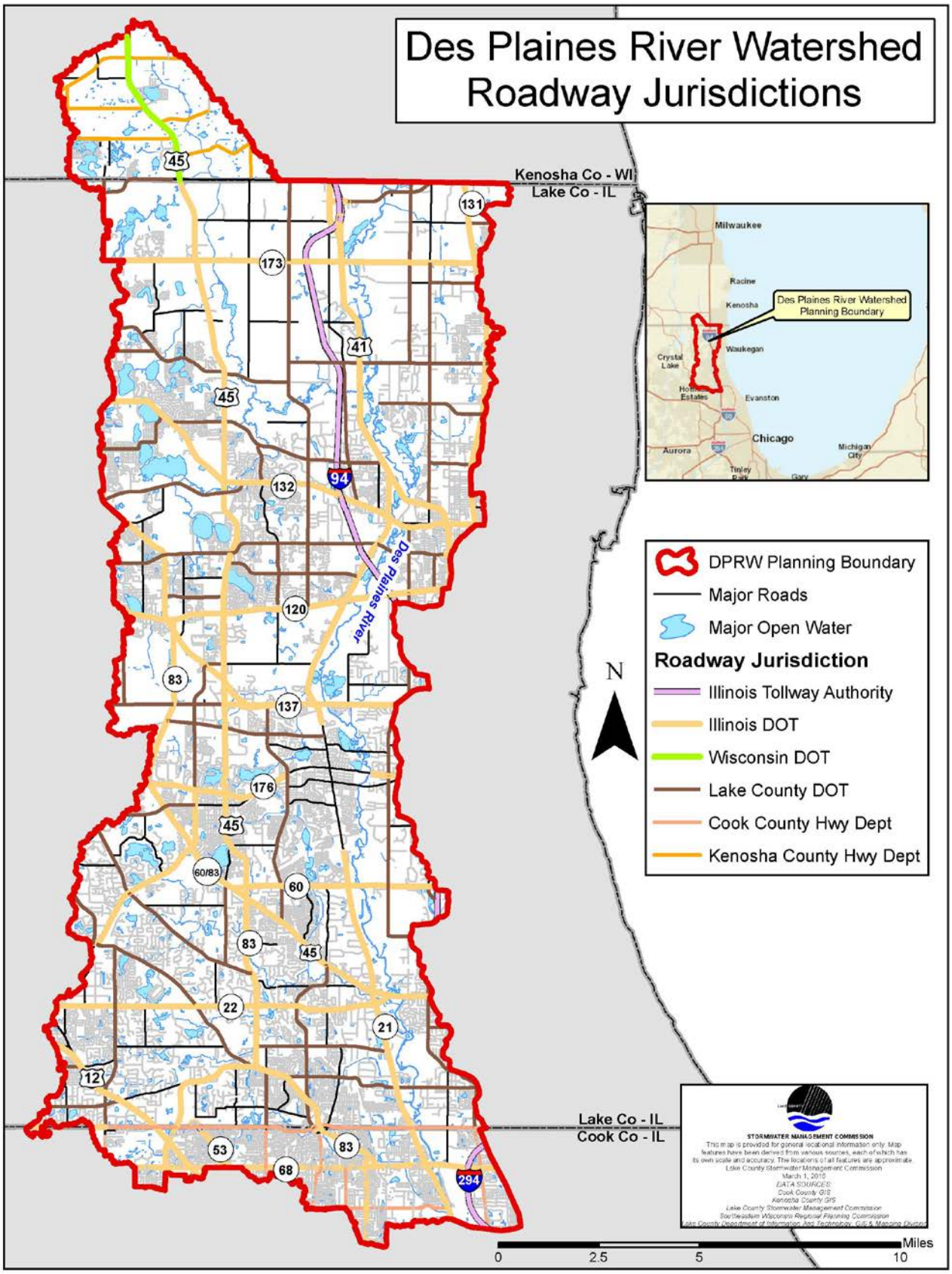


Figure 3-38: Des Plaines River Watershed Roadway Jurisdictions

3.7.2.2 Trails

There are currently approximately 442 miles of pedestrian and bicycle trails in the DPR planning area, including mowed footpaths and gravel, concrete, and asphalt trails. These trails are in various forms ranging from mowed footpaths to concrete or asphalt and are designed for single or multiple purpose users. The largest existing trail systems in the DPR planning area are the Des Plaines River Trail (31.4 miles) (Figure 3-39) and Millennium Trail and Greenway Trail (11.8 miles) (Figure 3-40).

Figure 3-39: Des Plaines River Trail System - LCFPD

Several jurisdictions develop and manage trails in the watershed including the Forest Preserve Districts, Park Districts, Municipalities, Townships, HOAs, CCDOT and LCDOT. Several villages and townships support trail systems along and across roadways within their jurisdiction. Park Districts also provide and maintain a trail network to connect people to parks and other community centers. The Forest Preserves provide a large trail network within and connecting forest preserves. HOAs provide neighborhood trails within the subdivision which connect to community trail systems and neighborhood parks. Additionally, there are short segments of connector trails constructed and maintained by the LCDOT and townships.

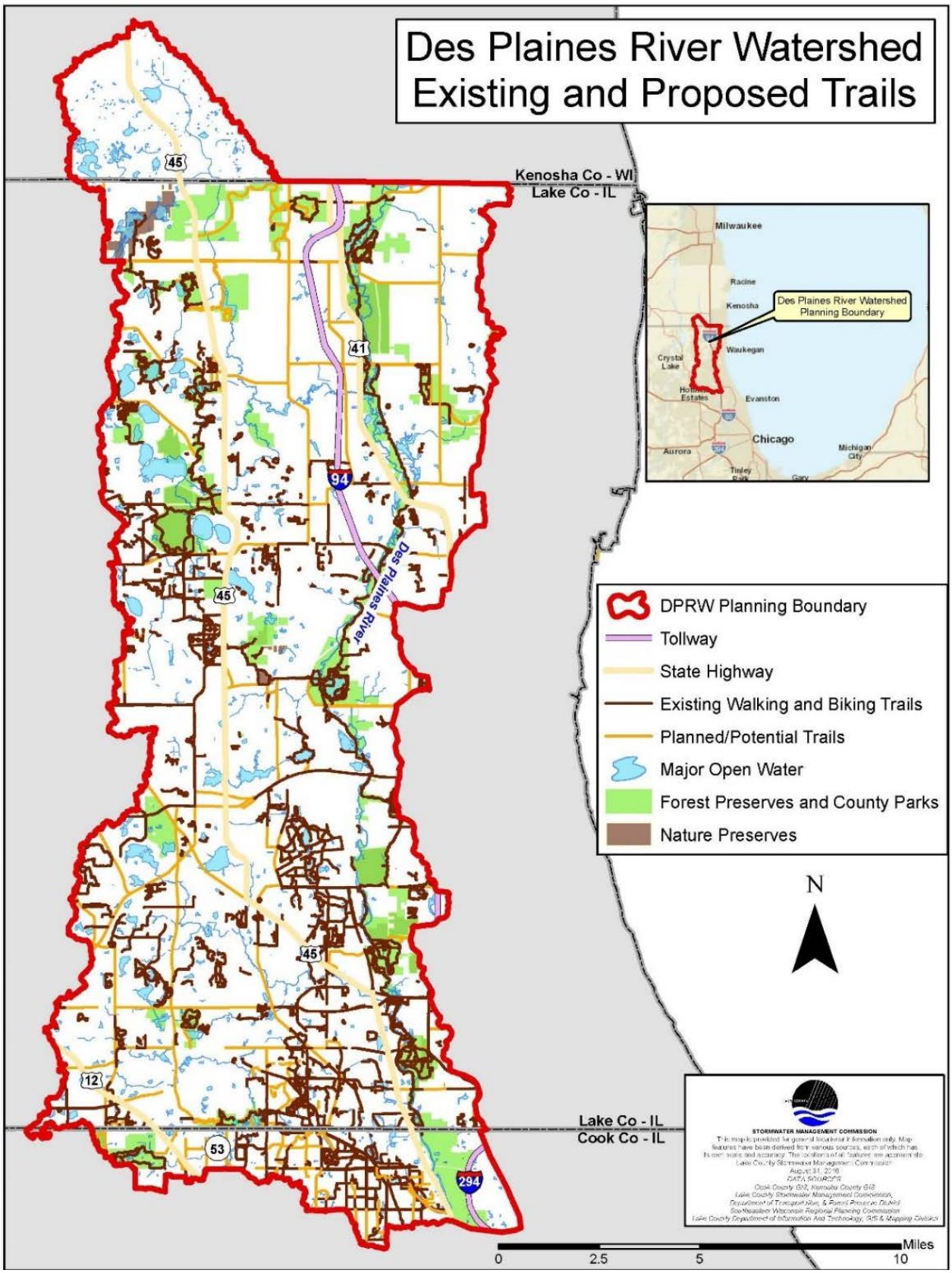


Figure 3-40: Des Plaines River Watershed Existing and Proposed Trails

3.7.3 Planned Transportation Projects

> ***In the year 2020, Lake County will have a development pattern and transportation system that provides a variety of living and transportation choices, meets the mobility needs of all residents, and minimizes adverse environmental impacts.***
> LCDOT Regional Framework Plan 2004

Information about planned roadway improvements in the watershed was gathered through local, regional, and state transportation contacts and from available road planning reports. The compiled list of planned roadway improvements includes all major county, regional, and state planned projects; however, this is not an exhaustive list of all planned roadway projects in the planning area. There are likely additional local roadway improvement plans that were not captured in this analysis.

An example of roadway improvements is shown in Figure 3-41. Roadway improvement projects are intended to benefit watershed and county residents and the local economy by providing better transportation access. The design of rights-of-way has a substantial impact on the livability of communities' health, safety and welfare of residents, and the quality of aquatic resources. Transportation agencies face several challenges in addressing the volume of runoff from roadways and the pollutants typical in roadway runoff. A transportation jurisdiction frequently has limited control of the pollutants entering its right of way (including pollutants generated from atmospheric deposition, vehicle operation, litter, organic debris, and surrounding land uses).

3.7.3.1 Roads

There are 39 miles of proposed roadway, which includes roadway widening, new roadway, re-alignment of roads and bypass over the next five to ten years (Figure 3-42). The largest stretches of proposed major roadways in the DPR planning area are Route 53/120 (approximately 19.7 miles) and Route 22 from Quentin Road to Route 83 (approximately 3.51 miles within the DPR planning area). Traffic congestion on the highways and roads in Lake County negatively impacts the local economy and quality of life. Traffic congestion was amongst the issues most frequently mentioned by participants at the Regional Framework Plan Public Forums. "Less traffic congestion" was identified as the second most important quality of life factor in a Lake County Resident Transportation Survey conducted by the Department of Communications in 2000.

Road improvement and construction projects are vital to economic stability and growth but can result in negative impacts to the surrounding environment if not constructed using the appropriate BMPs. Road construction and road widening increase the amount of impervious surface and reduces open space in the watershed, resulting in increased runoff and potential for water quality degradation if not mitigated. Road construction also greatly increases the potential for soil erosion to nearby streams and lakes if soil erosion control measures are not properly installed before, during and after construction.

As described earlier in this section, "car habitat" is a substantial portion of the impervious cover in the watershed. Stormwater runoff increases as impervious surfaces increase, which results in additional pollutants in the stormwater runoff and ultimately local waterbodies. Collecting and minimizing the mobilization of this

material from streets and highways where pollutants tend to accumulate is the goal of successful roadway runoff management. Table 3-17 lists common pollutants in stormwater runoff from “car habitat”.

Figure 3-41: Roadway Reconstruction of Peterson Road from Route 83 west through Atkinson Road

3.7.3.2 Trails

There are 183 miles of proposed trail and bikeway systems over the next five to twenty-four years (Figure 3-40) (Lake County 2040 Non-Motorized Plan). If constructed, many of the proposed trails would connect the network of existing trails within and outside the watershed such as the Des Plaines River Trail, Millennium Trail, Prairie Crossing Trail, Pine Dunes Forest Preserve Trail, North Shore Trail, Buffalo Creek Forest Preserve Trail, Quentin Road, Lake Cook Road, Rand Road and Long Grove Road to the Deer Grove Forest Preserve and Deer Park Mall. The longest stretches of proposed trail systems in the DPR planning area are the Multi-Preserve Connection from Hawley Road to Lake-Cook Road (8.1 miles) and Millennium Trail and Greenway Trail Extension (8.4 miles). Section 3.8 Green Infrastructure Inventory examines open and partially open space parcels and ownership necessary to design and connect proposed trails to the existing system.

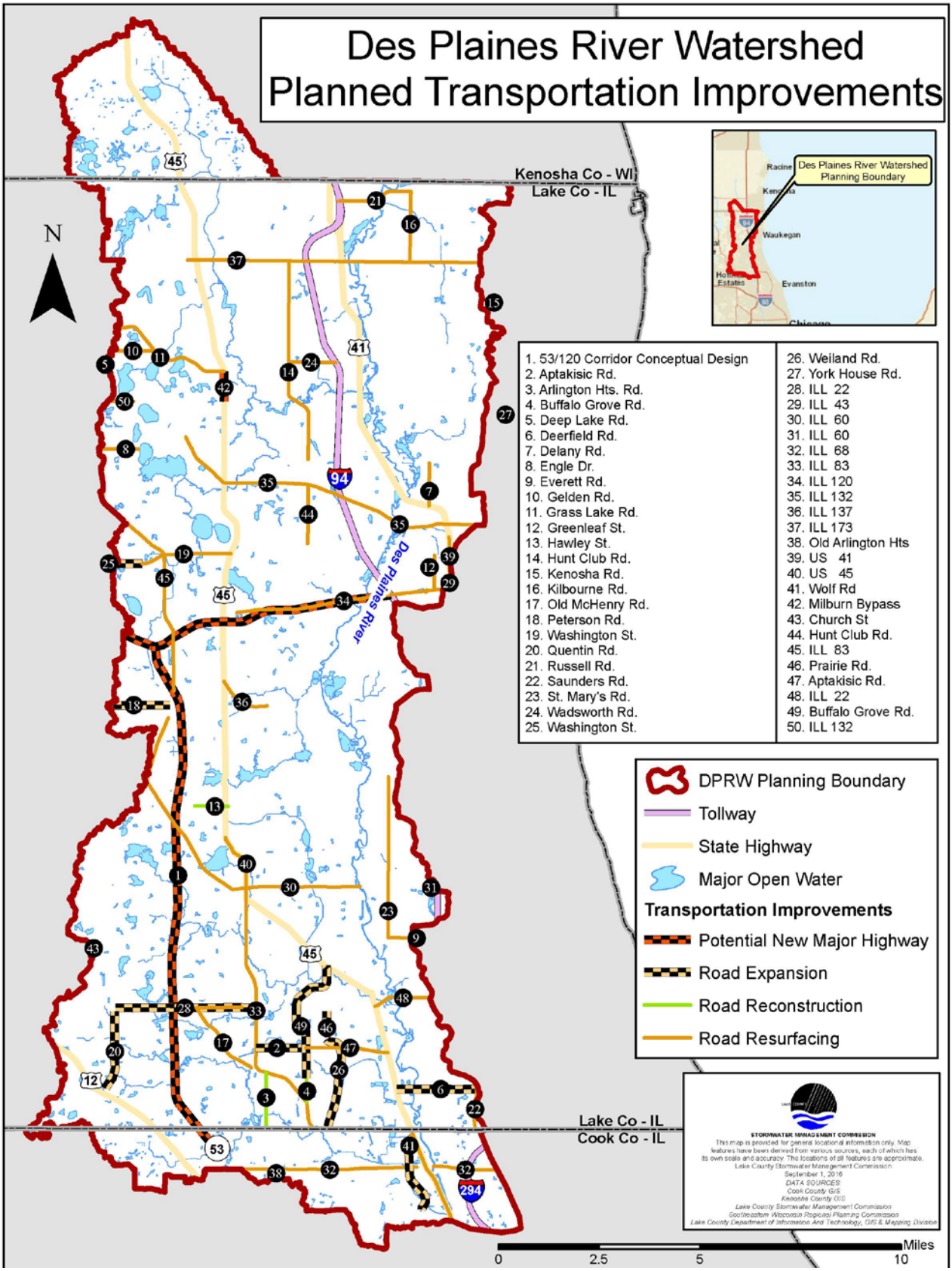


Figure 3-42: Planned and Potential Roadway Improvements in the DPR Planning Area

Table 3-17: Highway Runoff Constituents and Their Primary Sources

CONSTITUENTS	PRIMARY SOURCES
Particulates	Pavement wear, vehicles, atmosphere, maintenance
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Leaded gasoline (auto exhaust), tire wear (lead oxide filler material, lubricating oil and grease, bearing wear)
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guard rails etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, brake lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Cyanide	Anti-cake compound (ferric ferrocyanide, sodium ferrocyanide, yellow prussiate of soda) used to keep deicing salt granular
Sodium, Calcium, Chloride	Deicing salts
Sulphate	Roadway beds, fuel, deicing salts
Petroleum	Spills, leaks or blow-by motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate
PCB	Spraying of highway rights-of-way, background atmospheric deposition, PCB catalyst in synthetic tires

Source: US DOT, FHWA, Report No. FHWA/RD-84/057-060, June, 1987; USEPA 1993.

3.8 GREEN INFRASTRUCTURE

3.8.1 GREEN INFRASTRUCTURE MODEL AND STRATEGY FOR LAKE COUNTY, ILLINOIS

The Lake County Green Infrastructure Model and Strategy (GIMS) encapsulates facets of green infrastructure beyond those related to just stormwater. Many of the green infrastructure datasets related to water used in the GIMS were also used in the watershed-based plan green infrastructure prioritization criteria, in order to eliminate "double counting" datasets. The GIMS provides a more comprehensive assessment of the overall green infrastructure values in our stormwater-based assessment. The GIMs following text is taken directly from the Project Summary (page 5) of the Lake County GIMS "Technical Report" (2017):

> ***The Lake County GIMS builds on the previous efforts of the Chicago Wilderness Regional Green Infrastructure Vision through building a more refined infrastructure network model with higher resolution and more up-to-date GIS data. The GIMS also builds on the efforts of The Conservation Fund's (the Fund) support to the Chicago Metropolitan Agency for Planning (CMAP) to access ecosystem service valuation in Lake and six other Illinois counties in its planning area. The Lake County GIMS provides a framework for identifying land conservation and restoration opportunities for the county's major native landscape types: woodland/forest. Prairie/grassland/savanna, wetlands, and freshwater aquatic systems. The primary products of the Lake County GIMS are derived GIS datasets and models, which describe and characterize the regional green infrastructure network, restoration opportunities, and ecosystem service values of this network. The derived GIS datasets include core***

areas, functional connections, restoration building blocks, and composite layers that combine the science-based, data driven ecological network with the inventory of protected and managed lands. Included in the functional connections are corridor linkages for woodland/forest, prairie/grassland/savanna, wetlands, and steam buffers, as well as functional connectivity within Lake County's trail network.

For more information on the Green Infrastructure Model and Strategy for Lake County, Illinois, please visit http://www.lcfpd.org/conservation/greenstrategy/

3.8.2 GREEN INFRASTRUCTURE

Green Infrastructure is a stormwater management approach that saves money, supports sustainability, and more efficiently uses limited financial and natural resources. It is achieved by capturing raindrops where they fall reducing runoff volumes, and recharging groundwater supplies. By integrating natural processes into the built environment, green infrastructure provides stormwater management, flood mitigation, economic benefits, air quality management, and much more. Green infrastructure can be planned and implemented on local and regional scales:

- *Local scale:* Green infrastructure on a local scale consists of site-specific BMPs (such as naturalized detention facilities, vegetated swales, porous pavement, rain gardens, and green roofs) that are designed to maintain natural hydrologic functions by absorbing and infiltrating precipitation where it falls.
- *Regional Scale:* Green infrastructure at the regional scale consists of the interconnected network of open spaces and natural areas that mitigate stormwater runoff, naturally recharge aquifers, and improve water quality while providing recreational opportunities and wildlife habitat (Figure 3-43)
    - Regional scale green infrastructure aims to create an unbroken chain of natural areas and encourages planers to design interconnected hubs of natural space. This connection enhances the health of open spaces and promotes species diversity.

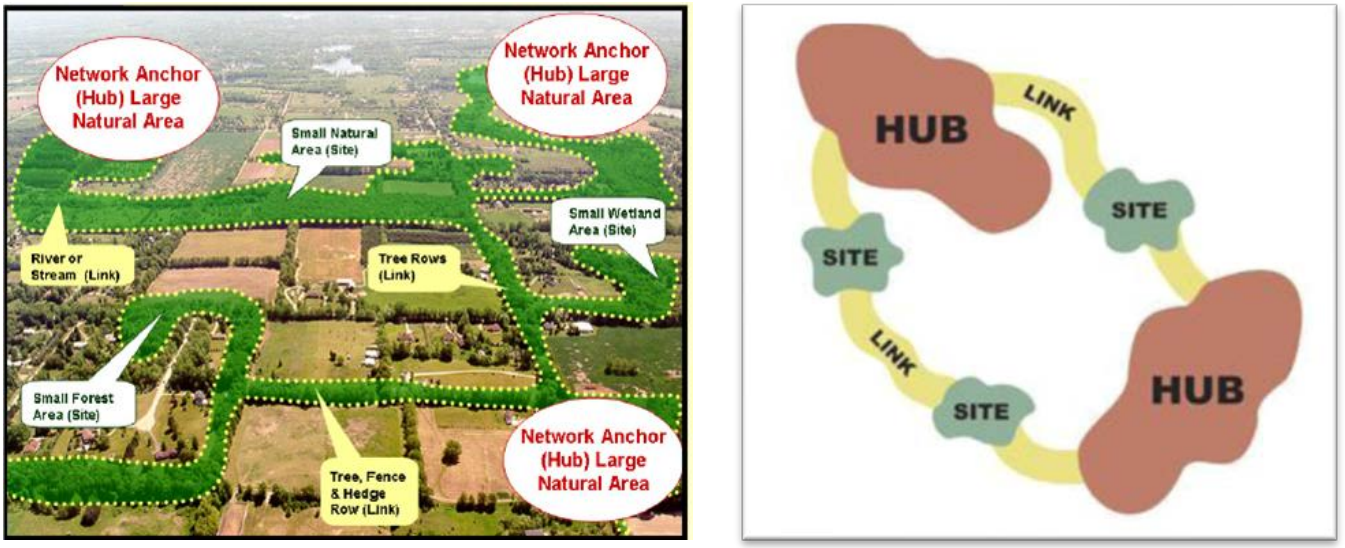


Figure 3-43: Diagram of Regional Scale Green Infrastructure

The Des Plaines River Watershed-Based Plan addresses the condition and quality of water resources and flood damage in the DPR planning area. Stormwater runoff is a major cause of water pollution and flooding in developed and semi-developed watersheds like the DPR planning area. Impervious surfaces such as rooftops, driveways, parking lots, and streets generate stormwater runoff that conveys pollutants to components of the natural drainage or green infrastructure system (ex. wetlands, lakes, and streams). Higher flows of stormwater can also cause erosion and flooding in urban streams, damaging habitat, property, and infrastructure. Since green infrastructure substantially influences how water moves in and on the landscape, it is an important element in the Des Plaines River Watershed-Based Plan for assessing current and planning for future conditions. *There are four goals that can be met by increasing the green infrastructure in the DPR planning area.*

1. *Water quality improvement: Minimize runoff volumes, velocities, and pollutants to waterways utilizing wetlands, natural landscapes, and stormwater BMPs as infiltration and pollutant filtration systems.*
2. *Regional green infrastructure and natural resources: Utilize good natural resource management practices and green infrastructure on private and public property to protect, enhance, and restore natural resources. This maintains and enhances native plant and wildlife communities, natural hydrology, and buffers for streams, lakes, and wetlands while expanding environmental corridors that provide ecological, educational, and recreational benefits.*
3. *Reduce current flood damage and prevent future flooding from worsening: Use infiltration and evapotranspiration provided by green infrastructure to reduce volume of runoff and flood damage.*
4. *Funding, installing and maintaining stormwater infrastructure: Reduce the rate and volume of stormwater runoff by minimizing impervious cover and implementing stormwater green infrastructure practices that reduce runoff volumes, velocities, and pollutants to waterbodies. Funding should be sought to implement green infrastructure practices wherever feasible. Appendix L describes potential funding sources for green infrastructure practices.*

Local and regional scale green infrastructure work in concert to infiltrate and store precipitation, thereby reducing the amount of stormwater runoff and the need to treat the water. Green infrastructure also brings many other environmental, social, and economic benefits. These benefits promote urban livability by improving the environment and preserving open space, which supports sustainable communities.

3.8.3 Public and Private Ownership

Most developed and partially open land in the DPR planning area is privately owned (see Table 3-18 and Figure 3-44). Approximately 44% of open space in the DPR planning area is publicly owned, most of which is within the Upper Des Plaines River, North Mill- Dutch Gap Canal, Mill Creek, and Lower Des Plaines River subwatersheds. Approximately 56% of open space in the DPR planning area is privately owned, most of which is located in the Upper Des Plaines River, North Mill- Dutch Gap Canal, and Mill Creek subwatersheds.

OPEN PARCELS: Parcels with no built structures or impervious cover (including open water).

PARTIALLY OPEN PARCELS: Parcels that have a small structure (building, parking lot) relative to the parcel, allowing for the potential implementation of BMPs.

DEVELOPED PARCELS: Parcels that are mostly occupied by structures and/or impervious cover.

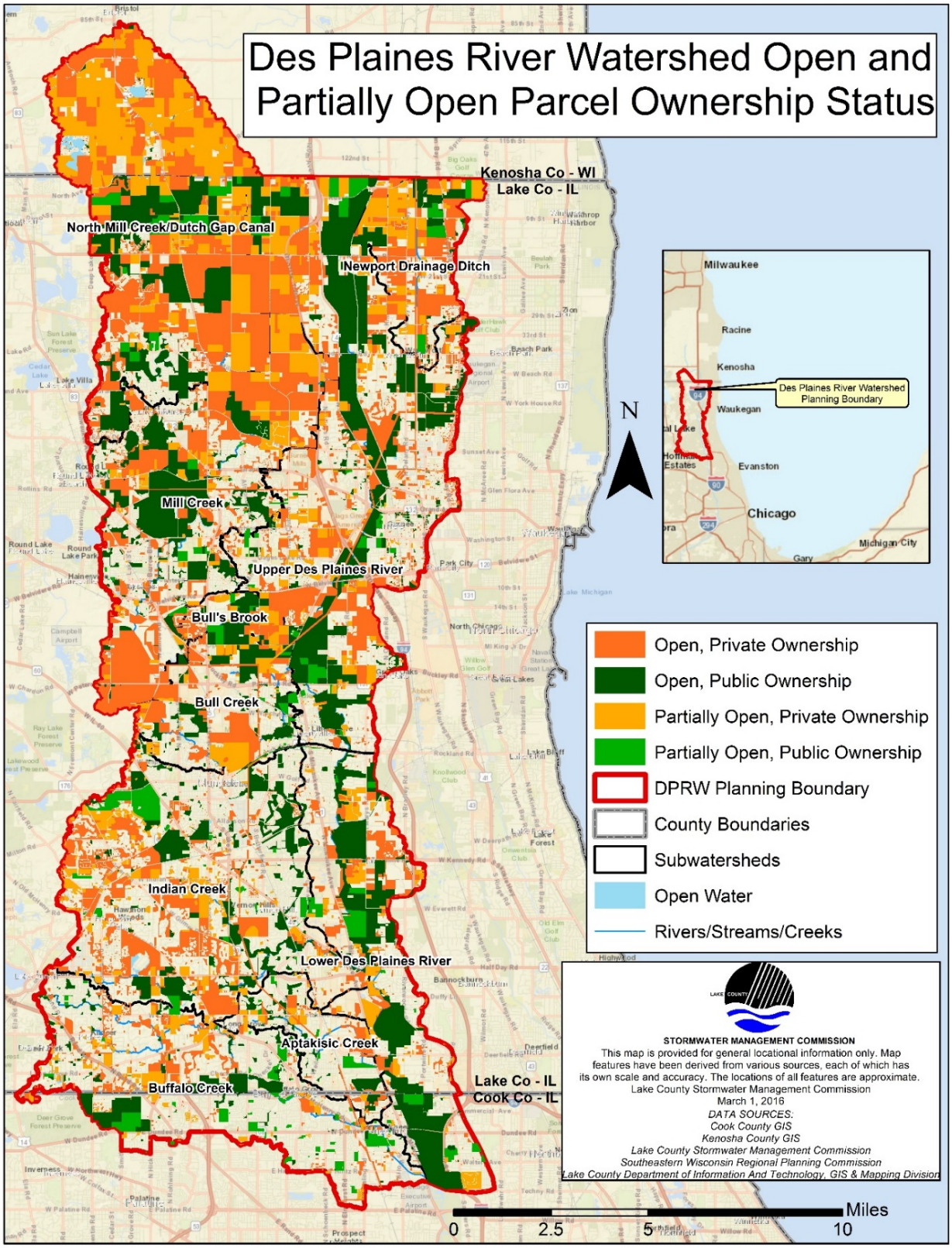


Figure 3-44: Public and Privately Owned Open and Partially Open Parcels in the DPR planning area

Table 3-18: Ownership of Open, Partially Open and Developed Parcels in the DPR planning area

	OPEN PARCELS				PARTIALLY OPEN PARCELS				DEVELOPED PARCELS			
	ACRES PUBLIC	% OF OPEN PARCELS (ACRES) IN SUBSHED	ACRES PRIVATE	% OF OPEN PARCELS (ACRES) IN SUBSHED	ACRES PUBLIC	% OF PARTIALLY OPEN PARCELS (ACRES) IN SUBSHED	ACRES PRIVATE	% OF PARTIALLY OPEN PARCELS (ACRES) IN SUBSHED	ACRES PUBLIC	% OF DEVELOPED PARCELS (ACRES) IN SUBSHED	ACRES PRIVATE	% OF DEVELOPED PARCELS (ACRES) IN SUBSHED
Aptakisic Creek	406	48.1	438	51.9	129	36.3	226	63.7	126	4.9	2,427	95.1
Buffalo Creek	1,417	49.0	1,473	51.0	785	43.3	1,027	56.7	224	2.2	9,913	97.8
Bull Creek	1,151	44.7	1,422	55.3	137	15.7	736	84.3	464	16.1	2,419	83.9
Bull's Brook	449	47.7	491	52.3	85	19.4	354	80.6	7	2.6	248	97.4
Indian Creek	2,744	38.0	4,473	62.0	773	29.0	1,897	71.1	542	4.7	10,883	95.30
Lower Des Plaines River	3,796	73.2	1,393	26.8	554	35.0	1,030	65.0	250	3.8	6,346	96.2
Mill Creek	3,728	37.8	6,139	62.2	203	9.4	1,947	90.6	633	11.1	5,074	88.9
Newport Drainage Ditch	357	17.5	1,681	82.5	238	17.6	1,114	82.4	17	1.3	1,271	98.7
North Mill – Dutch Gap Canal	3,894	32.4	8,128	67.6	782	10.5	6,664	89.5	84	2.9	2,785	96.7
Upper Des Plaines River	7,058	50.9	6,810	49.1	871	21.4	3,197	78.6	706	6.4	10,403	93.7
DPR planning area Total	**25,000**	**43.5**	**32,448**	**56.5**	**4,557**	**20.0**	**18,192**	**80.0**	**3,053**	**5.57**	**51,769**	**94.4**

3.8.4 PROTECTION STATUS

Protected open space differs from unprotected open space because it can't be utilized for developed land uses. The land is either permanently chartered as open land or in a permanent deed restriction such as a conservation easement. Publicly protected areas include forest preserve districts, state nature preserves, and park districts. Privately protected areas include homeowners/business association-owned land with deed restrictions or conservation easements, and land owned by land trusts and other conservation organizations. The conversion of open space to other uses reduces the watershed benefits provided by open land. Conversion of open space to traditionally developed land uses increases runoff, water quality degradation, and loss of wildlife habitat area and connectivity.

The green infrastructure inventory identified the number and size of protected parcels within the DPR planning area. All protected and unprotected parcels were then sorted as open parcels, partially open parcels or developed parcels. Approximately 46% of open and 22% of partial parcels were protected (Table 3-19). Open and partially open unprotected parcels located near protected areas or along areas stream corridors (Figure 3-45) will be key parcels for the development of a *Green Infrastructure network*.

Table 3-19: Protection Status Summary of Open and Partially Open Parcels in the DPR planning area

SUBWATERSHED	OPEN PARCELS				PARTIALLY OPEN PARCELS			
	ACRES PROTECTED	% OF OPEN PARCELS (ACRES) IN SUBWATERSHED	ACRES UNPROTECTED	% OF OPEN PARCELS (ACRES) IN SUBWATERSHED	ACRES PROTECTED	% OF PARTIALLY OPEN PARCELS (ACRES) IN SUBWATERSHED	ACRES UNPROTECTED	% OF PARTIALLY OPEN PARCELS (ACRES) IN SUBWATERSHED
Aptakisic Creek	415	49.1	430	50.9	129	36.3	226	63.7
Buffalo Creek	1,439	49.8	1,452	50.2	785	43.3	1,027	56.7
Bull Creek	1,212	47.1	1,362	52.9	177	20.3	696	79.7
Bull's Brook	684	72.8	256	27.2	254	57.7	186	42.3
Indian Creek	2,744	38.5	4,440	61.5	787	29.5	1,883	70.5
Lower Des Plaines River	4,076	78.6	1,113	21.5	730	46.1	854	53.9
Mill Creek	3,741	37.9	6,125	62.1	203	9.4	1,947	90.6
Newport Drainage Ditch	349	17.1	1,689	82.9	238	17.6	1,114	82.4
North Mill – Dutch Gap Canal	3,918	32.6	8,104	67.4	821	11.0	6,625	89.0
Upper Des Plaines River	7,617	54.9	6,252	45.1	923	22.7	3,144	77.3
DPR planning area Total	**26,195**	**45.6**	**31,223**	**54.4**	**5,047**	**22.2**	**17,702**	**77.8**

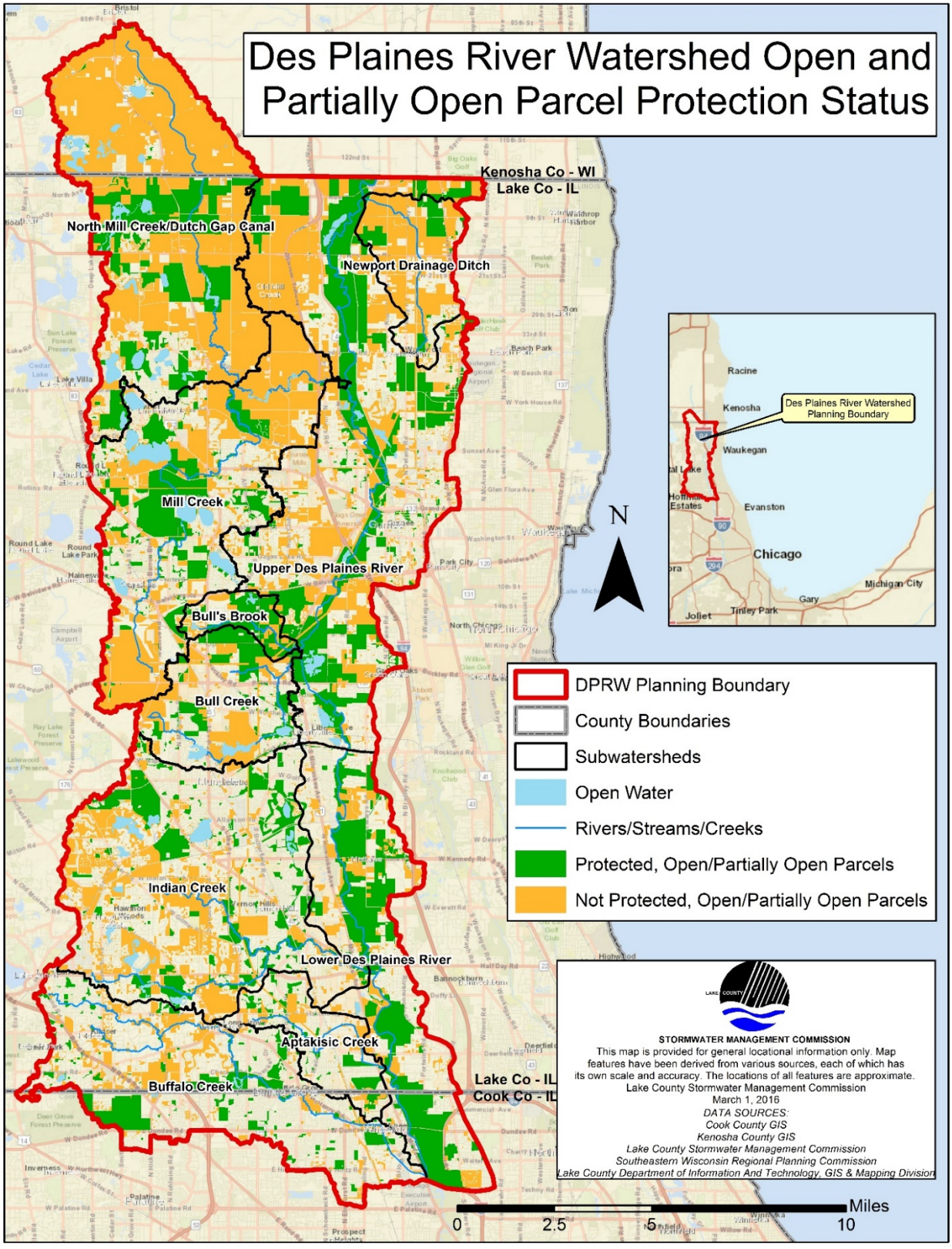


Figure 3-45: Protections Status of Parcels in the DPR Planning Area

3.9 PARKS AND RECREATION

3.9.1 PARKS AND OPEN SPACE

Figure 3-46: Buffalo Grove Farrington Ditch at Buffalo Skate Park

Three hundred and eighty-five (381) parks totaling approximately 5,982 acres were identified within the DPR planning area. For the purposes of this plan, "parks" are defined as publicly-owned open space not owned by a Forest Preserve District, including all open space owned by park districts, municipalities, townships, and the State of Illinois. Management, programming, and use of these lands is varied, and includes active and passive recreation, wildlife management, hunting and fishing, and nature preserves. This plan does not include golf courses in this definition. The average mean park size is approximately 15 acres. The number of parks per county and jurisdiction is presented in Table 3-20 and Table 3-21, respectively. Figure 3-46 displays an example of a park in the DPR planning area and all of the park locations are displayed in Figure 3-47.

Table 3-20: Distribution of Parks within the DPR Planning Area

PARK LOCATION (COUNTY)	NUMBER OF PARKS	SIZE (ACRES)	% OF THE WATERSHED
KENOSHA	11	14	0.01%
COOK	30	282	0.19%
LAKE	344	5,686	3.78%
TOTAL	**385**	**5,982**	**3.98%**

Table 3-21: Distribution of Parks within the DPR Planning Area by Jurisdiction

PARK LOCATION (JURISDICTION)	NUMBER OF PARKS	SIZE (ACRES)	% OF THE WATERSHED
City of Park City	1	1.9	0.001%
City of Prospect Heights	2	13.1	0.01%
City of Waukegan	6	274.5	0.18%
City of Zion	3	18.1	0.01%
Ela Township	1	2.3	0.002%
Fremont Township	3	4.2	0.003%
Lake Villa Township	4	2.4	0.002%
Libertyville Township	10	885.5	0.59%
State of Illinois	1	1,001.6	0.67%
Village of Salem Lakes	7	2.2	0.001%
Village of Antioch	6	79.2	0.05%
Village of Arlington Heights	4	56.7	0.04%
Village of Beach Park	2	6.6	0.004%
Village of Bristol	4	11.8	0.01%
Village of Buffalo Grove	49	460.2	0.31%
Village of Deer Park	8	52.6	0.03%
Village of Grayslake	39	396.7	0.26%
Village of Green Oaks	1	15.5	0.01%
Village of Gurnee	30	330.0	0.22%
Village of Hawthorn Woods	11	120.7	0.08%
Village of Lake Villa	2	12.6	0.01%
Village of Lake Zurich	15	125.4	0.08%
Village of Libertyville	21	392.8	0.26%
Village of Lincolnshire	7	36.4	0.02%
Village of Lindenhurst	31	187.9	0.12%
Village of Long Grove	19	418.8	0.28%
Village of Mettawa	1	9.2	0.01%
Village of Mundelein	33	403.3	0.27%
Village of Old Mill Creek	1	5.1	0.003%
Village of Palatine	4	29.5	0.02%
Village of Round Lake Beach	3	16.1	0.01%
Village of Vernon Hills	21	355.2	0.24%
Village of Wadsworth	2	17.1	0.01%
Village of Wheeling	8	106.7	0.07%
Warren Township	25	130.2	0.09%
TOTAL	381	5,982.1	3.98%

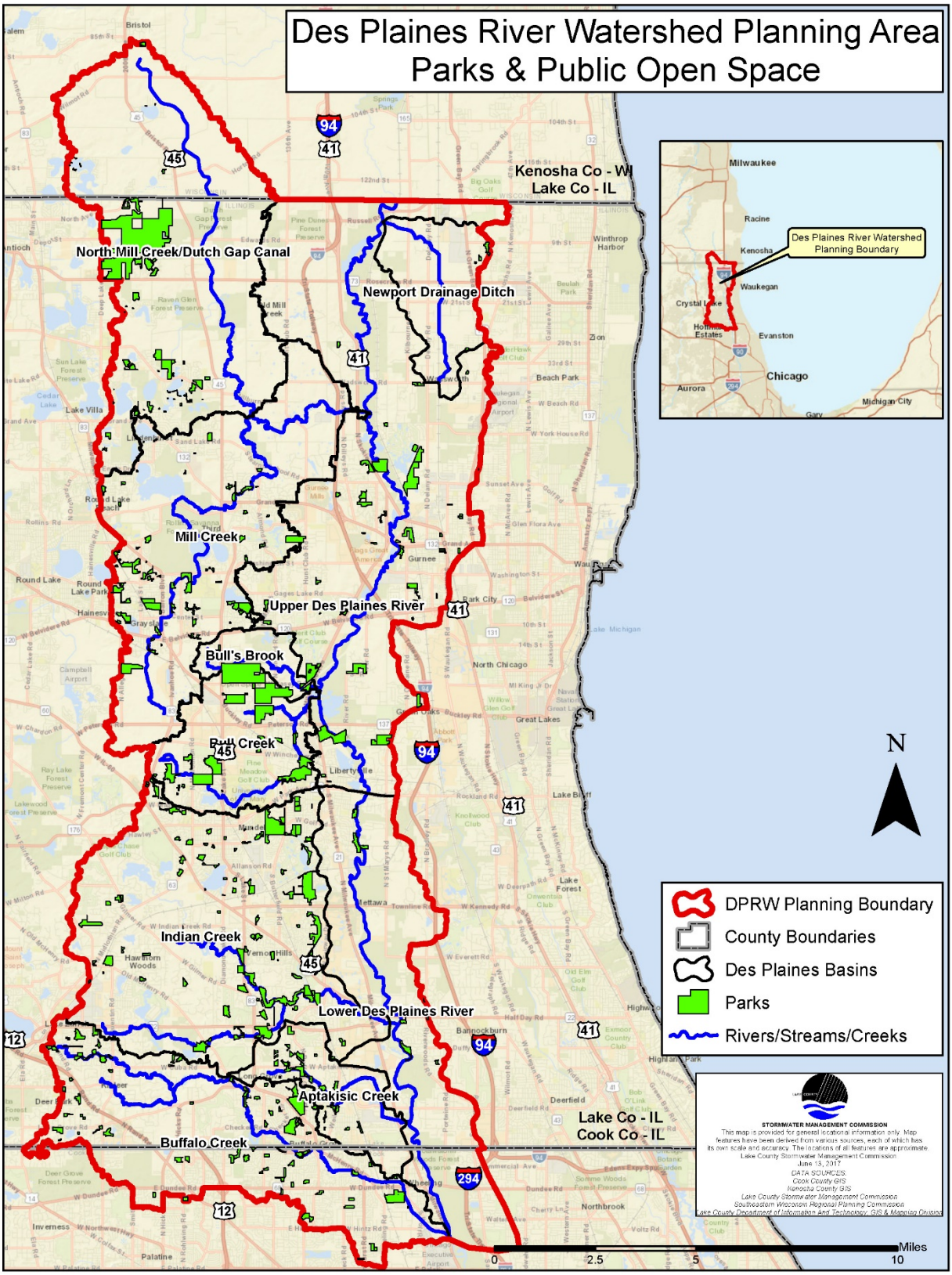


Figure 3-47: Location of Parks in DPR Planning Area

3.9.2 Golf Courses

Twenty-nine golf courses totaling approximately 4,319 acres are located within the DPR planning area. The distribution of golf courses by jurisdiction is summarized in Table 3-22, and graphically displayed in Figure 3-48.

Table 3-22: Distribution of Golf Courses within the DPR Planning Area

GOLF COURSE LOCATION (JURISDICTION)	NUMBER OF GOLF COURSES	SIZE (ACRES)	% OF THE WATERSHED
Avon Township	1	99.3	0.07%
City of Waukegan	1	249.9	0.17%
City of Zion	1	152.3	0.10%
Fremont Township	1	442.6	0.29%
Northfield Township	1	87.1	0.06%
Vernon Township	2	366.8	0.24%
Village of Arlington Heights	1	46.0	0.03%
Village of Beach Park	1	53.8	0.04%
Village of Buffalo Grove	2	247.4	0.16%
Village of Grays Lake	1	19.2	0.01%
Village of Gurnee	3	597.3	0.40%
Village of Hawthorn Woods	1	176.7	0.12%
Village of Kildeer	1	228.4	0.15%
Village of Libertyville	1	26.8	0.02%
Village of Lincolnshire	1	159.8	0.11%
Village of Long Grove	2	329.0	0.22%
Village of Mundelein	3	537.0	0.36%
Village of Northbrook	1	38.2	0.03%
Village of Riverwoods	1	1.4	0.00%
Village of Vernon Hills	2	332.7	0.22%
Village of Wheeling	1	127.0	0.08%
TOTAL	**29**	**4,319**	**2.87%**

Stormwater runoff from many of these golf courses flows directly into the Des Plaines River. Landscaping and maintenance practices at golf courses directly impact the watershed. While fertilizers and pesticides maximize productivity and performance of turf grass, the DPR planning area may be at risk from spills of concentrated chemicals used to mix fertilizers and pesticides for application. Of the many nutrients applied to golf turf and the primary contaminants of concern in fertilizers are nitrogen and phosphorus, which contribute to algal growth, weeds, and the impairment of water.

Pesticides may be toxic to aquatic and terrestrial systems depending on their solubility, toxicity, and chemical breakdown rate. Other potentially hazardous materials, such as fuels and paints that are used in everyday operation and maintenance, can contaminate water quality accidentally. Golf course BMPs should be followed for maintenance operations to prevent contamination from accidental releases.

Another significant source of pollution from golf courses are waterfowl. Shallow ponds surrounded by mowed turf grass attract significant populations of waterfowl. Deposits of fecal matter by resident and migrating waterfowl (primarily Canada geese) may contribute to high levels of fecal coliform in the watershed (Figure 3-49).

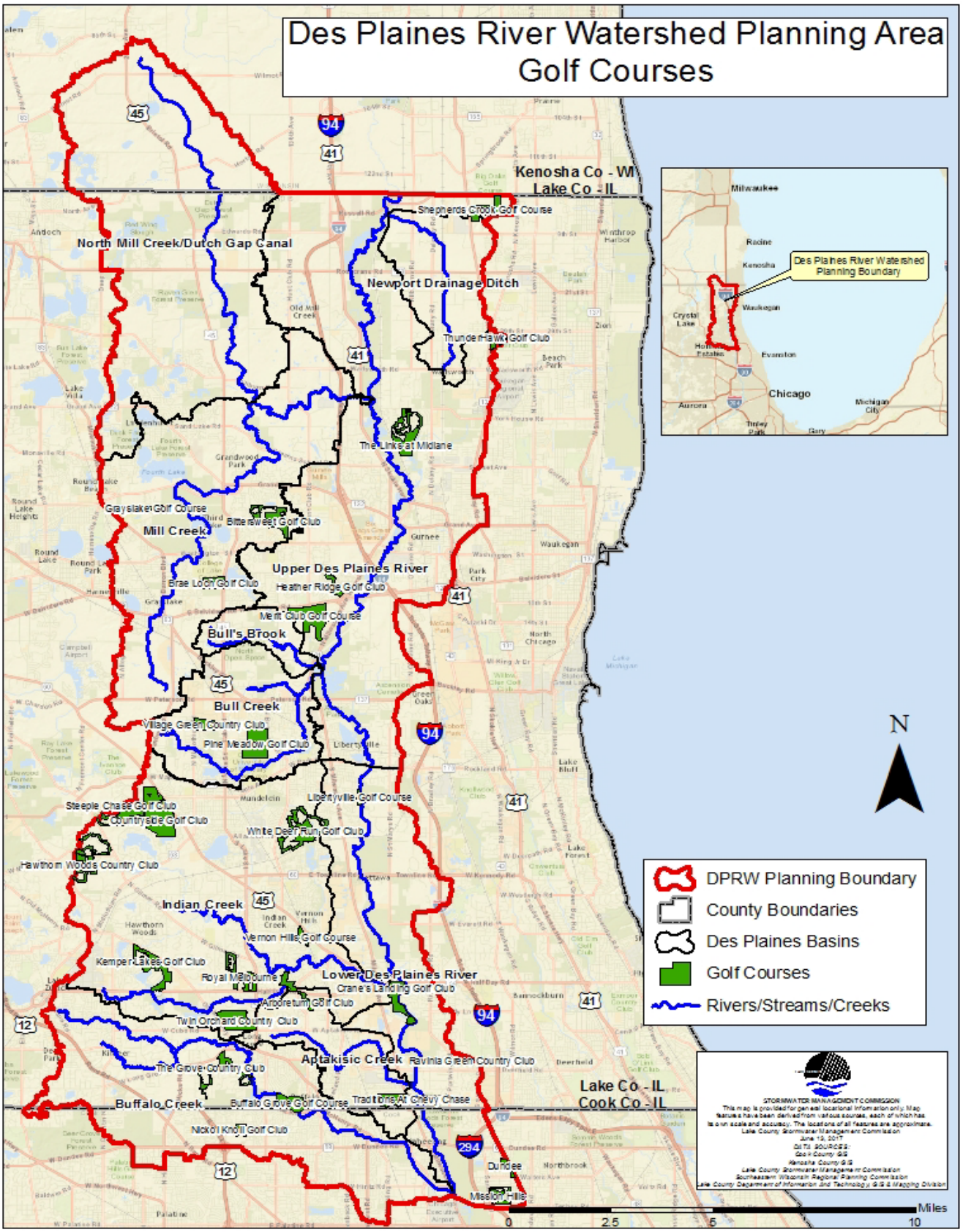


Figure 3-48: Golf Courses in Des Plaines River Watershed

Recommended BMPs for golf courses (Cornell University, 2014) include:

- *Maintain a 100-foot buffer around waterways for chemical storage and mixing. Storage areas should have a raised berm on all sides and an impervious surface for containment. Facilities should be equipped with "spill containment material".*
- *Grass clippings and debris removed from equipment should be disposed of properly and not released into waterways.*
- *Determine accurate supplemental nutrient needs based on soil chemical and physical analysis.*

Figure 3-49: Photo of geese on a golf course

- *Assess nutrient application efficiency through regular equipment calibration.*
- *Maintain turf with high shoot density to minimize runoff and maximize infiltration.*
- *Manage the surface accumulation of organic matter to maintain a permeable system that minimizes runoff and maximizes subsurface retention.*
- *Select turf that is well adapted to site conditions. Well adapted species require reduced amounts of fertilizer and pesticides, and if selected for drought tolerance, requires less water to survive and maintain playability.*
- *Minimize the amount of fertilizer and chemicals used during the establishment phase as establishing turf does not provide the needed uptake to prevent runoff and leaching.*
- *Implement methods such as core cultivation, deep slicing and water injection to alleviate soil compaction and remove organic material, resulting in increased infiltration and reduced runoff.*
- *Utilize proper topdressing material to maintain permeable turf.*
- *Utilize a combination of preventative and reactive strategies to manage pest problems. Select management options according to site conditions instead of the calendar.*
- *Establish wetland fringes around ponds to reduce populations of geese (geese prefer open water with closely mowed, visible banks to they can see predators approaching).*

3.10 NATURAL AREAS

3.10.1 NATURE PRESERVES, FOREST PRESERVES, AND HIGH QUALITY NATURAL AREAS

Several dedicated Illinois Nature Preserves, County Parks, and Lake County Forest Preserves are in the watershed. There are 40 forest preserve and county park areas totaling 18,532 acres in the DPR planning area (3 acres in Kenosha County, 16,652 acres in Lake County and 1,877 acres in Cook County) (See Figure 3-50 for an example of forest preserves within the DPR planning area). Thirty-nine of the approximately 128 miles of

major tributaries and 27 of the approximately 37 miles of the mainstem in the DPR planning area flow through forest preserves. The Lake County Forest Preserve District owns the most land of any single landowner in the watershed. Forest preserves are a key component of the system of hubs and links creating the regional green infrastructure system in the DPR planning area. In particular, the network of forest preserves along the Des Plaines River in Lake and Cook Counties provides significant flood damage reduction, water quality, habitat, and quality of life benefits to the planning area. Forest preserve districts are therefore key partners in successful implementation of this plan. Forest preserve properties within the DPR planning area are listed in Table 3-23, acres of forest preserve in each subwatershed is listed in Table 3-24, and forest and nature preserve properties are mapped in Figure 3-51. There are 19 nature preserve properties totaling 4,775 acres in the DPR planning area, as listed in Table 3-25. Six of these properties are entirely within a forest preserve property, five are partially within a forest preserve property, and five are located outside of forest preserve properties.

Figure 3-50: Almond Marsh Forest Preserve in Grayslake Illinois

Table 3-23: Forest Preserve and County Parks in the DPR Planning Area

SITE	ACRES	SITE	ACRES
Almond Marsh	502.2	**Hastings Lake**	268.4
Brae Loch Golf Club	154.0	**Heron Creek**	240.8
Bristol Woods	3.1	**Independence Grove**	1,140.5
Buffalo Creek	397.7	**Lake Carina**	473.5
Cahokia Flatwoods	221.4	**Lyons Woods**	2.0
Captain Daniel Wright Woods	682.9	**MacArthur Woods**	495.0
Casey Trail & Greenway	33.0	**McDonald Woods**	305.3
Countryside Golf Club	488.0	**Mill Creek**	276.8
Dam No. 1 Woods	668.4	**Oak-Hickory**	224.0
Deer Grove	92.2	**Old School**	272.2
Deer Grove East	558.9	**Pine Dunes**	862.5
Duck Farm	350.9	**Potawatomi Woods**	557.6
Dutch Gap	785.8	**Prairie Stream**	331.4
Edward L. Ryerson Conservation Area	561.1	**Raven Glen**	535.9
Egret Marsh	119.2	**Rollins Savanna**	1,236.9
Ethel's Woods	495.5	**Sedge Meadow**	793.2
Fourth Lake	622.1	**ThunderHawk Golf Club**	53.8
General Offices	6.6	**Van Patten Woods**	969.4
Grainger Woods Conservation Preserve	314.3	**Wadsworth Savanna**	1,960.6
Half Day	231.8	**Wilmot Woods**	243.9
		TOTAL:	**18,533**

Table 3-24: Forest Preserve and County Parks Acreages in the DPR Planning Area

SUBWATERSHED NAME	FOREST PRESERVE ACRES	% OF SUBWATSHED
Aptakisic Creek	1.8	0.04%
Buffalo Creek	1,072.3	6.17%
Bull's Brook	409.5	22.54%
Bull Creek	195.4	2.74%
Indian Creek	831.4	3.44%
Lower Des Plaines River	3,995.7	27.35%
Mill Creek	2,389.6	12.08%
Newport Drainage Ditch	188.0	3.75%
North Mill Creek/Dutch Gap Canal	3,113.2	13.23%
Upper Des Plaines River	6,335.6	19.47%
TOTALS	18,532.5	Percent of Planning Area 12.33

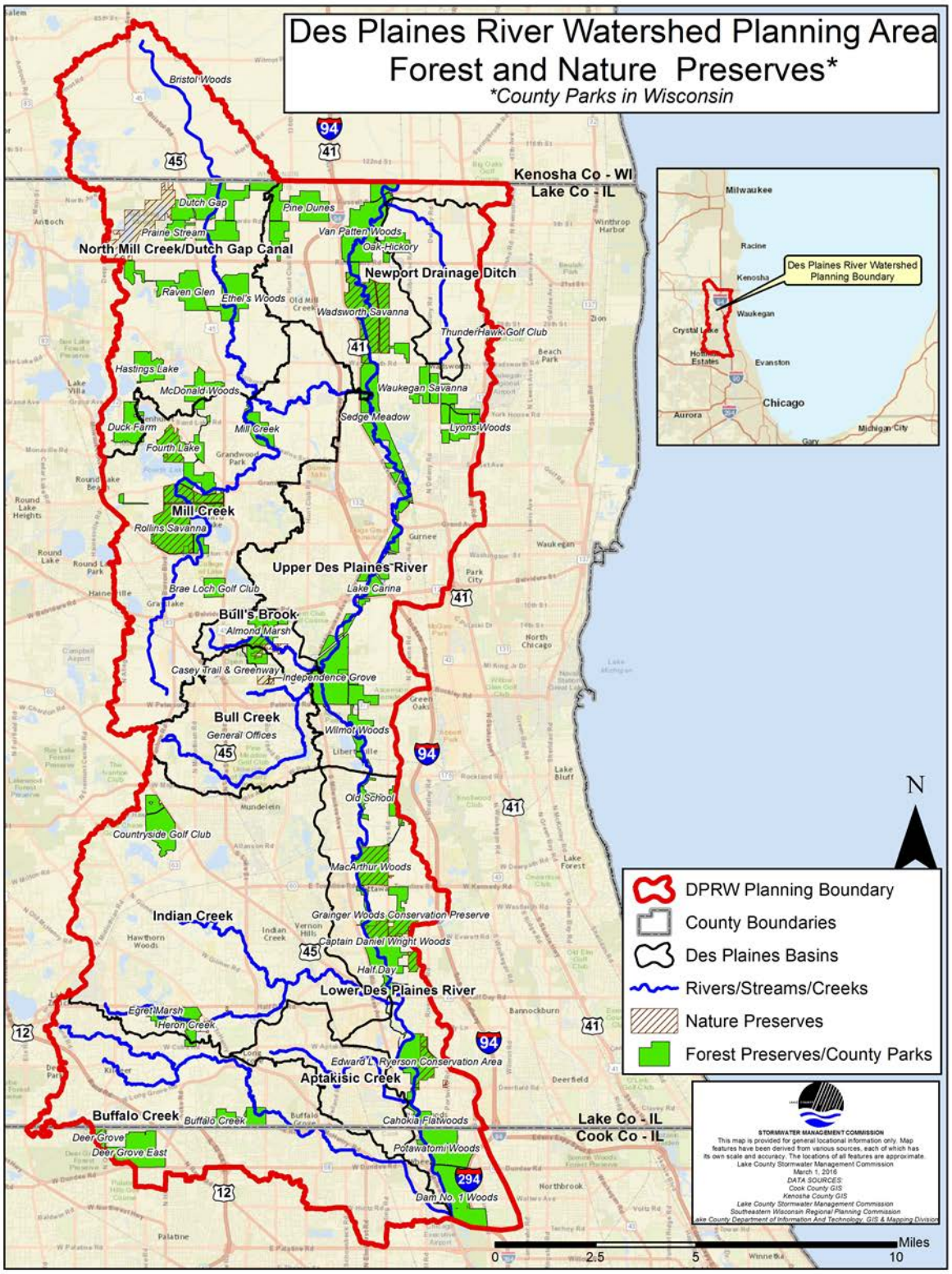


Figure 3-51: Des Plaines River Watershed Planning Area Forest and Nature Preserves

Table 3-25: Nature Preserves in the DPR Planning Area

SITE	ACRES	ACRES IN FOREST PRESERVE
Deer Grove West Woodland and Wetland Nature Preserve	78.5	78.5
Rhyan Tract Land and Water Reserve	13.6	13.6
Brooklands Wood Land and Water Reserve	10.7	0.0
Webber Wildlife Refuge Land and Water Reserve	17.2	0.0
Almond Marsh Nature Preserve	154.9	109.6
Oak Openings Nature Preserve	73.5	27.3
Liberty Prairie Nature Preserve	75.0	2.9
Eastern Prairie Fringed Orchid Nature Preserve	3.7	0.0
Red Wing Slough/Deer Lake Land and Water Reserve	734.8	0.0
Grainger Woods Nature Preserve	183.6	183.6
Lloyd's Woods Nature Preserve	142.8	142.8
MacArthur Woods Nature Preserve	469.6	466.4
Reed-Turner Woodland Nature Preserve	45.9	0.0
Edward L. Ryerson Nature Preserve	282.2	273.6
Wadsworth Prairie Nature Preserve	1,035.8	1,035.8
Fourth Lake Fen Nature Preserve	251.6	251.6
Kildeer Creek and Woodland Land and Water Reserve	63.4	63.4
Rollins Savanna Nature Preserve	1,059.3	1,059.3
Elm Road Woods Nature Preserve	78.9	78.9
TOTAL:	**4,775.0**	**3,787.3**

3.10.2 Threatened and Endangered Species

High quality natural resources in the DPR planning area include **threatened** and **endangered** species and communities, rare habitats, and important natural areas, including natural area inventory sites, forest preserves, nature preserves, and high quality **ADID** wetlands. No Federally endangered species have been observed in the watershed.

ENDANGERED SPECIES: A species in danger of extinction throughout all or a substantial portion of its range.

THREATENED SPECIES: A species likely to become endangered in the near future.

ADID SITES: Aquatic sites that have been determined to provide biological value by the USACE, Chicago District and the USEPA.

As of 2015, 58 Illinois listed threatened and endangered species were listed in the watershed including 32 vascular plant species, 17 vertebrate animal species, and 9 bird species. According to the WDNR and Wisconsin Natural Heritage Inventory program, the threatened and endangered species observed in the Kenosha County portion of the DPR planning area include 3 vertebrate animal species, 3 vascular plant species, and 2 natural communities. These include 5 species of special concern (not yet listed as threatened or endangered) and 1 state-listed endangered species. No formal status is assigned to natural communities by the WDNR.

Table 3-26 includes the Illinois listed threatened or endangered species in the DPR planning area and provides additional information, including status and type, and Table 3-27 lists the number of Illinois threatened and endangered species in each subwatershed. Ecologically significant and protected areas in the watershed provide habitat for threatened or endangered species and contain examples of high-quality natural

communities. These areas include ADID (high quality) wetlands, five INAI sites, nine forest preserves, and ten nature preserves

NOTEWORTHY: IDENTIFYING HIGH QUALITY NATURAL RESOURCES

The Illinois Natural Heritage Database provides information on the presence of the state's threatened and endangered plants and animals, INAI sites, Illinois Nature Preserves, and Forest Preserve lands. The database's information was gathered from the INAI inventory (conducted in the mid 1970's), as well as by IDNR biologists, resource managers, and volunteers. Lake County threatened and endangered species information was also assembled during LCHD-ES water quality and plant sampling of the lakes, in addition to 20 years of threatened and endangered species data from the LCFPD queried through the IDNR Element Occurrence Records reports.

Table 3-26: Illinois Listed Threatened and Endangered Species within the DPR planning area

COMMON NAME	SCIENTIFIC NAME	TYPE	STATUS
American Bittern	*Botaurus lentiginosus*	Bird	Endangered
American Orpine	*Sedum telephioides*	Vascular Plant	Threatened
Banded Killifish	*Fundulus diaphanus*	Vertebrate Animal	Threatened
Black Tern	*Chlidonias niger*	Vertebrate Animal	Endangered
Blackchin Shiner	*Notropis heterodon*	Vertebrate Animal	Threatened
Black-crowned Night-heron	*Nycticorax*	Bird	Endangered
Blacknose Shiner	*Notropis heterolepis*	Vertebrate Animal	Endangered
Blanding's Turtle	*Emydoidea blandingii*	Vertebrate Animal	Endangered
Buckbean	*Menyanthes trifoliata*	Vascular Plant	Threatened
Bulrush	*Scirpus hattorianus*	Vascular Plant	Threatened
Cerulean Warbler	*Dendroica cerulea*	Vertebrate Animal	Threatened
Common Bog Arrow Grass	*Triglochin maritima*	Vascular Plant	Threatened
Common Gallinule	*Gallinula galeata*	Vertebrate Animal	Endangered
Common Moorhen	*Gallinula chloropus*	Bird	Endangered
Common Tern	*Sterna hirundo*	Bird	Endangered
Downy Solomon's Seal	*Polygonatum pubescens*	Vascular Plant	Endangered
Downy Willow-herb	*Epilobium strictum*	Vascular Plant	Threatened
Dwarf Raspberry	*Rubus pubescens*	Vascular Plant	Threatened
Eastern Massasauga	*Sistrurus catenatus*	Vertebrate Animal	Endangered
Eastern Prairie Fringed Orchid	*Platanthera leucophaea*	Vascular Plant	Endangered
Forked Aster	*Aster furcatus*	Vascular Plant	Threatened
Forster's Tern	*Sterna forsteri*	Vertebrate Animal	Endangered
Grass-leaved Pondweed	*Potamogeton gramineus*	Vascular Plant	Threatened
Grove Bluegrass	*Poa alsodes*	Vascular Plant	Endangered
Hairy White Violet	*Viola blanda*	Vascular Plant	Endangered
Iowa Darter	*Etheostoma exile*	Vertebrate Animal	Threatened
King Rail	*Rallus elegans*	Vertebrate Animal	Endangered

COMMON NAME	SCIENTIFIC NAME	TYPE	STATUS
Least Bittern	*Ixobrychus exilis*	Vertebrate Animal	Threatened
Little Green Sedge	*Carex viridula*	Vascular Plant	Threatened
Marsh Speedwell	*Veronica scutellata*	Vascular Plant	Threatened
Mountain Blue-eyed Grass	*Sisyrinchium montanum*	Vascular Plant	Endangered
Northern Cranesbill	*Geranium bicknellii*	Vascular Plant	Endangered
Northern Harrier	*Circus cyaneus*	Bird	Endangered
Northern Long-eared Myotis	*Myotis septentrionalis*	Vertebrate Animal	Threatened
Osprey	*Pandion haliaetus*	Bird	Endangered
Pale Vetchling	*Lathyrus ochroleucus*	Vascular Plant	Threatened
Pied-billed Grebe	*Podilymbus podiceps*	Bird	Threatened
Pretty Sedge	*Carex woodii*	Vascular Plant	Threatened
Pugnose Shiner	*Notropis anogenus*	Vertebrate Animal	Threatened
Purple Fringed Orchid	*Platanthera psycodes*	Vascular Plant	Endangered
Queen-of-the-prairie	*Filipendula rubra*	Vascular Plant	Endangered
Reflexed Trillium	*Trillium recurvatum*	Vascular Plant	Threatened
Richardson's Rush	*Juncus alpinus*	Vascular Plant	Threatened
Sedge	*Carex bromoides*	Vascular Plant	Threatened
Sedge	*Carex formosa*	Vascular Plant	Endangered
Slender Bog Arrow Grass	*Triglochin palustris*	Vascular Plant	Threatened
Small Sundrops	*Oenothera perennis*	Vascular Plant	Threatened
Small Yellow Sedge	*Carex cryptolepis*	Vascular Plant	Endangered
Snowy Egret	*Egretta thula*	Bird	Endangered
Starhead Topminnow	*Fundulus dispar*	Vertebrate Animal	Threatened
Swollen Sedge	*Carex intumescens*	Vascular Plant	Threatened
Tamarack	*Larix laricina*	Vascular Plant	Threatened
Tubercled Orchid	*Platanthera flava var. herbiola*	Vascular Plant	Endangered
Tuckerman's Sedge	*Carex tuckermanii*	Vascular Plant	Endangered
Water Marigold	*Megalodonta beckii*	Vascular Plant	Endangered
Western Meadowlark	*Sturnella neglecta*	Bird	Threatened
Wilson's Phalarope	*Phalaropus tricolor*	Vertebrate Animal	Endangered
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	Vertebrate Animal	Endangered

Table 3-27: Number of Species that are State-Threatened or Endangered by Subwatershed

SUBWATERSHED	NUMBER OF SPECIES THAT ARE STATE-THREATENED OR ENDANGERED
North Mill Creek/Dutch Gap Canal	12
Mill Creek	17
Newport Drainage Ditch	0
Upper Des Plaines River	14
Bull's Brook	13
Bull Creek	6
Indian Creek	6
Lower Des Plaines River	19
Buffalo Creek	9
Aptakisic Creek	0

3.11 WETLAND INVENTORY

European settlers to the region altered much of the DPR planning area's natural hydrology and wetland processes. They drained wet areas, channelized streams, plowed prairie land, and cleared forests to farm the rich soils. Even after these alterations, the underlying soil retains clues to its prior condition. Hydric soils (soils that remain wet for an extended period) can help identify the locations of pre-settlement wetlands.

Many wetland types exist in the DPR planning area. These wetlands are characterized based on the location in the landscape, soil, vegetation, and hydrology. Marshes, often a mix of emergent vegetation and open water, are probably the most recognizable wetland type in the watershed and form in many different landscapes, including in isolated depressions, along stream corridors and lakes, and in low-lying floodplain areas along the

NOTEWORTHY: LAKE COUNTY WETLAND INVENTORY

The *Lake County Wetland Inventory (LCWI)* was originally developed in 1993 by a multi-agency team using a combination of information sources, including wetland inventory maps and the 1970 Soil Survey of Lake County by the USDA-Soil Conservation Service (SCS), National Wetland Inventory (NWI) maps by the USFWS, and various years of aerial photography. The LCWI was updated in 2002 using high resolution aerial photography and enhanced with Lake County GIS topographic information (elevation contours). The updated 2002 LCWI maps identify five different wetland types: *wetlands, farmed wetlands*, *artificial wetlands*, *converted wetlands*, and *Advance Identification wetlands (ADID)*. The LCWI is intended to improve the understanding and management of the County's wetland resources.

WETLANDS: Areas with a high potential for exhibiting hydric soil, hydrophytic vegetation, and required hydrologic conditions.

FARMED WETLANDS: Agricultural cropped areas on hydric soil that have been cleared, partially drained, or filled.

ARTIFICIAL WETLANDS: Man-made water features typically constructed on non-hydric soil.

Des Plaines River. Wet meadows (areas with saturated soil conditions for much of the year) were once a common wetland type in the watershed but have been reduced since the time of European settlement because of drainage and agriculture. Flatwoods, a forested wetland type that is relatively uncommon in northern Illinois, are found along the Des Plaines River in the southern half of the planning area. Vernal pools (forested wetland pockets that hold standing water during spring and early summer) are in the woodlands along the crests of the moraines that form the perimeter of the watershed. Other wetland types in the DPR planning area of which there are few examples still in existence or which have a more limited geographic distribution include bogs, fens, seeps, and lake fringes.

The first comprehensive effort to inventory and map wetland resources in the DPR planning area was the National Wetlands Inventory (NWI), undertaken by the U.S. Fish and Wildlife Service (USFWS) in the mid-1980s. NWI maps initially were developed by interpreting high-altitude aerial photographs using stereoscope, pen, and ink. Image interpretation for the NWI has evolved to now use geospatial software. In 1990 a countywide wetland mapping effort was undertaken. The Lake County Wetland Inventory (LCWI) was initially published in 1993, comprehensively updated in 2002, and the current version has a publication date of 2009. By way of comparison, the LCWI reflects approximately nearly twice the acreage of wetland resources for Lake County as the NWI and more than twice the acreage for the planning area. For the best indication of historic wetland locations prior to drainage and/or development there is the hydric soil mapping in the Soil Survey of Lake County, initially published by the Natural Resource Conservation Service (NRCS, formerly the Soil Conservation Service) in 1970 and updated in 2005. While the NWI offers a classification of wetland areas based on vegetation and hydrology, in 1992, the U.S. Environmental Protection Agency (USEPA) completed an Advanced Identification (ADID) study of high-function wetlands in Lake County

CONVERTED WETLANDS: Areas that have been drained or filled and no longer exhibit Wetland or Farmed Wetland characteristics

ADID WETLANDS: High functional wetlands identified by USEPA and others, based on biological, hydrological and water quality functions.

HYDROGEOMORPHIC DESCRIPTORS: Characteristics that emphasize geomorphic and hydrologic attributes such as the landscape position, landform, water flow path, and waterbody type of a wetland or water body rather than biological characteristics.

WATER FLOW PATH: Descriptors that characterize the direction of water flow (inflow, outflow, throughflow, bidirectional flow, etc.)

LANDSCAPE POSITION: The physical setting of a wetland relative to a water body, if present (e.g., a wetland associated with a lake, a river, or a depression surrounded by uplands).

LANDFORM: The large-scale landscape features that affect the physical shape of a wetland or water feature (e.g., basin, flat, slope, island, or fringe).

WATERBODY TYPE: A distinction in the underlying nature of the wetland based on size and shape of the associated water component: Lake, Pond, River, or Stream.

POTENTIALLY RESTORABLE WETLANDS: Areas with predominantly hydric soils that are not mapped as wetlands on the LCWI and have not been converted to urban land use.

WETLAND ENHANCEMENT: Augmenting wetland functions beyond the current conditions; enhancement of one function sometimes can occur at the expense of other functions.

NOTEWORTHY: HIGH FUNCTIONALITY (ADID) WETLANDS

In 1992, Lake County implemented the *Advanced Identification (ADID)* process to identify high functionality wetlands that should be protected. The ADID program is a USEPA program developed to shorten permit processing time and provide information to local governments to aid in zoning, permitting and land acquisition decisions. Three primary functions were used by the USEPA and U.S. Army Corps of Engineers (USACE) to evaluate wetlands during the ADID process: biological functions (i.e., threatened or endangered species, wildlife habitat, and plant species diversity), hydrologic functions (i.e., stormwater storage), and water quality mitigation functions (i.e., sediment and toxicant retention,

NOTEWORTHY: WETLAND RESTORATION AND PRESERVATION PLAN

The Wetland Restoration and Preservation Plan (WRAPP) was developed by SMC in 2018, with input from a 13-member Technical Advisory Group (TAG). Its dataset reflects enhancements of the 2002 LCWI maps using high resolution aerial photography and LiDAR collected since 2002, as well as existing information from the Lake County ADID study, soil surveys, and other available mapping products. Each WRAPP polygon was enhanced with descriptors associated with the NWI classification system and *hydrogeomorphology*. Using this combined information, the WRAPP estimates the functions (services) of mapped wetland and water resources for both existing and pre-settlement conditions within Lake County. The WRAPP will support watershed-based assessments of wetland function, identify locations of *potentially restorable wetlands (PRWs),* and identify opportunities for *wetland enhancement* and *preservation*. The WRAPP will include an on-line decision support tool (DST) to help users prioritize restoration and preservation opportunities based on acreage, wetland function or functional loss. This will allow the user to make informed decisions on wetland restoration and preservation options targeted to user-specific goals and objectives.

using the LCWI as a base. The ADID study identified about 200 wetland complexes in the county that were predicted to have high ecological, stormwater management, and water quality enhancement functionality.

The Lake County Wetland Restoration and Preservation Plan (WRAPP), which builds on these previous studies, provides the most current iteration of wetland resources and their functionality within the county. According to the WRAPP, approximately 17,000 acres or 40% of the pre-settlement wetlands remain in the watershed. Of this, 430 acres are classified as farmed wetlands.

Approximately 1,530 acres of constructed wetlands, drainage, and stormwater features also have been created in the watershed, although this is likely an under-estimate resulting from mapping constraints. Figure 3-52depicts the location of wetlands, as documented in the WRAPP.

3.11.1 WETLAND FUNCTION AND TYPE

Wetlands filter sediments and nutrients from runoff, provide wildlife habitat, reduce flooding, and help maintain water levels in streams. They also provide areas where groundwater is recharged by surface water. By performing these functions, wetlands improve the water quality and biological health of streams and lakes located downstream and protect public safety.

The WRAPP evaluated thirteen wetland functions, which fall under three general groups: hydrologic functions, biodiversity functions, and water quality functions. As indicated in Table 3-28, not all wetlands within the Des Plaines River Watershed perform all functions, and they also do not perform all functions equally well.

Table 3-28: Wetland Functions and Acreages Rating for the Des Plaines River Watershed

CATEGORY	FUNCTION	HIGH	
		#	AC
Hydrologic Functions	Flood Water Storage	4,798	12,830
	Stream Baseflow Maintenance	935	3,000
Biodiversity Functions	Native Fish Habitat	88	1,180
	Waterfowl Habitat	974	4,870
	Other Wetland-dependent Bird Habitat	2,306	7,120
	Woodland Amphibian Habitat	232	550
	Unique Wetland Resources	1,589	5,720
	Stream Shading	1,224	2,550
	Wildlife Movement Corridors	6,147	14,786
Water Quality Functions	Nutrient Transformation (P-focus)	4,281	11,540
	Sediment and Other Particulate Retention	3,170	7,250
	Shoreline/Stream Bank Stabilization	1,894	5,120
	Carbon Sequestration	3,564	11,080

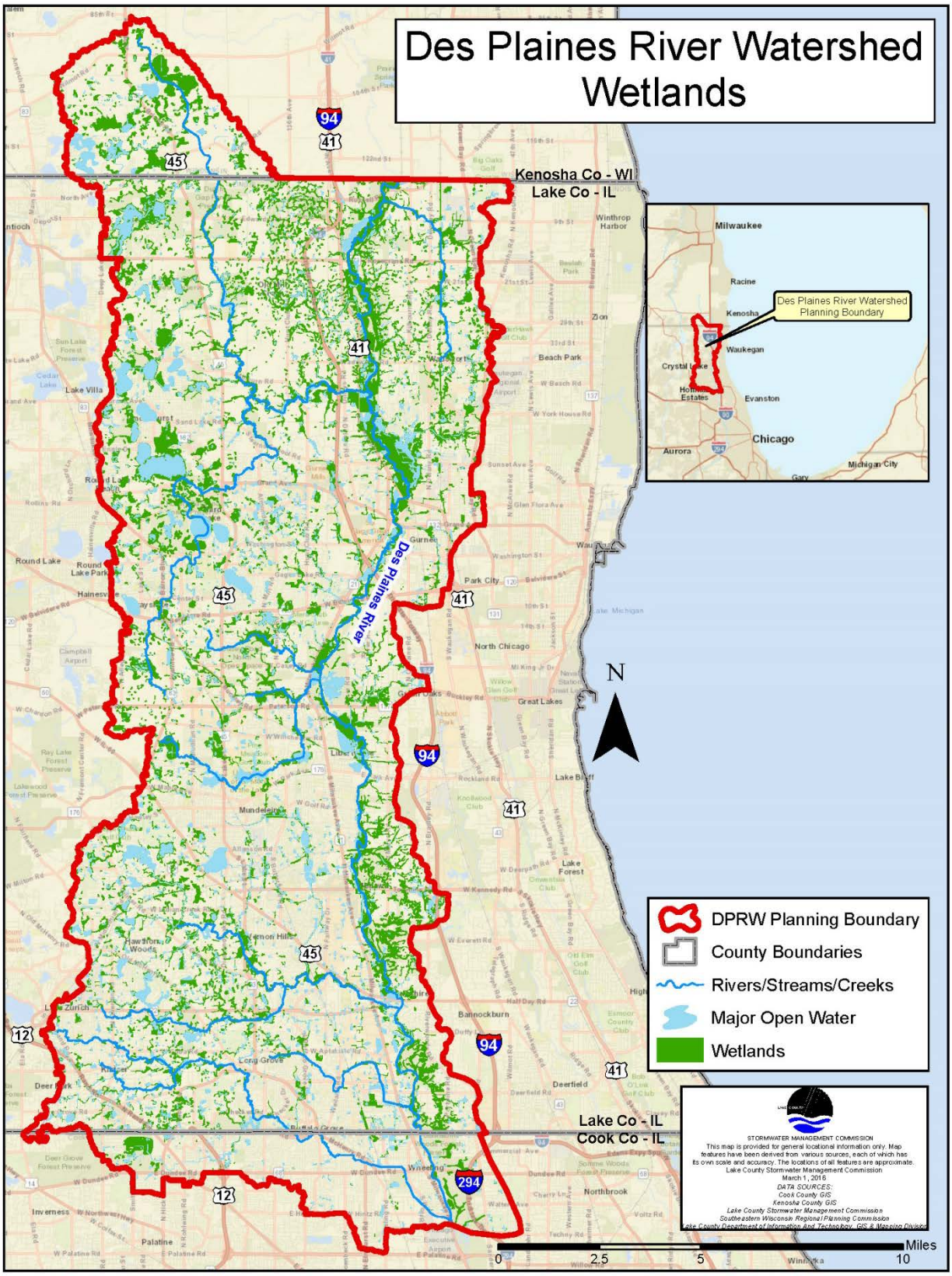


Figure 3-52: DPR Planning Area Wetland Locations

3.11.2 Approaches to and Tools for Wetland Management

Within a watershed, wetlands are managed using multiple approaches and various tools, including planning efforts, regulations, and voluntary activities. Advanced planning efforts can help identify wetland needs and potential locations. Countywide planning efforts include the WRAPP, the LCWI, and the ADID wetland studies previously described. Other efforts target specific areas of the county (e.g., select creeks in Fox River Watershed and the North Branch Chicago River watersheds, per Hey 2001a). Specific to the DPR planning area, is the *Des Plaines River Wetland Restoration Study*, which was developed by SMC with grant assistance from the USEPA to "advance the concept that wetland restoration can play an important role in helping to reduce flood flow volumes and rates" (Hey and Associates 2001). The study focused in identifying potential ***wetland restoration*** sites in the Upper Des Plaines watershed having more than 16 acres of drained hydric soil within open space on the Lake County's GIS.

Wetland Restoration: The re-establishment of wetlands in areas where they previously existed and were altered by drainage activities or landscape modifications.

Mitigation Banking: A system of credits and debits to offset environmental impacts associated with site development and achieve no net loss, typically accomplished via restoration, creation, enhancement, or preservation of similar wetland, stream, or natural habitats near the area of impact with the specific goal of compensating for unavoidable impacts to aquatic resources.

Wetland Preservation: Actions taken to maintain the size and functions of an existing wetland or water body.

Regulation of wetland impacts by agencies and municipalities is arguably the most visible approach for wetland management. This typically involves permits and may require mitigation which can occur at the national (USACE), state, county, and local (municipal) level. At the county level, Lake and Cook county regulate wetlands through the WDO and WMO, respectively. In Lake County, the WDO establishes a no-net-loss policy for wetland impact, with a goal of net gain in function. The WDO sets the minimum requirements for the county, including the need for a permit to approve wetland impacts and requirement for mitigation if impacts will exceed the minimum threshold. Wetland impacts within Lake County are to be mitigated within the county on a watershed basis. Wetland mitigation can take the form of mitigation banking, or a site-specific mitigation project involving wetland restoration, enhancement or, in rare cases, preservation. In Cook County, the WMO discourages wetland impacts, but allows for wetland mitigation in some cases. The WMO states the preferred wetland mitigation method is payment to mitigation banks. At the state level, the WI DNR regulates wetland Impacts in Kenosha County through a variety of state statues. For the most up to date information on WI DNR regulatory authority, visit the WI DNR's website.

Voluntary wetland restoration and management efforts are performed not as a required activity adjunct to a regulatory action but in response to a desire to restore or manage a target wetland for a specific purpose (e.g., duck habitat, flood water storage, etc.). Typical approaches include wetland preservation and wetland restoration or enhancement through on-the-ground activities that may include, but are not limited to, tile disablement, selective herbicide application, prescribe d burning, on-line flow restriction, and water level control.

NOTEWORTHY: WETLANDS PROTECTION IN LAKE COUNTY

Wetlands protection is provided under existing regulatory programs, including federal and state floodplain development restrictions, the USACE's Section 404 Clean Water Act wetland permit program, and the WDO.

A permit/approval is required for any development that will impact wetlands in Lake County. The USACE Chicago District issues permits for impacts to federal *Waters of the U.S.* (WOUS), while Lake County issues written approvals for impacts to *Isolated Waters of Lake County* (IWLC). The USACE-Chicago District normally issues regional permits for impacts to less than 1.0 acre of non-high quality WOUS and compensatory mitigation typically is required at a minimum 1.5:1 replacement ratio for impacts over 0.1 acre to these wetlands. An individual permit from the USACE usually is required for proposed impacts to federal ADID sites, as ADID sites are generally considered unsuitable for filling activities. The individual permit process requires permit applicants to identify and assess practicable alternatives for avoiding and minimizing impacts to the federal ADID sites. In cases where an IP is issued for impacts to federal ADID sites, the USACE usually requires mitigation at a 3:1 or higher ratio.

Lake County issues written approvals for IWLC impacts as part of the Watershed Development Permit process, in accordance with the WDO regulations. Compensatory mitigation is required at a 1.5:1 ratio for impacts to 0.1 acre or more of non-high quality IWLC and 3:1 or higher for impacts to high quality IWLC. The USACE-Chicago District's regulatory program and the WDO also require buffers of native vegetation around preserved wetlands to provide a natural transition between wetlands and developed upland areas and help treat stormwater runoff by filtering sediments and pollutants before the runoff reaches the wetlands. Required buffer widths vary depending on the size, type (linear vs. water body), and quality of the wetlands. For *High Quality Aquatic Resources* (HQAR), which include ADID sites, a 100-foot-wide buffer is required under both the USACE-Chicago District's regulatory program and the WDO. A 30- to 50-foot-wide buffer typically is required around all other wetland areas, depending on wetland size and type.

3.12 STREAM INVENTORY

3.12.1 INTRODUCTION AND METHODS

The SMC conducted stream inventories for each of the subwatersheds and the main stem of the Des Plaines River in the DPR planning area (Table 3-29). These assessments recorded qualitative information on several easily observed and measured parameters that provide information on the "baseline" conditions of the stream channel and riparian area. The results provide a framework for prioritizing and implementing watershed management strategies in the watershed-based plan.

The stream assessment includes the geomorphic characterization of the channel; identifying erosion, evaluating discharge points and hydraulic structures, obstructions, areas of deficient buffer zones, and areas with significant detrimental impact on the stream. Visual observations include vegetation, water quality conditions, habitat assessments, and aquatic and terrestrial life. This allows for a more comprehensive assessment of the stream conditions. Also, information captured during the inventory process includes notes and comments about the stream not represented in the other forms, such as specific restrictions to stream, restoration efforts or conversations with residents. A copy of the Stream Inventory Methodology and Inventory Report Form is in Appendix C.

EROSION: The process by which the surface of the earth is worn away by the action of water, glaciers, winds, waves

SEDIMENT DEPOSITION: The geological process in which sediments, soil and rocks are added to a landform or land mass.

HYDRAULIC STRUCTURES: Bridges, culverts, dams, weirs, or other structures spanning or crossing the stream channel.

DISCHARGE POINTS: The location where all sanitary, storm sewer and agricultural drainpipes surface or stormwater flows back into a lake or stream channel. Discharge points also include open channels, swales, gullies and other significant tributaries.

GLOBAL POSITIONING SYSTEM (GPS): A system of earth-orbiting satellites, transmitting signals continuously towards the earth that enables the position of a receiving device on or near the earth's surface to be accurately estimated from the difference in arrival times of the signals.

DEFINED CHANNEL: Clearly discernable bed and banks of a flowing watercourse

The DPR planning area stream network is divided within each subwatershed into reaches; smaller geographically-defined stream segments, for which data is aggregated and evaluated. A team of two observers wade the entire length of each reach to collect data. At representative points within each reach, the observers measure the channel dimensions and relative velocity at the surface of the stream. The observers photograph and document all areas of moderate to severe ***erosion***, significant ***sediment deposition***, debris jams, ***hydraulic structures,*** and ***discharge points***. Equipment to collect photographs utilizes a ***GPS*** which provides geographic coordinates that translate point locations into GIS for analysis and mapping of data collected in the field. For determining bank erosion (lateral recession) additional measurements obtained include bank height, lateral recession rate, severity, and lateral recession characteristics. The stream inventory only assesses reaches which can be safely waded and have a ***"defined" channel***. Reaches excluded from assessments are: open-water ponds, lakes, impoundments, wetland complexes (without defined channel), roadside swales, small minor tributaries, or areas with restricted access or that create a hazard for the observer(s): depth of water, unstable substrate, or both.

The following types of data were collect during the inventory and summarized in the following section:

- Channel conditions (dimensions of the banks and bed)
- Channelization
- Pool-Riffle Development
- Bank Erosion
- Sediment Accumulation and Debris Loading
- Hydraulic Structures (bridges, culverts, dams, etc.)
- Discharge Points (storm sewers, pipes and overland flow draining to the stream)
- Riparian Corridor (vegetated buffer along the stream)

The following characteristics of the DPR planning area stream reaches are summarized by subwatershed and reach and are available in Appendix C:

1. In-stream and Over-bank debris loads
2. Substrate Composition
3. Channelization and Sinuosity
4. Bank Erosion
5. Channel Dimensions

3.12.2 Stream Network Description/Stream Reaches

The DPR planning area stream inventory is comprised of nine subwatersheds and the main stem of the Des Plaines River (Figure 3-1). For the purposes of the inventory, the Bull Creek and Bull's Brook subwatersheds are combined and the Des Plaines River mainstem is identified separately because the inventory methodology was altered to facilitate the use of canoes. The DPR planning area stream network has 269.7 miles of flow path through streams, wetlands, and lakes. The stream inventories assessed 229.2 miles of stream channel as shown in Table 3-29 and Figure 3-53, and detailed information on the stream reaches in Appendix C. Each of the subwatersheds in the DPR planning areaare described below:

1. **North Mill Creek/Dutch Gap Canal Subwatershed:** The North Mill Creek/Dutch Gap Canal subwatershed encompasses 22.55 square miles (14,432 acres) of northern Lake County, Illinois and 13.61 square miles (8,713 acres) of southern Kenosha County, Wisconsin. The North Mill Creek/Dutch Gap subwatershed includes tributary drainage from Deer Lake Drain in the northwest and Hastings Creek from the west to the North Mill Creek, the main stem, which drains southeast and converges with the main stem of Mill Creek.
2. **Mill Creek Subwatershed:** The Mill Creek subwatershed encompasses 30.9 square miles (19,783 acres) of north central Lake County, Illinois. The Mill Creek subwatershed includes tributary drainage from the Avon-Freemont Drainage Ditch which flows north and Lambs Corner Creek which flows northwest both joining the Mill Creek. The Mill Creek flows east from the mouth of the North Mill Creek into the Des Plaines River.
3. **Newport Drainage Ditch Subwatershed:** Newport Drainage Ditch **sub**watershed encompasses 7.84 square miles (5,018 acres) of north east Lake County, Illinois. The Newport Drainage Ditch flows north/northwest to the Des Plaines River.
4. **Upper Des Plaines River Subwatershed:** The Upper Des Plaines River subwatershed encompasses 50.9 square miles (32,549 acres) of north central and north east Lake County, Illinois. The Des Plaines River

flows south from Wisconsin into this subwatershed to Route 176 in Libertyville and includes drainage from many smaller tributaries.

5. **Bull Creek/Bull's Brook Subwatershed:** The Bull Creek and Bull's Brook subwatersheds encompass 13.9 square miles (8,952 acres) in central Lake County, Illinois. Two branches of Bull Creek join north of Route 137 in Libertyville and flow east to the Des Plaines River. Bull's Brook flows east from Prairie Crossing to the Des Plaines River in Libertyville Township.
6. **Indian Creek Subwatershed:** The Indian Creek subwatershed encompasses 37.7 square miles (24,151 acres) of south central Lake County, Illinois. Seavey Ditch, Kildeer Creek (South Branch Indian Creek) and several other tributaries join Indian Creek, which enters the Des Plaines River just south of Route 22 in Lincolnshire.
7. **Lower Des Plaines River Subwatershed:** The Lower Des Plaines River subwatershed encompasses 22.8 square miles (14,607 acres) of south-central and south-east Lake County and 4.7 square miles (2,975 acres) of northern Cook County. The Des Plaines River flows from Route 176 in Libertyville south through this subwatershed to the confluence with Buffalo Creek at the southern end of the planning area.
8. **Buffalo Creek Subwatershed:** The Buffalo Creek subwatershed encompasses 27.2 square miles (17,392 acres) of south central Lake County and 12.5 square miles (8,023 acres) of northern Cook County. Two tributaries feed Buffalo Creek, which flows southeast from the Buffalo Creek Reservoir, into the Wheeling Drainage Ditch, and ultimately to the Des Plaines River in Wheeling.
9. **Aptakisic Creek Subwatershed:** The Aptakisic Creek subwatershed encompasses 6.83 square miles (4,374 acres) of south central Lake County and 0.7 square miles (421 acres) of northern Cook County. Two channelized streams join to form the main branch of Aptakisic Creek, which flows east through Buffalo Grove and Vernon Township to the Des Plaines River.
10. **Des Plains River Main Stem**: The Des Plaines River main stem flows south from Kenosha County in Wisconsin through Lake County, Illinois and into Cook County, Illinois. Within the DPR planning area, the Des Plaines main stem flows south through the Upper and Lower Des Plaines River subwatersheds.

Table 3-29: Stream Inventory Miles in the DPR Planning Area

SUBWATERSHED	12-DIGIT HUC(s)	NUMBER OF REACHES	ASSESSED MILES	YEAR ASSESSED
NORTH MILL CREEK	071200040201	34	23.8	2007
MILL CREEK	071200040202	28	11.5	2013
NEWPORT DRAINAGE DITCH	071200040301 *071200040104*	26	9.5	2015
UPPER DES PLAINES	071200040302 071200040301	70	45.1	2016
BULL CREEK - BULLS BROOK	071200040302 071200040302	35	16.0	2015
INDIAN CREEK	071200040501	53	37.3	2015
LOWER DES PLAINES	071200040503	25	11.1	2016
BUFFALO CREEK	071200040502	59	23.2	2013
APTAKISIC CREEK	071200040503	30	14.6	2015
DES PLAINES RIVER-MAIN STEM	071200040302 071200040301 071200040503	19	37.0	2016
WATERSHED TOTAL		**379**	**229.1**	

Figure 3-53: DPR Planning Area Stream Inventory Reaches

3.12.2.1Channel Conditions

Measurements of the physical dimensions of the stream channel reflect the shape of the channel and the amount of water that it can transport under **low or high flow conditions**. A summary of channel conditions by subwatershed is shown in Table 3-30. The channels in the DPR planning area have narrow, shallow headwater streams that gradually drain into wider, deeper main stem streams, a common feature in stream hydrology.

LOW OR HIGH FLOW CONDITIONS: Typically measured as a 7-day average of the lowest or highest water flow rates annually.

Table 3-30: Channel Conditions in the DPR Planning Area

SUBWATERSHED	BANK HEIGHT (FT.)		CHANNEL WIDTH TOP (FT.)		CHANNEL WIDTH BOTTOM (FT.)	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Dutch Gap/ North Mill Creek	1.5	3.8	12.4	20.0	7.5	13.4
Mill Creek	2.1	5.5	25.0	43.5	14.2	21.7
Newport Drainage Ditch	1.2	2.8	8.8	54.7	4.0	10.6
Upper Des Plaines River	1.1	3.7	8.7	15.2	5.0	9.4
Bull Creek-Bull's Brook	1.0	4.7	7.7	85.3	3.9	21.8
Indian Creek	1.6	6.6	15.5	38.3	9.5	27.2
Lower Des Plaines River	1.3	3.9	7.4	13.4	3.4	7.2
Buffalo Creek	1.2	3.7	21.7	42.9	9.9	18.4
Aptakisic Creek	1.3	5.5	11.3	35.8	7.0	27.0
Des Plaines Mainstem	1.9	5.5	78.1	197.1	53.1	118.3

3.12.2.2Channelization

Stream channelization describes any activity that moves straightens, shortens, cuts off, diverts, or fills in a stream channel (Figure 3-54). These activities, which include widening, narrowing, or lining a stream channel, alter the discharge and increase the velocity of water flowing through the streams. In natural meandering streams, channelization decreases the length of the stream and increases the gradient of the channel. Because it is the nature of concentrated, flowing water to create meandering channels with overbank floodplains that dissipate the energy of the flowing water, channelized streams may be susceptible to bank instability and erosion. Modifications in one area of the watershed or stream channel affect other areas upstream, downstream or within the immediate area. Table 3-31 and Figure 3-55 illustrate the degree of channelization of assessed reaches in each subwatershed within the DPR planning area.

Figure 3-54: Channelization in the Newport Drainage Ditch

The degree of channelization is ranked based on the percentage of channelization. Reaches with channelization of 1%-33% ranks “low”, 33%-66% ranks “moderate”, and >66% of a reach channelized ranks “high”. Reaches ranked as “None” have no indication of channelization.

Table 3-31: Degree of Channelization in the DPR planning area

SUBWATERSHED	DEGREE (# OF REACHES)				
	NONE	LOW	MODERATE	HIGH	TOTAL
North Mill Creek	5	10	9	10	**34**
Mill Creek	8	2	6	12	**28**
Newport Drainage Ditch	19	1	4	2	**26**
Upper Des Plaines River	12	29	22	7	**70**
Bull Creek-Bull’s Brook	10	20	3	2	**35**
Indian Creek	14	33	4	2	**53**
Lower Des Plaines River	7	16	2	0	**25**
Buffalo Creek	9	25	16	9	**59**
Aptakisic Creek	6	9	8	7	**30**
Des Plaines Mainstem	1	17	1	0	**19**
TOTAL	**91.0**	**162.0**	**75.0**	**51.0**	**379**

The majority (67%) of stream reaches assessed in the DPR planning area had “none” or a “low” degree of channelization, 20% were moderately channelized and 13% were highly channelized. The North Mill and Mill Creek subwatersheds stream reaches exhibited the highest percentages of channelization with 35% of their stream reaches ranked highly channelized. The subwatersheds with moderate to high degree of channelization have constructed ditches and channelized streams surrounded by turf grass and/or agricultural crops with very little buffer. As a result, these moderate to high channelized streams have reduced ***instream habitat*** and streambank stability.

INSTREAM HABITAT: Within a stream, the environment in which an animal or plant normally lives or grows

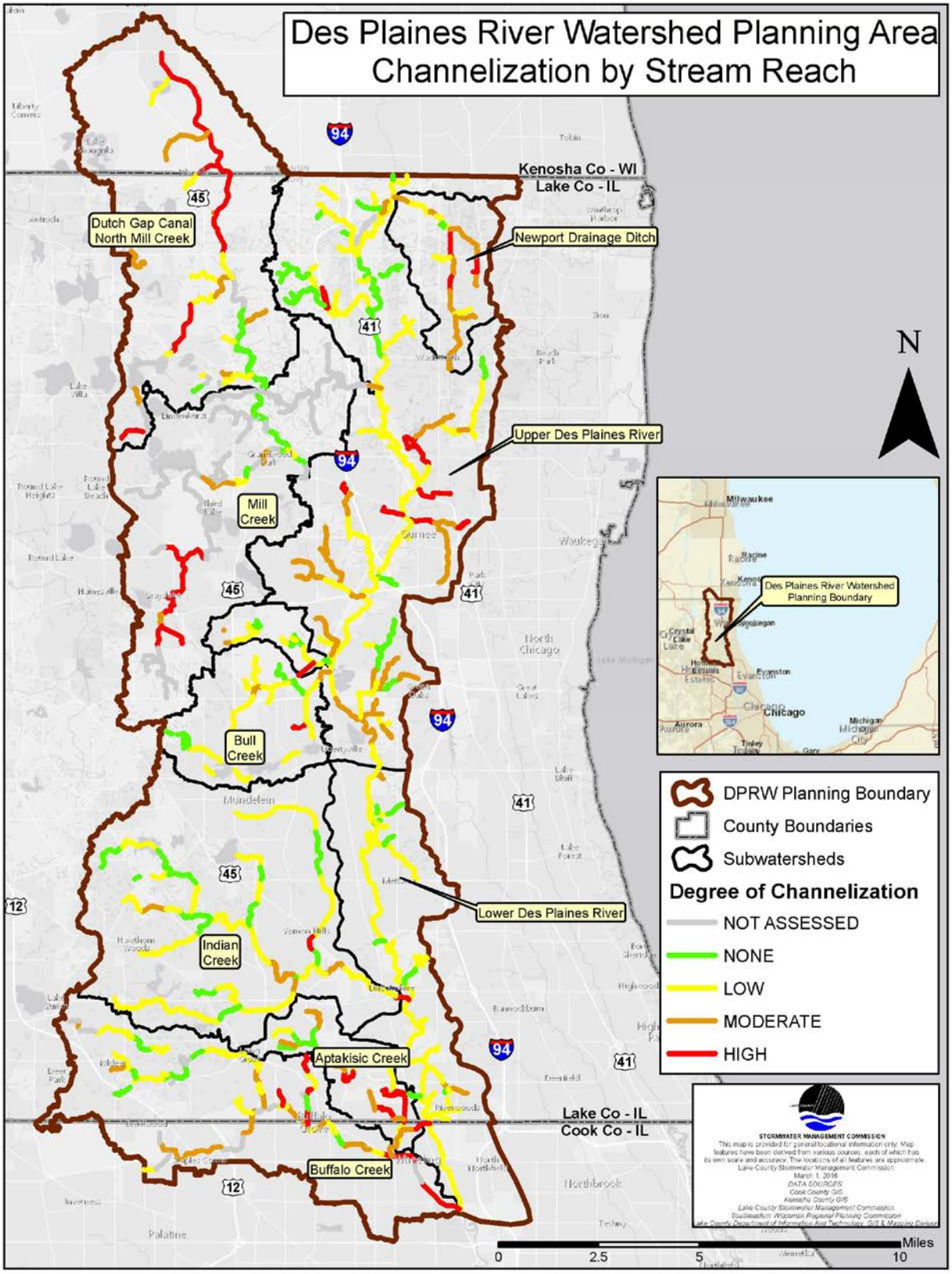


Figure 3-55: DPR Planning Area Channelization by Stream Reach

3.12.2.3Pool-Riffle Development

Under baseflow conditions, pools are low-gradient areas of deeper water with slower velocity and riffles are high-gradient areas of shallow water with higher velocity. During baseflow conditions, sediment erodes from riffles and is deposited into pools. During bankfull conditions, the relationship of relative velocity in riffles and pools is reversed and sediments along with substrate material are scoured from pools and the channel bed and deposited on riffles or bars. During periods of elevated flow when the velocity in pools exceeds that over riffles, deposition and bar formation tend to occur in areas adjacent to pools (Figure 3-56).

In a single-**thalweg** meandering channel, pools are typically associated with the outer portions of meander bends while riffles are typically located above or below pools. Bars typically form alongside pools or runs. Because pools and riffles exhibit very different physical conditions and are often adjacent to one another in the channel, they are important to the ecological health of the stream channel. Because of their typically shallow depth, increased gradient and large sediment size, riffles cause turbulence throughout the water column which aerates the stream, causing oxygen to dissolve from the air into the water. Pools have slower velocities and increased depth, offering habitat to a wide range of aquatic species for a variety of uses. Channelization often reduces the extent of pool-riffle sequences in a stream. Most stream channels in the watershed exhibit some degree of pool-riffle development as shown in Table 3-32.

THALWEG: the line of lowest elevation within a valley or watercourse.

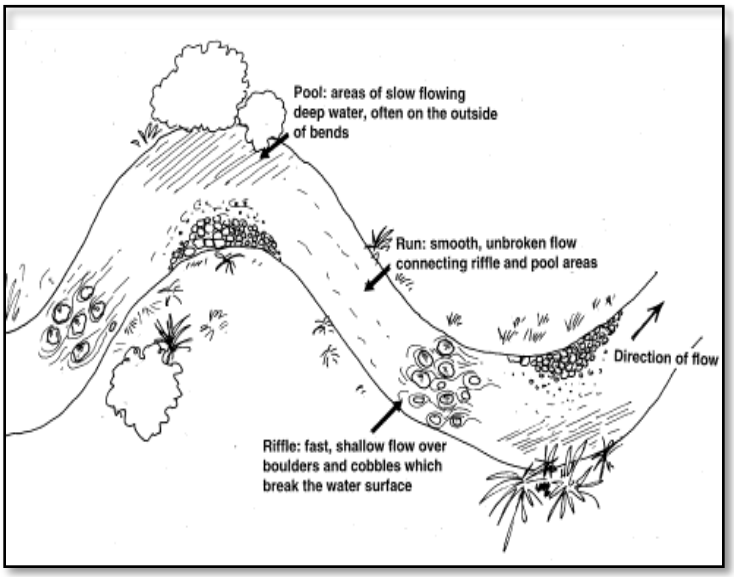


Figure 3-56: Pool/Riffle Sequence
Source: National Institute of Water and Atmospheric Research

A majority (62%) of stream reaches in the DPR planning area exhibited “none” or “low” pool/riffle development. The main stem of the Des Plaines River and the Buffalo Creek subwatersheds both contain substantial portions of natural stream channel and have more pool-riffle development than the constructed and channelized areas. The direct correlation between highly channelized streams and low pool/riffle development is evident in the North Mill and Mill Creek subwatersheds where 60% of stream reaches exhibited high channelization and 40% exhibited none to low (40%) pool/riffle development.

Table 3-32: Percent of Stream Reaches with Pool/Riffle Development in the DPR planning area

	NONE (<5%)	LOW (5-33%)	MODERATE (34-66%)	HIGH
Aptakisic Creek	33%	27%	20%	20%
Buffalo Creek	41%	42%	8%	8%
Bull Creek-Bull's Brook	23%	51%	20%	6%
Des Plaines River-Main Stem	0%	47%	53%	0%
Indian Creek	13%	57%	19%	11%
Lower Des Plaines	24%	24%	48%	4%
Mill Creek	57%	25%	14%	4%
Newport Drainage Ditch	54%	23%	15%	8%
North Mill Creek	13%	61%	27%	0%
Upper Des Plaines	11%	16%	56%	17%
WATERSHED TOTAL	**25%**	**37%**	**28%**	**9%**

3.12.2.4Streambank Erosion

The Rapid Assessment Point Method (RAP-M) assesses lateral recession and provides the degree of streambank erosion in the Des Plaines River watershed (Windhorn, 2000). Lateral recession rates (LRR) evaluates streambanks along the right and left bank (facing upstream) for each assessed reach. Segments with LRR characteristics were photo documented and measurements of left and right bank height and length were collected. The combined analysis allows for an overall assessment regarding the severity of the entire reach, including review of photographs, and repeatable measurements taken in the field. The methodology for lateral recession can be found in Appendix C (Windhorn, 2000).

Figure 3-57: Streambank Erosion in North Mill Creek Subwatershed

Streams are dynamic systems, in a perpetual state of flux, therefore, all banks exhibit some form of erosion (Figure 3-57). Streambank erosion in the DPR planning area tends to occur in developed areas, particularly residential neighborhoods, and urban areas. Surface runoff to streams contributes to streambank erosion and is dependent upon key factors such as the duration, timing, and amount of precipitation; the type and condition of soil within watershed; and land use and vegetative buffers.

The DPR planning area stream inventory assessed the degree of streambank erosion for each stream reach. The description of qualitative assessment criterion for streambank erosion is shown in Table 3-33 and the results of the streambank erosion assessment are summarized below in Table 3-34.

Table 3-33: Bank Erosion Criteria in the DPR planning area

CATEGORY	DESCRIPTION
Slight	Some bare bank but active erosion not apparent. Some rills but no vegetative overhang. No exposed tree roots.
Moderate	Bank is predominantly bare, with some rills and vegetative overhang.
Severe	Bank is bare, with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped.

Table 3-34: Percent of Stream Reaches with Streambank Erosion in the DPR planning area

EXTENT OF EROSION	NONE (% OF MILES ASSESSED)	SLIGHT (% OF MILES ASSESSED)	MODERATE (% OF MILES ASSESSED)	SEVERE (% OF MILES ASSESSED)
Aptakisic Creek	60%	0%	37%	3%
Buffalo Creek	12%	2%	68%	19%
Bull Creek-Bull's Brook	38%	0%	53%	9%
Des Plaines River-Main Stem	0%	0%	84%	16%
Indian Creek	40%	0%	58%	2%
Lower Des Plaines	0%	0%	100%	0%
Mill Creek	4%	7%	43%	46%
Newport Drainage Ditch	77%	0%	23%	0%
North Mill Creek	3%	29%	59%	9%
Upper Des Plaines	14%	0%	81%	4%
PERCENT OF WATERSHED	**24%**	**3%**	**62%**	**10%**

The results of the stream inventory indicate most stream reaches (62%) were moderately eroded, and 10% of stream reaches were severely eroded. The Lower Des Plaines had moderate erosion in 100% of the stream reaches assessed. In some reaches, streambank erosion was severe suggesting that the stream channels were responding to changes in watershed hydrology. While some stream reaches exhibited severe cases of localized bank erosion, no reach exhibited high erosion over its entire length. Some stream reaches assessed and exhibiting "slight" bank erosion had substantial portions of the flow path through wetland complexes.

3.12.2.5Sediment Accumulation

Sediment erosion, transport and deposition are naturally occurring processes in stream systems. Land use changes and anthropogenic modifications within the watershed can amplify the magnitude of these processes.

Typically, a stream generates, suspends, and transports sediment through high-gradient reaches and deposits sediment in low gradient reaches and/or in areas where velocity decreases (Figure 3-58). These low-velocity areas may be naturally occurring areas such as pools or sloughs. They may also occur behind debris jams or beaver dams or upstream of channel constrictions (such as culverts) or dams. Fluctuations in discharge rate results in a stepwise movement of deposition and storage of sediment within stream network. Increased sediment transported during storm events will increase sedimentation rates in downstream channels. Excessive sediment deposition affects fish and the benthic community in several ways including: the suspended sediment can interfere with food gathering or filtering organisms; decrease light levels which impact productivity and reproduction; and sediment accumulation on the bottom of channels can bury organisms to the point of starvation or death. Once sediment has entered waterways it is difficult and expensive to remove, requiring engineering solutions and heavy equipment. Preventative measures such as the revegetation of riparian areas and stream banks can help reduce sediment transport and bank erosion.

Figure 3-58: Sediment Accumulation in North Mill Creek

Most reaches in the DPR planning area had “Low” or “Moderate” sediment accumulation (Table 3-35). Of the assessed reaches for the main stem of the Des Plaines River, 84% exhibited moderate sediment accumulation. Also, a considerable number of reaches (68%) in the North Mill Creek reaches exhibited moderate sediment accumulation. North Mill Creek has moderate or high debris loading (Table 3-36) and a considerable number of problem hydraulic structures (Table 3-37) which can contribute to sediment accumulation. The sediment accumulation is likely due to local and upstream increases in runoff and/or erosion, especially in areas with highly erodible soils, such as those on agricultural lands. Conversely, Aptakisic Creek did not have any reaches exhibiting moderate or high degrees of sediment accumulation. The lack of sediment accumulation and the slight-to-moderate (60%) bank erosion in Aptakisic Creek are likely related.

Table 3-35: Percent of Sediment Accumulation in the DPR planning area

SUBWATERSHEDS	SLIGHT (% OF REACHES)	LOW (% OF REACHES)	MODERATE (% OF REACHES)	HIGH (% OF REACHES)
Aptakisic Creek	43%	57%	0%	0%
Buffalo Creek	15%	32%	31%	22%
Bull Creek-Bull's Brook	23%	66%	9%	3%
Des Plaines River-Main Stem	0%	16%	84%	0%
Indian Creek	15%	60%	23%	2%
Lower Des Plaines	0%	29%	71%	0%
Mill Creek	7%	32%	39%	21%
Newport Drainage Ditch	38%	42%	15%	4%
North Mill Creek	2%	18%	68%	12%
Upper Des Plaines	13%	36%	46%	4%
PERCENT OF WATERSHED	**16%**	**40%**	**36%**	**8%**

Slight: < 5%, Low: 5-33%, Moderate: 34-66%, High: 67-100%

3.12.2.6 Debris Loading

In addition to sediment, most streams transport some amount of debris (organic material typically originating outside the stream itself, such as tree limbs, brush, and leaves). Because debris transport is a naturally-occurring stream process, some debris can provide habitat and contribute to a diverse instream environment. However, too much debris can be problematic and may result in large debris jams, causing backwater flooding and sediment deposition (Figure 3-59). Debris jams can also cause erosion of the stream banks which can damage riparian lands and property.

Figure 3-59: Debris Jam in Mill Creek

In the DPR planning area, reaches having a moderate or high debris load are considered to have the potential to be problematic. In some cases, these reaches may be in natural or open space areas and no action is needed or warranted. In other cases, moderate or high debris loads may be problematic, and, for example, debris jams may warrant removal. Table 3-36 summarizes the reaches with moderate or high instream and/or overbank debris loads. These reaches exhibit multiple debris jams, beaver dams, or overhanging debris obstructions extending across all or significant portions of the channel and/or onto the banks. In DPR planning area, 129 reaches (34.3% of reaches assessed) exhibited moderate to high debris loads. While beaver activity contributed to the debris load in some of these reaches, it did not account for the moderate or high debris loads in all reaches. Several reaches are also located in forested areas and therefore the debris loads from the adjacent riparian areas may be higher. Conversely, reaches located in open space areas may not have debris loading that affects the water levels. In such cases, it is up to the land manager or owner to determine if the debris loading constitutes a true "problem."

Table 3-36: Percent of Debris Loading in the DPR planning area

SUBWATERSHEDS	INSTREAM DEBRIS	OVERBANK DEBRIS
Aptakisic creek	7%	7%
Buffalo Creek	53%	44%
Bull Creek-Bull's Brook	42%	40%
Des Plaines River-Main Stem	37%	47%
Indian Creek	40%	35%
Lower Des Plaines	8%	12%
Mill Creek	54%	57%
Newport Drainage Ditch	15%	8%
North Mill Creek	50%	27%
Upper Des Plaines	23%	33%
WATERSHED TOTAL	**35%**	**33%**

3.12.2.7Hydraulic Structures

Hydraulic structures are bridges, culverts, dams, weirs, or other structures spanning or crossing the stream channel Figure 3-60 and Figure 3-61). These structures modify or have the potential to modify the pattern or amount of flow in the stream channel and may act as constriction points under certain flow conditions (such as heavy rainfall events), leading to backwater flooding. Additionally, dams and weirs can impede the movement of fish and other aquatic organisms within the stream network. Culverts may create temporary or permanent barriers if scour causes the bottom of the culvert to become elevated above the water level of the stream. Problem hydraulic structures include: obstructed culverts and bridges, culverts that are undermined or collapsed, bridges, culverts, dams and weirs that have been washed out, and beaver dams that are causing severe bank erosion or impounding a significant volume of water or length of stream channel. Structures listed as "problem" structures were identified as needing further inspection; however, this designation is not a definitive determination that the structure is defective.

Figure 3-60: Beaver Dam in the Mill Creek Subwatershed

Figure 3-61: Culvert in Buffalo Creek Subwatershed

Many areas of the DPR planning area were modified by channelization and the construction of hydraulic structures. These changes result in a decreased quantity of pool-riffle complexes, increased sediment accumulation, increased debris loads, habitat alteration and decreased biological productivity. Bridges were present in all nine subwatersheds. The number of bridges per subwatershed ranged from 16 – 87

and the number of culverts per subwatershed ranged from 0 – 95. Higher concentrations of bridges and culverts may be related to urbanization and development of areas in a subwatershed. Constructed ditches and the main stem of the Des Plaines River did not have dams constructed on them; however, the North Mill Creek subwatershed had 27 dams, the highest number of dams in the DPR planning area. Table 3-37**Error! Reference source not found.** contains a summary of hydraulic structures in the DPR planning area. Note: Dams located on reaches not assessed were not included in the stream inventory.

"Problem Hydraulic Structures," defined as structures that may require further inspection or repair, are found in every subwatershed of the DPR planning area. The North Mill Creek had the most problem structures. Conversely, the Lower Des Plaines, Aptakisic Creek and main stem had the lowest number of problem hydraulic structures. Appendix C contains the complete summary of the 1,124 hydraulic structures recorded in the Des Plaines River Stream Inventory. Figure 3-62 maps the problem hydraulic structures identified in the Des Plaines River Stream Inventory.

Table 3-37: Problem Hydraulic Structures in the DPR planning area

PROBLEM HYDRAULIC STRUCTURES	BRIDGE	CULVERT	DAM	OTHER	TOTAL STRUCTURES	PROBLEM STRUCTURES	% OF STRUCTURES IDENTIFIED AS PROBLEM STRUCTURES
APTAKISIC CREEK	29	66	1	3	99	4	4%
BUFFALO CREEK	26	40	8	67	141	10	7%
BULL CREEK -BULL'S BROOK	34	64	5	6	109	18	16%
DES PLAINES RIVER-MAIN STEM	37	0	5	6	48	2	4%
INDIAN CREEK	87	95	7	19	208	29	14%
LOWER DES PLAINES	30	6	0	43	79	4	5%
MILL CREEK	16	25	11	0	52	12	23%
NEWPORT DRAINAGE DITCH	31	40	0	0	71	7	10%
NORTH MILL CREEK	29	44	27	19	119	44	37%
UPPER DES PLAINES	71	35	0	92	198	24	12%
WATERSHED TOTAL	**390**	**415**	**64**	**255**	**1,124**	**154**	**12%**

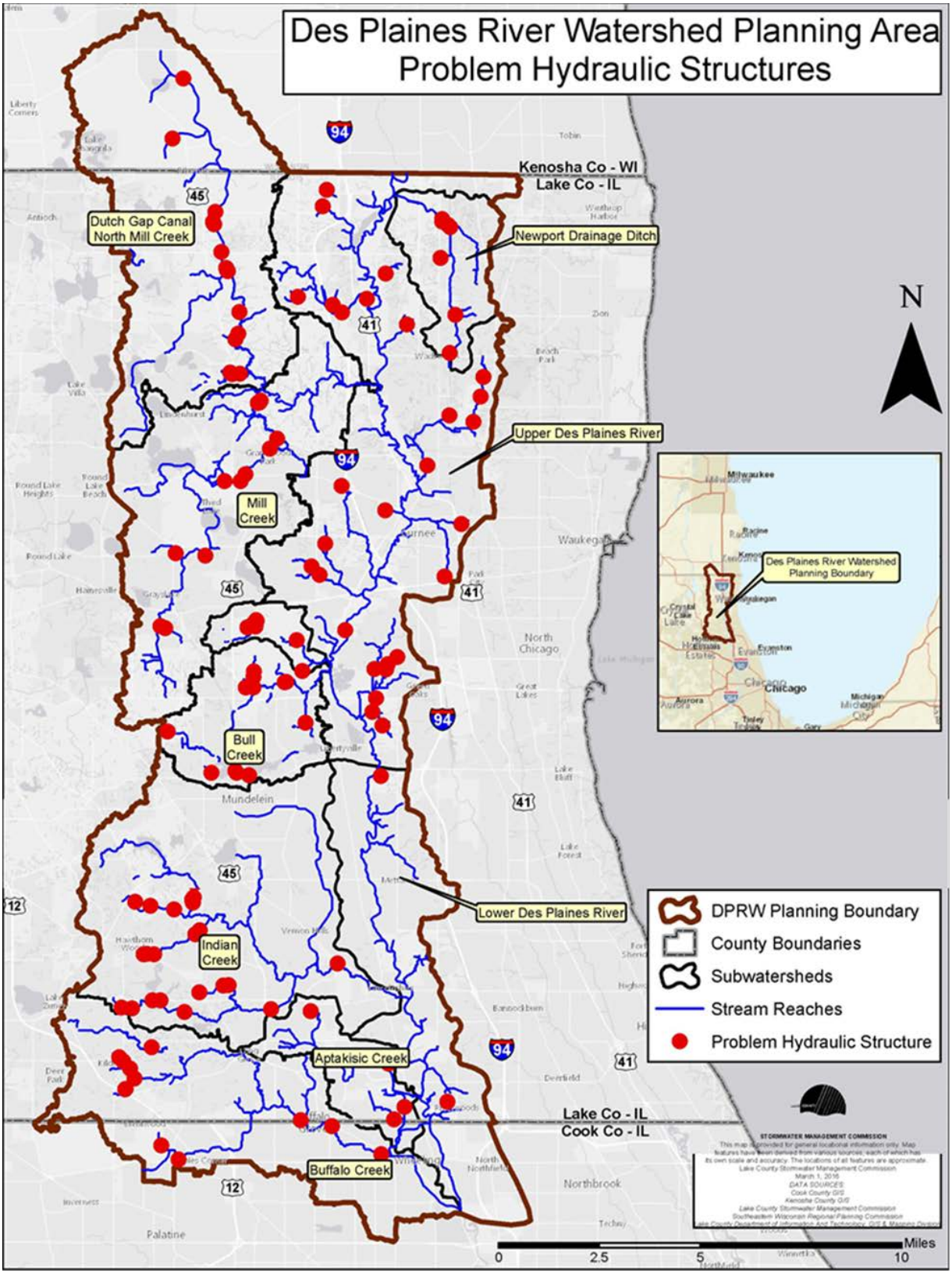


Figure 3-62: DPR Planning Area Problem Hydraulic Structures

3.12.2.8Discharge Points

Discharge points are identified as outfalls that discharge into streams including "pipes" such as drain tile outlets, sump pump discharges, storm sewers and "open channel" discharges such as drainage swales, gullies, and small tributaries (Figure 3-63). The stream inventory documented 2,310 discharge points into the stream network. Discharge points were most common in urban and residential areas where sump pump and stormsewer outfalls are numerous. Indian Creek watershed contained the largest number of discharge points, but the Buffalo Creek watershed had the highest density of discharge points per stream mile where a substantial portion of the watershed is suburban and residential development.

Figure 3-63: Example of a discharge point

Problem discharge points in the DPR planning area contribute to streambank erosion and the transport of excess sediment and associated nutrients to the stream channel. The location of these points is summarized in Table 3-38 and shown in Figure 3-64. Pipes commonly cause erosion below the end of the pipe, resulting in a positive feedback loop of bank erosion near the pipe, which may result in pipe, end section, apron, or supporting structure failure. Gullies and other open channels can also result in bank erosion, as they deliver concentrated flow to the stream channel. Pipes that appeared to have discolored discharge, substances other than water, or substantial damage were noted in the inventory.

Table 3-38: Problem Discharge Points in the DPR Planning Area

DISCHARGE POINTS	SWALES, GULLIES, & TRIBUTARIES	PIPES, STORM SEWERS, & CULVERTS	TOTAL DISCHARGE POINTS	PROBLEM DISCHARGE POINTS	DISCHARGE POINTS PER STREAM MILE
APTAKISIC CREEK	20	177	197	14	13.45
BUFFALO CREEK	65	240	305	52	13.15
BULL CREEK-BULL'S BROOK	70	101	171	27	10.69
DES PLAINES RIVER-MAIN STEM	75	102	177	27	4.78
INDIAN CREEK	134	294	428	25	11.46
LOWER DES PLAINES	15	61	76	9	6.87
MILL CREEK	47	113	160	35	13.91
NEWPORT DRAINAGE DITCH	22	16	38	3	3.99
NORTH MILL CREEK	62	52	114	35	4.79
UPPER DES PLAINES	92	261	353	64	7.83
WATERSHED TOTAL	**602**	**1417**	**2,019**	**291**	**8.81**

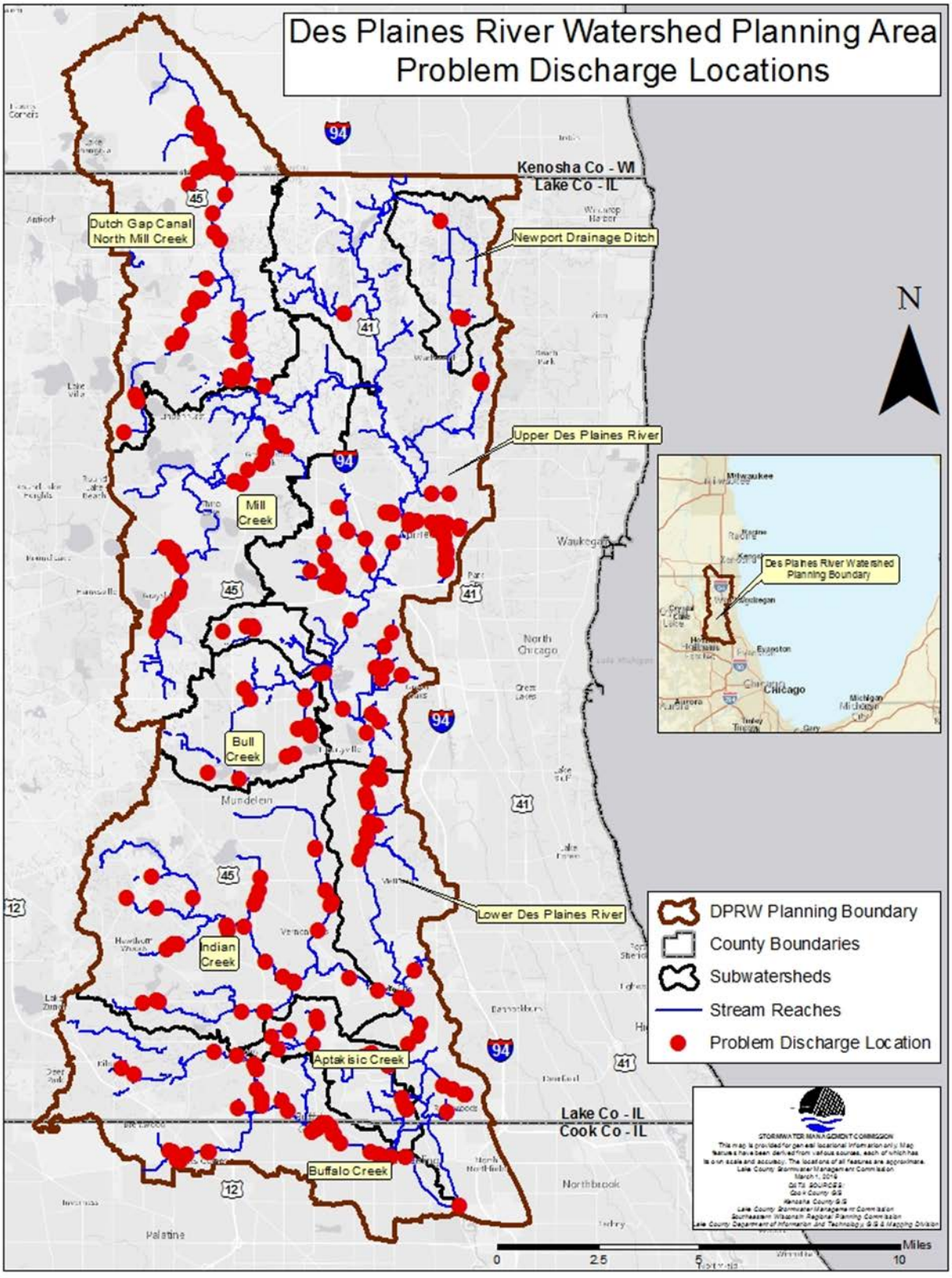


Figure 3-64: Problem Discharge Locations in the DPR Planning Area

3.12.2.9Riparian Buffers

The riparian zone is the area extending 100 feet from the left and right side of the stream channel (Figure 3-65). Vegetated riparian buffers are of interest because riparian vegetation can make streambanks more resistant to erosion, buffers act as filters for runoff and pollutants, and riparian areas offer habitat for wildlife and can be important links in the watershed green infrastructure network. Riparian vegetation also provides beneficial shading to streams and lakes which helps to avoid temperature stress on fish and aquatic organisms. The width and quality of vegetated riparian buffers were visually assessed while walking the stream channel throughout the inventory and checked with aerial photography of the watershed for each reach, including several reaches that were not otherwise assessed in the inventory.

Figure 3-65: Example of a riparian buffer

Table 3-39 summarizes the assessment criterion for buffer width, while Figure 3-66 maps the observed vegetated riparian buffer quality in 2013. Throughout the watershed, riparian buffer width was related to riparian land use, with wide riparian buffers ("High" buffer width) in locations where the stream flows through open space areas and narrow buffers ("Low" buffer width) in locations where the stream flows through developed areas. Generally, less urbanized areas had wider riparian buffers and flows through more open space areas. Urban areas had narrower buffers. There were only a few reaches in the watershed with riparian buffer.

RIPARIAN ZONES

NONE: <20 feet buffer width and zone contains little or no riparian vegetation due to human activities.

LOW: 20-40 foot buffer width and zone is impacted a great deal by human activities

MODERATE: 40-60-foot buffer width and zone is impacted minimally by human activities.

HIGH: >60-foot buffer width and zone is not impacted by human activities (i.e., no parking lots, roadbeds, lawns, crops.

Table 3-39: Riparian Buffer Widths in the DPR planning area

SUBWATERSHED	STREAM REACH RIPARIAN BUFFER WIDTH CONDITIONS *(based on stream inventory data)*			
	NONE (miles)	LOW (miles)	MODERATE (miles)	HIGH (miles)
APTAKISIC CREEK	4.98	5.88	2.55	1.23
BUFFALO CREEK	4.49	13.00	7.88	2.37
BULL CREEK-BULL'S BROOK	1.46	4.63	6.70	4.06
INDIAN CREEK	5.08	14.54	11.00	6.73
LOWER DES PLAINES	--	3.59	13.11	9.77
MILL CREEK	6.66	8.38	13.49	9.56
NEWPORT DRAINAGE DITCH	1.51	2.80	0.93	4.60
NORTH MILL CREEK	3.39	9.26	10.84	3.70
UPPER DES PLAINES	---	14.02	25.69	22.44
TOTALS:	**27.57**	**76.1**	**92.19**	**64.46**

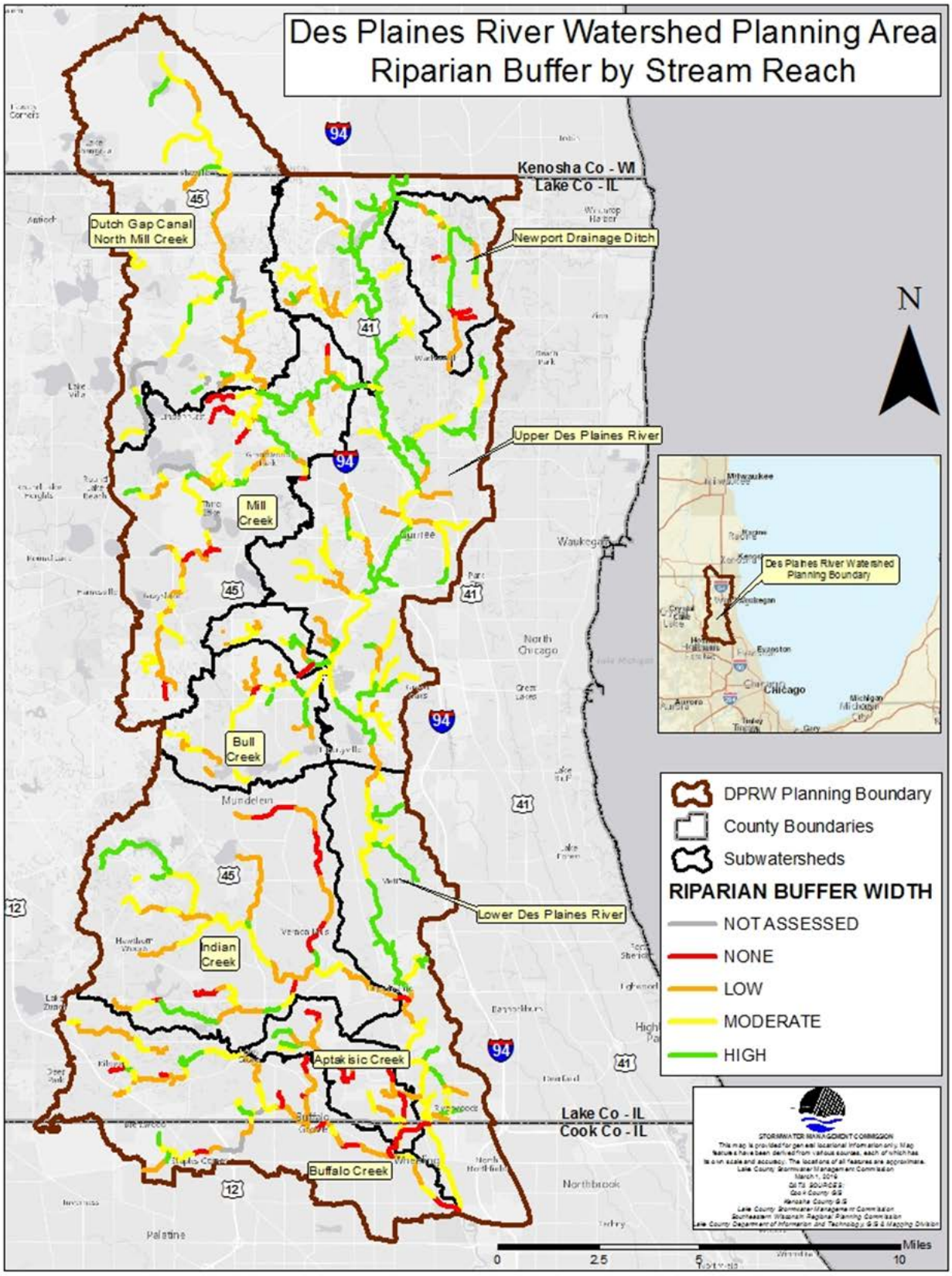


Figure 3-66: Riparian Buffers by Stream Reach in the DPR Planning Area

3.13 LAKE INVENTORY

3.13.1 Introduction and Methods

A lake inventory was conducted to assess the health of lakes within the watershed and provide information on natural and anthropogenic impacts to lake systems. Physical properties of lakes such as depth, area, shoreline length, and shoreline erosion were measured to determine lake morphology, which influences ecosystem function. Additionally, water quality parameters were assessed by the LCHD-ES, Illinois EPA, IDNR and the WI DNR to measure chemical, physical, and biological aspects of water quality. The parameters assessed at each lake are summarized in Table 3-40. Collectively this data provides essential information for watershed planning and management.

There are approximately 7,975 acres of open water in the DPR planning area. Open water includes all lakes, ponds, streams, and wetlands with open water surfaces. The Illinois EPA defines lakes as open bodies of water greater than 6 acres. For the purposes of this plan, lakes 20 acres or greater were considered for more detailed inventory and assessment. There are approximately 52 lakes (greater than 20 acres in size) in the DPR planning area (Figure 3-66). The LCHD-ES, Illinois EPA and IDNR has collected water quality data at 43 of these lakes within Lake County, and the WI DNR has collected data at two of these lakes within Kenosha County. Lakes assessed by LCHD-ES and the WI DNR will be summarized separately, because differences in sampling programs between organizations prevents the comparison of values.

Threats to the lakes can be described as coming from both external and internal sources. External sources include pollutants and nutrients entering the lake such as stormwater runoff, fertilizers, and erosion. Once introduced, many of these pollutants and nutrients remain in the lake and are recycled by internal processes. For example, growing aquatic vegetation consumes and accumulates nutrients from the lake, and decaying aquatic vegetation releases accumulated nutrients back into the lake. Additionally, sedimentation can remove nutrients and contaminates from the water column and deposit them into lake bottom sediment. These nutrients and contaminates may be reintroduced into the water column when anoxic conditions (< 1 mg/L dissolved oxygen) are present. Thus, lake management must consider both external and internal processes that impact lakes, and lake restoration objectives should be included in a lakes management plan.

Table 3-40: Parameters Assessed by Lake

SUBBASIN	LAKE	SHORELINE EROSION	NATIVE FISH	NATIVE PLANTS	FQI	WATER QUALITY MONITORING	MONITORING AGENCY
Buffalo Creek	Buffalo Creek Reservoir 1	X		X	X	X	LCHD-ES
	Buffalo Creek Reservoir 2	X		X	X	X	LCHD-ES
Bull Creek	Butler Lake	X	X	X	X	X	LCHD-ES, IDNR
	Loch Lomond	X	X	X	X	X	LCHD-ES, IDNR
	St. Mary's Lake	X		X	X	X	LCHD-ES
Indian Creek	Big Bear Lake	X		X	X	X	LCHD-ES
	Bresen Lake	X		X	X	X	LCHD-ES
	Countryside Lake	X	X	X	X	X	LCHD-ES, IDNR
	Diamond Lake	X	X	X	X	X	LCHD-ES, IDNR
	Forest Lake	X	X	X	X	X	LCHD-ES, IDNR
	Kemper Lake 1		X	X	X	X	LCHD-ES, IDNR
	Kemper Lake 2				X	X	LCHD-ES
	Lake Charles	X		X	X	X	LCHD-ES
	Little Bear Lake	X		X	X	X	LCHD-ES
	Salem Lake	X		X	X	X	LCHD-ES
	Sylvan Lake	X	X	X	X	X	LCHD-ES, IDNR
	Central Slough						
Lower Des Plaines	Stone Quarry Lake	X		X	X	X	LCHD-ES
Mill Creek	Druce Lake	X	X	X	X	X	LCHD-ES, IDNR
	Gages Lake	X	X	X	X	X	LCHD-ES, IDNR
	Gray's Lake	X	X	X	X	X	LCHD-ES, IDNR
	Lake Miltmore	X	X	X	X	X	LCHD-ES, IDNR
	Rollins Savanna Pond 2	X	X	X	X	X	LCHD-ES, IDNR

SUBBASIN	LAKE	SHORELINE EROSION	NATIVE FISH	NATIVE PLANTS	FQI	WATER QUALITY MONITORING	MONITORING AGENCY
	Sand Lake	X	X	X	X	X	LCHD-ES, IDNR
	Third Lake	X	X	X	X	X	LCHD-ES, IDNR
	Fourth Lake					X	LCHD-ES
	Tempel Farms Lake #2						
North Mill Creek	Crooked Lake	X	X	X	X	X	LCHD-ES, IDNR
	Deer Lake	X		X	X	X	LCHD-ES
	Hastings Lake	X	X	X	X	X	LCHD-ES, IDNR
	Lake Linden	X		X	X	X	LCHD-ES
	McDonald Lakes 2	X		X	X	X	LCHD-ES
	Slough Lake	X		X	X	X	LCHD-ES
	Timber Lake (north)	X	X	X	X	X	LCHD-ES, IDNR
	Waterford Lake	X	X	X	X	X	LCHD-ES, IDNR
	White Lake	X		X	X	X	LCHD-ES
	Rasmussen Lake					X	LCHD-ES
	Redwing Slough					X	LCHD-ES
	George Lake	X	X	X	X	X	WI DNR
	Paasch Lake						
	Benet Lake/Lake Shangrila					X	WI DNR
	Pollock Lake						
Upper Des Plaines	Independence Grove Lake	X	X	X	X	X	LCHD-ES, IDNR
	Lake Carina	X	X	X	X	X	LCHD-ES, IDNR
	Lake Minear	X			X	X	LCHD-ES
	Liberty Lake	X	X	X	X	X	LCHD-ES, IDNR
	Sterling Lake	X	X	X	X	X	LCHD-ES, IDNR

SUBBASIN	LAKE	SHORELINE EROSION	NATIVE FISH	NATIVE PLANTS	FQI	WATER QUALITY MONITORING	MONITORING AGENCY
	Almond Marsh					X	LCHD-ES
	Des Plaines Lake					X	LCHD-ES
	Osprey Lake					X	LCHD-ES
	Wadsworth Sand & Gravel						
	Leopold Lake						

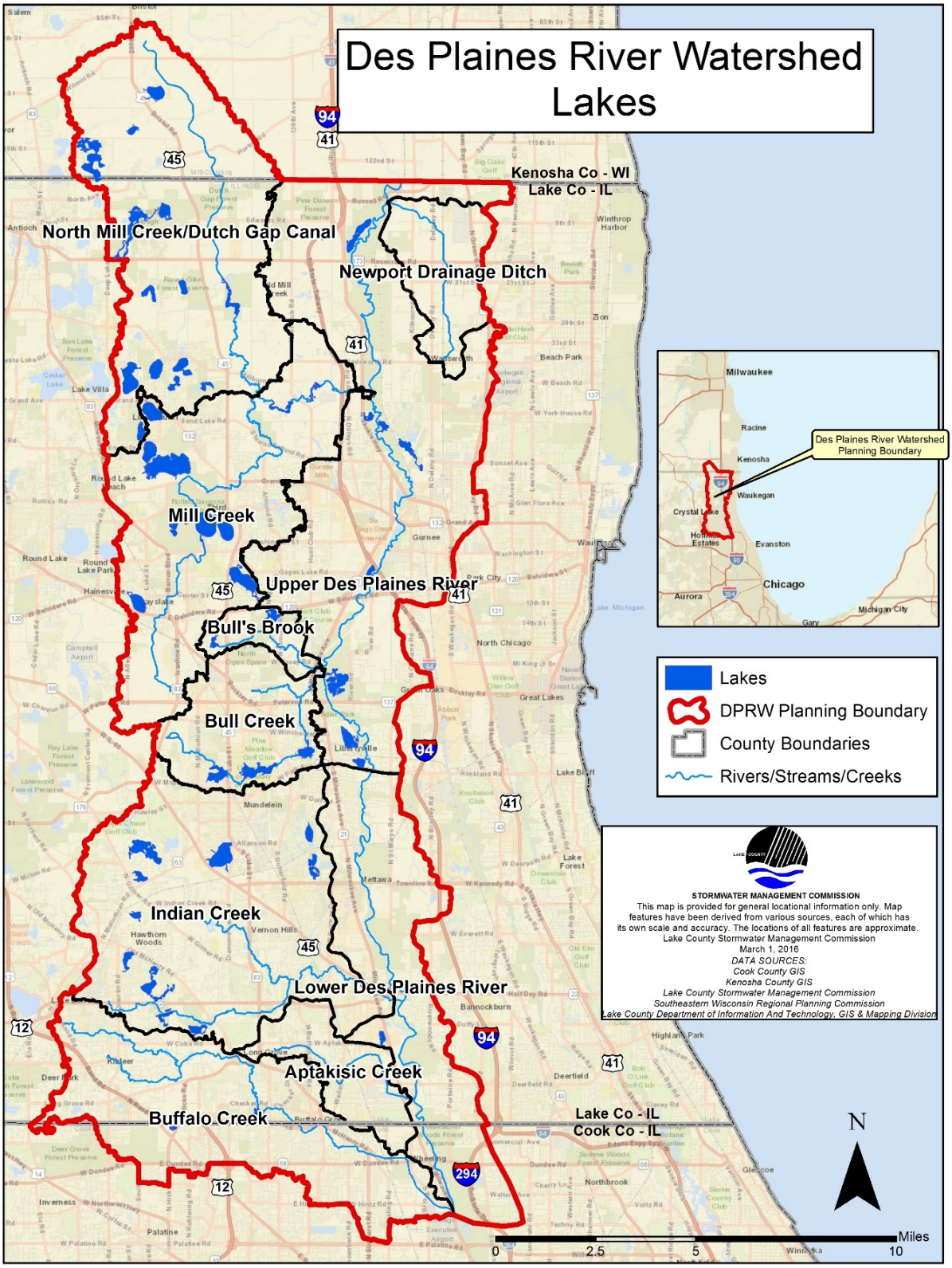


Figure 3-67: Lakes Greater than 20 Acres in the DPR Planning Area

3.13.2 Shoreline Erosion

Shoreline erosion is a natural process which results in the loss of sediment from a shoreline. Shoreline erosion occurs gradually; however, anthropogenic influences such as clearing of vegetation or rocks and increased stormwater runoff can substantially accelerate this process. Sediments eroded from shorelines are transferred to the lake's water column, which increases turbidity and introduces nutrients and contaminates which are attached to the sediment. This sediment is mostly deposited on the lake bed, which can result in degraded habitat for fish and aquatic life. Of the 36 lakes in the DPR planning area assessed by LCHD-ES from 2000-2015, 33 had eroded shorelines and 26 had severely eroded shorelines as shown in Table 3-41. This lake shoreline assessment identified visible erosion which may warrant implementation of erosion control practices; however, further site investigation is needed to determine if remedial action is necessary.

ALL SHORE EROSION: Total amount of eroded shoreline.

MODERATE SHORE EROSION: Recession is characterized by past or recently eroded banks, may exhibit some exposed roots, fallen vegetation, or minor slumping of soil.

SEVERE SHORE EROSION: Recession is characterized by eroding of exposed soil on nearly vertical bans, exposed roots, fallen vegetation, or extensive slumping of bank material, undercutting, washouts, or fence posts exhibiting realignment.

Table 3-41: Erosion of Lake Shorelines

LAKE NAME	LAST ASSESSED	SUBBASIN	% ALL SHORE EROSION	% MODERATE SHORE EROSION	% SEVERE SHORE EROSION
Buffalo Creek Reservoir 1	2013	Buffalo Creek	60	26	17
Buffalo Creek Reservoir 2	2013	Buffalo Creek	60	26	17
Butler Lake	2015	Bull Creek	39	14	0
Loch Lomond	2015	Bull Creek	23	1	3
St. Mary's Lake	2015	Bull Creek	78	30	22
Big Bear Lake	2002	Indian Creek	87	30	19
Bresen Lake	2000	Indian Creek	43	16	0
Countryside Lake	2010	Indian Creek	55	20	16
Diamond Lake	2002	Indian Creek	13	3	0
Forest Lake	2010	Indian Creek	41	12	9
Lake Charles	2000	Indian Creek	100	45	5
Little Bear Lake	2002	Indian Creek	85	43	26
Salem Lake	2000	Indian Creek	81	9	23
Sylvan Lake	2012	Indian Creek	10	4	0
Stone Quarry Lake	2004	Lower Des Plaines	39	6	0
Druce Lake	2011	Mill Creek	40	8	5
Gages Lake	2011	Mill Creek	41	9`	11
Gray's Lake	2011	Mill Creek	19	6	7
Lake Miltmore	2011	Mill Creek	52	7	1
Rollins Savanna Pond 2	2011	Mill Creek	0	0	0
Sand Lake	2011	Mill Creek	44	3	12
Third Lake	2010	Mill Creek	32	12	8
Crooked Lake	2010	North Mill Creek	42	9	6
Deer Lake	2010	North Mill Creek	0	0	0

LAKE NAME	LAST ASSESSED	SUBBASIN	% ALL SHORE EROSION	% MODERATE SHORE EROSION	% SEVERE SHORE EROSION
Hastings Lake	2010	North Mill Creek	10	1	5
Lake Linden	2010	North Mill Creek	16	0	0
McDonald Lakes2	2010	North Mill Creek	70	50	5
Slough Lake	2010	North Mill Creek	30	11	10
Timber Lake (north)	2010	North Mill Creek	0	0	0
Waterford Lake	2010	North Mill Creek	25	9	5
White Lake	2010	North Mill Creek	5	1	0
Independence Grove Lake	2007	Upper Des Plaines	38	15	8
Lake Carina	2007	Upper Des Plaines	63	15	8
Lake Minear	2007	Upper Des Plaines	67	14	39
Liberty Lake	2001	Upper Des Plaines	55	9	14
Sterling Lake	2007	Upper Des Plaines	22	5	9

3.14 STORMSEWER NETWORK

The natural drainage system of the DPR planning area has changed where residential, commercial, and industrial land uses replaced open lands. These land use/cover changes limit the land's capacity to infiltrate and store precipitation and runoff. In these portions of the planning area, a stormsewer network or **stormsewersheds** drains runoff directly to a stream or lake, or into a detention basin, which collects water before discharging it into a stream or lake.

STORMSEWERSHED: The land area drained by a stormsewer or stormsewer network.

Stormsewersheds were delineated in the watershed by reviewing municipal and stormsewer maps and analyzing aerial photography. The DPR planning area contains 83,620 acres (56% of DPR planning area) of stormsewersheds (see Table 3-42 and Figure 3-67). The stormsewersheds are mostly located in the central and southern portion of the DPR planning area (most developed portion of the watershed) and are less common in the northern portion of the DPR planning area.

Undeveloped areas, lands used for agriculture, and many older residential developments do not have stormwater detention facilities as they were built before detention basins were required by ordinances. The northern portion of the DPR planning area is dominantly an agriculture land cover and does not contain stormsewersheds. Although not mapped these agriculture areas utilize drain tiles in the agriculture fields to transport stormwater runoff; these drain tiles act as rural stormsewersheds.

Table 3-42: Stormsewersheds in the DPR planning area

SUBWATERSHEDS	TOTAL ACRES	ACRES OF SEWERED AREA	PERCENT OF SUBWATERSHED SEWERED
Aptakisic Creek	4,374.3	4,234	97%
Buffalo Creek	17,392.8	15,685	90%
Bull Creek	7,136.4	4,022	56%
Bull's Brook	1,816.8	555	31%
Indian Creek	24,151.4	22,217	92%
Lower Des Plaines River	14,607.2	9,435	65%
Mill Creek	19,783.0	10,285	52%
Newport Drainage Ditch	5,018.1	319	6%
North Mill – Dutch Gap Canal	23,532.3	2,153	9%
Upper Des Plaines River	32,548.6	14,714	45%
TOTALS:	**150,361**	**83,619**	**Total % of Watershed: 56%**

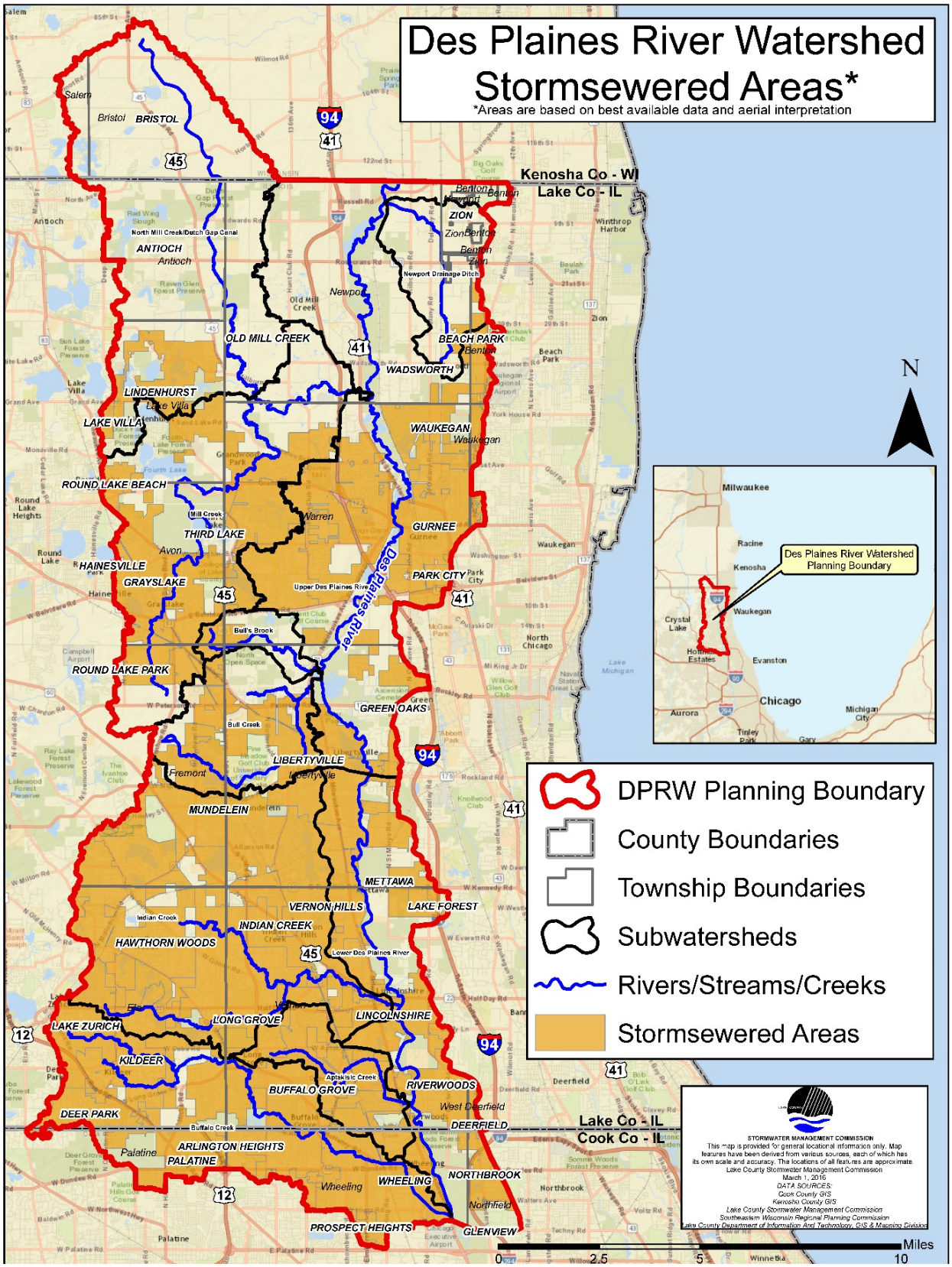


Figure 3-68: Stormsewered areas in the Des Plaines River Watershed Planning Area

3.15 DETENTION BASIN INVENTORY

In 2016, SMC conducted a detention basin inventory for all known areas being used for detention in the DPR planning area. The inventory was conducted by combining data from the 2003 Newport Drainage Ditch, 2013 Buffalo Creek, 2009 North Mill Creek, 2003 Indian Creek, 2013 Mill Creek, and 2004 Bull Creek detention basin inventories, and conducting field assessments at basins that were not previously inventoried. These locations were identified using aerial imagery analysis and field inspections. Basins were assessed for location (latitude/longitude), design features, maintenance and design needs, potential safety problems, and retrofit opportunities. Assessments were conducted at 2,303 detention basins (Table 3-43 and Figure 3-68). Appendix D summarizes the detention basin inventory results.

WET DETENTION BASINS: A stormwater control structure that provides both retention and treatment of contaminated stormwater runoff. It contains a perennial pool of water, which holds runoff from one rainfall event until displaced by a new rainfall event.

DRY DETENTION BASINS: - Basins that temporarily stores water before discharging to river or lake and usually dry up following large rainstorms or snow melt events. Typically, not effective at removing pollutants.

ONSTREAM (OR ONLINE) BASINS: Basins that are connected to a "natural" surface waterway (creek, stream, river etc.) , whether that waterway flows in and/or out of the pond..

3.15.1 CONSTRUCTED BASINS, PRE AND POST 1992

In 1992, the Lake County Watershed Development Ordinance (WDO) restricted stormwater release rates for all new development within Lake County. The WDO was generally more restrictive than the municipal ordinances it superseded. The WDO limited release rates from the 2-year recurrence interval design storm to 0.04 cfs per acre of development area and limited release rates from the 100-year recurrence interval design storm to 0.15 cfs per development acre. Basins built after the adoption of the WDO are required to meet these discharge rates.

Basins within Cook and Kenosha county were included in this analysis; however, these counties did not implement regulation on stormwater release rates in 1992, so the results are not indicative of substantial changes in detention basin design in these counties. Of the assessed basins, 903 were built before 1992 and 1,400 were built after 1992. Most of the basins (78%) in Buffalo Creek were built before 1992. Most of the basins in North Mill Creek (83%), the Newport Drainage Ditch (85%), and the Lower Des Plaines River (73%) were built after 1992. The number of detention basins built pre and post 1992 by subwatershed is summarized in Table 3-44.

3.15.2 BASIN TYPE, LOCATION, AND MAINTENANCE/RETROFIT NEEDS

A total of 2,303 basins were inventoried during this assessment. Of these, 1,691 basins were classified as **wet**, 424 were classified as **dry**, 184 were classified as wetland, and four were classified as **onstream** or **online**. Indian Creek and the Upper Des Plaines River subwatersheds had the most detention basins. The inventory assessed 1,947 basins for maintenance and retrofit needs. This assessment identified 1,271 (65 %) basins that could benefit from maintenance or improvement including the addition of aerators, native vegetation, and riprap, and the removal of woody vegetation, invasive vegetation, and debris.

Table 3-43: Number and Type of Detention Basins Inventoried by Subwatershed

SUBWATERSHED	NUMBER OF BASINS	NUMBER OF WET BASINS	NUMBER OF DRY BASINS	NUMBER OF WETLAND BASINS	NUMBER OF ONSTREAM BASINS
North Mill Creek	101	55	10	36	0
Mill Creek	248	199	33	16	0
Newport Drainage Ditch	75	55	11	9	0
Upper Des Plaines River	467	330	85	50	2
Bull Creek-Bull's Brook	137	84	46	7	0
Indian Creek	713	485	180	46	2
Lower Des Plaines River	166	144	13	9	0
Buffalo Creek	262	233	29	0	0
Aptakisic Creek	134	106	17	11	0
Total	**2,303**	**1,691**	**424**	**184**	**4**

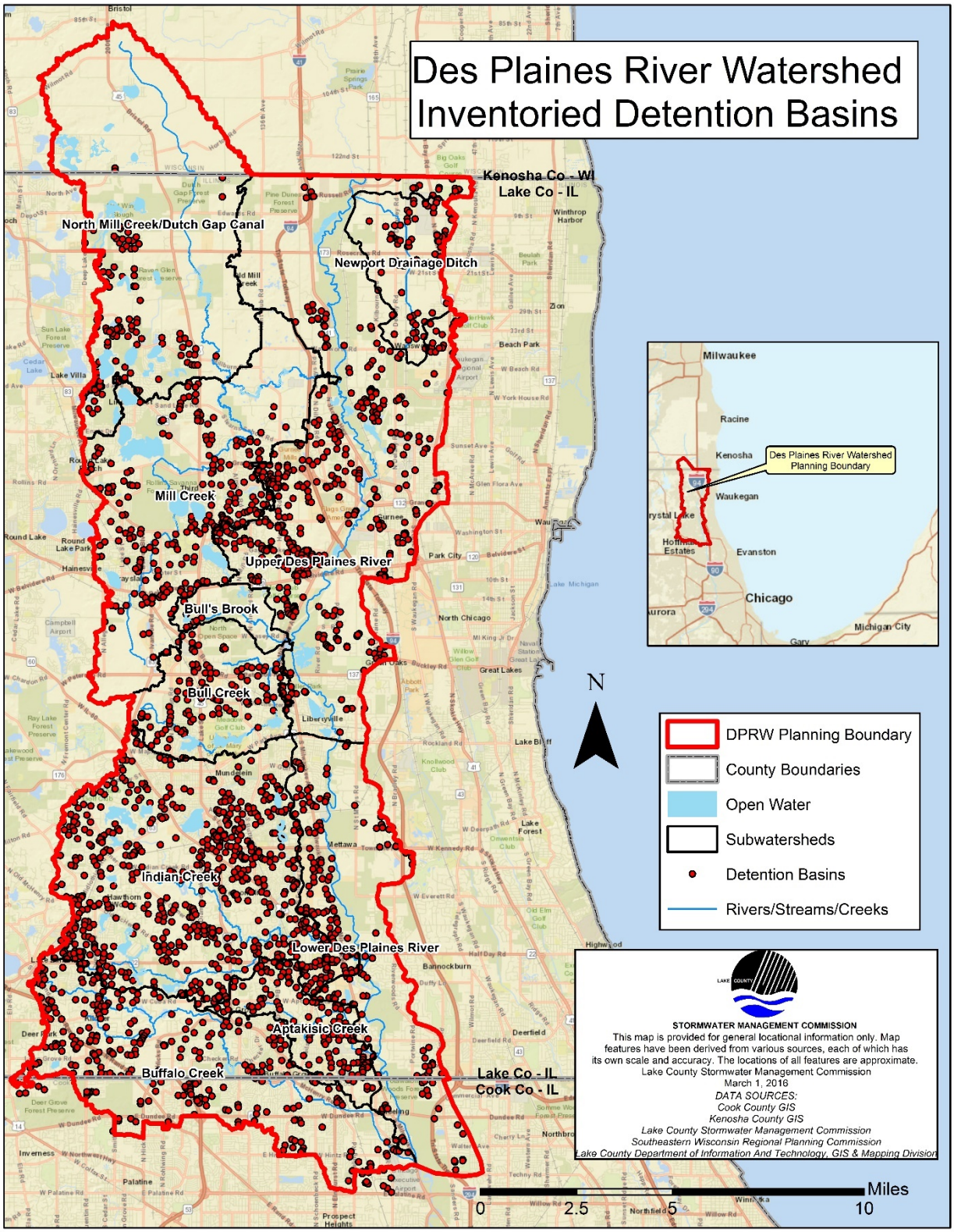


Figure 3-69: Inventoried Detention Basin in the Des Plaines River Watershed Planning Area

Table 3-44: Pre and Post 1992 Detention Basins by Subwatershed

SUBWATERSHED	NUMBER OF BASINS	NUMBER OF BASINS BUILT PRE 1992	NUMBER OF BASINS BUILT POST 1992
North Mill Creek	101	17	84
Mill Creek	248	79	169
Newport Drainage Ditch	75	11	64
Upper Des Plaines River	467	186	281
Bull Creek-Bull's Brook	137	42	95
Indian Creek	713	191	522
Lower Des Plaines River	166	88	78
Buffalo Creek	262	205	57
Aptakisic Creek	134	84	50
Total	**2,303**	**903**	**1,400**

3.16 LAKE AND STREAM WATER QUALITY

Water quality refers to a waterbody's ability to support a variety of aquatic life and recreational uses such as swimming, fishing, boating, and drinking. Water quality assessments also incorporate the aesthetic value of the water body. Water pollution reduces the health of aquatic ecosystems and may be harmful to human health. Water quality is impacted by pollutants from multiple point and nonpoint sources. During storms, pollutants on the landscape are washed from the ground and impervious surfaces into storm sewers, roadside drainage ditches, and natural drainageways and ultimately into the watershed's receiving streams and lakes.

Physical changes in the watershed, such as stream channelization and the loss of riparian vegetation and wetlands, reduce the ability of the natural drainage system to filter pollutants and infiltrate water into the ground, and contribute sediment and other pollutants to the stream and lakes, thereby reducing the quality of aquatic habitat. Water quality problems can be a result of many years of modification of the watershed landscape. These changes include modification of the stream channel, floodplain, wetlands, and other water resource-related landscape features.

Water quality degradation is also caused by an increase in watershed impervious cover (e.g., paving, concrete, rooftops) that has led to an increase in the volume and rate of runoff in the watershed. The increased quantity of runoff causes problems such as excessive stream bank erosion and the deepening of the stream channel due to in-stream erosion. In addition to increasing surface runoff, impervious surfaces reduce the amount of rainwater that infiltrates into the ground to recharge groundwater sources. This water quality summary includes information from water quality reports, data from stream inventories and recent water quality monitoring. Figure 3-69 shows the DPR planning area 2016 303(d) listed streams and lakes.

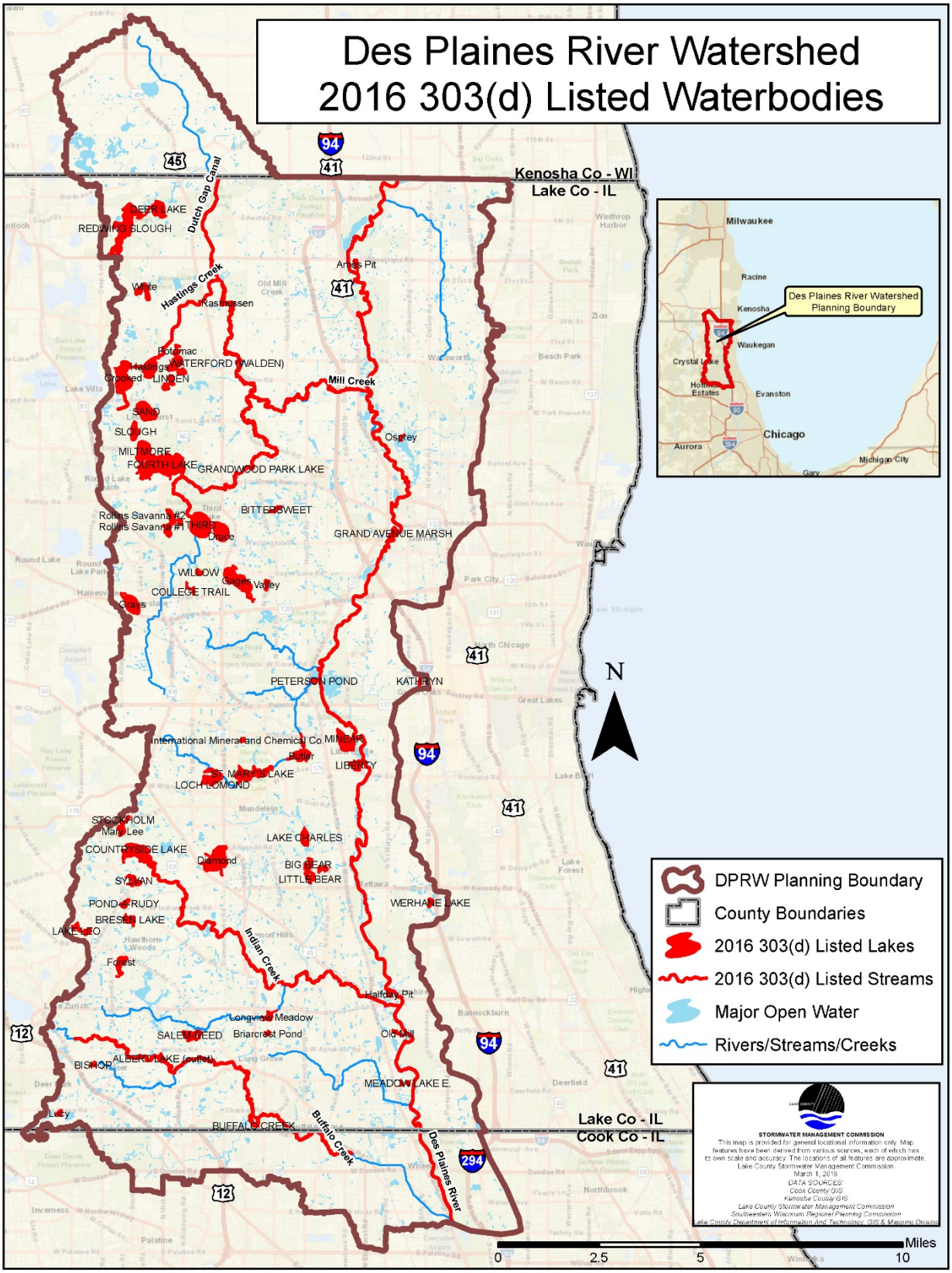


Figure 3-70: Des Plaines River Planning Area 2016 303(d) listed Streams and Lakes

3.16.1 Status of Designated Use Support

The Illinois EPA produces a biennial report on the water quality of surface waters and groundwater in Illinois. The "Integrated Water Quality Report and Section 303(d) List" ("Integrated Report") is based on federal guidance for meeting the requirements of Sections 305(b), 303(d) and 314 of the Clean Water Act. Discussion of the Integrated Report in this section is specifically related to surface water (lakes and streams) in the 2016 Integrated Report. Assessment of water quality for an individual water body or stream segment is expressed in terms of support of "designated uses". Designated uses assessed in the 2016 Integrated Report applicable to lakes and streams in the DPR planning area include Aquatic Life, Fish Consumption, Primary Contact (swimming), Secondary Contact (boating), and Aesthetic Quality. These uses are determined to be fully supported, not supported, not assessed, or to have insufficient information to make a determination. There are no specific assessment guidelines for Secondary Contact in Illinois. In any water where the Primary Contact use is assessed as "full support", Secondary Contact is also assessed as "full support". In all other cases, Secondary Contact is not assessed.

Illinois EPA evaluates physical, biological, and chemical monitoring data to make these assessments of designated use support. For some uses, monitoring data may indicate non-support or "impairment". For example, depauperate fish or invertebrate taxa may indicate impairment of the aquatic life designated use. In these cases, physical and/or chemical monitoring data are compared to numeric water quality standards to determine if pollutants are present in sufficient quantities to cause an impairment of one or more designated uses. In other cases, exceedance or violation of the water quality standard is sufficient to list the use as not supported and the water as "impaired". For example, exceedance of the fecal coliform standard results in non-support of the Primary Contact designated use, if it is an assessed use for a given water. Waters with one or more pollutants identified as the cause of impairment are added to the "303(d) list" of impaired waters and put onto a schedule for development of a Total Maximum Daily Load study for the pollutant(s) of concern (see Section 3.16.2 below). In some cases, "non-pollutants" are identified as the cause of non-support. Non-pollutants are typically non-chemical causes of impairment such as modification of flows in a stream by dams, alteration of habitat, or the presence of non-native invasive species. Once a surface water assessment is made, it typically remains unchanged in subsequent editions of the Integrated Report unless new data is obtained by Illinois EPA. Changes from previous editions are reported by Illinois EPA in an appendix to the report.

3.16.1.1Streams

Thirteen stream segments in the DPR planning area are assessed by Illinois EPA for support of designated uses as indicated by applicable water quality standards. These segments consist of 85 miles of rivers and streams. Of these, six are segments of the Des Plaines River (37 total miles), and two are segments of North Mill Creek ("Dutch Gap Canal" and "North Mill Creek"). The 2016 Integrated Report identified twelve of the assessed segments as impaired for one or more designated uses, all twelve of which did not support the aquatic life use. All six segments of the Des Plaines River in Lake County, accounting for the entire length of the Des Plaines River in Lake County, did not support the aquatic life and fish consumption uses (although water quality standards for several individual causes of impairment identified in 2014 were achieved in 2016). Buffalo Creek and three segments of the Des Plaines River did not support the primary contact (swimming) use. Bull Creek was the only segment in the Lake County portion of the DPR planning area found to support all designated uses, which is a change from 2014, when the aquatic life use was not supported. Indian and Mill Creek did not

support the aquatic life designated use in 2016, which is a change from 2014, when both segments fully supported all designated uses. Dutch Gap Canal, the channelized section of North Mill Creek upstream of Rasmussen Lake, was assessed for the first time in 2016 and did not support the aquatic life designated use.

Table 3-45: Causes of Stream Impairments in the DPR Planning Area

CAUSE OF IMPAIRMENT	SEGMENTS AFFECTED
Phosphorus*	6
Mercury	6
Arsenic**	5
Low Dissolved Oxygen	5
Fecal coliform	4
Other Flow Regime Alterations	4
Polychlorinated Biphenyls (PCBs)	4
Sedimentation/Siltation	4
Total Suspended Solids*	3
Chloride	2
Manganese**	2
Changes in Stream Depth and Velocity Patterns	2
Alterations in Streamside or Littoral Vegetative Covers	2
Unknown Cause(s)	2
Aquatic Algae	1
pH	1

*Phosphorus and total suspended solids used to identify causes prior to 2012

**Arsenic and manganese in sediment samples used to identify non-standard based causes of aquatic life impairment prior to 2012

Table 3-46: Sources of Stream Impairments in the DPR Planning Area

SOURCE OF POLLUTION	SEGMENTS AFFECTED
Unknown Source(s)	9
Atmospheric Deposition	6
Contaminated Sediment	5
Urban Runoff/Stormsewers	4
Municipal-Point Source Discharges	4
Dam or Impoundment	3
Site Clearance (Land Development or Redevelopment)	2
Crop Production (Crop Land or Dry Land)	2
Impacts from Hydrostructure Flow Regulation/Modification	2
Streambank Modifications/Destabilization	1
Agriculture	2
Channelization	1
Upstream Impoundments	1

Sixteen causes of impairment are identified and multiple causes may affect a single stream segment. Causes of impairment and sources of pollution are summarized in Table 3-45 and Table 3-46, respectively. Phosphorus and total suspended solids are no longer used by Illinois EPA to assess aquatic life use attainment in streams, but any listings prior to 2012 will not be removed unless new data indicates full support of the use. Similarly, five segments impaired by arsenic and two impaired by manganese are based on sediment chemistry data and first appeared as a cause of the aquatic life use impairment in 2010. Non-standard based sediment data is no longer used as the basis for assessment, but these causes will not be removed unless new data indicates full support of the aquatic life use. The mercury and polychlorinated biphenyls causes are related to non-support

of the fish consumption use for the Des Plaines River. The fecal coliform cause is related to non-support of the primary contact designated use in Buffalo Creek and three segments of the Des Plaines River. Sources of pollution fall into thirteen categories and multiple sources may affect a single segment. Sources are identified for each assessed segment in Table 3-47. Atmospheric deposition-toxics (6 segments) is related to mercury and PCB causes of non-support of the fish consumption use for the Des Plaines River. "Municipal-point source discharges" refers to wastewater treatment plants, although not all wastewater discharges upstream of affected segments are municipally-owned.

Table 3-47: Stream Impairments List in the DPR Planning Area

Bold font indicates the Designated Use and cause(s) of impairment for which the water appears on the 303(d) list. Bold underlining indicates waters for which a TMDL has been developed for one or more pollutants. Asterisks (*) indicate pollutant causes of impairment for which a TMDL has been developed.

STREAM	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
Buffalo Cr.	IL_GST	**Aquatic Life-Non Support** **Primary Contact-Non Support**	**Total Suspended Solids, Chloride*, Dissolved Oxygen*, Fecal Coliform***	Urban Runoff/Stormsewers; Unknown
Bull Cr.	IL_GV-01	Aquatic Life-Full Support Aesthetic Quality-Full Support	N/A	N/A
Des Plaines R.	IL_G-25	**Aquatic Life-Non Support** **Fish Consumption-Non Support** Aesthetic Quality-Full Support	**Arsenic, Sedimentation/Siltation, Total Suspended Solids, Dissolved Oxygen, Mercury**	Contaminated sediment, Site Clearance (Land Development or Redevelopment), Urban Runoff/Stormsewers, Atmospheric Deposition-Toxics, Unknown
Des Plaines R.	IL_G-35	**Aquatic Life-Non Support** **Fish Consumption-Non Support** Aesthetic Quality-Full Support	**Unknown, Phosphorus, Mercury, Polychlorinated biphenyls**	Municipal Point-Source Discharges, Unknown, Atmospheric Deposition-Toxics

STREAM	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
Des Plaines R.	IL_G-08	**Aquatic Life-Non Support** **Fish Consumption-Non Support, Primary Contact-Non Support** Aesthetic Quality-Full Support	**Dissolved Oxygen, Total Suspended Solids, Mercury, Fecal Coliform**	Unknown, Crop Production (Crop Land or Dry Land), Atmospheric Deposition-Toxics
Des Plaines R.	IL_G-26	**Aquatic Life-Non Support, Fish Consumption-Non Support**	**Unknown, Mercury, Polychlorinated biphenyls**	Unknown, Atmospheric Deposition-Toxics
Des Plaines R.	IL_G-36	**Aquatic Life-Non Support, Fish Consumption-Non Support, Primary Contact-Non Support**	**Phosphorus, Other flow regime alterations, Aquatic Algae, Mercury, Polychlorinated biphenyls, Fecal Coliform**	Impacts from hydrostructure Flow Regulation/modification, Dam or impoundment, Municipal Point-source discharges, Atmospheric Deposition-Toxics, Unknown
Des Plaines R.	IL_G-07	**Aquatic Life-Non Support,** **Fish Consumption-Non Support, Primary Contact-Non Support** Aesthetic Quality-Full Support	**Arsenic, Chloride, Phosphorus, Alteration in stream-side or littoral vegetative covers, Mercury, Polychlorinated biphenyls, Fecal Coliform**	Streambank modifications/destabilization, Contaminated Sediment, Municipal Point-source discharges, Urban Runoff/Stormsewers, Atmospheric Deposition-Toxics, Unknown
Dutch Gap Canal	IL_GWAB	**Aquatic Life-Non Support**	**Arsenic, Manganese, Phosphorus, Sedimentation/Siltation, Other flow regime alterations, Changes in stream depth and velocity patterns**	Contaminated Sediments, Dam or Impoundment, Agriculture

STREAM	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
Hastings Cr.	IL_GWAA	**Aquatic Life-Non Support**	**Arsenic, Phosphorus, Sedimentation/Siltation, Alteration in stream-side or littoral vegetative covers, Other flow regime alterations**	Channelization, Upstream Impoundments, Contaminated Sediments, Impacts from hydrostructure flow regulation/modification, Municipal Point-source discharges, Urban Runoff/Stormsewers, Site Clearance (land Development or Redevelopment), Crop Production (Crop Land or Dry Land)
Indian Cr.	IL_GU-02	**Aquatic Life-Non Support**	**Dissolved Oxygen**	Unknown
Mill Cr.	IL_GW-02	**Aquatic Life-Non Support,** Aesthetic Quality-Full Support	**Dissolved Oxygen, pH**	Unknown
North Mill Cr.	IL_GWA	**Aquatic Life-Non Support**	**Arsenic, Manganese, Phosphorus, Sedimentation/Siltation, Other flow regime alterations, Changes in stream depth and velocity patterns**	Contaminated Sediments, Dam or impoundment, Agriculture

Table 3-48: Causes of Impairment for Impaired Lakes

CAUSE OF IMPAIRMENT	LAKES AFFECTED
Phosphorus	52
Total Suspended Solids	43
Aquatic Plants	33
Low Dissolved Oxygen	9
Unknown Causes	8
Fecal coliform	4
Non-Native Aquatic Plants	1

3.16.1.2Lakes

Eighty-one lakes in the DPR planning area appear on Illinois EPA's list of assessed waters for 2016. Of these, 13 lakes do not have an assessed designated use. Of the remaining 68 lakes with designated uses, seven fully support all their respective designated uses. Of the seven lakes, four lakes are former gravel pits (Dog Training Pond, Independence Grove, Carina, and Sterling), two lakes are natural glacial lakes (Miltmore and Timber (North)), and one lake is a modified oxbow (Windward). Two lakes have "insufficient data" to conclude whether the lake supports or does not support designated uses (Green & Westchester II). Fifty-nine lakes do not support the aesthetic quality designated use, making it the most common designated use impairment for lakes in the planning area. Ten of these 59 lakes do not support the aquatic life designated use and four do not support the primary contact (swimming) designated use.

Seven causes of impairment were identified and multiple causes may affect a single lake. Causes of impairment for the 59 impaired lakes are summarized in Table 3-48. Phosphorus (52 lakes), total suspended solids (43 lakes), and aquatic plants (33 lakes), are the most common causes of impairment. Sources of pollution fall into twenty-two categories and multiple sources may affect a single lake. Sources of pollution are summarized in Table 3-49. Causes of impairment and sources of pollution are detailed for each lake in Table 3-50.

Table 3-49: Sources of Pollution for Impaired Lakes

SOURCE OF POLLUTION	LAKES AFFECTED
Unknown	33
Rural (residential areas)	19
Runoff from Forest/Grassland/Parkland	18
Agriculture	14
Urban Runoff/Stormsewers	12
Waterfowl	7
Littoral/Shore Area Modifications (non-riverine)	6
Yard Maintenance	6
Internal Nutrient Recycling	4
Streambank Modifications/Destabilization	3
Other Recreational Pollution Sources	3
Golf Courses	2
Natural Sources	2
Wildlife other than Waterfowl	2
Residential Districts	2
Site Clearance (Land Development or Redevelopment)	2
Contaminated Sediments	1
Impervious Surface/Parking Lot Runoff	1
On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	1
Sediment Resuspension (Clean Sediment)	1
Pesticide Application	1
Highway/Road/Bridge Runoff (Non-Construction Related)	1

Table 3-50: Causes of impairment and source of pollution by lake

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
ACORN	IL_WGD	None Assessed	N/A	N/A
ALBERT (outlet)	IL_VGG	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen*, Total Suspended Solids, Phosphorus***	Unknown
AMES PIT	IL_VGA	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus, Aquatic Plants**	Unknown
BENET	IL_UGW	None Assessed	N/A	N/A
BIG BEAR	IL_WGZU	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Unknown
BISHOP	IL_UGJ	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Rural (Residential Areas)
BITTERSWEET	IL_SGQ	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen, Total Suspended Solids, Phosphorus**	Pesticide Application, Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
BRESEN LAKE	IL_UGN	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Unknown
BRIARCREST POND	IL_SGZ	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	Cause Unknown	Unknown
BROWN'S	IL_RGZY	None Assessed	N/A	N/A
BUFFALO CREEK	IL_SGC	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen*, Total Suspended Solids, Phosphorus***	Unknown

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
BUTLER	IL_RGJ	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Highway/Road/Bridge Runoff (Non-Construction Related), Littoral/shore Area Modifications (Non-Riverine), Streambank Modifications/Destabilization, Unknown, Waterfowl, Urban Runoff/Storm Sewers, Runoff from Forest/Grassland/Parkland
COLLEGE TRAIL	IL_VGO	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Agriculture, Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
COUNTRYSIDE LAKE	IL_RGQ	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Rural (Residential Areas), Runoff from Forest/Grassland/Parkland, Natural Sources
CROOKED	IL_RGZA	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Wildlife other than Waterfowl, Agriculture, Rural (Residential Areas)
DEER	IL_RGX	None Assessed	N/A	N/A
DEER LAKE	IL_WGZF	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus, Aquatic Plants**	Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
DIAMOND	IL_RGB	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Littoral/shore Area Modifications (Non-Riverine), Sediment Resuspension (Clean Sediment), Internal Nutrient Recycling, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems), Yard Maintenance, Unknown

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
DOG TRAINING POND	IL_UGH	Aquatic Life-Full Support, Aesthetic Quality-Full Support	N/A	N/A
DRUCE	IL_RGV	Aquatic Life-Full Support, **Primary Contact-Non Support, Aesthetic Quality-Non Support**	**Fecal Coliform, Aquatic Plants**	Unknown
FARMINGTON	IL_UGK	None Assessed	N/A	N/A
FOREST	IL_RGZG	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus***	Unknown, Agriculture, Urban Runoff/Storm Sewers
FOURTH LAKE	IL_RGZC	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	Cause Unknown, **Aquatic Plants**	Unknown
GAGES	IL_RGI	Aquatic Life-Full Support, Primary Contact-Full Support, Secondary Contact-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Unknown, Internal Nutrient Recycling, Waterfowl, Yard Maintenance
GRAND AVENUE MARSH	IL_SGR	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Impervious Surface/Parking Lot Runoff, Yard Maintenance, Agriculture, Rural (Residential Areas)
GRANDWOOD PARK LAKE	IL_UGC	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown
GRAYS	IL_RGK	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus**	Internal Nutrient Recycling, Yard Maintenance

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
GREEN	IL_SGE	Aquatic Life-Insufficient Information, Aesthetic Quality-Insufficient Information	Cause Unknown	N/A
HALFDAY PIT	IL_UGB	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen*, Total Suspended Solids, Phosphorus***	Unknown
HARVEY LAKE	IL_VGJ	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown
HASTINGS	IL_RGZB	Aquatic Life-Full Support, **Primary Contact-Non Support, Aesthetic Quality-Non Support**	**Fecal Coliform, Total Suspended Solids, Phosphorus**	Other Recreational Pollution Sources, Agriculture, Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
HENDRICK	IL_UGU	None Assessed	N/A	N/A
HIDDEN VALLEY	IL_WGE	None Assessed	N/A	N/A
INDEPENDENCE GROVE	IL_SGH	Aquatic Life-Full Support, Aesthetic Quality-Full Support	N/A	N/A
INTERNATIONAL MINING AND CHEMICAL	IL_VGF	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown, Urban Runoff/Storm Sewers
LAKE CARINA	IL_VGC	Aquatic Life-Full Support, Aesthetic Quality-Full Support	N/A	N/A
LAKE CHARLES	IL_RGZJ	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Unknown
LAKE LEO	IL_UGL	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	Cause Unknown, **Aquatic Plants**	Unknown

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
LAKE NAOMI	IL_UGM	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown
LEOPOLD	IL_VGI	None Assessed	N/A	N/A
LIBERTY	IL_RGT	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Unknown
LINDEN	IL_RGC	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus, Aquatic Plants**	Residential Districts, Runoff from Forest/Grassland/Parkland
LITTLE BEAR	IL_WGZV	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Unknown
LOCH LOMOND	IL_RGU	Aquatic Life-Full Support, **Primary Contact-Non Support, Aesthetic Quality-Non Support**	**Fecal Coliform, Total Suspended Solids, Phosphorus**	Littoral/shore Area Modifications (Non-Riverine), Other Recreational Pollution Sources, Streambank Modifications/Destabilization, Unknown, Agriculture, Rural (Residential Areas), Urban Runoff/Storm Sewers, Waterfowl
LONGVIEW MEADOW	IL_SGU	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen, Total Suspended Solids, Phosphorus**	Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
LUCY LAKE	IL_SGT	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
MANNING SLOUGH	IL_UGQ	None Assessed	N/A	N/A
MARY LEE	IL_UGR	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus, Aquatic Plants**	Golf Courses, Agriculture

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
MEADOW LAKE E.	IL_WGL	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Rural (Residential Areas), Urban Runoff/Storm Sewers, Runoff from Forest/Grassland/Parkland
MEADOW LAKE W.	IL_WGF	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Urban Runoff/Storm Sewers, Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
MILTMORE	IL_RGZD	Aquatic Life-Full Support, Primary Contact-Full Support, Secondary Contact-Full Support, Aesthetic Quality-Full Support	N/A	N/A
MINEAR	IL_RGP	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	Cause Unknown, **Aquatic Plants**	Residential Districts, Yard Maintenance, Natural Sources, Runoff from Forest/Grassland/Parkland
NORTH ECONOMY GRAVEL PIT	IL_UGE	None Assessed	N/A	N/A
OLD MILL	IL_WGU	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Site Clearance (Land Development or Redevelopment), Wildlife other than Waterfowl, Urban Runoff/Storm Sewers, Waterfowl, Runoff from Forest/Grassland/Parkland
OSPREY	IL_SGY	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Non-Native Aquatic Plants, Dissolved Oxygen, Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
PETERSON POND	IL_UGI	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	Cause Unknown, **Aquatic Plants**	Unknown
POND-A-RUDY	IL_UGP	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen*, Total Suspended Solids, Phosphorus*, Aquatic Plants**	Unknown
POTOMAC LAKE	IL_RGZK	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus, Aquatic Plants**	Rural (Residential Areas), Urban Runoff/Storm Sewers
RASMUSSEN LAKE	IL_UGY	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen, Phosphorus, Total Suspended Solids**	Unknown
REDWING SLOUGH	IL_VGD	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Agriculture, Runoff from Forest/Grassland/Parkland
ROBINSON PIT	IL_UGD	None Assessed	N/A	N/A
ROLLINS SAVANNA #1	IL_VGW	**Aesthetic Quality-Non Support**	Cause Unknown	Unknown
ROLLINS SAVANNA #2	IL_VGX	**Aesthetic Quality-Non Support**	**Phosphorus**	Internal Nutrient Recycling
SALEM-REED	IL_WGK	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus*, Aquatic Plants**	Unknown
SANCTUARY POND	IL_SGX	None Assessed	N/A	N/A
SAND	IL_RGM	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	Cause Unknown, **Aquatic Plants**	Rural (Residential Areas), Urban Runoff/Storm Sewers, Runoff from Forest/Grassland/Parkland
SCHERMERVILLE	IL_WGZT	None Assessed	N/A	N/A

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
SLOUGH	IL_RGZE	**Aquatic Life-Non Support, Aesthetic Quality-Non Support**	**Dissolved Oxygen, Total Suspended Solids, Phosphorus**	Agriculture, Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
ST. MARY'S LAKE	IL_UGF	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Contaminated Sediments, Littoral/shore Area Modifications (Non-Riverine), Streambank Modifications/Destabilization, Unknown, Urban Runoff/Storm Sewers, Runoff from Forest/Grassland/Parkland
STERLING	IL_WGZJ	Aquatic Life-Full Support, Aesthetic Quality-Full Support	N/A	N/A
STOCKHOLM	IL_UGS	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Golf Courses, Agriculture
SYLVAN	IL_RGZF	Aquatic Life-Full Support, **Primary Contact-Non Support, Aesthetic Quality-Non Support**	**Fecal Coliform*, Total Suspended Solids, Phosphorus***	Littoral/shore Area Modifications (Non-Riverine), Unknown
THIRD	IL_RGW	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Littoral/shore Area Modifications (Non-Riverine), Yard Maintenance, Agriculture, Rural (Residential Areas)
TIMBER LAKE (NORTH)	IL_UGZ	Aquatic Life-Full Support, Aesthetic Quality-Full Support	N/A	N/A
VALLEY	IL_RGZM	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown

LAKE	ILLINOIS EPA ASSESSMENT UNIT ID	DESIGNATED USE(S) AND LEVEL OF SUPPORT	CAUSE(S)	SOURCE(S)
WATERFORD (WALDEN)	IL_WGS	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Other Recreational Pollution Sources, Urban Runoff/Storm Sewers, Rural (Residential Areas)
WERHANE LAKE	IL_VGH	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus, Aquatic Plants**	Unknown
WESTCHESTER II	IL_SGD	Aquatic Life-Insufficient Information, Aesthetic Quality-Insufficient Information	Phosphorus, Aquatic Algae	Waterfowl, Urban Runoff/Storm Sewers
WHITE LAKE	IL_UGX	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Phosphorus**	Site Clearance (Land Development or Redevelopment), Agriculture, Rural (Residential Areas), Runoff from Forest/Grassland/Parkland
WILLOW	IL_UGT	Aquatic Life-Full Support, **Aesthetic Quality-Non Support**	**Total Suspended Solids, Phosphorus**	Unknown
WINDWARD LAKE	IL_VGL	Aquatic Life-Full Support, Aesthetic Quality-Full Support	N/A	N/A

3.16.2 Total Maximum Daily Load for Des Plaines River/Higgins Creek

Total Maximum Daily Load (TMDL): An estimation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. It assesses contributing point and nonpoint sources and identifies pollution reductions necessary for designated use attainment.

Section 303(d) of the Clean Water Act requires Illinois EPA to identify all waters that do not meet water quality standards. For waters impaired by pollutants, Section 303(d) requires the development of a **TMDL**.

Illinois EPA developed the Des Plaines River/Higgins Creek Watershed TMDL Report in 2013, covering 18 lakes and stream segments, 14 of which are in the DPR planning area. The report directly addresses the pollutants phosphorus, fecal coliform, chloride. Dissolved oxygen impairment resulting

from nutrient enrichment was addressed by developing a TMDL for phosphorus, carbonaceous biochemical oxygen demand and/or ammonia. The results of the report are summarized in Table 3-51. For all pollutants and all water bodies, the pollutant load reductions needed to achieve the water quality standard are achieved by subtracting the permitted load from point sources and a factor of safety from the modeled TMDL, and dividing the remaining load ("waste load allocation") among the municipal MS4 permit holders in the tributary area based on relative acreage.

Table 3-51: Load reductions needed to attain water quality standards for Total Maximum Daily Load pollutants as reported in the Des Plaines/Higgins Creek Watershed TMDL Report. Source: Illinois EPA 2013

WATERBODY	TMDL POLLUTANT	LOAD REDUCTION NEEDED TO ATTAIN WATER QUALITY STANDARD	MUNICIPAL MS4S TRIBUTARY TO TMDL WATER BODY AND ASSIGNED WASTELOAD ALLOCATION TO ACHIEVE LOAD REDUCTION, BASED ON AREA IN TRIBUTARY WATERSHED
Buffalo Creek	Fecal Coliform	12-85%*	Long Grove, Lake Zurich, Buffalo Grove, Kildeer, Deer Park, Barrington, Palatine, Inverness, and Arlington Heights
Buffalo Creek	Chloride	11-46%*	Long Grove, Lake Zurich, Buffalo Grove, Kildeer, Deer Park, Barrington, Palatine, Inverness, and Arlington Heights
Buffalo Creek	Carbonaceous biochemical oxygen demand**	39%	Long Grove, Lake Zurich, Buffalo Grove, Kildeer, Deer Park, Barrington, Palatine, Inverness, and Arlington Heights
Buffalo Creek	Ammonia**	30%	Long Grove, Lake Zurich, Buffalo Grove, Kildeer, Deer Park, Barrington, Palatine, Inverness, and Arlington Heights
Albert Lake	Total phosphorus**	89%	Lake Zurich, Long Grove, and Kildeer
Big Bear Lake	Total phosphorus	33%	Libertyville, Mundelein, and Vernon Hills
Bresen Lake	Total phosphorus	59%	Hawthorn Woods
Buffalo Creek Reservoir	Total phosphorus**	65%	Arlington Heights, Barrington, Buffalo Grove, Deer Park, Inverness, Kildeer, Lake Zurich, Long Grove, and Palatine
Countryside Lake	Total phosphorus	51%	Hawthorn Woods, Long Grove, and Mundelein
Diamond Lake	Total phosphorus	9%	Long Grove and Mundelein

WATERBODY	TMDL POLLUTANT	LOAD REDUCTION NEEDED TO ATTAIN WATER QUALITY STANDARD	MUNICIPAL MS4S TRIBUTARY TO TMDL WATER BODY AND ASSIGNED WASTELOAD ALLOCATION TO ACHIEVE LOAD REDUCTION, BASED ON AREA IN TRIBUTARY WATERSHED
Forest Lake	Total phosphorus	63%	Hawthorn Woods and Lake Zurich
Half Day Pit	Total phosphorus**	80%	Lincolnshire
Lake Charles	Total phosphorus	13%	Libertyville, Mundelein, and Vernon Hills
Little Bear Lake	Total phosphorus	7%	Libertyville, Mundelein, and Vernon Hills
Pond-A-Rudy	Total phosphorus**	67%	Hawthorn Woods
Salem Lake	Total phosphorus	69%	Long Grove
Sylvan Lake	Fecal Coliform	80%	Hawthorn Woods and Long Grove
Sylvan Lake	Total phosphorus	35%	Hawthorn Woods and Long Grove

*Percent reduction needed to achieve water quality standards changes based on flow conditions. **Also addresses dissolved oxygen impairment

For the TMDL models, wastewater dischargers were assumed to be operating within NPDES permit limits and were not assigned a load reduction. The excess chloride load in Buffalo Creek is attributed to winter de-icing activities. For Sylvan Lake, nonpoint sources, including agricultural practices, such as grazing livestock, and septic system failure were indicated as potential sources of fecal coliform loading and are included in the load allocation.

3.16.3 Summary of Previous Studies and DRWW Monitoring Program

In the last two decades, dozens of efforts to monitor, sample, and collect field data on chemical, physical, and biological parameters related to water quality have been undertaken in the planning area. Data of at least one type (physical/chemical or biological) are available for more than 70 specific locations throughout the planning area. Data have been gathered by various investigators for different purposes and reasons and therefore are not always directly comparable. While it is beyond the scope of this plan to provide an exhaustive review of all sources of water quality data available across the planning area, a list of studies and datasets that have been generated in the last 20 years is included for reference (see Table 3-52), and the results are summarized in the following pages. Generally, these data fall into one or more of the following categories: 1) data were collected

by a public agency; 2) data are available publicly; 3) data/study is cited or referenced in previous watershed-based plans.

In 2015, the Des Plaines River Watershed Workgroup (DRWW) began collecting water column chemistry, streambed sediment, and biological community data at 40 sites in the planning area. In 2016, DRWW collected water chemistry, fish and macroinvertebrate data at 69 sites, sediment data at 50 sites and flow monitoring at 21 sites within the planning area. Currently 70 monitoring sites are located on the Des Plaines River and on tributary streams, including several not previously studied. The results of that data collection effort are discussed relative to previous data collection and monitoring efforts below. The findings of their baseline report (MBI, 2017) indicate similar trends to those identified in previous studies. None of the sites achieved full support for the aquatic life use/general use category. While no sites achieved the support criteria for fish assemblage, 34 of 70 sites achieved the criteria for aquatic macroinvertebrate assemblage. Major causes associated with impairment include siltation, chlorides, habitat degradation, organic enrichment/nutrients/dissolved oxygen, and Polycyclic Aromatic Hydrocarbons (PAHs)/Manganese. Sources to which these causes are attributed are urban runoff, habitat and hydrologic alterations, and wastewater treatment plant effluent. Excessive siltation and embeddedness of substrates was identified as the most pervasive cause of aquatic life impairment in the study. The increasing concentration of dissolved materials, markedly chloride, is noted as a trend across the entire study area and is consistent with data from previous studies. Organic enrichment from multiple sources was also prevalent across sites. Streambed sediment sampling indicated that PAHs are present throughout the DPR planning area and are correlated to urban land use (MBI, 2017).

Table 3-52: Summary of relevant recent stream water quality studies and monitoring efforts for the Des Plaines River and tributaries within the planning area

STREAM (STATION LOCATION)	YEAR	INVESTIGATOR(S)	NOTES
Des Plaines River (Wadsworth Rd., US Rt. 41, Washington St., IL Rt. 120, Oak Spring Rd., IL Rt. 60, Deerfield Rd.)	1986-2015	North Shore Water Reclamation District (formerly North Shore Sanitary District)	Chemical/physical parameters, aquatic macroinvertebrates, fish
Des Plaines River (IL Rt. 60, Benjamin Dr.)	2011-2015	Lake County Department of Public Works	Chemical/physical parameters
Des Plaines River (Russell Rd., Wadsworth Rd., Oak Spring Rd., IL Rt. 120, Benjamin Dr.)	1999-2015	Illinois Environmental Protection Agency	Chemical/physical parameters
Des Plaines River (Russell Rd.), Mill Creek (Wadsworth), Bull Creek (IL Rt. 21)	2000-2001	United States Geological Survey	Chemical/physical parameters, aquatic macroinvertebrates, fish (part of National Water Quality Assessment)
Aptakisic Creek (Pekara Dr., Aspen Dr.)	2003-2015	Lake County Department of Public Works	Chemical/physical parameters

STREAM (STATION LOCATION)	YEAR	INVESTIGATOR(S)	NOTES
Bull Creek (IL Rt. 21)	2003, 2008, 2013	Illinois Environmental Protection Agency & Illinois Department of Natural Resources	Chemical/physical parameters, aquatic macroinvertebrates, fish
Bull Creek (IL Rt. 21, Cass Park)	2001	Illinois Natural History Survey	Fish
Bull Creek, Bull's Brook (multiple)	2005	Integrated Lakes Management	Chemical/physical parameters (reported in Bull Creek/Bull's Brook Watershed-Based Plan)
Bull Creek, Bull's Brook (multiple)		Applied Ecological Services	Chemical/physical parameters (reported in Bull Creek/Bull's Brook Watershed-Based Plan)
Bull Creek, Bull's Brook (5 sites)	1997-2003	Riverwatch	Aquatic macroinvertebrates
Buffalo Creek (15 sites)	2013-2015	Buffalo Creek Clean Water Partnership	Chemical/physical parameters
Buffalo Creek	1996-2014	Riverwatch	Aquatic macroinvertebrates
Buffalo Creek	2012-2014	Buffalo Creek Clean Water Partnership	Aquatic macroinvertebrates
Indian Creek (Vernon Twp. Park)	2003, 2008, 2013	Illinois Environmental Protection Agency & Illinois Department of Natural Resources	Chemical/physical parameters, aquatic macroinvertebrates, fish
Seavey Ditch (Vernon Hills Golf Course)	2008	Village of Vernon Hills/Living Waters Consultants	Fish
Sylvan Lake Drain (above former WWTP, Washitay Ave.)	2006-2014	Lake County Department of Public Works	Chemical/physical parameters
Mill Creek (upstream of water reclamation facility, facility outfall, Dilley's Rd.)	2007, 2013	Lake County Department of Public Works, Hey & Associates	Chemical/physical parameters, aquatic macroinvertebrates, fish
Mill Creek (upstream of water reclamation facility, Dilley's Rd.)	2007-2015	Lake County Department of Public Works	Chemical/physical parameters
Mill Creek (Dilley's Rd.)	1999-2015	North Shore Water Reclamation District	Chemical/physical parameters

STREAM (STATION LOCATION)	YEAR	INVESTIGATOR(S)	NOTES
Mill Creek (Dilley's Rd.)	1999	Illinois Natural History Survey	Fish
Mill Creek (Il Rt. 83)	2012	Illinois Natural History Survey	Fish
Mill Creek (US Rt. 41, below Grandwood Park Dam)	2013	Illinois Environmental Protection Agency & Illinois Department of Natural Resources	Chemical/physical parameters, aquatic macroinvertebrates, fish
North Mill Creek (Millburn Rd., Old Kelly Rd.)	1998	Illinois Natural History Survey	Fish
Dutch Gap Canal (IL Rt. 173)	2010	Illinois Natural History Survey	Fish
North Mill Creek (Old Kelly Rd.), Hastings Creek (Miller Rd.), Dutch Gap Canal (IL Rt. 173), Dutch Gap Canal (Edwards Rd.)	2010	Lake County Health Department, Lake County Stormwater Management Commission/Living Waters Consultants	Chemical/physical parameters, aquatic macroinvertebrates, fish
North Mill Creek (Old Kelly Rd.), Hastings Creek (Miller Rd.), Dutch Gap Canal (IL Rt. 173)	2008, 2013	Illinois Environmental Protection Agency & Illinois Department of Natural Resources	Chemical/physical parameters, aquatic macroinvertebrates, fish
Dutch Gap Canal (Kenosha Co.)	2003, 2005	Wisconsin Department of Natural Resources	Aquatic macroinvertebrates, fish
Newport Ditch (Kilbourne Rd.)	1998	Illinois Natural History Survey	Fish
MacArthur Woods Tributary (Forest Preserve)	1997	Illinois Natural History Survey	Fish
Belvidere Road Tributary (IL Rts. 21 & 120)	2004, 2013	Illinois Natural History Survey	Fish
Watershed-wide	2002-2004	U.S. Army Corps of Engineers, Illinois Department of Natural Resources, Southeastern	Fish; 21 sites in DPR planning area(49 total sites in study)

STREAM (STATION LOCATION)	YEAR	INVESTIGATOR(S)	NOTES
		Wisconsin Regional Planning Commission	
Watershed-wide	2015-Present	Des Plaines River Watershed Workgroup	Chemical/physical parameters, aquatic macroinvertebrates, fish; 70 sites within planning area
Watershed-wide	1995-present	Lake County Forest Preserve District	Fish; fishery surveys at Forest Preserve properties

3.16.3.1Des Plaines River Mainstem

Several agencies have gathered water quality data for the Des Plaines River over the past two decades, including the United States Geological Survey (USGS), Illinois EPA, Illinois Department of Natural Resources, US Army Corps of Engineers, North Shore Water Reclamation District (NSWRD), and Lake County Public Works Department, the last two in conjunction with the discharge of effluent from wastewater treatment plants. The USGS gathered data from three sites in the DPR planning area (Des Plaines River at Russell Road, Mill Creek at Wadsworth, and Bull Creek at Libertyville) as part of its study of the effect of urbanization on the Des Plaines and Fox River watersheds (Harris, et al., 2005). Illinois EPA and Illinois DNR gather data from several sites in the DPR planning area every five years as part of the intensive basin survey. The Des Plaines River Watershed Workgroup began an intensive and comprehensive water quality monitoring effort throughout the DPR planning area in 2015 and findings through 2016 are discussed below.

3.16.3.2Dissolved Oxygen

Data from all sources indicated that dissolved oxygen fell below the water quality standard in 2.77% of samples for all sites (17 of 613 samples). In any body of water, dissolved oxygen generally decreases as water temperature rises, and dissolved oxygen data for the Des Plaines River displays a strong negative correlation to water temperature. Of all samples that fell below 5.0 mg/L (the higher of the two date-specific water quality standards), only one occurred when measured water temperature was below 60° F. The data also indicate that dissolved oxygen *increased* from upstream to downstream (i.e., low dissolved oxygen was more common upstream), as shown in Figure 3-70. It is unknown if this is a result of the nature of the river channel in northern Lake County or the result of oxygenated inputs (mainly treated wastewater effluent) south of Wadsworth Road. Of note, dissolved oxygen is listed as a cause of impairment in assessment units G-08 and G-25, the reaches containing the Russell Road and Wadsworth Road sample points.

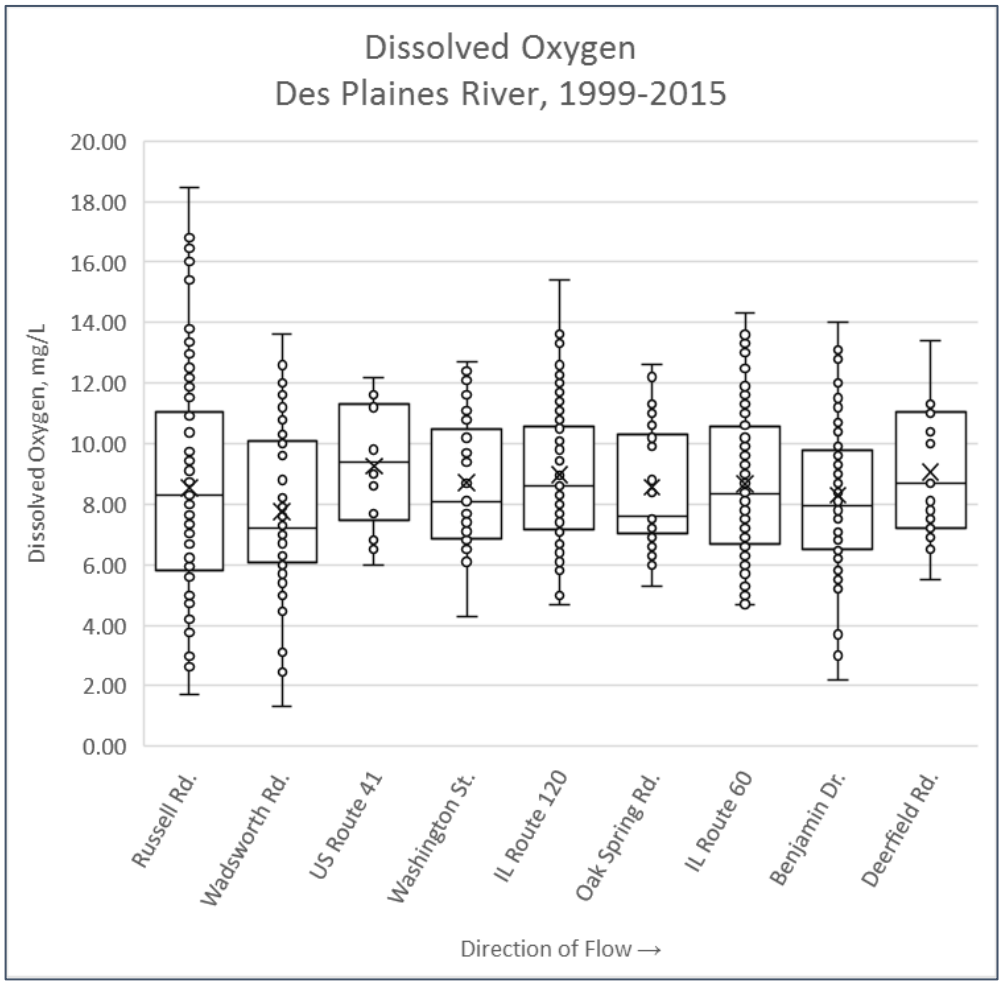


Figure 3-71: Upstream to downstream trend in dissolved oxygen from sample data on the Des Plaines River mainstem, 1999-2015
Mean for each location is indicated by the "X" marker.

DRWW baseline monitoring did not indicate any exceedances of the of the Illinois ambient water quality standards for dissolved oxygen in the Des Plaines River mainstem. Lower concentrations at the northern end of the DPR planning area are attributed to sluggish flows and prevalence of duckweed.

3.16.3.3Chloride

Chloride concentrations exceeded the USEPA chronic threshold for aquatic life of 230 mg/L in 10% of samples and exceeded the Illinois water quality standard (acute threshold) of 500 mg/L in 0.9% of samples. Chloride concentration increased slightly in the downstream direction. Data from all sites indicate that chloride concentration has increased over time, particularly from 2010-2015, as shown in Figure 3-71 The proportion of samples with chloride concentrations below 100 mg/L decreases markedly during this time frame. These trends are consistent with the baseline findings of the DRWW monitoring effort.

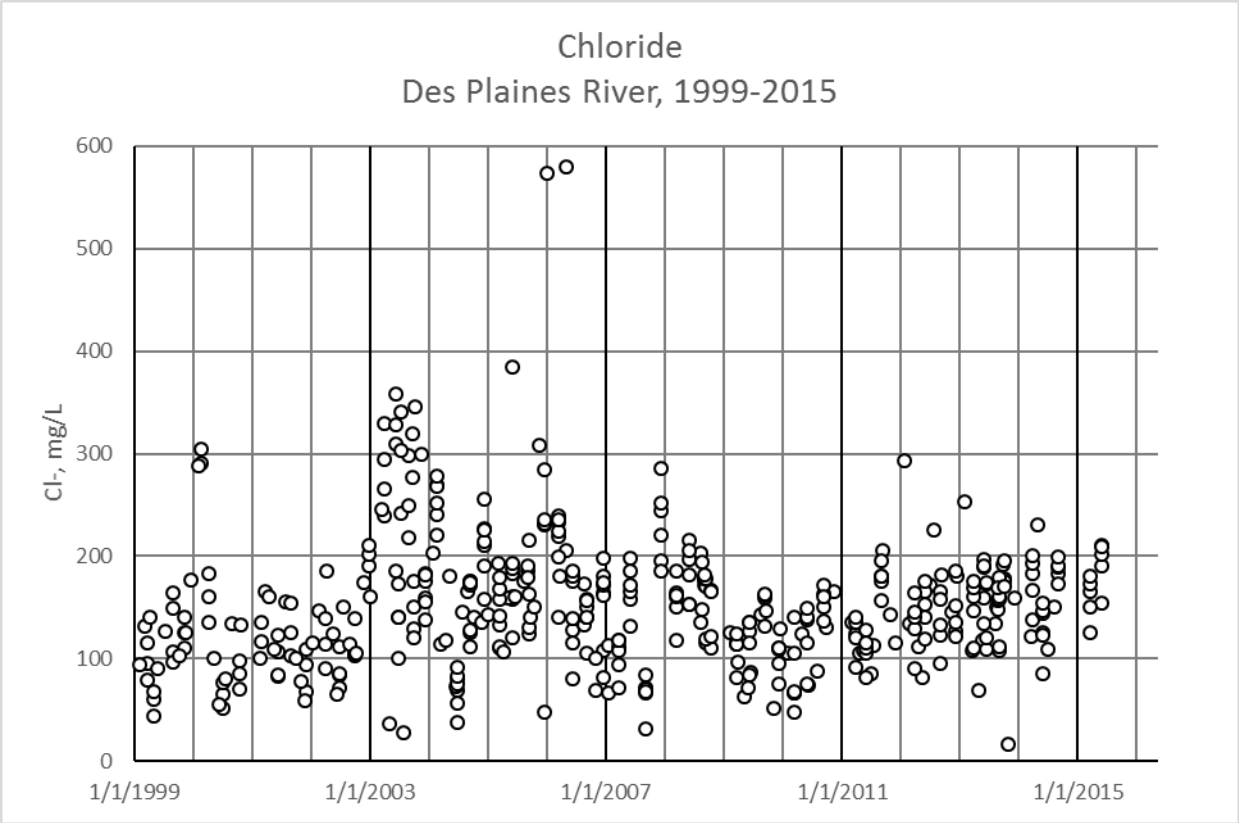


Figure 3-72: Chloride concentration in the Des Plaines River mainstem, 1999-2015, for all sample locations in the planning area

3.16.3.4 USEPA National Rivers and Streams Assessment

The USEPA National Rivers and Streams Assessment is compiled from data collected from 2008-2009 at more than 1,900 sampling locations nationwide using uniform field collection methods. The data were used to assess the condition of the nation's streams using biological, physical, and chemical data. Sampling sites were further divided into 11 geographical regions to develop thresholds for key pollutants (acidity, salinity as conductivity, total nitrogen, and total phosphorus) indicating the level of disturbance, based on all sites sampled in that region. The DPR planning area is in the "temperate plains region" and is compared to the thresholds developed for that region. The National Rivers and Streams Assessment used "good," to describe the chemical condition at the least disturbed sites (i.e., lowest levels of pollution) and "poor" to describe the condition at the most disturbed sites (i.e., highest levels of pollution). "Fair" describes the sites that fall between the "good" and "poor" thresholds for a given pollutant.

The DRWW baseline monitoring indicates elevated chloride levels throughout the Des Plaines River mainstem within the planning area. Figure 3-72 displays the 2015 and 2016 chloride trends from upstream to downstream, indicating a continuation of the recent historical trend, with the preponderance of concentration values above 100 mg/L. Additionally, the figure indicates the relation of chloride values to the USEPA chronic threshold as well as thresholds derived for fish and macroinvertbrates in the DuPage River system in northeastern Illinois.

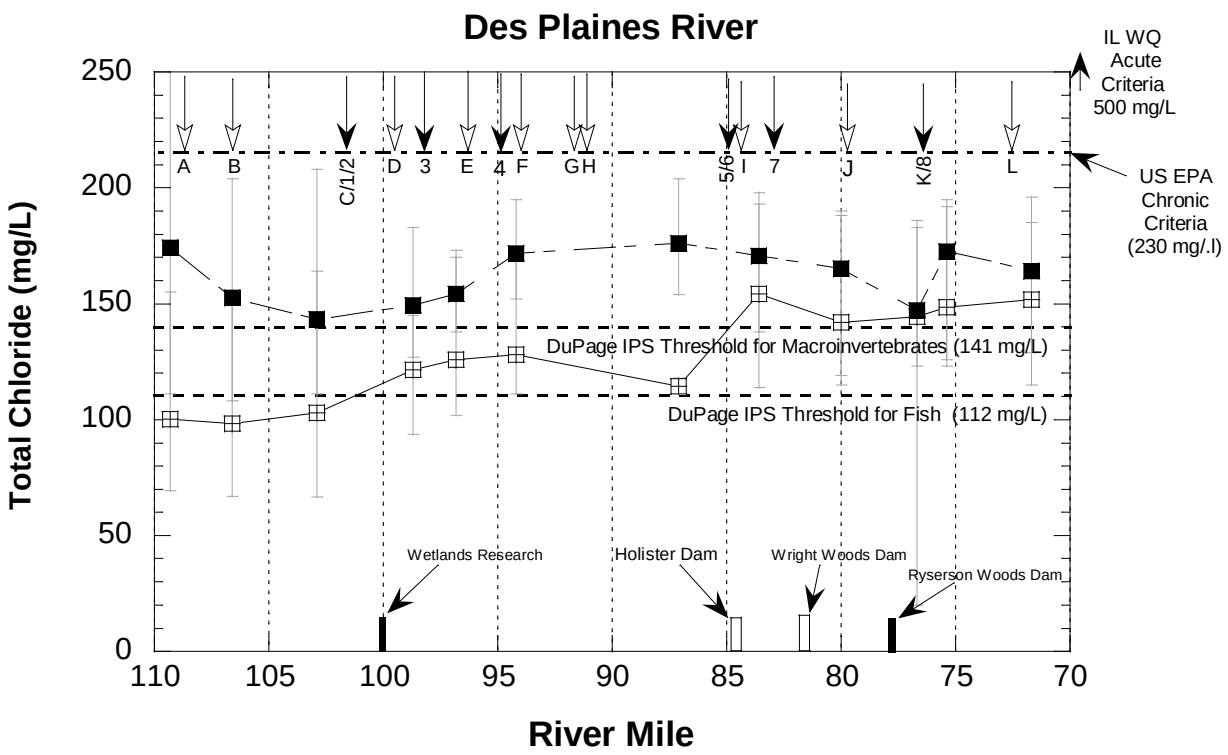


Figure 3-73: Concentrations of Total Chlorides in the Des Plaines River Mainstem
(From MBI, 2017). Mean, maximum, and minimum concentrations of total chlorides (upper panel) in the Des Plaines River mainstem in 2015 and 2016 in relation to municipal WWTP discharges and tributaries. Mainstem dams or weirs (black bars for dams that impede fish passage) are indicated by bars along the lower x-axis. The Illinois water quality criterion (500 mg/L), the USEPA national criterion (230 mg/L), and the DuPage IPS thresholds for fish (141 mg/L) and macroinvertebrates (112 mg/L) are indicated by dotted lines. The top arrows pointing downwards with letters signify tributary streams flowing into the Des Plaines River mainstem and that numbers indicate POTW discharges.

3.16.3.5Nitrogen

The only water quality standards in Illinois for nitrogen apply to public and food processing water supply (10mg/L for nitrate + nitrite, 10 mg/L for nitrate, 1 mg/L for nitrite) and therefore are not applicable to this DPR planning areafor the determination of designated use impairments under the State's water quality standards. More broadly, however, nitrogen is of concern throughout the Mississippi River basin as it, along with phosphorus, is one of the main contributors to seasonal hypoxia in the Gulf of Mexico. The USEPA National Rivers and Streams Assessment (USEPA, 2016) developed thresholds for total nitrogen, the sum of total Kjeldahl nitrogen (TKN), nitrate (NO_3), and nitrite (NO_2). The thresholds are not water quality standards but indicate the level of disturbance relative to a reference condition. Based on these thresholds, total nitrogen levels in the Des Plaines River are elevated above reference conditions, resulting in 88% of samples falling into the NRSA's "poor" condition, with total nitrogen concentrations above 1.274 mg/L. Available data indicate that the elements comprising total nitrogen are elevated where the Des Plaines River enters the DPR planning areafrom Wisconsin, and remain high or increase through the DPR planning area(Figure 3-73 and Figure 3-74). The range of TKN concentrations are relatively stable from upstream to downstream while nitrate-nitrite nitrogen concentrations increase in the downstream direction, resulting in a corresponding up-to downstream increase in total nitrogen through the planning area. These trends are consistent with the findings of the DRWW baseline monitoring study.

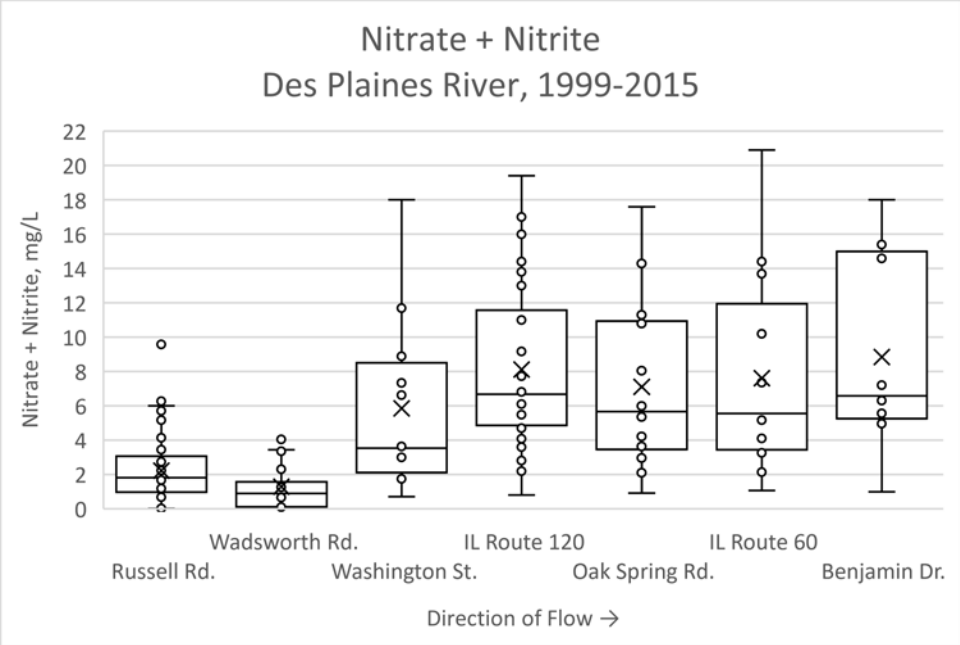


Figure 3-74: Upstream to downstream trend in nitrate/nitrite nitrogen on the Des Plaines River mainstem
Mean for each location is indicated by the "X" marker. Nitrate/Nitrite nitrogen sample data on the Des Plaines River mainstem, 1999-2015.

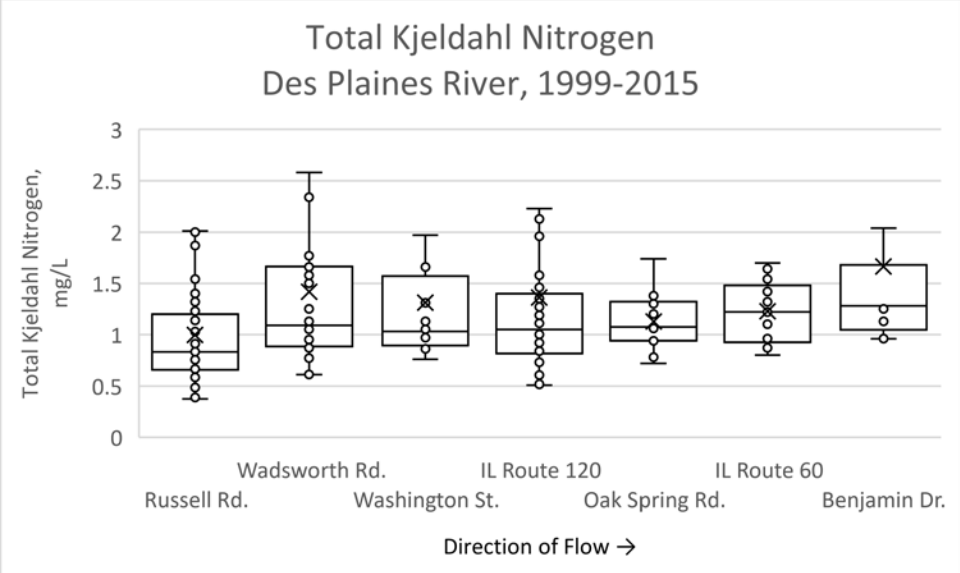


Figure 3-75: Upstream to downstream trend in total Kjeldahl nitrogen from Des Plaines River mainstem
Mean for each location is indicated by the "X" marker, outliers removed. Total Kjeldahl nitrogen from sample data on the Des Plaines River mainstem, 1999-2015.

The DRWW monitoring data did not indicate exceedances of water quality criteria for ammonia-N at any site in the planning area. Total Kjeldahl nitrogen exhibited elevated levels at upstream and mid-stream sites as well as a consistent upstream to downstream pattern from 2015 to 2016 (Figure 3-75). Nitrate concentrations

increased from upstream to downstream in association with the addition of treated wastewater effluent. Nitrate levels approached or exceeded non-standard benchmarks and were well above the USEPA ecoregional reference background value of 1.798 mg/L Figure 3-76) (MBI, 2017).

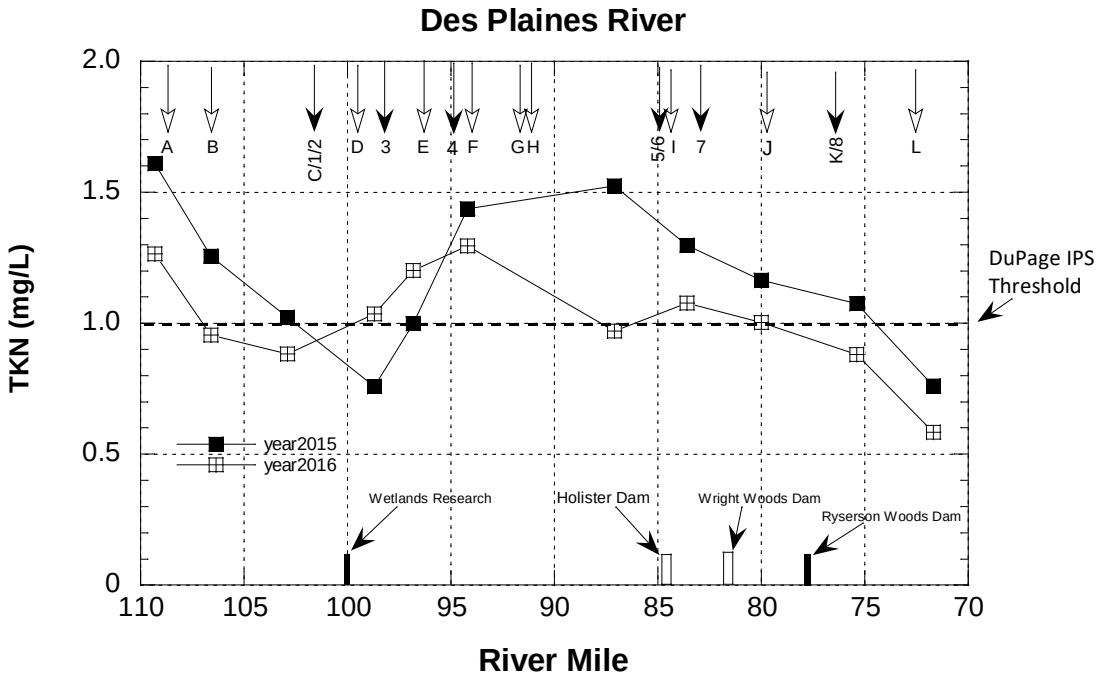


Figure 3-76: Concentrations of TKN in the Des Plaines River mainstem in 2015 and 2016 in relation to municipal WWTP discharges and tributaries

(From MBI, 2017). Mainstem dams or weirs (black bars for dams that impede fish passage) are indicated by bars along the lower x-axis. A dashed line represents effect levels correlated with impaired biota in the DuPage River-Salt Creek IPS study (1.0 mg/L). The top arrows pointing downwards with letters signify tributary streams flowing into the Des Plaines River mainstem and that numbers indicate POTW discharges.

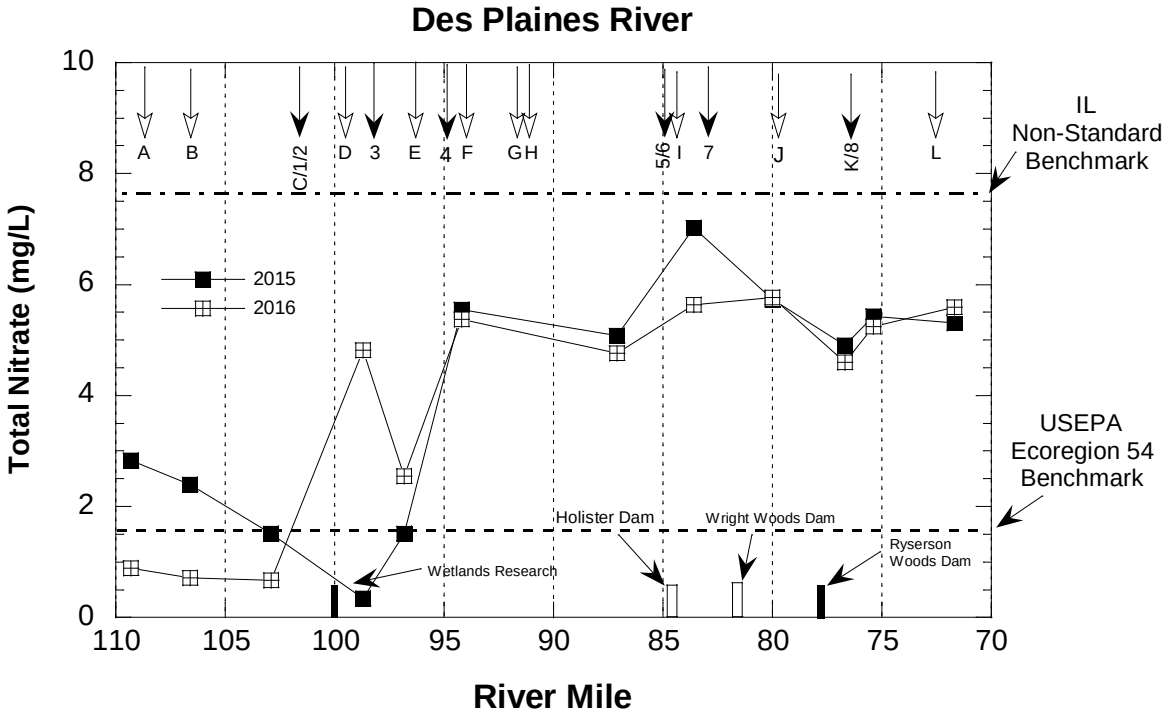


Figure 3-77: Concentrations of total nitrate-N in the Des Plaines River mainstem in 2015 and 2016 in relation to municipal WWTP discharges and tributaries.

(From MBI, 2017). Mainstem dams or weirs (black bars for dams that impede fish passage) are indicated by bars along the lower x-axis. The lower dashed line represents the USEPA Ecoregion 54 background reference site concentration (1.8 mg/L) and the upper dashed line the IL non-standard benchmark (7.8 mg/L). The top arrows pointing downwards with letters signify tributary streams flowing into the Des Plaines River mainstem and that numbers indicate POTW discharges.

3.16.3.6Phosphorus

Phosphorus standards do not exist for streams in Illinois, however lakes over 20 acres have a total phosphorus standard of 0.05 mg/L. Prior to 2012, Illinois EPA used a non-standard based criterion of 0.61mg/L to determine whether total phosphorus was a potential cause of aquatic life impairment in streams, resulting in the identification of phosphorus as such for 3 assessment units of the Des Plaines River in the planning area. The listing as a potential cause of impairment will remain until new data indicate that the segment fully supports the aquatic life use. In monitoring data from 1999-2015 for the Des Plaines River, about 3% of samples had non-flow-weighted concentrations below 0.05 mg/L and about 55% of samples were below 0.61 mg/L. The middle 50% of samples ranged from 0.176-1.18 mg/L. The USEPA National Rivers and Streams Assessment developed thresholds for total phosphorus as an indicator of the level of disturbance. Based on the USEPA thresholds for the region, 79% of the samples for the Des Plaines River fall into the "poor" or most disturbed condition (>0.143 mg/L). Like nitrogen, phosphorus levels in the Des Plaines River are elevated when the river enters the DPR planning area and increase downstream within the planning area, particularly south of Wadsworth Road (Figure 3-77). These trends are consistent with the findings of the DRWW baseline monitoring study.

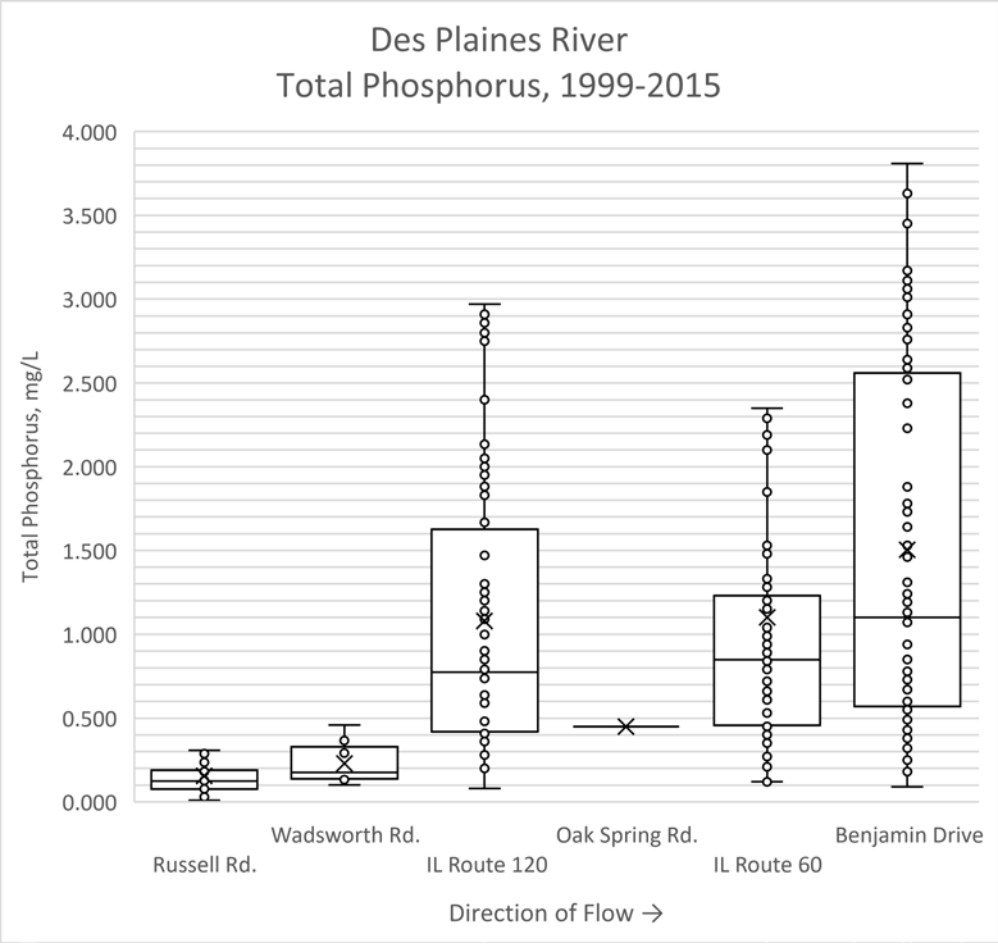


Figure 3-78: Upstream to downstream trend in total Phosphorus from sample data on the Des Plaines River mainstem, 1999-2015

Mean for each location is indicated by the "X" marker, outliers removed.

The DRWW monitoring data from 2015 and 2016 are consistent with trends identified in other sources of data from the past two decades, mainly in the upstream to downstream increase in phosphorus concentrations along the Des Plaines River mainstem within the DPR planning area (Figure 3-78**)**. Monitoring sites are consistently above the USEPA background levels for ecoregion 54 as well as above the "poor" condition phosphorus threshold for the National Rivers and Streams Assessment (>0.143 mg/L).

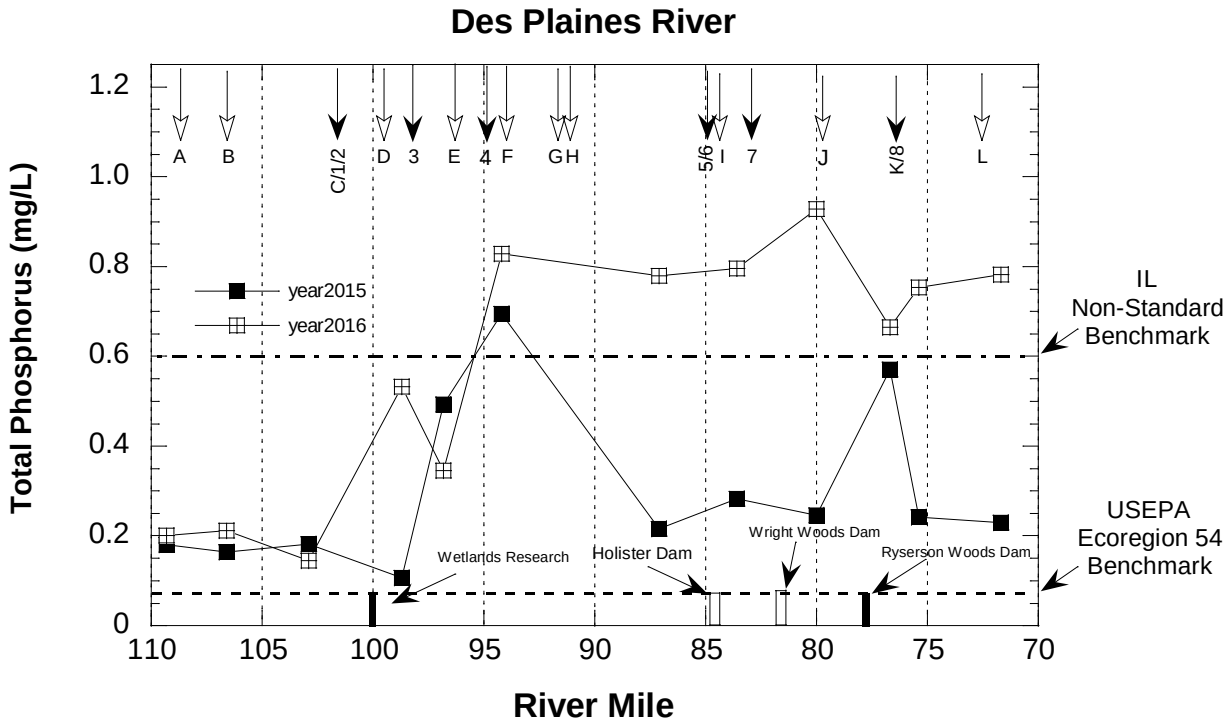


Figure 3-79: Concentrations of total phosphorus in the Des Plaines River mainstem in 2015 and 2016 in relation to municipal WWTP discharges and tributaries
(from MBI, 2017). Mainstem dams or weirs (black bars for dams that impede fish passage) are indicated by bars along the lower x-axis. The lower dashed line represents the USEPA Ecoregion 54 background reference site concentration (0.07 mg/L) and the upper dashed line the IL non-standard benchmark (0.61 mg/L).

3.16.3.7 Total Suspended Solids (TSS)

Currently, no water quality standard exists for TSS in Illinois streams. Prior to 2012, the Illinois EPA used a non-water quality standard-based criterion of 116 mg/L to determine whether TSS was a potential cause of aquatic life impairment in streams. As a result, TSS was listed as a cause of impairment for 2 assessment units of the Des Plaines River in the planning area. TSS will continue to be identified as a potential cause of impairment in these segments until new data indicate full support of the aquatic life use. Elevated TSS in streams can result from several natural and anthropogenic sources. Natural sources include erosion of stream banks and bed materials and resuspension of sediment and organic material, TSS inputs from tributary streams, and particulates carried into streams from the surrounding landscape by runoff. Anthropogenic sources of TSS include erosion from human activities that result in vegetation and soil disturbance such as agriculture, forestry, and site development or redevelopment, perturbation of the stream channel such as dredging, and rill, gully, and stream channel erosion resulting from concentrated or increased runoff caused by land use and land cover changes. Available monitoring data from 1999-2015 do not indicate a clear relationship between TSS and streamflow (discharge), so it is likely that several variables influence measured TSS levels in the Des

Plaines River. Data from the DRWW baseline monitoring study indicated some upstream to downstream increase of TSS in the Des Plaines River mainstem, however the levels did not exceed other published threshold levels (MBI, 2017).

3.16.3.8Metals

Arsenic is identified as a potential cause of impairment of aquatic life in 2 assessment units of the Des Plaines River within the planning area, based on sediment chemistry data. Neither the historical monitoring data nor the DRWW study data indicate violations of the acute or chronic water quality standards for dissolved arsenic in the Des Plaines River. Sediment samples from the DRWW study did not indicate arsenic levels elevated above the commonly referenced threshold effect levels. The listing as a potential cause of impairment will remain until new data indicate the segment fully supports the aquatic life use. Manganese is not listed as a cause of impairment for any portion of the Des Plaines River mainstem, however DRWW sediment sampling indicates elevated levels of manganese in 9 of 11 mainstem monitoring sites. Mercury is listed as a cause of impairment of the fish consumption beneficial use in all six assessment units of the Des Plaines River mainstem based on fish tissue samples from 1985-2011. Channel catfish (Ictalurus punctatus) and largemouth bass (Micropterus salmoides) tissues indicated elevated levels of mercury. The Illinois EPA Integrated Report identifies atmospheric deposition as the main source of mercury, as does a recent TMDL report for the nearshore Illinois waters of Lake Michigan (USEPA et al., 2015).

3.16.3.9Organic Compounds

PCBs are identified as a cause of impairment of the fish consumption beneficial use in four of the six assessment units of the Des Plaines River mainstem based on fish tissue samples from 1985-2011. Common carp (Cyprinus carpio) and largemouth bass (Micropterus salmoides) tissues indicated elevated levels of PCBs. The source identified in the Illinois EPA Integrated Report is atmospheric deposition, unknown sources, and contaminated sediment.

PAHs are not identified as a cause of impairment for any beneficial uses by Illinois EPA. Sediment chemistry monitoring data from the DRWW indicates that elevated levels of numerous PAHs are present in sediment throughout the Des Plaines River mainstem (MBI, 2017). PAHs are the product of hydrocarbon combustion and their geographic distribution has been linked to urban and transportation related land uses (such as coal tar sealants) (Baldwin et al., 2016).

3.16.3.10 Fecal coliform/Escherichia coli bacteria

Fecal coliform bacteria are listed as a cause of impairment of primary contact use in 3 assessment units of the Des Plaines River in the planning area. The water quality standard for fecal coliform is based on the average of samples above 200 colony-forming units (cfu)/100mL or the number of exceedances of 400 cfu/100mL over 30-day or five-year time periods. This assessment method is limited, and a monitoring station may or may not exceed water quality standards depending on the temporal range of data selected. Additionally, it is not known how much fecal coliform is from natural and anthropogenic sources. Additional assessment is needed to determine the origin of elevated levels and cause of elevated levels. The DRWW baseline monitoring study measured *E. coli* bacteria rather than fecal coliform, so data were compared to the USEPA recommended national water quality criteria (geometric mean of 126 cfu/100 mL or exceendance of 410 cfu/100 mL). Numerous exceedances of these thresholds occurred in the Des Plaines River mainstem, almost entirely downstream of the addition of treated effluent (MBI, 2017).

3.16.3.11 Biological Monitoring

Biological monitoring data related to the aquatic macroinvertebrate and fish communities of the Des Plaines River mainstem within the DPR planning area indicate that the fishery is degraded while the results of sampling the aquatic macroinvertebrate community is more variable.

Macroinvertebrate species assemblages at some sites are indicative of water quality sufficient to fully support aquatic life while other sites are indicative of some level of water quality impairment. Generally, sample locations north of U.S. Route 41 frequently contain macroinvertebrate assemblages indicative of impairment, while samples downstream typically indicate conditions that fully support aquatic life. This pattern is consistent with the initial findings of the DRWW baseline monitoring study (MBI, 2017). The DRWW data are a comprehensive "snapshot" of the macroinvertebrate community along the Des Plaines River at a point in time. In 2016, 103 taxa were collected across the Des Plaines River mainstem sites with the predominant types largely indicative of lentic habitats and moderate to heavy siltation. Three upstream sites (all north of U.S. Route 41) did not meet the Illinois macroinvertebrate criterion for full support of the aquatic life use while the criterion was met at all remaining Des Plaines River mainstem monitoring sites. The mIBI, the metric used to determine aquatic life use support, generally increased (improved) in the downstream direction (Figure 3-79) (MBI, 2017).

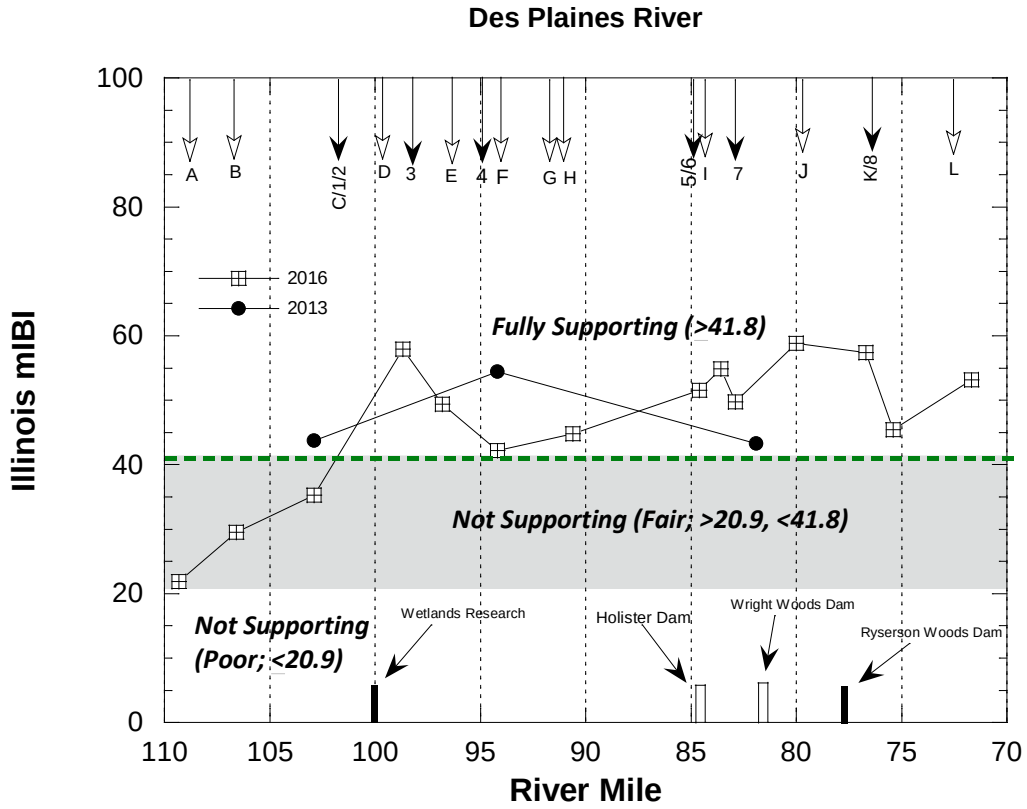


Figure 3-80: Illinois mIBI scores for samples in the Des Plaines River in 2013 and 2016 in relation to municipal WWTP discharges and tributaries.

MBI, 2017 Illinois mIBI scores for samples in the Des Plaines River mainstem in 2013 (from Illinois Intensive Basin Survey) and 2016 (DRWW) in relation to municipal WWTP discharges and tributaries. Mainstem dams or weirs (black bars for dams that impede fish passage) are indicated by bars along the lower x-axis. Thresholds for full and non-support fair and non-support-poor are indicated. The top arrows pointing downwards with letters signify tributary streams flowing into the Des Plaines River mainstem and that numbers indicate POTW discharges.

Community monitoring data for the last two decades is relatively robust for the Des Plaines River mainstem, with at least 12 sites sampled by various agencies from 1995-2015. Approximately 40 total native fish species occur across all the data reviewed, while the range for an individual sample was 11-24 native species. Currently, no sites on the Des Plaines River mainstem within the DPR planning area contain fish communities indicative of water quality fully supportive of aquatic life. Fish communities are generally depauperate in the number of sucker species (Catostomidae) as well as species that fill the following ecological niches: benthic invertivores (feed on bottom-dwelling invertebrates), lithophilic spawners (spawn on mineral substrates), and species known to be intolerant of water pollution. Sunfish (Centrarchidae) and minnows (Cyprinidae) are well represented in the fishery. A recent study by the Illinois DNR analyzing 30 years of data in the Des Plaines River watershed similarly found that while the diversity of the fishery has improved, the entire river is still lacking in the above species and niches. Likewise, while the relative abundance of pollution-tolerant species has declined, the relative abundance of intolerant species hasn't substantially increased (Pescitelli, 2016).

The DRWW baseline monitoring study provides a comprehensive "snapshot" of the Des Plaines River mainstem fish community at a point in time. In 2016, 36 total species and 34 native species of fish were collected across 14 sites on the mainstem. Consistent with other recent monitoring data, all sites failed to achieve the Illinois fish criterion for support of the aquatic life use. With a couple exceptions, the three upstream sites on the Des Plaines River mainstem had the lowest scores for the fIBI, the metric used to determine support of the aquatic life use based on the stream fishery (Figure 3-80). Species composition was associated with heavy siltation of substrates at all sites. The 15 most commonly collected species were all predominantly tolerant, moderately tolerant, or intermediately tolerant of disturbed conditions. As in previous collections, sucker species were lacking while sunfish and minnows were well-represented and among the most commonly collected species at all sites (MBI, 2017).

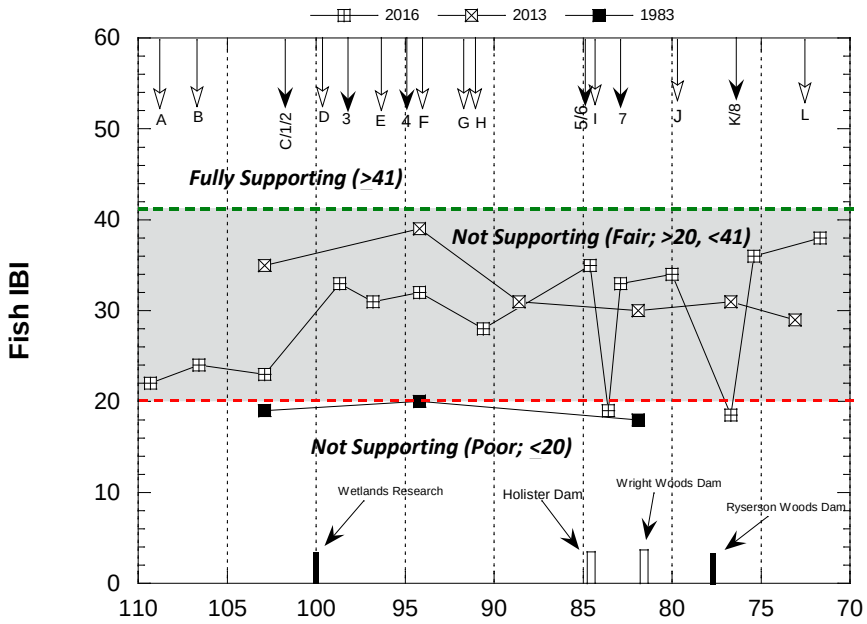


Figure 3-81: Illinois fIBI scores for samples in the Des Plaines River mainstem in 1983, 2013, and 2016 in relation to municipal WWTP discharges and tributaries.

(from MBI, 2017). Mainstem dams or weirs (black bars for dams that impede fish passage) are indicated by bars along the lower x-axis. Thresholds for full and non-support fair and non-support-poor are indicated. The top arrows pointing downwards with letters signify tributary streams flowing into the Des Plaines River mainstem and that numbers indicate POTW discharges.

3.16.3.12 Tributary & Sub-Watershed Water Quality Studies

The major and minor tributaries to the Des Plaines River within the DPR planning area have variable amounts of monitoring data available. Some tributaries only had a few data points for a stream over the last two decades, while other streams had more robust data sets, and many streams had no monitoring data prior to the study undertaken by the DRWW. More robust data sets are typically the result of specific studies (e.g., focused monitoring projects in the watersheds of North Mill and Buffalo Creeks) or facility-related monitoring (e.g., data for Aptakisic and Mill Creeks). The Illinois EPA and Illinois DNR intensive basin surveys have generated more sporadic data points for monitoring sites on tributary streams, as not all established tributary monitoring stations are sampled during each five-year survey. While it is important to consider this data within the watershed plan it is also important to be aware of such limitations. Findings of the DRWW baseline monitoring study are included in each section of the discussion below.

3.16.3.13 Dissolved Oxygen

Dissolved Oxygen is listed as a cause of impairment in Buffalo, Indian, and Mill Creeks, and a TMDL has been developed for constituents determined to contribute to the dissolved oxygen impairment of Buffalo Creek. Available monitoring data for dissolved oxygen in Indian Creek below its confluence with Kildeer Creek (South Branch Indian Creek) is probably too limited to draw any conclusions beyond those used by Illinois EPA to make its determination of impairment. The BCCWP began monitoring water quality at fifteen sites in 2013 and MWRD has monitored water quality at Lake-Cook Road since the 1970s. Data collected by the BCCWP and reported in the Buffalo Creek Watershed-Based Plan indicate that dissolved oxygen and biochemical oxygen demand fall below or exceed acceptable limits at several locations. Lake County Public Works periodically

sampled the Sylvan Lake Drain branch of Indian Creek up and downstream of the Sylvan Diamond Lake wastewater treatment plant outfall (above the plant discharge on a wetland tributary to Sylvan Lake Drain and at Washitay Avenue downstream) (LCPWD, 2016). Data from grab samples from 2006-2014 indicated that dissolved oxygen routinely fell below the general use standard (5.0 mg/L March-July or 3.5 mg/L August-February) at the upstream sampling point (58.6% of samples). Dissolved oxygen at the downstream site fell below the standard 14.8% of the time (12 of 81 samples). All recorded dissolved oxygen concentrations outside of acceptable ranges occurred between May and August, and all but one occurred while water temperatures were above 18° C (64.4° F). Lake County Public Works also periodically samples Mill Creek up- and downstream of the WRF outfall (below the first dam upstream of the WRF and at Dilleys Road downstream), and North Shore Water Reclamation District samples Mill Creek at Dilleys Road (LCPWD, 2016; NSWRD, 2016). Data from grab samples from 1999-2015 indicate dissolved oxygen fell below the general use standard (5.0 mg/L March-July or 3.5 mg/L August-February) in 6.25% of upstream samples (5 of 80) and 4.6% of downstream samples (6 of 131). In about half the cases, the sub-standard values occurred on the same day, suggesting that upstream or local environmental conditions (such as ambient water temperature) may contribute to low dissolved oxygen.

The LCHD-ES monitored water quality at three sites in the North Mill Creek watershed from March to November 2010 in conjunction with the development of the North Mill Creek watershed-based plan (Table 3-52). Dissolved oxygen violated the water quality standard at each site during the study, but for relatively brief periods and was largely attributed to low flow conditions and high summer water temperatures (LCHD, 2011). The DRWW monitoring data recorded relatively few instances of failure to meet the minimum water quality standards for dissolved oxygen. The report indicated that the prevalence of high daytime concentrations (>10 mg/L) likely indicate a need for continuous monitoring to determine if excessive diel swings occur, indicative of increased algal conditions.

3.16.3.14 Chloride

Chloride is listed as a cause of aquatic life use impairment in Buffalo Creek and is included in the Des Plaines/Higgins Creek TMDL report. MWRD data indicates that chloride levels in Buffalo Creek have increased since the 1970s, BCCWP monitoring data from 2013-2015 confirms that chloride exceeds desirable levels, and chloride was identified as a primary pollutant of concern in the Buffalo Creek Watershed-Based Plan. Bull Creek and Bull's Brook, Integrated Lakes Management (2003) noted that chloride concentrations were typical for urban streams. A previous study by Applied Ecological Services found high chloride concentrations at 7 of 12 sample locations in the watersheds. Of 10 grab samples from Illinois EPA for Bull Creek at Illinois Route 21 from 2003-2013, all exceeded the USEPA chronic threshold of 230 mg/L for aquatic life and none exceeded the acute water quality standard of 500 mg/L for chloride.

Available data (Figure 3-81) indicate a recent historic trend similar to the mainstem Des Plaines River, with many samples indicating elevated chloride concentrations above 100 mg/L and several above the USEPA chronic threshold of 230 mg/L. However, the results of a 2010 study of the North Mill Creek watershed include several data points with chloride concentrations below 100 mg/L. This suggests that chloride levels may be lower in the North Mill Creek watershed than other tributary streams. This trend is evident in Figure 3-81 in the numerous data points collected in 2010 that fall below 100 mg/L and is consistent with data from the DRWW baseline study, which also found lower chloride concentrations in the North Mill Creek subwatershed than in other tributaries and subwatersheds.

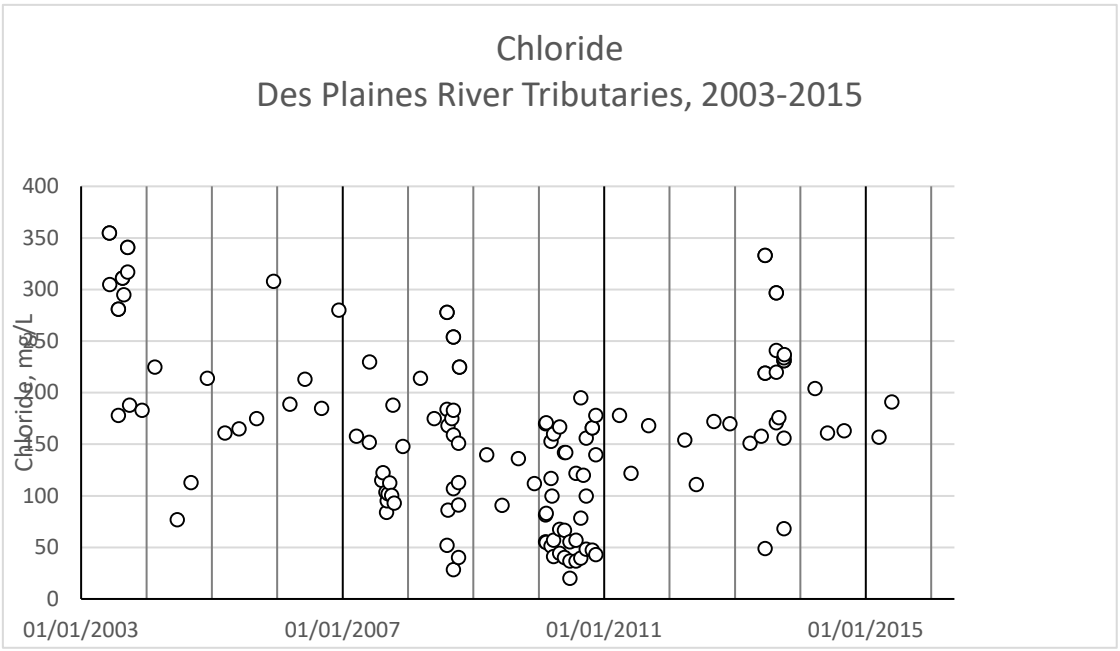


Figure 3-82: Chloride concentration across all monitored tributary sites, 2003-2015

DRWW monitoring data from 2016 indicated elevated chloride in all subwatershed streams, but higher concentrations tended to be associated with more urbanized drainage areas (Figure 3-82). The North Mill Creek subwatershed had the lowest chloride levels while Aptakisic Creek and some of the Des Plaines River Tributaries (Stoneroller Creek, Belvidere Road Tributary) had the highest chloride levels (MBI, 2017).

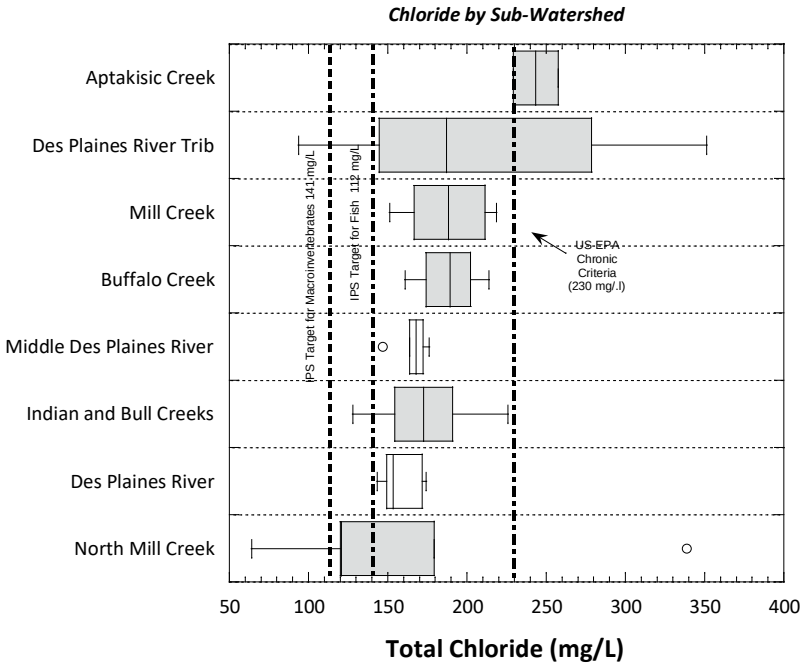


Figure 3-83: Mean, maximum, and minimum concentrations of total chlorides in tributary subwatersheds

The Illinois water quality criterion (500 mg/L), the USEPA national criterion (230 mg/L), and the DuPage IPS thresholds for fish (141 mg/L) and macroinvertebrates (112 mg/L) are indicated.

3.16.3.15 Nutrients (Nitrogen and Phosphorus)

Nutrient concentrations in tributary streams tend to be elevated or high. Lake County Public Works periodically sampled Aptakisic Creek up and downstream of the Des Plaines River wastewater treatment plant outfall (above the plant discharge at the Pekara Drive and at Aspen Court downstream) (LCPWD, 2016). Based on the USEPA thresholds for the region for phosphorus, 52% of the samples at Pekara Drive (45 of 86) fall into the "good" or least disturbed condition (<0.0.086 mg/L), while 26% (22 of 86) fall into the "poor" or least disturbed condition (>0.143 mg/L). At Aspen Drive, 2% of samples (2 of 88) fall into the USEPA's "good" condition while 98% (86 of 88) fall into the "poor" condition. Consistent with data from the previous two decades, the DRWW monitoring report found that nitrate and phosphorus increased below the wastewater treatment plant on Aptakisic Creek, resulting the highest values for each constituent among tributaries throughout the DPR planning area (see Figure 3-83 and Figure 3-84) (MBI, 2017).

In Bull Creek and Bull's Brook, Integrated Lakes Management (2005) found that several sites near agricultural fields tested high for nitrate and phosphorus, among other parameters. The DRWW monitoring data indicated relatively low levels of nitrate and phosphorus relative to other tributary stream systems in the DPR planning area (MBI, 2017).

In Buffalo Creek, ammonia was determined to be a contributing factor to the dissolved oxygen cause of impairment and an ammonia TMDL was developed. MWRD data indicate that phosphorus levels have decreased since the 1970s, but BCCWP data from 2013-2015 indicated that phosphorus levels were still elevated and it was identified as one of the main pollutants of concern in the Buffalo Creek Watershed-Based Plan. DRWW monitoring data indicated elevated levels of phosphorus, although those were relatively low compared to other subwatersheds (MBI, 2017).

The Indian Creek Watershed-Based Plan (LCSMC, 2008) summarizes the results of water quality monitoring performed in 1997 by Illinois EPA. Nutrient levels were high in both August and December of 1997. Ammonia-nitrogen and total phosphorus levels exceeded the standards set by the state. In August of 1997, ammonia-nitrogen levels exceeded the indigenous (aquatic) life support level of 0.22 mg/L. Total phosphorus levels exceeded state standards during both sampling events. In fact, phosphorus levels were nearly three times the "General Use" standard in August and twice the standard in December. Algal blooms documented in the streams and lakes of the watershed were attributed to high nutrient levels. At the time, Illinois EPA attributed the source of elevated nutrient levels to municipal point sources (wastewater treatment plants), construction sites, urban runoff/stormwater sewers, and contaminated sediments. DRWW monitoring data from 2016 indicate elevated phosphorus levels in Indian Creek and Kildeer Creek (South Br. Indian Creek), although they are relatively low compared to other subwatersheds (MBI, 2017).

Lake County Public Works periodically sampled Mill Creek upstream and downstream of its Mill Creek water reclamation facility. Based on the USEPA National Rivers and Streams thresholds for the region, most samples both upstream (80% or 63 of 79 samples) and downstream (79% or 59 of 75 samples) of the Lake County Public Works facility fall into the "poor" condition (>0.143 mg/L) indicating disturbed conditions relative to reference conditions for the region. Phosphorus levels upstream and downstream of the facility discharge appeared to be similar, based on grab samples. DRWW monitoring data were consistent with these trends, as phosphorus levels both upstream and downstream of the facility continue to be elevated (MBI, 2017).

Phosphorus is listed as a cause of impairment in North Mill Creek, Hastings Creek, and Dutch Gap Canal. Three sites monitored by the Lake County Health Department in the North Mill Creek watershed in 2010 and by Illinois EPA in 2008 and 2013 had high concentrations of nutrients, particularly nitrate-nitrite nitrogen and phosphorus. Hastings Creek consistently had extremely high concentrations of these nutrients. The watershed areas tributary to North Mill Creek and Dutch Gap Canal are still largely agricultural, which may correlate to elevated nutrient levels at those two sites. Hastings Creek is affected by the Lindenhurst sewage treatment plant, which is the most likely source of the higher nutrient concentrations found at that site during the study (LCHD, 2010). DRWW monitoring data from 2016 are consistent with these trends. Sites on North Mill Creek/Dutch Gap Canal had elevated nutrient levels, while nutrient levels increased downstream of the wastewater treatment plant on Hastings Creek (MBI, 2017).

Other tributary streams were identified as having elevated phosphorus levels (e.g., Slocum Corners Creek and Newport Ditch), but were relatively low compared to other tributary streams (MBI, 2017).

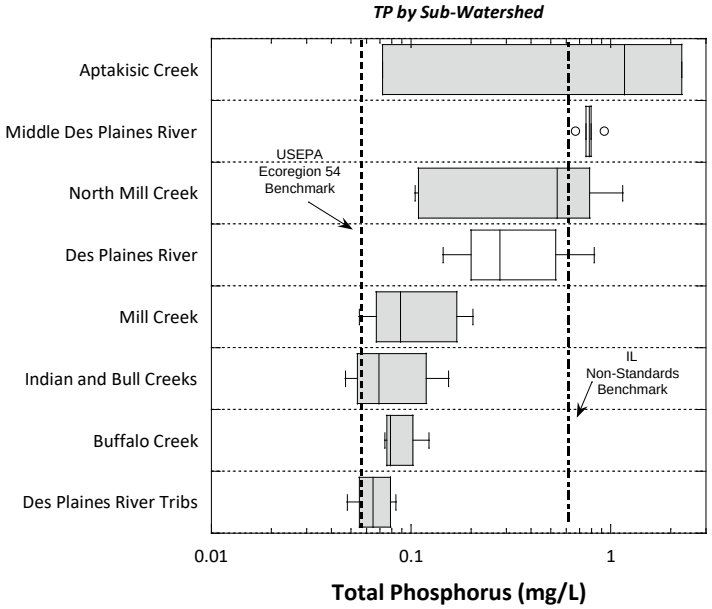


Figure 3-84: Concentrations of total phosphorus in tributary
(from MBI, 2017) The left dashed line represents the U.S. EPA Ecoregion 54 background reference site concentration (0.07 mg/L) and the right dashed line the IL non-standard benchmark (0.61 mg/L).

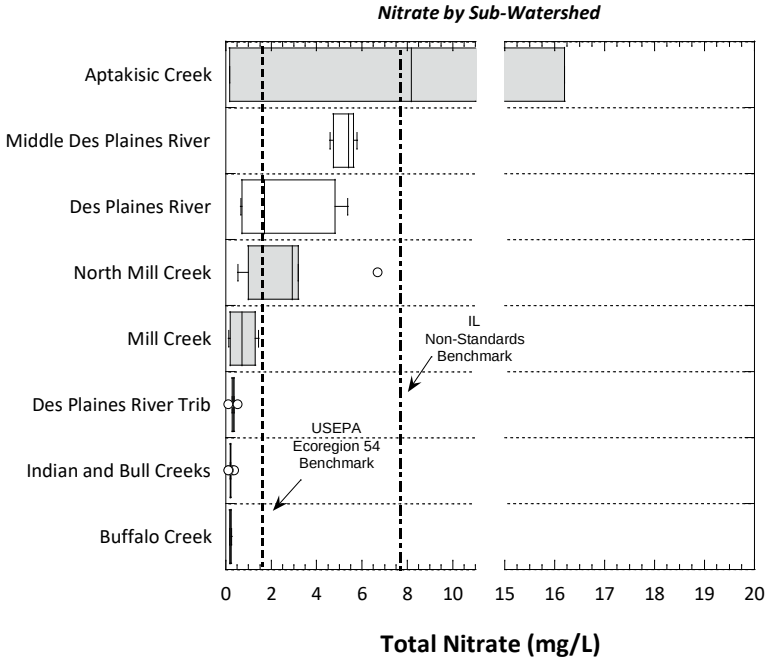


Figure 3-85: Concentrations of total nitrate-N in tributary subwatersheds
(from MBI, 2017) The left dashed line represents the USEPA Ecoregion 54 background reference site concentration (1.8 mg/L) and the right dashed line the IL non-standard benchmark (7.8 mg/L).

3.16.3.16 Metals

Arsenic is listed as a cause of impairment in North Mill Creek, Hastings Creek, and Dutch Gap Canal, and was previously listed as a cause of impairment in Bull Creek prior to its removal from the impaired waters list. These listings are based on sediment samples from these streams and none of the historical monitoring data indicate violations of the acute or chronic water quality standards for dissolved arsenic in the water column of these streams. The listing as a potential cause of impairment will remain until new data indicate a segment fully supports the aquatic life use. The DRWW data indicates elevated levels of arsenic in sediment at multiple sites in the watersheds of Bull and Indian Creeks, and at individual sites on Stoneroller and Buffalo Creek (MBI, 2017).

Manganese is listed as a cause of impairment in North Mill Creek and Dutch Gap Canal, and was previously listed as a cause of impairment in Bull Creek prior to its removal from the impaired waters list. These listings are/were based on sediment samples from these streams, as none of the historical monitoring data indicate violations of the acute or chronic water quality standards for dissolved manganese in the water column of these streams. Sediment sampling performed by the DRWW indicates that manganese is present at elevated levels in all subwatershed stream systems and most small mainstem tributaries (Suburban Country Club Tributary being the exception) where sediment sampling was performed (MBI, 2017).

3.16.3.17 Organic Compounds

PAHs are not identified as a cause of impairment for any beneficial uses by Illinois EPA. Sediment chemistry monitoring data from the DRWW indicates that elevated levels of numerous PAHs are present in sediment throughout the tributary stream systems in the planning area. Multiple sites exhibiting elevated or highly elevated sediment PAH levels are present in the subwatersheds of Mill, Bull, Indian, Aptakisic, and Buffalo Creeks (MBI, 2017).

3.16.3.18 Biological Monitoring

3.16.3.18.1 Aquatic Macroinvertebrates

Several watershed plans and existing study reports summarize conditions of the aquatic macroinvertebrate communities in tributary streams within the planning area. The 2016 DRWW monitoring program sampled macroinvertebrate communities at more than 50 tributary sites and offers a comprehensive “snapshot” of the macroinvertebrate community in tributary streams within the DPR planning areaat a point in time. In general, results indicate that aquatic macroinvertebrate assemblages vary by watershed and by watershed size (MBI, 2017). Figure 3-85 shows the relationship between mIBI scores and watershed size for the DRWW monitoring study. Figure 3-86 shows the range of mIBI values by subwatershed.

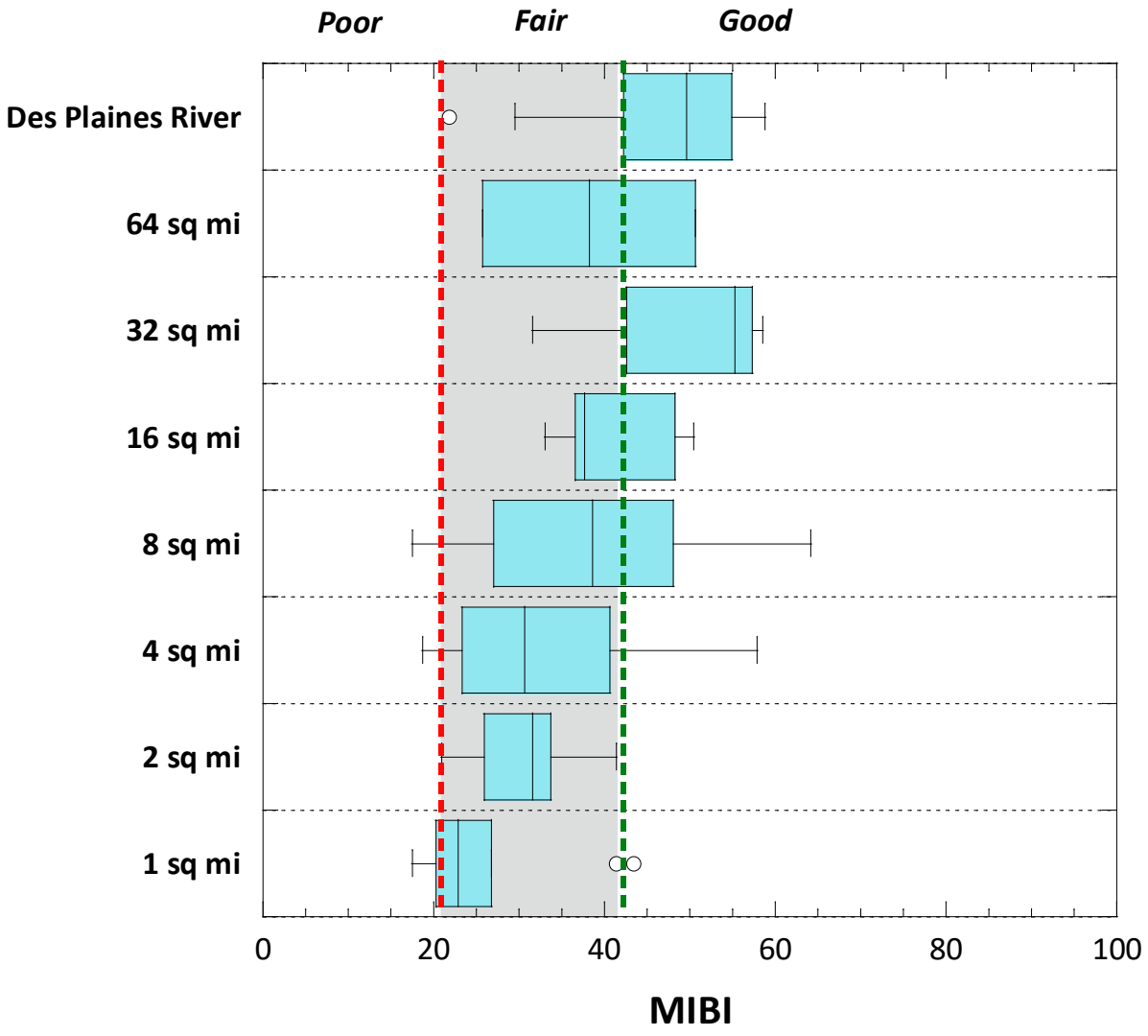


Figure 3-86: Macroinvertebrate IBI scores for the Des Plaines River mainstem and subwatersheds
from MBI, 2017). Box and whisker plot of macroinvertebrate IBI scores for the Des Plaines River mainstem and subwatersheds arranged by drainage size panels for samples collected in the 2016. The gray shaded area on the plot demarcate the non-support fair range from full support and non-support-poor.

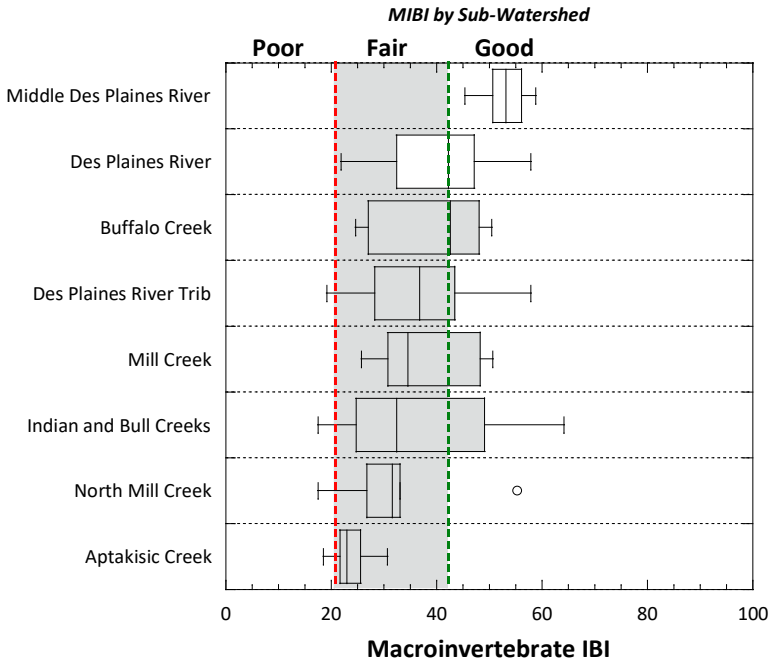


Figure 3-87: Illinois macroinvertebrate IBI scores for samples in tributary subwatersheds

Thresholds for full and non-support fair and non-support-poor are indicated.

The Bull Creek-Bull's Brook Watershed-Based Plan (LCSMC, 2008) summarizes the results of RiverWatch and Illinois EPA macroinvertebrate monitoring at five locations in the watersheds from 1997-2003. The data measure aquatic macroinvertebrate diversity and assign a qualitative descriptor based on the relative tolerance of the identified species to pollutants and aquatic habitat disturbance. Data from both sources indicated "good" water quality in both streams. DRWW monitoring data indicated varying levels of quality throughout the watershed. While poor sites indicated organic enrichment and low dissolved oxygen, sites with the highest mIBI scores reflected larger watershed size and included the highest scores in the entire survey (MBI, 2017).

The Buffalo Creek watershed plan summarizes data from the IDNR Riverwatch program from 1996-2014 and includes data from BCCWP collected from 2012-2014. The data measure aquatic macroinvertebrate diversity and assign a qualitative descriptor based on the relative tolerance of the identified species to pollutants and aquatic habitat disturbance. The results across 8 stream sites in the watershed range from "very poor" to "fair" in their qualitative description of water quality based on macroinvertebrate taxa present (BCCWP and LCSMC, 2015; BCCWP, 2015). The DRWW data indicated that three sites on the lower reaches of Buffalo Creek were in "good" condition while an upstream site and a site on the Buffalo Creek Tributary rated "fair." The upstream site on Buffalo Creek also indicated organic enrichment (MBI, 2017).

In the North Mill Creek subwatershed, aquatic macroinvertebrates were collected at four sites in 2010: North Mill Creek/Dutch Gap Canal at Edwards Road, North Mill Creek/Dutch Gap Canal at Highway 173, North Mill Creek at Kelly Road (below Rasmussen Lake dam), and Hastings Creek at Miller Road. Sample results were used to calculate the mIBI with results ranging from 33.7 to 51.6, indicating "fair" to "good" species composition. However, no taxa considered intolerant of pollution were collected at any sites, and the species composition suggests the sites are turbid and subject to siltation. The results were similar to those of the Illinois EPA

collections in 2008, with the exception that the mIBI at North Mill Creek/Dutch Gap Canal at Highway 173 increased from 37.1 ("fair") to 51.6 ("good"). There is no readily abundant reason for the increase in score between collections. Two common mussel species (giant floater and white heelsplitter) were identified below the Rasmussen Lake dam (Living Waters Consultants, Inc., 2010). Limited recent data exists for streams in the portion of the DPR planning areain Wisconsin, however, in 2003 and 2005, the Wisconsin DNR conducted a study on the Dutch Gap Canal at one sample location that shows the same degraded macroinvertebrate as in the IEPA study in 2008. In 2005, they also evaluated the macroinvertebtes and found an HBI of 7.4, which is considered to be "fairly poor" due to significant organic pollution. The DRWW monitoring data indicated "good" mIBI values at lower reaches and "fair" values at upstream sites. Values on Hastings Creek declined below the wastewater treatment plant, with assemblages at both sites indicating organic enrichment (MBI, 2017).

The DRWW monitoring data for Indian Creek yielded "good" mIBI values at downstream sites on Indian and Kildeer Creeks, while upstream sites with smaller drainage areas as well as sites on West Fork Indian Creek, Seavey Drainage Ditch, and Forest Lake Drain yielded "fair" values (MBI, 2017).

DRWW monitoring data for the Aptakisic Creek subwatershed yielded sites with mIBI values that rated "fair" to "poor," with larger drainage areas being associated with better values. While the mIBI value at the site downstream of the wastewater treatment plant discharge rated "fair", the taxa assemblage indicated a toxic biological response, the only such macroinvertebrate signature among the sample sites (MBI, 2017).

DRWW monitoring data for other tributary streams ranged from poor to good and mIBI values generally increased with watershed size, although there were some exceptions. For example, both the lowest mIBI value (downstream site on Suburban Country Club Tributary) and the highest mIBI value (Stoneroller Creek) were yielded by sites with just over 4 square miles of tributary drainage area. A site on Werhane Lake Drain had the smallest drainage area of these remaining tributary sites and a "good" mIBI value. The downstream site on Newport Ditch had the largest drainage area of the remaining tributary sites and a "good" mIBI value. The West Fork Belvidere Road Tributary also had a "good" mIBI value. All remaining sites had "fair" mIBI values (MBI, 2017).

3.16.3.18.2 Fish

Numerous fishery surveys have been completed for tributary streams in the planning area, with various goals. Some surveys, such as those conducted by the Illinois DNR in concert with Illinois EPA for the Intensive Basin Survey program are used to determine aquatic life use attainment in streams. Other fishery surveys have been conducted to determine the presence of rare or endangered species or to inventory the fish community at specific sites (Willink et al., 2016; LCFPD, 2016). The DRWW monitoring program sampled fish communities at more than 50 tributary sites and offers a comprehensive "snapshot" of the fishery in tributary streams within the DPR planning areaat a point in time. The results of previous surveys to assess aquatic life use as well as the results of the 2016 DRWW monitoring effort are discussed below. Figure 3-87 and Figure 3-88 display the fIBI values for tributary sites in the DRWW survey from 2016 and Error! Reference source not found. displays the relationship between fIBI and drainage area from the same survey.

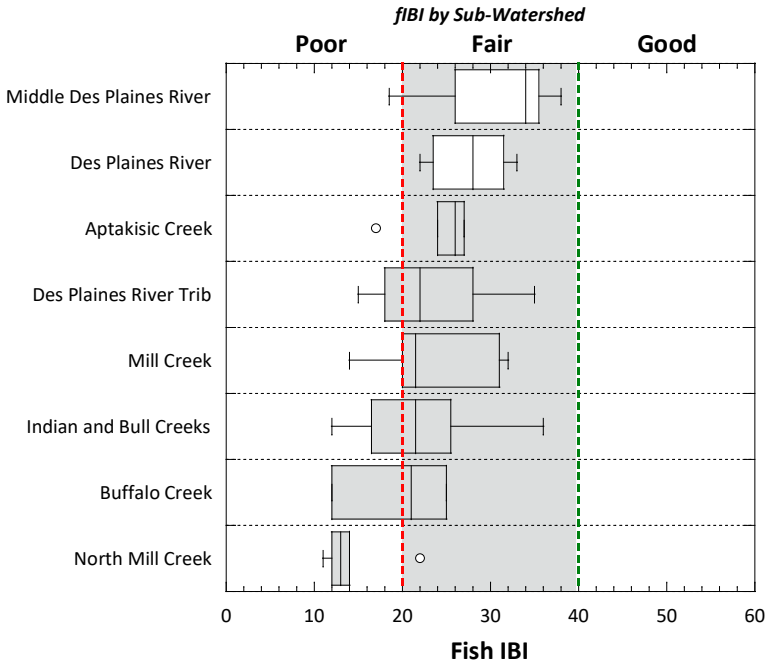


Figure 3-88: Illinois fIBI scores for samples in tributary subwatersheds
Thresholds for full and non-support fair and non-support-poor are indicated.

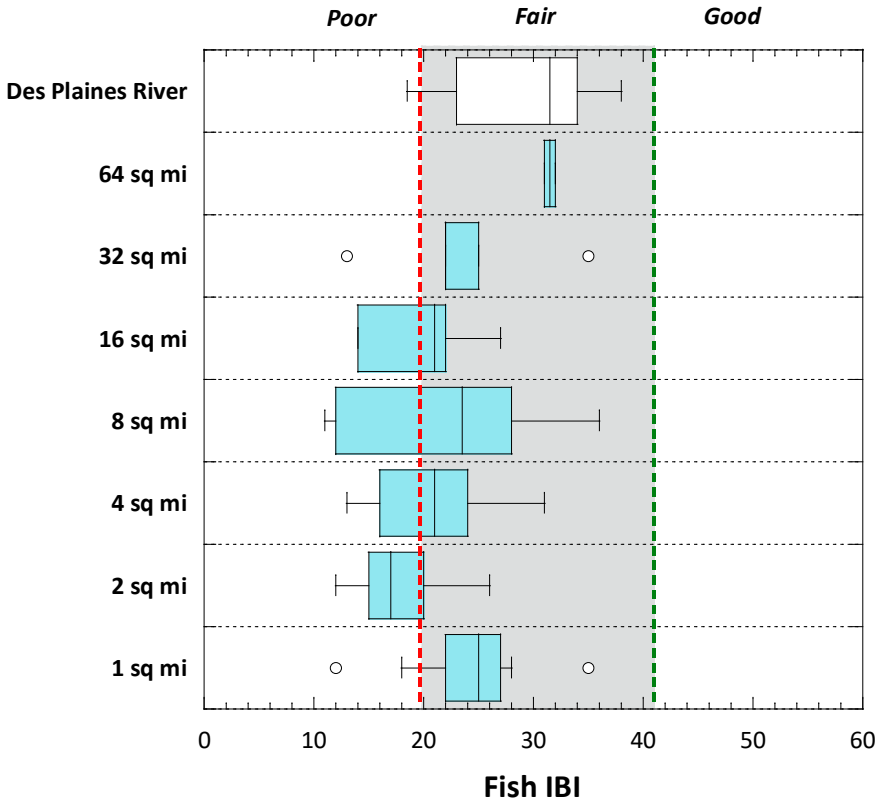


Figure 3-89: Box-and-whisker plot of fIBI scores for the Des Plaines River mainstem and subwatersheds
Box-and-whisker plot of fIBI scores for the Des Plaines River mainstem and subwatersheds arranged by drainage size panels for samples collected in the 2016. The gray shaded area on each plot demarcate the non-support fair range from full support and non-support-poor.

Living Waters Consultants sampled four sites in the North Mill Creek watershed for fish in 2010: North Mill Creek/Dutch Gap Canal at Edwards Road, North Mill Creek/Dutch Gap Canal at Highway 173, North Mill Creek at Kelly Road (below Rasmussen Lake dam), and Hastings Creek at Miller Road. Sample results were used to calculate the fIBI, which ranged from 19 to 23, indicating poor or impaired fish communities at all four sites (the highest possible f-IBI score is 60). Number of species encountered generally increased downstream and diversity of sunfish genera (centrarchidae) was relatively high throughout the watershed. Results of the fish collection resulted in more species and slightly increased fIBI values from the IDNR collection in 2008. A 2002-2004 fishery survey of 49 Des Plaines River mainstem and tributary sites by the Army Corps of Engineers, Illinois DNR, and Southeastern Wisconsin Regional Planning Commission included four sites in the North Mill Creek watershed. Both the number of native species (range 2-13) and fIBI (range 0-25) improved downstream of the Rasmussen Lake dam (being removed as of 2018) (Veraldi et al., 2005). Lake County Forest Preserve District has sampled the fisheries of streams within forest preserves in the North Mill Creek subwatershed, including Hastings Creek within Raven Glen Forest Preserve (2002-2005) collecting 9-12 native species, North Mill Creek at Ethel's Woods Forest Preserve (2002-2005) collecting between 3 and 12 native species, and Millburn Creek (Unnamed Tributary to North Mill Creek) at McDonald Woods Forest Preserve (1997) collecting 3-5 native species (LCFPD, 2016).

Comparison of sample data to fish habitat quality at each site suggested that factors other than habitat availability influence fish diversity in the North Mill Creek watershed (Living Waters Consultants, Inc., 2010). Limited recent data exists for streams in the portion of the DPR planning areain Wisconsin, however, in 2003 and 2005, the Wisconsin DNR also conducted a study on the Dutch Gap Canal at one sample location that shows the same degraded fish communities as in the Illinois EPA study in 2008. In 2003, they determined that the fish assemblage was "very poor" (IBI rating of 5). In 2005, the IBI rating for fish decreased to 3, within the classification of "too low to calculate". The 2016 DRWW fishery survey included 6 sites in the North Mill Creek watershed in Illinois. Number of native species ranged from 1 to 13, and five sites had "poor" fIBI values (<20), while only the downstream site (North Mill Creek at Millburn Road) had a "fair" fIBI value. North Mill Creek watershed sites had low species richness relative to its size and a high proportion of species tolerant to disturbance and pollution (MBI, 2017).

Since 2000, several fish surveys have been conducted on Mill Creek, with the resulting fIBI scores ranging from 15 to 39, indicating moderate to severe impairment of the fish community. Thirty-two native species are represented across all surveys. The lowest score (fIBI = 15) was from a sample taken below Third Lake Dam, while a sample below Grandwood Park Lake dam was also low (fIBI = 18). All other samples for which fIBI scores were computed were collected at sites downstream of the first dam on Mill Creek, and ranged from 27 to 39. Among other Lake County streams in the Des Plaines River basin, the fIBI values for downstream samples are comparable to the results of recent fish surveys from sites in the Indian and Bull Creek Watersheds with uninterrupted connections to the Des Plaines River. In samples from Mill Creek, the greatest number of species encountered in any single sample was 26, from a site below the first dam upstream of the Des Plaines River. Nineteen (19) species were encountered in each of the other recent samples taken downstream of the first dam on Mill Creek. Samples taken at four locations upstream of the first dam on Mill Creek yielded 15 or fewer species. Samples from Lake County Forest Preserve sites yielded 7 native species at

Mill Creek Forest Preserve (2012), 8 native species at Fourth Lake Forest Preserve (2003), and 6 to 15 native species at Rollins Savanna Forest Preserve (1999-2014) (LCFPD, 2016). The highest fIBI scores in the Mill Creek Watershed and from other similar Des Plaines River tributaries tend to come from sampling locations on downstream, barrier-free reaches where fish can migrate to and from the Des Plaines River. Other factors that may affect the decrease in species diversity in upstream reaches of the watershed are modification of habitat and degradation of water quality (LCSMC, 2014). The DRWW monitoring program sampled 6 sites in the Mill Creek watershed in 2016. The number of native species ranged from 6 to 25 and fIBI ranged from 14 to 32. The only site with a "poor" fIBI (fIBI = 14) was at Stearns School Road. Although there was a decrease in the number of native species and fIBI score from the site upstream of the Mill Creek water reclamation facility to the site downstream of the facility, the biological signatures were similar and indicated influence from nonpoint sources related to urban runoff and siltation (MBI, 2017).

Bull Creek is not listed as impaired for the aquatic life use and the fishery has been sampled relatively frequently in the last two decades at Illinois Route 21 north of Libertyville. This location typically yields among the highest fIBI values relative to other tributaries in the DPR planning area(range 34-40). Other sites further upstream in the subwatershed have yielded lower species richness and fIBI values (Veraldi, et al., 2005). The DRWW monitoring program surveyed the fishery of Bull Creek at 6 locations in the subwatershed in 2016. Native species abundance ranged from 1-21 across all sites, while fIBI values ranged correspondingly, from 12-36, indicating "poor" to "fair" conditions. While the monitoring station at Illinois Route 21 yielded the greatest species richness and highest fIBI value, it was below the criteria for aquatic life use attainment (fIBI >40). This site also had the best-rated habitat conditions in the subwatershed. Other sites were "fair" while upstream sites rated "poor" based on fIBI values and had heavy silt cover and substrate embeddedness (MBI, 2017).

Indian Creek is currently listed by Illinois EPA as impaired for aquatic life use, although it was previously identified as achieving aquatic life use support (Illinois EPA, 2011). Similar to Bull Creek, a monitoring site at Port Clinton Road located near the downstream end of the subwatershed, has been monitored relatively frequently in the past, and typically yields among the highest fIBI values relative to other tributaries in the DPR planning area(range 31-39). The Lake County Forest Preserve District has sampled the fishery at a restored section of Kildeer Creek in Heron Creek Forest Preserve (upstream of Old McHenry Road), identifying up to 16 native species in recent samples (LCPFD, 2016). A site on Seavey Drainage Ditch was surveyed by Living Waters Consultants and the Village of Vernon Hills in conjunction with the removal of a low-head dam and stream channel naturalization at the Vernon Hills Golf Course in 2006 and 2008. Species richness and fIBI values upstream and downstream of the former dam improved following dam removal, with the number of native species increasing from 10 (above and below dam) to 16 and fIBI increasing from 20 (above dam) and 25 (below dam) to 32. A fishery survey in 2016 at an adjacent site downstream yielded 15 native species (Willink et al., 2016). Species richness and fIBI values tended to decrease at sites further upstream (Veraldi et al., 2005; Pescitelli, 2016). The DRWW monitoring program sampled the fishery at 13 sites in the Indian Creek subwatershed in 2016. Streams sampled included Indian Creek, Seavey Drainage Ditch, West Fork Indian Creek, Kildeer Creek (South Branch Indian Creek), and Forest Lake Drain. Native species richness ranged from 2-15 and fIBI values ranged from 13 ("poor") to 35 ("fair"). The highest number of native species was collected at Oakwood Road while the highest fIBI value occurred at the site at Port Clinton Road (which also had the second-highest native species richness value at 14). Habitat ranged from fair to excellent, although all sites had moderate to heavy siltation and substrate embeddedness. Fish assemblages had high proportions of tolerant

species although more sensitive species were collected at some of the sites with larger drainage areas. In general, fish species were indicative of the degraded habitat and low gradient stream conditions found at the sampling locations (MBI, 2017).

The DRWW monitoring program sampled the fishery at 5 sites in the Aptakisic Creek subwatershed in2016. The fish assemblage was dominated by tolerant species and lacked sensitive species and mineral substrate spawners. Native species abundance ranged from 5-18 while fIBI values ranged from 17 ("poor") to 27 ("fair"). Similar to the sites up and downstream of the Mill Creek water reclamation facility, native species richness and fIBI declined below the wastewater treatment plant on Aptakisic Creek (native species from 18 to 12 and fIBI from 26 to 24). While the fish community response is detectable, it appears that the macroinvertebrate response is greater (MBI, 2017).

The Buffalo Creek fishery was previously sampled at two locations (Illinois Route 83 and Coffin Road) in 2002-2004 as part of a basin-wide survey led by the Army Corps of Engineers, Illinois DNR, and Southeastern Wisconsin Regional Planning Commission and in 1997 and 2002 at Buffalo Creek Forest Preserve by the Lake County Forest Preserve District (Veraldi et al., 2005; LCFPD, 2016). At that time, both native species abundance (8 or 9 at all sites) and fIBI values (10-14, "poor") indicated impairment of the fish community. In 2008, the monitoring station at Lake-Cook Road yielded 10 species and an fIBI of 32 ("fair"). The DRWW monitoring program sampled the fishery at 5 sites in the Buffalo Creek subwatershed in 2016. Native species abundance ranged from 6 to 15 while fIBI values ranged from 12 ("poor") to 25 ("fair"). Upstream sites were dominated by tolerant species while more sensitive species were present in downstream samples.

Other tributaries within the DPR planning area were sampled infrequently or not at all during the two decades preceding the DRWW monitoring program fishery survey in 2016. The Lake County Forest Preserve District has sampled the fishery at Stoneroller Creek at Lake Carina Forest Preserve (2000-2014), Werhane Lake Drain at MacArthur Woods Forest Preserve (2002, 2012), and Bull's Brook at Almond Marsh Forest Preserve (1997, 2002); the Army Corps of Engineers, Illinois DNR, and Southeastern Wisconsin Regional Planning Commission fishery survey of 2002-2004 included a site on Newport Ditch at Kilbourne Road; and Illinois DNR sampled Bull's Brook between Casey Road and Illinois Route 21 in 2004 (LCFPD, 2016; Veraldi et al., 2005, LCMSC, 2008). In the limited data from those previous surveys, native species abundance ranged from 3 (Bull's Brook) to 16 (Stoneroller Creek and Newport Ditch) and generally increased with tributary drainage area and proximity to the Des Plaines River. The DRWW monitoring program surveyed 12 sites in the remaining tributary streams within the DPR planning area. Native species abundance ranged from 1 to 15 and fIBI values ranged from 15 (poor) to 35 (fair). Illinois DNR had previously collected two state-listed species (blackchin shiner and Iowa darter) from Bull's Brook in 2004 (LCSMC, 2008). The DRWW survey did not collect either species from Bull's Brook in 2016, despite sampling more sites on that stream (MBI, 2017). Scores for fIBI were generally related to tributary watershed size with fIBI increasing with drainage area. Despite good overall habitat quality at several locations, all sites were impacted by siltation and substrate embeddedness (MBI, 2017).

Fish surveys conducted on numerous tributary sites over the past two decades by multiple investigators including the DRWW in 2016 indicate that the fisheries of tributary streams in the DPR planning area are largely impaired and dominated by tolerant species characteristic of lentic habitats. The sites with the greatest native species abundance and highest values for biological integrity are typically at or just below the threshold

indicative of impairment of the aquatic life beneficial use. These sites typically have larger tributary watersheds and better connectivity to the Des Plaines River. Previous studies have indicated that dams have a strong influence on fish species assemblage in Des Plaines River tributaries, with habitat degradation and urban land cover exerting a secondary influence (Slawski et al., 2008). The DRWW monitoring report identified changes to fishery composition associated with heavy siltation and substrate embeddedness, urban runoff, and the addition of treated wastewater effluent (MBI, 2017).

3.16.4 Summary of Previous Lake Studies And Data

The majority of historical physical and chemical data for lakes in the DPR planning area has been gathered by the Lake County Health Department-Lakes Management Unit. These data are reported in detailed lake reports, available from the LCHD-ES website. Pertinent findings of that monitoring effort are summarized here. Additionally, a subset of 10 of those lakes monitored by LCHD-ES have also been monitored by the Illinois EPA since 1999. Those data are also summarized where they augment or depart from the pertinent findings.

3.16.4.1Native Fish and Plant Species

The LCHD-ES surveyed 22 lakes in the DPR planning area for the number of native fish species present, and 36 lakes for the number of native plant species as summarized in Table 3-53. The number of native fish species observed ranged from 0 – 27 and the number of native plant species observed ranged from 0 – 13. These counts can be utilized to identify lakes that would benefit from habitat restoration.

Table 3-53: Number of Native Fish and Plant Species Identified in Assessed Lakes

LAKE NAME	LAST ASSESSED	SUBWATERSHED	NATIVE FISH SPECIES	NATIVE PLANT SPECIES
Buffalo Creek Reservoir 1	2013	Buffalo Creek	-	5
Buffalo Creek Reservoir 2	2013	Buffalo Creek	-	5
Butler Lake	2015	Bull Creek	10	8
Loch Lomond	2015	Bull Creek	9	2
St. Mary's Lake	2015	Bull Creek	-	0
Big Bear Lake	2012	Indian Creek	-	1
Bresen Lake	2016	Indian Creek	-	8
Countryside Lake	2013	Indian Creek	10	3
Diamond Lake	2012	Indian Creek	11	5
Forest Lake	2012	Indian Creek	18	8
Kemper Lake 1	2012	Indian Creek	0	5
Lake Charles	2012	Indian Creek	-	5
Little Bear Lake	2012	Indian Creek	-	2
Salem Lake	2000	Indian Creek	-	10
Sylvan Lake	2012	Indian Creek	5	2
Stone Quarry Lake	2004	Lower Des Plaines	-	4
Druce Lake	2011	Mill Creek	16	13
Gages Lake	2011	Mill Creek	19	4
Gray's Lake	2011	Mill Creek	13	5
Lake Miltmore	2011	Mill Creek	21	8
Rollins Savanna Pond 2	2011	Mill Creek	0	8
Sand Lake	2011	Mill Creek	9	3

LAKE NAME	LAST ASSESSED	SUBWATERSHED	NATIVE FISH SPECIES	NATIVE PLANT SPECIES
Third Lake	2012	Mill Creek	27	12
Crooked Lake	2006	North Mill Creek	8	4
Deer Lake	2010	North Mill Creek	-	13
Hastings Lake	2006	North Mill Creek	6	7
Lake Linden	2010	North Mill Creek	-	1
McDonald Lakes 2	2010	North Mill Creek	-	4
Slough Lake	2013	North Mill Creek	-	3
Timber Lake (north)	2010	North Mill Creek	8	12
Waterford Lake	2010	North Mill Creek	8	3
White Lake	2010	North Mill Creek	-	9
Independence Grove Lake	2016	Upper Des Plaines	10	18
Lake Carina	2016	Upper Des Plaines	10	6
Liberty Lake	2001	Upper Des Plaines	11	1
Sterling Lake	2016	Upper Des Plaines	13	15

3.16.4.2Floristic Quality Index

Floristic quality index (FQI) is a metric that evaluates how close the flora of an area is to undisturbed conditions. It can be used to identify natural areas, compare floristic quality between or within lakes, monitor long-term changes in floristic quality, or monitor habitat restoration efforts. To determine FQI, each floating and submerged plant species is assigned a number based on its sensitivity to disturbance, and the average of the assigned numbers is multiplied by the square root of the number of plant species found in the lake. FQI scores between 1-19 indicate low vegetative quality, scores between 20-35 indicate high vegetative quality, and scores >35 indicate undisturbed vegetative quality. The LCHD-ES surveyed 38 lakes in Lake County for FQI (Table 3-54)**.** These assessments determined FQI scores both including (FQI Native) and excluding (FQI w/ Adventives) invasive species. Of the 38 lakes assessed for FQI Native, 31 had low vegetative quality and 7 had high vegetative quality. When invasive species were included in the FQI scores (FQI w/ Adventives), 33 lakes had low vegetative quality and 5 had high vegetative quality.

Table 3-54: FQI of Assessed Lakes Without and With Adventives

LAKE NAME	LAST ASSESSED	SUBBASIN	FQI NATIVE	FQI W/ ADVENTIVES
Buffalo Creek Reservoir 1	2013	Buffalo Creek	12.5	11.4
Buffalo Creek Reservoir 2	2013	Buffalo Creek	12.5	11.4
Butler Lake	2015	Bull Creek	6.4	16.1
Loch Lomond	2015	Bull Creek	8.5	8.5
St. Mary's Lake	2015	Bull Creek	0.0	0.0
Big Bear Lake	2012	Indian Creek	5.0	3.5
Bresen Lake	2016	Indian Creek	17.8	16.6
Countryside Lake	2014	Indian Creek	7.7	11.5
Diamond Lake	2012	Indian Creek	5.5	3.7
Forest Lake	2012	Indian Creek	15.9	14.8
Kemper Lake 1	2012	Indian Creek	13.4	12.2
Kemper Lake 2	2012	Indian Creek	9.8	8.5
Lake Charles	2012	Indian Creek	11.0	9.0

LAKE NAME	LAST ASSESSED	SUBBASIN	FQI NATIVE	FQI W/ ADVENTIVES
Little Bear Lake	2012	Indian Creek	7.5	5.8
Salem Lake	2000	Indian Creek	20.2	18.5
Sylvan Lake	2012	Indian Creek	10.6	10.6
Stone Quarry Lake	2004	Lower Des Plaines	12.5	12.5
Druce Lake	2011	Mill Creek	21.8	19.1
Gages Lake	2011	Mill Creek	12.5	10.2
Gray's Lake	2011	Mill Creek	16.1	16.1
Lake Miltmore	2011	Mill Creek	18.7	16.8
Rollins Savanna Pond 2	2011	Mill Creek	17.7	17.7
Sand Lake	2011	Mill Creek	10.4	8.0
Third Lake	2014	Mill Creek	25.1	22.5
Crooked Lake	2010	North Mill Creek	16.0	14.0
Deer Lake	2010	North Mill Creek	24.4	23.5
Hastings Lake	2010	North Mill Creek	17.0	15.0
Lake Linden	2010	North Mill Creek	8.0	8.0
McDonald Lakes 2	2010	North Mill Creek	12.5	12.5
Slough Lake	2013	North Mill Creek	5.0	5.0
Timber Lake (north)	2010	North Mill Creek	23.4	20.9
Waterford Lake	2010	North Mill Creek	9.2	9.2
White Lake	2010	North Mill Creek	17.0	16.0
Independence Grove Lake	2016	Upper Des Plaines	27.5	24.6
Lake Carina	2007	Upper Des Plaines	14.3	12.1
Lake Minear	2015	Upper Des Plaines	13.9	11.0
Liberty Lake	2001	Upper Des Plaines	5.0	5.0
Sterling Lake	2016	Upper Des Plaines	26.9	24.5

3.16.4.3Water Quality

The water quality of 44 lakes in the DPR planning area was assessed utilizing multiple parameters including total phosphorus (TP), soluble reactive phosphorus (SRP), total Kjeldahl nitrogen (TKN), ammonia (NH_3-N), nitrate (NO_{3-}), secchi disk depth (SECCHI), total solids (TS), total dissolved solids (TDS), total volatile solids (TVS), total suspended solids (TSS), chloride (Cl^-), alkalinity (ALK), specific conductivity (COND), pH, and dissolved oxygen (DO). The most recent year of water quality data was used for each lake, which ranged from 2000 – 2016. Water quality data that is older than 10 years may not be representative of the current lake conditions and should be interpreted carefully. This lake inventory offers a summary of water quality for all assessed lakes in the DPR planning area. In depth analysis and reports for individual lakes within Lake County can be accessed at http://www.lakecountyil.gov/2400 /Lake-Reports. Table 3-55 summarizes the arithmetic mean of the most recent year of data for each parameter assessed at each lake.

Table 3-55: Water Quality in Lakes for Most Recent Year Assessed

Value for each parameter is the arithmetic mean of all samples for most recent assessment year. If most recent assessment was > 10 years before this lake inventory summary (2017), results may not be representative of the current lake conditions.

LAKE NAME	YEAR LAST ASSESSED	SUBBASIN	TP (mg/L)	SRP (mg/L)	TKN (mg/L)	NH3-N (mg/L)	NO3-N (mg/L)	SECCHI (ft)	TS (mg/L)	TDS (mg/L)	TSS (mg/L)	TVS (mg/L)	ALK (mg/L CaCO3)	COND (mS/cm)	Cl- (mg/L)	pH (s.u.)	DO (mg/L)
Buffalo Creek Reservoir 1	2013	Buffalo Creek	0.068	0.010	1.10	<0.10	<0.05	2.2	668	654	7.2	106	169	1.206	210	8.38	8.73
Buffalo Creek Reservoir 2	2013	Buffalo Creek	0.096	0.089	1.18	<0.10	<0.05	2.3	677	660	19.2	112	168	1.219	210	8.28	9.06
Butler Lake	2015	Bull Creek	0.032	<0.005	0.80	<0.10	0.08	6.5	620	-	2.3	125	159	0.995	205	8.14	7.38
Loch Lomond	2015	Bull Creek	0.196	0.188	1.54	<0.10	0.06	2.2	486	-	11.0	103	174	0.774	134	8.42	7.51
St. Mary's Lake	2015	Bull Creek	0.061	0.009	1.02	<0.10	<0.05	3.0	609	549	8.5	114	158	0.998	198	8.25	8.33
Big Bear Lake	2012	Indian Creek	0.096	0.006	1.17	0.10	0.05	1.3	616	557	18.1	118	156	0.987	193	8.04	7.77
Bresen Lake	2016	Indian Creek	0.158	0.020	2.06	<0.10	<0.05	2.7	547	464	14.8	135	179	0.828	145	8.68	8.78
Countryside Lake	2014	Indian Creek	0.080	0.005	1.38	0.14	0.05	2.6	440	405	8.1	95	134	0.710	139	8.55	8.14
Diamond Lake	2012	Indian Creek	0.039	0.037	0.84	<0.10	<0.05	3.2	514	466	6.5	90	153	0.833	165	8.37	8.26
Forest Lake	2012	Indian Creek	0.154	0.006	1.23	<0.10	0.03	2.5	621	-	13.5	121	152	1.245	214	8.60	8.42
Kemper Lake 1	2012	Indian Creek	0.222	0.015	1.95	<0.10	0.25	2.6	611	-	11.6	132	173	0.959	184	8.23	5.90
Kemper Lake 2	2012	Indian Creek	0.110	0.090	1.18	<0.10	<0.05	1.8	559	-	18.0	109	138	0.930	189	8.05	7.03
Lake Charles	2012	Indian Creek	0.093	0.010	1.07	0.13	0.17	2.2	501	436	15.1	97	131	0.785	153	8.26	7.75
Little Bear Lake	2012	Indian Creek	0.068	<0.005	1.06	0.10	0.05	2.4	624	614	11.4	111	153	1.022	205	8.06	7.75
Salem Lake*	2000	Indian Creek	0.165	0.060	1.64	0.18	0.06	1.6	422	379	16.5	134	142	0.617	-	8.73	7.47
Sylvan Lake	2012	Indian Creek	0.100	<0.005	1.58	<0.10	<0.05	2.0	573	478	17.0	137	160	0.856	150	8.49	10.72
Stone Quarry Lake*	2004	Lower Des Plaines	0.023	0.005	1.34	0.43	0.76	8.8	862	773	3.5	138	104	1.527	228	8.25	8.87
Druce Lake	2011	Mill Creek	0.014	<0.005	0.60	0.10	0.12	12.3	702	-	1.7	117	138	1.165	276	8.47	10.85
Fourth Lake	2011	Mill Creek	0.037	<0.005	1.05	<0.10	<0.05	2.4	638	568	6.3	125	196	1.035	202	7.95	8.67
Gages Lake	2011	Mill Creek	0.020	<0.005	0.97	<0.10	0.10	5.4	613	-	4.8	103	117	1.022	246	8.52	8.91
Gray's Lake	2011	Mill Creek	0.031	<0.005	0.89	<0.10	0.06	4.1	459	-	6.2	96	135	0.762	147	8.40	11.58
Lake Miltmore	2011	Mill Creek	0.021	<0.005	0.82	<0.10	0.06	7.4	567	536	3.6	111	137	0.971	208	8.83	9.11

LAKE NAME	YEAR LAST ASSESSED	SUBBASIN	TP (mg/L)	SRP (mg/L)	TKN (mg/L)	NH3-N (mg/L)	NO3-N (mg/L)	SECCHI (ft)	TS (mg/L)	TDS (mg/L)	TSS (mg/L)	TVS (mg/L)	ALK (mg/L CaCO3)	COND (mS/cm)	Cl- (mg/L)	pH (s.u.)	DO (mg/L)
Rollins Savanna Pond 2	2011	Mill Creek	0.587	0.029	6.47	<0.05	<0.10	1.0	359	227	72.0	171	185	0.357	3	8.32	6.48
Sand Lake	2011	Mill Creek	0.038	<0.005	1.23	<0.10	<0.05	7.5	409	-	5.0	114	124	0.725	129	8.89	8.66
Third Lake	2014	Mill Creek	0.038	0.000	1.03	0.00	0.49	1.2	731	708	5.0	122	164	1.181	254	9.77	10.14
Crooked Lake	2010	North Mill Creek	0.070	<0.008	1.26	0.12	0.17	4.3	526	492	7.3	123	162	0.884	173	8.69	10.24
Deer Lake	2010	North Mill Creek	0.094	<0.005	0.84	<0.10	<0.05	8.1	636	-	7.8	132	143	0.465	232	8.61	8.96
Hastings Lake	2010	North Mill Creek	0.052	<0.005	1.18	<0.10	<0.05	3.5	506	474	5.2	118	164	0.849	160	8.68	9.43
Lake Linden	2010	North Mill Creek	0.057	<0.005	1.02	<0.10	0.05	4.6	413	-	4.2	77	149	0.729	134	8.15	7.13
McDonald Lakes 2	2010	North Mill Creek	0.225	0.027	2.32	0.46	0.58	0.5	518	-	77.0	106	159	0.788	136	8.29	7.18
Rasmussen Lake	2012	North Mill Creek	0.486	0.237	2.31	0.10	1.24	1.6	530	-	22.6	114	219	0.785	115	9.14	13.91
Redwing Slough	2010	North Mill Creek	0.082	0.053	1.41	0.38	0.48	-	635	-	11.0	145	272	0.375	231	7.82	4.16
Slough Lake	2013	North Mill Creek	0.216	0.171	2.05	<0.10	<0.05	1.6	692	-	17.0	140	238	1.104	202	8.51	8.64
Timber Lake (north)	2010	North Mill Creek	0.021	<0.005	0.81	<0.10	<0.05	7.4	352	-	2.5	114	209	0.560	38	8.32	8.04
Waterford Lake	2010	North Mill Creek	0.040	<0.005	0.85	<0.10	0.09	4.7	480	-	3.9	80	142	0.854	175	8.32	7.31
White Lake	2010	North Mill Creek	0.086	0.046	1.41	0.11	0.06	4.0	239	-	7.3	91	125	0.373	37	8.66	7.38
Almond Marsh	2011	Upper Des Plaines	0.621	0.019	3.34	<0.05	<0.05	-	442	267	77.0	136	147	0.508	97	7.77	-
Independence Grove Lake	2016	Upper Des Plaines	0.013	<0.005	0.47	<0.10	<0.05	10.3	523	426	1.6	151	141	0.753	84	8.25	9.04
Des Plaines Lake	2016	Upper Des Plaines	0.109	0.025	1.26	<0.10	1.26	2.1	611	518	12.0	140	214	0.936	149	8.24	9.32
Lake Carina	2016	Upper Des Plaines	0.011	<0.005	0.40	<0.10	<0.05	17.0	797	717	1.4	138	133	1.331	328	8.44	9.16
Lake Minear	2015	Upper Des Plaines	0.016	<0.005	0.48	<0.10	<0.05	13.8	409	380	0.0	99	120	0.661	122	8.42	8.74
Liberty Lake*	2001	Upper Des Plaines	0.063	0.013	1.21	0.12	<0.05	3.2	539	506	8.3	114	121	0.902	-	8.21	8.50
Osprey Lake	2007	Upper Des Plaines	0.111	0.010	1.28	<0.10	<0.05	1.0	495	-	34.2	108	189	0.786	104	8.04	7.90
Sterling Lake	2016	Upper Des Plaines	0.011	0.008	0.47	0.13	<0.05	13.8	536	380	1.5	148	164	0.661	146	8.42	8.74

- = Data not collected

3.16.4.4Nutrients

Plants and algae require nutrients from their environment to grow. The primary nutrients necessary for plant and algal growth in lakes are nitrogen and phosphorus. Aquatic vegetative growth in DPR planning area lakes is typically phosphorus limited. This means that any contributions of phosphorus to the water column directly affects plant and algal growth. The LCHD-ES analyzed TP and SRP at lakes within the DPR planning area. TP is a measure of all organic and inorganic phosphorus in the water column. Lakes with TP concentrations greater than 0.05 mg/L are classified as impaired by the Illinois EPA, because they can support excessive algal growth. The most recent yearly average of TP for the assessed lakes ranged from 0.011 – 0.621 mg/L, as shown in Figure 3-89. The yearly average of TP concentration exceeded Illinois EPA's 0.05 mg/L TP standard in 28 (63.6%) of the assessed lakes.

SRP is a measure of phosphorus in the dissolved form that is readily available for plant and algal growth. The most recent yearly average of SRP for the assessed lakes ranged from 0 – 0.237 mg/L, as shown in Figure 3-90. Nitrogen is also needed for plant and algal growth, and is present in both organic and inorganic forms. The LCHD-ES analyzed TKN, NH_3-N, and NO_3 at lakes in the DPR planning area. TKN is a measure of organic nitrogen, which is typical bound by aquatic vegetation. The most recent yearly average of TKN for the assessed lakes ranged from 0.397 – 6.474 mg/L, as shown in Figure 3-91. NH_3-N and NO_3-N are measures of inorganic nitrogen, which can support seasonal algal blooms if present in sufficient quantities. The most recent yearly average of NH_3-N ranged from 0 - 0.462 mg/L, as shown in Figure 3-92**.** The most recent yearly average of $N0_3$-N ranged from 0.030 – 1.260 mg/L, as shown in Figure 3-93**.**

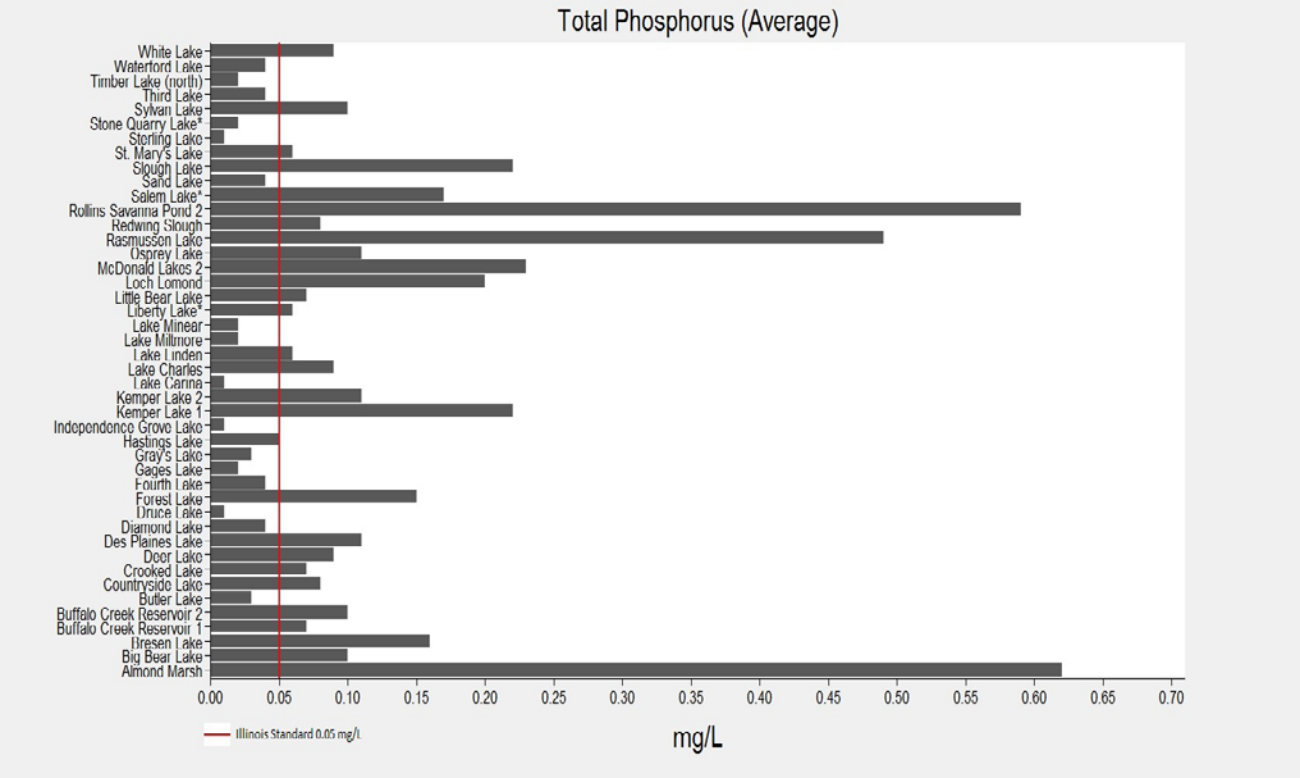


Figure 3-90: Most Recent Yearly Total Phosphorus Average by Lake

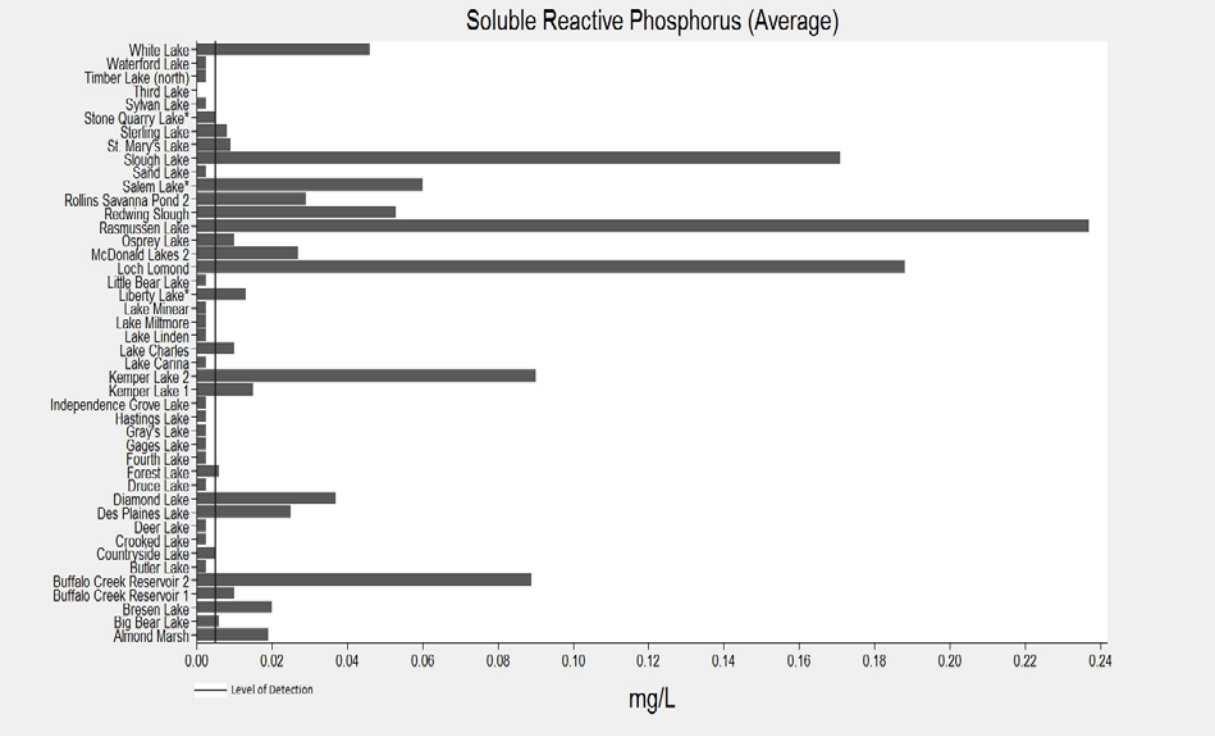


Figure 3-91: Most Recent Yearly SRP Average by Lake

Note: Values below the limit of detection are displayed as half of the limit of detection and represent concentrations between 0 – 0.1 mg/L.

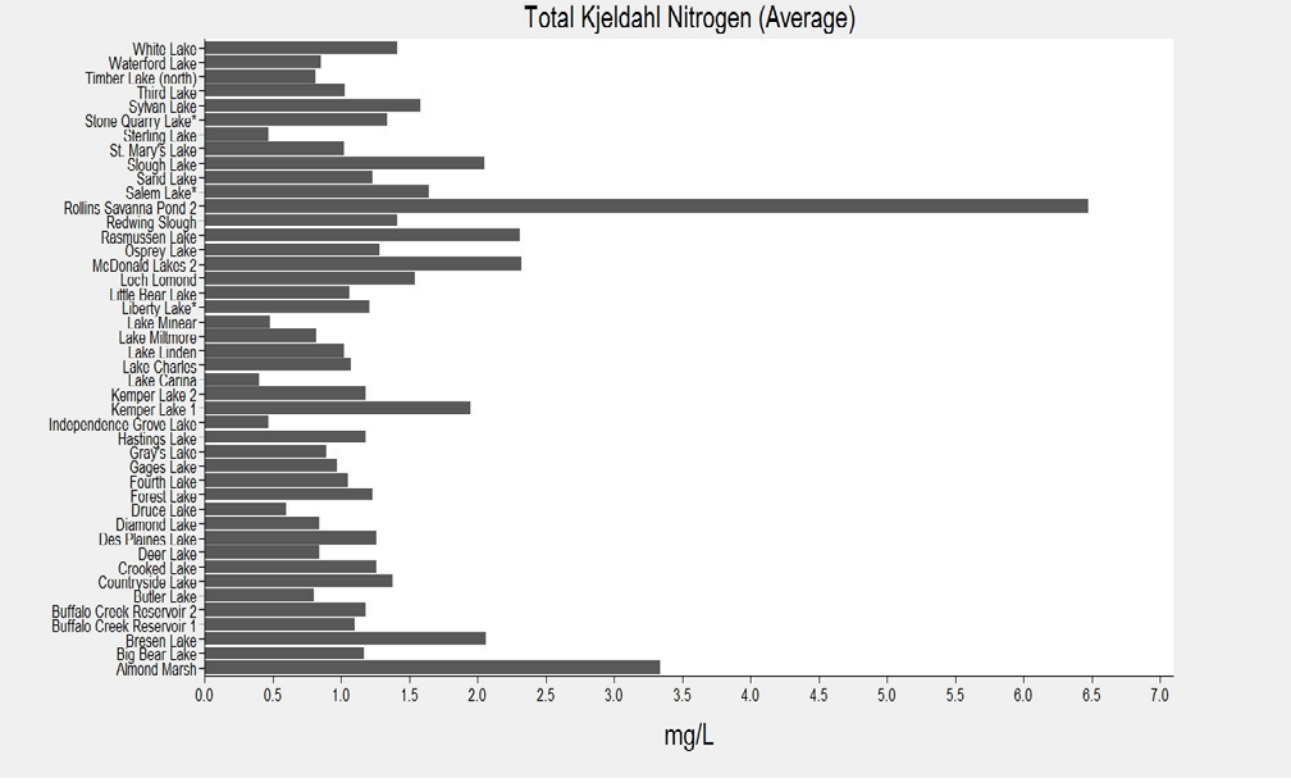


Figure 3-92: Most Recent Yearly TKN Average by Lake

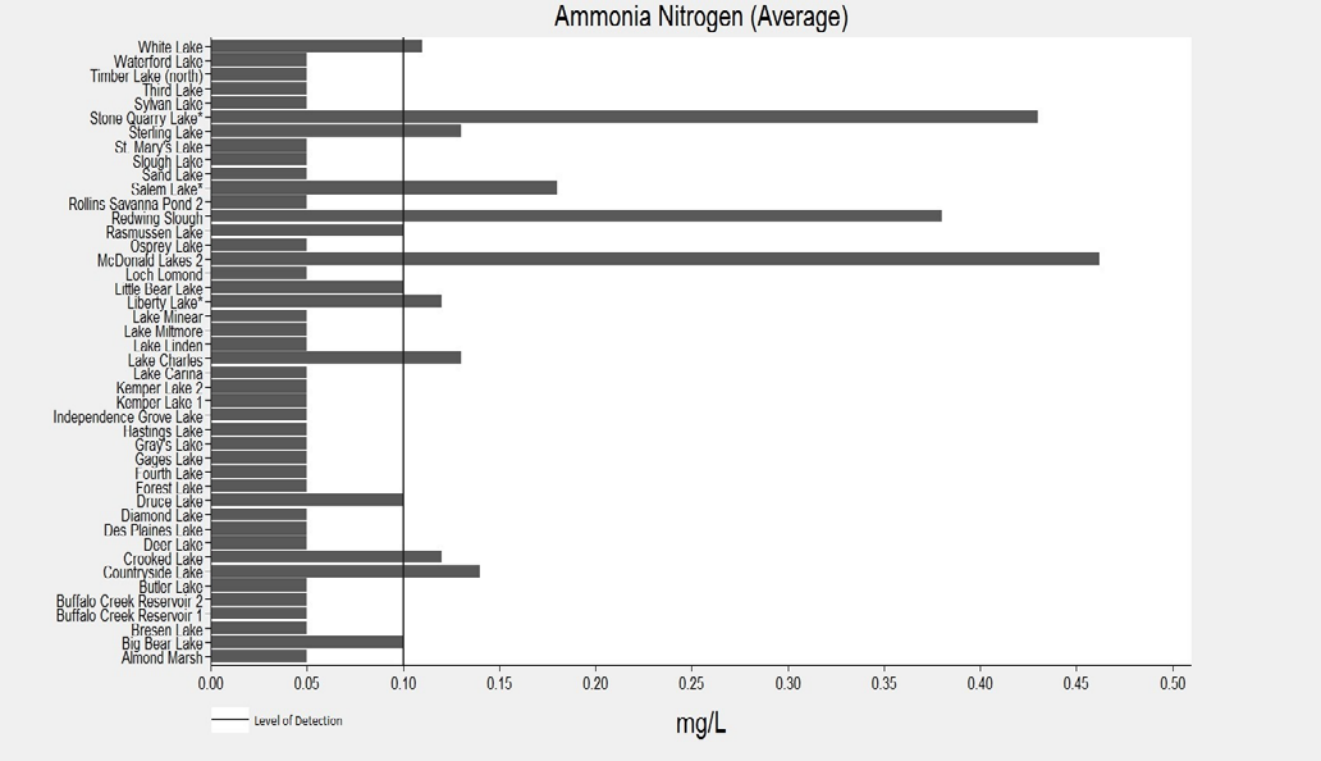


Figure 3-93: Most Recent Yearly Average of NH3-N by Lake

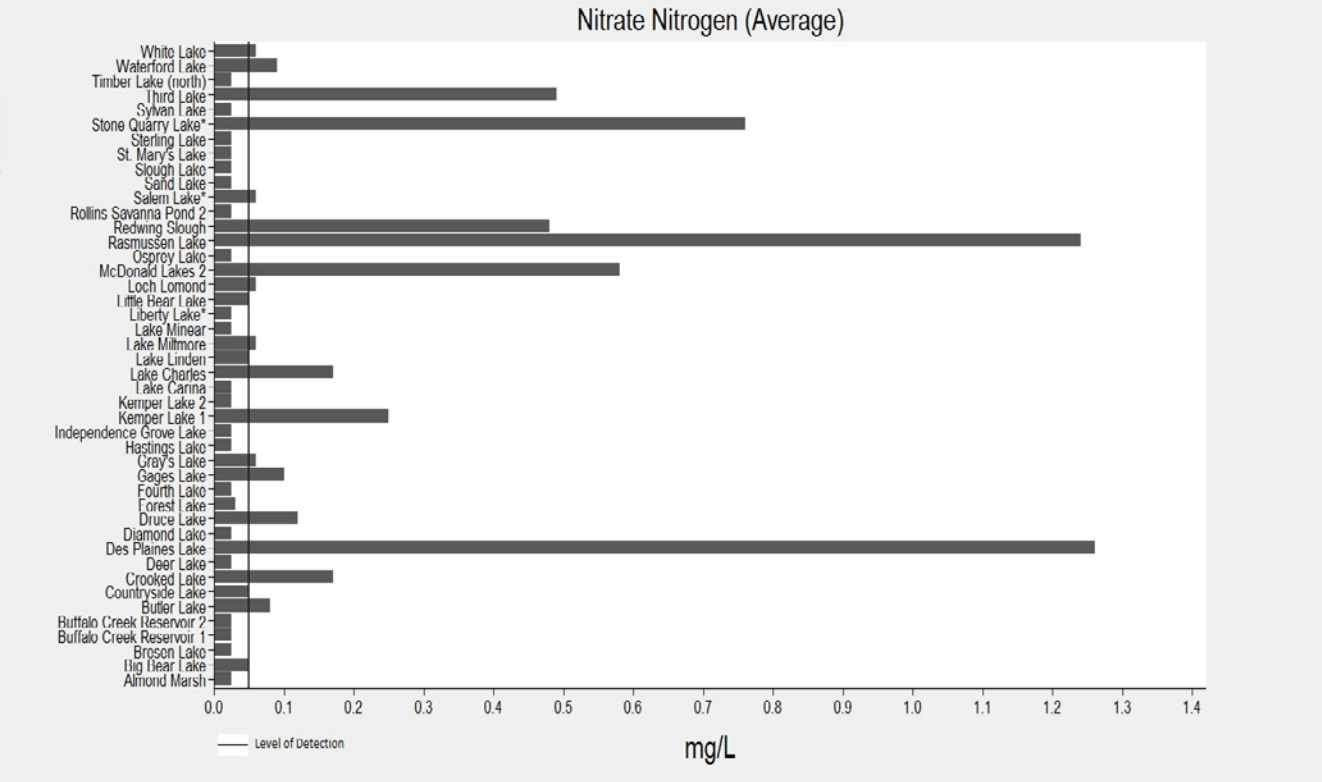


Figure 3-94: Most Recent Yearly Average of NO3-N by Lake

3.16.4.5Water Clarity

Water clarity, or water transparency, is a measurement of the depth that light penetrates through the water column. A Secchi disk is typically utilized to measure this parameter (Figure 3-94). Briefly, a disk, with alternating black and white patterns, is lowered into the water column until it can't be seen by the observer. The depth at which this occurs is known as the Secchi depth. Secchi depth can be used as a proxy to estimate the amount of suspended and dissolved material in a lake such as algae, plankton, and sediment. Since suspended and dissolved material scatters light that enters the water column, increases in suspended sediments result in decreases in secchi depth. The most recent yearly average of secchi depth for the assessed lakes ranged from 0.5 – 17.0 feet, as summarized in Figure 3-95.

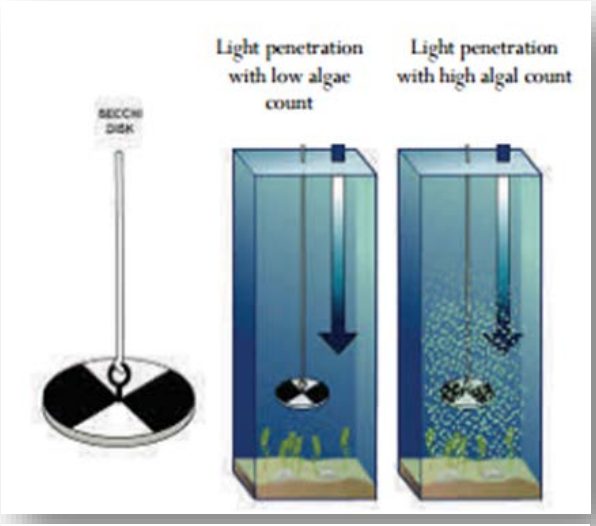


Figure 3-95: Illustration of a water clarity measurement utilizing a Secchi disk

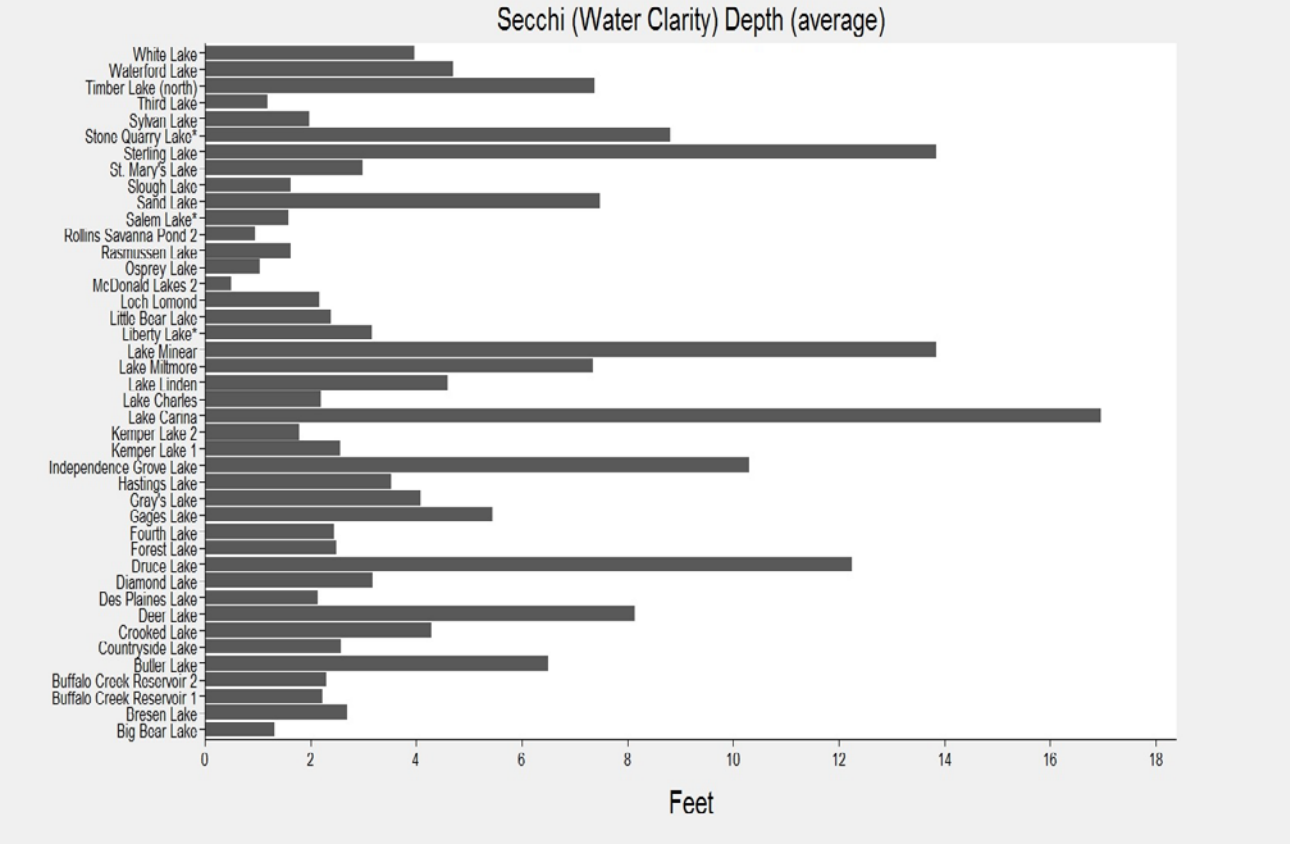


Figure 3-96: Most Recent Yearly Average of Secchi Depth by Lake

3.16.4.6Solids

Solids in the water column of a lake consists of suspended and dissolved material. TS is a measure of all suspended and dissolved solids in the water column. The most recent yearly average of TS for the assessed lakes ranged from 239 – 862 mg/L, as summarized in Figure 3-96. TDS is a measure of all the dissolved solids in a water column. The most recent yearly average of TDS for the assessed lakes ranged from 227 – 773 mg/L, as summarized in Figure 3-97**.** TSS is a measure of all organic and inorganic solids suspended in the water column including algae and sediment. High TSS concentrations can negatively impact many aspects of lake ecosystems and are typically associated with high phosphorus and low water clarity in DPR planning area lakes. The most recent yearly average of TSS for the assessed lakes ranged from 0.0 – 77.0 mg/L, as summarized in Figure 3-98. TVS is a measure of organic solids in the water column, including algae, plant material, and zooplankton. Lakes with high TVS typically have large quantities of aquatic plants and algae. The most recent yearly average of TVS for the assessed lakes ranged from 77.2 – 171.0 mg/L, as summarized in Figure 3-99.

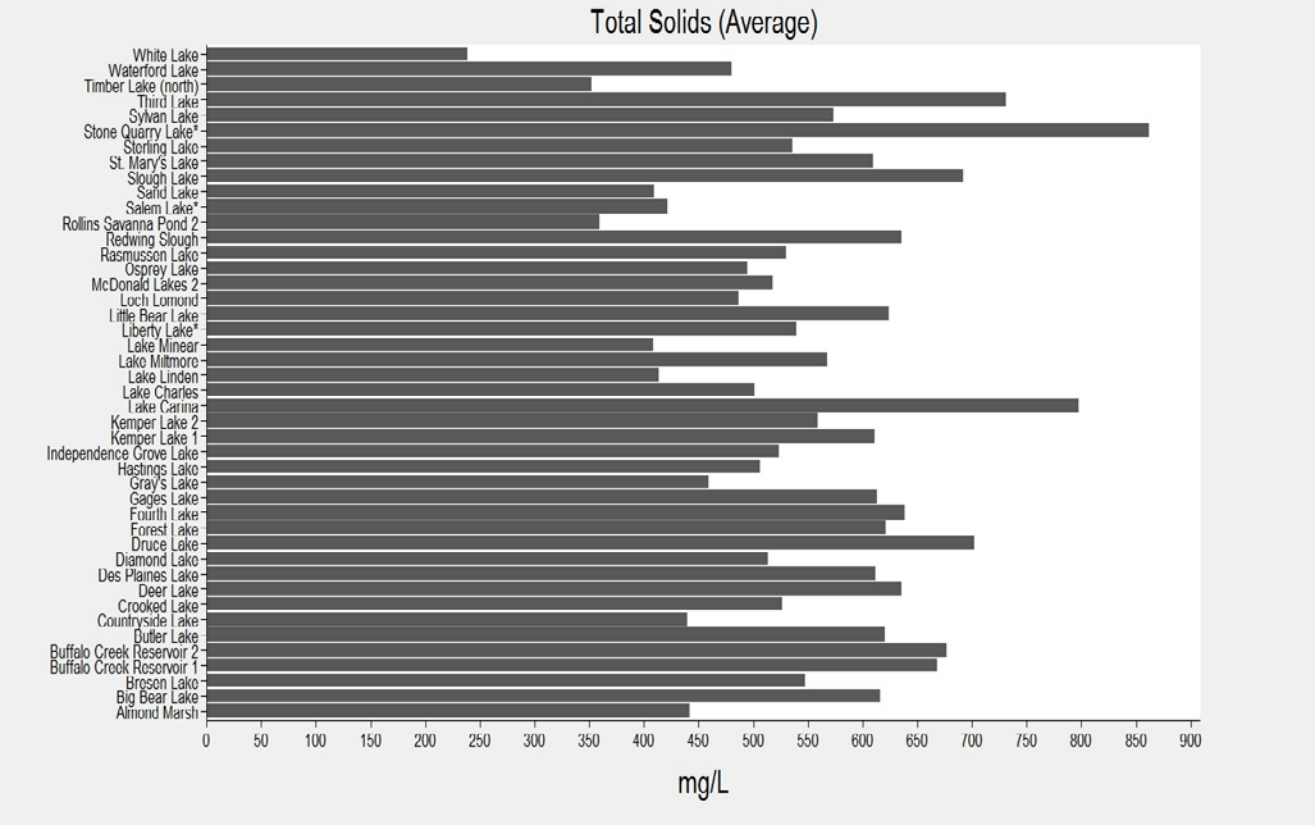


Figure 3-97: Most Recent Yearly Average of Total Solids by Lake

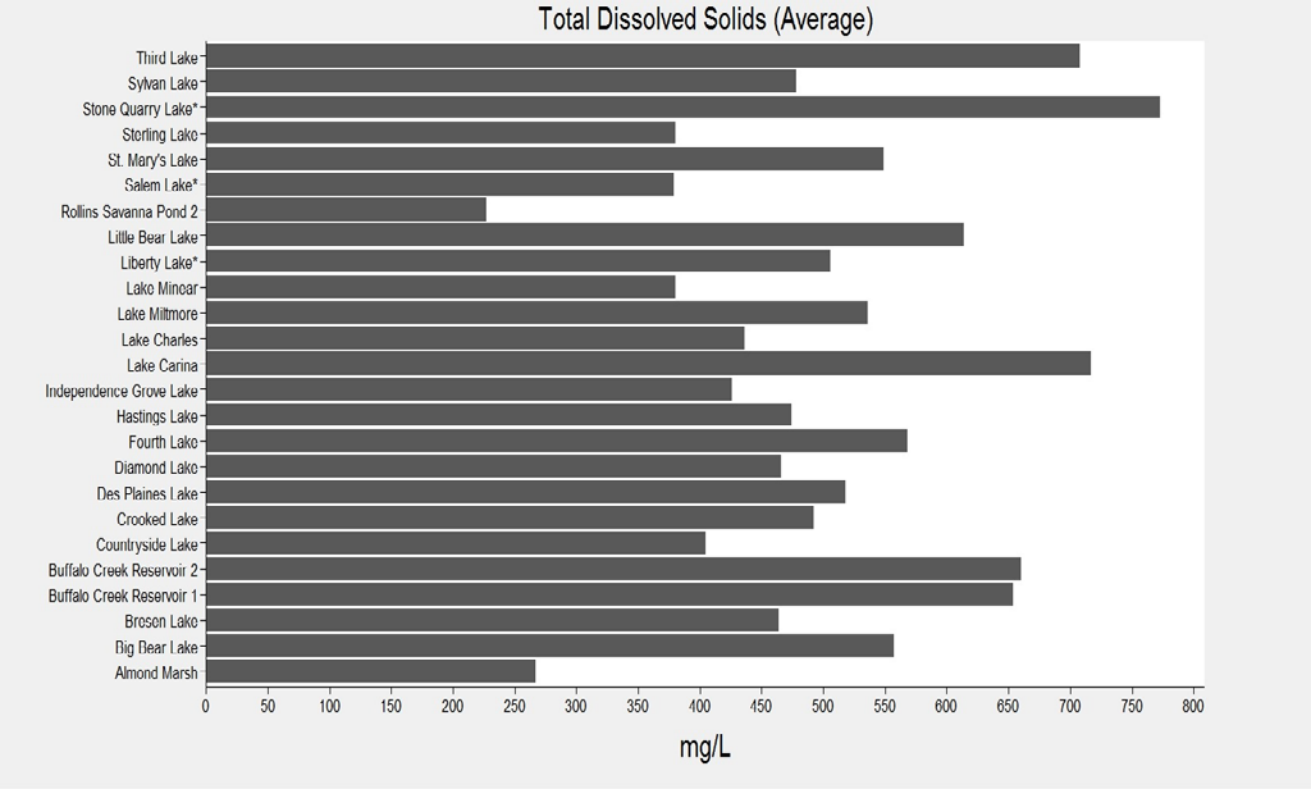


Figure 3-98: Most Recent Yearly Average of Total Dissolved Solids by Lake

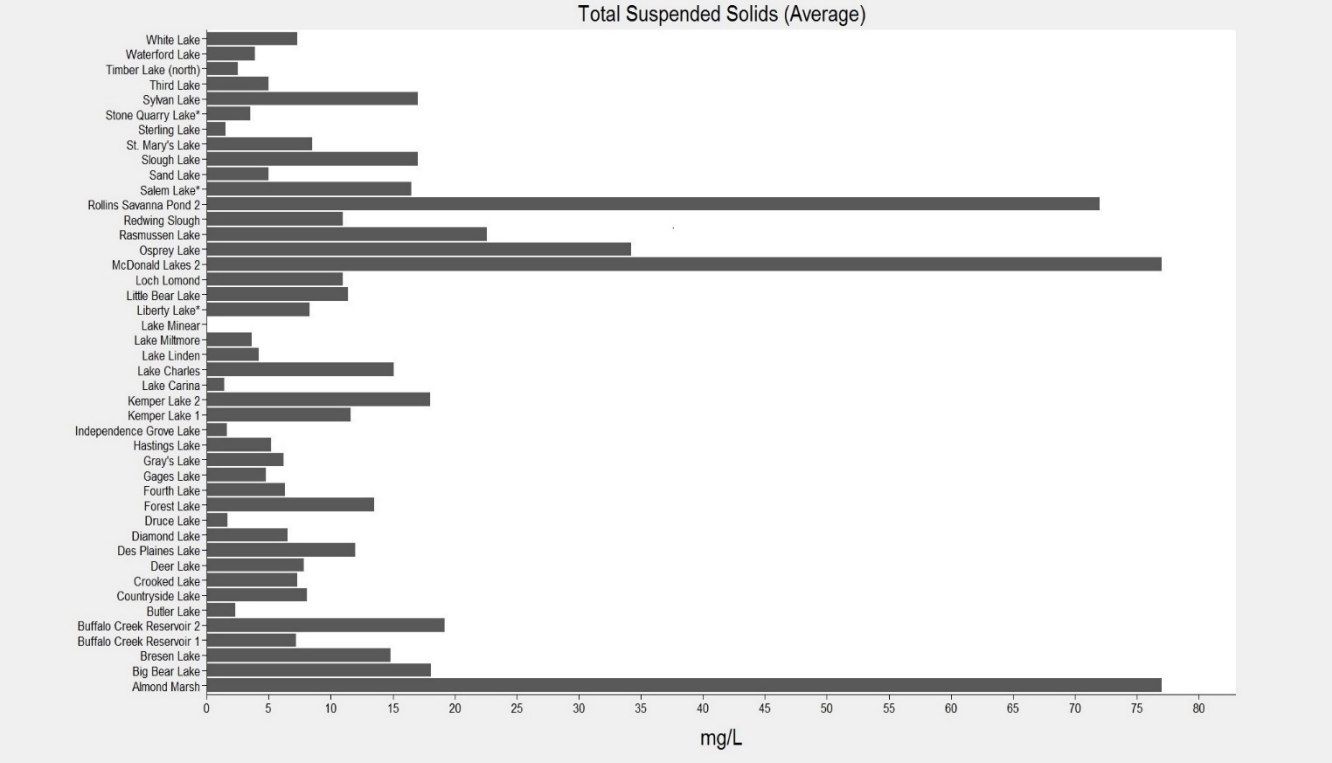


Figure 3-99: Most Recent Yearly Average of Total Suspended Solids by Lake

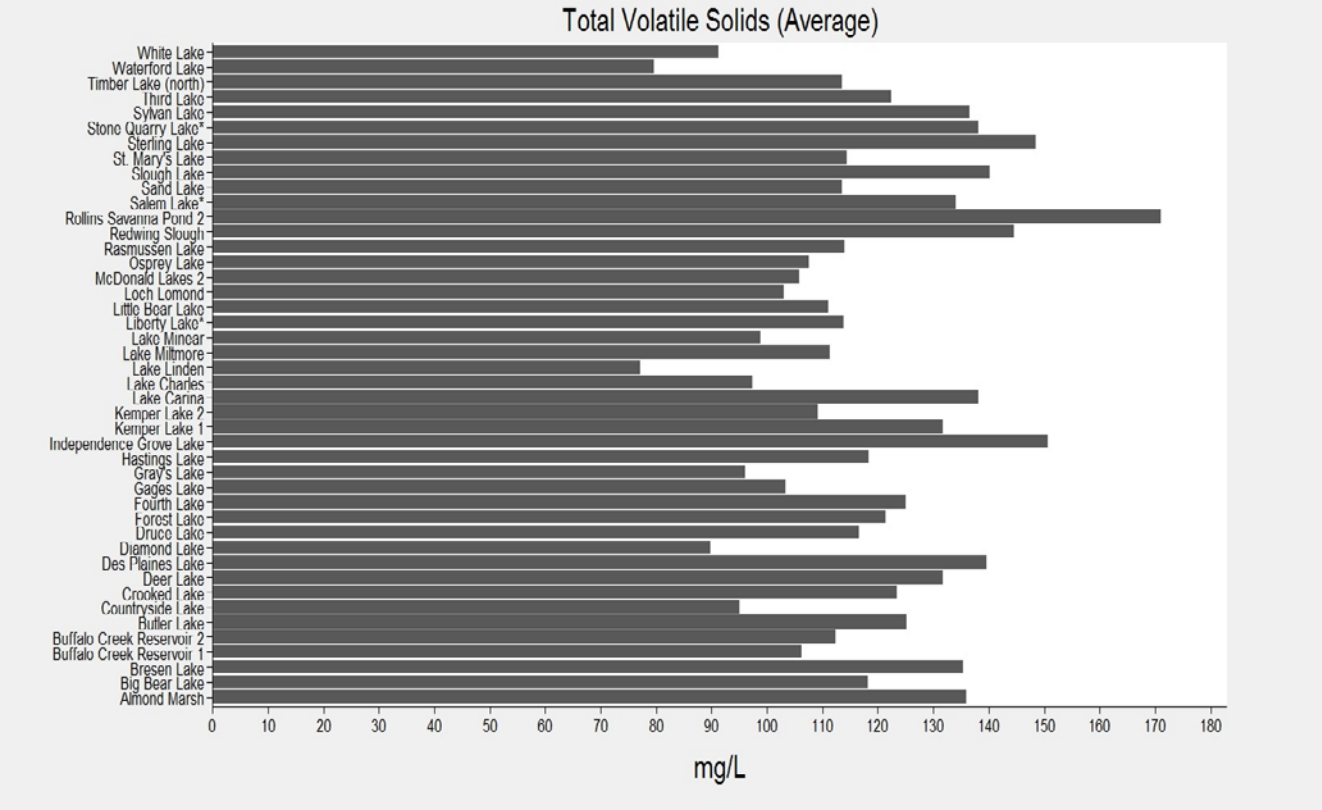


Figure 3-100: Most Recent Yearly Average of Total Volatile Solids by Lake

3.16.4.7Alkalinity, Specific Conductivity, and Chloride

Alkalinity is a measure of the buffering capacity of water, which is influenced by the minerals in surrounding sediment and bedrock. Lakes with high alkalinity have greater buffering capacities than lakes with lower alkalinity. The most recent yearly average for assessed lakes ranged from 104 – 272 mg/L, as summarized in Figure 3-100. Specific conductivity is measured to approximate the quantity of dissolved ions in a solution. Specific conductivity is closely related to chloride concentrations and TDS in DPR planning area lakes. Yearly average specific conductivity values ranged from 0.357 – 1.527 mS/cm in assessed DPR planning area lakes, as summarized in Figure 3-101**.** The concentration of chloride ions has been increasing in DPR planning area lakes over time. This increase is caused by the utilization of road salt for deicing. Road salt applied to surfaces within the watershed is incorporated into stormwater runoff, which drains into lakes. Increased chloride concentrations can cause detrimental impacts to aquatic life. The USEPA national recommended water criteria for chronic toxicity of chlorides is 230 mg/L. Yearly average chloride concentrations ranged from 3 - 327 mg/L in assessed DPR planning area lakes, as summarized in Figure 3-102. The yearly average chloride concentration exceeded Illinois EPA's 230 mg/L standard in 6 (14.3%) of the assessed lakes in the DPR planning area. These chloride concentrations assessments were conducted between May and September. Chloride concentrations in DPR planning area lakes are likely higher during times when road salt is typically applied.

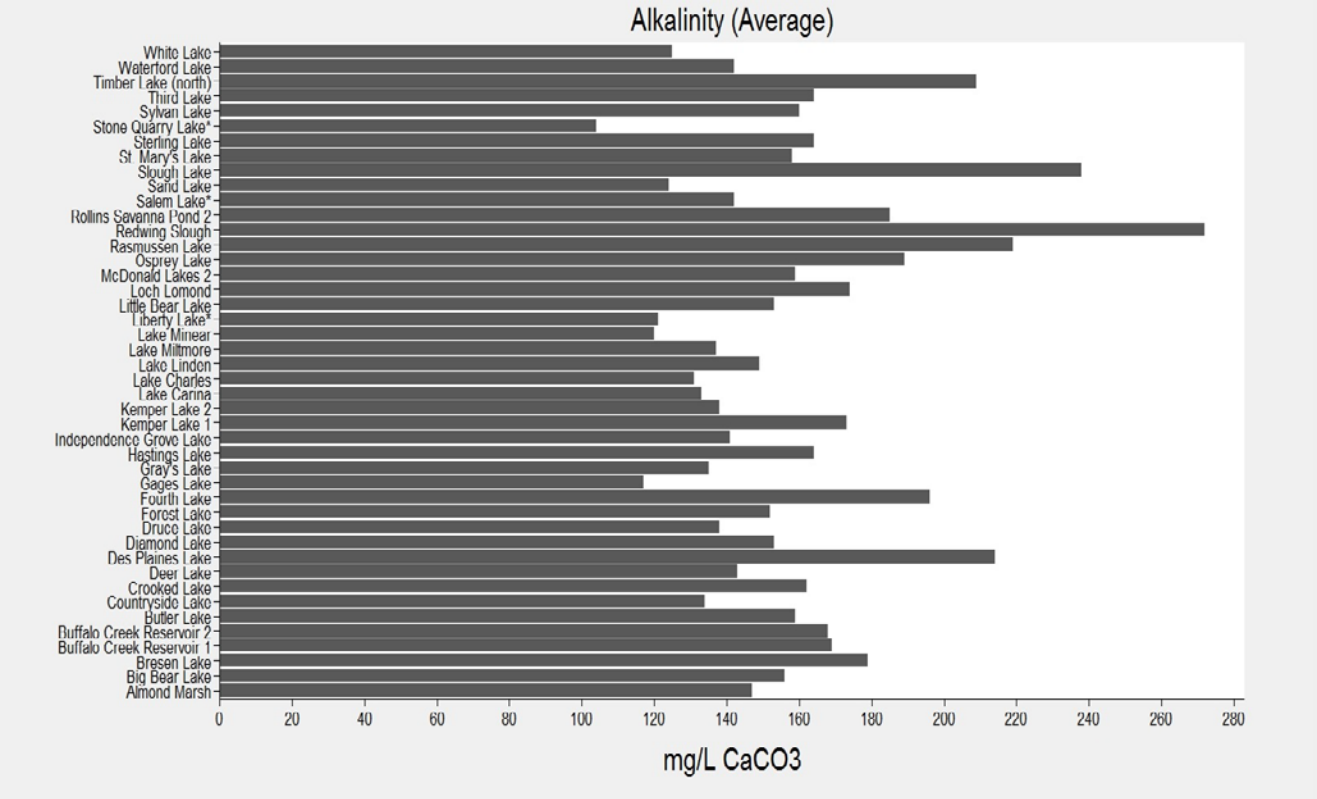


Figure 3-101: Most Recent Yearly Average Alkalinity by Lake

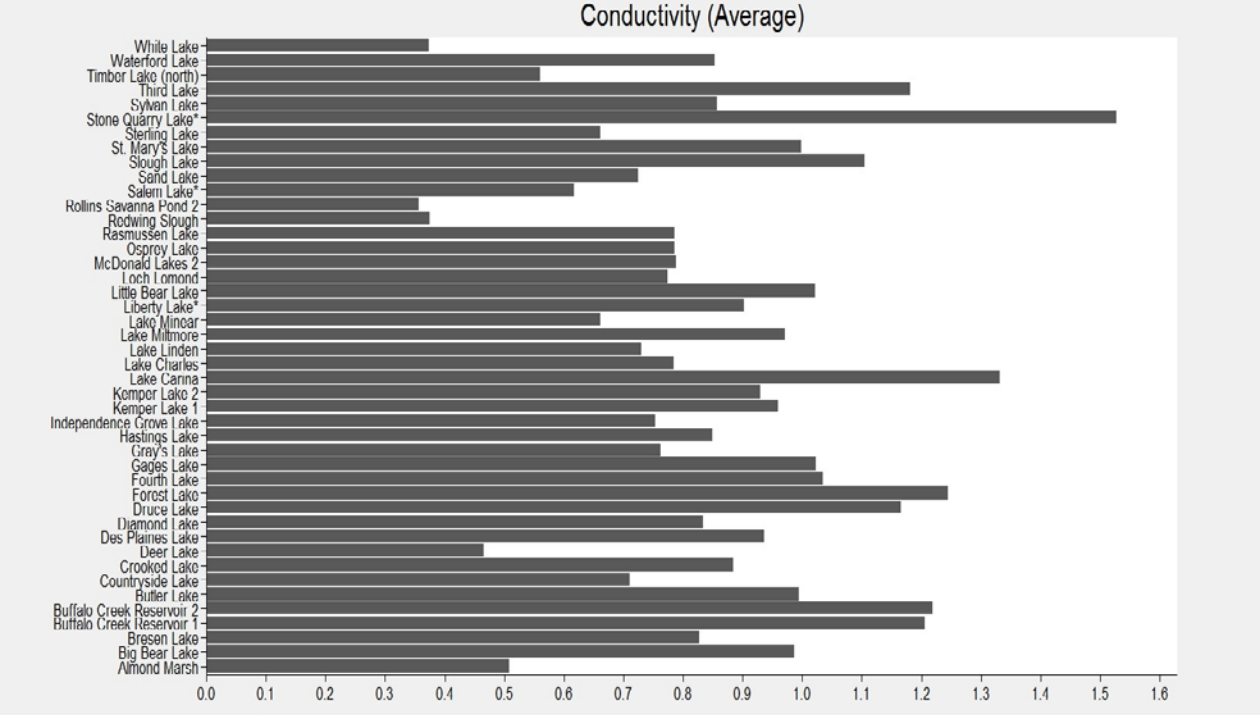


Figure 3-102: Most Recent Yearly Average Specific Conductivity by Lake

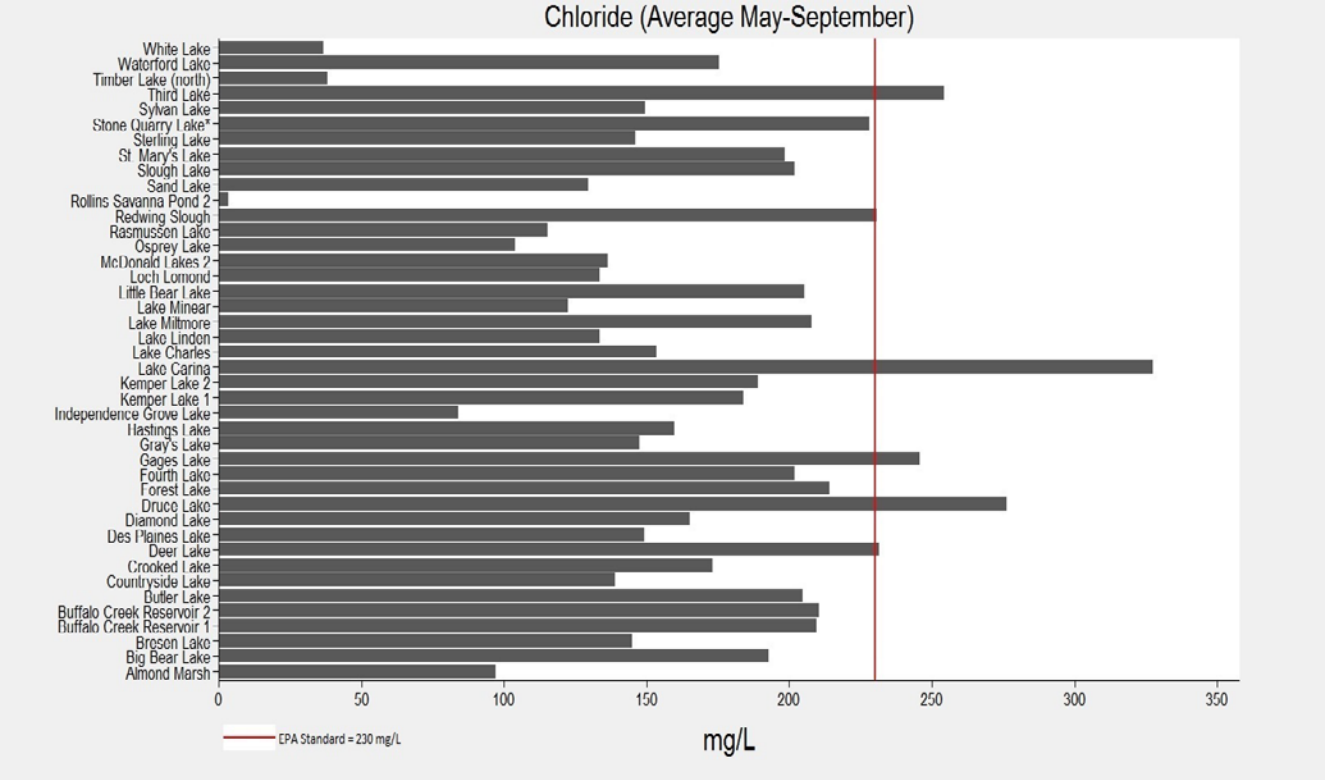


Figure 3-103: Most Recent Yearly Average Chloride Concentration by Lake

3.16.4.8pH and Dissolved Oxygen

pH is a measure of the concentration of the hydrogen ion in water, which affects multiple chemical processes within a lake such as the carbonate equilibrium cycle. The range of pH that is supportive of aquatic life is 5 – 9 standard units (s.u.). Values outside of this range can be harmful to aquatic life. Yearly average pH values ranged from 7.77 – 9.77 s.u. in assessed DPR planning area lakes. Rasmussen Lake and Third Lake had yearly averages of pH outside of the range recommended for aquatic life.

Dissolved oxygen is a measure of the concentration of gaseous oxygen in water. DO concentrations vary spatially and temporally on multiple scales. In stratified lakes, dissolved oxygen is generally higher in the epilimnion than the hypolimnion. DO concentrations fluctuate daily, with increases occurring in daytime hours when photosynthesizing plants are releasing oxygen into the water columns, and decreases occurring in nighttime hours when minimal photosynthesis is occurring. DO concentrations also vary seasonally because the solubility of oxygen in water decreases as water temperature increases. Additionally, lakes with substantial amounts of aquatic vegetation may experience sharp declines in DO, due to decaying plants and algae consuming water. Fish may experience oxygen stress if DO concentrations are below 5 mg/L for prolonged periods of time. Lakes with large amounts of aquatic vegetation may have high DO concentrations during daylight, and experience sharp decreases in DO at night. Yearly average DO values ranged from 4.16 – 13.91 mg/L in assessed DPR planning area lakes, as summarized in Figure 3-103. Redwing Slough had a yearly average DO below concentrations recommended for aquatic life. DO measurements were conducted during day light hours and likely represent the high end of growing season DO levels. Continuous overnight

monitoring of DO in lakes is necessary to determine if diurnal fluctuations are sufficient to negatively impact aquatic life.

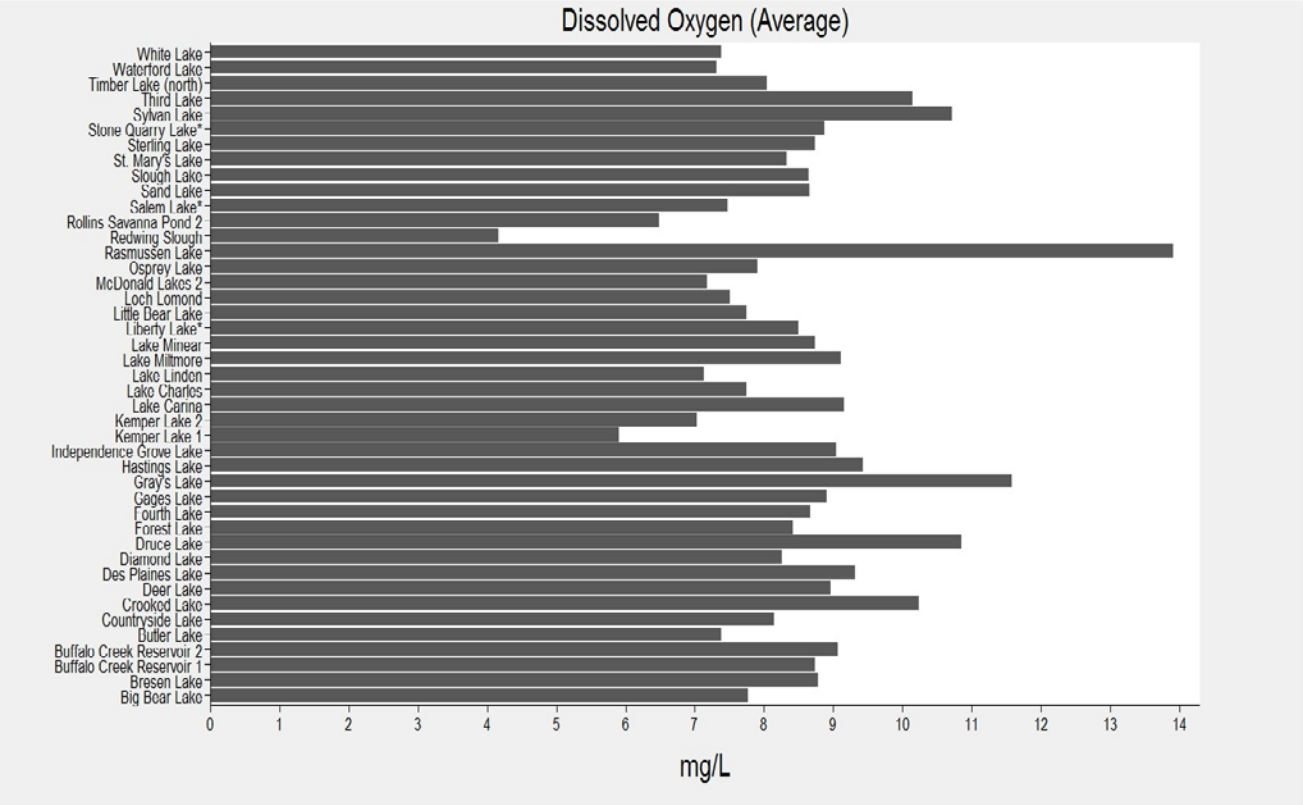


Figure 3-104: Most Recent Yearly Average Dissolved Oxygen Concentration by Lake

3.16.4.9Other Parameters/Studies

BCCWP and the Lake County Health Department also collected sediment samples at Albert Lake and two sites at Buffalo Creek Reservoir (one in each basin). Samples were analyzed for 136 parameters. Published guidelines (MacDonald, et al. 2000; Mitzelfelt, 1996) were exceeded for 7 parameters in Albert Lake and 10 parameters in Buffalo Creek Reservoir. In Albert Lake, copper and nickel are above a "threshold effect" concentration, indicating that they may have some effect on benthic organisms. Silver was considered highly elevated relative to mean concentrations from samples from 63 Illinois lakes. Mercury was above the "probable effect" concentration and considered elevated relative to concentrations from samples from 63 Illinois lakes, but may be bound to sediment, posing minimal risk. One suspected source of metals is the former Lake Zurich treatment plant that discharged to Buffalo Creek upstream of Albert Lake, which closed in 1993. In Buffalo Creek Reservoir, copper was found to be above the "threshold effect" concentration in the east basin. In the west basin, silver was considered highly elevated and mercury was above the "threshold effect" concentration and considered elevated relative to samples from 63 Illinois lakes (BCCWP and LCSMC 2015). Additionally, 5 organic compounds, all PAHs, were detected above the "threshold effect" level in Buffalo Creek Reservoir: pyrene, fluoranthene, chrysene, benzo(a)pyrene, and benzo(a)anthracene (BCCWP, 2015).

3.16.4.10 Kenosha County Lake Assessments

George Lake and Benet Lake/Lake Shangrila are lakes within the DPR planning area that are in Kenosha County, Wisconsin. George Lake is a 59-acre glacial lake located in Kenosha County, Wisconsin that is fed by two intermittent unnamed tributary streams. George Lake has a maximum depth of 16 ft, an average depth of 7 ft, 1.2 miles of shoreline, and a watershed area of 2,187 acres. The lake has one outlet, a fixed crest spillway/ dam, that is a major tributary of North Mill Creek / Dutch Gap Canal. There has been a gradual change in land use within the George Lake subwatershed from agricultural to urban since the 1950's. This trend is expected to continue in the future. Water quality data is provided by the 2007 lake management plan for George Lake, which was written by SEWRPC using data collected by the WI DNR's citizen lake monitoring network. George Lake is considered productive, nutrient rich, and visual assessments indicate an increase in algal blooms and a decrease in water clarity. George Lake has an average secchi depth of 4.83 ft, an average chloride concentration of 36 mg/L, and an average TP concentration of 0.05 mg/L. The lake is phosphorus limited and eutrophic. SEWRPC determined that stormwater runoff is the most likely source of phosphorus to the lake. George Lake has high quality habitat, with high numbers of plant and animal species. There is minimal shoreline erosion at George Lake.

Benet Lake is a 95.14-acre glacial lake located primarily in Wisconsin (93.5%) with a small portion (6.5%) on the south side extending into Lake County in Illinois. Benet Lake is connected by a shallow channel to Lake Shangrila and is sometimes considered part of the same lake with a total of size of 185.9 acres. The Illinois portion of the lake lies in the extreme northwest corner of the North Mill Creek / Dutch Gap Canal watershed. Benet Lake is not connected directly to North Mill Creek and is an isolated water body. Benet Lake has an average secchi depth of 1.4 ft, and an average TP concentration of 0.046 mg/L. Lake Shangrila has an average secchi depth of 1.0 ft, and an average TP concentration of 0.046 mg/L. Both lakes TP concentrations exceed Wisconsin state limits. Lake Benet is slightly hypereutrophic and has heavy algal blooms, dense aquatic vegetation beds, blue green algae blooms, and Eurasian Watermilfoil present along the shoreline.

3.17 NPDES POINT SOURCE PERMITS

The USEPA under the Federal Water Pollution Control Act Amendments of 1972, regulates and monitors point source industrial and wastewater pollutant discharges into the nation's waterways (Public Law 92-500; 33 U.S.C. 1251 et seq.). Authorized under amendments made to the 1977 CWA in 1987 and implemented in 1990, the USEPA developed a two-phased NPDES permit program to address industrial and MS4s, serving populations of greater than 100,000, requiring a permit to discharge stormwater from their outfalls into waterways. NPDES Phase 2, enacted into law in 1999 and implemented in 2003, builds upon the existing Phase I program by regulating stormwater discharges from small MS4s located in urbanized areas (as defined by the latest decennial census) and construction sites that disturb one to five acres obtain a permit to discharge stormwater from their outfalls into waterways. Additional information regarding the NPDES program and specifically permit basics and definitions are available from USEPA NPDES website (USEPA WMPD, 2012; USEPA, 2017, December 21). See section 3.18.1 for more information on DPR planning area NPDES permits that are currently active at the time of compiling this report.

Point sources are defined as discrete conveyances including but not limited to any pipe, ditch, channel, or conduit from which pollutants are or may be discharged into waterways. Point source regulation through NPDES includes wastewater treatment plants, industrial discharges, concentrated animal feeding operations, combined sewer overflows, sanitary sewer overflows, urban stormwater runoff and MS4 urban stormwater discharges. The NPDES program plays a key role in restoring water quality since it sets discharge limits, requires monitoring and reporting requirements, and limits discharge of specific pollutants including BOD, TSS, ammonia nitrogen, fecal coliform, DO, and phosphorus.

3.17.1 Wastewater Treatment Plants

WWTP's are vital to public health. Sewers collect sewage and wastewater from homes, businesses, and industries and deliver it to wastewater treatment facilities to remove pollutants from water impacted by human waste which can be either discharged to water bodies or land, or reused.

Sewage treatment processes typically use a series of processes to treat wastewater prior to discharge. The typical series of unit processes includes:

- preliminary treatment or screening to remove large solids,
- primary clarification (or preliminary sedimentation) to remove floating and settleable solids,
- biological treatment (also referred to as secondary treatment) to remove biodegradable organic pollutants and suspended solids, and
- disinfection to deactivate pathogens.

Some facilities also provide more advanced treatment which is designed to reduce constituents, such as nitrogen and phosphorus, that are not removed in any significant quantity by traditional biological treatment processes. Some municipalities currently experience high peak influent flows during periods of increased wet weather that exceed the treatment capacity of existing biological or advanced treatment units.

Under these 'peak flow conditions,' in order to prevent damage to the wastewater treatment plant, some plant operators divert a portion of the flow around biological or advanced treatment units. The diverted flow is then either recombined with flows from the biological treatment units or discharged directly into waterways" (*USEPA,* 2016).

Within the DPR planning area, there are 18 active WWTPs of varying capacity, function and treatment capabilities based on the USEPA Facility Registry System database (Table 3-56 and Figure 3-104) (USEPA, 2017). Of the 18 WWTPs identified, nine are operated by a public government body and service a population range of 2,860 -126,629 per facility, or a total population of 395,928. Based on the available data from current NPDES permits, the WWTPs in the DPR planning area contribute an actual average of 80.80 MGD of treated water into the Des Plaines River system through various waterbodies (20.19 MGD) or via direct discharge (60.61 MGD) into the main stem of the Des Plaines river. Table 3-57 lists Wastewater Treatment Plants in the DPR planning area Direct Discharges & Violations. The 18 WWTPs within the DPR planning area have the capacity to process 197.758 MGD of treated water into the Des Plaines River system.

Of the 18 WWTP's, 17 are located within the DPR planning area with the exception of the NSWRD Waukegan Facility which is located in the Lake Michigan Watershed. The Waukegan NSWRD facility discharges into the DPR planning area with an average of 22 MGD of treated water. The IDNR Upper Des Plaines River Area Assessment Volume 2: Water Resources concludes that 25% of water flow in the Upper Des Plaines River Watershed originates from wastewater treatment plants, with most of the WWTP water discharge having originated and been withdrawn from Lake Michigan for use in public water supply via the Central Lake County Joint Action Water Agency water supply (Illinois Department of Natural Resources, 1998). Treated Wastewater makes up 50% and 95% of Des Plaines River flows during medium to low flow situations, respectively.

Table 3-56: Wastewater Treatment Plants in the DPR Planning Area

PERMIT NO.	WASTEWATER TREATMENT PLANT	ACTUAL AVERAGE FACILITY FLOW (MGD)	FACILITY DESIGN FLOW (MGD)	RESIDENTS SERVED	SITE FUNCTION
IL0051934	Alden Long Grove Rehabilitation Center STP	0.015	0.037	Varies	Private Healthcare Facility
IL0049930	Fox Point Mobile Home Park STP - Wheeling	0.016	0.04	Varies	Private Mobile Home Site
IL0022055	Lake County Public Works Des Plaines River	16	51.8	80,132	County WWTP
IL0071366	Lake County Public Works Mill Creek STP	2.1	7.8	2,860	County WWTP
IL0022071	Lake County Public Works New Century Town STP	6	18	12,800	County WWTP
IL0020796	Lindenhurst Sanitary District STP	2	5.7	14,861	Municipal WWTP
IL0072966	Lou Perrine's Gas & Groceries STP	0.015	0.022	Varies	Fuel Station
IL0078093	Mobil Oil Service Gas Station WWTP	0.0043	0.011	Varies	Fuel Station
IL0035092	North Shore Water Reclamation District Gurnee STP	23.6	47.2	105,208	Municipal WWTP
IL0030244	North Shore Water Reclamation District Waukegan STP	22	44	126,629	Municipal WWTP
WI0030481	Paramski Mobile Homes Rainbow	0.04		Varies	Private Mobile Home Site
IL0024350	St. Mary's of the Lake Seminary - STP	0.03	0.075	Varies	Private WWTP
IL0073431	Toor Car & Truck Plaza STP	0.0075	0.011	Varies	Private Fuel Station
IL0071722	Tristar Gas and Food _ Wadsworth Plaza	0.012	0.02	Varies	Fuel Station
IL0029530	Village of Libertyville STP	4	8	22,503	Municipal WWTP
IL0022501	Village of Mundelein STP	4.95	15	30,935	Municipal WWTP
IL0074535	Wadsworth Crossing STP	0.008	0.032	Varies	Fuel Station/ Business Complex
IL0047619	Wadsworth Marathon STP	0.004	0.01	Varies	Fuel Station
	Total:	**80.8017**	**197.758**		

Table 3-57: Wastewater Treatment Plants in the DPR planning area Direct Discharges and Violations

PERMIT NO.	WASTEWATER TREATMENT PLANT	ACTUAL AVERAGE FACILITY FLOW (MGD)	DIRECT DISCHARGES TO…	VIOLATION ISSUES 2013-2016*[1]
IL0051934	Alden Long Grove Rehabilitation Center STP	0.015	Unnamed Trib of Buffalo Creek	Chlorine
IL0049930	Fox Point MHP STP - Wheeling	0.016	Des Plaines River	No Issues
IL0022055	Lake County Public Works Des Plaines River	16	Aptakisic Creek	No Issues
IL0071366	Lake County Public Works Mill Creek STP	2.1	Mill Creek	No Issues
IL0022071	Lake County Public Works New Century Town STP	6	Des Plaines River	No Issues
IL0020796	Lindenhurst Sanitary District STP	2	Hastings Creek/Mill Creek	No Issues
IL0072966	Lou Perrine's Gas & Groceries STP	0.015	Des Plaines River	Nitrogen, ammonia total [as N] Coliform; Fecal general
IL0078093	Mobil Oil Service Gas Station WWTP	0.0043	Des Plaines River	Ammonia as N; Solids, total suspended; BOD, carbonaceous, 05 day, 20 C
IL0035092	North Shore Water Reclamation District Gurnee STP	23.6	Des Plaines River	No Issues
IL0030244	North Shore Water Reclamation District Waukegan STP	22	Des Plaines River	No Issues
WI0030481	Paramski Mobile Homes Rainbow	0.04	Unnamed Tributary	No Issues
IL0024350	St. Mary's of the Lake Seminary - STP	0.03	St. Mary's Lake	Ammonia as N
IL0073431	Toor Car & Truck Plaza STP	0.0075	Unnamed Tributary (via storm sewer) to the Des Plaines River	Ammonia as N; Solids, total suspended
IL0071722	Tristar Gas and Food _ Wadsworth Plaza	0.012	Des Plaines River	BOD, carbonaceous, 05 day, 20 C; Solids, total suspended; Ammonia as N;
IL0029530	Village of Libertyville STP	4	Des Plaines River	Ammonia as N; BOD, carbonaceous, 05 day, 20 C
IL0022501	Village of Mundelein STP	4.95	Des Plaines River	No Issues
IL0074535	Wadsworth Crossing STP	0.008	Des Plaines River	No Issues
IL0047619	Wadsworth Marathon STP	0.004	Des Plaines River	Ammonia as N; Solids, total suspended; Oil and grease;
	TOTAL:	**80.8018**		

* A violation is noted as per the EPA Discharge Monitoring Report Pollutant Loading Tool as one or more exceedances of permit effluent limits for this pollutant sometime during the year recorded.

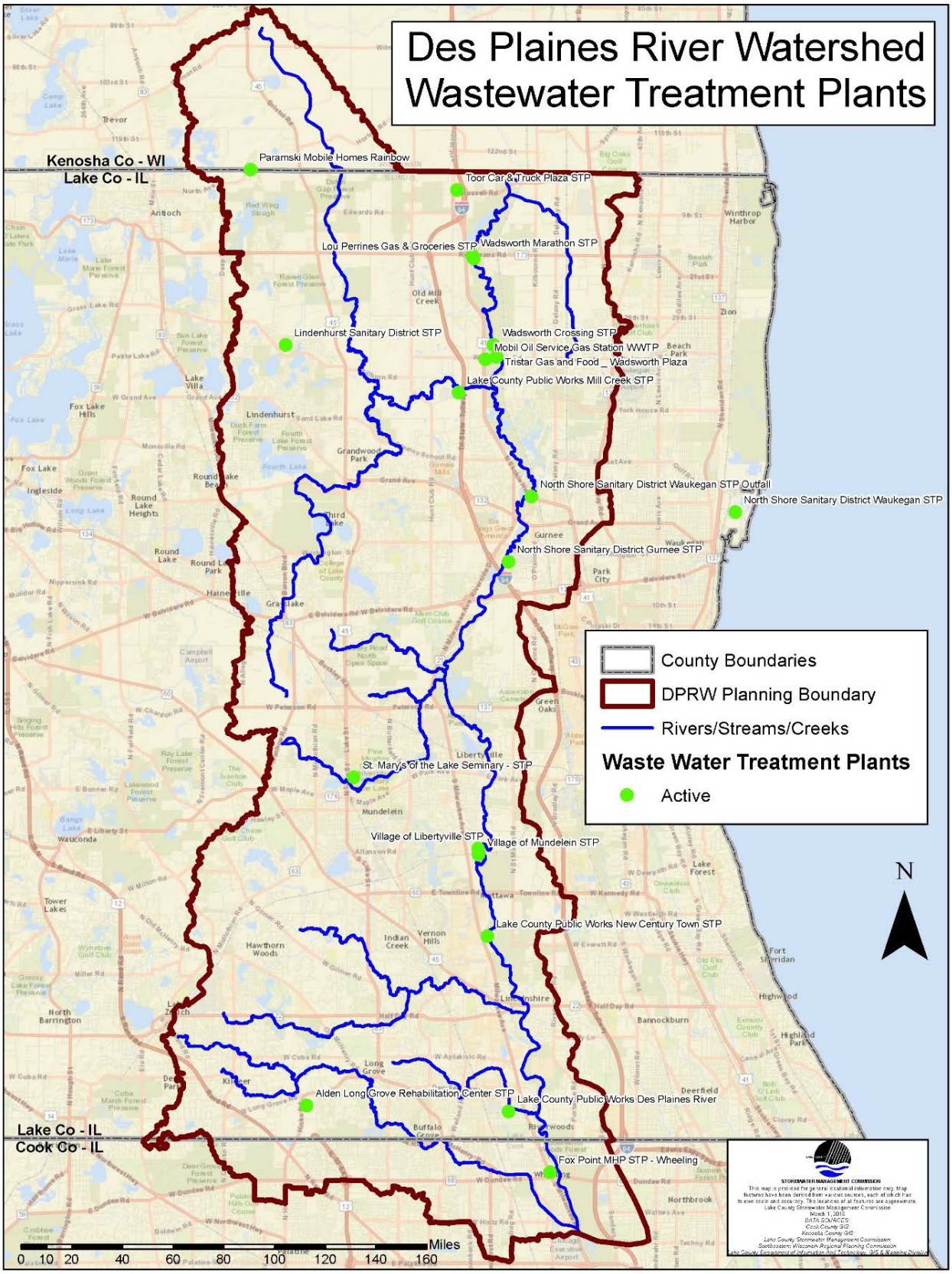


Figure 3-105: DPR Planning Area Active WWTPs

3.17.2 Other Point Sources

3.17.2.1Pesticide Point Source Discharge

Pesticide Application Point Source Discharges regulates point source discharges of biological pesticides and chemical pesticides that leave a residue over or into waters of the U.S. and requires a permit under the USEPA NPDES pesticides general permit (Illinois EPA, 2011). The USEPA's pesticides general permit authorizes discharges to waters of the U.S. from the application of biological pesticides and chemical pesticides that leave a residue for mosquito and other flying insect pest control, aquatic weed and algae control, aquatic nuisance animal control and forest canopy pest control.

Agricultural runoff and/or irrigation return flows that contain pesticides are exempt from NPDES permitting requirements as authorized by Congress in 1987 with an amendment to the CWA for the exemption. In Illinois, the Pesticide Application Point Source Discharges permit is NPDES Permit No. ILG87. In Wisconsin the Pesticide Application Point Source Discharges permits are: Aquatic Plants, Algae and Bacteria - Permit No. WI0064556, Detrimental or Invasive Aquatic Animals - Permit No. WI0064564, Forest Canopy Pests - Permit No. WI-0064572, or Mosquitoes or Other Flying Insects - Permit No. WI-0064581.

Within the study area are 26 NPDES Pesticide Application Point Source Discharge permits (USEPA, 2017, January 4), all located in Illinois within the DPR planning area or within a municipality that comprises some percentage of the land jurisdiction within the DPR planning area, see Table 3-58 and Figure 3-105 for individual NPDES pesticide permits. There may be additional commercial organizations with an NPDES pesticides general permit performing work on public and private property within the study area but are not included within this inventory as their activities cannot be determined at this time.

Table 3-58: ILG87 Permits Issued to Organizations located within a Municipality with Jurisdiction in the DPR Planning Area

PERMITTEE	NPDES PERMIT NO.	CITY	PERMITTEE	NPDES PERMIT NO.	CITY
Apex Landscaping	ILG870764	Hawthorn Woods	**Michael Gowe**	ILG870196	Gurnee
Ela Township	ILG870500	Lake Zurich	**Northern Illinois Lake and Pond Management**	ILG870080	Palatine
Fremont Township	ILG870748	Mundelein	**Northwest Mosquito Abatement**	ILG870138	Wheeling
Glenview, Village of	ILG870649	Glenview	**Palatine Park District**	ILG870105	Palatine
Integrated Lakes Management	ILG870013	Waukegan	**Palatine, Village of**	ILG870698	Palatine
John Weatherton	ILG870782	Buffalo Grove	**Royal Melbourne Country Club**	ILG870102	Long Grove
Lake County Forest Preserve District	ILG870192	Libertyville	**Skeeter Beater, LLC**	ILG870889	Hawthorn Woods
Lake County Health Department	ILG870262	Libertyville	**Teresa Jane Thornton**	ILG870726	Wadsworth
Lake Villa Township Office Daycare-Treatment Plant	ILG870348	Lake Villa	**Vernon Hills Park District**	ILG870104	Vernon Hills
Libertyville, Village of	ILG870890	Libertyville	**Village of Buffalo Grove Dept. PW**	ILG870678	Buffalo Grove
Lincolnshire Dept. PW	ILG870473	Lincolnshire	**Warren Township Highway Dept.**	ILG870360	Gurnee
McGinty Bros Inc	ILG870369	Long Grove	**Woodland CCSD 50**	ILG870788	Gurnee

Data Source: USEPA Facility Registry Service (FRS)

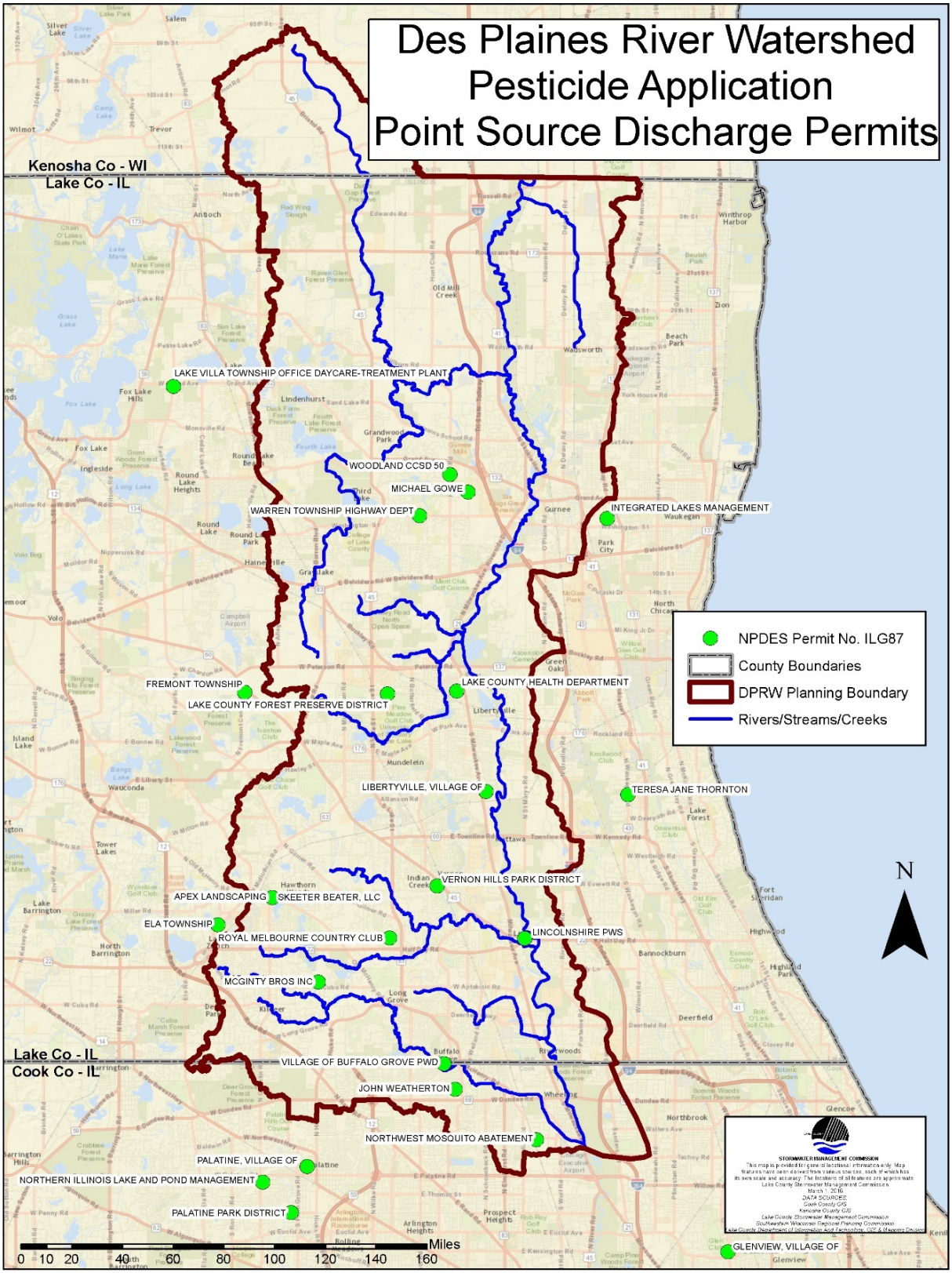


Figure 3-106: DPR Planning Area Pesticide Application Point Source Discharge Permit

3.18 NPDES PHASE II STORMWATER PERMITS

The NPDES Phase II Program regulates stormwater discharges from small MS4s, industrial and construction site activities. Stormwater runoff is identified as a key method of conveying pollutants from impervious surfaces into local rivers and streams causing, untreated water to degrade water quality. Polluted runoff or nonpoint source (NPS) pollution substantially impacts water quality. Polluted runoff is caused by rainfall or snowmelt moving over and through the ground picking up natural and human–made pollutants, depositing them into rivers, lakes, wetlands and groundwater.

Under the permitting requirements of the NPDES Phase II, permittees are required to implement certain practices that control pollution in stormwater runoff. They are required to prevent the contamination of stormwater runoff and develop a SWPPP. NPDES Phase II, is intended to reduce negative impacts to water quality and aquatic habitats by preventing and controlling unregulated sources of storm water discharge, educating communities about water quality and improving water quality.

3.18.1 INDUSTRIAL ACTIVITY STORM WATER POINT SOURCE DISCHARGE (STORMWATER DISCHARGES FROM INDUSTRIAL ACTIVITIES, 2009)

Storm Water Discharges from Industrial Activities into WOUS require a permit under the USEPA NPDES. This permit is applicable to storm water discharges associated with industrial activity from areas where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water in the state of Illinois. Runoff from rainfall or snowmelt that comes in contact with these industrial activities can pick up pollutants and transport them directly to a nearby river or lake coastal water or indirectly via a storm sewer and degrades water quality. The permit provides a list of facilities that are included and excluded under a General NPDES Permit for Industrial Storm Water Discharge into WOUS.

In Illinois, the Industrial Activity Storm Water Point Source Discharge is NPDES Permit No. ILR00 *(*Illinois EPA, 2016). In Wisconsin, there are 6 individual permits for Industrial Activity Storm Water Point Source Discharges: Tier 1 Permit No. S067849; Tier 2 Permit No. S067857; Non-metallic Mining Operations Permit No. A046515 or B046515; Auto Recycling Permit No. S059145 or Permit No. S058831 (WI DNR*,* 2016).

There are 50 NPDES Industrial Activity Storm Water Point Source Discharge permits located within the DPR planning area (USEPA, 2017). No permittees were observed in Wisconsin.

Table 3-59 and Figure 3-106 identifies individual NPDES industrial storm water discharge permits.

Table 3-59: ILR00 Permits Issued to Organizations located within the DPR Planning Area

PERMITTEE	NPDES PERMIT NO.	CITY	PERMITTEE	NPDES PERMIT NO.	CITY
Aptar	ILR007086	Libertyville	Nichols Aluminum LLC-Lincolnshire Operations	ILR000454	Lincolnshire
Campanella & Sons, Inc.	ILR004465	Wadsworth	Northfield Block Co	ILR002622	Mundelein
Carter-Hoffmann, LLC	ILR006361	Mundelein	Nu-Pro Polymers	ILR000922	Wheeling
Chicago Executive Airport	ILR002970	Wheeling	Onyx Waste Svcs	ILR002927	Waukegan
Clavey Rd Sewage Treatment PLT	ILR004380	Gurnee	Orange Crush LLC	ILR004268	Wheeling
Clavey Rd Sewage Treatment PLT	ILR004379	Gurnee	Pactiv Corp	ILR001122	Wheeling
Clavey Rd Sewage Treatment PLT	ILR004381	Gurnee	Penray Cos Inc	ILR001445	Wheeling
Conway Central Express	ILR001361	Mundelein	PQ Corp Gurnee	ILR007190	Gurnee
Countryside Landfill	ILR000152	Grayslake	PQ Corporation	ILR005547	Gurnee
Degussa Construction Chemicals	ILR000512	Gurnee	Rexam Medical Packaging	ILR000036	Mundelein
Dist Tech	ILR003946	Gurnee	Roquette America Inc	ILR000528	Gurnee
Fedex Freight Inc	ILR006624	Zion	Signode Svc Business	ILR005975	Arlington Heights
Fedex Ground	ILR007009	Grayslake	Solo Cup Co	ILR006120	Wheeling
Gallagher Corp	ILR000225	Gurnee	Spectrum Mfg Inc (D/B/A Lake Region Medical)	ILR005969	Wheeling
HV Manufacturing Co	ILR001136	Wheeling	Taubensee Steel & Wire Co.	ILR000968	Wheeling
Inland Die Casting	ILR002937	Wheeling	Tempel Steel Co	ILR001252	Libertyville
Kirschhoffer Truck Service Inc	ILR002118	Zion	Tomoegawa	ILR000207	Wheeling
Laidlaw Transit Inc	ILR004388	Wheeling	Tredegar Film Products - Lake Zurich Inc	ILR000255	Lake Zurich
Land & Lakes Wheeling	ILR001840	Deerfield	United Parcel Service	ILR003127	Palatine
Maclean-Fogg Component Systems	ILR003992	Mundelein	Vantage Specialties	ILR001027	Gurnee
Maclean Molded Products	ILR000265	Wheeling	VCNA Prairie Illinois Inc Yard 1024	ILR002515	Vernon Hills
Meyer Material-N. Chicago 21	ILR003680	Lake Bluff	Village of Mundelein-Waste Water Treatment Plant	ILR006234	Libertyville

PERMITTEE	NPDES PERMIT NO.	CITY	PERMITTEE	NPDES PERMIT NO.	CITY
MHS Automation	ILR005423	Round Lk Bch	Vulcan Construction Materials LP	ILR006844	Grayslake
Mike Kallas	ILR005436	Gurnee	YRC Inc	ILR001987	Wheeling
Newport Township Landfill	ILR004382	Gurnee	Zeller Plastik Inc	ILR006977	Libertyville

Data Source: USEPA Facility Registry Service (FRS)

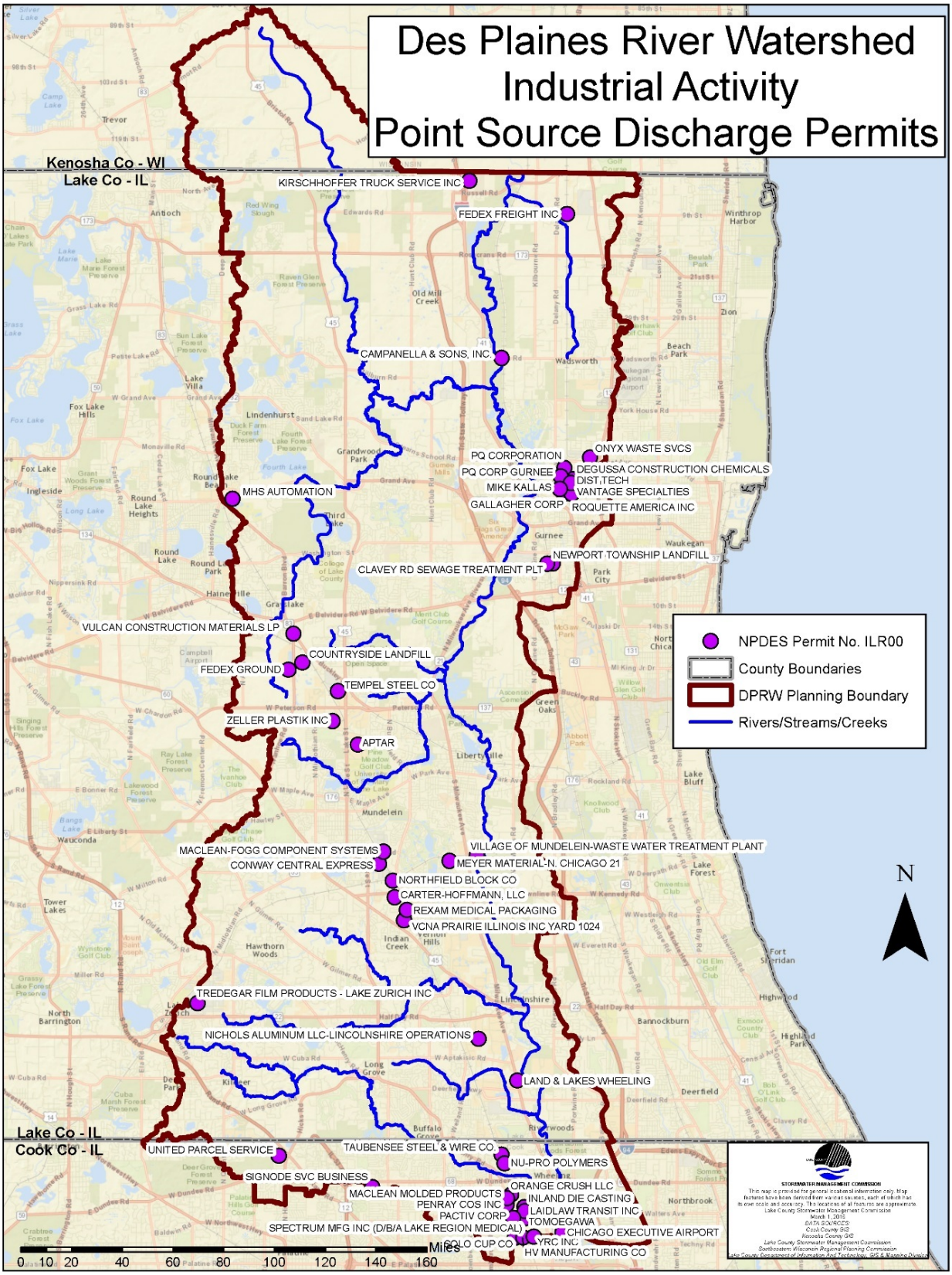


Figure 3-107: DPR Planning Area Industrial Activity Point Source Discharge Permits

3.18.2 Construction Site Activities Storm Water Discharge ("General Stormwater NPDES Permit for Construction Activities," 2010)

A USEPA NPDES permit is required for stormwater discharges into WOUS from construction sites where one or more acres of land is disturbed. Smaller sites within a larger construction project or development must consider the total disturbance of the project when determining if a USEPA NPDES permit is required. Many permittees in Illinois obtain permit coverage for their construction projects under the State's General Storm Water NPDES Permit for Construction Activities. In order for storm water discharges from construction sites to be authorized under this General Permit, the owner must submit a NOI in accordance with the requirements of the general permit. Permittees must develop and implement a SWPPP to effectively manage the discharge of pollutants from the site.

In Illinois, the Construction Site Activities Storm Water Discharge is Permit No. ILR10 *(*Illinois EPA, 2014). In Wisconsin, the construction site activities storm water discharge permit is Permit No. WI-S067831 (WI DNR, 2012).

Within the study area 86 NPDES ILR10 permits are identified as being located within the DPR planning area (USEPA, 2017). No permittees were observed in Wisconsin. Table 3-60 and Figure 3-107 identify individual NPDES construction site activity storm water point source discharge permits.

Table 3-60: ILR10 Permits Issued to Organizations located within the DPR Planning Area

PERMITTEE	NPDES PERMIT NO.	CITY	PERMITTEE	NPDES PERMIT NO.	CITY
Adler Square-Libertyville	ILR10J353	Libertyville	Hope Presbyterian Church	ILR10J181	Grayslake
Affinity Processing Serv Inc	ILR10C930	Lake Zurich	Independence Grove Parking Lot	ILR10H391	Libertyville
Almond Marsh Preserve	ILR10D489	Grayslake	Ired Lake Co-Mill Creek Estate	ILR10J611	Oak Brook
Amcore Bank-Antioch	ILR10J584	Antioch	Jacobs Way	ILR10I929	Mundelein
Amcore Bank-Vernon Hills Lt 3	ILR10J536	Vernon Hills	Katie's' Subdivision	ILR10H479	Wheeling
Apachi Day Camp	ILR10H930	Lake Zurich	Kemper Lakes Club	ILR10H332	Kildeer
Arlington Heights Nissan	ILR10D867	Arlington Heights	Keylime Cove	ILR10D881	Gurnee
Autozone Auto Parts	ILR10H372	Gurnee	Lake Co-Galt Offsite Wm Ext	ILR10J431	Oak Mill Creek
Autumn Leaves-Vernon Hills	ILR10H770	Vernon Hills	Lake Co Forest Preserve-Heron	ILR10I429	Libertyville
Berenesa Plaza Shopping Center	ILR10I878	Buffalo Grove	Lake County Hs Tech Campus	ILR10I153	Grayslake
Bridgeview Commons	ILR10J289	Lincolnshire	Lake Forest Oasis	ILR10A760	Lake Forest
Castillo Single Family Home	ILR10H281	Wadsworth	LCFPD Ryerson Visitors Center	ILR10A409	Deerfield
Centerpoint Business Ctr-1&3	ILR10I916	Gurnee	Lehman Manufactured Homes	ILR10I202	Zion
Chase Bank	ILR10H422	Waukegan	Life Time Fitness	ILR10H957	Vernon Hills
City Limits Harley Davidson	ILR10J419	Palatine	Lowe's - Vernon Hills	ILR10H661	Vernon Hills

PERMITTEE	NPDES PERMIT NO.	CITY	PERMITTEE	NPDES PERMIT NO.	CITY
Clubland Commons	ILR10I283	Antioch	Majestic Pines of Indian Creek	ILR10J688	Indian Creek
Cobblestone Land Comm Bldgs.	ILR10I933	Schaumburg	Marling-Delany Rd Buildings	ILR10J637	Waukegan
Coe-Butler Lake-Libertyville	ILR10E479	Libertyville	Menards Il 53 Rd Imprv-Long Gr	ILR10H987	Long Grove
Coletta Single Family Home	ILR10I385	Wadsworth	Midlane Club-Waukegan	ILR10J370	Waukegan
College of Lake County	ILR10I904	Grayslake	Millbrook Pointe (Ig#7006)	ILR10J440	Wheeling
Columbus Centre	ILR10I573	Lake Zurich	Mobil Oil WWTP	ILR10H385	Wadsworth
Compx International Inc	ILR10H366	Grayslake	Multi-Tenant Bldg. Lot 4	ILR10H485	Lake Zurich
Condell Medical Ctr Emerg Exp	ILR10I474	Libertyville	Mundelein Town Center	ILR10I124	Mundelein
Congregation or Shalom	ILR10J684	Vernon Hills	Normandy Woods Subdivision	ILR10I119	Gurnee
Deer Park Estates	ILR10F521	Deer Park	Northfield Block Co	ILR10I999	Mundelein
Eastgate Estates Subdivision	ILR10H538	Long Grove	Oaks of Lincolnshire Subd	ILR10H686	Lincolnshire
Edward R. James Homes	ILR10C932	Buffalo	Offices & Deer Park Town Ctr	ILR10I942	Deer Park
Eleanor Lane Subd	ILR10J139	Kildeer	Pond View Estates	ILR10H605	Wadsworth
Estates at Churchill Hunt Ph. 2	ILR10C868	Gurnee	Retail Strip Mall-Long Grove	ILR10J283	Long Grove
Evergreen Point of Kildeer	ILR10C390	Kildeer	Safco	ILR108338	Buffalo Grove
Falling Waters Way-L 22-26	ILR10I597	Lindenhurst	Sonday Property Warehouse	ILR10J601	Zion
Forest Avenue Retail Ctr	ILR10I394	Mundelein	Springhill Suite Hotel	ILR10I120	Waukegan
Fox Chase Center LLC	ILR10I475	Round Lake Beach	Stone Creek Crossing	ILR10I788	Grayslake
Gates of Deer Grove Grading	ILR10J171	Palatine	Stone Creek Crossing	ILR10H695	Grayslake
Grand Gurnee Plaza	ILR10I672	Gurnee	Sunrise Senior Living	ILR10H512	Mundelein
Grants Grove	ILR10A360	Lindenhurst	Superdawg Drive-In	ILR10J743	Wheeling
Grayslake Side Track	ILR10A543	Grayslake	Tore & Lukes Restaurant	ILR10J633	Palatine
Great Lakes Crossing Comm Dev	ILR10H582	Zion	Tri-State Venture One	ILR10I831	Gurnee
Gross Property Warehouse	ILR10J589	Zion	Triangle Corporate Park	ILR10I918	Gurnee
Gurnee Community Bank	ILR10C696	Gurnee	Trumpet Park Subdivision	ILR10H269	Zion
Gurnee Fuel Stop	ILR10D878	Gurnee	Walmart #1668-03	ILR10I337	Gurnee
Hampton Inn & Ste.-Libertyville	ILR10I674	Libertyville	Wanish Park Townhomes/Condos	ILR10H953	Libertyville
Heritage Trails Subdivision	ILR10J230	Zion	Wheeling Animal Hospital	ILR10D982	Wheeling

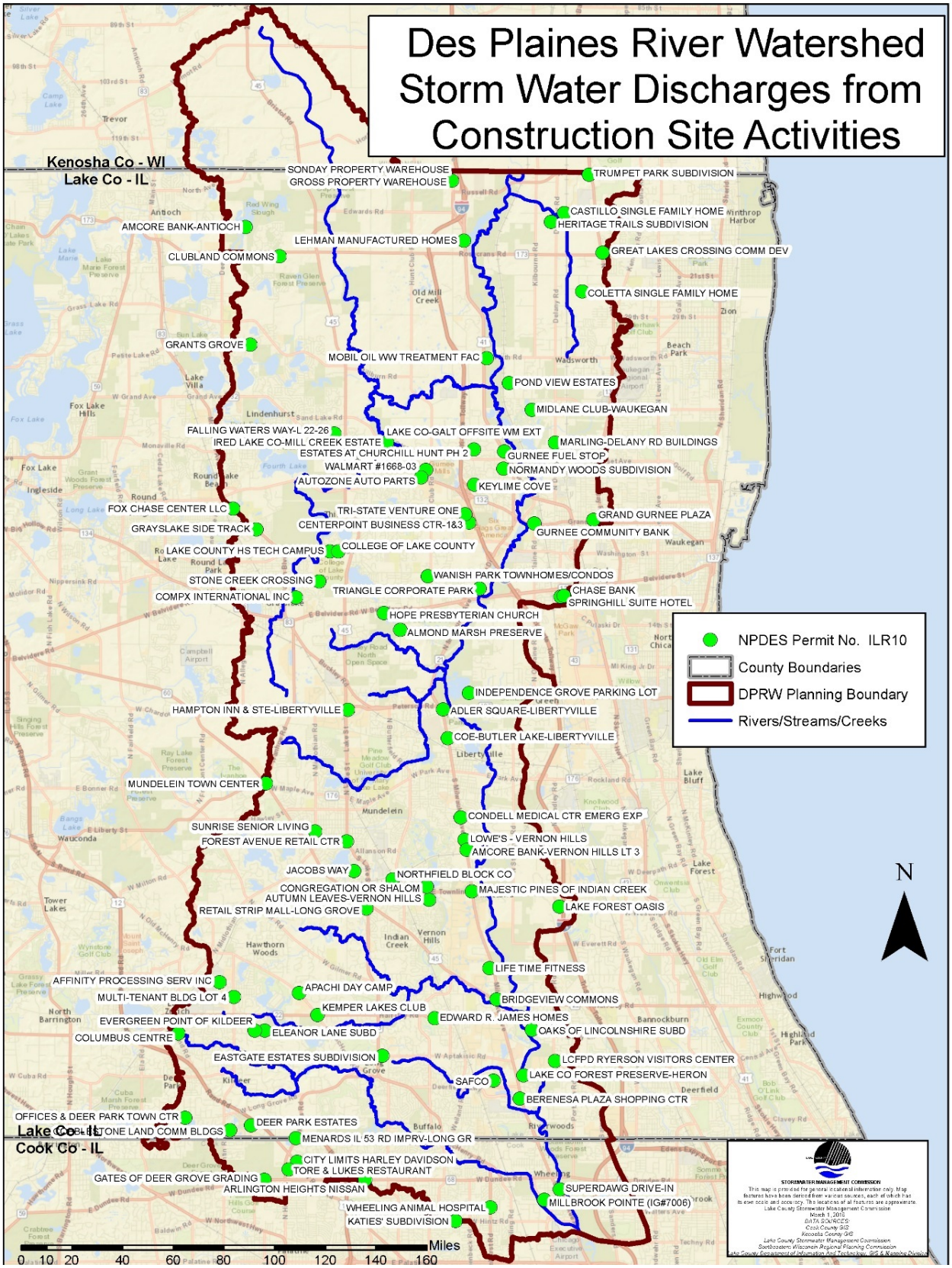


Figure 3-108: DPR Planning Area Storm Water Discharges from Construction Site Activities

3.18.3 ILR40, Discharges from Small Municipal Separate Storm Sewer Systems

Per Permit No. *ILR40 (Illinois EPA,* 2016), Storm Water Discharges from Small MS4s into WOUS require a permit under the USEPA NPDES program as many units of government have distinct roles and responsibilities related to water quality and nonpoint source pollution control. Discharges from small MS4s in USEPA Region 5 states are regulated under each state's general NPDES Permit No. ILR40 (Illinois) and WI-S050075-2 (Wisconsin) (USEPA, 2016). In the DPR planning area, the state NPDES program administrators are the Illinois EPA and the WI DNR.

The permit requires that MS4 operators develop, implement, and enforce a stormwater management program to reduce the discharge of pollutants. A permittee's stormwater management program must include six minimum control measures:

1. Public education and outreach on storm water impacts
2. Public involvement and participation
3. Illicit discharge detection and elimination
4. Construction site storm water runoff control
5. Post construction storm water management in new development and redevelopment
6. Pollution prevention / good housekeeping for municipal operations

To define its storm water management program, a permittee must define BMPs and measurable goals for each of the six minimum control measures.

In the DPR planning area, there are 3 units of county government, 15 units of township government, 37 units of municipal government and 2 drainage districts operating as MS4's with distinct roles and responsibilities related to activities and water quality control (Figure 3-108).

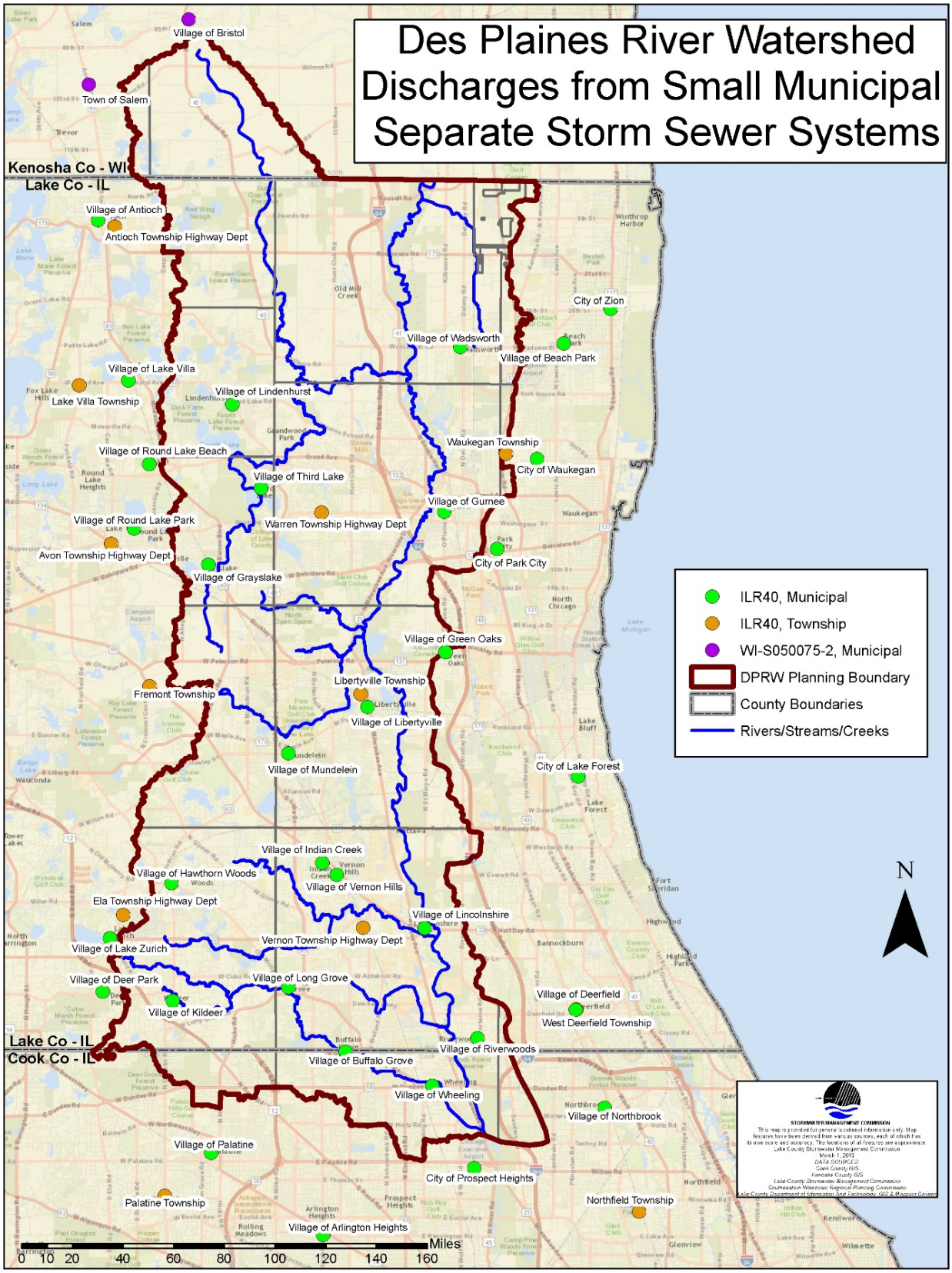


Figure 3-109: DPR Planning Area Small Municipal Separate Storm Sewer Systems

3.18.3.1 Municipal

In the DPR planning area, there are 37 units of municipal government, located within 2 states and 3 counties. The following NPDES MS4 tables' detail the municipality by name, the NPDES MS4 permit number, the number of acres the municipality has jurisdiction of within the DPR planning area and a percentage of their municipality. Each table is separated based on its County affiliation in either Wisconsin or Illinois.

There are 27 municipal units of government with NPDES MS4 permits within the DPR planning area in Lake County, IL (Table 3-61). Contributing acres by municipal units of government in Lake County ranges from 37-8,639 acres.

Table 3-61: ILR10 Permits Issued to Organizations located within the DPR Planning Area

PERMITTEE	PERMIT NO.	ACRES IN DPR PLANNING AREA	PERCENT	PERMITTEE	PERMIT NO.	ACRES IN DPR PLANNING AREA	PERCENT
City of Lake Forest	ILR400367	107.03	1.0%	Village of Libertyville	ILR400374	5,866.38	100.0%
City of Park City	ILR400420	259.71	34.8%	Village of Lincolnshire	ILR400375	2,204.70	73.7%
City of Waukegan	ILR400465	3,728.32	23.7%	Village of Lindenhurst	ILR400276	3,119.38	99.9%
City of Zion	ILR400482	1,285.57	20.5%	Village of Long Grove	ILR400219	8,035.64	100.0%
Village of Antioch	ILR400281	2,128.89	39.2%	Village of Mettawa	No Active Permit	2,705.42	79.6%
Village of Beach Park	ILR400164	1,365.34	30.2%	Village of Mundelein	ILR400395	5,935.05	92.8%
Village of Grayslake	ILR400202	6,821.86	95.0%	Village of Old Mill Creek	No Active Permit	6,901.73	100.0%
Village of Green Oaks	ILR400203	772.78	29.3%	Village of Riverwoods	ILR400431	1,618.31	63.1%
Village of Gurnee	ILR400204	8,639.04	98.7%	Village of Round Lake Beach	ILR400439	406.20	12.2%
Village of Hawthorn Woods	ILR400209	3,558.19	67.0%	Village of Round Lake Park	ILR400242	37.28	2.6%
Village of Indian Creek	ILR400212	170.68	100.0%	Village of Third Lake	ILR400654	551.03	100.0%
Village of Kildeer	ILR400215	2,838.87	100.0%	Village of Vernon Hills	ILR400252	5,047.22	100.0%
Village of Lake Villa	ILR400369	216.43	4.6%	Village of Wadsworth	ILR400492	6,266.59	100.0%
Village of Lake Zurich	ILR400370	2,023.66	43.6%				

There are 7 municipal units of government that are located in both Lake and Cook County, IL (Table 3-62). Contributing acres by municipal units of government in Lake and Cook County ranges from 42 - 5,962 acres.

Table 3-62: NPDES Permits Issued to Municipalities located within the DPR planning area and located within Lake and Cook Counties, IL

PERMITTEE	PERMIT NO.	ACRES IN DPR PLANNING AREA	PERCENT OF MUNICIPAL ACRES WITHIN THE DPR PLANNING AREA
Village of Arlington Heights	ILR400282	954.18	8.8%
Village of Buffalo Grove	ILR400303	5,961.58	98.3%
Village of Deer Park	ILR400323	1,169.83	48.3%
Village of Deerfield	ILR400324	42.96	1.2%
Village of Northbrook	ILR400404	911.04	10.7%
Village of Palatine	ILR400416	1,487.36	16.9%
Village of Wheeling	ILR400471	4,606.72	81.9%

There is one municipal unit of government that is located in Cook County, IL which encompasses a percentage of municipal acres in the DPR planning area (Table 3-63**)**.

Table 3-63: NPDES Permits Issued to Municipalities located within the DPR planning area and located completely within Cook County, IL

PERMITTEE	PERMIT NO.	ACRES IN DPR PLANNING AREA	PERCENT OF MUNICIPAL ACRES WITHIN THE DPR PLANNING AREA
City of Prospect Heights	ILR400427	206.87	7.5%

There are two municipal units of government that are located in Kenosha County, WI (Table 3-64). The municipalities contribute 1,037.23 and 7,634.43 acres to the DPR planning area.

Table 3-64: NPDES Permits Issued to Municipalities located within the DPR planning area and located completely within Kenosha County, WI

PERMITTEE	PERMIT NO.	ACRES IN DPR PLANNING AREA	PERCENT OF MUNICIPAL ACRES WITHIN THE DPR PLANNING AREA
Town of Salem	WI-S050075-2, FIN: 31153	1,037.23	5.1%
Village of Bristol	WI-S050075-2, FIN: 31150	7,634.43	35.9%

3.18.3.2 Townships

There are 15 townships located in Lake and Cook County, IL (Table 3-65). Twelve of the townships have active NPDES permits and 3 townships did have an NPDES permit.

Table 3-65: ILR40 Permits Issued to Drainage Districts located within the DPR planning area

PERMITTEE	NPDES PERMIT NO.	COUNTY
Antioch Township Highway Dept.	ILR400003	Lake
Avon Township Highway Dept.	ILR400006	Lake
Benton Township	No Active Permit	Lake
Ela Township Highway Dept.	ILR400046	Lake
Fremont Township	ILR400054	Lake
Lake Villa Township	ILR400074	Lake
Libertyville Township	ILR400077	Lake
Newport Township	No Active Permit	Lake
Northfield Township	ILR400098	Cook
Palatine Township	ILR400107	Cook
Vernon Township Highway Dept.	ILR400144	Lake
Warren Township Highway Dept.	ILR400145	Lake
Waukegan Township	ILR400148	Lake
West Deerfield Township	ILR400150	Lake
Wheeling Township	No Active Permit	Cook

Data Source: USEPA Facility Registry Service (FRS)[i]

3.18.3.3 Drainage Districts

There are two drainage districts in the DPR planning area (Avon Fremont and Grubb School). Neither district has an active NPDES permit.

3.18.3.4 Counties

There are 3 units of county government, located within 2 states in the DPR planning area that require a NPDES permit (Table 3-66).

Table 3-66: ILR40 Permits Issued to Counties located within the DPR Planning Area

PERMITTEE	NPDES PERMIT NO.
Lake County	ILR400517
Cook County Highway Department	ILR400485
Kenosha County	S050075, FIN (Facility ID): 33645

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 4

AC- ACRE
ADID – Advance Identification
BMP – Best Management Practices
CCFPD - Cook County Forest Preserve District
CFU - Colony Forming Unit
Ch- Chapter
CLC – College of Lake County
CMAP – Chicago Metropolitan Agency for Planning
CWP – Center for Watershed Protection
DPR Planning Area – Des Plaines River Watershed Planning Area
DRWW – Des Plaines River Watershed Workgroup
E. coli - Escherichia coli
EMC - Event Mean Concentration
FLU – Future Land Use
FPDCC - Forest Preserve District of Cook County
GI - Green Infrastructure
GIMS – Green Infrastructure Model and Strategy
GIS- Geographic Information System

GIV- Green Infrastructure Vision

I-Last™ - Illinois- Livable and Sustainable Transportation Rating System and Guide

IC – Impervious Cover

IDNR – Illinois Department of Natural Resources

IDOT- Illinois Department of Transportation

IGA – Intergovernmental Agreement

Illinois EPA – Illinois Environmental Protection Agency

Lbs- Pounds

LCDOT- Lake County Department of Transportation

LCFPD- Lake County Forest Preserve District

LCHD- Lake County Health Department

LCHD-ES- Lake County Health Department- Ecological Services

LID- Low Impact Development

LRR- Lateral Recession Rates

MBI - Midwest Biodiversity Institute

MG- Million Gallons

MGD- Million Gallons per Day

MLSWCD – McHenry-Lake Soil & Water Conservation District

MRLC - Multi-Resolution Land Characteristics Consortium

Mun.- Municipal

MWRD – Metropolitan Water Reclamation District of Greater Chicago

NA- Not Applicable

NCSWCD – North Cook Soil & Water Conservation District

ND- No Data

NLCD - National Land Cover Database

NPDES- National Pollutant Discharge Elimination System

NPDES II- National Pollutant Discharge Elimination System Phase Two

NRCS- Natural Resources Conservation Service

NSWRD – North Shore Water Reclamation District

PAH – Polycyclic Aromatic Hydrocarbons

PB&D –Planning, Building and Development

PCBs – Polychlorinated Biphenyl

PEC- Probable Effect Concentration

SEWRPC - Southeastern Wisconsin Regional Planning Commission

SMC – Lake County Stormwater Management Commission

SSURGO- Soil Survey Geographic Database

STEPL- Spreadsheet Tool for Estimating Pollutant Load

SWAMM™- Spatial Watershed Assessment and Management Model

SWCD - Soil & Water Conservation District

TEC- Threshold Effect Concentration

TMDL – Total Maximum Daily Load

TSS – Total Suspended Solids

U of IL Extension- University of Illinois Extension

UDO – Unified Development Ordinance

USACE- United Stated Army Corps of Engineers

USEPA- United States Environmental Protection Agency

USLE- Universal Soil Loss Equation

WASCB- Water and Sediment Control Basin

WOUS – Waters of the United States

WDO – Watershed Development Ordinance

WI DNR- Wisconsin Department of Natural Resources

WMO – Watershed Management Ordinance

WWTP- Wastewater Treatment Plant

Yr.- Year

4 WATERSHED PROBLEM ASSESSMENT

This chapter assesses in detail the problems identified in Chapter 3 Watershed Characteristics Assessment. The Watershed Problem Assessment chapter sections describe the effect of land use and land cover change on water resources in the DPR planning area; estimate the most prevalent causes and sources of pollution in rivers, streams and lakes; estimate nonpoint source pollutant loading in the DPR planning area; and identify critical areas where programmatic or site-specific actions or projects are likely to result in nonpoint source pollutant reductions. This chapter also assesses how jurisdictional roles, including regulatory oversight, can be better coordinated to improve the condition of water resources. Finally, a green infrastructure analysis identifies locations that provide important stormwater functions.

4.1 LAND USE IMPACTS AND IC CHANGES

As discussed in Chapter 3, impervious cover (IC) is the result of altering or replacing native soil permeability through various land use functions. IC produces an increase in direct storm water runoff and nonpoint source pollution stressors into wetlands, ponds, streams, and rivers thereby impacting local water quality. Stressors increase pollutant loads in stormwater runoff, alter stream flow, decrease bank stability, increase water temperatures, and reduce wetland capacity and function. These impacts affect terrestrial and aquatic wildlife, plant establishment, habitat function, recreational opportunities, environmental health, and property use and value.

As discussed in Chapter 3, research also shows that IC impacts water quality at relatively low levels of development and land use (0-9% IC or **Low IC**). Symptoms of water quality impact from land use stressors have been observed at 10-29% IC (or **Medium IC**) of a watershed, and research has quantified and observed degradation of natural water bodies when IC is between 30-100% (**High IC**) of the watershed. Figure 4-1 visualizes percent imperviousness based on impacted land use (Chabaeva, 2007).

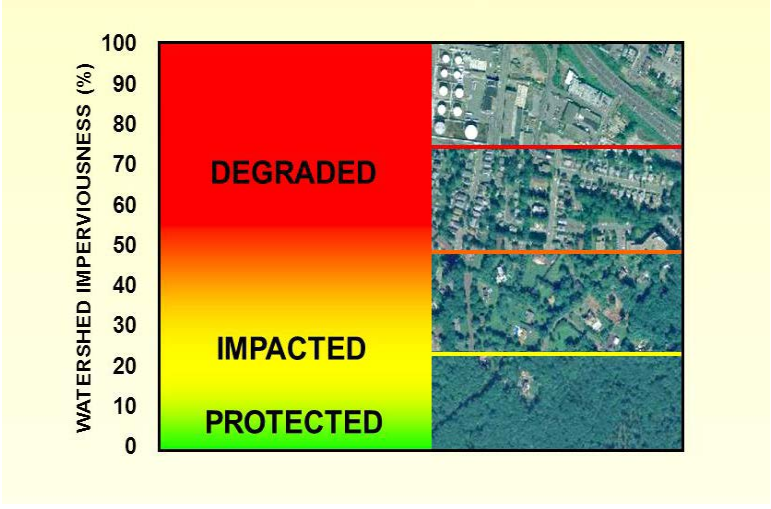


Figure 4-1: Comparison of percent imperviousness to land use

IMPERVIOUS COVER (IC) CLASSIFICATION: As mentioned in section 3.6.3 Existing and Projected Future Percent Imperviousness, water quality is impacted at 10% and degradation of water quality is consistent at greater than 30% impervious cover. The impervious cover is analyzed by impacts:

Low IC – Land use changes increase impervious cover to 0-9% of the watershed with minimal impact to water quality.

Medium IC – Land use changes increase impervious cover to 10-29% of the watershed with water quality impacts noticeable.

High IC – Land use changes increase impervious cover to 30-100% of the watershed with water quality degradation expected.

4.1.1 Effects of Land Use Change on Water Quantity

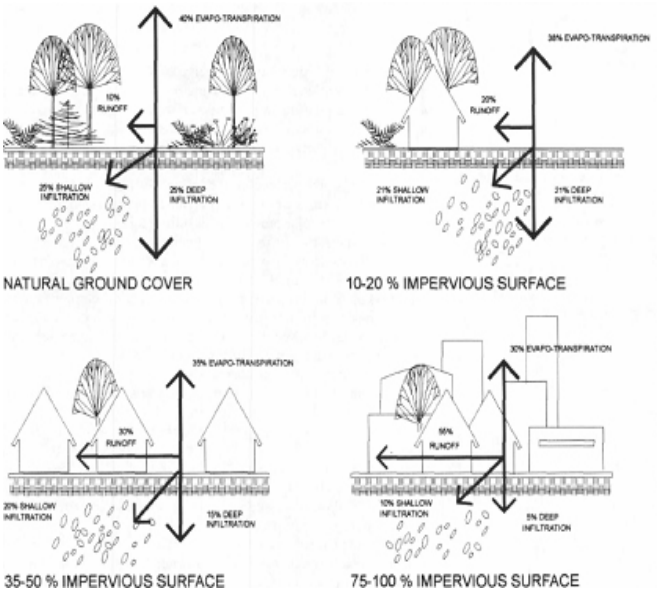
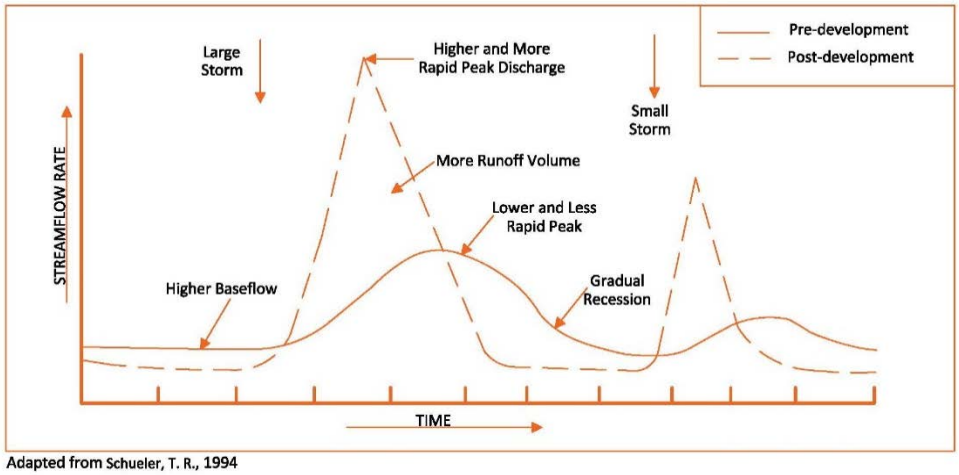


Figure 4-2: Influence of impervious surface on the fate of precipitation

Land disturbance associated with land use modification has a direct effect on stormwater quantity. When a natural site is disturbed, its hydrology is essentially altered due to impacts to the native soils and vegetation. Plowing, clearing, and tree removal eliminate vegetation that reduces stormwater runoff volumes through the hydrologic processes of interception, evaporation, and transpiration. Earthwork and grading disturb native soils and may remove areas with natural depressions that collect, infiltrate, and retain rainfall and stormwater runoff onsite. Soil compaction resulting from the operation of heavy machinery over and across the site reduces the infiltration capacity of underlying soil. Land use changes that increase impervious surfaces, such as roads, parking lots, and rooftops, further reduce the infiltration capacity of an area and increase stormwater runoff volume and velocity.

The installation of drainage improvements (e.g., channelization, dredging, or artificial drainage systems) further reduces a site's ability to retain rainfall. Collectively these impacts result in substantially increased stormwater runoff volumes and velocities (Figure 4-2) and reductions in groundwater recharge (Pitt, 1994; Shueler, 1987; Thompson, 2009). Increased stormwater runoff volumes and velocities result in increased peak discharge rates, which can be at least two to five times higher on developed sites than undeveloped sites, resulting in increased flooding risk (Figure 4-3). Reduced groundwater recharge decreases baseflow to aquatic resources, including streams and wetlands.



Adapted from Schueler, T. R., 1994

Figure 4-3: Pertinent impacts of urbanization on hydrology at the catchment scale

4.1.2 Effects of Land Use Change on Water Quality

Land use change also affects stormwater quality. Impervious and compacted surfaces, such as farm fields, lawns, parks, and athletic fields, accumulate pollutants including sediment, nutrients, trash, and debris during dry weather. These pollutants are quickly transferred to receiving waters during precipitation events, often through artificial drainage systems, resulting in increased pollutant loads to aquatic resources (Figure 4-4). Tables in sections 3.16.1 Status of Designated Use Support, 3.16.3 Summary of Previous Studies and DRWW Monitoring Program, and 3.16.4.3 Water Quality, characterize water quality impacts, causes and sources to lakes and streams.

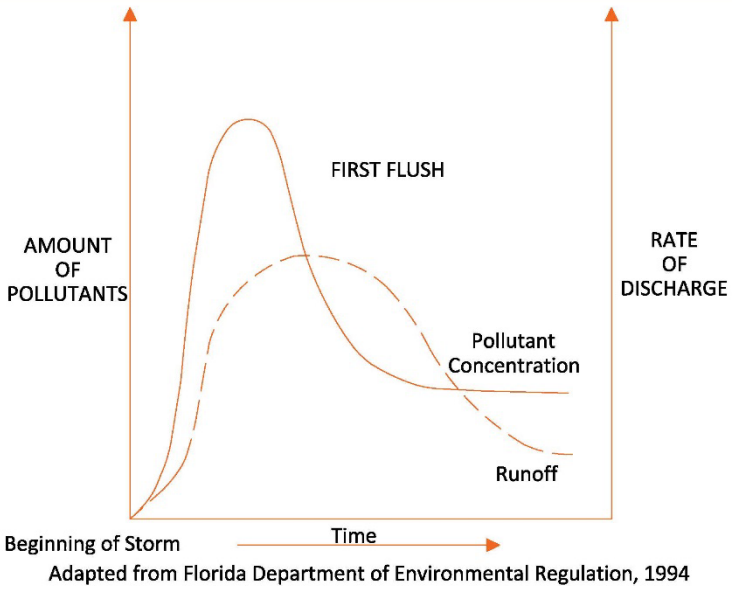


Figure 4-4: Influence of impervious surface on fate of pollutant concentrations

Stormwater pollutants come from a variety of diffuse and scattered sources, many of which are a direct or indirect result of land use change. These nonpoint source pollutants include:

- Sediment: Sources of sediment to stormwater runoff include land disturbing activities, atmospheric deposition, and surface or streambank erosion. Sediment particles can adsorb other stormwater pollutants, such as nutrients, metals, hydrocarbons, and pesticides, and transport them into receiving streams, wetlands, and other aquatic resources.
- Nutrients: Sources of nutrients such as nitrogen and phosphorus to stormwater runoff include fertilizer, pet and animal waste, leaves, grass clippings, sanitary sewer overflows, septic system discharges, and atmospheric deposition.
- Bacteria: Sources of bacteria and pathogens to stormwater runoff include pet and animal waste, sanitary sewer overflows, and septic system discharges. Runoff impacted by these sources typically exceeds public health standards for recreational contact.
- Organic Matter: Sources of organic matter to stormwater runoff include leaves, grass clippings, pet and animal waste, sanitary sewer overflows, and septic system discharges. The decomposition of this organic matter can decrease dissolved oxygen to levels that are detrimental to aquatic life.
- Metals: Sources of heavy metals, such as lead, zinc, copper, and cadmium, to stormwater runoff include atmospheric deposition, vehicle wear, and commercial, industrial, and hazardous waste sites.
- Hydrocarbons: Sources of hydrocarbons (i.e., PAHs or coal tar sealants) to stormwater runoff include vehicle wear, chemical spills, restaurant grease traps, and improper handling and disposal of waste oil and grease.
- Pesticides: Sources of insecticides, herbicides, and other pesticides to stormwater runoff include farming activities, lawn care and maintenance activities, chemical spills, and atmospheric deposition.

- Chemicals: Sources of chemicals, such as chlorine, solvents, soaps and detergents, degreasers, drain cleaners, vehicular liquids and paint, to stormwater runoff include residential, commercial, industrial, and hazardous waste sites.
- Chlorides: Sources of chlorides to stormwater runoff include winter sidewalk, driveway, roadway, and parking lot anti-icing and deicing activities, and water softeners.
- Trash and Debris: Considerable quantities of trash and debris typically accumulate on impervious or compacted pervious surfaces and are transferred to receiving waters by stormwater runoff. This trash and debris can accumulate in stormwater conveyance systems, potentially causing clogging and nuisance flooding.

As outlined below, an extensive and ever-growing body of research shows that these nonpoint source pollutants have substantial negative impacts on streams, wetlands, and other aquatic resources. Negative impacts include impaired water quality, reduced dissolved oxygen levels, increased primary productivity (e.g., eutrophication, algal blooms), sediment contamination, degradation of habitat, and a general decline in the abundance and diversity of wildlife and aquatic animals.

4.1.3 Effects of Land Use Change on Stormwater Temperature

Land use changes also affect stormwater temperature. The compacted pervious and impervious surfaces resulting from land use change absorb and retain heat, especially when exposed to sunlight. The heating of these surfaces is exacerbated by reduced shade resulting from the clearing of vegetation. During precipitation events, these heated surfaces increase the temperature of stormwater runoff, resulting in increased water temperatures and decreased dissolved oxygen in receiving waters.

4.1.4 Impacts on Aquatic Resources

Changes in hydrology and stormwater runoff characteristics (e.g., increased stormwater runoff rates, volumes, and pollutant loads) resulting from changes in land use can have a wide range of negative impacts on the aquatic resources of the DPR planning area. Additional information about these impacts is provided below.

4.1.4.1 Streams

Impacts on the stream resources within the planning area are characterized in sections 3.12.2 Stream Network Description/Stream Reaches and 3.16.3 Summary of Previous Sudies and DRWW Monitoring Program. Changes in stormwater quantity, quality, and temperature resulting from changes in land use can have multiple negative impacts on freshwater streams. These well-documented impacts (CWP, 2003; CWP, 2009; Cruse et al., 2012) include:

- Increased Channel Forming Events: Increased stormwater runoff rates and volumes resulting from land use changes increase the frequency and duration of channel forming bankfull and near-bankfull events, resulting in changes in channel form, stream channel enlargement (e.g., stream down-cutting and widening), and streambank erosion.
- Increased Flooding: Increased stormwater runoff rates and volumes resulting from land use changes also increase the frequency, duration, and severity of overbank and extreme flooding events. These flooding events can cause property damage and endanger public health and safety.

- Decreased Baseflow: Increased stormwater runoff volumes resulting from land use changes reduce the amount of recharge to shallow groundwater aquifers which supply baseflow to streams and rivers.
- Stream Channel Enlargement: Stream channels enlarge (e.g., downcut and widen) to accommodate the increased peak discharges resulting from land use changes.
- Streambank Erosion: As stream channels enlarge to accommodate an increased frequency and duration of channel forming events and the increased peak discharges resulting from land use changes, streambanks are gradually undercut, scoured, and eroded away.
- Loss of Riparian Vegetation: As stream channels enlarge and streambanks are gradually eroded away, the roots of vegetation along the stream corridor may become exposed, undercut, uprooted, and conveyed downstream.
- Degradation of Habitat: Increased stormwater runoff rates and volumes resulting from land use changes scour stream beds and degrade aquatic habitat. The increased sediment loads that result from land use changes and erosion can also degrade aquatic habitat by filling in streambeds and destroying the important pool-riffle structure found in many streams.
- Increased Temperatures: Increased stormwater runoff temperatures resulting from land use changes can raise the temperature of freshwater streams. Since aquatic organisms can only survive within a specific temperature range (e.g., some darter fish species and other cool water species), increased stream temperatures can lead to a decline in wildlife abundance and diversity.
- Degradation of Water Quality: Increased stormwater pollutant loads resulting from land use changes reduce the overall water quality of freshwater streams. This water quality degradation negatively impacts many of the ecological functions that these important natural resources provide.
- Reduced Dissolved Oxygen Levels: Increased amounts of organic matter found in urban stormwater runoff, and increased stormwater runoff temperatures that result from land use changes, reduce the amount of dissolved oxygen found in freshwater streams. Fish kills and the loss of other aquatic organisms can occur if dissolved oxygen levels decrease enough. Low dissolved oxygen levels can also cause the release of harmful pollutants such as metals, nutrients, hydrocarbons, and pesticides that have accumulated within stream bottom sediment.
- Decline in Wildlife Abundance and Diversity: Increased stormwater runoff rates, volumes, and pollutant loads resulting from land use changes degrade habitat and water quality. This reduces the abundance and diversity of aquatic organisms found in freshwater streams. Sensitive keystone or indicator organisms that require high quality habitat may become stressed and be gradually replaced by organisms more tolerant of degraded conditions. For more detailed information on threatened and endangered species see section 3.10.2.
- Reduced Recreational and Aesthetic Value: Increased trash, debris, and pollutant loads found in stormwater runoff can accumulate in freshwater streams and detract from their natural beauty and recreational value.

4.1.4.2 Lakes and Wetlands

Impacts on aquatic lake resources within the planning area are characterized in sections 3.13.2 Shoreline Erosion and Buffer Condition and 3.16 Lake and Stream Water Quality. Impacts on aquatic wetland resources within the planning area are characterized in section 3.11 Wetland Inventory. Changes in stormwater quantity and quality resulting from changes in land use can have multiple negative impacts on lakes and wetlands.

The water quality of lakes, particularly man-made lakes, is substantially negatively impacted by increased stormwater pollutant loads. Since lakes function as sinks within the landscape, incoming sediment, nutrient, bacteria, metals, hydrocarbons, pesticides, chlorides, and trash and debris can remain in a lake for a long time. The accumulation of these various pollutants can reduce overall water quality, contaminate sediments, increase primary productivity (e.g., increase algal growth), and negatively impact many of the important ecological functions that lakes provide. Elevated total suspended solids and phosphorus concentrations were observed in many of the lakes in the DPR planning area, causing impairments to aesthetic quality and aquatics. Moderate to severe shoreline erosion and low vegetative quality were observed at most of the assessed lakes (section 3.13.2). Chloride concentrations have been increasing over time in lakes throughout the DPR planning area (see Chapter 3).

As documented above, land use changes can have a wide range of impacts on the health of terrestrial and aquatic resources. These impacts, which range from additional runoff volume to degraded water quality to a decline in wildlife abundance and diversity, have been well documented by an extensive and ever-growing body of research. These impacts have been observed within the aquatic resources of the DPR planning area, as described in Chapter 3 and can, in part, be linked to the changes in hydrology and stormwater runoff characteristics (i.e., increased stormwater runoff rates, volumes, and pollutant loads) resulting from land use changes that have occurred in the watershed over the last two centuries. Changes in stormwater quantity and quality resulting from changes in land use can have multiple negative impacts on lakes and wetlands. These well-documented impacts (Wright et al., 2006; Cruse et al., 2012) include:

- Increased Ponding: Increased stormwater runoff rates and volumes resulting from land use changes can cause increased ponding within wetlands. This can stress native wetland plant communities, especially in wetlands that did not previously receive large inputs of stormwater runoff.
- Increased Water Level Fluctuations: Increased stormwater runoff rates and volumes resulting from land use changes can cause increased water level fluctuations in wetlands. This can stress native wetland plant communities and reduce plant and wildlife abundance and diversity.
- Decreased Baseflow: Increased stormwater runoff volumes resulting from land use changes reduce the amount of precipitation available to recharge shallow groundwater aquifers and provide a steady supply of baseflow to wetlands, particularly during dry weather.
- Shoreline Erosion: Increased ponding and water level fluctuations and decreased baseflow resulting from land use changes can stress native wetland plant communities and leave portions of wetland shorelines unvegetated, making them vulnerable to undercutting, scour, and erosion.
- Degradation of Habitat: Increased ponding and water level fluctuations and decreased baseflow resulting from land use changes can stress native wetland plant communities and degrade wetland habitat. Increased sediment loads resulting from land use changes and surface and streambank erosion can also degrade wetland habitat.
- Degradation of Water Quality: Increased stormwater pollutant loads resulting from land use changes reduce the overall water quality of wetlands. This negatively impacts many of the ecological functions these important natural resources provide.
- Increased Primary Productivity: Increased nutrient loads in stormwater runoff increases the primary productivity of wetlands, promoting algal growth and forcing native wetland plant communities to

compete for available nutrients. This competition can stress native wetland plant communities and reduce plant and wildlife abundance and diversity.

- Sediment Contamination: Metals, hydrocarbons, and pesticides in stormwater runoff can become attached to sediment particles and accumulate within wetlands. This can cause sediment contamination and expose aquatic and terrestrial organisms to the harmful effects of these pollutants.
- Decline in Wildlife Abundance and Diversity: When increased stormwater runoff rates, volumes, and pollutant loads resulting from land use changes degrade habitat and water quality, the abundance and diversity of plants, animals, and other organisms found in freshwater wetlands may be significantly reduced. In these situations, native wetland plant communities tend to be replaced by invasive species, and sensitive macroinvertebrate, amphibian, reptile, and bird populations become stressed and gradually replaced by populations that are more tolerant of the degraded conditions. This can result in the local extinction of native aquatic and terrestrial organisms. For more detailed information on threatened and endangered species see section 3.10.2.
- Reduced Aesthetic Value: Trash, debris, and pollutant loads in stormwater runoff can accumulate in wetlands, detracting from their natural beauty and aesthetic value.

4.1.5 Assessing the Impacts of Forecasted Land Use Changes

4.1.5.1 IC Model

Assessing impacts of forecasted land use changes within the DPR planning area involves further analysis of current land use impacts and IC. Section 3.6.3 Existing and Projected Future Percent Imperviousness presents two data sources on IC impacts: planimetric data and the NLCD. A combination model, Figure 4-5, was developed from the NLCD and planimetric **GIS** datasets to assist in identifying IC in rural areas that typically lack planimetric data. The combined model shows land use and construction impacts beyond the developed artificial surfaces. The combined datasets indicate that 48.32% of the DPR planning area (72,655.41 acres) is within the impacted and degraded Medium and High IC classification and 31.33% of the DPR planning area contributes to significant water impacts (Table 4-1). The addition of the planimetric data to the NLCD dataset refines the data and decreases acreage of Low IC within the NLCD data by 0.71%, and increases the acreage of High IC by 0.71% (1,037.37 acres).

Geographic Information System: A computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface.

The combined imperviousness analysis data was joined geospatially to the subwatersheds within the DPR planning area to determine IC within each subwatershed (Table 3-13). Aptakisic Creek and Buffalo Creek currently have over 50% (62.65% and 53.34%, respectively) of their respective subwatersheds within the High IC classification and less than 19% (11.18% and 18.93%, respectively) of their respective subwatershed within the Low IC classification. Indian Creek analysis indicates that 26.34% of the subwatershed can be considered Low IC with 67% of the subwatershed impacted by various land uses. Aptakisic, Buffalo, and Indian Creek have a significant percentage of IC within their respective subwatersheds. The Bull Creek subwatershed has a mix of impervious impacts with Low IC of approximately 38% of the subwatershed and 21% of the subwatershed in Medium IC.

The Upper Des Plaines, Lower Des Plaines, and Mill Creek subwatersheds within the DPR planning area have approximately 50% of their respective subwatersheds within the Low IC classification and the other 50% of

their subwatershed in the High IC classification. The Newport Drainage Ditch, North Mill Creek/Dutch Gap Canal, and Bull's Brook subwatershed currently have greater than 68% of their respective subwatersheds in areas of Low IC (70.18%, 78.04%, and 68.41%, respectively). These subwatersheds have relatively low development and urbanization impacts and have a larger percentage of their land as open space and agricultural lands.

Table 4-1: Combined Percent IC by Subwatershed
Open water not included in acre totals

SUBWATERSHED	COMBINED IC PERCENTAGE 0-9% (Low)		COMBINED IC PERCENTAGE 10-29% (Medium)		COMBINED IC PERCENTAGE 30-100% (High)	
	ACRES	% AREA	ACRES	% AREA	ACRES	% AREA
Aptakisic Creek	488.97	11.18%	954.83	21.83%	2,740.35	62.65%
Buffalo Creek	3,292.70	18.93%	4,220.94	24.27%	9,276.50	53.34%
Bull's Brook	1,242.94	68.41%	234.37	12.90%	249.63	13.74%
Bull Creek	2,707.32	37.94%	1,509.90	21.16%	2,528.42	35.43%
Indian Creek	6,361.79	26.34%	6,842.93	28.33%	9,508.80	39.37%
Lower Des Plaines River	6,776.18	46.39%	2,356.53	16.13%	4,895.48	33.51%
Mill Creek	9,847.87	49.78%	2,537.26	12.83%	5,812.37	29.38%
Newport Drainage Ditch	3,521.43	70.18%	604.22	12.04%	799.86	15.94%
North Mill Creek/Dutch Gap Canal	18,365.50	78.04%	1,383.70	5.88%	2,296.78	9.76%
Upper Des Plaines River	17,156.14	52.71%	4,900.89	15.06%	9,001.67	27.66%

To determine the forecasted impacts of land use, the current IC model data is first associated with current land use data to develop observational trends for a forecast model (Table 4-2). The prediction model then compares the impact trends from Table 4-2 to anticipated FLU data (Table 3.14 and Table 3.15) to present a forecast model of impacts.

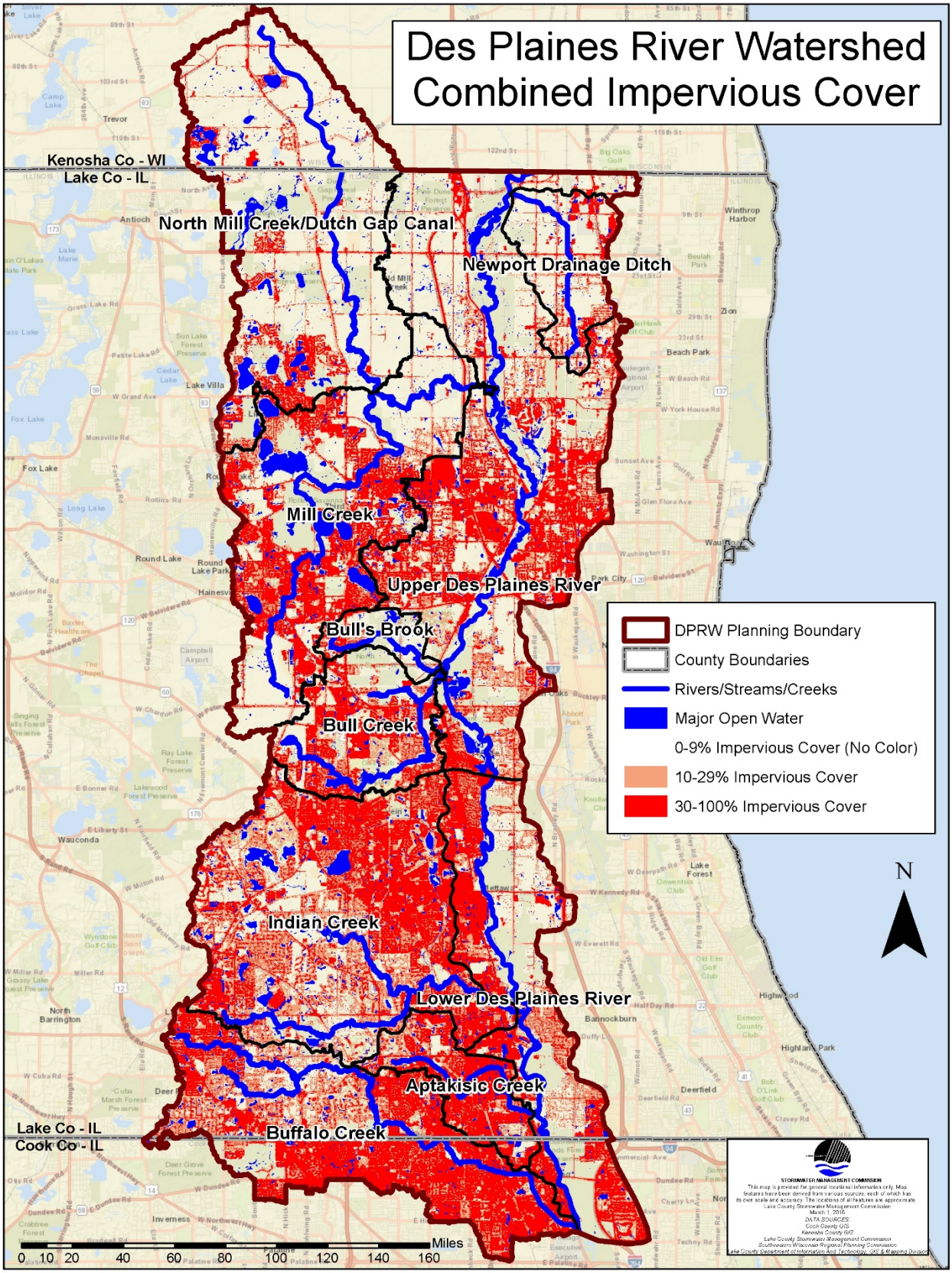


Figure 4-5: Combined Imperviousness
Data from Table 4-1

Table 4-2: Current Planning Area Land Use with Aggregate Percent IC
Open water not included in acre totals

LAND USE	COMBINED IC PERCENTAGE 0-9% (Low)		COMBINED IC PERCENTAGE 10-29% (Medium)		COMBINED IC PERCENTAGE 30-100% (High)	
	ACRES	% AREA	ACRES	% AREA	ACRES	% AREA
Agricultural Land	21,775.05	87.39%	1,601.67	6.43%	1,539.66	6.18%
Commercial and Services	172.07	3.39%	321.23	6.32%	4,588.92	90.29%
Forest, Grassland, and Wetlands	15,196.98	71.34%	3,359.21	15.77%	2,745.89	12.89%
Industrial, Warehousing, and Wholesale	122.51	3.30%	216.35	5.82%	3,377.49	90.88%
Institutional	545.26	17.97%	626.11	20.64%	1,862.08	61.38%
Open Space	21,766.83	76.63%	4,451.39	15.67%	2,186.58	7.70%
Residential	7,598.65	20.32%	12,051.40	32.22%	17,750.79	47.46%
Transportation, Communication, and Utilities	2,101.70	11.71%	2,865.82	15.96%	12,985.58	72.33%

4.1.5.2 Forecasted Land Use Changes

FLU is forecasted to increase IC, based on the past and current trends on land use conversions described in 3.6.1 Historic Land Cover to 3.6.2 Existing Land Use in the DPR Planning Area. As forecast, FLU (Figure 4-6) will continue to impact water quality through the conversion of vegetated or naturalized land uses (Agricultural, Open Space and Forest, Grassland, and Wetlands) to urbanized land uses that increase IC (Industrial; Warehousing and Wholesale; Commercial and Services; Institutional; Residential; and Transportation, Communication, and Utilities). The impact of FLU changes on water quality will depend on the retrofitting of existing developed land uses (6.3 Site-Specific Action Plan) and the utilization of sustainable land development or green infrastructure solutions (6.2 Programmatic Action Plan).

Presuming the FLU estimates progress as forecasted by the current data, approximately 34,776 acres of vegetated or naturalized land uses (Agricultural, Open Space and Forest, Grassland, and Wetlands) will be impacted by new development (Table 4-3). The forecast is that 85% of the 34,776 acres of impact will be converted from Low IC to Medium and High IC, with 61% being High IC.

Table 4-3: Forecasted Increase in Acreage of IC Based on Forecasted FLU Data

LAND USE	PERCENT IC 0-9% (Low)	PERCENT IC 10-29% (Medium)	PERCENT IC 30-100% (High)	% INCREASE FLU VS. CURRENT LAND USE
Commercial and Services	+258	+482	+6,882	250%
Industrial, Warehousing, and Wholesale	+83	+146	+2,280	168%
Institutional	+333	+382	+1,137	161%
Residential	+4,447	+7,052	+10,387	159%
Transportation, Communication, and Utilities	+106	+145	+656	105%

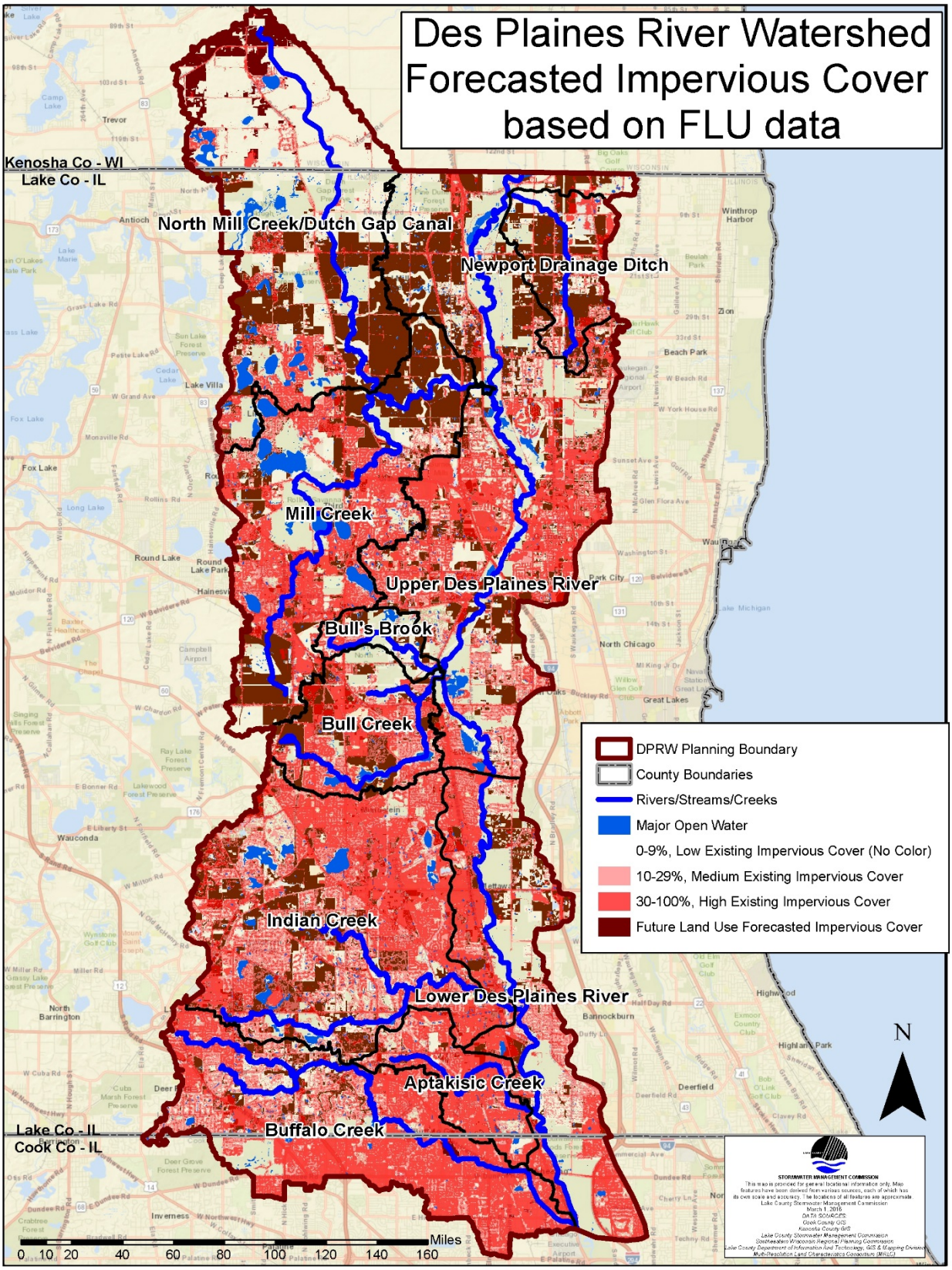


Figure 4-6: Forecasted FLU increases in IC

The FLU datasets utilized in this study have varying projected future year targets: Lake County has no projected date (the data are based on underlying municipal and Lake County land use plans), CMAP projections are to 2040, and Kenosha County projections are to 2035. In their NLCD dataset, the MRLC includes observations of IC during the years 2001, 2006, and 2011. During the MRLC 10-year study period, 2001-2011, the conversion of land use increased IC approximately 4,487.42 acres. Within the study area, between the years 2001-2006, approximately 3,378.81 acres were converted from low IC to medium and high IC. During the years 2006-2011, approximately 1,108.60 acres converted from low IC to medium and high IC. Table 4-4 indicates the observed IC changes during the years 2001-2011.

The NLCD data indicated approximately 450 acres of conversion to higher classes of imperviousness per year occurred during the years 2001-2011. At this rate, it will take approximately 77 years to reach the 34,776 acres of increased imperviousness estimated by the FLU NLCD 2001-2011 IC model. Conversion to higher classes of imperviousness would need to increase to approximately 1,738 acres per year to reach the same acreage estimated by the FLU IC model in 20 years (a typical life span for land use plans). In considering that FLU datasets target an approximate 20-year timeline, land conversion of approximately 1,738.00 acres per year would reach the FLU target of 34,776 acres. Forecasted land use and IC has the potential to range from 450 to 1,738 acres per year of new IC for an additional 9,000 to 34,776 acres of Medium and High IC over a 20-year forecast model. Forecasted IC will depend on the type of land use, infill land use, and types of retrofit projects that protect, improve, and restore water quality within the DPR planning area.

Table 4-4: Study Area IC Increase from 2001-2011

TYPE	ACRES	% OF DPR PLANNING AREA
OBSERVED IC INCREASES BETWEEN 2001-2006		
Increase in Imperviousness by 0-9%	-	0.00%
Increase in Imperviousness to 10-29%	1,178.12	0.83%
Increase in Imperviousness to 30-100%	2,200.69	1.55%
OBSERVED IC INCREASES BETWEEN 2006-2011		
Increase in Imperviousness to 0-9%	-	0.00%
Increase in Imperviousness to 10-29%	-	0.00%
Increase in Imperviousness to 30-100%	1,108.60	0.78%

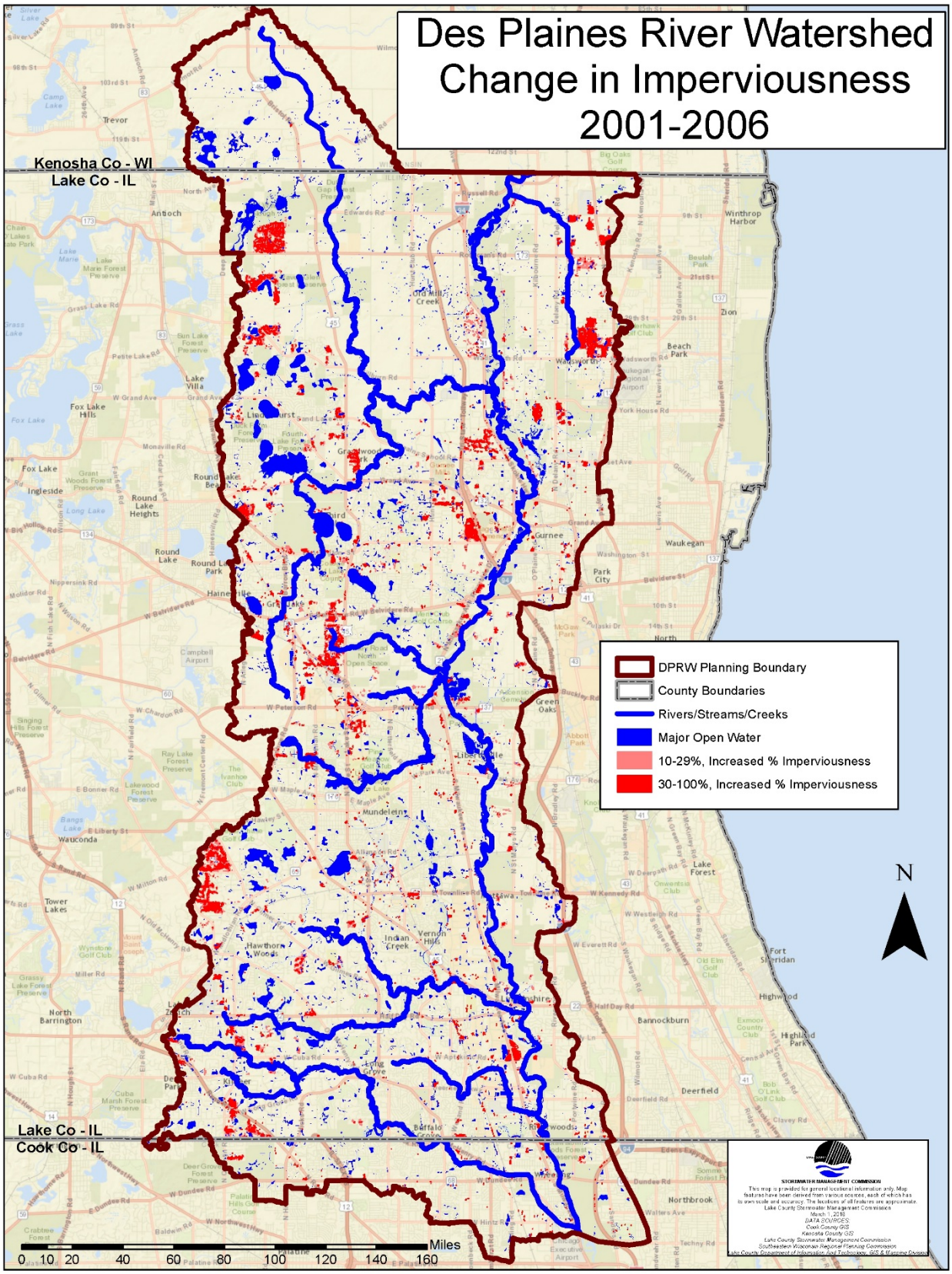


Figure 4-7: Observed NLCD Increased IC during 2001-2006

Data from Table 4-3

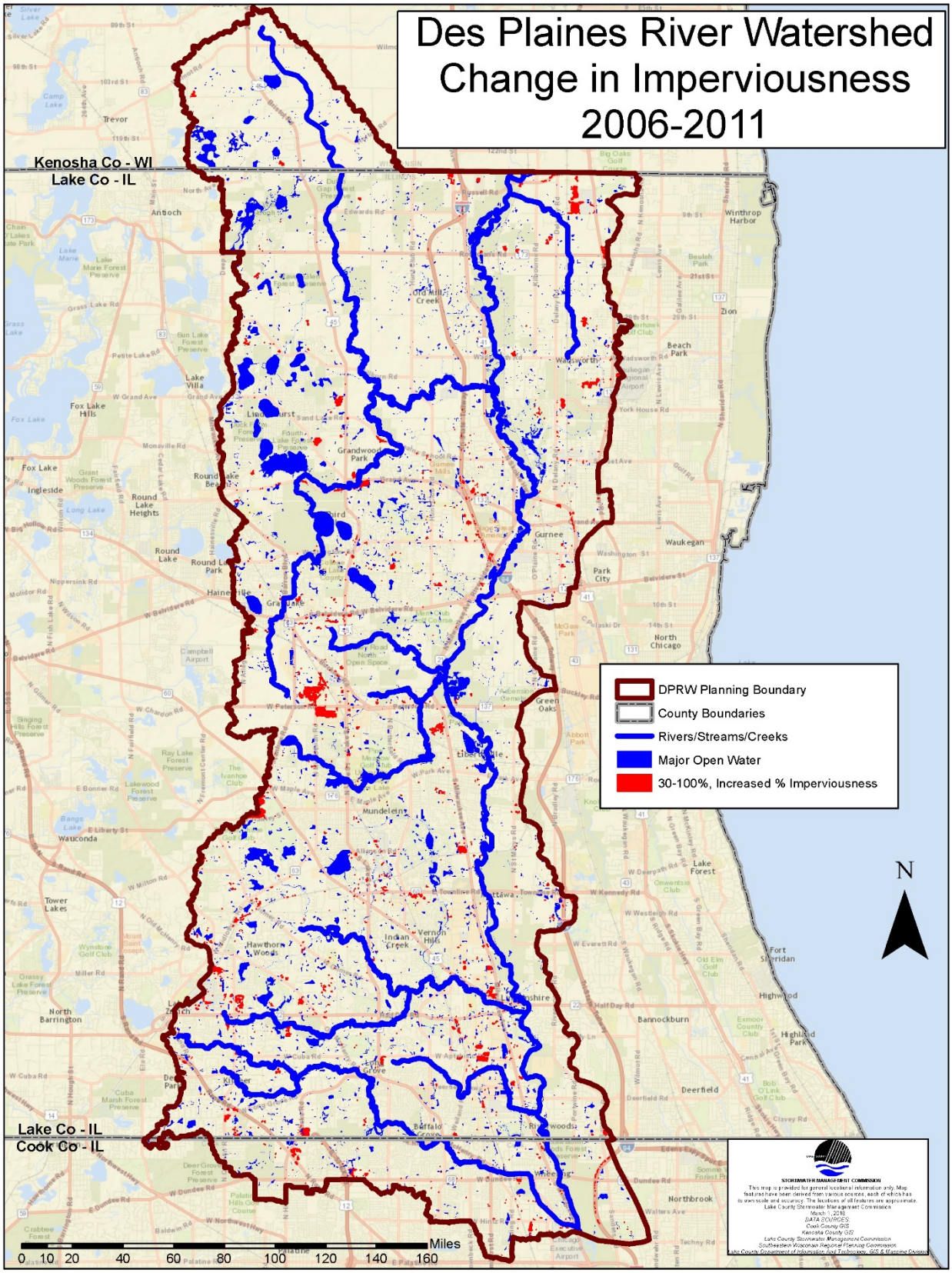


Figure 4-8: Observed NLCD Increased IC during 2006-2011
Data from Table 4-3

4.1.6 Reducing Land Use Impacts Through Development Standards and Policy

The Des Plaines River Watershed-Based Plan recommends actions for protecting and restoring natural resources, improving water quality, and reducing and preventing flood damage in the watershed. These actions include both remedial and preventative measures for communities to support. Among the most significant and influential are preventative measures such as policies and regulatory programs, which are proactive practices rather than costly remedial measures after the problems become unavoidable.

This watershed-based plan does not recommend specific land uses or zoning; however, it does consider the health of watershed lakes, streams, and wetlands, which is a direct reflection of land use and land management. Therefore, consideration of land management and development impacts by local land use authorities is necessary for effective watershed planning. Current water resource problems and consideration of potential land use changes signal the need to review and modify policies, standards, and practices guiding land development and management in the DPR planning area.

It is anticipated that stormwater runoff volume and pollution will continue to increase as IC increases within the DPR planning area. Municipalities and counties should review relevant ordinances to evaluate policies, standards, and regulations for new and retrofitted development, and for land management as it pertains to stormwater runoff volume, detention, water quality, **floodplains/floodways**, and wetlands. Both watershed development regulations and policies focused on stormwater management and local ordinances and policy that direct development practices that influence IC and drainage should be reviewed based on their potential to positively influence watershed health by preventing negative land development impacts.

Floodplains: Floodplains are lowlands, adjacent to rivers, streams and creeks that are subject to recurring floods. Mapped regulatory floodplains are defined as the area of land, which is inundated with water during 100-year flood events.

Floodway: A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

4.1.6.1 Stormwater Management

Current stormwater regulations are enforced locally with minimum requirements for development based on local ordinance and NPDES minimum requirements. Section 4.3 Watershed Jurisdictional Coordination identifies roles and jurisdictions of development programs. Section 3.18 NPDES Phase II Stormwater Permits identifies national stormwater requirements. Future local ordinance revisions could consider conditions unique to individual subwatersheds that warrant consideration for developing and administering watershed-specific stormwater management regulations to address the technical issues of concern in the subwatershed.

The primary technical issues of concern related to stormwater management are:

- Hydrologic changes have resulted in stream channel changes. Deepening and widening of the stream corridors in some locations has created excessive erosion and sedimentation, property loss, debris loads and blockages, and aquatic habitat impairments.
- Current IC and land use vary within an individual catchment or jurisdiction.
- Current drainage infrastructure varies within an individual catchment and/or jurisdiction with undersized, older, not maintained, or inadequate infrastructure which largely contributes to urban flooding.

- Significant increases in impervious surface and resulting hydrologic changes are projected for areas that are currently naturalized, agricultural, or vacant land uses.
- Nonpoint source pollution from urban land uses, transportation infrastructure and maintenance practices, and agricultural runoff are projected to impair watershed lakes.

The effects of increased runoff volume resulting from land use changes can be addressed in a variety of ways, including the following examples:

- Institute more effective and consistent runoff volume reduction practices as 9,000 to 34,776 acres of undeveloped lands in the watershed (agricultural, open space, and water) are projected to convert to land uses with greater IC (e.g., residential, commercial/retail, transportation).
- Review the detention volume/release rate requirements for the watershed and determine if unique conditions warrant adjustments or changes to storage and release regulations.
- Review and revise ordinance and policy language to ensure that the disconnection and minimization of impervious surfaces are allowed by right.
- LID practices and the use of green infrastructure best practices (that maintain natural hydrology post-development) could be expanded by municipal and county ordinances for all new development and significant redevelopment.
- Mitigate unavoidable wetland loss within the watershed or subwatershed where the wetland impact/loss occurs.
- Utilize tree preservation ordinances that protect mature healthy native trees and stands of forest/savanna for stormwater reductions, habitat value and increased urban tree canopy coverage.

Water quality has been identified as a major watershed issue and concern. Local community ordinances can be reviewed and revised to ensure that development codes do not preclude but rather encourage BMPs to protect and improve water quality. Examples of such BMPs include:

- The use of native vegetation in home and business landscaping.
- Sustainable street designs, including alternative transportation opportunities (complete streets) and bio-swales or other vegetated conveyance systems for stormwater management instead of traditional curb and gutter.
- Infiltration for a significant portion of increased runoff volume due to land development. The WDO was amended in 2013 to include runoff volume reduction requirements.
- Preservation of natural retention and infiltration areas recognized as green infrastructure to reduce polluted runoff.
- Rainwater harvesting such as through the use of rain barrels and cisterns.

Site-specific erosion issues were identified as a concern. Many of these erosion issues can be addressed with the following:

- Requirements or incentives for stream corridor buffering and restoration for stream reaches located on new development sites could provide water quality, flood reduction, and habitat enhancement benefits. Currently stream corridor enhancements are not required as part of land development activities.

- Developing stream maintenance and restoration standards that can be applied throughout the DPR planning area.
- Continued outreach and education to riparian landowners on proper maintenance and protections.
- Development and support for standardized long-term maintenance and monitoring protocols for naturalized stormwater drainage systems and natural areas. Development of a standardized protocol for monitoring and maintenance plans for new developments and required endowment funds for long-term implementation of the plans.

4.1.6.2 Local Municipal and County Policies and Ordinances

Policy and regulatory changes regarding land use are the responsibility of the county and municipal planning and development departments. All of those entities should consider developing and implementing sound environmental long-term planning goals in their guiding documents. Planning documents vary in function (e.g., master plans, comprehensive plans, overlay or area-specific plans) but can seek balanced land use, land preservation, and development guidelines to positively affect watershed response. Development guidelines may be the best avenue for incorporating watershed-specific development standards and practices that prevent flood damage and protect water quality. Because elected officials change, long-term planning guidelines support county and municipal staff in preserving watershed health through the available resources for enforcement and recommendations.

Planning and zoning guidance provides the next level of watershed protection. Most planning and zoning regulation is in the form of local comprehensive land use plans and development-related ordinances that regulate onsite land use practices to ensure adequate floodplain, wetland, stream, lake, pond, soil conservancy, and other natural resource protection. Zoning ordinances, and overlay districts in particular, define the allowed type of development and where it can be located relative to natural resources. Other examples of planning/zoning resource protection include riparian and wetland buffers, impervious area reduction, open space/greenway dedication, and conservation development.

An excellent source of information on model development principles and a sample code and ordinance review worksheet can be found in *Better Site Design: A Handbook for Changing Development Rules in Your Community* (CWP, 1998). In addition, the CWP and USEPA have self-appraisal checklists that watershed communities may use to evaluate their existing codes and ordinances to identify where they can change or modify regulations to improve the preservation and use of green infrastructure in the DPR planning area. Adopting watershed-friendly codes and ordinances will elevate protection and enhancement of watershed resources. Watershed communities should perform this self-appraisal and establish an action plan to revise ordinances and codes where needed.

Improved coordination and communication between county and local government would benefit water resource protection. Local enforcement officers, local planners, and zoning boards should be very familiar with watershed development regulations, and should consider revising local ordinances that address watershed and site-specific water, natural resource, and flooding issues not covered by county, regional, or state program requirements.

NOTEWORTHY: COMMUNITY PROGRAMS AND REGULATIONS INFLUENCE WATERSHED HEALTH

Many codes and ordinances influence the health and function of a watershed. The table below includes typical types of codes and ordinances to evaluate and potentially change or modify to help improve watershed conditions.

Code or Ordinance Types with Ties to Watershed Health

SUBJECT OF REGULATION	CODE/ORDINANCE/REGULATION
Erosion and Sediment Control	Zoning Ordinance, Stormwater Ordinance
Environmental Regulations (e.g., Buffers, Water Quality, Wetlands, Threatened/Endangered Species)	Subdivision Codes, Stormwater Ordinance, Planned Unit Development Agreements, Special Use Permits
Floodplain Regulations	Zoning Ordinance, Stormwater Ordinance, Subdivision Codes, Building Code
Stormwater Management and Drainage	Stormwater Ordinance, Subdivision Codes, Zoning Ordinance, Planned Unit Development Agreements, Street Standards and Road Design, Building Code, Fire Code
Tree Protection and Landscaping	Tree Protection Ordinance, Landscape Ordinance, Nuisance Ordinance, Planned Unit Development Agreements, Building Code, Fire Code
Parking Requirements	Zoning Ordinance; Planned Unit Development Agreements, Special Use Permit, Grading Ordinance

NOTEWORTHY: CONSERVATION AND LID

County and local governments can work together to develop incentives for conservation and LID. Conservation development is the ideal compromise between economic development and water resource protection. Some ways to incorporate conservation development into developing communities and provide incentives for developers include:

- Allow conservation development "by-right" (does not require variances)
- Establish a joint review department/agency application process that reduces review time for conservation development
- Reduce fees for conservation development application review
- County and municipalities work together to locate appropriate parcels for future conservation development, and then zone those parcels as conservation development (parcels in the green infrastructure network that are proposed for development would be good candidates)
- Require all developments have a certain percentage of preserved open space
- Develop native landscaping ordinances
- Reduce setback requirements between lots and encourage multi-level and clustered residential development to reduce land consumption
- Provide credit for combining natural buffers with recreational opportunities
- Require native plantings in all detention basins
- Provide detention credit for green infrastructure BMPs

Communities may incorporate conservation and LID using several methods and strategies. Conservation development zoning could be applied to rezoning changes in rural areas. The conservation development zoning classification should outline the intent, design guidelines, density bonus, and the specific areas where conservation development zoning changes would be permitted. The areas that may be rezoned to a conservation development might include areas that are adjacent to ecologically significant lands or are identified in the green infrastructure system. Rural residential districts or less productive agricultural areas may also be considered. Areas that are defined as rural residential could provide a transition from higher density residential to rural.

Design guidelines for conservation developments should include LID practices, a detailed outline of the process used to define the environmentally sensitive areas on the site, and identify areas on the site that are developable. Because each site will have different developable areas and sizes, design guidelines should be flexible and should consider different development characteristics, such as roadway length, width, and lot size. Density bonuses may be written into the zoning code and could include bonuses for the following: use of native vegetation throughout the development including individual lots, reduction in pavement or impervious surface, use of permeable pavements, increased percentages of open space, trail or sidewalk connections to other developments or regional trails, additional expanded buffering of natural areas and adjacent spaces, and creation of wildlife habitat.

4.2 WATERSHED RESOURCE PROBLEMS ASSESSMENT

This section assesses the problems and concerns identified in Chapter 2 and Chapter 3 in order to better understand them and guide informed and prioritized actions to address them. Many lakes and streams in the watershed have poor water quality which negatively affects aesthetic value, aquatic habitat, recreational value, and fish consumption uses. Total phosphorus, total suspended solids, and sedimentation/siltation are the most common causes of impairments for both streams and lakes in the DPR planning area. Low dissolved oxygen, chloride, fecal coliform, and aquatic algae are also considered prevalent causes of problems throughout the DPR planning area.

The following subsections describe further analysis used to assess how watershed conditions are affecting the water quality, natural resources, and green infrastructure throughout the DPR planning area.

4.2.1 Lake Impairments

Based on the 2004 Illinois EPA 305(b) list, 73 of 81 assessed lakes in the DPR planning area have statutory impairments, as thoroughly detailed in Chapter 3. More robust monitoring programs are beneficial to thoroughly characterize a waterbody, its watershed, and understand the issues that affect aquatic life and the overall health and function of the system.

Of the 73 lakes in the DPR planning area with impairments, 52 are listed as impaired for phosphorus, 43 for total suspended solids, and 33 for aquatic algae. Low dissolved oxygen, unknown causes, and fecal coliform combined are listed as the cause of 21 lake impairments.

Many of the lakes are in poor water quality condition due to nonpoint sources of phosphorus and total suspended solids. The lakes suffering from high sediment and nutrient concentrations are vulnerable to low dissolved oxygen, algae blooms, and invasive aquatic plant growth which negatively affect recreational, habitat, and aesthetic value. In addition to nonpoint sources of sediment and phosphorus, internal lake processes contribute to nutrient and sediment issues.

Algae blooms and invasive species are responsible for decreasing the biological productivity and limit the diversity of both fish and macroinvertebrate species. Lake shoreline erosion is also another consideration; as inventoried in Chapter 3, and further analyzed in section 4.2.5, shoreline erosion impacts the water quality of the lakes, and contributes to the loss of shoreline and property. Additionally, a trend of steadily rising chloride levels has been identified in lakes across the DPR planning area, though levels do not currently exceed Illinois water quality standards.

4.2.2 Stream Impairments

Twelve of the 13 assessed stream segments in the DPR planning area are classified as impaired by the Illinois EPA (Chapter 3). Sixteen different causes are listed for the impairments; the predominant causes are phosphorus, mercury, arsenic, low dissolved oxygen, fecal coliform, PCBs, sediment/siltation, total suspended solids, and chloride. These statutory impairments are based on a limited set of data and more robust monitoring programs are beneficial to thoroughly characterize a watershed and understand the issues that affect aquatic life and the overall health and function of the watershed. In 2015, the DRWW implemented a comprehensive water quality monitoring program for the DPR planning area (Lake County portion only), and this data, along with commissioned studies (MBI, 2017), have been instrumental in further characterizing watershed problems and how water quality is affecting

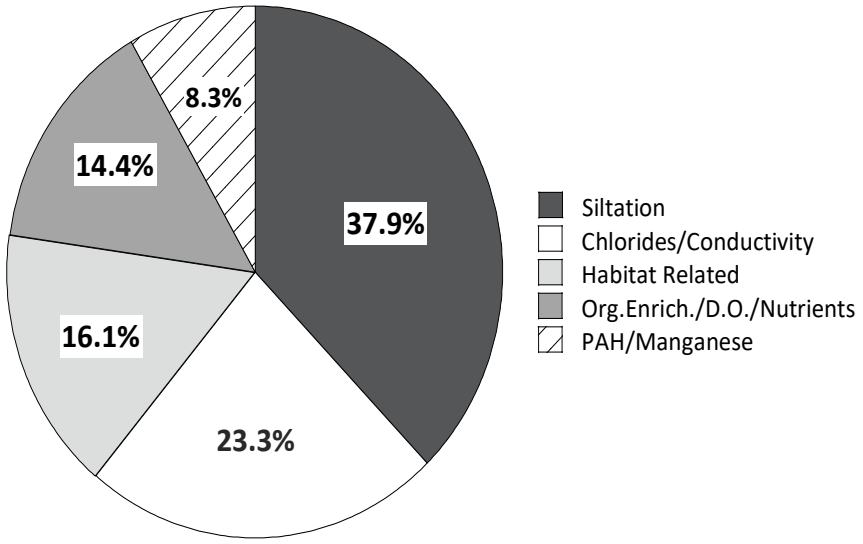


Figure 4-9: Major Causes Associated with Aquatic Life Impairments Identified by the DRWW Monitoring Study, 2016
MBI, 2017

aquatic health throughout the DPR planning area. Figure 4-9 shows major causes associated with aquatic life impairments based on MBI's 2017 Monitoring Study performed for the DRWW. The monitoring data and study help analyze trends, prioritize actions, and will help monitor and measure success of watershed management activities and augment the limited data used to determine the statutory water quality impairments.

4.2.3 Causes and Sources

Chapter 3 introduced and identified problems and impairments in the DPR planning area, and this section aims at better understanding the causes and sources of impairments. Various sources of quantitative and qualitative data and information were analyzed with the goal to identify the causes and sources of water pollution that will need to be managed to achieve the estimated pollutant load reductions and the goals and objectives of this plan.

The combined efforts outlined in the inventory presented in Chapter 3, the MBI 2017 Monitoring Study, and the Illinois EPA Integrated Report (2016) study provide a wealth of data, scientific assessment, and watershed knowledge to assess the stream impairments and better understand the causes and sources. Table 4-5 provides a planning level inventory of impairments, causes, and sources based on the characterization and inventory of the DPR planning area. This table serves as a summary to document the issues and provides a baseline to further characterize them in a sufficient manner to recommend priority areas and specific actions.

Table 4-5: Summary of Causes and Sources of Pollution and Impairments

IMPAIRMENT	CAUSES	SOURCES	PRIORITY	HIGHEST PRIORITY WATERSHEDS
Aquatic Life and Aesthetic Quality	Chloride / Conductivity	▪ Urban runoff, impervious surfaces not detained or retained ▪ Salt application for deicing of parking lots and roadways ▪ Wastewater treatment plants	HIGH	Buffalo Creek (TMDL), Indian Creek, Upper DPR, Aptakisic Creek, Newport Drainage Ditch, Lower Des Plaines
	Total Suspended Solids (TSS)	<u>Streams / Rivers</u> ▪ Agricultural land use ▪ Altered hydrology ▪ Urban runoff ▪ Streambank modifications/destabilization (MBI report) ▪ Site Clearance (Land Development or Redevelopment)(Illinois EPA) ▪ Bank Erosion <u>Lakes</u> ▪ Sediment Resuspension (Clean Sediment) (Illinois EPA)	HIGH	<u>Watersheds</u> Indian Creek, North Mill/Dutch Gap, Mill Creek <u>Lakes</u> 43 lakes in the DPR planning area
	Siltation / Sedimentation			

IMPAIRMENT	CAUSES	SOURCES	PRIORITY	HIGHEST PRIORITY WATERSHEDS
		▪ Impervious surface/parking lot runoff (Illinois EPA) ▪ Other recreational pollutant sources (Illinois EPA) ▪ Littoral/Shore area modifications (non-riverine) (Illinois EPA) ▪ Lakeshore Erosion		
	Organic Enrichment	▪ Wastewater treatment plants ▪ Agricultural runoff	MEDIUM	Upper DPR, Lower DPR
	Dissolved Oxygen	▪ Altered hydrology ▪ Urban runoff ▪ Agricultural runoff ▪ Wastewater treatment plants	MEDIUM	Buffalo Creek, Upper DPR, Lower DPR, Indian Creek, Mill Creek
Aquatic Life and Aesthetic Quality (continued)	Total Phosphorus	<u>Streams/Rivers</u> ▪ Wastewater treatment plants ▪ Agricultural runoff ▪ Urban Runoff/storm sewers <u>Lakes</u> ▪ Rural (Residential Areas) (Illinois EPA) ▪ Runoff from Forest/Grassland/Parkland (Illinois EPA) ▪ Waterfowl (Illinois EPA) ▪ Internal nutrient recycling (Illinois EPA) ▪ On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) (Illinois EPA) ▪ Yard Maintenance (Illinois EPA) ▪ Residential Districts (Illinois EPA) ▪ Golf courses (Illinois EPA)	HIGH	<u>Watersheds</u> Buffalo Creek, Indian Creek, North Mill/Dutch Gap <u>Wastewater Treatment Plants</u> <u>Lakes</u> 52 lakes in the DPR planning area
	Bank Erosion	▪ Urban runoff ▪ Altered hydrology ▪ Habitat alteration ▪ Streambank modifications/destabilization	HIGH	Mill Creek, Buffalo Creek, Upper DPR, Lower DPR, Bull Creek, North Mill Creek
	Channel Modification	▪ Channelization	MEDIUM	North Mill, Mill Creek, Aptakisic Creek, Buffalo Creek

IMPAIRMENT	CAUSES	SOURCES	PRIORITY	HIGHEST PRIORITY WATERSHEDS
Aquatic Life and Aesthetic Quality (continued)	Other flow regime alterations & Changes in Stream Depth and Velocity Patterns (Illinois EPA)	▪ Dam or impoundment ▪ Impacts from hydrostructure flow regulation/modification ▪ Urban Runoff/Stormsewers	MEDIUM	North Mill/Dutch Gap, Hastings Creek
	Aquatic Algae (Streams)	▪ Wastewater treatment plants ▪ Agricultural runoff ▪ Urban runoff	MEDIUM	Lower DPR
	Aquatic Plants (Lakes)	▪ Wastewater treatment plants ▪ Agricultural runoff ▪ Urban runoff	MEDIUM	<u>Lakes</u> 34 lakes in the DPR planning area
	Non-native aquatic plants (Illinois EPA)	▪ Unknown	LOW	Osprey Lake (Upper DRP)
	Alterations in stream-side or littoral vegetative cover (Illinois EPA, Riparian)	▪ Habitat alteration ▪ Streambank modifications/destabilization	HIGH	Indian Creek, Upper DPR, Newport, Aptakisic Creek
	PAHs & Manganese	▪ Urban runoff ▪ Agricultural runoff ▪ Altered hydrology ▪ Contaminated Sediment	MEDIUM	Indian Creek, Lower DPR, Buffalo Creek, Upper DPR
	Arsenic	▪ Urban runoff ▪ Altered hydrology ▪ Contaminated Sediment	LOW	Upper DPR, Lower DPR, North Mill/Dutch Gap
	pH	▪ Unknown	LOW	Mill Creek

IMPAIRMENT	CAUSES	SOURCES	PRIORITY	HIGHEST PRIORITY WATERSHEDS
Primary Contact Recreation	Fecal Coliform Bacteria	▪ Failed septic systems ▪ Urban runoff	HIGH	Watersheds Buffalo Creek, Lower DPR, North Mill/Dutch Cap, Newport Drainage Ditch Lakes Druce, Hastings, Loch Lomond, Sylvan
Fish Consumption	PCBs	▪ Contaminated Sediment (Illinois EPA)/legacy	LOW	Upper DPR, Lower DPR
	Mercury	▪ Atmospheric Deposition (Illinois EPA)	LOW	

Des Plaines River Watershed Workgroup (DRWW), Monitoring data 2015 – 2017; MBI, 2017; Illinois Environmental Protection Agency (IEPA). 2016 303(d) List

4.2.4 Pollution Loading and Nonpoint Sources

Pollutant loading from a watershed is the sum of point sources and nonpoint sources. Nonpoint source pollution is a primary concern related to water quality in the DPR planning area based on the watershed characterization and the recent bioassessment of the Upper Des Plaines River and its tributaries (MBI, 2017). Based on the data available, the watershed planning committee has identified priority impairments and problems to address in this watershed-based plan as detailed in Table 4-5.

Point sources are also major contributors to the overall watershed pollutant loads, especially phosphorus, nitrogen, and chloride. Existing regulatory permit processes and enforcement address point source pollution; however, some parameters are not regulated and contribute to watershed problems and stakeholder concerns. The permitted point source facilities within the DPR planning area include 18 wastewater treatment facilities. All permitted facilities are subject to regulatory monitoring and reporting requirements, which are all public records.

Northwater Consulting performed a flow and load duration analysis at five USGS gaging stations (Des Plaines River at Russel Road, Des Plaines River near Des Plaines, Des Plaines River near Gurnee, North Mill Creek near Milburn, Mill Creek at Old Mill Creek and Buffalo Creek near Wheeling) using 2015, 2016 and 2017 DRWW water quality monitoring data from these locations. Streamflow statistics were evaluated for the Des Plaines River at Des Plaines USGS station and determined that the water year of 2014 was representative of an average year of data over the last 30-years (1986-2016). 2014 water year data was applied to perform flow and load duration analyses for the DPR planning area USGS. Table 4-6 summarizes the estimated loading of select pollutants from the DPR planning area using data from all pollutant sources evaluated.

Table 4-6: Summary of Pollutant Loading in the DPR Planning Area

POLLUTANT	UNITS	NONPOINT SOURCE POLLUTION LOAD MODEL	POINT SOURCES	STREAM-BANK AND GULLY	LAKE SHORE-LINE	SEPTIC FAILURE	TOTAL	FLOW/ LOAD DURATION ANALYSIS[1]
Total Phosphorus	lbs/yr	43,622	169,000[A]	13,495	206	3,000	229,323	304,435
Total Nitrogen	lbs/yr	974,965	3,123,802[B]	27,112	414	7,600	4,133,893	2,791,561
Total Suspended Solids	tons/yr	23,698	67.29[C]	13,556	206	NA	37,527	6,348
Chloride	lbs/yr	51,873,595	36,383,729[D]	NA	NA	NA	88,257,324	108,460,867
E.Coli Bacteria	CFU/yr (in billions)	152,182	NA[E]	NA	NA	22,084	174,266	983,724
Fecal Coliform Bacteria	CFU/yr (in billions)	225,991	NA	NA	NA	32,795	258,786	1,460,830

[1]Detailed in the narrative above; [A]No phosphorus reporting or data for 8 of 18 facilities; [B]Total Nitrogen data obtained from Waukegan and Gurnee WWTPs; average concentration applied to all other plants; [C]No reporting or data for 1 of 18 facilities, [D]E.coli to Fecal coliform multiplier of 1.485, [E]Chloride data obtained from Waukegan and Gurnee WWTPs; average concentration applied to all other plants.

The flow and load duration analysis is based on direct measurements and accounts for cumulative loading from all sources. When comparing pollutant loading estimates with the load duration analysis results, it is clear that phosphorus, nitrogen, chloride, and bacteria loading estimates are all lower than what was actually measured in the field. This difference can partially be attributed to an incomplete estimate of point source loading due to data gaps. Possible explanations for differences between estimated loads for each pollutant are provided below:

- Total Phosphorus – Data are not reported by all point source discharges.
- Total Nitrogen – Data are only available for two discharges; average concentration applied to all other discharges.
- Total Suspended Solids – The load duration analysis results based on DRWW data are much lower than model estimates; the DRWW monitoring program sampling method (and program) is not designed to estimate sediment loading, resulting in a significant underestimate.

- Chloride – Data are only available for two discharges; average concentration applied to all other discharges.
- Bacteria – Data are not reported by all point source dischargers.

4.2.4.1 Nonpoint Source Pollution Load Model

A custom GIS model (Spatial Watershed Assessment and Management Model, SWAMM™) was developed to estimate current and future nonpoint source pollutant loads for five (5) parameters, which included total phosphorus, total nitrogen, total suspended solids, chloride, and fecal coliform bacteria.

The model output illustrates and quantifies the spatial distribution of nonpoint source loading in the DPR planning area. The nonpoint source loads are subtotaled by land use category and at the catchment scale.

SWAMM™ incorporates the land use described in Chapter 3 and Soil Survey Geographic Database (SSURGO) soils data for the DPR planning area. Average annual runoff volumes were estimated for the basin using the land use, soil-types, and climate statistics. **Event mean concentrations (EMCs)** were applied to the runoff volumes based on land use practices. The EMCs are established based on literature sources, water quality studies, and professional experience, and are listed in Appendix G. In agricultural areas, the model incorporates a universal soil loss equation (USLE) with a delivery ratio based on distance to the closest receiving water body (Appendix G). The USLE portion of the model allows for refined loading estimates based on soil types and topography. Formulas and selected variables incorporated into the model are largely derived from STEPL, Version 3 and Schueler's Simple Method (Appendix G). Furthermore, the model was calibrated using local water quality data collected by the DRWW and stream flow data generated by the USGS. Model parameters were calibrated based on professional judgement and considered the results of the load duration analysis.

4.2.4.2 Nonpoint Source Loading, Current Conditions

Figure 4-10 through Figure 4-14 illustrate the spatial distribution of nonpoint source loading for total suspended solids, total phosphorus, total nitrogen, chloride, and fecal coliform bacteria, respectively.

EVENT MEAN CONCENTRATION (EMC): Method for characterizing pollutant concentrations in stormwater runoff. The pollutant concentrations are measured in studies and on-going research that collects and analyzes runoff from various land-use practices in different geographic and climatic regions. The values are determined by compositing (in proportion to flow rate) a set of samples, taken at various points in time during a runoff event, into a single sample for analysis.

COLONY FORMING UNIT (CFU): CFU is a measure of viable bacterial or fungal numbers. Unlike direct microscopic counts where all cells, dead and living, are counted, CFU measures viable cells.

NOTEWORTHY – SPREADSHEET TOOL FOR ESTIMATION OF POLLUTANT LOAD (STEPL)

STEPL employs simple algorithms to calculate nutrient and sediment loads from different land uses and the load reductions that would result from the implementation of various BMPs. STEPL development is supported and funded by the EPA.

Table 4-7 through Table 4-9 display the total pollutant load results for the DPR planning area by land use category and subwatershed.

Results show that transportation land uses and water (receiving bodies for much of the chloride) contribute the highest annual per acre nonpoint source loads of chloride. Agriculture represents the highest phosphorus, nitrogen, and sediment nonpoint source loads. Residential land uses contribute the highest fecal coliform nonpoint source loading, and open space ranks near the lowest for all pollutants. Bull's Brook was the lowest for all types of nonpoint source pollution loading. The Upper Des Plaines River subwatershed was second highest for sediment pollution loading but was highest for all other types of nonpoint source pollution loading.

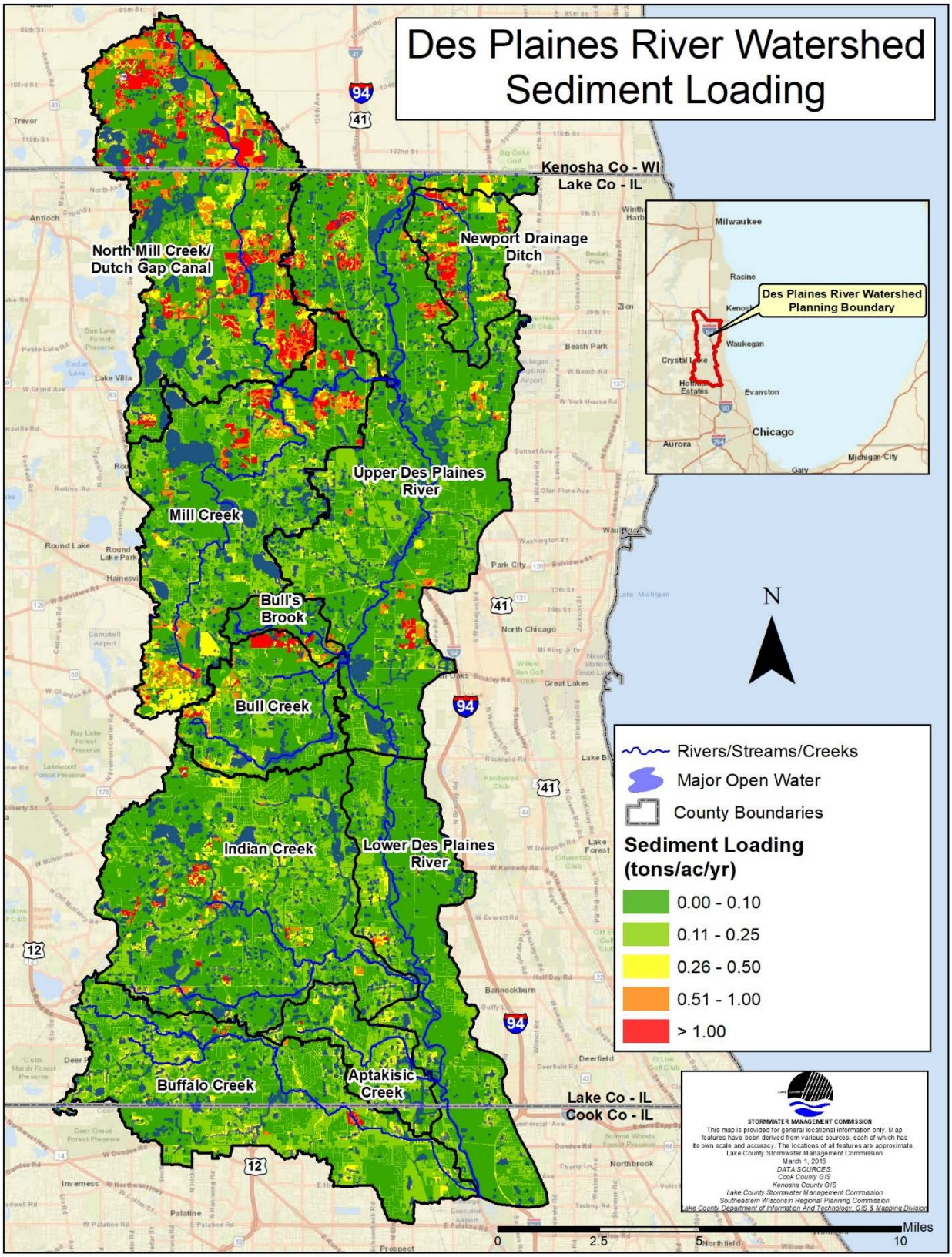


Figure 4-10: Modeled Annual Nonpoint Source Sediment Loading

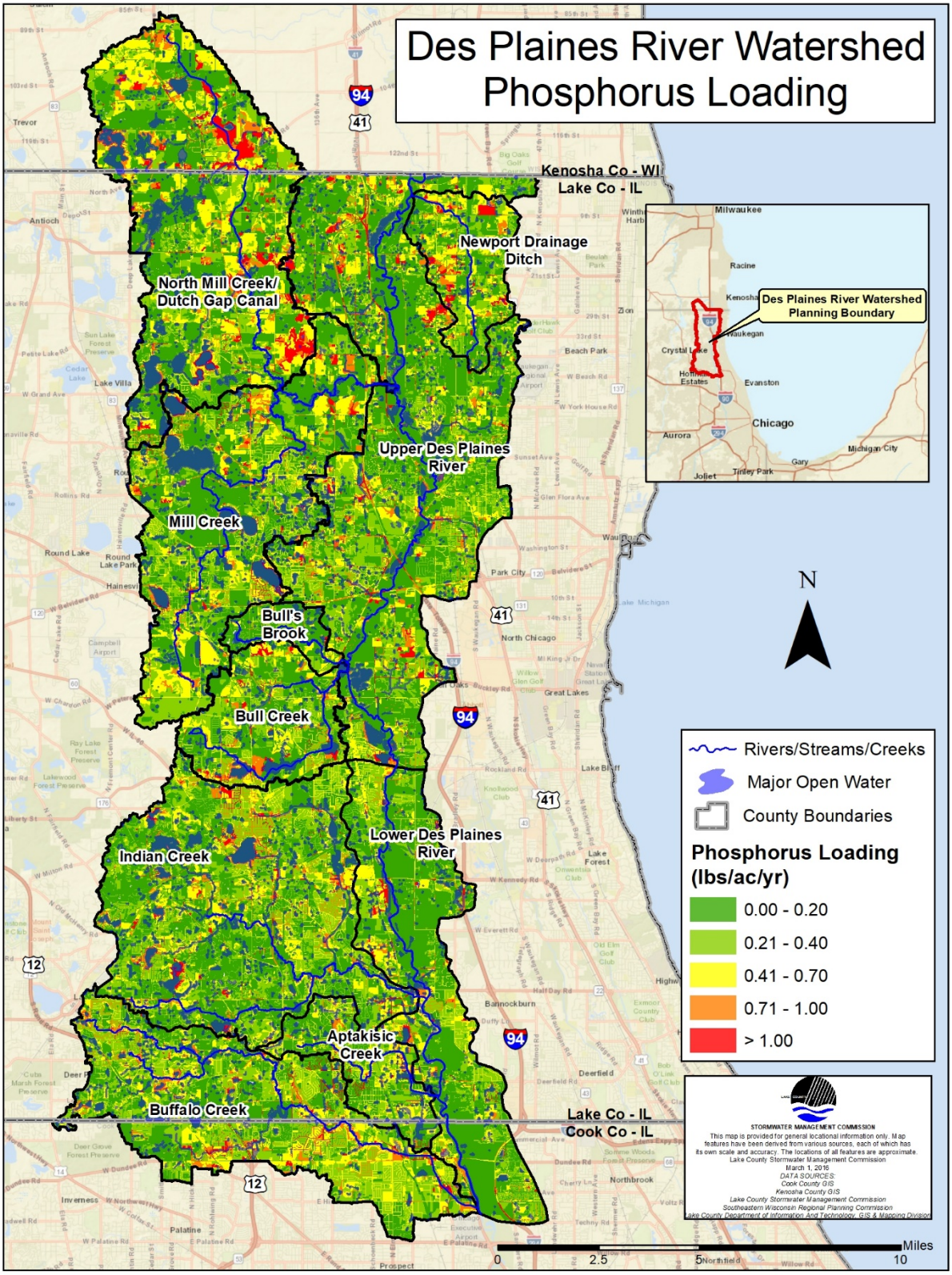


Figure 4-11: Modeled Annual Nonpoint Source Phosphorus Loading

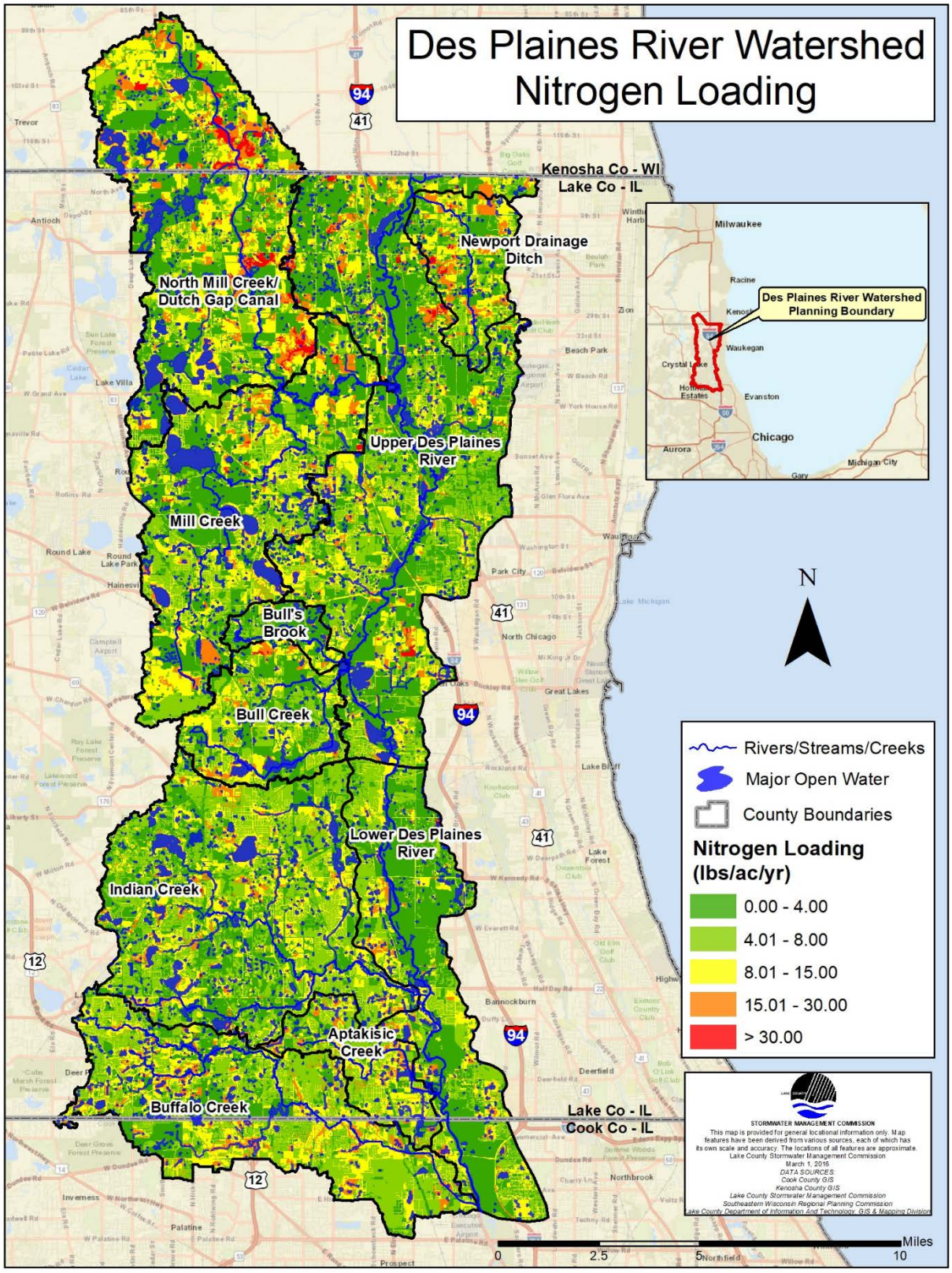


Figure 4-12: Modeled Annual Nonpoint Source Nitrogen Loading

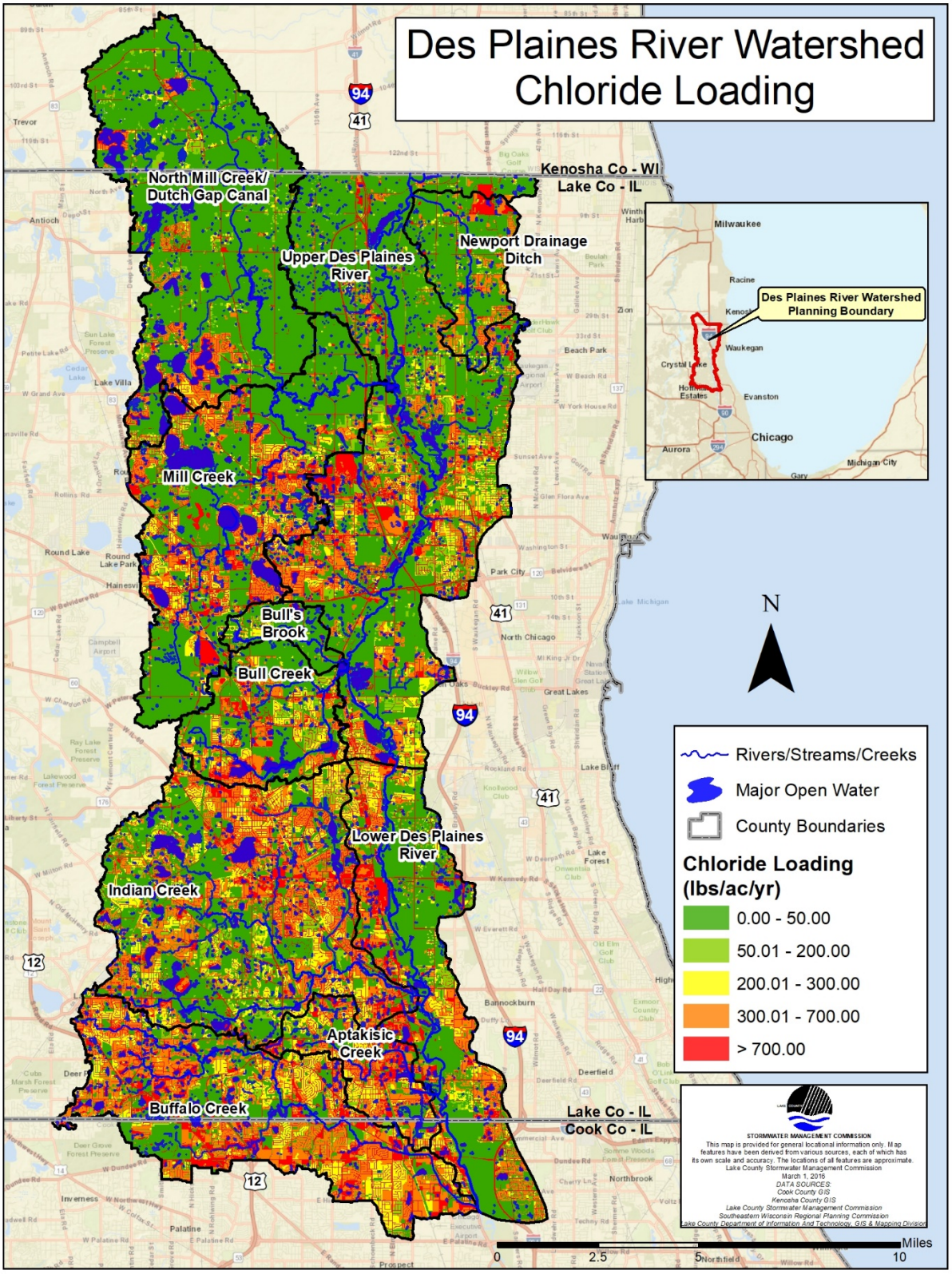


Figure 4-13: Modeled Annual Nonpoint Source Chloride Loading

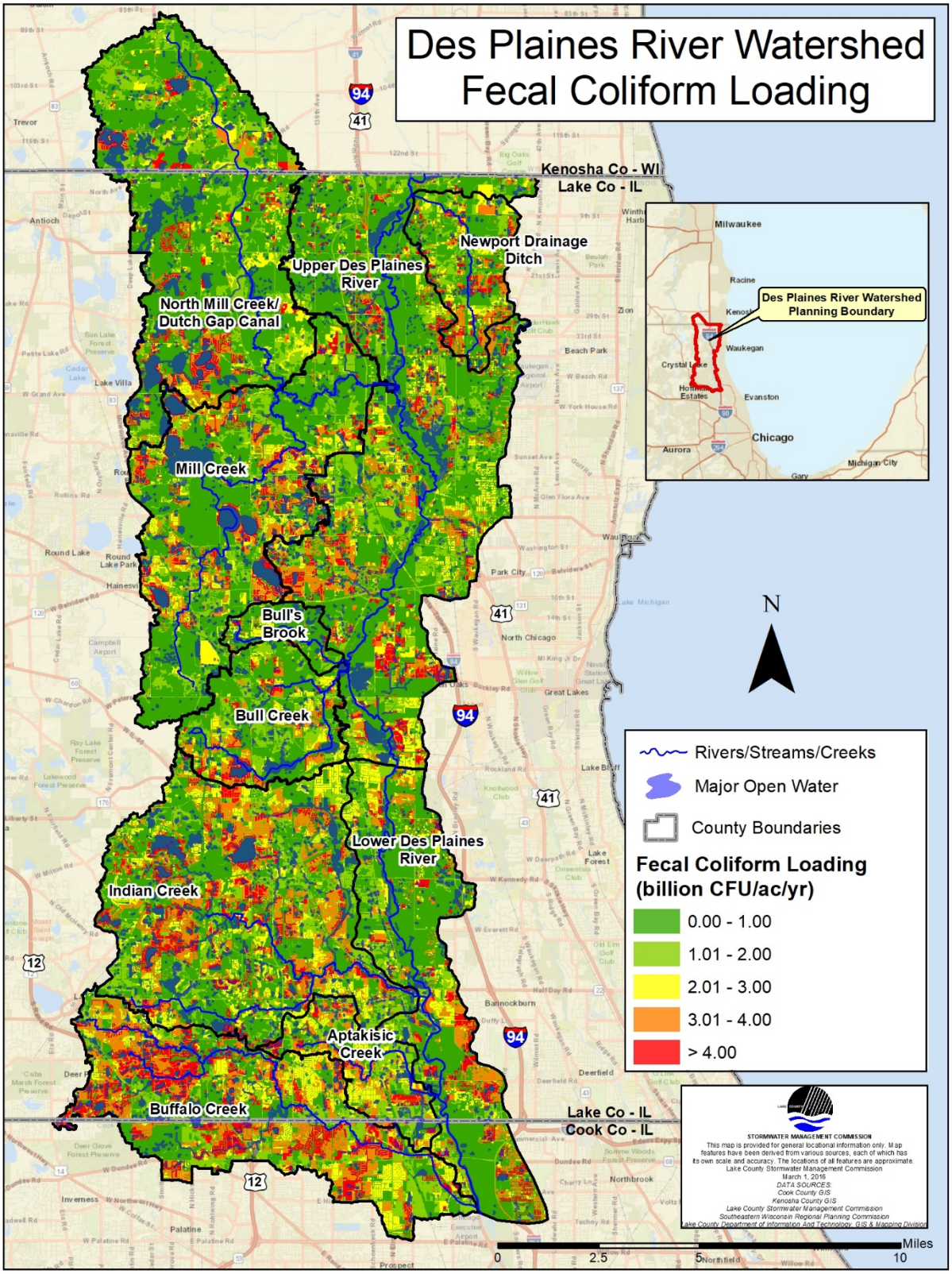


Figure 4-14: Modeled Annual Nonpoint Source Fecal Coliform Loading

Table 4-7: Annual Nonpoint Source Loading Estimates

PARAMETER	UNIT	TOTAL	AVG – PER ACRE
Total Suspended Solids	tons/yr	23,698	0.157
Total Phosphorus	lbs/yr	42,622	0.283
Total Nitrogen	lbs/yr	974,965	6.48
Fecal Coliform Bacteria	CFU in billions/yr	225,991	1.5
Chloride	lbs/yr	51,873,595	344.6

Table 4-8: Annual Nonpoint Source Loading By Land Use

LAND USE	ACRES	PHOSPHORUS		NITROGEN		CHLORIDE		FECAL COLIFORM		TOTAL SUSPENDED SOLIDS	
		Total (lbs)	Average (lbs/ac)	Total (lbs)	Average (lbs/ac)	Total (lbs)	Average (lbs/ac)	Total (cfu in billions)	Average (per acre)	Total (tons)	Average (tons/ac)
Airport	93	45	0.49	603	6.6	78,649	861	89	0.97	9.5	0.10
Beaches	7.3	1.1	0.15	29	3.8	10	1.4	8.7	1.1	0.09	0.01
Bus Facility	3.8	1.2	0.35	27	7.3	1,924	621	3.1	0.84	0.63	0.17
Cemetery	279	74	0.22	1,402	3.5	37,309	100	121	0.31	9.0	0.02
Commercial/ Retail	2,015	1,082	0.49	20,497	8.8	1,690,793	707	2,334	0.99	312	0.13
Cultural and Entertainment	330	106	0.34	2,116	6.2	159,522	463	347	1.0	47	0.13
Equestrian Pasture	1,492	516	0.36	11,062	7.7	2,010	1.2	5,302	3.5	70	0.05
Farm Building	866	280	0.31	11,083	12	63,679	68	2,699	3.0	63	0.07
Feed Lot	93	218	2.0	2,884	27	211	2.1	1,352	13	18	0.17
Forest	16,163	1,200	0.06	23,633	1.3	15,421	0.82	3,333	0.18	129	0.006
Golf Courses	3,132	1,312	0.37	23,570	6.3	6,106	1.6	3,243	0.87	134	0.03
Government/ Institutional	2,069	1,021	0.44	19,989	8.6	942,518	404	2,159	0.93	287	0.12
Grassland	10,490	702	0.06	8,462	0.72	11,089	0.94	2,371	0.20	80	0.005
Hotel/Motel	86	39	0.43	818	8.6	41,354	433	130	1.4	13	0.13
Industrial	2,524	839	0.31	19,176	6.7	1,211,445	420	3,809	1.3	421	0.14
Junk Yard	7.4	1.3	0.17	32	4.0	1,886	231	5.9	0.73	0.80	0.10
Landfill	519	254	0.30	6,496	7.1	379,313	412	1,188	1.3	145	0.14
Mobile Home	127	41	0.31	1,081	7.3	16,834	113	540	3.7	11	0.07
Office/Research	766	377	0.44	8,656	9.2	410,446	435	721	0.77	95	0.10
Open Space Road	287	96	0.28	1,110	3.4	4,666	15	60	0.19	5.6	0.02
Open Water	7,082	956	0.09	32,672	3.5	10,550,867	1,151	4,706	0.50	33	0.003
Open Water Stream	779	571	0.61	13,296	15	745,935	850	1,054	1.2	8.3	0.01
Orchards and Nurseries	1,433	362	0.22	13,864	8.6	1,877	1.2	2,066	1.3	70	0.04
Other Conservation	218	18	0.07	175	0.75	229	0.98	49	0.21	29	0.02
Other Open Space	143	7.4	0.05	175	1.3	116	0.84	24	0.18	0.86	0.006
Parking Lot	3,295	1,639	0.48	31,063	8.9	3,448,919	988	4,400	1.3	455	0.13
Parks and Recreation	2,778	298	0.09	9,663	3.1	26,979	9.6	746	0.24	27	0.008
Pasture	487	181	0.45	3,813	8.8	626	1.3	1,784	4.0	21	0.05

Table 4-8 continued

LAND USE	ACRES	PHOSPHORUS		NITROGEN		CHLORIDE		FECAL COLIFORM		TOTAL SUSPENDED SOLIDS	
		Total (lbs)	Average (lbs/ac)	Total (lbs)	Average (lbs/ac)	Total (lbs)	Average (lbs/ac)	Total (cfu in billions)	Average (per acre)	Total (tons)	Average (tons/ac)
Rail Station	6.8	2.3	0.31	48	5.8	3,146	382	5.5	0.68	0.69	0.09
Railroad	455	166	0.33	2,207	4.5	164,741	336	368	0.75	58	0.11
Recreational Trails	196	24	0.12	940	4.9	5,698	30	74	0.38	5.9	0.03
Residential-Multi Family	637	134	0.21	3,251	5.0	73,718	113	2,018	3.1	147	0.10
Residential-Single Family	1,152	353	0.25	11,121	7.7	526,806	365	5,567	3.9	3,445	0.10
Residential Farm	32,784	9,193	0.27	251,440	7.3	11,820,975	345	127,494	3.7	27	0.04
Roads	12,505	8,420	0.60	142,156	10	18,818,348	1,370	20,364	1.5	2,114	0.15
Row Crops	18,351	9,861	0.45	241,975	11	34,290	1.6	19,342	0.92	14,894	0.71
Under Development	723	124	0.15	2,391	2.9	28,652	35	465	0.57	63	0.08
Urban Open Space	7,810	605	0.07	26,603	3.0	10,001	1.1	2,052	0.23	257	0.01
Utilities	410	125	0.27	2,273	4.2	169,842	327	300	0.59	29	0.05
Utility ROW	645	37	0.05	1,455	2.2	536	0.80	114	0.17	6.7	0.008
Vacant	183	11	0.05	214	1.0	151	0.73	32	0.16	1.0	0.005
Vehicle Dealership	52	25	0.43	481	8.4	40,548	699	43	0.75	7.1	0.12
Warehousing	577	314	0.48	5,241	8.0	304,871	463	895	1.4	92	0.14
Wetlands	16,465	1,994	0.10	15,720	0.87	20,537	1.1	2,213	0.12	55	0.003

*Estimates in this table are the result of the nonpoint source model and do not account for major gully and streambank erosion sources

Table 4-9: Annual Nonpoint Source Pollutant Loading By Subwatershed

SUBWATERSHED	ACRES	PHOSPHORUS		NITROGEN		CHLORIDE		FECAL COLIFORM		TOTAL SUSPENDED SOLIDS	
		Total (lbs)	Average (lbs/ac)	Total (lbs)	Average (lbs/ac)	Total (lbs)	Average (lbs/ac)	Total (cfu in billions)	Average (per acre)	Total (tons)	Average (tons/ac)
Aptakisic Creek	4,384	1,262	0.23	33,602	6.1	2,511,012	499	8,448	1.3	490	0.08
Buffalo Creek	17,430	5,651	0.26	127,876	6.0	8,698,163	444	40,715	1.7	1,884	0.08
Bull Creek	7,132	2,137	0.24	44,143	4.9	2,524,804	322	9,692	1.1	1,150	0.08
Bull's Brook	1,817	336	0.17	7,126	3.6	290,285	179	1,426	0.78	197	0.07
Dutch Gap Canal/North Mill Creek	23,537	7,921	0.25	184,750	5.5	4,699,445	243	28,057	1.2	8,206	0.14
Indian Creek	24,222	6,687	0.23	149,842	5.1	9,834,505	350	41,780	1.3	2,452	0.07
Lower Des Plaines River	14,636	3,571	0.23	74,669	4.9	4,809,685	355	18,806	1.2	881	0.06
Mill Creek	19,789	5,470	0.24	125,151	5.4	7,531,358	378	26,897	1.3	3,223	0.09
Newport Drainage Ditch	5,018	1,723	0.26	39,669	5.6	976,897	260	8,079	1.3	1,210	0.10
Upper Des Plaines River	32,550	8,863	0.23	188,137	4.9	9,997,441	305	42,092	1.1	4,005	0.07

4.2.4.3 Point Source Loading

Permitted point source discharge locations that report phosphorus, nitrogen, sediment, and chloride were tabulated to estimate pollution loading and are shown in Table 4-10. Loading of bacteria cannot be estimated because that data is not reported, but a generalized estimate of phosphorus, total nitrogen, chloride, and sediment from point sources can be derived.

- Sediment from point sources is estimated at 67.3 tons/yr, which is 0.3% of the total watershed loading.
- Total nitrogen from point sources is estimated at 3,123,802 lbs/yr, which equates to approximately 76% of the total watershed loading.
- Phosphorus from point sources is estimated to be in the range of 169,000 lbs/yr; this is nearly 80% of the total watershed loading.
- Chloride loading from point sources is estimated to be 36,383,729 lbs/yr, or 42% of the total watershed load.

Point source discharges are a significant source of nitrogen, phosphorus, and chloride in the DPR planning area. The phosphorus estimate of 169,000 lbs/yr is based on the direct calculation listed in Table 4-10. To account for facilities without data, 5.69 lbs per million gallons of discharge were assumed, based on the lower quartile of the facilities that reported phosphorus data.

Based on the DRWW monitoring and measured nitrogen data from two DPR planning area point source dischargers, point sources appear to be a major contributor of nitrate (MBI, 2017). Using measured data from two plants, point sources also appear to be a substantial contributor of chloride. Point sources do not appear to be a major contributor of sediment, and further data is necessary to evaluate the fecal coliform bacteria loading from point sources.

Table 4-10: Loading Estimates from Point Sources

FACILITY	PERMIT NUMBER	DESIGN AVG. FLOW (MGD)	DESIGN MAX. FLOW (MGD)	2016 ANNUAL FLOW (MG)	ANNUAL PHOS-PHORUS LOAD (LBS/YR)	ANNUAL TOTAL NITROGEN LOAD (LBS/YR)[2]	ANNUAL SEDIMENT LOAD (TONS/YR)[3]	CHLORIDE LOAD (LBS/YR)[4]
Alden Long Grove Rehabilitation Center STP	IL0051934	0.015	0.037	12.8	ND	1,971	0.35	22,800
Fox Point MHP STP - Wheeling	IL0049930	0.016	0.04	2.2	66.6	338	0.02	3,908
Lake County Public Works Des Plaines River	IL0022055	16	51.8	3,449	63,684	532,185	30	6,156,083
Lake County Public Works Mill Creek STP	IL0071366	2.1	7.8	288	281	44,490	2.2	514,636
Lake County Public Works New Century Town STP	IL0022071	6	18	1,332	7,592	205,553	9.1	2,377,747
Lindenhurst Sanitary District STP	IL0020796	1.57	5.7	442	5,272	68,142	10.52	788,239
Lou Perrines Gas & Groceries STP	IL0072966	0.015	0.022	0.2	ND	31.5	0.0016	365
Mobil Oil Service Gas Station WWTP	IL0078093	0.0043	0.011	1.5	ND	231	0.038	2,671
North Shore Water Reclamation District Gurnee STP	IL0035092	23.6	47.2	4,964	ND	840,415	0	10,184,341
North Shore Water Reclamation District Waukegan STP	IL0030244	22	44	8,322	9,957	1,110,488	0	12,631,797
Paramski Mobile Homes Rainbow	WI0030481	0.04	ND	12.8	ND	1,971	ND	22,800
St. Mary's of the Lake Seminary - STP	IL0024350	0.03	0.075	5.8	144	901	0.037	10,423
Toor Car & Truck Plaza STP	IL0073431	0.0075	0.011	1.4	ND	220	0.009	2,541
Tristar Gas and Food _ Wadsworth Plaza	IL0071722	0.012	0.02	0.9	ND	141	0.017	1,629
Village of Libertyville STP	IL0029530	4	8	1,219	49,247	188,095	14.9	2,175,801
Village of Mundelein STP	IL0022501	4.95	15	832	0	128,400	0	1,485,277
Wadsworth Crossing STP	IL0074535	0.008	0.032	0.8	ND	124	0.0036	1,433
Wadsworth Marathon STP	IL0047619	0.004	0.01	0.7	29.6	107	0.0076	1,238
	TOTALS	**80.4**	**198**	**20,888**	**136,273**	**3,123,802**	**67.3**	**36,383,729**

ND – No data available or reported; 2 Total Nitrogen data obtained from Waukegan and Gurnee WWTPs; average concentration applied to all other plants, 3 total suspended solids, 4Chloride data obtained from Waukegan and Gurnee WWTPs; average concentration applied to all other plants

4.2.4.4 Sediment Source Analysis

The nonpoint source model does not directly account for significant sources of streambank and gully erosion. Estimates for significant gully and streambank erosion were made based on a windshield survey of the DPR planning area that was conducted in the spring of 2017 and a review of similar surveys done for subwatersheds in which previous SMC-led plans were developed. Stream inventory data collected by the Lake County SMC throughout the DPR planning area (Chapter 3) was also used to support this analysis.

Sediment Loading in the Watershed

- Nonpoint sources: 23,437 tons/yr
- Streambank erosion: 11,481 tons/yr
- Gully erosion: 2,075 tons/yr
- Lake shorelines: 206 tons/yr
- NPDES point sources: 67 tons/yr

NOTEWORTHY – GULLY EROSION

Gully erosion is the removal of soil along drainage lines by surface water runoff. Once initiated, gullies continue to expand by headward erosion or by slumping of the side slopes unless steps are taken to stabilize the disturbance. Gully erosion occurs when water is channeled across unprotected land and washes away the soil along the flow path. Under natural conditions, run-off is moderated by vegetation which generally holds the soil together, protecting it from excessive run-off and direct rainfall. To repair gullies, the object is to divert or modify the flow of water moving into and through the gully so that scouring is reduced, sediment can accumulate, and revegetation can proceed. Stabilizing the gully head is important to prevent damaging water flow and headward erosion. In most cases, gullies can be prevented by good land management practices.

4.2.4.5 Streambank Erosion

Table 4-11 summarizes the streambank load estimates. Streambank erosion was estimated using data collected by SMC throughout the DPR planning area, specifically lateral recession rates (LRRs) and eroding bank heights. To ensure consistency with results from previously completed watershed-based plans, this information was adjusted to fit results tabulated for two previous plans within the Des Plaines River Watershed (Mill Creek and North Mill Creek). The adjustment was performed largely to resolve data collection discrepancies between field teams of summer interns that performed the surveys. An adjustment factor representing the average percent of total load attributed to streambank erosion (25.5%) was applied to all streambank inventory data as a result.

For streams that were unassessed by a field team, average eroding bank heights and LRRs were generated from similarly assessed tributary segments in the same subwatershed and applied to populate stream reaches. Streambank erosion and corresponding nutrient loads were calculated for all but two subwatersheds, Mill and North Mill, where previous estimates have been provided.

Table 4-11: Streambank Pollutant Loading Estimates

WATERSHED	TOTAL NITROGEN (lbs/yr)	TOTAL PHOSPHORUS (lbs/yr)	TOTAL SEDIMENT (tons/yr)	NOTES
North Mill Creek/Dutch Gap Canal	5,000	2,500	2,500	Sediment results from watershed plan. Nitrogen and phosphorus calculated from sediment totals
Mill Creek	6,034	3,017	3,017	Sediment and phosphorus results from watershed plan. Nitrogen calculated from sediment totals
Upper & Lower Des Plaines River	7,477	3,738	3,738	Calculated from SMC Data; sum of Upper and Lower Des Plaines River Sub-Watersheds
Newport Drainage Ditch	73	37	37	Calculated from SMC Data
Bull's Brook/Bull Creek	233	116	116	Calculated from SMC Data; sum of Bull's Brook and Bull Creek Sub-Watersheds
Indian Creek	1,243	622	622	Calculated from SMC Data
Aptakisic Creek	214	107	107	Calculated from SMC Data
Buffalo Creek	2,688	1,344	1,344	Calculated from SMC Data
TOTALS	**22,962**	**11,481**	**11,481**	

It is estimated that at least 11,481 tons of sediment are delivered to waterways annually as the result of streambank erosion sources in the DPR planning area. Although streambank erosion is a large source of sediment loading in the DPR planning area, it is not as significant as sheet and rill erosion. Areas of significant gully erosion in the Mill and North Mill Creek Watershed were identified during previous planning efforts. All remaining gullies were assessed during the DPR planning area windshield survey performed in the spring of 2017.

4.2.4.6 Gully Erosion

Gully erosion in the DPR planning area was evaluated during the DPR planning area windshield survey and estimated using GIS. Gully erosion totals presented in this section include results from previously completed watershed-based plans; gully erosion presented in older plans was updated to reflect current conditions. A total of 417 eroding gullies, both ephemeral (those that form each year) and permanent (those that receive intermittent streamflow and expand over time such as a forested ditch or channel) were evaluated.

For those ephemeral gullies not visible from a road or observed during site assessment, GIS was used to estimate their location and extent. Gullies were delineated in GIS using aerial imagery, and conservative width

(0.5 ft), depth (0.5 ft), and years eroding (1 yr) were applied to each gully. For gullies observed in the field, dimensions were directly measured in the field and transferred to GIS for analysis.

Total net erosion in tons/year and estimates of nitrogen and phosphorus loading were calculated using GIS and equations derived from IEPA's load reduction spreadsheet. A distance-based delivery ratio was applied to account for distance to a receiving waterbody. Sediment trapping efficiency was accounted for, if the gully drained to a retention or detention structure.

The following equations were applied to estimate sediment and nutrient yields from gully sources:

$$Sy = \left\{\frac{L \times W \times D}{Y} \times \gamma d\right\} DPS^{0.2069}$$

Sy – sediment yield in tons/yr
L – gully length in feet
W – gully width in feet
D -gully depth in feet
Y – years eroding
γd – Soil dry weight density (tons/ft^3)
DPS$^{0.2069}$- Distance to lake or perennial stream in feet, delivery ratio

$$TN = \left[Sy \times \frac{2000\ lbs}{1.0\ ton}\right] \times Nc\ x\ Cf$$

TN – Total nitrogen load from gully in lbs/yr
Sy – Sediment yield in tons/yr
Nc – Nitrogen concentration in soil (0.001 lbs/lb)
Cf – Correction factor, 1.0

$$TP = \left[Sy \times \frac{2000\ lbs}{1.0\ ton}\right] \times Pc\ x\ Cf$$

TP – Total nitrogen load from gully in lbs/yr
Sy – Sediment yield in tons/yr
Pc – Phosphorus concentration in soil (0.0005 lbs/lb)
Cf – Correction factor, 1.0

Table 4-12: Gully Pollutant Loading Estimates

WATERSHED	TOTAL NITROGEN (lbs/yr)	TOTAL PHOSPHORUS (lbs/yr)	TOTAL SEDIMENT (tons/yr)	NOTES
North Mill Creek/Dutch Gap Canal	1,376	688	688	Updated previous results using current methodology
Mill Creek	790	334	395	Sediment and phosphorus results from watershed plan. Nitrogen calculated from sediment totals.
Upper Des Plaines River	637	319	319	Results tabulated using current methodology
Lower Des Plaines River	6	3	3	Results tabulated using current methodology
Newport Drainage Ditch	816	408	408	Results tabulated using current methodology
Bull's Brook	1	1	1	Results tabulated using current methodology
Bull Creek	448	224	224	Results tabulated using current methodology
Indian Creek	70	35	35	Results tabulated using current methodology
Aptakisic Creek	2	1	1	Results tabulated using current methodology
Buffalo Creek	5	2	2	Results tabulated using current methodology
TOTALS	**4,150**	**2,014**	**2,075**	

Gully erosion in the DPR planning area is moderate, with the majority occurring on agricultural land. Sustainable agriculture practices observed in the DPR planning area, such as water and sediment control basins (WASCOBs) or grassed waterways and other grade control structures, have been implemented in places to address this type of erosion. Results indicate that there are 43.5 miles of eroding gullies in the DPR planning area, of which 8.5 miles (20%) drain to an existing pond or detention structure. It is estimated that gully erosion is responsible for the annual delivery of 2,075 tons of sediment, 2,014 pounds of phosphorus, and 4,150 pounds of nitrogen. As shown in the results of the gully assessment (Table 4-12), the North Mill Creek/Dutch Gap subwatershed produces the largest total sediment and nutrient load from gully erosion, followed by Newport Drainage Ditch and Mill Creek subwatersheds.

4.2.4.7 Lake Shoreline Erosion

Lake shoreline erosion in the DPR planning area was estimated using a combination of shoreline assessment data provided by the LCHD combined with a field assessment performed by Northwater and SMC in August 2017. As described in Chapter 3, assessed lakes (only those greater than 20 acres in size) were assigned an erosion rank ranging from 0 (no erosion) to 3 (severe erosion). In order to quantify pollutant loading, each rank was assigned an average eroding bank height and lateral recession rate determined by direct observation at a selection of lakes (greater than 20 acres in size) in the DPR planning area determined to be representative by the LCHD. Four lakes were evaluated for this purpose during the 2017 reconnaissance: Countryside Lake, Lake Minear, Big Bear Lake, and St. Mary's Lake. At each lake, a series of data points (94 total points) representing a cross-section of erosion rankings were collected and eroding height and lateral recession rates were recorded. The newly collected data were appended to the corresponding shoreline segments in GIS, and average values were generated for each rank and applied to the remaining assessed lakes in the DPR planning area. Due to the unique nature of St. Mary's Lake, results represent direct measurements taken; average values were not applied to this lake. Through consultation with the LCHD and observations of lake bank erosion, it was determined that St. Mary's Lake exhibits higher rates of bank erosion compared to all other lakes in the watershed and therefore, the application of average values would have underestimated the true rate of erosion.

Table 4-13: Average Values Applied for Lake Shoreline Erosion Rankings

RANK	AVG ERODING BANK HEIGHT (FT)	AVG LATERAL RECESSION RATE (FT)
0	0	0
1	0.52	0.017
2	0.77	0.03
3	1.6	0.12

Total sediment and nutrient loading from assessed shorelines are summarized in Table 4-13 by ranking category. For those assessed lakes in the DPR planning area, annual sediment loading from lake shorelines is estimated at 206 tons, total annual nitrogen loading is 414 pounds, and total annual phosphorus loading is 206 pounds (Table 4-14).

Table 4-14: Pollutant Load Estimates from Lake Shorelines by Ranking

RANK	TOTAL SEDIMENT LOAD (TONS/YR)	TOTAL NITROGEN LOAD (LBS/YR)	TOTAL PHOSPHORUS LOAD (LBS/YR)
0	0	0	0
1	33	67	33
2	36	72	36
3	137	275	137
TOTAL	**206**	**414**	**206**

By subwatershed, the largest lake bank sediment and nutrient load is originating from the Indian Creek subwatershed followed by Bull Creek (Table 4-15).

Table 4-15: Pollutant Load Estimates from Lake Shorelines by Subwatershed

SUBWATERSHED	TOTAL NITROGEN LOAD (lbs/yr)	TOTAL PHOSPHORUS LOAD (lbs/yr)	TOTAL SEDIMENT LOAD (tons/yr)
North Mill Creek/Dutch Gap Canal	72	36	36
Mill Creek	73	36	36
Upper Des Plaines River	72	36	36
Lower Des Plaines River	No lakes	No lakes	No lakes
Newport Drainage Ditch	No lakes	No lakes	No lakes
Bull's Brook	No lakes	No lakes	No lakes
Bull Creek	81	40	40
Indian Creek	100	50	50
Aptakisic Creek	No lakes	No lakes	No lakes
Buffalo Creek	16	8	8
TOTAL	**414**	**206**	**206**

4.2.4.8 Septic Systems Analysis

Pollutant loading from failing septic systems was estimated using data generated from previous watershed-based plans and combined with planimetric data to assess the remainder of the DPR planning area. The three watershed-based plans from within the DPR planning area that included pollutant load estimates from failing septic systems are North Mill Creek/Dutch Gap Canal, Mill Creek, and Buffalo Creek. For these watershed-based plans, the number of failed septic systems was estimated by quantifying the number of water wells that fall outside of sewered areas, assuming that the presence of a well also indicates the presence of a septic system. An estimated septic system failure rate of 2% was applied in these previous plans to estimate loading.

For the remainder of the DPR planning area, a different method was applied. The presence of a septic system was assumed for each building with a planimetric footprint greater than 100 square-feet located within a nonsewered area. Similar to the previous watershed-based plans, a 2% septic system failure rate was applied to estimate loading.

Septic system loading for phosphorus and nitrogen was calculated using STEPL, Version 3 and the methodology outlined by Lowe *et al.* (2007) and is presented in Table 4-16. Assuming 2.43 people per system and an average of 0.15 billion CFU/person/day, it is estimated that failing septic systems may contribute an annual load of 7,660 lbs/yr of nitrogen, 3,000 lbs/yr of phosphorus, and an annual fecal coliform bacteria load of 32,795 billion CFU/yr. Figure 4-15 depicts the distribution of potential septic systems in all previously unplanned areas of the DPR planning area.

Table 4-16: Septic Systems Analysis and Associated Pollutant Load Estimates

WATERSHED	ESTIMATED NO. OF FAILING SEPTIC SYSTEMS	TOTAL NITROGEN LOAD (lbs/yr)	TOTAL PHOSPHORUS LOAD (lbs/yr)	TOTAL FECAL COLIFORM LOAD (billion CFU/yr)	NOTES
North Mill Creek/Dutch Gap Canal	13	417	163	1,783	Nitrogen and phosphorus results gathered from watershed plan; Bacteria load calculated.
Mill Creek	14	435	171	1,870	Phosphorus and bacteria results gathered from watershed plan; Nitrogen load calculated
Upper Des Plaines River	78	2,428	951	10,377	Calculated using building and sewered area data
Lower Des Plaines River	22	691	271	2,927	Calculated using building and sewered area data
Newport Drainage Ditch	36	1,124	440	4,790	Calculated using building and sewered area data
Bull's Brook/Bull Creek	18	547	214	2,395	Calculated using building and sewered area data
Indian Creek	11	339	133	1,463	Calculated using building and sewered area data
Aptakisic Creek	1	31	12	133	Calculated using building and sewered area data
Buffalo Creek	53	1,648	645	7,057	Bacteria results gathered from watershed plan; Nitrogen and phosphorus load calculated.
TOTAL	**246**	**7,660**	**3,000**	**32,795**	

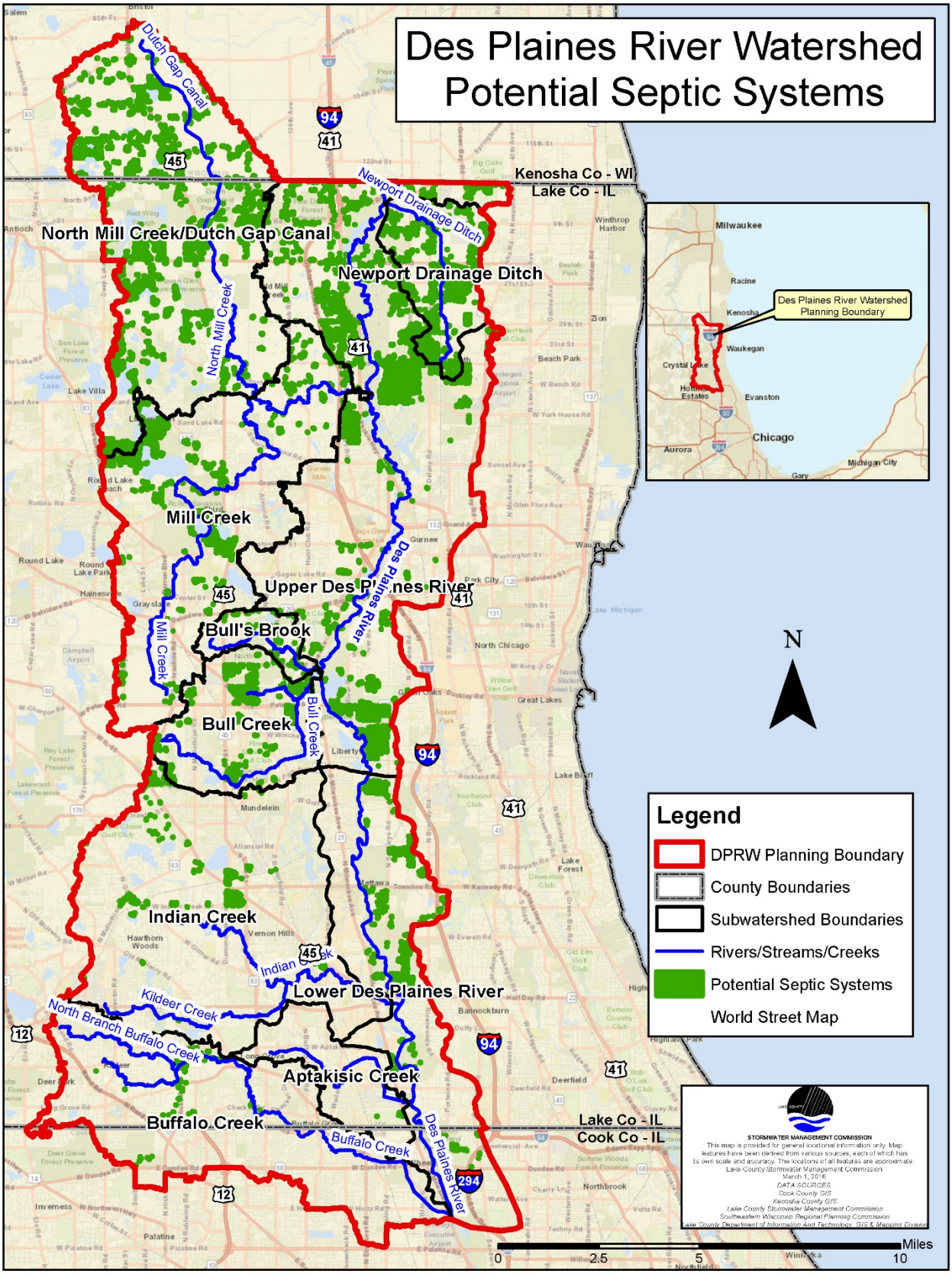


Figure 4-15: Septic System Distribution in the DPR Planning Area

4.2.4.9 Projected Future Nonpoint Source Loading

A separate model scenario was run to simulate future land use conditions. Information on future land use projections within the DPR planning area was obtained from Lake County GIS, CMAP (consisting of municipal/township FLU projections) and SEWRPC data and incorporated into the model. Slight modifications were made to the layer by SMC to account for recent infrastructure planning. In order to perform the comparative analysis, current land use categories had to be grouped into broader categories. It is important to note that the resolution and breakdown of current land use is much more detailed than the future condition. Understanding the impacts of future development can inform planning and development decisions and can assist in mitigating water quality concerns before they arise. Table 4-17 through Table 4-19 present the results of the future conditions modeling analysis.

When comparing existing conditions to future conditions, increases are estimated to occur in chloride (43%), phosphorus (87%), and bacteria (96%) (Table 4-17). Due to the likely reduction in agricultural ground in the future, changes in sediment loads are not expected to change significantly. Table 4-18 outlines the future nonpoint source loading by land use category, and Table 4-19 outlines the subwatersheds where land use and nonpoint source water quality conditions are most likely to change. The majority of the land use and pollutant loading changes are expected to occur in the north and western portions of the DPR planning area where there is more undeveloped land. Figure 4-16 shows the land use vulnerability in the DPR planning area based on future scenarios of nonpoint source loading.

Table 4-17: Future Scenario, Annual Nonpoint Source Loading

PARAMETER	FUTURE MODEL RESULTS	AVG PER ACRE	% CHANGE FROM CURRENT SCENARIO
Total Suspended Solids (ton/yr)	24,765	0.16	+4.5%
Total Phosphorus (lbs/yr)	79,285	0.53	+82%
Total Nitrogen (lbs/yr)	1,504,989	10.0	+54%
Fecal Coliform (CFU billions/yr)	440,815	2.93	+95%
Chloride (lbs/yr)	70,664,455	470	+36%

Table 4-18: Future Scenario, Nonpoint Source Loading by Land Use

LAND USE	ACRES	PHOSPHORUS		NITROGEN		CHLORIDE		FECAL COLIFORM		TOTAL SUSPENDED SOLIDS	
		Total (lbs)	lbs/ac	Total (lbs)	lbs/ac	Total (lbs)	lbs/ac	Total (cfu in billions)	per acre	Total (tons)	tons/ac
Agricultural	9,947	8,045	0.81	190,393	19.1	24,403	2	13,857	1.39	10,249	1.03
Commercial/	8,069	7,019	0.87	100,277	12.4	8,356,439	1,036	11,958	1.48	1,508	0.19
Gateway	798	495	0.62	7,546	9.5	349,004	438	844	1.06	81	0.10
Government/	4,488	3,965	0.88	60,426	13.5	2,794,683	623	6,755	1.51	864	0.19
Industrial	6,708	4,457	0.66	69,016	10.3	4,255,987	634	14,288	2.13	1,477	0.22
Low Density Urban	6	1	0.15	18	3.3	851	151	10	1.70	0	0.03
Low Residential	749	216	0.29	4,676	6.2	203,229	271	2,522	3.37	21	0.03
Medium Density Urban	8	2	0.19	33	4.0	1,517	187	17	2.11	0	0.04
Mixed Use	1,112	617	0.55	8,810	7.9	434,641	391	817	0.73	96	0.09
Office and Research Parks	4,329	4,377	1.01	66,705	15.4	3,085,094	713	7,457	1.72	718	0.17
Public/Private Open Space	32,561	6,446	0.20	161,160	4.9	966,960	30	12,812	0.39	446	0.01
Residential	59,787	31,109	0.52	663,668	11.1	30,694,662	513	346,244	5.79	7,015	0.12
Utilities/ Transportation	15,988	11,540	0.72	142,559	8.9	10,046,980	628	18,889	1.18	2,258	0.14
Vacant	101	10	0.10	171	1.7	120	1	26	0.26	1	0.01
Water	5,726	984	0.17	29,531	5.2	9,449,885	1,650	4,320	0.75	29	0.01

Table 4-19: Future Scenario, Nonpoint Source Loading by Watershed

WATERSHED	ACRES	PHOSPHORUS		NITROGEN		CHLORIDE		FECAL COLIFORM		TOTAL SUSPENDED SOLIDS	
		Total (lbs)	lbs/ac	Total (lbs)	lbs/ac	Total (lbs)	lbs/ ac	Total (cfu in billions)	per acre	Total (tons)	tons/ac
Aptakisic	4,384	2,559	0.58	44,235	10.1	2,398,841	548	13,589	3.10	629	0.14
Buffalo Creek	17,430	9,667	0.56	184,127	10.6	9,435,325	542	70,391	4.04	2,175	0.12
Bull Creek	1,817	550	0.30	11,152	6.1	452,468	249	2,905	1.60	88	0.05
Bulls Brook	7,132	3,732	0.52	63,713	8.9	3,529,152	495	15,878	2.23	800	0.11
Indian Creek	23,537	12,738	0.54	274,909	11.7	7,869,951	334	57,681	2.45	7,786	0.33
Lower Des Plaines River	24,222	11,957	0.50	223,003	9.2	12,337,776	511	80,499	3.33	2,587	0.11
Mill Creek	14,636	6,997	0.48	130,822	9.0	6,136,854	420	38,930	2.66	1,317	0.09
Newport Drainage	19,789	9,823	0.50	181,467	9.2	10,026,894	507	51,928	2.62	2,672	0.14
North Mill – Dutch Gap Canal	5,018	3,388	0.68	62,402	12.4	3,116,737	621	22,495	4.48	946	0.19
Upper Des Plaines River	32,550	17,874	0.55	329,158	10.1	15,360,456	472	86,519	2.66	5,765	0.18

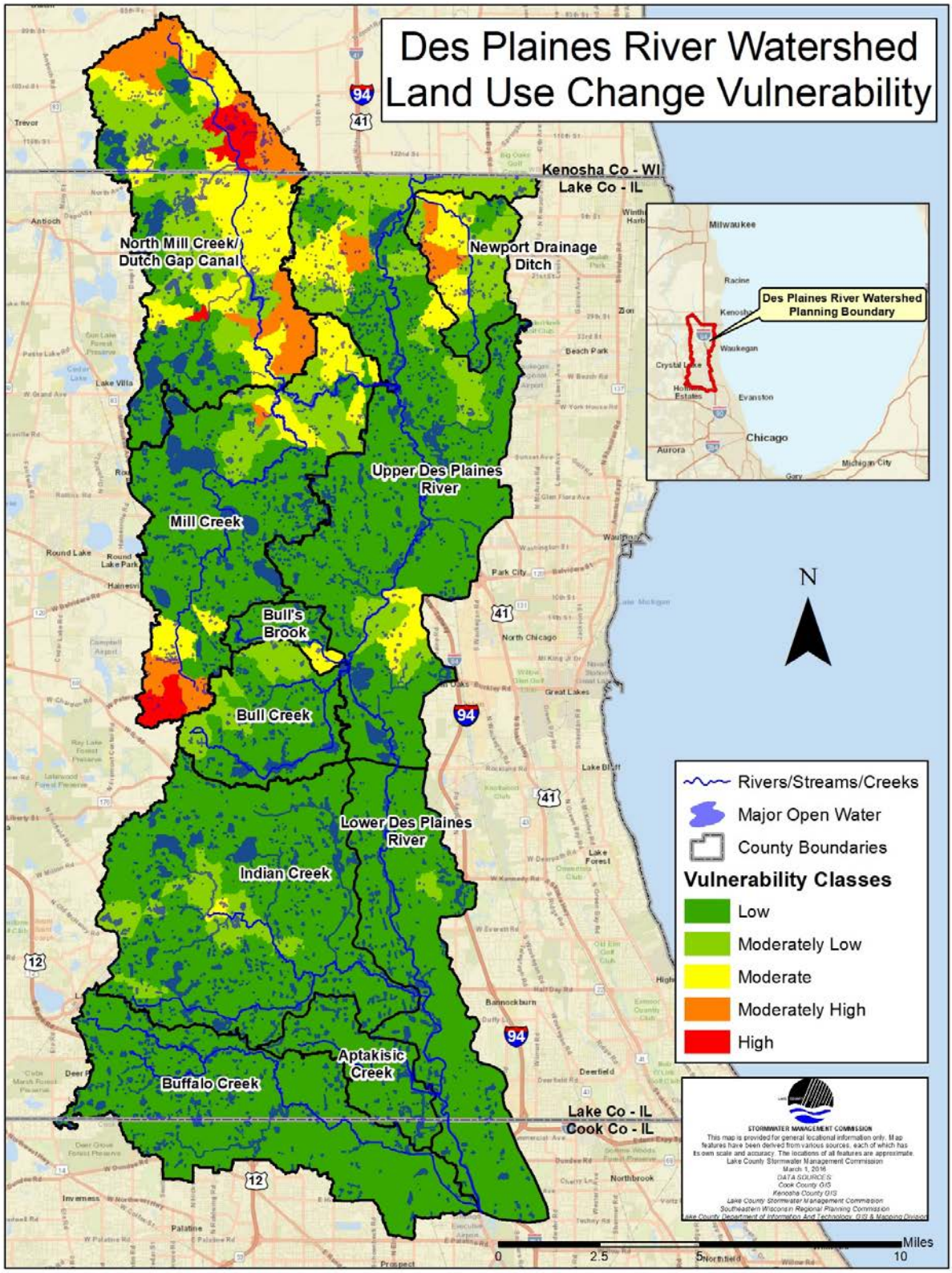


Figure 4-16: Land Use Change Vulnerability

4.2.4.10Pollution Loading Hotspots

Pollution loading hotspots are defined as the catchments with the highest annual nonpoint source load contributions. Understanding hotspots helps to focus and prioritize BMP implementation to achieve the goals and objectives of the plan. Nonpoint pollution loading hotspots were determined from each modeled parameter. Using the model described in section 4.2.4.1, pollutant loading hotspot catchments were chosen as those exceeding an annual loading criterion for each pollution parameter. The North Mill-Dutch Gap Canal subwatershed contains most of the hotspot catchments (19) for three of five nonpoint source pollutant loading parameters (total suspended solids, total phosphorus, and total nitrogen). The Buffalo Creek subwatershed contains the most hotspot catchments for fecal coliform loading (6), as well as the most hotspot catchments for chloride loading (20). Meanwhile, Mill Creek (15) and the Upper Des Plaines River (13) subwatersheds have the second and third highest number of hotspot catchments for chloride loading.

Overall, 19% of catchments in the DPR planning area meet the criteria for a chloride hotspot. The North Mill-Dutch Gap Canal and Upper Des Plaines River subwatersheds have hotspot catchments for all 5 pollution parameters with 27 and 18 hotspot catchments respectively; however, the majority of hotspot catchments in each subwatershed meet differing pollution parameter criteria. Table 4-20 lists nonpoint pollution loading hotspot catchments for each pollution parameter, along with their associated subwatersheds and pollutant parameter criteria.

Table 4-20: Hotspot Catchments for Nonpoint Source Pollution Loading

PARAMETER	HOTSPOT CATCHMENTS	CORRESPONDING SUBWATERSHEDS	CRITERIA
Total Suspended Solids	NM056, NM046, NM042 NM004, NM039, NM055 NM028, BC006, UD087	North Mill-Dutch Gap Canal Bull Creek	> 0.70 tons/ac/yr
Total Phosphorus	NM046, NM052, NM050 NM004, NM048, NM039	North Mill-Dutch Gap Canal Upper Des Plaines	> 0.60 lbs/ac/yr
Total Nitrogen	NM046, NM052, NM050 NM004, NM039, NM048	North Mill-Dutch Gap Canal Upper Des Plaines	> 14 lbs/ac/yr
Fecal Coliform	BF009, BF023, BF035 BF010, BF037, BF008 IC052, LD015, UD020	Buffalo Creek Indian Creek Lower Des Plaines	> 3.5 billion CFU/yr
Chloride	84 of 432 total catchments	<u>Fraction of Catchments Per Subwatershed:</u> ▪ 20/43 Buffalo Creek, 47% ▪ 15/58 Mill Creek, 26% ▪ 13/94 Upper Des Plaines, 14% ▪ 9/64 Indian Creek, 14% ▪ 9/58 Lower Des Plaines, 16% ▪ 7/63 North Mill-Dutch Gap, 11% ▪ 7/9 Aptakisic Creek, 78% ▪ 3/21 Bull Creek, 14% ▪ 1/16 Newport Drainage Ditch, 6%	> 500 lbs/ac/yr

4.2.5 Critical Areas Analysis

Critical areas are defined as catchments in the watershed best suited to focus implementation efforts to help achieve the goals and objectives of the watershed-based plan. Critical areas represent catchments that likely contribute to water quality impairments and problems in the watershed and present opportunities where project implementation would provide the greatest value and benefit. Due to the size and diversity of land use practices in the DPR planning area, five separate critical area analyses were performed. These include:

1 Aggregate critical catchments, based on both the scoring of several normalized criteria and previous watershed-based plans
2 Chloride critical catchments, based on both the scoring of load modeling and impervious surface density, and DRWW chloride datasets
3 PAH critical catchments, based on commercial and parking lot land use, and DRWW PAH datasets
4 Lakeshore erosion critical reaches, based on lakeshores assessed by LCHD
5 Streambank erosion critical reaches, based on streambanks assessed by SMC

4.2.5.1 Aggregate Critical Areas

A methodology was developed to define aggregate critical area catchments. This methodology uses a ranking system based on the criteria below and detailed in Table 4-21. The analysis was performed on the entire DPR planning area. Although each catchment met some or all the criteria, only the highest-ranked catchments were selected as priority; this represents 10% of all catchments. Twenty-one critical catchments defined in previous watershed-based plans were then incorporated; this ensured a comprehensive listing of aggregate critical area catchments. Selection criteria included:

1 Agricultural highly erodible soils
2 Areas of greatest future land use change
3 Greatest length of streambank erosion
4 Nonpoint source pollution loading hotspots; catchments of greatest loading per acre
5 Highest septic density
6 Greatest length of stream channelization
7 Total number of publicly-operated wastewater treatment plant outfalls
8 Previously defined critical areas

Noteworthy – Aggregate Critical Area Analysis

Each catchment was ranked for each of the seven criteria, after which the catchments were normalized statistically on a scale of 0-1.0. The normalized ranking of each critical area criteria was summed for each catchment, after which the data were renormalized on a scale of 0-100. The statistical process identifies priority catchments that associated a combined score of all criteria. All criteria were given the same weight.

A total of 67 catchments (16% of all catchments) were selected as critical. A small number of catchments were selected to ensure that each subwatershed contained at least two critical area catchments. As a result, one additional catchment was selected for Buffalo Creek and the Bull's Brook subwatersheds; two additional catchments were selected for Aptakisic Creek, Indian Creek, and the Lower Des Plaines River subwatersheds. Table 4-22 and Figure 4-17 show the final critical areas, their scoring and ranking, and method of selection. It is recommended to also reference and utilize the recent, previous subwatershed plans when working in those subwatersheds. Chapter 6 outlines recommended actions for the critical area catchments.

Table 4-21: Aggregate Critical Area Criteria

CRITICAL AREA CRITERIA	DESCRIPTION	TOP CATCHMENTS[1]
Highly Erodible Land	Chapter 3 identifies highly erodible soils in the DPR planning area, these soils in agricultural areas are susceptible to erosion. Highly erodible soils that are within agricultural and equestrian pasture areas are considered for this analysis.	UD080, UD086, MC057, MC058, MC055 over 20%
Land Use Changes	The comparison between current and future land use allowed for each catchment to be analyzed. Catchments with the greatest percentage of land use categories vulnerable to change were ranked higher.	NM022, NM046, MC058, NM050, NM052
Streambank Erosion	The surveys conducted by SMC mapped, assessed and quantified streambank erosion. The length of severe streambank erosion was analyzed for each catchment, and those with greater lengths were ranked higher.	UD054, UD017, UD031, LD041, LD017
Nonpoint Source Pollution Loading Hotspots	Catchments with the highest percentile (per unit acre) of nonpoint source pollutant loading for phosphorus, sediment, nitrogen, chloride and fecal coliform bacteria; calculated from nonpoint source pollutant model	NM046, NM037, UD069, UD015, MC017
Septic System Density	Septic system density was estimated for each catchment. This was developed by quantifying the number of buildings that exceeded 100 square feet in non-sewered areas.	LD003, UD006, NP008, NP009, NP016
Channelization	Based on the DRWW findings, catchments that have the greatest length of stream/river channelization based on the SMC dataset.	AC002, BF003, UD007, UD003, UD053
Publicly-Operated Wastewater Treatment Outfalls	Catchments that contain publicly-operated WWTP outfalls.	LD049, LD048, MC005, LD034, UD028, UD045, AC004, NM015

[1] Top catchments listed in this table under each criterion may not necessarily be listed as aggregate critical catchments

Table 4-22: Aggregate Critical Area Ranking By Catchment

CATCHMENT	SUBWATERSHED	SCORE	RANK	SELECTION METHOD[1]
AC002	Aptakisic Creek	69.2	121	C
AC004	Aptakisic Creek	80.5	91	C
BB001	Bull's Brook	98.2	13	C
BB005	Bull's Brook	39.5	232	C
BC006	Bull Creek	98.0	15	C
BC020	Bull Creek	94.3	32	C
BF003	Buffalo Creek	60.0	152	P
BF009	Buffalo Creek	79.0	94	P
BF011	Buffalo Creek	94.1	34	B
BF025	Buffalo Creek	59.2	156	P
BF038	Buffalo Creek	30.5	286	P
BF039	Buffalo Creek	43.4	217	P
IC041	Indian Creek	91.5	53	C
IC049	Indian Creek	92.3	48	C
LD011	Lower Des Plaines River	65.4	141	C
LD014	Lower Des Plaines River	73.2	112	C
MC001	Mill Creek	48.9	198	P
MC002	Mill Creek	81.8	88	P
MC015	Mill Creek	94.1	35	C
MC018	Mill Creek	65.8	139	P
MC025	Mill Creek	57.0	165	P
MC053	Mill Creek	66.6	134	P
MC054	Mill Creek	86.7	74	P
MC057	Mill Creek	92.7	43	C
MC058	Mill Creek	84.9	79	P

CATCHMENT	SUBWATERSHED	SCORE	RANK	SELECTION METHOD[1]
NM003	Dutch Gap Canal/North Mill Creek	96.7	22	C
NM004	Dutch Gap Canal/North Mill Creek	94.2	33	B
NM005	Dutch Gap Canal/North Mill Creek	70.2	118	P
NM015	Dutch Gap Canal/North Mill Creek	96.9	21	C
NM016	Dutch Gap Canal/North Mill Creek	30.9	282	P
NM017	Dutch Gap Canal/North Mill Creek	83.0	83	P
NM019	Dutch Gap Canal/North Mill Creek	93.8	37	C
NM021	Dutch Gap Canal/North Mill Creek	99.1	7	B
NM028	Dutch Gap Canal/North Mill Creek	98.5	10	C
NM029	Dutch Gap Canal/North Mill Creek	93.4	40	C
NM031	Dutch Gap Canal/North Mill Creek	50.3	191	P
NM035	Dutch Gap Canal/North Mill Creek	98.2	14	C
NM036	Dutch Gap Canal/North Mill Creek	95.3	25	C
NM039	Dutch Gap Canal/North Mill Creek	98.4	12	C
NM040	Dutch Gap Canal/North Mill Creek	93.7	39	C
NM045	Dutch Gap Canal/North Mill Creek	91.1	56	P
NM046	Dutch Gap Canal/North Mill Creek	95.1	26	C
NM052	Dutch Gap Canal/North Mill Creek	94.3	31	B
NM058	Dutch Gap Canal/North Mill Creek	94.4	28	C
NM061	Dutch Gap Canal/North Mill Creek	92.7	42	C
NP001	Newport Drainage Ditch	99.6	3	C
NP002	Newport Drainage Ditch	94.3	30	C
NP004	Newport Drainage Ditch	99.9	2	C
NP005	Newport Drainage Ditch	99.4	4	C
NP008	Newport Drainage Ditch	93.0	41	C

Table 4-22 continued

CATCHMENT	SUBWATERSHED	SCORE	RANK	SELECTION METHOD[1]
NP009	Newport Drainage Ditch	96.3	23	C
NP012	Newport Drainage Ditch	97.4	19	C
NP013	Newport Drainage Ditch	99.9	1	C
UD014	Upper Des Plaines River	99.3	5	C
UD015	Upper Des Plaines River	98.4	11	C
UD016	Upper Des Plaines River	95.9	24	C
UD017	Upper Des Plaines River	94.0	36	C
UD031	Upper Des Plaines River	97.0	20	C
UD060	Upper Des Plaines River	94.4	29	C
UD069	Upper Des Plaines River	98.8	9	C
UD078	Upper Des Plaines River	98.8	8	C
UD080	Upper Des Plaines River	97.8	17	C
UD081	Upper Des Plaines River	99.2	6	C
UD086	Upper Des Plaines River	97.4	18	C
UD087	Upper Des Plaines River	94.5	27	C
UD093	Upper Des Plaines River	97.9	16	C
UD094	Upper Des Plaines River	93.7	38	C

[1] Critical area selection methods: C = selected from aggregate critical criteria analysis; P = selected from previous subwatershed plan; B = selected by both aggregate critical criteria analysis and previous subwatershed plan.

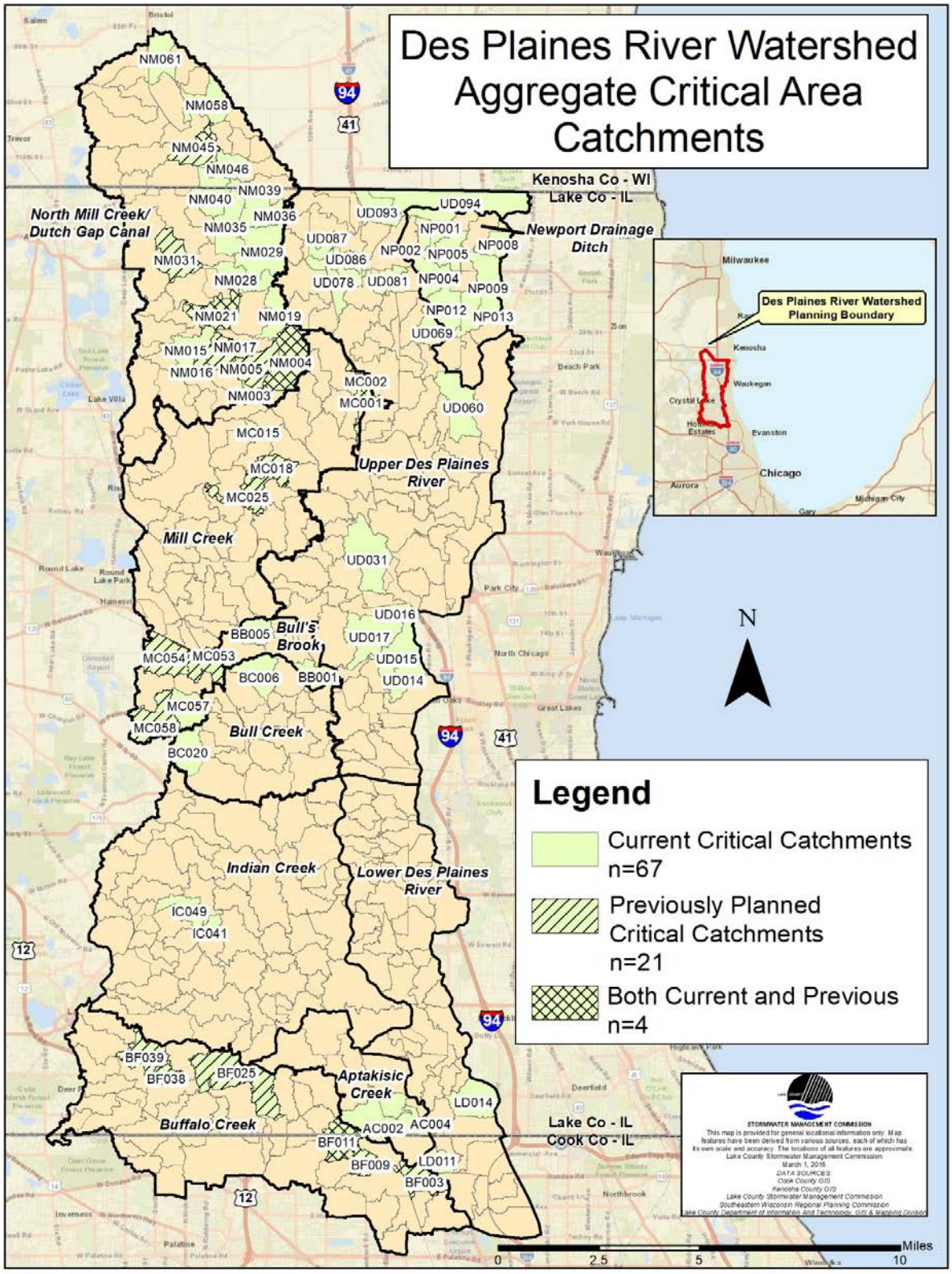


Figure 4-17: Aggregate Critical Area Catchments and Selection Methods

4.2.5.2 Chloride Critical Areas

Chloride is a major cause of water quality impairments in the DPR planning area and problematic to address using traditional practices. As a result, a separate critical areas analysis was performed for chloride in order to better focus efforts aimed at reducing nonpoint source chloride loads in the DPR planning area. The methodology utilizes nonpoint source load modelling, impervious area, and DRWW monitoring data. This allowed for an effective and comprehensive approach to determine critical areas for chloride loading and was performed for the entire DPR planning area (including subwatersheds with existing plans). Chloride critical area catchments were selected using the following criteria:

1. Rank, based on highest chloride loading per unit area as calculated by the nonpoint source model
2. Percentage of impervious area
3. Catchments tributary to, or that include, the 10 DRWW monitoring stations with the highest geometric mean chloride concentrations

Per acre pollutant load results and percentage impervious area were calculated and normalized statistically, summed by catchment, and ranked. The top 20 highest-ranked catchments were selected. The DRWW monitoring data were then analyzed to determine those stations with the highest measured concentrations. Geometric mean chloride concentrations ranged from 89 mg/L to 371 mg/L with ten stations exhibiting the highest mean chloride concentrations; those greater than 190 mg/L. All catchments that included or were tributary to one of one of these ten stations were selected, resulting in 41 catchments.

In total, 61 catchments represent chloride critical areas (Figure 4-18). Indian Creek, Aptakisic Creek, and the Upper Des Plaines River subwatersheds contain the greatest total number and area of chloride critical area catchments (Table 4-23).

Table 4-23: Chloride Critical Areas by Subwatershed

WATERSHED	NUMBER OF CATCHMENTS	ACRES OF CHLORIDE CRITICAL AREA
Aptakisic Creek	8	3,828
Buffalo Creek	4	1,228
Bull Creek	8	2,758
North Mill Creek/Dutch Gap Canal	6	2,223
Indian Creek	14	6,695
Lower Des Plaines River	6	1,508
Mill Creek	1	260
Upper Des Plaines River	14	4,779
TOTAL	**61**	**12,011**

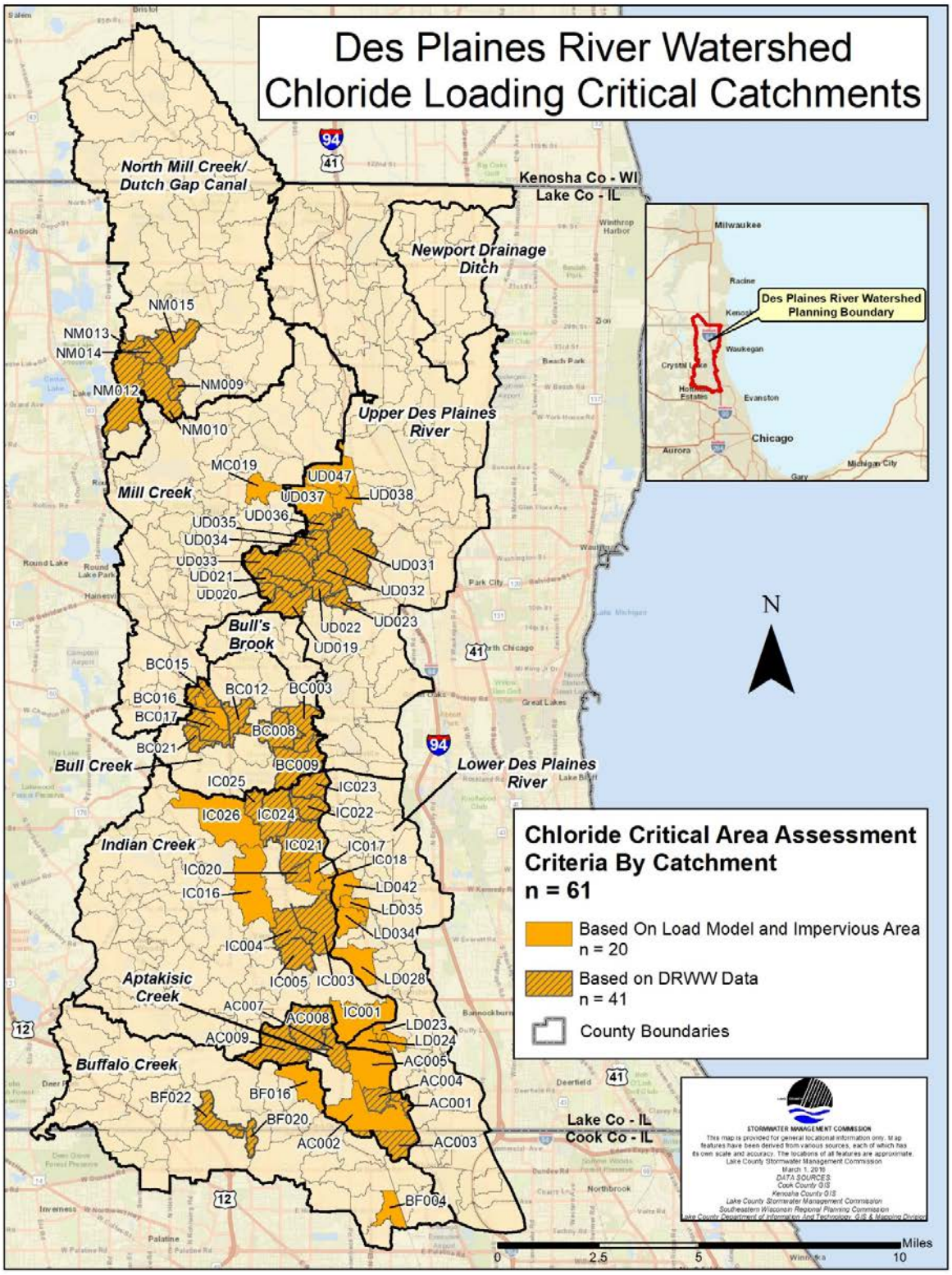


Figure 4-18: Chloride Critical Area Catchments

4.2.5.3 PAH Critical Areas

PAHs are considered one of the emerging causes of aquatic life impairments in the watershed (MBI, 2017). Land use information and DRWW water quality monitoring data were used to establish unique critical area catchments for PAHs. A recent study of PAHs in streambed sediment in the Milwaukee-area (Baldwin et al., 2016) found that the primary source of PAHs was coal-tar pavement sealant. The study also suggested statistically that commercial land use and parking lots were the major contributors of PAHs. As a result, land use and stream sediment data were used to determine PAH critical areas for the DPR planning area. PAH critical area catchments are those where efforts can be focused to achieve meaningful PAH reductions. This analysis was performed for the entire DPR planning area and included:

1 Catchments with the greatest proportion of parking lots and commercial land use
2 Catchments directly tributary to or that include DRWW sediment sampling sites resulting in the highest number of PAH exceedances of sediment quality guidelines

Percent area of parking lots and commercial land use was calculated for each catchment using a customized GIS land use layer; the top 25 highest catchments were selected. Of these catchments, the percentage area of parking lots and commercial land use ranged from 19%-61%; the average percentage area of parking lots and commercial land use was 29%.

The sum of PAH exceedances for both the threshold effect concentration (TEC) and probable effect concentration (PEC) for any given DRWW monitoring station ranged from 0-13. The top ten stations were selected, all with at least 10 TEC and PEC exceedances. The catchments directly tributary to, or that included these stations, were selected. A total of 25 catchments were selected based on the DRWW data.

A total of 46 PAH critical catchments were selected; four of which met both criteria in the Upper Des Plaines subwatershed (Figure 4-19). Indian Creek, Lower Des Plaines River, and Buffalo Creek subwatersheds have the greatest acreage of PAH critical areas while Indian Creek, Lower Des Plaines River, and the Upper Des Plaines River subwatersheds contain the greatest number of catchments (Table 4-24).

Table 4-24: PAH Critical Areas by Subwatershed

WATERSHED	NUMBER OF CATCHMENTS	ACRES OF PAH CRITICAL AREA
Aptakisic Creek	4	2,510
Buffalo Creek	5	2,702
Bull Creek	4	1,759
Indian Creek	7	2,558
Lower Des Plaines River	15	4,293
Mill Creek	5	1,627
Upper Des Plaines River	6	2,582
GRAND TOTAL	**46**	**18,031**

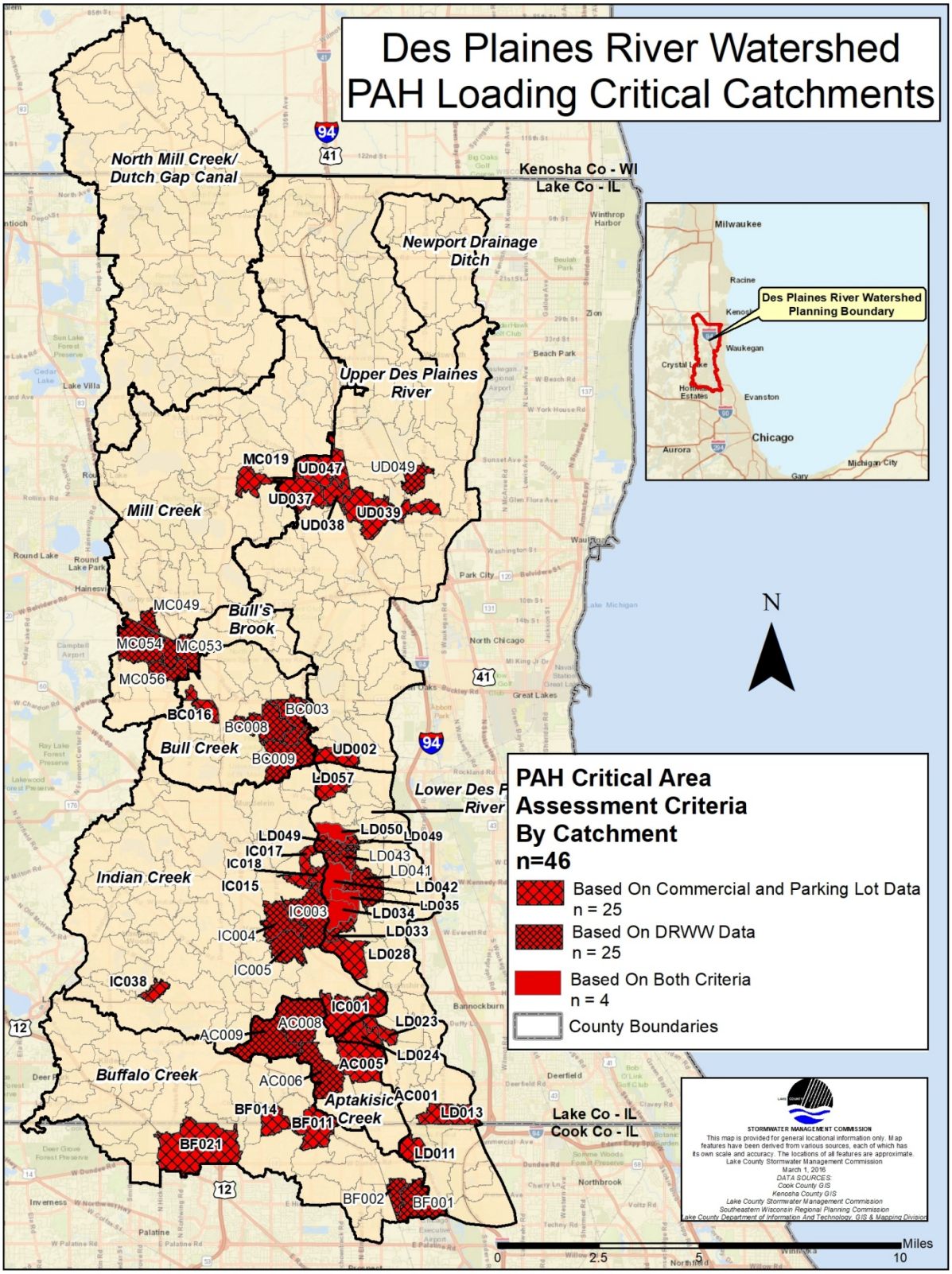


Figure 4-19: PAH Critical Area Catchments

4.2.5.4 Lakeshore Erosion Critical Areas

Lakeshore erosion critical areas represent shorelines in need of stabilization to reduce sediment and nutrient loading and improve lake water quality. Lake shoreline erosion is described in Chapter 3 and quantified in section 4.2.1. Lakeshore erosion critical areas are based on the following criteria; only those shorelines meeting all three criteria were selected:

1. Erosion severity; a ranking system developed by the LCHD; 0 indicating no erosion, 1-3 slight, moderate, and severe, respectively. Only shorelines with a severe erosion category were selected.
2. Average annual recession rate, the thickness of soil measured perpendicularly to the bank surface, which is eroded every year, measured in feet per year. Only shorelines with an average annual recession rate of 0.1 ft/yr or greater were selected.
3. Length of shoreline, measured in feet. Only shorelines equal to or greater than 50 ft in length were selected.

The DPR planning area contains a total of 70 lakeshore erosion critical areas, comprising 14,173 ft (2.7 mi) of lake shoreline. The Upper Des Plaines River and Indian Creek subwatersheds have the greatest total length of critical area, followed closely by Mill Creek and Dutch Gap Canal-North Mill Creek subwatersheds. The three lakes with the greatest length of critical areas are County Side, Grandwood Park, and St. Mary, respectively. Aptakisic Creek, Bull's Brook, the Lower Des Plaines River, and Newport Drainage Ditch subwatersheds have no identified lake shoreline critical areas. Table 4-25 lists lakes with critical shoreline erosion areas by subwatershed and catchment, along with sediment load and length. Figure 4-20 shows the location of the critical shoreline erosion areas.

Table 4-25: Lakeshore Erosion Critical Areas and Information

SUBWATERSHED	CATCHMENT	LAKES	LAKE SEDIMENT LOADING (TONS/YR)	TOTAL SUBWATERSHED LOADING (TONS/YR)	LENGTH (FT)	TOTAL SUBWATERSHED LENGTH (FT)
Bull Creek	BC010	St. Mary's	19.7	19.7	1,485	1,485
Buffalo Creek	BF020	Buffalo Creek Reservoir 1	6.9	6.9	893	893
Indian Creek	IC017	Little Bear	1.2	24.3	152	3,167
	IC021	Lake Charles	1.5		190	
Mill Creek	MC024	Druce	0.6	22.2	73	2,884
	MC025	Grandwood Park	13.4		1,750	
North Mill Creek - Dutch Gap Canal	NM007	Waterford	1.7	19.1	218	2,490
	NM007	McDonalds Woods Lake 2	3.4		440	
	NM010	Hastings	1.9		248	
	NM011	Slough	3.8		490	
Upper Des Plaines River	UD004	Minear	21.8	25.0	2,835	3,253
			Total:	**117.2**		**14,173**

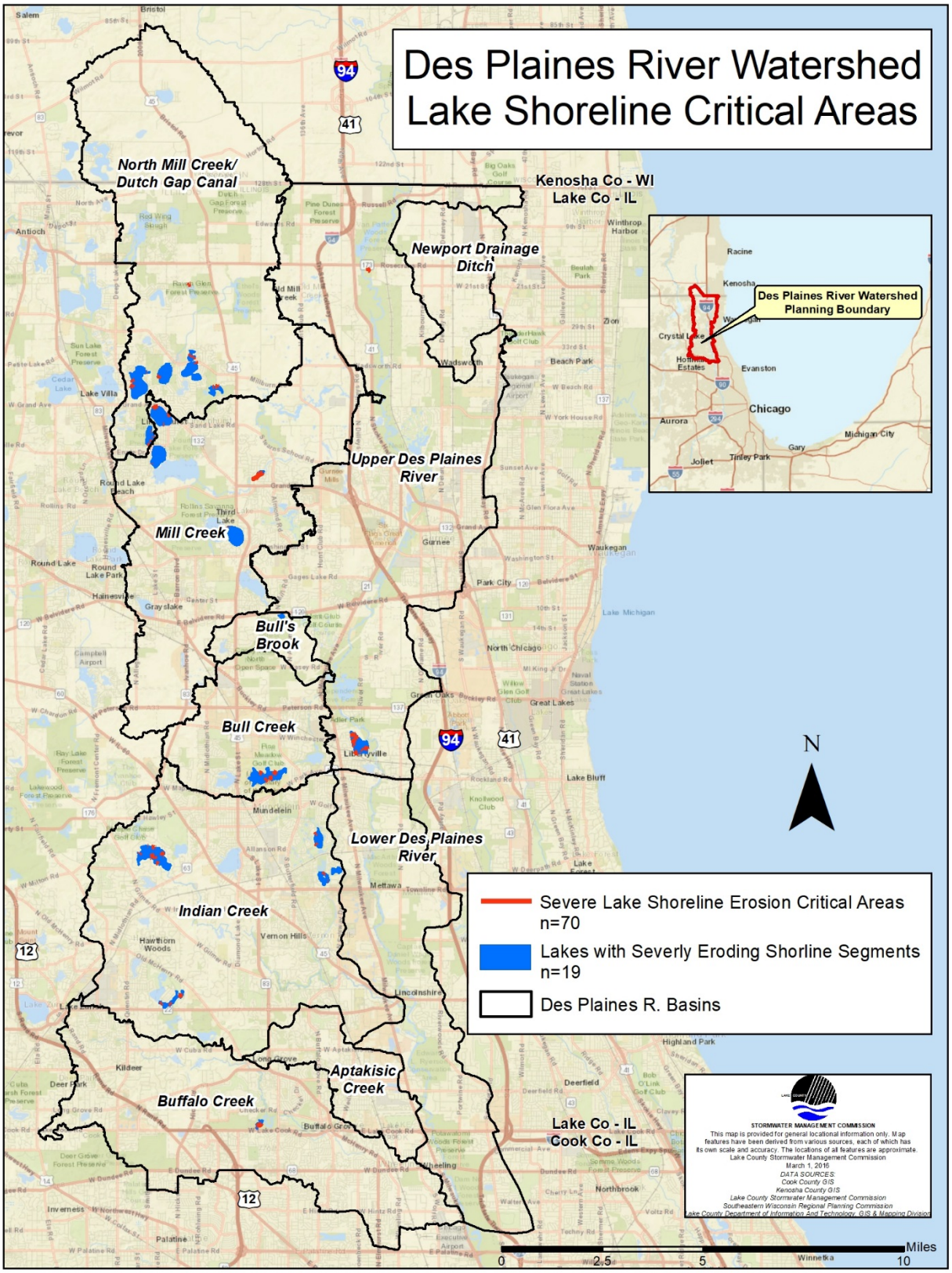


Figure 4-20: Lake Shoreline Critical Areas

4.2.5.5 Streambank Erosion Critical Areas

Streambank erosion critical areas are banks exhibiting high rates of failure or those best suited for stabilization efforts to reduce sediment and nutrient loading. Streambank erosion was discussed previously in Chapter 3 and quantified in section 4.2.4.5. The following criteria were used to select critical areas:

1 Total sediment load
2 Location, either on the mainstem Des Plaines River, or on a tributary

A total of ten miles of streambanks were selected as critical areas; five miles on the Des Plaines River mainstem and five miles of streambanks on tributaries to the Des Plaines River with the highest sediment loading. These critical areas account for 17% of the total DPR planning area sediment load from streambank erosion (Table 4-11). Critical areas are located along 8 different streams (Table 4-26) with the highest load occurring in the Mill Creek subwatershed, followed closely by the Lower Des Plaines River (Table 4-27). The Mill Creek subwatershed also has the highest ratio of total sediment loading to total critical area length (Table 4-27).

The longest total length occurs in the Upper Des Plaines River subwatershed, followed by the Lower Des Plaines River subwatershed (Table 4-27). The Aptakisic Creek, Bull's Brook, Bull Creek, Indian Creek, and Newport Drainage Ditch subwatersheds contain no streambank erosion critical areas. Figure 4-21 shows the location of critical streambank erosion areas.

Table 4-26: Streambank Erosion Critical Areas Sediment Loading by Stream

STREAM	TOTAL LENGTH (ft)	SEDIMENT LOAD BY STREAM (tons/yr)
Belvidere Road Tributary	1,638	33.4
Buffalo Creek/Wheeling Drainage Ditch	2,540	88.6
Des Plaines River	27,678	850.2
Irondale Creek	4,613	70.6
Mill Creek	8,453	849.8
Stoneroller Creek	1,826	33.5
Unnamed Tributary 1	4,992	34.5
Unnamed Tributary 2	1,270	41.5

Table 4-27: Streambank Erosion Critical Areas by Catchment

SUBWATERSHED	CATCHMENTS	STREAM NAME	STREAM SEGMENT LENGTH (FT)	TOTAL SUB-WATERSHED LENGTH (FT)	STREAM SEGMENT SEDIMENT LOADING (TONS/YR)	TOTAL SUB-WATERSHED SEDIMENT LOADING (TONS/YR)
Buffalo Creek	BF003 BF009 BF010	Buffalo Creek / Wheeling Drainage Ditch	1,504 566 470	2,540	53 19 16	89
Lower Des Plaines River	LD001 LD010 LD011 LD012 LD013 LD017 LD032 LD036 LD041	Des Plaines River Des Plaines River Des Plaines River Des Plaines River Unnamed Tributary 2 Des Plaines River Des Plaines River Des Plaines River Des Plaines River	1,424 108 3,310 3,091 1,270 1,889 532 127 3,990	15,740	54 4 127 90 41 55 33 8 244	656
Mill Creek	MC001 MC018 MC042 MC042 MC042 MC042 MC042 MC042 MC042 MC042 MC042 MC042 MC042 MC042 MC043 MC043 MC044 MC054	Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek Mill Creek	1,098 1,005 397 96 425 271 283 104 451 117 127 161 260 29 131 362 361 1,217	6,895	48 29 33 33 54 45 36 31 30 53 89 67 33 5 24 67 69 34	781

SUBWATERSHED	CATCHMENTS	STREAM NAME	STREAM SEGMENT LENGTH (FT)	TOTAL SUB-WATERSHED LENGTH (FT)	STREAM SEGMENT SEDIMENT LOADING (TONS/YR)	TOTAL SUB-WATERSHED SEDIMENT LOADING (TONS/YR)
Upper Des Plaines River	UD011 UD013 UD014 UD016 UD017 UD022 UD023 UD031 UD056 UD076	Des Plaines River Irondale Creek Irondale Creek Des Plaines River Des Plaines River Belvidere Rd Tributary Des Plaines River Stoneroller Creek Mill Creek Unnamed Tributary 1	2,673 396 4,217 768 9,446 1,638 322 1826 1558 4992	27,836	48 35 35 14 169 33 6 34 69 35	476
			GRAND TOTAL	**53,011**	**GRAND TOTAL**	**2,002**

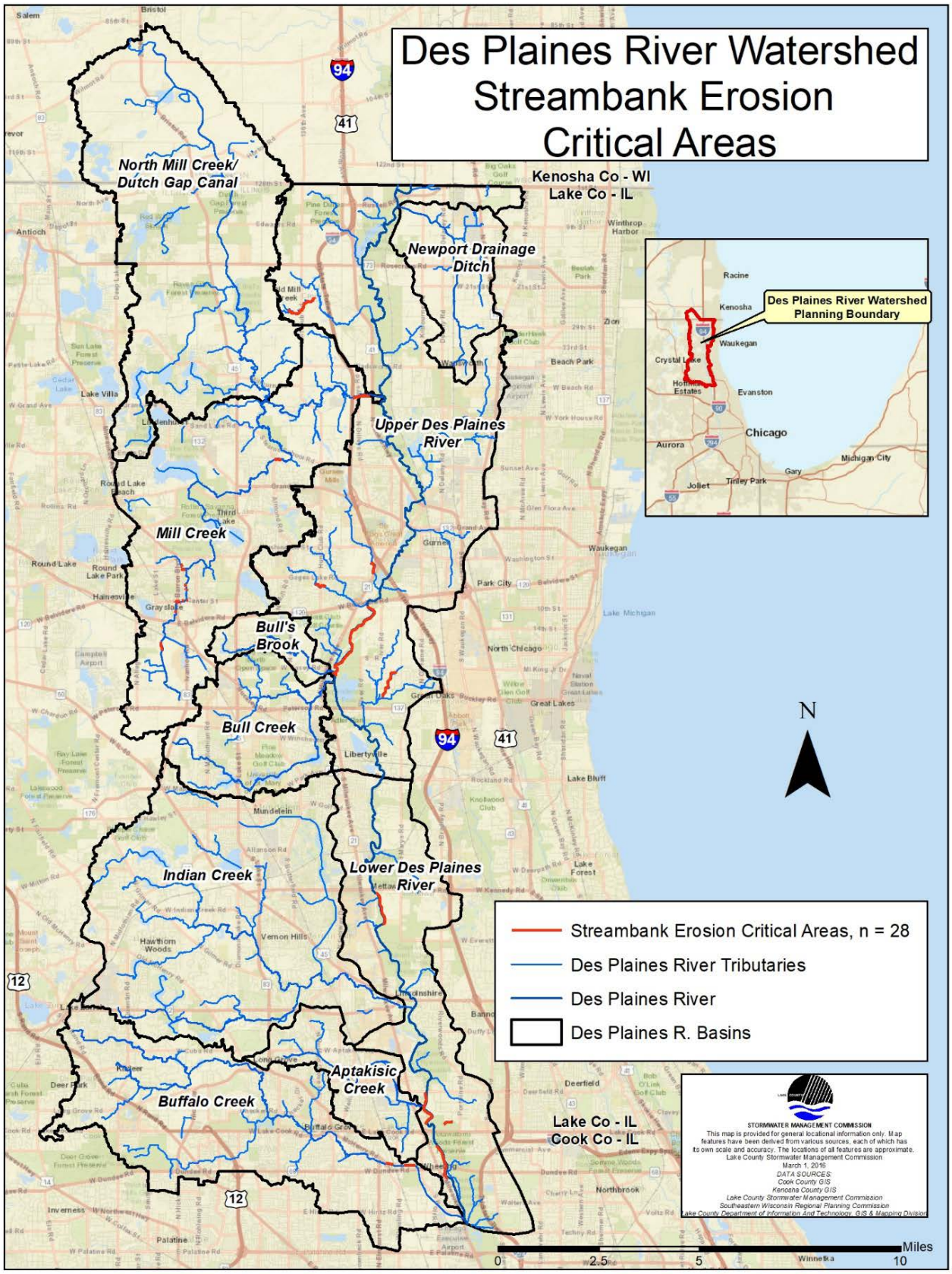


Figure 4-21: Streambank Erosion Critical Areas

4.3 WATERSHED JURISDICTIONAL COORDINATION

Watershed protection, which is a shared responsibility of multiple jurisdictions in the DPR planning area, is problematic because the jurisdictions operate with different policies, practices, and regulations. A coordinated and consistent watershed management effort does not exist due to the multiple authorities and jurisdictions and their divergent management practices and development requirements related to land and water resources. Requirements for and application of BMPs also vary based on county, municipal, township, drainage, park, forest preserve, and school district policies, standards, requirements, and incentives.

While public policies and regulations can significantly influence the prevention of further watershed degradation, private efforts need to be combined with public initiatives to address current watershed issues, such as concentrated areas of flood damage and the poor water quality in lakes and degraded stream conditions prevalent throughout the DPR planning area. Private landowners (urban and rural) and homeowner groups should voluntarily incorporate BMPs in the landscapes they manage to resolve existing watershed problems and improve conditions. Education and outreach can substantially influence voluntary participation in watershed improvement activities and improve the general public's understanding of the need for jurisdictional projects and programs. For more information on education and outreach strategies and tools, see Chapter 8 Education and Outreach Strategy and Tools.

Because the DPR planning area comprises multiple jurisdictions, the ability to coordinate is a primary limitation in adopting consistent preventative practices. The ability to coordinate also presents challenges in completing BMP projects or instituting programs and policies that may provide broad watershed benefits. Presently, no watershed-wide stakeholder engagement effort exists that supports education, outreach, and voluntary implementation of BMPs, although there are examples of these types of efforts in the Buffalo Creek, Bull Creek-Bull's Brook, and Indian Creek subwatersheds. The following section describes watershed jurisdictional coordination roles and responsibilities.

4.3.1 ISSUES TO BE ADDRESSED BY COORDINATED JURISDICTIONAL EFFORT

The watershed planning process identified multiple issues that would be most effectively addressed at the watershed level through a coordinated effort of watershed jurisdictions, with the support of private stakeholders, including:

- Volume of stormwater runoff
- Poor water quality
- Poor habitat quality
- Lack of water quality data
- Barriers to alternative transportation (connecting routes and modes)
- Flood damage/regional flood storage
- Protection and restoration of natural resources
- Education and outreach regarding watershed issues

Table 4-28 includes a summary of the issues identified in the watershed planning process that would be best addressed through coordinated partnership efforts.

Table 4-28: Issues to be addressed with watershed-level coordination

ISSUE	STRATEGIES TO ADDRESS ISSUE	POTENTIAL ACTIONS	RESPONSIBILITY
Volume of stormwater runoff	Review adequacy of runoff volume reduction requirements for watershed	Review regulations and update as needed.	Municipalities, Counties, SMC, MWRD
	Porous pavement	Promote through public/private BMP programs.	Municipalities, Counties
	Installing and maintaining neighborhood and site scale green infrastructure; Native landscaping; Downspout disconnection; Rain garden program	Review ordinances and land management standards to allow by right and set up voluntary incentive programs.	Municipalities, Counties, CLC, Park Districts
	Wetland mitigation in the watershed	Future potential watershed-specific policy.	SMC, MWRD, USACE, Certified Communities
	Preserving landscape scale green infrastructure; Wildlife and floodplain connections with greenway corridors	Incorporate green infrastructure network in land use plans. Set up partnership to fund and implement.	Municipalities, Counties, FPD, Park Districts
	Road improvement/retrofit projects/designs	Incorporate stormwater BMPs. Score all projects with I-Last™ or similar tool.	IDOT, Tollway County DOTs, Municipalities, Townships
	Pollution prevention education	Coordinate with NPDES II program outreach.	Municipalities, SMC, MWRD, CLC, Counties, Watershed Groups

ISSUE	STRATEGIES TO ADDRESS ISSUE	POTENTIAL ACTIONS	RESPONSIBILITY
Water Quality Impairment	Utilization of DRWW monitoring data	Implement targeted projects and programs based on DRWW data to reduce the number of water quality impairments	DRWW, SMC, Municipalities, MWRD, Townships, Counties, LCDOT, IDOT, Park Districts, LCFPD, CLC, U of IL Extension; (All watershed stakeholders)
	Phosphorus ban	Adopt ban(s).	Municipalities, Counties
	Nutrient management plans and agricultural BMPs	Provide cost-share or free technical service to agricultural producers with grant or farm program support.	Agricultural Producers, Municipalities, County, NRCS/SWCDs
	Reduce sodium chloride application with alternative practices and chemicals	Form buying consortium to share equipment and reduce cost of alternative products.	Municipalities, County DOTs, Townships
	Coal tar sealant ban	Adopt ban(s).	Municipalities, Counties
	Calibrate salt application equipment	Document calibration.	All applicators
	Consistent snow removal policies and application rates	Determine model policy and application rates as a base from which jurisdictions develop or modify individual policies.	Municipalities, County DOTs, IDOT, Tollway, Townships
	Coordinate geography-based plow routes among jurisdictions for efficiency and reduced travel, equipment and materials storage costs.	Optimize route efficiency recommendations and maintain coordinated effort/standards via Memorandum of Understanding.	County DOTs, IDOT, Municipalities, Townships, Watershed Groups

ISSUE	STRATEGIES TO ADDRESS ISSUE	POTENTIAL ACTIONS	RESPONSIBILITY
Water Quality Impairment (continued)	Applicator certification/ registration	State requirement. Phase in as a requirement via municipal ordinance, County Township.	Illinois EPA, IDOT, Municipalities, Townships, County DOTs
	Coordinated intergovernmental purchase of private contractor services for winter maintenance	Counties take lead in coordinating shared service with municipalities. Only qualified contractors eligible for bid.	LCDOT, Municipalities, Townships, Private, Watershed Groups
Poor habitat quality	Stream, wetland, and lake maintenance program and restoration strategy; Dam repair/removal	Develop and adopt standards for stream, wetland, and lake maintenance and restoration.	SMC, MWRD, Municipalities, Counties, Drainage Districts, IDNR/WI DNR
	Communities participate in invasive plant control; Inform private landowners about invasive plant control	Each community and transportation agency adds invasive plant management to maintenance programs (technical support from invasive plant network and FPDs). Coordinate outreach with established programs like NPDES II and FPD education programs.	Municipalities, Counties, Park Districts, FPD, CLC, U of IL Extension, County DOTs, IDOT, Townships
Lack of water quality data	Coordinated NPDES II and stream gage monitoring	Watershed municipalities collaborate on developing coordinated monitoring program (under-way).	SMC, LCHD-ES, DRWW, MWRD, USGS, Watershed Groups
	Participate in monitoring program of DRWW	Each NPDES community/agency participates in work group.	Municipalities, Townships, Drainage Districts, Counties

ISSUE	STRATEGIES TO ADDRESS ISSUE	POTENTIAL ACTIONS	RESPONSIBILITY
Barriers to alternative transportation - connecting routes and modes	Neighborhood connections with trails; Connecting trails and safe sidewalks to transportation hubs and work centers (e.g., train stations and bus stops, commercial centers, business parks)	Assess underserved neighborhoods and disconnected transportation hubs, work, and business centers. Meet with appropriate jurisdictions to formulate strategies to address in Lake County 2040 Transportation Plan.	County DOTs, Municipalities, IDOT, Counties
Flood damage	Regional Flood Storage Sites	Assess if regional flood storage will mitigate or prevent flood damage and implement priority storage sites.	SMC, MWRD, Municipalities, Townships, Counties
	Evaluating Stormwater Infrastructure	Clear, repair, or replace blocked, damaged, and failing stormwater infrastructure to maintain or improve conveyance.	SMC, MWRD, Municipalities, Townships, Counties, IDOT, County DOTs
	Flood Mitigation Projects	Utilizing local and regional partnerships to fund and implement flood mitigation projects such as buy-outs	SMC, MWRD, Municipalities, Townships, Counties, IDNR, IEMA
Protection and restoration of natural resources	Habitat Protection, & Wetland and Stream Restoration	Restoration of hydrology and native plant communities in existing natural areas.	Park Districts, FPD, Municipalities, Townships, IDNR, WI DNR
Education and outreach regarding watershed issues	Inform residents about BMP's, water quality and water resources, and agency roles; Promote volunteer opportunities	Coordinate outreach with established programs.	Municipalities, Counties, Park Districts, FPD, CLC, U of IL Extension, County DOTs, IDOT, Townships

4.3.2 Watershed Roles and Responsibilities

Watershed management in the DPR planning area is a shared responsibility of both public and private interests. Watershed protection provided by jurisdictional entities and private stakeholders comes in several

forms: policy, regulation, planning, zoning, development and land management standards/incentives, education, outreach, and in-the-ground BMP projects.

Municipal and county governments share the greatest responsibility for watershed protection because they influence and oversee development impacts to the watershed through land use planning, land management and development policies, and regulatory oversight. Transportation infrastructure improvements are necessary to accommodate business and population growth. The operation, maintenance, and construction of roadways can substantially influence water resources. Roadways are initiated and maintained by multiple stakeholders including townships, municipalities, counties, the Illinois and Wisconsin Departments of Transportation, and the Illinois Tollway Authority. In addition, the Illinois Tollway Authority is considering the development of the Route 53/120 corridor, which would increase their footprint in the DPR planning area.

Other agencies and private entities with watershed or technical advisory roles include the North Shore Water Reclamation District (NSWRD), MWRD, LCFPD, FPDCC, park districts, drainage districts, Openlands, CLC, DRWW, U of I Extension Service, NCSWCD, and the MLSWCD. The NSWRD operates two wastewater treatment plants that discharge effluent to the Des Plaines River within the planning area. MWRD has stormwater management authority in the Cook County portion of the planning area and operates flood control projects in the Buffalo Creek subwatershed. The forest preserves and park districts provide important recreation opportunities and protect natural resources such as rare or high-quality habitat and threatened or endangered species. They protect and manage land that often contains wetlands, lakes, ponds, and streams. SWCDs provide technical resource assistance to the public and other regulatory agencies including soil erosion and sediment control inspections. Drainage districts such as Avon-Fremont Drainage District and Grubb School Drainage District have authority to maintain the conveyance function of certain creeks and streams in the DPR planning area. The U of I Extension Service and the CLC are well situated to be demonstration sites and provide technical assistance and educational outreach programs to watershed stakeholders.

NOTEWORTHY: DRWW'S TECHNICAL ROLE IN THE WATERSHED

DRWW's continuous monitoring efforts will accurately assess the water quality problem and identify specific locations for implementation projects that will provide the greatest cost/benefit ratio. It will also allow for a consistent measure of progress. By monitoring over an extended period, using a consistent methodology, DRWW will identify BMPs that are successful at reducing nonpoint source pollution and improving water quality.

4.3.2.1 Watershed Development

Development practices that affect water resources (rivers, streams, lakes, isolated wetlands, and floodplains) are largely regulated by the WMO in Cook County, the WDO in Lake County, and the WI DNR in Kenosha County, along with county and municipal ordinances and land use plans. In addition to local regulations, the USACE regulates discharge of "fill" material into WOUS (including adjacent and connected wetlands), and the IDNR has floodplain/floodway regulatory and oversight authority. The Illinois and Wisconsin Departments of Transportation and the Illinois State Toll Highway Authority design and construct roadways in the DPR planning area. (State and federal projects are not required to meet local regulatory requirements but are governed by state and federal policies and regulations.)

In Lake County, the WDO is administered and enforced by SMC or a Certified Community. A community can be fully certified with authority to review and enforce both the standard stormwater and the isolated wetland provisions of the WDO, or partially certified with delegation to review and enforce one aspect of the WDO

(either the standard or isolated wetland provisions). SMC retains certain review authorities for all communities, primarily for several specific floodplain and floodway provisions of the WDO. Development practices within unincorporated areas are guided by the Lake County Framework Plan and must meet the requirements of the UDO. The Lake County PB&D administers the UDO on unincorporated parcels. Lake County PB&D operates under direction from the Regional Planning Commission, the Zoning Board of Appeals, the Planning, Building and Zoning Committee of the Lake County Board, and the full County Board. The County Board oversees decisions made by county departments and, therefore, can affect policies and regulations for unincorporated Lake County (29% of the DPR planning area). Development affecting water resources in the unincorporated areas of the townships must be reviewed by Lake County PB&D, except publicly funded projects in the floodway, which are reviewed by SMC. Lake County PB&D reviews may involve coordination with SMC on issues such as base (100-year) flood elevation determinations. Authority for local land use planning and development regulation within municipalities (incorporated areas) within Lake County rests with the municipality and its municipal codes and regulations. All development in Lake County municipalities must meet the minimum standards set forth by the WDO (many municipalities are certified to administer WDO standards). The IDNR has floodplain/floodway regulatory and oversight authority within Cook and Lake counties. IDNR has delegated floodplain/floodway review authority for Lake County to SMC. For the most up-to-date information on Lake County regulatory authority, visit Lake County's website.

In Cook County, the WMO is administered and enforced by MWRD or an Authorized Municipality. MWRD retains certain review authorities, primarily for developments that are tributary to combined sewers; developments proposing outfalls to the waterways or Lake Michigan within Cook County; and certain modifications and reconfigurations to existing detention facilities. The WMO allows local municipalities whose corporate boundary lies within both Cook County and an adjacent collar county (such as Lake County) to adopt and enforce the ordinance of the adjacent county in lieu of the WMO. Those municipalities must enter into an IGA with MWRD to follow the indicated ordinance. Municipalities, whether Authorized/Certified or not, can always enforce more stringent provisions for development if they determine there are conditions that warrant stricter requirements for their community. For the most up-to-date information on Cook County regulatory authority, visit Cook County's website.

In Kenosha County, the WI DNR regulates wetland, floodway, and floodplain impacts, as well as shoreline zoning, runoff reduction standards, and disturbances over an acre. Development practices are also regulated by the Village of Bristol and the Village of Salem Lakes municipal ordinances. The SEWRPC has developed a watershed management plan, natural areas management plan, and has restudied and remapped the floodplains in the Wisconsin portion of the DPR planning area. For the most up-to-date information on Kenosha County regulatory authority, visit the WI DNR and SEWRPC websites.

4.3.2.2 In-the-Ground Projects

In-the-ground projects are encouraged and incentivized when local units of government throughout the county adopt a watershed management plan. Plan adoption should be followed by close coordination and development of funding mechanisms, timelines, and shared responsibilities for implementing the projects prioritized by watershed planning efforts. Implementation of projects identified within the watershed-based plan requires partnerships between stakeholder groups, including homeowner associations, nonprofit organizations, businesses, schools, and community agencies, who must coordinate, fundraise, secure grants,

and oversee project implementation. The experience and success that partnerships often gain from working together on a watershed project can influence regulatory changes and increase cooperation among policy-makers.

The watershed action plan (Chapter 6 and Appendix N) identifies lead and support roles for multiple units of government to assist private landowners and watershed groups. Specific types of aid that governments can provide to private landowners can include BMP project cost-share funding or technical assistance, particularly for studies or plans. Private entities as partners can also provide cost-share for design, consulting, and construction work for projects, and in-kind BMP services, such as seeding, planting, restoration work, trail construction, and interpretive education.

Watershed projects benefit from partnerships that share design, permitting, material, and labor costs. Public/private partnerships are also important for securing state or federal funding for in-the-ground projects. Projects with shared costs and benefits often result in more successful project outcomes because of the relationships built among partners who share a vested interest in the success of their projects. Partnership on a first project may establish an institutional relationship that results in implementing projects in the future.

4.3.2.3 Post-Construction Monitoring and Maintenance

Opportunities should also be identified for establishing partnerships to improve the effectiveness and efficiency of monitoring and maintenance. Partnerships could share responsibility for stream monitoring and maintenance, stormwater monitoring, road and parking lot deicing, detention basin monitoring and maintenance, and invasive plant management. Additionally, partnerships may be established to share technical expertise; develop maintenance guidelines or standards; share services, equipment, or storage locations; or combine contracts with neighboring jurisdictions for similar activities, such as winter road maintenance and invasive plant management. Information on work responsibilities for each organization/jurisdiction should be available online to all watershed partners and residents to increase transparency and information availability. Interjurisdictional coordination may entail doing business in a new or different way; however, it results in watershed goals being achieved in a more efficient, effective, and sustainable manner. The DRWW is an example of an interjurisdictional partnership providing some of the services identified above.

4.4 STORMWATER GREEN INFRASTRUCTURE ANALYSIS

4.4.1 PARCEL PRIORITIZATION CRITERIA

2015 aerial photography of Kenosha County, WI, Lake County, IL, and Cook County, IL identified open and partially open parcels in the DPR planning area. Open parcels are those with no development such as residences, farmsteads, accessory buildings, and roads. Open parcels may contain structures such as park gazebos, picnic facilities, and trails or maintenance roads. Partially open parcels may contain some development such as residences, farmsteads, accessory buildings and roads; however, the majority (typically greater than 75-80%) of the parcel is open space. To further define the open and partially open parcels in the DPR planning area, edge of pavement, building footprints, and the NLCD were all overlaid on the 2015 aerial photography layer, then visually inspected to verify the locations.

Once the inventory of open/partially open parcels was created, additional criteria were considered based on stakeholder feedback obtained during a watershed planning committee meeting. Prioritization criteria were selected based on the benefits the parcels would provide in meeting four goals (flood prevention/reduction, water quality improvement, stormwater management and drainage, and natural resources improvement). Table 4-29 contains a list of the stakeholder approved ranking criteria for open and partially open parcels and the goals that are addressed by each criterion.

Table 4-29: Green Infrastructure Prioritization Criteria for the DPR Planning Area

RANKING CRITERIA FOR OPEN AND PARTIALLY OPEN PARCELS	FLOOD PREVENTION/ REDUCTION	WATER QUALITY IMPROVEMENT	STORMWATER MANAGEMENT AND DRAINAGE	NATURAL RESOURCES
1. Parcels that intersect 100-year floodplain.	X		X	
2. Parcels within catchments with less than 1 square mile of drainage to a channel	X	X		X
3. Parcels that intersect with a wetland polygon.	X	X		X
4. Parcels that are adjoining to or include at least 2.5 acres of drained hydric soils.	X	X		X
5. Parcels within 0.5 miles radius of a known flood problem area.	X			
6. Parcels that are within 100 feet of a watercourse or lake (equal to or greater than 6 acres).	X	X	X	X
7. Parcels intersecting with nonpoint source pollutant hotspot catchments.	X		X	
8. Parcels adjoin to or including forest preserves, land trusts, townships, and privately/publicly protected open space (including Illinois Natural Area Inventory sites).		X		
9. Parcels adjoining to or including mapped high-quality wetlands (ADID).		X		X
10. Parcels adjoining to or including threatened and endangered species sites.				X
11. Parcels with prime agricultural soils.		X		
12. Parcels with highly erodible soils.			X	X
13. Parcels greater than 5 acres (this reflects the median size of OPEN parcels in the watershed).	X	X	X	
14. Parcels intersecting ecological complexes (see Section 3.8.1).	X	X		X
15. Parcels that connect existing protected open space areas.		X		

4.4.2 Green Infrastructure Parcel Analysis and Prioritization

4.4.2.1 Parcel Prioritization Results

The open and partially open parcels were identified based on the prioritization criteria using a GIS and a binomial process. If a parcel met a criterion, it received a "Yes" or one point. If the parcel did not meet that criterion, it received a "No" or zero points. GIS was then used to rank the parcels. Rank was determined based on the maximum points received by each parcel for each goal. For example, the total maximum points for Flood Prevention and Reduction is 9. Figure 4-22 depicts the parcel prioritization process.

After completion of the prioritization, parcels were categorized as high, medium, or low priority. Finally, the total points for each parcel were summed to determine the overall parcel priority for the green infrastructure system. Parcels with the highest number of points overall were ranked highest in the context of the stormwater green infrastructure network, meaning that they possess the greatest capacity for watershed protection or improvement by meeting multiple goals (flood prevention/reduction, water quality improvement, stormwater management and drainage and natural resources improvement). The priority categorization was visually displayed and evaluated, and connector parcels were identified and manually categorized.

4.4.2.2 Overall Prioritization: A Stormwater Green Infrastructure Network

Figure 4-23 and Table 4-30 display the results of the priority parcel ranking for all criteria that were described in Table 4-29. Parcels with 10 or more total points were categorized as high priority parcels. Parcels with total scores between five and nine points were categorized as medium priority parcels. Parcels with total scores between zero and four points were categorized as low priority parcels.

The green infrastructure parcel prioritization analysis demonstrates that high priority parcels are the least prevalent of the three categories. 763 parcels totaling 24,797 acres are categorized as high priority parcels. The majority of these parcels are public lands such as parks and forest preserves. Medium priority parcels are the most prevalent of the three categories in terms of acreage. 6,241 parcels totaling 47,848 acres are categorized as medium priority parcels. Medium priority parcels are scattered throughout the DPR planning area, with many medium priority parcels located in close proximity to high priority parcels. Low priority parcels are the second least prevalent in terms of

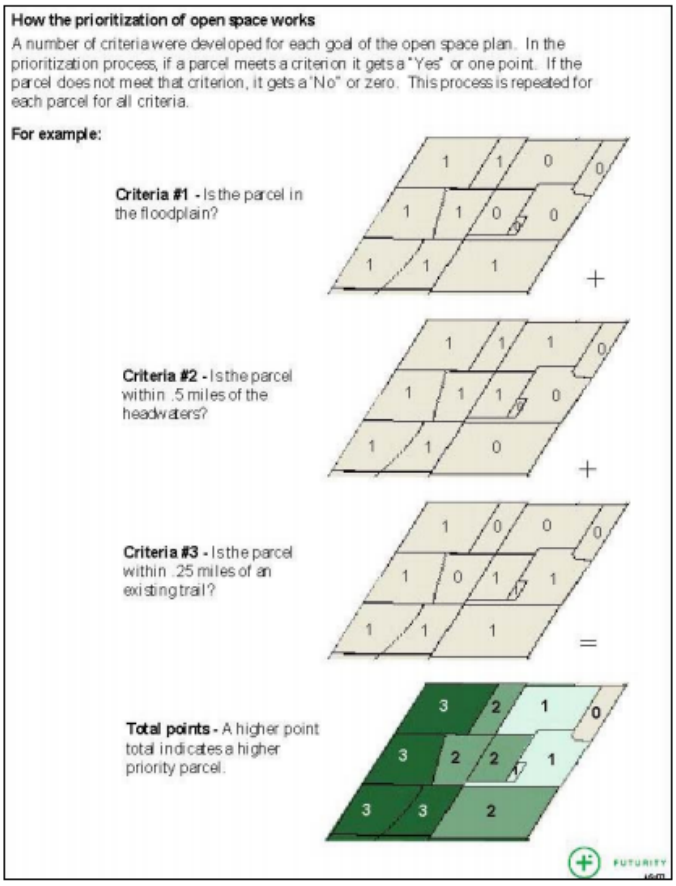


Figure 4-22: Green infrastructure Parcel Prioritization Process
Source: Futurity Inc., Christy SF 2005

acreage of the three categories. 7,834 parcels totaling 7,563 acres are categorized as low priority. Based on the results, average parcel size increases with priority, as larger open space parcels typically satisfy more of the prioritization criteria than smaller parcels.

The majority of the high and medium priority parcels are associated with stream corridors, wetlands, and high quality natural areas. While medium and low priority parcels may initially appear to be scattered throughout the DPR planning area, some of these parcels are important as connectors between higher priority parcels.

Table 4-30: Results of Priority Parcel Ranking Priority in DPR Planning Area

PRIORITY PARCEL RANKING	HIGH PRIORITY (10+ POINTS)	MEDIUM PRIORITY (5-9 POINTS)	LOW PRIORITY (0-4 POINTS)
No. of Parcels	763	6,241	7,834
Acres	24,797	47,848	7,563

Table 4-31: Results of Priority Parcel Ranking Priority per subwatershed in the DPR Planning Area

WATERSHED	HIGH PRIORITY ACRES/% OF WATERSHED	MEDIUM PRIORITY ACRES/% OF WATERSHED	LOW PRIORITY ACRES/% OF WATERSHED	WATERSHED TOTAL ACRES/%
Aptakisic Creek	41 (0.94%)	972 (22.22%)	196 (4.48%)	1,209 (27.64%)
Buffalo Creek	468 (2.69%)	3,568 (20.51%)	650 (3.74%)	4,686 (26.94%)
Bull Creek	760 (10.65%)	2,260 (31.67%)	414 (5.80%)	3,434 (48.12%)
Bull's Brook	717 (39.46%)	510 (28.07%)	27 (1.49%)	1,254 (69.01%)
Indian Creek	1,939 (8.03%)	6,234 (25.81%)	1,765 (7.31%)	9,938 (41.15%)
Lower Des Plaines River	2,484 (17.01%)	3,482 (23.84%)	809 (5.54%)	6,775 (46.38%)
Mill Creek	3,492 (17.65%)	7,411 (37.46%)	1,032 (5.22%)	11,935 (60.33%)
Newport Drainage Ditch	712 (14.19%)	2,386 (47.55%)	219 (4.36%)	3,317 (66.10%)
Dutch Gap-North Mill Creek	8,646 (36.74%)	10,290 (43.73%)	533 (2.27%)	19,469 (82.73%)
Upper Des Plaines River	5,538 (17.01%)	10,735 (32.98%)	1,918 (5.89%)	18,191 (55.89%)
Planning Area Total	24,797 (16.49%)	47,848 (31.82%)	7,563 (5.03%)	80,208 (53.34%)

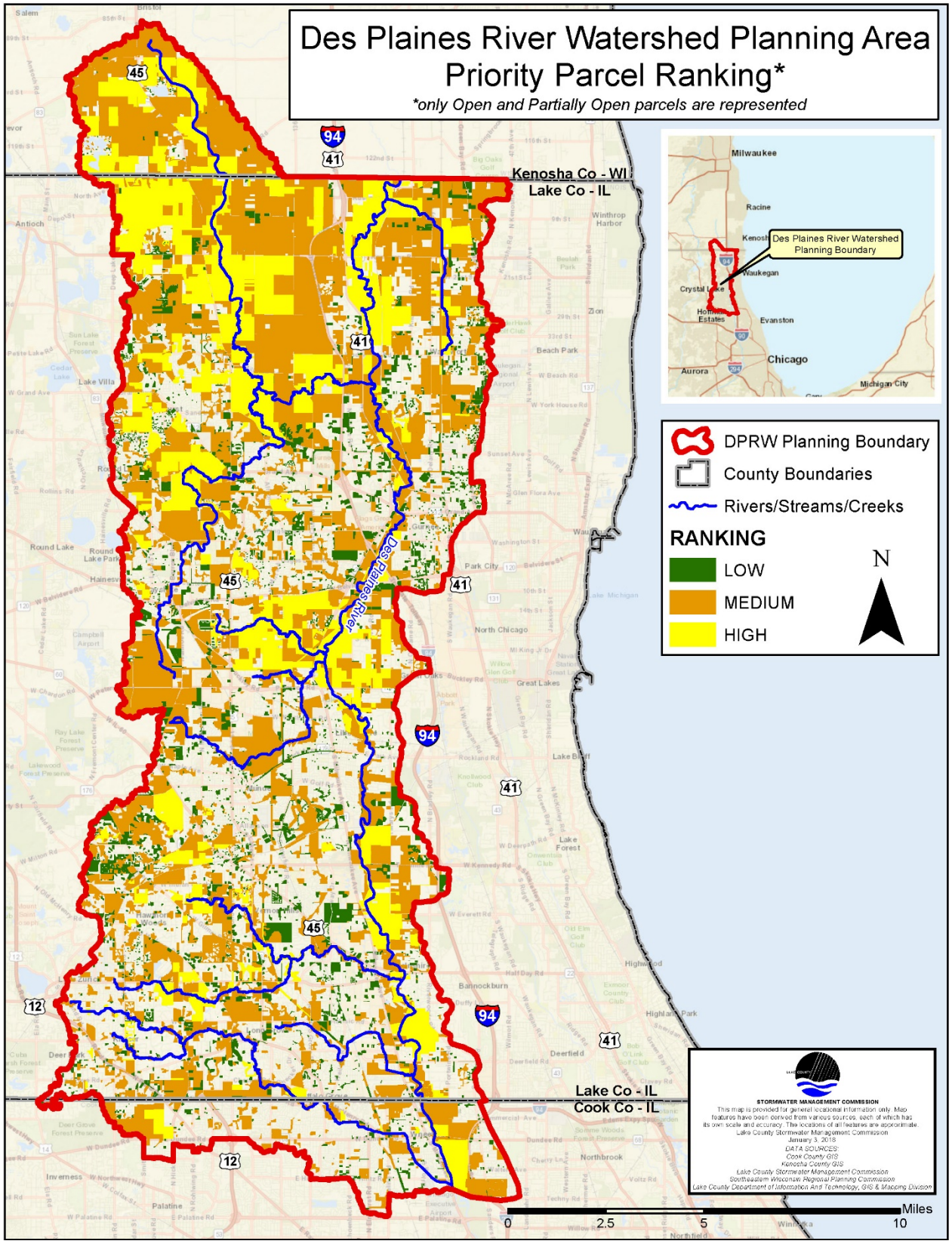


Figure 4-23: Priority Parcel Ranking for Green Infrastructure Network

While high priority parcels only account for 16% of the DPR planning area in total acres, their protection and enhancement will be an integral part of the restoration of the planning area. The majority of the parcels in this category are public lands such as parks and forest preserves. Continuing to protect these high priority public parcels will preserve natural ecosystems that promote stormwater infiltration and reduce stormwater runoff.

The majority (in terms of acreage) of the open or partially open parcels in the DPR planning area are classified as medium priority parcels. Medium priority parcels are scattered throughout the DPR planning area and comprise nearly 60% of the open and partially open parcel acreage. Medium priority parcels are often located in proximity to high priority parcels and stream corridors. The medium priority parcels with existing protection provide excellent opportunities for a variety of green infrastructure practices. Lastly, scattered low-priority open areas offer important opportunities for stormwater green infrastructure practices and should be considered for local stormwater infiltration BMPs.

Utilizing the high and medium priority parcels only, a Stormwater Green Infrastructure Network (see Figure 4-24) for the DPR planning area was developed. Parcels that connect existing protected open space areas were also given a score of one (refer to Criteria 15 – Table 4-29) if they provided a connection or corridor between existing protected open space areas.

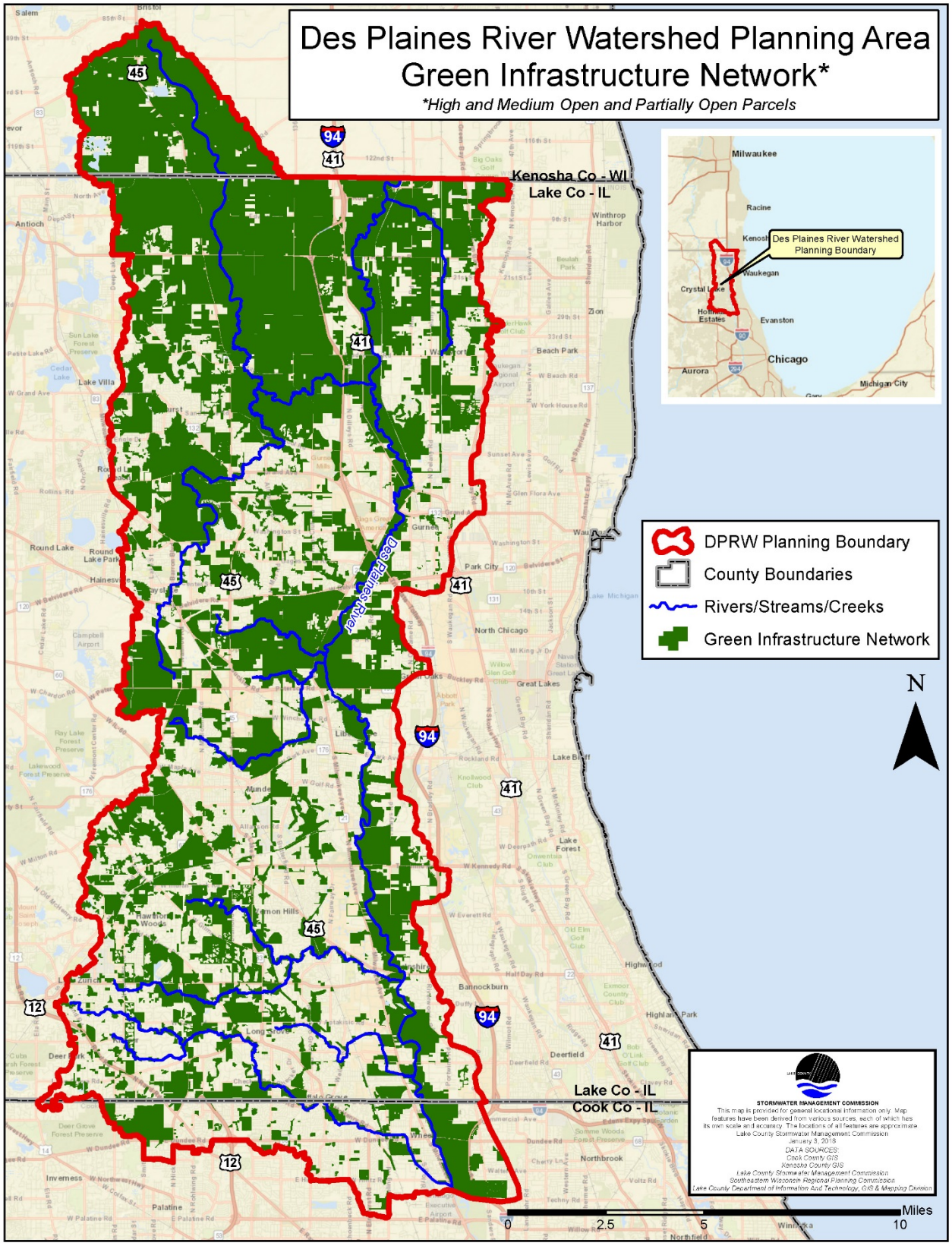


Figure 4-24: Green Infrastructure Network of High and Medium Parcels

In order to achieve the goals of the watershed-based plan, the integrity of the Stormwater Green Infrastructure Network will need to be preserved or enhanced across multiple jurisdictions. In many cases this will require significant coordination and planning among jurisdictions. Priority should be given to preserve the rainfall infiltration and storage capacity of the high and medium priority parcels that are not currently protected. The protection and additional implementation of green infrastructure practices on these parcels where appropriate will increase infiltration and effectively reduce stormwater runoff. Further priority should be given to protect and improve water quality and stream condition of the high and medium priority unprotected parcels that are located within the stream corridors of the planning area and its tributaries. While the scattered low priority open and partially open parcels may not be incorporated into the connected green infrastructure network, communities, park districts, road agencies, and private landowners may significantly reduce runoff and pollution in the DPR planning area by strategically implementing stormwater green infrastructure practices on these sites.

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 5

ANHMP - All-Natural Hazards Mitigation Plan

BFE – Base Flood Elevation

CRS - Community Rating System

DCEO - Department of Commerce and Economic Opportunity

DMA 2000 - Disaster Mitigation Act of 2000

DPR Planning Area – Des Plaines River Watershed Planning Area

FEMA – Federal Emergency Management Agency

FIRM – Flood Insurance Rate Map

FIS – Flood Insurance Study

FPA – Flood Problem Area

FPAI – Flood Problem Areas Inventory

GIS – Geographic Information System

HEC – Hydrologic Engineering Center

HMPC - Hazard Mitigation Planning Committee

IDNR-OWR – Illinois Department of Natural Resources – Office of Water Resources

IEMA – Illinois Emergency Management Agency

ISWS – Illinois State Water Survey

ITR – Independent Technical Review

LiDAR - Light Detection and Ranging

NFIP – National Flood Insurance Program

NRCS – Natural Resources Conservation Service

PB&D – Planning, Building & Development

RVR – Runoff Volume Reduction

SFHA – Special Flood Hazard Areas

SMC – Lake County Stormwater Management Commission

SMU – Subwatershed Management Unit

USACE – United States Army Corps of Engineers

USDA – United States Department of Agriculture

USGS – United States Geological Survey

WDO – Lake County Watershed Development Ordinance

WMO – Cook County Watershed Management Ordinance

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5 FLOOD PROBLEM ASSESSMENT

Floodplains and floodways along stream and river corridors perform a variety of benefits. Some of these benefits include aesthetic value, flood storage, water quality, and plant and wildlife habitat. The most important function, however, is the capacity of the floodplain to hold water during significant runoff events to minimize flood damage. Upland areas outside of the floodplains and floodways can experience urban flooding, which is common in older sections of communities where original storm sewers were not designed to present-day standards (prior to stormwater and floodplain regulations). Urbanization has increased runoff, and climate is trending to more frequent and intense storm events (Illinois Urban Flooding Awareness Act, 2015). The increased stormwater runoff, in combination with areas with inadequate and poorly maintained stormwater infrastructure, lead to flash flooding in these urbanized areas.

5.1 FLOOD EVENTS

Flooding is a problem many DPR planning area residents have experienced, whether at home, in their yard, in their neighborhood, at work, or on area roadways. As SMC compiled the Des Plaines River Watershed-Based Plan, more information was needed about when and where flooding occurs that impacts residents in the DPR planning area. As part of the watershed planning process, SMC wanted to identify structures in the watershed that are at risk of flooding so that the watershed plan can include reasonable solutions to reduce flood damage in a cost-effective manner. Throughout the watershed, overbank flooding is most extensive along the Des Plaines River with the highest recorded crest elevations occurring in 2017, 1986, and 2004. Numerous additional historical floods have occurred in the watershed and are mentioned below. The description of these floods below was obtained through various historical resources, including hydrologic atlases and flood hazard mitigation plans and reports.

5.1.1 1938

The 1938 flood was one of the more notable floods that occurred in Lake County. This flood seemed to have a two-pronged attack hitting areas around both Butler Lake and the Des Plaines River, which was caused by a tremendous amount of rain in a small window of time. Some residents were surprised when they left for work and found they could not reach their cars due to the flood waters. This flood was thought to have about $1 million worth of property damage and $35,000 of that came from property from Fould's Milling Co. (Hillier, 2015). The Fould's factory was located on Church St. and was right next to both the Des Plaines River and Liberty Lake. Most of the flooding damage occurred in the basement of the factory destroying

Figure 5-1: Libertyville Fire Department draining the Fould's Milling Co.
Source: Independent Register on July 8, 1938.

thousands of dollars' worth of products (see Figure 5-1). The Libertyville Fire Department sent their truck in to help syphon out water, with many fireman and volunteers working through the night to get the basement clear again. While Fould's Milling Co. was dealing with their flood damage, Butler Lake was dealing with their own problems (see Figure 5-2). Lake County's record-setting flood of 1938 became a bit of town lore in Grayslake as the "day that fish swam down main street" (French & Associates, Ltd., 2001).

Figure 5-2: Butler Lake flooding of Lake Street
Source: Libertyville Independent Register on July 8, 1938.

The flood of 1938 wasn't the first flood in Libertyville, but it seemed to be the first that illustrated what a problem flooding could be. Officials for the town realized that something needed to happen to curtail the flooding and damage. However, no one could seem to agree on what should be done or whose responsibility it was. About 25 years later, Libertyville would have two floods in three years that were worse than their 1938 predecessor, but it would be years beyond that before any government action would take place to address the prevention of flooding.

5.1.2 1950s

In 1951, flooding occurred along Indian Creek and around Countryside Lake. The flooding along Indian Creek was reported at the time to be the highest in recent years. In July 1957, flooding occurred around Gages and Diamond Lakes and along Buffalo Creek and its tributaries, Seavey (Hawthorn) Drainage Ditch, Aptakisic Creek, and Wheeling Drainage Ditch.

5.1.3 1960s

The floods of April 1960 resulted from snowmelt followed by heavy rains which eventually overwhelmed the available floodplain storage and set new flood stage records on the Fox and Des Plaines Rivers, respectively. Flooding occurred from March-April 1960 along Mill Creek and Avon-Fremont drainage ditch, Indian Creek, Kildeer Creek (S. Branch Indian Creek), Bull Creek, North Mill Creek and Dutch Gap Canal, the Des Plaines River, and along many other small streams and lakes in the area. In April 1965, Hastings Creek and the Avon-Fremont drainage ditch flooded, as did areas around Sylvan and Forest Lakes. The 1960 flood is notable in that it spurred the first floodplain mapping effort in northeastern Illinois, undertaken by the Northeastern Illinois Planning Commission (now CMAP).

5.1.4 1986 and 1987

The 1986 flood was triggered by widespread regional rainfall with varying intensity and duration which had been preceded by two weeks of nearly continuous rain falling across northern regions of the Des Plaines River, North Branch of the Chicago River and Fox River watersheds. As a result, flooding occurred in rivers and streams across Lake, McHenry, northern Cook Counties (Juhl, 2018).

The Des Plaines River has a long history of flooding that has caused significant economic losses. The damages associated with the 1986 floods was an estimated $35 million in damages to 10,000 dwellings and 263 business and industrial sites. More than 15,000 residents were evacuated from the flooded area and seven lives were lost. Severe impacts to transportation occurred in 33 municipalities along the Des Plaines River in Lake and Cook Counties (USACE, 2014).

Figure 5-3: Des Plaines River flooding 1986

The Des Plaines River took four weeks to pass this floodwater. Northeastern Illinois received almost one inch of rain daily from September 21 through October 4; on some days, as much as three inches of rain fell. Over this two-week period, the Des Plaines River watershed received up to 12.9 inches of rain compared to the normal monthly amount of three inches. The flooding in Lake County killed four people; one person drowned when his boat capsized, and three people had heart attacks fighting the flood. A federal disaster declaration was declared by President Ronald Reagan for the region. Figure 5-3 shows the Des Plaines River flooding in 1986.

The 1987 flooding was caused by short duration high intensity storms. The flooding affected 11,500 single family units and caused $53 million in private property damage in northern Illinois.

The storms of October 2-3, 1986, and August 13-14, 1987, in Illinois, though of contrasting types, both caused record floods and stream discharges with recurrence intervals exceeding 100 years. The 1986 floods were scattered throughout northeastern Illinois and were most severe in Lake and Cook Counties in Illinois. The floods of 1987 were localized and confined to the Des Plaines River basin. Flood damages were great, leaving many residents and motoring public stranded and without access to services. The 1986 and 1987 floods generated enough public awareness of the continued problems of drainage and flooding for the Illinois General Assembly to pass legislation authorizing the formation of countrywide stormwater management programs. Such programs, in conjunction with state and federal programs, are providing stormwater management planning, watershed planning, regulation of construction within floodplain areas, and new sources of funding to manage local drainage and flooding problems.

Lake County adopted a comprehensive stormwater management plan and ordinance to address increased flooding and improve water quality. Existing development, however, is still subject to flooding. As a result, SMC in cooperation with local, state and federal agencies initiated a flood mitigation program to reduce flooding in developed areas.

5.1.5 2004

Figure 5-4: Flooding at the Gurnee Grade School

In May 2004, record to near record flooding occurred in Lake and Cook counties. Heavy rainfall and resultant runoff from the headwaters of the Des Plaines River in Kenosha County, Wisconsin brought the Des Plaines River to flood stage from the Russell to Gurnee stream gages on May 18th. Monthly average rainfall reported re between 10 and 13 inches of rain, with the Upper Des Plaines, Fox River, and Southern Wisconsin watersheds receiving around 40 percent of annual precipitation in 30 days (NOAA, National Weather Service 2004). Floodwaters inundated large areas in Lake County Illinois. The area along the Des Plaines River from Russell to Gurnee stream gages suffered the worst flood problems. Floodwaters inundated large areas of low lying farmland near Russell and surrounded some houses as well. Many residents were evacuated from their homes as flood waters continued to rise. Approximately 40 homes and 20 businesses were affected by high water in Gurnee with 35 homes evacuated. Gurnee area schools were closed. Flood waters surrounded Viking School and the Gurnee Grade School during the peak of the flooding, but sandbagging efforts helped prevent any major flood damage. Many major roads were impacted by flooding and at one time only 4 east-west roads were open from the Wisconsin state line down to Gurnee. Figure 5-4 shows the sandbagging efforts of the Gurnee Grade School in Gurnee during this storm event.

5.1.6 2008

In 2008, multiple storm events associated with the remnants of Hurricane Ike led to 51 consecutive hours of precipitation in Northeastern Illinois. The largest rainfall accumulations occurred south of Lake County but resulted in a disaster declaration for Lake and other surrounding counties for these storms and flooding.

5.1.7 2013

Figure 5-5: April 2013 flood event in Grandwood Park
Flooding damage to the Grandwood Park Dam

In 2013, a massive rainstorm on April 17-18, 2013 delivered between 4-7 inches of rainfall to Northern Illinois (NOAA National Weather Service, 2014). The late snow melt and heavy rains in early April combined with the two-day rain event on April 17-18th, 2013 resulted in extended, widespread riverine flooding in the Des Plaines River watershed. Major flood stage, as defined by the National Weather Service is “extensive inundation of structures and roads.” On April 19th, 2013, the Des Plaines River at

Lincolnshire stream gage reached peak water level of 16.36 feet setting a record. The peak water level near Gurnee reached 11.32 feet, just shy of the record 11.95 feet set in 1986. (USACE, 2017).

The heavy rains overwhelmed storm and sanitary sewer systems, caused sewer backups, localized and riverine flooding throughout the County. Floods damaged an estimated 3,200 properties, forced evacuations, and caused numerous power outages and road closures. In Lincolnshire, a levee was breached requiring 49 homes to be evacuated. In Buffalo Grove, the basin at Buffalo Creek Forest Preserve overtopped the dam and Buffalo Creek discharge increased to record levels causing substantial erosion and habitat loss. In response to flooding and severe storms, President Obama declared that a major disaster exists in the State of Illinois. This declaration made federal disaster assistance available for Individuals and Public Assistance. In Lake County, 1,159 individuals and/or households received upwards of $2.7 million dollars in federal disaster assistance. Figure 5-5 shows the April 2013 flood event damage to the Grandwood Park District Dam and the surrounding flooding.

5.1.8 2017

Torrential rounds of heavy rain began late on the night of July 11th, 2017 and continued into the morning of July 12th 2017. Multiple rounds of rain continued over the same locations produced 3-7 inches of rain which brought flash flooding by daybreak and continued throughout the entire day and into the next night. Flooding occurred, and at times very rapidly, affecting flood-prone areas as well as communities that had not experienced this type of flooding before. The heavy rain overwhelmed stormwater infrastructure and the rapid rise of several feet of water along the Des Plaines River led to widespread flooding in the southern portion of the watershed. Major roads were closed, and residents in several areas were evacuated. Hundreds of homes and properties sustained major damage and another 3,000 homes had less severe damage. Record crests were recorded for the Des Plaines River at the Gurnee, Lincolnshire, and Russell Road stream gage locations. Flood waters in many locations along the river did not recede for several days after the rain began. Three Illinois counties including Lake County were proclaimed disaster areas by Governor Bruce Rauner, however federal assistance for a major disaster declaration was denied because the total amount of flood damages did not meet the state threshold for federal assistance. Figure 5-6 shows the extent of flash flooding that occurred in downtown Mundelein during the July 2017 storm event.

Figure 5-6: Flooding in downtown Mundelein

5.1.9 June 2015 Illinois Urban Flooding Awareness Act Final Report

In August 2014, the Illinois General Assembly through PA98-0858 tasked the IDNR to prepare a report on the extent, cost, prevalence, and policies related to urban flooding (Illinois Urban Flooding Awareness Act, 2015). In addition, IDNR was tasked to identify resources and technology that may lead to mitigating the impacts of

urban flooding. Flooding in urban areas has received increasing attention in the last decade, with at least $2.319 billion in documented damages between 2007 and 2014, of which $1.240 billion were private claims that typically represent basement flooding and sewer backup (Illinois Urban Flooding Awareness Act, 2015). The Urban Flooding Awareness Act requires FEMA to direct a study to quantify these facts and develop recommendations to assist federal, state, and local governments in their efforts to prevent and provide relief from urban flooding to homeowners and businesses across the country. The Urban Flooding Awareness Act specifically identifies the following nine topics to be addressed in the report:

1. Prevalence and costs associated with urban flooding events across the state and the trends in frequency and severity over the past two decades.
2. Apparent impact of global climate change on urban flooding.
3. The impact of county stormwater programs on urban flooding over the past two decades, including a list of projects and programs and the flood damages avoided.
4. An evaluation of policies such as using the 100-year storm as the standard for designing urban stormwater detention infrastructure and the 10-year storm for the design of stormwater conveyance systems.
5. Review of technology to evaluate the risk of property damage from urban flooding and whether a property is in or adjacent to a 1% (100-year) floodplain or not, including LiDAR and GIS.
6. Strategies for minimizing damage to property from urban flooding, with a focus on rapid, low-cost approaches such as nonstructural and natural infrastructure, and methods for financing them.
7. The consistency of the criteria for state funding of flood control projects between IDNR, IEMA, and DCEO.
8. Strategies for increasing participation in the NFIP and Community Rating System (CRS).
9. Strategies and practices to increase the availability, affordability, and effectiveness of flood insurance and basement backup insurance.

5.2 FLOOD PROBLEM AREAS INVENTORY

5.2.1 FLOOD AND STORMWATER QUESTIONNAIRE

As part of the watershed planning process, SMC identified structures in the watershed that are at risk of flooding so that the watershed-based plan can include reasonable solutions to reduce flood damage. In February 2016, SMC mailed 6,946 hard copies and over 1,500 emails of the voluntary flood and stormwater questionnaire. Recipients were made up of DPR planning area stakeholders in SMC's contact database and known flood problem area residents. The flood and stormwater questionnaire was also accessible to the public through SMC's website and was publicized at the March-May 2016 Des Plaines River watershed planning meetings. The flood and stormwater questionnaires were collected and summarized in May 2016.

The flood and stormwater questionnaire results can help address watershed flooding issues and needs by providing information for residential and business flood damage and flood history. The flood questionnaire focused on characteristics of the landowner's property (i.e., type of property, foundation, basement, water supply, etc.), types of insurance, flood history (possible sources of historical flooding, flood damage, frequency), flood mitigation measures, and other flooding or stormwater management issues in their

community.

SMC received 237 completed questionnaires to summarize (without any address specific data) and use for flood mitigation planning purposes in the watershed assessment and action plan. The results of the flood and stormwater questionnaire indicated that 44% of the respondents said flooding was a concern and 30% of respondents said drainage was a concern. 80% of the respondents that indicated they have flooded said they are located in a floodplain. The top three causes of flooding specified by stakeholders are multiple causes, overbank flooding, and storm sewer backup. Stakeholders identified flood damage reduction and maintaining infrastructure as a high priority by category. Flood problem area information was obtained through some of the received questionnaires and included in the overall FPAs inventory. See Figure 5-7 for flood questionnaire results on the types of flooding identified in the DPR planning area.

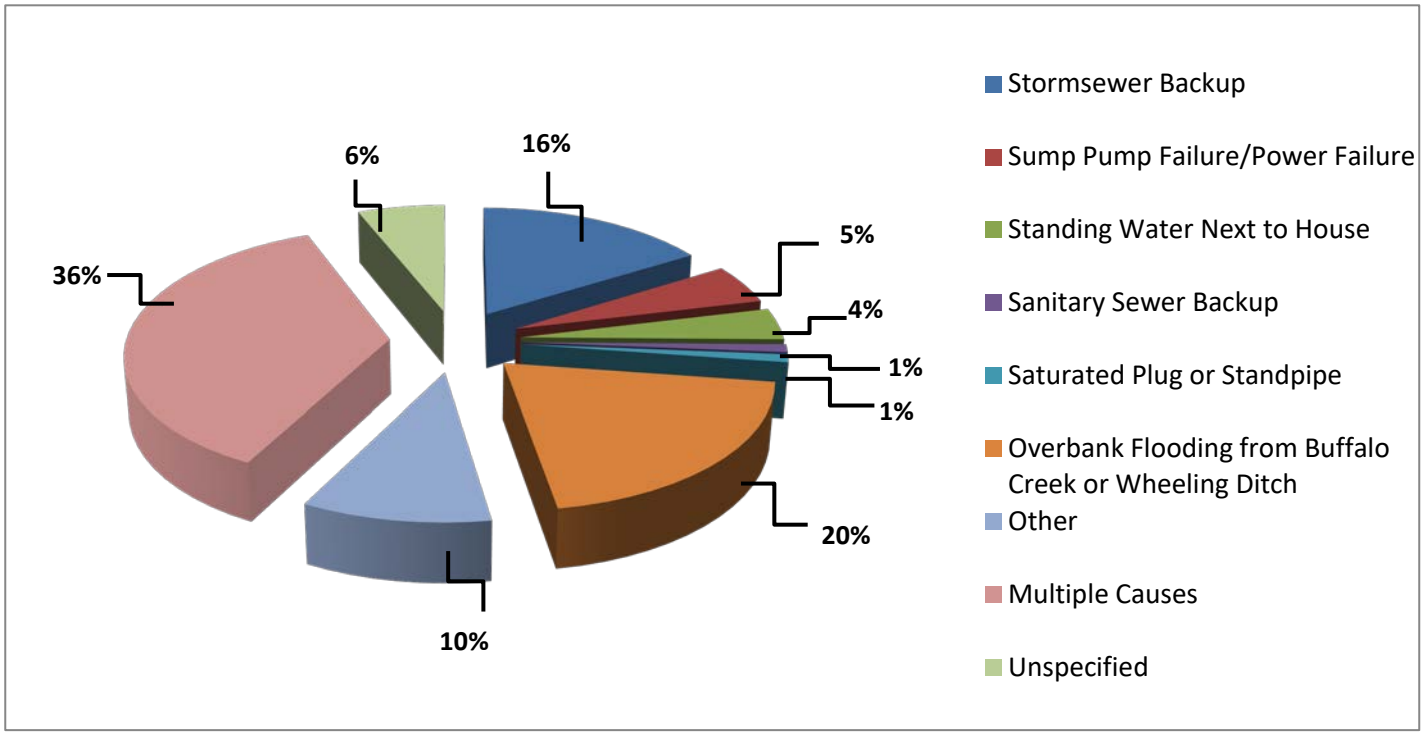


Figure 5-7: Causes of flooding identified from the Flood and Stormwater Questionnaire

5.2.2 Characterization of Flood Problem Areas

SMC conducted the countywide Flood Problem Areas Inventory (FPAI) in 1995-1996 and updated it in 2002. The FPAI, and a flood risk assessment based on mapped floodplains, identified structures that have been or may be damaged by flood events that are less than the 100-year event. The FPAI is used to locate flood damage problem areas based on reports of flood damage by residents or communities. The FPAI identifies the primary cause of flood damage for each area and is used to recommend flood mitigation priorities. The flood risk assessment identifies additional locations where structures occur in mapped floodplain areas and are likely at risk of flood damage. The purpose was to identify those structures that are at risk of flooding so that the plan can recommend ways to reduce flood damage.

Flood Problem Area (FPA): One or more structures in a geographical area that are damaged by the same primary source or cause of flooding. Structures include transportation, utility infrastructure, buildings, and well and septic failure caused by flooding. Areas also include locations where road flooding results in damage to infrastructure, loss of critical access, or threatens safety.

As part of the watershed planning process, SMC updated the inventory of local FPAs to identify the sources of flooding, improve opportunities for reducing flood damage, aid decision-makers about determining adequate downstream capacity when issuing development permits in proximity to FPAs, and reduce flood damage at existing sites from nearby development projects. In March 2016, SMC mailed and emailed 44 watershed municipalities, townships, and large jurisdictions the current flood problem area map and information forms for their jurisdiction to provide updated or new flood problem information. The FPAI information was collected and summarized in April 2017; 30 jurisdictions responded to this inventory update with updated and new information.

Before starting the Des Plaines River watershed planning process, 149 FPAs were known in the DPR planning area. As a result of this FPAI update, SMC received updates on 32 known FPAs, removed 12 locations (flood mitigation efforts were implemented), and added 77 new FPAs to the inventory. Currently, there are 214 known FPAs in the DPR planning area (see Figure 5-8); this number does not include all of the flood data collected from the July 2017 flood event. Because the FPAI includes many areas affected by storms less than the 100-year event, the July 2017 flood event data is excluded given the larger magnitude of that particular storm.

5.2.2.1 July 2017 Flood Event FPAs and Critical Facilities

From July 11-12, 2017 a major precipitation event resulted in rainfall amounts between 3.4 and 7.2 inches in Lake County causing substantial flooding. SMC, Lake County PB&D, and local municipalities surveyed impacted areas to identify FPAs, impacted properties, and impacted critical facilities using data from resident self-reporting and the IEMA. SMC defined FPAs as areas that experienced flooding during the event. FPAs varied in size, with some impacting one property and others impacting over 100 properties. Critical facilities are areas that may require a special response because of human needs or potential environmental impacts, including daycares, schools, gas stations, nursing homes, long term care facilities, and similar facilities. SMC identified 486 FPAs that impacted 2,233 properties and 46 critical facilities within the Lake County portion of the DPR planning area (Figure 5-8). The July 2017 flood event identified FPAs overlapped with approximately 29 existing FPAs in the DPR planning area.

During the survey, structure damage from flooding and multiple forms of flooding were observed, including sewer backups; street, yard, and driveway flooding; and structure flooding. Table 5-1 summarizes the number of FPAs, impacted properties, and impacted critical facilities for each type of flooding. This flood impacted multiple municipalities within the DPR planning area, with Grayslake, Gurnee, Libertyville, Mundelein, and Warren Township having the largest number of impacted properties (Table 5-2). From this event, IEMA received over 3,500 flood damage assessment form entries, and an estimated 9,553 structures were adversely affected by the storm events in Lake County, Illinois.

Table 5-1: DPR Planning Area FPAs, impacted properties, and impacted critical facilities by type of flooding

TYPE OF FLOODING	NUMBER OF FPAS	NUMBER OF IMPACTED PROPERTIES	NUMBER OF IMPACTED CRITICAL FACILITIES
Sewer Backup	14	15	1
Street/Yard/Driveway Flooding	75	75	3
Structure Flooding	378	2,124	41
Structural Damage from Flooding	19	19	1
Total	**486**	**2,233**	**46**

Table 5-2: DPR Planning Area FPAs, affected properties, and impacted critical facilities by municipality

MUNICIPALITY	NUMBER OF FPAS	NUMBER OF IMPACTED PROPERTIES	NUMBER OF IMPACTED CRITICAL FACILITIES
Antioch	3	3	0
Avon Township	3	3	0
Beach Park	3	3	0
Buffalo Grove	11	25	1
Ela Township	1	1	0
Fremont Township	11	19	0
Grayslake	61	353	12
Green Oaks	7	7	0
Gurnee	73	182	1
Hainesville	1	2	0
Hawthorn Woods	8	8	0
Lake Villa Township	13	41	0
Lake Zurich	1	1	0
Libertyville	45	530	6
Libertyville Township	14	62	0
Lincolnshire	2	8	0
Lindenhurst	17	49	2
Long Grove	16	18	2
Mettawa	4	6	0
Mundelein	64	443	8
Newport Township	5	48	0
Park City	2	2	0
Riverwoods	9	10	0
Round Lake Beach	9	13	1

MUNICIPALITY	NUMBER OF FPAS	NUMBER OF IMPACTED PROPERTIES	NUMBER OF IMPACTED CRITICAL FACILITIES
Third Lake	5	29	0
Vernon Hills	17	38	1
Vernon Township	10	30	1
Wadsworth	4	4	0
Warren Township	54	272	11
Waukegan	11	19	0
Waukegan Township	1	3	0
Zion	1	1	0

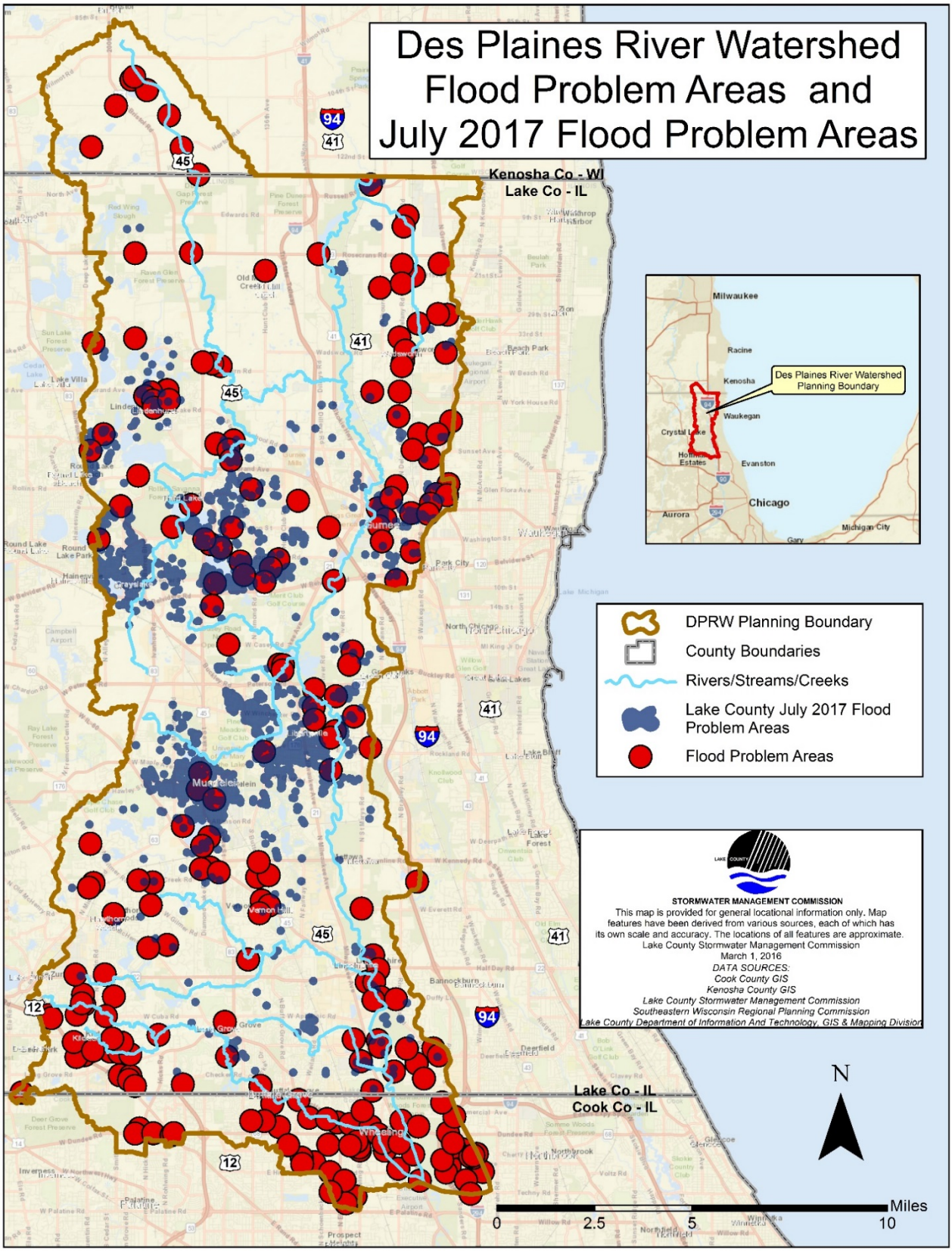


Figure 5-8: Des Plaines River Watershed FPAs and July 2017 flood damage assessment map

5.3 FLOOD RISK ASSESSMENT – STRUCTURES IN THE FLOODPLAIN

Flood risk areas are Special Flood Hazard Areas (SFHA) where structures have been identified as being at risk for flood damage because they are located in the 100-year floodplain. SMC compared the revised floodplain maps with recent (2015) aerial photographs to locate structures in the floodplain. All structures located within the 100-year floodplain are shown in Figure 5-9. Many of the identified structures are in or near potential FPAs. An estimated 4,911 structures (schools; churches; businesses; and residences, including garages, sheds, and gazebos), are at risk of flooding due to their location in the **100-year floodplain**. Of the 4,911 structures, approximately 4,564 properties are within the 100-year floodplain.

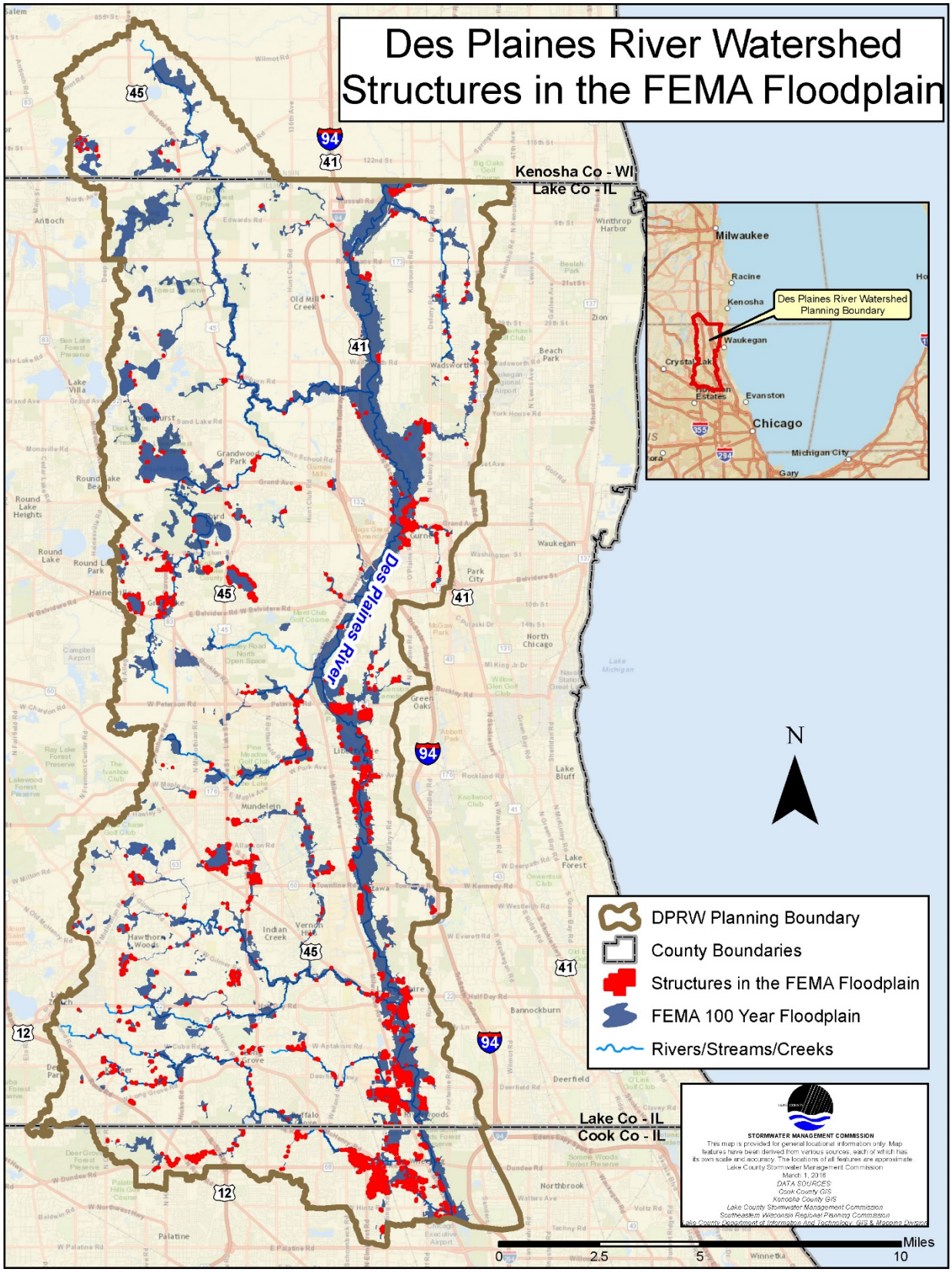


Figure 5-9: Des Plaines River Watershed Structures in the FEMA Floodplain

5.4 FLOODPLAIN STUDY SUMMARY

Hydrologists assign statistical probabilities to different size floods to characterize common, less likely, and severe floods for individual streams. For example, a 2-year flood event has a 50% probability of occurring in any year, and a 100-year flood has a 1% chance of being equaled or exceeded in any year. The 100-year flood event, also referred to as the "base flood," is the standard used by the NFIP to determine the need for flood insurance. The 100-year flood event has become the accepted national standard for floodplain regulatory purposes and was developed in part to guide floodplain development that lessens the damaging effects of floods. The **100-year floodplain** may also include a designated floodway. The floodway is the portion of the stream or river channel that must be reserved to discharge the base flood without increasing the water surface elevation more than 0.1-foot. A graphic representation of a typical floodplain and floodway is shown in Figure 5-10.

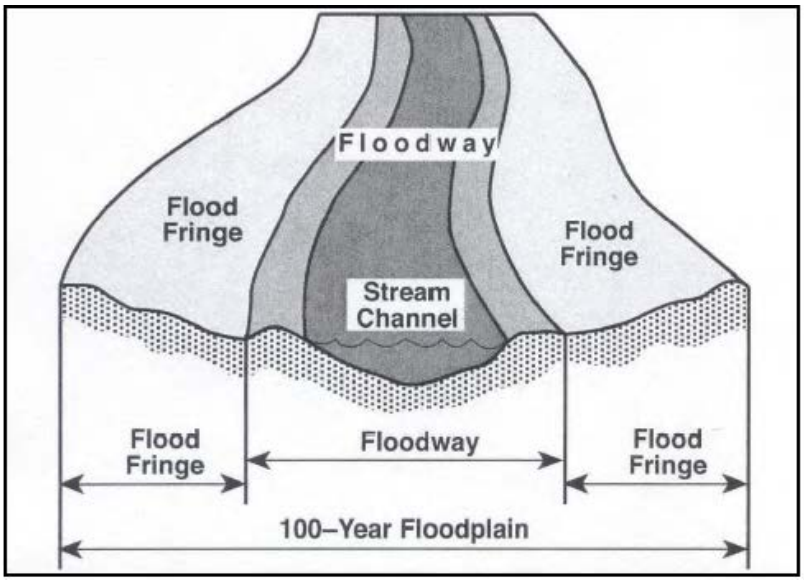


Figure 5-10: Graphical representation of the typical floodplain and floodway

FEMA has conducted **Flood Insurance Studies** (FIS) that assess a watershed's **hydrology**, land use, and drainage characteristics to identify areas that have the highest probability of flooding. FIS are used to produce **Flood Insurance Rate Maps** (FIRM). These maps depict the probable extent of the floodplain during a 100-year flood event. The FIRM are used to determine flood insurance requirements and calculate insurance costs. The maps are also used in concert with local, state, and federal ordinances to regulate development and building protection requirements within and adjacent to floodplain areas. The DPR planning area covers approximately 150,361 acres, and approximately 14% of the watershed is inundated during the 100-year flood event. Figure 5-11 reflects the regulatory floodplain boundary based on the effective FIRM.

Prior to the Countywide FIS, multiple communities located within the Des Plaines River Watershed completed hydrologic and **hydraulic** analyses. The pre-Countywide FIS studies were included in FIS studies from approximately 1979 to 1980.

FLOOD INSURANCE STUDY (FIS): Studies conducted by FEMA to determine areas that have the highest probability for flooding.

HYDROLOGY: Hydrology is the study of the occurrence, circulation, distribution, and properties (e.g., quality) of Earth's water.

HYDRAULICS: Hydraulics is the study of how water flows over the land surface. This includes flows within sewers, culverts, stream channels, wetlands, lakes, impoundments, etc.

FLOOD INSURANCE RATE MAP (FIRM): A map prepared by FEMA that depicts the SFHA within a community. The FIRM includes zones for the 100-year and 500-year floodplains and may or may not depict Regulatory Floodways.

The USACE updated the hydrologic and hydraulic analysis for the Des Planes River for FEMA in the September 2000 Flood Insurance revision. The work performed by the USACE was completed in September 1995. The updated study included corrections to nomenclature and planimetric information such as corporate limits. The limits of the DPR study are bound by Lake Cook Road at the southern limit of the county and extends north to approximately 0.8 miles north of Russel Road. Hydrologic data was based on USGS gaging stations. The gage data was analyzed utilizing a log-Pearson type III distribution, following guidelines recommended by the U.S. Water Resources Council. The USACE completed an analysis of the DPR frequency discharge curves for the four main stem recording gages within the study reach. The results were calibrated to match the statistical results using the HEC-1 hydrologic model. Currently, there are three floodplain studies in the DPR planning area for Newport, Bull Creek, and Mill Creek watersheds. Table 5-3 contains more information on the DPR planning area watershed floodplain studies and the status of data for usage as regulatory “best available”.

Table 5-3: Floodplain Studies in the DPR Planning Area and Status of Data for Usage as Regulatory "Best Available"

FLOODPLAIN STUDIES	CONTRACTOR	INDEPENDENT TECHNICAL REVIEW (ITR)	ITR COMPLETED?*	SMC ADOPTED?**	IDNR/ FEMA REVIEWED?	STATUS
Newport	MWH Global	Hey & Associates	Yes	No	No	Bleck Engineering has made comments on study.
Bull Creek (Des Plaines)	USGS / FluidClarity	Hey & Associates	Yes	No	No	ITR completed comments and incorporated in final Fluid Clarity study. Model updated after ITR review.
Mill Creek	Tetra Tech	Bleck Engineering	Yes	No	Flows Certified	ISWS completed revisions/waiting on Grayslake for possible additional revisions (Status: 5/2014).

* can be recommended for use as regulatory best available (where BFEs are higher than FEMA's)
** can be required for use as regulatory best available (where BFEs are higher than FEMA's)

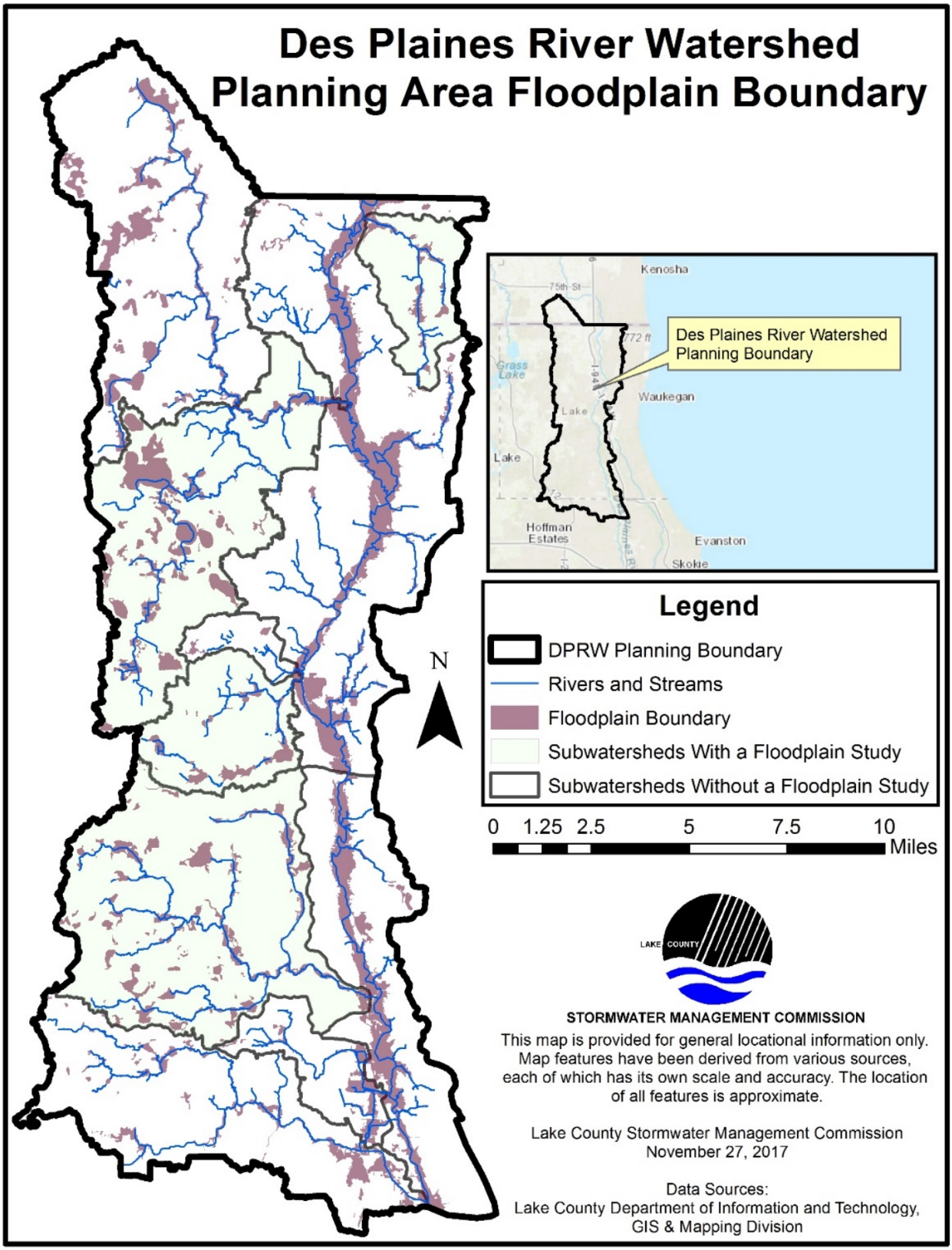


Figure 5-11: Des Plaines River Watershed Planning Area Floodplain Boundary

5.5 FLOOD DAMAGE REDUCTION

Flooding is a common issue in the DPR planning area because of urban development and a relatively flat regional topography. Urban development has increased impervious surfaces and modified or built in natural storage and floodplain areas, resulting in increased stormwater runoff volumes and rates. The relatively flat topography of the region results in excess water dispersing over a large area. Protection of the existing flood storage capacity of the landscape, including depressional areas, wetlands, and floodplains, is necessary to prevent increased flood risks in the region. Flood damage reduction is necessary to reduce the extent, frequency, and impact of flooding where development has already occurred. Flood damage reduction can be accomplished utilizing preventative or remedial measures.

5.5.1 PREVENTATIVE MEASURES

Flood prevention techniques, including zoning, regulation, land acquisition, and runoff reduction, seek to prevent flooding problems before they occur. Zoning and floodplain regulations seek to prevent flood damages by limiting development in areas where flooding is most likely to occur. Land acquisition maintains open space, preserving rainfall infiltration and natural storage areas. Runoff reduction techniques reduce flood damage potential at the source by decreasing the amount of runoff from a developed site. This is accomplished by reducing on-site drainage, minimizing impervious surfaces, and implementing natural drainage measures.

5.5.1.1 Floodplain Zoning

Zoning ordinances regulate development by dividing the community into zones or districts and setting development criteria for each district. Zoning can prevent increased flood risks by controlling where new development or redevelopment occur. Zoning ordinances can establish separate zoning districts or overlay zoning. Separate districts designate floodplains as a special zoning districts that only allow development that is not susceptible to flood damage, such as some recreational uses, conservation, or agriculture. Overlay zoning adds special development limitations to the underlying zoning (i.e., residential, commercial, industrial, etc.) in areas subject to flooding. Special development limitations can include local, state or federal building requirements related to flood safety and can restrict the types of development occurring in overlay zoning districts or require additional permitting or oversight in these districts.

5.5.1.2 Floodplain Regulations

Regulations that restrict construction in floodplains are usually found in one or more of the following documents: subdivision ordinances, building codes, and separate stand-alone floodplain ordinances such as the Lake County WDO, Cook County WMO, and Wisconsin's local (municipal) floodplain ordinances. If the zoning for a site allows a structure to be built, then the applicable subdivision and building regulations impose construction standards to protect buildings from flood damage and will require compensatory storage to prevent the development from aggravating the flooding problem. Subdivision ordinances specifically govern how land will be subdivided into lots and regulate standards for infrastructure provided by the developer, including roads, sidewalks, utilities, stormwater detention, storm sewers, and drainage ways. Both building codes and the countywide and local ordinances establish flood protection standards for all structures. Individual communities can adopt floodplain regulations that are more restrictive than the minimum WDO, WMO, or NFIP requirements.

All development in Lake County floodplains requires a WDO permit. The WDO restricts development in mapped floodways and limits development in the 100-year floodplain. Lowest floor elevations (including basements) must be a minimum of 2 feet above the BFE for residential structures constructed in the floodplain. Nonresidential structures must also meet these lowest floor elevation requirements or be dry-flood-proofed to 2 feet above the BFE, and compensatory storage must be provided for water storage lost due to floodplain fill at a ratio of 1.2:1 for riverine floodplain and 1:1 for depressional floodplain. All Lake County communities must adhere to the standards required in the WDO as minimum development requirements for their community. Individual communities can adopt floodplain regulations that are more restrictive than the minimum requirements of the WDO. Since the WDO applies to both new developments and redevelopment projects, the WDO flood prevention and water quality provisions have the potential to improve conditions in redeveloped areas.

Cook County communities must adhere to the standards required in the WMO as minimum development requirements for their community. All development in a **Flood Protection Area** requires a Watershed Management Permit. The WMO restricts development in mapped floodways and limits development in the 100-year floodplain. Compensatory storage must be provided for floodplain storage lost due to floodplain fill at a ratio of 1.1:1.

FLOOD PROTECTION AREA: Regulatory floodplains, regulatory floodways, riparian environments, wetlands, and wetland buffers.

Wisconsin floodplain development is managed through local floodplain ordinances. All local floodplain ordinances must meet the minimum requirements of the NFIP. Floodplain ordinances are adopted at the local level in the same manner as any other ordinance. Enforcement of the floodplain regulations is the responsibility of local officials. For most communities, the responsible official is the Zoning Administrator. Every community that participates in the NFIP must have the FIRMs and FIS available for the public. Communities that do not adequately enforce the local floodplain ordinance can be penalized by FEMA through probation or suspension from the NFIP. Violations of the minimum requirements of ch. NR 116 can result in enforcement action by the WI DNR. Development and redevelopment in Wisconsin within the entire Des Plaines River Watershed (including outside of the DPR planning area) can affect stormwater drainage coming into Lake & Cook County, Illinois. See section 4.1 for more information about the effects of impervious surfaces and development to downstream sites.

5.5.1.3 Floodplain Property Acquisition

Floodplain property acquisition is one of the flood mitigation tools used by Lake County to abate the potential increase in flood risk, including the implementation of the Lake County WDO and Comprehensive Planning to protect against new flood damages. Floodplain property acquisitions ensure that buildings in a flood-prone area will cease to be subject to damage. Acquisitions are usually undertaken by a government agency, using a combination of state, local and federal (FEMA) cost-share funding to reduce the financial impact to the property owner. Properties acquired are cleared of buildings and structures and returned to public open-space areas such as parks, greenways, recreational trails, river access points, and wildlife habitat corridors. The resulting open space from acquisitions and demolition of property in the floodplain and flood-prone areas can also be used for stormwater management and/or serve as a buffer to protect against damage from increased flooding and stormwater runoff. Floodplain property acquisitions provide the best long-term flood protection measure and coverts problem areas into a community asset.

5.5.1.4 Runoff Reduction

Runoff reduction can be accomplished utilizing techniques that improve infiltration, site design, or stormwater regulation. Improved infiltration techniques include natural landscaping with deep-rooted plants, permeable pavers or porous pavement, and bio infiltration devices. Improved site design techniques include preserving natural drainage systems, impervious surface reduction, alternative streetscapes that reduce and infiltrate runoff, alternative parking lot designs, and green roofs.

Stormwater regulations can also reduce the quantity of runoff from developments. Due to a trend of increasing Runoff Volume Reduction (RVR) requirements of the Illinois EPA, both the WDO and WMO have adopted both qualitative and quantitative RVR provisions. The WDO is a credit-based system designed to capture a percent of the annual rainfall event to the maximum extent practicable. The WMO is tied to the first inch of runoff from the impervious area of a development site, defined as the control volume. These measures will decrease the volume and flow rate of stormwater that is discharged off a site thereby preventing future flood damage.

NOTEWORTHY – LAKE COUNTY WDO REGULATIONS

The Lake County WDO defines adequate downstream stormwater capacity as a system that can be shown to "store or convey up to and including the 100-year stormwater runoff without increasing damage to adjoining properties or to a point downstream known to the Enforcement Officer to be a restriction causing significant backwater."

5.5.2 REMEDIAL MEASURES

Flooding problems are reduced or eliminated by both structural and non-structural means. Structural flood mitigation measures focus on reducing the probability of flooding (i.e., removing or reducing the ability of flood waters to reach a property or structure) while nonstructural flood mitigation measures focus on reducing the consequences of flooding (i.e., flood-proofing a structure located in the floodplain.)

Structural flood mitigation measures include improving overland flow routes, increasing storm sewer capacity, and implementing other conveyance-related drainage improvements. Improved conveyance practices should be designed to ensure that adjacent and downstream properties and waterways will not be negatively impacted by increased flows. More complex structural flood mitigation measures may involve the construction of structures such as reservoirs, levees, and floodwalls to confine or redelineate the flooding limits. Nonstructural mitigation alternatives include practices such as acquisition or relocation of flood-prone structures, flood-proofing, or implementation of ordinances and codes. Several common types of structural and nonstructural mitigation measures are described below.

5.5.2.1 Structural Flood Mitigation Measures

Structural measures control or contain water and are designed to prevent floodwaters from reaching buildings or property. Structural alternatives include reservoirs, levees and floodwalls, diversions, stream channel conveyance improvements, and drainage and storm sewer improvements. Large or complex structural flood mitigation alternative projects are often costly to implement, so local agencies and private land owners often request help from state or federal agencies such as the IDNR-OWR, the USACE, and the USDA NRCS.

Structural flood control is generally the most expensive type of mitigation measure because of installation time and costs, maintenance requirements, and environmental impacts. Thorough assessment of alternatives prior to selecting a structural flood control measure can minimize costs and impacts. The advantages and

disadvantages of structural flood control techniques are discussed in Table 5-4 (Association of State Floodplain Managers, 2007).

Table 5-4: Benefits and drawbacks to structural flood control measures

ADVANTAGES	SHORTCOMINGS
May provide the greatest amount of protection for land area used.	They disturb the land and disrupt natural water flow, often destroying wildlife habitat.
Because of land limitations, may be the only practical solution in some circumstances.	They require regular maintenance, which if neglected, can have disastrous consequences.
Can incorporate other benefits into structural project design such as water supply and recreational uses.	They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
Regional detention may be more cost efficient and effective than requiring numerous small detention basins.	They can create a false sense of security, as people protected by a project often believe the structure eliminates any flooding risk.
	Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.
	They can create new flooding problems if improperly designed or built.
	Levees and reservoirs can significantly degrade riparian and aquatic habitat and water quality.

5.5.2.1.1 Reservoirs and Regional Detention

Reservoirs and regional detention are large structures that control flooding by holding water behind dams or in storage basins. After a flood peaks, water is released or pumped out slowly at a rate that is equal to or less than the capacity of the downstream channel. Reservoirs that maintain a normal water level may be used for water supply or to provide water-based recreational benefits. Additionally, wet or dry detention basins can serve multiple uses by doubling as parks or other open space uses.

Figure 5-12: Flood control reservoir

The amount of land needed, coupled with the expense of construction, management, and maintenance, limit the use of reservoirs. Additionally, reservoirs may fail to prevent floods that exceed their design levels, eliminate the natural and beneficial functions of the floodplain, and negatively impact water quality and aquatic habitat. Figure 5-12 shows an example of a flood control reservoir.

5.5.2.1.2 Detention Basins

Some localized flooding problems can be minimized by enlarging or adjusting flows through existing detention basins or by constructing new basins. Detention basins are effective at flood reduction in watersheds of up to 30 square miles. While regional detention is generally more cost-effective than constructing numerous small detention facilities, in some cases there may not be sufficient land available for regional detention. Smaller detention basins may be the most cost-effective solution for localized flood problems. Slowing release rates from new and existing detention basins can reduce the downstream flood risk and impacts of short duration-high-velocity events on the stream channel. Retrofitting older detention basins to improve functionality or

storage volume or constructing new detention basins are often viable flood mitigation alternatives, especially for smaller tributary areas (less than 100 acres).

5.5.2.1.3 Levees and Floodwalls

Earthen levees or concrete floodwalls are constructed between rivers and at-risk properties to mitigate overbank flooding. Levees and floodwalls confine water to the stream channel by artificially raising the banks (Figure 5-13). Regulatory levees must meet very strict and onerous design and permitting requirements. A serious concern with levees is that they frequently offer a false sense of security. In some cases, land use behind a levee can change to high intensity, high-value occupation under the false assumption that all future floods will be controlled by the levee, when in reality, large floods may overtop or breach the levee creating more flood damage than would have occurred.

Figure 5-13: Floodwall example

Levees and floodwalls have other limitations. Placed along the river or stream edge, they degrade riparian and aquatic habitat. Levees are expensive to construct, require considerable land and maintenance, and are more likely to push floodwater onto other properties upstream or downstream. In some cases, it may be necessary to include expensive and noisy pumping operations for internal drainage. Levees also act as barriers to river access, block views, and disrupt local drainage patterns.

5.5.2.1.4 Barriers

Constructing barriers such as nonregulatory low floodwalls and berms around an individual property can keep floodwaters from reaching the structure. Berms are commonly used in areas subject to shallow flooding; see Figure 5-14 for a diagram of a backyard berm. Not considered engineered structures, berms are made by regrading or filling an area. Low floodwalls may be built around stairwells to protect the basements and lower floors of structures. By keeping water away from the structure walls, the problems of seepage and hydrostatic pressure are reduced. Barriers are commonly referred to as nonregulatory since a barrier typically cannot be used to remove a structure or property from the Regulatory Floodplain.

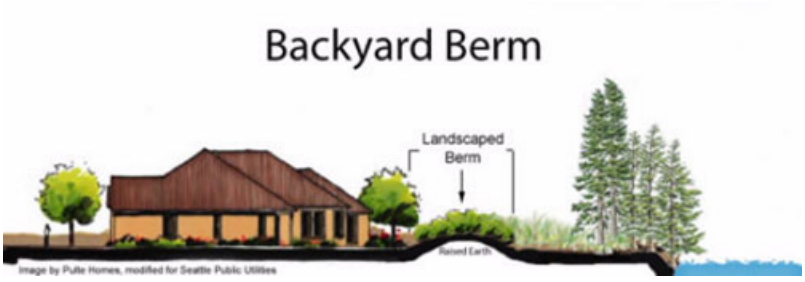


Figure 5-14: Example of a backyard berm
Diagram Courtesy of Seattle Public Utilities (Seattle.gov)

As with levees, the use of low floodwalls and berms must also include a plan to install drainpipes or sump pumps to handle leaks and water seepage through or under the barrier, and to remove water that may collect within the barrier. Care must be taken in the design, location, and installation of low floodwalls or berms to ensure that flood waters are not inadvertently pushed onto adjacent properties.

5.5.2.1.5 Improved Channel Conveyance

Channel conveyance improvements alter channels to increase drainage rate and volume. Improvements include making channels wider, deeper, smoother, or straighter. Some channels in urban areas have also been lined with concrete or put in underground pipes. Channel conveyance improvements such as channelization and dredging are environmentally destructive with respect to habitat and water quality and are frequently unsustainable.

Straightening, deepening, or widening a stream or river channel, commonly referred to as channelization, has been traditionally utilized to reduce riverine overbank flooding problems. Channelized rivers and streams drain water faster from areas adjacent to and upstream of the channel but can increase or create new flooding problems downstream as larger volumes of water are transported at a faster rate. Channelized waterways tend to be less stable and more susceptible to streambank erosion; therefore, the need for periodic reconstruction, streambank stabilization, and silt removal becomes cyclic, making stream and channel maintenance extremely expensive.

Dredging is another type of conveyance improvement; however, it is frequently cost prohibitive due to dredged material disposal costs. Additionally, dredged areas typically fill in relatively quickly if upstream erosion is not reduced.

5.5.2.1.6 Drainage Improvements

Drainage improvements can include open ditches, swales, or storm sewers. Man-made ditches and storm sewers help drain areas where surface drainage is inadequate or where underground drainageways may be safer or more practical. Drainage and storm sewer improvements can be a quick and relatively cost-effective way to safely convey runoff for a wide range of smaller storm events. Storm sewer improvements may include the installation of new sewer lines or inlets, modifications to existing sewer inlets, installation of larger pipes, construction of better defined or more effective overland flow routes, and the use of mechanical measures, such as pumps or backflow preventers. Since drainage improvements typically result in runoff being more efficiently conveyed to a downstream location, these mitigation measures should only be used when the receiving waterway has sufficient capacity to handle the additional volume and flow of water. To prevent cumulative downstream flood impacts, drainage improvements are often combined with other storage volume creation or runoff reduction measures.

Performing regular maintenance on stormwater infrastructure for drainage improvements, such as channel clearing, dredging, storm sewer cleaning, or clogged debris removal, can be the most cost-effective measure in reducing future larger, more expensive infrastructure problems. “All stormwater management systems, whether gray or green, require maintenance. Appropriate operation and maintenance activities ensure that green (and gray) infrastructure will continue to function properly and yield expected water quality and environmental benefits, protect public safety, meet legal standards, and protect communities’ financial investment.” (U.S. Environmental Protection Agency - Office of Water, 2013).

5.5.2.2 Nonstructural Flood Mitigation Measures

Flooding problems can also be addressed using nonstructural methods. Nonstructural flood control techniques include flood-proofing, and elevation or relocation of a structure. More communities and county-wide agencies could get involved in nonstructural programs such as acquisition by helping to identify repetitively

flooded properties. Runoff reduction techniques may also be used by individual homeowners or neighborhood associations in retrofit projects to lessen flooding problems.

5.5.2.2.1 Buyouts and Acquisitions

Acquisition ensures that structures in a flood-prone area will cease to be subject to flood damage. The major difference is that acquisition is undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to an appropriate permanent public use such as a park. Acquiring and clearing structures from the floodplain is the best long-term flood protection measure, one which converts a problem area into a community asset that can provide environmental and recreational benefits. To achieve maximum benefits from this type of public investment, acquisition and land reuse should be a component of a community's redevelopment plan, and be incorporated as a strategy in park, greenways, and capital improvement plans. See Figure 5-15 for before and after photos of the Gurnee Grade School (Gurnee, Illinois) flood buyout location.

Figure 5-15: 2013 Gurnee Grade School flood mitigation site during flood events
Before buyout looking south (top); after buyout and school removed looking north (bottom)
"X" is the same spot on the site location

5.5.2.2.2 Structure Relocation

Moving a structure to higher ground is an extremely effective way to protect it from flooding. In many cases structure relocation is cost prohibitive because of the size, condition, and type of structure and the cost of acquiring a relocation site. Structure relocation can be cost effective where flooding is relatively severe or frequent. Structure relocations have high initial costs, but they may be more cost-efficient than paying for repetitive flood damages or high flood insurance premiums. Relocation is typically the responsibility of the structure owner; however, government-sponsored loans or grants may be available for cost-share.

5.5.2.2.3 Structure Elevation

Raising a structure above the floodplain elevation is the best way to protect a structure that cannot be removed from the floodplain. The structure is elevated on a foundation or piers so that the lowest floor is above the BFE. When flooding occurs, water levels stay below the main floor, causing minimal damage to the structure or its contents. Raising a structure above the flood level is less expensive than moving it and can be less disruptive to a neighborhood. Commonly practiced in flood-prone areas nationwide, this protection technique is required by law for new and substantially damaged residences located in a 100-year floodplain.

Although flood damages can be reduced or eliminated through structure elevation, remaining in a flood-prone location has some limitations. While the structure itself is sufficiently elevated to be protected from flood damage, flooding may isolate the building and make it inaccessible. Flood waters surrounding the structure can also result in a loss of utility service or septic use, making the structure uninhabitable. Additionally, pollutant contamination in flood waters may present health and safety concerns.

5.5.2.2.4 Flood Proofing

Flood-proofing measures include dry flood-proofing or wet flood-proofing. In areas where there is shallow flooding, dry flood-proofing measures can be used to prevent water from entering at-risk structures. Dry flood-proofing is a combination of practices that are used to make a building watertight, so flood waters do not enter the structure, including the basement or crawl space. Various FEMA and the USACE publications highlight the range of practices that can be used to dry flood-proof a structure. Figure 5-16 shows an example of dry flood proofing practices.

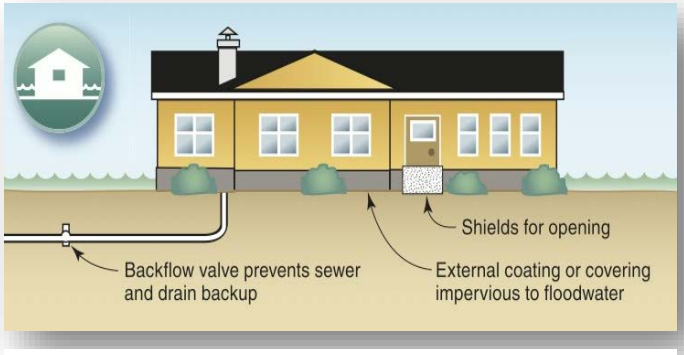


Figure 5-16: Dry flood-proofing

As defined by FEMA, wet flood-proofing includes permanent or contingent measures applied to a structure or its contents that prevent or provide resistance to damage from flooding while allowing flood waters to enter the structure or area. Wet flood-proofing allows water to enter the structure, but minimizes the damage to the structure and its contents. Wet flood-proofing includes some of the least expensive and easiest mitigation practices to install. Generally, this includes properly anchoring the structure, using flood resistant materials below the BFE, protecting mechanical and utility equipment, and using openings or breakaway walls. Several low-cost steps can be taken to wet floodproof a structure. For example, simply moving furniture and electrical appliances out of the flood-prone portions of the structure can prevent thousands of dollars in damages. One strong advantage of wet flood-proofing is that flood damage can be reduced through some common sense, low or no-cost practices. Figure 5-17 shows an example of wet flood proofing practices.

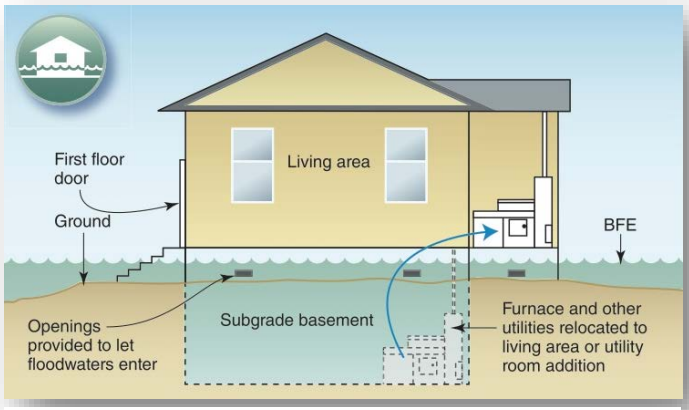


Figure 5-17: Wet flood-proofing

5.5.2.2.5 Runoff Reduction

Examples of runoff reduction techniques include the use of natural landscaping, permeable pavement, rain gardens and green roofs. Implementing these runoff reduction retrofits is generally the responsibility of individual property owners. These techniques typically do not have a substantial impact when applied on a single site; however, the cumulative effect of runoff reduction techniques at numerous sites throughout the watershed can result in substantial flood reduction benefits. The large scale of individual implementation required to achieve measurable flood reduction benefits makes this flood mitigation measure a long-term complementary mitigation measure rather than an immediate flood mitigation alternative.

5.5.3 All-Natural Hazards Mitigation Plan Recommendations

The DPR planning area is subject to natural hazards that potentially threaten life and property. Flooding, severe summer and winter storms, extreme cold and heat, and tornadoes are the most significant natural hazards that affect Lake County (including the DPR planning area).

To prepare for and mitigate the effects of natural hazards, counties within the DPR watershed have developed hazard mitigation plans. FEMA, through the Disaster Mitigation Act of 2000 (DMA 2000) and the Stafford Act, requires that each community develop and adopt a FEMA-approved All-Natural Hazards Mitigation Plan (ANHMP) in order to be eligible for hazard mitigation grant funds. DMA 2000 and the Stafford Act require that the mitigation ANHMP be updated and readopted every five years to maintain grant eligibility. An ANHMP assesses the natural hazards that affect counties, sets mitigation goals, considers mitigation efforts currently being implemented, evaluates additional mitigation strategies, and recommends mitigation actions to be implemented over the next five years. The mitigation actions are designed to utilize both public and private sectors to protect the people and assets of the counties. Implementation of all action items is contingent on the availability of staff and funding.

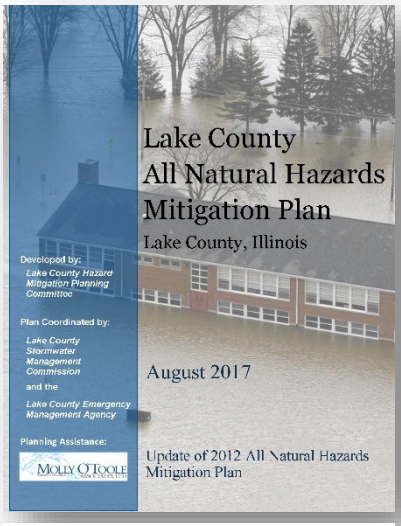


Figure 5-18: 2017 ANHMP

Lake County and the hazard mitigation planning committee (HMPC) developed and adopted the Lake County Countywide ANHMP in 2006 as a multi-jurisdictional plan; the plan was updated in 2012 and 2017 (see Figure 5-18).The 2017 update to the ANHMP was developed by the Lake County HMPC as a multi-jurisdictional ANHMP to meet federal mitigation planning requirements. The 2017 ANHMP is adopted by resolution by the County and each participating municipality. The 2017 ANHMP will be implemented and maintained through both countywide and individual initiatives, as funding and resources become available.

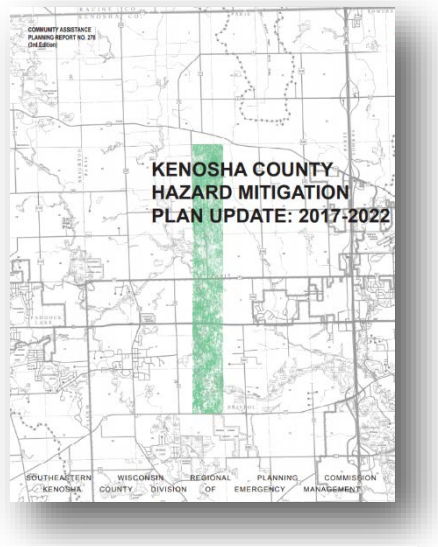


Figure 5-19: Kenosha County ANHMP

SEWRPC and the Kenosha County Division of Emergency Management cooperatively developed the Kenosha County ANHMP in 2005 (Figure 5-19); the plan was updated in 2009 and 2017. The plan follows the guidelines and requirements of the Wisconsin Department of Military Affairs, Division of Emergency Management, and FEMA. The plan was written with the guidance of the Kenosha County Hazard Mitigation Task Force. The plan has been adopted and approved by Kenosha County and the municipalities within the county.

The Cook County Department of Homeland Security and Emergency Management developed the Cook County Multi-Jurisdictional Hazard Mitigation Plan (Figure 5-20) in 2014 with guidance from a steering committee comprised of planning partners and local stakeholders. The plan was developed under a grant from the IEMA in coordination with 115 planning partners and is the largest multijurisdictional all hazards mitigation plan ever completed in the United States. That plan incorporated existing local and state plans, studies, reports, and technical information.

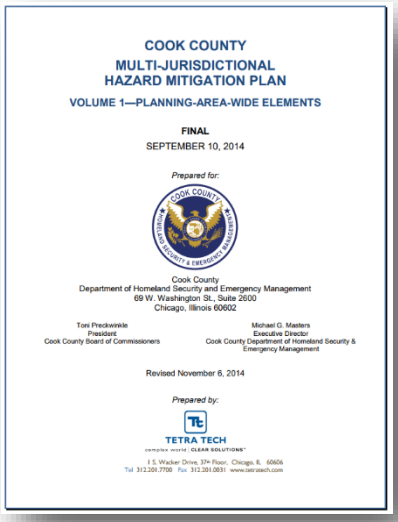

COOK COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN
VOLUME 1—PLANNING-AREA-WIDE ELEMENTS
FINAL
SEPTEMBER 10, 2014
Prepared for:
Cook County
Department of Homeland Security and Emergency Management
69 W. Washington St., Suite 2600
Chicago, Illinois 60602
Toni Preckwinkle
President
Cook County Board of Commissioners
Michael G. Masters
Executive Director
Cook County Department of Homeland Security & Emergency Management
Revised November 6, 2014
Prepared by:
TETRA TECH

Figure 5-20: Cook County ANHMP

5.6 EXISTING AND POTENTIAL REGIONAL FLOOD STORAGE

5.6.1 EXISTING FLOOD STORAGE

Existing flood storage is defined as depressional areas and floodplains that are presently storing, or potentially could store, stormwater runoff to decrease flooding in the watershed. Besides flood protection, flood storage areas can be used for the mitigation of wetland losses (wetland restoration), channel protection, and water quality protection. Flooding is a common problem in the DPR planning area. Creating or enhancing storage would provide many benefits including reducing runoff to streams and minimizing channel erosion. Storage areas that are created through wetland restoration would improve water quality and habitat and increase groundwater recharge. The criteria used to identify existing storage locations are:

Figure 5-21: Wetland with high flood storage

- Include all mapped FEMA 100-year floodplains (SFHA), wetlands with high flood storage function (as identified in the WRAPP), detention basins, and open water areas (Example Figure 5-21).
- Minimum storage size of 1 acre-foot on partially open or open parcels.
- Includes stream corridors.

The existing flood storage locations are identified in Figure 5-22**.** These locations range from 1-5,084 acre-feet of storage with a median storage of 4 acre-feet. The total of 1,931 storage areas encompass 24,219 acres (16% of the DPR planning area) with an estimated potential to store a total of 50,348 acre-feet of water.

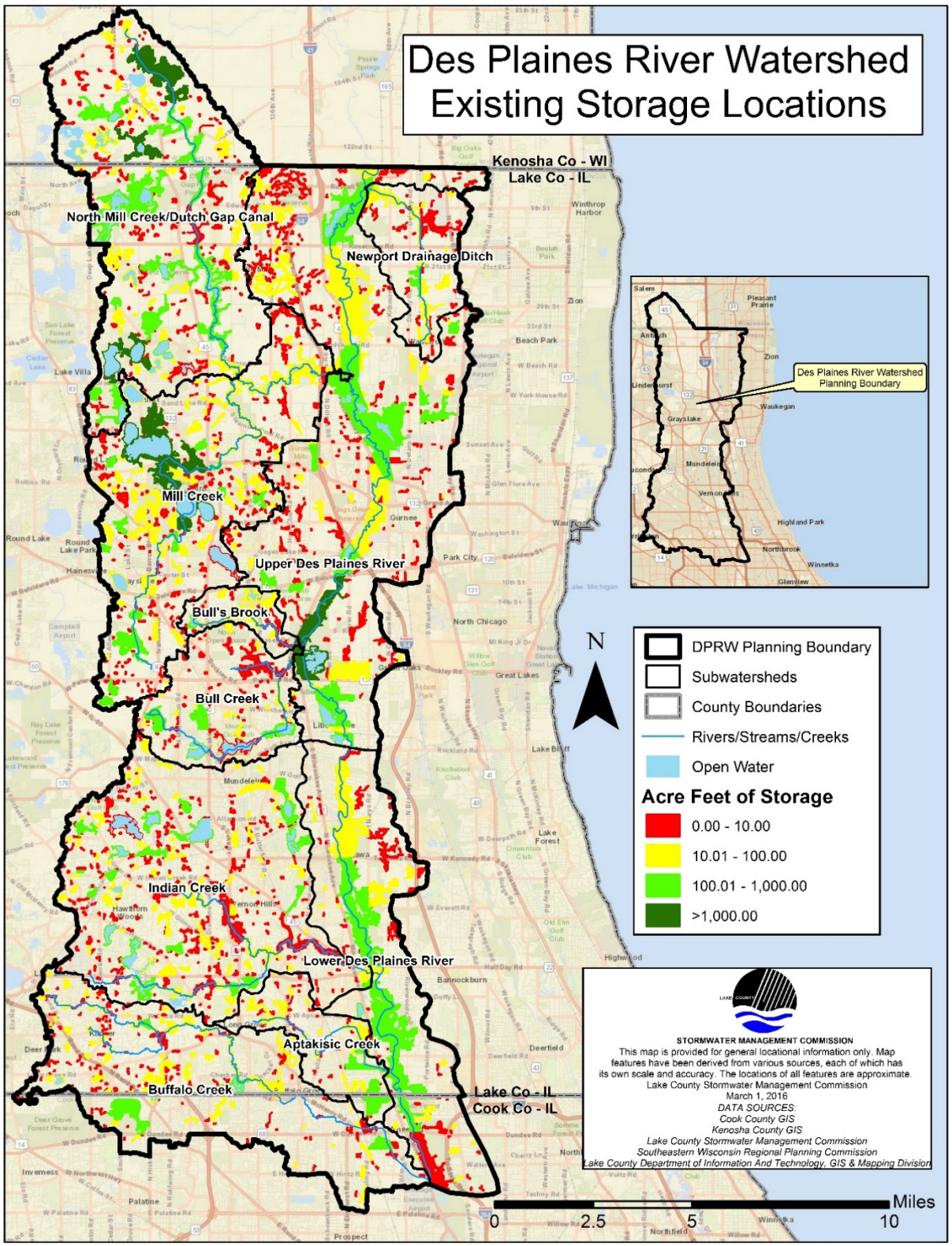


Figure 5-22: Des Plaines River Watershed Existing regional flood storage

5.6.2 Regional Storage Analysis

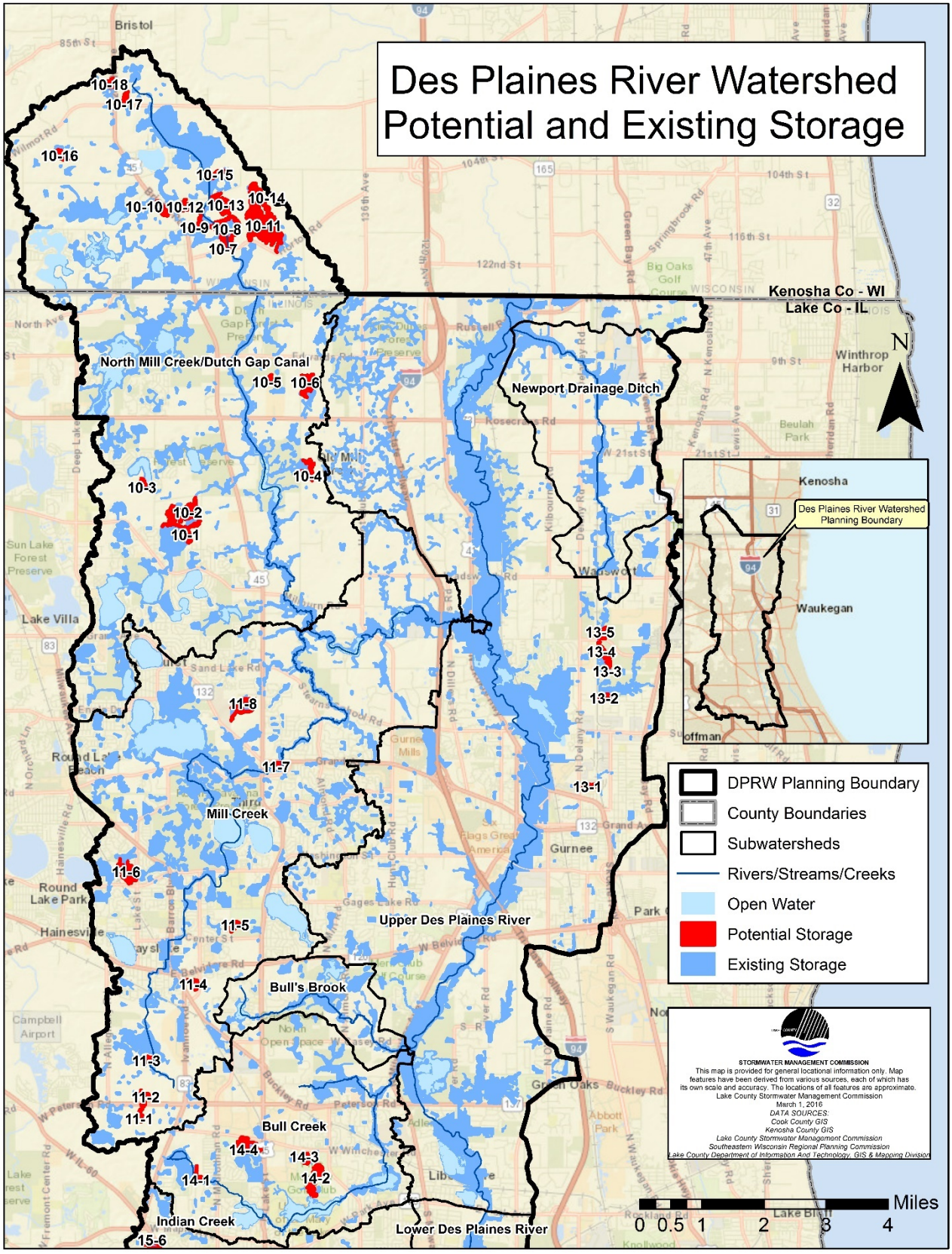
A GIS analysis of the watershed was performed to identify potential regional storage locations. Regional storage locations are depressional areas in the watershed that are within open space land use and are not currently classified as large lakes or large wetland complexes. Identified regional storage locations met the following criteria:

- Locations greater than 5 acres in size
- At least 100 acres of tributary drainage area
- Excludes existing flood storage locations
- Excludes building and transportation footprints on open and partially open parcels
- Not an existing WRAPP wetland

Sites meeting the above criteria were visually screened to eliminate artifacts of the GIS analysis and locations where site characteristics would impede creation of additional storage. Fifty-three sites with a total potential storage of 1,485 acre-feet of storage were identified based on the regional storage criteria defined above and additional screening (Table 5-5 and Figure 5-23). Chapter 6 further details implementation actions regarding the identified potential regional storage locations.

Table 5-5: Potential Regional Flood Storage Sites

SITE ID	SUBWATERSHED	ESTIMATED POTENTIAL STORAGE (ACRE-FEET)	SITE ID	SUBWATERSHED	ESTIMATED POTENTIAL STORAGE (ACRE-FEET)
10-1	North Mill Creek	19.80	13-2	Upper Des Plaines River	48.91
10-2	North Mill Creek	100.05	13-3	Upper Des Plaines River	19.81
10-3	North Mill Creek	17.56	13-4	Upper Des Plaines River	38.66
10-4	North Mill Creek	8.28	13-5	Upper Des Plaines River	27.77
10-5	North Mill Creek	3.42	14-1	Bull Creek	17.39
10-6	North Mill Creek	45.28	14-2	Bull Creek	44.62
10-7	North Mill Creek	9.47	14-3	Bull Creek	13.54
10-8	North Mill Creek	19.55	14-4	Bull Creek	123.41
10-9	North Mill Creek	8.80	15-1	Indian Creek	16.14
10-10	North Mill Creek	6.09	15-2	Indian Creek	7.43
10-11	North Mill Creek	170.65	15-3	Indian Creek	90.01
10-12	North Mill Creek	9.98	15-4	Indian Creek	19.09
10-13	North Mill Creek	39.68	15-5	Indian Creek	68.90
10-14	North Mill Creek	22.27	15-6	Indian Creek	42.39
10-15	North Mill Creek	4.91	16-1	Lower Des Plaines River	42.61
10-16	North Mill Creek	7.33	17-1	Buffalo Creek	24.13
10-17	North Mill Creek	19.24	17-2	Buffalo Creek	11.01
10-18	North Mill Creek	7.10	17-3	Buffalo Creek	6.16
11-1	Mill Creek	18.57	17-4	Buffalo Creek	13.30
11-2	Mill Creek	13.90	17-5	Buffalo Creek	6.27
11-3	Mill Creek	5.65	18-1	Aptakisic Creek	21.55
11-4	Mill Creek	12.18	18-2	Aptakisic Creek	42.42
11-5	Mill Creek	20.94	18-3	Aptakisic Creek	10.13
11-6	Mill Creek	55.75	18-4	Aptakisic Creek	6.47
11-7	Mill Creek	23.01	18-5	Aptakisic Creek	11.55
11-8	Mill Creek	22.98	18-6	Aptakisic Creek	6.84
13-1	Upper Des Plaines River	12.01	**TOTAL ESTIMATED POTENTIAL STORAGE**		**1,484.96**


Des Plaines River Watershed
Potential and Existing Storage
Bristol
Kenosha Co - WI
Lake Co - IL
Winthrop Harbor
N
North Mill Creek/Dutch Gap Canal
Newport Drainage Ditch
Kenosha
Des Plaines River Watershed Planning Boundary
Waukegan
Lake Villa
Mill Creek
Gurnee
Upper Des Plaines River
Bull's Brook
Bull Creek
Indian Creek
Lower Des Plaines River
10-18
10-17
10-16
10-15
10-14
10-13
10-12
10-10
10-9
10-8
10-11
10-7
10-6
10-5
10-4
10-3
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11-8
11-7
11-6
11-5
11-4
11-3
11-2
11-1
13-5
13-4
13-3
13-2
13-1
14-4
14-3
14-2
14-1
15-6
DPRW Planning Boundary
County Boundaries
Subwatersheds
Rivers/Streams/Creeks
Open Water
Potential Storage
Existing Storage
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
March 1, 2016
DATA SOURCES:
Cook County GIS
Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
Miles
0 0.5 1 2 3 4

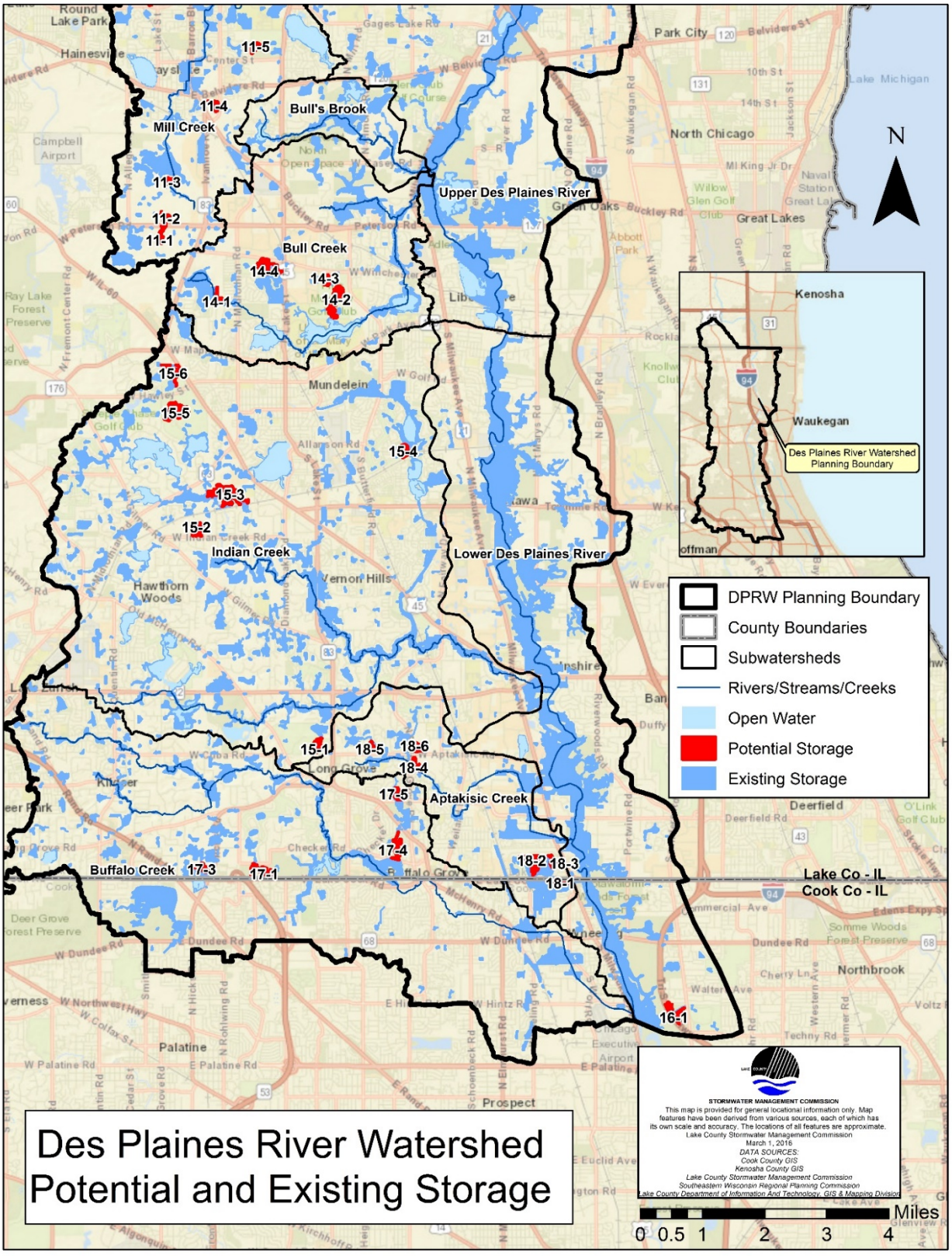

Figure 5-23: Des Plaines River Watershed potential and existing regional flood storage

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 6

AG - Agricultural Producers
APMP – Aquatic Plant Management Plan
BACT - Barrington Area Conservation Trust
BC-BB - Bull Creek- Bulls Brook
BMP – Best Management Practices
CBL - Corporation and Business Landowners
CCDPH - Cook County Department of Public Health
CCPW - Cook County Public Works
CL - Conserve Lake County
CLC – College of Lake County
CMAP - Chicago Metropolitan Agency for Planning
DD - Drainage District
DH - Developers and Homebuilders
DOT - Departments/Divisions of Transportation
DPR planning area – Des Plaines River Watershed Planning Area
DRWW - Des Plaines River Watershed Workgroup
EIG - Environmental Interest Groups
EM - State Emergency Management Agencies
EO - Elected Officials
EQ - Equestrian Facilities
EXT - County Extension Services
FB - Farm Bureaus
FEMA - Federal Emergency Management Agency
FPD - Forest Preserve Districts
GI – Green Infrastructure
GIS – Geographic Information System
HOA - Homeowners Associations
IDNR - Illinois Department of Natural Resources
I-LAST – Illinois – Livable and Sustainable Transportation Rating System
IL/WI DOA - Illinois and Wisconsin Departments of Agriculture
Illinois EPA - Illinois Environmental Protection Agency
ISD - LC Health Department Individual Sewage Disposal Program
ISGS - Illinois State Geological Survey
ISWS - Illinois State Water Survey
KRLT - Seno Kenosha/Racine Land Trust Conservancy
LA - Lake Associations
LCHD - Lake County Health Department
LCPW - Lake County Public Works Department
M - Municipalities
MS4 – Municipal Separate Storm Sewer Systems
MWRD - Metropolitan Water Reclamation District
N/L - Nursery and Landscaping Business
NRCS - Natural Resources Conservation Service
OL - Open Lands Project
PAH – Polycyclic Aromatic Hydrocarbons
PB&D - County Planning, Building, and Development (Includes Cook, Kenosha, and Lake counties)
PC - Snow Removal and Deicing Private Contractors and Consultants
PD - Parks and Recreation Districts
POA - Property Owners Associations
POTW - Publicly Owned Treatment WorkS
PR - Private Residential
RL - Riparian Landowner

SEWRPC - Southeastern Wisconsin Regional Planning Commission
SI - Schools and Institutions
SMC - Lake County Stormwater Management Commission
SWALCO - Solid Waste Agency of Lake County
SWCD - Soil and Water Conservation District
T - Townships
TMDL – Total Maximum Daily Load
TSS – Total Suspended Solids
UDO – Unified Development Ordinance
USACE - U.S. Army Corps of Engineers
USFWS - U.S. Fish and Wildlife Service
USGS - United States Geological Survey
VLM - Volunteer Lake Monitoring
WDO – Watershed Development Ordinance
WI – Wisconsin
WI DNR - Wisconsin Department of Natural Resources
WPC - Watershed Planning Committee(s)
WRAPP – Wetlands Restoration and Preservation Plan
WWTP - Wastewater Treatment Plants

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6 PRIORITIZED ACTION PLAN SUMMARY

A variety of BMPs and programs are discussed in this plan as potential options for the mitigation of pollutant issues in the DPR planning area. In this chapter, specific ***recommendations*** are made to meet the goals of the watershed plan and previously approved (sub)watershed-based plans, including the identification of specific locations for BMPs in the DPR planning area. This chapter presents specific recommended action items developed jointly by the watershed planning committee, SMC, DRWW and the consultant planning team to meet the goals of this watershed-based plan. Due to the size of the planning area and sheer number of site-specific action recommendations developed during the course of the planning process, readers of the plan are encouraged to use the ***online mapping application*** (https://tinyurl.com/ycthwx9x). The individual recommendations are also listed in tables, organized by jurisdiction, in Appendix N. Maps showing the action recommendations are included in Appendix N, but users are encouraged to use the online mapping application. The critical implementation partners for the watershed are identified in Section 6.1.

NOTEWORTHY – ACTION PLAN RECOMMENDATIONS

The action plan recommendations in this Prioritized Action Plan Summary are to be interpreted as guidance recommendations (projects) for watershed stakeholders and not a regulatory document.

There are two primary types of action plan recommendations presented in this chapter: 1) programmatic actions and 2) site-specific project actions including critical area (pollutant load "hotspot") actions. The action plan recommendations identify specific locations for projects and activities recommended for implementation at the watershed-scale.

1. "Programmatic Actions" represent program, policy, regulatory, and project actions that are applicable throughout the watershed. The actions are based on achieving the goals and objectives of the watershed-based plan as outlined in **Chapter 2**.
2. "Site-Specific Actions" address site-specific project opportunities or issues that have been identified throughout the DPR planning area. Site-specific projects were identified through the stream and detention basin inventories, local stakeholders and agency staff, DRWW and the consultant team. Some of the site-specific practices were identified using existing map data and have not been field verified; however, they do represent actual locations where recommended BMPs are applicable. Overall, these site-specific actions are the result of watershed assessment activities, a detailed analysis of existing watershed data, a windshield survey of the DPR planning area and stakeholder input.

SITE-SPECIFIC ACTION PLAN ONLINE MAPPING APPLICATION

An online mapping application was developed for stakeholders to view the action recommendations from this plan. Because the planning area covers 235 square miles and there are thousands of individual action recommendations across dozens of jurisdictions, it is likely easier for plan users to navigate to their individual areas of interest or browse areas they are familiar with for certain types of project recommendations. Printable maps are included in Appendix N, but due to the scale of the planning area, most users will likely find more utility in the online application, which can be accessed at: https://tinyurl.com/ycthwx9x or via the DesPlaines River Watershed-Based Plan page on the Lake County Stormwater Management Commission website (www.lakecountyil.gov/stormwater).

a. "Critical Area Actions" identify critical catchments, streambanks and lake shorelines based on the "Pollutant Load Hotspot Analysis" to focus actions. These areas include hotspot catchments identified in **Chapter 4**. Actions implemented in these critical areas will provide the greatest value and benefit to the watershed.

For each of the seven watershed goals identified in **Chapter 2**, there is an action table that describes each recommended action including its 1) priority, 2) cost estimate (if applicable), 3) lead partners and support partners (if applicable) and 4) recommended implementation timeframe.

1. Priority was assigned to each of the recommended actions and classified as H (high), M (medium) or L (low). Priority was based on multiple factors including lead partners, land ownership, cost, and technical requirements based on circumstances and conditions observed at the time the plan was written. These circumstances and conditions will likely change over time resulting in changes to the priority of projects. This watershed-based plan is considered a living document that can be updated and adapted as conditions and priorities change.
2. Cost estimates are provided only for those watershed improvement actions that involve remedial projects, such as planting native vegetation, retrofitting detention basins, etc. Cost estimates are not provided for preventative measures such as education and regulatory action. Cost estimates should not be considered price quotes, but used as a way to compare the relative costs of proposed treatments. Furthermore, BMP implementation projects vary drastically by specific technique employed, size of area, access to location, property values, and other factors.
3. Lead and support partners are those organizations or agencies that have the greatest potential to implement each recommended action.
4. Timeframe refers to the period of time in which the recommended action could be implemented. Timeframe is classified into three categories including:
    - S (Short = 1-5 years)
    - M (Medium = 6-10 years)
    - L (Long = 10+ years)

Chapter 7 outlines an implementation and evaluation strategy for the action plan, and **Chapter 8** identifies outreach and education strategies and tools that will provide watershed stakeholders with the knowledge and skills necessary to implement the watershed-based plan.

6.1 IMPLEMENTATION PARTNERS

Throughout the prioritized action plan tables and narrative, responsible parties are suggested for taking the lead partner role or providing a supporting partner role in plan implementation. This section presents the responsible parties as well as a brief description of their role. Table 6-1 provides a concise reference or key of implementation partners for reviewing the programmatic and site-specific action plan tables that follow. Implementation partners do not necessarily have the resources to complete a recommendation, but these recommendations can be implemented through coordination with other partners, grant funding, and more.

LEAD PARTNERS: Identify the lead public or private landowner, agency or other stakeholder with the greatest potential to implement the action.

SUPPORT PARTNERS: Include parties that could be involved in assisting in the action implementation related to regulation, permitting, coordination, technical needs and funding assistance.

Table 6-1: DPR Planning Area Implementation Partners

ACRONYM	RESPONSIBLE PARTY	GENERAL RESPONSIBILITY
AG	Agricultural Producers	Management and operation of cropped and other agricultural lands.
BACT	Barrington Area Conservation Trust	Promote Conservation@Home and green infrastructure in municipalities near Deer Grove Forest Preserve.
C	Counties	Land use and development, technical and financial support, and drainage system management.
CBL	Corporation and Business Landowners	Grounds management and maintenance. Implementation and maintenance of stormwater BMPs.
CCDPH	Cook County Department of Public Health	Permit well and private sewage disposal systems in Cook County. Enforce Cook County and Illinois state laws relating to environmental health issues. Regularly inspect, monitor, regulate, educate, and advise the public on environmental health concerns that adversely impact human health.
CCPW	Cook County Public Works	Manage water and wastewater facilities in Cook County.
CMAP	Chicago Metropolitan Agency for Planning	Technical, planning, training, and funding assistance.
DD	Drainage Districts	Maintain conveyance, stability, and function of drainage ways within district boundaries. *Includes Avon-Fremont and Grubb School.
DH	Developers and Homebuilders	Land development, stormwater management system design and construction.
DOT	Departments/Divisions of Transportation	Maintain, design, and construct transportation infrastructure in the watershed including stream, lake, and wetland crossings. *Includes State, Illinois Tollway, County, Municipal and Township Highway and Streets Departments.
DRWW	Des Plaines River Watershed Workgroup	Voluntary dues paying consortium of publicly operated treatment works (POTWs) and MS4s (municipal separate storm sewer system permit holders) organized to improve water quality throughout the Des Plaines River Watershed in Lake County and remove the Des Plaines River waterways from the Illinois EPA 303(d) impaired waters list.
EIG	Environmental Interest Groups	Advocate group positions on topics including environmental and land management. *Includes: Sierra Club & League of Women Voters
EM	State Emergency Management Agencies	Flood and disaster planning, emergency response, and hazard mitigation.

ACRONYM	RESPONSIBLE PARTY	GENERAL RESPONSIBILITY
		*Includes Illinois & Wisconsin Emergency Management Agency.
EO	Elected Officials	Decision-making authority for county policies and ordinances [including the Watershed Development Ordinance (WDO) and Unified Development Ordinance (UDO)].
EQ	Equestrian Facilities	Owners, managers, operators, tenants, and users of equestrian facilities and land uses.
EXT	County Extension Services	Provides education and technical support. *Includes University of Illinois & University of Wisconsin Extension.
FB	Farm Bureaus	Promotes farming practices that promote environmental stewardship. *Includes Cook, Kenosha, and Lake County Farm Bureaus.
FEMA	Federal Emergency Management Agency	National Flood Insurance Program, floodplain mapping and enforcement, and mitigation funding.
FPD	Forest Preserve Districts	Manage and maintain green infrastructure, natural areas, and open space. *Includes Cook and Lake County Forest Preserve Districts.
HOA/POA	Homeowners Associations/Property Owners Associations	Management of common areas and natural and constructed drainage systems.
IDNR	Illinois Department of Natural Resources	Natural area preservation and management, research, technical, and financial assistance.
IL/WI DOA	Illinois and Wisconsin Departments of Agriculture	Farmland and natural resource technical and financial assistance
Illinois EPA	Illinois Environmental Protection Agency	Water resource monitoring, pollution regulation and control, technical assistance and project funding.
ISD	LC Health Department Individual Sewage Disposal Program	Regulates the use of septic systems in incorporated and unincorporated areas of Lake County where sanitary sewer systems are not yet available. Regulation involves inspecting, planning, and installing septic systems.
ISGS/USGS	Illinois State Geological Survey & United States Geological Survey	Gather and manage geologic and water quality data.
ISWS	Illinois State Water Survey	Flood risk modeling and floodplain mapping
KRLT	Seno Kenosha/Racine Land Trust Conservancy	Natural resources education, conservation, and land preservation.
LA	Lake Associations	Lake management for water quality and recreation.
LCHD	Lake County Health Department	Monitor, manage, and provide technical support for water resources. Includes environmental services unit.
LCPW	Lake County Public Works Department	Manages water and wastewater facilities in Lake County.
M	Municipalities	Land use and development, technical and financial support, and drainage system management.
MWRD	Metropolitan Water Reclamation District of Greater Chicago	Controls municipal sewer construction permits outside the city of Chicago. Administers the Watershed Management Ordinance in suburban Cook County.
NRCS/SWCD	Natural Resources Conservation Service Soil and Water Conservation District	Provide technical and financial assistance for natural resource management. *Includes McHenry-Lake, North Cook, & Kenosha County SWCDs.

ACRONYM	RESPONSIBLE PARTY	GENERAL RESPONSIBILITY
N/L	Nursery and Landscaping Business	Grow and maintain landscaping plant materials. This includes irrigation or watering and storage of equipment and materials.
OL	Openlands	Provide technical assistance for land acquisition and preservation
PB&D	County Planning, Building, and Development (Includes Cook, Kenosha, and Lake counties)	Land use planning and permitting for unincorporated areas, natural resources and system management.
PC	Snow Removal and Deicing Private Contractors & Consultants	Land and pavement management and maintenance for snow removal and deicing.
PD	Parks and Recreation Districts	Management and maintenance of parks and open space.
PO	Property Owner	The owner on record for a particular tax parcel.
PR/RL	Private Residential/Riparian Landowner	Land management and maintenance including stream channels and riparian corridors.
RR	Railroad	Land Management in railroad right of way.
SEWRPC	Southeastern Wisconsin Regional Planning Commission	Southeastern Wisconsin regional planning for information and professional planning initiatives for the proper planning and design of public works systems (highways, transit, sewerage, water supply and parks and open space facilities).
SI	Schools and Institutions	Schools and institutions with large properties or campus settings. *Includes College of Lake County and secondary schools
SMC	Lake County Stormwater Management Commission	Technical and financial assistance for flooding, watershed planning, and water quality. Administers the Watershed Development Ordinance in Lake County.
SWALCO	Solid Waste Agency of Lake County	Implements the Lake County Solid Waste Management Plan.
T	Townships	Road maintenance and support for watershed improvement projects.
USACE	U.S. Army Corps of Engineers	Wetland protection and regulation and restoration funding.
USFWS	U.S. Fish and Wildlife Service	Threatened and endangered species protection, technical and financial assistance for habitat restoration.
UT	Utilities	Land Management in utility right of way
WI DNR	Wisconsin Department of Natural Resources	Natural area preservation and management, research, and technical assistance. Water resource monitoring, pollution regulation and control, and project funding.
WPC	Watershed Planning Committee(s)	Coordinate watershed plan implementation, education and outreach. Planning and support for watershed improvement projects. *Includes Subwatershed Planning Committees (Upper Des Plaines River Ecosystem Partnership, Buffalo Creek Clean Water Partnership, Bull Creek Planning Committee, and Indian Creek Watershed Project).
WWTP	Wastewater Treatment Plants	Maintain wastewater treatment regulatory standards. *Includes privately and publicly owned treatment works

6.2 PROGRAMMATIC ACTION PLAN (BASIN WIDE)

6.2.1 GOAL #1: WATER QUALITY IMPROVEMENTS

GOAL: Improve water quality and prevent future pollution impacts to streams, lakes, ponds, and wetlands within the DPR planning area.

OUTCOME: Overall water quality is improved. Water bodies will fully support their designated uses (are not impaired).

Table 6-2: Actions for Goal #1

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Develop and implement a watershed monitoring program to assess whether water quality standards are being met and evaluate watershed implementation effectiveness.	**Buffalo Creek:** Table 6 -2 Action 1-E **BC-BB:** Table 56 Action 5 **North Mill Creek:** Table 5-2 Action 1-G **Mill Creek:** Table 6-4 G Action 3.J	H	DRWW, M, LCHD, CCDPH, ISWS, USGS	Illinois EPA, FPD, IDNR, SMC, WPC	S
2	Continue to support (and improve) Lake County Health Department and Illinois EPA's Volunteer Lake Monitoring Programs.	**Buffalo Creek:** Table 6 -2 Action 1-F **BC-BB:** Table 56 Action 6 **North Mill Creek:** Table 5-2 Action 1-H **Mill Creek:** Table 6-3 Action 2.L	M	LCHD, LA	Illinois EPA, DRWW, SMC, M, SI, IDNR, CMAP	S
3	Employ charcoal packets or other appropriate techniques to track organics from agricultural fields.	**BC-BB:** Table 56 Action 5	L	NRCS/SWCD, AG, WI/IL DOA, EXT	Illinois EPA, FB ISGS/USGS, ISWS	M
4	Evaluate existing data to identify areas that are impacted by toxic sediment. If toxic sediment is found, identify contaminants of concern, human and ecological health risks and potential responsible parties. Pursue investigation and remediation if human or ecological risks are likely.	**Mill Creek:** Table 6-3 Action 2.V	M	DRWW, LCHD, Illinois EPA, CCDPH	ISWS, ISGS/USGS	M
5	Monitor lake inlets for nutrients, sediment and erosion, and create detailed nutrient budgets for lakes.	**BC-BB:** Table 56 Actions 1 and 2	M	DRWW, LA, IDNR, LCHD, WI DNR, ISWS, ISGS/USGS	CCPW, Illinois EPA, WPC	M
6	Continue to conduct intensive basin surveys for Illinois Integrated Water Quality Report on five-year rotational basis.	Not in previous plans.	M	Illinois EPA, IDNR, WI DNR	SEWRPC, LCHD, SMC, DRWW, WPC	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
7	Establish total maximum daily loads (TMDLs) of priority nutrients and pollutants for each of the lakes in the watershed. Regulate so that loading thresholds are not exceeded for each lake.	**Mill Creek:** Table 6-3 Action 2.U	M	Illinois EPA	LCHD, DRWW, LA	M
8	Reduce the quantity of road salt (sodium chloride) needed for safe and cost-effective winter maintenance to address rising chloride levels in local water bodies.	Not in previous plans.	H	DOT, M, CBL, N/L, EO, PR/RL, PC, HOA/POA, PD	SMC, LCHD, T, CCDPH, DRWW, MRWD, SEWRPC, Illinois EPA	S
9	Establish and publish watershed-wide recommended guidance for winter de-icing BMPs including road salt application rates and alternatives.	**Buffalo Creek:** Table 6 -2 Action 1-I **BC-BB:** Table 56 Action 10 **North Mill Creek:** Table 5-2 Action 1-K **Mill Creek:** Table 6-3 Goal 2 Action 2.F	H	DOT, SI, LCHD, M, T, SMC	Illinois EPA, WI DNR, PC, WPC, IDNR, PB&D, PR/ RL, CMAP, SEWPRC, CBL	M
10	Reduce phosphorus loads by using conservation practices on agricultural fields to reduce soil loss.	**Buffalo Creek:** Table 6 -2 Action 1-C **North Mill Creek:** Table 5-2 Action 1-E **Mill Creek:** Table 6-3 Action 2.I	M	AG, NRCS/SWCD, EQ, FPD	IL/WI DOA, SMC, T, SEWPRC, M, PR/RL	M
11	Implement effective leaf cleanup and composting programs.	Not in previous plans.	M	M, T, EO, CL, C, DOT, BACT, LCHD, HOA/POA	PB&D, PR/RL, CBL, CMAP, SEWRPC, SMC	S
12	Address re-suspension of phosphorus in lakes where feasible.	Not in previous plans.	M	M, LCHD, HOA/POA, FPD, PD, LA, PR/RL	SMC, PB&D, DRWW, MWRD, SEWRPC, T	M
13	Maintain golf courses using BMPs that minimize nutrient loads and impacts to water quality.	Not in previous plans.	M	GC, M, PD, FPD	SMC, EIG, MWRD	
14	Pass ordinances that restrict the use of lawn fertilizer with phosphorus.	Not in previous plans.	M	M, T, C, EO, HOA/POA	PB&D, CBL Illinois EPA, CMAP, PR/RL, CL, BACT, LCHD, SMC	S
15	Develop a cost-share mechanism to help private property owners upgrade/fix aging/failing septic systems and eliminate illicit connections.	**Buffalo Creek:** Table 6 -2 Action 1-D **North Mill Creek:** Table 5-2 Action 1-F **Mill Creek:** Table 6-3 Action 2.J **Indian Creek:** Table 66 Action 32	M	HOA/POA, ISD, LCHD, CCDPH, Illinois EPA	M, PR/RL, SI, DRWW	L

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
16	Work with Illinois EPA to evaluate wastewater treatment systems for overall water quality impacts, upgrade plants to accommodate phosphorus control, and address problem discharges if any are identified.	**BC-BB:** Table 56 Action 8	M	WWTP, DRWW, MWRD, Illinois EPA, M, LCPW	LCHD, WPC	M
17	Where appropriate, remove or retrofit impoundments, dams, piped stream conveyance, and weirs in streams to support fish passage and migration, hydraulic connectivity.	Not in previous plans.	M	IDNR, WI DNR, USFWS, M, T, PD, PO, FPD, USACE	DRWW, SMC, WPC, SEWRPC, Illinois EPA, NRCS/SWCD, LCHD	M
18	Maximize in-stream habitat in conjunction with installation of structures (bridges, culverts, etc.) to minimize negative impacts to streams and aquatic life.	Not in previous plans.	H	DOT, M, PD, T	SMC, Illinois EPA, MWRD, WI DNR, IDNR, USACE, PB&D	M
19	Reduce streambank, shoreline, and construction-related erosion.	Not in previous plans.	H	M, DD, LA PR/RL, PO, MWRD, PD, FPD, HOA/POA	Illinois EPA, SMC, IDNR, DOT, PB&D, USACE, NRCS/SWCD	M
20	Identify and restore degraded stream banks and beds where possible.	**BC-BB:** Table 58 Actions 3 and 5 **Indian Creek:** Table 65 Actions 27 and 28, and Table 66 Action 19	M	SMC, PR/RL, M, T, CMAP, SEWPRC	USACE, IDNR, WI DNR	L
21	Reduce/eliminate harmful algae blooms in lakes.	Not in previous plans.	H	LCHD, LA, PR/RL	DOT, Illinois EPA, WI DNR, M, C, T, FPD, CMAP, USACE, USFWS, IDNR, WPC, DRWW, WWTP	M
22	Creation and enforcement of ordinances requiring proper cleanup and disposal of pet waste.	Not in previous plans.	L	M, C, EO, FPD, PD	SMC, SEWRPC, DRWW, WPC, PB&D, CCDPH, LCHD, Illinois EPA, WI DNR	M
23	Conduct routine well and septic evaluations and repairs.	**Indian Creek:** Table 66 Action 28	L	PO, AG, HOA/POA	ISD, LCHD, CCDPH	M
24	Remediate aging and failing sanitary sewer lines that cross-connect with stormsewers and seasonally high groundwater tables.	**Mill Creek:** Table 6-2 Action 1.E	H	M, C, T, PO, LCPW, PB&D, CCPW	DOT	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
25	Reduce or ban the use and direct discharge of substances known to be sources of PAHs, including coal tar sealants.	Not in previous plans.	M	PR/RL, PO, M, T, C, CBL, PD, AG, HOA/POA	DRWW, WPC, SMC, LCHD, CCDPH, Illinois EPA	S
26	Prepare pollution prevention plans to address emergency response for potential catastrophic environmental events such as pipeline leaks and flooding.	Not in previous plans.	H	SMC, MWRD, PB&D, M, PO, CBL	M, FEMA, EM	S
27	Conduct further investigation of high priority Environmental Data Resource (EDR) sites by monitoring for the chemical constituents in these releases to resolve questions of hazard waste contamination.	**BC-BB:** Table 56 Action 17	M	PO, ISD, ISGS/USGS, ISWS	Illinois EPA, WI DNR	M
28	Minimize runoff volumes, velocities, and pollution to waterways by creating/restoring wetlands, natural landscapes, and stormwater best management practices such as infiltration and pollutant filtration systems.	**Buffalo Creek:** Table 6 -2 Action 1-A **North Mill Creek:** Table 5-2 Action 1-C **Mill Creek:** Table 6-3 Action 2.H **Indian Creek:** Table 66 Action 4	M	AG, PR/RL, PD, FPD, WPC, M, T	NRCS/SWCD, Illinois EPA, WI DNR, USACE, OL, DRWW, SMC, IDNR, MWRD, SEWRPC, CMAP	M
29	Where feasible, retrofit existing swales and open drainage-ways to infiltrate runoff with natural landscaping.	**Buffalo Creek:** Table 6 -2 Action 1-K **North Mill Creek:** Table 5-2 Action 1-P **Mill Creek:** Table 6-3 Action 2.R **Indian Creek:** Table 66 Action 3	M	PO, HOA/ POA, EQ, CBL, DOT, AG, PD	DH, SMC, MWRD, OL, Illinois EPA, WI DNR, BACT, NRCS/SWCD	M
30	Install bioretention BMPs to capture rooftop runoff	**Buffalo Creek:** Table 6 -2 Action 1-J **North Mill Creek:** Table 5-2 Actions 1-S and 1-L **Mill Creek:** Table 6-3 Actions 2.N and 2.T	M	DH, CBL, C, M, SI, T, PO	SMC, PB&D, Illinois EPA, WI DNR, MWRD	M
31	Replace riprap, concrete and turf grass shorelines with deep-rooted native landscaping and bioengineering where possible.	**Buffalo Creek:** Table 6 -2 Action 1-H **North Mill Creek:** Table 5-2 Action 1-J **Mill Creek:** Table 6-3 Actions 2.B and 2.C **Indian Creek:** Table 66 Action 22	H	LA, M, CBL HOA/POA, SI, FPD, DD, WI DNR, DH, PD, PR/RL	PB&D, SMC Illinois EPA, IDNR, FPD, USFWS, CMAP, WPC, USACE, NRCS/SWCD	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
32	Replace or restore failed hydraulic structures and discharge pipes.	**Buffalo Creek:** Table 6 -2 Action 1-L **North Mill Creek:** Table 5-2 Action 1-Q **Mill Creek:** Table 6-3 Action 2.S **Indian Creek:** Table 66 Actions 18, 23, and 40	H	PO, DD, DOT, HOA/POA, LA, T, M	FEMA, EM, SMC, USACE	M
33	Install stormwater green infrastructure BMPs in new or existing developments. Reduce use of centralized detention ponds and replace with distributed infiltration-based stormwater management systems using bioretention practices.	**BC-BB:** Table 56 Action 15 **Mill Creek:** Table 6-4 Action 3.B	H	DH, PD, CBL, M, C, HOA/POA, SI	SMC, MWRD, WPC, PB&D,	M
34	Install filtration BMPs (ex. sand, filtration basins, treatment wetlands) downstream of government maintenance, industrial and commercial facilities; new infrastructure and improvement projects; transportation runoff collection points; and other land uses potentially generating a heavy load of pollutants.	Not in previous plans.	H	DH, CBL, DOT, M, C, SI, T, PR/RL, PO	SMC, Illinois EPA, WI DNR, MWRD, USACE, PB&D	L
35	Disable drain tiles to restore wetland hydrology.	**Indian Creek:** Table 66 Action 43	L	AG, PO, PD, FPD, M, T	USACE, NRCS/SWCD, PB&D, SMC	L
36	Use Stormwater Treatment Train concepts wherever possible to infiltrate and clean stormwater runoff.	Not in previous plans.	H	PO, M, PB&D, CBL, DOT, DH, HOA/POA	SMC, Illinois EPA, MWRD, NRCS/SWCD, WI DNR	S
37	Establish pharmaceutical disposal center(s) or a system to collect unused pharmaceuticals to encourage proper disposal	**North Mill Creek:** Table 5-2 Action 1-M **Mill Creek:** Table 6-3 Action 2.O	M	SWALCO, LCHD, Illinois EPA	M, T, C, Pharmacies	M
38	Identify, repair, or disconnect all illegal discharges (illicit storm drain and/or sump pump hookups).	**BC-BB:** Table 56 Action 7 **Indian Creek:** Table 66 Actions 29 and 31	H	M, T, PR/RL, CBL, HOA/POA, ISD	SMC, LCHD, CCDPH, MWRD, SEWRPC, Illinois EPA, DRWW	L
39	Retrofit detention basins by converting dry to wet or wetland bottom basins and/or removing concrete or low flow channels, where feasible.	**BC-BB:** Table 56 Action 13 **Indian Creek:** Table 66 Action 16	M	PO, M, C, HOA/POA, CBL, PD	SMC, FPD USACE, PB&D, Illinois EPA	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
40	Identify opportunities for wetland protection and enhancement on high priority parcels identified to maintain or improve water quality.	**BC-BB:** Table 56 Action 14	H	M, T, FPD, PD, SMC, PO	USACE, Illinois EPA, WPC	S
41	Replace failing seawalls with bioengineering stabilization measures.	**BC-BB:** Table 58 Action 6	M	PR/RL, LA, CBL, HOA/POA	SMC, IDNR, USACE, WI DNR	M
42	Relocate and/or place storm drain inlets away from areas with potential land use impacts to water quality (direct or indirect discharge).	Not in previous plans.	M	PO, DH, M, C, PB&D, DOT, CBL, HOA/POA	SMC, MWRD	M
43	Increase native tree installation for stormwater benefits (ex. reduced erosion and runoff)	Not in previous plans.	L	PO, M, C, T, HOA/POA, LA, PD, FPD	NRCS/SWCD SMC, EIG, N/L CMAP, IDNR, SEWRPC, WI DNR, BACT, OL	L
44	Implement projects identified by DRWW monitoring and studies that reduce or remove causes of impairment and/or help to attain the aquatic life use standard for impaired waters	Not in previous plans	H	DRWW, PO	DRWW members, Illinois EPA, IDNR	M
45	Implement BMPs that reduce pollutants with a TMDL	Not in previous plans.	H	AG, C, CBL, FPD, PD, HOA/POA, M, PO, PR/RL, T	BACT, CMAP, DD, DH, DOT, IDNR, IL/WI DOA, Illinois EPA, LCHD, LCPW, NRCS/SWCD, PB&D, SI, SMC, WI DNR, WPC	L

6.2.2 Goal #2: Regional Green Infrastructure and Natural Resources Improvements

GOAL: Protect, enhance, and restore natural resources (soil, water, plant communities, and fish and wildlife) by employing good natural resource management practices. Using green infrastructure on public and private properties to maintain, enhance, or restore natural hydrology, native plant and wildlife communities, provide buffers for streams, lakes, wetlands, and high-quality areas. Expand environmental corridors to provide ecological, educational, and recreational benefits.

OUTCOME*:* Natural resources are protected, establishing a series of interconnected hubs and corridors that work to preserve and enhance the high-quality natural areas of the watershed.

Table 6-3: Actions for Goal #2

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Develop resource conservation and management plans, especially for ADID wetlands and other biodiversity sites.	**BC-BB:** Table 55 Action 3 **Indian Creek:** Table 67 Action 9	M	SMC, FPD, IDNR, PD, AG, M, T	USACE, NRCS/SWCD, CMAP, USFWS	M
2	Develop private/public property and high/medium priority green infrastructure protection strategies for natural communities, using acquisition, conservation easements, and other techniques.	**Buffalo Creek:** Table 6 -2 Action 1-N **BC-BB:** Table 55 Action 4, Table 59 Action 4 **North Mill Creek:** Table 5-5 Action 4.I **Mill Creek:** Table 6-5 Action 4-D **Indian Creek:** Table 67 Actions 6 and 15	M	M, C, T, SMC, OL, KRLT, IDNR, WPC, FPD, AG	CMAP, USFWS	M
3	Identify/initiate private/public partnerships and funding to complete restoration projects *Potential participants are also lead partners.	**Indian Creek:** Table 66 Action 42	M	WPC, PO, CBL, EIG	IDNR, USFWS, FPD, PD, WI DNR, Illinois EPA, CMAP, SMC, HOA/POA	
4	Avoid development in and installation of gray infrastructure through high priority green infrastructure system parcels wherever possible.	**Buffalo Creek:** Table 6-5 Action 4-E **North Mill Creek:** Table 5-5 Action 4.H	H	M, C, DOT, T, DH, LCPW, CCPW	CMAP, SMC, SEWRPC, MWRD, EIG	S
5	Expand Forest Preserve sites where adjacent landowners are willing to participate	Not in previous plans	H	FPD, PO	WPC	L

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
6	Restore degraded terrestrial and aquatic resources (lakes, wetlands and streams) using BMPs to improve habitat. This includes in-stream habitat features, such as natural channel substrates and pools and riffles to improve water quality and aquatic biodiversity.	**Buffalo Creek:** Table 6-4 Action 3-D **North Mill Creek:** Table 5-3 Action 2.D **Mill Creek:** Table 6-5 Action 4-H	H	PR/RL, DD, FPD, WI DNR, PD, IDNR	USACE, M, SMC, MWRD, NRCS/SWCD, Illinois EPA, PB&D	M
7	Convert highly erodible land areas, 10-year floodplain, and lands adjacent to ADID wetlands into passive land use practices.	**Mill Creek:** Table 6-5 Action 4-P	M	PR/RL, M, C, SMC, PD, T, AG, EQ, CBL, SI, HOA/POA	NRCS/SWCD, SMC, IL/WI DOA	L
8	Modify, retrofit, or eliminate constructed hydraulic restrictions along the stream corridors to promote natural stream morphology.	**Buffalo Creek:** Table 6-3 Action 2-A **North Mill Creek:** Table 5-4 Action 3.A	H	DD, M, C, PR/RL, FPD, DOT, HOA/POA, MWRD	USACE, IDNR, SMC, WI DNR, NRCS/SWCD, SEWRPC	M
9	Incorporate naturalized stream restoration as part of new developments where applicable.	**North Mill Creek:** Table 5-6 Action 5.G	M	DH, HOA/POA	SEWRPC, SMC, CMAP, M, C, PB&D, EO	L
10	Modify, retrofit or eliminate hydraulic restrictions along the stream corridors to promote natural stream morphology and maintain conveyance for adequate drainage.	**Buffalo Creek:** Table 6-6 Action 5-D **BC-BB:** Table 58 Actions 4 and 10 **North Mill Creek:** Table 5-4 Action 3.J **Indian Creek:** Table 65 Actions 3 and 30, Table 66 Action 37	H	PR/RL, USACE, M, C, T, DD, FPD	IDNR, SMC, FEMA, MWRD, WI DNR, CMAP	L
11	Develop a stream restoration plan and cost estimate for moderately and severely eroded stream reaches.	**Buffalo Creek:** Table 6-4 Action 3-E **North Mill Creek:** Table 5-3 Action 2.E	H	DD, SMC, FPD, USACE	IDNR, Illinois EPA, WI DNR, NRCS/SWCD, CCDPH, CMAP, SEWRPC, PB&D	S
12	Maintain, expand, or restore high quality native plant buffers along river, streams, lakes, and wetlands.	**Mill Creek:** Table 6-5 Action 4-C **Indian Creek:** Table 67 Actions 2 and 10	H	PR/RL, CBL, HOA/POA, LA, DD, SMC, FPD, IDNR, EQ, PD WI DNR, AG	USACE, NRCS/SWCD, CMAP, USFWS	S
13	Include high quality stream reaches in green infrastructure plan for conservation and protection.	**BC-BB:** Table 60 Action 4	H	T, FPD, SMC, M, C, CMAP	IDNR, PB&D, WI DNR, DRWW, Illinois EPA	S

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
14	Preserve, restore, and create wetlands areas with a target of a minimum 10% wetland land cover per subwatershed.	Not in previous plans.	H	SMC, PB&D, WI DNR, Illinois EPA, M, T, IDNR, USACE	EO, CMAP	L
15	Identify potential wetland mitigation banking sites in the watershed and encourage private and/or public investment for in-watershed mitigation.	**BC-BB:** Table 59 Actions 13 and 16 **North Mill Creek:** Table 5-6 Action 5.E **Mill Creek:** Table 6-4 Action 3.G **Indian Creek:** Table 67 Actions 11 and 12	H	SMC, FPD, USACE, PB&D	PD, M, C, T, SEWRPC, CMAP, WI DNR, IDNR	L
16	Identify and preserve natural areas that provide important ecological, environmental education, and recreational opportunities.	**Buffalo Creek:** Table 6-4 Action 3-A **North Mill Creek:** Table 5-3 Action 2.A	H	FPD, PD, SEWRPC, CMAP, SI, M, T, SMC, IDNR, WI DNR	Illinois EPA, MWRD	L
17	Municipalities and County review development standards and policies and adopt changes as needed to implement the watershed plan and preserve and protect healthy aquatic life and good water quality.	**Buffalo Creek:** Table 6-5 Action 4-C **North Mill Creek:** Table 5-5 Actions 4.D and 4.E **Mill Creek:** Table 6-5 Action 4-M	H	M, C, EO	IDNR, DOT, WI DNR, MWRD, SMC, PB&D, SEWRPC, CMAP, T	S
18	Clearly identify and designate areas prioritized in the Green Infrastructure Plan as green infrastructure conservation areas in county, park district, and municipal comprehensive plans and maps.	**Buffalo Creek:** Table 6-5 Action 4-D **North Mill Creek:** Table 5-5 Action 4.F **Mill Creek:** Table 6-5 Action 4-N	H	M, C, PD, PB&D, T, FPD	IDNR, WI DNR, SMC, OL, CMAP, SEWRPC	M
19	Require developers to maximize open space through conservation easements and dedications.	**BC-BB:** Table 57 Action 13 and Table 59 Action 10	L	EO, M, C, T, SMC, PB&D	WI DNR, Illinois EPA, CMAP	L
20	Encourage at least 50% of open space to be planted with native vegetation.	**BC-BB:** Table 59 Action 2	H	M, C, T, HOA/POA, LA, PD, BACT, OL	NRCS/SWCD, SMC, EIG, CMAP, IDNR SEWRPC, WI DNR	M
21	Identify green infrastructure needs based on projected buildout conditions in the watershed and assess land protection needs to meet the desired level of service.	**BC-BB:** Table 60 Action 8	M	WPC, FPD, SEWRPC, CMAP, SMC	USACE, IDNR, WI DNR, M, PB&D	L
22	Identify high quality areas for protection, acquisition, wetland protection, and habitat enhancement.	**BC-BB:** Table 55 Action 5 **Indian Creek:** Table 67 Actions 5 and 7	M	PR/RL, DD, FPD, WI DNR, PD, PB&D, IDNR	USACE, M, C, MWRD, SMC NRCS/SWCD Illinois EPA	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
23	Adopt standards for conservation development to be applied on high priority open space.	**BC-BB:** Table 59 Action 7	H	M, C, PB&D, T,	EO, SMC, CMAP	M
24	Maximize buffers, habitat and natural areas in golf courses.	Not in previous plans.	M	GC, M, PD, FPD	SMC, EIG, MWRD	M
25	Identify, map and restore environmental corridors across community, county and state lines, and trail connections between new and existing parks and forest preserves where appropriate.	**Buffalo Creek:** Table 6-4 Action 3-C **BC-BB:** Table 60 Action 3 **North Mill Creek:** Table 5-3 Action 2.C **Mill Creek:** Table 6-5 Action 4-E **Indian Creek:** Table 67 Actions 1 and 4	M	FPD, PD, M, T, PB&D, SEWRPC, CMAP	HOA/POA, OL, IDNR, SMC, WPC	M
26	Assess current fish population and reduce or eradicate common carp and other invasive aquatic species.	Not in previous plans.	H	LCHD, LA, HOA/POA, PO, WI DNR, IDNR	ISGS/USGS, USFWS	M
27	Develop an aquatic plant management plan for lakes and streams that targets the reduction of invasive species, promotes native plant diversity and recreational use.	**Buffalo Creek:** Table 6-4 Action 3-F **North Mill Creek:** Table 5-3 Action 2.F **Mill Creek:** Table 6-5 Action 4-I	M	LA, IDNR, WI DNR, LCHD	Illinois EPA, WI DNR, FPD, USACE, USFWS, IDNR, WPC	M
28	Remove invasive species.	Not in previous plans.	M	PO, FPD, DD IDNR, WI DNR, OL, BACT, PD, CBL, DOT, EIG, HOA/POA, LA, PC, SI, EIG	SMC, CMAP, WPC, Illinois EPA	L
29	Establish a quagga/zebra mussel and invasive species reporting and monitoring system.	**North Mill Creek:** Table 5-3 Action 2.G **Mill Creek:** Table 6-5 Action 4-J	H	LA, IDNR, LCHD, WI DNR	M, C, PD, EIG POA/HOA, PR/RL, WPC, DRWW	S
30	Reintroduce extirpated native species as water resources or ecosystem improve (such as blanding turtle)	Not in previous plans.	M	USFWS, IDNR, WI DNR, FPD	Illinois EPA, WPC, PD, LA, BACT, OL	L

6.2.3 Goal #3: Flood Damage Reduction

GOAL: Reduce current flood damage in the DPR planning area and prevent future flooding from worsening in the watershed and along the Des Plaines River downstream of Lake County.

OUTCOME: Flood damages are reduced to the maximum extent achievable and impacts to residents, businesses, institutions, governments, and natural resources in the DPR planning area are minimal.

Table 6-4: Actions for Goal #3

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Identify and increase additional flood storage at regional wetland/lake restoration or flood storage sites.	**BC-BB:** Table 57 Action 9 **Mill Creek:** Table 6-4 Action 3.J **Indian Creek:** Table 65 Action 33	H	SMC, MWRD IDNR, FPD, M, T, PD, PO, WI DNR	LCHD, DD, CMAP, PB&D	M
2	Increase storage capacity and retrofit existing detention basins to 2-year release.	**Indian Creek:** Table 65 Action 6, 18	M	M, C, T, PO, HOA/POA	SMC, MWRD, CMAP, USACE, PB&D	M
3	Restore historical floodplain function by removing spoil piles along channelized stream reaches.	**BC-BB:** Table 57 Action 10 **Indian Creek:** Table 65 Action 26	L	PR/RL, T, C, M, FPD, DD	NRCS/SWCD, USACE, SMC, MWRD, IL/WI DOA	M
4	Create water storage adjacent to Flood Problem Area Inventory sites.	**Indian Creek:** Table 65 Action 5	M	SMC, MWRD, M, C, T, FPD, PD	FEMA, EM, USACE	M
5	Evaluate, preserve, and enhance the flood storage functions of existing depressional, floodplain, and riparian areas in open and undeveloped parcels.	**BC-BB:** Table 55 Actions 7 and 8, Table 57 Actions 1 and 2 **North Mill Creek:** Table 5-4 Action 3.I **Mill Creek:** Table 6-2 Actions 1.A and 1.B **Indian Creek:** Table 65 Actions 12 and 36, Table 66 Action 20	H	M, C, T, SMC, MWRD, PD, FPD, PR/RL, PO, DOT	IDNR, WPC, WI DNR, PB&D, CMAP, SEWRPC, FEMA, EM	L
6	Use infiltration and evapotranspiration provided by green infrastructure to reduce volume of runoff and mitigate flood damage.	**Buffalo Creek:** Table 6-3 Action 2-E **BC-BB:** Table 57 Actions 5 and 8 **North Mill Creek:** Table 5-4 Action 3.K **Indian Creek:** Table 65 Actions 2, 7, 9, 11 and 32.	H	PO, M, C, DH, SMC, HOA/POA, PD, T, MWRD, DOT	WI DNR, FEMA, EM, DOT, CBL, IDNR, USACE, FPD, PB&D	L

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
7	Restore and enhance under-utilized space at commercial, industrial, and residential developments with stormwater green infrastructure practices.	**Buffalo Creek:** Table 6-5 Action 4-A **North Mill Creek:** Table 5-5 Action 4.A **Mill Creek:** Table 6-5 Action 4.L	M	DH, PO, HOA/POA, CBL, SI	Illinois EPA, PB&D, SMC, CMAP, WPC, MWRD	L
8	Increase native tree installation to reduce runoff.	Not in previous plans.	H	PO, M, C, T, HOA/POA, LA, PD, BACT, OL, DH, SI, FPD, DOT	NRCS/ SWCD, SMC, EIG, CMAP, IDNR, SEWRPC, WI DNR	S
9	Maintain golf courses using BMP's that increase soil permeability and minimize stormwater runoff.	Not in previous plans.	M	GC, M, PD, FPD	SMC, EIG, MWRD	M
10	Identify or install overland flow routes for all detention facilities and flood prone depressional areas where needed.	Not in previous plans.	H	SMC, M, C, T, FPD, PD, MWRD	FEMA, EM, USACE	S
11	Require more specific/stringent maintenance and drainage easement requirements for stormwater features in new developments and re-developments.	**North Mill Creek:** Table 5-5 Action 4.B	H	SMC, EO, Illinois EPA, WI DNR, MWRD, WPC, PB&D	DH, CBL, HOA/POA	S
12	Communities adopt and implement "no adverse impact" floodplain management standards.	**BC-BB:** Table 57 Action 15	H	M, C, T, EO, CMAP, SMC, PB&D	FEMA, EIG, Illinois EPA, USACE, EM, WI DNR, SEWRPC	M
13	Reduce the use of centralized detention ponds and install stormwater green infrastructure BMPs in new or existing developments.	**Buffalo Creek:** Table 6-3 Action 2-J **Mill Creek:** Table 6-4 Action 3.B **Indian Creek:** Table 66 Action 22	H	DH, CBL, M, C, PB&D, PO, HOA/POA, SI, T	SMC, CMAP, MWRD, SEWRPC, WPC	M
14	Encourage wet or wetland detention basins for new development and retrofit existing dry basins to these types.	**BC-BB:** Table 57 Action 3 **Indian Creek:** Table 65 Action 10	M	SMC, PB&D, M, C, T, CBL, HOA/POA, DOT, MWRD	CMAP, DH	M
15	Encourage conservation developments or clustered development in Planned Unit Developments and Planned Residential Developments.	**Indian Creek:** Table 65 Actions 13 and 31	L	DH, M, CMAP, P&BD	WPC, EO, OL, BACT, EIG, SMC, MWRD	M
16	Maintain and increase local drainage system capacity to improve resiliency for changing precipitation patterns.	**Mill Creek:** Table 6-2 Action 1.M	H	M, C, T, PD, FPD, DOT, DD	LCPW, CCPW, SMC, MWRD	L
17	Evaluate and implement watershed-specific release rates for the 100-year storm event.	**Indian Creek:** Table 66 Action 26	L	SMC, MWRD, C, M, PB&D	EO, USACE, IDNR, WI DNR, EIG	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
18	Develop and implement a stream inspection and maintenance program throughout the watershed. Remove excessive debris loads in channels to maintain conveyance and reduce streambank erosion.	**Buffalo Creek:** Table 6-3 Action 2-C **BC-BB:** Table 58 Action 1 **North Mill Creek:** Table 5-4 Action 3.F **Mill Creek:** Table 6-2 Action 1.G **Indian Creek:** Table 65 Actions 1, 23, 25, & 27	H	M, C, PB&D, FPD, PR/RL, DD, MWRD, PD, SMC	DOT, WPC, LCPW, IDNR, Illinois EPA, WI DNR, T, CMAP, USACE, CCPW	S
19	Support flood hazard map updates, including the FEMA Flood Insurance Study, to accurately identify current flood hazard areas and streams of high concern.	**Buffalo Creek:** Table 6-3 Action 2-H **BC-BB:** Table 57 Action 14 **North Mill Creek:** Table 5-4 Action 3.D **Mill Creek:** Table 6-2 Action 1.K	H	FEMA, ISWS, WI DNR, SEWRPC, CMAP M, C, T, SMC, MWRD	PB&D, USACE, IDNR, EM	M
20	Develop flood inundation maps to show varying depths of flooding and respective area of inundation, in coordination with the Lake County All Natural Hazards Mitigation Plan, Kenosha County Hazard Mitigation Plan and Cook County Multi-Jurisdictional Hazard Mitigation Plan.	**Buffalo Creek:** Table 6-3 Action 2-I	H	SMC, M, MWRD, CMAP, SEWRPC, C, PB&D	FEMA, EM, M	M
21	Develop a consistent floodplain boundary between Kenosha and Lake counties for watershed planning and green infrastructure purposes.	**North Mill Creek:** Table 5-4 Action 3.E	H	SEWRPC WI DNR, IDNR, ISWS, FEMA	SMC, M, C	M
22	Purchase and remove structures that are chronically flood damaged through the voluntary buyout program.	**Buffalo Creek:** Table 6-3 Action 2-G **BC-BB:** Table 62 Action 6 **North Mill Creek:** Table 5-4 Action 3.K **Mill Creek:** Table 6-2 Action 1.D **Indian Creek:** Table 65 Actions 15 and 20	H	PO, SMC, M	EM, MWRD, IDNR, FPD, FEMA, PB&D	L
23	Develop and implement standardized dam and weir maintenance and inspection protocol.	**Mill Creek:** Table 6-2 Action 1.H	H	M, PB&D, FPD, PO, PD, IDNR, WI DNR	WPC, Illinois EPA, T, C, CMAP, USACE, USFWS, MWRD, DD, SMC	S

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
24	National Flood Insurance Program (NFIP) communities participate in the Community Rating System (CRS) program to mitigate flood damage and reduce flood insurance rates for residents.	**Buffalo Creek:** Table 6-3 Action 2-D	M	M, C, PB&D, FEMA	SMC, MWRD, WI DNR	M
25	Implement floodproofing measures or elevate at-risk structures.	**Buffalo Creek:** Table 6-3 Action 2-G **BC-BB:** Table 57 Action 7 **Mill Creek:** Table 6-2 Action 1.C **Indian Creek:** Table 65 Action 16	H	PO, M, C, SMC, MWRD, PB&D, CBL	FEMA, EM, DOT, IDNR, WI DNR,	M
26	Install porous or permeable surfaces (pavement, concrete, asphalt, pavers) in parking areas.	Not in previous plans.	H	PO, CBL, SI, M, PD	SMC, MWRD, PB&D, M	M

6.2.4 Goal #4: Funding, Installing, And Maintaining Stormwater Infrastructure

GOAL: Reduce the volume and improve the quality of stormwater runoff by installing appropriate gray or green stormwater infrastructure and improving the condition of existing stormwater infrastructure.

OUTCOME: Reduce stormwater runoff volume and the pollution reaching and negatively impacting water bodies and natural resources and causing flood damage.

Table 6-5: Actions for Goal #4

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Reduce the rate and volume of stormwater runoff from existing or new development by minimizing impervious cover and implementing green infrastructure practices.	**Buffalo Creek:** Table 6-6 Action 5-C **North Mill Creek:** Table 5-6 Actions 5.D and 5.K **Mill Creek:** Table 6-4 Action 3.J	H	PO, DH, CBL, M, PB&D, HOA/POA, SI, DOT	SMC, MWRD, WI DNR, SEWRPC, CMAP	M
2	Maintain infiltration functionality of areas with high infiltration soil types by designating them as undisturbed open space features in developing/ redeveloping sites.	**Buffalo Creek:** Table 6-6 Action 5-A **North Mill Creek:** Table 5-6 Action 5 **Mill Creek:** Table 6-4 Action 3.D	M	M, C, PO, DH, T, HOA/POA	SMC, MWRD, WI DNR, SEWRPC	M
3	Remove direct sump pump connections to waterways and sewers and redirect to green infrastructure BMPs.	**Mill Creek:** Table 6-4 Action 3.L	H	M, PO, PR/RL, CBL, DH, PB&D	SMC, ISD	S
4	Certified Community (under WDO & WMO) staff assist developers by assessing each new development site for proper BMP site selection and implementation of stormwater management practices that best minimize runoff volumes and velocities.	**BC-BB:** Table 59 Action 17	M	M, PB&D	SMC, MWRD,	S
5	Expand funding opportunities including alternative funding mechanisms, technical assistance, and maintenance resources for improving stormwater green infrastructure and best management practices.	**BC-BB:** Table 62 Action 1 **Indian Creek:** Table 67 Action 3	H	CMAP, IDNR, USFWS, WI DNR, Illinois EPA, FEMA	FPD, PD, WPC, SMC, MWRD, EIG	L
6	Recommend HOA dues for maintenance of open space in residential developments.	**BC-BB:** Table 62 Action 3	M	HOA/POA, PO	WPC, M, PB&D	M
7	Include sanitary sewer repairs in capital improvement and public works plans.	**Indian Creek:** Table 66 Action 33	M	M, C, LCPW, CCPW	EO, ISD	S

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
8	Develop standards/guidelines for use of green infrastructure for stormwater management in site planning and design including strategically connecting to off-site green infrastructure.	Not in previous plans.	M	PB&D, SMC, CMAP, SEWRPC, M	WPC, WI DNR, Illinois EPA	M
9	Increase education and political will to provide funding and technical analysis for improving local and countywide regulations pertaining to impervious surface stormwater runoff and best management practices (BMPs).	Not in previous plans.	M	EO, WPC	IDNR, WI DNR, Illinois EPA, EIG, CMAP, SMC	M
10	Retrofit and maintain existing stormwater management and conveyance structures and design new detention basins to incorporate multiple benefits (such as maintaining conveyance, reducing erosion, and limiting nuisance wildlife).	**Mill Creek:** Table 6-3 Action 2.E	H	PO, M, C, DH, CBL, HOA/POA, SI, FPD, CMAP, DOT	PD, SMC, PB&D, MWRD	M
11	Develop and implement a monitoring and maintenance plan for stormwater detention facilities, storm drains, drainageways, and catch basins, that identifies agency responsibilities, a maintenance schedule, budget, and funding source.	**BC-BB:** Table 57 Action 11 **North Mill Creek:** Table 5-4 Action 3.G **Mill Creek:** Table 6-4 Action 3.A	h	PO, DH, CBL, HOA/POA, M, T, C	WI DNR, IDNR, SMC, MWRD, FPD, WPC	S
12	Design and install stormwater BMPs to capture and stormwater runoff from roads, parking lots, and other transportation infrastructure.	**Buffalo Creek:** Table 6-6 Action 5-F **BC-BB:** Table 59 Action 5 **North Mill Creek:** Table 5-6 Action 5.J **Mill Creek:** Table 6-4 Action 3.I	H	CBL, DOT, M, C, T, DH, SI	SMC, Illinois EPA, MWRD, WI DNR	M
13	Naturalize road rights-of-way and increase onsite bioretention.	**Indian Creek:** Table 66 Action 8	H	DOT, M, C, T	SMC, CMAP, SEWRPC	M
14	Utilize modeling and monitoring data to evaluate if design assumptions and performance of stormwater infrastructure are being achieved	Not in previous plans.	L	DRWW, SMC, CMAP, FEMA, WPC, ISWS	EM, IDNR, WI DNR, ISGS/USGS	M
15	Through a monitoring and modeling effort, develop baseline annual hydrographs to preserve baseflow conditions of creeks and tributaries.	**Mill Creek:** Table 6-4 Action 3.C	M	DRWW, SMC, FEMA, CMAP, WPC, ISWS	EM, IDNR, WI DNR, ISGS/USGS	L
16	Develop standardized 5-year and long-term maintenance and monitoring plan for natural areas within new developments and require developers to identify a funding and implementation mechanism.	**BC-BB:** Table 59 Action 6 and 9	M	CMAP, WPC, DH, HOA/POA, PO, M, PB&D	IDNR, WI DNR, SMC, MWRD	M

6.2.5 GOAL #5: COMMUNITY AND AGENCY COORDINATION

GOAL: Improve coordination, research, and decision-making among public, private, and non-profit entities to help achieve watershed plan goals and objectives.

OUTCOME: Watershed stakeholders coordinate and utilize all their local resources to implement watershed improvement projects.

Table 6-6: Actions for Goal #5

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Watershed communities adopt the Des Plaines River Watershed Based Plan.	**Mill Creek:** Table 6-4 Action 3.J	H	SMC, M, C, WPC, EO	T, OL, PB&D, FPD, CMAP, SEWRPC, MWRD, Illinois EPA, PD, DD, SI, DRWW,	S
2	Municipalities and County review development standards and policies and adopt changes as needed to implement the watershed-based plan and preserve and protect healthy aquatic life and good water quality.	**Buffalo Creek:** Table 6 -2 Action 1-G **North Mill Creek:** Table 5-2 Action 1-I **Mill Creek:** Table 6-3 Action 2.A **Indian Creek:** Table 66 Actions 21, 36 and 44, and Table 65 Action 35	H	M, C, DD, PO, MWRD, PD, FPD	USACE, Illinois EPA, SMC, IDNR, DOT, PB&D, NRCS/SWCD	M
3	The DRWW will continue to monitor water quality and develop strategies to address water quality impairments in the Des Plaines River watershed.	Not in previous plans.	H	DRWW	M, C, T, PB&D, FPD, CMAP, SEWRPC, MWRD, DD, Illinois EPA, PD, SMC, WPC	L
4	Establish a watershed organization or committee with funding and support to guide watershed plan implementation, provide technical assistance to watershed stakeholders, and coordinate multi-partner projects, and determine the roles of existing watershed communities, councils, organizations, and groups.	**BC-BB:** Table 63 Action 6	H	WPC, DRWW	Illinois EPA, LCHD, SMC, M, T, C, MWRD, PB&D, DD, FPD, CMAP, PD, Illinois EPA	S
5	Coordinate watershed committee activities and plan implementation through the hire of a coordinator or the use of shared personnel services among members of the WPC.	**BC-BB:** Table 63 Action 5	H	DRWW, WPC	M, C, T, PB&D, FPD, CMAP, SEWRPC, PD MWRD, Illinois EPA, DD, SMC	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
6	Identify a watershed champion in each subwatershed or local area to promote and coordinate water resource management.	Not in previous plans.	M	SMC, DRWW, WPC	M, C, T, PD, FPD, EIG	S
7	Form a multijurisdictional partnership to develop funding packages and grant proposals to implement recommendations in the watershed plan and greenway protection/connection strategies.	**BC-BB:** Table 60 Actions 5 and 7, Table 62 Action 5, and Table 63 Actions 3 and 4 **Indian Creek:** Table 66 Action 41	M	WPC	M, C, T, PB&D, FPD, CMAP, SEWRPC, DRWW, SMC MWRD, Illinois EPA, PD, DD	S
8	Develop a model or template for an intergovernmental agreement for participation in cooperative watershed projects.	**Buffalo Creek:** Table 6-6 Action 5-B **BC-BB:** Table 63 Action 1, Table 59 Action 11, Table 61 Action **North Mill Creek:** Table 5-6 Action 5.C, Table 5-8 Action 7.N **Mill Creek:** Table 6-4 Action 3.F	M	SMC, WPC, M, C, CMAP	FPD, DOT, MWRD, HOA/POA, CBL	M
9	Land use planning jurisdictions consider DPR watershed-based plan recommendations when developing local comprehensive plans and making land use decisions.	**BC-BB:** Table 63 Action 10	M	WPC, PB&D, M, C, T, FPD	CMAP, SEWRPC, SI	M
10	Incorporate watershed plan recommendations or green infrastructure protection into community and county comprehensive land use plans.	**BC-BB:** Table 63 Action 8	H	M, C, PB&D, CMAP, FPD, T	SMC, WPC, IDNR, WI DNR	M
11	Invite planners making land use decisions to lead workshops and/or make biannual presentations to watershed committee regarding land use decisions and progress made to protect green infrastructure at the community and county levels.	**BC-BB:** Table 63 Action 7	M	WPC, C, M, PB&D, CMAP, FPD, T, SEWRPC	SMC, IDNR, WI DNR	S
12	Identify high priority stormwater green infrastructure and flood problem areas on all development review maps/databases.	**BC-BB:** Table 55 Action 1, Table 63 Action	M	PB&D, M, C,	WPC, IDNR, FEMA, EM, USACE, SMC, NRCS/SWCD, WI DNR, SEWRPC, CMAP	S

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
13	Greenway coordinators designated by each municipality, township, relevant county and state agency, and private conservation/land trust organization will meet 2 times/year to evaluate and coordinate green infrastructure preservation.	**BC-BB:** Table 63 Action 12	M	DRWW, WPC, NRCS/SWCD, CMAP, M, C, T, FPD, PB&D, SMC	Illinois EPA, PD, PO, EXT	L
14	Adopt tree preservation ordinances to preserve tree quantity and quality	Not in previous plans.	L	M, C, T, EO	CMAP, WI DNR, Illinois EPA, PB&D	L
15	Watershed committee annually assesses progress on plan implementation and updates the watershed-based plan no less frequently than every 10 years.	**Mill Creek:** Table 6-6 Action 5.G	H	WPC	Illinois EPA, WI DNR, DRWW, WPC Members	M

6.2.6 Goal #6: Sustainable Agriculture Systems

GOAL: Watershed stakeholders participate in farmland preservation programs and implement sustainable agricultural practices to accomplish other watershed goals and objectives.

OUTCOME: The plan encourages farmland preservation and sustainable agriculture practices in the watershed.

Table 6-7: Actions for Goal #6

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Install and expand agricultural best management practices (BMPs), including drainage and tillage, to reduce sediment, chemical, and nutrient transport.	**Buffalo Creek:** Table 6-4 Action 3-G **BC-BB:** Table 56 Action 16 **North Mill Creek:** Table 5-8 Action 7.D, Table 5-2 Action 1-B **Mill Creek:** Table 6-4 Action 3.J	H	AG, FPD, PO, NRCS/SWC, EQ	WI/IL DOA, WI DNR, Illinois EPA, IDNR	M
2	Maintain conveyance in streams and drainage-ways adjacent to and downstream of agricultural land to reduce overland flooding and pollutant loads.	**North Mill Creek:** Table 5-8 Action 7.G	M	DD, PR/RL, FPD, AG, DOT, M, EQ	USACE, SMC, IDNR, WI DNR	M
3	Collect rainwater from farm building and agricultural arena roof tops for non-potable animal use (i.e. washing, rinsing) or garden water demand.	**North Mill Creek:** Table 5-8 Action 7.O	L	AG, EQ, PO	IL/WI DOA, NRCS/SWCD, FB, EXT	M
4	Encourage livestock rotational grazing	**North Mill Creek:** Table 5-8 Action 7.M	M	AG, EQ, FPD	IL/WI DOA, NRCS/SWCD, FB, EIG	S
5	Minimize livestock access to highly erodible lands, steep slopes, and waterways with fencing or cattle guards. Fence to keep grazing areas away from open water areas, wetlands, and riparian areas.	**Indian Creek:** Table 5-8 Actions 7.K and 7.T	H	AG, EQ, PR/RL	SMC, Illinois EPA, MWRD, WI DNR	S
6	Avoid manure disposal in floodplains, highly erodible land areas, and adjacent drainage areas of wetlands and water bodies.	**North Mill Creek:** Table 5-8 Action 7.Q	H	EQ, AG	IL/WI DOA, NRCS/SWCD, FB, EXT, SMC, USACE, WI DNR, IDNR	S
7	Cease farming in nonproductive depressional areas.	**Indian Creek:** Table 65 Action 34	L	AG, EQ, FPD	IL/WI DOA, FB NRCS/SWCD, IDNR, WI DNR	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
8	On private farmlands, work with non-profit organizations and USDA programs such as CRP, CREP, WRP, and EQIP to restore/enhance natural areas.	**Buffalo Creek:** Table 6-4 Action 3-G **BC-BB:** Table 62 Action 4 **North Mill Creek:** Table 5-3 Action 2.H **Mill Creek:** Table 6-5 Action 4.K	H	AG, EQ, PO	IL/WI DOA, NRCS/SWCD, FB, EXT, IDNR, WI DNR	L
9	Route runoff from agriculture facilities through bio-retention basins and swales.	**North Mill Creek:** Table 5-8 Action 7.S	M	EQ, AG, FPD	IL/WI DOA, NRCS/SWCD, FB, EXT, SMC	M
10	Create and implement Resource Management Plans (including manure management and storage and comprehensive nutrient management plans) for all farms, equestrian facilities, and nurseries in the watershed.	**BC-BB:** Table 56 Action 16 **North Mill Creek:** Table 5-8 Actions 7.B, 7.L, and 7.P, Table 5-2 Action 1-A	H	AG, FPD, EQ NRCS/SWC, N/L	IL/WI DOA, FB, EXT, SMC	M
11	Maintain drain tiles to reduce sediment transport to waterways and investigate opportunities for showcasing end-of-tile water quality BMPs at demonstration sites.	**North Mill Creek:** Table 5-8 Action 7.I	H	AG, FPD, EQ	SMC, NRCS/SWCD, FB, EXT, IL/WI DOA	M
12	Disable and remove non-functioning drainage tiles following feasibility study to evaluate potential impacts to neighboring properties	**North Mill Creek:** Table 5-8 Action 7.H **Indian Creek:** Table 65 Action 29	L	AG, FPD, SMC, EQ	NRCS/ SWCD, FB, EXT, IL/WI DOA	L
13	Investigate opportunities for a farmland preservation program (Illinois and Wisconsin portions of the watershed may require separate programs) and open space. Partner with existing farmland protection groups to share knowledge and provide support.	**North Mill Creek:** Table 5-8 Action 7.A **Indian Creek:** Table 67 Action 14	H	IL/WI DOA, AG, EQ, FPD, C	NRCS/SWCD, FB, EXT	L
14	Identify high priority and prime farmland parcels in the watershed and recommend for farmland protection program to county agencies.	**BC-BB:** Table 60 Action 10 **Indian Creek:** Table 67 Action 13	M	PB&D, C, T, FPD, NRCS/SWCD	FB, OL, CMAP, SEWRPC, WI DNR	S

6.2.7 Goal #7: Education And Outreach

GOAL: Provide watershed stakeholders with the knowledge, skills, and motivation needed to take action to implement the watershed plan.

OUTCOME: Stakeholders have adequate information and knowledge of resources to implement the watershed plan.

Table 6-8: Actions for Goal #7

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
1	Provide information and training to riparian landowners on best practices for stream and lake shoreline restoration and maintenance that will reduce erosion and increase water quality.	**Buffalo Creek:** Table 6-7 Action 6-G **BC-BB:** Table 61 Action 11 **North Mill Creek:** Table 5-7 Action 6.E **Mill Creek:** Table 6-4 Action 3.J **Indian Creek:** Table 65 Action 21	M	SMC, WPC, NRCS/SWCD, MWRD, LA, LCHD, HOA/POA	M, C, T, PD, OL, KRLT, BACTPR/RL, CMAP	S
2	Conduct a watershed outreach campaign to inform and engage the public about watershed issues, landowner responsibilities, and available resources.	Not in previous plans.	H	WPC,	SMC, CMAP, SEWRPC, KRLT, OL, BACT, LCHD, DRWW, HOA/POA, M, C, T	S
3	Continue to educate local municipalities, landowners, and public works staff on road salt alternatives and application BMPs to minimize the use of road salt by public and private snow removal providers.	**Buffalo Creek:** Table 6-7 Action 6-E **BC-BB:** Table 61 Action 15 **North Mill Creek:** Table 5-7 Action 6.D **Mill Creek:** Table 6-6 Action 5.J	H	SMC, LCHD, LCPW, DOT	WI DNR, Illinois EPA, MWRD, CCDPH, SEWRPC, DRWW, M, C, T, WPC	S
4	Inform the public and distribute educational materials on the importance of watershed health (water quality, flood prevention/mitigation, soil conservation and agricultural production, green infrastructure, water-based recreation) to the economy of watershed communities.	**Buffalo Creek:** Table 6-7 Action 6-D **North Mill Creek:** Table 5-7 Action 6.B **Indian Creek:** Table 6-6 Action 6.H	H	WPC	LCHD, M, C, T, SI, HOA/POA, IDNR, WI DNR, EIG, CMAP, MWRD, SMC, EXT, DRWW, OL, FPD	S
5	Inform homeowners and municipalities about water quality problems associated with sump pump, septic systems, and illicit storm drain hookups.	**Buffalo Creek:** Table 6-7 Action 6-F **BC-BB:** Table 61 Action 3 **Indian Creek:** Table 66 Action 30	M	SMC, LCHD, PB&D, MWRD	Illinois EPA, M, C, T, EIG	S
6	Provide information on mosquito prevention measures for individual homeowners, including removing stagnant water in tires, buckets, clogged gutters etc.	Not in previous plans.	L	LCHD, CCDPH	POA/HOA	L

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
7	Provide information and training to farmland owners on how to develop and implement resource management plans designed to improve agricultural practices to reduce erosion and limit fertilizer/pesticide use.	**BC-BB:** Table 61 Action 6	H	NRCS/SWCD, FB, EXT, AG	WI/IL DOA, IDNR, WI DNR	S
8	Inform developers, municipalities, and residents about the negative impacts that untreated or unmitigated impervious surface coverage has on water resources.	**BC-BB:** Table 61 Action 9	H	WPC, OL	SMC, LCHD, MWRD, SEWRPC	S
9	Inform municipalities, businesses, and homeowner associations about detention basin and stormwater inlet maintenance practices that improve water quality and reduce flooding.	**BC-BB:** Table 61 Action 10	H	LCHD, WPC LCPW, SMC, CCPW, DRWW	HOA/POA	S
10	Offer and provide technical assistance to the public and local government for funding and cost-share opportunities and support with project development to implement the watershed plan.	**BC-BB:** Table 61 Actions 12 and 18 **North Mill Creek:** Table 5-7 Action 6.H **Mill Creek:** Table 6-6 Actions 5.C and 5.L	M	WPC, SMC, NRCS/SWCD WPC, CMAP, SEWRPC	MWRD, LCHD, M, Illinois EPA, T, C	M
11	Provide watershed residents with a 5 and 10-year report card that illustrates the ecological health of the watershed and reports progress towards watershed goals.	**Mill Creek:** Table 6-6 Action 5.G	H	WPC,	Illinois EPA, M, C, T, DRWW, LCHD, SMC, MWRD	M
12	Support and promote the Conservation@Home program to reduce stormwater runoff and gully formation. Non-profit in Kenosha County should consider promoting and supporting a similar program.	**Buffalo Creek:** Table 6-7 Action 6-C **BC-BB:** Table 61 Action 16 **North Mill Creek:** Table 5-7 Action 6.F	M	KRLT, WPC, FPD, BACT, OL, NRCS/SWCD	SMC, MWRD	M
13	Facilitate public training and engage students, teachers, riparian landowners, lake associations, and homeowner associations to volunteer for lake, stream, and natural area stewardship (i.e. stream and lake clean-up days) and monitoring of water resources.	**BC-BB:** Table 61 Action 7 **Mill Creek:** Table 6-6 Action 5.E	M	WPC, LA, HOA/POA, LCHD, SI, CMAP, DRWW	SMC, Illinois EPA, DD, MWRD, OL, KRLT, LS	M
14	Non-profit organizations choose a school to work with to naturalize open space and potentially adopt into the green infrastructure network.	**North Mill Creek:** Table 5-5 Action 4.J **BC-BB:** Table 60 Action 9	M	SI, CL, BACT, KRLT	SMC, CMAP	M

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
15	Promote the removal of invasive plants by providing trainings aimed at species identification/control (species such as: phragmities, teasel, garlic mustard, buckthorn).	**Buffalo Creek:** Table 6-7 Action 6-H **BC-BB:** Table 61 Action 8 **North Mill Creek:** Table 5-7 Action 6.G	L	OL, SI, BACT, EXT, EIG, HOA/POA	LCHD, SMC, CCDPH, MWRD, CMAP, N/L, WPC, FPD, PD	S
16	Outreach campaign, demonstration site, and workshop promoting the establishment of native plants and proper plant selection.	Not in previous plans.	L	OL, SI, BACT, EXT, EIG, HOA/POA	LCHD, SMC, CCDPH, MWRD, CMAP, N/L, WPC, FPD, PD	M
17	Inform communities about the benefits of adopting the “no adverse impact standard” and maintaining floodplain as open space in reducing flood damage.	**BC-BB:** Table 61 Action 1 **North Mill Creek:** Table 5-4 Action 3.H **Mill Creek:** Table 6-2 Action 1.L	H	SMC, PB&D, MWRD, WI DNR	IDNR, EM, FEMA, EIG	M
18	Provide outreach and workshops for the public affected by flood damage to educate them about the causes of flooding, flood mitigation practices, and ways to prevent local and regional flood damage.	**Buffalo Creek:** Table 6-7 Action 6-J **BC-BB:** Table 61 Action 2 **North Mill Creek:** Table 5-7 Action 6.I **Mill Creek:** Table 6-6 Action 5.M	H	SMC, PB&D, MWRD, WI DNR	IDNR, EM, FEMA, LCPW, CCPW	S
19	Inform homeowner's associations about the importance of funding and maintaining open space in developments.	**BC-BB:** Table 61 Action 17	M	WPC, SMC, PB&D, M, EIG	HOA/POA, DH, C, T, CMAP, WI DNR	M
20	Include stream name signs at all stream crossings.	**Buffalo Creek:** Table 6-7 Action 6-B **North Mill Creek:** Table 5-7 Action 6.A **Mill Creek:** Table 6-6 Action 5.B	M	DOT, T, DD, PD, FPD, M, WPC	SMC, LA, MWRD, PD	M
21	Incorporate watershed signage and information at public properties such as forest preserves, public parks, and public lake boating areas.	**Buffalo Creek:** Table 6-7 Action 6-B **North Mill Creek:** Table 5-7 Action 6.A **Mill Creek:** Table 6-6 Action 5.B	H	M, C, T, WI DNR	SMC, MWRD, PD, FPD, LA, LCHD	S
22	Promote invasive species awareness at public boat launches regarding boat transport, live-well water, and use of live bait.	**North Mill Creek:** Table 5-3 Action 2.G **Mill Creek:** Table 6-5 Action 4-J	H	LA, IDNR, LCHD, WI DNR	M, PD, FPD, HOA/POA, WPC, EIG	S
23	Conduct an analysis to quantify the economic costs, benefits and value of water resources in the watershed.	Not in previous plans.	M	WPC	EIG, SMC, FPD, CMAP, LCHD, M, T, C, MWRD, CCDPH, WI DNR, IDNR, SEWRPC, Illinois EPA, SI	L

ACTION #	ACTION	PREVIOUS PLANS	PRIORITY	LEAD PARTNERS	SUPPORTING PARTNERS	TIME FRAME
24	Continue to support rain barrel distribution and sale programs within the watershed.	Not in previous plans.	H	SWALCO, MWRD	SMC, FPD, SWCD	L

6.2.8 Regulatory and Policy Programmatic Actions

This watershed-based plan does not include land use recommendations because land use planning and development decisions are the right and responsibility of watershed municipalities and counties. This plan does consider the health of DPR planning area lakes, streams and wetlands, which is a direct reflection of land use and management. Therefore, municipal and county consideration of land management and development impacts is necessary for effective watershed planning. Modifications and changes to local regulations and policy can have a significant influence on improving the ecological, environmental, safety and economic conditions of the watershed. Design standards, ordinances, codes and other regulatory tools are key mechanisms for implementing a vision for the watershed that will prevail into the future. The way that many codes and ordinances are written may encourage or require design approaches that unintentionally neglect preserving and enhancing watershed health. Local regulating entities are encouraged to provide incentives for design approaches, development and redevelopment standards, codes and ordinances that allow innovative watershed development that reduces flood damage, improves water quality and preserves or includes green infrastructure.

An excellent source of information on model development principles and a sample code and ordinance review worksheet can be found in *Better Site Design: A Handbook for Changing Development Rules in Your Community* (Center for Watershed Protection, 1998).

During the watershed planning process, stakeholders identified opportunities for policy and regulatory changes to benefit the DPR planning area and address flooding, water quality and natural resource concerns. Several stakeholders indicated a desire for more proactive enforcement of existing regulations. Recommended opportunities for policy and regulatory review and modification are based on stakeholder input during watershed planning committee meetings and specific watershed issues identified through the watershed assessment process. Issues to be addressed and opportunities include:

6.2.8.1 Development and Stormwater Runoff

1. Local land development standards should:
    - Allow, incentivize, and/or credit Low Impact Development standards/practices, infiltration BMPs, and maintaining pre-development hydrology.
    - Offset the impact of future impervious cover to insure that additional impervious cover does not degrade subwatershed management units.
    - Reduce the rate and volume of stormwater runoff from areas that are already developed.

2. Establish rain garden program(s).

3. Communities and the county enact ordinances and standards for sump pump and downspout discharges to be directed to lawn or rain gardens and infiltrated.

6.2.8.2 Pollution Prevention

1. Reduce the quantity of road salt (sodium chloride) needed for safe and cost-effective winter maintenance to reverse the current trend of rising chloride levels in water bodies. Adopt standards for the use of deicing chemicals/practices.

2. Regulate and limit the use of lawn chemicals, such as nitrogen fertilizers and pesticides, and tar for seal coating asphalt surfaces.
3. Reduce phosphorus loads by watershed municipalities and the county by passing an ordinance that bans the use of fertilizer with phosphorus unless a soil test indicates it is needed.
4. Reduce fecal coliform pollution by regulating septic system construction and maintenance, requiring regular maintenance and enforcement of ordinances requiring proper cleanup and disposal of pet waste.

6.2.8.3 Monitoring and Stream Maintenance

1. Develop and implement a watershed monitoring program to collect and monitor water quality and biological data on a regular basis.
2. Establish institutional stream maintenance program and standards using the American Fisheries Society standards as guidelines.

6.2.8.4 Wetlands and Floodplains

1. Maintain riparian and depressional floodplain and wetlands to maximize flood storage and conveyance.
2. Restore and create wetlands where feasible with a minimum target of 10% wetland per subwatershed.

6.2.8.5 Green Infrastructure

1. Identify and preserve open space as green infrastructure or greenways to promote flood damage reduction, water quality improvement, natural resource protection and wetland restoration.
2. Adopt and prioritize Green Infrastructure Plan elements and support implementation of these elements through local land use plans, policies and maps. Amend local and county zoning ordinances to encourage green infrastructure practices.

6.2.8.6 Transportation Sustainability Practices

1. Use I-LAST Scoring System for all new roadway expansion and extension projects.
2. Use practices that reduce and treat runoff volumes from roads and parking lots (reduce pavement extent, use porous pavement where appropriate, infiltrate runoff where appropriate).
3. Transportation design should consider wildlife crossings and avoid waters and wetlands where possible.
4. Include environmentally friendly stream crossings that protect aquatic habitat.
5. Monitor and maintain BMPs post-construction.
6. Conduct street sweeping and inlet cleaning.

Table 6-9 illustrates the most significant local entities in the watershed that influence, develop and enforce local policy and regulation. State and federal agencies are not highlighted due to the fact that state and federal regulation and policy change should not be the focus of a locally led watershed planning effort.

Table 6-9: Regulatory/Policy Action Recommendations

ID	Action	Priority	Lead Partners	Supporting Partners
RP-1	Review and modify land and transportation development standards, practices, codes and ordinances for new development and redevelopment to allow and incentivize low impact development design and green infrastructure practices.	H	M, PB&D, DOT	SMC, MWRD, WI DNR, Illinois EPA
RP-2	Encourage the use of stormwater green infrastructure BMPs for detention credit.	M	M, PB&D	SMC, MWRD, WI DNR, Illinois EPA
RP-3	Provide programs with incentives to retrofit existing developed areas and construct new developments with green infrastructure BMPs to reduce runoff volumes and rates and mitigate water quality impacts.	H	M, PB&D	SMC, MWRD, Illinois EPA, WI DNR
RP-4	Require downspout and sump pump discharges be disconnected from the storm sewer system and be directed to rain gardens, lawns, drywells or other practices for infiltration.	M	M, PB&D	HOA/POA, MWRD, CMAP, SMC
RP-5	Regulatory agencies and units of government determine if current enforcement supports existing regulations	M	M, PB&D, DOT, SMC, MWRD, Illinois EPA, IDNR, WI DNR, USACE	EO
RP-6	Jurisdictions with transportation maintenance authority should have an adopted winter maintenance/snow and ice removal policy that includes snow removal priorities, practices and products used. Municipalities should require that all chemical applicators whether public or private must be registered with the jurisdiction and have appropriate training.	H	M, DOT, T, FPD	SMC, LCHD, CCDPH, MWRD, Illinois EPA, WI DNR, CCPW, LCPW
RP-7	Ban the use of fertilizer with phosphorus unless a soil test indicates it is needed.	H	M, PB&D	LCHD, CCDPH, DRWW
RP-8	Investigate limiting or banning the use of coal tar seal-coating products and lawn pesticides known to runoff and pollute waters.	M	M, PB&D	LCHD, CCDPH, DRWW
RP-9	In compliance with Illinois EPA, establish total suspended solids (TSS) or other numerical water quality performance standard for new developments and redevelopment in DPR planning area.	M	SMC, MWRD, WI DNR, DRWW	M, PB&D

ID	Action	Priority	Lead Partners	Supporting Partners
RP-10	Participate in a coordinated watershed monitoring program to collect and monitor water quality and biological data on a regular basis.	M	DRWW, WWTP	SMC, LCHD, CCDPH, M
RP-11	Cooperatively establish, adopt and implement stream maintenance standards in conformance with American Fishery Society guidelines.	M	SMC, M, MWRD, WI DNR, IDNR	LCHD, FPD, CCDPH
RP-12	Review effectiveness of wetland regulations and develop watershed-specific provisions if needed.	L	SMC, MWRD, USACE, WI DNR, IDNR	M, PB&D
RP-13	Require in-watershed (DPR planning area) mitigation for all floodplain wetland impacts.	H	SMC, MWRD, USACE, WI DNR, IDNR	M, PB&D
RP-14	Map depressional wetlands/floodplain and investigate flood damage in these areas to determine if floodplain development in depressional areas should be restricted for safety reasons.	H	SMC, MWRD, M, PB&D, SEWRPC	FEMA
RP-15	Adopt and prioritize green infrastructure elements and support implementation of these elements through local land use plans, policies and maps.	H	M, PB&D	SMC, MWRD, FPD, SEWRPC
RP-16	Adopt and implement “complete streets” and sustainable transportation policies that are multi-modal and provide safe, accessible and connected non-motorized transportation (including underserved and low to moderate income areas with alternative transportation options).	M	M, T, DOT	PB&D, FPD, SMC, CMAP, MWRD, SEWRPC
RP-17	Develop and implement roadway design standards that include environmentally friendly stream crossings that protect aquatic habitat, route roadways away from sensitive waters and wetlands where possible and consider and incorporate wildlife crossings.	H	M, DOT, T	WI DNR, IDNR, SMC
RP-18	Implement street-sweeping and inlet clearing programs, particularly during autumn months	H	DOT, M, T	LCHD, DRWW
RP-19	Consider impervious surface coverage regulations at appropriate scales such as parcels or catchments to reduce runoff volumes new development and redevelopment.	M	M, PB&D, WPC, SMC, DRWW, CMAP, BACT	USACE, IDNR, Illinois EPA, EIG, OL
RP-20	Require that developers demonstrate measures taken to minimize impervious surfaces (i.e. parking ratios, multi-	M	CBL, DOT, M, T, SI, EO	SMC, Illinois EPA, MWRD, WI DNR

ID	Action	Priority	Lead Partners	Supporting Partners
	level parking, permeable surface parking, reduced street widths, and sidewalks on one side of street, etc.).			

See Section 6.1 Implementation Partners for descriptions of the Lead/Support Partners.

6.2.9 DRWW Recommendations

The DRWW completed a biological and water quality assessment of the Upper Des Plaines River and Tributaries in 2016; the final report was published in December, 2017. In general, the assessment focused on biological indicators of stream health and what causes, and sources of impairments are present in the watershed. As noted in the report, eleven (11) different causal categories and four different source categories were identified and, in some cases, differed from causes and sources of aquatic life impairment identified for the same water body by Illinois EPA in the 2016 Integrated Report. For causes, four (4) were habitat-related (siltation, no riparian, bank erosion, and channel modification) and seven (7) were chemical (low dissolved oxygen, organic enrichment, nutrients, chlorides, conductivity, manganese, PAHs). Certain causes such as siltation (66 of 70 sites) and chlorides (41 of 70 sites) were pervasive throughout the study area while others were either localized or sporadic throughout the study area. Sources included urban runoff, habitat alterations, altered hydrology, and WWTP effluent. These constitute the principal causes and sources that would need to be addressed to resolve the aquatic life impairments (MBI, 2017).

The report provides a thorough synthesis of results and draws meaningful conclusions from the data; this was used to generate a series of recommendations that should be considered when determining what plan actions should be prioritized or considered to address water quality. Many of the actions described in the following section directly address report conclusions listed below:

1. Excessive stream siltation associated with habitat alterations and altered hydrology from urban and suburban runoff is the primary stressor in the watershed. Actions that reduce instream sediment loads and address altered hydrology should receive priority. These actions could include:
   a. Streambank and stream bed stabilization.
   b. Retention and detention to reduce peak flows and trap eroded sediment.
   c. Stream restoration and maintenance practices that restore critical habitat features.

2. Organic enrichment-related biological responses were observed downstream from WWTPs. Efforts underway by these plants to reduce phosphorus loading will benefit overall water quality and biological conditions.

3. Sediment contamination with PAH compounds was observed on the mainstem of the DPR and several tributaries, correlated with the degree of urbanization. Detention and retention practices that trap and filter these pollutants should be targeted to heavily urbanized areas of the watershed. These practices could include porous/permeable pavement, detention/retention basins, filter/buffer strips, rain gardens, and other urban BMPs.

4. Chloride concentrations are increasing and chlorides were identified as the second-most prevalent cause of biological impairment. Efforts that reduce the application of road salts is critically important throughout the watershed. Chloride loading from WWTPs is also a potential concern as these point sources are responsible for a relatively high percentage of the total watershed chloride load (Chapter 4). Areas upstream of WWTPs with high chloride loads (NPS chloride loads) may need to be evaluated separately from areas downstream of point sources of chloride.

6.3 SITE-SPECIFIC ACTION PLAN

NOTEWORTHY: PROJECT SPECIFIC ACTIONS

Site-specific watershed projects/actions include urban and agricultural BMPs, detention basin retrofits, problem hydrologic/hydraulic structure modification, flood mitigation solutions, streambank and lake bank stabilization, and wetland preservation/restoration and creation priorities.

Project or site-specific action items and recommendations are tied to a particular location or locations in the watershed. As with the programmatic actions, these site-specific recommendations were developed to address watershed problems, to improve watershed resources and to achieve goals and objectives. Due to the size of the planning area and sheer number of site-specific action recommendations developed during the course of the planning process, readers of the plan are encouraged to use the ***online mapping application*** (https://tinyurl.com/ycthwx9x). The individual recommendations are also listed in tables, organized by jurisdiction, in Appendix N. Maps showing the action recommendations are included in Appendix N, but users are encouraged to use the online mapping application.

During development of the watershed-based plan, many methods were used to identify specific project sites, which are outlined below:

- Direct stakeholder input.
- Detention basin inventory.
- Stream inventory and assessment.
- Lake shoreline inventory and assessment.
- Flood problem area inventory.
- Flood storage area analysis.
- Lake County Wetland Restoration & Preservation Plan (WRAPP).
- Green infrastructure analysis.
- GIS analysis and water quality modeling.
- Windshield surveys.
- Previously planned projects.

The identification of specific sites suited for watershed improvement projects has been ongoing during past planning efforts in subwatersheds of the DPR planning area. Specifically, Mill Creek, North Mill Creek/Dutch Gap, Indian Creek, and Buffalo Creek have current watershed-based plans that should be considered jointly with this regional plan. This chapter is not a comprehensive inventory of all possible projects in the DPR planning area; it is only intended to provide guidance on where to "kick start" implementation.

For the purposes of this plan, wetland enhancement includes only existing wetlands and restoring their natural function, efficiency and biodiversity whereas wetland restoration and creation includes creating wetlands where they do not currently exist. Opportunity sites for flood mitigation and regionally significant storage site action recommendations are also highlighted.

NOTEWORTHY: SITE-SPECIFIC ACTIONS VS. BASIN-WIDE SITE-SPECIFIC ACTIONS

SITE-SPECIFIC ACTIONS:
Recommendations for a specific geographic location in the planning area. Sites may be represented by single points, linear features (such as stream banks), or polygons (specific areas, such as a wetland).

BASIN-WIDE SITE-SPECIFIC ACTIONS:
Recommendations that can be applied to a specific geographic location but which are generally identified across the planning area based on land use/land cover or some other "mappable" geographic characteristic. Opportunities for runoff volume reduction are an example of basin-wide site-specific actions.

This section outlines and summarizes site-specific actions and basin-wide site-specific actions. Where applicable, the action recommendations are coded by jurisdictions (Table 6-10) and project type category (Table 6-11). Actions and projects are then further described and summarized, by major action category and jurisdiction in Section 6.3.6. Individual site-specific actions and their attributes and details are available through the online web application hosted by SMC and in detailed jurisdictional tables located in Appendix N. Chapter 7 includes overall cost estimates, pollutant load reductions, and implementation strategies. There are over 5,000 site-specific and basin-wide site-specific action recommendations, spanning 56 separate jurisdictions. These actions are summarized in Table 6-12, Table 6-13, Table 6-14, and Table 6-15. If implemented, the actions would benefit over 100,000 acres and nearly 19 miles of streambank/lake shoreline.

Table 6-10: Site-specific Jurisdiction Coding

ABBREVIATIONS	JURISDICTION
ANT	Village of Antioch
ARL	Village of Arlington Heights
BEA	Village of Beach Park
BRI	Village of Bristol
BUF	Village of Buffalo Grove
CFP	Cook County Forest Preserve District
DFD	Village of Deerfield
DPK	Village of Deer Park
GLV	Village of Glenview
GRN	Village of Green Oaks
GRY	Village of Grayslake
GUR	Village of Gurnee
HAW	Village of Hawthorn Woods
HNS	Village of Hainesville
IND	Village of Indian Creek
KLD	Village of Kildeer
LFP	Lake County Forest Preserve District
LFT	City of Lake Forest
LIB	Village of Libertyville
LND	Village of Lindenhurst
LNG	Village of Long Grove
LSH	Village of Lincolnshire
LVA	Village of Lake Villa

ABBREVIATIONS	JURISDICTION
PPH	City of Prospect Heights
PRK	City of Park City
RLB	Village of Round Lake Beach
RLP	Village of Round Lake Park
RIV	Village of Riverwoods
SAL	Village of Salem Lakes
SOI	State of Illinois
TANT	Antioch Township
TAVN	Avon Township
TBEN	Benton Township
TELA	Ela Township
TFRE	Fremont Township
TLIB	Libertyville Township
TLVA	Lake Villa Township
TNEW	Newport Township
TNFD	Northfield Township
TPAL	Palatine Township
TRD	Village of Third Lake
TVRN	Vernon Township
TWAK	Waukegan Township
TWAR	Warren Township
TWDF	West Deerfield Township
TWHE	Wheeling Township

ABBREVIATIONS	JURISDICTION
LZR	Village of Lake Zurich
MET	Village of Mettawa
MND	Village of Mundelein
NBK	Village of Northbrook
OLD	Village of Old Mill Creek
PAL	Village of Palatine

ABBREVIATIONS	JURISDICTION
VRN	Village of Vernon Hills
WAD	Village of Wadsworth
WAK	City of Waukegan
WHE	Village of Wheeling
ZIO	City of Zion

Table 6-11: Site-Specific Action Categories

PROJECT SPECIFIC ACTION CATEGORY	ID CODE	DESCRIPTION
Site-specific BMPs	SSD	Site-Specific (project recommendations are based on coordination with stakeholders and project opportunities identified during windshield surveys. The practice applies to a very specific single location on the ground.
Site-specific stakeholder project recommendations	DST	Direct recommendations from stakeholders or jurisdictions. Recommendations are specific locations. Subcategories include DSTF for site-specific flooding issues, DSTFP for recommended flood damage reduction projects and DSTG for generalized site-specific recommendations.
Streambank erosion control practices	SBD	Site-specific streambank erosion control recommendations, including severely eroding streambanks identified from inventories.
Stream Buffers	DSB	Buffers/filter strips generated from stream inventory data. These locations were identified by SMC as having poor or nonexistent riparian zones.
Lake shore erosion control practices	DL	Site-specific lakeshore recommendations include severely eroding lake banks identified during the inventory.
Detention basin retrofit projects	DD	Detention basin retrofit recommendations are based on a basin survey completed by SMC. These projects include maintenance and actions to improve basin function.
Problem discharge locations	DPD	Problem discharge points are any direct discharges streams that should be evaluated and/or repaired. These locations were identified by SMC staff during various stream inventories.
Problem hydraulic impediments	DPH	Hydraulic impediments are any notable issues that impede the conveyance and function of the waterway. These locations were identified by SMC staff during various stream inventories.
Cover Crops*	CC	Recommendations for implementing cover crop use.
Runoff volume reduction*	RVR	Recommendations for installation of runoff volume reduction BMPs such as rain barrels, rain gardens, green roofs, curb and gutter cuts, permanent vegetation cover, bioswales (vegetated swales) and tree installation practices.
Feed area management*	FAM	Recommendations for installation of feed area basins.
No-till/strip-till*	TIL	Recommendations for implementing no-till/strip-till farming practices.
Nutrient management*	NU	Recommendations for developing nutrient management plans.
Pasture enhancement*	PE	Recommendations for enhancing existing pasture operations.
De-icing practices/ salt management*	ICE	Recommendations to reduce road salt application.
Wetland creation/restoration*	WLR	Recommendations to create wetlands.
Wetland enhancement*	WLE	Recommendations to enhance wetlands.
Flood problem areas	DFPAI	Site-specific flood mitigation projects to address the flood problem area inventory sites described in Chapter 5.

PROJECT SPECIFIC ACTION CATEGORY	ID CODE	DESCRIPTION
Potential regionally significant flood storage sites	DFS	Potential storage areas that should be evaluated in the watershed.
Site-specific wetland creation sites	DWS	Site-specific wetland creation/restoration sited compiled from the WRAPP including high priority WRAPP wetlands and those that will achieve the greatest sediment and nutrient load reductions.
High Priority Previously Planned Actions	N/A	Those actions identified in a previously completed plan. All actions are considered high priority and contain a master locator number or a previously established code.

* Basin wide site-specific actions. These recommendations are aggregated and mapped by jurisdiction.

Table 6-12: Summary of Site-Specific Actions by Priority

BMP TYPE	# OF PROJECTS				ACRES BENEFITED				UNIT OF PRACTICE			
	H	M	L	TOTAL	H	M	L	TOTAL	H	M	L	TOTAL
Bioswale	1	0	0	1	6.8	0	0	6.8	0.23 ac	0	0	0.23 ac
Debris Jam	4	11	1,444	1,459	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Detention Basin Retrofit	0	478	128	606	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge Point	111	68	0	179	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Field Border	43	0	0	43	1,029	0	0	1,029	64 ac	0	0	64 ac
Filter Strip	13	0	0	13	780	0	0	780	44 ac	0	0	44 ac
Grade Control	2	0	0	2	44	0	0	44	N/A	N/A	N/A	N/A
Grass Conversion	4	0	0	4	34	0	0	34	34 ac	0	0	34 ac
Grass Waterway	31	0	0	31	1,098	0	0	1,098	50 ac	0	0	50 ac
Hydraulic Structure	23	64	1	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lake Shoreline Stabilization	88	0	0	88	N/A	N/A	N/A	N/A	2.9 mi	0	0	2.9 mi
Permeable Pavement	1	0	0	1	1	0	0	1	1 ac	0	0	1 ac
Pond	0	0	4	4	286	0	0	286	N/A	N/A	N/A	N/A
Rain Barrel/Rain Garden	2	0	0	2	84	0	0	84	510 rain barrels, 250 rain gardens	0	0	510 rain barrels, 250 rain gardens
Sediment Forebay	3	0	0	3	3,890	0	0	3,890	900 ft	900 ft	900 ft	900 ft
Stormwater Management BMP	1	0	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stream Buffer	194	0	0	194	434	0	0	434	75 ac	0	0	75 ac

BMP TYPE	# OF PROJECTS				ACRES BENEFITED				UNIT OF PRACTICE			
	H	M	L	TOTAL	H	M	L	TOTAL	H	M	L	TOTAL
Stream Bank Stabilization	61	0	0	61	N/A	N/A	N/A	N/A	15.5 mi	0	0	15.5 mi
Swale/Open Channel	5	20	0	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Urban Detention	4	0	0	4	163	0	0	163	N/A	N/A	N/A	N/A
WASCoB	8	0	0	8	70	0	0	70	N/A	N/A	N/A	N/A
Wetland Creation/ Restoration	131	0	0	131	49,734	0	0	49,734	1,300 ac	0	0	1,300 ac
Totals	730	641	1,577	2,948	57,654	0	0	57,654	1,568 ac & 19 mi	0	0	1,568 ac & 19 mi

[1] This practice is located on SMC property and was completed in 2017
[2] Projects may identify multiple wetland restoration/creation sites

Table 6-13: Summary of Site-Specific Action Costs by Priority

BMP TYPE	ESTIMATED COST			
	H	M	L	TOTAL
Bioswale[1]	$150,282	$0	$0	$150,282
Debris Jam	$40,000 - $320,000	$110,000 - $880,000	$14,440,000 - $115,520,000	$14,590,000 - $116,720,000
Detention Basin Retrofit	$0	$2,390,000 - $23,900,000	$640,000 - $6,400,000	$3,030,000 - $30,300,000
Discharge Point	$555,000 - $3,330,000	$340,000 - $2,040,000	$0	$895,000 - $5,370,000
Field Border	$257,000	$0	$0	$257,000
Filter Strip	$175,360	$0	$0	$175,360
Grade Control	$16,000	$0	$0	$16,000
Grass Conversion	$135,200	$0	$0	$135,200
Grass Waterway	$400,000	$0	$0	$400,000
Hydraulic Structure	$230,000 - $1,840,000	$640,000 - $5,120,000	$10,000 - $80,000	$880,000 - $7,040,000
Lake Shoreline Stabilization	$1,550,833	$0	$0	$1,550,833
Permeable Pavement	$627,264	$0	$0	$627,264
Pond	$0	$0	$200,000	$200,000
Rain Barrel/Rain Garden	$915,800	$0	$0	$915,800
Sediment Forebay	$1,404,000	$0	$0	$1,404,000
Stormwater Management BMP	$250,000	$0	$0	$250,000

BMP TYPE	ESTIMATED COST			
	H	M	L	TOTAL
Stream Buffer	$301,104	$0	$0	$301,104
Stream Bank Stabilization	$32,834,536 - $41,084,536	$0	$0	$32,834,536 - $41,084,536
Swale/Open Channel	$25,000 - $150,000	$100,000 - $600,000	$0	$125,000 - $750,000
Urban Detention	$400,000	$0	$0	$400,000
WASCoB	$124,000	$0	$0	$124,000
Wetland Creation/Restoration	$103,998,098	$0	$0	$103,998,098
Total	$144,389,557 - $157,429,557	$3,580,000 - $32,540,000	$15,290,000 - $122,200,000	$163,259,477 - $312,169,477

[1] This practice is located on SMC property and was completed in 2017

Table 6-14: Summary of Acres of Recommended Basin-Wide Site-Specific Actions by Priority

BMP TYPE	ACRES OF PRACTICE			
	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	TOTAL
Cover Crops (CC)	15,204	3,097	42	18,343
Runoff Volume Reduction (RVR)	10,709	13,704	0	24,413
Nutrient Management (NU)	0	18,341	0	18,341
No-Till /Strip-Till (TIL)	9,771	2	1	9,775
Pasture Enhancement (PE)	0	134	1	135
Feed Area Management (FAM)	68	0	0	68
Wetland Creation/Restoration (WLR)	1,608	0	0	1,608
Wetland Enhancement (WLE)	0	1,217	0	1,217
Total	**43,176**	**30,719**	**4**	**73,900**

Table 6-15: Summary of Cost of Recommended Basin-Wide Site-Specific Actions by Priority

TYPE	ESTIMATED COST			
	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	TOTAL
Cover Crops (CC)	$440,042	$660,453	$41	$1,100,536
Runoff Volume Reduction (RVR)	$156,781,260	$200,628,932	$0	$357,410,192
Nutrient Management (NU)	$0	$366,822	$0	$366,822
No-Till /Strip-Till (TIL)	$342,011	$75	$33	$342,118
Pasture Enhancement (PE)	$0	$4,079,775	$42,239	$4,122,014
Feed Area Management (FAM)	$4,068,535	$0	$0	$4,068,535
Wetland Creation/Restoration (WLR)	$128,613,837	$0	$0	$128,613,837
Wetland Enhancement (WLE)	$36,499,279	$0	$0	$36,499,279
Total	**$326,744,964**	**$205,736,057**	**$42,313**	**$532,523,333**

6.3.1 Critical Area Actions

Critical areas are defined in Chapter 4. Actions addressing these critical areas will have the greatest value and benefit to the DPR planning area. Table 6-16 summarizes the critical area categories, relevant jurisdictions, and relevant actions. Jurisdictions can reference this table to review which critical areas are relevant. Figure 6-1 illustrates the critical areas in map format with jurisdictional boundaries. Site specific actions that fall within critical areas are considered high priority and are attributed with this information in the online mapping system and in Appendix N.

Table 6-16: Critical Area Categories, Jurisdictions, and General Actions

CRITICAL AREA CATEGORY	JURISDICTIONS	GENERAL RELEVANT ACTIONS
Critical Catchments (Aggregate)	**Townships:** Antioch, Avon, Benton, Ela, Fremont, Lake Villa, Libertyville, Newport, Vernon, Warren, West Deerfield, Wheeling **Municipalities:** Waukegan, Zion, Antioch, Beach Park, Bristol, Buffalo Grove, Deerfield, Grayslake, Green Oaks, Gurnee, Hawthorn Woods, Kildeer, Lake Zurich, Libertyville, Lindenhurst, Long Grove, Mundelein, Old Mill Creek, Riverwoods, Third Lake, Wadsworth, Wheeling **State/Forest Preserve:** Edward L. Ryerson, Red Wing Slough, Almond Marsh, Bristol Woods, Buffalo Creek, Casey Trail & Greenway, Dutch Gap, Ethel's Woods, Fourth Lake, Hastings Lake, Heron Creek, Independence Grove, Lake Carina, Mill Creek, Oak-Hickory, Pine Dunes, Potawatomi Woods, Prairie Stream, Raven Glen, Rollins Savanna, Sedge Meadow, Van Patten Woods, Wadsworth Savanna, Waukegan Savanna	Agricultural and urban BMPs, enhance and expand green infrastructure, wetland restoration restoration/creation and enhancement, maintain infiltration and hydrology of catchment, stream maintenance, detention basin retrofits, monitoring
Critical Catchments (Chloride)	**Townships:** Antioch, Ela, Fremont, Lake Villa, Libertyville, Palatine, Vernon, Warren, Wheeling **Municipalities:** Prospect Heights, Arlington Heights, Buffalo Grove, Grayslake, Gurnee, Indian Creek, Lake Villa, Libertyville, Lincolnshire, Lindenhurst, Long Grove, Mundelein, Palatine, Riverwoods, Vernon Hills, Wheeling **State/Forest Preserve:** MacArthur Woods, Buffalo Creek, Cahokia Flatwoods, Captain Daniel Wright Woods, Duck Farm, Edward L. Ryerson, Independence Grove, Lake Carina	Road Salt management and reduce application, detention/retention, monitoring,
Critical Catchments (PAHs)	**Townships:** Avon, Ela, Fremont, Libertyville, Northfield, Palatine, Vernon, Warren, West Deerfield, Wheeling **Municipalities:** Waukegan, Arlington Heights, Buffalo Grove, Deerfield, Grayslake, Gurnee, Indian Creek, Kildeer, Libertyville, Lincolnshire, Long Grove, Mettawa, Mundelein, Northbrook, Palatine, Riverwoods, Vernon Hills, Wheeling **State/Forest Preserve:** MacArthur Woods, Buffalo Creek, Cahokia Flatwoods, Captain Daniel Wright Woods, Dam No.1 Woods, Deer Grove, Edward L. Ryerson, Half Day, Lake Carina, Potawatomi Woods, Sedge Meadow, Wilmot Woods	Urban BMPs, detention/retention, general erosion control from urban areas, monitoring
Lakeshore Erosion	**Townships:** Antioch, Ela, Freemont, Lake Villa, Newport, Vernon and Warren Townships, Hastings Lake, Half Day, **Municipalities:** Kildeer, Libertyville, Lindenhurst, Long Grove, Mundelein, Third Lake, Vernon Hills **State/Forest Preserve:** McDonald Woods, Wadsworth Savanna, Buffalo Creek, Duck Farm, Hastings Lake	Stabilize severely eroding lake shorelines
Streambank Erosion	**Townships:** Newport, Warren, Avon, Libertyville, Vernon **Municipalities:** Waukegan, Buffalo Grove, Grayslake, Green Oaks, Gurnee, Mettawa, Old Mill Creek, Riverwoods, Wadsworth, Wheeling **State/Forest Preserve:** Cahokia Flatwoods, Captain Daniel Wright Woods, Independence Grove, Dam No.1 Woods, Potawatomi Woods	Stabilize severely eroding streambanks

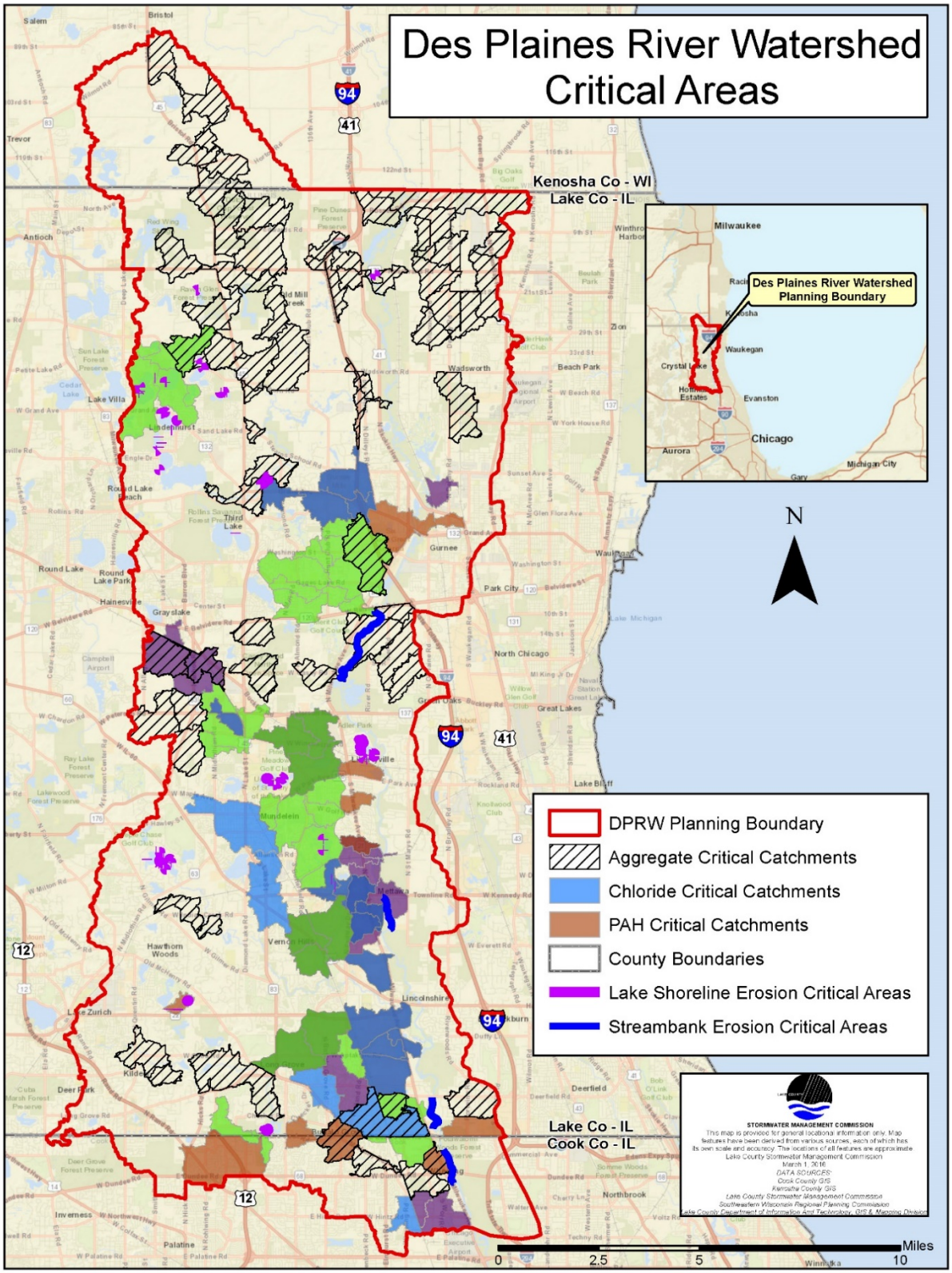

Figure 6-1: DPR Planning Area Critical Areas

6.3.2 Flood Problem Area Mitigation Actions

Lake County SMC has advanced progress towards flood mitigation efforts by inventorying and maintaining a database of flood problem areas as reported by watershed residents and stakeholders. Maps and summary information of the flood problem areas are included in Chapter 5, and this chapter intends to guide and direct actions to address the problems. There are 722 flood problem areas in the Lake County database, and 214 of these are located within the DPR planning area (Chapter 5). The Upper Des Plaines River, Buffalo Creek, Lower Des Plaines River and Indian Creek subwatersheds have the most reported problem areas (Table 6-17). It is not within the scope or objectives of this plan to assess each individual problem and propose specific mitigation actions, however it is important to enable jurisdictions and stakeholders to better understand the problems to address and prioritize actions. The flood problem area data was reviewed, and a planning-level GIS analysis was applied to guide and focus actions.

The mitigation projects are ranked as high (H), medium (M) and low (L) based on the type of flooding problem area reported, number of July 2017 flood incidents reported and the number of structures. Priorities given to flood problem area inventory sites from previous subwatershed-based plans (Buffalo Creek, Bull Creek-Bulls Brook, Mill Creek, North Mill-Dutch Gap, and Indian Creek) were carried over for this ranking process.

A high priority (H) was given to reported structural or roadway flooding on an annual basis or more and impacted the most residents, structural damage from flooding (type), structural flooding located in the floodplain and if the site locations impacted 5 structures or more. In total, the 176 high priorities included 2,308 structures. Medium priority (M) was applied to areas that had less frequent structural and roadway flooding and impacting fewer residents, and structural flooding that impacted less than 5 structures. In total, there were 328 medium priority sites with 1,031 structures. Low priority (L) was applied to Street/Driveway/Yard Flooding, and Sewer Backups. In total, there were 186 low priority sites with 281 structures. Some sites were classified as "V" for Verify from the Buffalo Creek Watershed-Based Plan for flood problem areas that had been mitigated to some degree (improvements have been completed at these sites to reduce or eliminate the flood damage). This prioritization exercise is for planning purposes only, all flood problem areas outlined in this plan warrant attention and have reported impacts. Indian Creek, Mill Creek, and the Upper Des Plaines subwatersheds have the greatest number of high priority actions.

Table 6-17: Summary of Flood Action Priorities by Subwatershed

SUBWATERSHED	FLOOD PROBLEM AREA INVENTORY SITES	JULY 2017 FLOOD INCIDENTS	# HIGH PRIORITY ACTIONS	# OF STRUCTURES
Aptakisic Creek	4	12	6	44
Buffalo Creek	57	9	12	382
Bull Creek – Bulls Brook	4	37	14	263
Indian Creek	26	107	37	729
Lower Des Plaines River	34	28	15	375
Mill Creek	15	137	49	741
Newport Drainage Ditch	11	3	1	116
North Mill Creek/Dutch Gap Canal	21	23	6	103
Upper Des Plaines River	42	130	36	953

6.3.2.1 Approach to Flood Mitigation Actions

Field reconnaissance is necessary to first evaluate the sites; this would be followed by a detailed flood study or drainage analysis in combination with some level of engineering design and property owner(s) input to define alternatives and the most feasible mitigation measures for a specific problem area.

Flood problems are often complex and require specialized expertise; numerical modeling is sometimes necessary to adequately understand and diagnose the problem and design solutions. Flood mitigation activities also require a comprehensive understanding of regulations, local ordinances, and floodplain management. Professional engineers, certified floodplain managers and stormwater managers need to be engaged in addressing flooding problems and the design of mitigation solutions.

An important action recommendation is to avoid a strict focus of directly addressing flood problems alone; a more holistic approach should be adopted to consider the flood problem locations and integrating these issues in all planning, permitting, development, and infrastructure processes so that the issues can potentially be addressed, and precautions can be taken so the problems do not worsen. It is also important to consider the toolbox of programmatic recommendations, preventative mitigation strategies and industry standard structural and non-structural flood mitigation best practices which are discussed in Chapter 5.

Section 6.3.6 defines actions based on jurisdictions, and Appendix N includes supporting details for each of the sites.

6.3.3 Potential Regional Flood Storage Sites

Based on the analysis presented and illustrated in Chapter 5, there are 53 potential regional storage locations identified in the watershed with a total potential storage of 1,485 acre-feet.

Table 6-18 outlines the potential storage by subwatershed, and a feasibility study is recommended for each of the sites to evaluate the cost and benefit of increasing or creating flood storage in these areas. Prioritization should be considered for sites that would benefit flood problem areas.

Storage at most of these sites could potentially be created in the watershed by constructing berms and performing moderate grading and excavation. It is important to note that significantly more storage is available in the watershed in existing open water lakes and large wetland complexes; however, these areas were excluded from this analysis in order to focus on previously unidentified areas. Section 5.6 identifies existing regional storage locations in the planning area. Section 6.3.6.6 further details potential regional flood storage actions by jurisdiction.

Table 6-18: Potential Flood Storage by Subwatershed

SUBWATERSHED	# POTENTIAL STORAGE SITES	TOTAL ESTIMATED POTENTIAL STORAGE (acre-feet)
Aptakisic Creek	6	99
Buffalo Creek	5	61
Bull Creek	4	199
Bulls Brook	-	-
Newport Drainage Ditch	-	-
North Mill Creek/Dutch Gap Canal	18	519

SUBWATERSHED	# POTENTIAL STORAGE SITES	TOTAL ESTIMATED POTENTIAL STORAGE (acre-feet)
Indian Creek	6	244
Lower Des Plaines River	1	43
Mill Creek	8	173
Upper Des Plaines River	5	147
TOTAL	**53**	**1,485**

6.3.4 Potential Wetland Enhancement and Restoration Sites

As described in Chapter 3, the Wetland Restoration and Protection Plan (WRAPP) identified specific opportunities for the enhancement of existing wetlands and the restoration or creation of wetlands or those that are potentially restorable. These wetlands were evaluated, based on priority and developed into site-specific and basin-wide site-specific actions; the WRAPP provided scoring totals from which to select high priority sites. Existing wetlands, suitable for enhancement are summarized below based on their priority. As with restoration/creation, the WRAPP dataset provided scoring totals from which to select high priority enhancement sites.

6.3.4.1 Wetland Enhancement

Wetland enhancement can be described as those existing wetlands that could benefit from remedial actions that enhance their extent or function. Existing wetlands include those that are on publicly owned open space parcels identified as farmed, excavated, ditched, drained, channelized, or spoil/disposal areas. A total of 16,639 acres of existing wetland are identified in the WRAPP. While nearly all wetlands in the DPR planning area would likely benefit from some enhancement or management activity, 1,214 acres can be considered high priority for enhancement; this represents 7% of the total acreage (Figure 6-2). The highest percentage of wetland enhancement area (as a fraction of total existing wetland area) is found within the Aptakisic and Bull Creek subwatershed. The greatest total area of high priority wetland enhancement is within Mill Creek and the Upper Des Plaines River (8). High priority sites are further quantified in section 6.3.6.

Table 6-19: Wetland Enhancement by Subwatershed

SUBWATERSHED	WETLAND ENHANCEMENT (acres)	HIGH PRIORITY (acres)	% TOTAL ENHANCEMENT
Aptakisic Creek	203	51	25%
Buffalo Creek	861	21	2.5%
Bull Creek	671	202	30%
Bull's Brook	317	4	1.2%
North Mill Creek/Dutch Gap Canal	3,267	126	3.9%
Indian Creek	1,841	49	2.7%
Lower Des Plaines River	1,760	70	3.9%
Mill Creek	2,523	299	11%
Newport Drainage Ditch	607	45	7.4%
Upper Des Plaines River	4,590	348	7.6%
TOTAL	**16,639**	**1,216**	**7.3%**

Wetland enhancement sites are also located within critical area catchments. A total of 4,561 wetland acres are contained within a critical area catchment; this represents 27% of all existing wetland acres. Thirteen percent of all high priority wetland enhancement sites are located in a critical area catchment; the greatest percentage and total area is found within the Mill Creek and Bull Creek subwatersheds (Table 6-20).

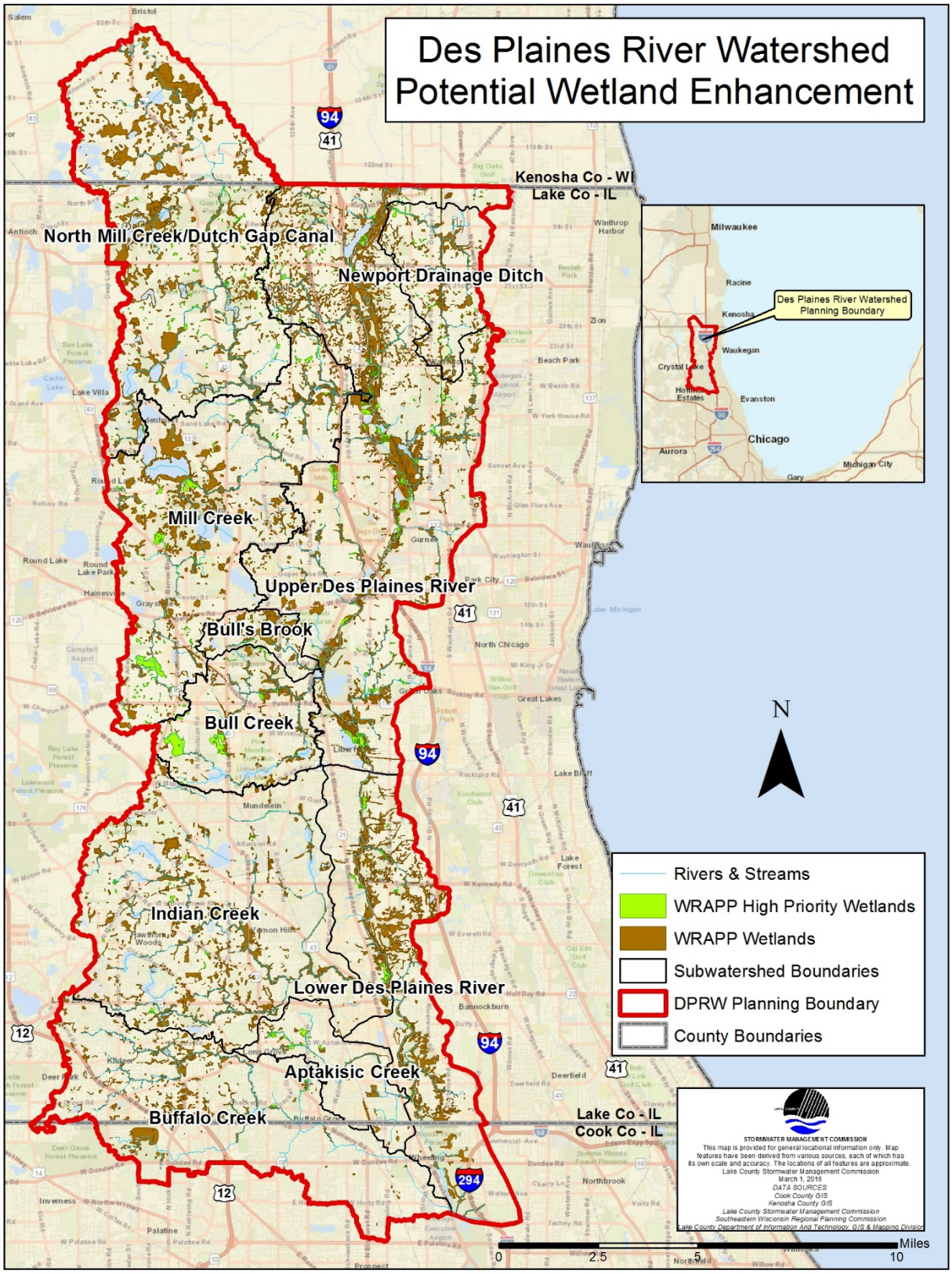

Figure 6-2: WRAPP Potential Wetland Enhancement

Table 6-20: Wetland Enhancement by Critical Area Catchment

SUBWATERSHED	WETLANDS IN CRITICAL CATCHMENTS (acres)	HIGH PRIORITY ENHANCEMENT IN CRITICAL CATCHMENTS (acres)	% OF TOTAL WETLAND AREA
Aptakisic Creek	202	51	25%
Buffalo Creek	272	16	5.8%
Bull Creek	340	149	44%
Bull's Brook	71	0.41	0.6%
North Mill Creek/Dutch Gap Canal	1,300	81	6.2%
Indian Creek	223	11	5.0%
Lower Des Plaines River	314	10	3.3%
Mill Creek	442	141	32%
Newport Drainage Ditch	342	32	9.3%
Upper Des Plaines River	1,057	116	11%
TOTAL	**4,561**	**607**	**13%**

6.3.4.2 Wetland Restoration/Creation

Wetland restoration/creation locations are predictors of the best places to attempt wetland restoration based on historic wetland conditions and existing land use/land cover; although not necessarily specific land management practices or behaviors. A selection of potentially restorable wetland restoration/creation locations were given high priority and were used to generate site-specific actions as well as general basin-wide site-specific actions. Expected annual load reductions were generated for both. For basin-wide site-specific actions, all WRAPP "high priority" wetlands excluding site-site specific locations were selected from the dataset; annual expected load reductions were calculated for the footprint of each location. These wetlands and the methodology used to choose site-specific locations are further described in Section 6.3.6 and summarized below.

The DPR planning area contains a total of 11,714 acres of potentially restorable wetlands of which 2,261 acres (19%) are considered high priority (Figure 6-3); the highest percentage of high priority potential wetland restoration acreage (as a percentage of subwatershed total potential wetland restoration acreage) is found within the Aptakisic and Bull Creek subwatersheds. The greatest total high priority potential wetland restoration acreage area is within Buffalo Creek and Indian Creek (**Error! Reference source not found.**). A total of 6,909 locations were identified as potential for restoration/creation, of which 636 or 9% are high priority.

Table 6-21: Wetland Restoration/Creation by Subwatershed

SUBWATERSHED	TOTAL RESTORATION / CREATION (acres)	HIGH PRIORITY (acres)	% TOTAL RESTORATION / CREATION
Aptakisic Creek	289	236	81%
Buffalo Creek	2,448	514	21%
Bull Creek	439	169	39%
Bull's Brook	92	33	36%
North Mill Creek/Dutch Gap Canal	3,100	377	12%
Indian Creek	1,539	472	31%
Lower Des Plaines River	404	59	15%
Mill Creek	1,085	96	8.9%
Newport Drainage Ditch	597	48	8%
Upper Des Plaines River	1,720	257	15%
TOTAL	**11,714**	**2,261**	**19%**

Wetland restoration/creation sites are also distributed within critical area catchments. A total of 5,578 acres are contained within a critical area catchment; this represents 48% of all restoration/creation acres. Twenty-one percent of all high priority sites are in critical area catchments; the greatest percentage is found in the Aptakisic and Bull's Brook subwatershed and the greatest total area within Aptakisic, Buffalo Creek, and Indian Creek (Table 6-22).

Table 6-22: Wetland Restoration/Creation by Critical Area Catchments

SUBWATERSHED	RESTORATION/CREATION IN CRITICAL CATCHMENTS (acres)	HIGH PRIORITY IN CRITICAL CATCHMENTS (acres)	% TOTAL ENHANCEMENT
Aptakisic Creek	289	235	81%
Buffalo Creek	1,295	253	20%
Bull Creek	280	134	48%
Bull's Brook	48	26	55%
North Mill Creek/Dutch Gap Canal	1,548	197	13%
Indian Creek	464	235	51%
Lower Des Plaines River	131	4.8	3.7%
Mill Creek	335	6.6	2.0%
Newport Drainage Ditch	396	19	4.7%
Upper Des Plaines River	792	81	10%
TOTAL	**5,578**	**1,191**	**21%**

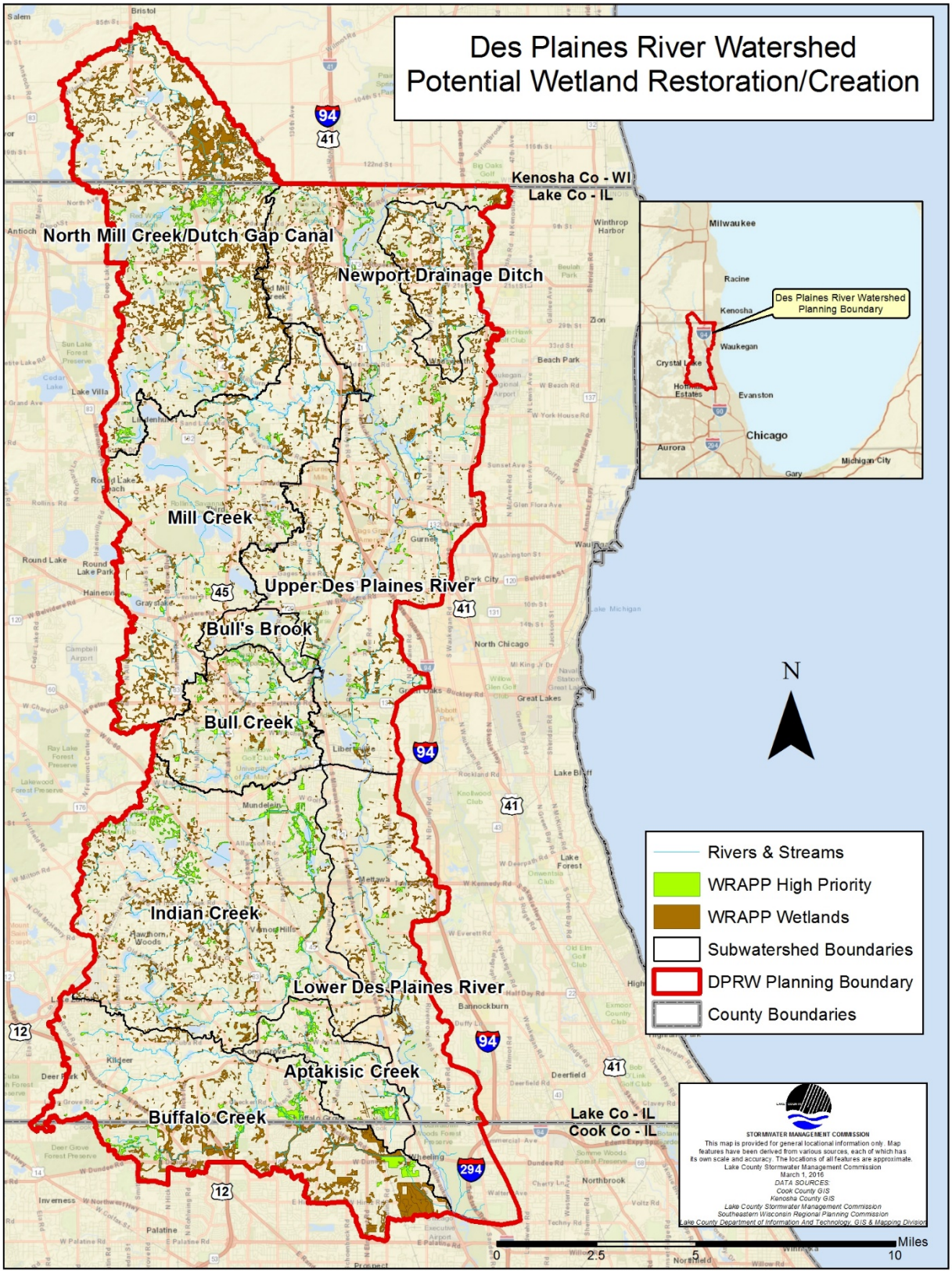

Figure 6-3: WRAPP Potential Wetland Restoration/Creation

For site-specific actions, strategic wetland restoration/creation locations were selected from the "high-priority" sites, evaluated individually and expected annual load reductions were generated for the entire drainage area to the potential wetland restoration/creation site. The following criteria were used to prioritize sites:

1. Sites within the top 20% highest nutrient and sediment loading catchments.
2. Wetlands predicted to have high functional significance for at two of the following functions: floodwater storage, nutrient retention, sediment retention, baseflow maintenance, streambank/shoreline stabilization, and carbon sequestration; and area greater than 1 acre.
3. Those not within the top 20% highest nutrient and sediment loading catchments but have a total score of 4 or greater.
4. Those wetlands greater than 10 acres in size.

Following prioritization, each individual wetland polygon was modified to fit current site constraints, drainage areas were delineated, a unique ID was applied, and annual expected load reductions were calculated. These wetlands are considered site-specific and are summarized in Section 6.3.6 and Chapter 7 and detailed by jurisdiction in Appendix N.

6.3.5 Green Infrastructure

The stormwater green infrastructure analysis detailed in section 4.4 was used as the basis to create a series of hubs and corridors that connect open space parcels to provide stormwater management, flood mitigation, economic, and biodiversity conservation benefits for the DPR planning area. Hubs and corridors either consist of existing GI, or they are areas which can be integrated into the current GI network. Using the data developed for the stormwater green infrastructure analysis, hubs were selected using the following criteria:

1. Parcel prioritization: highest priority parcels with a score of 10 or greater, adjacent to one another; these adjacent parcels were dissolved into individual polygons and anything greater than 140 acres (average size) were selected.
2. Protected parcels found in state parks, forest preserves, Illinois nature preserves, and the Illinois Natural Areas Inventory.

Using these criteria, hubs were identified in each subwatershed except Aptakisic Creek. Due to the highly developed character of the subwatershed, Aptakisic Creek contained no areas meeting either criterion. As a result, hubs in this subwatershed were manually selected from protected private and public parcels, parcels with wetlands recommended for enhancement or restoration under the WRAPP analysis, and parcels with open areas which could be converted to natural areas and protected from further development. Following the creation of hubs, corridors were selected using the following criteria:

1. Stormwater GI Parcel prioritization: highest priority parcels with a score of 9 or greater, larger than 10 acres and adjacent to one another.
2. Protected parcels found in state parks, forest preserves, Illinois nature preserves, and the Illinois Natural Areas Inventory.
3. Parcels adjacent to streams with medium to high parcel priority with a score of 5 or greater.
4. Open areas with medium to high parcel priority with a score of 5 or greater, such as row crops, wetlands, grasslands, or forest.

Corridors were further selected from parcels adjacent to streams designated as medium to high priority. Due to development density in many sections of the watershed, riparian corridors and adjacent open spaces may be the only feasible areas to serve as corridor connections. Corridors were created until every hub had at least one corridor connecting it to an adjacent hub.

6.3.5.1 Hubs

The majority of hubs are found in the northern third of the watershed which contains the greatest amount of land devoted to public protected areas such as preserves and parks; conversely, the lower two thirds are more urbanized and developed, with a lower density of lands under protection. Protected areas classified as a state park, forest preserve, Illinois nature preserves, or an Illinois Natural Area are located within one or more hubs in each subwatershed except Aptakisic Creek. The greatest number of hubs are located in the North Mill/Dutch Gap Canal and the Upper Des Plaines subwatersheds, and the greatest total area is found within the North Mill/Dutch Gap Canal subwatershed (Table 6-23).

Within all hubs, there is a greater number and area of protected parcels than unprotected and most of the protected land is publicly owned (Table 6-243). Hubs contain 97 miles of streams and 21 miles of trails although only 58 out of 97 stream miles are within protected parcels. Hubs include all or a portion of 25% of the total acres of wetlands and 38% of the total acres of potentially restorable wetlands.

Due to the lack of natural areas and the limited protection status of parcels forming hubs within the Aptakisic Creek subwatershed, it is recommended that implementation of stormwater green infrastructure BMPs and/or protection be pursued for suitable locations. Furthermore, large expanses of the planning area lack “natural” areas (e.g., the southern Bull Creek, eastern Indian Creek, and eastern and western ends of Buffalo Creek subwatersheds). These areas should be considered for future creation of naturalized green infrastructure or implementation of BMPs that mimic “natural” (rather than urban) hydrology. Within hubs across the DPR planning area, parcels with protected status containing land uses such as agriculture and developments such as golf courses could be naturalized or enhanced with BMPs in the future.

6.3.5.2 Corridors

Many of the identified corridors follow streams and serve as natural riparian areas, although only 30% of stream miles within corridors are considered protected. All identified corridors contain both a higher number and acreage of unprotected, privately owned parcels overall (Table 6-24). Selected corridors contain 58 miles of streams and 24 miles of trails; however, only 17 stream miles are within parcels considered protected. Corridors intersect or completely contain 100 WRAPP wetlands and 72 potentially restorable wetlands. Altogether, corridors intersect or contain 19% of the total acres of WRAPP wetlands and 7% of the total acres of potentially restorable wetlands.

An issue with corridor connectivity between hubs throughout the watershed is caused by major roadways. Additionally, there is little connectivity between hubs in the southwest and northwest DPR planning area. For example, no corridors directly connect hubs in the Indian Creek and Bull Creek subwatersheds, although the two subwatersheds are adjacent.

Enhancing and protecting corridors along riparian areas, especially those adjacent to unprotected stream sections, will improve water quality and help preserve and enhance biodiversity. Riparian corridor buffers

should be restored to widths which benefit not only water quality but also benefit aquatic and terrestrial life. Corridor parcels identified within open or partially open space such as agricultural land can be restored to natural land cover types more easily. Furthermore, enhancing existing and restoring/creating wetlands within corridors will mitigate impacts from stormwater, improve water quality, and provide critical habitat components.

Most corridors identified along the Des Plaines River have protected status and connect protected hubs along the river. For these corridors, stormwater green infrastructure in unprotected parcels should be prioritized for enhancement and protection. Across the DPR planning area (outside of the Des Plaines River corridor), few parcels within corridors are under protection. Unprotected corridors should be prioritized for restoration or enhancement of stormwater green infrastructure to preserve critical connections between hubs. All corridor parcels within Newport Drainage Ditch are considered unprotected; protection and enhancement of corridors within this subwatershed should also receive priority.

Figure 6-4 shows locations of hubs and corridors throughout the watershed, and Figure 6-5 depicts hubs and corridors by parcel.

Table 6-23: Hub Number and Total Area per Subwatershed

SUBWATERSHED	# OF HUBS	AREA (acres)
Aptakisic Creek	2	412
Buffalo Creek	4	1,097
Bull Creek	2	535
Bull's Brook	1	782
Indian Creek	6	1,125
Lower Des Plaines River	7	3,828
Mill Creek	5	4,109
Newport Drainage Ditch	3	614
North Mill Creek/Dutch Gap Canal	10	8,558
Upper Des Plaines River	12	5,756
TOTAL	**46**	**12,011**

Table 6-24: Hubs and Corridors Land Owndership andProtections Status by Parcels and Acerage

LAND OWNERSHIP TYPE	PROTECTION STATUS	HUBS		CORRIDORS		TOTAL PARCELS	TOTAL ACRES
		PARCELS	ACRES	PARCELS	ACRES		
Private Land	Protected	49	837	32	254	81	1,091
	Unprotected	678	8,264	847	5,417	1,525	13,681
Public Land	Protected	1,059	17,685	371	3,676	1,430	21,361
	Unprotected	7	30	1	0.34	8	30
	TOTAL	**1,793**	**26,815**	**1,251**	**9,347**	**3,044**	**36,163**

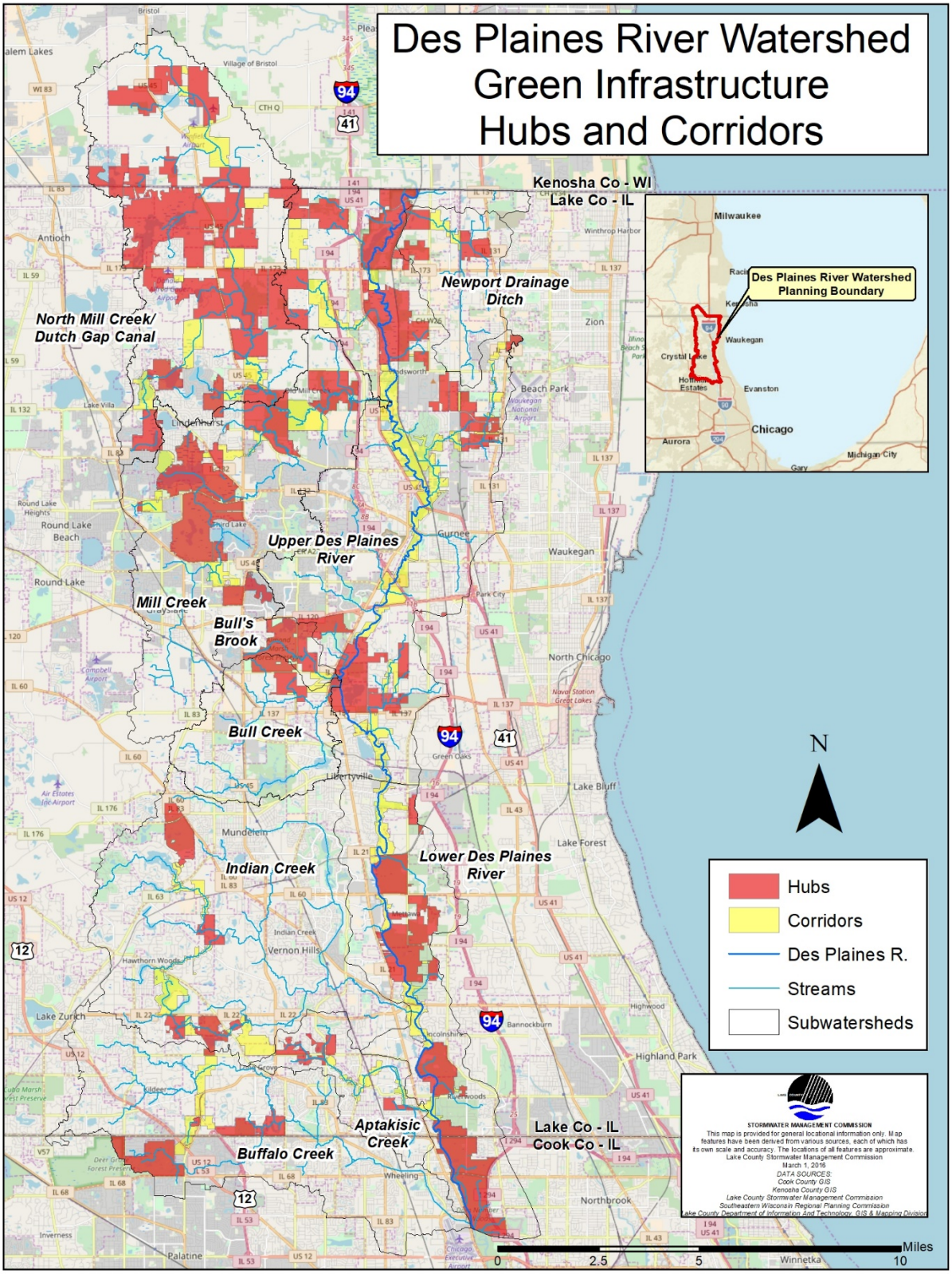

Figure 6-4: DPR Planning Area Green Infrastructure Hubs and Corridors

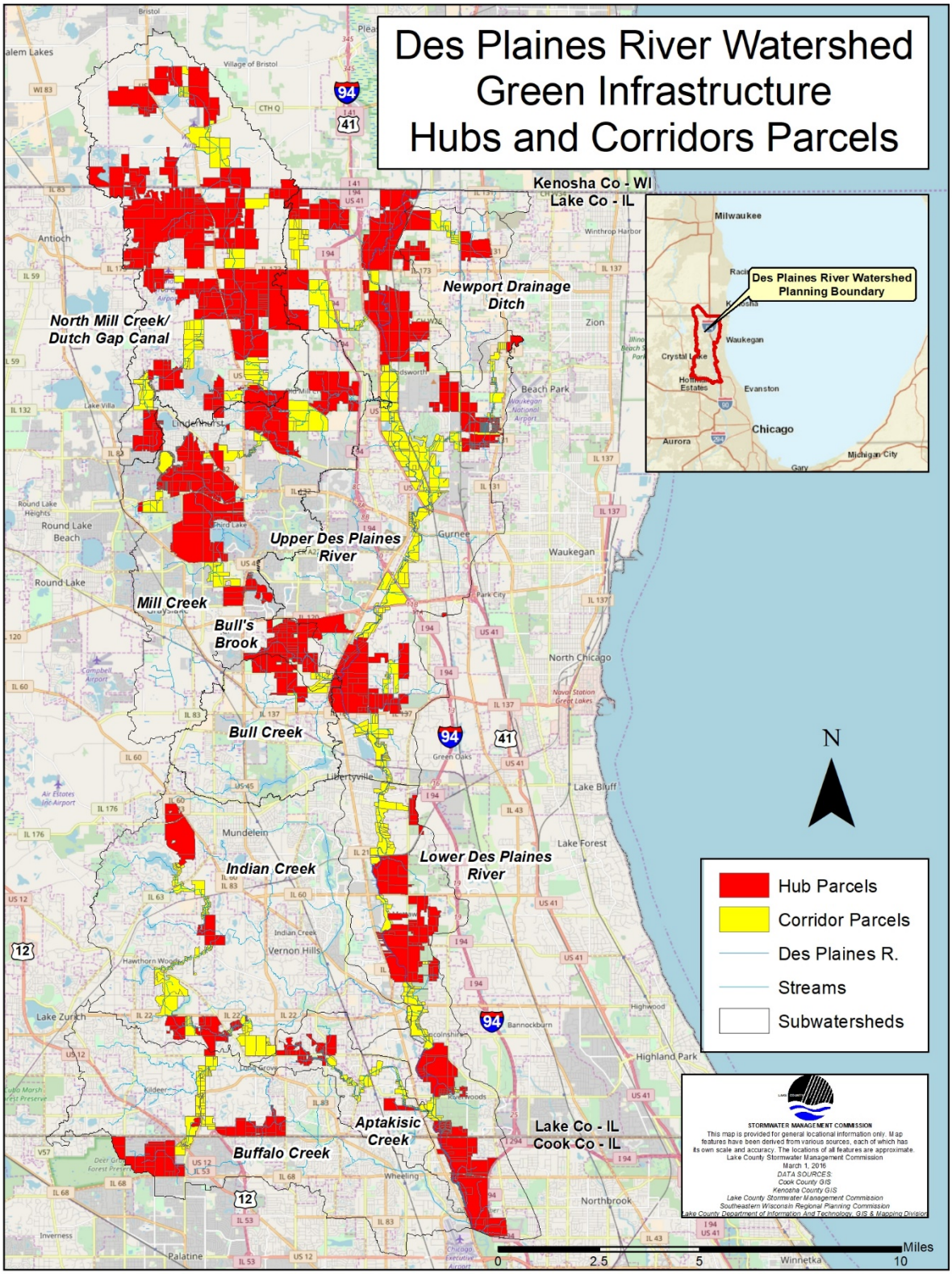

Figure 6-5: DPR Planning Area Green Infrastructure Hubs and Corridors Parcels

6.3.6 Site-Specific Actions By Jurisdiction

The following section summarizes previously planned actions and new project specific recommendations or actions for each jurisdictional area within the DPR planning area. Due to the large number of practices, specific details on individual actions are included in Appendix N and available through the Lake County SMC web application. Appendix N therefore includes tables containing specific actions by jurisdiction, subwatershed, and catchment; these tables include unique action item codes, type, a description, catchment, subwatershed, quantities and units, cost estimates (if applicable), coordinates, priority status and timeline, critical catchment status, plan goals addressed, supporting partners, implementation status, and load reductions if applicable.

This section is organized by major action category: previously planned high priority actions, site-specific practices, basin-wide site-specific actions, problem discharge locations, problem hydraulic impediments and detention basin retrofits, and flood problem areas and regional flood storage.

6.3.6.1 Previously Planned High Priority Actions

Site-specific actions were compiled by SMC from previous watershed-based plans and are presented by jurisdiction. All items are considered high priority and they are not inclusive of all other actions from previous watershed-based plans. Other subwatershed-based plans can be referenced for a complete list. Table 6-25 and Figure 6-6 summarize and display the high priority actions from previous plans' major categories. There are a total of 688 high priority practices spanning 35 individual jurisdictions. Stormwater infrastructure practices account for 30% of all actions, followed by detention basin retrofit's (24%) and stream and lake bank maintenance and restoration (23%).

Table 6-25: Previously Planned High Priority Action Summary

JURISDICTION	BMP[1]	DETENTION BASIN RETROFIT	STORMWATER INFRASTRUCTURE [2]	STREAM & LAKE BANK MAINTENANCE & RESTORATION[3]	DRAINAGE [4]	OTHER [5]	TOTAL
	# OF ACTIONS						
VILLAGE/MUNICIPALITY							
City of Lake Forest	0	0	2	0	0	0	2
City of Park City	0	0	0	0	0	0	0
City of Prospect Heights	0	0	0	0	0	0	0
City of Waukegan	0	0	0	0	0	0	0
City of Zion	0	0	0	0	0	0	0
Village of Salem Lakes	0	0	0	0	0	0	0
Village of Antioch	0	0	2	0	0	0	2
Village of Arlington Heights	2	4	0	0	0	0	6
Village of Beach Park	0	0	0	0	0	0	0
Village of Bristol	0	0	27	0	0	0	27
Village of Buffalo Grove	0	19	5	7	3	0	34
Village of Deer Park	0	12	1	0	0	0	13
Village of Deerfield	0	0	0	0	0	0	0

JURISDICTION	BMP[1]	DETENTION BASIN RETROFIT	STORMWATER INFRASTRUCTURE [2]	STREAM & LAKE BANK MAINTENANCE & RESTORATION[3]	DRAINAGE [4]	OTHER [5]	TOTAL
	# OF ACTIONS						
Village of Glenview	0	0	0	0	0	0	0
Village of Grayslake	31	6	25	6	3	5	76
Village of Green Oaks	0	0	0	0	0	0	0
Village of Gurnee	2	3	0	1	0	0	6
Village of Hainesville	0	0	0	0	0	0	0
Village of Hawthorn Woods	0	1	8	5	4	0	18
Village of Indian Creek	0	1	3	0	0	0	4
Village of Kildeer	5	13	0	1	2	0	21
Village of Lake Villa	0	0	0	0	0	0	0
Village of Lake Zurich	2	15	1	0	1	0	19
Village of Libertyville	11	24	5	15	1	0	56
Village of Lincolnshire	0	6	6	1	0	0	13
Village of Lindenhurst	2	5	12	3	0	0	22
Village of Long Grove	2	4	11	5	3	0	25
Village of Mettawa	0	0	0	0	0	0	0
Village of Mundelein	5	8	7	20	0	0	40
Village of Northbrook	0	0	0	0	0	0	0
Village of Old Mill Creek	0	0	21	0	0	1	22
Village of Palatine	0	3	0	0	0	0	3
Village of Riverwoods	0	0	0	0	0	0	0
Village of Round Lake Beach	0	0	0	0	0	0	0
Village of Round Lake Park	0	0	0	0	0	0	0
Village of Third Lake	0	1	2	1	0	0	4
Village of Vernon Hills	3	30	0	10	1	0	44
Village of Wadsworth	0	0	0	0	0	0	0
Village of Wheeling	1	7	6	0	6	0	20
TOWNSHIP							
Antioch	0	0	5	0	0	0	5
Avon	1	0	1	2	0	0	4
Benton	0	0	0	0	0	0	0
Ela	1	0	3	4	5	0	13
Fremont	10	0	0	3	3	0	16
Lake Villa	1	0	2	8	0	0	11
Libertyville	6	3	4	22	0	0	35
Newport	2	0	2	0	0	0	4

JURISDICTION	BMP[1]	DETENTION BASIN RETROFIT	STORMWATER INFRASTRUCTURE [2]	STREAM & LAKE BANK MAINTENANCE & RESTORATION[3]	DRAINAGE [4]	OTHER [5]	TOTAL
	# OF ACTIONS						
Northfield	0	0	0	0	0	0	0
Palatine	0	3	0	0	0	0	3
Vernon	1	0	0	4	2	0	7
Warren	5	0	6	14	1	0	26
Waukegan	0	0	0	0	0	0	0
West Deerfield	0	0	0	0	0	0	0
Wheeling	0	0	0	0	1	0	1
STATE OF ILLINOIS/FOREST PRESERVE DISTRICT							
Lake County Forest Preserve District	16	0	35	13	3	3	70
Forest Preserve District of Cook County	0	0	0	0	0	0	0
State of Illinois	0	0	0	0	0	1	1
TOTAL ACTIONS	**111**	**168**	**205**	**155**	**39**	**10**	**688[6]**

[1] Includes the following: agriculture, bioretention, buffers, retention basin, filter strip, grass waterway, rain garden, stormwater pond, stormwater wetland, WASCoB, wetland restoration. [2] Includes the following: culvert, outfall maintenance, problem hydraulic structure, problem outfall, stormwater infrastructure, stormwater infrastructure retrofit, maintenance. [3] Includes the following: debris and sediment removal, lake shoreline stabilization, streambank stabilization, stream maintenance and restoration. [4] Includes the following: flood problem resolution, regional detention facility. [5] Includes the following: dam removal, open space, restoration, comprehensive, unknown. [6] Some practices may overlap such as streambank stabilization that can span multiple jurisdictions

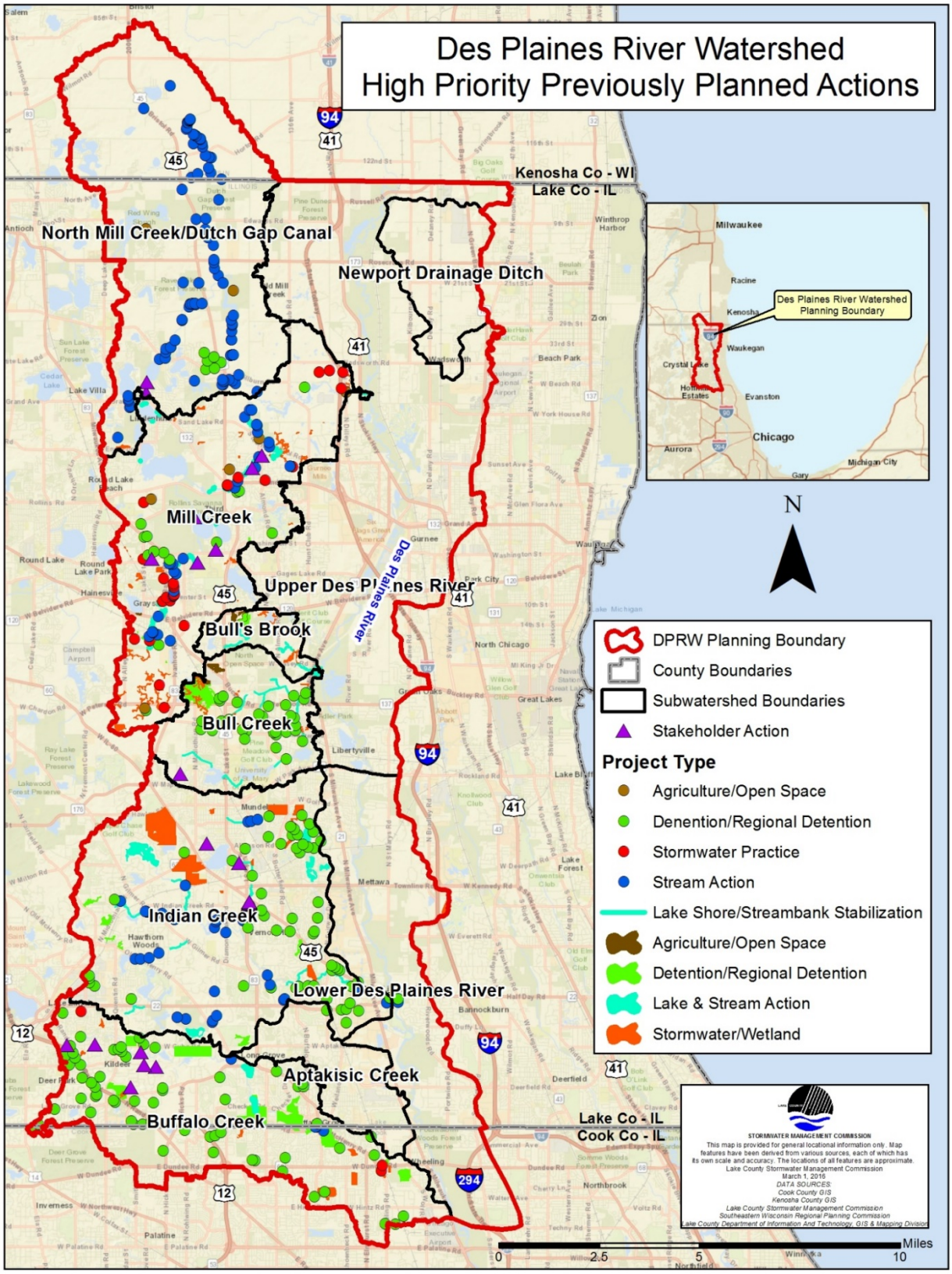

Figure 6-6: Des Plaines River Watershed High Priority Previously Planned Actions

6.3.6.2 Site-Specific Actions

Site-specific actions are comprised of **new** project recommendations and are based on lake and stream inventories, coordination with stakeholders and project opportunities identified during windshield surveys. The practice applies to a single specific geographic location. This section also includes stakeholder recommendations tied to a physical location. Table 6-265 summarizes all new actions by jurisdiction; a detailed table of each individual action item (SSD, SBD, DSB, DLD, DWS, and DST), complete with all applicable attributes is located in Appendix N. Figure 6-7 shows the location of all site-specific practices and Figure 6-8 depicts the locations identified by watershed stakeholders during the planning process. It is important to note that many of the actions align with recommendations developed from DRWW monitoring efforts, designed specifically to address causes and sources of biological impairments.

The Village of Old Mill Creek contains the greatest recommended area of field borders, grass conversion and grassed waterways; 19 acres of filter strips and stream buffers are located in the Village of Wadsworth. Warren Township and the Forest Preserve Districts contain the greatest cumulative length of streambank and lake shoreline stabilization, 164 acres of potentially restorable wetlands are located in the Village of Vernon Hills and 130 acres on FPD property. Two out of the 3 recommended in-lake sediment forebays are in Mundelein, Wadsworth contains the most water and sediment control basins (WASCoBs) and the majority of new site-specific urban BMPs are in Mundelein as well. Finally, there are a total of 118 location-specific stakeholder actions comprised of additional water quality, lake and stream restoration, flood damage reduction, and infrastructure projects.

Table 6-26: New Site-Specific Action Summary

JURISDICTION	FIELD BORDERS / GRASS COVERSION/ GRASSED WATERWAY	FILTER STRIPS / STREAM BUFFERS	LAKE BANK/ STREAMBANK STABILIZATION [1]	WETLAND RESTORATION / CREATION	SEDIMENT FOREBAY[2] / GENERAL STORMWATER MANAGEMENT	GRADE CONTROL / WASCoB / POND	URBAN BMPS[6]	GENERAL STAKEHOLDER
	ACRES	ACRES	FEET	ACRES	#	#	#	#
MUNICIPALITY								
City of Lake Forest	0	0	0	0	0	0	0	0
City of Park City	0	0	0	7.3	0	0	0	0
City of Prospect Heights	0	0	0	0	0	0	0	0
City of Waukegan	2	6.9	1,045	60	0	0	0	3
City of Zion	0.6	2.5	0	5.6	0	0	0	0
Village of Salem Lakes	1.2	0	0	0	0	0	0	0
Village of Antioch	0	0	0	1	0	0	0	0
Village of Arlington Heights	0	0	0	0	0	0	0	0
Village of Beach Park	0	0.3	0	2.4	0	0	0	2
Village of Bristol	13	1.8	0	61	0	0	0	0
Village of Buffalo Grove	0	11	37	174	0	0	1	1

JURISDICTION	FIELD BORDERS / GRASS COVERSION/ GRASSED WATERWAY	FILTER STRIPS / STREAM BUFFERS	LAKE BANK/ STREAMBANK STABILIZATION [1]	WETLAND RESTORATION / CREATION	SEDIMENT FOREBAY[2] / GENERAL STORMWATER MANAGEMENT	GRADE CONTROL / WASCoB / POND	URBAN BMPS [6]	GENERAL STAKEHOLDER
	ACRES	ACRES	FEET	ACRES	#	#	#	#
Village of Deer Park	0	0	0	0	0	0	0	0
Village of Deerfield	0	0	0	0	0	0	0	0
Village of Glenview	0	0	0	0	0	0	0	0
Village of Grayslake	9.3	1.8	0	108	0	0	0	2
Village of Green Oaks	0	0	0.0	1.2	0	1	0	0
Village of Gurnee	0	6	8,820	39	0	0	0	3
Village of Hainesville	0	0	0	0.0	0	0	0	0
Village of Hawthorn Woods	0	3.8	809	18	0	2	2	3
Village of Indian Creek	0	0	0.1	0	0	0	0	0
Village of Kildeer	0	0	628	0	0	0	0	2
Village of Lake Villa	0	0	0	0.2	0	0	0	0
Village of Lake Zurich	0	0	963	15	0	0	0	2
Village of Libertyville	2.3	0	6,903	63	0	0	0.2 (ac)	12
Village of Lincolnshire	0	0.8	541	11	0	0	0	3
Village of Lindenhurst	0.6	0	1,622	5.4	0	0	0	2
Village of Long Grove	6.6	1.2	1,036	71	0	0	1.2 (ac)	22
Village of Mettawa	0	0	597	2.9	0	0	0	0
Village of Mundelein	23	4.7	485	68	3[3]	0	521[4]	12
Village of Northbrook	0	0	0	0	0	0	0	0
Village of Old Mill Creek	29	0.5	0	65	0	2	0	2
Village of Palatine	0	0	0	0	0	0	0	0
Village of Riverwoods	0	0	3,306	2	0	0	0	0
Village of Round Lake Beach	0	0	0	0	0	0	0	0
Village of Round Lake Park	0	0	0	0	0	0	0	0
Village of Third Lake	0	4.8	73	0	0	0	0	2
Village of Vernon Hills	5.3	9.6	1,211	164	0	0	0	2

JURISDICTION	FIELD BORDERS / GRASS COVERSION/ GRASSED WATERWAY	FILTER STRIPS / STREAM BUFFERS	LAKE BANK/ STREAMBANK STABILIZATION [1]	WETLAND RESTORATION / CREATION	SEDIMENT FOREBAY[2] / GENERAL STORMWATER MANAGEMENT	GRADE CONTROL / WASCoB / POND	URBAN BMPS [6]	GENERAL STAKEHOLDER
	ACRES	ACRES	FEET	ACRES	#	#	#	#
Village of Wadsworth	8.4	19	966	15	0	16	0	5
Village of Wheeling	0	2.8	0	42	0	0	1	0
TOWNSHIP								
Antioch	1.7	0	235	8.7	0	0	0	0
Avon	0	2.7	4,051	0	0	0	0	1
Benton	0	0	0	0	0	0	0	0
Ela	0.9	5.8	113	7.6	1	2	0	3
Fremont	7.3	16	998	14	0	0	240[5]	10
Lake Villa	3.5	0	1,041	3.8	0	6	0	0
Libertyville	11	2.6	1,711	36	0	1	0	8
Newport	6.3	6.4	67	27	0	0	0	0
Northfield	0	0	0	0	0	0	0	0
Palatine	0	0	0	0	0	0	0	0
Vernon	0	5.8	1,607	49	0	0	0	1
Warren	6.8	0	18,642	13	0	6	0	5
Waukegan	0	0	0	0.6	0	0	0	0
West Deerfield	0	0	0	0	0	0	0	0
Wheeling	0	0	0	0	0	0	0	0
STATE OF ILLINOIS/FOREST PRESERVE DISTRICT								
Lake County Forest Preserve District	8.4	6.6	35,036	130	0	1	0	9
Forest Preserve District of Cook County	0	0	4,912	0	0	0	0	0
State of Illinois	1	0	0	0	0	0	0	0
TOTAL ACTIONS	**149**	**123**	**97,455**	**1,292**	**4**	**37**	**766**	**118**

[1] Streambank stabilization also requires riffle structures; riffle counts are listed by bank ID in Appendix N. [2] All in-lake dams are estimated at 300 ft in length. [3] Village of Mundelein includes 2-in-lake dams, 1 general stromwater management stakeholder recommendation. [4] Village of Mundelein includes 1 urban detention basin, 350 rain barrels and 170 rain gardens. [5] Freemont Township includes 160 rain barrels and 8 rain gardens. 6 Urban BMPs include: permeable/porous pavement, bioswale, detention basin, rain barrels and rain gardens; the biswale project was completed in 2017.

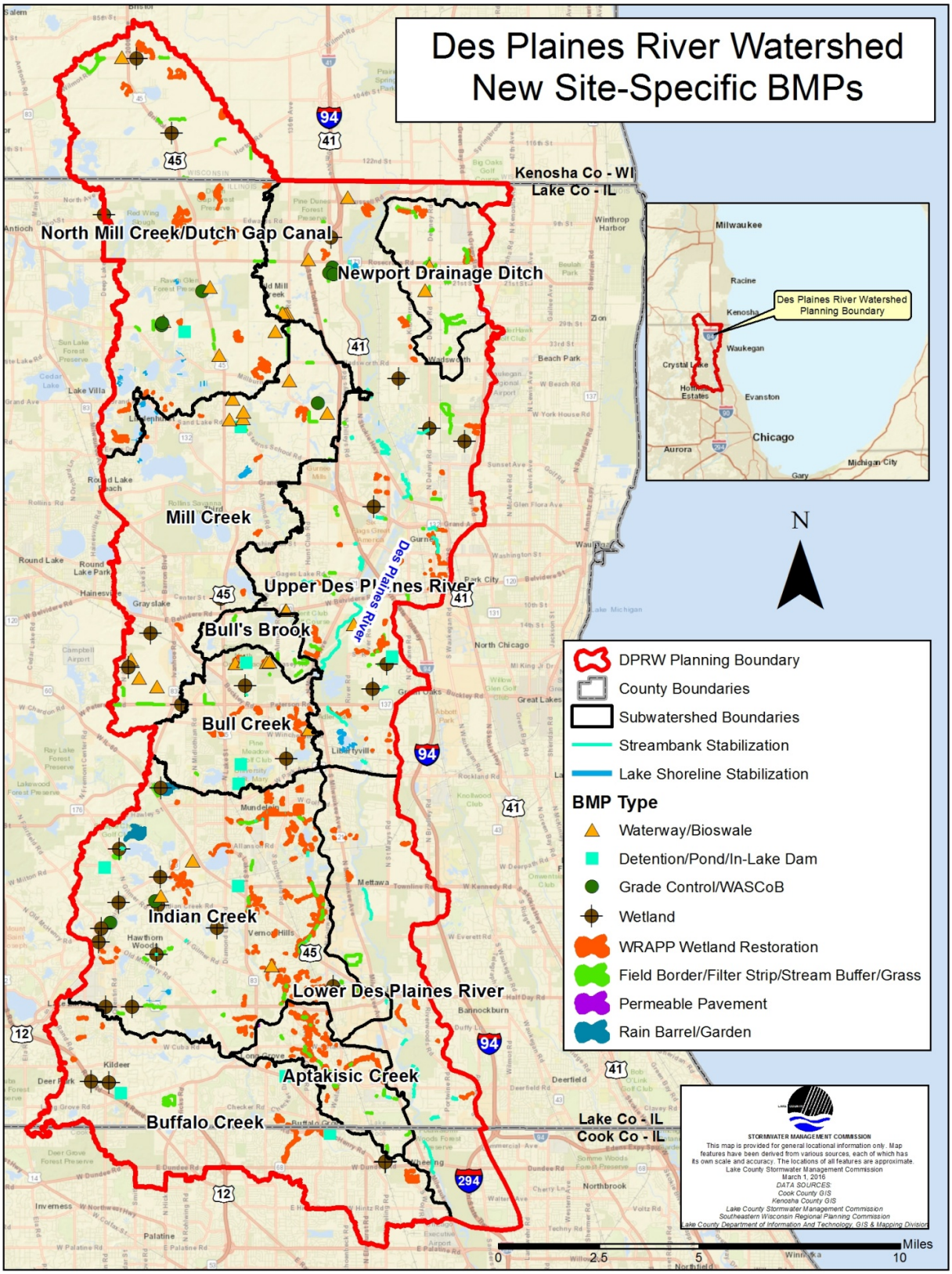

Figure 6-7: Des Plaines Watershed New Site-Specific BMPs

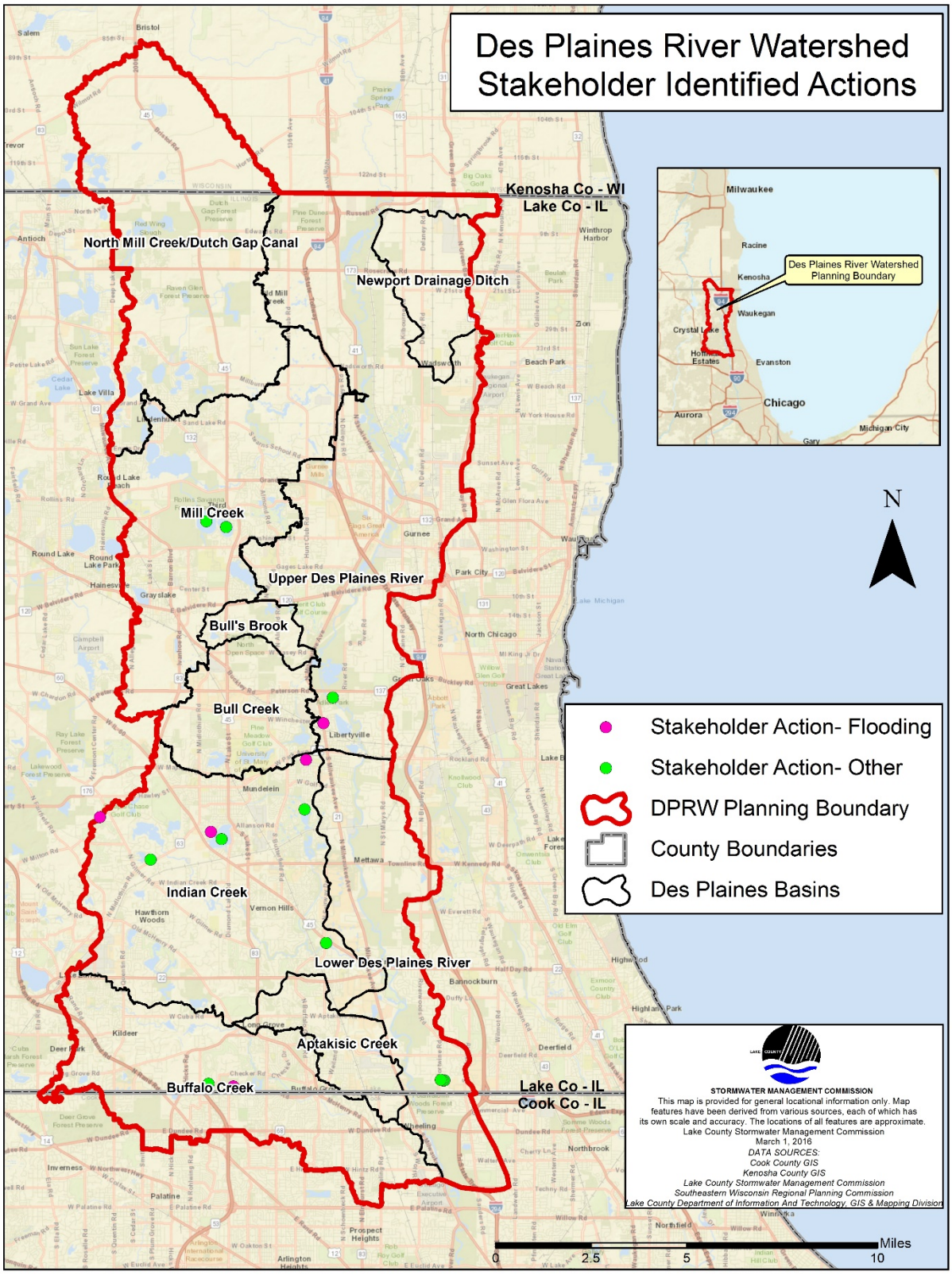

Figure 6-8: Des Plaines River Watershed Stakeholder Identified Actions

6.3.6.3 Basin-Wide Site-Specific Actions

Basin-wide site-specific project recommendations are those practices that can be implemented at specific geographic locations, but for which there are a wide array of opportunities across the planning area. They are based on GIS analysis and although they are "site specific," they are mapped across a large geographic area.

Table 6-27 summarizes all basin-wide site-specific actions by jurisdiction; detailed tables of each individual action item, by jurisdiction, complete with all applicable attributes is located in Appendix N. Figure 6-9 shows the location of all basin-wide site-specific practices. Many actions align with recommendations developed from DRWW monitoring efforts, designed specifically to address causes and sources of biological impairments.

Table 6-27: Basin-Wide Site-Specific Action Summary by Jurisdiction

JURISDICTION	COVER CROPS / TILLAGE	NUTRIENT MGMT.	PASTURE/ FEED AREA ENHANCE.	RUNOFF VOLUME REDUCTION	ROAD SALT MGMT.	WETLAND REST/ CREATE	WETLAND ENHANCE
	AREA (ACRES)						
MUNICIPALITY							
City of Lake Forest	0	0	0	25	19	0	0
City of Park City	0	0	0	65	33	0	1
City of Prospect Heights	0	0	0	178	52	0	0
City of Waukegan	696	512	7	291	231	15	29
City of Zion	196	115	0	36	53	32	0.5
Village of Salem Lakes	545	290	5	139	48	0	0
Village of Antioch	480	234	0	59	101	12	3
Village of Arlington Heights	0	0	0	203	143	32	0
Village of Beach Park	128	123	4	209	114	8	10
Village of Bristol	6,023	3,442	37	418	215	2	0
Village of Buffalo Grove	42	24	0	1,437	1,060	324	47
Village of Deer Park	18	9	0	164	126	5	0.1
Village of Deerfield	0	0	0	0	4	0	0
Village of Glenview	0	0	0	1	1	0	0
Village of Grayslake	1,702	1,260	14	920	661	46	156
Village of Green Oaks	29	28	0.1	244	82	4	10
Village of Gurnee	74	67	0	1,590	879	58	34
Village of Hainesville	0	0	0	1	1	0	0
Village of Hawthorn Woods	230	143	0.9	560	243	11	9
Village of Indian Creek	0	0	0	83	24	0	0
Village of Kildeer	36	29	0	473	296	1	2
Village of Lake Villa	44	22	0	3	24	0.7	0.7
Village of Lake Zurich	14	14	0	360	308	11	0
Village of Libertyville	163	88	0	1,966	86	91	22
Village of Lincolnshire	46	23	0	661	270	3	7
Village of Lindenhurst	389	197	0	493	441	8	6

JURISDICTION	COVER CROPS / TILLAGE	NUTRIENT MGMT.	PASTURE/ FEED AREA ENHANCE.	RUNOFF VOLUME REDUCTION	ROAD SALT MGMT.	WETLAND REST/ CREATE	WETLAND ENHANCE
	AREA (ACRES)						
Village of Long Grove	710	485	1	1,319	671	107	31
Village of Mettawa	4	4	2	214	136	0	2
Village of Mundelein	160	108	0	1,824	558	87	109
Village of Northbrook	0	0	0	192	122	0	0
Village of Old Mill Creek	4,664	2,932	1	216	173	0.1	78
Village of Palatine	0	0	0	655	169	6	0
Village of Riverwoods	0	0	0	436	155	0	0
Village of Round Lake Beach	0	0	0	139	65	5	3
Village of Round Lake Park	40	29	0	3	1	0	0.1
Village of Third Lake	18	18	0	52	50	0.3	2
Village of Vernon Hills	160	80	0	1,227	597	174	7
Village of Wadsworth	977	685	33	952	356	14	28
Village of Wheeling	122	61	0	1,899	621	138	0
TOWNSHIP							
Antioch	1,878	1,200	21	156	87	29	30
Avon	99	54	0	73	31	0	11
Benton	150	82	0.6	0.3	2	0.8	1
Ela	436	298	2	317	77	5	10
Fremont	723	648	5	510	106	13	89
Lake Villa	542	346	1	613	165	0.4	15
Libertyville	665	401	0.5	490	77	100	18
Newport	2,780	1,809	53	525	283	20	68
Northfield	0	0	0	123	21	0	0
Palatine	0	0	0	0	10	0.26	0
Vernon	154	110	0	263	135	115	5
Warren	691	510	9	1,370	523	23	20
Waukegan	0	0	0	65	11	0	0
West Deerfield	0	0	0	0	0.7	0	0
Wheeling	0	0	0	79	19	1	0
STATE OF ILLINOIS/FOREST PRESERVE DISTRICTS							
Lake County Forest Preserve District	2,266	1,851	7	60	34	670	349
Forest Preserve District of Cook County	0	0	0	62	0	74	0
State of Illinois	15	15	0	1	1	15	1
TOTALS	**28,142**	**18,362**	**203**	**24,414**	**10,798**	**2,261**	**1,215**

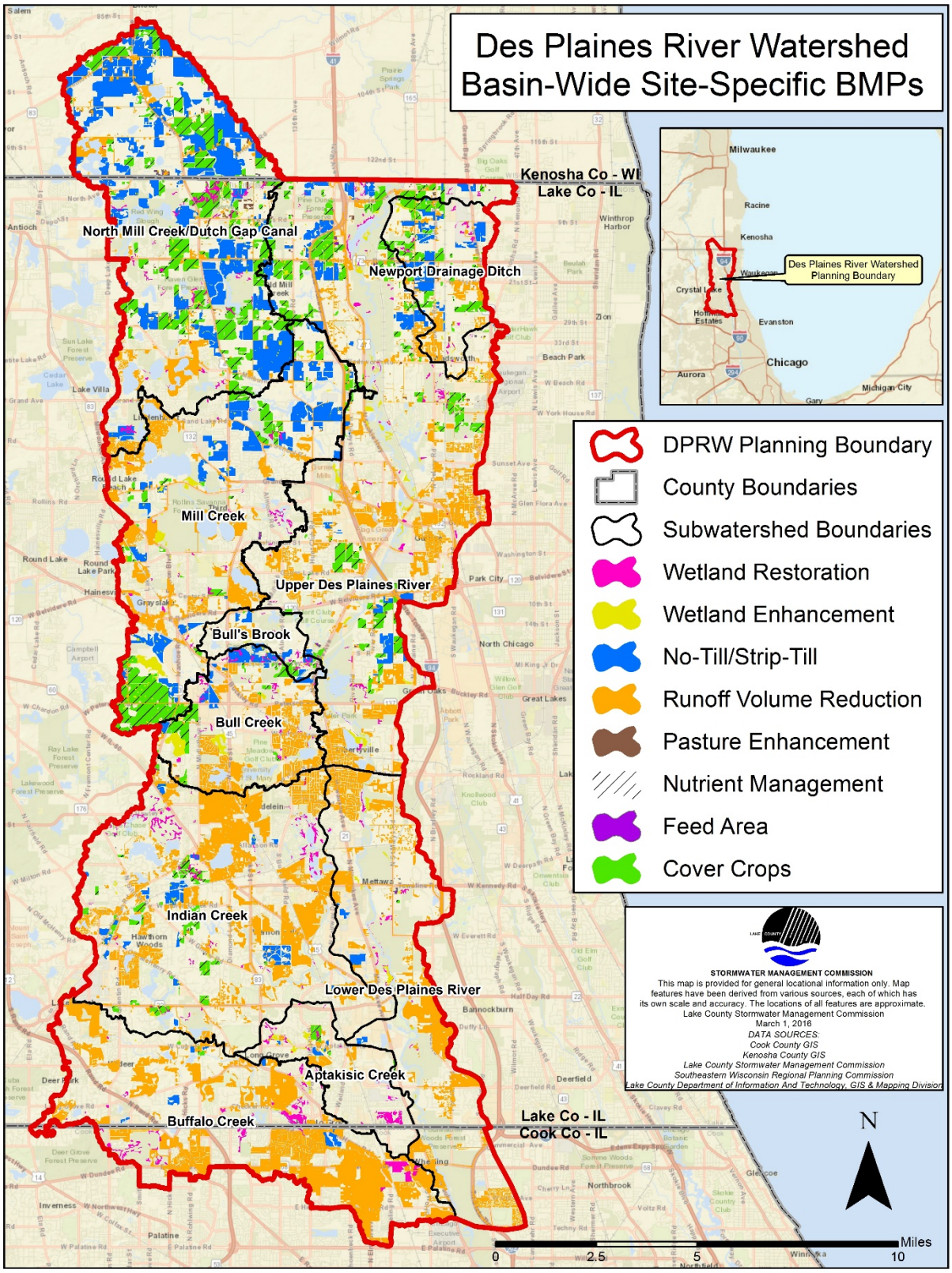

Figure 6-9: Des Plaines River Watershed Basin-Wide Site-Specific BMPs

6.3.6.4 Problem Discharge Locations, Problem Hydraulic Impediments, and Detention Basin Retrofits

Problem discharge locations represent potential maintenance or repair needs related to direct discharges to streams in the DPR planning area, captured by SMC staff during a stream inventory. Problem discharge locations include both outlet structures and open swales. Problem hydraulic impediments represent any notable issues that impede the conveyance and function of a waterway, also captured by SMC staff during a stream inventory. Hydrologic impediments include both debris jams and problem hydraulic structures.

Detention basin retrofit recommendations are based on a detention basin inventory completed by SMC and include maintenance and actions to improve or enhance basin function. All actions presented in this section include updated data from older subwatershed-based plans and newly acquired data from the recent assessment effort. Figure 6-10 shows all hydraulic impediments, problem discharge locations, and detention basin retrofits.

The Village of Gurnee and Libertyville contain the greatest total number of problem discharge locations, the Village of Long Grove and the Lake County FPD contain the greatest number of problem hydraulic impediments; 426 instances of debris jams were identified on FPD property. A total of 135 detention basin retrofit opportunities are located in Gurnee and 79 in the Village of Buffalo Grove (Table 6-28).

Table 6-28: Problem Discharge, Hydraulic Impediment, and Detention Basin Retrofit Summary by Jurisdiction

JURISDICTION	PROBLEM DISCHARGE LOCATIONS		PROBLEM HYDRAULIC IMPEDIMENT		DETENTION BASIN RETROFIT	TOTAL
	OUTLET STRUCTURE	OPEN CHANNEL/SWALE	DEBRIS JAM	HYDRAULIC STRUCTURE		
	# OF ACTIONS					
VILLAGE/MUNICIPALITY						
City of Lake Forest	0	0	0	0	1	1
City of Park City	5	0	14	1	1	21
City of Prospect Heights	0	0	0	0	0	0
City of Waukegan	12	1	40	3	51	107
City of Zion	0	0	11	1	19	31
Village of Salem Lakes	0	0	0	0	0	0
Village of Antioch	0	0	0	0	0	0
Village of Arlington Heights	0	0	0	0	0	0
Village of Beach Park	0	0	9	1	10	20
Village of Bristol	0	0	0	0	2	2
Village of Buffalo Grove	9	1	37	2	79	128
Village of Deer Park	0	0	0	0	1	1
Village of Deerfield	0	0	0	0	0	0
Village of Glenview	0	0	0	0	0	0
Village of Grayslake	1	0	0	2	14	17
Village of Green Oaks	5	0	12	3	7	27
Village of Gurnee	42	3	115	4	135	299
Village of Hainesville	0	0	0	0	0	0

JURISDICTION	PROBLEM DISCHARGE LOCATIONS		PROBLEM HYDRAULIC IMPEDIMENT		DETENTION BASIN RETROFIT	TOTAL
	OUTLET STRUCTURE	OPEN CHANNEL/SWALE	DEBRIS JAM	HYDRAULIC STRUCTURE		
	# OF ACTIONS					
Village of Hawthorn Woods	7	1	37	8	15	68
Village of Indian Creek	0	0	0	0	3	3
Village of Kildeer	2	0	15	5	3	25
Village of Lake Villa	0	0	0	0	0	0
Village of Lake Zurich	0	1	17	1	12	31
Village of Libertyville	24	5	12	1	40	82
Village of Lincolnshire	5	1	16	0	24	46
Village of Lindenhurst	0	0	0	0	5	5
Village of Long Grove	12	2	206	6	28	254
Village of Mettawa	1	0	37	2	1	41
Village of Mundelein	5	0	25	5	33	68
Village of Northbrook	0	0	0	0	8	8
Village of Old Mill Creek	0	0	0	1	0	1
Village of Palatine	0	0	0	0	1	1
Village of Riverwoods	5	1	17	1	8	32
Village of Round Lake Beach	0	0	0	0	1	1
Village of Round Lake Park	0	0	0	0	0	0
Village of Third Lake	0	0	0	0	1	1
Village of Vernon Hills	7	0	47	3	47	104
Village of Wadsworth	3	0	108	6	19	136
Village of Wheeling	0	0	0	0	10	10
TOWNSHIP						
Antioch	0	0	0	0	0	0
Avon	0	0	0	0	0	0
Benton	0	0	0	0	1	1
Ela	2	1	1	1	7	12
Fremont	1	0	48	3	3	55
Lake Villa	0	0	0	0	0	0
Libertyville	8	3	51	10	4	76
Newport	2	0	35	4	1	42
Northfield	0	0	0	0	0	0
Palatine	0	0	0	0	1	1
Vernon	6	0	24	2	9	41
Warren	9	0	70	7	49	135
Waukegan	0	0	0	0	0	0
West Deerfield	0	0	0	0	0	0

JURISDICTION	PROBLEM DISCHARGE LOCATIONS		PROBLEM HYDRAULIC IMPEDIMENT		DETENTION BASIN RETROFIT	TOTAL
	OUTLET STRUCTURE	OPEN CHANNEL/SWALE	DEBRIS JAM	HYDRAULIC STRUCTURE		
	# OF ACTIONS					
Wheeling	0	0	4	0	0	4
STATE OF ILLINOIS/FOREST PRESERVE DISTRICT						
Lake County Forest Preserve District	7	5	421	5	3	441
Forest Preserve District of Cook County	1	0	5	0	0	6
State of Illinois	0	0	25	0	1	26
TOTAL ACTIONS	**181**	**25**	**1,459**	**88**	**658**	**2,411**

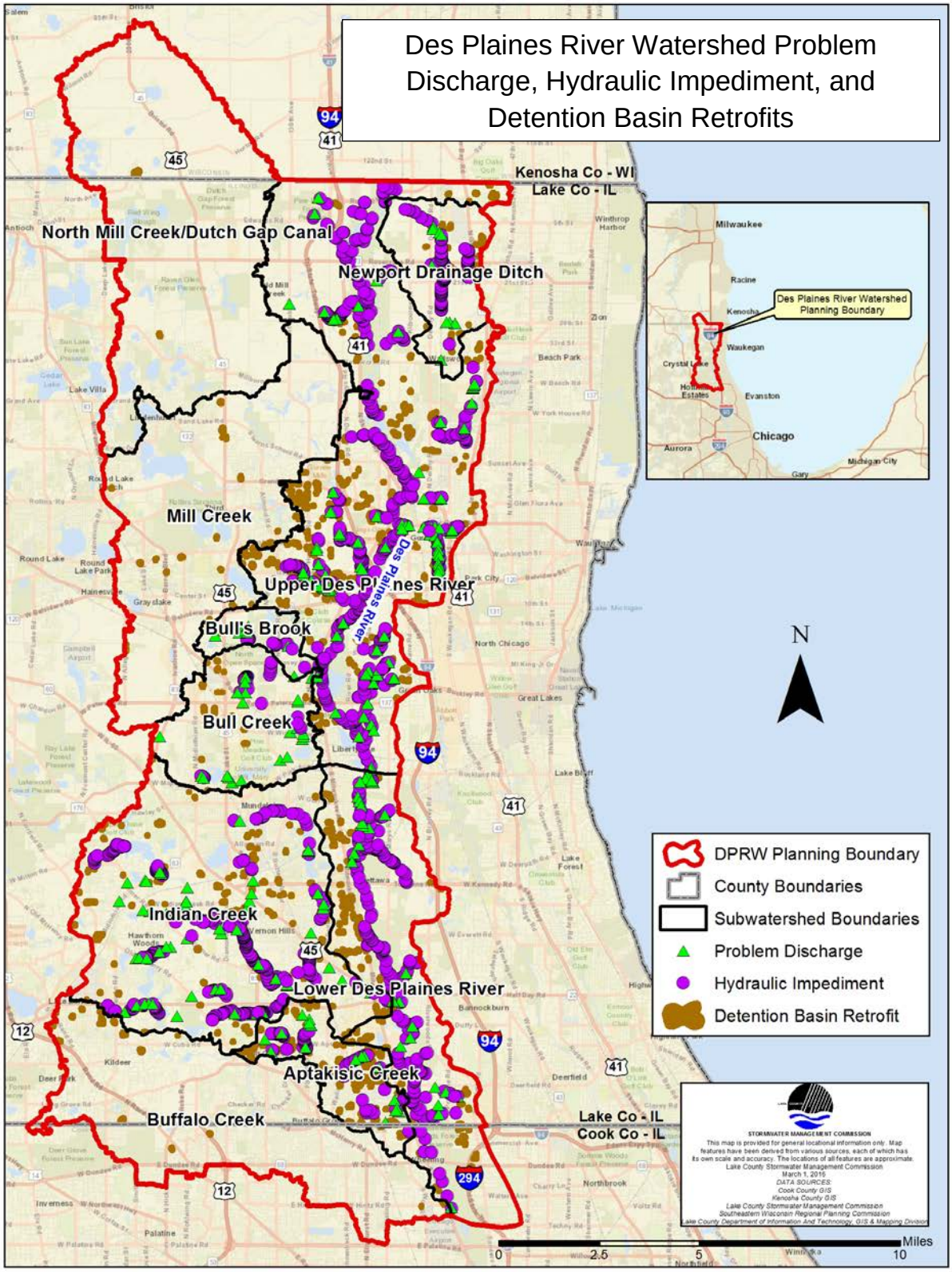

Figure 6-10: Des Plaines River Watershed Problem Discharge, Hydraulic Impediment, and Detention Basin Retrofits

6.3.6.5 Flood Problem Area Mitigation

Table 6-29, Table 6-30 and Table 6-31 summarize the flood problem areas and the July 2017 flood incidents within each jurisdiction. It is important to note that some of the flood problem areas inventory sites overlap with reported flood problems from the July 2017 flood event (see Chapter 5, Figure 5-8).

Figure 6-11 shows the distribution of flood problem are inventory sites throughout the DPR planning area.

There are 176 high priority action projects (sites), which include 2,308 structures and spread across 20 municipalities and 10 townships (Table 6-29). Mundelein, Grayslake, Libertyville, Gurnee and Warren Township have the greatest documented need for flood mitigation actions and have the greatest number of high priority actions.

Table 6-29: Summary of High Priority Flood Mitigation Actions by Jurisdiction

JURISDICTION	# OF HIGH PRIORITY PROJECTS	ESTIMATED # OF AFFECTED STRUCTURES
Avon Township	1	1
Fremont Township	4	24
Lake Villa Township	7	28
Libertyville Township	5	144
Newport Township	4	80
Northfield Township	2	70
Vernon Township	4	20
Village of Beach Park	1	1
Village of Buffalo Grove	8	22
Village of Grayslake	23	293
Village of Green Oaks	3	3
Village of Gurnee	15	65
Village of Hainesville	1	2
Village of Hawthorn Woods	2	2
Village of Lake Zurich	3	19
Village of Libertyville	17	484
Village of Lincolnshire	1	1
Village of Lindenhurst	4	33
Village of Long Grove	5	5
Village of Mettawa	1	2
Village of Mundelein	24	396
Village of Riverwoods	4	24
Village of Third Lake	2	23
Village of Vernon Hills	4	20
Village of Wadsworth	1	7
Village of Waukegan	3	32
Village of Wheeling	5	232
Warren Township	19	262
Waukegan Township	2	7
Wheeling Township	1	6
TOTAL	**176**	**2,308**

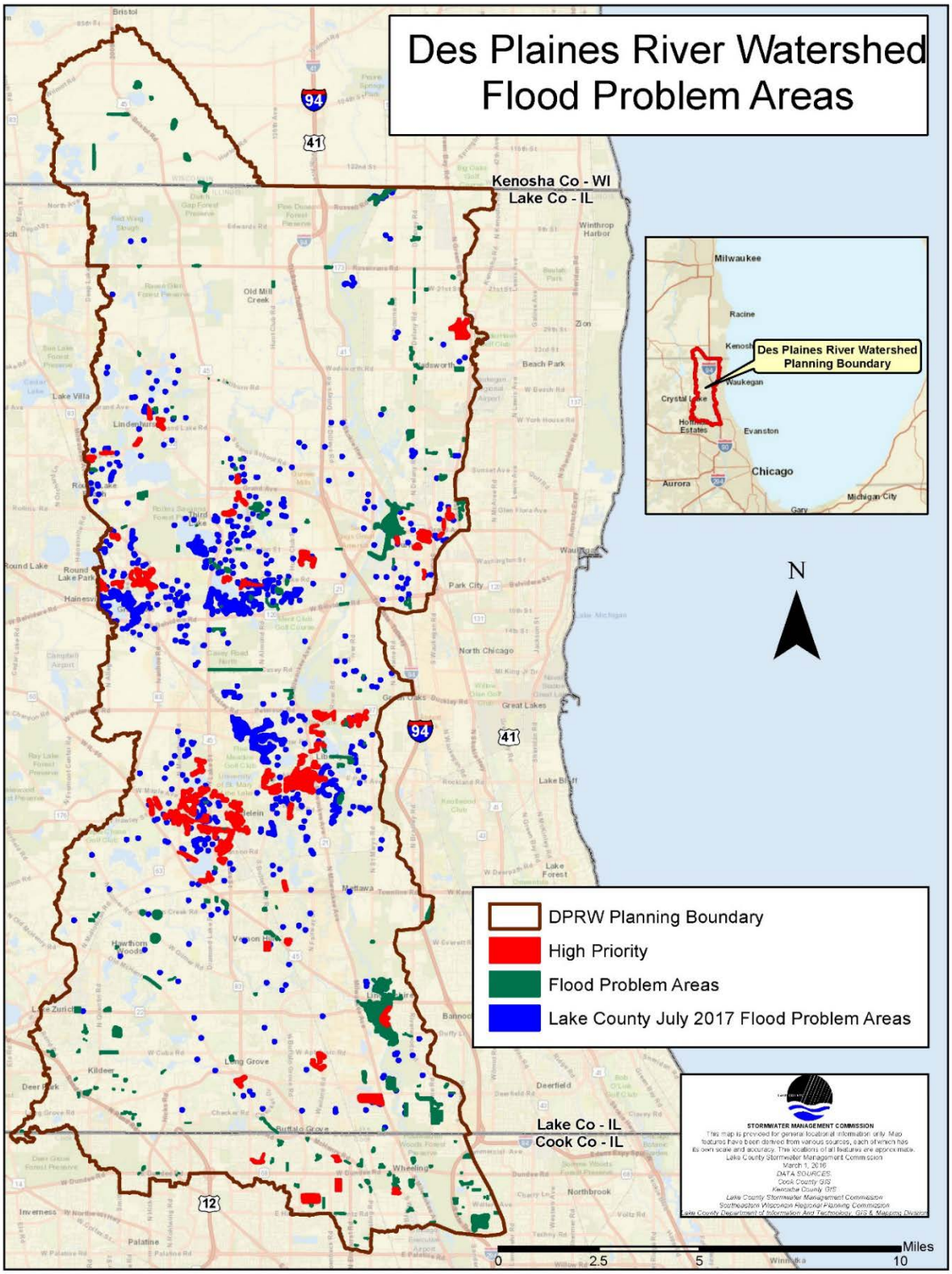

Figure 6-11: DPR Planning Area Flood Problem Areas

Table 6-30: Summary of Reported Flood Problems & Mitigation Need by Flooding Type (Municipalities & Townships)

JURISDICTION	FPAI & 2017 INVENTORY SITES & STRUCTURES				FLOODING TYPE NO. OF SITES (NO. OF STRUCTURES)								
	NUMBER OF FPAI SITES	NUMBER OF 2017 FLOOD INCIDENTS	NUMBER OF FPAI STRUCTURES	2017 AFFECTED STRUCTURES	DEPRESSIONAL FLOODING	EROSION	OVERBANK FLOODING	LOCAL DRAINAGE PROBLEMS	SEWER OR SEPTIC FAILURE	SEWER BACKUP	STREET, DRIVEWAY OR YARD	STRUCTURE DAMAGE FROM FLOODING	STRUCTURE FLOODING
Avon Township	2	2	--	2	1	--	1		--	--	--	--	2 (2)
City of Lake Forest	1	--	4	--	--	--	--	1 (4)	--	--	--	--	--
City of Park City	1	2	4	2	--	--	1 (4)		--	--	--	--	2 (2)
City of Prospect Heights	4	--	1	--	--	--	--	4 (1)	--	--	--	--	--
City of Waukegan	2	11	24	19	1 (24)	--	1	--	--	--	1 (1)	--	10 (18)
City of Zion	--	1	--	1	--	--	--	--	--	1 (1)	--	--	--
Ela Township	3	1	3	1	--	--	--	3 (3)	--	--	--	--	1 (1)
Fremont Township	2	11	16	19	--	--	1 (6)	1 (10)	--	--	3 (3)	--	8 (16)
Lake Villa Township	3	13	10	41	1 (4)	--	--	2 (6)	--	--		--	13 (41)
Libertyville Township	6	14	148	62	--	--	4 (143)	2 (5)	--	2 (2)	5 (6)	--	7 (54)
Newport Township	2	5	35	48	1 (1)	--	1 (34)	--	--	--	--	--	5 (48)
Northfield Township	2	--	70	--	2 (70)	--	--	--	--	--	--	--	--
Vernon Township	1	8	3	26	--	--	1 (3)	--	--	--	1 (1)	--	7 (25)
Village of Antioch	2	3	--	3	--	--	1	1	--	--	--	--	3 (3)
Village of Beach Park	3	3	104	3	--	--		3 (104)	--	--	1 (1)	--	2 (2)
Village of Bristol	8	--	17	--	3 (6)	--	5 (11)	--	--	--	--	--	--
Village of Buffalo Grove	7	11	19	25	1 (6)	2	2 (11)	2 (2)	--	--	--	3 (3)	8 (22)
Village of Deer Park	2	--	4	--	2 (4)	--	--	--	--	--	--	--	--
Village of Grayslake	2	62	1	352	1	--	1 (1)	--	--	1 (1)	10 (10)	3 (3)	48 (338)
Village of Green Oaks	3	7	2	7	1 (1)	--	--	2 (1)	--	--	--	1 (1)	6 (6)
Village of Gurnee	10	73	253	182	2 (9)	--	3 (164)	3	2 (80)	2 (2)	9 (8)	2 (2)	60 (170)
Village of Hainesville	--	1	--	2	--	--	--	--	--	--	--	--	1 (2)
Village of Hawthorn Woods	7	8	6	8	3 (4)	--	--	4 (2)	--	--	--	--	8 (8)
Village of Indian Creek	2	--	11	--	--	--	--	2 (11)	--	--	--	--	--
Village of Kildeer	11	--	--	--	3	--	3	5	--	--	--	--	--
Village of Lake Forest	1	--	4	--	--	--	--	1 (4)	--	--	--	--	--
Village of Lake Zurich	5	1	20	1	1 (1)	--	1 (1)	3 (18)	--	--	--	--	1 (1)
Village of Libertyville	4	45	15	530	--	--	3 (15)	1	--	3 (3)	5 (6)	--	37 (521)

JURISDICTION	FPAI & 2017 INVENTORY SITES & STRUCTURES				FLOODING TYPE NO. OF SITES (NO. OF STRUCTURES)								
	NUMBER OF FPAI SITES	NUMBER OF 2017 FLOOD INCIDENTS	NUMBER OF FPAI STRUCTURES	2017 AFFECTED STRUCTURES	DEPRESSIONAL FLOODING	EROSION	OVERBANK FLOODING	LOCAL DRAINAGE PROBLEMS	SEWER OR SEPTIC FAILURE	SEWER BACKUP	STREET, DRIVEWAY OR YARD	STRUCTURE DAMAGE FROM FLOODING	STRUCTURE FLOODING
Village of Lincolnshire	6	2	105	8	--	--	6 (105)	--	--	--	--	--	2 (8)
Village of Lindenhurst	7	17	19	49	5 (17)	--	--	2 (2)	--	--	2 (2)	--	15 (47)
Village of Long Grove	5	16	--	18	--	1	--	5	--	--	5 (5)	--	11 (13)
Village of Mettawa	1	4	--	6	--	--	1	--	--	--	--	--	4 (6)
Village of Mundelein	5	64	13	443	--	--	1 (4)	4 (9)	--	3 (4)	19 (18)	8 (8)	34 (413)
Village of Northbrook	13	--	1	--	4	--	--	9 (1)	--	--	--	--	--
Village of Old Mill Creek	4	--	--	--	1	--	--	3	--	--	--	--	--
Village of Palatine	4	--	--	--	--	--	1	3	--	--	--	--	--
Village of Riverwoods	7	9	59	10	1 (20)	--	3 (30)	3 (9)	--	--	1 (1)	--	8 (9)
Village of Round Lake Beach	--	9	--	13	--	--	--	--	--	--	--	--	9 (13)
Village of Third Lake	2	5	2	29	--	--	--	2 (2)	--	--	1 (1)	--	4 (28)
Village of Vernon Hills	3	17	--	38	--	--	--	3	--	--	3 (3)	--	14 (35)
Village of Wadsworth	13	4	15	4	5 (10)	--	4 (5)	4	--	--	1 (1)	--	3 (3)
Village of Wheeling	22	--	325	--	1 (40)	--	12 (93)	9 (192)	--	--	--	--	--
Warren Township	16	53	145	270	7 (84)	--	2 (10)	7 (51)	--	2 (2)	7 (7)	2 (2)	42 (259)
Waukegan Township	2	1	7	3	1 (3)	--	--	1 (4)	--	--	--	--	1 (3)
Wheeling Township	1	--	6	--	1 (6)	--	--	--	--	--	--	--	--
SITE TOTALS:	**207**	**483**	--	--	**48**	**3**	**59**	**95**	**2**	**14**	**74**	**19**	**376**
STRUCTURE TOTALS	--	--	**1,471**	**2,225**	**(310)**	--	**(640)**	**(441)**	**(80)**	**(15)**	**(74)**	**(19)**	**(2,117)**

Note: Table 6-30 displays the number of flood sites followed by () of structures affected. Example 2 sites (3 structures affected)

Table 6-31: Summary of Reported Flood Problems & Mitigation Need by Flooding Type (State and Forest Preserve Land)

STATE OR FOREST PRESERVE LAND	FPAI & 2017 INVENTORY SITES & STRUCTURES				FLOODING TYPE NO. OF SITES (NO. OF STRUCTURES)			
	NUMBER OF FPAI SITES	NUMBER OF 2017 FLOOD INCIDENTS	NUMBER OF FPAI STRUCTURES	2017 AFFECTED STRUCTURES	DEPRESSIONAL STORAGE FLOOD	OVERBANKING FLOODING	LOCAL DRAINAGE PROBLEMS	STRUCTURE FLOODING
Deer Grove East Forest Preserve	1	--	--	--	--	1	--	--
Edward L. Ryerson Nature Preserve	3	--	6	--	--	2 (4)	1 (2)	--
Half Day Forest Preserve	1	--	12	--	--	--	1 (12)	--
Lake Carina	1	--	2	--	--	1 (2)	--	--
Potawatomi Woods	1	1	--	--	1	--	--	1
Waukegan Savanna	--	1	--	--	--	--	--	1
Wilmot Woods	--	1	--	--	--	--	--	1
SITE TOTALS:	**7**	**3**	**--**	**--**	**1**	**4**	**2**	**3**
STRUCTURE TOTALS	**--**	**--**	**20**	**0**	**--**	**(6)**	**(14)**	**--**

Note: Table 6-31 displays the number of flood sites followed by () of structures affected. Example 2 sites (3 structures affected)

6.3.6.6 Potential Flood Storage

Table 6-32 and Figure 6-12 define the potential flood storage projects by jurisdiction. These sites can be further evaluated to determine feasibility of creating additional flood storage in the DPR planning area. General examples of practices to increase flood storage include construction of wetlands, berms and basins.

- Thirty-three sites are located in municipalities; the Village of Bristol, Wisconsin has the greatest opportunity to increase flood storage in the watershed (325 acre-feet). This is followed by the Village of Mundelein (199 acre-feet), and the Village of Grayslake (106 acre-feet).
- Ten sites are located in unincorporated areas of townships; the Antioch Township has the greatest opportunity to increase flood storage in the watershed (100 acre-feet). This is followed by Vernon Township (75.5 acre-feet), and Newport Township (45 acre-feet).
- Ten sites with the potential to provide 348.5 acre-feet of storage are located on Lake County Forest Preserve District Property.

Table 6-32: Potential Flood Storage Sites for Evaluation

JURISDICTION	SITE ID	POTENTIAL STORAGE (acre-feet)
Village of Antioch	10-3	17.56
Village of Bristol (WI)	10-16	7.33
	10-10	6.09
	10-15	4.91
	10-17	19.24
	10-18	7.10
	10-12	9.98
	10-7	9.47
	10-9	8.80
	10-14	22.27
	10-8	19.55
	10-13	39.68
	10-11	170.65
Village of Buffalo Grove	17-5	6.27
	18-4	6.47
	17-4	13.30
Village of Grayslake	11-3	5.65
	11-2	13.90
	11-4	12.18
	11-1	18.57
	11-6	55.75
Village of Gurnee	13-1	12.01
Village of Lindenhurst	11-8	22.98
Village of Long Grove	18-5	11.55
	15-3	90.01
Village of Mundelein	14-1	17.39
	14-3	13.54
	14-2	44.62
	14-4	123.41
Village of Old Mill Creek	10-4	8.28
Village of Vernon Hills	15-4	19.09
Village of Wheeling	18-1	21.55
Antioch Township	10-2	100.05
Ela Township	15-2	7.43
	17-3	6.16
Lake Villa Township	10-1	19.80
Newport Township	10-6	45.28
Vernon Township	18-3	10.13
	18-6	6.84
	15-1	16.14
	18-2	42.42
Warren Township	11-7	23.01

JURISDICTION	SITE ID	POTENTIAL STORAGE (acre-feet)
Forest Preserve	13-3	19.81
	10-5	3.42
	13-2	48.91
	17-2	11.01
	13-5	27.77
	11-5	20.94
	13-4	38.66
	15-6	42.39
	17-1	24.13
	16-1	42.61
	15-5	68.90

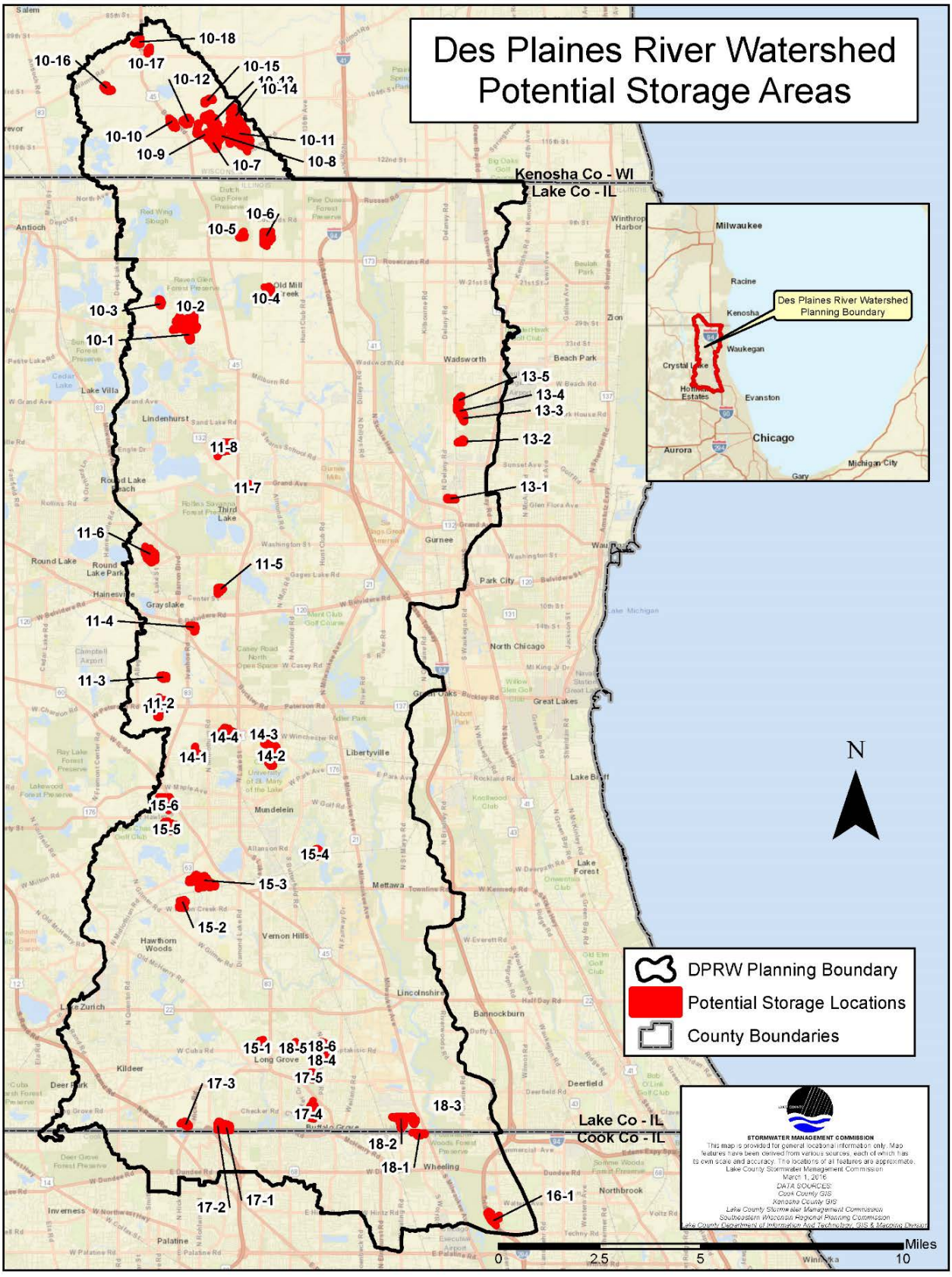

Figure 6-12: Potential Flood Storage Locations

6.3.7 LAKE ACTIONS

6.3.7 Lake Action Recommendations

This section identifies more than 400 actions for 71 lakes and is largely based on data and recommendations identified in Lake County Health Department Lake Reports dating back to around the year 2000 (Table 6-33). Lake-specific actions include programmatic, planning, and BMP recommendations. In some cases, the age of the lake report suggests that additional monitoring should be done before implementing any of the other recommendations for that lake. Because the recommendations are based on lake reports, actions may reflect the uses of a particular lake. For instance, where fishing is an active use, lakes may have fishery surveys identified as a recommendation. In general, the most important recommendations across all lakes from a water quality perspective include the development of (and adherence to) lake management plans, implementation of NPS pollution reduction BMPs (particularly for chloride and TMDL pollutants), shoreline restoration, and the management/control of aquatic invasive and exotic species. Similar to the other types of action recommendations in this plan, lake actions have been given a unique ID, priority, time frame for implementation, lead partners are identified, and estimated cost is provided. Lakes with action recommendations are shown in

Figure 6-13 and actions are listed in Table 6-34. Lake action recommendations are also included in the online mapping application for the Des Plaines River Watershed-Based Plan.

Table 6-33: Summary of Lake Action Recommendations

Priority	Number of Actions	Estimated Cost
High	169	$4,630,872 - $7,378,842
Medium	102	$2,263,796 - $6,144,077
Low	176	$569,099 - $1,718,551
Total	**447**	**$7,463,767 - $15,241,470**

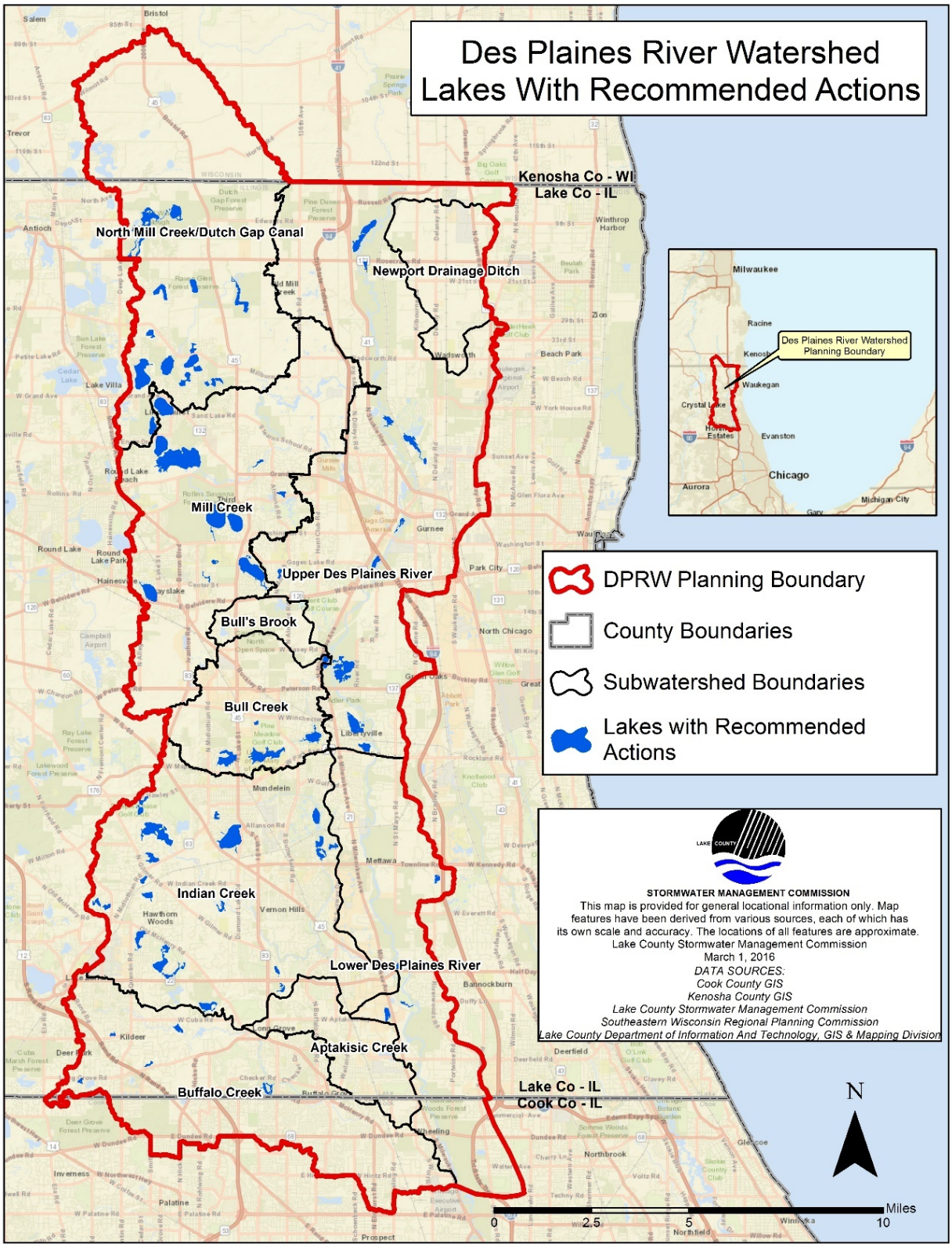

Figure 6-13: Lakes with Recommended Actions

Table 6-34: Recommended Lake Actions

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
Albert Lake	TP DO	LK1	Participate in the VLMP	L	L	HOA	$200
		LK2	Install staff gage	L	L	HOA	$500
		LK3	Develop APMP to address curlyleaf pondweed	M	M	HOA	$3,000
		LK4	Carp Removal	L	L	HOA	$6,000 - $10,000
		LK5	Conduct fishery survey	L	L	HOA	$3,000 - $5,000
		LK6	Create bathymetric map	L	L	HOA	$2,500 - $6,000
		LK7	Encourage native landscaping & riparian buffers/filter strips	M	M	HOA	$1,500
		LK8	Manage curlyleaf pondweed	M	S	HOA	$11,220
		LK9	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	HOA, M	N/A
Ames Pit - ADID 20	N/A	LK10	Participate in the VLMP	L	L	FPD	$200
		LK11	Place garbage cans near lake to reduce litter	L	S	FPD	$2,800
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK13	Install sign near access points that shows ways to reduce the spread of aquatic invasive species	L	S	FPD	$300
		LK14	Conduct fishery survey	L	L	FPD	$3,000 - $5,000
		LK15	Update current bathymetric map in 2026	L	L	FPD	$2,500 - $6,000
Big Bear Lake	TP	LK16	Implement chloride reduction BMPs in watershed	H	L	PD, M, DOT	N/A
		LK17	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	PD	N/A
		LK18	Carp Removal	L	L	PD	$6,000 - $10,000
		LK19	Provide fish structures	L	L	PD	$500 - $3,000
		LK20	Consider IDNR recommendations for fishery stocking and management	H	L	PD	N/A
		LK21	Update current bathymetric map	L	S	PD	$2,500 - $6,000
		LK22	Stabilize shoreline using native vegetation buffer (1st priority) or other measures	H	M	PD	$123,857- $209,060
		LK23	Promote spread of aquatic vegetation	H	S	PD	N/A
		LK24	Control Eurasian watermilfoil	H	S	PD	$15,000
Bishops Lake	N/A	LK25	Participate in the VLMP	L	L	LA	$200
		LK26	Develop Lake Management Plan that incorporates aquatic plant management	L	L	LA	$12,000
		LK27	Conduct fishery survey	L	L	LA	$3,000 - $5,000
		LK28	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK29	Create bathymetric map	L	L	LA	$2,500 - $6,000
		LK30	Stabilize shoreline using native vegetation buffer	M	L	LA	$109,500
		LK31	Promote spread of aquatic vegetation	L	L	LA	N/A
Bittersweet Golf Club Pond 13	N/A	LK32	Participate in the VLMP	L	L	GC, M	$200
		LK33	Carp Removal	L	L	GC, M	$6,000 - $10,000
		LK34	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK35	Create bathymetric map	L	L	GC, M	$2,500 - $6,000
		LK36	Control invasive shoreline plants	L	L	GC, M	$839 - $1,259
		LK37	Increase wildlife habitat	L	L	GC, M	$500 - $3,000
Bresen Lake	TP	LK38	Participate in the VLMP	L	L	PR/RL	$200
		LK39	Install staff gage	L	L	PR/RL	$500
		LK40	Conduct fishery survey	L	L	PR/RL	$3,000 - $5,000
		LK41	Develop a Lake Management Plan that incorporates aquatic plant management.	L	L	PR/RL	$12,000
		LK42	Update current bathymetric map in 10 years	L	L	PR/RL	$2,500 - $6,000
		LK43	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	L	L	PR/RL	$1,500
		LK44	Maintain or enhance wildlife areas surrounding Bresen Lake	L	L	PR/RL	$500 - $3,000
		LK45	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	PR/RL, M, T	N/A
		LK46	Investigate use of aerator to control internal nutrient loading	L	L	PR/RL	N/A
Buffalo Creek Reservoir	TP DO	LK47	Continue participating in the VLMP	H	L	FPD	$200
		LK48	Implement chloride reduction BMPs in watershed	H	L	FPD, M, DOT	N/A
		LK49	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	FPD, M	N/A
		LK50	Carp Removal	L	L	FPD	$6,000 - $10,000
		LK51	Update bathymetric map following reservoir expansion	M	S	FPD	$2,500 - $6,000
		LK52	Stabilize shoreline using native vegetation buffer (1st priority) or other measures	H	M	FPD	$665,227 - $928,223
		LK53	Promote spread of native aquatic vegetation (particularly in West Basin)	H	M	FPD	N/A

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK54	Control curlyleaf pondweed in early spring	H	S	FPD	$21,108
Butler Lake	N/A	LK55	Continue participating in the VLMP	H	L	M	$200
		LK56	Install staff gage	M	L	M	$500
		LK57	Implement chloride reduction BMPs in watershed	H	L	M, DOT	N/A
		LK58	Develop Lake Management plan that includes an APMP	H	M	M	$12,000
		LK59	Install sign near access points that shows ways to reduce the spread of aquatic invasive species	L	L	M	$300
		LK60	Conduct fishery survey	M	S	M, IDNR	$3,000 - $5,000
		LK61	Reduce carp population	L	L	M	$6,000 - $10,000
		LK62	Create bathymetric map	M	S	M	$2,500 - $6,000
		LK63	Monitor Eurasian watermilfoil and curlyleaf pondweed and hand rake or manually remove to keep from spreading. (Cost does not include equipment)	H	M	M	$8,052 - $42,274
College Trail Lake	N/A	LK64	Participate in the VLMP	L	L	PD, HOA	$200
		LK65	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
Countryside Lake	TP	LK66	Create Lake Report	L	L	LCHD, LA	N/A
		LK67	Continue participating in the VLMP	H	L	LA	$200
		LK68	Support chloride reduction BMPs in watershed	H	L	LA, T, DOT	N/A
		LK69	Update APMP	M	M	LA	$3,000
		LK70	Implement BMPs in the watershed that reduce pollutants with a TMDL	M	L	LA, T	N/A
Crooked Lake	N/A	LK71	Participate in the VLMP	H	L	LA, HOA	$200
		LK72	Install staff gage	M	L	LA, HOA	$500
		LK73	Lake level alteration should be limited to reduce potential for shoreline erosion and associated impacts	H	S	LA, HOA	N/A
		LK74	Implement chloride reduction BMPs in watershed	H	L	LA, HOA, M, T, DOT	N/A
		LK75	Implement phosphorus reduction BMPs in watershed.	H	L	LA, HOA	N/A
		LK76	Develop Lake Management plan that includes an APMP	H	M	LA, HOA	$12,000
		LK77	Remove carp	H	L	LA, HOA	$6,000 - $10,000
		LK78	Consider IDNR recommendations for fishery stocking and management	H	M	LA, HOA	N/A
		LK79	Update bathymetric map in 2020	L	S	LA, HOA	$2,500 - $6,000
		LK80	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	LA, HOA	$1,500

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK81	Mitigate shoreline erosion	M	L	LA, HOA	$515,750 - $672,040
		LK82	Increase native plant diversity	H	M	LA, HOA	N/A
		LK83	Control and reduce curlyleaf pondweed	H	S	LA, HOA	$33,000
Deer Lake	N/A	LK84	Participate in the VLMP	L	L	IDNR	$200
		LK85	Educate lake users on controlling the spread of exotic species	L	L	IDNR	$1,500
		LK86	Support chloride reduction BMPs in watershed	H	L	IDNR, T, M, DOT	N/A
		LK87	Support nutrient reduction BMPs in watershed	H	L	IDNR, AG, T, M	N/A
		LK88	Update bathymetric map in 2020	L	S	IDNR	$2,500 - $6,000
Des Plaines Lake	N/A	LK89	Participate in the VLMP	M	L	FPD	$200
		LK90	Monitor Eurasian watermilfoil population	L	L	FPD	$3,200 - $10,000
		LK91	Support chloride reduction efforts in watershed	H	L	FPD, M, T, DOT	N/A
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK92	Install sign near access points that shows ways to reduce the spread of aquatic invasive species	L	L	FPD	$300
		LK93	Reduce carp population	L	L	FPD	$6,000 - $10,000
		LK94	Update bathymetric map in 2022	L	S	FPD	$2,500 - $6,000
		LK95	Mitigate existing shoreline erosion	M	L	FPD	$70,963 - $385,230
Diamond Lake	TP	LK96	Continue participating in the VLMP	H	L	HOA, PD	$200
		LK97	Install staff gage	M	L	HOA, PD	$500
		LK98	Consider wake restrictions in nearshore or shallow areas	H	S	HOA, PD	N/A
		LK99	Implement chloride reduction BMPs in watershed	H	L	HOA, PD, M, T, DOT	N/A
		LK100	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	HOA, PD, M, T	N/A
		LK101	Create a Diamond Lake Improvement organization and a Lake Management plan	H	M	HOA, PD	$12,000
		LK102	Install signs at boat ramps educating boaters about the presence of invasive species in Diamond Lake and ways to prevent their spread	H	S	HOA, PD	$300
		LK103	Continue to coordinate with IDNR Fisheries	H	S	HOA, PD	N/A
		LK104	Update bathymetric map in 2019	L	S	HOA, PD	$2,500 - $6,000

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK105	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	HOA, PD	$1,500
		LK106	Decrease Eurasian watermilfoil and curlyleaf pondweed populations	H	S	HOA, PD	$52,133
Dog Training Pond	N/A	LK107	Participate in the VLMP	L	L	FPD	$200
		LK108	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK109	Create bathymetric map	L	L	FPD	$2,500 - $6,000
Druce Lake	N/A	LK110	Continue participating in the VLMP	H	L	HOA, M	$200
		LK111	Install staff gage	M	L	HOA, M	$500
		LK112	Support chloride reduction BMPs in watershed	H	L	HOA, M, T, DOT	N/A
		LK113	Develop Lake Management plan that includes an APMP	H	M	HOA, M	$12,000
		LK114	Install signs at boat ramps educating boaters about the presence of invasive species in Druce Lake and ways to prevent their spread	H	S	HOA, M	$300
		LK115	Conduct fishery survey	H	M	HOA, M	$3,000 - $5,000
		LK116	Update bathymetric map during next lake monitoring cycle	L	S	HOA, M	$2,500 - $6,000
		LK117	Mitigate shoreline erosion	H	L	HOA, M	$102,960 - $316,800
		LK118	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	M	L	HOA, M	$1,500
Forest Lake	TP	LK119	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK120	Implement chloride reduction BMPs in watershed	H	L	PO, M, T, DOT	N/A
		LK121	Develop APMP	L	L	PO	$3,000
		LK122	Manage curlyleaf pondweed	L	L	PO	$21,000
		LK123	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	PO	N/A
Fourth Lake	N/A	LK124	Anglers using private access should remove carp	L	L	PO	N/A
		LK125	Create new bathymetric map to replace current 1966 map	M	S	PO	$2,500 - $6,000
		LK126	Support chloride reduction BMPs in watershed	H	L	PO, M	N/A
		LK127	Control Eurasian watermilfoil	M	L	PO	$182,938
		LK128	Participate in the VLMP	H	L	PO	$200
Gages Lake	N/A	LK129	Continue participating in the VLMP	H	L	LA, PD	$200
		LK130	Install staff gage	M	L	LA, PD	$500
		LK131	Implement localized chloride reduction BMPs in watershed	H	L	LA, PD, T, DOT	N/A

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK132	Develop Lake Management plan that includes an APMP	H	M	LA, PD	$12,000
		LK133	Install signs at boat ramps educating boaters about the presence of invasive species in Gages Lake and ways to prevent their spread	H	S	LA, PD	$300
		LK134	Continue to coordinate with IDNR Fisheries	H	L	LA, PD	N/A
		LK135	Update bathymetric map during next lake monitoring cycle	L	S	LA, PD	$2,500 - $6,000
		LK136	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	LA, PD	$1,500
		LK137	Mitigate shoreline erosion	H	M	LA, PD	$411,363 - $607,253
		LK138	Control curlyleaf pondweed and Eurasian watermilfoil	H	M	LA, PD	$85,800
Grand Avenue Marsh	N/A	LK139	Participate in the VLMP	L	L	FPD	$200
		LK140	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK141	Conduct fishery survey	L	L	FPD	$3,000 - $5,000
		LK142	Update bathymetric map	L	L	FPD	$2,500 - $6,000
Grandwood Park Lake	N/A	LK143	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK144	Support nutrient reduction BMPs in watershed	H	L	PD, M, T, PR/RL, AG	N/A
		LK145	Develop APMP	L	L	PD	$3,000
		LK146	Create bathymetric map	L	L	PD	$2,500 - $6,000
		LK147	Remove carp	L	L	PD	$6,000 - $10,000
		LK148	Stabilize shoreline using native vegetation buffer (1st priority) or other measures	H	L	PD	$65,000
		LK149	Improve wildlife habitat	L	L	PD	$500 - $3,000
		LK150	Control invasive species	L	L	PD	$3,478 - $5,218
		LK151	Control aquatic plants and algae	L	L	PD	$7,200
Grays Lake	N/A	LK152	Continue participating in the VLMP	H	L	PD, M	$200
		LK153	Install staff gage	M	L	PD, M	$500
		LK154	Implement localized chloride reduction BMPs in watershed	H	L	PD, M, DOT	N/A
		LK155	Remove carp	M	L	PD, M	$6,000 - $10,000
		LK156	Continue to coordinate with IDNR for fishery management recommendations	H	S	PD, M, IDNR	N/A
		LK157	Conduct fishery assessment	H	M	PD, M	$3,000 - $5,000

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK158	Update bathymetric map during next lake monitoring cycle	L	S	PD, M	$2,500 - $6,000
		LK159	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	PD, M	$1,500
		LK160	Mitigate shoreline erosion	H	M	PD, M	$137,280 - $253,440
		LK161	Assess need for annual aquatic herbicide applications for exotic species control	M	S	PD, M	$15,192
Halfday Pit	TP DO	LK162	Participate in the VLMP	L	L	FPD	$200
		LK163	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK164	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	FPD, M, T	N/A
		LK165	Create bathymetric map	L	L	FPD	$2,500 - $6,000
Harvey Lake	N/A	LK166	Participate in the VLMP	M	L	M	$200
		LK167	Install staff gage	M	L	M	$500
		LK168	Implement localized chloride reduction BMPs in watershed	H	L	M, DOT	N/A
		LK169	Develop Lake Management plan that includes an APMP	H	M	M	$12,000
		LK170	Update the shoreline management plan to continue removal of buckthorn and purple loosestrife	H	M	M	N/A
		LK171	Conduct fishery assessment	M	M	M	$3,000 - $5,000
		LK172	Create bathymetric map	M	S	M	$2,500 - $6,000
		LK173	Continue management of invasive species within shoreline buffer	M	S	M	$3,064 - $4,597
Hastings Lake	N/A	LK174	Continue participating in the VLMP	H	L	FPD	$200
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK175	Support chloride reduction BMPs in watershed	H	L	FPD, M	N/A
		LK176	Carp removal	H	L	FPD, LCHD	$6,000 - $10,000
		LK177	Update bathymetric map during next lake monitoring cycle	L	S	FPD	$2,500 - $6,000
		LK178	Continue management of invasive species within shoreline buffer	M	S	FPD	$4,599 - $6,898
		LK179	Mitigate existing shoreline erosion	M	L	FPD	$55,440
		LK180	Control Eurasian watermilfoil	M	L	FPD	$14,400
Hendrick Lake	N/A	LK181	Participate in the VLMP	L	L	PR/RL	$200
		LK182	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK183	Create bathymetric map	L	L	PR/RL	$2,500 - $6,000
Independence Grove	N/A	LK184	Participate in the VLMP	H	L	FPD	$200
		LK185	Install a staff gage	M	L	FPD	$500

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK186	Monitor Eurasian watermilfoil and curlyleaf pondweed population	M	M	FPD	$3,200 - $10,000
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK187	Install signs at access points to educate users about the presence of invasive species in Independence Grove Lake and ways to prevent their spread	M	S	FPD	$300
		LK188	Conduct fishery assessment	H	S	FPD	$3,000 - $5,000
		LK189	Add large woody debris/coarse woody material for habitat benefits	L	L	FPD	$500 - $3,000
		LK190	Incorporate native plants in landscaping	M	M	FPD	$35,220
		LK191	Mitigate existing shoreline erosion	M	L	FPD	$304,127 - $1,393,920
		LK192	Rake or manually remove Eurasian watermilfoil and curlyleaf pondweed (Cost does not include equipment)	L	L	FPD	$3,293 - $17,559
International Mining and Chemical Lake	N/A	LK193	Participate in the VLMP	L	L	CBL	$200
		LK194	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK195	Create bathymetric map	L	L	CBL	$2,500 - $6,000
Kemper Lake 1	N/A	LK196	Create bathymetric map	L	L	CBL	$2,500 - $6,000
		LK197	Stabilize shoreline using native vegetation buffer	L	L	CBL	$118,100 - $408,010
		LK198	Increase native plant diversity	L	L	CBL	N/A
		LK199	Manage curlyleaf pondweed	L	L	CBL	$41,916
		LK200	Assess current fish population	L	L	CBL	$3,000 - $5,000
		LK201	Install a staff gage	L	L	CBL	$500
		LK202	Participate in the VLMP	L	L	CBL	$200
		LK203	Implement chloride reduction BMPs in watershed	H	L	CBL, M, T, DOT	N/A
Kemper Lake 2	N/A	LK204	Assess current fish population	L	L	CBL	$3,000 - $5,000
		LK205	Install a staff gage	L	L	CBL	$500
		LK206	Participate in the VLMP	L	L	CBL	$200
		LK207	Implement chloride reduction BMPs in watershed	H	L	CBL, M, T, DOT	N/A
		LK208	Create bathymetric map	L	L	CBL	$2,500 - $6,000
		LK209	Stabilize shoreline using native vegetation buffer	M	L	CBL	$443,413 - $770,140
		LK210	Increase native plant diversity	L	L	CBL	N/A
		LK211	Manage curlyleaf pondweed	L	L	CBL	$16,740
Lake Carina	N/A	LK212	Participate in the VLMP	M	L	FPD	$200
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK213	Install sign near access points that shows ways to reduce the spread of aquatic invasive species	M	S	FPD	$300
		LK214	Update bathymetric map	L	S	FPD	$2,500 - $6,000
		LK215	Conduct fishery assessment	H	S	FPD	$3,000 - $5,000
		LK216	Consider shoreline restoration in areas with visible erosion, with priority given to revegetation with native vegetation	M	L	FPD	$23,760-$104,543
Lake Charles	TP	LK217	Participate in the VLMP	M	L	PD, PO	$200
		LK218	Install staff gage	M	L	PD, PO	$500
		LK219	Develop Lake Management plan that includes an APMP	H	M	PD, PO	$12,000
		LK220	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	PD, PO, M	N/A
		LK221	Conduct fishery assessment	H	S	PD, PO	$3,000 - $5,000
		LK222	Determine water quality impacts of common carp	M	L	PD, PO	N/A
		LK223	Update bathymetric map in 2023	M	M	PD, PO	$2,500 - $6,000
		LK224	Remove reed canarygrass along entire shoreline	L	L	PD, PO	$5,149 - $7,724
		LK225	Target Eurasian watermilfoil and reduce curlyleaf pondweed	M	L	PD, PO	$21,000
Lake Farmington	N/A	LK226	Participate in the VLMP	L	L	HOA	$200
		LK227	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK228	Create bathymetric map	L	L	HOA	$2,500 - $6,000
Lake Leo	N/A	LK229	Participate in the VLMP	L	L	LA	$200
		LK230	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK231	Create bathymetric map	L	L	LA	$2,500 - $6,000
Lake Linden	N/A	LK232	Participate in the VLMP	H	L	PO	$200
		LK233	Monitor curlyleaf pondweed early in the season	M	S	PO	$3,200 - $10,000
		LK234	Develop Lake Management plans that include APMPs for all lakes in Lindenhurst	H	M	PO	$12,000
		LK235	Follow IDNR fishery management recommendations	H	S	PO	N/A
		LK236	Increase fish habitat with coarse woody material or fish structures	L	L	PO	$500 - $3,000
		LK237	Update bathymetric map in 2021	M	S	PO	$2,500 - $6,000
		LK238	Increase extent of shoreline with minimum 25-foot buffer	M	M	PO	$15,119
Lake Miltmore	N/A	LK239	Continue participating in the VLMP	H	L	LA, HOA, T	$200
		LK240	Implement chloride reduction BMPs in watershed	H	L	LA, HOA, T, DOT	N/A
		LK241	Implement nutrient reduction BMPs in the watershed to protect overall excellent water quality	H	L	LA, HOA, T	N/A

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK242	Develop Lake Management plan that includes an APMP	H	M	LA, HOA, T	$12,000
		LK243	Conduct fishery assessment	H	M	LA, HOA, T	$3,000 - $5,000
		LK244	Coordinate with IDNR on fishery management	H	M	LA, HOA, T	N/A
		LK245	Mitigate shoreline erosion	H	L	LA, HOA, T	$66,927 - $435,033
		LK246	Update bathymetric map	L	S	LA, HOA, T	$2,500 - $6,000
		LK247	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	LA, HOA, T	$1,500
Lake Naomi	N/A	LK248	Participate in the VLMP	L	L	LA	$200
		LK249	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK250	Create bathymetric map	L	L	LA	$2,500 - $6,000
Liberty Lake	N/A	LK251	Participate in the VLMP	L	L	PO	$200
		LK252	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK253	Create bathymetric map	L	L	PO	$2,500 - $6,000
Little Bear Lake	TP	LK254	Implement chloride reduction BMPs in watershed	H	L	PD, M, DOT	N/A
		LK255	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	PD, M	N/A
		LK256	Carp Removal	L	L	PD	$6,000 - $10,000
		LK257	Provide fish structures	L	L	PD	$500 - $3,000
		LK258	Consider IDNR recommendations for fishery stocking and management	H	M	PD	N/A
		LK259	Update bathymetric map	M	S	PD	$2,500 - $6,000
		LK260	Stabilize shoreline using native vegetation buffer (1st priority) or other measures	H	M	PD	$438,240
		LK261	Promote spread of aquatic vegetation	H	S	PD	N/A
		LK262	Control Eurasian watermilfoil	H	S	PD	$8,133
Loch Lomond	N/A	LK263	Continue participating in the VLMP	H	L	LA	$200
		LK264	Monitor inlets for nutrients, sediment, and erosion	L	L	LA	$20,000
		LK265	Install staff gage	M	L	LA	$500
		LK266	Implement chloride reduction BMPs in watershed	H	L	LA, M, T, DOT	N/A
		LK267	Implement recommendations of Lake Management Plan and Small Watershed Assessment and Action Plan	H	L	LA	N/A
		LK268	Install sign near access points that shows ways to reduce the spread of aquatic invasive species	H	S	LA	$300
		LK269	Conduct fishery assessment	M	M	LA	$3,000 - $5,000
		LK270	Reduce or remove common carp	M	L	LA	$6,000 - $10,000

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK271	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline buffers	M	L	LA	$1,500
		LK272	Plant emergent vegetation	M	L	LA	$10,000
Longview Meadow Lake	N/A	LK273	Participate in the VLMP	L	L	FPD, PO	$200
		LK274	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK275	Implement chloride reduction BMPs in watershed	H	L	FPD, PO, M, T, DOT	N/A
		LK276	Carp Removal	L	L	FPD, PO	$6,000 - $10,000
		LK277	Remove invasive shoreline and emergent plant species including reed canary grass, purple loosestrife, common reed, Canada thistle and buckthorn	L	L	FPD, PO	$4,284 - $6,425
		LK278	Mitigate existing shoreline erosion	M	L	FPD, PO	$25,607
		LK279	Plant emergent vegetation	L	L	FPD, PO	$10,000
Lucy Lake	N/A	LK280	Participate in the VLMP	L	L	M	$200
		LK281	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK282	Implement chloride reduction BMPs in watershed	H	L	M, DOT	N/A
		LK283	Create bathymetric map	L	L	M	$2,500 - $6,000
Mary Lee Lake	N/A	LK284	Participate in the VLMP	L	L	PO	$200
		LK285	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK286	Implement chloride reduction BMPs in watershed	H	L	M, T, DOT, PO	N/A
		LK287	Create bathymetric map	L	L	PO	$2,500 - $6,000
McDonald Woods Lake 1	N/A	LK288	Participate in the VLMP	L	L	FPD	$200
		LK289	Implement localized chloride reduction BMPs in watershed	H	L	FPD, M, DOT	N/A
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK290	Maintain weir at outlet to prevent carp migration from McDonald Lake 2	H	S	FPD	N/A
McDonald Woods Lake 2	N/A	LK291	Participate in the VLMP	L	L	FPD	$200
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK292	Remove carp	H	L	FPD	$6,000 - $10,000
		LK293	Remove invasive shoreline and emergent plant species and replace with natives	M	L	FPD	$23,000
Lake Minear	N/A	LK294	Continue participating in the VLMP	H	L	LA, HOA	$200
		LK295	Monitor Eurasian watermilfoil and curlyleaf pondweed	M	L	LA, HOA	$3,200 - $10,000
		LK296	Install staff gage	M	L	LA, HOA	$500

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK297	Implement localized chloride reduction BMPs in watershed	H	L	LA, HOA, M, DOT	N/A
		LK298	Develop Lake Management plan that includes an APMP	H	M	LA, HOA	$12,000
		LK299	Install signs at access points to educate users about the presence of invasive species in Lake Minear and ways to prevent their spread	M	S	LA, HOA	$300
		LK300	Update bathymetric map during next monitoring cycle	L	M	LA, HOA	$2,500 - $6,000
		LK301	Mitigate shoreline erosion	H	L	LA, HOA	$617,233 - $953,567
		LK302	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	M	L	LA, HOA	$1,500
		LK303	Rake or manually remove Eurasian watermilfoil and curlyleaf pondweed (Cost does not include equipment)	M	L	LA, HOA	$786 - $4,189
Oak Hills Lake	N/A	LK304	Create bathymetric map	L	L	PD	$2,500 - $6,000
		LK305	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK306	Participate in the VLMP	L	L	PD	$200
Osprey Lake	N/A	LK307	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK308	Participate in the VLMP	L	L	PD, GC	$200
		LK309	Create bathymetric map	L	L	PD, GC	$2,500 - $6,000
Peterson Pond	N/A	LK310	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK311	Participate in the VLMP	L	L	FPD	$200
		LK312	Create bathymetric map	L	L	FPD	$2,500 - $6,000
Pond-a-Rudy	TP DO	LK313	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK314	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	M, T	N/A
Potomac Lake	N/A	LK315	Monitor and manage curlyleaf pondweed	M	L	PO	$8,760
		LK316	Participate in the VLMP	H	L	M, PO	$200
		LK317	Implement localized chloride reduction BMPs in watershed	H	L	PO, M, DOT	N/A
		LK234	Develop Lake Management plans that included APMPs for all lakes in Lindenhurst	H	M	PO	$12,000
		LK318	Increase fish habitat with coarse woody material or fish structures	L	L	PO	$500 - $3,000
		LK319	Follow IDNR fishery management recommendations	H	S	PO	N/A
		LK320	Update bathymetric map	M	S	PO	$2,500 - $6,000
		LK321	Consider installing a shoreline buffer on south side of lake along Grass Lake Road	H	M	PO	$1,200

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK322	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	M	L	PO	$1,500
		LK323	Mitigate shoreline erosion using native vegetation or rip rap	H	M	PO	$85,537 - $370,657
Rasmussen Lake	N/A	LK324	Determine when lake can be removed from 305(b) report resulting from dam removal	H	S	FPD, Illinois EPA	N/A
Redwing Slough	N/A	LK325	Develop Lake Management plan that includes an APMP	H	M	IDNR	$12,000
		LK326	Implement chloride reduction BMPs in watershed	H	L	IDNR, T, DOT	N/A
		LK327	Install sign near access points that shows ways to reduce the spread of aquatic invasive species	L	M	IDNR	$300
Rivershire Pond 2	N/A	LK328	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK329	Participate in the VLMP	L	L	HOA	$200
		LK330	Create bathymetric map	L	L	HOA	$2,500 - $6,000
Salem Lake	TP	LK331	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK332	Participate in the VLMP	L	L	CBL, PR/RL, PD	$200
		LK333	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	M	N/A
		LK334	Create bathymetric map	L	L	CBL, PR/RL, PD	$2,500 - $6,000
Sand Lake	N/A	LK335	Install staff gage	M	L	LA, T	$500
		LK336	Continue participating in the VLMP	H	L	LA, T	$200
		LK337	Develop Lake Management plan that includes an APMP	H	M	LA, T	$12,000
		LK338	Implement chloride reduction BMPs in watershed	H	L	LA, T	N/A
		LK339	Conduct fishery assessment	H	S	LA, T	$3,000 - $5,000
		LK340	Update bathymetric map in 2021	L	S	LA, T	$2,500 - $6,000
		LK341	Mitigate shoreline erosion	H	M	LA, T	$125,927 - $369,390
		LK342	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	LA, T	$1,500
		LK343	Reduce Eurasian watermilfoil and curlyleaf pondweed populations	H	S	LA, T	$44,991
Slough Lake	N/A	LK344	Participate in the VLMP	M	L	FPD	$200
		LK345	Implement chloride reduction BMPs in watershed	H	L	FPD, M, T, DOT	N/A
		LK346	Conduct pollution source identification monitoring for septic and farm field runoff.	M	S	FPD, LCHD	N/A
		LK347	Reduce/Eliminate phosphorus fertilizer use	H	S	FPD, AG	N/A

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK348	Develop a plan to address/manage nutrient rich bottom sediments. The plan should include an assessment of the potential effectiveness/feasibility of dredging, chemical inactivation, and/or a downstream treatment train between Slough and Crooked Lakes.	M	L	FPD	$10,000 - $15,000
		LK349	Carp Removal	H	L	FPD	$6,000 - $10,000
		LK350	Stabilize shoreline using native vegetation buffer (1st priority) or other measures	M	L	FPD	$110,880 - $158,400
		LK351	Encourage or plant native vegetation once carp are removed	M	L	FPD	N/A
Saint Mary's Lake	N/A	LK352	Monitor staff gage at least monthly	M	L	SI	N/A
		LK353	Participate in the VLMP	M	L	SI	$200
		LK354	Develop Lake Management plan, including aquatic habitat and water clarity restoration	H	M	SI	$12,000
		LK355	Install signs at access points to educate users about the presence of invasive species in St. Mary's Lake and ways to prevent their spread	M	S	SI	$300
		LK356	Remove carp	L	L	SI	$6,000 - $10,000
		LK357	Conduct fishery assessment	H	S	SI	$3,000 - $5,000
		LK358	Mitigate shoreline erosion with preference given to natural vegetation	H	M	SI	$978,437 - $1,471,403
		LK359	Monitor success of carp exclosures	L	L	SI	N/A
Sterling Lake	N/A	LK360	Install staff gage	M	L	FPD	$500
		LK361	Participate in the VLMP	M	L	FPD	$200
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK362	Install coarse woody material for habitat	L	L	FPD	$500 - $3,000
		LK363	Install signs at access points to educate users about the presence of invasive species in Sterling Lake and ways to prevent their spread	H	S	FPD	$300
		LK364	Monitor Eurasian watermilfoil and curlyleaf pondweed	M	M	FPD	$3,200 - $10,000
		LK365	Conduct fishery assessment	H	S	FPD	$3,000 - $5,000
		LK366	Update bathymetric map during next monitoring cycle	L	M	FPD	$2,500 - $6,000
		LK367	Mitigate existing shoreline erosion	M	L	FPD	$14,257 - $285,120
		LK368	Widen shoreline buffer to 25 feet where possible	M	M	FPD	$5,200
		LK369	Rake or manually remove Eurasian watermilfoil and curlyleaf pondweed (Cost does not include equipment)	M	L	FPD	$1,634 - $8,716
Stockholm Lake	N/A	LK370	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK371	Participate in the VLMP	L	L	PO	$200
		LK372	Create bathymetric map	L	L	PO	$2,500 - $6,000

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
Stone Quarry Lake	N/A	LK373	Increase fish habitat	L	L	PO	$500 - $3,000
		LK374	Create bathymetric map	M	S	PO	$2,500 - $6,000
		LK375	Increase wildlife habitat	L	L	PO	$500 - $3,000
		LK376	Mitigate shoreline erosion with preference given to natural vegetation	M	L	PO	$29,463 - $157,133
		LK377	Remove or control invasive species including purple loosestrife and reed canary grass	M	L	PO	$4,341 - $6,511
		LK378	Incorporate native plants in landscaping through rain gardens or shoreline buffers	M	L	PO	$12,000
		LK379	Monitor invasive species	M	M	PO	$3,200 - $10,000
		LK380	Monitor shoreline erosion	M	L	PO	$4,000
		LK381	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK382	Participate in the VLMP	L	L	PO	$200
		LK383	Implement chloride reduction BMPs in watershed	H	L	PO, M, DOT	N/A
		LK384	Reduce/eliminate phosphorus fertilizer use	H	M	PO, AG	N/A
Sylvan Lake	FC TP	LK385	Continue participating in the VLMP	H	L	LA	$200
		LK386	Remove waterfowl feces rather than sweeping into lake	H	S	LA	$3,900
		LK387	Do not feed geese	H	S	LA	N/A
		LK388	Implement BMPs in the watershed that reduce pollutants with a TMDL	H	L	LA, M, T	N/A
		LK389	Develop Lake Management plan, including an action plan for blue-green algae	H	M	LA	$12,000
		LK390	Promote vegetation for fish habitat and reduce fish feeders	M	L	LA	N/A
		LK391	Update bathymetric map during next monitoring cycle	M	S	LA	$2,500 - $6,000
		LK392	Mitigate shoreline erosion incorporating hardscape only where necessary	H	M	LA	$69,167 - $96,837
		LK393	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips	H	M	LA	$1,500
		LK394	Consider operating aerators to prevent stratification	M	L	LA	$10,000
Third Lake	N/A	LK395	Update Lake Report and monitoring data (Most recent report is >10 years old)	H	M	LCHD	N/A
		LK396	Continue participating in the VLMP	H	L	PO, M	$200
		LK397	Create long term plan for replacement of lake aeration system	H	M	PO, M	$100,000 - $150,000
		LK398	To the extent practicable, operate dam to reduce flood damages	M	M	M	N/A
		LK399	Support nutrient reduction BMPs in the watershed	M	L	M	N/A
		LK400	Develop Lake Management plan that includes an APMP	M	L	PO,M	$12,000
		LK401	Mitigate shoreline erosion with preference of shoreline buffer with native vegetation	L	L	PO, M	$52,800 - $633,600

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK402	Support chloride reduction BMPs in watershed	H	L	PO, M, T, DOT, FPD	N/A
Timber Lake (North)	N/A	LK403	Continue participating in the VLMP	H	L	FPD, PO	$200
		LK12	Develop lake management plan for all lakes in Forest Preserves	H	M	FPD	$12,000
		LK404	Install sign near access points to educate on ways to reduce the spread of aquatic invasive species	M	S	FPD	$300
		LK405	Implement chloride reduction BMPs in watershed	H	L	M, T, DOT	N/A
		LK406	Conduct fishery assessment	H	S	FPD	$3,000 - $5,000
		LK407	Update bathymetric map	L	L	FPD	$2,500 - $6,000
		LK408	Mitigate shoreline erosion with preference of shoreline buffer with native vegetation	M	L	FPD, PO	$23,233 - $214,897
Valley Lake	N/A	LK409	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK410	Install staff gage	L	L	PD	$500
		LK411	Continue participating in the VLMP	H	L	PD	$200
		LK412	Develop Lake Management plan that includes an APMP	L	L	PD	$12,000
		LK413	Update bathymetric map	L	L	PD	$2,500 - $6,000
Waterford Lake	N/A	LK414	Survey curlyleaf pondweed	L	L	M	$3,200 - $10,000
		LK415	Continue participating in the VLMP	H	L	M	$200
		LK234	Develop Lake Management plans that include APMPs for all lakes in Lindenhurst	H	M	M	$12,000
		LK416	Increase fish habitat with coarse woody material or fish structures	L	L	M	$500 - $3,000
		LK417	Update bathymetric map during next monitoring cycle	L	M	M	$2,500 - $6,000
		LK418	Mitigate shoreline erosion	M	L	M	$28,830 - $144,143
		LK419	Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline buffers	M	L	M	$1,500
		LK420	Restore beneficial native aquatic plants, including those already present and consider introducing native species to increase plant diversity.	M	M	M	N/A
		LK421	Do not treat native pondweeds	H	S	M	N/A
		LK422	Clear pathways if needed to allow for recreational/boating use	M	M	M	N/A
Werhane Lake	N/A	LK423	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK424	Participate in the VLMP	L	L	CBL	$200
		LK425	Create bathymetric map	L	L	CBL	$2,500 - $6,000
White Lake	N/A	LK426	Participate in the VLMP	L	L	HOA, PO	$200
		LK427	Develop Lake Management plan that includes an APMP	M	M	HOA, PO	$12,000

LAKE NAME	TMDL	PLAN ID	RECOMMENDED ACTIONS	PRIORITY	TIME FRAME	LEAD PARTNER(S)	COST
		LK428	Increase fish habitat including native aquatic plants, coarse woody material, and habitat structures	L	L	HOA, PO	$500 - $3,000
		LK429	Conduct fishery assessment	M	M	HOA, PO	$3,000 - $5,000
		LK430	Update bathymetric map during next monitoring cycle	L	M	HOA, PO	$2,500 - $6,000
		LK431	Evaluate effectiveness/sizing of aeration system	M	S	HOA, PO	N/A
Wilderness Park Lake - ADID 127	N/A	LK432	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
Willow Lake	N/A	LK433	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK434	Participate in the VLMP	M	L	SI	$200
		LK435	Create bathymetric map	M	S	SI	$2,500 - $6,000
Windward Lake	N/A	LK436	Update Lake Report and monitoring data (Most recent report is >10 years old)	L	L	LCHD	N/A
		LK437	Create bathymetric map	L	L	PO	$2,500 - $6,000

6.3.8 Small Watershed Assessment & Action Plan (SWAAP)

The Small Watershed Assessment and Action Plan (SWAAP) was completed concurrently with the Des Plaines River Watershed-Based Plan. A SWAAP provides additional information on existing watershed conditions and potential watershed protection and restoration projects, which will help: (1) address existing goals, objectives, and recommendations outlined in the watershed-based plan based on site-specific field verified solutions; (2) further engage municipalities, homeowners, and other watershed stakeholders in the implementation of many of the ideas and concepts presented in the watershed-based plan with succinct project directives; (3) provide watershed stakeholders with critical data and information required to secure further technical assistance and obtain funding to support the implementation of watershed protection and restoration programs and projects; and, (4) further advance local efforts to protect and restore local lakes, streams, and wetlands and address the goals of the Clean Water Act.

The SWAAP identifies the efforts to transition watershed-based programmatic and/or site-specific action plan recommended projects identified in the Bull Creek-Bull's Brook Watershed-Based Plan (2008) and the Buffalo Creek Watershed-Based Plan (2016) to implementation. The SWAAP presents implementable recommendations with conceptual project design, supported with project definition, probable cost and purported water quality improvement benefits for stakeholders to implement or secure future funding for project implementation. Experience confirms that if no coordinated effort is made among municipalities, residents, and other watershed stakeholders to conduct this additional work, few of the ideas and concepts presented in a watershed-based plan will be turned into reality and the potential of the watershed-based planning process to reduce the impacts of nonpoint source pollution will not be fully realized.

The two locations chosen to be assessed for this report are located within the DPR planning area. The locations assessed in detail within this SWAAP report include areas in and around Loch Lomond (AUID:IL_RGU) in Mundelein, IL and Buffalo Creek (AUID: IL_GST) in Long Grove, IL.

The Loch Lomond SWAAP component targets a study area of 469 acres, within a drainage area of 2.02 square miles for Bull Creek (AUID: IL_GV04). The SWAAP is within the Bull Creek-Des Plaines River HUC 12: 071200040302, and Loch Lomond lake is the largest waterbody in the study area (AUID: IL_RGU). The SWAAP area of Loch Lomond has previously been identified with site-specific project recommendations within the Bull Creek- Bull's Brook Watershed-Based Plan and has additional site-specific project recommendations identified within the Des Plaines River Watershed-Based Plan as part of SMC subwatershed management unit (SMU) BC019.

The Buffalo Creek SWAAP component targets a study area of 161 acres, within a drainage area of 9.70 square miles. There are 28.5 stream miles upstream of the Buffalo Creek SWAAP area, and it is located within the Wheeling Drainage Ditch HUC 12: 071200040502. Buffalo Creek is the main stream corridor in the study area (AUID: IL_GST). The SWAAP area of Buffalo Creek site has previously been identified with site-specific project recommendations within the Buffalo Creek Watershed-Based Plan will has additional site-specific project recommendations identified within the Des Plaines River Watershed-Based Plan as part of SMC SMU BF025.

The SWAAP planning process included a review of conditions within the selected study area, based on the contents of the associated watershed-based plan and other relevant information (e.g., GIS data), as well as detailed, on-the-ground assessment work in order to present a detailed characterization of the study area. The detailed assessment presents stakeholders valuable resources and information on their defined small watershed. The SWAAP assessment bolsters stakeholder awareness of water quality impacts and next steps to achieve improvement goals for progressing water quality improvements. Preliminary concept plans for stream and stream corridor restoration practices, lake and lake shoreline restoration practices, and upland protection and restoration practices are presented in following, with detailed guidance on the implementation of watershed protection and restoration projects and strategies that can help meet the watershed management goals established in the watershed-based plan.

Detailed information and proposed project locations can be referenced in **Appendix P: Small Watershed Assessment and Action Plan (SWAAP)**. Proposed project locations can be observed on the Des Plaines River Watershed-Based Plan Web Mapping Application: https://lakecountyil.maps.arcgis.com/apps/webappviewer/index.html?id=4bec638a6b8f471eb4e7c3dee717f042.

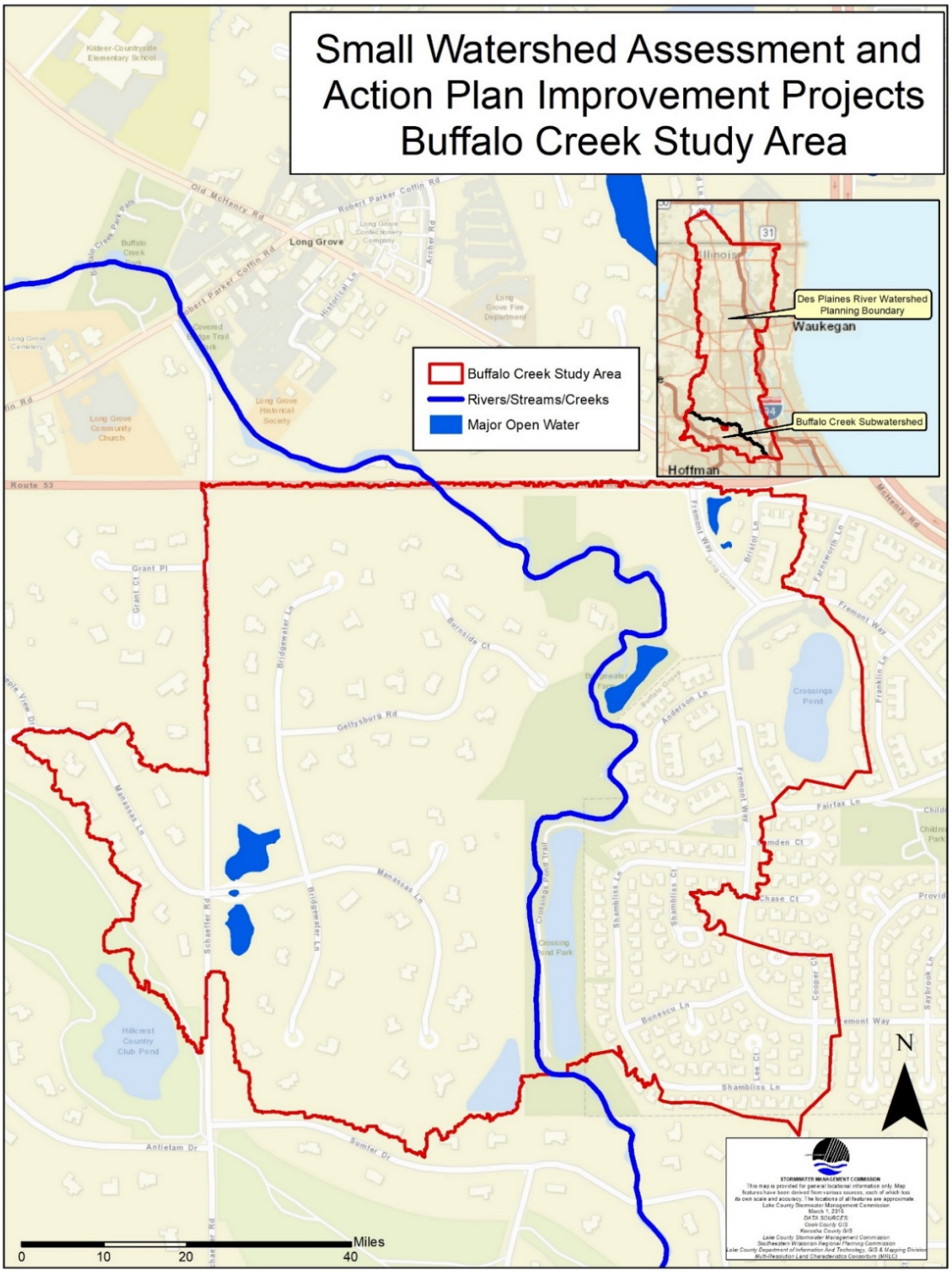

Figure 6-14: Buffalo Creek SWAAP Study Area Reference

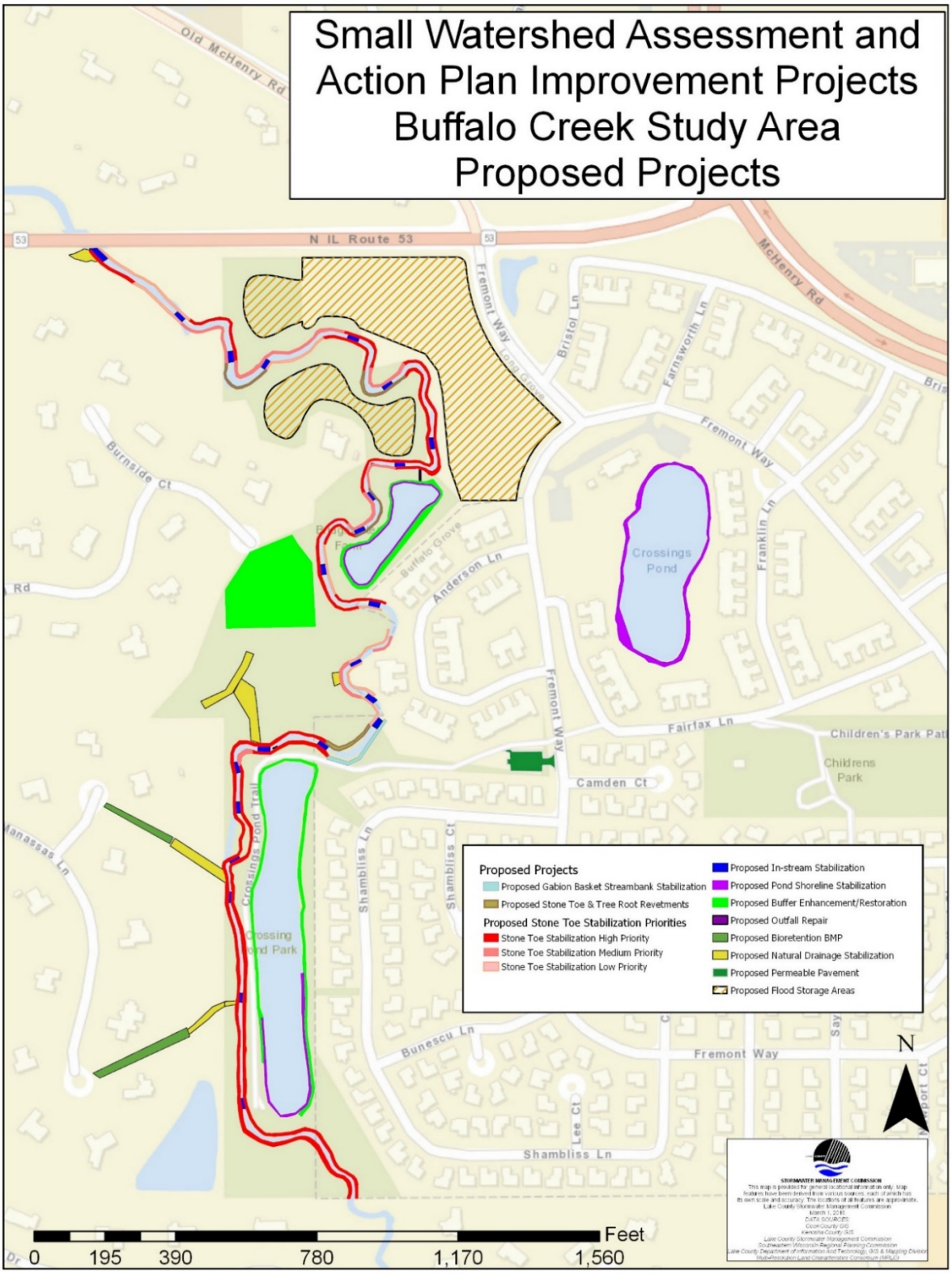

Figure 6-15: Buffalo Creek Study Area Proposed Projects

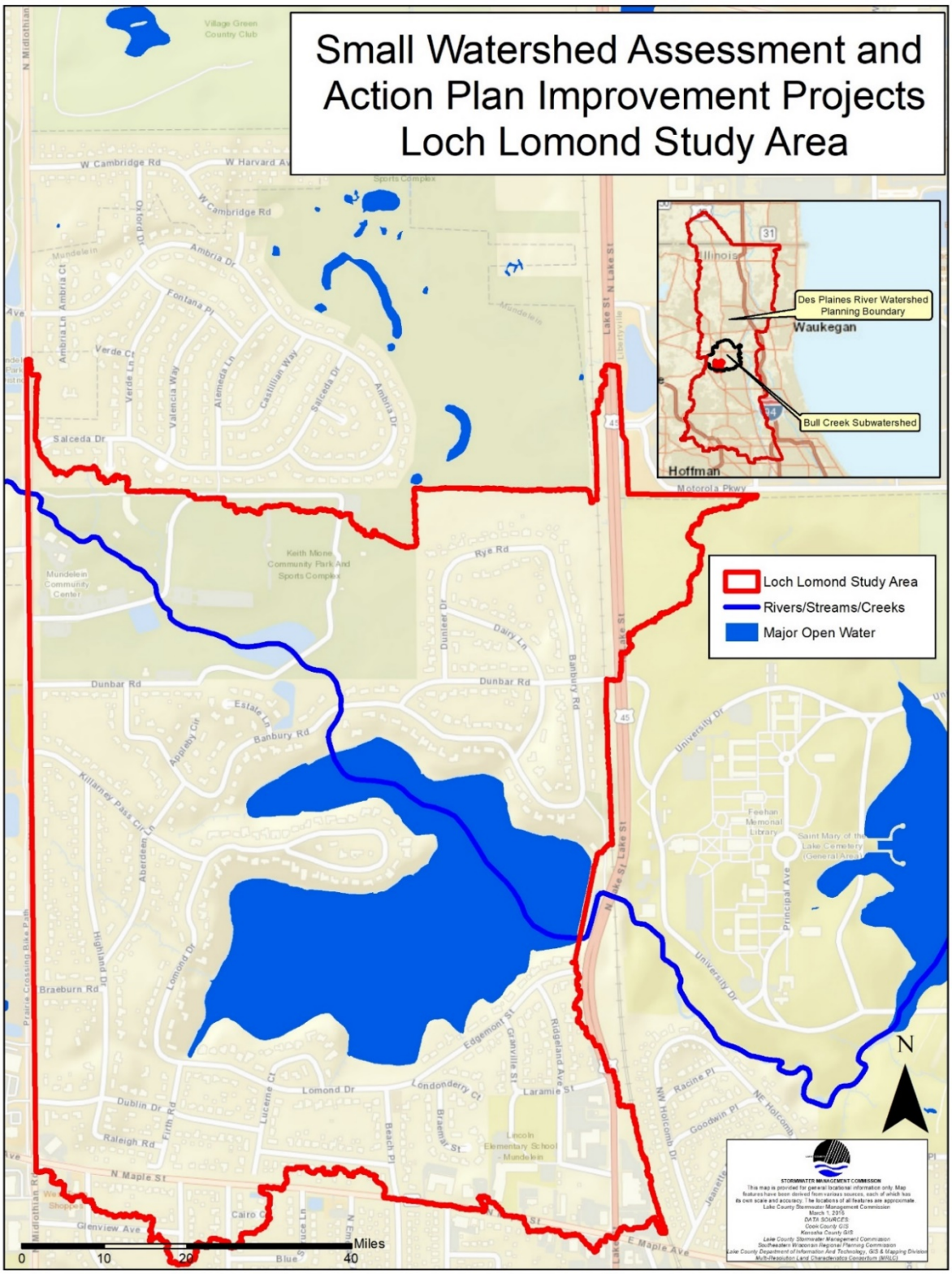

Figure 6-16: Loch Lomond SWAAP Study Area Reference

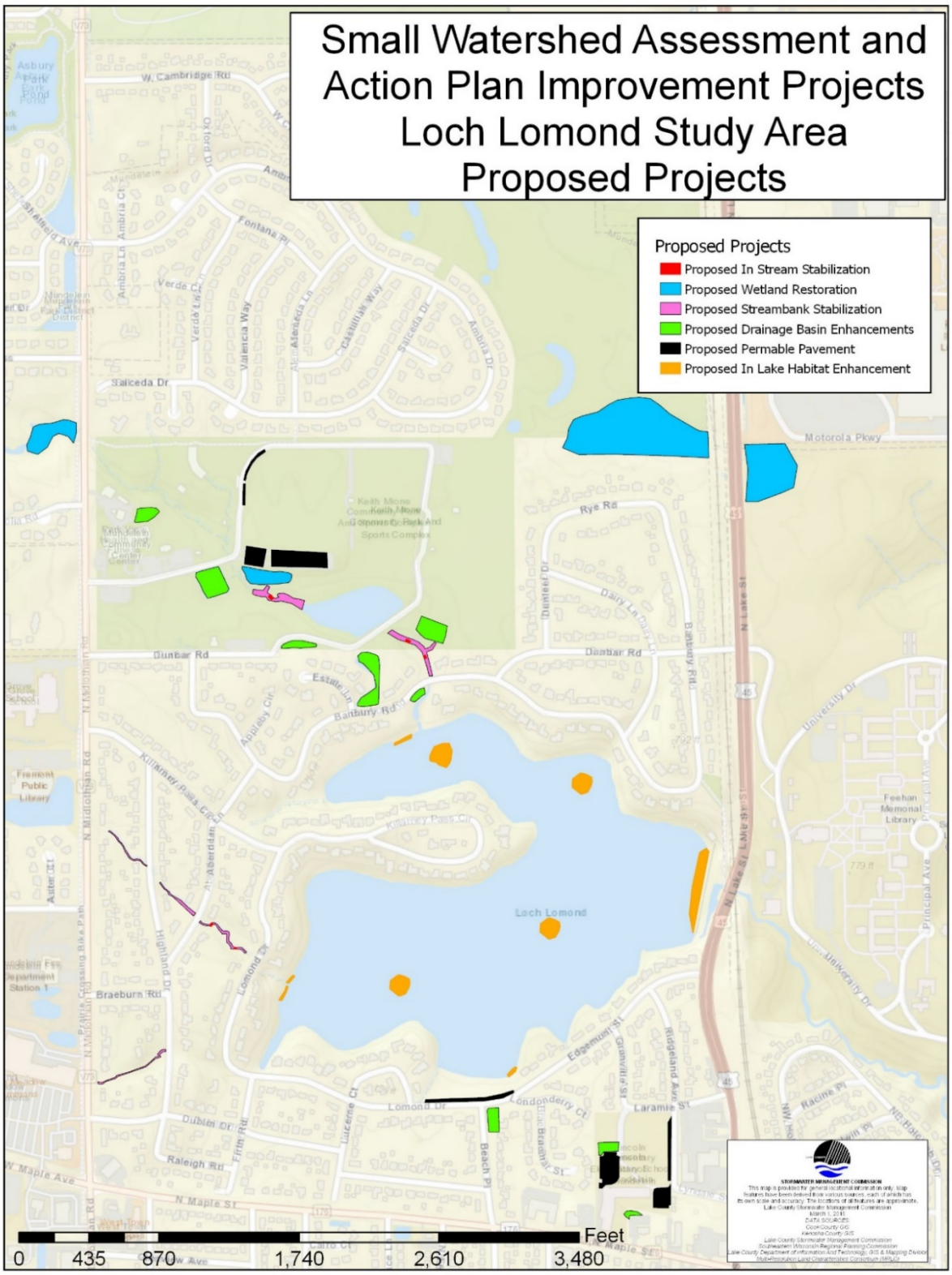

Figure 6-17: Loch Lomond Study Area Proposed Projects

6.4 REFERENCES

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 7

ACEP – Agricultural Conservation Easement Program
BMP – Best Management Practices
CFU – Colony Forming Unit
CRP – Conservation Reserve Program
DD - Detention basin retrofit projects
DFPAI - Flood problem areas
DFS - Potential regionally significant flood storage sites
DL - Lake shore erosion control practices
DPD - Problem discharge locations
DPH - Problem hydrologic impediments
DPP - Previously planned actions
DPR planning area – Des Plaines River Watershed Planning Area
DRWW – Des Plaines River Watershed Workgroup
DSB - Stream buffers
DSG - General site-specific BMPs
DST = Stakeholder identified specific BMPs
DWS - Wetland restoration and creation sites
EQIP – Environmental Quality Incentives Program
FEMA – Federal Emergency Management Agency
FSA – Farm Service Agency
GCS – Grade Control Structure
IDNR – Illinois Department of Natural Resources
Illinois EPA – Illinois Environmental Protection Agency
INLRS – Illinois Nutrient Loss Reduction Strategy
LCFPD – Lake County Forest Preserve District
LCHD – Lake County Health Department
LMU – Lakes Management Unit
NGRREC – National Great Rivers Research and Education Center
NRCS – Natural Resources Conservation Service
QAPP – Quality Assurance Project Plan
RCPP – Regional Conservation Partnership Program
SBD - Streambank erosion practices
SMC – Lake County Stormwater Management Commission
SSD - Windshield survey identified site-specific BMPs
SWCD – Soil and Water Conservation District
SWG – State Wildlife Grant
TKN - Total Kjeldahl Nitrogen
TMDL – Total Maximum Daily Load
TOC – Total Organic Carbon
TSS – Total Suspended Solids

US EPA – United States Environmental Protection Agency

USDA – United States Department of Agriculture

USFWS – U.S. Fish and Wildlife Service

USGS – United States Geological Survey

VLMP – Illinois Volunteer Lake Monitoring Program

WASCOB – Water and Sediment Control Basin

WRAPP – Wetlands Restoration and Preservation Plan

WWTP – Wastewater Treatment Plant

7 PLAN IMPLEMENTATION AND EVALUATION

This chapter identifies a strategy and provides guidance to support transition from planning to implementation and to evaluate the effectiveness of implementation toward the goals and objectives of the plan. The primary components of this chapter include:

- Pollution load reduction estimates of action recommendations
- Estimated costs of plan implementation
- Leaders and supporters for plan implementation
- Initial steps for plan implementation
- Funding resources and opportunities
- Implementation schedule
- Evaluating plan performance
- Indicator and milestone grading system
- Water quality monitoring strategy
- Updating the watershed plan

How readily this plan is used and implemented by DPR planning area stakeholders is a major indicator of its success and is easily measured by tracking the actions taken. Improvement in watershed resources or water quality are other indicators of success achieved through monitoring. Successful plan implementation will require significant cooperation and coordination among lead and support partners to secure and allocate resources and apply them to actions in the DPR planning area. The watershed-based plan can be considered a living document and has the flexibility for stakeholders to make revisions over time that reflect shifts in local priorities or watershed conditions.

7.1 ESTIMATE OF POLLUTANT LOAD REDUCTIONS AND TARGETS

Pollution load estimates were made using the nonpoint source model described in Chapter 4. The purpose of estimating pollutant load reductions and targets in the DPR planning area is to present a general idea of BMP implementation benefits and to outline the practices that result in the greatest benefit to the watershed and achieve plan goals.

Load reduction estimates were **not** performed for all actions identified in Chapter 6; estimates were made for projects with specific on-the-ground locations, where project information was collected and reduction efficiencies are available in literature sources. Many actions presented in Chapter 6 are planning level actions, and do not have the detail of information at this time to support load reduction estimates; estimates are calculated for individual implementation projects during the design stage of the project as site information is generated. Table 7-1 includes the categories of projects for which load reduction estimates are made, and Table 7-2 outlines the average expected removal efficiencies that were applied; certain project categories have ranges in efficiencies due to variations in contributing watershed area.

Table 7-1: Project Categories Inclusive of Load Reduction Estimates

ID CODE	PROJECT SPECIFIC ACTION CATEGORY	INCLUDED IN LOAD REDUCTION ESTIMATES
SSD	Windshield survey site-specific best management practice projects	Yes[1]
DST	Stakeholder identified site-specific best management practice projects	Yes[1]
CC	Cover Crops	Yes[2]
RVR	Runoff Volume Reduction Practices	Yes
FAM	Feed Area Management	Yes
TIL	No-Till/Strip-Till	Yes
NU	Nutrient Management	Yes
PE	Pasture Enhancement[4]	Yes
ICE	De-icing Practices/Salt Management	Yes
WLR	Wetland Creation/Restoration practices	Yes
WLE	Wetland Enhancement practices	Yes
SBD	Streambank erosion practices	Yes
DSB	Stream buffers	Yes
DL	Lake shore erosion control practices	Yes
DD	Detention basin retrofit projects	No
DPD	Problem discharge locations	No
DPH	Problem hydrologic impediments	No
DFPAI	Flood problem areas	No
DFS	Potential regionally significant flood storage sites	No
DWS	Wetland restoration and creation sites	Yes
DPP	Previously planned actions	Yes[3]

[1]Load reductions are not calculated for stakeholder identified practices that lack sufficient information from which to calculate load reductions or may not result in directly measurable reductions. These practices can include: education, planning, invasive species removal, general flooding issues etc. [2] Load reductions only calculated for the footprint of high priority WRAPP sites. [3] Tabulated from previous watershed-based plans and includes all reported load reductions; some actions do not have associated reductions. [4] Pasture Enhancement includes practices such as fencing, grass planting, watering system, diversions, etc…

Table 7-2: Best Management Practice Average Expected Load Reduction Efficiencies

BEST MANAGEMENT PRACTICE	NITROGEN REDUCTION	PHOSPHORUS REDUCTION	CHLORIDE REDUCTION	SEDIMENT REDUCTION	BACTERIA REDUCTION
Site-Specific (SSD/DL/SBD/DST/DSB)					
Bioswale	10%	55%	45%	65%	45%
Wetland Restoration/Creation	10%-55%	5%-65%	5%-25%	10%-70%	15%-65%
Detention/Retention	25%-30%	40%-55%	15%-25%	60%-70%	45%-55%
Sediment Forebay	20%-40%	20%-60%	15%-25%	20%-50%	45%-55%
Grass Conversion	90%	80%	45%	90%	60%
Water and Sediment Control Basin	20%	60%	25%	70%	35%
Filter Strip/Riparian Buffer/Field Border	20%-30%	30%-40%	10%-20%	45%-60%	25%-45%
Grass Waterway	30%	25%	30%	45%	50%
Porous Pavement	35%-45%	45%-50%	50%-60%	70%-80%	35%-40%
Road Salt Management	0%	0%	25%	0%	0%
Grade Control Structure	10%	20%	20%	30%	25%
Streambank Stabilization	100%	100%	N/A	100%	N/A
Basin-Wide Site-Specific (CC/ICE/RVR/NU/WLR/PE/FAM/TIL)					
No-Till / Strip-till	10%	50%	0%	70%	20%
Cover crop (all crop)	30%	30%	0%	40%	35%
Feed Area Management	85%	83%	5%	79%	80%
Pasture Enhancement	30%	40%	20%	60%	45%
Runoff Volume Reduction	25%	40%	15%	60%	45%
De-icing Practices/Salt Management	0%	0%	25%	0%	0%
Nutrient Management Plan (All crop ground)	15%	7%	0%	0%	0%
Wetland Creation/Restoration (only wetland footprint)	90%	90%	90%	90%	90%

7.1.1 Reduction Estimates for Site Specific Actions

Load reduction estimates are provided for the majority of project/site-specific recommendations throughout the DPR planning area that are summarized in the action plan (Chapter 6) and detailed in Appendix N. Load reductions also include basin-wide site-specific BMPs, streambank, and lake shoreline stabilization BMPs. The suite of projects would benefit over 127,427 acres if fully implemented.

Table 7-3 summarizes load reductions from previously planned subwatersheds in the DPR planning area. Load reductions from previously planned subwatershed projects that have already been implemented may not be considered in Table 7-3. Efforts were made to avoid overlap with the location of previously planned BMPs and associated load reductions. Previous watershed-based plans for subwatersheds applied a wide variety of techniques for modeling and estimating load reductions, as well as different approaches to the identification of BMPs.

Figure 7-1: Proposed no-till and cover crops

Table 7-4 through Table 7-5 summarizes the annual load reduction estimates by project type for all new BMPs identified for the DPR planning area during the planning process. This inventory includes projects throughout the entire DPR planning area, including subwatersheds with previously approved watershed-based plans. Figure 7-1 through Figure 7-3 show selected site-specific BMPs identified in the watershed during the April 2017 DPR planning area windshield survey. Estimates also do not account for load reductions from programmatic, education and outreach, and policy and regulatory actions since direct impacts are not easily determined at this stage of the planning process.

Based on the review of reduction estimates, project/site-specific and basin-wide site-specific actions identified in the watershed-based plan are effective for addressing water quality problems and impairments in the watershed such as sediment, nitrogen, and phosphorus. Those actions are moderately effective in addressing bacteria and chloride, and programmatic and regulatory actions will be more effective at addressing these pollutants throughout the watershed. Due to the proportion of pollutant loading that originates from point sources, alignment and coordination with the WWTPs will also be critical for addressing chloride, nitrogen, and phosphorus loading.

Table 7-3: Annual Load Reductions from Previous Watershed Plans

SUBWATERSHED	NITROGEN	PHOSPHORUS	CHLORIDE	BOD	COD	SEDIMENT	BACTERIA	LEAD	ZINC
	LBS/YR	LBS/YR	LBS/YR	LBS/YR	LBS/YR	TONS/YR	CFU/YR (10^6)	LBS/YR	LBS/YR
Buffalo Creek	10,989	3,980	N/A	24,555	N/A	6,315	N/A	N/A	N/A
Indian Creek	18,037	N/A	N/A	86,578	549,206	3,949	N/A	1,606	1,770
Bull Creek-Bulls Brook	5,723	1,531	N/A	31,004	107,244	1,147	N/A	453	590
Mill Creek	N/A	7,930	141,383	N/A	N/A	5,717	6,783	N/A	N/A
North Mill Creek /Dutch Gap	101,175	89,357	319,186	N/A	N/A	N/A	22,998	N/A	N/A
GRAND TOTAL	**135,923**	**102,798**	**460,569**	**142,137**	**656,450**	**17,128**	**29,781**	**2,059**	**2,361**

Figure 7-2: Proposed wetland restoration/creation

Figure 7-3: Proposed field border and grade control

Table 7-4: Estimated Annual Basin-Wide BMP Load Reductions

BMP	QUANTITY (area / number / length)	NITROGEN REDUCTION (lbs/yr)	PHOSPHORUS REDUCTION (lbs/yr)	CHLORIDE REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	BACTERIA REDUCTION (BILLION CFU/YR)
Basin-Wide Site-Specific BMPs - Total area benefited: 83,616 acres						
Cover Crops[1]	18,360 ac	72,612	2,959	0	5,958	6,782
Runoff Volume Reduction[2]	24,447 ac	52,771	4,894	2,339,500	1,749	32,321
Livestock Feed Area Basin/System[3]	68 ac / 81	1,996	151	33.6	11.4	971
No-Till / Strip-Till[1]	9,783 ac	15,667	3,203	0	8,320	2,277
Nutrient Management Plan	18,360 ac	36,306	6,905	0	0	0
Pasture Enhancement[4]	135 ac / 103	887	72	53.4	11	568
Road Salt Management	10,790 ac	0	0	4,104,866	0	0
Wetland Creation/Restoration	1,673 ac / 503	9,281	439	80,285	132	1,145
Basin-Wide BMP Total		**189,520**	**18,623**	**6,524,738**	**16,181**	**44,064**

[1] based on one year. [2] for undetained areas and could include any type or detention/retention practice. [3] these basins/systems address livestock capacity in comparison to the available pasture are observed. [4] Includes a combination of practices assumes some fencing, grass planting, a watering system, and a diversion. [5] Refers to a rock chute structure. [6] Loading and load reduction estimates for streambank and lake shoreline erosion are based on the Region 5 EPA's spreadsheet tool for "estimating pollutant load reductions for nonpoint source pollution control BMPs." All default values found in this spreadsheet tool are utilized for calculating estimates. [7] includes stream riffles for grade control and instream habitat enhancement; number calculated at 7 times bankfull width.

Table 7-5: Estimated Annual Site-Specific BMP Load Reductions – New BMPs

BMP	QUANTITY (AREA / NUMBER / LENGTH)	NITROGEN REDUCTION (LBS/YR)	PHOSPHORUS REDUCTION (LBS/YR)	CHLORIDE REDUCTION (LBS/YR)	SEDIMENT REDUCTION (TONS/YR)	BACTERIA REDUCTION (BILLION CFU/YR)
Site-Specific BMPs - Total area benefited: 38,389 acres / 295,892 ft						
Bioswale	0.23 ac / 170 ft / 1	6	1.4	1,808	0.68	3
Detention Basin, Urban	4 /1.5 ac	338	27	20,738	11	157
Field Border	43 / 61 ac / 75,032 ft	3,582	200	1,389	410	391
Filter Strip	10 /16 ac / 16,041 ft	789	46	522	64	119
Grade Control[5]	2	65	16	217	21	7.8
Grass Conversion	4 / 34 ac	431	16	112	29	11
Sediment Forebay	3 / 900 ft	8,422	430	274,241	221	3,448
Lake Shoreline Stabilization[6]	11,157 ft	171	86	0	86	0
Porous Pavement	1 / 1.2 ac	5	0.24	747	0.13	0.62
Pond[7]	4	930	127	12,244	214	228
Rain Barrel/Garden	510 barrels / 250 gardens	282	18	15,152	5	131
Stream Buffer	75 ac / 78,336 ft	1,400	77	13,324	44	440
Streambank Stabilization[6,7]	75,086 ft / 330 riffles	3,279	1,639	0	1,639	0
WASCOB	31	318	107	958	122	19
Waterway	31 / 50 ac/ 40,070 ft	5,963	960	12,466	1,246	642
Wetland Creation/Restoration	132 / 1,288 ac	62,363	2,406	918,951	2,336	17,386
Site-Specific BMP Total Reductions		**88,345**	**6,157**	**1,272,869**	**6,449**	**22,983**
Stakeholder BMPs - Total area benefited: 1,536 acres/ 33,026 ft						
Filter Strip/Riparian Buffer	28 ac / 21,056 ft	641	41	7,078	71	185
Stormwater Management BMP	1	1,644	86	57,864	40	947
Lake Shoreline Stabilization[6]	4,351 ft	3.7	1.9	0	1.9	0
Streambank Stabilization[6]	7,619 ft	402	201	0	201	0
Stakeholder BMP Total Reductions		**2,691**	**330**	**64,942**	**314**	**1,132**
TOTAL REDUCTION ESTIMATES		**91,036**	**6,487**	**1,337,811**	**6,763**	**24,115**

[1] based on one year. [2] for undetained areas and could include any type or detention/retention practice. [3] these basins/systems address livestock capacity in comparison to the available pasture are observed. [4] Includes a combination of practices assumes some fencing, grass planting, a watering system, and a diversion. [5] Refers to a rock chute structure. [6] Loading and load reduction estimates for

streambank and lake shoreline erosion are based on the Region 5 EPA's spreadsheet tool for "estimating pollutant load reductions for nonpoint source pollution control BMPs." All default values found in this spreadsheet tool are utilized for calculating estimates. [7] includes stream riffles for grade control and instream habitat enhancement; number calculated at 7 times bankfull width.

7.1.1.1 Load Reductions by Subwatershed

Load reduction estimates for nonpoint source pollutants are totaled by subwatershed as shown in Table 7-6 with bold indicating the top three highest total reductions per pollutant. Estimates indicate that the highest total nitrogen reductions can be achieved in the North Mill/Dutch Gap, Indian Creek, and Upper Des Plaines subwatersheds. The greatest phosphorus and sediment reductions can be realized in the North Mill/Dutch Gap, Mill Creek, and Upper Des Plaines subwatersheds. Efforts to address chloride and bacteria in the Buffalo Creek, Indian Creek, and Upper Des Plaines subwatersheds are likely to result in the greatest cumulative reductions.

Table 7-6: Estimated Load Reductions by Subwatershed

SUBWATERSHED	ACRES BENEFITED	NITROGEN REDUCTION (LBS/YR)	PHOSPHORUS REDUCTION (LBS/YR)	CHLORIDE LOAD REDUCTION (LBS/YR)	SEDIMENT REDUCTION (TONS/YR)	BACTERIA REDUCTION (CFU/YR 10^6)
Aptakisic Creek	3,315	6,187	287	393,278	141	1,720
Buffalo Creek	12,135	22,465	1,698	1,635,368	812	11,097
Bull Creek	13,787	24,532	1,717	456,935	1,925	7,214
Bull's Brook	738	1,672	155	2,188	176	221
Dutch Gap Canal/North Mill Creek	28,063	84,077	7,930	586,431	8,897	9,599
Indian Creek	21,370	37,284	2,490	1,643,950	1,743	14,426
Lower Des Plaines River	5,932	10,042	1,377	661,286	968	4,365
Mill Creek	16,108	34,469	3,309	1,050,887	2,909	6,250
Newport Drainage Ditch	4,753	13,344	1,466	142,850	1,418	2,195
Upper Des Plaines River	20,243	45,101	4,603	1,278,976	3,997	10,656

7.1.1.2 Load Reduction Targets

Water quality targets were established based on review of the Des Plaines River/Higgins Creek TMDL report, coordination between DPR planning area stakeholders. After a review process, it was decided that the two watershed TMDLs from within the DPR planning area (Buffalo Creek and Higgins Creek) would be used as guidance for chloride, phosphorus, and fecal coliform. The Illinois Nutrient Loss Reduction Strategy (INLRS) would be adopted for sediment, nitrogen, and phosphorus. Pollutant load reduction targets for nitrogen, phosphorus, sediment, chlorides and bacteria are shown in Table 7-7.

Table 7-7: Nonpoint and Point Source Load Reduction Targets

POLLUTANT	REDUCTION TARGET (%)	NOTES
Nitrogen	45%	Based on the INLRS
Phosphorus (lbs/yr)	50%, except for lakes with a phosphorus TMDL, where the TMDL targets apply.	Based on TMDL estimates and the INLRS. See Section 3.16.2 for TMDL load reduction targets for specific lakes.
Sediment (tons/yr)	45%	Based on INLRS target for phosphorus, and given the low sediment load in the watershed is considered an attainable target
Chloride (lbs/yr)	50%, except for Buffalo Creek, where the TMDL target applies	Target represents a range for streams modeled in the Buffalo Creek and Higgins Creek TMDL and is consistent with TMDL recommendations. See Section 3.16.2 for TMDL load reduction targets for Buffalo Creek.
Bacteria (billion CFU)	65% planning area-wide; except for Sylvan Lake and Buffalo Creek, where TMDL targets apply.	The fecal coliform target is based on the Buffalo Creek TMDL and represents an average of the modeled reductions over a range of flows; a reduction target of 65% was selected which accounts for seasonal variability. See Section3.16.2 for TMDL load reduction targets for Sylvan lake and Buffalo Creek.

Comparing the nonpoint and point source load reduction estimates to the total modelled pollutant loads suggests that moderate reductions may result from BMP implementation. Table 7-8 shows the breakdown of estimated nonpoint and point source pollutant loads in comparison to the total pollutant loads. Figure 7-4 is a series of charts showing the difference in nonpoint and point source contributions to the total estimated pollutant loads. Table 7-9 shows the estimated percent reductions in nonpoint source pollutant loads that can be achieved through BMP implementation. The key points to consider are:

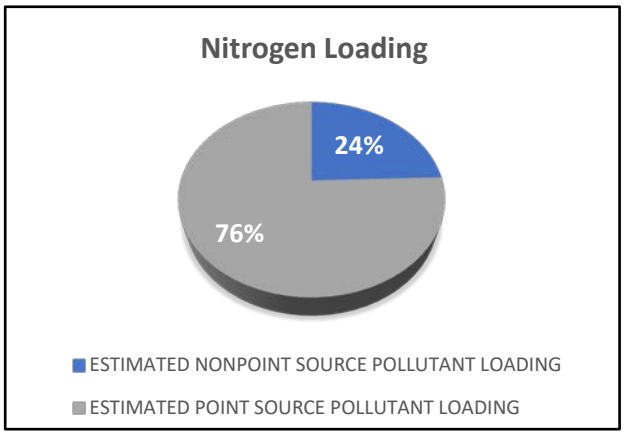
1. Project/site-specific and basin-wide site-specific actions are most effective at addressing sediment. Focusing on wide-spread adoption of cover crops and agricultural BMPs, such as field borders and grassed waterways, as well as streambank stabilization, will help address sediment loading and exceed the target reduction.
2. Project/site-specific and basin-wide site-specific actions are nominally effective in addressing nitrogen, phosphorus, and chloride. These practices do not address point sources, which are estimated to contribute 76% of the total nitrogen, 74% of the total phosphorus, and 41% of the chloride loads in the DPR planning area. Load reduction targets can only be achieved by reducing contributions from point sources. It is important to note that through new, lower permit limits, point sources within the DPR planning area are moving towards substantial reductions in phosphorus in the coming years.
3. Programmatic and regulatory actions may better address chloride by greatly reducing application rates. BMPs typically have poor chloride removal efficiencies because chloride is dissolved in the water. Furthermore, the cost of implementing BMPs to address chloride throughout dense urban areas (primary source) is high.
4. Watershed-wide detention practices, wetland restoration, streambank stabilization, and agricultural BMPs, especially wide-spread adoption of no-till/strip-till, cover crops, and nutrient management, can reduce a relatively large percentage of the nonpoint source component of phosphorus and nitrogen loading.

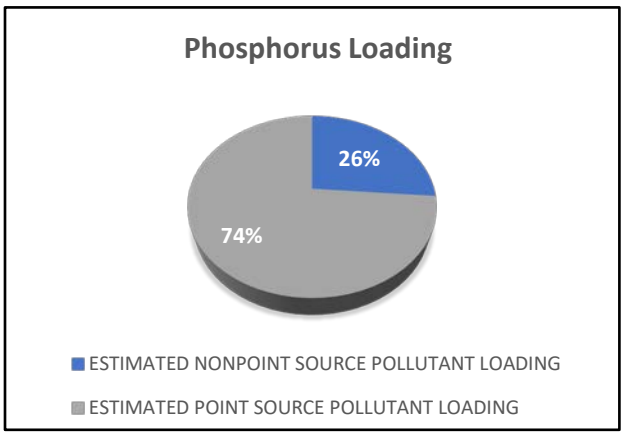
5. Project/site-specific and basin-wide site-specific actions are moderately effective in addressing nonpoint source bacteria and must be focused at addressing the major urban area sources. Watershed-wide adoption of urban detention practices are necessary to achieve more noticeable reductions in bacteria. Point source data for bacteria was not available; it is believed that notable reductions could be achieved by addressing these sources.

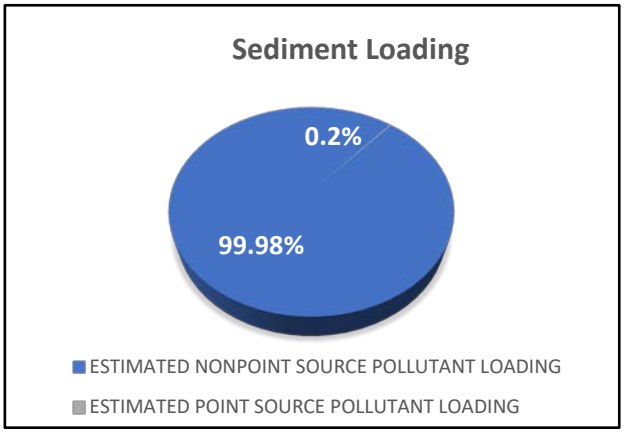
Table 7-8: DPR Planning Area Estimated Pollutant Loading (Nonpoint & Point Sources)

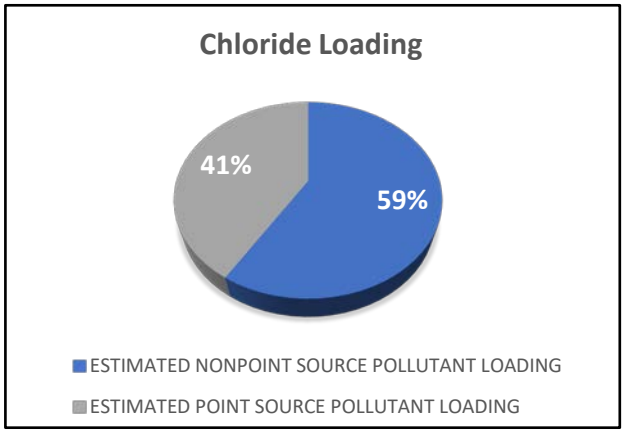
POLLUTANT	ESTIMATED NONPOINT SOURCE POLLUTANT LOADING[1]	ESTIMATED POINT SOURCE POLLUTANT LOADING	TOTAL POLLUTANT LOADING
Nitrogen (lbs/yr)	1,010,091	3,123,802	**4,133,893**
Phosphorus (lbs/yr)	60,323	169,000	**229,323**
Sediment (tons/yr)	37,460	67.29	**37,527**
Chloride (lbs/yr)	51,873,595	36,383,729	**88,257,324**
Bacteria (billion CFU)	258,786	NA	**258,786**

[1] – Nonpoint source loading totals includes stream and lake bank erosion, gully erosion and failing septic systems









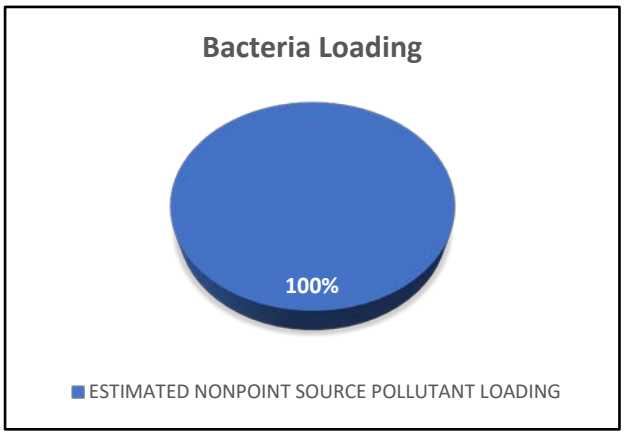


Figure 7-4: Nonpoint and Point Source Pollutant Contributions

Table 7-9: Estimated Nonpoint Source (NPS) Pollutant Load Reductions from BMPs

POLLUTANT	TOTAL ESTIMATED NPS POLLUTANT LOADING	ESTIMATED SITE-SPECIFIC BMP ANNUAL NPS POLLUTANT LOAD REDUCTIONS (%)	ESTIMATED BASIN-WIDE BMP ANNUAL NPS POLLUTANT LOAD REDUCTIONS (%)	ESTIMATED ANNUAL NPS LOAD REDUCTIONS (%)
Nitrogen (lbs/yr)	1,010,091	91,036 (9%)	189,520 (19%)	280,556 (28%)
Phosphorus (lbs/yr)	60,323	6,487 (11%)	18,623 (31%)	25,110 (42%)
Sediment (tons/yr)	37,460	6,763 (18%)	16,181 (43%)	22,944 (61%)
Chloride (lbs/yr)	51,873,595	1,337,811 (3%)	6,524,738 (13%)	7,862,549 (15%)
Bacteria (billion CFU)	258,786	24,115 (9%)	44,064 (17%)	68,179 (26%)

7.2 COST ESTIMATES

Actions recommended in this plan will be implemented by numerous lead and supporting partners (as indicated in Chapter 6 and Appendix N), and therefore the estimated costs of plan implementation are spread across various watershed stakeholders. Furthermore, the menu of projects identified is inclusive, so that the plan identifies as many potential projects as possible. The summary of cost estimates that follows is intended to provide a general idea of the scope of all projects considered in the plan but is not to be construed as a single "project cost" to be borne by a lone watershed entity. Table 7-10 summarizes the estimated funding required for the site-specific actions identified in the action plan (Chapter 6). The identified site-specific actions represent the main projects that are recommended for implementation. Table 7-11 summarizes the estimated funding required for the basin-wide site-specific actions identified in the action plan. The identified basin-wide site-specific actions represent all the projects that are needed to meet the full potential of non-point source pollution reduction in the planning area. The cost estimates are for direct implementation projects and not the

administrative, project management, and watershed coordinator costs. For all BMPs, an additional 20% should be considered to account for engineering/permitting and annual maintenance.

Cost estimates are generated from a combination of technical experience, previous subwatershed plans, and the USDA's average practice cost list. Cost estimates are generalized for watershed-scale planning purposes and these estimates should not be used to calculate costs for individual projects, as costs may range significantly depending on site conditions. Appendix K includes criteria and assumptions used to develop the cost estimates listed In Table 7-9. Potential funding sources are included in Appendix L.

Table 7-10: Cost Estimates for Site-Specific Action Recommendations

TYPE	# OF PROJECTS/ACTIONS	ACRES BENEFITED / ACRES PRACTICE	UNIT COST	ESTIMATED TOTAL COST
Filter Strips/ Riparian Buffers / Field Border /Grass Conversion	255	2,276/217	$4,000/ac	$868,664
WASCOB	8 / 31 basins	70	$4,000/basin	$124,000
Grassed Waterways	31	1,098/50	$8,000/ac	$400,000
Bioswale	1	6.8/0.23	$15/sq-ft	$150,282
Streambank Stabilization	82,705 ft / 330 riffles	N/A	$300/ft / $35,000/riffle	$32,834,536 - $41,084,536
Lake Shore Stabilization	15,312 ft	N/A	$100/ft	$1,550,833
Sediment Forebay	3 / 900 ft	3,876	$1,560/ft	$1,404,000
Grade Control Structure	2	44	$8,000/structure	$16,000
Hydrologic/Hydraulic Impediments	1,547	N/A	$10,000 - $80,000/site	$15,470,000 - $123,760,000
Problem Discharge Locations	204	N/A	$5,000 - $30,000/site	$1,020,000 - $6,120,000
Detention Basin Retrofits	658	N/A	$5,000 - $50,000/site	$3,030,000 - $30,300,000
Wetland Creation/Restoration	131	49,734/1,300	$80,000/ac	$103,998,098
Stormwater BMPs	10	450/2	Variable	$2,393,064
Lake Actions	*447*	*N/A*	*Variable*	*$7,463,767 - $15,241,470*
TOTAL				**$170,723,244 - $327,410,947**

Note: Lake Actions are a mixture of both site-specific and basin-wide site-specific action plan recommendations. For more information on lake action recommendations see Chapter 6, Section 6.3.7.

Table 7-11: Summary of Cost of Recommended Basin-Wide Site-Specific Actions by Priority

Type	Estimated Cost			
	High Priority	Medium Priority	Low Priority	Total
Cover Crops (CC)	$440,042	$660,453	$41	$1,100,536
Runoff Volume Reduction (RVR)	$156,781,260	$200,628,932	$0	$357,410,192
Nutrient Management (NU)	$0	$366,822	$0	$366,822
No-Till /Strip-Till (TIL)	$342,011	$75	$33	$342,118
Pasture Enhancement (PE)	$0	$4,079,775	$42,239	$4,122,014
Feed Area Management (FAM)	$4,068,535	$0	$0	$4,068,535
Wetland Creation/Restoration (WLR)	$128,613,837	$0	$0	$128,613,837
Wetland Enhancement (WLE)	$36,499,279	$0	$0	$36,499,279
Total	**$326,744,964**	**$205,736,057**	**$42,313**	**$532,523,333**

Where readily available, costs were tabulated from previously completed watershed-based plans and are presented in Table 7-12. Although there is some overlap with action items, it is reasonable to assume that those estimates from other watershed-based plans are in addition to those presented above. Using estimates from the current and past watershed-based plans, the total cost among all stakeholders to implement all site-specific action recommendations would be approximately $265-$422 million. When basin-wide site-specific BMPs are included, the cost estimate for all possible nonpoint source reduction projects totals nearly $954 million. It is important to consider that there are many complimentary benefits in addition to water quality improvements that are not necessarily quantified in this estimate. When evaluating implementation strategies, it is important to consider the benefits such as green infrastructure enhancement, improved habitat, increased recreational value, and reduced flooding issues.

Table 7-12: Cost Estimates from Previous Plans (if available)

SUBWATERSHED PLAN	TOTAL COST ESTIMATE
Buffalo Creek	$15,269,165
Mill Creek	$49,226,882
North Mill Creek/Dutch Gap Canal	$29,646,365
GRAND TOTAL	**$94,142,412**

7.3 NEXT STEPS FOR PLAN IMPLEMENTATION

Often, the greatest challenge of any watershed management process is its coordinated implementation. Successful implementation requires widespread coordination, effective partnerships and support, local leadership, financial and technical resources, time, and a genuine willingness to translate planning to action on-the-ground. The DPR planning area includes many implementation partners and supporters that will have to coordinate efforts to implement the recommendations in the action plan. No single partner has the financial or technical resources to accomplish the plan goals and objectives; partners working together are necessary to achieve meaningful results. Responsible entities are defined as jurisdictions; these entities have primary responsibility over actions or practices within their boundaries. Jurisdictions include municipalities, townships, counties, forest preserve districts, and the State of Illinois. Supporting partners are described in Section 6.1 Implementation Partners. Responsible entities or lead jurisdictions as well as supporting partners are further detailed in the individual action item tables located in Appendix N.

Combining and coordinating resources, funding, effort, and leadership will be the most efficient and effective means of maintaining watershed health. Implementation of this plan will also require the development of partnerships with local, state, and federal organizations for implementation, technical assistance, and funding. These efforts require the investment of a significant amount of time and resources.

Table 7-13 below shows five immediate, year-one priorities. The following subsections describe the key components of successful and sustainable plan implementation.

Table 7-13: Year One Plan Implementation Priorities

RECOMMENDED ACTION/PRIORITY
1. Working with DRWW, the Bull Creek-Bull's Brook Watershed Council, Buffalo Creek Clean Water Partnership, and other active subwatershed groups, determine specific year-1 implementation actions; coordinate with DRWW on short term monitoring priorities.
2. Research funding and technical assistance to implement recommendations identified in the action plan.
3. Submit grant applications, if applicable, and secure additional funding sources for plan implementation.
4. Coordinate available programs, policy changes, and other local initiatives and programs where private landowners are responsible for participation or implementation.
5. Promote and adopt the plan; prioritize and incorporate plan recommendations into existing programs, activities, and budgets.

7.3.1 PLAN ADOPTION

Support of the goals, objectives and recommendations of the Des Plaines River Watershed-Based plan should be formalized through its adoption by primary implementation entities (jurisdictions) and lead and support partners. Jurisdictions should adopt the watershed-based plan so that there is a basis for the incorporation of plan recommendations into the operations and procedures of the organization and its pursuit of project funding and implementation relevant to the DPR planning area. Chapter 6 outlines the DPR planning area

jurisdictions and lead and support partners responsible for implementing the action recommendations of the watershed-based plan.

7.3.2 Support and Maintain Exiting Watershed Planning Committee(s)

One important step for plan implementation will be continued support for existing watershed organizations to lead, organize, and coordinate plan actions. A planning group was established for the DPR planning area as a whole and is made up of representatives from other subwatersheds where locally active groups are implementing previous plan recommendations (watershed planning committee). Responsibilities of the committee(s) include administration, coordination of stakeholders to support individual watershed projects, and working with regulatory partners on recommended policies and programs.

Throughout the watershed planning process, the existing watershed planning committee has provided valuable input regarding issues, resources, priorities, and actions. The committee can continue to hold regular meetings, take a lead in facilitating plan recommendations, organize watershed field trips, host educational workshops and forums, and bring watershed stakeholders and multiple units of government together to discuss issues and opportunities. The supporting partners can consider whether staff positions are needed or merging with the existing collaborative organizations and/or subwatershed committees would be beneficial in the future. The watershed planning committee is encouraged to generate stakeholder interest and involvement with implementation. As projects are initiated, the positive environmental, aesthetic, and community benefits will lead to additional participation.

7.3.3 Stakeholder Participation and Engagement

There are tangible benefits to stakeholder participation in watershed activities, from positive media attention to improved quality of life for residents. Increased involvement also can yield and leverage significant local, state, and federal funding opportunities to help share the cost of project implementation. Some actions can be added to existing capital improvement and maintenance plans, budgets, and schedules. This is a fairly quick and easy approach to implementing recommendations within the purview of specific jurisdictions. In other cases, an action recommendation will require the involvement of multiple stakeholders, such as residents, a municipality, and a county, state, or federal agency to provide financial and technical support. Some actions require cross-jurisdictional coordination for issues; for example, establishing a green infrastructure corridor along a stream channel, or natural area preservation and restoration often require interjurisdictional cooperation and may require a longer time frame for implementation. Other actions will require the cooperation of individual or groups of landowners, whether they are residents, homeowners' associations, businesses, or institutions.

7.3.4 Identify Implementation Champions

Implementation actions require a leader or a single champion for the project, to organize resources and keep the project(s) moving forward. This champion may be the watershed organization, or a single entity such as a landowner, a subwatershed group, or a municipality. In some cases, actions recommend the adoption of new policies, plans, or standards that modify the form, intensity, or type of development or redevelopment in the watershed in a way that better protects resources. These actions will require some effort on the part of

municipalities to understand how plans and policies can be modified and to discuss and adopt new, or modify existing, policies, plans, and standards.

7.3.5 Resources and Funding

Funding implementation and watershed coordination actions is a priority. Securing sources of funding engages contract-level accountability and performance requirements that stakeholders are often more responsive to. There are numerous sources of funds available to help support projects or provide cost-share to match other sources of funds. A list of numerous local, regional, state, and federal funding sources is identified in Appendix L. Most of the programs require a local match of funds or in-kind services. Although these funding sources can provide a good source of revenue, significant local investment of time and money will be required to move this plan forward. These soft costs must be evaluated and incorporated into the operating strategies of the individual partners.

Many federal, state, local, and private programs are available. There are numerous sources of funding available to support projects or provide cost-share to match other sources of funds. Appendix L outlines the most common and available potential sources of funding for the technical assistance and actions identified in the plan; most BMPs recommended **are** eligible for some form of funding. Information regarding potential funding sources is readily available online and applicants should research available programs ahead of time to understand the funding cycles, conditions, and terms. Most grant programs require financial or labor match, thus applications that leverage multiple sources also have the highest probability of being successful.

7.3.6 Implementation Partners

Parties who are key potential partners whose support will lead to the realization of identified goals for the DPR planning area are listed in Chapter 6 and in the detailed action plan tables in Appendix N as implementation partners. These organizations are listed as such because they are expected to fulfill one or more of the following functions:

- Oversee or implement watershed protection, restoration, and remediation strategies
- Acquire funding for watershed plan implementation
- Organize or participate in data collection
- Provide regulatory or technical guidance and issue permits
- Monitor the success of the watershed plan
- Acquire land for green infrastructure restoration or protection purposes
- Develop education strategies

Because implementation of the watershed-based plan will largely rest with local units of government, it is critical that they be involved from the beginning. They usually have the most to gain by participating and the most up-to-date information on the structure, needs, and available resources of the community. In addition, some of the most powerful tools for implementation, such as planning, controlling development standards, and zoning reside at the local, jurisdictional level.

7.4 EVALUATING PLAN PERFORMANCE

An important component of any watershed planning initiative is the ability to monitor performance towards goals and objectives. This section focuses on the administrative-based monitoring that tracks the activities of stakeholders and the range of actions that are implemented. Section 7.5 discusses direct monitoring of quantitative criteria such as water quality and aquatic health that indicate the effectiveness of implementation actions.

7.4.1 EVALUATING PLAN IMPLEMENTATION PERFORMANCE

It is necessary to monitor the progress towards achieving the seven goals of this watershed-based plan outlined in Chapter 2. Tracking progress relevant to these is as simple as an organized system in each jurisdiction to keep track of what is happening in their portion of the watershed. Communicating and reporting progress towards goals is equally as important as tracking them in the first place.

The following recommendations are included to help track progress and achieve the goals with plan implementation.

- In the early stages of the plan implementation process, stakeholders should establish a sustainable and active watershed committee that will meet at least quarterly to discuss activities and progress towards goals. A list of completed actions, proposed, and in-progress actions should be tracked for each jurisdiction.
- The plan should be evaluated every five years to assess the progress made as well as to revise the plan, if appropriate, based on the progress achieved. The plan should also have a comprehensive review and update after 10-years (section 7.7). Amendments and changes may be made more frequently as laws change or new information becomes available that will assist in providing a better outlook for the watershed. As goals are accomplished and additional information is gathered, efforts may need to be shifted to issues of higher priority.
- The watershed planning committee should request each major jurisdiction and project partner in the watershed to provide an annual update, which could be in the form of a scorecard that tracks progress towards goal objectives via measurable milestones. The scorecard system is presented in section 7.4.2 and Appendix M. It is an easy and effective way to compile and track progress in a measurable way and evaluate the effectiveness of achieving short, medium, and long-term goals. Scorecards are an effective way to identify what needs attention and what stakeholders should focus on in the next year.
- Other opportunities for evaluating the status of plan implementation include the completion of quarterly project reports or group meeting minutes. Since this plan is a flexible tool, changes/modifications are anticipated based on usability and changes in priority throughout implementation.

7.4.2 MEASUREABLE MILESTONES AND SCORECARD SYSTEM

Interim measurable milestones are directly tied to the DPR planning area performance indicators. Milestones are essential when determining if management measures are being implemented and how effective they are

at achieving plan goals and objectives over given time periods. This allows for periodic plan updates and changes that can be made if milestones are not being met.

Watersheds are complex systems with varying degrees of interaction and interconnection between physical, chemical, biological, hydrological, habitat, and social characteristics. Indicators that reflect these characteristics may be used as a measure of watershed health. Goals and objectives in the plan determine which indicators should be monitored to assess success. Physical indicators could include amount of sediment entering a steam reach or presence or lack of adequate stream buffers, whereas chemical and biological indicators could include nitrogen loads or macroinvertebrate health. Social indicators can be measured using demographic data or, for example, the number of landowners adopting conservation practices.

DPR planning area scorecards were developed for each of the watershed-based plan goals and are located in Appendix M. Table 7-14 provides an example indicator and associated milestones for each goal as taken from the complete scorecards in Appendix M.

Table 7-14: Example Indicators and Milestones for Each Goal

GOAL	EXAMPLE INDICATOR	SHORT TERM MILESTONE (1-5 YRS)	MEDIUM TERM MILESTONE (6-10 YRS)	LONG TERM MILESTONE (10+ YRS)
1. Water Quality Improvements	Number of waterbodies removed from the Illinois EPA's impaired list.	2 lakes / 1 stream segment	6 Lakes / 3 stream segments	30 Lakes / 6 steam segments
2. Regional Green Infrastructure & Natural Resources	Area of degraded natural communities restored.	1,000 acres	5,000 acres	10,000 acres
3. Flood Damage Reduction	Percentage of structures with flood insurance in the 100-year floodplain.	25%	50%	100%
4. Funding, Installing, and Maintaining Stormwater Infrastructure	Number of cost-sharing programs.	10	20	50
5. Community and Agency Coordination	Number of municipalities, counties, and natural resource agencies that adopt the Des Plaines River Watershed-Based Plan.	25 Agencies	All Agencies	All Agencies
6. Sustainable Agricultural Systems	Number and area of agricultural BMPs installed.	25 BMPs treating greater than 2,500 acres	50 BMPs treating greater than 2,500 acres	100 BMPs treating greater than 5,000 acres
7. Education and Outreach	Number of people reached by outreach campaign.	Establish outreach campaign	5,000	10,000

This scorecard system should serve as an organizational monitoring plan and a tool for tracking progress toward meeting plan goals and specific recommendations and action items. Realistic short, medium, and long-term milestones are included for each indicator in the scorecards (Table 7-14). Each milestone is a specific action recommendation and is intended to fulfill plan objectives if executed. Indicators are to be used as measurement tools when determining if each milestone has or has not been met. If the measurement of each

indicator becomes problematic, the watershed planning committee should revisit and make adjustments where needed. It is up to local stakeholders to determine the priority of each milestone based on their ability to follow through with them. Scorecard evaluation on an annual basis is an effective way to identify priorities and what stakeholders should focus on in the next planning year.

Milestones in the scorecards can be graded based on the following criteria: A = Met or exceeded milestone(s); B = Milestone(s) 75% achieved; C = Milestone(s) 50% achieved; D = Milestone(s) 25% achieved; F = Milestone(s) not achieved

7.4.3 Plan Implementation Schedule

Implementing actions should occur immediately where specific projects and willing stakeholders have been identified. A general implementation schedule is presented in Table 7-15. More detailed timeframes are included in Appendix N for each site-specific action.

Table 7-15: General Implementation Schedule

TASK	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Promote and adopt the plan	X									
Determine specific year-1-5 implementation actions; coordinate with DRWW on short term monitoring priorities.	X	X								
Research funding and technical assistance to implement priority recommendations identified in the action plan.	X	X	X	X						
Submit grant applications if applicable and secure additional funding sources for plan implementation.	X	X	X	X	X	X	X	X		
Coordinate available programs, policy changes and other local initiatives and those programs where private landowners are responsible for signing up.	X	X	X	X	X	X	X	X	X	
Project planning, site surveys and project design and budget development		X	X	X	X	X	X	X	X	
Prioritize and incorporate plan recommendations into existing programs, activities, and budgets.	X	X	X	X	X	X	X	X	X	X
Implementation and construction of projects			X	X	X	X	X	X	X	X
Report and monitor progress	X	X	X	X	X	X	X	X	X	X
Communicate success stories		X	X	X	X	X	X	X	X	X
Evaluate accomplishments			X			X				X
Update Watershed-Based Plan										X

7.5 WATER QUALITY MONITORING STRATEGY

The need for water quality-monitoring has clearly been defined and communicated by stakeholders. As detailed in Chapter 3, the DRWW implemented a comprehensive watershed-wide monitoring program and quality assurance project plan with over seventy stations, and data collection started in September of 2015. The DRWW monitoring effort should be continued and financed to support further characterization of problems and to monitor conditions and health of the watershed through time. The DRWW monitoring will support a quantitative means to assess the effectiveness of plan implementation and the cumulative contribution towards goals and objectives.

Error! Reference source not found. shows the location of existing DRWW monitoring sites, Illinois EPA monitoring sites, USGS gage stations, and publicly-owned WWTPs. For more information about the monitoring strategy and monitoring locations view DRWW's website and monitoring strategy (http://www.drww.org/plans/reports). The DRWW water quality monitoring data has proven valuable throughout the planning process to characterize the watershed and prioritize actions. The feedback and recommendations summarized below are the result of analyzing and applying the DRWW monitoring data:

1. Environmental parameters that include some volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) or polycyclic aromatic hydrocarbons (PAHs), pesticides, and some metals are expensive analyses. A scientific and use case analysis of this data should be performed to determine what type of environmental monitoring should be continued. Perhaps collection of this data could be scaled back either by intensity, number of stations, or number of parameters. Indicator parameters could also be evaluated and considered.
2. Pairing DRWW monitoring data with USGS gage stations is important and the relevant stations should be maintained. Key DRWW stations that coincide with important USGS gages include 13-6, 10-4, 10-2 16-4, 16-1/16-2, 11-2, 13-1, and 17-2.
3. Data from stations downstream of wastewater treatment facilities should be used cautiously. Based on nutrient and chloride data reviewed, it is likely that the effluent and streamflow had not fully mixed. This resulted in elevated estimates of pollutant loading.
4. Installing staff gages at or near the DRWW monitoring sites should be considered and stage readings recorded during sampling events. This will allow flow to be attributed to sampling events in the future with a stage/discharge relationship.
5. From a watershed planning standpoint, the important parameters to continue monitoring are:
    a. Nitrogen, Kjeldahl, Total
    b. Nitrogen, Ammonia
    c. Nitrate, Total
    d. Nitrite, Total
    e. Phosphorus, Total
    f. Chloride, Total
    g. Total Suspended Solids
    h. E. Coli
    i. Total Dissolved Solids
    j. Conductivity
    k. pH
    l. Diel Dissolved Oxygen
    m. Temperature
    n. Total Organic Carbon (TOC)
    o. Fish Community, Fish Index of Biotic Integrity (fIBI)
    p. Aquatic macroinvertebrate Community, Macroinvertebrate Index of Biotic Integrity (mIBI)

6. The total suspended solids data was limited for estimating sediment loading in the watershed, possibly due to the method of sample collection. Future monitoring at all sites or select sites should consider alternate sample collection methods to collect a more representative sample for estimating sediment yields.

Section 7.4 tracks progress through achievement of actions, while this section outlines a strategy to directly monitor the effectiveness of the actions from a water quality perspective. Table 7-16 summarizes the proposed monitoring categories and associated recommendations. Given the current DRWW monitoring program, this section emphasizes lake and volunteer monitoring.

Table 7-16: Summary of Monitoring Categories and Recommendations

MONITORING CATEGORY	SUMMARY OF RECOMMENDATIONS
Streamflow	USGS and the DRWW maintain functioning gages in watershed; baseline hydrographs have been developed. Continue DRWW streamflow measurements.
Ambient water quality (streams)	Support and utilize current and future DRWW monitoring efforts.
Physical and biologic assessment (streams)	Support and utilize current and future DRWW monitoring efforts.
BMP effectiveness	Monitoring BMP effectiveness of specific practices or clusters of practices; coordinate with DRWW.
RiverWatch program	Partner with National Great Rivers Research and Education Center (NGRREC) to enhance the volunteer monitoring program in the watershed.
LCHD Lake monitoring	• Incorporate quantifiable and spatial monitoring of aquatic invasive species in lakes. • Incorporate monitoring for algal toxins. • Sample and assess all lakes in the watershed in the same year and on the same schedule. • Collect storm-event water quality samples from all lake inlets as part of program; install staff gages. • Conduct a lake nutrient balance assessment and evaluate available phosphorus in lake sediment. • Incorporate additional parameters into lake shoreline assessments to better quantify sediment and nutrient loads; this includes eroding bank height and estimated lateral recession rates. Collect lake bank soil cores to determine soil nutrient concentrations.
Illinois Volunteer Lake Monitoring Program (VLMP)	
Continuous watershed model	Develop a continuous flow and water quality model for the watershed to effectively evaluate future land use changes and climate change impacts on water balance and water quality for streams and lakes.
Storm event runoff monitoring	Support and utilize current and future DRWW monitoring efforts.

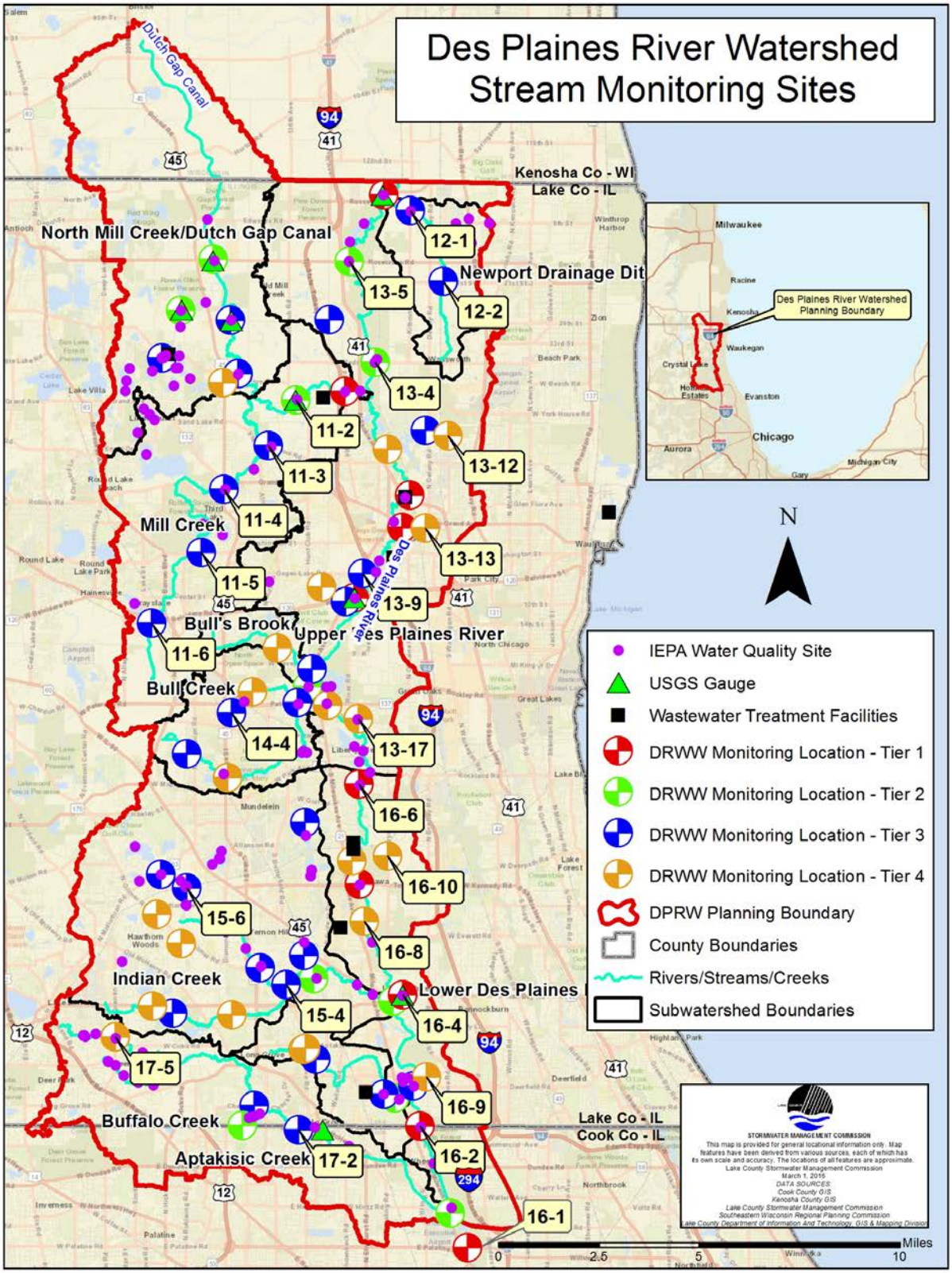


Figure 7-5: Existing DRWW Monitoring, USGS Gage, and WWTP Sites

7.5.1 BMP Effectiveness Monitoring

As funding allows, BMP effectiveness monitoring should be performed on projects to assess if actions are achieving the watershed-based plan goals and objectives. It is recommended to incorporate monitoring into the budget of BMP projects. Monitoring should be conducted by environmental consultants or independent agency staff experienced in sampling and monitoring methods.

Monitoring can be used to determine the overall effectiveness of individual or multiple spatially clustered BMPs on achieving the watershed-based plan goals. It is usually necessary to collect and analyze water quality and perform bioassessment sampling if the BMP is directly addressing a stream reach. This can be accomplished by monitoring prior to the practice (inflow) and downstream of the practice (outflow) or monitoring baseline and post-implementation conditions. It is also important to monitor the hydraulic performance and channel changes. Urbanized areas typically increase the total volume and rate of stormwater runoff that enters receiving streams and storm sewer systems. This causes changes in both hydrology and morphology. A goal of BMPs is usually to attenuate these flows and morphological impacts.

Table 7-17 includes minimum parameters that can be used as guidelines in designing and evaluating a monitoring program to evaluate BMP effectiveness. Benchmark indicators are based on water quality criteria and standards, the 2017 MBI report, or expert examination of water quality conditions to identify values representative of conditions that support designated uses and biological integrity and quality. The 2017 MBI Report and 2015 DRWW QAPP should also be referenced prior to initiating a monitoring program in order to maintain consistency.

Evaluation of the progress toward meeting targets indicates whether implemented BMPs are effective. If implemented BMPs are determined to be ineffective, the approach should be reconsidered or changed altogether.

Table 7-17: Baseline Water Quality Analysis Parameters

PARAMETERS	BENCHMARK INDICATORS
Total Phosphorus	0.05 mg/L for lakes (Illinois criteria) / 0.072 mg/L (regional reference non-effect benchmark; DRWW report)
Total Suspended Solids (TSS)	28 mg/L (regional reference non-effect benchmark; DRWW Report)
Total Dissolved Solids (TDS)	296 mg/L (regional reference non-effect benchmark; DRWW report)
Ammonia-N	15 mg/L (Illinois general use criteria)
Total Kjeldahl Nitrogen (TKN)	0.7 mg/L (regional reference non-effect benchmark; DRWW Report)
Nitrate-N	10 mg/L (Illinois drinking water standard)
Chloride	500 mg/L (Illinois criteria)
Fecal Coliform Bacteria	126 cfu/100 ml (US EPA geometric mean criteria; recreational use standard)
Dissolved Oxygen	No less than 5.0 mg/L (Illinois criteria)
Temperature	Less than 90° F (Illinois criteria)
pH	Between 6.5 – 9.0 (Illinois criteria)

PARAMETERS	BENCHMARK INDICATORS
Conductance, Specific	751 µS/cm (regional reference non-effect benchmark; DRWW report)
Flow	--
Fish	Fish Index of Biotic Integrity (fIBI) 41 or greater
Aquatic Macroinvertebrates	Macroinvertebrate Index of Biotic Integrity (mIBI) 41.8 or greater

7.5.2 RIVERWATCH VOLUNTEER PROGRAM

The National Great Rivers Research and Education Center (NGRREC) administers the RiverWatch program, which educates and trains volunteers to collect data from Illinois streams. The NGRREC holds open labs and workshops throughout the state to train volunteers. The RiverWatch program was previously called EcoWatch and was administered by the IDNR.

While the RiverWatch monitoring program collects basic information about macroinvertebrates and aquatic habitat, it provides a real opportunity to engage stakeholders and volunteers to actively participate in the watershed in a meaningful way. A continuous and consistent monitoring program under RiverWatch would be a valuable tool to supplement work being done by the DRWW, evaluate the evolving condition of the watershed, and monitor the effectiveness of watershed-based plan implementation. A RiverWatch program, however, should not be seen as a replacement for physical and biologic assessments performed by the DRWW.

It is recommended that the watershed planning committee work with the DRWW to select several designated RiverWatch stream reaches in the watershed. The reaches are typically 200-300 feet in length, depending on the type of macroinvertebrate habitat. The designated reaches should either be on public land or private lands with landowner permission. Stream reaches within Forest Preserve District property should be evaluated. The designated reaches should be communicated to the NGRREC so that volunteers in the area are focused to the designated stream reaches.

The watershed planning committee may want to consider a public relations program to educate the public regarding the RiverWatch program and enlist volunteers. Funding opportunities should be considered to reimburse travel expenses for volunteers to attend the necessary training provided by NGRREC.

7.5.3 LAKE MONITORING

There are numerous lakes in the DPR planning area that are characterized as part of Chapter 3. The lakes are a tremendous resource for recreation and watershed health and function. Lake monitoring should be considered a priority to maintain and manage the lake systems and their value as an ecological and recreational resource. Currently the Illinois EPA, LCHD, and Lake Associations administer lake monitoring programs in the DPR planning area. These programs should be supported and enhanced by the watershed stakeholders and implementation partners.

7.5.3.1 LCHD Lake Monitoring

The Lakes Management Unit (LMU) of the LCHD has been collecting water quality data on Lake County lakes since the late 1960s. Starting in 1999, approximately 32 lakes per year are monitored, equating to about a 5-year period between lake monitoring. Data collection includes temperature, dissolved oxygen, phosphorus, nitrogen, suspended solids, pH, alkalinity, conductivity, water clarity, plant community, and shoreline characteristics. Detailed reports are written for each lake and include data analyses, a list of problems specific to each lake, and recommendations on how to reduce or eliminate those problems. Reports are available online, although the information is not readily available in a database format. It is recommended that the watershed planning committee continue support of this existing lake monitoring program and track the results of each of the monitored lakes in the watershed to monitor the effectiveness of plan implementation.

7.5.3.2 Illinois Volunteer Lake Monitoring Program (VLMP)

The Illinois EPA established the VLMP program in 1981 to engage and educate the public about lake health and lake management while developing a means to collect data and observations about lakes throughout Illinois. The program funds volunteer training programs, technical and administrative support to volunteers, and laboratory analysis costs. As volunteers gain experience, they can graduate to higher tiers of data collection and lake assessment as shown in Table 7-18.

The LCHD LMU works directly with the Illinois EPA and the VLMP volunteers relative to Lake County. Not all lakes in the watershed have a volunteer commitment through the VLMP program. The VLMP program does not include quantity or spatial-based monitoring of aquatic invasive species, although the volunteers are free to provide narrative descriptions about aquatic invasive species.

Table 7-18: Monitoring Tiers of the Illinois VLMP

TIER LEVEL	DESCRIPTION OF VLMP MONITORING TIERS
Tier 1	Volunteers perform Secchi disk transparency monitoring and field observations only. Monitoring is conducted twice per month from May - October, typically at 3 in-lake sites. Field observations include the presence of invasive species including installation and monthly observations of zebra mussel plate installed near boat launch.
Tier 2	In addition to the tasks of Tier 1, volunteers collect water samples for nutrient and suspended solid analysis at the representative lake site (site 1). Water quality samples are taken only once per month, May - August, and October in conjunction with one Secchi transparency monitoring trip.
Tier 3	In addition to tasks of Tier 1 and 2, volunteers collect water samples at up to three sites on their lake. Their samples are analyzed for nutrients and suspended solids. They also collect and filter their own chlorophyll samples. Dissolved oxygen and temperature profiles may also be performed, depending on equipment availability. Data collected in Tier 3 is used in the category 5 Integrated Report and is subject for use in designating state impaired waters.

7.5.3.3 Lake Monitoring Recommendations

In addition to efforts currently being performed by individual Lake Associations, LCHD, and the Illinois VLMP, the following recommendations should be considered to enhance current monitoring activity that is performed on lakes, and should be considered at a minimum for all lakes 20 acres or greater, but should be applied to all other lakes as resources allow:

1. Incorporate quantifiable and spatial monitoring of aquatic invasive species in lakes.
2. Develop a rugged and long-lasting watershed-specific aquatic invasive species educational sign, if one doesn't currently exist, and install at all boat ramps.
3. Incorporate monitoring for algal toxins in lakes used for recreation.
4. Sample and assess all lakes within a five-year rotation (or shorter) and on the same schedule.
5. Per stakeholder input, collect storm-event water quality samples from all lake inlets as part of program; install staff gages.
6. Assess lake nutrient balance; evaluate available phosphorus in lake sediment.
7. Incorporate additional parameters into lake shoreline assessments by the LCHD to better quantify sediment and nutrient loads; this includes eroding bank height and estimated lateral recession rates. Collect lake bank soil cores to determine soil nutrient concentrations.

7.6 PLAN IMPLEMENTATION MILESTONES

This section includes goals, objectives, indicators, and milestones, consistent with implementation scorecards found in Appendix M. Table 7-19 through Table 7-25 list all consensus milestones established by the watershed planning committee. The "Objective ID" columns in Table 7-19 through Table 7-25 references Chapter 2, Section 2.4 goals (number) and objectives (letter).

7.6.1 WATERSHED GOAL #1 MILESTONES: WATER QUALITY IMPROVEMENTS

Improve water quality and prevent future pollution impacts to streams, lakes, ponds, and wetlands within the planning area. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-19: Water Quality Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
1a	Watershed stream annual monitoring program support. **Goal #1 Actions 1-4**	**S**	Continue water quality monitoring through DRWW monitoring program
		M	
		L	
		S	1. Enroll 15 lakes in the Volunteer Lake Monitoring Program (VLMP) 2. Install staff gages

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Implementation of watershed monitoring program for lakes. **Goal #1 Actions 5-7**		3. Begin Lake inlet water quality monitoring
		M	1. Enroll 30 lakes in the Volunteer Lake Monitoring Program 2. Analysis of monitoring and VLMP data 3. Estimate/assess nutrient loads from watershed for 5 lakes with sufficient data.
		L	1. Enroll 40 lakes in the Volunteer Lake Monitoring Program 2. Analysis of 5-10 year water quality trends for lakes with sufficient data
1b	Number of water bodies removed from the Illinois EPA's impairments list. **Goal #1 Actions 1-10**	**S**	2 Lakes / 1 stream segment
		M	6 Lakes / 3 stream segments
		L	30 Lakes / 6 steam segments
	Number of causes of impairment removed. **Goal #1 Actions 1-7**	**S**	5 lakes / 2 streams
		M	10 lakes / 5 streams
		L	40 lakes / 13 streams
1c	Winter Maintenance Program establishment including: policy and manual development, de-icing workshop attendance and certification. **Goal #1 Actions 8-9**	**S**	20% of municipal programs
		M	40% of municipal programs
		L	100% of municipal programs
1d	Number of local units of government that adopt a phosphorous ordinance. **Goal #1 Action 14**	**S**	8
		M	20
		L	All municipalities
	Number of exceedances of permitted phosphorus concentrations from wastewater treatment plant effluent.	**S**	0% reduction in exceedances
		M	25% reduction in exceedances
		L	50% reduction in exceedances

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Goal #1 Action 16		
	Number of agricultural BMPs implemented that target phosphorous. **Goal #1 Action 10**	**S**	1) 5 acres grass conversion 2) 10 WASCOBs 3) 5 equestrian facility/ livestock operations 4) 5 grass waterways 5) 250 acres no-till and cover crops 6) 5 field borders
		M	1) 10 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/ livestock operation 4) 10 grass waterways 5) 1,000 acres no-till and cover crops 6) 10 field borders
		L	1) 5 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/ livestock operations, 4) 10 grass waterways, 5) 3,000 acres no-till and cover crops 6) 10 field borders
	Number of upgraded septic systems. **Goal #1 Action 15**	**S**	500
		M	1,200
		L	2,000
	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #1 Actions 11-13**	**S**	8
		M	20
		L	All municipalities
1e	Number of dams and impoundments removed or retrofitted. **Goal #1 Actions 17-18**	**S**	1
		M	2
		L	3
1f		**S**	10%

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Reduction in concentrations of total suspended solids (TSS). **Goal #1 Action 19**	**M**	20%
		L	45%
	Linear feet of streambank and shoreline restored. **Goal #1 Action 20**	**S**	5,000 linear ft
		M	15,000 Linear ft
		L	30,000 Linear ft
1g	Number of algae blooms reported. **Goal #1 Action 21**	**S**	Quantify baseline number of algae blooms
		M	10% reduction
		L	20% reduction
1h	Percentage of identified sources of fecal coliform addressed. **Goal #1 Actions 22-24**	**S**	Identify and quantify sources of fecal coliform pollution
		M	50% addressed
		L	75% addressed
1i	Concentration of PAHs detected in water quality/sediment monitoring efforts. **Goal #1 Action 25**	**S**	Identify locations of high PAH concentrations
		M	Develop a management and remedial action plan
		L	Plan Implementation
1j	Number of MS4 communities maintaining a database of pollution prevention plans that address emergency response to catastrophic events. **Goal #1 Actions 26-27**	**S**	10
		M	20
		L	All
1k	Number of action recommendations completed.	**S**	50

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Goal #1 Actions 28-43	**M**	100
		L	All

7.6.2 Watershed Goal #2 Milestones: Regional Green Infrastructure and Natural Resources

Protect, enhance, and restore natural resources (soil, water, plant communities, and fish and wildlife) by employing good natural resource management practices. Using green infrastructure on public and private properties to maintain, enhance, or restore natural hydrology, native plant and wildlife communities, provide buffers for streams, lakes, wetlands, and high-quality areas. Expand environmental corridors to provide ecological, educational, and recreational benefits. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-20: Green Infrastructure and Natural Resources Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
2a	Number of water bodies removed from the Illinois EPA's impairments list. **Goal #1 Actions 1-10**	**Addressed by Objective ID 1b (1)**	
	Number of causes of impairment removed. **Goal #1 Actions 1-7**	**Addressed by Objective ID 1b (2)**	
	Area of open space identified and preserved for environmental and recreational natural areas. **Goal #2 Actions 17-24**	**S**	1,000 acres (in addition to 2018 baseline of 27,000 acres preserved)
		M	2,000 acres (in addition to 2018 baseline of 27,000 acres preserved)
		L	3,000 acres (in addition to 2018 baseline of 27,000 acres preserved)
	Acres of invasive species removal/management projects.	**S**	2,500
		M	5,000

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Goal #2 Actions 28-29	**L**	10,000
2b	Area of degraded natural communities restored. **Goal #2 Actions 1-3, 6, 7-11, 15, 16, 23, and 25-28**	**S**	1,000 acres
		M	5,000 acres
		L	20,000 acres
2c	Length of native plant buffers along water bodies maintained, expanded, and/or restored. **Goal #2 Actions 12-13**	**S**	10 miles
		M	20 miles
		L	50 miles
2d	Acres of wetlands enhanced and/or restored. **Goal #2 Actions 14-15**	**S**	500 acres
		M	1,500 acres
		L	3,000 acres
2e	Area of open space identified and preserved for environmental and recreational natural areas. **Goal #2 Actions 17-24**	**Addressed by Objective ID 2a**	
2f	Number of new trail connections. **Goal #2 Action 25**	**S**	5
		M	10
		L	20
2g	Number of lake management plans developed to address aquatic resource trends based on lake reports. **Goal #2 Action 26**	**S**	5 plans
		M	10 plans
		L	25 plans

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Number of lake management plan project recommendations implemented. **Goal #2 Action 26**	**S**	5 plans
		M	5 projects implemented
		L	10 projects implemented
2h	Number of lakes with Aquatic Plant Management Plans (APMP). **Goal #2 Action 27**	**S**	5
		M	10
		L	25
2i	Acres of invasive species removal/management projects. **Goal #2 Actions 28-29**	**Addressed by Objective ID 2a**	
2j	Number of successful reintroductions of threatened and endangered native species into natural habitats. **Goal #2 Action 30**	**S**	1 attempted
		M	5 attempted
		L	2 successful

7.6.3 Watershed Goal #3 Milestones: Flood Damage Reduction

Reduce current flood damage in the DPR planning area and prevent future flooding from worsening in the watershed and along the Des Plaines River downstream of Lake County. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-21: Flood Damage Reduction Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
3a	Area of new or restored flood storage sites. **Goal #3 Actions 1-9**	**S**	25 acres
		M	50 acres
		L	100 acres
3b		**S**	10

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Number of flood problem areas positively affected by flood mitigation projects implemented. **Goal #3 Actions 1-9**	**M**	20
		L	30
3c	Number of flood insurance policies in the watershed communities. **Goal #3 Action 24**	**S**	Track number of NFIP policies
		M	Track number of NFIP policies
		L	Track number of NFIP policies
	Number of Lake County Floodproofing Workshop attendees. **Goal #7 Actions 1-2, 4-5, 9, 13, 17-18**	**S**	300
		M	600
		L	900
3d	Number of action recommendations completed. **Goal #1 Actions 28-43** **Goal #3 Actions 6-9**	**Addressed by Objective ID 1k**	
3e	Number of mapped overland flow routes. **Goal #3 Action 10**	**S**	1 subwatershed
		M	5 subwatersheds
		L	All 10 subwatersheds
3f	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #1 Actions 11-13**	**Addressed by Objective ID 1d**	
3g	Number of local drainage system improvement projects implemented. **Goal #3 Actions 1-10, 22, 25**	**S**	25
		M	50
		L	100

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
3h	Number of communities with established stream maintenance programs. **Goal #3 Action 18**	**S**	10
		M	15
		L	All municipalities
3i	Number of updated FEMA floodplain maps (less than 10 years old). **Goal #3 Actions 19-21**	**S**	2
		M	5
		L	Entire planning area
3j	Number of Voluntary Floodplain Buyouts. **Goal #3 Action 22**	**S**	20
		M	50
		L	400
3k	Number/value of claims filed each year per community in the watershed. **Goal #3 Actions 24**	**S**	Reduce by 5%
		M	Reduce by 10%
		L	Reduce by 25%

7.6.4 Watershed Goal #4 Milestones: Funding, Installing, and Maintaining Stormwater Infrastructure

Reduce the volume and improve the quality of stormwater runoff by installing appropriate gray or green stormwater infrastructure; improving the condition of existing stormwater infrastructure. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-22: Stormwater Infrastructure Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
4a	Number of action recommendations completed. **Goal #1 Actions 28-43** **Goal #3 Actions 6-9** **Goal #4 Actions 2-4**	**Addressed by Objective ID 1k**	
4b		**S**	5

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Number of cost-sharing programs available in the DPR planning area. **Goal #4 Actions 5-7, 9**	**M**	7
		L	10
	Amount of grant funding available for stormwater green infrastructure and BMPs. **Goal #4 Actions 5 and 9**	**S**	$2,500,000
		M	$3,000,000
		L	$5,000,000
4c	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #1 Actions 11-13** **Goal #4 Actions 8-9, 11**	**Addressed by Objective ID 3f**	
4d	Number of local, county, and state representatives provided educational outreach materials for improving local and countywide regulations. **Goal #4 Action 9**	**S**	20
		M	40
		L	50
4e	Funding increase for in-the-ground stormwater BMPs. **Goal #4 Actions 5 and 9**	**S**	10% increase from 2018 baseline
		M	10% increase from 2018 baseline
		L	20% increase from 2018 baseline
4f	Number of existing stormwater management structures retrofitted. **Goal #4 Actions 10-11**	**S**	30
		M	100
		L	500
		S	30

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Number of developments built using conservation design principles and/or green infrastructure. **Goal #2 Action 19** **Goal #3 Action 11-15** **Goal#4 Action 4, 8**	**M**	60
		L	80
4g	Potential maintenance needs identified in future stream and detention basin inventories. **Goal #3 Action 18** **Goal #4 Action 11, 15**	**S**	N/A
		M	10% aggregate reduction from 2018 baseline
		L	20% aggregate reduction from 2018 baseline
4h	Number of communities with established stream maintenance programs. **Goal #3 Action 18**	**Addressed by Objective ID 3h**	
4i	Lane miles of roadway retrofitted or constructed with BMPs. **Goal #4 Actions 12-13**	**S**	5 miles
		M	10 miles
		L	15 miles
4j	Number of informational guides on roles and responsibilities for stormwater gray/green infrastructure maintenance distributed. **Goal #7 Action 9**	**S**	2,000
		M	5,000
		L	10,000
4k	Number of compliant site inspections performed during the 10-year operation and maintenance period for Illinois EPA 319 grant funded projects. **Goal #4 Actions 14-16**	**S**	All 319 grant funded projects
		M	All 319 grant funded projects
		L	All 319 grant funded projects

7.6.5 Watershed Goal #5 Milestones: Community and Agency Coordination

Improve coordination, research, and decision-making among public, private, and nonprofit entities to help achieve watershed plan goals and objectives. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-23: Community and Agency Coordination Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
5a	Number of municipalities, counties, and natural resource agencies that adopt the Des Plaines River Watershed-Based Plan. **Goal #5 Actions 1 and 2**	**S**	25 Agencies
		M	All agencies
		L	All agencies
5b	Watershed stream annual monitoring program support. **Goal #1 Actions 1-4** **Goal #5 Action 3**	**Addressed by Objective ID 1a**	
5c	Establishment of lead organization (watershed planning committee) with budget and executive committee. **Goal #5 Actions 4-6**	**S**	1 lead organization
		M	
		L	
	Number of projects advanced/undertaken with the support of the watershed planning committee. **Goal #5 Actions 7-8**	**S**	100 action plan recommendations
		M	250 action plan recommendations
		L	500 action plan recommendations
5d	Communities and organizations have designated an individual or board member(s) representative to participate on the watershed planning committee. **Goal #5 Action 4, 13**	**S**	10 communities
		M	20 communities
		L	All communities
5e		**S**	10

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Number of jurisdictions implementing watershed site-specific and programmatic actions. **Goal #5 Actions 9-11**	**M**	20
		L	All
5f	Number of jurisdictions that have ordinances and programs that protect and preserve watershed natural resource areas. **Goal #5 Actions 12-14**	**S**	10
		M	20
		L	All
	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #5 Actions 10, 14**	**Addressed by Objective IDs 3f & 4c**	
5g	Number of RiverWatch sites/lakes enrolled in volunteer/citizen scientist river and lake monitoring programs. **Goal #1 Action 2** **Goal #7 Actions 13**	**S**	25
		M	50
		L	75
5h	Number of watershed stakeholders providing feedback for the watershed report cards. **Goal #5 Action 15**	**S**	30
		M	100
		L	200

7.6.6 Watershed Goal #6 Milestones: Sustainable Agriculture Systems

Watershed stakeholders participate in farmland preservation programs and implement sustainable agricultural practices to accomplish other watershed goals and objectives. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-24: Sustainable Agricultural Systems Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
6a	Number and area of agricultural BMPs installed. **Goal #6 Actions 1-9**	**S**	25 BMPs cumulatively treating greater than 1,000 acres.
		M	50 BMPs cumulatively treating greater than 2,000 acres
		L	100 BMPs cumulatively treating greater than 5,000 acres
6b	Number or percent of farms, equestrian facilities, and nurseries with Resource Management Plans (assume 2018 baseline of 0). **Goal #6 Action 10**	**S**	5%
		M	25%
		L	50%
6c	Number of high priority sediment reduction agriculture BMPs installed. **Goal #6 Actions 11-12**	**S**	15
		M	30
		L	60
	Demonstration sites established and monitored. **Goal #7 Action 2, 7, 13**	**S**	3
		M	5
		L	7
	Length of drain tile removed or disabled. **Goal #6 Action 12**	**S**	5,000 ft
		M	10,000 ft
		L	30,000 ft
6d	Number of county and municipal agencies that have adopted a farmland preservation program(s). **Goal #6 Action 13**	**L**	Community dependent
6e	Acres of cover crops or crop residue left on fall agricultural fields.	**S**	5% of all conventional or reduced tilled fields (500 acres)

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Goal #6 Action 1, 8, 10, 13	**M**	25% of all conventional or reduced tilled fields (2,500 acres)
		L	50% of all conventional or reduced tilled fields (5,000 acres)
	Acres of waterway, wetland, WASCOB, field border, filter strip, GSS and other erosion control agriculture BMPs that are implemented, enhanced or restored. **Goal #6 Actions 1-9, 11-12**	**S**	1) 5 acres grass conversion 2) 10 WASCOBs, 3) 5 equestrian facility/livestock operations, 4) 5 grass waterways, 5) 250 acres no-till and cover crops, 6) 5 field borders 7) 5 acres filter strips, 8) 50 acres of wetlands 9) 10 nutrient management plans
		M	1) 10 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/livestock operations 4) 10 grass waterways 5) 1,000 acres no-till and cover crops 6) 10 field borders 7) 10 acres filter strips 8) 100 acres of wetlands 9) 50 nutrient management plans
		L	1) 5 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/livestock operations, 4) 10 grass waterways, 5) 3,000 acres no-till and cover crops, 6) 10 field borders, 7) 10 acres filter strips, 8) 200 acres of wetlands 9) 100 nutrient management plans
6f	Number of prime farmland acres in production. **Goal #6 Action 14**	**L**	75% of all prime farmland (2018 baseline)

7.6.7 Watershed Goal #7 Milestones: Education and Outreach

Provide watershed stakeholders with the knowledge, skills, and motivation needed to take action to implement the watershed plan. Watershed stakeholders include (but are not limited to): residents,

property owners, property owner associations, government agencies, jurisdictions, and developers. Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years.

Table 7-25: Education and Outreach Milestones

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
7a	Number of landowners that receive information about best practices for stream and lake shoreline restoration and maintenance. **Goal #7 Action 1-2, 4, 13**	**S**	500
		M	500
		L	2,000
7b	Number of people reached by watershed outreach campaign. **Goal #7 Actions 2, 4, 10-11, 16**	**S**	Establish outreach campaign
		M	5,000
		L	10,000
7c	Number of public agencies and local private contractors attending the annual Lake County De-icing Workshop. **Goal #1 Actions 8-9** **Goal #7 Action 3**	**S**	20 public agencies; 100 local private contractors
		M	35 public agencies; 150 local private contractors
		L	All public agencies with winter maintenance responsibilities; 200 local private contractors
	Number of public agencies with winter maintenance responsibilities that use alternative de-icing products. **Goal #1 Actions 8-9** **Goal #7 Action 3**	**S**	20
		M	35
		L	All
7d	Number of property owners that receive information about the importance of watershed health.	**S**	2,000
		M	5,000
		L	10,000

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Goal #7 Actions 2, 4, 11		
	Number of landowners that receive information about watershed programs and projects.	**S**	2,000
		M	5,000
	Goal #7 Actions 2, 10, 12	**L**	10,000
	Number of workshops.	**S**	10
		M	20
	Goal #7 Actions 13, 16, 18	**L**	30
7e	Number of action recommendations completed. **Goal #1 Actions 28-43** **Goal #3 Actions 6-9** **Goal #4 Actions 2-4** **Goal #7 Actions 20-21**	**Addressed by Objective IDs 1k**	
	Continuous increase in number of contacts on the SMC Des Plaines River watershed contact database.	**S**	5% increase
		M	7% increase
	Goal #7 Actions 2, 4, 10-11, 16	**L**	10% increase
7f	Pollution prevention campaign established.	**S**	Establish campaign
		M	Maintain campaign
	Goal #7 Actions 2-5, 8, 17, 22	**L**	Maintain campaign
7g	Number of volunteers for lake, stream, and natural area stewardship and maintenance.	**S**	500
		M	500
	Goal #7 Actions 13-14	**L**	1,000
7h		**S**	1 site / 1 training/yr.

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE
	Number of native plant demonstration sites established, and trainings held. **Goal #7 Actions 15-16, 21-22**	**M**	2 sites / 2 trainings/yr.
		L	2 sites / 2 trainings/yr.
7i	Number of communities that adopt the "no adverse impact standard." **Goal #7 Action 17**	**S**	2
		M	5
		L	All applicable communities
7j	Number of educational flyers or mailings to high flood risk property owners about flood mitigation measures. **Goal #7 Action 18**	**M**	5,000
	Number of clicks (overall activity) on SMC website with flooding resources. **Goal #7 Action 4, 18**	**S**	5% increase in 2018 baseline
		M	7% increase in 2018 baseline
		L	10% increase in 2018 baseline
7k	Number of educational signs regarding aquatic invasive species installed. **Goal #7 Actions 20-22**	**S**	10
		M	20
		L	At least one sign at every lake with public access

7.7 UPDATING THE WATERSHED-BASED PLAN

Watershed-based plans are required by the Illinois EPA to be updated every 10 years. Furthermore, the watershed-based plan should be revised, as necessary, as new information is received, and progress is made. For example, as DRWW monitoring efforts continue, additional data can be used to revise loading estimates and determine if implementation efforts are achieving stated goals, milestones, and reduction targets. The Des Plaines River Watershed-Based Plan is an umbrella document, and when major updates occur, existing subwatershed plans must also be updated. Plan updates do not require an entire rewrite; typical elements that will likely require a major update or revision are summarized in Table 7-26.

Table 7-26: Plan Update Elements and Responsibilities

MAJOR PLAN ELEMENT REQUIRING UPDATE	ELEMENT COMPONENT REQUIRING UPDATE	LEAD RESPONSIBLE ENTITY (S)	PRIMARY SUPPORTING PARTNERS
Watershed Characterization	• Land use information • Water quality data/analysis • Stream/lake impairments • Climate • Demographics • Jurisdictions • Pollution loading	Lake County SMC	• Jurisdictions (Chapter 6) • DRWW • Watershed Planning Committee and subwatershed planning groups
Action and Implementation Plan Components	• Project recommendations • Expected load reductions • Milestones, timeframes, and priorities • Responsible parties and support partners • Monitoring plan	Lake County SMC	• Jurisdictions (Chapter 6) • DRWW • Watershed Planning Committee and subwatershed planning groups

7.8 REFERENCES

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COMMON ACRONYMS/ABBREVIATIONS USED IN CHAPTER 8

APWA – American Public Works Association

BMP – Best Management Practices

BOMA – Building Owners and Managers Association International

CLC – College of Lake County

CMAP – Chicago Metropolitan Agency for Planning

CSA – Community-Supported Agriculture

DPR Planning Area – Des Plaines River Watershed Planning Area

DRWW – Des Plaines River Watershed Workgroup

FEMA – Federal Emergency Management Agency

FSA – Farm Service Agency

HOA – Homeowners Association

I/E – Information and Education

IDNR – Illinois Department of Natural Resources

ILCA – Illinois Landscape Contractors Association

Illinois EPA – Illinois Environmental Protection Agency

ILMA – Illinois Lakes Management Association

LCFPD – Lake County Forest Preserve District

LCHD – Lake County Health Department

LCTV – Lake County Television

LID – Low Impact Development

LA – Lake Associations

MWRD – Metropolitan Water Reclamation District of Greater Chicago

NFIP - National Flood Insurance Program

NRCS – Natural Resources Conservation Service

PB&D – Planning Building & Development

PSA- Public Service Announcement

SMC – Lake County Stormwater Management Commission

SWALCO - Solid Waste Agency of Lake County

SWCDs –Soil & Water Conservation Districts (McHenry-Lake & North Cook)

USEPA – U.S. Environmental Protection Agency

USGS – United States Geological Survey

WI DNR – Wisconsin Department of Natural Resources

WWTPs – Wastewater Treatment Plants (including publicly owned treatment works)

YCC – Youth Conservation Corps

8 EDUCATION AND OUTREACH STRATEGIES AND TOOLS

Figure 8-1: April 13, 2017 Des Plaines River Watershed planning meeting

Stakeholders provide input for the education and outreach strategy.

This chapter provides a strategy for information, education, and public involvement to address watershed topics and issues (see Figure 8-1). The education and outreach strategy provides messaging and motivation for each target audience to help achieve the goals and realize the vision for the Des Plaines River watershed:

The Des Plaines River watershed will be a destination valued by residents, businesses, and governments that join together to actively engage in education and participate in improving water quality. Stakeholders will preserve and enhance regional green infrastructure, resulting in cleaner streams and lakes, better plant and animal biodiversity, and reduced flood damage – while balancing a sustainable native landscape with development and economic growth.

8.1 WATERSHED INFORMATION AND EDUCATION NEEDS

Community engagement, outreach, and education are essential components of the Des Plaines River Watershed-Based Plan. The education and outreach strategy is designed to:

- Raise public awareness about watershed issues and foster support for solutions;
- Educate stakeholders, the public, and other identified target audiences to increase awareness and encourage behavioral changes (see Figure 8-2 for a Work-In-Progress sign);
- Provide engaged stakeholders the knowledge and skills they need to become watershed stewards and implement the watershed action plan;
- Leverage public and private partnerships to implement action items.

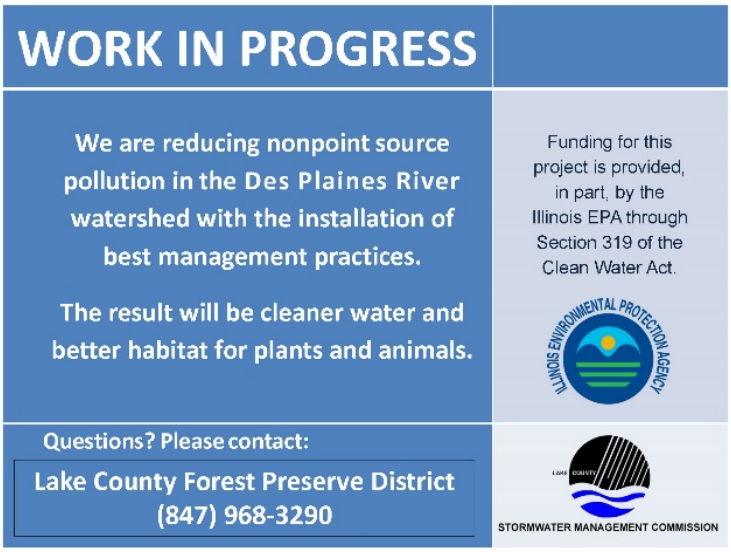

Figure 8-2: Example Work-In-Progress signs

The signs were installed at the three BMP implementation projects completed in 2017.

8.2 RECOMMENDED PROGRAMS

Development of an education and outreach program begins by defining education and outreach goals and objectives, see Figure 8-3 showing an example of an outreach program. During the June 2016 Des Plaines River watershed planning meeting, stakeholders discussed and approved the following goal and objectives related to education and outreach.

EDUCATION & OUTREACH GOAL: Provide watershed stakeholders with the knowledge, skills, and motivation needed to take action to implement the watershed plan. Watershed stakeholders include (but are not limited to): residents, property owners, property owner associations, government agencies, local units of government, and developers.

OUTCOME: *Stakeholders have adequate information and knowledge of resources to implement the watershed plan.*

Figure 8-3: 2016 HOA Workshop on Maintenance for Subdivision Drainage Systems

OBJECTIVES:

a) Educate and provide information and training to riparian and lakeshore landowners on best practices for stream and lake shoreline restoration and maintenance that will reduce erosion and increase water quality.

b) Conduct a watershed outreach campaign to inform and engage the public about watershed issues, landowner responsibilities, and available resources.

c) Educate local government officials and agencies, consultants and contractors working in the watershed, landscapers and nurseries, and landowners on road salt alternatives and application BMPs to minimize the use of road salt by public and private snow removal providers.

d) Educate the general public on the importance of watershed health (water quality, flood prevention, soil conservation and agricultural production, green infrastructure, and water-based recreation) to the economy of the communities in the watershed.

e) Utilize trainings, workshops, public meetings, newsletters, websites, media, campaigns, and stakeholder word of mouth to provide watershed stakeholders opportunities to participate in watershed programs and projects.

f) Develop and implement a pollution prevention campaign to educate residents, businesses, developers and homebuilders on source control and runoff reduction measures that may be used on their properties. These measures can be used to reduce or eliminate pollution inputs associated with landscape maintenance and agricultural production.

g) Facilitate public training and engage schools and youth groups (students), lake associations, and homeowner associations to volunteer for lake, stream, and natural area stewardship and maintenance.

h) Promote the use of native plants and the removal of invasive plants by establishing demonstration sites and training.

i) Provide communities with the tools they need to prevent flood damage from worsening by using the "no adverse impact standard" and maintaining floodplain as open space.

j) Provide outreach and workshops for the public affected by flood damage to educate them on the causes of flooding, flood mitigation practices, and what can be done to prevent local and regional flood damage.

k) Install signs at each lake to educate riparian and lakeshore landowners and lake users on ways to reduce the spread of aquatic invasive species.

8.3 TARGET AUDIENCES

The audiences for specific education and outreach activities and topics include organizations, watershed residents, the general public, and professionals within the watershed community. These audiences have a wide range of understanding of watershed issues and needs for further education and outreach. Education and outreach intends to be responsive to existing partners, attract stakeholders that have not previously participated in watershed improvement activities, and align messages with audience knowledge levels and motivations. Education and outreach partners include the following entities.

Figure 8-4: Stakeholders participating in the watershed goals and opportunities exercise
Stakeholder input was used to create education and outreach strategy.

8.3.1 LOCAL GOVERNMENT OFFICIALS AND AGENCIES

Continued support from local governments and public landowners will be critical to implementing the education and outreach strategy. These officials and agencies develop policies and regulations and manage the land and projects within the watershed. They will need to commit to projects on public lands and communicate with and motivate residents to participate in watershed improvements. The local government target audience includes:

- Municipalities
- Townships
- County agencies
- Elected officials and policy makers
- Drainage districts
- Park districts & Forest preserve districts
- Public works agencies
- Transportation agencies (Highway Commissioners)

8.3.2 Residents and Businesses

Numerous residents and landowners in the Des Plaines River watershed have participated in one or more Des Plaines River watershed meetings or subwatershed committee meetings (see Figure 8-4). The target audience includes the following groups or residents:

- All residents and landowners (including agriculture producers, equestrian and large-track landowners)
- Not-for-Profit and Environmental interest groups
- Businesses and institutions (i.e., golf courses, shopping centers, churches and Chambers of Commerce)
- Community-Supported Agriculture (CSA) systems

8.3.3 Riparian and Lakeshore Landowners

Riparian landowners may have a disproportionate impact (positive or negative) on stream and wetland areas, and often have a vested interest in improving watershed conditions to protect their property, comply with regulations, or enhance property values. Riparian areas are critical locations because they contribute to watershed problems or hold the key to solutions. Therefore, the riparian property owners should be targeted for special attention in the education and outreach strategy. The target audience includes the following groups of riparian and lakeshore landowners:

- Homeowner and lake associations (HOAs/LAs)
- Single family residences
- Commercial and multifamily residential properties
- Owners of undeveloped land
- Railroads
- Utility companies located in floodplains or along streams, lakes, and wetlands

8.3.4 Schools and Youth Groups

Outreach and education programs and messages are targeted towards students in schools and youth groups which are needed in order to achieve sustainable improvements over time. The behaviors needed to effect long-term changes and improvements in watershed conditions will take hold in the shortest time and with the greatest effect in groups of children and young adults. Youth involvement in outdoor activities, such as stream clean-ups and habitat restoration days, is an effective way to engage groups in learning about and acting to improve watershed conditions. The student target audience includes the following schools and youth groups:

- Secondary schools
- Community colleges (CLC)
- Youth groups (Boy Scouts, Girl Scouts)

8.3.5 Developers & Homebuilders

The land development process has the potential to adversely affect watershed conditions, but development interests can be balanced with watershed goals if identified prior to or early in the design and development process. Developers and homebuilders should adopt a variety of best development standards and comply with regulations, codes, and ordinances to protect watershed resources.

8.3.6 Consultants and Contractors Working in the Watershed

Several engineering, environmental and other consultants have participated in stakeholder meetings and provided their expertise towards the watershed planning process. The watershed-based plan will provide consultants and contractors with resources to share with their clients and support for prioritization of future projects. The help of consultants and contractors will be needed to bring outreach and education messages to their clients to motivate and fund BMPs and watershed improvements far into the future.

- Restoration contractors
- Legal counsel
- Insurance companies
- Winter maintenance product/equipment suppliers
- Winter maintenance (snow removal) contractors
- Engineering, landscape architectural, and environmental consulting firms

8.3.7 Landscapers & Nurseries

Landscapers, lawn and garden centers, nurseries, hardware stores, large retail establishments, and snow removal contractors can make a huge impact by learning and following watershed-friendly lawn care and winter maintenance practices, especially by reducing their use of pollutants such as chloride and phosphorus. Communities can support education by maintaining registries for lawn care, nurseries, and winter maintenance providers.

- Lawn & garden centers

8.4 PARTNER ORGANIZATIONS

Organizations that will be responsible for implementing the watershed plan recommendations can assist in education and outreach and can also be one of the targeted audiences. Each partner should couple plan implementation efforts with parallel efforts to inform and educate. Several educational programs are currently being implemented by other organizations that watershed stakeholders may take advantage of for the Des Plaines River watershed education and outreach strategy. See Table 8-1 below for a list of potential partner organization for implementing the watershed plan recommendations.

Table 8-1: Partner Organizations

PARTNER ORGANIZATIONS	
All Residents & Landowners	Master Gardeners, Garden Blubs
Businesses and Institutions	SWCDs
CLC	Municipalities (including Public Works Depts.)
CMAP	MWRD
Conserve Lake County	NRCS
Cook County	Park Districts
Drainage Districts	SMC
Environmental Interest Groups	Townships
Farm Bureaus	Transportation Departments
Forest Preserve Districts	USGS
IDNR	USEPA
Illinois EPA	WWTPs
ILMA	Watershed Planning Committees
Kenosha County	Watershed Workgroups
Lake County	WI DNR
LCHD	YCC

8.5 GUIDANCE FOR IMPLEMENTATION

The following list provides general guidance for implementing the education and outreach strategy. More detailed recommendations for addressing specific watershed issues are included in Table 8-3.

- Use words that the general public can understand and speak to their existing values and priorities.
  - Basic watershed science education (e.g., biology, the water cycle, and stream ecology) may be needed when the audience has little knowledge about rivers, streams, lakes, wetlands, or watersheds.
  - Identify and provide for different levels of understanding and the needs of various audience groups. When interacting with a group, stress the dimensions of the project that apply most to them. For example, when interacting with homeowners, focus on items such as rain gardens, lawn care, pollution prevention and restoration, and management of riparian buffers. Develop a similar menu of topics for each target audience.
  - Be sure to inform your audience about actions they can take and behaviors they can change to help address watershed problems and issues.
- Develop multiple messages; use one broad message for the general public and a series of more specifically targeted messages for specific audiences (e.g., landowners, business owners, and municipalities).
  - Keep the message simple and straightforward with only two or three take-home points at a time, use graphics and photos to illustrate the message, and repeat it frequently.

- Emphasize the connections between the message and the issue or resource being addressed. For example, connect the message to storms, streams, lakes, the Des Plaines River, land management, the urban landscape, and streets.

- Coordinate the education and outreach strategy with partner organizations to combine efforts, achieve economies of scale, tap into one another's networks, share costs, and ensure consistent messages.
- Use websites and other social media, as well as public places, such as libraries and village halls, to post and promote your message.
  - All materials and messages should promote the local watershed groups, with contact information and information on how to get involved.
  - Be sure to link the issue to the audience and inform the audience about actions they, specifically, can take to help address watershed problems and issues.
  - Post messages on websites and in popular public and private places, such as parks, forest preserves, libraries, grocery stores, and village halls.

8.6 MESSAGE FORMATS AND DELIVERY MECHANISMS

Numerous existing programs, tools, and materials are available that can be used or customized to accelerate education and outreach efforts. See Table 8-2 below for examples of education and outreach through print, electronic, visual and personal contact communication efforts.

Table 8-2: Examples of Education & Outreach Efforts

PRINT	ELECTRONIC	VISUALS	PERSONAL CONTACT
Brochures	Social Media	Displays/Exhibits	Demonstrations, field trips, watershed tours
Fact sheets	Websites	Signage	Presentations (meetings, events, workshops, seminars, open houses etc.…)
Newsletters	E-News/Emails	Posters/ Bulletin boards	Interviews
News releases	Videos/local cable channel	Presentations	Surveys
Feature articles	Public Service Announcements (PSA)		Target individual Discussions
Inserts/Utility bills	Bulletin Boards		
Flyers	Surveys		
Direct mail			
Manuals or plans; Technical resources			
Media kit			

8.7 EVALUATING PLAN OUTREACH

Watershed plan evaluation provides a feedback mechanism for ongoing improvement of your outreach effort and for assessing whether the effort is successful. It also builds support for further funding. The entity or persons responsible for implementing the education and information campaign should customize the following

ideas. For a number of these evaluation strategies, you should collect baseline information or survey current knowledge before the outreach activities begin and check periodically throughout the outreach campaign to help measure progress and effectiveness. Evaluations conducted early in the effort will help determine which programs are working and which ones are not. Based on this information, money and time can be saved by focusing on the programs that work and discarding those that do not.

Actual achievement of the watershed plan goals and objectives, such as reductions in flooding and impairment of water quality in the Des Plaines River watershed, are perhaps the best indicators of outreach effectiveness. While it is difficult to attribute flood reduction and water quality improvement to a specific outreach strategy program or action, there is little doubt that increased understanding and involvement in the watershed is essential to watershed improvement. Indicators to evaluate, monitor, and provide a timeframe for each educational topic are listed in **Chapter 7; Section 7.6.7 & Appendix O Evaluation Scorecards**.

8.8 WATERSHED INFORMATION AND EDUCATION RESOURCES

Many resources include effective education and outreach messages, delivery techniques, watershed management planning, media relations, and strategies to assist with developing an outreach campaign. A web search provides many examples, but helpful resources include:

- USEPA Watershed Academy - http://water.epa.gov/learn/training/wacademy/index.cfm
- The Center for Watershed Protection - http://www.cwp.org/

Although larger educational activities, such as training workshops and demonstration projects, may require public or private grant sources, you can incorporate many of SMC's Stormwater Best Practices (http://www.lakecountyil.gov/2261/Stormwater-Best-Practices) into established work activities, projects, and education programs.

Table 8-3 provides educational messages, outreach methods, target audiences, and partner leads for implementing the Education and Outreach Strategy. It is important to note that although target audiences and partner leads are indicated in certain educational topics, many different target audiences and partner leads could apply to several of the topics.

Table 8-3: Educational Topics, Messages & Partners

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: GREEN INFRASTRUCTURE STORMWATER PRACTICES			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Park Districts & Forest Preserve Districts • Drainage Districts • Public Works & Transportation Agencies RESIDENTS & BUSINESSES • Businesses and Institutions (golf courses) • CSA systems • Not-for-Profit & Environmental Interest Groups RIPARIAN & LAKESHORE LANDOWNERS • HOAs /LAs • Commercial & Multi-family residential properties • Utility Companies located in floodplains or along streams, lakes or wetlands SCHOOLS AND YOUTH GROUPS • Secondary Schools & Community Colleges • Youth Groups DEVELOPERS & HOMEBUILDERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Engineering, landscape architectural, and environmental consulting firms LANDSCAPERS & NURSERIES • Lawn & Garden Centers	• Local Codes & Ordinances • LCFPD Green Infrastructure Model • Landowner Guides (Brochures), Factsheets • Presentations, Information Booths & Webinars • Target Individual Discussions • Demonstrations, tours, public meetings (watershed committee meetings), and workshops • Direct Mail, Utility Bills/Inserts, Emails • Feature Articles, Media Kit, PSA • Manuals/plans • Social Media, Websites	• SMC • Lake County PB&D • Municipalities • Townships • LCFPD • DRWW • Environmental Interest Groups	• Put a LID on Nonpoint Sources • Green Infrastructure: It Does It All • Let it Soak In; Keep It Recharging • Design with Infiltration in Mind • Green Infrastructure increases property values • Include green infrastructure protection/enhancement in community and HOA capital and operating budgets.

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: MINIMIZE FLOOD RISK & DAMAGE (NO ADVERSE IMPACT)			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Drainage Districts • Park Districts & Forest Preserve Districts • Public Works & Transportation Agencies RESIDENTS & BUSINESSES • Businesses & Institutions RIPARIAN & LAKESHORE LANDOWNERS • HOAs / LAs • Single, Commercial & Multi-family residential properties • Utility Companies located in floodplains or along streams, lakes or wetlands DEVELOPERS & HOMEBUILDERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Legal Counsel • Insurance Companies • Engineering and environmental consulting firms	• Landowner Guides, Factsheets, & Newsletters • Interviews, Target Individual Discussions • Buyout Program and Promote Via Partnerships (realtors, insurance agents, etc.) • Demonstrations, tours, presentations, public meetings, Floodproofing Workshop • Direct Mail to flood prone property owners, Utility Bills/Inserts, Emails, Surveys • News Releases, Feature Articles • Social Media, Websites, Video/Local Cable Channel (LCTV) • Local Model Ordinance • Technical Assistance with Flood Audits	• Counties • Municipalities • FEMA, NFIP • SMC • MWRD • Insurance Companies & Realtors • Chambers of Commerce • Drainage Districts • Schools • DRWW	• Maintain Your Culvert • Stream Maintenance Reduces • Convert Grey to Green Infrastructure • Infiltration Practices Reduce Runoff • Let It Soak In • Know How Your Property is Affected by Changes to Flood Maps • Floodproofing Tips for Your Home or Business • Maintain Your Detention Basin • How to protect your property from flood damage

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: BEST PRACTICES FOR LAKES AND LAKE SHORELINES			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Park Districts & Forest Preserve Districts RESIDENTS & BUSINESSES • Agriculture Producers, Equestrian and Large Tract Landowners • Businesses & Institutions (golf courses, shopping centers, churches) RIPARIAN & LAKESHORE LANDOWNERS • Single, Commercial & Multi-family residential properties • HOAs/LAs • Utility Companies located in floodplains or along streams, lakes or wetlands DEVELOPERS & HOMEBUILDERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Restoration Contractors • Engineering, landscape architectural, and environmental consulting firms	• Landowner Guides (Brochures), Factsheets, Newsletters • Lake & Yard Signage, Presentations • Interviews, Target Individual Discussions • Demonstrations, tours, HOA/Lake Management Association Meetings • Direct Mail, Utility Bills/Inserts, Emails • News Releases, Feature Articles, Media Kit, PSA • Manuals/plan, Certifications • Social Media, Websites, Video/Local Cable Channel (LCTV) • "Who to Call" list for landowner questions/assistance • Lake clean-up days • Biological Monitoring Results	• LCHD • CLC • HOAs • Park Districts • Lake Management Associations • DRWW	• If You Don't Want It in Your Lake Don't Put It on Your Lawn • Manage Your Edge with A Native Buffer • What Fish Testing Can Tell You About your Lake • What Shape Is Your Shoreline In • Control the Invaders • Put a Buffer Between Your Lake and The Geese • Before Dropping Anchor, Check for Zebra Mussels

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: STORMWATER INFRASTRUCTURE MAINTENANCE (DETENTION BASIN & OUTFALL MANAGEMENT)			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Drainage Districts • Public Works Agencies • Transportation Agencies – Highway Commissioners • Park Districts & Forest Preserve Districts RESIDENTS & BUSINESSES • Businesses & Institutions (golf courses, shopping centers, churches, Chamber of Commerce) • Environmental Interest Groups RIPARIAN & LAKESHORE LANDOWNERS • Single, Commercial & Multi-family residential properties • HOAs/LAs • Utility Companies located in floodplains or along streams, lakes or wetlands DEVELOPERS & HOMEBUILDERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Engineering and environmental consulting firms	• Individual Discussions • Targeted Mailings, Brochures, Factsheets • HOA Workshops; Signage, Posters • Low Impact Development workshop/tour Presentations • Social Media, Websites, Newsletters • News Releases, PSA, LCTV, Videos • Technical Assistance & Resources (manuals/plans) • County & Municipal Boards • Detention Basin Inventory (SMC Website) • Surveys & Interviews	• Municipalities • Townships • Drainage Districts • Local Elected Officials • SMC • DRWW	• Reduce Road Runoff, Road Pollutants • Purpose of/Need to Maintain HOA Detention Ponds • BMPs and How to Maintain Them • Adopt a Storm Drain • Regular Maintenance Keeps Your Facility Working • Infiltrating runoff reduces pollution and flooding • Your detention basin can clean pollutants from stormwater and reduce flooding – Just Naturalize It!

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: STREAMSIDE LANDOWNER BEST PRACTICES (RIPARIAN BUFFERS & YARD PRACTICES)			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Drainage Districts • Park Districts & Forest Preserve Districts • Public Works & Transportation Agencies RESIDENTS & BUSINESSES • Agriculture Producers, Equestrian & Large Tract Landowners • Businesses and Institutions (golf courses and churches) • Non-Profit & Environmental Interest Groups RIPARIAN & LAKESHORE LANDOWNERS • HOAs /LAs • Single, Commercial & Multi-family residential properties • Owners of Undeveloped Land • Railroads • Utility Companies located in floodplains or along streams, lakes or wetlands SCHOOLS AND YOUTH GROUPS • Secondary Schools & Community Colleges • Youth Groups DEVELOPERS & HOMEBUILDERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Restoration Contractors • Engineering, landscape architectural, and environmental consulting firms LANDSCAPERS & NURSERIES • Lawn & Garden Centers	• Landowner Guides (Brochures), Factsheets, Newsletters, Bulletin Boards and Flyers • Displays/Exhibits, Lake & Yard Signage, Posters, Presentations • Interviews, Target Individual Discussions • Demonstrations, tours, public meetings and workshops aimed at developers • Direct Mail, Utility Bills/Inserts, Emails, Surveys • News Releases, Feature Articles, Media Kit, PSA • Manuals/plan, Certifications • Social Media, Websites, Video/Local Cable Channel (LCTV) • Stream Inventory & Shoreline Assessments (SMC website) • Encourage Lake and Stream clean-up days • Provide a “Who to Call” list for landowner questions/assistance	• Riparian Landowners • Park Districts & Forest Preserve District • Dam Owners • Elected Officials • SMC • DRWW • HOAs • Landscape Contractors • Consultants • Non-Profit Groups	• Dam Maintenance, Replacement, Removal • Rain Gardens absorb runoff and are great for birds and butterflies • Save The Bank, Invest in Native Vegetation • Go Natural with Native Buffers • You Are Responsible for Maintaining the Creek on Your Property • Invasives Not Invited • Stream Maintenance Can Help Reduce Flooding • We Have Our Highways Give Them Theirs • What Shape Is Your Streambanks In • Do not dump yard waste or chemicals in the stream or stream buffers

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: STEWARDSHIP TO PREVENT POLLUTION (FERTILIZER, PESTICIDES, & LANDSCAPING)			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Drainage Districts • Public Works & Transportation Agencies – Highway Commissioners • Park Districts & Forest Preserve Districts RESIDENTS & BUSINESSES • Agriculture Producers, Equestrian & Large Tract Landowners • Businesses and Institutions (golf courses, shopping centers, churches and Chamber of Commerce) • Not-for-Profit & Environmental Interest Groups • CSA Systems RIPARIAN & LAKESHORE LANDOWNERS • HOAs /LAs • Single, Commercial & Multi-family residential properties • Railroads • Utility Companies located in floodplains or along streams, lakes or wetlands SCHOOLS AND YOUTH GROUPS • Secondary Schools & Community Colleges • Youth Groups DEVELOPERS & HOMEBUILDERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Environmental consulting firms LANDSCAPERS & NURSERIES	• Landowner Guides (Brochures like Rain Garden How-To Guides, Factsheets, Newsletters, Bulletin Boards, and Flyers • Displays/Exhibits, Lake & Yard Signage, Posters, Presentations • Interviews, Target Individual Discussions • Demonstrations, tours, public meetings, Educational Campaigns and workshops aimed at developers, lake education days • Conservation @ Home Program (Conserve Lake County), Farmer Markets • Direct Mail, Utility Bills/Inserts, Emails, Surveys • News Releases, Feature Articles, Media Kit, PSA • Manuals/plan, Certifications • Social Media, Websites, Video/Local Cable Channel (LCTV) • Local Nurseries Selling Native Plants • "Who to Call" list for landowner questions/assistance • Identify Watershed Champions	• Conserve Lake County • Lawn and Garden Centers & Hardware Stores, • Park Districts • SMC • CLC & Schools • LCFPD • SWALCO • HOAs • Municipalities • DRWW • University of Illinois Extension Service • Realtors	• Cost Savings in Using Conservation Practices (ex. native landscaping); • A Healthy Yard Has Low Impact on Environment, Improves Sustainability; • What You Can Do To Improve Waters Quality • Recycle Rain Water; Harvest Rain Water; • A Healthy Yard = Less Time You Spend Maintaining It • Test Your Soil Before You Treat It • Do your part to keep waters clean • Only feed your lawn in the Fall • Use phosphorus free fertilizer • You can reduce pollution and maintenance costs while increasing profitability

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: BEST WINTER MAINTENANCE PRACTICES			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Drainage Districts • Public Works Agencies • Transportation Agencies – Highway Commissioners • Park Districts & Forest Preserve Districts RESIDENTS & BUSINESSES • Businesses and Institutions (golf courses, shopping centers, churches and Chamber of Commerce) • Environmental Interest Groups RIPARIAN & LAKESHORE LANDOWNERS • HOAs /LAs • Single, Commercial & Multi-family residential properties CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Winter Maintenance Product/Equipment Suppliers • Winter Maintenance (Snow Removal) Contractors • Environmental consulting firms LANDSCAPERS & NURSERIES • Lawn & Garden Centers	• Guides/Brochures, Factsheets, Newsletters, Bulletin Boards and Flyers • Displays/Exhibits, Signage, Posters, Presentations • ILMA Conferences & Meetings, Partnerships • Interviews, Target Individual Discussions • Demonstrations, tours, public meetings, Deicing Workshops (Lake County & Adjacent Counties), Product Application & Calibration Demonstration • Direct Mail, Utility Bills/Inserts, Emails, Surveys • News Releases, Feature Articles, Media Kit, PSA, Lobbying • Manuals/plan, Deicing Operator Certification • Social Media, Websites, Video/Local Cable Channel (LCTV)	• SMC • LCHD • Transportation Agencies • Local Government • State Officials • APWA • BOMA • ILCA • Schools • Business Associations • DRWW	• Salt Alternatives Save Money, Reduce Impacts to Our Water Resources • Calibration Key to Effective Product Application • Store It Right • Save Our Lakes, Use Less Salt on Our Roads • Road Salt Use Diet • Less is More- Road Salt

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: AGRICULTURAL & EQUESTRIAN BEST PRACTICES			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Forest Preserve Districts RESIDENTS & BUSINESSES • Agriculture Producers, Equestrian and Large Tract Landowners • Environmental Interest Groups • Community-Supported Agriculture (CSA) systems RIPARIAN & LAKESHORE LANDOWNERS CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED LANDSCAPERS & NURSERIES • Lawn and Garden Centers	• Landowner Guides (Brochures), Factsheets, Newsletters, Bulletin Boards • Direct Mailings (SWCD/NRCS Programs) • Target Individual Discussions, Presentations, Interviews • Social Media, Websites • Demonstrations, tours, and workshops • Technical Assistance • Manuals/plans • Lake County Farm Bureau, Illinois Horse Council, University of Illinois Extension Service	• SMC • LCFPD • University of Illinois Extension Service • Illinois Department of Agriculture – SWCDs, NRCS, FSA • DRWW • Agriculture Producers, Equestrian Landowners	• Good Practices Don't Have to Be Costly • Use Only What You Need (Nutrient Input) • Cover Crops Increase Yield, Water Retention • Soil: Keep It on the Land, Out of the Water • You can reduce farming inputs and pollution while increasing profitability

TARGET AUDIENCES	EDUCATION/OUTREACH METHOD OR VEHICLE	PARTNER LEADS	POTENTIAL MESSAGES
TOPIC: CONTROLLING NUISANCE & INVASIVE SPECIES (TEASEL, MUSKRATS, CARP, BEAVERS, GEESE, EURASIAN WATER MILFOIL, QUAGGA/ZEBRA MUSSELS)			
LOCAL GOVERNMENT OFFICIALS & AGENCIES • Elected Officials (policy makers) • Municipalities, Townships and County • Public Works & Transportation Agencies • Park Districts & Forest Preserve Districts RESIDENTS & BUSINESSES • Agriculture Producers, Equestrian and Large Tract Landowners • Environmental Interest Groups • Businesses & Institutions (golf courses) RIPARIAN & LAKESHORE LANDOWNERS • HOAs & LAs • Single, Commercial & Multi-family residential properties • Railroads CONSULTANTS AND CONTRACTORS WORKING IN THE WATERSHED • Engineering, landscape architectural, and environmental consulting firms LANDSCAPERS & NURSERIES • Lawn and Garden Centers	• Lake Reports (LCHD) • Landowner Guides (Brochures), Factsheets, Newsletters, Bulletin Boards and Flyers • Displays/Exhibits, Signage, Posters, Presentations • Interviews, Target Individual Discussions • Demonstrations, tours, and workshops • Direct Mail, Utility Bills/Inserts, Emails, Surveys • News Releases, Feature Articles, Media Kit, PSA • Manuals/plan • Social Media, Websites, Video/Local Cable Channel (LCTV)	• Municipalities • Townships • Drainage Districts • SMC • IDNR • DRWW • Riparian Landowners • Park Districts • Forest Preserve District	• Invasive plants are weeds that over run and crowd out native plant communities; • Invasive plants result in loss of habitat and biodiversity • Stop aquatic hitchhikers-clean your boat and drain your livewells

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9 GLOSSARY OF TERMS

100-Year Floodplain: Areas with a 1% annual chance of flooding.

2 Year - 100 Year Flood: For each river, engineers assign statistical probabilities to different size floods to describe a common or ordinary flood versus a less likely or a severe flood. A 100-year flood is a flood that has a 1-percent chance of being equaled or exceeded in any given year. The 100-year flood, also referred to as the "base flood", is the standard used by the National Flood Insurance Program (NFIP) for floodplain management and is used to determine the need for flood insurance. A structure located within the 100-year special flood hazard area shown on an NFIP map has a 26 percent chance of suffering flood damage during the term of a 30-year mortgage. A two-year flood event has a 50% probability of occurring in any year; 2-year rain events are important because they form the general shape of our stream systems and are the cause for much of the pollutant loading.

303(d): A state's list of impaired or threatened waters. The Federal Clean Water Act requires states to submit a list of impaired waters to the USEPA for review and approval using water quality assessment data from the Section 305(b) Water Quality Report. States are then required to develop total maximum daily load analyses (TMDLs) for waterbodies on the 303(d) list.

Advance Identification Wetlands: Wetlands that were identified through the Advanced Identification (ADID) process. Completed in 1992, the ADID process sought to identify wetlands that should be protected because of their high functional value. The primary functions evaluated were ecological value based on wildlife habitat quality and plant species diversity, hydrologic functions such as stormwater storage value and/or shoreline/bank stabilization value, and water quality values such as sediment/toxicant retention and/or nutrient removal/transformation function.

Alkalinity (ALK): A measure of the buffering capacity of water.

American Public Works Association (APWA): A professional association of public works agencies, private companies, and individuals that seeks to promote professional excellence and public awareness through education, advocacy and the exchange of knowledge

Ammonia (NH_3-N): A form of inorganic nitrogen.

Aquatic Plant Management Plan (APMP): A plan that provides a coordinated strategy for managing aquatic plants.

Artificial Wetlands: A designed wetland, created for human use, such as wastewater or sewage treatment, habitat to attract wildlife, or land reclamation after mining or other disturbances.

Bankfull: The point at which water flow in a stream fills the channel to the top of its banks just to the point where water begins to overflow onto the adjacent floodplain.

Barrens: An area with vegetation that is scattered with stunted woody growth and an exposed infertile substrate that supports species adapted to fire and drought and occurs in areas climatically suitable for forest growth of large trees.

Baseflow: Stream discharge that is not directly attributed to direct runoff or melting snow. It is usually sustained by groundwater.

Best Management Practices (BMPs): Non-structural practices, such as site planning and design aimed to reduce stormwater runoff and avoid adverse development impacts, or structural practices that are deigned to store or treat stormwater runoff to mitigate flood damage and reduce pollution. BMPs used in urban areas include stormwater detention ponds, restored wetlands, vegetative filter strips, porous pavement, silt fences and biotechnical streambank stabilization.

Biological Oxygen Demand (BOD): The amount of dissolved oxygen that is required by microscopic organisms to decompose organic matter in waterbodies.

Bioswale: Vegetated ditches that collect, convey, filter and infiltrate stormwater runoff.

Bog: A low nutrient peatland, usually in a glacial depression, that is acidic in the surface stratum and often dominated at least in part by the genus *Sphagnum.*

Building Owners and Managers Association International (BOMA): A professional organization that represents the owners and managers of commercial properties through advocacy, influence, and knowledge.

Catchments: Small unit of a watershed or subwatershed that is delineated and used in watershed planning efforts because the effects of impervious cover are easily measured, there is less chance for confounding pollutant sources, boundaries have fewer political jurisdictions, and monitoring/mapping assessments can be done in a relatively short amount of time. The 432 catchments in the DPR planning area have an average size of 23.5 square miles, with a range of 2.8 – 50.9 square miles.

Center for Watershed Protection (CWP): Non-profit corporation that provides local government, activists, and watershed organizations with the technical tools for protecting some of the nation's natural resources such as streams, lakes, and rivers.

Certified Community: Community authorized by SMC to administer and enforce most of the provisions of the WDO. A community can be a fully certified community (delegated to review both standard general stormwater provisions and isolated waters (wetland) aspects of the WDO) or partially certified community (delegated to review either standard or isolated wetland aspects of the WDO). SMC retains certain review authorities, primarily with respect to the floodplain and floodway provisions of the WDO in certified communities.

Channel: Any river, stream, creek, brook, ditch, gully, ravine, swale or wash, into which surface or groundwater flows, either perennially or intermittently.

Channelized stream: A stream that has been artificially straightened, deepened or widened.

Chicago Metropolitan Agency for Planning (CMAP): A regional planning agency that plans for the most effective public and private investments in northeastern Illinois region and to better integrate plans for land use and transportation. CMAP provides technical assistance and training opportunities to local governments to improve watershed management activities including watershed planning and stormwater management.

Chloride (Cl^-): A common non-point source pollutant, largely introduced into the environment through the use of deicing agents

Clean Water Act (CWA): The CWA is the basic framework for federal water pollution control and has been amended in subsequent years to focus on controlling toxins and improving water quality in areas where compliance with nationwide minimum discharge standards is insufficient to meet the CWA's water quality goals.

Climate Normals: 30-year averages of climatological variables including temperature and precipitation

College of Lake County (CLC): A community college accredited by the Higher Learning Commission.

Community-Supported Agriculture (CSA): A system connecting food producers and consumers by allowing the consumer to subscribe to the harvest of a certain farm or group of farms.

Colony Forming Unit (CFU): A measure of viable bacterial or fungal numbers. Unlike direct microscopic counts where all cells, dead and living, are counted, CFU measures viable cells.

Conductivity: A measure of the ability of water to pass an electrical current that is used as a proxy for the concentration of inorganic dissolved solids in water**.**

Conservation Easement: The transfer of land use rights without the transfer of land ownership. Conservation easements can be attractive to property owners who do not want to sell their land, but would support perpetual protection from further development. Conservation easements can be donated or purchased.

Converted Wetlands: Areas that have been drained or filled and no longer exhibit wetland or farmed wetland characteristics.

Critical Areas: Catchments in the watershed best suited to focus implementation efforts to help achieve the goals and objectives of the watershed plan. Critical areas represent catchments that likely contribute to impairments and problems in the watershed, and present opportunities where project implementation would provide the greatest value and benefit.

Defined Channel: Clearly discernable bed and banks of a flowing watercourse.

Dendritic Stream System: A stream system where there are many contributing streams (similar appearance to the twigs of a tree), which are then joined together into the tributaries of the main river. They develop where the river channel follows the slope of the terrain.

Des Plaines River Watershed Planning Area: The 235 square mile portion of the Des Plaines River watershed assessed for this watershed plan. The planning area originates at the Dutch Gap Canal/North Mill Creek Watershed in Kenosha County, Wisconsin, and extends through Lake County, Illinois, to the confluence of Buffalo Creek in Cook County, Illinois.

Des Plaines River Watershed Workgroup (DRWW): Consortium of publicly operated treatment works and MS4s organized to improve water quality throughout the Des Plaines River Watershed in Lake County and remove the Des Plaines River waterways from the IEPA 303(d) impaired waters list.

Developed Parcels: Parcels that are mostly occupied by structures and/or impervious cover.

Digital Elevation Model (DEM): A digital cartographic/geographic dataset of elevations in xyz coordinates.

Digital Terrain Models (DTM): A digital cartographic/geographic dataset of elevations in xyz coordinates that contains information on geographical elements and natural features.

Discharge Point: The location where all sanitary, storm sewer and agricultural drainpipes surface or stormwater flows back into a lake or stream channel. Discharge points also include open channels, swales, gullies and other significant tributaries.

Dissolved Oxygen: The amount of oxygen in water, usually measured in milligrams/liter (mg/L).

Drain Tile: A drainage system that removes excess water from the soil below the surface.

Drainage Basin: Land surface region drained by a length of stream channel; usually 1,000 to 10,000 square miles in size.

Dry Detention Basin: Basins that temporarily stores water before discharging to river or lake and usually dry up following large rainstorms or snow melt events. Typically, not effective at removing pollutants.

Dry Flood Proofing: A combination of practices that are used to make a building watertight, so flood waters do not enter the structure, including the basement or crawl space.

***E. coli*:** A species of fecal coliform bacteria that is specific to fecal material from warm-blooded animals, that is used as an indicator of health risk from water contact.

Emergent Vegetation: Vegetation that is rooted in the bottom sediment of a waterbody with leaves and stems that extend out of the water.

Endangered Species: A species in danger of extinction throughout all or a substantial portion of its range.

Erosion: Displacement of soil particles on the land surface due to water or wind action.

European Settlement: A period in the early 1800's when European settlers moved across the United States. During this movement, natural plant communities were altered for farming and related development.

Event Mean Concentration (EMC): Method for characterizing pollutant concentrations in stormwater runoff. Pollutant concentrations are measured in studies and on-going research that collects and analyze s runoff from various land-use practices in different geographic and climatic regions. The values are determined by compositing (in proportion to flow rate) a set of samples, taken at various points in time during a runoff event, into a single sample for analysis.

Farm Service Agency (FSA): An agency within the United States Department of Agriculture that implements farm conservation and regulation.

Farmed Wetlands: Agricultural cropped areas on hydric soil that have been cleared, partially drained, or filled.

Farmland Preservation Program: A joint effort by non-governmental organizations and local governments to protect examples of a region's farmland.

Fecal Coliforms: Bacteria that is specific to fecal material from warm-blooded animals, that is used as an indicator of health risk from water contact.

Federal Emergency Management Agency (FEMA): Government agency within the Department of Homeland Security that responds to, plans for, recovers from, and mitigates against disasters/emergencies, both natural and man-made.

Fens: A peatland, herbaceous (including calcareous floating mats) or wooded, with calcareous groundwater flow.

Filter Strip: A long narrow portion of vegetation used to retard water flow and collect sediment for the protection of watercourses, reservoirs, sensitive areas, or adjacent properties.

Flared End Section (FES): A structure commonly found at the end of pipes near waterbodies. FES are used to reduce erosion from pipe discharge and minimize debris accumulation at pipe openings.

Flash Flood: A quickly rising and falling overflow of water in stream channels that is usually the result of increased amounts of impervious surface in the watershed.

Flatwoods: Open woodlands of level uplands and terraces that occur on impervious subsoil horizons and have seasonally wet and dry soils.

Flood Insurance Rate Map (FIRM): A map prepared by FEMA that depicts the SFHA within a community. The FIRM includes zones for the 100-year and 500-year floodplains and may or may not depict Regulatory Floodways.

Flood Insurance Study: Studies conducted by the FEMA to determine areas that have the highest probability for flooding.

Floodplain: Floodplains are lowlands, adjacent to rivers, streams and creeks that are subject to recurring floods. Mapped regulatory floodplains are defined as the area of land, which is inundated with water during 100-year flood events.

Flood Problem Area (FPA): One or more structures in a geographical area that are damaged by the same primary source/cause of flooding. Structures include transportation, utility infrastructure, buildings, and well and septic failure caused by flooding. Areas also include locations where road flooding results in damage to infrastructure, loss of critical access, or is a threat to safety.

Flood Protection Area: Regulatory floodplains, regulatory floodways, riparian environments, wetlands, and wetland buffers.

Floodway: A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Floristic Quality Assessment (FQI): A metric that evaluates how close the flora of an area is to undisturbed conditions.

Forest Preserve District: Districts designed to protect large natural areas and provide passive recreation.

Geographic Information System (GIS): A computer-based approach to interpreting maps and images and applying them to analysis of systems and problem-solving.

Glacial Slough: Shallow, wetland-type lake that are formed during glacial retreat

Global Positioning System (GPS): Satellite mapping systems that enables locators and mapping to be created via satellite.

Goal: A clear, concise, and measurable statement or target for the watershed plan that identifies a change or outcome to be achieved.

Grade Stabilization Structure (GSS): A structure with a drop spillway, built across a drainageway with a sudden drop in elevation, that is used to prevent gully erosion.

Gray Infrastructure: A network of transportation, power, communication and other human constructed systems that are designed to connect across multiple jurisdictions and incorporate facilities that function at different scales.

Green Infrastructure: Defined by the Lake County Stormwater Management Commission as: on a local scale, municipal or neighborhood, green infrastructure consists of site-specific best management practices (such as naturalized detention facilities, vegetated swales, porous pavements, rain gardens, and green roofs) that are designed to maintain natural hydraulic functions by absorbing and infiltrating precipitation where it falls. On

the regional scale, green infrastructure consists of the interconnected network of open spaces and natural areas (such as forested areas, floodplains and wetlands, greenways, parks, and forest preserves) that mitigate stormwater runoff, naturally recharge aquifers, and improve water quality while providing recreational opportunities and wildlife habitat.

Green Infrastructure Model and Strategy (GIMS): A GIS based model that provides a framework for identifying land conservation and restoration opportunities to guide regional and local green infrastructure planning.

Green Infrastructure Network: Use of vegetation, soils, and natural processes to manage water and create healthier urban environments.

Green Infrastructure Vision (GIV): A GIS based regional scale green infrastructure vision that consists of spatial data and policies that identify the most important natural areas to protect in the Chicago region.

Gully Erosion: The removal of soil along drainage lines by surface water runoff. Once started, gullies will continue to move by headward erosion or by slumping of the side walls until the disturbance is stabilized.

Homeowners Association (HOA): An organization in a subdivision, planned community or condominium that makes and enforces rules for the properties within its jurisdiction.

Hummocky: Extremely irregular surface.

Hydraulics: A branch of science that deals with practical applications of liquid in motion.

Hydraulic Conductivity: A measure of a material's capacity to transmit water.

Hydraulic Structures: Bridges, culverts, dams, weirs, or other structures spanning or crossing the stream channel.

Hydric Soils: A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. These conditions alter the physical, biological and chemical characteristics of the soil, thereby influencing the species composition or growth, or both, of plants on those soils.

Hydrogeomorphic Descriptors: Characteristics that emphasize geomorphic and hydrologic attributes such as the landscape position, landform, water flow path, and waterbody type of a wetland or water body.

Hydrologic Cycle: The continuous movement of water on, above, or below the surface of the Earth.

Hydrologic Soil Groups (HSG): Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D. A's generally have the smallest runoff potential and D's the greatest.

Hydrologic Unit Code (HUC): A hydrologic unit can accept surface water directly from upstream drainage areas, and indirectly from associated surface areas such as remnant, noncontributing, and diversions to form a drainage area with single or multiple outlet points. Hydrologic units are only synonymous with classic watersheds when their boundaries include all the source area contributing surface water to a single defined outlet point. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to twelve digits based on the six levels of classification:

- 2-digit HUC first-level (region)
- 4-digit HUC second-level (subregion)
- 6-digit HUC third-level (accounting unit)
- 8-digit HUC fourth-level (cataloguing unit)

- 10-digit HUC fifth-level (watershed)
- 12-digit HUC sixth-level (subwatershed)

Hydrology: The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Hydrophytic Vegetation: Plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen because of excessive water content; one of the indicators of a wetland.

Illinois Department of Natural Resources (IDNR): A government agency established to manage, protect and sustain Illinois' natural and cultural resources, provide resource-compatible recreational opportunities and to promote natural resource-related issues for the public's safety and education.

Illinois Department of Transportation (IDOT): The Illinois Department of Transportation focuses primarily on the state's policies, goals and objectives for Illinois' transportation system and provides an overview of the department's direction for the future.

Illinois Environmental Protection Agency (Illinois EPA): Government agency established to safeguard environmental quality, consistent with the social and economic needs of the State, to protect health, welfare, property, and the quality of life.

Illinois Lakes Management Association (ILMA): An association that provides education and professional advice to assist in lake management decisions.

Illinois Landscape Contractors Association (ILCA): An association whose mission is to enhance the professionalism and capabilities of members by providing leadership, education, representation, and services while promoting environmental awareness and the value of the landscape industry.

Illinois- Livable and Sustainable Transportation Rating System and Guide (I-Last^{TM}): A transportation sustainability performance metric system developed by the Joint Sustainability Group of the Illinois Department of Transportation, the American Council of Engineering Companies and the Illinois Road and Transportation Builders Association.

Illinois Natural Areas Inventory (INAI): A survey conducted by the Illinois Department of Natural Resources to catalog high quality natural areas, threatened and endangered species and unique plant, animal and geologic communities for maintaining biodiversity.

Impervious Cover: An area covered with solid material or that is compacted to the point where water cannot infiltrate underlying soils (e.g. parking lots, roads, houses, patios, swimming pools, tennis courts, etc.). Stormwater runoff velocity and volume can increase in areas covered by impervious surfaces

Index of Biotic Integrity (IBI): A numeric rating based on fish surveys that is dependent on the abundance and composition of the fish species in a stream. Fish communities are useful for assessing stream quality because fish represent the upper level of the aquatic food chain and therefore reflect conditions in the lower levels of the food chain. Fish population characteristics are dependent on the physical habitat, hydrologic and chemical conditions of the stream, and are considered good indicators of overall stream quality because they reflect stress from both chemical pollution and habitat perturbations. For example, the presence of fish species that are intolerant of pollution is an indicator that water quality is good. The IBI is calculated on a scale of 12 to 60, with higher scores indicating better water quality.

Infiltration: The portion of rainfall or surface runoff that moves into the subsurface soil.

Instream Habitat: The environment within a stream in which an animal normally lives or grows.

Intergovernmental Agreement (IGA): An agreement between two or more jurisdictions in cooperation to solve problems of mutual concern.

Kettle Lake: Shallow, glacial lakes that are formed when partially buried ice blocks from glaciers melt creating a depression that fills with water.

Lake County Health Department – Ecological Services (LCHD-ES): Government agency initiated to monitor the quality of Lake County's surface water in order to maintain or improve water quality and alleviate nuisance conditions, promote healthy and safe lake conditions, and protect and improve ecological diversity.

Lake County Planning Building and Development (LC PB&D): A government agency that is responsible for land use planning and permitting in unincorporated areas, and natural resources and systems management in Lake County.

Lake County Stormwater Management Commission (SMC): The Lake County Stormwater Management Commission established and existing under state statute [55 ILCS 5/5-1062] for the purposes of developing, revising, and implementing a countywide stormwater management plan.

Lake County Watershed Development Ordinance (WDO): One part of the adopted Lake County Comprehensive Stormwater Management Plan. It sets forth the minimum requirements for the stormwater management aspects of development in Lake County.

Lakeowner Association (LOA): An organization that makes and enforces rules for the lakes within its jurisdiction.

Land Cover: The physical material that covers the surface of the Earth, including forests, urban areas, water, prairies, etc.

Landform: The large-scale landscape features that affect the physical shape of a wetland or water feature (e.g., basin, flat, slope, island, or fringe).

Landscape Position: The physical setting of a wetland relative to a water body, if present (e.g., a wetland associated with a lake, a river, or a depression surrounded by uplands).

Land Use: The type of human activity that takes place on an area of land.

Lateral Recession Rate (LRR): The rate a channel or shoreline is receding due to erosion.

Light Detection and Ranging (LiDAR): A remote sensing method that uses a pulsated laser to measure distances to the Earth to generate three-dimensional data of the Earth's surface.

Loess: A fine-grained unstratified accumulation of clay and silt deposited by wind.

Low Impact Development (LID): A development practice that retains and infiltrates rainfall on-site utilizing site design and planning techniques that mimic the natural infiltration-based, groundwater-driven hydrology of the landscape.

Low or High Flow Conditions: Typically measured as a 7-day average of the lowest or highest water flow rates annually.

Macroinvertebrates: Invertebrates that can be seen by the unaided eye. Most benthic invertebrates in flowing water are aquatic insects or the aquatic stage of insects, such as stonefly nymphs, mayfly nymphs, caddisfly larvae, dragonfly nymphs and midge larvae. They also include mussels and worms. The presence of benthic macroinvertebrates that are intolerant of pollutants is an indicator of good water quality.

Marl: A loose or crumbling earthy deposit that contains a substantial amount of calcium carbonate.

Marsh: Low-lying land area, dominated by herbaceous plants, that is usually saturated or inundated with surface or ground water.

McHenry-Lake Soil and Water Conservation District (MLSWCD): A government agency that assists McHenry and Lake County residents and business with conserving and protecting land, air, water and other resources.

Metropolitan Water Reclamation District (MWRD): An independent government and taxing body that treats wastewater in Cook County.

Mitigation Banking: A system of credits and debits to offset environmental impacts associated with site development and achieve no net loss, typically accomplished via restoration, creation, enhancement, or preservation of similar wetland, stream, or natural habitats near the area of impact with the specific goal of compensating for unavoidable impacts to aquatic resources.

Municipal Separate Storm Sewer Systems (MS4s): A water conveyance owned by a state, city, town, village, or other public entity that discharges to waters of the United States, that is designed or used to collect or convey stormwater and is not a combined with sewage infrastructure. Certain operators of MS4s are required to obtain NPDES permits and develop stormwater management programs.

Moraines: A mass of rocks and sediment transported and deposited by glaciers, typically as ridges at its edges or extremity.

National Flood Insurance Program (NFIP): Managed by the Mitigation Division within the Federal Emergency Management Agency, participants in the NFIP adopt and enforce floodplain management ordinances to reduce future flood damage and in exchange are eligible to receive federally funded flood insurance.

National Land Cover Database (NLCD): A national land cover product created by the Multi-Resolution Land Characteristics (MRLC) Consortium.

National Pollutant Discharge Elimination System (NPDES): Clean Water Act law requiring smaller communities and public entities that own and operate an MS4 to apply and obtain an NPDES permit for stormwater discharges. Permittees at a minimum must develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable. The stormwater management program must include these six minimum control measures:

- Public education and outreach on stormwater impacts
- Public involvement/participation
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Post-construction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

Natural Community: An assemblage of plants and animals interacting with one another and their physical environment.

Natural Resource Conservation Service (NRCS): NRCS provides technical expertise and education on conservation, development, management, and wise use of natural resources to landowners and land managers. Areas of expertise include streambank stabilization and soil erosion/ sediment control, wetland and habitat restoration, agricultural conservation, water quality protection, conservation planning, and natural

resource maps and reports. NRCS administers several cost-share programs targeted to water quality, wetland restoration, and other watershed priorities.

Nitrate (NO_3^-): A form of inorganic nitrogen.

Non-Point Source Pollution (NPS): Refers to pollutants that accumulate in waterbodies from a variety of sources including runoff from the land, impervious surfaces, the drainage system and deposition of air pollutants.

North American Vertical Datum of 1988 (NAVD88): The vertical control datum of orthometric height established for vertical control surveying in the United States of America based upon the General Adjustment of the North American Datum of 1988.

North Shore Water Reclamation District (NSWRD): A municipal body that collects and conveys wastewater from local sewer systems from 17 communities in Lake County to water reclamation facilities in Gurnee, Waukegan, and Highland Park.

Objectives: Specific, precise, measurable, attainable, relevant, and time-based steps needed to attain watershed plan goals.

Onstream (or Online) Basins: Basins that are connected to a "natural" surface waterway (creek, stream, river etc.), whether that waterway flows in and/or out of the pond.

Open Parcels: Parcels with no built structures or impervious cover.

Outwash: Sand and gravel deposits removed or washed out from a glacier.

Partially Open Parcels: Parcels that have a small structure (building, parking lot) relative to the parcel, allowing for the potential implementation of BMPs.

Pesticides General Permit (PGP): A permit issued under the Clean Water Act's National Pollutant Discharge Elimination System, that regulates point source discharges of biological and chemical pesticides that leave a residue.

pH: A measure of the concentration of the hydrogen ion in water, which affects multiple chemical processes within a lake such as the carbonate equilibrium cycle.

Point Source Pollution: Discharges from a single source such as an outfall pipe conveying wastewater from an industrial plant or wastewater treatment facility.

Polychlorinated biphenyl (PCB): An organic compound that was banned in the United States in 1979 because it is hazardous to human and environmental health. PCBs do not easily break down or degrade and are persistent in the environment.

Polycyclic Aromatic Hydrocarbons (PAH): A class of chemicals commonly present in urban and suburban non-point source pollution. PAH's are naturally formed in coal, crude oil, and gasoline, and can be formed when coal, oil gas, wood, garbage, or tobacco is burned.

Potentially Restorable Wetlands: Areas with predominantly hydric soils that are not mapped as wetlands on the LCWI and have not been converted to urban land use.

Prairie: An extensive flat or rolling area dominated by grasses. Prairie grasslands once covered much of central North America.

Probable Effect Concentration: A consensus based sediment quality guideline. Concentrations of a substance higher than the PEC are expected to frequently cause adverse effects to biota.

Problem Hydraulic Structures: Structures that may require further inspection or repairs.

Publicly Owned Treatment Works (POTWs): A sewage treatment plant that is owned by a government agency.

Rainwater Harvesting: Onsite collection, storage, and reuse of rainwater.

Rapid Assessment Point Method (RAP-M): A method used to capture erosion and sediment information on a watershed scale.

Riparian: The riverside or riverine environment next to the stream channel, e.g., riparian, or streamside, vegetation.

River Watch: A volunteer stream monitoring program that seeks to engage Illinois adults by training them as Citizen Scientists to collect consistent, high-quality data on the conditions of local streams.

Runoff: The portion of rain or snow that does not infiltrate into the ground and is discharged into streams by flowing over the ground instead.

Savanna: A type of woodland characterized by open spacing between trees and intervening grassland.

Secchi Disk: A circular disk with an alternating black and white pattern used to measure water transparency or turbidity.

Sedimentation: The process that deposits soils, debris and other materials on ground surfaces or in bodies of water or watercourses.

Seep: A wetland, herbaceous or wooded, with saturated soil or inundation resulting from the diffuse flow of groundwater to the surface stratum.

Slough: A swamp or shallow lake system, usually a backwater to a larger body of water.

Soil Phase: A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Soil Series: A level of classification in the USDA Soil Taxonomy classification system hierarchy.

Soil Survey Geographic Database (SSURGO): A database that contains information about soil that was collected by the National Cooperative Soil Survey.

Soluble Reactive Phosphorous (SRP): A measure of phosphorus in the dissolved form that is readily available for plant and algal growth.

Solid Waste Agency of Lake County (SWALCO): An agency in Lake County that implements a regional approach to solid waste management.

Southeastern Wisconsin Regional Planning Commission (SEWRPC): The official areawide planning agency for southeastern Wisconsin that provides planning and technical assistance for public works systems and provides regional expertise in addressing environmental issues.

Spatial Watershed Assessment and Management Model (SWAMM^{TM}): A spatially based GIS model and management system for estimating non-point source pollution loading and identifying locations for BMP implementation.

Spreadsheet Tool for Estimating Pollutant Load (STEPL): A spreadsheet that employs simple algorithms to calculate nutrient and sediment loads from different land uses and the load reductions that would result from the implementation of various BMPs.

Stormwater Pollution Prevention Plan (SWPPP): A document that details how a construction project will minimize stormwater pollution.

Subwatershed: A smaller basin within a larger drainage area that all drains to a central point of the larger watershed.

Thalweg: A line connecting the lowest points of successive cross-sections along the course of a valley or river.

Threatened Species: A species likely to become endangered.

Threshold Effect Concentration (TEC): A consensus based sediment quality guideline. Concentrations of a substance lower than the TEC are not expected to cause adverse effects to biota.

Till: A heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders deposited directly by and underneath a glacier without stratification.

Total Maximum Daily Load (TMDL): The maximum amount of point and non-point source pollutants a stream can take in during a single day and still support its designated uses.

Total Dissolved Solids (TDS): A measure of the dissolved solids in a water sample.

Total Kjeldahl Nitrogen (TKN): A measure of organic nitrogen and ammonia in a water sample.

Total Phosphorus: A measure of all organic and inorganic phosphorus in a water sample.

Total Solids (TS): A measure of all suspended and dissolved solids in a water sample.

Total Suspended Solids (TSS): A measure of organic and inorganic material greater than 0.45 microns in size that are suspended in the water column.

Total Volatile Solids (TVS): A measure of organic solids in the water column, including algae, plant material, and zooplankton.

Unified Development Ordinance (UDO): Ordinance that regulates zoning, subdivision, signs and site development in unincorporated Lake County.

United States Environmental Protection Agency (USEPA): A federal government agency created to protect human and environmental health by writing and enforcing regulations.

United Stated Army Corps of Engineers (USACE): Federal group of civilian and military engineers and scientists that provide services to the nation including planning, designing, building and operating water resources and other Civil Works projects. These also include navigation, flood control, environmental protection, and disaster response.

United States Geological Survey (USGS): Government agency established in 1879 with the responsibility to serve the Nation by providing reliable scientific information to describe and understand the Earth, minimize the loss of life and property from natural disasters, manage water, biological, energy, and mineral resources, and enhance and protect our quality of life.

Universal Soil Loss Equation (USLE): A mathematical model commonly used to estimate yearly soil loss.

University of Illinois Extension: The University of Illinois Urbana-Champaign outreach effort that provides technical assistance and educational outreach relating to energy and environmental stewardship, food safety and security, economic development and workforce preparedness, family health financial security and wellness, and youth development.

Vernal Pools: A wetland that is characterized by temporary pools of water.

Waterbody Type: A distinction in the underlying nature of the wetland based on size and shape of the associated water component: Lake, Pond, River, or Stream.

Water Clarity: A measure of the depth that light penetrates through the water column.

Water and Sediment Control Basin (WASCOB): A series of small embankments across concentrated flow paths, that store then slowly release runoff through an underground outlet.

Water Flow Path: Descriptors that characterize the direction of water flow (inflow, outflow, throughflow, bidirectional flow, etc.).

Watershed: Land area that drains to a given stream or river. The land area above a given point on a waterbody (river, stream, lake, wetland) that contributes runoff to that point is considered the watershed.

Watershed Development Ordinance (WDO): One part of the adopted Lake County Comprehensive Stormwater Management Plan. It sets forth the minimum requirements for the stormwater management aspects of development in Lake County.

Watershed Management Ordinance (WMO): Ordinance that establishes uniform, minimum, and comprehensive countywide stormwater management regulations for Cook County.

Watershed Planning Committee: A committee comprised of SMC staff and watershed stakeholders, with a goal of creating an umbrella "watershed-based plan" for the Des Plaines watershed and reducing nonpoint source pollution.

Wastewater Treatment Plant (WWTP): A facility that treats sewage and wastewater prior to discharging it into the environment.

Wet Detention Basin: A permanent pool of water with designed dimensions, inlets, outlets and storage capacity, constructed to collect, detain, treat and release stormwater runoff.

Wet Flood Proofing: Wet flood-proofing allows water to enter the structure, but minimizes the damage to the structure and its contents.

Wetland: Land that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation adapted for life in saturated soil conditions. A wetland is identified based on hydrology, soils, and vegetation as mandated by the current Federal wetland determination methodology.

Wet Meadows: A type of wetland away from stream or river influence with water made available by general drainage and consisting of non-woody vegetation growing in saturated or occasionally flooded soils.

Waters of the United States (WOUS): For the purpose of the Watershed Development Ordinance the term Waters of the United States refers to those water bodies and wetland areas that are under the U.S. Army Corps of Engineers jurisdiction.

Wetland Creation: Development of a wetland in an area that was not previously a wetland (i.e., not in a drained or otherwise modified hydric soil).

Wetland Enhancement: Augmenting wetland functions beyond the current conditions; enhancement of one function sometimes can occur at the expense of other functions.

Wetland Preservation: Actions taken to maintain the size and functions of an existing wetland or water body.

Wetland Restoration: The re-establishment of wetlands in areas where they previously existed and were altered by drainage activities or landscape modifications.

Wetlands Restoration and Preservation Plan (WRAPP): A plan, developed by SMC in 2018, with input from a technical advisory group. The WRAPP estimates functions of mapped wetlands and water resources for existing and pre-European settlement conditions within Lake County. The WRAPP will include an on-line decision support tool to help users prioritize restoration and preservation opportunities based on acreage, wetland function or functional loss.

Wisconsin Department of Natural Resources (WI DNR): A state department that oversees watershed planning, water quality programs, floodplain, stormwater and non-federal wetland permitting, shoreline management, and fishery and wildlife management in Wisconsin. The WNDR also controls allocation of Federal Clean Water Act ("Section 319") funding for nonpoint source pollution reduction projects.

Wisconsin Department of Transportation (WISDOT): A department responsible for planning, building, and maintaining Wisconsin's state highway, interstate system, and transportation system.

Woodland: An area that is mostly covered with trees and shrubs.

Appendix A: Stakeholder Meeting Reports

Des Plaines River Watershed Kickoff Meeting
March 17, 2016 – 2:00 to 4:00 PM and 6:30 to 8:30 PM

MEETING REPORT

Meeting Purpose: Bring together a diverse group of watershed stakeholders, familiarize attendees with watershed planning and the Des Plaines River watershed, and begin to develop a watershed plan.

Desired Meeting Results:

- Stakeholders have an understanding of watershed conditions and watershed planning process
- Stakeholders identify watershed issues and opportunities

MEETING SUMMARY

Introductions:

A list of the meeting attendees is included with this meeting report.

Overview of the Watershed:

An overview of the watershed planning project and process, and a characterization of watershed conditions were presented. The presentations are available on the SMC website.

Patty Werner presented what a watershed plan is, how it is used, and explained why we are doing a watershed plan for the Des Plaines River watershed, and briefly covered how the watershed planning process will work over the next 26 months.

Watershed Characteristics:

Ashley Warren described the characteristics and condition of the Des Plaines River watershed including historic land cover, ecology/natural resources, and current and projected watershed land use and demographic data. Mike Novotney presented on the effects of urbanization on land changes, increased stormwater runoff and impacts on streams. Jeff Laramy summarized SMC's stream and detention basin inventory efforts and procedures. Mike Prusila presented information on the stream water quality conditions in the Des Plaines River watershed. Mike Adam with the Lake County Health Department presented on water quality and conditions of the Des Plaines River lakes. Mike Warner ended the presentation with a brief overview of the studies and assessments of floodplain areas in the watershed and flood problem areas.

Watershed Issues and Opportunities:

Meeting participants were divided into four (4) groups (both meetings) with a facilitator assigned to each group for this stakeholder input exercise. Meeting facilitators in each group asked that the meeting participants identify issues, opportunities, and strategies that they think should be addressed in the watershed planning process. Each participant in turn provided the issues of greatest concern to them, and opportunities and strategies to improve the watershed. These were recorded on flip charts and are compiled in an attached table.

Questions/comments from the meeting attendees from the presentation (both sessions):

Question/Response

1. *Why was Bull Creek taken off the Impaired Waters list in 2016?*
   More recent monitoring may have shown that pollutant levels in that segment of Bull Creek did not exceed state standards.
2. *What is a Flood Problem Area (FPA)?*
   FPAs are composed of one or more structures in a geographical area that are damaged by the same primary source/cause of flooding. Structures include transportation, utility infrastructure, buildings, and well and septic failure caused by flooding. Areas also include locations where road flooding results in damage to infrastructure, loss of critical access or is a threat to safety. Nuisance flooding: includes yard or open space flooding where it does not result in damage to a structure, loss of access, or loss of septic or utility function.
3. *Did SMC send flood questionnaires to people who have flood problems as a result of poor watershed management?*

While SMC does not have the capacity to send a letter to every resident in the watershed, the meeting invitation mailing, which included a link to the online flood questionnaire and a riparian landowner brochure, was mailed to residents that live along tributary streams, the Des Plaines River and around the lakes in the watershed, and also to those addresses that are located in known flood problem areas.

4. *What models will SMC be using to model pollutants loads?*
   SMC is hiring a consultant to do nonpoint source pollutant loading modeling in late 2016 or early 2017. Consultants will submit the type of methods they will use in response to a request for proposals.
5. *Did SMC get permission from property owners to do the stream inventory work?*
   Letters were sent to larger property owners informing them that SMC staff will be inventorying the streams. SMC also notified all of the municipalities and watershed stakeholder lists via email that inventories were underway.
6. *How will SMC watershed planning efforts involve the Route 53 road expansion?*
   The Route 53 road project will be treated as any other future land use change in the watershed plan. Projected future land use will be used for impervious cover calculations and nonpoint source pollutant modeling for future conditions. SMC typically collects future land use information from land use planning authorities such as Chicago Metropolitan Agency for Planning (CMAP), Lake County, Kenosha County and the municipalities in the watershed. This information is used as best available data for mapping and modeling purposes.
7. *Why isn't more of the Wisconsin portion of the watershed included in this planning effort?*
   The Southeastern Wisconsin Regional Plan Commission's (SEWRPC) has completed a watershed plan for the Des Plaines River in Wisconsin that SMC will use to inform this planning study. Illinois EPA typically does not use Illinois designated grant funds for out of state projects.
8. *TMDLs have been established for Indian Creek and Buffalo Creek subwatersheds, will TMDLs be completed for the remainder of the watershed?*
   Illinois EPA is responsible for completing Total Maximum Daily Load (TMDL) studies that identify the maximum amount of a pollutant that receiving waters can absorb without violating state water quality standards. TMDLs for the mainstem of the Des Plaines River and the upper Des Plaines subwatersheds in Lake County will likely not be completed by Illinois EPA during this planning process.
9. Other planning jurisdictions in the Des Plaines watershed include the Southeastern Wisconsin Regional Planning Commission, the Metropolitan Water Reclamation District of Greater Chicago, and the Cook County Forest Preserve District. The Buffalo Creek Watershed-Based Plan includes a portion of Cook County.
10. *Are there any River Watch activities going on right now?*
    Riverwatch monitoring is occurring in the Buffalo Creek subwatershed, and there are possibly two (2) additional sites being monitored in the Bull Creek/Brook subwatershed.
11. *Is there an agency designated for keeping the river clear (of debris)? An example was a tree was lodged on Buckley Road Bridge and was just cleared recently.*
    No one agency is dedicated to just clearing stream and river debris. SMC does not have the funding to be able to provide a stream maintenance service at this time. There are a few drainage districts in the watershed that do some debris management in their easement sections. Roadway authorities clear debris within their right of ways. Private landowners are responsible for maintaining the stream channel or lakeshores on their properties. SMC does provide up to $500 to organizations for stream cleaning efforts (SMC provided funding for 5 stream cleanup efforts in 2015).

Next Meetings:
Stakeholders voted on preferences for the next meeting date and the preferred day of the week for future meetings. The next watershed meeting will be held on April 28th 2016 in the afternoon, more details to follow. Thursday was voted as the day most convenient for watershed stakeholders to attend meetings. Several meetings will be scheduled in the evenings.

Final Announcements:

Names were drawn for rain barrel and compost bin raffle winners at both meetings.
A summary of the stakeholder input on watershed issues and opportunities and a summary meeting report will be sent via email and posted on the SMC website.

Meeting Attendees:

Last Name	First Name	Organization
Adam	Mike	Lake County Health Dept. (LCHD) Lakes Management Unit
Rogers	Carol	Warren Township High School
Zehner	Steve	Robinson Engineering
Bartolai	Alana	LCHD
Salemi	Joseph	North Lakeshore Realty Co.
Dittrich	Wally	Village of Lincolnshire
Brown	David	Village of Vernon Hills
Knysz	Marcy	TRC / BCCWP
Heilemann	Rosemary	League of Woman Voters – Lake County
Weiss	Jeff	Buffalo Creek Clean Water Partnership
Soliz	Maggie	Applied Ecological Services
Shimbey	David	Plan Commission Riverwoods
Geiselhart	Chris	Bull Creek Bulls Brook Stakeholder
Wojcik	Thomas	Resident
Resnick	Margaret	Mundelein Park District
Bland	Jim	Sierra Club
Bouchard	Chris	RHMG
Roberts	Jesse	Senator Mark Kirk Rep.
Neu	Dave	Conserve Lake County
Lodesky	Joe	Resident
Bartholomew	Boh	Resident
Dorn	Brian	North Shore Water Reclamation District
Robinson	Joe	North Shore Water Reclamation District
Lannin	Sue	Resident
Hurtade	Juan	Resident
Godshalk	James	Resident
Burger	Jeanette	Resident
Ettinger	Frank	Resident
Snarr	Jack	Resident
Wagner	Bryan	Illinois Tollway
Nehila	Jeff	Grayslake Park District
Pedersen	Linda	Lake County Board
Bartholomew	Pat	EHS Services
Jacobson	Rick	Jacobson Golf Course Design
Shatkin	Judy	Resident
Kendzior	Paul	Village of Libertyville
Vella	Steve	Village of Libertyville
Chefalo	Tom	Lake County Planning Building and Development (PB&D)
Anderson	Jim	Lake County Forest Preserve District (LCFPD)
Talbett	Michael	Village of Kildeer
Ettinger	Albert	Sierra Club
Barner	Allie	Natural Resource Conservation Service (NRCS)
Rospopo	Jim	NRCS
Morthorst	Tom	Village of Third Lake
Craig	Evan	Sierra Club
Frable	Erika	Village of Hawthorn Woods
Geiselhart	Paul	Lake County Audubon
Koch	Greg	MWRDGC
Weinen	Kitty	Senator Mark Kirk Rep.
Klonowski	Paul	Resident
Papa	Jan	Bluestem Ecological Services

Last Name	First Name	Organization
Wilson	Don	Resident
Flood	Rob	Gages Lake Conservation Committee, North Shore Water Reclamation District
Moffat	Cory	Resident
Grosuewer	Brad	Resident
Weik	Ken	Resident
Herr	Mr. & Mrs. P.	Resident
Aldridge	Margie	Resident
Aldridge	Warren	Resident
Moss	Glen	Lake County Audubon
Cwiak	Dave	Vernon Hills Park District
Wittenberg	Bill	Resident
Stefani	Bill	Lake County Tech Campus
Yun	Charles	Resident
Kolar	Trish	Resident
McDonough	Andy	Resident
Machado	Kathie	Resident
Benavides	Kristen	Resident
Benavides	Dominic	Resident
McDonough	Lisa	Resident
Werner	Patty	Lake County Stormwater Management Commission (SMC)
Warren	Ashley	SMC
Warner	Mike	SMC
Prusila	Mike	SMC
Novotney	Mike	SMC
Vancil	Susan	SMC
Laramy	Jeff	SMC
Schindelar	Neil	SMC
Osterby	Sharon	SMC
Traynoff	Kelcey	SMC
McNeill	Darcy	SMC

DES PLAINES RIVER WATERSHED MEETING AGENDA
CENTRAL PERMITTING FACILITY
APRIL 28TH 2016
2:00PM – 4:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to complete and prioritize watershed issues and opportunities and to begin developing future watershed plan goals and a watershed vision statement.

Meeting Objectives:

- Prioritize watershed issues, opportunities, and strategies
- Agree on watershed plan goals
- Develop content for a vision statement

1. ***Introductions and Announcements***
    a. Introductions
    b. Website navigation to SMC Des Plaines River watershed plan page
    c. Review and accept March meeting summary

2. ***"Tell it in Ten" Series: Des Plaines River Watershed Workgroup (DRWW)***
    a. Andrea Cline, GeoSyntec Consultants

3. ***Prioritize Watershed Issues, Opportunities & Strategies***
    a. Stakeholders will get a chance to vote on watershed issues and opportunities/strategies from the March 17th 2016 kickoff meetings.

4. ***Watershed Vision, Our Mission, Plan Goals and Objectives Presentation***
    a. Presentation, followed by voting on watershed goals

5. ***Begin Developing Vision Statement***
    a. Facilitated session

6. ***Next Meeting & Remaining Questions***
    a. Next meeting: June 1st 2016 at Lake County Central Permitting Facility, 2:00-4:00pm

Des Plaines River Watershed Plan Meeting
April 28, 2016 – 2:00 to 4:00 PM
Lake County Central Permitting Facility

MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to complete and prioritize watershed issues and opportunities and to begin developing future watershed plan goals and a watershed vision statement.

Desired Meeting Results:

- Prioritize watershed issues, opportunities, and strategies
- Agree on watershed plan goals
- Develop content for a vision statement

MEETING SUMMARY

Introduction & Announcements:
Patty Werner, Planning Supervisor of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Meeting attendees introduced themselves. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the March 17th 2016 meeting summary by consensus of the group.

"Tell it in Ten" Series: Des Plaines River Watershed Workgroup (DRWW)
Andrea Cline, GeoSyntec Consultants gave a presentation on behalf of the DRWW. The presentation included: Des Plaines River watershed characteristics, who the DRWW is, why they were formed, and current and planned activities of the DRWW within the watershed.

Questions/comments from the meeting attendees from the presentation:
Question/Response

1. *Can you explain stream reach impairment significance and why stream reaches are not meeting IL EPA standards for impaired waters.*
   Andrea Cline explained the use of TMDLs to monitor and assess pollutant loads to impaired waters.

2. *What is Dissolved Oxygen?*
   The amount of oxygen dissolved in the water that is available to support fish and other aquatic animals.

3. *Will DRWW be monitoring for pesticides?*
   Yes water chemistry will test for these in the water column.

Prioritizing Watershed Issues, Opportunities & Strategies:
Ashley Warren, SMC, led a discussion on the process that was used to compile the meeting attendee feedback from the March 17, 2016 Kickoff Meeting. The meeting attendees were then asked to clarify several topics that were listed at the March 17th meeting that were not easily understandable. The group was asked if any changes or additions needed to be made to the breakout session summary before voting began, no additional changes were made.

The meeting attendees were given ten votes to prioritize issues and ten votes to prioritize opportunities/strategies. A copy of the breakout summary of the issues and opportunities/strategies with tallied votes is attached.

Goals, Objectives, & Vision and Mission Presentation:
Patty Werner, SMC, gave a brief presentation reviewing the watershed planning process and explained the differences between setting goals and objectives, and a vision verses a mission statement.

Watershed Goal Voting:

Ashley Warren explained that the summary of issues and opportunities presented by stakeholders at the March meeting has been compiled into watershed goal categories. Meeting attendees were given an opportunity to prioritize seven potential watershed goal categories from highest to lowest priority. The vote results of the watershed goals are attached.

Begin Developing Vision Statement:
Each meeting attendee was given a Des Plaines River watershed plan vision exercise sheet to list three to four phrases for four questions related to the future watershed conditions. After listing a few phrases for each question, the meeting attendees were asked to choose their top answer (phrase) for each question.

The meeting room was split into four smaller groups to review each group participant's top answers to the questions. Each small group voted on their preference of vision phrases to share with the larger group. Each group reported their top vision phrases to the larger group. The larger group then voted on which of the breakout group's vision phrases should be included (or combined) into the Des Plaines River watershed vision statement. See the table below for the vision statement exercise results.

Next Meetings:
Stakeholders voted on preferences for the next meeting date (June 1st or June 16th). The next meeting will be held on June 1st 2016 in the afternoon, more details to follow. All of the watershed meeting summaries, agendas, and meeting information will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

Meeting Attendees:

Last Name	First Name	Organization
Joyce	Brian	City of Lake Forest
Bartholomew	Bob	Resident
Stauber	Camille	Sustainable Places Inc.
Jacobson	Rick	Jacobson Golf Course Design
Machado	Kathie	North Libertyville Estates Community Association (NLECA)
Wittenberg	Bill	Resident
Nickels	John	Resident
Adam	Mike	Lake County Health Dept. (LCHD) Lakes Management Unit
Heilemann	Rosemary	League of Woman Voters – Lake County
Pippen	Scott	Village of Lincolnshire
Anderson	Jim	Lake County Forest Preserve District (LCFPD)
Talbett	Michael	Village of Kildeer
Morthorst	Tom	Village of Third Lake
Vella	Steve	Village of Libertyville
Amidei	Moses	Village of Wadsworth
Bland	Jim	Sierra Club
Vogel	Randy	Land & Water Resources, Inc.
Reed	Bud	East Skokie Drainage District (ESDD)
Papa	Jan	Bluestem Ecological Services
Hicks	Bob	Resident
Shafer	Barbara	Resident
Flood	Rob	Gages Lake and North Shore Water Reclamation District (NSWRD)
Robinson	Joe	North Shore Water Reclamation District
Ryan	John	Land & Water Resources, Inc.
Burke	Caitlin	Gewalt Hamilton
Stefani	Bill	Lake County Tech Campus
Leach	Nick	Village of Gurnee
Gerleman	Doug	Go Green and Northbrook Environmental Committee
O'Connor	Jen	Resident
Griffith	Scott	Lake County Stormwater Management Commission (SMC)
Werner	Patty	SMC

Last Name	First Name	Organization
Warren	Ashley	SMC
Warner	Mike	SMC
Prusila	Mike	SMC
Novotney	Mike	SMC
Laramy	Jeff	SMC
Osterby	Sharon	SMC

Des Plaines River Watershed Plan Meeting
June 1st 2016 – 1:30 to 3:30 PM
Lake County Central Permitting Facility

DRAFT MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about stormwater green infrastructure practices, review and agree on the vision for the watershed and get stakeholder feedback on watershed plan goals and objectives.

Desired Meeting Results:

- Agree on our vision for the watershed
- Develop watershed plan goals and objectives

MEETING SUMMARY

Introduction & Announcements:

Patty Werner, Planning Supervisor of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Meeting attendees introduced themselves. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the April 28th 2016 meeting summary by consensus.

"Tell it in Ten" Series: Libertyville Township Open Space District

Kathleen O'Connor, Libertyville Township Supervisor gave a presentation on behalf of the Libertyville Township Open Space District. The presentation included: background of the Libertyville Township Open Space District, different projects the District has accomplished and looking to accomplish, youth and volunteer activities, and partnerships and their roles with the Open Space District. Presentation will be posted with the meeting report on SMC's website: http://www.lakecountyil.gov/3655/Agendas-and-Minutes.

Questions/Comments:

Question/Response

1. *What material is the trail made of?*
   CA-6 stone/crushed gravel material is used on most of the trail systems. There are two sections of asphalt due to areas of heavy machinery use.

2. *Is the Casey Road area agriculture use disappearing?*
   People were asked about this area and wanted to see the (agriculture) area restored to prairie.

3. *Will the new trail be different than the Lake County Forest Preserve District (LCFPD) trails?*
   No, the trails installed by the Open Space District will be uniform with the LCFPD trail, except for the trail markers.

Meeting Topic: Stormwater Green Infrastructure Practices

Mike Novotney, SMC Principal Water Resources Professional gave a presentation on stormwater green infrastructure practices. The presentation included: a breakdown on what green infrastructure (GI) is, how GI practices work, and examples of best management practices including their benefits and where they can be installed. Presentation is attached.

Questions/Comments:

Question/Response

1. *Is there regional green infrastructure to preserve?*
   Yes, examples of that would be LCFPD areas and keep in mind that not all regional green infrastructure has been inventoried. This watershed planning effort will help identify additional areas.

2. *How do Green Infrastructure practices reduce the carbon footprint?*
   GI assists in the capture of carbon dioxide from the atmosphere by absorbing it and acting as a long-term storage, instead of it being released and contributing to climate change.

Review and Vote on a Vision Statement:
Ashley Warren and Patty Werner, SMC, led a discussion on the process that was used to compile the meeting attendee feedback from the April 28, 2016 watershed meeting. Based on the stakeholder feedback SMC summarized two vision statement options. Jim Anderson created an additional (Option #3) vision statement for the group to review. After a discussion about each of the three options it was decided by consensus that the group would like Option #1 to incorporate an education and recreation component and use some language from Option #3 and have it presented to the group at the July 14th 2016 watershed meeting. See meeting presentation to view all three vision statement options.

3. *Private landowners should have the ability to do maintenance or drainage improvements on private property. Will this watershed plan add additional stormwater regulatory requirements (in regards to private property maintenance)? Who does what?*
    - SMC is the coordinating agency to coordinate on stormwater management issues and solutions. SMC coordinates with local jurisdictions to address stormwater related issues.
    - The watershed plan vision statement will consider the entire watershed, but could include looking at the regulatory impacts on the watershed drainage system.

Stakeholder feedback on Watershed Goals and Objectives:
Patty Werner, SMC, explained that SMC has compiled draft watershed goals, outcomes, and objectives based off the issues and opportunities/strategies identified by stakeholders at the March and April meetings. Attendees were broken up into four groups to visit and review the draft goals at objections at four stations. Participants had 10-15 minutes at each station to review the draft goals and objectives and add comments or suggest revisions. SMC will revise the goals and objectives for stakeholder review at the July meeting.

Next Meetings:
The next meeting will be held on July 14th 2016 from 1:30pm – 3:30pm at the Lake County Central Permitting Facility (2nd Floor). All of the watershed meeting summaries, agendas, and meeting information will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

Meeting Attendees:

Last Name	First Name	Organization
Smith	Brian	Illinois Tollway (AECOM)
Weiss	Jeff	Buffalo Creek Clean Water Partnership
Chefalo	Tom	Lake County Planning, Building & Development
Nehila	Jeff	Grayslake Park District
Eckebrecht	Mark	Beach Park Resident
Geisenhoffer	Colin	U.S. EPA Region 5
Godshalk	Jamie	Resident/Lincolnshire
Shimberg	David	Riverwood Resident
Heilemann	Rosemary	League of Woman Voters – Lake County
Brown	David	Village of Vernon Hills
Anderson	Jim	Lake County Forest Preserve District (LCFPD)
Dittrich	Wally	Village of Lincolnshire
Papa	Jan	Bluestem Ecological Services
Flood	Rob	Gages Lake and North Shore Water Reclamation District (NSWRD)
O'Connor	Kathleen	Libertyville Township Open Space District/Bull Creek-Bull's Brook Watershed
Machado	Kathie	Resident/North Libertyville Estates
Vancil	Susan	Lake County Stormwater Management Commission (SMC)
Werner	Patty	SMC
Warren	Ashley	SMC
Novotney	Mike	SMC
Laramy	Jeff	SMC
Osterby	Sharon	SMC

Des Plaines River Watershed Plan Meeting
July 14th 2016 – 1:30 to 3:30 PM
Lake County Central Permitting Facility

DRAFT MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about flooding and flood mitigation programs. Stakeholders will identify additional flood problem areas within the watershed and agree on a vision for the watershed.

Desired Meeting Results:

- Finalize our vision for the watershed
- Stakeholders know more about flood risk, response, and damage within the watershed

MEETING SUMMARY

Introduction & Announcements:

Patty Werner, Planning Supervisor of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Meeting attendees introduced themselves. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the June 1st 2016 meeting summary by consensus.

"Tell it in Ten" Series: Lake County Emergency Management Agency (LCEMA) & Lake County SMC Flood Response

Kent McKenzie, Coordinator for LCEMA, gave a presentation on Lake County EMA's role in Lake County flood response and broke down the process through different phases. Kent gave a brief description of the four phases involved for flood response (preparedness, pre-incident, during incident, and post-incident) and their different components.

Kurt Woolford, Chief Engineer at SMC, gave a presentation on flooding in Lake County and SMC's role with flood response. Kurt explained SMC's Flood response manual and a brief overview of SMC's response teams, Threat Alert Level system based on NWS watches and warnings and the associated response to each level, and what is evaluated by SMC during a flood briefing.

Meeting Topic: Flooding and SMC's Buyout Program

Sharon Østerby, SMC Water Resource Professional, gave a presentation of Des Plaines River watershed flooding, resident flood survey responses, and flood mitigation programs. The presentation included: an overview of floodplains, types of flooding and nuisance flooding/drainage issues, SMC's flood problem area (FPA) inventory, and measures that can be taken to protect properties that have flooding problems.

All presentations will be posted with the meeting report on SMC's website: http://www.lakecountyil.gov/3655/Agendas-and-Minutes.

Flood Problem Areas (FPA):

Patty Werner, SMC, gave a brief presentation on Flood Problem Areas (FPA) and how the information will be incorporated into the watershed based plan. SMC will soon request updated flood problem area information from municipalities and townships (excluding those in the Buffalo Creek watershed since communities in that watershed updated the FPA within the past couple years with the development of the Buffalo Creek Watershed Plan).

Finalize a Watershed Vision Statement:

Ashley Warren and Patty Werner, SMC, led a discussion on the process that was used to compile the meeting attendee feedback from the April 28, 2016 and June 1st 2016 watershed meetings. Based on the stakeholder feedback SMC summarized a draft vision statement for the Des Plaines River Watershed Planning Committee approval. After a discussion about the process of compiling the vision statement and additional stakeholder input, the Des Plaines River Watershed Planning Committee gave a 1st motion (Jeff Weiss) and 2nd motion (Paul Kendzior) to approve the vision statement and the watershed vision statement was approved by consensus.

Approved Des Plaines River Watershed Vision Statement:
The Des Plaines River Watershed will be a destination valued by residents, businesses and governments that join together to actively engage in education and participate in improving water quality. Stakeholders will preserve and enhance regional green infrastructure, resulting in cleaner streams and lakes, better plant and animal biodiversity and reduced flood damage while balancing a sustainable native landscape with development and economic growth.

Questions/Comments:
Question/Comment & Response

1. *The planning committee should focus on the reduction of levees, employ more flood control measures, grassland floodplains, talk about what people can do to stay out of floodplains, and the effects of urban development on flooding.*
   Patty explained that all of these are good topics that can be incorporated into the watershed issues and opportunities/strategies list and discussed further as we develop the mission statement and the watershed action plan. Ashley took notes of all of the suggestions to add into the watershed based plan discussion list.

2. *What is "enhanced regional green infrastructure"?*
   Patty described regional green infrastructure as the network of floodplains, wetlands and open land in the watershed that infiltrates, and stores rainfall. Forest preserves, parklands, and private open lands all make up the regional green infrastructure network. Site level green infrastructure includes stormwater practices that infiltrate and store rainfall on developed properties such as native landscaping, rain gardens and the green roof here at the Central Permit Facility.

3. *What is the floodplain, how is it determined?*
   Kurt Woolford, SMC, explained that a floodplain is an area of low-lying ground adjacent to a river or stream, formed mainly of river sediments and subject to flooding. The Federal Emergency Management Agency (FEMA) determines the locations of floodplain areas, and we use FEMA maps to regulate/manage floodplains. Kurt noted that FEMA does re-evaluate areas and revises the locations of some floodplains.

Stakeholder Identify Flood Problem Areas:
Attendees were asked to use the maps on the wall to identify and describe additional flood problem areas or drainage issues they know about within the Des Plaines River Watershed. The information collected will be incorporated into our watershed based plan. Watershed maps with SMC existing data and information collected at the watershed meeting are on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

Next Meetings:
The next meeting will be held on August 18th 2016 from 1:30pm – 3:30pm at the North Shore Water Reclamation District (NSWRD), 14770 William Koepsel Drive, Gurnee, Illinois 60031. All of the watershed meeting summaries, agendas, and meeting information will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

Meeting Attendees:

Last Name	First Name	Organization
Amidei	Moses	Village of Wadsworth
Leach	Nick	Village of Gurnee
Talbett	Michael	Village of Kildeer
Nelson	Kristina	Wildwood Resident
Wilson	Don	Lindenhurst Resident
Lee	Rita	IDNR -OWR
Milner	Bill	IDNR -OWR
Neu	Dave	Conserve Lake County
Hicks	Bob	Liberty Lake
Wittenberg	Bill	Libertyville Township Resident
Kendzior	Paul	Village of Libertyville
Dane	Leonard	Deuchler Environmental, Inc. (DEI)

Last Name	First Name	Organization
Adam	Mike	LCHD
Smith	Brian	Illinois Tollway (AECOM)
Weiss	Jeff	Buffalo Creek Clean Water Partnership
Hey	Don	Wetlands Research Inc. (WRI)
Burke	Caitlin	Gewalt Hamilton & Associates (GHA)
Dittrich	Wally	Village of Lincolnshire
Curran	Jerry	WRI
Flood	Rob	Gages Lake and North Shore Water Reclamation District (NSWRD)
Baczek	Evan	DuPage Stormwater Management
Nathan	Walter	Riverwoods Resident
Vancil	Susan	Lake County Stormwater Management Commission (SMC)
Werner	Patty	SMC
Warren	Ashley	SMC
Warner	Mike	SMC
Prusila	Mike	SMC
Osterby	Sharon	SMC

Des Plaines River Watershed Planning Meeting
August 18, 2016 – 1:30 to 3:30 PM
North Shore Water Reclamation District – Gurnee, Illinois

MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about wastewater treatment plant upgrades and expansions, efforts made for upstream and downstream biological monitoring, and green infrastructure practices installed at those facilities.

Introduction & Announcements:
Ashley Warren, Water Resource Professional of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Meeting attendees introduced themselves at the beginning of the Des Plaines River Watershed Workgroup (DRWW) meeting. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the July 14th 2016 meeting summary by consensus.

"Tell it in Ten" Series: North Shore Water Reclamation District (NSWRD)
Brian Dorn, Executive Director for NSWRD, gave a presentation on the history of the NSWRD leading up to present day conditions and services, the operations of the NSWRD, and photos of different operating systems within the wastewater treatment plant (WWTP).

Meeting Topic: Wastewater Treatment Plant Panel Discussion & Identifying Recommendations for Watershed Plan
Ashley Warren gave a brief presentation about the wastewater treatment plants located within the Des Plaines River Watershed planning area. Ashley provided background information on the locations and volume of flow treated at the plants to start the wastewater treatment plant panel discussion. Four wastewater treatment plant representatives each gave a short presentation about the wastewater treatment plant they work at describing the current operations of the plant, daily average flows for the plant, monitoring efforts, overflow operations and any expansions and upgrades to the plant.
Presenters:

1. Joe Robinson, Director of Laboratory Services, NSWRD WWTPs
2. Paul Kendzior, Director of Public Works, Village of Libertyville WWTP
3. Jason Pieper, Chief Operator, Lake County Public Works Department WWTPs
4. Charles Hernandez, Crew Supervisor & Rafel Palka, Plant Operator, Village of Lindenhurst WWTP

Topics Presented by Panelists:

- Past water quality monitoring indicates:
    - chloride levels are rising especially as you move south in the watershed
    - the river is nutrient impaired based on fluctuating dissolved oxygen levels
    - water clarity has improved over the years
- Effects of biological nutrient removal (BNR) on phosphorous level of effluent and the different BNR results between WWTPs.
- Receiving and treating septic waste has become a good revenue source for LCPW
- The roles biological and chemical treatment play in phosphorous removal
- The effects of heavy rain on a wastewater treatment plant flow (due to stormwater entering the sanitary system) and overflow discharge procedures when influent exceeds plant treatment capacity.
- What the future holds for WWTP's with the National Pollutant Discharge Elimination System (NPDES) Permits becoming more stringent for phosphorus removal.

Discussion Notes:

- The sources of impairment to the river need to be properly identified and appropriately addressed rather than depending on WWTP discharges solely to reduce pollution. Need to address nonpoint sources of pollution to reduce impairments and improve water quality.
- All of the WWTPs report heavier wet weather flows through their plants that indicate inflow of stormwater into the sanitary system, and have activities to reduce wet weather flows and accommodate overflow conditions.
- Compiling with more stringent permit requirements will be more expensive for WWTPs and their customers.

- WWTP's have more flexibility to do the best they can on removing phosphorus rather than having to comply with a mandatory limit so that WWTP can give the public the best bang for their buck in treatment for water quality.
- Public education needs related to proper disposal of unused pharmaceuticals and personal care items labeled as "flushable" that do not break down and clog WWTP equipment.
- Residential and commercial properties need to manage their stormwater runoff on-site by changing the landscape to hold water. Need to look at this more seriously as part of WWTP wet weather flow reduction programs and the DPR watershed action plan.
- It has been brought to elected officials about investing more money in campaigns for water quality awareness
- Meetings (like this one) provide WWTP operators an opportunity to share information and discuss challenges and potential solutions with each other. A coordinated effort is beneficial to mitigating the impacts of new regulations.
- Water quality problems need to be addressed using a watershed based approach. A coordinated pollutant loading reduction program will provide the best water quality outcome for resources expended. This will include non-point source best management practices such as buffers on agricultural fields.

Next Des Plaines River Watershed Planning Meeting:
The next meeting will be held in conjunction with the September 14th Municipal Advisory Committee (MAC) Meeting, located at Central Permitting Facility, 2nd Floor, 500 W. Winchester Road, Libertyville, IL 60048, 9:00am – 11:00am. All of the watershed meeting summaries, agendas and meeting presentations will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adam	Mike	Lake County Health Department
Talbett	Mike	Village of Kildeer
Berns	Leslie	Lake County Forest Preserve District
Bland	Jim	Sierra Club
Dorn	Brian	North Shore Water Reclamation District
Formica	Matt	Village of Lindenhurst
Harrison	Betty	Village of Lake Zurich
Janes	Brandon	Village of Deerfield
Kendzior	Paul	Village of Libertyville
Kolb	Peter	Lake County Public Works
Leach	Nick	Village of Gurnee
McFarlane	Austin	Lake County Public Works
Pippen	Scott	Village of Lincolnshire
Reynolds	Mike	Village of Buffalo Grove
Robinson	Joe	North Shore Water Reclamation District
Talbett	Michael	Village of Kildeer
Warner	Mike	Lake County Stormwater Management Commission
Boeche	Adam	Village of Mundelein
Bounds	Dan	Baxter & Woodman
Cline	Andrea	Geosyntec Consultants
Doyle	K.C.	Lake County
Flood	Rob	North Shore Water Reclamation District
Gerleman	Douglas	Go Green Northbrook
Godshalk	Jamie	Resident
Hernandez	Charles	Village of Lindenhurst
Morthorst	Tom	Village of Third Lake
Olson	Darren	Christopher B. Burke Engineering, Ltd.
Palra	Rafal	Village of Lindenhurst
Paradoski	Gary	Aqua Vitae
Pieper	Jason	Lake County Public Works
Prusila	Mike	Lake County Stormwater Management Commission
Reed	Bud	Citizen

Last Name	First Name	Organization
Smith	Brian	AECOM
Stauber	Camille	Sustainable Places
Sweeny	Ross	Resident
Warren	Ashley	Lake County Stormwater Management Commission
Werner	Patty	Lake County Stormwater Management Commission
Witthuhn	Vern	Strand Associates
Zemaities	Mike	Lake County Division of Transportation

Des Plaines River Watershed Planning Meeting
September 14, 2016 – 9:00 a.m. to 11:00 a.m.
Lake County Central Permitting Facility, Libertyville

MEETING REPORT – Meeting held in conjunction with the Municipal Advisory Committee (MAC)

Introduction & Announcements:
The meeting attendees introduced themselves at the beginning of the Municipal Advisory Committee (MAC) meeting. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the August 18th 2016 meeting summary by consensus at the Des Plaines River Watershed Planning Meeting portion of the meeting.

Meeting Topic: Stormwater Management Programs and Watershed Plan Recommendations
Mike Warner, Executive Director, Lake County Stormwater Management Commission (LCSMC) gave a brief overview of how projects that are called out as action recommendations in approved watershed-based plans are eligible IL EPA 319 project grant funding. Mike used the example of the 319 grant-funded Lake County Central Permit Facility (CPF) stormwater best management practices (BMPs), which were recommendations from the Bull Creek – Bulls Brook watershed based plan. The watershed planning status map and the Illinois Environmental Protection Agency (Illinois EPA) priority watershed planning and implementation maps were presented to the meeting attendees as well.

Panel Discussion
Mike started the Local Stormwater Programs panel discussion by introducing the panel members Darren Monico, Village of Buffalo Grove; Ramesh Kanapareddy, City of Highland Park; and Dave Brown, Village of Vernon Hills. Panelists gave brief presentations on their municipal stormwater programs, 319-funded projects in their municipalities and challenges they have come across.

Darren Monico, Village of Buffalo Grove
- Presented Killdeer Creek Streambank Stabilization at Arboretum Golf Course (Indian Creek Watershed project)
- The project included 25 foot banks, with stone toe and articulated concrete used for streambank stabilization
- Baxter and Woodman Consulting Engineers did the design and are working on project monitoring and maintenance during the 10 year operations and maintenance period
- Copenhaver Construction was contractor - still working with them to get good vegetation establishment
- Required homeowner easements - concerns with the vegetation removal that was screening for their property, but they agreed to the project

Dave Brown, Village of Vernon Hills
- Vernon Hills has followed the watershed plan for implementation projects that are grant-funded. They have leveraged $1.7 million in grant funds for Village projects.
- Lake County Health Department (LCHD) reports also important to the Village's lake management.
- The Village of Vernon Hills was formed in 1958 and flooding is not really a problem for the Village. so they are able to focus on water quality projects.
- Presented the 2010 Hazeltime Road project that was 720 linear feet of stream restoration totaling $350K in costs with $188K in grant funds. The Village has reduced staff time needed for maintenance. (Prior to the project they had lots of sediment and stone accumulation in road culverts.)
- Fall 2000 implemented a project along Seavey Ditch at White Deer Run totaling $68K with assistance of WMB funds.
- In 2007 they implemented the Harvey Lake Shoreline Stabilization. They originally planned to do a third of the shoreline, but bids came in so favorable that they did it all. North-Cook Soil & Water Conservation District provided grant funding.
- The Village uses the LCHD Lake Report as its guiding document – it is useful when talking with neighbors.

- A 2006 State and Tribal Assistance Grant (STAG) helped find the Seavey Ditch Restoration project. Dave discussed screening removal with residents and provided two trees and a shrub for each yard to replace the invasive species that were removed. Following the completion of the project, homeowner lawn chairs faced the creek indicating their acceptance of the project.
- In 2009 the Village used a STAG grant to remove a dam on the Vernon Hill's golf course totaling $447K cost with 50% provided by the grant.

Ramesh Kanaparrady, City of Highland Park

- Highland Park is a lakefront community with ravine and beach issues and with flooding problems.
- They are participating in a ravine restoration project with the Army Corps of Engineers (ACOE) that is underway. It took 2 years to create the temporary easements for work on 8 private properties. It is a $1 million project with 65% / 35% cost share.
- Waiting for the development of a Lake Michigan Watershed Based Plan

Take-a-ways from Panelist Discussion:

- Maintenance is an on-going challenge for Illinois EPA 319 projects and other stormwater and drainage projects. Some communities are able to absorb maintenance through existing staff or hire a consultant. Lack of funding makes maintenance a big challenge.
  - Highland Park tries to monitor all the ravines 2x/year, but it is a challenge.
  - Vernon Hills uses a flatboat to assess stream condition and blockage issues and they inspect the bridges and culverts annually.
- All panelists agreed there should be a county-wide program to address stream maintenance.
  - Buffalo Grove has submitted a 319 grant proposal for stream restoration recommended in the Buffalo Creek Watershed Based Plan as a high priority project.
- Education of residents is an ongoing need (for ex. doggie bag disposal and not draining oil into stormwater inlets) Outreach for stormwater programs to the community includes articles and notices in the City newsletter and a website subscription service for electronic updates, and reaching out to homeowners near the project sites. Educating landowners on BMPs and keeping them updated on the project is critical for project success.

Grandwood Park Dam Comment

- GPPD meeting tonight to proceed with the emergency resolution to address whether to remove or replace the dam, which will be decided in the coming months (Mill Creek Watershed).

Next Des Plaines River Watershed Planning Meeting:

The next meeting is October 12th 2016, located at Ryerson Woods Visitor Center, 21950 North Riverwoods Rd. Riverwoods, Il 60015, 1:00pm – 3:00pm. All of the watershed meeting summaries, agendas and meeting presentations will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adam	Mike	Lake County Health Department
Alder	Beth	Resident
Amidei	Moses	Village of Wadsworth
Anderson	Jim	Lake County Forest Preserve District
Bicking	Steve	HR Green
Bouchard	Chris	RHMG Engineering, Inc.
Burke	Caitlin	Gewalt Hamilton Assoc., Inc.
Byrne	Rob	Village of Lincolnshire
Chung	Fred	Village of Libertyville
Corona	Joy	Bleck Engineering Co., Inc.
Crane	Juli	Lake County Stormwater Management Commission
Drabicki	Scott	Village of Gurnee

Des Plaines River Watershed Planning Meeting
October 12, 2016 – 1:00 to 3:00 PM
Ryerson Woods Visitor Center – Riverwoods, Illinois

MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about conservation efforts within the Des Plaines River watershed and discuss the vision for conservation with local conservation organization representatives.

Introduction & Announcements:
Mike Prusila, Water Resource Professional of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Mike asked meeting attendees to introduce themselves at the beginning meeting. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the September 14th 2016 meeting summary by consensus.

"Tell it in Ten" Series: Lake County Forest Preserve District (LCFPD)
Jim Anderson, Executive Director for LCFPD, opened with a description of the Ryerson Conservation Center. Jim mentioned the LCFPD currently maintains 360 buildings on LCFPD properties and would like to reduce this number over time; increasing green infrastructure and providing financial sustainability. He gave a presentation on the history of the LCFPD land acquisitions over time (1961-2016), initially focused on the Des Plaines River corridor and expanding countywide beginning in the 1970s, currently totaling nearly 31,000 acres.

Meeting Topic: Conservation
Jim Anderson gave a presentation on the LCFPD 100-year vision and Green Infrastructure Model and Strategy (GIMS). Building off the presentation on LCFPD's history, the 100-year vision will drive future acquisitions and planning for the next 100 years. There are currently 30,531 acres of LCFPD properties and the countywide goal proposed by the Land Preservation Partners of Lake County is 60,000 acres of green infrastructure (combined with Illinois beach State Park, Illinois Nature Preserves, and local preserves) by 2030. Jim mentioned there is no new referendum in the near future for the LCFPD. The 100-year vision has three major driving concepts; 1) Leadership, 2) Conservation, and 3) People. The goals of the Vision are 1) Leadership, 2) Organization Sustainability (shift from 5 to 10-year budget) 3) Conservation, 4) Communication, Education, and Outreach, and 5) Public Access and Connections. Conservation goals were generated by staff and presented to leadership. The goal is to preserve nature at the landscape level and prevent species loss by preserving and expanding natural corridors, and specifically capturing three 10,000-acre "conservation landscapes" (not all land owned by LCFPD). Data driven conservation is the key – it's important to have the data to see how areas are affected, so LCFPD embarked on a detailed study of green infrastructure in Lake County.

Data-gathering on regional Green Infrastructure in Northeast Illinois began with Dennis Dreher then with the Northeastern Illinois Planning Commission (now CMAP) and Chicago Wilderness' (CW) Green Infrastructure Vision (GIV). The current version (GIV 2.2) includes the entire Chicago Wilderness region, from SE WI to NW IN. The GIV is modeled on environmentally significant cores, surrounded by hubs and networked by connecting links. CW and CMAP have attempted to monetize the value of the green infrastructure network in the region and estimated that there are, at minimum, billions of dollars of value for various ecosystem services (such as flood control, air quality, etc…). Most of the hubs in Lake County are protected by the LCFPD.

LCFPD is in the final stages of developing a Green Infrastructure Model and Strategy (GIMS) for Lake County. The end goal is to identify three (3) 10,000-acre sites around Lake County. LCFPD is currently focusing on four (4) ecological complexes – 1) Lake/McHenry, 2) Lake Michigan, 3) Upper Des Plaines River, and 4) Lower Des Plaines River. The GIMS uses the core-hub-corridor model of a green infrastructure network. The GIMS examines current conditions by community type. For example, 87% of oak ecosystems have been lost, mostly before 1939. The existing woodland hubs are mostly protected in LCFPD lands. There are many opportunities for prairie/savanna restoration. Most wetland hubs (large wetland complexes) are protected. The GIMS will be used for targeting "strategic habitat conservation areas", largely by watershed: The Des Plaines River corridor, north central Lake County (also in the DPR watershed), the Lake-McHenry complex, and Lake Michigan. LCFPD will target these strategic areas for any acquisitions, restoration, and work with partners and neighbors.

The GIMS model and data will be available to the public either through CMAP or Lake County GIS by the end of 2016

Questions (answers given by Jim Anderson):

1) What does landscape scale mean?
    a. LCFPD is looking at the entire area (i.e. Chicago Wilderness) and trying to prioritize issues in these areas.
2) What does GIV mean?
    a. GIV = Green Infrastructure Vision, a concept and product similar to the LCFPD GIMS.
3) Are these ecological complexes identified to drive ecological restoration and financial decisions?
    a. Yes. These are the areas the LCPFD would like to focus on.
4) Any work with the Hackmatack NWR in McHenry and Walworth counties?
    a. LCFPD is aware of it and some of is tied into the Chain O' Lakes/Glacial Park area but it is not part of the current GIMS.

Conservation Panel Discussion:

Jim Anderson moderated a five-member panel discussion about land conservation.

Panel Discussion Members:

1. Sarah Surroz, Conserve Lake County
2. Keith Gray, Mettawa Open Lands
3. Steven Byers, Illinois Nature Preserve Commission
4. John Balaban, Master Volunteer Steward
5. Kathleen O' Connor, Libertyville Township Open Space District

Discussion questions and responses are summarized as follows:

1. Do you consider recommendations in watershed plans when developing a resource conservation and management plans, acquiring open space for conservation, or restoring/enhancing existing natural areas?

    - Sarah Surroz – as a non-profit 501c, Conserve Lake County always refers to watershed plans. They also use watershed plans to educate people about issues within the watershed and show people from where their water originates and where it's going.

    - John Balaban – He is aware of the existence of the Lake County Watershed plans and his hope is that the Cook County Forest Preserve District is referencing these as well. When new stewards are brought on board, they are educated on the watershed plans. With new restoration projects, an effort is made to keep the water on the land and maintain the integrity of the watershed.

    - Jim Anderson talked briefly about the Natural Resources Conservation Service precision conservation efforts in WI, MN, IA, and IL.

2. What are the struggles your organization faces when trying to acquire open space for conservation?

    - Kathleen O' Connor – acquisition of land (Libertyville Township) stopped a while ago. Kathleen stressed the importance of on-going communication/conversation with elected officials and the watershed plans can be used as a tool to build relationships and help educate people. Site management plans have been developed for all Libertyville Township sites.

    - Alana Bartolai (Lake County Health Dept.) – The Lakes Management Unit of LCHD provides a large amount of data for watershed plans such as shoreline erosion, chemicals present, etc. Work with residents to develop Lake Management Plans for individual lakes. *Note: Alana was not part of the panel but Jim directed the question to her.*

3. What steps is your organization taking for future conservation activities? Are you developing or have you developed a resource conservation plan to protect and enhance open space, green infrastructure and natural resources?
    - Keith Gray – Costco money has been used to purchase land to maintain the communities charm. Lands are put away for perpetuity but some residents don't see this as beneficial. A constant dialog needs to take place to help people understand. In his experience, there are several people who want to do the right thing for the planet.
    - Jim Anderson – echoed similar thoughts. He mentioned that as Lake County Board members move on and off the board, the LCFPD must maintain a constant conversation about conservation.
    - Steve Byers – Steve mentioned their goal is to maintain areas long term. They look at factors such as has the site been identified be the Illinois Natural Area Inventory process, does the site contain threatened and endangers species? They work with landowners who wish to protect their land and these areas receive the highest level of protection under state statute. Steve gave the example of Grainger Woods. The LCFPD dedicated the site as an Illinois Nature Preserve and the Nature Preserve Commission worked with adjacent landowners around Grainger Woods to offer further protection.
4. Are there any upcoming water quality improvement / conservation projects you will be implementing? Will you be seeking grant funding for your project?
    - Jeanette Burger – working with Jeff Weiss to present the Buffalo Creek Watershed Plan to various village boards within the watershed. It will be a hard process and long sell.
    - Jim Anderson – shared a story about patience and opportunities will present themselves. When writing grants, you should always refer to existing watershed plans.
    - Sarah Surroz – need to decide how much land do we (each organization) want to preserve and manage. She mentioned 20% might be a good goal for actual preservation; however, a lot of preservation/restoration type activities can still happen in the remaining 80% regarding water quality, implementation of BMPs, etc. She mentioned several large properties around Ryerson are good examples. Another example Sarah mentioned is working with landowners and developers regarding conservation easements.
    - Jim Anderson – the Illinois Environmental Protection Agency (Illinois EPA) has looked at increasing water quality standards. Improve habitat for flora and fauna on the 80% referenced by Sarah Surroz above. Jim mentioned the 20% probably wouldn't be enough for people and maintaining a quality of life. Also need to work with corporate partners and he cited the FedEx property as a good example of a productive working relationship.

Additional Discussion Notes:

- John Balaban mentioned he is currently involved with restoring 5,000 acres and if people are educated about conservation, they seem to understand. He mentioned citizens stop by and thank Cook County Forest Preserve staff because of the beauty provided by the resource. John gave two examples – Niles installed a large conduit to remove water from the village directly to the river during flooding. Glenview bought 12 properties to keep water and flooding in Glenview. John mentioned with climate change and experience more intense rainfall events, retaining the water in its natural flow paths is a good thing.
- Tom Chefalo, Lake County Public Building & Development (PB&D), asked if people recognize the corridors in the GIV plan and are curious what can be done to help. Jim Anderson answered that the corridors in the GIV look at species mobility and once the public has access to the mapping, citizens and other stakeholders can identify these corridors and plan accordingly. Jim mentioned the Village of Grayslake recently received the Conservation at Home certification.

Last Name	First Name	Organization
Ells	Robert	City of Lake Forest
Ende	Jeff	Village of Barrington
Firnbach	Scott	Village of Round Lake Park
Frable	Ericka	Village of Hawthorn Woods
Furlan	Frank	Waukegan & Round Lake Park
Giertych	Al	Lake County Department of Transportation
Gray	Jean	Grandwood Park Resident
Griffith	Scott	Lake County Stormwater Management Commission
Hansen	Jeff	Village of Lake Bluff
Husemoller	David	College of Lake County
Kanapareddy	Ramesh	City of Highland Park
Larson	Andrea	Manhard
Lebbos	Ed	Bollinger, Lach & Assoc., Inc.
Little	Barbara	Village of Deerfield
Marrin	Anne	Village of Fox Lake
Monico	Darren	Village of Buffalo Grove
Olson	Darren	Christopher B. Burke Engineering, Ltd.
Perry	Geoff	Gewalt Hamilton Assoc., Inc.
Prusila	Mike	Lake County Stormwater Management Commission
Reed	Bud	East Skokie Drainage District
Smith	Brian	AECOM
Steffen	Eric	Lake County Public, Building & Development
Stockley	Mark	Village of Fox River Grove
Surroz	Sarah	Conserve lake County
Talbett	Michael	Village of Kildeer
Tierney	John	Baxter & Woodman
Warner	Mike	Lake County Stormwater Management Commission
Warren	Ashley	Lake County Stormwater Management Commission
Werner	Patty	Lake County Stormwater Management Commission
Williams	Chris	Village of Lake Villa
Woolford	Kurt	Lake County Stormwater Management Commission
Yamin	Yamin	James Anderson Company
Zehner	Steve	Robinson Infrastructure Management/Village of Hainesville

Des Plaines River Watershed Planning Meeting
November 10, 2016 – 6:00 to 8:00 PM
Mundelein Park District – Mundelein, Illinois

MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about creek and stream maintenance efforts within the Des Plaines River watershed and review the stream inventory data collected on the Des Plaines River and its tributaries.

Introduction & Announcements:
Ashley Warren, Water Resource Professional of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Meeting attendees introduced themselves. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the October 12, 2016 meeting summary by consensus.

Meeting Topic: Maintenance of Creeks & Streams – Landowner Roles and Responsibilities
Ashley Warren gave a presentation explaining a riparian landowner's role and responsibilities for maintaining healthy streams, creeks, lake shorelines and riparian buffers (plant buffer). Land ownership for stream maintenance in the Des Plaines River Watershed planning area (270 miles) is divided into public lands (109 miles), private lands (144 miles) and road right-of-way (~17 miles). Maintenance of streambanks, shorelines, and riparian buffers is the responsibility of the property owner, and there are different types of maintenance and preventative measures that can be implemented; vegetation and debris management, streambank and shoreline protection, fertilizing wisely, and minimizing stormwater runoff.

Can you be a Steward for Water Quality?
Ernesto Huaracha, Water Resource Professional with SMC, gave an overview on how to be a good steward for water quality, and conditions that impact the quality of our water. Point and non-point source pollution contribute to erosion, increased turbidity, excess nutrients from fertilizers and pesticides, chlorinated oil drainage and waste, polycyclic aromatic hydrocarbon/coal tar and vegetation degradation. As landowners, we can use best practices to reduce pollution; minimize stormwater runoff, reduce and prevent pollutants from entering streams, and protect/support/create native plant buffers and plantings. All of those best practices to reduce pollution can be accomplished through everyday good yard/housekeeping practices. Landowners also have the capability to report concerns they see in Lake County by using the "Report a Concern" page on Lake County's website: https://il-lakecounty.civicplus.com/3637/Report-a-Concern.

"Tell it in Ten" Series: Mundelein Park District
Margaret Resnick, Director for Mundelein Park District, gave a brief overview of recent projects the Mundelein Park District has implemented. Some of the best management practice (BMP) projects Mundelein Park District have installed include rain gardens, roadside/residential swales, aquatic weed harvesting, lake shoreline and stream stabilization, native plant buffers and incorporating prescribed burns into their maintenance plans (120 acres). These projects have been made possible by support by local sponsors and organizations such as Lake County Stormwater Management Commission, Local Municipalities, and the Illinois Environmental Protection Agency (Illinois EPA) – Section 319 Grants.

Des Plaines River Watershed Stream Inventory Data
Jeff Laramy, GIS Analyst with SMC, gave a presentation about SMC's recent stream inventory data collected within the Des Plaines River watershed planning area. The stream inventory is performed to collect data that will be used in the watershed planning process to make recommendations and identify area for possible restoration. The data collected is based on a physical assessment of the river and tributaries, which includes channel conditions and identifying hydraulic structures, point discharges, land use and vegetative cover and debris jams. Approximately 246 miles of stream have been inventoried in the Des Plaines River watershed planning area. Data was presented for each of the stream inventory criteria – channelization, erosion, hydraulic structures and problems, discharge points and problems, and debris jams. Data collected translates into recommendations in the action plan to identify areas for possible stream restoration.

Neil Schindelar, Engineering Technician with SMC, went through a brief demonstration of the Des Plaines River Stream Inventory Web Application that includes all of the recent stream inventory data collected by SMC. This

application has the capacities to allow the public to see where any problem areas along the river and streams were observed, as well as, see photos of the problem areas.

Questions/Comments (answers given by SMC staff):

1) What should the public look for to report (on Report a Concern) to Lake County's website?
    a. For Stormwater Management concerns, problems such as illicit discharges, erosion, construction/development, flooding, etc…
2) What is being done to reach out to landowners/villages with the data collected – debris jams?
    a. SMC has contacted villages in the past to report larger debris jams to them for possible removal.
    b. How can we (SMC) communicate that to whoever is performing the maintenance to take care of those (debris jams)? SMC sent out a riparian landowner informational mailing in the beginning of the Des Plaines River watershed planning process – February 2016.
    c. The difficult part is property owners are unaware that they are responsible for maintenance of their creeks and streams and there is a lack of funding to perform larger maintenance activities. How do you make a connection with the landowners – again lack of funding to help or provide outreach.
    d. Once stream inventories are done they can become static (no updating information) and it would be a good idea to keep updating it with new information (i.e. SMC is told when debris jams are removed, so they can be removed from the inventory).
3) Trees near streambanks - canopy from trees prevents vegetation from taking hold. Wadsworth will be doing some channel clearing on three tributaries and getting rid of the trees along the streambanks
    a. There is no blanket statement that all trees along streambanks are bad. Trees can provide benefits, but some invasive junk trees are removed from some streambank stabilization projects (current Bull Creek Streambank Stabilization Project, Beach Park, Illinois)
4) The LCFPD Steward Program has held over 40 clean-up days this year; would they be able to send SMC information/photos of new information?
    a. Yes! The public can use tablets or (at least 3G) smartphones to send SMC information- that would be very helpful and make the Stream Inventory application a living document.

Next Des Plaines River Watershed Planning Meeting:
The next meeting will be held on Thursday, December 8th 2016 at Tempel Farms, 17000 W. Wadsworth Road, Old Mill Creek, IL 60083, 12:00pm – 2:00pm (includes free lunch). Must RSVP with Dijana Silber (dsilber@lakecountyil.gov) to attend. All of the watershed meeting summaries, agendas and meeting presentations will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adler	Beth	Des Plaines River Watershed Workgroup (DRWW)
Amidei	Moses	Village of Wadsworth
Anderson	Jim	Lake County Forest Preserve (LCFPD)
Anderson	Ders	Openlands
Baade	Tony	Loch Lomond Property Owners Association (LLPOA)
Bailey	Clint	United States Geological Survey (USGS)
Gretz	Helen	Lake County Forest Preserve District
Heilemann	Rosemary	Lake County League of Woman Voters
Huaracha	Ernesto	Lake County Stormwater Management Commission (LCSMC)
Klonowski	Paul	Lake County Forest Preserve District's Des Plaines River Steward Program
Lageman	Jon	United States Geological Survey (USGS)
Laramy	Jeff	Lake County Stormwater Management Commission (LCSMC)
Papa	Jan	Bluestem Ecological Services
Pfeil	Bob	Village of Buffalo Grove
Prusila	Mike	Lake County Stormwater Management Commission (LCSMC)
Ratz	Rob	Lake County Forest Preserve District's Des Plaines River Steward Program
Schindelar	Neil	Lake County Stormwater Management Commission (LCSMC)
Smith	Brian	Tollway
Urbanozo	Gerard	Lake County Health Department (LCHD)
Wade	Joe	City of Prospect Heights
Warren	Ashley	Lake County Stormwater Management Commission (LCSMC)

Last Name	First Name	Organization
Werner	Patty	Lake County Stormwater Management Commission (LCSMC)
Wittenberg	Bill	Libertyville Resident

Des Plaines River Watershed Planning Meeting
December 08, 2016 – 12:00 to 2:00 PM
Tempel Farms – Old Mill Creek, Illinois

MEETING REPORT

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about a variety of agriculture and equestrian practices within the Des Plaines River watershed and discuss how they influence water quality and natural resources.

Introduction & Announcements:
Patty Werner, Planning Supervisor of the Lake County Stormwater Management Commission (SMC), welcomed participants to the meeting. Patty gave a brief overview of the Des Plaines River watershed planning meetings this year and the purpose of the planning efforts. Patty mentioned attendees at the meeting that are members of the Des Plaines River Watershed Workgroup (DRWW) and their monitoring efforts in the watershed. Larry Leffingwell and Tempel Farms were thanked for hosting this watershed meeting.

Meeting attendees introduced themselves. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the November 10, 2016 meeting summary by consensus.

"Tell it in Ten" Series: Tempel Lipizzans
Emily Riccio, Program Coordinator of the Tempel Lipizzans, gave a presentation of the history of Tempel Farms and how Tempel and Esther Smith created the Tempel Lipizzans organization we know today. The presentation highlighted the transportation of Lipizzans from Austria to America and the careful management, passion and training involved with raising and performing with Lipizzan horses.

Meeting Topic: Agriculture in the Des Plaines River Watershed
Patty Werner gave a presentation showing the current and future land use projections for the watershed – in particular changes in agriculture in the Des Plaines River watershed. Maps including Illinois Environmental Protection Agency (Illinois EPA) Water Quality Impairments showed agriculture listed as a source of pollution impairments in 4 stream/river segments and 12 lakes in the watershed. Agriculture best management practices (BMPs) play a big role in keeping soil in place and maintaining adequate moisture and nutrients for crop production without polluting waters. Categories of different agriculture BMPs were presented with examples pictured including: best farming practices such as conservation tillage and nutrient management; building soil and reducing erosion with cover crops: managing and treating overland and underground stormwater flows; equestrian facility practices; protecting agricultural streams; and managing invasive species in unfarmed natural areas.

Agriculture Panelists & Discussion

Chris Cubberly, Tempel Organics Supervisor
Chris gave an overview of the Tempel Organics operations, emphasizing the importance of soil based health. Cover crops are a large part of their operations and keeping the soil in place (8 acres of cover crops last season). Some of the cover crops used at Tempel Farms include: ryegrass, hairy vetch, buckwheat and winter wheat. Some of the other activities Tempel Organics implement include:

- Installation of some drainage tile for small areas to maintain food crop productivity,
- utilizing manure and compost in their operations,
- tilling dead plant material back into the ground and
- native buffers are installed on the property

Chris utilizes a farm stand, farmer's market, and whole sales to stores to promote and sell the Tempel Organics produce. He believes that local communities supporting local farms can make the difference and promote more local jobs.

Matt Ueltzen, Lake County Forest Preserve District (LCFPD)
Matt gave an overview of the Lake County Forest Preserve's (LCFPD) Farm Program. Matt presented LCFPD's policy and interim management strategy for continued agriculture use on lands owned by the LCPFD until a permanent District use is implemented. An overview was given on the Farm Program procedures, beginning with the public bid process to the farm license and agreement requirements. Currently, there are 2,508.93 acres of LCFPD Farm Program areas in the watershed; statistics on the land use and average cost per acre is provided in the PowerPoint presentation.

LCFPD is currently involved with an Illinois EPA 319 Grant (Clean Water Act) in conjunction with SMC; Dutch Gap Agricultural BMP Implementation Project. This project involves implementation of agricultural conservation practices such as installing grassed waterways, filter strip, and a drain tile repair on five different farm sites.

Geoff Milne, Agricultural Supervisor Tempel Farms
Geoff oversees 1,800 acres of row crop (corn-soybean rotation) operations, including 150 acres of wheat and 250 acres of hay for the Tempel Lipizzans. The wheat fields are no-tillage operations following soybeans and most of the soybean fields following corn (unless ruts in the field occur), which helps with disease and pest management. Tempel Farms has implemented several agriculture conservation practices, including building dry stone dams, waterways, no-till operations, fixing broken drain tiles and trying cover crops for the first time last fall – clover, ryegrass (re-used from Tempel Organic seeds), hairy vetch and tillage radishes. Some of the problems they face with conservation practices is the cover crops don't always die off or don't kill off too easy for Spring.

Joe Lodesky, Gurnee Farmer and Agrarian Conservationist
Joe is a 5th generation family farmer on the same land as he grew up on (173 years of family ownership). Joe has been in charge of the land operations for 20 years. Joe gave some history of the farming operations, including problems they faced over time; wheat on wheat farming which did fail and putting manure from their cattle on the fields in winter and having it wash away in the Spring. In general, the past farming system used to be all about productivity and using up all of the nutrients; that has changed now. Since then, Joe has done research on conservation farming (referencing books such as "Biological Farmer") and is implementing best practices such as cover crops, repairing drain tiles and focusing on soil health in general. Joe showed some maps of his property and the adjacent properties from 1939 and recent. Those maps showed the land use changes that have occurred.

Larry Leffingwell, General Manager Tempel Farms
Larry gave a brief overview of Tempel Farms and some of the conservation practices that are undertaken on Tempel Farms. Some of the history: Larry shared that the lands Tempel Farms owns keep all of the family names with the properties; and some of the properties have been hosting traditional fox hunts since the 1940s.

It was noted that farming is a lot cleaner than it used to be. Some of the problems he has seen:

- non-native species – Autumn Olive,
- regulation restrictions that may be disincentives for investing in conservation practices, and
- challenges with getting "older" farmers to include more conservation practices (cover crops, no-till in Fall, dry dams).

Larry emphasized that Tempel Farms is trying to transition into responsible row crop operations; with a goal of one day becoming self-sustaining. Larry would like to have more environmental aspects included within the Village of Old Mill Creek Comprehensive Land Use Plan.

Panel Discussion:

- What is No-Till?
  - Not tilling the land at all.
- Do regulations hold you back from doing conservation practices?
  - Yes, if you have land. It is hard to work with certain government entities. Example given was problems that came up with Larry trying to build his hay shed and the drainage requirements.
- Do you feel that future land use for agriculture will be going down? Is that accurate?
  - At some point, but Lake County has two rarities together water and good soil to grow in – compared to California who is running out of useable water.
- Discussion:
  - Point to make that moving food from coast to here when you can have it grown down the street (Farm to Table Concept). Grow Food Here and Eat it Here.
  - Tom Doolittle has had dairy cows for 42 years with a semi-organic farming system. He has done 25 years of no-till farming into corn and soybeans. Overall farmers need to generate enough money to live on and farmland is disappearing.
- How late into the year can you grow to buy and eat locally (Tempel Organics question)?
  - All year. With hoop houses you can continue to grow produce.
- Jim Rospopo (McHenry-Lake USDA Natural Resources Conservation Service) brought up a good reference for the meeting attendees: David Brandt an Ohio farmer emphasizes no-till, cover crops and decreases

fertilizer use (lower costs) to increase organic matter greatly. This has allowed him to get into the fields sooner after a rain event and have more active cover – less ground that needs to be worked.

All of the watershed meeting summaries, agendas and meeting presentations will be posted on SMC's website: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Aaberg	Nathan	Liberty Prairie Foundation
Adam	Michael	Lake County Health Department
Adler	Beth	Des Plaines River Watershed Workgroup (DRWW)
Amidei	Moses	Village of Wadsworth
Anderson	Jim	Lake County Forest Preserve District
Brandes	Ryan	Lindenhurst Environmental Committee
Chefalo	Tom	Lake County Planning, Building and Development Department
Cubberly	Chris	Tempel Organics
Custic	Melissa	The Morton Arboretum / Chicago Region Trees Initiative
Doolittle	Tom	Grubb School Drainage District
Dorn	Brian	North Shore Water Reclamation District
Frank	Brian	Lake County Planning, Building & Development
Garrigan	Michael	Village of Antioch
Geiselhart	Chris	Lake County Audubon / Bull Creek Bull Brook Stakeholder
Geiselhart	Paul	Lake County Audubon
Hart	Sandra	Lake County Board Dist. 13
Heilemann	Rosemery	Lake County League of Woman Voters
Himmelstein	Hal	Resident and Volunteer Steward
Huaracha	Ernesto	Lake County Stormwater Management Commission
Isaacson	Kim	University of Illinois Extension
Kerkman	Randy	Village of Bristol
Laramy	Jeff	Lake County Stormwater Management Commission
Leffingwell	Larry	Tempel Farms
Lodesky	Joe	Gurnee Farmer and Agrarian Conservationist
Maine	Ann	Lake County Board Dist. 21
Martini	Judy	Lake County Board Dist.5
Meents	Haley	Lake County Communications
Milne	Geoff	Tempel Farms
Morthorst	Tom	Village of Third Lake
Moss	Glen	Resident and Volunteer Steward
Neal	Marty	Libertyville Township Highway Dept.
Paap	Kathy	Donald Hey & Wetlands Research Inc
Papa	Jan	Bluestem Ecological Services
Pedersen	Alfred	Resident
Pedersen	Linda	County Board Dist.1
Pfeil	Robert	Libertyville Resident
Riccio	Emily	Tempel Lipizzans
Robinson	Joe	North Shore Water Reclamation District
Rospopo	James	USDA Natural Resources Conservation Service
Scott	Les	Resident and Volunteer Steward
Snyder	Rebekah	Lake County Forest Preserve District
Surroz	Sarah	Conserve Lake County
Ueltzen	Matt	Lake County Forest Preserve District

Last Name	First Name	Organization
Varga	Ernest	McHenry County
Warren	Ashley	Lake County Stormwater Management Commission
Werner	Patty	Lake County Stormwater Management Commission
Weskerna	Ed	LC Soil & Water Conservation District
Wilson	Donald	Resident and Volunteer Steward

DES PLAINES RIVER WATERSHED MEETING AGENDA
CENTRAL PERMIT FACILITY
500 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
FEBRUARY 9, 2017 * 1:00 PM – 3:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about the current state of our lakes, best management practices for lakes, and available lakes management programs within the Des Plaines River watershed.

1. ***Introductions and Announcements***
   a. Introductions-Patty Werner led self-introductions.
   b. Review and accept December 8, 2016 meeting summary-The meeting summary was accepted by consensus.
   c. Mike Adam announced that LCHD will be hosting a hosting an evening meeting on lakes at 7 PM March 7th at the Central Permit Facility.

2. ***"Tell it in Ten" Series: Lake County Health Department (LCHD)***
   a. Mike Adam, Senior Biologist, LCHD, gave a presentation focusing on the history of the health department, specifically as it relates to lakes. It was established in 1956 by referendum and its first annual report described one of its objectives as the conservation of lakes, primarily related to the effect of septic systems and wastewater effluent. Previous sewage treatment discharge to lakes in the past have left legacy pollution problems in lakes such as Long Lake and Third Lake nutrient issues. Septic systems right next to lakes - have created lake pollution problems. Many septic systems are still the original - have not been replaced. Many were designed for seasonal use only. As the county has grown, the Department's range of services has diversified, and the Lakes Management Unit has grown into the Ecological Services division, and conducts swimming pool inspections, vector analysis (mosquitoes and ticks, e.g.), beach monitoring, and lake monitoring. In fact, the Ecological Services division monitoring over 25% of the licensed beaches in Illinois.

3. ***Lakes Management Plans & Programs***
   a. Alana Bartolai, Water Quality Specialist, LCHD presented an overview of Des Plaines watershed lakes and lake programs in the County.
      - Current state of our lakes-94 lakes >6ac. in the Des Plaines watershed in Lake County, a few lake origins: glacial, impounded, borrow pit (excavated). ~60 lakes in DPR watershed have a designated use impairment. Typically, the causes are fecal coliform bacteria, phosphorus, total suspended solids, and aquatic plants (too many or too few). Uses that may be impaired are primary and secondary contact recreation, aquatic life, aesthetic quality, and fish consumption.
      - The lakes are ranked on water quality and the twelve lakes ranked with the best water quality are newer lakes developed within the last 40 years and consist mostly of reclaimed borrow and gravel pits.
      - Source of impairments- Phosphorus impairments may be due to internal loading (seasonal cycling within the lake) or external loading (sources drain into the lake from the surrounding watershed or are inputs from humans). High phosphorus can be problematic as it may lead to excessive aquatic plant growth or algae blooms, which in turn may result in periods of low dissolved oxygen levels, which in turn may result in fish kills. Most lakes in the County have Total Phosphorus levels above 0.05 mg/L (Lake County lakes average 0.068 mg/L overall), which is the Illinois state water quality standard for lakes. Lakes with the lowest phosphorus levels in the Des Plaines Watershed are former gravel pits ("young" lakes with little nutrient accumulation thus far) and some glacial lakes (those that tend to have smaller tributary watersheds). Total Nitrogen >0.3 mg/L may also result in algae blooms, and nitrogen is another nutrient of concern in Lake Co. lakes. Total suspended solids (affecting water clarity), dissolved oxygen (below 5.0 mg/L at 1-foot depth), and pH (>9 or <6.5, may

be affected by alum treatments over the short-term), may also cause water quality impairments. Aquatic plants are an important component of lake health, but too few, too many, or invasive species may cause impairment. IDNR recommends 20-40% lake bottom coverage with aquatic vegetation for healthy fish habitat. E. coli bacteria from avian sources (gulls, waterfowl), septics, and other causes can cause sickness at swimming beaches and result in water quality impairment.

- How-To guide to monitor your lake-Beyond the LCHD monitoring reports, there are other monitoring efforts in which lake communities can participate & gather more data for their lake. Volunteer lake monitoring program is a statewide program, most gather secchi depth, some gather tier 2 water chemistry. There are 23 lakes in the entire Des Plaines Watershed (all IL counties) that participate. Inlet sampling: Forest Lake samples inlets to the lake to determine where pollutants may be coming from. LCHD Lab fees: Chloride = $12/sample; P = $18/sample; TSS = $15/sample. The LCHD is participating in a Lowrance loaner program, where volunteers can collect sonar data to map plant coverage/lake bottom. Beaches serving more than 5 people should be licensed by IDPH. If you suspect a harmful algae bloom (blue-green algae/cyanobacteria), send a photo to LCHD, and they will follow up.
- Lake-related Best Management Practices (BMPs) include watershed (things that can be done upstream of a lake) and in-lake (treatments to the lake itself).
- Lake and Aquatic Management Plans-LCHD is encouraging lake associations to develop and implement lake management plans for identification and adaptive management of priority lake issues. They are creating a template for lake associations to create individual lake management plans. Additionally, the Des Plaines Watershed Plan will include recommendations for specific lakes, so it is important to provide feedback to the planning group on priorities for the next 10 years.

Q-What is the overall condition of lakes in Lake County and how has it changed over the last 25 years or so?

A-Most lakes are impaired, probably not much changed in 25 years. Some impairments such as internal phosphorus loading will be difficult to remove from the list.

Q-Is there a reason or significant difference between lakes that are impaired & not impaired?

A-Many of the lakes that are not impaired are borrow pits/former gravel quarries that are not old enough to have accumulated nutrients or are deep glacial lakes that are somewhat more resistant that shallow lakes.

Q-Does aeration solve impairments?

A-Sometimes, usually they are an attempt to prevent stratification, so if that contributes to impairment, it may be helpful. Third Lake has had decent success with some very large aerators.

4. Lake Association Panelists & Discussion

Mike introduced the panelists and each gave an overview of their lake, lake history, management history, issues, successes, and challenges.

a. Tony Baade, Loch Lomond Property Owners Association-Loch Lomond is a relatively shallow impoundment (max depth ~9 feet) that is about 60 years old with a very good balanced fishery and active monitoring program since the 1990s (fish surveys since the mid-1980s). Non-motorized boating, swimming, and fishing are major uses. The LLPOA is 600 households with annual dues around $300/year. Biggest successes are getting resident volunteers to stick with collecting lake data and finally figuring out some management measures that are successful at goose discouragement. Challenges include management of stormwater system in surrounding watershed and algae blooms (result of legacy nutrients from watershed runoff). The association has a stenciling program in place.

Q-Do you contract with LCHD to monitor inlets?

A-Yes, they monitor 4 inlets to the Lake

Q-Have you considered/tried dredging?

A-No, prohibitively expensive on a lake-wide scale.

b. Greg Denny, Diamond Lake Preservation Alliance-Diamond Lake is a glacial lake that was developed in the 1st half of the 20th century as a resort/summer home area. Since that time, motorized boating has been a major use on the lake, along with fishing, swimming, and non-motorized boating/paddle boarding, etc… Sedimentation is major issue at the moment, along with potential use conflicts between motorized and non-motorized users. Diamond Lake Preservation Alliance was created to provide a forum for lake management, Hey & Assoc. created lake management plan to provide guidance on weed treatments. Impaired for phosphorus, although that seems to be dropping in levels, also invasive species are present (Eurasian watermilfoil, curlyleaf pondweed, zebra mussels, and recently gizzard shad). Muskellunge have been stocked as a predator to suppress gizzard shad cycles. The association has a stenciling program in place.

Q-are there evident user conflicts?

A-the LCHD lake reports indicate the relationship between horsepower and depth required to mitigate resuspension of sediment. No-Wake areas are often disregarded.

c. Rob Flood, Gages Lake Conservation Committee-Gages Lake is a glacial lake with a relatively small watershed. GLCC formed in early 1970s primarily to address aquatic plant management. Boating, fishing, & swimming are major uses, there are no horsepower restrictions on motor boats. The GLCC board is elected by citizens that have lake rights and supported by voluntary dues. This funding model has worked better than fundraising. Most of the budget is spent on aquatic plant management (primarily Eurasian Watermilfoil). Whole-lake treatment has not been as successful as spot treatments in boating and swimming areas. Major challenge is that Gages Lake is unincorporated and GLCC is advisory and has no enforcement authority or ability to pass ordinances that would codify management objectives. Stormwater management in the tributary watershed is also an issue, would like to work with Township & county to reduce stormwater and chloride inputs. Carp are also a challenge along with zebra mussels, the GLCC sponsors a carp fishing derby and works with DNR on a carp electro-fishing removal program. Also sponsor adopt-a-highway cleanup along US 45. Recently re-introduced white water lily. GLCC wants to develop a written lake management plan.

Q-Are milfoil weevils still used and are they successful at control?

A- Some lakes have attempted use, but they can be expensive to stock and success has been limited or cyclical, with weevils being effective some years but not others.

Q-How do you make the carp derby popular

A-Do it on free fishing weekend (don't require IL fishing license) Partner with Wildwood PD and Lions Club and give out prizes. Get about 50 carp out. The 50 carp equate to approximately 84.5 lbs of phosphorus removed due to carp due phosphorus contribution in waste and residual buildup internally.

Q: What do you do with the carp that is removed?

A: Give the carp to some local organic farmers who use as fertilizer.

d. Tom Morthorst, Village of Third Lake, Lakes Commission-Oversees Third & Druce Lakes and is advisory to Village Board. Third Lake is motorized, Druce is non-motorized. Both in VLM program. Third is the deepest inland lake in the county and has the highest # of fish species in the DPR watershed. Mill Creek

runs into Third Lake and received effluent from the Grayslake WWTP during mid-20th century, resulting in nutrient loading to lake. 25% of Village budget is spent managing lakes, most expensive aspect is aeration, followed by plant control and fish stocking. Both lakes are listed as impaired, both have zebra mussels. Runoff is a concern; Village was 1st in Lake Co. to adopt a municipal phosphorus-free fertilizer ordinance. Lakes Commission is now addressing chloride and will be making recommendations to Village Board soon. Replacing Third Lake dam in 2017, will be electronic operation and remote-controlled, should allow preemptive opening of gates to provide more stable water levels during runoff events and reduce shoreline erosion. In 1990s, there was a sequence of massive gelatin-like algae blooms as a result of bath beads, that ultimately required dredging and the installation of large aerators (the size of a truck bed). Capital cost for just aerators was $100,000. Dredging took 2 summers, and combined with aeration has been largely successful in preventing subsequent blooms.

Q-Do all the lakes have public access?

A- Diamond & Gages have fee access, Third, Druce, and Loch Lomond are completely private.

Q-Is there any education at boat launches?

A-Yes, at Diamond & Gages regarding invasive species.

Q-Is there an attempt to educate the younger generation on lake management issues?

A-LLPOA has done some Eagle Scout projects, there are stormsewer stenciling projects, Diamond Lake has sent leaflets to owners. GLCC uses carp derby as an education/outreach opportunity. Obviously, this is an ongoing need.

Q-Village of Vernon Hills is replacing a stormsewer outfall into Evergreen Lake. What are best BMPs at outfall?

A-Probably requires additional engineering study, but some pretreatment of water that can contact vegetation for some time prior to discharging into main lake.

Patty Werner asked the meeting participants to send their own lake stories to her or Ashley Warren so that they can be considered in the plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adam	Michael	Lake County Health Department
Adler	Beth	Des Plaines River Watershed Workgroup (DRWW)
Anderson	Jim	Lake County Forest Preserve District
Baade	Tony	Loch Lomond Property Owners Association
Blake	Kelly	Integrated Lakes Management (ILM)
Bland	Jim	Sierra Club
Broderick	Colleen	Wildwood Park District
Brown	David	Village of Vernon Hills
Bundalo	Dan	Wildwood Park District
Bundalo	Cindy	Valley Lake Committee
Carrier	Kevin	Lake County Department of Transportation
Chefalo	Tom	Lake County Planning, Building and Development Department
Denny	Greg	Diamond Lake
DeVore	Sheryl	Lake County News
Dicke	Faith	Crooked Lake (East Shore)
Flood	Rob	Gages Lake & North Shore Water Reclamation District
Fritz	Dean	Wildwood Park District
Giertich	Al	Lake County Department of Transportation

Last Name	First Name	Organization
Huaracha	Ernesto	Lake County Stormwater Management Commission
Jakubicek	Frank	IDNR -Fisheries
Kippy	Jim	
Kubillos	Sandy	Integrated Lakes Management (ILM)
Laramy	Jeff	Lake County Stormwater Management Commission
Lebbos	Ed	Bollinger, Lach & Assoc., Inc.
Marrs	Joseph	Cedar Crossing HOA
Miceli	Tom	Sierra Club & Lake County Forest Preserve River Steward
Miceli	Kathy	Sierra Club & Lake County Forest Preserve River Steward
Morthorst	Tom	Village of Third Lake
Moss	Glen	Resident and Volunteer Steward
Nelson	John	Lake County Forest Preserve District
Paap	Kathy	Donald Hey & Wetlands Research Inc.
Papa	Jan	Bluestem Ecological Services
Pfeil	Robert	Libertyville Resident
Prusila	Mike	Lake County Stormwater Management Commission
Resnick	Margaret	Mundelein Park District
Robinson	Joe	North Shore Water Reclamation District
Rodrigues	Gabriel	Vernon Hills Park District
Schimanski	David	Village of Deerfield
Sweeny	Ross	Niles Resident
Weik	Ken	Bull Creek Homeowners Assn.
Werner	Patty	Lake County Stormwater Management Commission
Wilson	Donald	Resident and Volunteer Steward
Wolff	Michael	Lake County Grading Company
Zemaitis	Mike	Lake County Department of Transportation
Zink	Sarah	Integrated Lakes Management (ILM)

DES PLAINES RIVER WATERSHED MEETING REPORT
CENTRAL PERMIT FACILITY
500 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
MARCH 9, 2017 * 1:00 PM – 3:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about the Des Plaines River watershed settings and characteristics including impacts of settlement, topography, soils, subwatersheds, drainage systems and current flood problem areas within the Des Plaines River watershed.

1. ***Introductions and Announcements***
   a. Introductions- Ashley Warren & Patty Werner led self-introductions.
   b. Review and accept February 9, 2017 meeting summary-The meeting summary was accepted by consensus.

2. ***"Tell it in Ten" Series: Libertyville-Mundelein Historical Society***
   a. Jenny Barry, President & Local History Librarian, gave a presentation on the Libertyville-Mundelein Historical Society. The Libertyville-Mundelein Historical Society was officially founded in 1955. The Libertyville-Mundelein Historical Society archives are housed in the Cook Home, contain thousands of photographs, postcards, and documents. The Cook Home stands as a wonderful tribute to the dedicated members of the Libertyville-Mundelein Historical Society who continue to embrace a mission of preservation that benefits our extended community.

      Jenny described early settlement history, demographic changes, the development of Libertyville and important historical events along the Des Plaines River in Lake County, IL from present day Half Day to north of Libertyville. She highlighted the backgrounds, exploration and settlement of early European pioneers Daniel Wright, Hiram Kennicott, Ransom & Richard Steele, George Vardin, Elconah Tingley, and Archimedes Wynkoop.

3. ***Watershed Setting & Characteristics***
   a. Patty Werner, Planning Supervisor; and Jeff Laramy, GIS Analyst, SMC outlined the Des Plaines River watershed planning efforts and described the watershed setting and characteristics.

      Patty's presentation included the watershed planning background of Illinois EPA funding secured to cost-share the watershed plan and cooperating with the Des Plaines River Watershed Workgroup (DRWW) and other stakeholders to develop a plan for a watershed that spans two states and two Illinois counties. The presentation gave an overview of the geology of the watershed that shaped the landscape, Pre-European settlement landcover and a brief overview of people in the watershed over time and their relationship to changing the landscape to what we know today. The current and future demographics were outlined with soil and topography maps (basis for watershed, subwatershed and drainage catchment delineation).

      Jeff's presentation on the Des Plaines River subwatersheds – Upper Des Plaines River, Indian Creek, North Mill Creek/Dutch Gap Canal, Mill Creek, Buffalo Creek, Lower Des Plaines River, Bull Creek, Newport Drainage Ditch, Aptakisic Creek and Bull's Brook. The presentation included an overview of the watershed further divided into 422 small drainage catchments based on surface topography, the 131-square miles of the planning area that has storm sewers that transport runoff (56% of the planning area), and the current municipal and township jurisdictions in the watershed planning area. Jeff also demonstrated on-line web applications for the subwatersheds/jurisdictions and the detention basin inventory that are linked on the SMC website.

      Q-Is SMC checking for deed restrictions for the detention basin inventory web application?

A- No, SMC does not look at ownership information, but ownership will be important for implementing maintenance and retrofits included in the watershed action plan.

Q-Is there usually an emergency overflow area noted on the detention basin inventory (out in the field)?

A- Yes, it is a feature that is noted on the field forms and transferred into the web application. Many times, it is not an obvious structure, but instead an area that may be graded lower for overflow.

Q- Are detention ponds (basin) designed for overflow? Example given: It was noted that Route 120 and O'Plaine Road detention pond (basin) water levels always stay low. Where does the water go after it enters the detention basin?

A- Every detention basin has a design capacity for water volume. It is a good thing that the detention basin is not overflowing and the water levels are generally low. The water leaves the basin through an outlet control structure once the water level reaches a certain height or it may infiltrate/evaporate over time.

Q- Does the detention basin inventory map have storm sewer network data?

A- Currently no, but it is a good idea for the future. SMC does not have all the watershed municipality data for the storm sewers. Some municipalities do not have the staff capacity or money to collect that data.

Q- Are the web applications available to the public?

A- They will be after today's presentation. SMC will get the links posted on the website, on the Des Plaines River watershed webpage. http://www.lakecountyil.gov/2376/Des-Plaines-River-Watershed.

b. Sharon Osterby, Water Resources Professional, SMC presented an overview of the flood problem areas update.
Sharon's presentation began with a summary of what the flood problem area update is and why it is necessary, as well as, who received a flood problem area update letter and form in the watershed. The sources of flooding in flood prone areas include riverine flooding, depressional flooding, urban flooding (inadequate drainage) and sanitary sewer flooding (backups). Since 1995 when the first inventory of flood problem areas began, SMC has identified 229 flood problem areas in the watershed. What the 2016 flood problem area update has shown is an increase in flood problem areas and what sources of flooding have occurred.

4. Year 1 Progress Report on DPR Watershed Plan & Discussion

a. Ashley Warren, Water Resources Professional, SMC summarized the Year 1 Progress Report for the Des Plaines River watershed. (see attached report)

SMC questions directed to meeting attendees regarding the watershed planning process and meetings.

Q - What do you (meeting attendees) like or not like about the meetings? What are we doing right? Any improvements?

A- Like the variety in topics, they are good and very educational.

Q - Has anyone worked on designing and implementing stormwater best management practices (BMPs)?

A- A master gardener was present at the meeting, and the University of Illinois- Extension master gardeners maintain the Lake County Central Permit Facility rain garden BMP in front of the building.

Patty - SMC is looking for potential small drainage areas such as lakesheds to develop conceptual designs and budgets for BMPs as part of the Small Watershed Assessment and Action Plan (SWAPP)

pilot program. Anyone interested can contact Ernesto Huaracha, Water Resource Professional, SMC, ehuaracha@lakecountyil.gov 847-377-7715 for more information or to express interest in participating in the program.

Meeting Attendees Questions

Q – Any more thought of directing effluent water from the wastewater treatment plants to Lake Michigan instead of the Des Plaines River to reduce flood flows in the Des Plaines?

A – Not at this time.

Meeting attendee suggestion: SMC presenting to the meeting attendees potential granting agencies that can help fund/resolve our watershed issues.

Comment: SMC is currently compiling a master table of potential funding sources for green infrastructure and other BMPs that will be linked on the Des Plaines River watershed webpage for public use. SMC will also be hosting a meeting later in 2017 on potential funding sources. It was suggested to move this meeting forward on the topic schedule and include representatives of the different funding sources as meeting presenters.

5. ***Next Meeting & Remaining Questions***
   a. Next meeting: April 13, 2017 at Central Permitting Facility, 2nd Floor, 500 W. Winchester Road, Libertyville, IL 60048; 6:00pm -8:00pm. For more information visit: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adam	Michael	Lake County Health Department
Adler	Beth	Des Plaines River Watershed Workgroup (DRWW)
Anderson	Jim	Lake County Forest Preserve District
Baade	Tony	Loch Lomond Property Owners Association
Barner	Allie	Natural Resource Conservation Service (NRCS)
Barry	Jenny	Libertyville-Mundelein Historical Society
Batz	Bill	Prairie Crossing
Berg	Keith	Mundelein Resident
Bland	Jim	Sierra Club
Blank	Richard	Resident
Brady	Kathy	Prospect Heights Resident
Brandes	Ryan	Lindenhurst Environmental Commission
Burke	Michael	Christopher B. Burke Engineering
Flood	Rob	Gages Lake & North Shore Water Reclamation District
Fritz	Dean	Wildwood Park District
Giertich	Al	Lake County Department of Transportation
Grabowski	Cara	Natural Resource Conservation Service (NRCS)
Hedblom	Mary	Mundelein Resident
Heilemann	Rosemary	League of Woman Voters – Lake County
Heinz	John	CBBEL
Hickory	Arlene	Citizens Act to Protect Our Water
Hockman	John	Riverwoods Resident
Huaracha	Ernesto	Lake County Stormwater Management Commission
Johnson	Ken	Conservation Design Forum
Laramy	Jeff	Lake County Stormwater Management Commission
Meier	Robin	Loch Lomond Resident
Miceli	Tom	Sierra Club & Lake County Forest Preserve River Steward
Miceli	Kathy	Sierra Club & Lake County Forest Preserve River Steward
Morthorst	Tom	Village of Third Lake
Moss	Glen	Resident and Volunteer Steward
Nimmo	Al	Midwest Construction Products
Osterby	Sharon	Lake County Stormwater Management Commission

Last Name	First Name	Organization
Pfeil	Robert	Libertyville Resident
Polzin	Tom	Hey & Associates
Prusila	Mike	Lake County Stormwater Management Commission
Robinson	Joe	North Shore Water Reclamation District
Rodriguez	Gabriel	Vernon Hills Park District
Schultz	Sarah	Environmental Action Team
Smith	Brian	AECOM, Tollway
Sobol	Fred	Libertyville Resident
Sweeny	Ross	Niles Resident
Thomsen	Stephanie	Strand Associates, Inc.
Warner	Mike	Lake County Stormwater Management Commission
Warren	Ashley	Lake County Stormwater Management Commission
Weiss	Jeff	Buffalo Creek Clean Water Partnership
Werner	Patty	Lake County Stormwater Management Commission
Wilson	Donald	Resident and Volunteer Steward

DES PLAINES RIVER WATERSHED MEETING REPORT
CENTRAL PERMIT FACILITY
500 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
APRIL 13, 2017 * 6:00 PM – 8:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to provide their input on developing an education and outreach strategy for the Des Plaines River watershed plan that will provide key stakeholders and the public with the knowledge, skills and motivation to implement the plan.

1. ***Introductions and Announcements***
   a. Introductions- Ashley Warren & Patty Werner led self-introductions. Patty introduced Jeff Boeckler of Northwater Consulting as the Des Plaines River Watershed Based Plan consultant. Northwater will be assisting SMC with the completion of the watershed plan.
   b. Review and accept March 9, 2017 meeting summary-The meeting summary was accepted by consensus.

2. ***"Tell it in Ten" Series: Prairie Crossing Charter School***

   Geoff Deigan, Executive Director, Prairie Crossing Charter School (PCCS), gave a presentation on the background on PCCS, their educational awards, and school values. In 1999, Prairie Crossing Charter School was approved by the Illinois State Board of Education. Today, PCCS serves up to 432 students from grades Kindergarten through 8th grade, and the student demand is greater than the capacity the school allows. The school focus is on environmental learning, academic excellence, partnering with parents, and personal responsibility.

   PCCS has received multiple awards for academic excellence, Leadership in Energy and Environmental Design (LEED) awards, green and blue ribbon school awards, National Charter School of the Year, etc… Parents and students choose PCCS for the small school personalized care they receive from teachers and staff, for the "learn by doing" education that inspires their students' performance, and for the focus of keeping the environment at the center of everything they do.

   Q- Is there a waiting list for PCCS?

   A- Yes, the maximum number of students accepted into the school is 432. In 2016, there were 66 children on the waiting list – there is more demand than supply.

   Q- Is there an Illinois network of schools that focus on the environment?

   A- No, but there is a green schools network out of Madison, Wisconsin. PCCS hopes that all schools in the area will be "green, healthy, sustainable" by 2040.

   Q- What is your (Geoff's) background with PCCS?

   A- Geoff's 2 daughters attended the school the 2nd year it was open. In 2004, Geoff volunteered as the manager for the creation of the Comstock, Carson and Gym buildings, allowing PCCS to expand into a full K-8 public school. He served on the School Board in 2007, and during his 4-year tenure as Chair, he led an engaged, passionate and focused team of Directors with strong results. In 2013, Geoff returned as Executive Director to elevate the school's mission, vision and culture. Geoff's two daughters (PCCS Alumni) currently attend University of Iowa and University of Madison. 85% of PCCS alumni go on to Honors Courses in high school – it is PCCS's desire to have alumni that are well rounded, responsible people.

3. ***Education & Outreach (E&O) Strategy Topics***
   a. Ashley Warren, Water Resource Professional, & Haley Meents, Communications Specialist, SMC presented background information for developing an education and outreach strategy that will include

identification of education and outreach topics, the provider and vehicle(s) for education, the target audience(s) and some sample messages that may be used for outreach.

4. Breakout Session: E&O Strategy – Target Audiences, Methods/Vehicles, & Potential Messages

Attendees were divided into 3 groups for a breakout session to gather input for the E&O Strategy. SMC staff led an education and outreach planning exercise that involved the group to review draft E&O Strategy components provided by SMC, and brainstorm additional ideas for the education and outreach strategy. SMC will summarize the stakeholder input and present a draft E&O Strategy for implementing the watershed plan at a later date.

5. Next Meeting & Remaining Questions

a. Next meeting: Green Infrastructure & Watershed Land Use, May 11, 2017 at Central Permitting Facility, 2nd Floor, 500 W. Winchester Road, Libertyville, IL 60048; 1:00pm - 3:00pm. For more information visit: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Buckardt	Nan	Lake County Forest Preserve District
Burger	Jeanette	Long Grove Resident
Charland	Gloria	Sierra Club
Davis	Eileen	Lake County Forest Preserve District
Deigan	Geoff	Prairie Crossing Charter School
Denny	Greg	Diamond Lake Preservation Alliance
Godshalk	James	Lincolnshire Resident
Gurak	Ron	Long Lake Improvement & Sanitation Association
Heilemann	Rosemary	League of Woman Voters – Lake County
Hickory	Arlene	Citizens Act to Protect Our Water
Huaracha	Ernesto	Lake County Stormwater Management Commission
Jensen	Lynora	Master Naturalist & Forest Preserve of Cook County volunteer
Johnson	Chris	Sierra Club
Laramy	Jeff	Lake County Stormwater Management Commission
Lundy	Marj	Lincolnshire Resident
Meents	Haley	Lake County Stormwater Management Commission
Miceli	Tom	Sierra Club & Lake County Forest Preserve River Steward
Miceli	Kathy	Sierra Club & Lake County Forest Preserve River Steward
Mitros	Mary	DuPage County
Moss	Glen	Resident and Volunteer Steward
Nelson	Anna	Valley Lake Wildwood Park District Committee Member
Raube	Dennis	Lindenhurst Resident
Warren	Ashley	Lake County Stormwater Management Commission
Werner	Patty	Lake County Stormwater Management Commission
Wilson	Donald	Resident and Volunteer Steward

DES PLAINES RIVER WATERSHED MEETING REPORT
CENTRAL PERMIT FACILITY
500 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
MAY 11, 2017 * 1:00 PM – 3:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about the Des Plaines River watershed land use, impervious cover and regional scale green infrastructure (GI) inventory. Our objective is to review and finalize criteria that will be used to prioritize open parcels for inclusion in a Des Plaines watershed green infrastructure network.

1. ***Introductions and Announcements***
   a. Introductions- Patty Werner, Planning Supervisor, Lake County Stormwater Management Commission (SMC) led self-introductions. Patty explained we have completed Year 1 of this 319 grant cycle and we are moving into Year 2 of the grant cycle, which will involve completing the watershed based plan with the assistance of Northwater Consulting. Northwater Consulting will be compiling the pollutant load modeling and watershed action recommendations for the planning area. The draft watershed based plan is due to be completed January 2018.
   b. Review and accept April 13, 2017 meeting summary - The meeting summary was accepted by consensus.

2. ***What is Green Infrastructure?***
   a. Patty Werner gave a brief presentation on what green infrastructure is, the different types of green infrastructure and green infrastructure's role in watershed planning. The two types of green infrastructure are site/local scale green infrastructure that include smaller scale in best management practices and the regional scale green infrastructure which looks at the network of green infrastructure areas/corridors (hubs). Green infrastructure is identified as a priority topic by watershed stakeholders and is an important component of "quality of life" in the watershed having significant influence on water quality, flooding, natural resources and our economy.

3. ***"Tell it in Ten" Series: Lake Co. Green Infrastructure Model & Strategy (GIMS)***
   a. Jim Anderson, Director of Natural Resources, Lake County Forest Preserve District (LCFPD), gave a presentation on LCFPD's (Lake County & surrounding areas) Green Infrastructure Model and Strategy (GIMS) results. GIMS supports consistent planning and implementation efforts toward a common vision for Lake County by being available for use for watershed based plans, comprehensive plans (etc.…). GIMS was reviewed by a local advisory group.

      Jim reviewed the benefits of GIMS and its importance to people (quality of life, space to grow food, health benefits) and the environment (enhancing ecosystems and creating more biodiversity). GIMS provides a framework for identifying conservation opportunities for the county's major landscape types – woodlands, wetlands, etc. and for considering strategic habitat conservation areas, enhancement areas and ecological complexes. As part of the modeling, GIMS estimated annual benefit values for green infrastructure for carbon storage, groundwater recharge and water purification ecosystem services.

      Q - Can the public get to the GIMS data (or maps)?

      A- No, but a lot of the GIMs data is in Lake County's GIS map system (open to the public). SMC is using some the GIMs data for the watershed planning analysis. The GIMS data really requires a higher-level skill set with the specific software to interpret the data, but if there is a request made to LCFPD to share the data they are happy to do so.

Q- Is LCFPD willing to share the ecosystem services slides in your presentation?

A- Yes, we can make that available to the public – SMC will post the presentation on the Des Plaines Watershed Webpage on their website. Link to the website (see presentation slides).

Q- Has the LCFPD aggregated the numbers (for the ecosystem services annual benefit values) for just the Des Plaines River watershed?

A- No, not yet, but it would be interesting to see – SMC will use the data from LCFPD to aggregate the data.

4. Watershed Land Use, Impervious Cover, & Regional Scale GI Inventory

a. Ernesto Huaracha, Water Resource Professional, SMC gave a presentation on Des Plaines River watershed current and future land use and its effects on impervious cover.
   - Most of the Des Plaines River watershed land use is residential, followed by agriculture and open space (private/public). Looking at the predicted future land use changes, agriculture and open space areas appear to decrease the most compared to other land uses and residential and commercial/retail areas have the highest increase in land use area.
   - The future land use data sources indicate that residential land use continues to be the largest land use within the planning area and that agriculture, forest, grasslands, open space and wetlands will be converted to further urbanized land uses.
   - Impervious cover is an artificial surface that no longer allows water to enter the soil, which includes buildings, roads, parking lots, sidewalks and compacted open areas. The amount of impervious cover is important to watershed planning because impervious cover results in an increase in stormwater runoff, increased nonpoint source pollution in stormwater flows and impacts to local water quality and aquatic life.
   - SMC is using a combination of planimetric (building, road and parking lot outlines) and the national land cover database (NLCD) datasets for analyzing impervious cover. Utilizing both datasets creates a more realistic understanding of urban development impacts and aids in development of local and regional green infrastructure planning.
   - Based on those datasets, SMC has been able to determine impervious cover percentages (low-high) for each of the Des Plaines River watershed subwatersheds. Due to some subwatersheds being more highly developed such as Aptakisic and Buffalo Creek watersheds, they have a higher combined impervious cover (30-100%). Newport Drainage Ditch and North Mill Creek/Dutch Gap Canal have the highest ratio of undeveloped to developed land, more than 70% of the subwatershed is undeveloped (further details provided in the presentation).
   - For comparative purposes, impervious cover analysis from 2001-2011 indicated 450 acres per year in the watershed were converted from pervious land to impervious cover due to various land use changes.

Q- Does SMC look at permeability of certain soils (ex: sand/gravel vs. clay has low permeability) when assessing the runoff characteristics of the watershed? Also, looking at climate change; soils are presumed to be drier and during rain events, these soils may not infiltrate the water quickly and may lead to increased stormwater runoff.

A- Soil characteristics will come into consideration when assessing green stormwater infrastructure projects, selecting areas for projects keeping soil types in mind. Example: Central Permitting Facility front rain garden and back rain garden got compacted during construction and ponded for the first few years (continuously, except during drier periods of the year). Even though those are higher clay soils, the native vegetation planted in those areas have helped decrease the ponding and increase permeability through the deep root establishment/growth. So, there is a difference even with a clay soil with native vegetation and deep root structure, which is far more permeable than a concrete or asphalt parking lot. So, the

differences between soil types are important, but there is a notable difference between different soil types and impervious surfaces.

Climate Change: SMC uses state rainfall models. What we see is the differences in the number and intensity of rain events. Although the rain events can be short in duration, they may generate higher amounts of rainfall runoff, resulting in flooding of stormwater management systems that aren't designed to accommodate those amounts of precipitation. Climate change is a significant unknown variable. How it influences the work we do is through the rainfall duration curves adopted by the agencies that look at climate. These are incorporated into any models that are done in relation to stormwater runoff.

Q- Lake County farm and tiles and their influence. How do you account for this?

A- These are in essence storm sewer systems in agriculture areas. Farmland is still pervious area because it is holding some water, and providing some recharge, but runoff is transported off-site through tiles and ditches. It may be comparable to a underdrain system in a constructed bioinfiltration system, which is – different from a natural forested area for example where trees are absorbing the precipitation or evapotranspiration occurs. So, the natural areas are the most beneficial for managing precipitation, followed by agriculture, then urbanized areas would be the least beneficial. Noted: when farmed areas are over-tilled (worked) there can be a hard pan created in the soil layer, where water does not infiltrate as well.

Q- How does SMC) look at turf grass? Have seen studies that show turf grass infiltrates very little (almost like impervious cover).

A- The impervious cover dataset accounts for the turf grass areas. The NLCD dataset will pick up the turf grass through the 10-25% impervious cover dataset, in theory the water will infiltrate some but can still have stormwater that runs off pretty fast.

b. Jeff Laramy, GIS Analyst, SMC gave a presentation on how SMC develops the green infrastructure inventory using a parcel based analysis. SMC maps the open and partially open (publicly/privately owned) parcels in the watershed, identifies whether they are and protected or unprotected and open land, and then applies a list of prioritization criteria to rank green infrastructure. A binomial system is used. If a parcel receives one point for each criterion it meets. The parcels are then aggregated by functional benefit related to the watershed plan goals (water quality, flood mitigation, natural resources et.). There are a total of 116,334 parcels in the watershed planning area that will be evaluated based on 15 different prioritization criteria. Most of the process is semi-automated in GIS, however, we still need to go through and visually inspect and make corrections using aerial photography.

5. Review & Finalize Criteria for Prioritizing Parcels for GI Inventory

a. Mike Prusila, Water Resource Professional, SMC presented and explained the draft parcel prioritization criteria for the Green Infrastructure analysis. The criteria are used to prioritize open and partially-open parcels as described by J. Laramy in 4.b, above.

b. The group agreed that the following criteria should remain unchanged in the analysis: Parcels that intersect the FEMA Special Flood Hazard Area (1% annual chance floodplain); Parcels within catchments with less than 1 square mile of drainage to a "channel" (as defined in the WDO); Parcels that intersect a wetland polygon as identified the Wetland Restoration and Preservation Plan; Parcels within a 0.5 mile radius of a flood problem area; Parcels within 100 feet of a watercourse or lake (lakes 6 acres or greater); Parcels intersecting the non-point source pollutant "hot spot" catchments, as determined by the pollutant loading analysis; Parcels adjoining to or including forest preserves, land trusts, township, and privately and publicly protected open space (incl. IL Natural Area Inventory sites and Nature Preserves); Parcels adjoining to or including high quality wetlands (ADID); Parcels adjoining to or including threatened and endangered species sites; parcels with prime agricultural soils; parcels with highly erodible soils; Parcels greater than

5 acres; Parcels within the GIMS Ecological Complexes; Parcels that connect existing protected open space areas.

c. The group had questions or comments on the following: There was a suggestion to determine how the analysis is affected if adjacent hydric inclusions are added to the criteria to select parcels adjoining to or including at least 2.5 acres of drained hydric soil (i.e., non-wetland hydric soils). SMC will look into this, but in past analyses, hydric inclusions have covered large areas of watersheds and have not added great value to this kind of prioritization. There were suggestions to consider highly permeable soils (groundwater recharge value) and oak ecosystem soils. SMC has previously investigated how to include highly permeable soils in this type of analysis and there is not general agreement from experts in the field on a good data set to use. SMC will include the oak ecosystem soils in the criteria, if provided the data.

Q-Why aren't the criteria weighted?

A-For one, the stakeholder group is diverse, so desired weight of a particular criterion may differ among stakeholders. Secondly, if all criteria are weighted equally, it is clear that the analysis is evaluating all parcels objectively.

6. Next Meeting & Remaining Questions

a. Next meeting: Watershed Funding Opportunities & Jurisdictional Coordination: June 8, 2017 at Central Permitting Facility, 2nd Floor, 500 W. Winchester Road, Libertyville, IL 60048; 1:00pm - 3:00pm. For more information visit: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adler	Beth	Des Plaines River Watershed Workgroup
Anderson	Jim	Lake County Forest Preserve District
Baade	Tony	Loch Lomond Property Owners Association
Batz	Bill	Prairie Crossing Charter School
Charland	Gloria	Sierra Club
Chung	Fred	Village of Libertyville
Doyle	KC	Cook County Department of Environment & Sustainability
Dutton	Meghan	Sierra Club
Heilemann	Rosemary	League of Woman Voters – Lake County
Huaracha	Ernesto	Lake County Stormwater Management Commission
Laramy	Jeff	Lake County Stormwater Management Commission
Leach	Nick	Village of Gurnee
Miceli	Tom	Sierra Club & Lake County Forest Preserve River Steward
Miceli	Kathy	Sierra Club & Lake County Forest Preserve River Steward
Moss	Glen	Resident and Volunteer Steward
Papa	Jan	Bluegrass Ecological Services
Pfeil	Bob	Libertyville Resident
Prusila	Mike	Lake County Stormwater Management Commission
Raube	Dennis	Lindenhurst Resident
Rice-Davis	Chelsey	Congressman Schneider's Office
Rodriguez	Gabriel	Vernon Hills Parks
Schilling	Steven	Deigan & Associates
Smith	Brian	AECOM/Tollway
Soliz	Maggie	Applied Ecological Services
Sweeny	Ross	Citizen
Talbett	Michael	Village of Kildeer
Thomsen	Stephanie	Strand
Werner	Patty	Lake County Stormwater Management Commission
Wilson	Donald	Resident and Volunteer Steward

DES PLAINES RIVER WATERSHED MEETING REPORT
LAKE COUNTY DEPT. OF TRANSPORTATION
600 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
JUNE 8, 2017 * 1:00 PM – 3:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about the Des Plaines River watershed grant funding opportunities and how to leverage those funds for water quality, flood damage reduction, natural resource restoration projects, and environmental education programs.

1. ***Introductions and Announcements***
   a. Introductions - Ashley Warren, Water Resource Professional, Lake County Stormwater Management Commission (SMC) led self-introductions. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the May 11th, 2017 meeting summary without changes by consensus of the group.
   b. Mike Warner, Executive Director, SMC gave a brief congratulatory speech to announce that Patty Werner, Planning Supervisor, SMC will be retiring June 30, 2017. Congrats Patty!

2. ***"Tell it in Ten" Series: Lake County Forest Preserve Grant Streambank Stabilization Projects***
   a. Leslie Berns, Manager of Landscape Ecology, Lake County Forest Preserve District (LCFPD), gave a presentation on two of LCFPD's grant funded stream and creek restoration projects. One of the projects was the Kildeer Creek Restoration project in the Heron Creek Forest Preserve; partially funded by Openlands, Illinois EPA and SMC. This project included the restoration of 3,700 feet of channel by installing best management practices such as stone toe and cross vanes (including a step pool technique) and utilizing some on-site trees as stabilization measures. The second project highlighted was Elm Road Woods Tributary Restoration Project in the Captain Daniel Wright Woods Forest Preserve; partially funded by a Watershed Management Board (WMB) grant. This project included a natural channel restoration of 2,200 feet of channel by installing timber cross-vanes (and single timber vanes), erosion control blanket and native vegetation BMPs to stabilize the creek. This project was focused on stabilizing the creek and adjacent areas through natural measures to help blend into the landscape and minimize disturbance with heavy equipment.

      Q – Is Kildeer Creek a flashy stream? Why was the stone toe method selected at this site? Was it due to the volume of stream flow through the site?

      A- The use of stone toe is not solely determined based on the volume of stream flow, it is also effective when a steeper stream channel gradient increases the velocity of the flow in the channel. Heron Creek has a lot of erosive power due to its steep slope or gradient. The step pool method was also used in certain areas where the gradient was higher. The stone toe practice is installed around the outside curves (bends) of the creek because of the erosive force of the water in these bends. Water will churn and dig down below the stone along the outside curves, so the stone toe needs to be installed deep to reduce erosion (and sheer stress). There are some places that stone toe will work better than others, you need to vary the rock sizes used in the practice to help hold the rocks together.

      Q - What do you think the lifespan of the logs used for vanes and cross vanes at Elm Woods will be?

      A- The Elm Road Woods project was experimental by utilizing on-site materials. White oak was used. It was estimated that the top log layer of the cross vanes would be exposed to more air and will likely result in faster decomposition; it is estimated to have a lifespan of approximately 20 years. The second (bottom) layer of timber cross vanes is estimated to be slower to break down (being submerged longer in water) and is estimated to have a lifespan of 30-40 years. The hope is that the area will stabilize itself within the lifespan of the logs. .

      Q- Was the Elm Road Woods project a natural system?

A- LCFPD thinks that area may have been a very small ephemeral stream, based on the land form.

Discussion:

- Based on experience, getting equipment and materials into some of the sensitive restoration sites can be difficult and destructive. This was the case for the Elm Road Woods project, so local on-site resources (logs) were utilized. Factors to consider when designing restoration projects for the future include climate change which could result in heavier and larger storm events than in the past, which will affect discharge rates (flows).
- What people should expect when planning projects like these.
    1. possible permitting – Army Corps of Engineers (ACOE), SMC Permits, Illinois EPA
    2. do the leg work for design and engineering and getting to know your project area.

3. How to Get Your Watershed Project Funding Ready & SMC Grant Programs?

a. Patty Werner gave a brief presentation on getting your watershed project ready to fund by explaining the steps involved in getting your project ready to apply for funding. Some of the steps involved securing technical assistance, engaging participation with project partners, developing your concept design (30% of design should be completed), having a cost estimate for the project and writing a scope of work with a schedule/timeline. These steps are crucial to putting together a successful grant application. After these steps, finding potential funding sources and an administrative agent are important to start writing the grant application. Some recommendations before investing time in the grant writing process would be to make sure you are familiar with the grant program requirements, contacting the program contact/staff to be sure your project is a good match, and securing someone who is comfortable writing grant applications.
Q – What if a community or stakeholder has a new project idea for a 319 grant project and the watershed based plan is already completed? Do you have a process for amending the DPR Watershed based plan?

A- Currently SMC is soliciting project ideas now to incorporate projects or action plan recommendations and updates into the watershed based plan. The Illinois EPA stated that local groups (planning committees) can use websites to make changes or updates to the watershed based plan. A watershed planning committee can acknowledge new techniques (or projects) and use the plan as a living document to make amendments. Please note: a potential 319 project has a much higher priority if it is referenced in an approved watershed based plan for the grant application, therefore any projects not in a watershed based plan during the interim 10-year period (every ten years the watershed based plans need to be updated) should get assigned an action ID number (site specific action recommendation) and inserted into the watershed based plan.

b. Patty gave a presentation on SMC funding programs available. The available grants include watershed management board grants (WMB) and watershed management assistance grants (WMAG), stormwater infrastructure repair fund (SIRF), coordinating watershed projects and "regrants" funding from state and federal grants (including Illinois EPA 319 grants).In some instances, SMC takes the project lead and develops project funding for IEMA/FEMA hazard mitigation (structure buyouts) and in partnership w/locals on drainage system restoration projects. These grant opportunities vary in amount , cost share requirements, project purpose and SMC's roles in the programs. Please contact SMC staff for more information.

4. Funding Organization Panelists

a. Christine Davis, Illinois Environmental Protection Agency (Illinois EPA)
    - Chris gave a presentation on Illinois EPA's Nonpoint Source (NPS) Pollution Program (Clean Water Act Section 319). The NPS Pollution Program created a watershed priorities map to help determine high priority watershed projects (for both planning and implementation) that rotates watershed priorities each fiscal year within a 5-year cycle.

The grant projects typically range from $100,000 - $1.2 Million for projects that implement watershed-based plans and TMDLs. There is a minimum of 40% local cost share for 319 grants. Chris went through the grant application process for a 319 grant and the documentation that would be required and processes to expect. Chris introduced the Grant Accountability and Transparency Act (GATA), which is a new addition to the grant application process that is required for state grant assistance and creates a uniform budget template.

b. Joseph Kratzer, Metropolitan Water Reclamation District of Greater Chicago (MWRD)
   - Joe gave a presentation on MWRD's stormwater management program. This program is primarily focused on flooding issues in Cook County and has several programs (services include funding and/or technical assistance) that range from designing projects, to constructing projects and creating partnerships with local communities. MWRD's primary stormwater management activities include a capital improvement program to address regional stormwater problems and implementing comprehensive uniform stormwater regulations to ensure that future development and redevelopment does not exacerbate flooding. Some of the programs offered include Stormwater Phase I (DWP) & II Projects, Green Infrastructure (i.e. free rain barrel program) and Flood-Prone Property Acquisitions (voluntary buyouts). Some projects MWRD has been a part of include regional streambank stabilization projects, flood control projects, localized detention, upsizing critical storm sewers/culverts, pump stations, establishing drainage ways, etc.

c. Nancy Williamson, Illinois Department of Natural Resources (IDNR)
   - Nancy Williamson gave a brief overview of the GATA program and the step-by-step process to fill out the new forms and appropriate information to include. Nancy also provided an update for currently suspended IDNR grant programs. Some of the federally funded grant programs are available including Land and Water Conservation Fund (LWCF), Recreational Trails Program (RTP). It is uncertain how GATA requirements will affect small grant programs such as habitat/pheasant and schoolyard habitat grants.

For additional information on each grant program please review the meeting PowerPoint presentations that can be found here: http://www.lakecountyil.gov/3655/DPR-Watershed-Meeting-Summaries.

Panelist Q&A:

Q – How do you incorporate monitoring efforts into a 319 grant? The 319 grant is a 2-year cycle but monitoring efforts can take more than 2 years.

A- Illinois EPA does have grant recipients that are performing monitoring in a phased approach. They submit grant applications with components of the Phase I that they will complete and on the next cycle for the 319 grants will move onto Phase II. The Illinois EPA is considering accepting project proposals for a design, engineering and permitting (Phase I) of a project that will result in a Phase 2 proposal for project implementation in the next year/cycle. The design only grants would be considered a lower priority.

Q- Can an applicant get reimbursed for design work?

A- Reimbursement for design work can only happen during the approved grant time period (not for design work completed before the grant is awarded). If you have a design with a shovel ready project it tends to give the applicant a higher chance of getting awarded a 319 grant compared to a similar project without a design ready. In some cases, a WMB/WMAG grant can help with the costs of design work for a project.

Comment/Discussion: clarification on the comprehensive watershed based plan SMC is completing. Concerns about Long Lake and getting project implementation and watershed based plan funding for Squaw Creek watershed, which includes Long Lake within the Upper Fox River Watershed.

A- Lake County SMC is currently working on an umbrella watershed based plan for the Des Plaines River Watershed. Currently, not every watershed or subwatershed in Lake County

has an approved or up-to-date watershed based plan, but SMC has a goal in the future to have a watershed based plan for all the watersheds in the County. The Illinois EPA's TMDL report writing contractor is compiling an Upper Fox River Watershed Total Maximum Daily Load (TMDL) Report (completion date unknown), which may be eligible as a watershed based plan (The Illinois EPA is not sure it will contain the watershed based plan components). This would make the Upper Fox River watershed a higher priority for project funding if the TMDL is approved as a watershed based plan. Watershed stakeholders can directly apply to the Illinois EPA for completing a watershed based plan for their watershed or stakeholders can work with SMC to apply for a watershed based plan or project implementation. The advantage of utilizing SMC is they can help navigate project applicants through the grant documentation process and grant administration. By applying for a 319 grant through SMC, the cost share local match requirement becomes 50/50 because SMC uses the additional 10% as match for their administrative assistance.

Q- When will Squaw Creek be a high priority for 319 funding?

A- (Unknown at the meeting) The Upper Fox River (Squaw Creek) will be a priority watershed for IL EPA planning in 2019.

Q- Are there any MWRD funding or projects focused on water quality? Are any of the updates to the Cook County watershed plans considering water quality?

A- Although MWRD projects are mainly focused on flood control, to a certain degree MWRD tends to implement green infrastructure in their projects (which can improve water quality). Yes, 4 out of 6 of the MWRD detailed watershed plans are being updated to watershed based plans with the 9 US EPA required elements.

5. Next Meeting & Remaining Questions

a. Next meeting: Transportation: July 13, 2017 at Lake County Department of Transportation, Conference Room A, 600 W. Winchester Road, Libertyville, IL 60048; 1:00pm - 3:00pm. For more information visit: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adler	Beth	Des Plaines River Watershed Workgroup
Anderson	Ders	Openlands
Baade	Tony	Loch Lomond Property Owners Association
Burger	Jeanette	Buffalo Creek Resident
Beilfuss	Ed	Carillon North Homeowner Association
Berns	Leslie	Lake County Health Dept. (LCHD)
Bland	Jim	Sierra Club
Brady	Cathy	McDonald Creek
Burke	Caitlin	Gewalt Hamilton
Caldarella	Christie	HR Green
Clayton	Michael	Riverwoods Preservation Council
Charland	Gloria	Sierra Club
Comber	Donna	Carillon North Homeowner Association
Davis	Christine	Illinois Environmental Protection Agency (Illinois EPA)
Dorn	Brian	North Shore Water Reclamation District
Doyle	K.C.	Cook County Dept. of Environmental Control
Flood	Rob	Gages Lake; North Shore Water Reclamation District
Frable	Erika	Hawthorn Woods
Gurak	Ron	Long Lake Improvement & Sanitation Assn.
Heilemann	Rosemary	League of Women Voters
Hickory	Arlene	Citizens Act to Protect Our Water
Huaracha	Ernesto	Lake County Stormwater Management Commission
Johnson	Chris	Sierra Club

Last Name	First Name	Organization
Kessen	Jay	AMEC Foster Wheeler
Kowalski	Marian	Wildwood Park District
Kratzev	Joe	Metropolitan Water Reclamation District of Greater Chicago
Kuntz	Darrell	Lake County Div. of Transportation
Kuykendall	Scott	McHenry County
Leach	Nick	Village of Gurnee
Lofstrom	Michael	Vernon Township
Maldnad Zarda Pineda	Jackie	Round Lake Park Resident
Morthorst	Tom	Village of Third Lake
Neilson	April	Sierra Club/ ILM Environments
Olson	Darren	Christopher Burke Engineering, Ltd.
Pfeil	Robert	Libertyville Resident
Popelle	Joe	Long Lake Improvement & Sanitation Assn.
Prusila	Mike	Lake County Stormwater Management Commission
Raffel	Larry	Wheeling Park District
Reed	Bud	East Skokie Drainage Dist.
Ringa	RJ	Long Lake Improvement & Sanitation Assn.
Robinson	Joe	North Shore Water Reclamation District
Rodriguez	Gabriel	Vernon Hills Park District
Sauter	Holly	Metropolitan Water Reclamation District of Greater Chicago
Soliz	Maggie	Applied Ecological Services
Sweeney	Ross	Niles Resident
Takizana	Homnomi	Openlands
Vella	Steven	Libertyville Public Works
Weiss	Jeff	Buffalo Creek Clean Watershed Partnership
Williamson	Nancy	Illinois Department of Natural Resources (IDNR)
Wilson	Don	Lindenhurst Resident & Volunteer Steward
Zemaitis	Mike	Lake County Div. of Transportation

JOINT MEETING OF THE
DES PLAINES RIVER WATERSHED WORKGROUP (DRWW)
AND DES PLAINES RIVER WATERSHED PLAN (DPR PLAN)
AUGUST 17, 2017 1:30-4:00 PM
LIBERTYVILLE VILLAGE HALL, SECOND FLOOR
118 W COOK STREET, LIBERTYVILLE, IL 60048

MEETING MINUTES

1. ***Introductions and Announcements*** *– Brian Dorn, North Shore Water Reclamation District (NSWRD) and DRWW President, called the meeting to order at 1:30 pm, conducted introductions, and provided an overview of the meeting.*
2. ***No previous meeting minutes to approve – May meeting was canoe outing***

3. ***Public Comment.*** *None.*
4. ***Des Plaines River Watershed Planning Meeting –*** *Ashley Warren introduced the Des Plaines River watershed planning process and asked meeting attendees to review the June 8th, 2017 meeting summary.*
   a. ***Approval of 6/8/17 Meeting Summary by Consensus.*** Meeting summary was approved by consensus.
   b. ***DRWW and Historical Monitoring Data. (Note: All speakers powerpoint presentations are available at DRWW.org/meetings/meeting presentations &*** http://www.lakecountyil.gov/3655/DPR-Watershed-Meeting-Summaries***)***
      i. ***Brian O'Neill – Burns and McDonnell.*** *Brian presented a powerpoint presentation regarding the importance of flow data, how to measure flow and results of data collected in the Des Plaines Watershed in 2016-2017.*

Q - Will the data you are collecting be used in the plan?
A – Yes.

Q – With high rain events, that may continue to increase, how do you account for that?
A – That is a challenge for any of these types of relationships.
Comment: This flow monitoring is not intended to characterize flood relationships.

Q – If you have a narrow stream channel and then during flooding it is very wide, wouldn't you need 2 curves to determine flow?
A – Yes.

Q – If you could estimate what was the baseline discharge from the Des Plaines River, what would that number be?

A – I have not done that calculation.

Q – Do you do any measurements on groundwater?
A – No.

ii. ***Mike Prusila – Lake County Stormwater Management Commission*** *gave a powerpoint presentation on historical water quality/sediment and fish/macro/habitat data for the Des Plaines River Watershed. No questions.*
iii. ***Chris Yoder – Midwest Biodiversity Institute (MBI)*** *gave a powerpoint presentation of DRWW water quality/sediment, fish/macro/habitat data collected in 2015-2016.*

Q - What the quality of the water coming from Wisconsin into Lake County, IL?
A – The 3 most northern sampling locations in Lake County had a lack of fish/macros. The water up there is more like a wetland than a river, it is somewhat stagnant.

Q – There were some Polycyclic Aromatic Hydrocarbons (PAHs) detected over the limit in the Des Plaines River (mainstem), but good macroinvertebrate numbers, can you comment on that?
A – The macroinvertebrate numbers were good, but the fish diversity was not. The biology (fish and macros) is going to trump the pollutants, which means that if we can improve the fish diversity we will not have to worry about the pollutants.

Q – There are a lot of lakes in the watershed. Pollutant loads become a critical issue for evaluating lakes. More frequent collection of data would need to be done to evaluate lakes effectively. Any comment on this over the long haul?
A – I would generally agree with you, if that's what your goal is.
Mike Adam – The DRWW Lakes Committee will be looking at this and deciding if we can resolve this through modeling or if we need more data.
Chris Yoder – And that's a different goal or end point – a trophic state, which is based on water clarity, which is different than the one we are going for. The goal or end point we are going for is a high IBI number – which means there are healthy levels of fish and macroinvertebrates. If the IBI = 41 then the stream reach is considered to not be impaired.

Q – Comment on their being a bias in the metrics against headwater streams (tributaries) vs. Des Plaines River proper. Tributaries cannot have as many fish species as the river.
A – Illinois Indexes of Biological Integrity (IBI) is for wadeable streams, but it worked pretty good, so I'm not sure if this is a major issue. I agree with your concern, but I don't think it's quite that bad. We are more concerned that almost none of the 70 sites are meeting the IBI, which means it may be set too high or this regions' calibration is incorrect. MBI will have to do due diligence on that. We look at habitat sensitive species.

Q – One of the first slides says you are sampling based on potential aquatic uses, but most of your talk was about meeting state criteria, not aquatic use. It seems like all the push is to go back to a pre-settlement-type of condition.
A – No. The general use goal incorporates the aftermath of human development, finding the best of what's left, and calibrating the criteria to that. This is not a pristine goal. Lower DuPage at Shanahan Dam scores a 60 (highest score, but fish cannot re-establish above the dam. The species of fish you need to boost the IBI are not present above the dam. We may have to transport fish around the watershed.

Q – Why is the aquatic use above the dam the same as below the dam?
A – The dam is an impairment, and we need to fix that, but the problem is that not every impairment is not able to be fixed. We're not going to lower the bar due to socio-economic issues that cannot be resolved. The system starts from a reasonable statement of what a restored condition would look like and it's not asking for presettlement conditions. But there is a place to put them if we ever find them on this yardstick, which is important so you can go and protect those places.
Comment: Restorability helps us to determine what actions to take.

Q – One of the big negative impacts was chloride levels and siltation. You said reduction of road salt was a goal to get chloride levels down, what about silt? Does the silt come from (only?) farming?
A – Sediment from bank erosion mostly causes siltation in streams, so you can do bank erosion protection to reduce silt in streams. The U.S. Geological Society (USGS) did a tracer study which showed most of the silt came from stream banks and not farming. I was surprised to see the result of the USGS tracer study.

5. ***DRWW Business***

   a. ***Committee Updates***

      i. ***Monitoring/WQ Improvement Committee***. *Joe Robinson, chairman, gave the update. Joe stated that the presentations that had just been given by Brian O'Neill and Chris Yoder summarized all the work the committee has been doing. The committee will continue to discuss modifications to the monitoring program. Anyone who would like to be on the committee should come to the committee meetings – on the third Thursday of each month from 1:00 – 2:30 pm. Check DRWW.org for meeting dates, times, locations and agendas.*

      ii. ***Lakes Committee.*** *Mike Adam, chairman, gave the update. The committee is working on analyzing/summarizing lakes data and how to incorporate it into the river data. The committee meets quarterly and anyone who wants to join is welcome. Check DRWW.org for meeting dates, times, locations and agendas.*

6. ***Next meeting for DRWW General Members: November 16, 2017. Location: TBT***

    a. *Next Des Plaines River Watershed Planning Meeting (Topic: Transportation Planning & Winter Maintenance) will be September 14, 2017, 1:00pm -3:00pm at the Central Permitting Facility, 2nd Floor, 500 W. Winchester Road, Libertyville, IL 60098*

7. ***Old business:*** *None*

8. ***New business:*** *None*

9. ***Adjournment:*** *Joe Robinson made a motion to adjourn. Michael Talbett seconded the motion. The motion passed unanimously.*

DRWW Members and Delegates Present:

Al Giertych, Lake County DOT
Alana Bartolai, Lake County Health Department
Ashley Warren, Lake County SMC
Betty Harrison, Village of Lake Zurich
Brandon Janes, Village of Deerfield
Brian Dorn, North Shore Water Reclamation District
Donald Hey, Wetlands Research, Inc.
Jim Anderson, Lake County Forest Preserve District
Jim Bland, Sierra Club
Joe Robinson, North Shore Water Reclamation District
Kathleen Paap, Wetlands Research, Inc.
Michael Talbett, Village of Kildeer
Mike Warner, Lake County Stormwater Management Commission
Paul Kendzior, Village of Libertyville
Steve Vella, Village of Libertyville
Tom Morthorst, Village of Third Lake
Mike Adam, LCHD
Ernesto Huaracha, LCSMC
Mike Prusila, LCSMC (speaker)
Nan Buckardt, LCFPD
John Nelson, LCFPD
Eileen Davis, LCFPD
Monica Rockstroh, Christopher B Burke Engineering
Graael Urbanoz, LCHD
David Brown, Vernon Hills
Geoff Szafranski, Vernon Hills
Gaby Rodriguez, Vernon Hills
Cameron Crombie, LCHD
Rob Flood, North Shore Water Reclamation District

Additional Attendees:

Beth Adler, DRWW Technical Coordinator
Clint Bailey, USGS
Brian O'Neill, Burns and McDonnell (speaker)
Chris Yoder, MBI (speaker)

Patty Werner, citizen
Aaron Goldberg, NEIU.edu
Jeff Boeckler, Northwater Consulting
Todd Peck, Zion Park Dist
Adam Boeche, Mundelein
Rosemary Heilemann, League of Women Voters
Ross Sweeney, citizen
Holly Hudson, CMAP
Don Wilson, citizen
Arlene Hickory, CAPOW
Todd Gedvile, Vernon Twp
Frank Abderholden, Trib Publications
Ann Maine, Lake County Board
Vince Mosca, Hey and Assoc.
Scott Kuykendall, McHenry County
Thomas Chefalo, LCPB&D
Maria Gaytan-Martinez, House of Representatives
Fred Schneider, citizen
Bob Pfeil, citizen
Cindy Bundaco, Wildwood Park District
Jan Papn, Blue Stem Eco

DES PLAINES RIVER WATERSHED MEETING REPORT
CENTRAL PERMITTING FACILITY
500 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
SEPTEMBER 14, 2017 * 1:00 PM – 3:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about transportation pollution prevention practices, opportunities for best management practices (BMPs), reducing chloride use in the watershed through winter maintenance alternatives/practices and utilizing green infrastructure in the planning process of designing roadways, trails and parking lots.

1. ***Introductions and Announcements***
   Introductions - Ashley Warren, Water Resource Professional, Lake County Stormwater Management Commission (SMC) led self-introductions. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the August 17th, 2017 meeting summary without changes by consensus of the group.

2. ***"Tell it in Ten" Series: Lake County Department of Transportation (LCDOT)***
   a. Al Giertych, Assistant County Engineer, LCDOT gave a brief overview of LCDOT's operations and roles and responsibilities for Lake County. Al reviewed LCDOT's strategic goals for improving the county's transportation services; including providing public safety, enhancing economic opportunities, promoting a sustainable environment and building healthy and resilient communities. LCDOT's management philosophy sets system priorities such as preservation, modernization and expansion, while exercising flexibility and creativity to shape effective transportation solutions LCDOT uses many tools (traffic management center) and outreach methods to keep Lake County residents updated on roadways and evaluating alternatives for roadway projects. Innovative stormwater practices are being utilized in some of the transportation projects. Highway maintenance operations follow an annual snow and ice control operations plan that define the level of service provided and consists of 26 assigned routes. LCDOT has found winter maintenance alternatives to reduce road salt application rates and minimize environmental impacts without sacrificing any safety components.

3. ***Transportation's Role in the Des Plaines River Watershed***
   a. Ashley Warren gave a brief presentation on the transportation systems and winter maintenance alternatives in the Des Plaines River watershed planning area. The purpose of this meeting is to bring stakeholders in the Des Plaines River watershed together to learn about transportation pollution prevention practices, opportunities for best management practices (BMPs), reducing chloride use in the watershed through winter maintenance alternatives/practices and utilizing green infrastructure in the planning process of designing roadways, trails and parking lots. The Des Plaines River watershed planning area contains 1,886 centerline miles of roadway and although road improvement and construction projects are vital to economic stability and growth, it can result in negative impacts to the surrounding environment if not constructed using Best Management Practices. Of all the highway and parking lot runoff constituents (see presentation), Phosphorous, polychlorinated biphenyls (PCBs), Chlorides and Manganese are all listed on the Des Plaines River watershed impairments list.

4. ***Transportation Organization Panelists & Discussion (Al Giertych- Moderator)***
   a. Michael K. Skibbe, Deputy Director of Public Works, Village of Buffalo Grove
      - Mike gave a presentation on the Village of Buffalo Grove's Snow and Ice Control Program that was updated in 2014-2015. This update focused on re-evaluating the equipment and manpower used, routes taken, where reduced costs could come from. Through an increase in winter maintenance alternatives like liquids, the Village could decrease their salt use with a slight increase in the use of liquids with road salt. Anti-icing, prewetting, use of more liquids, carbide cutting edges, weather forecasting and wing plows have allowed the Village to cut down on some of their costs and maintain their efficiency on keeping roadways safe. The Village is the recipient of Excellence in Storage Award (Safe & Sustainable Snow fighting Award) since 1990 for properly storing road salt and the 2016 APWA Excellence in Snow & Ice Control Award.

b. Darrell Kuntz, Project Manager, Planning Department; LCDOT
   - Darrell gave a presentation on the Illinois Route 83 to West of Alleghany Road, Peterson roadway improvement project and the stormwater BMPs implemented as part of this overall project. The project BMPs included detention basin (3 ponds) adjacent to the roadway, infiltration ditches (10,400 feet) adjacent to the trail path and roadways and median rain gardens (5) to filter stormwater runoff from the roadways and trail paths, and the use of compost material (13,000 cu.yds.) for native vegetation growth.

c. Kermit Shockley, Yard Operations Supervisor; & Agar Shirani P.E., Hydraulics and Hydrology Studies Manager; Illinois Dept. of Transportation (IDOT)
   - Kermit gave a presentation on IDOT's winter maintenance operations. The IDOT facility trucks are equipped with extra winter maintenance alternative components that allow the road salt to be pre-wetted in the tanks of the vehicles during winter maintenance operations. The Bureau of Maintenance keep snow and ice cheat sheets in the vehicles to assist the drivers. Although it is difficult to know how much road salt reduction has occurred because each year the frequency and severity of the snow storms are different, the estimated cost savings from the Winter 2015/2096 is estimated to be $483,360.
   - Agar gave a presentation on IDOT's BMP practices and the associated permits for IDOT projects. Agar explained the form for water quality BMPs permanent measures checklist that needs to be filled out for projects, which includes coordination with other agencies such as Army Corps of Engineers (ACOE), considerations for establishing new BMP measures and grey infrastructure BMP alternatives and sufficient right-of-way and easement access for the project. Some examples of projects incorporating BMPs included: detention basins for the IL 173 and US 41 roadway project and Washington Road from Illinois 21 to Illinois 137 project, a permanent sediment trap and settling basin at Hunt Club Road off Illinois 120 and a permanent sediment trap/ditch checks that drain to Loon Lake off Illinois Route 83 in Antioch.

d. Bryan Wagner, Environmental Policy and Program Manager, Illinois Tollway
   - Bryan gave a presentation about summer and winter transportation BMPs. The Tollway has implemented an 11-mile bioswale pilot project along Route 294 and 94 in conjunction with the Cook County Forest Preserve District (FPDCC). This project consists of 7 wet/dry bioswale locations and adds up to a large percentage of total suspended solids, chloride and metals reduction. Along with bioswales other transportation (summer) BMPs implemented by the Tollway include: naturalized and in-pipe detention, and furrows, which are maintained through practices such as mowing and tree replacement policies, a tree planting initiative and a pollinator program. Some of the winter maintenance activities include deicing practices of mechanical plowing of 292 miles of roadway, 2 brine makers in the system and pre-wetting with brine or Beet Heet to a salt and sand mixture.

e. Jack Linehan, Assistant to the Village Administrator, Village of Gurnee
   - Jack gave a presentation on the Village of Gurnee's sidewalk infrastructure and walkability that was integrated into the Village's 2016-2021 Strategic Plan through a Blue-Ribbon Commission (BRC) made up of the community members and Village planners. For this update, the BRC reviewed the 1996 Pedestrian Master Plan, the 2016 Pedestrian Survey, existing regional plans and GIS mapping to identify criteria for recommending new or improved infrastructure. The Blue-Ribbon Commission identified 30 projects that will improve accessibility and connectivity for pedestrian and bicyclists. These projects were then ranked into priority tiers (ranging from priority 1 to 3) based on the guiding principles of Connections to regional trails, parks and schools, improving connectivity along major roadways and local businesses and filling in infrastructure gaps.

Panelist Q&A:

Q – Did LCDOT add on higher costs by incorporating BMPs into your Peterson Road project? There was an option to just pipe the project?

A- The compost material was the highest costs of all the BMPs, but in general the BMPs in the project were minor costs in comparison to the overall costs for the roadway project. In the future, LCDOT will probably reduce the amount (thickness) of compost used on the site based

on this experience. This project had some room to work with, so adding in BMPs to the project was a good option. The project was going to incorporate ditches originally so infiltration ditches and median rain gardens were a better way to reduce runoff (since transportation projects are usually limited in ways to reduce runoff).

Storm pipes are seen as the last option at times because the pipes are another asset that an engineer will need to inspect and maintain. Open ditches are the preferred stormwater runoff collection and as a positive are not confined to a pipe size for transporting water flows.

Q- Are the rain gardens designed to be maintenance-free?

A- No, but they are designed to be low maintenance. The Village of Grayslake have been performing the maintenance on the median rain gardens.

Q- Did LCDOT select plants for the BMPs based on resistant to salt spray?

A- Yes, LCDOT used Morton Arboretum plant base to determine which plants will grow best in the roadway conditions (including salt spray) and selecting plants that do not drop a lot of fruit (clogging up the storm sewers).

Q- Did LCDOT have to get a permit from the Illinois EPA to use compost in an aquatic environment?

A- No, an Illinois EPA permit was not acquired for this project. An ILR10 permit and NPDES permit for this project.

Q- Did LCDOT have any plans to monitor salt retention on this project?

A- Not at this roadway site, but LCDOT and the LCHD are performing monitoring in Bull Creek (downstream of the road salt storage facility) and creating a chloride capture facility through engineered soils.

The best way to reduce output or discharge of chlorides is to reduce its use. You can attenuate them when you use BMPs (release rate) but the intent of the BMPs is to reduce the other stormwater constituents related to highways and parking lots.

Q- Was the 30-40% chloride reduction shown in the Tollway's presentation representing the reduction in chloride use or a filtered reduction in chloride from implemented BMPs?

A- That 30%-40% chloride loss was from the BMPs implemented by the Tollway. The retention BMPs allowed some stormwater runoff to infiltrate into the engineered soils, resulting in a chloride loss.

Q- Have you incorporated new BMPs at local salt storage maintenance facilities? Higher chloride levels are coming from those facilities. Is there any monitoring for these facilities?

A- The IDOT facilities are left with extra salt at the end of the winter season so IDOT has started to build additional salt storage facilities (2 buildings finished and a third is in progress) away from storm sewer drains and this allows IDOT to maximize the amount of road salt in those sheds. IDOT does perform EMIS monitoring monthly to see if salt is leaching out.

The Tollway does keep road salt storage under a roof and good housekeeping practices are implemented at the facilities. There is visible monitoring for road salt leaving the facility but no additional data for pollutant monitoring is currently being collected.

Q- What are the major components of a liquid brine? Does it contain any alcohol? How did beet juice get involved in winter maintenance? What is Beet Heet?

A- LCDOT mainly uses salt brine, calcium chloride and Beet Heet. LCDOT liquid mixes contain 70-80% salt brine with calcium chloride or Beet Heet. Road salt alone does not work as well at lower temperatures. The Beet Heet is a beet juice derivative. The liquids do not contain any alcohol and are made at the Libertyville LCDOT facility. LCDOT looked to McHenry County's

winter maintenance operations when they started using a Supermix which used beet juice and LCDOT started using beet juice as of last year and will continue to use it.

The Village of Buffalo Grove also uses beet juice in their operations and the beet juice has proteins and the sugars in the beets that helps with some of the anti-icing and anti-corrosive properties. Beet Heet is a commercial version of beet juice.

Q- Does each Village need to have a slurry truck? Is there a way for all of these Villages to collaborate on this effort for winter maintenance? Would a Village be lacking if they did not have the ability to mix the liquid themselves?

A- The Deicing Workshops and the APWA are good examples of ways that Villages and other transportation agencies can come together to collaborate and network for winter maintenance. Word of mouth through Villages, Townships and through conferences allow agencies like LCDOT to educate and assist others with winter maintenance alternatives. A Village may be at a disadvantage by not making their own mix, but some communities are purchasing the appropriate equipment together or buy the blends pre-mixed. In a small Village, it is good to network with other smaller small Villages and coordinate with one another for winter maintenance.

Q- Has there been consideration of creating buffer areas or zones around lakes for reduced chloride application?

A- The goal is to reduce chloride application generally. Specifically, LCDOT is attempting to reduce the number of outfalls directly to lakes.

Q- Is there a way to interface to private contractors (shopping centers, church parking lots, etc.)?

A- The Deicing Workshop is a great way that Lake County is reaching out to that group of people.

Q- Why was chloride chosen as opposed to sodium?

A- Chloride is very mobile, plentiful, cheap and effective.

5. Next Meeting & Remaining Questions

a. Next meeting: Cohosting with the Bull Creek – Bulls Brook Watershed Council; Non-Point Source Pollution: October 12, 2017 at the Central Permitting Facility, 500 W. Winchester Road (2nd Floor), Libertyville, IL 60048; 1:00pm - 3:00pm. For more information visit: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adler	Beth	Des Plaines River Watershed Workgroup
Dittrich	Wally	Village of Lincolnshire
Wagner	Bryan	Tollway
Hey	Donald	Wetlands Research Inc.
Coggin	Ed	Weston Solutions
Maine	Ann	Lake County Board
Bland	Jim	Sierra Club
Bundalo	Cindy	Wildwood Valley Lake
Burke	Caitlin	Gewalt Hamilton
Skibbe	Mike	Village of Buffalo Grove
Clayton	Michael	Riverwoods Preservation Council
Shockley	Kermit	Illinois Dept. of Transportation
Linehan	Jack	Village of Gurnee
Burger	Jeanette	Resident
Warner	Mike	Lake County Stormwater Management Commission
Adam	Mike	Lake County Health Department
Flood	Rob	Gages Lake; North Shore Water Reclamation District
Frable	Erika	Hawthorn Woods

Last Name	First Name	Organization
Kerrigan	Kevin	Lake County Dept. of Transportation
Heilemann	Rosemary	League of Women Voters Lake County
Hickory	Arlene	Citizens Act to Protect Our Water
Huaracha	Ernesto	Lake County Stormwater Management Commission
Papp	Kathy	Wetland Research Inc.
Peterson	Maria	Resident
Panther	Reed	Tollway
Calabresa	Carol	Lake County Public Building and Development
Kuntz	Darrell	Lake County Div. of Transportation
Kuykendall	Scott	McHenry County
Werner	Patty	Resident
Homola	Sandy	Exp Global Inc.
Shirani	Agar	Illinois Dept. of Transportation
Morthorst	Tom	Village of Third Lake
Batista	Santos	Illinois Dept. of Transportation
Harrision	Betty	Village of Lake Zurich
Little	Barbara	Village of Deerfield
Gedville	Todd	Vernon Township
Prusila	Mike	Lake County Stormwater Management Commission
Benjamin	Grant	Long Lake Improvement & Sanitation Association (& Sierra Club)
Pribyl	Susan	Long Lake Improvement & Sanitation Association (& Sierra Club)
Weiss	Jeff	Buffalo Creek Clean Watershed Partnership
Warren	Ashley	Lake County Stormwater Management Commission
Zemaitis	Mike	Lake County Div. of Transportation

JOINT MEETING FOR
DES PLAINES RIVER WATERSHED PLANNING &
BULL CREEK – BULLS BROOK MEETING MINUTES
CENTRAL PERMIT FACILITY, 500 W. WINCHESTER ROAD, LIBERTYVILLE, IL 60048
OCTOBER 12, 2017 * 1:00 PM – 3:00PM

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about the Des Plaines River watershed non-point source pollution (NPS) and present the NPS pollution modeling that has been compiled by Northwater Consulting.

1. ***Introductions and Announcements***
   Introductions - Ashley Warren, Water Resource Professional, Lake County Stormwater Management Commission (SMC) led self-introductions. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the September 14th, 2017 meeting summary without changes by consensus of the group.

   Kathleen O'Connor, Council Chairperson, Bull Creek – Bulls Brook (BC-BB) Watershed Council gave an update to the meeting attendees that the March 2018 Des Plaines River Watershed Planning Meeting will be replacing the March 2018 BC-BB Watershed Council meeting in order to be a part of the Des Plaines River watershed draft review of the watershed-based plan. Currently the watershed council is in a holding pattern to assess how they will move forward once the umbrella Des Plaines River Watershed-Based Plan is completed.

2. ***"Tell it in Ten" Series: Bull Creek - Bulls Brook Watershed Council***
   a. Kathleen O'Connor gave a brief overview of BC-BB watershed council operations that started following the completion of the 2008 BC-BB watershed-based plan. The watershed council focuses on watershed project updates, adult and youth education and projects, as well as producing a watershed E-news newsletter to keep their stakeholders involved in partnership and volunteer opportunities. The partnerships and volunteers that are part of this watershed council play a big role in the council's success.
      Libertyville Township plays an active role in the watershed council by utilizing their open space areas to transition into restoration projects and wetland mitigation sites. Although the watershed council is in a holding pattern for future meetings and newsletters, the watershed stakeholders remain active. Libertyville Township is also partnering with Lake County Forest Preserve District (LCFPD), Conserve Lake County, Hey and Associates and SMC to implement an award Illinois Environmental Protection Agency (Illinois EPA) Section 319 wetland and gully restoration opportunity north of Casey Road in Libertyville Township.

3. ***Pollution Sources in the Des Plaines River Watershed***
   a. Mike Prusila, Planning Supervisor, SMC gave an overview presentation on pollution sources (point and nonpoint sources) in the Des Plaines River watershed planning area. The point sources ("end of pipe) are permit regulated under the Clean Water Act and include effluent and runoff through engineered structures. Non-point source pollution is not permit-regulated under the Clean Water Act but are the leading cause of water quality problems. Point source discharges are easier to identify since they come from an engineered structure, i.e. wastewater treatment plant discharges, municipal separate storm sewer systems (MS4s), Industrial stormwater discharges, etc.… It becomes more difficult to regulate when dealing with nonpoint source pollution that originates from agriculture, transportation systems and urban area runoff, dams, channelization of streams, shoreline and streambank erosion and atmospheric deposition. Most pollutants of concern in the DPR watershed have point and nonpoint sources such as: total suspended solids/sediment, nutrients (nitrogen & phosphorus), chloride, bacteria and hydrocarbons. The ways we can identify or estimate the extent of the presence of sources in the watershed is by permit data, monitoring data, total maximum daily load (TMDL) and nonpoint source pollutant loading model.

4. ***Des Plaines River Watershed Non-Point Source Pollution Modeling Results***
   a. Jeff Boeckler, Principal and Founder, Northwater Consulting presented the preliminary watershed loading & nonpoint source (NPS) model for the Des Plaines River watershed. The watershed

loading summary encompasses all sources of pollution (based on the best available data), including the NPS pollution model, wastewater treatment plant (WWTP) data, stream and lake shoreline estimates and septic estimates. The inputs for the non-point source model include land use, existing BMP data, field observations from a 2017 windshield survey of the watershed and some additional delineation measures. Other considerations taken into account for the NPS model include precipitation values and soils hydrologic groupings. The NPS model is set up with a curve number equation for runoff and event mean concentrations for pollutants, then calibrated using the U.S. Geological Survey (USGS) gauge data, Des Plaines River Watershed Workgroup (DRWW) water quality data and adjusted model parameters to fit measured loads. Based on USGS gauge data and DRWW water quality data, the load duration analysis calculated annual average flow using the 22 sample events taken during the 2014 monitoring year. NPS pollution load allocations for all pollutants modeled were summarized by the top 3 land use categories, which included residential single-family, row crops, open water and roadways. Other sources of pollution included loading values 18 WWTP monitoring reports, lake bank erosions from 45 assessed lakes from average eroding bank height and annual recession rate, streambank erosion from SMC inventory data for estimated annual sediment and nutrient loads and failing septic systems from previous (sub)watershed-based plans and building locations.

Q – Was historical water quality data used from other subwatershed plans for this model?

A - Yes, the model also included Illinois EPA, WWTP and DRWW water quality data. The other subwatershed-based plans did not have the extent of data that the DRWW provided for this plan.

Q- How were the results modified? How much assumption was used and was there any sensitivity analysis?

A- No sensitively analysis has been performed, assumptions include the use of event mean concentrations, the accuracy of the land use data, and professional judgment used to adjust the model at calibration points.

Q- Was rainfall incorporated into the model?

A- Yes, the model uses rainfall data

Q- What will be done with the NPS model information?

A- This information will be incorporated into watershed-based plan and help access potential best management practices (BMPs) that would be beneficial in certain areas. The model will also be incorporating BMPs to determine reductions models at each location.

Q- Will implemented BMPs be incorporated into the model?

Yes, SMC has been reaching out to local jurisdictions and stakeholders for updates to existing BMP information and potential new BMPs.

Q- How important are future land use models? Municipalities overestimate their expansions, impervious surfaces, parking lots, commercial growth.

A- The uncertainty of future land use reduces the real-life accuracy of the “future” condition model. However, it is still instructive to indicate areas where pollutant loads are likely to change if future land use changes occur.

Q- Is there a section in the plan or analysis for what is coming into the county?

A- (See presentation) You can view the data results at the monitoring gauge on the Des Plaines River at Russell Road, border of Lake County Illinois and Kenosha County Wisconsin to see what is coming into Lake County.

Q- Some of the WWTP’s are currently upgrading to meet the new phosphorus regulations of 1mg/liter monthly average discharge, is there any thought to comparing these preliminary results to future results once the upgrades have been implemented?

A- That is an option, it could be very helpful to compare the preliminary results to future monitoring efforts.

Q- Is there confidence in this preliminary data?

A- Yes, there is good preliminary data but it would be better to have another 3-4 years of monotiling data to more confidence in the results.

Q- Has setting up a voluntary monitoring program been considered? Setting up a website and collecting data and uploading the results to have more sample sites.

A- This has been done with the Lakes Management Committee but one consideration is quality control over the sampling data.

5. Bull Creek - Bulls Brook Informational Speaker

a. Mike Warner, Executive Director, SMC gave a summary of the July 2017 Flood Event in Lake County through a Flood Problem Area and Mitigation Web Application. Mike presented the rainfall distribution map from the July 2017 event that indicated the rainfall totals throughout the region, noting that the rivers in different watersheds peaked on different days. The reported damage from this event is approximately 50% of all affected structures. A map of SMC project locations and SMC's comprehensive plan project recommendations to compare the spatial distribution and areas that need to be further addressed. Another map showed the correlation of buyout project points and reported remaining flooded homes. An example was given of Mill Creek watershed needs assessment, and Des Plaines River needs assessment planning in progress.

Q- What is the process of the buyout program?

A- The process includes working with a homeowner to assess and buy their home, which will then be taken down and the parcel is graded to allow as much flood storage capacity as possible and the local entity assumes responsibility of the property.

Q- Why is turf grass installed at some of these sites (not as absorbing as native vegetation)?

A- SMC prefers to install native vegetation but the owner must agree to this as well as the local residents and entities. SMC tries to work with the owner and local residents, as well as the local surroundings, to develop a restoration plan acceptable to everyone and sometimes turf grass is asked to be used. There are several examples of projects that have installed native vegetation and installed other BMPs on buyout properties. See https://arcg.is/1jP0Cz.

6. Next Meeting & Remaining Questions

a. Next meeting: Watershed Plan Implementation & Milestones: Cohosting by the Des Plaines River Watershed (DRWW) November 16, 2017 at Central Permitting Facility, 2nd Floor, 500 W. Winchester Road, Libertyville, IL 60048; 1:30pm - 3:30pm. For more information visit: http://www.lakecountyil.gov/2387/Des-Plaines-River-Watershed-Plan.

MEETING ATTENDEES:

Last Name	First Name	Organization
Adam	Mike	Lake County Health Department
Adler	Beth	Des Plaines River Watershed Workgroup
Anderson	Jim	Lake County Forest Preserve District
Benjamin	Grant	Long Lake Improvement & Sanitation Association (& Sierra Club)
Boeckler	Jeff	Northwater Consulting
Burger	Jeanette	Resident
Burke	Caitlin	Gewalt Hamilton
Charland	Gloria	Sierra Club
Chefalo	Tom	Lake County Public Building and Development
Cooper	Jeff	Village of Libertyville
Dorn	Brian	North Shore Water Reclamation District
Flood	Rob	Gages Lake; North Shore Water Reclamation District
Happ	Jonathan	Libertyville Township
Hickory	Arlene	Citizens Act to Protect Our Water
James	Kirsten	Hey and Associates Inc.
Jeske	Brian	Mundelein Park District
Johannesen	David	James Anderson Co.
Johnson	Chris	Sierra Club

Last Name	First Name	Organization
Klick	Ken	Lake County Forest Preserve District
Knysz	Marcy	Manhard Consulting
Melara	Alvaro	Congressman Brad Schneider
Miceli	Kathy	Sierra Club
Miceli	Tom	Sierra Club
Morthorst	Tom	Village of Third Lake
Mosca	Vince	Hey & Associates Inc.
O'Connor	Kathleen	Libertyville Township & BC-BB Watershed Council
Prusila	Mike	Lake County Stormwater Management Commission
Robinson	Joe	North Shore Water Reclamation District
Rodriguez	Gaby	Vernon Hills Park District
Sweeny	Ross	Citizen
Talbett	Michael	Village of Kildeer
Warner	Mike	Lake County Stormwater Management Commission
Warren	Ashley	Lake County Stormwater Management Commission
Wilson	Don	Citizen
Zemaitis	Mike	Lake County Div. of Transportation

JOINT MEETING OF THE
DES PLAINES RIVER WATERSHED WORKGROUP (DRWW) &
DES PLAINES RIVER WATERSHED PLANNING MEETING

NOVEMBER 16, 2017 1:30-3:30 PM
LAKE COUNTY CENTRAL PERMIT FACILITY, SECOND FLOOR
500 W. WINCHESTER RD, LIBERTYVILLE, IL 60048

MEETING MINUTES

1. **Introductions and Announcements –** Al Giertych with Lake County Department of Transportation and DRWW Vice-President, called the meeting to order at 1:35 pm, conducted introductions, and provided an overview of the meeting.
2. **Public Comment.** None
3. **Des Plaines River Watershed Planning Meeting –** Ashley Warren, Water Resource Professional, Lake County Stormwater Management Commission (SMC) led self-introductions. A list of the meeting attendees is included with this meeting report.
   a. **Approval of 10/12/17 Meeting Summary by Consensus.** Meeting attendees reviewed and accepted the October 12th, 2017 meeting summary without changes by consensus of the group.
   b. **Prioritized Action Plan.** Ashley Warren discussed Chapter 6 of the Des Plaines River Watershed-Based Plan. This chapter presents a prioritized action plan which details potential options for mitigating pollutant issues and provides recommendations to meet the watershed plan goals. The action plan is written to provide stakeholders with guidance for identifying projects and to allow for the potential access to Section 319 and other sources of grant funding. The action plan consists of two action recommendations; programmatic and site-specific action plan recommendations. Programmatic actions are based on watershed-wide programs, policies, and regulatory actions such as phosphorus bans. Site-specific actions are on-the-ground, specific location actions, such as establishing native vegetation at a detention basin. The actions are selected to achieve goals which were selected based on stakeholder input and previous plans within the watershed. Supporting information is included for each action including priority (high, medium, or low), lead and supporting partners for implementing the action, stakeholder input and an estimated timeframe for completing the action (short, medium, long).

      Comments were made jointly by League of Women Voters/Sierra Club: Requesting that SMC identify specific, preventive measures to reduce non-point source pollution, adopt regulations to promote Green Infrastructure, reduce runoff of nutrients, phase out lawn fertilizers with phosphorus, and educate about road salting.

Ashley Warren: SMC is continually updating the plan based on stakeholder input, SMC is still receiving input from organizations and updating the plan accordingly.

Q/A

Q: Will removal of invasive phragmites is included in the action plan?
A: Phragmites is an issue that will be addressed in the plan. This will be a programmatic action due to the prevalence and persistence of phragmites in Lake County.

c. **Watershed Plan Implementation.** Jeff Boeckler, Northwater Consulting discussed the Des Plaines River Watershed 2017 windshield survey and a draft of the site-specific action plan. The windshield survey identified projects within the watershed that could be implemented with minimal planning. The survey identified opportunities to install or improve bioswales, urban detention ponds, ponds, grade control structures, sediment dams, water and sediment control basins, grass waterways, wetlands, field boarders, filter strips, rain gardens, rain barrels and porous pavement. Sites for recommended stream bank stabilization were identified using information collected during the SMC stream inventory. The detention basin inventory for the watershed is being reviewed, updated, and incorporated into the action plan. Watershed-wide practices such as road salt management were identified using GIS layers. Lake specific recommendations were identified by the Lake County Health Department and DRWW. The next steps are to finish evaluating the inventory data, apply unique ID's to each location, populate jurisdictional responsibilities, calculate expected annual load reductions for BMP's in drainage areas, and determine reasonable milestones and a schedule for implementation. Jeff then introduced the web interface map that displays that identifies existing and recommended practices in the watershed. All plan recommendations will be mapped in this interface, which will be available to the public.

Q/A

Q: The entire group was asked if they were comfortable using a web interface to identify projects in their area of interest and if this method was better action planer maps and tables?
A: It was stated that having all the information in a sortable format such as a table that could be related to the web interface would be ideal. There should be an option to print maps from the interface for people who do not use or are comfortable with computers.

4. **DRWW Business**

a. **Approval of Previous Meeting Minutes (8/17/17).** Paul Kendzior made a motion to approve the minutes, Joe Robinson seconded. Motion passed by unanimous voice vote.

b. **Committee Updates**

i. **Monitoring/WQ Improvement Committee**. Joe Robinson, Chairman gave a presentation of the summaries of the Draft Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries (2017) and the Draft Flow Monitoring Report (2017). Joe said next steps include (1) revising the monitoring program and (2) addressing water quality improvements by reducing siltation; continuing the de-icing education program; reducing PAHs through control and education; habitat improvement and POTW phosphorus load reduction.

ii. **Lakes Committee.** Mike Adam, chairman talked about the De-icing Workshop held every fall by LCHD and SMC (this year 200 people were trained). A de-icing test is administered at the end of the training, if the test is successfully completed then they are placed on a "preferred provider" list which is on SMC's website. Regarding the Lakes Committee update, Mike noted that there is a good data set for all the Lakes. Now it is time to start determining, using modeling, if the nutrient loadings are internal or external. After this determination, the Lakes Committee can come up with recommendations on how to address these sources of nutrients. Additional sampling may be necessary to verify the results of the modeling. In addition, Jim Bland is working on sampling for zebra mussels and their impacts.

5. **Old Business**

a. **Approval of Technical Coordinator Contract.** Mike Warner, Administrator went over the modifications to the technical coordinator contract since the last Executive Board meeting. There were no questions. Paul Kendzior made a motion to approve the Technical Coordinator Contract, Jim Anderson seconded. The voice vote was unanimous in favor of approving the contract.

6. **New Business:** None.

7. **Next DRWW General Membership Meeting:** February 15, 2018 at Lake County Central Permit Facility at 1:30 pm.

a. **Next Des Plaines River Planning Meeting:** December 7, 2017 1-3pm (with an optional off-site tour after), at the Buffalo Grove Village Hall, 50 Raupp Blvd., Buffalo Grove, IL 60089

8. **Adjournment:** Joe Robinson made a motion to adjourn. Michael Talbett seconded the motion. The motion passed unanimously.

DRWW Members and Delegates Present:

Al Giertych, Lake County DOT
Beth Adler, DRWW Technical Coordinator
Brandon Janes, Village of Deerfield
Darrell Olsen, Christopher B Burke Engineering
Donald Hey, Wetlands Research, Inc.

Jim Anderson, Lake County Forest Preserve District
Joe Robinson, North Shore Water Reclamation District
Michael Talbett, Village of Kildeer
Mike Adam, Lake County Health Department
Mike Warner, Lake County Stormwater Management Commission
Paul Kendzior, Village of Libertyville
Rob Flood, North Shore Water Reclamation District

Additional Attendees:
Adam Boeche, Mundelein
Ashley Warren, SMC
Chris Geiselhart, LPAHA
Don Wilson, citizen
Ed Coggin, Weston
Ed Lebbos, BLA/VOL
Ernesto Huaracha, SMC
Fritz Chesek, citizen
Jan Action plana, Bluestem Ecological Services
Jeff Boeckler, Northwater Consulting
Jeff Weiss, Buffalo Creek Subwatershed Workgroup
John Hines, LLPOA
Jonathan Happ, Libertyville Twp
Kathy Micali, Sierra Club
Kirsten James, Hey and Assoc.
Maggie Soliz, AES
Mike Prusila, SMC
Moses Amidei, Wadsworth Village Administrator
Patty Werner, citizen
Rosemary Heilemann, League of Women Voters
Ross Sweeney, citizen
Todd Gedville, Vernon Twp
Tom Chefalo, LCPBD
Tom Miceli, Sierra Club
Tony Baade, LLPOA
Vernon Witthuhn, Strand Assoc.
Willy Dittrich, Village of Lincolnshire

JOINT MEETING FOR
DES PLAINES RIVER WATERSHED PLANNING MEETING &
BUFFALO CREEK CLEAN WATER PARTNERSHIP MEETING AGENDA

VILLAGE OF BUFFALO GROVE COUNCIL CHAMBERS
50 RAUPP BLVD. BUFFALO GROVE, IL 60089
DECEMBER 07, 2017 * 1:00 PM – 3:00PM

STORMWATER MANAGEMENT COMMISSION

Buffalo Creek Clean Water Partnership

Meeting Purpose: To bring stakeholders in the Des Plaines River watershed together to learn about the importance of wetlands and preview the Wetland Restoration and Preservation Plan findings. Stakeholders will also be provided an opportunity to provide feedback on the BCCWP milestone scorecard.

1. *Introductions and Announcements*

   Introductions - Ashley Warren, Water Resource Professional, Lake County Stormwater Management Commission (SMC) led self-introductions. A list of the meeting attendees is included with this meeting report. Meeting attendees reviewed and accepted the November 16th, 2017 Des Plaines River Watershed meeting summary without changes by consensus of the group.

2. *"Tell it in Ten" Series: Buffalo Creek Clean Waters Partnership (BCCWP)*

   Jeff Weiss gave a brief overview of BCCWP operations and the geography of the Buffalo Creek watershed. The partnership previously conducted water quality monitoring at 15 sites along Buffalo Creek. The Des Plaines River Watershed Workgroup has continued these monitoring efforts. The BCCWP wrote a watershed-based plan for Buffalo Creek which identified approximately 30 programmatic and 531 site-specific action recommendations within the watershed. The watershed plan has been adopted by multiple municipalities in the watershed; however, select municipalities have not yet adopted the plan. The next major efforts for the BCCWP includes encouraging municipalities and organizations to support the Des Plaines River Watershed-Based Plan, developing a demonstration project within the watershed, implementing the organizations education and outreach program and implementing site specific and programmatic actions identified in the Buffalo Creek Watershed-Based Plan.

3. *Lake County Wetland Restoration and Preservation Plan & Watershed Wetland Restoration Opportunities*

   Mike Prusila, Planning Supervisor at SMC gave an overview presentation on the Lake County Wetland Restoration and Preservation Plan (WRAPP) and wetland restoration opportunities in the Des Plaines River watershed. Previous watershed plans written by SMC have incorporated wetlands; however, there has not been a consistent methodology between plans. The WRAPP seeks to provide a uniform baseline across the county for incorporating wetlands into watershed-based plans and to provide a planning tool for a wide range of end users. The end products of the WRAPP will be a report, an online mapping tool, and data to inform watershed-based plans. To create this data, a technical advisory committee was consulted to determine 13 wetland functions to assess areas within the county. To develop the GIS database, the Lake County Wetlands Inventory was used as a baseline, multiple additional data sources, including LIDAR (Light Detection and Ranging) and planimetric data were used to augment the baseline data. The work performed to derive a new dataset included revising polygon boundaries where needed, adding wetland functions, estimating pre-European settlement wetland locations and identifying potential wetland restoration or enhancement opportunities. Additional data was collected at 48 field sites to calibrate the results from the GIS wetland function assessment. The preliminary assessment data indicates that approximately 49% of pre-European settlement wetlands have been lost, similar to previous studies. Additionally, 82% of existed wetlands are rated high for flood storage, 48% are rated high for nutrient transformation and 39% are rated high for sediment/particulate retention, functions that are of particular significance in the Des Plaines Watershed. Limitations of the WRAPP study include the

selected functions will reflect some but not all of the watershed priorities, identification of potentially restorable wetlands was based on current land use data and does not consider property ownership or future land use plans, and this is a predicted functional assessment which is not a substitute for a field study.

Q- Is it possible to put a dollar value on the ecological services that will be provided by the enhanced wetlands?
A- It is possible, but it is outside the current scope of this current study. It will be a next step that will be identified in the WRAPP final report.

Q- The Illinois Tollway Authority has commissioned an environmental impact study of the extension of Route 53. How will this effect wetland loss in the watershed?
A- The Tollway will be required to provide wetland mitigation. The mitigation is based on acreage not wetland function.

Q- It appears that many of the wetlands in the county were historically linked together. How does isolated wetland restoration or mitigation address the loss of linkages?
A- Both linked and isolated wetlands have pros and cons. For example resources in isolated wetlands may be more resistant to predators and diseases, and linked wetlands may be more resistant to urban influences.

Q- When will the online mapping tool be available and how will the public know when it is available?
A- A draft version should be available in early 2018. SMC will notify the public through the watershed email list.

Q- How will SMC address wetland sites from previous watershed-based plans being identified using a different selection and prioritization criteria?
A- SMC will be looking into that when we get to that level of detail in the plan. By changing the selection criteria there is a risk of losing restoration opportunities, but if some areas are improperly ranked there will be a need to change the prioritization criteria.

4. *Buffalo Creek Clean Waters Partnership (BCCWP)*
   a. Watershed Project Updates
      i. Jeff Wiess
         - Buffalo Creek Basin Expansion: Bid review and contracting is underway. Work will start for this project in Spring 2018 to extend storage capacity to 920 acre-feet, improve stream outlets and buffers and improve trails and public access.
         - BCCWP 2018 Events: Earth Day at Deer Grove Forest Preserve in April, Rylko Park clean-up/plant-up workday in May, Farrington clean-up/plant-up workday in September, River Watch in May and June, Buffalo Grove/Deer Grove seed harvest and cleaning from August to December.

      ii. Tom Milas, Emerald Ash Borer Manager, Village of Buffalo Grove
         - The Village of Buffalo Grove hired a designated staff member to maintain restoration sites, create new management plans for 20 sites (five along Buffalo Creek), implement corporate and grant funding for multiple projects, create signage and increase proactive communications with residents.
            - The new projects include: Farrington Ditch, Buffalo Creek Nature Preserve, Jacobs Court Pond, White Pine Ditch and the Buffalo Grove Village Hall Basin.

iii. Dan Anderson, Parks Specialist, Buffalo Grove Park District

- The Buffalo Grove Park District conducted restoration at 15 natural areas in 6 parks and received SMC, Green Region and WMB grants for those projects. The District hired land management staff to maintain the sites, start a new prairie establishment project, and create a native seed collection and nursery.

iv. Jeff Mengler, Senior Project Scientist, Hey & Associates, Inc.

- Buffalo Creek Wetland Mitigation Bank: Semper Fi Land won the contract to complete the project. So far, all drain tiles have been disabled and a storm sewer was installed to prevent upstream flooding. Trails and berms are currently under construction, and brush/tree clearing is underway. Dormant seeding will occur before the first major snowfall

b. Marcy Knysz, Watershed Coordinator, BCCWP

- BCCWP Milestone Scorecard: Due to time constraints, discussion on the milestone scorecard was delayed until the next BCCWP meeting.

Meeting Attendees

Last Name	First Name	Organization
Adam	Mike	Lake County Health Department
Adler	Beth	Des Plaines River Watershed Workgroup
Anderson	Dan	Buffalo Grove Park District
Benjamin	Grant	Squaw Creek Clean Water Alliance
Burger	Jeanette	Resident
Burke	Caitlin	Gewalt Hamilton Associates
Cahill	Jack	Squaw Creek Clean Water Alliance
Crane	Julie	Lake County Stormwater Management Commission
Gallett	Michael	Village of Kildeer
Heilemam	Rosemary	Resident
Huaracha	Ernesto	Lake County Stormwater Management Commission
James	Kirsten	Hey and Associates, Inc.
Johnson	Chris	Sierra Club
Jozefowski	Jacob	Lake County Stormwater Management Commission
Knysz	Marcy	Manhard
Krocza	Rick	Vernon Hills Park District
Mosca	Vince	Hey and Associates, Inc.
Pribyl	Susan	Squaw Creek Clean Water Alliance
Prusila	Mike	Lake County Stormwater Management Commission
Reynolds	Mike	Village of Buffalo Grove
Rodriguez	Gaby	Vernon Hills Park District
Warren	Ashley	Lake County Stormwater Management Commission
Weidenfeld	David	Village of Buffalo Grove
Weiss	Jeff	Bull Creek
Werner	Patty	Citizen
Wolfgram	Jeff	Village of Wheeling

Appendix B: Snow and Ice Removal Policies and Procedures

APPENDIX B DES PLAINES RIVER SNOW & ICE REMOVAL POLICIES & PROCEDURES

Jurisdiction	Winter Maintenance Policy / Manual (Y/N)	Ever Attended a Lake Co. De-icing Workshop (Y/N)	Calibrate Trucks? (Y/N)	Annual road salt purchased (tons)	Amount of road salt reduced? (Y/N)	Road Salt Alternatives & Practices
Antioch	Yes/ Yes Online	No	N/A	N/A	N/A	Only Solid/Dry Deicing Products Road Salt, Sand, Other Abrasive Materials
Antioch Township	No/No	No	N/A	N/A	No	Only Solid/Dry Deicing Products 50/50 Road Salt, Sand, Other Abrasive Materials
Arlington Heights	Yes/No	Yes	N/A	N/A	N/A	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Salt Brine; Calcium Chloride; Beet Juice
Avon Township	No/ No In development	Yes Send staff annually	Yes - Annually Set Appl. Rates	800	Yes	Anti-Icing Used Before Winter Storm Pre-Wetting Operations Products: Therma Point & Organic Blend
Beach Park	Yes/No	Yes	Yes - Annually Set Appl. Rates	N/A	Yes	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Beet Juice & Other Mixtures
Benton Township	No/No	No	Yes - Annually Set Appl. Rates	N/A	Yes	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Beet Juice & Other Mixtures
Bristol, WI	No/No	No	Yes - Annually Set Appl. Rates	300	Yes - approx. 10% reduction	Anti-Icing Used Before Winter Storm Only Solid/Dry Deicing Products: Sand
Buffalo Grove	Yes/Yes	Yes	Yes - Annually Standard Rate: 200lbs/ lane mile	N/A	Yes - 33% reduction	Anti-Icing Before Winter Storm Pre-Wetting Operations Utilize Liquid Deicing Products
Deerfield	Yes/No	Yes	N/A	N/A	Yes	Anti-Icing Before Winter Storm Pre-Wetting Operations Brine; Calcium Chloride
Ela Township	Yes/No	Yes	Yes Computerized; monitor road salt rates	500-700	Yes	Anti-Icing Before Winter Storm (1-5 Days Before) Pre-Wetting Operations Brine; BEET HEET; Super Mix
Glenview	Yes/No	Yes	Yes	4,000- 5,000	Yes - 17% - 43% reduction	Anti-Icing Before Winter Storm Pre-Wetting Operations BEET HEET; Brine
Grayslake	No/No Only a Liability Manual	Yes	Yes - Annually Standard Rate: 400lbs/ lane mile	2,500	Yes - 38% on average	Snow Operations are Outsourced/Contracted for Roadways Grayslake Performs Winter Maintenance on Sidewalks & Parking Lots Pre-Wetting Operations; Beet Juice
Green Oaks	No/No	No	N/A	N/A	N/A	N/A
Gurnee	Yes/ Yes Online	Yes	Yes - Annually Standard Rate: 300lbs/ lane mile	2,800	Yes, averaging 40%	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Super Mix: (CaCl, Salt Brine, Geo-Melt)

Jurisdiction	Winter Maintenance Policy / Manual (Y/N)	Ever Attended a Lake Co. De-icing Workshop (Y/N)	Calibrate Trucks? (Y/N)	Annual road salt purchased (tons)	Amount of road salt reduced? (Y/N)	Road Salt Alternatives & Practices
Hainesville	No/No	Yes	No	175	Yes - 50% reduction	Anti-Icing Used Before A Winter Storm Pre-Wetting Operations Beet Juice
Hawthorn Woods	Yes/ Yes Updated annually and approved by Village Board	Yes	Yes - semi-annually Set Application Rates for each storm	900	Yes - 50% reduction	Anti-Icing Used Before A Winter Storm (Pre-Salt) Calcium Chloride; NaCl
IDOT	Yes/ Yes Online	Yes	Yes - Annually Standard Rate: 100- 350lbs/ lane mile	220,000	Yes - 10% reduction	Anti-Icing Used Before A Winter Storm Pre-Wetting Operations Calcium Chloride; Super Mix
Illinois Tollway	No/No	Yes	Yes - Annually Standard Rate: 200- 300lbs/ lane mile	3-year average 64,000	Yes – Unknown reduction	Pre-wetting Operations Beet Heet, Calcium Chloride, Sand, Super Mix: (CaCl, Salt Brine, Geo-Melt)
Indian Creek	No/No	No	N/A	N/A	N/A	N/A
Kildeer	No/No	Yes	No	700	Yes - 15% reduction	Snow Operations Are Outsourced/Contracted Pre-Wetting Operations Calcium Chloride; Beet Juice
Lake Forest	Yes/No	Yes	N/A	700	N/A	Pre-Wetting Operations Salt Brine; Calcium Chloride, Blended Liquids
Lake Villa	No/No	Yes	No	1,800	N/A	Only Solid/Dry Deicing Products Do Use Beet Juice on Metra Sidewalks
Lake Villa Township	No/No	No	No	1,750 (typically use only 80%)	Yes	Only Solid/Dry Deicing Products Beet Juice (Metra Sidewalks)
Lake Zurich	Yes/Yes Available upon request	Yes	Yes - temperature dependent; Standard Rate: 200- 600lbs/ lane mile	N/A	Yes	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Liquid De-Icers Used for Anti-Icing & Pre-Wetting Applications
LCDOT	Yes/Yes	Yes	Yes - Annually Standard Rate: 200- 400lbs/ lane mile	14,000	Yes - 13% reduction (min.)	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations BEET HEET, Salt Brine *Alternative Liquid Deicers are Continually Reviewed & Analyzed*
Libertyville	Yes/No	Yes	Yes, Standard Rate: 250lbs/ lane mile	N/A	N/A	Salt & Sand Mixture
Libertyville Township	No/No	Yes	Yes - Annually	800	Yes - 30% reduction	Only Solid/Dry Deicing Products Calcium Chloride

Jurisdiction	Winter Maintenance Policy / Manual (Y/N)	Ever Attended a Lake Co. De-icing Workshop (Y/N)	Calibrate Trucks? (Y/N)	Annual road salt purchased (tons)	Amount of road salt reduced? (Y/N)	Road Salt Alternatives & Practices
Lincolnshire	Yes/ Yes (PDF)	Yes	Yes	600	Yes - 30% reduction	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations BEET HEET; Calcium Chloride; Beet Juice; Super Mix
Lindenhurst	Yes/No	Yes	Yes	Approx. 850	Yes - reduced salting operations in roadways	Anti-Icing Used Before A Winter Storm Pre-Wetting Operations Salt Brine, Calcium Chloride, & a Biodegradable Agricultural By-Product (Beet)
Long Grove	No/No	No	N/A	N/A	N/A	N/A
Mettawa	No/No	Yes	N/A	N/A	N/A	N/A
Mundelein	Yes/Yes	Yes	Yes Standard Rate: 200lbs/ lane mile	N/A	N/A	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Calcium Chloride; Sand
Newport Township	No/No	Yes	Yes - Annually Set Appl. Rates	180	Yes - 20% reduction	Anti-Icing Used Before a Winter Storm Sand
Northbrook	Yes/No	Yes	Yes	N/A	N/A	Anti-Icing Used Before a Winter Storm Sand
Northfield Township - Cook County	Yes/Yes Online	Yes	Yes - Annually Standard Rate: 250lbs/ lane mile	800	Yes - 15% reduction	Anti-Icing Used Before a Winter Storm Only Solid/Dry Deicing Products
Old Mill Creek	No/No	No	N/A	N/A	N/A	N/A
Palatine	Yes/No	Yes	Yes – Every 3-5 yrs Standard Rate: 250lbs/ lane mile	3,000 - 4,000	Yes - 25% reduction	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Super Mix
Palatine Township- Cook County	Yes/No	No	N/A	N/A	N/A	N/A
Park City	No/No	Yes	N/A	N/A	N/A	N/A
Prospect Heights	Yes/Yes Available via FOIA	Yes	Yes - Annually Standard Rate: 200 - 300lbs/ lane mile	700	No	Only Solid/Dry Deicing Products
Riverwoods	No/No	No	Yes	Each Snow Event use roughly: 8 tns	N/A	Anti-Icing Used Before a Winter Storm Calcium Chloride

Jurisdiction	Winter Maintenance Policy / Manual (Y/N)	Ever Attended a Lake Co. De-icing Workshop (Y/N)	Calibrate Trucks? (Y/N)	Annual road salt purchased (tons)	Amount of road salt reduced? (Y/N)	Road Salt Alternatives & Practices
Round Lake Beach	No/Yes Still as DRAFT	Yes	Yes - Annually Standard Rate: 300lbs/ lane mile	1,000 - 2,000	Yes - 20-30% reduction	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations BEET HEET
Round Lake Park	No/No	Yes	Manually	N/A	N/A	N/A
Salem - Kenosha Co. WI	Yes/Yes	No	N/A	N/A	N/A	N/A
Third Lake	No/ No In development	Yes - All Staff	Yes - Annually Set Appl. Rates	800	Yes	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Therma Point; Organic Blend
Vernon Hills	Yes/Yes	Yes	N/A	N/A	N/A	Brine; Calcium Chloride
Vernon Township	No/No	Yes	Yes - Annually Set Appl. Rates	450	Yes - 40% reduction	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Super Mix
Wadsworth	No/No	Yes	Yes - Annually Standard Rate: 300 lbs./lane mile	N/A	Yes - 20% reduction	Anti-Icing Used Before a Winter Storm
Warren Township	Yes/No	Yes	N/A	N/A	N/A	Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Brine; BEET HEET
Waukegan	No/No	Yes	Yes	N/A	N/A	Pre-Wetting Operations Use Sand as Well
Waukegan Township	Yes/No	No	Yes	N/A	N/A	Super Mix; Sand
West Deerfield Township	No/Yes	No	N/A	N/A	N/A	Anti-Icing Used Before a Winter Storm
Wheeling	No/Yes	Yes	Yes - Annually Set Appl. Rates	1,000	Yes - 20% reduction	Snow Operations Outsourced/Contracted Anti-Icing Used Before a Winter Storm Pre-Wetting Operations Brine
Wheeling Township	No/No	No	N/A	N/A	N/A	Snow Operations Outsourced/Contracted Only Solid/Dry Deicing Products
Zion	Yes/No	Yes	Yes - Annually	2,200	Unable to determine	Only Solid/Dry Deicing Products Calcium Chloride During Salt Shortage: Salt Treated Sand

N/A = Not Answered

Appendix C: Stream Inventory Summary

The Lake County Stormwater Management Commission conducts stream inventories as part of the overall watershed planning process. Water quality sampling was not performed during the stream inventory, but the sources and causes of water quality impairment in the streams were investigated. An important component of the assessment process is the evaluation of current hydraulic, geomorphic, and aquatic stream characteristics. The major stream characteristics assessed and noted include:

- channel conditions such as bank height, erosion problems and bank vegetation
- hydraulic structures such as bridges and culverts in the river or floodplain
- point discharges into the river
- land use and vegetative cover in the riparian corridor
- channel substrate and degree of sedimentation.
- lateral recession rates

The inventory procedures for tributary and mainstem reaches are described below. Several procedures were considered self-explanatory and were therefore not described.

Tributary Inventory Procedures

Tributaries are smaller streams that flow into a larger stream. Different sized streams have different characteristics and survey limitations. Separate stream inventory methods were used for tributary and mainstem reaches to account for those differences. The following stream inventory report and procedures were utilized to survey tributary streams within the DPR watershed. This section is followed by a Mainstem Inventory Procedures section which describes the methods utilized to survey mainstem reaches.

Stream Inventory Report Form

Reach Boundaries

A stream reach is defined as a stream segment having mostly homogenous hydraulic, geomorphic and riparian cover and land use characteristics. Reaches generally did not exceed 2,000 feet in length. Where possible, beginning and end stations were established along the stream using permanent physical landmarks such as bridges that are readily recognized.

Channel Flow Status (Stream Stage)

The degree to which the channel is filled with water. The flow status will change as the channel enlarges (e.g., aggrading stream beds with actively widening channels) or as flow decreases because of dams and other obstructions, diversions for irrigation, or drought. When water does not cover much of the streambed, the amount of suitable substrate for aquatic organisms is limited. In high-gradient streams, the decrease in water level exposes logs and snags, thereby reducing the areas of good habitat. Channel flow is especially useful for interpreting biological condition under abnormal or lowered flow conditions. This parameter becomes important when more than one biological index period is used for surveys or the timing of sampling is inconsistent among sites or annual periodicity.

Channel Conditions

Channelization

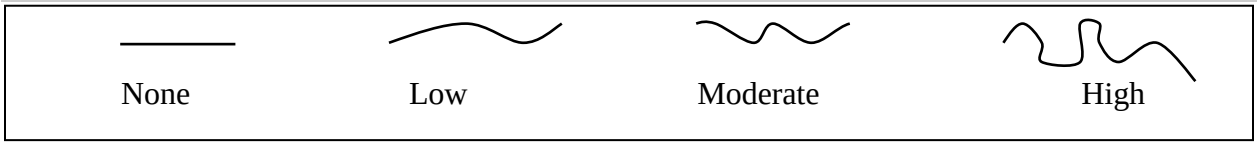
Channelization refers to channel modifications performed by humans. The one-third rule was applied where low means < 33% of the reach is channelized, moderate means 33 to 66% and high means > 66% of the reach is channelized. The presence of a pilot channel was noted under 'Pilot Channel Formed' for channelized streams. A narrow, meandering pilot channel may develop within the wide and flat trapezoidal ditch that was excavated during channelization. A pilot channel is indicative of recovery from channelization.

Sinuosity

Sinuosity is dependent on the stream stage in many channelized reaches. For instance, in many cases a narrow, highly sinuous pilot channel has developed during low stream stage within a wider, non-sinuous channel that was excavated during channelization. Therefore, sinuosity was estimated for both baseflow conditions (describing sinuosity in the pilot channel) and for the bankfull-flow events. However, when the stream inventory report form was completed during bankfull flow, sinuosity during baseflow conditions was difficult to estimate. Figure 1 was used for estimating the degree of sinuosity.

Figure 1

SINUOSITY ESTIMATION GUIDE



Pool/Riffle Development

The proportion represented by riffles, runs, and pools was noted to describe the morphological heterogeneity of the reach. Pools are well-defined areas of deeper than average water. Pools generally do not extend in length more than three or four times the stream width. Pools had to be almost immediately followed by a riffle environment for the stream to be characterized as having high pool/riffle development. A riffle is characterized by shallower water and higher velocities with rippling or disturbances to the surface water tension that allow turbulence and mixing to occur. Many streams in Lake County had low or no pool/riffle development.

Bank Erosion

Severe bank erosion is a significant concern for Lake County's stream and rivers. Severely eroded banks have exposed soil on nearly vertical banks extending from the top of bank to the low water mark, so erosion is constantly occurring. Highly eroded streambanks contribute heavy loads of sediment and erode during times of higher flows. Active slumping and sloughing may be apparent where fresh, moist, loose soil and other signs of recent bank movement such as exposed tree roots or suspended fences extending into the stream are found. Eroded areas are most prevalent in the outer edges of bends and meanders. All cases of severe erosion were photographed and noted on the form and the map or aerial photo. Structures that were present and threatened by slumping were recorded. Right and left bank were determined by facing upstream. On impounded areas of streams, the absence of bank or littoral vegetation along the normal water mark resulting in constant erosion was considered severe.

Lateral Recession Rates

This rate assesses the width or thickness of eroding surface on a channel streambank. Recession rates of eroding banks for Illinois streams and gullies typically range from 0.05 feet 0.5 feet per year. Stream banks with LRR of 1 or more feet per year do occur but are uncommon. Lateral recession characterization was assessed along each side of the bank. LRR were applied as uniformly and consistently as possible along both sides of each channel. See RAP-M Rapid Assessment, Point Method – Inventory and Evaluation of Erosion and Sedimentation for Illinois R.D.Windhorn 12/00 http://www.nrcs.usda.gov/wps/portal/nrcs/detail/il/technical/engineering/?cid=nrcs141p2_030556

Armoring

Armoring refers to the placement of gabions, wood, metal, riprap or other similar artificial materials along the streambank to reduce bank erosion. The one-third was applied again where low means < 33% of the reach is armored, moderate means 33 to 66% and high means > 66% of the reach is armored. Portions of armoring that are failing were noted.

Sediment Accumulations

Sediment accumulations that affect the channel capacity and flow conveyance were described. Sediment deposition measures the amount of sediment that has accumulated in pools and the changes that have occurred to the stream bottom because of deposition. Deposition occurs from large-scale movement of sediment. Sediment deposition may cause the formation of islands, point bars (areas of increased deposition usually at the beginning of a meander that increase in size as the channel is diverted toward the outer bank) or shoals, or result in the filling of runs and pools. In some cases, sediment accumulations may not impact channel conveyance.

Mid-Stream Bars and Islands

Exposed mid-stream bars or islands were recorded when present. Although these structures may increase habitat availability for organisms, they also reduce the unobstructed stream width and may enhance the debris-accumulating potential of the stream reach.

Mean Water Depth

Water depth was measured at the deepest portion of the channel cross section (known as the thalweg) with a sturdy 4- to 5-foot rod inscribed with depth marks in inches. The range of water depths reflected the variation between the deepest and shallowest portions of the channel cross-section in the reach.

Mean Bank Height, Top Mean Channel Width and Bottom Mean Channel Width

Mean bank height was measured from the top to the bottom of the streambank. The top of the bank occurs where there is a convex-shaped transition in bank slope between the stream bank and the outlying floodplain. The bottom of the bank occurs where there is a concave-shaped transition in slope between the stream substrate and the stream banks, and it may be below the water level.

Top and bottom mean bank widths refer to the mean bank-to-bank width across the top and across the bottom of the banks. If the top of one bank was higher in elevation than the top of the opposite bank, the top mean channel width was measured from the elevation of the lowest bank. In estimating these and other values, the investigator considered longitudinal changes in bank dimensions when estimating values.

Beaver Activity

Reaches with occasional bank slide or chewed stump were recoded as having low beaver activity. If these features became progressively more apparent, the reach was recorded as having moderate activity. High activity was characterized by almost constant activity in the wooded areas with felled trees in excess of 12 inches; slides and beaver cut brush being common in the stream. All dams and lodges were noted and recorded as high beaver activity.

Stream Debris Load

1. Instream Debris Load

Stream debris load refers to natural and man-made debris including leaves, sticks, logs, lumber, trash and sediment. The one-third rule was applied where low means < 33% of the reach contains debris obstructing or deflecting flow, moderate means 33 to 66% and high means > 66% of the reach is characterized by large accumulations of lodged and partially compacted debris spanning the entire stream width.

2. Overbank Debris Load

The overbank debris load refers to loosened, floatable materials that are prevalent enough to potentially cause debris jams at culverts and bridges during high flows events. The locations and types of debris as well as how it may impact the reach was noted. Similarly to the instream debris load section, the one-third rule was applied.

Hydraulic Structures

Hydraulic structures include low head dams, weirs, bridges, levees, and culverts. Dimensions as well as construction materials were measured and recorded. Structures were photographed and their locations were recorded. Elevations were determined from existing data or field survey dependent upon the approved scope of work. Notes included condition, drop or change in elevation, blockages and other characteristics.

Point Discharges

Point discharges include all sanitary, storm sewer and agricultural drainpipes greater than 4 inches in diameter. They also include open channels, swales, gullies and other significant tributaries. Locations of all point discharges were recorded by taking a GPS waypoint. The problem column (see SIRF) was checked if the condition of the discharge point was blocked, cracked, etc. The volume of flow was noted in the appropriate column using the following categories: none, trickle, moderate, substantial, other. Notes included comments on odors, sheens or high turbidity if present.

Vegetation and Land Use

Floodplain Vegetation (within 100 ft of stream)

For the respective banks the land use and vegetative cover was noted as percentages of the floodplain surface area. The vegetated buffer was given a score from 0-10 (see SIRF for specific criteria).

Predominant Bank Vegetation (%) and Predominant Tree/Shrub Species

These measurements provide an indication of bank stability and the potential for the development of debris blockages in the channel. For the respective banks the predominant vegetation type was noted as percentages of the bank surface area. Due to the rapid colonization capabilities of some tree and shrub species, the presence or absence of tree and shrub types were documented even if trees or shrubs were uncommon in the stream reach.

When possible, tree and shrub species included in the 'Other' category were identified. Canopy cover was estimated as a percentage of shaded coverage of the channel.

Aquatic Vegetation

The general type and relative dominance of aquatic plants were documented in this section. Besides being an ecological assemblage that responds to perturbation, aquatic vegetation provides a refuge and food for aquatic fauna. Filamentous algae can grow in fast or slow flowing streams over solid surfaces within the stream channel. Extensive filamentous algae coverage is indicative of excessive nutrient levels. Submergent, emergent, free floating, rooted floating or no vegetation was considered when estimating percentage of aquatic vegetation over the total area of the reach.

Substrate and Water Quality

Substrates

The substrate in the stream channel was classified using the following definitions:

1. *Claypan (Hardpan)*: Claypan is made up of particles less than 0.0002 inches in diameter, which forms a dense, gummy surface that is difficult to penetrate.
2. *Silt*: Silt particles are between 0.0002 to 0.002 inches in diameter. Silt is a fine material that generally feels "greasy" when rubbed between fingers.
3. Sand: *Sand* is made up of materials from 0.002 to 0.08 inches in diameter. Sand exhibits a gritty texture when rubbed between fingers.
4. *Gravel*: Gravel is a mixture of rounded coarse material from 0.08 to 2.5 inches in size.
5. *Cobble*: Cobble is made up of stones from 2.5 to 10 inches in diameter.
6. *Boulder*: Boulders are defined as rounded stones over 10 inches in diameter or large "slabs" over 10 inches in length.
7. *Organic*: Organic substrate refers to living or decaying plant material.
8. *Concrete*: Channels lined with concrete or other man-made materials should be noted.

Substrate Stability

Substrate stability was assessed according to how well the stream substrate supports the weight of the observer walking within the stream. Assessing substrate stability required the observers to walk through representative lengths of the stream channel in the reach. To help ensure the safety of the observers, waders were worn to prevent cuts and infections, and at least two observers walked each reach together. Stream channels were not walked if the safety of the recorder was in jeopardy because of strong current, deep-water sections, soft substrate, or any other potential danger. Substrate stability classified as 'None' indicates that the substrate can't support the observer's weight and the observer quickly sinks into the substrate. These substrate types are usually deep silts were not walked in. 'Low' substrate stability can be walked over, but the observer will sink several inches into the substrate if they stand for an extended time period. These substrates may include silts and loose sand or gravel. 'Moderate' substrate stability describes substrate that can be walked over without sinking more than an inch or two and may include coarse gravel, cobble, and some boulders. 'High' substrate stability can be readily walked on without sinking into the substrate. 'High' substrate stability often occurs when cobble, boulders, shale or claypan covers the stream bottom.

Substrate Embeddedness

Substrates were considered embedded if more than 50% of the surface of the substrates were surrounded or covered by unnatural accumulations of fine material such as sand or silt. Embedded substrates can't be easily dislodged. Naturally silty or sandy streams were not

considered embedded; however, if sedimentation buried the natural coarse substrates with sand or silt, the stream reach was considered embedded. The degree of embeddedness was determined by jabbing a sturdy rod into the stream bottom to determine whether the underlying stream substrate is coarse material, or sand and silt. High embeddedness was recorded when over 66% of the site area was embedded (as defined above), moderate embeddedness was recorded when 33-66% of the site area was embedded and low was recorded when <33% of the area was embedded. 'N/A' ratings were applied to stream channels that were naturally composed of silt and sand.

Instream Cover

All types of instream cover present were noted. Cover was not counted in areas of the stream with insufficient depth. General comments on perceived abundance of various cover types were reported.

Aquatic and Terrestrial Organisms

Some measurements for the Aquatic and Terrestrial Organisms section (SIRF Section G) require that riffles be distinguished from runs and pools. Pools and riffles were defined in section D.1.2.3. Runs are deeper than riffles, have relatively rapid, non-turbulent flow and are generally located downstream from riffles where the stream narrows. The streambed is often flat beneath a run and therefore the water surface is not visibly broken.

Biological information (versus chemical or physical information) is widely regarded as the most reliable type of data collection for evaluating the ecological conditions of stream reaches. Although SMC does not sample for fish, macroinvertebrates, mammals or birds, their presence was noted when they were encountered in a stream reach.

Additional Comments

Additional notes or comments included any irregularities such as cars in the stream, floodplain construction activity, presence of livestock in the stream, foul smelling discharges, errors in existing mapping. Opportunities and obstacles to access were noted on each form.

Access

Approval for access on private property is important. It is also important as a common courtesy to inform public landholders (park districts, forest preserve districts, etc.) that an inventory is taking place and field crews may be present on their property.

Golf courses present a unique hazard. Surveyors called beforehand and stopped in and visit with golf course pro shop personnel before entering these properties.

Access to any sensitive areas such as nature preserves, military installations, and power plants was coordinated in advance. These entities granted permission in writing before field crews accessed these sites.

The Lake County Stormwater Management Commission will notified watershed stakeholders in advance of the inventory. A letter and watershed map were mailed to riparian landowners owner equal to or greater than 5 acres along the stream corridor. See Figure 2 and Figure 3. In addition, an email containing a letter and watershed map (similar to Figure 2 and Figure 3) was sent to officials within the watershed. Field crews also carried a letter signed by the Executive Director of the Lake County Stormwater Management Commission granting the crews authority to conduct the inventory.

FIGURE 2 SAMPLE LETTER TO RIPARIAN LANDOWNERS

To Whom It May Concern:

The Lake County Stormwater Management Commission (SMC) is working to complete a detailed assessment and management plan for the Indian Creek watershed. As part of this process, SMC will be performing a stream inventory/assessment of Indian Creek and its tributaries. This assessment will examine channel conditions, erosion, outfalls, substrate, and water quality; as well as instream cover and channel shading. SMC Engineering Aide Neil Schindelar and four Watershed Interns, Dan Wolski and Andrew Leifel, KaitLynn Kraus and Stuart Lannoye will perform the stream assessments. The above individuals are authorized under the SMC's stream maintenance authority to gain reasonable access to Indian Creek and its tributaries to perform the stream assessments.

The information collected in the field assessment will be used in the development of the watershed management plan for Indian Creek. This plan will address water quality impairments, flooding problems and natural resource protection along with other problems and opportunities identified by watershed stakeholders. The anticipated completion date of the field assessment is December 2015.

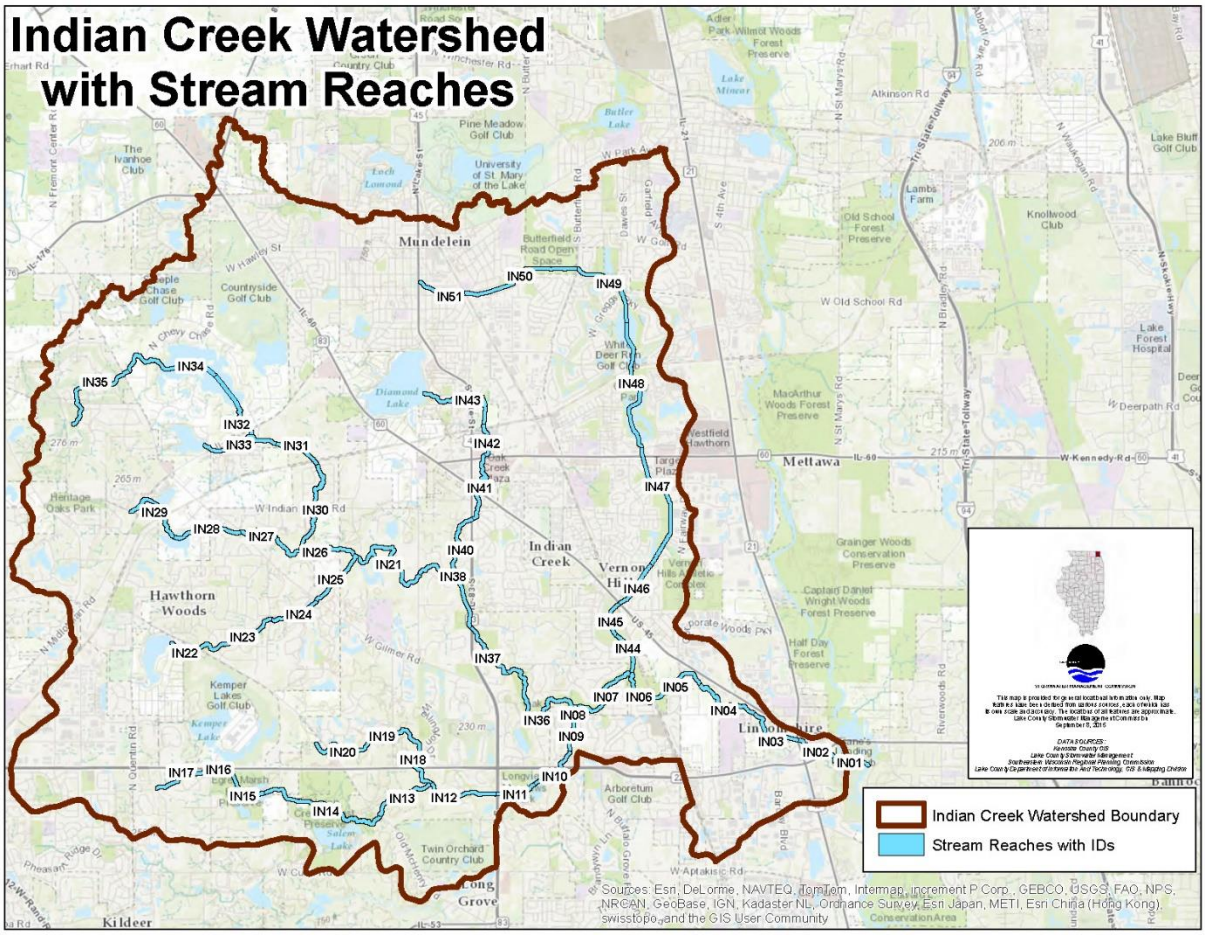
If you would like additional information on the stream assessment, please contact Jeff Laramy, GIS Analyst at 847-377-7700 or email jlaramy@lakecountyil.gov.

If you are interested in participating in the watershed planning process as a stakeholder, please contact Patty Werner at pwerner@lakecountyil.gov (847) 377-7717. Thank you for your cooperation.

Sincerely,

Mike Warner
Executive Director

FIGURE 3 SAMPLE WATERSHED MAP



SAMPLE STREAM INVENTORY REPORT FORM

STREAM NAME:_____REACH ID:_____ DATE:_____

REACH BOUNDARY- DOWNSTREAM:_____ GPS Photo. #_____

REACH BOUNDARY-UPSTREAM:_____ GPS Photo #_____

APPROX. LENGTH (ft):_____ TEMP. (°F)_____ TIME:_____

INVESTIGATORS:___ RECENT RAIN: (Now, 12, 24, 48 hours, week)_____

GAGE READING:_____

LOOKING UPSTREAM

WATER DEPTH	DEPTH (FT)	GPS PHOTO#	AVERAGE	RANGE

1				
2				
3				
MEAN WATER DEPTH				
BOTTOM CHANNEL WIDTH (FT)	**WIDTH (FT)**	**GPS PHOTO#**	**AVERAGE**	**RANGE**
1				
2				
3				
MEAN BOTTOM CHANNEL WIDTH (FT)				
TOP CHANNEL WIDTH (FT)	**WIDTH (FT)**	**GPS #**	**AVERAGE**	**RANGE**
1				
2				
3				
MEAN TOP CHANNEL WIDTH (FT)	**WIDTH (FT)**	**GPS #**	**AVERAGE**	**RANGE**
BANK HEIGHT	**HEIGHT (FT)**	**WIDTH**	**SLOPE RUN/RISE**	**PHOTO #**
1 LEFT				
1 RIGHT				
2 LEFT				
2 RIGHT				
3 LEFT				

3 RIGHT				
MEAN BANK LEFT				
MEAN BANK RIGHT				
VELOCITY (FT/S)				
1				
2				
3				
MEAN VELOCITY (FT/S)				

A. BANK EROSION

***Photos of Moderate to Very Severe will be taken**

LRR (ft./yr.)	Category	Description
0.01 - 0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
0.3 - 0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross-section is U-shaped and streamcourse or gully may be meandering.

Lateral Recession Assessment

PHOTO #	L=left R=Right C=Center Looking Upstream	Aspect U=Up D=Down	Bank Height (ft.)	LRR Category Slight, Moderate, Severe, VerySev., ExtremelySev.	LRR (ft/yr)	LRR Characteristics (circle those that apply)	Notes (Use "many"or "some" where appropriate)
	L C R	U D		SL Mod Sev VerySev ExtSev		undercutting-bare bank overhanging veg.-fallen trees exposed roots-(fine or woody) rotational slips or slides	
	L C R	U D		SL Mod Sev VerySev ExtSev		undercutting-bare bank overhanging veg.-fallen trees exposed roots-(fine or woody) rotational slips or slides	
	L C R	U D		SL Mod Sev VerySev ExtSev		undercutting-bare bank overhanging veg.-fallen trees exposed roots-(fine or woody) rotational slips or slides	

B. DISCHARGE POINTS:

(Pipes, ditches, swales, tributaries; note numbers, sizes and locations of discharges with diameters of 4 inches or more.)

TYPE & MATERIAL	DIMEN-SIONS (inches)	PHOTO #	L/R or Center of Channel	P♣	FLOW♦	NOTES

NOTES (ex: suspicious effluent etc.):_____

♣P= Problem (check for Yes)

***None, Trickle, Moderate, Substantial, Other**

C. HYDRAULIC STRUCTURES:

(Note sizes & locations in channel or adjacent floodplain.)

TYPE & MATERIAL	DIMENSIONS L/W (INCHES)	L/R or Center of Channel Looking upstream	P *	PHOTO #	NOTES:

♣P= Problem (check for Yes)

D. CHANNEL CONDITIONS:

CHANNEL FLOW (STREAM STAGE):

NONE	LOW	MODERATE	NORMAL	HIGH
Very little water in channel and mostly present as standing pools	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed	Water fills > 75% of the available channel; or <25% of channel substrate is exposed	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water levels are higher than the base of both banks
0 1	2 3 4	5 6	7 8	9 10

CHANNELIZATION: NONE_____ LOW____ MODERATE____ HIGH_____

PILOT CHANNEL FORMED (YES / NO)

SPOILS PILES ON BANKS (Left / Right / Both)

_____

BANKFULL SINUOSITY: NONE____ LOW____ MODERATE____ HIGH____

BASEFLOW SINUOSITY: NONE____ LOW____ MODERATE____ HIGH____

POOL/RIFFLE DEVELOPMENT: % POOL ____ % RIFFLE ____ % RUN ____

DEGREE OF BANK EROSION:

_____

NONE	MODERATE	*SEVERE	*VERY SEVERE
Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems; less than 5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over; 5-33% bank has areas of erosion.	Moderately unstable; 33-66% of bank has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 66-100% of bank with erosional scars.
Left Bank 10 9	8 7 6	5 4 3	2 1 0
Right Bank 10 9	8 7 6	5 4 3	2 1 0

***Photos of Moderate to Very Severe Erosion will be taken**

DEGREE OF ARMORING: NONE____ LOW____ MODERATE____ HIGH____

TYPES OF HIGH CASES: _____GPS PHOTO #_____

TYPES OF HIGH CASES: _____GPS PHOTO #_____

TYPES OF HIGH CASES: _____GPS PHOTO #_____

E. SEDIMENT ACCUMULATIONS:

NONE	LOW	MODERATE	HIGH
Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment depositions	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected, sediment deposits at obstructions, constrictions and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increase bar development; more than 80% bottom changing frequently, pools almost absent due to substantial sediment deposition
10 9	8 7 6	5 4 3	2 1 0

TYPES OF HIGH CASES: _____GPS PHOTO #_____

TYPES OF HIGH CASES: _____GPS PHOTO #_____

COMMENTS:

_____

_____

_____

MID-STREAM BARS AND ISLANDS: YES:_____ NO:_____

GPS PHOTO #_____

GPS PHOTO #_____

GPS PHOTO #_____

GPS PHOTO #_____

BEAVER ACTIVITY: NONE_____ LOW_____ MODERATE_____ HIGH_____

DAM/LODGE: YES (NUMBER OF DAMS)_____ NO_____

STREAM DEBRIS LOAD (as defined in methodology):

INSTREAM: LOW _____ MODERATE _____ HIGH _____

OVERBANK: LOW _____ MODERATE _____ HIGH _____

NOTES:_____

F. DEBRIS JAM: PHOTO #: _____ LENGTH: _____ WIDTH: _____HEIGHT: _____

PHOTO #: _____ LENGTH: _____ WIDTH: _____HEIGHT: _____

PHOTO #: _____ LENGTH: _____ WIDTH: _____HEIGHT: _____

IMPOUNDED: YES:_____ NO:_____

COMMENT:_____

SOURCE:_____

G. FLOODPLAIN VEGETATION(within 100 ft of stream)

DOMINANT LAND USE (%):

LEFT: AGRICULTURAL:_____ OPEN SPACE:_____ RECREATIONAL: _____

COMMERCIAL/INDUSTRIAL:_____RESIDENTIAL:_____ OTHER:_____

RIGHT: AGRICULTURAL:_____ OPEN SPACE:_____ RECREATIONAL:_____

COMMERCIAL/INDUSTRIAL:_____ RESIDENTIAL:_____OTHER:_____

LAND COVER (%):

LEFT: TREES: _____ LAWN:_____ WETLANDS:_____ CROPS:_____ SHRUBS:_____

HERBACEOUS: _____ IMPERVIOUS:_____ WATER:_____OTHER: _____

RIGHT: TREES:_____ LAWN:_____ WETLANDS:_____ CROPS:_____ SHRUBS:_____

HERBACEOUS:_____ IMPERVIOUS:_____ WATER:_____OTHER:_____

WIDTH OF VEGETATED BUFFER:

NONE	LOW	MODERATE	HIGH
Width of riparian zone <20 feet; little or no riparian vegetation due to human activities	Width of riparian zone 20-40 feet; human activities have impacted zone a great deal	Width of riparian zone 40-60 feet; human activities impacted zone minimally	Width of riparian zone >60 feet; human activities (parking lots, roadbeds, lawns, crops) have not impacted zone
Left Bank 0 1 2	3 4 5	6 7 8	9 10
Right Bank 0 1 2	3 4 5	6 7 8	9 10

Notes_____

_____

_____

H. BANK VEGETATION (within 10 ft of stream):

PREDOMINANT VEGETATION (%)

LEFT BANK: UNMOWED GRASS:___ LAWN:___ WETLAND:___ TREES:___ SHRUB:___

CROP:___ HERBACEOUS: ___ NONE:___ OTHER:_____

RIGHT BANK: UNMOWED GRASS:___ LAWN:___ WETLAND:___ TREES:___ SHRUB:___

CROP:___ HERBACEOUS: ___ NONE:___ OTHER:_____

PREDOMINANT TREE/SHRUB SPECIES ON BANKS (CHECK ALL PRESENT)

WILLOWS_____ BOX ELDER_____ HONEYSUCKLE_____

BUCKTHORN_____ HARDWOODS_____ OTHER_____

CANOPY (PERCENT SHADED COVERAGE OF CHANNEL):_____

I. AQUATIC/INSTREAM VEGETATION

VEGETATION (%): ROOTED EMERGENT:_____ ROOTED SUBMERGENT:_____

ROOTED FLOATING:_____ FREE FLOATING:_____ FLOATING ALGAE:_____

ATTACHED ALGAE:_____ NO VEGETATION:_____

J.SUBSTRATE AND WATER QUALITY:

SUBSTRATE COMPOSITION (%): CLAYPAN_____ SILT_____ SAND_____ GRAVEL_____

COBBLE_____BOULDER_____ CONCRETE_____ ORGANIC MATTER_____

CATEGORIZE AS "NONE", "LOW", "MODERATE", OR "HIGH" (Locate worst cases.):

SUBSTRATE STABILITY OF ENTIRE REACH:_____

SUBSTRATE EMBEDDEDNESS OF ENTIRE REACH:_____

GREASE & OIL IN WATER COLUMN_____ GREASE & OIL IN SEDIMENT_____

TURBIDITY (including tributaries, point discharges; LOW, MODERATE, HIGH):_____

WATER COLOR: CLEAR_____ BROWN_____ GREEN_____ GRAY_____

COMMENTS/PROBABLE CAUSES:_____

K. INSTREAM COVER FOR FISH:

(Check all that apply.)

UNDERCUT BANKS_____ POOLS OVER 28" DEEP_____ MACROPHYTES_____ LOGS_____

OVERHANGING VEGETATION_____ ROOTWADS_____ BOULDERS_____ BACKWATERS_____

COMMENTS:_____

_____

L. AQUATIC AND TERRESTRIAL ORGANISMS:

(Check or note all that were observed.)

MACROINVERTEBRATES:

MAYFLIES:_____ CADDISFLIES:_____ DRAGONFLY/DAMSELFLY NYMPHS:_____

SNAILS:_____ SCUDS:_____ SOWBUGS:_____ LEECHES:_____ WORMS: _____

WATER PENNIES:_____ BEETLES:_____ OTHER:_____

FISH:

CARP:____ BLACK BULLHEADS:____ CREEK CHUBS:____ GREEN SUNFISH:____ BLUEGILL: _____LARGEMOUTH

BASS:____ JOHNNY DARTERS:___ FATHEAD MINNOWS:____ GOLDEN SHINERS:

OTHERS:_____

BIRDS:

DUCKS:___GEESE:___ HERONS:___ KINGFISHERS:___ SANDPIPERS/PLOVERS:___ GULLS/TERNS:_____

OTHERS:_____

REPTILES:_____

AMPHIBIANS:_____

MAMMALS:_____

MUSSEL BEDS: NO ___ YES ___ IF YES: GPS #'S ____ ____ ____

M. PHOTO LOG:

PHOTOGRAPHER:_____**DATE:**_____

GPS #	PHOTO #	L/R or Center of Channel	Aspect (Up/ Downstream)	Photo Description:

Mainstem Inventory procedure

Reach Boundaries and Channel Cross Sections

A main-stem stream reach is defined as a river segment having fairly homogenous hydraulic, geomorphic and riparian cover and land use characteristics (such as all ditched agriculture or all natural and wooded). Reaches for the main-stem generally do not exceed 2.5 miles (13,200 feet) in length. Channel cross sections in a stream reach are defined as the start, middle and end of each stream reach.

Channel Conditions

Thalweg Water Depth

Thalweg water depth was measured at the deepest portion of the channel cross sections (known as the thalweg) with a sturdy 4- to 5-foot survey rod inscribed with depth marks in inches.

Stream Stage and Discharge

Stream stage describes the degree to which the channel is filled with water. It is obtained by measuring the height of the water surface at the channel cross sections of a stream reach. When water does not cover much of the streambed, the amount of suitable substrate for aquatic organisms is limited. In high-gradient streams, the decrease in water level exposes logs and snags, thereby reducing the areas of good habitat.

STREAM STAGE (height of water at surface)

NONE		LOW			MODERATE		NORMAL		HIGH	
Very little water in channel and mostly present as standing pools		Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed			Water fills > 75% of the available channel; or <25% of channel substrate is exposed		Water reaches base of both lower banks, and minimal amount of channel substrate is exposed		Water levels are higher than the base of both banks	
0	1	2	3	4	5	6	7	8	9	10

The stream discharge (flow) measures the quantity of water passing a location along the stream or river. The "Float Method" was used to obtain the mean surface velocity. This method measures the time it takes an object to float a specified distance. Velocity (fps) was calculated by dividing the distance (ft) the float traveled by the average time (sec) (eq 1).

Equation 1: $$V_{surface} = \frac{Travel\ Distance}{Travel\ Time} \quad (1)$$

Because surface velocities are typically higher than mean or average velocities, a coefficient (k) value of 0.85 was used to represent the average velocity in the channel (eq 2). This was determined by the bed characteristics where 0.8 is rough, and 0.9 is smooth.

Equation 2: $$V_{mean} = k \times V_{surface} \quad (2)$$

The timer was started when the object crossed the upstream marker and stopped when it crossed the downstream marker. Measurements were taken at each cross sectional area to determine the average for the stream reach. Cross sectional area (A) was calculated by multiplying the width of the channel (W) by the depth of water (Z) (eq 3).

Equation 3: $$A = W \times Z \quad (3)$$

Discharge (Q_{cfs}) was calculated in cubic feet per second using equation 4. Values were then converted from feet per second to gallons per minute (Q_{gpm}) (eq 5).

Equation 4: $$Q_{cfs} = V_{mean} \times A \quad (4)$$

Equation 5: $$Q_{gpm} = Q_{cfs} \times 448.88 \quad (5)$$

This is especially useful for interpreting biological condition under abnormal or lowered flow conditions. This parameter also becomes important when more than one biological index period is used for surveys or the timing of sampling is inconsistent among sites or annual periodicity. The stream stage-discharge relation can be applied to the stage record to obtain a continuous record of discharge at given points along the stream or river. This relation (streamgaging) defines the natural but often changing relation between stage and discharge.

Bank Height

Bank height was measured from the top to the bottom of the streambank at each cross section and where a >2ft change occurs. The top of the bank occurs where there is a convex-shaped transition in bank slope between the stream bank and the outlying floodplain. The bottom of the bank occurs where there is a concave-shaped transition in slope between the stream substrate and the stream banks, which may be below the water level.

Lateral Recession Rates

This rate assesses the width or thickness of eroding surface on a channel streambank. Recession rates of eroding banks for Illinois streams and gullies typically range from 0.05 feet 0.5 feet per year. Stream banks with LRR of 1 or more feet per year do occur but are uncommon. Lateral recession characterization was assessed along each side of the bank. LRR were applied as uniformly and consistently as possible along both sides of each channel. See RAP-M Rapid Assessment, Point Method – Inventory and Evaluation of Erosion and Sedimentation for Illinois R.D.Windhorn 12/00 http://www.nrcs.usda.gov/wps/portal/nrcs/detail/il/technical/engineering/?cid=nrcs141p2_030556

LATERAL RECESSION RATE (LRR) CHARACTERIZATION:

LRR (ft. /yr.)	Category	Description
0.01 - 0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
0.3 - 0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross-section is U-shaped and stream course or gully may be meandering.

LATERAL RECESSION OBSERVED:

(Record change in conditions along the course of a segment of channel. *Photos will be taken):

L=left R=Right C=Center Looking Upstream	Aspect U=Up D=Down	Bank Height (ft.)	LRR Category Slight, Moderate, Severe, Very Sev., Extremely Sev.	LRR (ft. /yr.)	LRR Characteristics (circle those that apply)	Notes (Use "many" or "some" where appropriate)
L C R	U D		SL Mod Sev Very Sev Ext Sev		undercutting-bare bank overhanging veg.-fallen trees exposed roots-(fine or woody) rotational slips or slides	

Bank Erosion

Severe bank erosion is a significant concern for Lake County's stream and rivers. Severely eroded banks have exposed soil on nearly vertical banks extending from the top of bank to the low water mark, so erosion is constantly occurring. Highly eroded streambanks contribute heavy loads of sediment and erode during times of higher flows. Active slumping and sloughing may be apparent where fresh, moist, loose soil and other signs of recent bank movement such as exposed tree roots or suspended fences extending into the stream are found. Eroded areas are most prevalent in the outer edges of bends and meanders. All cases of severe and very severe erosion were photographed and noted on the form and the map or aerial photo. Structures that were present and threatened by slumping should were recorded. Right and left bank were determined by facing upstream. On impounded areas of streams, the absence of bank or littoral vegetation along the normal water mark resulting in constant erosion was considered severe.

BANK EROSION (Overall):

NONE			MODERATE			*SEVERE			*VERY SEVERE		
Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems; less than 5% of bank affected.			Moderately stable; infrequent, small areas of erosion mostly healed over; 5-33% bank has areas of erosion.			Unstable; 33-66% of bank has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 66-100% of bank with erosional scars.		
Left Bank	10	9	8	7	6	5	4	3	2	1	0
Right Bank	10	9	8	7	6	5	4	3	2	1	0

Armoring

Armoring refers to the placement of gabions, wood, metal, riprap or other similar artificial materials along the streambank to reduce bank erosion. The one-third rule was applied where low means < 33% of the reach is armored, moderate means 33 to 66% and high means > 66% of the reach is armored. All armoring along the mainstem was documented with photo and GPS coordinates.

Sediment Accumulations

Sediment accumulations that affect the channel capacity and flow conveyance were described. Sediment deposition measures the amount of sediment that has accumulated in pools and the changes that have occurred to the stream bottom because of deposition. Deposition occurs from large-scale movement of sediment. Sediment deposition may cause the formation of islands, point bars (areas of increased deposition usually at the beginning of a meander that increase in size as the channel is diverted toward the outer bank) or shoals, or result in the filling of runs and pools. Exposed mid-stream bars or islands were recorded when present. Although these structures may increase habitat availability for organisms, they also reduce the unobstructed stream width and may enhance the debris-accumulating potential of the stream reach. In some cases, sediment accumulations may not impact channel conveyance.

NONE		**LOW**			**MODERATE**			**HIGH**		
Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment depositions		Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools			Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected, sediment deposits at obstructions, constrictions and bends; moderate deposition of pools prevalent			Heavy deposits of fine material, increase bar development; more than 80% bottom changing frequently, pools almost absent due to substantial sediment deposition		
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**

Point Discharges

Point discharges include all sanitary, storm sewer and building, yard and agricultural drainpipes or tiles greater than 4 inches in diameter. They also include open channels, swales, gullies and other significant tributaries. Locations of all point discharges were recorded. Blocked, eroded, cracked, or otherwise damage discharged points were recorded. The volume of flow was noted in the appropriate column using the following categories: none, trickle, moderate, substantial, other. Notes included comments on suspicious discharges, odors, sheens or high turbidity if present.

Hydraulic Structures

Hydraulic structures include low head dams, weirs, bridges, levees, and culverts. Dimensions as well as construction materials were measured and recorded. Structures were photographed and their locations were recorded. Notes included structure condition, drop or change in elevation, blockages.

Riparian Vegetation

For the respective banks the predominant vegetation type was noted as percentages of the bank surface area (note: percentages should total 100%). Canopy cover was estimated as a percentage of shaded coverage of the channel for a stream reach.

Riparian Vegetation (Check one):

	Severe	No woody vegetation with high banks, predominately grasses, buffer < 10', canopy < 20% closed
	Moderate	Sparsely vegetated banks, buffer 10' to 20' wide, canopy 20% to 40% closed
	Minor	Some woody diversity and density, buffer 20' to 60', canopy 40% to 60% closed
	Good	Good density and diversity of woody species, or low banks with grasses, buffer > 60', canopy > 80%

Comments and Other Observations

The following characteristics was noted in the "Comments" sections when observed as excessive, unusual or abnormal.

Water Color

Water color can be an indication of impaired or poor water quality in the stream or river. Suspended and dissolved particles in water influence color. Dissolved organic matter, such as humus, peat or decaying plant matter, can produce a yellow or brown color. Water rich in phytoplankton and other algae usually appears green. Soil runoff produces a variety of yellow, red, brown and gray colors.

Turbidity

Turbidity is the relative clarity of the water. It is the result of suspended solids in the water that reduce the transmission of light. Weathered rocks and soils, the land-use activity and the type of trees and plants growing within the watershed influence the types and amount of dissolved and suspended material found in a stream or river. Increases in turbidity can result in increased water temperature do to increased heat absorption from sunlight. This results in decreased dissolved oxygen concentrations. Decreased light penetration results in decreased photosynthesis. Suspended solids in turbid waters can clog fish gills, reduce growth rates and disease resistance, and prevent egg and larval development. Settled particles can accumulate and smother fish eggs and aquatic insects on the river bottom, suffocate newly-hatched insect larvae and make river bottom microhabitats unsuitable for macroinvertebrates.

Grease and Oil

Grease and oil in the water can originate from various sources such as organic compounds. Free organic compounds including vegetable oil, animal fats, waxes, soaps and greases often appear as a rainbow colored film on the surface of the water. Organic compounds also originate from domestic sewage (raw or treated), urban run-off, industrial effluents and farm wastes. Even at low concentrations, organic pollutants discharged into a river may be toxic to aquatic life, reduce dissolved oxygen, and alter the usability and aesthetics of a water body.

Instream Cover for Fish

Instream cover consists of the variety and abundance of logs, rocks, aquatic and bank vegetation in and around the waterway that can be used by fish and benthic macroinvertebrates to hide, rest, hunt for prey, and reproduce. In general, as the instream cover increases, the diversity of sensitive aquatic life increases. Insufficient instream cover is a factor affecting the viability of aquatic life in the watershed.

Beaver Activity

Low beaver activity includes an occasional bank slide or chewed stump within the reach. These features must become progressively more apparent to be rated as moderate activity. High activity is characterized by almost constant activity in the wooded areas with felled trees in excess of 12 inches; slides and beaver cut brush being common in the stream. All dams and lodges were noted as high beaver activity.

Riparian Corridor Vegetation (within 100 ft. of stream)

For the respective banks the land use and vegetative cover was noted as percentages of the surface area within 100 feet of the stream (note: percentages should total 100%).

RIPARIAN CORRIDOR VEGETATION (within 100 ft. of stream)

Predominant Land Use (%)						
Left	Agricultural		Open Space		Recreational	
	Commercial/Industrial		Residential		Other	
Right	Agricultural		Open Space		Recreational	
	Commercial/Industrial		Residential		Other	

Land Cover (%)										
Left	Trees		Lawn		Wetlands		Crops		Shrubs	
	Herbaceous		Impervious		Water		Other			

Right	Trees		Lawn		Wetlands		Crops		Shrubs	
	Herbaceous		Impervious		Water		Other			

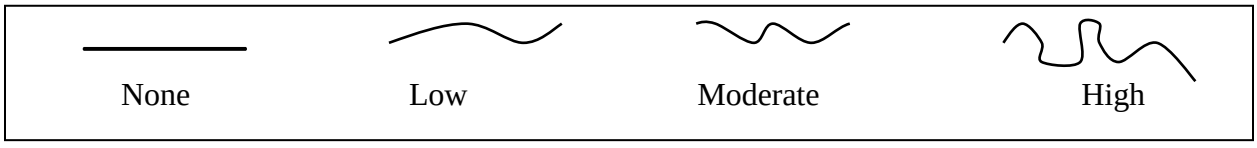
Channelization

Channelization refers to channel modifications by humans. The one-third rule was applied where low means < 33% of the reach is channelized, moderate means 33 to 66% and high means > 66% of the reach is channelized. The presence of a pilot channel was noted under 'Pilot Channel Formed' for channelized streams. A narrow, meandering pilot channel may develop within the wide and flat trapezoidal ditch that was excavated during channelization. A pilot channel is indicative of recovery from channelization.

Sinuosity

Sinuosity is dependent on the stream stage in many channelized reaches. For instance, in many cases a narrow, highly sinuous pilot channel has developed during low stream stage within a wider, non-sinuous channel that was excavated during channelization. Therefore, sinuosity was estimated for both baseflow conditions (describing sinuosity in the pilot channel) and for the bankfull-flow events. Figure 1 was used for estimating the degree of sinuosity.

Figure 1- Sinuosity Estimation Guide



Top Channel Width and Bottom Mean Channel Width

Top and bottom mean bank widths refer to the mean bank-to-bank width across the top and across the bottom of the banks. If the top of one bank was higher in elevation than the top of the opposite bank, the top mean channel width was measured from the elevation of the lowest bank. In estimating these and other values, the investigator was conscious of longitudinal changes in bank dimensions when estimating values.

2013

Mill Creek Stream Inventory Summary

Sharon Østerby

Lake County Stormwater Management

4/24/2014

INTRODUCTION

The Lake County Stormwater Management Commission (SMC) conducted a Stream Inventory in the Mill Creek Watershed during the summer of 2013 in addition to a number of other studies and projects related to the development of a watershed plan in the Mill Creek Watershed. The purpose of this assessment was to record quantitative and qualitative stream information, including the capture of visual information on the stream conditions in the Mill Creek Watershed. The information collected will provide a baseline of the overall stream conditions; which can be further extrapolated to indicate the conditions of the stream network of the Mill Creek Watershed. The assessments results will be incorporated into the watershed plan and provide a framework for prioritizing and implementing watershed management strategies.

WATERSHED OVERVIEW

The Mill Creek watershed is a subwatershed of the Des Plaines River Basin and encompasses approximately 31 square miles (20,107 acres) in north central Lake County. The Mill Creek watershed includes 38 miles of stream, more than 1,400 acres of wetland, and 23 named lakes encompassing over 1,100 acres. Smaller ponds and unnamed water bodies encompass approximately another 218.5 acres, bringing the open water total area in the watershed to over 2,500 acres.

The Mill Creek watershed is located in northeast Illinois, in north central Lake County and drains approximately from south to north through the Avon-Freemont Ditch, joining with North Mill Creek, and then flowing east to the Des Plaines River. The Des Plaines River then continues south through suburban Lake County, into a more urban Chicagoland, and eventually joins the Kankakee River near Morris, Illinois. The combined Des Plaines and Kankakee Rivers form the Illinois River. The Illinois River flows into the Mississippi River just north of St. Louis, Missouri. Mill Creek is a headwater tributary of the Mississippi River Basin, which covers 1,245,000 square miles of the continental U.S. Mill Creek flows into the Des Plaines and Illinois Rivers before reaching the Mississippi River and eventually the Gulf of Mexico, over a thousand miles away.

AVON-FREEMONT DRAINAGE DITCH

The Avon-Fremont Drainage Ditch provides drainage for agricultural land in Avon and Fremont Townships. The channel begins north of Peterson Road and runs north through the Village of Grayslake to Washington Street, where water flows into a wetland complex and ultimately into Third Lake.

LAMBS CORNER CREEK

Lambs Corner Creek is a small tributary that begins north of Grand Avenue (IL 132) and west of Hunt Club Road and runs generally northwest through residential developments, joining Mill Creek near the intersection of Stearns School Road and Mill Creek Drive.

MILL CREEK

Third Lake empties over a dam on the northwest shore into Mill Creek, which flows north to Rollins Road. North of Rollins Road, Mill Creek turns east, generally parallel to Rollins Road, to U.S. Route 45. Between Third Lake and U.S. Route 45, Mill Creek mostly flows through channelized wetlands. East of U.S. Route 45, Mill Creek flows north and east in a meandering channel to Grandwood Park Lake, an impoundment that was constructed in the mid-20th century. Below the Grandwood Park Dam, Mill Creek flows northeast under Hutchins Road and north under Stearns School Road. North of Stearns School Road, the stream meanders to the north, where North Mill Creek, the largest tributary to Mill Creek, enters south of Millburn Road. Mill Creek generally flows east from the mouth of North Mill Creek, through two impoundments on private land, under Interstate 94 and U.S. Route 41, to the Des Plaines River. The mouth of Mill Creek is located immediately south of a footbridge over the Des Plaines River on the Lake County Forest Preserves' Des Plaines River Trail south of Wadsworth Road

THE STREAM INVENTORY ASSESSMENT

The stream assessment includes the geomorphic characterization of the channel; identifying erosion, evaluating discharge points and hydraulic structures, obstructions, areas of deficient buffer zones, and areas with significant detrimental impact on the stream. Visual observations regarding vegetation, water quality conditions, habitat assessments, and aquatic and terrestrial life are included in the stream inventory and allow for a more comprehensive assessment of the stream conditions. Also, information captured during the inventory process includes notes and comments about the stream that may not be well represented in the other forms, such as specific restrictions to stream, restoration efforts or conversations with local residents. The stream inventory data is captured through a uniform and standard process to ensure it is accurate and reproducible. See Appendix D and Appendix F for methodology used for stream inventory assessment.

DATA COLLECTION AND METHODOLOGY

The stream network within the watershed is divided into reaches, smaller geographically-defined segments, for which data is aggregated. Data is collected by a team of two observers walking the entire length of every assessment reach. At representative points within each reach, the observers measure the channel dimensions, relative velocity (at the surface) of the stream, noting streambank and riparian conditions, and document hydraulic structures and discharge points using a standardized database. For the purpose of determining bank erosion (lateral recession) additional measurements are obtained, including bank height, lateral recession rate, severity, and lateral recession characteristics. The Rapid Assessment, Point Method (RAP-M) methodology and implementation for this approach can be found in Appendix F (Windhorn). The observers use a camera that is equipped with a GPS (global positioning system) to photograph areas of moderate to severe erosion, significant sediment deposition and debris jams, hydraulic structures and discharge points, and photos of the stream channel that are representative of the conditions throughout the reach. This combined method and technology allows for analysis and

mapping of the collected data. A copy of the Stream Inventory Methodology can be found in Appendix D and the Inventory Report Form can be found in Appendix E.

The following types of data were collected during the inventory and are summarized in the following sections:

- **A.** Channel Conditions (and Dimensions)
  - Channelization
  - Pool-Riffle Development
  - Bank Erosion (Lateral Recession)
  - Sediment Accumulation
  - Debris Loading
- **B.** Hydraulic Structures (Bridges, Culverts, Dams, Weirs, or structures conveying flow in the channel)
- **C.** Point Discharges (stormsewers, pipes, and overland flow draining to the stream)
- **D.** Vegetation and Land Use
  - Floodplain Vegetation and Land Use
  - Riparian Buffer Zone Width
  - Bank Vegetation
  - Predominant Species on Bank
  - Aquatic Instream Vegetation
- **E.** Substrate and Water Quality
  - Substrate Composition and Stability
  - Turbidity
- **F.** Instream Cover for Fish
- **G.** Aquatic and Terrestrial Organisms

The following characteristics of the Mill Creek Watershed stream reaches are summarized by reach in Appendix A-Table A:

1. In-stream and Over-bank Debris Loads
2. Substrate Composition
3. Channelization and Sinuosity (none, low, moderate, or high)
4. Bank Erosion (9-10=none, 6-8=low, 3-5=moderate, 0-2=high)
5. Channel Dimensions, including bank height and channel width

RESULTS

The Mill Creek Watershed contains approximately 23 miles of stream channels (of which 11.4 miles were assessed during the stream inventory). The network of stream channels in the watershed includes natural meandering channels, channelized segments of natural streams, and wholly constructed channels or ditches that were created primarily to drain lands for agriculture in the early 20th century. In addition to the stream network, these channels are connected to an array of wetlands, lakes, and impoundments. The Mill Creek Watershed stream networks assessed during the stream inventory were divided into three geographic sections: Avon-Freemont Drainage Ditch, Lambs Corner Creek, and Mill Creek.

Rivers and stream ecosystems provide important ecological functions and services. Some of these ecological services consist of purification of water, groundwater recharge with wetlands, and providing habitats for wildlife. These services are important for many reasons, including economic benefits, and the protection of human health and safety. When the natural balance of an ecosystem is changed or damaged, some or all of the ecological services they provide may be lost. Restoring some or all of the functionality of an ecosystem is usually exceedingly expensive to do so.

In the Mill Creek Watershed, the stream channels exhibit a diversity of characteristics throughout the watershed, some of which impede the functionality of the stream and its ability to provide hydrologic connections. Like many streams in the region, the results from land and resource management practices have caused both direct and secondary impacts to channels in the Mill Creek stream network. Immediate impacts can be measured in terms of the changing channel conditions discussed throughout this inventory report. The secondary impacts are those which are more subtle and recorded over longer periods of time such as the loss of habitat, or corridors that allow safe passage of aquatic and terrestrial organisms. The Mill Creek and Avon-Freemont Drainage Ditch have many areas where the land use has shifted from agricultural to residential, or the response to improved drainage and surface runoff has resulted in channelized, redirected, and deepened stream channels.

As a result, in Mill Creek and the Avon-Freemont Drainage Ditch, stream channels where channelization, debris, aquatic vegetation, and sediment accumulation exist, or where the gradient has been altered can impact the streams ability to move, store and deposit sediments effectively. Streams with steep, narrow slopes have increased discharge, and cross-sectional width and depth, and therefore increased velocity moving downstream. These channels have areas of moderate to severe streambank erosion, debris and sediment accumulated in both the channel and hydraulic structures, and discharge points damaged from eroding streambanks during bankfull events. Additionally, beaver dams located in both Mill Creek and the Avon-Freemont Drainage Ditch are impeding stream flow, disturbing structure and ecological functions, and causing adverse effects to aquatic and terrestrial organisms, including blocking fish migration and movement.

Preserving natural vegetation and stabilizing exposed soil in riparian zones dissipates stream energy during high-water flow events, prevents flooding and minimizes erosion. In all three geographical areas, the width of the riparian zone was more than 50% impacted by human activities. Throughout the watershed, increasing areas of impervious surfaces such as parking lots, and/or the loss of natural vegetation increases surface runoff and in turn decreases the rate of infiltration, water entering streams, groundwater recharge through stream beds, downstream waterways, wetlands and springs.

Minimizing human impact on and modifications to stream channels and riparian zones is essential for river and stream ecosystems to continue to provide ecological functions and services in the Mill Creek Watershed.

Mill Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length		Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
MC01	LOW	LOW	-	MOD	MOD	1,718	0.33	-	-	-	-	-	-	58.3	-
MC18	MOD	HIGH	MOD	NONE	SEV	2,498	0.47	0.50	4.00	21.50	-	16.00	16.50	60.2	2.8
MC22	HIGH	HIGH	MOD	NONE	SEV	2,562	0.49	0.50	4.00	19.00	-	19.00	-	59.5	3.5
MC31	HIGH	MOD	HIGH	NONE	SEV	2,637	0.50	0.50	1.90	19.00	25.00	18.00	19.00	21.3	1.1
MC34	HIGH	HIGH	HIGH	NONE	SEV	2,556	0.48	0.40	1.90	16.00	34.00	12.00	17.60	25.3	0.7
MC35	LOW	LOW	MOD	LOW	MOD	1,519	0.29	0.50	1.30	14.00	14.00	10.80	10.80	14.0	0.5
MC36	LOW	LOW	MOD	NONE	MOD	1,715	0.32	0.40	0.70	3.40	4.00	3.40	4.00	3.7	0.6
MC39	HIGH	HIGH	MOD	NONE	SEV	1,983	0.38	1.00	4.50	19.30	21.90	11.20	14.90	20.6	1.3
MC40	HIGH	HIGH	HIGH	MOD	SEV	3,097	0.59	2.00	7.00	17.00	76.70	13.00	13.60	46.9	0.7
MC41	LOW	LOW	NONE	NONE	NONE	1,934	0.37	1.50	2.00	57.40	57.40	25.50	25.50	57.4	3.4
MC42	HIGH	HIGH	MOD	NONE	SEV	1,881	0.36	1.50	3.00	40.00	57.40	16.50	30.00	48.7	2.0
MC43	HIGH	HIGH	HIGH	LOW	SEV	3,536	0.67	0.20	2.70	17.00	24.40	8.00	12.90	20.7	0.9
MC44	HIGH	HIGH	MOD	MOD	MOD	1,127	0.21	1.00	2.00	20.00	20.00	15.00	18.50	20.0	1.7
MC45	HIGH	HIGH	HIGH	MOD	SEV	2,094	0.40	1.00	3.00	17.50	20.00	17.50	18.50	18.8	2.2
MC50	LOW	LOW	MOD	MOD	MOD	2,398	0.45	0.50	0.50	20.00	20.00	17.00	17.00	20.0	2.1
MC68	LOW	LOW	MOD	HIGH	MOD	2,661	0.50	1.00	6.00	20.00	35.50	18.00	26.50	26.8	2.3
MC69	LOW	LOW	LOW	HIGH	SEV	1,662	0.31	0.50	2.00	22.00	41.00	17.00	25.50	29.5	1.7
MC70	MOD	MOD	HIGH	HIGH	MOD	2,202	0.42	1.00	5.00	18.50	40.00	10.00	20.00	28.5	2.8
MC71	LOW	-	LOW	HIGH	MOD	1,348	0.26	1.00	7.50	24.00	30.00	13.50	29.00	26.3	0.7
MC73	MOD	MOD	LOW	HIGH	SEV	2,685	0.51	26.00	26.00	70.50	70.50	39.50	39.50	35.3	1.5
MC74	LOW	LOW	MOD	HIGH	MOD	1,513	0.29	3.50	12.00	36.40	42.60	12.60	18.30	39.5	0.8
MC75	LOW	LOW	LOW	HIGH	SEV	1,989	0.38	6.50	11.00	23.90	64.20	15.40	15.90	44.1	0.9
MC76	LOW	MOD	LOW	HIGH	MOD	2,130	0.40	1.00	6.00	20.00	38.00	18.00	27.00	26.7	1.5
MC77	LOW	LOW	LOW	HIGH	LOW	1,571	0.30	0.50	13.00	8.00	49.00	8.00	12.00	27.7	1.0
MC78	HIGH	HIGH	MOD	MOD	SEV	2,668	0.51	2.00	15.00	35.00	46.00	8.50	11.70	51.1	0.6
MC79	HIGH	HIGH	LOW	HIGH	LOW	1,657	0.31	0.50	2.00	30.30	40.00	2.50	2.90	35.2	0.3
MC80	HIGH	HIGH	NONE	HIGH	MOD	2,190	0.41	1.00	1.00	29.00	53.00	12.00	24.00	42.7	3.1
MC81	LOW	LOW	NONE	HIGH	MOD	3,200	0.61	1.00	4.00	35.00	50.00	6.60	15.00	41.7	0.9

- : Not Collected

NORTH MILL CREEK-DUTCH GAP CANAL DUTCH GAP CANAL WATERSHED

STREAM INVENTORY SUMMARY

The Lake County Stormwater Management Commission conducted an extensive inventory of water quality, aquatic life, physical habitat, and in-stream flow characteristics to determine conditions within the North Mill Creek-Dutch Gap Canal watershed stream network. Habitat and channel condition assessments are based on data collected during the stream inventory. Though not specifically assessed, the inventory also addressed aquatic and riparian life where possible or identifiable.

The data summarized below for the North Mill Creek-Dutch Gap Canal-Dutch Gap Canal stream inventory were collected from May to June 2007. SMC personnel assessed approximately 22 miles of stream channels. Wetlands, overflow and drainage swales, and zero- and first-order feeder channels (the smallest perennial streams as well as those that only carry water for part of the year or after storm events) in the North Mill Creek-Dutch Gap Canal-Dutch Gap Canal network were not assessed during of the stream inventory.

GENERAL DESCRIPTION

The North Mill Creek-Dutch Gap Canal-Dutch Gap Canal watershed drains 36.16 square miles (23,145 acres) in northeastern Illinois and southeastern Wisconsin, and is a headwaters unit within the larger Des Plaines River watershed in the Mississippi River basin. The North Mill Creek-Dutch Gap Canal-Dutch Gap Canal watershed is bordered to the west by the Upper Fox River, Sequoit Creek, and Squaw Creek subwatersheds within the Fox River watershed. The bordering watersheds within the Des Plaines River drainage include the Salem Branch to the north, Upper Des Plaines to the east, and Mill Creek to the south. The North Mill Creek-Dutch Gap Canal-Dutch Gap Canal watershed covers 22.55 square miles (14,432 acres) of northern Lake County, Illinois and 13.61 square miles (8,713 acres) of southern Kenosha County, Wisconsin. Additionally, the watershed includes parts of three municipalities: Lindenhurst, Old Mill Creek, Antioch, in Illinois and significant unincorporated areas.

North Mill Creek-Dutch Gap Canal watershed contains the Hastings Creek tributary, which enters the mainstem north of Rasmussen Lake and the Deer Lake Drain, which enters north of the Wisconsin-Illinois state line. Deer Lake Drain includes 1.8 miles of assessed stream channels, the Hastings Creek tributary includes 3.9 assessed miles, and North Mill Creek-Dutch Gap Canal-Dutch Gap Canal mainstem includes 16.0 assessed miles. The land use of North Mill Creek-Dutch Gap Canal-Dutch Gap Canal watershed north of Rasmussen Lake dam mainly consists of open space and agriculture. The stream here has a greater degree of channelization and acts mainly as a drainage way between agricultural fields. However, south of Rasmussen Lake dam and predominantly west of US Highway 45, the surrounding land use is residential and commercial.

NORTH MILL CREEK-DUTCH GAP CANAL

North Mill Creek-Dutch Gap Canal is the mainstem of the North Mill Creek-Dutch Gap Canal watershed. It flows some 16 miles to where it converges with Mill Creek. North Mill Creek-Dutch Gap Canal Mainstem begins just north of 93rd Street, east of US Highway 45 in Kenosha County, Wisconsin. The headwaters are George Lake and

drainage from the surrounding land. As the stream flows south, a tributary from Mud Lake enters North Mill Creek-Dutch Gap Canal Mainstem. Further south, Deer Lake Drain converges with North Mill Creek-Dutch Gap Canal Mainstem, just north of the Wisconsin-Illinois state line. Continuing downstream, Hastings Creek converges with North Mill Creek-Dutch Gap Canal Mainstem just before Rasmussen Lake. From Rasmussen Lake dam southward, two tributaries enter North Mill Creek-Dutch Gap Canal Mainstem, one which drains the more residentially developed area west of US Highway 45 and the other which drains from a farm field north of Kelly Road. Another tributary enters just below Millburn Road that drains Waterford Lake to McDonald Lakes into North Mill Creek-Dutch Gap Canal Mainstem. McDonald Lakes contain two dams, one separating the two water bodies and another at the eastern end of the lakes. Finally, North Mill Creek-Dutch Gap Canal Mainstem continues south until it converges with Mill Creek. In general the land use within 100 feet of North Mill Creek-Dutch Gap Canal Mainstem is agricultural and open space.

HASTINGS CREEK

Hastings Creek flows just under 4 miles through three lakes (Slough Lake, Crooked Lake, and Hasting Lake). The headwaters of Hastings Creek begin with drainage from a residential area just west of Slough Lake. Hastings Creek begins as a system of lakes and wetlands with only some portions having a defined channel until after Hastings Lake where the channel becomes more distinct. The Timber Lake tributary flows into Hastings Creek shortly before it converges with North Mill Creek Mainstem, between Miller Road and Illinois Route 173. Portions of Hastings Creek are located underground including Timber Lake tributary east of US Highway 45 and downstream of Slough Lake to Duck Farm Forest Preserve. The surround land use begins as mainly residential, but as you move downstream towards North Mill Creek-Dutch Gap Canal Mainstem it becomes dominated by agriculture and open space.

DEER LAKE DRAIN

The Deer Lake Drain flows just under 2 miles from Deer Lake and Candice Lake to North Mill Creek-Dutch Gap Canal Mainstem. Deer Lake Drain begins just south of Illinois Route 173 between Deep Lake Road and Savage Road in the Raven Glen Forest Preserve. Deer Lake Drain flows from the Forest Preserve through Redwing Slough, Deer Lake, and Candice Lake. The segments between the lakes were not assessed due to the fact that they were mostly wetlands or large waterways connecting the lakes. From the dam at Candice Lake the stream flows northeasterly into Kenosha County, Wisconsin where it merges with North Mill Creek-Dutch Gap Canal Mainstem.

Given that Deer Lake Drain begins on the Forest Preserve the dominant land use is open space and recreation. After the series of lakes, the land use changes to mainly wetland, and then finally to agriculture where the stream is highly channelized before it converges with North Mill Creek-Dutch Gap Canal Mainstem.

STREAM ASSESSMENT: LAKE COUNTY SMC STREAM INVENTORY

The North Mill Creek-Dutch Gap Canal stream network was divided into forty individual reaches for data collection purposes (see Map NM-1). A reach is a segment of the stream exhibiting relatively homogeneous hydraulic, geomorphic, riparian, and land use conditions throughout. In the North Mill Creek-Dutch Gap Canal watershed, 6 of the reaches consist entirely or primarily of lakes and/or wetlands and were not assessed by SMC. The remaining reaches consist primarily of stream channels and were assessed. Assessed reaches average approximately 3,217 feet in length (see Table NM-1).

Table NM-1. North Mill Creek-Dutch Gap Canal Watershed Stream Reaches		
Stream Network	**Number of Assessed Reaches**	**Average Length (ft.)**
North Mill Creek-Dutch Gap Canal	23	3850
Hastings Creek	8	2600
Deer Lake Drain	3	3200
TOTAL	34	3217

Inventory methodology included walking the entire reach, measuring channel dimensions, noting streambank and riparian conditions, and documenting hydraulic structures and discharge points using a standardized database. Using a digital camera with an integrated Global Positioning System (GPS), over 400 photographs were taken during the inventory of the North Mill Creek-Dutch Gap Canal watershed. This allowed the photographs taken to be accurately place on a map using GPS coordinates. The major stream characteristics inventoried include:

1. Channel conditions (physical dimensions, degree of bank erosion, sediment accumulation, debris load, pool/riffle development);
2. Hydraulic structures (bridges, culverts, dams and weirs);
3. Discharge points (pipes, drain tiles, stormsewers, tributary streams and swales);
4. Riparian corridor (floodplain and streambank land use and cover); and
5. Aquatic habitat (substrate composition and in-stream cover).

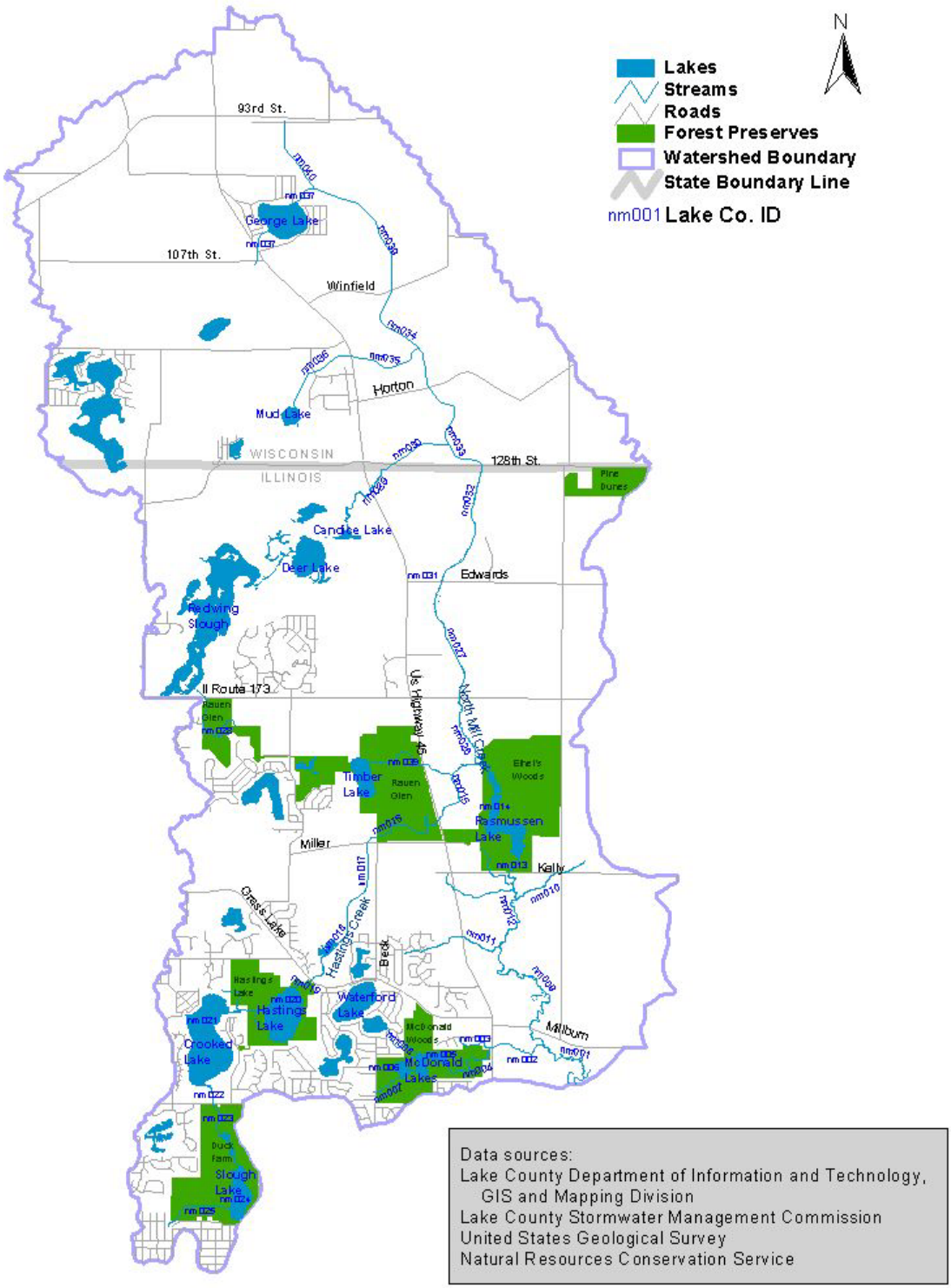
Appendix A summarizes major reach characteristics for the North Mill Creek-Dutch Gap Canal watershed.

Although some quantitative data was collected such as channel width, discharge point sizes and hydraulic structure measurements, the condition of the river was largely assessed using a qualitative method that involved visually inspecting and rating each stream reach as low, moderate or high for the characteristic being evaluated. A copy of the stream inventory methodology can be found in Appendix E. The following terminology is used in the discussion of the stream inventory results.

- *None, low, moderate and high*: "none" refers to levels affecting less than 5% of the reach, "low" refers to levels affecting 5 to 33% of the reach; "moderate" means >33 to 66% was affected; and "high" indicates more than 66% of the reach was affected.
- *Point discharges:* refers to open channels and pipes that drain ***into the river***. Open channels may include gullies, ditches or stream tributaries of the river.
- *Turbidity:* refers to the clarity of the water and is a function of how much material including sediment is suspended in the water. High degrees of turbidity make the river less hospitable to aquatic life.

- *Hydraulic structures:* low head dams, weirs, bridges, culverts and any other structures conveying flow ***in the channel***.

Map NM-1. The North Mill Creek-Dutch Gap Canal Watershed and Reach Numbers.



CHANNEL CONDITIONS: NORTH MILL CREEK-DUTCH GAP CANAL WATERSHED

A number of factors were assessed in order to determine and describe the condition of stream channels in the North Mill Creek-Dutch Gap Canal watershed. While streams are inherently dynamic systems, parameters such as degree of channelization, sinuosity, pool/riffle development, sediment accumulations, bank erosion, and debris loads suggest trends towards or away from relative stability. Physical measurements such as bank height, bank slope, channel width and water depth reflect the shape of the channel and the amount of water that is transported by the river under both high and low flow conditions. Streambank vegetation, canopy coverage and hydraulic structures affect the hydraulic capacity of the channel and floodway and are therefore also included in the stream condition inventory.

The inventory suggests a diversity of stream channel characteristics throughout the watershed. The data gathered also suggest that a number of natural and anthropogenic processes are occurring throughout the watershed with both favorable and detrimental results. Table NM-2 summarizes channel shape parameters in the North Mill Creek-Dutch Gap Canal watershed. Additional information regarding overall reach and channel character is available in Appendix A. A brief summary of conditions and parameters inventoried for streams in the North Mill Creek-Dutch Gap Canal watershed is listed in the following sections.

Table NM-2. Range of Channel Dimensions*, North Mill Creek-Dutch Gap Canal Watershed

Stream	Bank Height (feet)		Bank Slope (Rise/Run)		Channel Width, Top (feet)		Channel Width, Bottom (feet)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
North Mill Creek-Dutch Gap Canal Mainstem	0.83	5.06	0.39	1.02	7.33	31.67	3.25	25.62
North Mill Creek-Dutch Gap Canal, Mainstem to McDonald Lakes, including Tributaries	1.17	3.33	0.25	0.9	7	12.5	2.83	6.17
Hastings Creek	0.88	3.58	0.31	0.92	8.33	18	4.67	13.5
Deer Lake Drain	0.5	2.67	0.28	1.03	10.33	11.67	6.33	7.67

*Range of individual reach means

POOL-RIFFLE DEVELOPMENT

Under baseflow conditions, pools are low-gradient areas of deeper water and slower velocity and riffles are high-gradient areas of shallow water and higher velocity. Pools represent localized deeper areas in the channel while riffles represent localized shallows. During periods of baseflow, sediment eroded from riffles and deposited in pools. During floods, the relationship of relative velocity in riffles and pools is reversed and sediments are scoured from pools and deposited on riffles or bars. During periods of elevated flow when the velocity in pools exceeds that over riffles, deposition and bar formation tend to occur in areas adjacent to pools.

In a single-thalweg meandering channel, pools are typically associated with the outer portions of meander bends while riffles are typically located above or below pools. Bars typically form alongside pools or runs. Because pools and riffles exhibit very different physical conditions and are often adjacent to one another in the channel, they are important to ecological health of the stream channel. Because of their typically shallow depth, increased gradient and large sediment size, riffles cause turbulence throughout the water column and have the effect of aerating the stream, causing oxygen to dissolve from the air into the water. Pools, on the other hand, have slower velocities and increased depth, offering habitat to wide range of aquatic species for a variety of uses. Channelization often reduces the extent of pool-riffle sequences in a stream.

Most stream channels in the North Mill Creek-Dutch Gap Canal watershed exhibit some degree of pool-riffle development (see Table NM-3). Over the entire watershed, all but three of the assessed reaches exhibited some pool-riffle formation. None of the reaches showed a high degree of pool-riffle development, but 32% of the assessed reaches in the North Mill Creek-Dutch Gap Canal watershed showed a moderate degree of pool-riffle development. The greatest extent of pool-riffle development was encountered in North Mill Creek-Dutch Gap Canal Mainstem below the Rasmussen Lake dam. The North Mill Creek-Dutch Gap Canal Mainstem channel north of Rasmussen Lake, however, has very little pool-riffle development, which is most likely due to the low gradient and high degree of channelization in the area. Channelization and dredging have likely reduced the amount of pool-riffle development in some lower-gradient reaches or created a defined channel where one would not have otherwise occurred.

Table NM-3 Pool-Riffle Development, North Mill Creek-Dutch Gap Canal Watershed

Degree of Pool/Riffle Development*	North Mill Creek-Dutch Gap Canal Mainstem		Hastings Creek		Deer Lake Drain		North Mill Creek-Dutch Gap Canal Watershed (Total)	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%
None	3	13	0	0	0	0	3	9
Low	12	52	5	63	3	100	20	59
Moderate	8	35	3	37	0	0	11	32
High	0	0	0	0	0	0	0	0

*None < 5%; Low 5-33%; Moderate 34-66%; High >66%

STREAMBANK EROSION

Erosion is a function of the amount of runoff generated by a storm or flood event, the steepness of the banks, and the amount and type of vegetation growing on the banks. With development in the Hastings Creek system increased erosion is more likely, due to the higher rate of runoff. In other highly eroded reaches (nm034 and nm030), the dominant land use was agriculture and the high degree of channelization lead to a greater amount of erosion. Only one reach in the entire watershed had a classification of none (nm028), however this is due to the fact that over half of the channel was wetland.

Table NM-4 summarizes streambank erosion in the North Mill Creek-Dutch Gap Canal watershed. Due to the high amount of residential land use in Hastings Creek the amount of erosion is also high with 25% of the reaches having a high degree of erosion and the other 75% having a moderate degree. The majority of the reaches in the North Mill Creek-Dutch Gap Canal watershed showed some degree of erosion with 59% being classified as moderate and 12% classified as high.

Table NM-4 Streambank Erosion, North Mill Creek-Dutch Gap Canal Watershed								
Extent of Erosion*	**North Mill Creek-Dutch Gap Canal**		**Hastings Creek**		**Deer Lake Drain**		**North Mill Creek-Dutch Gap Canal Watershed (Total)**	
	Reaches	**%**	Reaches	**%**	Reaches	**%**	Reaches	**%**
None	0	0	0	0	1	33	1	3
Low	8	35	0	0	1	33	9	26
Moderate	13	56	6	75	1	33	20	59
High	2	9	2	25	0	0	4	12

*None < 5%; Low 5-33%; Moderate 34-66%; High >66%

SEDIMENT ACCUMULATION

Sediment erosion, transport and deposition are naturally occurring processes in stream systems, but the magnitude of these processes can be amplified due to human modifications to the watershed. Typically a stream generates, suspends, and transports sediment through high-gradient reaches and deposits sediment in low gradient reaches and/or in areas where velocity decreases. These low-velocity areas may be naturally occurring areas such as pools or sloughs. They may also occur behind debris jams or beaver dams or upstream of channel constrictions such as culverts or dams.

All but one reach in the North Mill Creek-Dutch Gap Canal watershed exhibited some sediment accumulation (see Table NM-5). The reach south of the Rasmussen Lake dam (nm013) was the only reach that was classified as none, likely because the sediment is trapped by the dam and the high amount of boulders. In some cases, deposition is likely increased due to local or upstream increases in runoff and/or erosion. Seventy-nine percent of North Mill Creek-Dutch Gap Canal watershed reaches experience moderate or high degrees of sediment accumulation. The cases of high sediment accumulation occurred in the Hastings Creek system, where 4 out of the 8 reaches were classified as high. This is most likely due to the high degree of bank erosion caused by the increased runoff from impervious surfaces upstream and the degree of channelization associated with the upstream land use (highly developed residential area).

Table NM-5 Sediment Accumulation, North Mill Creek-Dutch Gap Canal Watershed								
Sediment Accumulations*	**North Mill Creek-Dutch Gap Canal Mainstem**		**Hastings Creek**		**Deer Lake Drain**		**North Mill Creek-Dutch Gap Canal Watershed (Total)**	
	Reaches	**%**	Reaches	**%**	Reaches	**%**	Reaches	**%**
None	1	4	0	0	0	0	1	3
Low	5	22	1	13	0		6	18
Moderate	17	74	3	37	3	100	23	67
High	0		4	50	0		4	12

*None < 5%; Low 5-33%; Moderate 34-66%; High >66%

DEBRIS LOADS

Like sediment, most or all streams transport some amount of debris. Large organic debris such as tree limbs and branches can provide habitat, divert currents to create pools, bars, and slow-water habitat for aquatic organisms, and provide energy inputs to the ecosystem that are not produced within the stream. However, too much

debris can be problematic and may result in debris jams. These debris jams may cause backwater flooding and sediment deposition and can divert the current into one or both banks, leading to streambank erosion.

In the North Mill Creek-Dutch Gap Canal watershed, problematic or potentially problematic instream debris loads occurred in half of the reaches and overbank debris loads occurred in a little more then a quarter of the reaches. Table NM-6 summarizes the reaches that failed the debris load test, and have either moderate or high instream and/or overbank debris loads. Debris in these reaches causes or has the potential to cause backwater flooding, sedimentation, and bank erosion. Reaches that "failed the test" contain multiple debris jams or overhanging obstructions extending across all or a significant portion of the channel and/or onto the banks. Hastings Creek system had the greatest percent of reaches that failed the debris load test. North Mill Creek-Dutch Gap Canal Mainstem south of Rasmussen Lake and Hastings Creek had significant amount of beaver dams, which increase the instream debris loads and occurrence of debris jams. However, the beaver dams also allow the stream to spread out into the floodplain to slow down and drop out sediment and other pollutants. As for high overbank debris load, this can be attributed to human activity and naturally occurring forest debris (i.e. fallen trees, limbs).

Table NM-6 Instream and Overbank Debris Load, North Mill Creek-Dutch Gap Canal Watershed

Failed Debris Load Test*	North Mill Creek-Dutch Gap Canal Mainstem		Hastings Creek		Deer Lake Drain		North Mill Creek-Dutch Gap Canal Watershed (Total)	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%
Instream	11	48	5	63	1	33	17	50
Overbank	5	22	4	50	0	0	9	27
Both	5	22	3	38	0	0	8	24

*Indicates moderate to high debris load

HYDRAULIC STRUCTURES

Hydraulic structures are any bridges, culverts, dams, weirs, levees, and fences in or across the stream channel. These structures modify the pattern or amount of flow and may act as constriction points causing backwater flooding. Additionally, dams and weirs can impede the movements of fish and other aquatic organisms within the stream network. Culverts may also act as temporary or permanent barriers if, over time, a plunge pool develops, causing the bottom of the culvert to become elevated above the water level of the pool. Hydraulic structures also require periodic maintenance and replacement. A complete summary table of the 120 hydraulic structures recorded in the stream inventory can be found in Appendix C.

The majority of the hydraulic structures were in-stream culverts under crossings. Forty-four culverts were encountered with 25 being concrete culverts. Bridges were also abundant in the North Mill Creek-Dutch Gap Canal watershed with a total of 30 bridges, 19 of which are wooden footbridges. Many of the crossing structures were found to be non-operational and in disrepair with the potential to cause debris jams and erosion on surrounding banks (see list of photos in Appendix C). There are a total of 13 fences that cross the stream channel in the North Mill Creek-Dutch Gap Canal watershed impeding the flow of the stream and in some cases cause debris jams (see list of photos in Appendix C). Beaver dams were prevalent throughout the watershed, 78% of the dams recorded were identified as beaver dams. Some of the dams created backwaters, and in some instances also created cut-off channels.

There was an average of 5.5 hydraulic structures per mile of stream. Table NM-7 summarizes numbers and types of hydraulic structures in the North Mill Creek-Dutch Gap Canal watershed.

Table NM-7 Hydraulic Structures, North Mill Creek-Dutch Gap Canal Watershed

Hydraulic Structures	North Mill Creek-Dutch Gap Canal Mainstem	Hastings Creek	Deer Lake Drain	North Mill Creek-Dutch Gap Canal Watershed (Total)
Beaver Dam	16	4	1	21
Bridge	22	7	1	30
Culvert	30	9	5	44
Dam	4	0	2	6
Fence	8	3	2	13
Other	5	1	0	6
Total	85	24	11	120

DISCHARGE POINTS

Discharge points are any outfalls into streams in the North Mill Creek-Dutch Gap Canal watershed, including drain tile outlets, sump pump pipes, stormsewer outfalls, drainage swales, open channels, and tributaries. The stream inventory documented 113 points of discharge into stream channels, of which 58 were pipes (see Table NM-8). Hastings Creek contains the highest amount of discharge points per stream mile (4.1 pipes and 3.3 tributaries/swales per stream mile). Discharge points are most common in the more developed suburban and residential areas where sump pump and stormsewer outfalls are numerous.

Problem discharge points found in the North Mill Creek-Dutch Gap Canal watershed contribute to streambank erosion and/or transport excess sediment to the stream channel. Another problem frequently noted during the stream inventory is the state of disrepair of some drain tiles, particularly those constructed of clay. As the streambank erodes, longer sections of the tile become exposed and eventually collapse under their own weight. This effectively shortens the pipe, causing the point at which runoff discharges from the pipe to retreat from the channel, further eroding the streambank. Erosion is also a problem with steel pipes as they age they become rusted and holes develop, which shortens the point where the water discharges. As for plastic pipes, there are also some erosion problems when the plastic pipe has been punctured or cut, this also shortens the point where the water discharges. In total there were 36 discharges points with problems, including 14 steel pipes, 8 clay pipes, and 4 plastic pipes.

A suspicious discharge was located during the stream inventory that was whitish grayish in color and had a strong sewer odor. The Lake County Health Department was informed and once tested it was found to have over 180,000 fecal coliforms. Since the discharge pipe was located on Lake County Forest Preserve District land and no responsible party could be located, they were able to cap the discharge pipe, preventing any future discharge.

Table NM-8 Discharge Points, North Mill Creek-Dutch Gap Canal Watershed				
Discharge Points	**North Mill Creek-Dutch Gap Canal Mainstem (16 miles)**	**Hastings Creek (3.9 miles)**	**Deer Lake Drain (1.8 miles)**	**North Mill Creek-Dutch Gap Canal Watershed (21.7 miles)**
Tributary, Swales and Gullies	37	13	5	55
Tributary, Swales, and Gullies per Stream Mile	2.3	3.3	2.8	2.5
Pipes (including Storm Sewers, Culverts, and Drain Tiles)	37	16	5	58
Pipes per Stream Mile	2.3	4.1	2.8	2.7
Combined Total Discharges Points	74	29	10	113
Discharge Points per Stream Mile	4.6	7.4	5.6	5.2
Problem Discharge Points	23	9	4	36

RIPARIAN CORRIDOR/FLOODPLAIN

Vegetation and land use characteristics were visually assessed while walking the stream channel throughout the inventory process. In general, the riparian zone and streambanks are not intensively developed, although they are moderately to highly impacted by human activity in some reaches.

Table NM-9 summarizes land use in the riparian corridors of the North Mill Creek-Dutch Gap Canal watershed. This area is defined as extending 100 feet from the stream channel on either side and was visually estimated during the inventory. Approximately half of the riparian corridor area in the watershed is open space or vacant land (not including lakes and unassessed wetlands), much of it preserved in public or private ownership. An additional 25% was agricultural land use and in most case the buffer width was sufficient, although there were instances where crops were intruding into the buffer width of the stream, leaving less than 10 feet of vegetation. Recreation land use accounted for only 8%, all of which is owned and managed by the Lake County Forest Preserve.

Table NM-9 Land Use in Riparian Corridors, North Mill Creek-Dutch Gap Canal Watershed				
Land Use*	**North Mill Creek-Dutch Gap Canal Mainstem (%)**	**Hastings Creek (%)**	**Deer Lake Drain (%)**	**North Mill Creek-Dutch Gap Canal Watershed (Total)**
Agricultural	22	35	26	25
Recreational	5	18	3	8
Residential	9	1	7	7
Vacant/Open Space	62	41	65	58
Commercial/Industrial	0	4	0	1
Other	2	0	0	2

*Due to rounding percentages may not add up to 100%

Table NM-10 summarizes vegetation and land cover on streambanks, indicating the type of land cover existing in buffer areas along stream channels (generally within about 10 feet of the water). Shrubs, herbaceous plants and grasses, and wetland vegetation composed the majority of streambank vegetation, and significant portions were also covered by trees or bare soil. Some streambanks are dominated by invasive species such as buckthorn, but in general there was a wide variety of species.

Table NM-10 Streambank Vegetation and Land Cover, North Mill Creek-Dutch Gap Canal Watershed

Land Use*	North Mill Creek-Dutch Gap Canal Mainstem (%)	Hastings Creek (%)	Deer Lake Drain (%)	North Mill Creek-Dutch Gap Canal Watershed (Total)
None	18	24	2	18
Unmowed Grass	3	9	0	4
Lawn	1	1	0	1
Wetland	9	4	45	11
Trees	10	7	3	9
Shrubs	15	8	5	12
Row crops	1	0	8	1
Herbaceous	44	48	37	44

*Due to rounding percentages may not add up to 100%

AQUATIC HABITAT

Substrate composition, instream vegetation, and instream cover for fish were assessed during the stream inventory to provide an indication of the quality of the aquatic habitat available in the North Mill Creek-Dutch Gap Canal watershed.

SUBSTRATE COMPOSITION

North Mill Creek-Dutch Gap Canal watershed streambeds are composed of a variety of sediment grains that range in diameter from extremely fine clays (<1/1000th of an inch) to relatively coarse cobbles and boulders (>1 foot). Generally, fine sediments are transported in suspension until velocity slows enough that they are deposited on the streambed. Larger sediments are not transported as readily and may only move during increased flows. Clays are typically regarded as cohesive sediments that naturally adhere to one another and are therefore more difficult to erode while silts are more easily eroded. Sands and larger sediments (e.g., gravels and cobbles) are less cohesive. Clay and silt-dominated banks and beds, therefore, tend to be associated with narrow, incised channels while sand, gravel, and cobble-dominated channels are more often shallow and wide. Clay/silt channels tend to incise or deepen in response to increased flows while sand/gravel channels tend to widen. These relationships, however, are also contingent upon a number of other contributing factors such as gradient, bank slope, and bank vegetation.

Substrate is also an important measure of habitat quality. Extremely fine sediments, such as clays, adhere closely to one another and may bury the streambed. Coarse-grained sediments like gravels present abundant interstices, allowing water, oxygen, and other dissolved and suspended materials to infiltrate the hyporheic zone. The hyporheic zone refers to the area surrounding the stream channel that is saturated

and through which there is some percolation or flow. Essentially, the hyporheic zone is the area where the surface water and groundwater interface and mix. These interstitial pores also provide habitat to benthic (bottom-dwelling) macroinvertebrates, which play important roles in both aquatic food webs and ecosystem functioning. Excessive deposition of clays, silts, and fine particulate organic matter reduces the potential for infiltration and accessibility to the hyporheic zone. Excessive deposition also negatively effects filter feeders such as mussels, and may cause anoxia, or oxygen depletion, in the streambed as organic materials decompose.

In the North Mill Creek-Dutch Gap Canal watershed, most reaches contain a mixture of sediment types, although segments are often dominated by a combination of either:

- sands, gravels and cobbles, or
- silts, clays, and organic matter.

Table NM-11 summarizes the relationship of these two substrate types in the watershed. Across the entire watershed, clay, silt, and organic matter dominated the substrate composition in most of the reaches (24 of 34 reaches). Most reaches exceed 20% composition of both substrate groups, suggesting that throughout a reach neither association out rightly dominates, but that both likely occur. The only portion of the watershed that appears to be dominated by one type of substrate is North Mill Creek-Dutch Gap Canal Mainstem below the Rasmussen Lake dam, which is primarily composed of sand, gravel, and cobble. This is likely due to the "sediment trap" effect of Rasmussen Lake as well as the higher flows, which probably erode and transport a relatively high amount of fine sediment to Mill Creek.

Table NM-11 Predominant Substrate Composition, North Mill Creek-Dutch Gap Canal Watershed

Substrate Composition	North Mill Creek-Dutch Gap Canal Mainstem		Hastings Creek		Deer Lake Drain		North Mill Creek-Dutch Gap Canal Watershed (Total)	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%
Sand, Gravel, Cobble								
50-75%	6	100	3	100	0	0	9	100
<75%	0	0	0	0	0	0	0	0
Clay, Silt, Organic Matter								
50-75%	13	87	1	17	3	100	17	71
<75%	2	13	5	83	0	0	7	29

WATER QUALITY

Visual inspections of several water quality indicators were made during the stream inventory. Turbidity and watercolor, the presence of grease and oil in the sediment or water column, and the abundance of algae were assessed. Table NM-12 summarizes water quality indicators.

Table NM-12 Water Quality Indicators, North Mill Creek-Dutch Gap Canal Watershed

Indicator	North Mill Creek-Dutch Gap Canal		Hastings Creek		Deer Lake Drain		North Mill Creek-Dutch Gap Canal Watershed (Total)	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%
Turbidity, Low	12	52	2	25	1	33	15	44
Turbidity, Moderate	10	43	3	38	2	67	15	44

Turbidity, High	1	4	3	38	0	0	4	12
Grease and Oil	9	39	2	25	0	0	11	32
Algae Score	17		10		13		15	

TURBIDITY

In general, turbidity is not a significant problem in the North Mill Creek-Dutch Gap Canal watershed. Of the four reaches having high turbidity, three were in Hastings Creek (NM015, NM16, and NM17). These reaches also contain excessive fine sediment, which may be re-suspended by minor disturbances.

GREASE AND OIL

Grease and oil were present in nearly a third of all stream reaches in the North Mill Creek-Dutch Gap Canal watershed (see Table NM-12). Where grease and oil was present, it was detected in both the sediment and the water column. The presence of grease and oil bore no strong relationship to any particular land use, but is probably related urban runoff upstream.

ALGAE

Algae are an indicator of high nutrient loads. Algae were not a significant problem in North Mill Creek-Dutch Gap Canal watershed streams. Excessive algae growth can negatively impact aquatic organisms and habitat by causing large daily fluctuations in dissolved oxygen levels. Algae are photosynthetic and therefore take up carbon dioxide during the day and release oxygen into the water column and the air. At night, algae respire, taking oxygen out of the water column and releasing carbon dioxide. Therefore, larger populations of algae have greater potential to cause large daily oxygen fluctuations. In addition, abundant algae populations are often aesthetically undesirable and typically detract from the visual quality of water resources.

Algae scores were calculated by totaling the percentage of the reach affected by both floating and attached algae, based on visual inspection. North Mill Creek-Dutch Gap Canal contained the highest algae score with a score of 17.

INSTREAM FISH COVER

Instream fish cover availability was evaluated based on the presence of a number of structural elements and habitats, consisting of undercut banks, pools over 28 inches deep, aquatic macrophytes, logs, overhanging vegetation, rootwads, boulders, and backwaters. Fish utilize these various forms of habitat in a number ways, including spawning, rearing, foraging, predator avoidance, and resting. Tables NM-13 and NM-14 summarize cover availability and diversity in the North Mill Creek-Dutch Gap Canal watershed.

Overhanging vegetation is the most abundant cover type, appearing in all of the assessed reaches, whereas boulders are least abundant (see Table NM-13). Logs, undercut banks, and macrophytes were also common in stream channels in the North Mill Creek-Dutch Gap Canal watershed, each occurring in more than 80% of the assessed reaches. The role of logs and other large woody debris (LWD) in stream systems and restoration has lately become a matter of consideration. In forested watersheds, logs and other LWD divert flow, create eddies (current reversals), and play an important role in pool, riffle, and bar development. Backwater areas have probably

decreased over time and presently occur in wetlands and other low-lying areas and behind weirs, dams and debris jams.

Table NM-13 Instream Fish Cover, North Mill Creek-Dutch Gap Canal Watershed

Cover Type*	North Mill Creek-Dutch Gap Canal Mainstem		Hastings Creek		Deer Lake Drain		North Mill Creek-Dutch Gap Canal Watershed (Total)	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%
Undercut Banks	22	96	8	100	1	33	31	91
Pool Over 28" Deep	11	48	3	38	1	33	14	41
Macrophytes	17	74	8	100	3	100	28	82
Logs	23	100	8	100	2	66	33	97
Overhanging Vegetation	23	100	8	100	3	100	34	100
Rootwads	12	52	1	13	0	0	13	38
Boulders	8	35	1	13	0	0	9	26
Backwaters	11	48	5	63	1	33	17	50

*Total number of reaches containing cover type and percentage of reaches containing cover type. Percentages do not total 100.

Many fish species require multiple types of habitat over varying time spans to accommodate daily and seasonal requirements as well as life-cycle changes. Habitat diversity, therefore, can be as important as habitat abundance. Table NM-14 summarizes instream cover diversity by comparing the available cover types across reaches. Overall, the North Mill Creek-Dutch Gap Canal watershed offered about 5 types of cover per reach. The North Mill Creek-Dutch Gap Canal Mainstem has the greatest amount of diversity for instream cover, averaging 5.5 forms per reach. Deer Lake Drain contained the least amount of cover with an average of 3.7 forms per reach.

Table NM-14 Instream Cover Diversity, North Mill Creek-Dutch Gap Canal Watershed

Cover Types per Reach*	North Mill Creek-Dutch Gap Canal Mainstem		Hastings Creek		Deer Lake Drain		North Mill Creek-Dutch Gap Canal Watershed (Total)	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%
1	0	0	0	0	0	0	0	0
2	0	0	0	0	1	33	1	3
3	3	13	0	0	0	0	3	9
4	4	17	1	13	1	33	6	18
5	6	26	4	50	1	33	11	32

6	4	17	3	38	0	0	7	21
7	1	4	0	0	0	0	1	3
8	5	22	0	0	0	0	5	15
Average # of Cover Types/Reach	5.5		5.3		3.7		5.3	

AQUATIC AND TERRESTRIAL ORGANISMS

Organisms were not specifically sampled during the stream inventory, but some animals were observed during the inventory.

North Mill Creek-Dutch Gap Canal Mainstem:

Dragonfly and damselfly nymphs, snails, worms, beetles, carp, fathead minnows, bluegill, ducks, geese, herons, frogs, toads, turtle, mouse, and deer.

Hastings Creek:

Dragonfly and damselfly nymphs, snails, worms, golden shiner, carp, fathead minnows, bluegill, ducks, frogs, turtles, beaver, and deer.

Deer Lake Drain:

Dragonfly and damselfly nymphs, beetles, and frogs.

APPENDIX B: DISCHARGE POINTS IN THE NORTH MILL CREEK-DUTCH GAP CANAL WATERSHED

Discharge points are gullies, swales, tributaries and other channels, pipes, culverts, drain tiles and other outfalls that drain into streams in the North Mill Creek-Dutch Gap Canal watershed. As part of the 2007 North Mill Creek-Dutch Gap Canal stream inventory, SMC documented the locations and conditions of 113 outfalls discharging to streams in the North Mill Creek-Dutch Gap Canal watershed. These discharge points range from 4-inch PVC pipes to tributaries 4 feet deep, with a bottom channel width of 12 feet and a top channel width of 18 feet. Throughout the entire watershed, the assessed reaches (excluding lakes) averaged 5.2 discharge points per mile. Of the 113 discharge points documented along the assessed reaches, 31 are located along North Mill Creek-Dutch Gap Canal Mainstem below Rasmussen Lake dam (including the McDonald Lakes tributary), 30 are located in the Hastings Creek stream network, 10 are located in the Deer Lake Drain system and 42 are located in the North Mill Creek-Dutch Gap Canal Mainstem network upstream of Rasmussen Lake (including Mud Lake and George Lake tributaries). Discharge points were most numerous (42 total) along North Mill Creek-Dutch Gap Canal Mainstem north of Rasmussen Lake but were most frequent along the Hastings Creek system (7.4 per stream mile). Table B-1 summarizes the documented points of discharge in the North Mill Creek-Dutch Gap Canal watershed. “Lake Co ID” refers to the unique alphanumeric identification number assigned to each reach during the stream inventory. “Type” describes the structure of each discharge. “Diameter” lists the diameter of all circular and ovular pipes and culverts. “Width, Bottom,” “Width, Top,” and “Depth” describe the dimensions of swales, open channels, and tributaries. “Photo” refers to the unique numeric identification number assigned to each photograph taken during the stream inventory. General notes are also included where applicable.

North Mill Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length		Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	mi.	Min	Max	Min	Max	Min	Max		
NM001	MOD	LOW	MOD	NONE	MOD	5,899	1.12	2.50	5.00	28.00	36.00	17.00	29.00	31.7	2.7
NM002	LOW	LOW	MOD	LOW	MOD	3,054	0.58	1.50	4.00	8.50	16.00	2.50	8.00	12.5	0.4
NM003	LOW	LOW	MOD	MOD	LOW	1,945	0.37	0.50	5.00	3.50	14.00	1.50	4.00	8.2	0.1
NM004	LOW	LOW	LOW	LOW	HIGH	3,300	0.63	0.50	5.00	5.00	11.00	3.00	4.00	7.3	0.4
NM007	LOW	LOW	MOD	NONE	LOW	1,407	0.27	3.50	7.00	6.00	15.00	2.00	3.50	10.7	0.2
NM008	MOD	MOD	MOD	LOW	LOW	969	0.18	1.00	1.50	4.00	9.00	3.00	4.00	7.0	0.2
NM009	MOD	LOW	HIGH	NONE	LOW	7,827	1.48	2.00	5.00	18.00	32.50	10.00	25.00	25.8	1.9
NM010	LOW	LOW	HIGH	NONE	LOW	5,094	0.96	2.00	5.00	24.00	39.00	15.00	32.00	31.4	2.1
NM011	HIGH	MOD	MOD	LOW	LOW	1,832	0.35	0.50	2.00	4.00	11.00	2.50	9.00	7.3	0.6
NM012	MOD	MOD	LOW	MOD	MOD	4,195	0.79	1.00	3.00	4.00	8.50	3.00	4.00	5.8	0.5
NM013	LOW	LOW	HIGH	NONE	LOW	793	0.15	2.00	3.00	19.00	38.00	15.00	27.00	31.0	1.9
NM015	MOD	LOW	LOW	MOD	MOD	4,557	0.86	1.00	3.00	15.00	20.00	3.50	15.00	17.0	2.7
NM016	LOW	LOW	LOW	LOW	HIGH	4,656	0.88	2.00	5.00	12.00	21.00	7.00	16.00	15.8	1.7
NM017	LOW	LOW	LOW	HIGH	HIGH	2,238	0.42	3.00	4.00	11.00	25.00	9.00	18.00	18.0	3.5
NM018	MOD	MOD	LOW	HIGH	MOD	5,308	1.01	2.00	6.00	14.00	19.00	10.00	12.50	16.3	1.6
NM019	MOD	LOW	HIGH	LOW	MOD	849	0.16	0.50	2.00	9.00	14.00	7.00	9.00	11.3	0.9
NM022	MOD	HIGH	MOD	MOD	MOD	1,102	0.21	1.00	2.50	5.00	10.00	4.00	6.00	8.3	0.7
NM023	MOD	MOD	MOD	MOD	MOD	1,181	0.22	0.50	2.00	10.00	17.50	5.00	10.00	13.8	0.2
NM025	LOW	MOD	MOD	HIGH	MOD	3,432	0.65	0.50	2.50	13.00	14.00	7.00	11.00	13.3	0.8
NM026	MOD	LOW	HIGH	LOW	MOD	3,757	0.71	1.50	4.00	18.00	27.00	18.00	23.00	22.7	1.3
NM027	LOW	LOW	MOD	HIGH	MOD	5,794	1.10	1.00	7.00	17.00	24.00	10.00	15.00	19.3	2.3
NM028	LOW	LOW	MOD	MOD	NONE	4,480	0.85	0.50	1.50	9.00	14.00	6.00	8.00	11.7	0.6
NM029	LOW	LOW	HIGH	LOW	LOW	3,677	0.70	0.50	1.00	7.00	16.00	5.00	8.00	11.3	1.2
NM030	MOD	LOW	MOD	HIGH	MOD	2,934	0.56	2.00	4.00	8.00	13.00	7.00	9.00	10.3	1.6
NM031	MOD	MOD	HIGH	MOD	MOD	371	0.07	0.50	1.50	8.00	8.00	3.00	3.50	8.0	0.1
NM032	LOW	LOW	MOD	HIGH	MOD	5,949	1.13	3.00	7.00	26.00	34.00	13.00	25.00	29.3	2.6
NM033	LOW	LOW	MOD	HIGH	MOD	5,374	1.02	3.00	4.00	17.00	25.00	12.00	21.00	21.3	2.5
NM034	MOD	LOW	MOD	HIGH	MOD	5,604	1.06	1.50	5.00	16.00	20.00	8.50	13.00	18.0	2.3
NM035	LOW	LOW	MOD	MOD	MOD	3,536	0.67	1.00	3.00	6.00	16.00	4.00	7.00	9.7	0.8
NM036	MOD	LOW	MOD	MOD	LOW	4,831	0.91	0.50	1.00	12.00	19.00	6.00	13.00	15.7	0.7
NM037	LOW	LOW	MOD	LOW	MOD	4,897	0.93	2.00	4.00	14.00	18.00	9.00	12.00	15.3	0.6
NM038	MOD	MOD	LOW	LOW	LOW	4,644	0.88	1.00	3.00	9.00	9.00	4.00	6.00	9.0	0.4
NM039	MOD	LOW	MOD	HIGH	MOD	4,961	0.94	2.00	6.00	21.00	43.00	10.00	30.00	31.0	2.4
NM040	LOW	LOW	LOW	HIGH	MOD	5,211	0.99	4.00	6.00	19.00	23.00	12.00	15.00	21.0	2.5

Table B-1 Discharge Points, North Mill Creek-Dutch Gap Canal Watershed, Lake County, Illinois and Kenosha County, Wisconsin

Lake Co ID	Type	Diameter (in)	Size, Bottom (ft)	Size, Top (ft)	Size, Deep (ft)	Problem	Photo	Notes
nm001	Steel Pipe	12					78	
nm001	Open Channel		4	8	2		68	Swale
nm001	Open Channel		3	7	0.16		74	Swale
nm002	Steel Pipe	18		0	0		78	Discharge from roads
nm002	Open Channel		0.5	3	2		89	
nm003	Clay Pipe	5		0	0		112	
nm003	Clay Pipe	4		0	0	Yes	109	Broken drainage pipe. Head of pipe found approx 30 ft downstream
nm003	Clay Pipe	4		0	0		113	
nm004	Open Channel		1	2	1.5		137	Run off from field and possibly housing
nm004	Clay Pipe	4		0	0	Yes	126	Sewer odor with white grayish discharge
nm004	Open Channel		0.5	1.5	0.5	Yes	130	Oil in discharge
nm007	Tributary		3	8	3		152	
nm007	Open Channel		2	3.5	1		143	
nm007	Steel Pipe	7		0	0		153	
nm009	Tributary		1.5	7	3		187	Trib
nm009	Steel Pipe	12					190	Bank erosion around pipe
nm009	Open Channel		2.5	5	1.5		176	
nm009	Open Channel		4	8	2		180	Swale
nm009	Tributary		1.5	2	1		179	
nm009	Tributary		3	7	1.5		194	
nm009	Steel Pipe	12					185	Discharge from pond
nm010	Tributary		2	6	2.5		211	
nm010	Tributary		5	7	3		209	
nm010	Open Channel		2.5	5	3		206	Runoff from field
nm010	Tributary		3	9	2.5		215	
nm010	Plastic Pipe	12					222	
nm010	Open Channel		2.5	4	2		223	Runoff from ag field
nm010	Open Channel		1.5	2	1.5		205	Runoff from ag field
nm010	Plastic Pipe	7	5	10	4	Yes	214	Failed plastic drainage pipe with no flow, flow from channel
nm012	Plastic Pipe	8					236	Drainage from residence
nm013	Open Channel		5	13	2		250	Channel leading from pond in 251
nm015	Clay Pipe	16				Yes	273	Drain tile under water, trib from timber lake. depth of water is 2 feet.
nm016	Open Channel		3	5	2		278	Swale with water but no flow

nm016	Open Channel		1.5	3.5	2		282	Swale
nm016	Steel Pipe	6				Yes	276	Drainage pipe, with erosion and debris jam
Lake Co ID	**Type**	**Diameter (in)**	**Size, Bottom (ft)**	**Size, Top (ft)**	**Size, Deep (ft)**	**Problem**	**Photo**	**Notes**
nm016	Plastic Pipe	4					277	PVC drainage pipe
nm016	Open Channel		7	12	2		279	Swale from backwater in photo 280
nm016	Open Channel		9	15	2.5		284	Armored swale from forest preserve land.
nm016	Steel Pipe	6				Yes	285	Broken pipe with erosion undercut
nm016	Steel Pipe	6					287	Drainage pipe
nm016	Concrete Pipe	12					288	Drainage pipe w/ armoring
nm016	Plastic Pipe	4				Yes	289	PVC pipe w/ erosion
nm016	Open Channel		1.5	3	2.5		275	Swale, runoff from rd, has water but no flow currently
nm016	Plastic Pipe	6				Yes	283	PVC pipe sticking out into channel
nm017	Concrete Pipe	18					297	Drainage pipe
nm017	Concrete Pipe	18				Yes	299	Discharge pipe under concrete structure, brownish color to discharge water
nm017	Open Channel		1	2.5	1		295	Swale with rocks
nm018	Plastic Pipe	10					328	Two discharge pipes on either side of culvert, drainage off of beck rd
nm018	Plastic Pipe	13					322	Drainage pipe w/ plastic flange
nm018	Open Channel		2	3	2		315	Swale
nm018	Open Channel		8	11	2		312	Swale
nm018	Concrete Pipe	8				Yes	308	Broken drainage pipe
nm018	Open Channel		2	7	1.5		307	Concrete abutment, swale w/ water
nm018	Other		4	8	2		318	Concrete swale w/ discharge from water treatment plant, flow alternates temperature from warm to cool.
nm018	Concrete Pipe	16				Yes	313	Drainage pipe w/ erosion undercutting pipe
nm019	Tributary		1.5	3	0.6		334	Trib from lake
nm022	Open Channel		0.5	1	0.5		349	Swale from sand lake rd
nm022	Tributary		3	5	2.5	Yes	347	Eroded trib
nm023	Open Channel		2.5	4	1		353	Small trib
nm025	Plastic Pipe	6					363	
nm026	Open Channel		3	6	2.5		385	Swales from road discharge on either side of culvert
nm026	Tributary		1.5	3	0.5		372	
nm026	Tributary		2	2	2		368	

nm026	Steel Pipe	12					386	Pipe w/ swale for rd discharge
nm027	Open Channel		1	1.5	0.5		388	Drainage from farm field
nm027	Open Channel		5	10	4		403	Swale with debris
Lake Co ID	**Type**	**Diameter (in)**	**Size, Bottom (ft)**	**Size, Top (ft)**	**Size, Deep (ft)**	**Problem**	**Photo**	**Notes**
nm027	Open Channel		1.5	6	3	Yes	396	Swale, piece of broken clay drain pipe at mouth
nm027	Open Channel		3	5	0.5		394	Swale
nm027	Open Channel	14					407	Drainage from farm land
nm027	Clay Pipe	26				Yes	393	Drainage pipe with 3 broken sections, channel eroded back to pipe
nm028	Steel Pipe	18					419	Discharge with armor
nm029	Steel Pipe	14				Yes	425	Two culverts
nm029	Open Channel		3	7	2.5		426	Swale from rd discharge
nm030	Open Channel		2.5	3	2		441	Drainage from corn field
nm030	Clay Pipe	4					435	Drainage pipe, pipes line culvert on both sides approximately 6 each side
nm030	Open Channel		2.5	6	2.5	Yes	445	Eroded channel from corn field
nm030	Open Channel		2	3.5	2.5		443	Drainage from corn field
nm030	Plastic Pipe	6				Yes	440	Bank eroded back behind pipe
nm030	Open Channel		2.5	3	1		434	Unsure of origin
nm030	Clay Pipe	8				Yes	433	Broken end
nm031	Concrete Pipe	12				Yes	448	Water is flowing into pipe not discharging
nm031	Open Channel		2.5	4	1.5		449	Discharge from field
nm032	Other		5	11	3	Yes	457	Trib from drain tile
nm032	Open Channel		2.5	7	2		462	Discharge from field
nm033	Tributary						467	Trib flowing through culvert
nm033	Open Channel		2	3	2.5		470	Drainage from corn field
nm033	Steel Pipe	12				Yes	476	Erosion around pipe
nm033	Steel Pipe	12				Yes	464	Rusted and broken
nm033	Steel Pipe	14				Yes	474	Discharge pipe with another transects over pipe, erosion below and above pipe
nm033	Open Channel		4	6	2.5		473	Drainage from farm field
nm033	Open Channel		4	5	3		469	
nm033	Steel Pipe	13				Yes	479	Drainage pipe broken and eroding back
nm034	Plastic Pipe	14					504	
nm034	Plastic Pipe	4					503	
nm034	Steel Pipe	12				Yes	482	Broken steel drainage pipe, erosion
nm034	Clay Pipe	10				Yes	488	Buried and broken
nm034	Clay Pipe	6				Yes	490	Broken pipe
nm034	Tributary		12	18	4		492	Water in channel but flow rate is mod

Lake Co ID	Type	Diameter (in)	Size, Bottom (ft)	Size, Top (ft)	Size, Deep (ft)	Problem	Photo	Notes
nm034	Open Channel		1	2	2		493	
nm034	Steel Pipe	6				Yes	495	Erosion
nm034	Steel Pipe	12				Yes	496	Large eroded hole up on bank, pipe broken
nm034	Steel Pipe	12				Yes	484	Piece completely broken off, eroding back around pipe underground
nm034	Plastic Pipe	14					505	Near earlier pipe
nm034	Clay Pipe		3	8	3.5	Yes	506	Channel with Clay Pipe rubble
nm034	Steel Pipe	6				Yes	508	
nm034	Plastic Pipe						510	Broken with armor
nm034	Steel Pipe	12				Yes	511	Broken and partly buried
nm034	Steel Pipe	14				Yes	512	Appears to be no flow, under water
nm034	Plastic Pipe	4					499	Two pipes
nm034	Clay Pipe	8					498	Protruding into channel but not much erosion
nm035	Steel Pipe	6					518	Sticking out into channel
nm038	Open Channel		3	5	3	Yes	538	Swale w/ erosion
nm039	Open Channel		2	2.5	1		542	Swale

APPENDIX C: HYDRAULIC STRUCTURES IN THE NORTH MILL CREEK-DUTCH GAP CANAL WATERSHED

Hydraulic structures were measured and recorded as part of the North Mill Creek-Dutch Gap Canal stream inventory. Hydraulic structures are any objects in or spanning the stream channel that could have the potential to constrict, divert, deflect, or impede flow, causing localized erosion problems and/or backwater flooding. These structures include bridges, in-stream culverts, dams, weirs, and fences. SMC personnel located 120 hydraulic structures, over a third of which are in-stream culverts associated with roads or driveways (44 in total, 25 concrete culverts). Additionally, the inventory found 30 bridges, 19 of which are wood footbridges, suggesting that a total of 74 hydraulic structures facilitate movement of people, animals, or vehicles across the stream channel. Only 6 out of the 27 dams recorded are human made and most serve to regulate water levels on lakes and ponds or provide for flood control and stormwater management. The remaining 21 dams are beaver dams and obstructed the flow of the stream and in some cases created backwaters. The most hydraulic structures are found along North Mill Creek-Dutch Gap Canal Mainstem (85 of the 120). This is not unexpected since North Mill Creek-Dutch Gap Canal Mainstem attributes to 16 miles out of 21.7 miles of stream in the entire watershed. However hydraulic structures do not occur the most frequently in North Mill Creek-Dutch Gap Canal (5.3 per stream mile), they occur more frequently in the Hastings Creek system (6.2 per stream mile) and in Deer Lake Drain (6.1 per stream mile). This suggests that at the catchment scale, riparian zones in Hastings Creek and in Deer Lake Drain are more developed than in the North Mill Creek-Dutch Gap Canal Mainstem catchment. When looking at a map or aerial photograph it can be seen that the area around Hastings Creek and Deer Lake Drain is more develop and residential than North Mill Creek-Dutch Gap Canal Mainstem.

Table C-1 lists the hydraulic structures of the North Mill Creek-Dutch Gap Canal watershed. “Lake Co ID” refers to the individual reach in which the hydraulic structure is located (for a complete explanation of the numbering system for the stream inventory, see Appendix A). “Type” refers to the nature of the hydraulic structure while “Material” describes dominant substance from which the structure is constructed. “Diameter” refers to the diameter (inches) of culverts while “Width” and “Height” (feet) refer to the dimensions of other hydraulic structures. “Problem” lists those structures at which an existing or potentially problematic situation (such as) was noted. “Photo” refers to the unique identification number given to the photo of the hydraulic structure. General notes are also included where applicable.

Table C-1 Hydraulic Structures, North Mill Creek-Dutch Gap Canal Watershed, Lake County, Illinois and Kenosha County, Wisconsin

Lake Co ID	Type	Material	Diameter (in)	Size, Width (ft)	Size, Height (ft)	Problem	Photo	Notes
nm001	Beaver Dam	Wood		32	4		64	
nm001	Beaver Dam	Wood		10	3		71	
nm001	Beaver Dam	Wood		0	0		73	Beaver dam with midstream bar, dam and oxbow with dams on all sides
nm001	Beaver Dam	Wood		20	4.5		76	
nm001	Bridge	Concrete		41	8		79	Bridge/culvert at Milburn
nm002	Fence	Steel		14	2	Yes	94	Across channel
nm002	Bridge	Wood		20	2	Yes	98	Timber foot bridge with old metal bride and concrete footing
nm002	Culvert	Concrete		10	5		100	At Route 45
nm003	Culvert	Concrete	48	0	0		118	
nm003	Culvert	Concrete	36	0	0		120	Culvert at Haven
nm003	Fence	Wood		12	2	Yes	117	Old wood and wire fence
nm003	Bridge	Wood		16	3.5		110	Foot bridge
nm003	Other	Concrete		3	2	Yes	105	Armoring and an old structure
nm003	Culvert	Concrete	12	0	0		103	Culvert with rock drainage above, at route 45
nm003	Bridge	Wood		17	5		115	Foot bridge
nm004	Culvert	Concrete	34	0	0		124	Two culverts
nm004	Culvert	Steel	16	12	3	Yes	127	Possible old crossing, concrete spanning most of channel, left culvert has some flow, right is full of sediment, stream has scoured left bank and is flowing around structure
nm006	Bridge	Wood		18	4		141	Foot bridge
nm007	Bridge	Wood		96	2		146	Footbridge with debris accumulation in spots
nm007	Culvert	Concrete	29				154	Culvert under Beck Rd
nm007	Culvert	Concrete	22				155	Culvert near Beck Rd coming from little lake
nm008	Fence	Steel		12	5	Yes	159	
nm008	Culvert	Concrete	22	0	0		156	
nm008	Bridge	Wood		8	0.5		163	Foot bridge
nm008	Culvert	Steel	26	0	0		159	Two culverts under trail
nm009	Dam	Concrete		38	3		195	Debris
nm009	Bridge	Wood		35	2	Yes	183	Timber foot bridge
nm009	Bridge	Wood		30	3		189	Metal and wood foot bridge
nm009	Other	Concrete			2.5		192	Old Bridge crossing
nm010	Bridge	Concrete		27	6.5		226	Old bridge from Kelly rd

Lake Co ID	Type	Material	Diameter (in)	Size, Width (ft)	Size, Height (ft)	Problem	Photo	Notes
nm010	Other	Other		19.5	5	Yes	203	Concrete and stone creating a debris jam
nm010	Other	Concrete		15	2	Yes	197	Massive debris behind structure
nm011	Culvert	Concrete		5	1.5		233	End of reach, wetland at rt 45
nm012	Culvert	Steel	24				239	Crawford rd
nm012	Culvert	Steel	20				237	
nm012	Culvert	Steel	24				242	Culvert at farm crossing
nm013	Fence	Steel		20	11	Yes	245	Steel fence w/ concrete side walls and debris jam upstream
nm013	Dam	Concrete		29	5		258	Dam/bridge at Rasmussen lake
nm015	Culvert	Concrete		10	2		260	
nm015	Culvert	Steel	60				266	Culvert under farm road
nm015	Bridge	Other		38	3.5	Yes	271	Wood and steel bridge , possible dam, in ruins, some of pillar eroded and over half of wood missing
nm016	Culvert	Steel	84				291	Culvert under forest preserve trail
nm016	Culvert	Concrete		13	7		292	
nm017	Other	Concrete		6	2	Yes	298	Discharge pipe under right form draining brown liquid
nm017	Culvert	Concrete	48				301	Culvert under residence road
nm018	Bridge	Wood		15	0.5		306	Wood foot bridge
nm018	Bridge	Wood		16	1.5		311	Old timber foot bridge
nm018	Beaver Dam	Wood		10		Yes	317	Site of one dam, other dams beginning downstream, next to treatment plant
nm018	Beaver Dam	Wood		6		Yes	323	
nm018	Fence	Steel		15	6	Yes	325	Fence crossing stream and in both directions, with barbed wire
nm018	Fence	Steel		12	6	Yes	326	End of steel fence from water treatment plant
nm018	Culvert	Concrete	48				328	Culvert at beck rd
nm018	Bridge	Wood		22	4		304	Timber footpath
nm019	Bridge	Wood		10	1		330	Old foot bridge
nm022	Beaver Dam	Wood		6	2	Yes	342	
nm022	Beaver Dam	Wood		10	2	Yes	343	
nm022	Bridge	Wood		11	2.5		344	Foot bridge, human activities, dead fish in water and on banks
nm022	Culvert	Concrete		9	3		350	Culvert at sand lake rd
nm023	Culvert	Steel	24			Yes	358	End of stream, rusted culvert pipe, surrounded by concrete rubble, eroded horseshoe shape around pipe, very little flow, dead fish in reach
nm023	Bridge	Wood		33	4		352	Foot bridge in forest preserve

nm023	Fence	Steel		12	5	Yes	351	Fence from forest preserve
nm025	Culvert	Other	16			Yes	361	Two concrete culverts and one steel
Lake Co ID	**Type**	**Material**	**Diameter (in)**	**Size, Width (ft)**	**Size, Height (ft)**	**Problem**	**Photo**	**Notes**
nm026	Other	Concrete		25	2	Yes	376	Old concrete structure, erosion on right bank upstream, concrete under water across most of channel, metal gear structure, possible old dam
nm026	Bridge	Concrete		22	3.5		389	
nm026	Culvert	Concrete		56	8		384	Bridge at rt 173
nm026	Beaver Dam	Other		26	3	Yes	381	Combination of a beaver dam, concrete armoring and tree blocking channel, approx 5 foot drop
nm026	Beaver Dam	Wood		20	3		378	Very wide dam
nm026	Beaver Dam	Wood		26	3		375	3 dams
nm026	Beaver Dam	Wood		21	1.5		373	
nm026	Beaver Dam	Wood		16	3		370	
nm026	Bridge	Steel		21	2	Yes	367	Old farm crossing
nm026	Beaver Dam	Wood		28	2	Yes	366	
nm026	Beaver Dam	Wood		32	1.5	Yes	365	
nm026	Beaver Dam	Wood		15	3		379	
nm027	Fence	Steel		18	4	Yes	387	Fence w/ utility line, barbed wire either side of fence
nm027	Fence	Steel		18	7	Yes	404	Top fence crossing channel, bottom fence is opened downstream
nm027	Culvert	Steel	144				408	Two large culverts
nm027	Fence	Steel		28	4	Yes	410	
nm027	Bridge	Steel		32	5.5	Yes	406	Wood and steel bridge on horse farm
nm027	Beaver Dam	Wood		19	3.5	Yes	402	Concrete and metal debris on left bank
nm027	Beaver Dam	Wood		22	3.5	Yes	401	
nm027	Beaver Dam	Wood		11	0.5		392	
nm027	Bridge	Concrete			5	Yes	400	Old bridge
nm028	Fence	Steel		8	5	Yes	421	
nm028	Culvert	Plastic	24				413	3 culverts
nm028	Bridge	Wood		17	2.5		415	Foot bridge
nm028	Dam	Wood		7	1	Yes	416	Small broken wood dam
nm028	Culvert	Concrete		8	3		418	Culvert at rt 173
nm028	Fence	Steel		14	3	Yes	420	End of reach, wetland beyond
nm029	Culvert	Concrete		20	3		432	Culvert under 128th st
nm029	Beaver Dam	Wood		7.5	0.5		431	
nm029	Dam	Concrete		6	3.5		423	Dam at lake
nm029	Culvert	Concrete		12	4		422	Culvert under rt 45

Lake Co ID	Type	Material	Diameter (in)	Size, Width (ft)	Size, Height (ft)	Problem	Photo	Notes
nm030	Culvert	Concrete	36				446	Empties into north mill
nm031	Culvert	Concrete	12				447	Trib to nm at Edwards created by culvert drainage from field
nm032	Culvert	Concrete		24	8		463	Culvert under 128th st
nm033	Culvert	Concrete					467	See trib info
nm033	Culvert	Concrete		20	9		480	Culvert at Horton rd
nm034	Bridge	Concrete		15	6	Yes	494	Walls failing, erosion
nm034	Bridge	Concrete		26	8	Yes	514	Old bridge
nm034	Bridge	Concrete		38	8		515	
nm035	Culvert	Steel	60				517	Culvert for farm rd
nm035	Bridge	Wood		11	2.5	Yes	519	Old broken foot bridge
nm035	Culvert	Concrete	72				522	
nm036	Beaver Dam	Wood		13	1	Yes	524	
nm036	Culvert	Steel	60				526	Culvert under 187th
nm037	Culvert	Steel		12	4		533	Culvert under 107th
nm037	Culvert	Concrete	72				531	Two culverts under rt 45
nm037	Dam	Concrete		20	3		556	Spillway from George lake
nm037	Bridge	Wood		26	2.5		558	Driveway crossing
nm037	Culvert	Steel	16				559	Culvert under driveway
nm037	Fence	Steel		10	10	Yes	563	
nm037	Bridge	Wood		15	2.5		532	Foot bridge
nm038	Culvert	Plastic	38				534	Culvert under rt 45, portion to nm is underground drain tile
nm038	Culvert	Steel	30				539	
nm038	Dam	Other		4.5	2.5	Yes	540	Poor function wood and concrete dam, upstream is wetland
nm039	Culvert	Steel	60			Yes	546	Pipe underwater on upstream side
nm039	Bridge	Wood		30	0.5		547	Foot bridge
nm040	Culvert	Steel	60				554	Culvert under 93rd st
nm040	Bridge	Wood		22	2.5		551	Old foot bridge

APPENDIX D: NORTH MILL CREEK-DUTCH GAP CANAL WATERSHED STREAM INVENTORY PHOTO LOG

Photographs were taken throughout the stream inventory to document conditions in the stream and river corridor. Additional photos such as debris, representative reach (photo taken at each channel measurement), and armor were taken. As well as every point discharge and hydraulic structure. In total, 438 photos were taken. Photos are listed and described in Table D-1 below and are organized by reach (for a complete explanation of the numbering scheme for the stream inventory, see Appendix B). "Lake Co ID" refers to the unique alphanumeric identification number assigned to individual reaches assessed in the stream inventory. "Photo" refers to the unique identification number assigned to each photo taken during the stream inventory. "Photo Description" refers to what the photo is of and any additional notes. Any gap in photo number is due to duplication or poor picture quality.

Table D-1 Stream Inventory Photo Log, North Mill Creek-Dutch Gap Canal Watershed, Lake County, Illinois and Kenosha County, Wisconsin

Lake Co ID	Photo	Photo Description
nm001	67	Debris
nm001	79	Bridge at Milburn
nm001	76	Beaver dam
nm001	75	Debris
nm001	74	Swale
nm001	73	Beaver dam and cut off channel with dams on all sides
nm001	72	Erosion and debris
nm001	71	Beaver dams
nm001	78	Steel pipe with discharge from road
nm001	69	Midstream bar
nm001	68	Swale
nm001	65	Bank erosion
nm001	64	Beaver dam
nm001	75	Representative reach 1
nm001	166	Representative reach 3, taken on 6/5/07 (after initial reach evaluation)
nm001	165	Representative reach 2 taken on 6/5/07 (after initial reach evaluation)
nm001	70	Midstream bar, with cut off channel
nm001	66	Debris
nm002	85	Bar created by split channel formation due to debris
nm002	98	Timber foot bridge old metal bridge and debris
nm002	96	Debris
nm002	95	Debris
nm002	94	Fence across channel
nm002	93	Debris
nm002	92	Debris
nm002	90	Debris

nm002	100	Representative reach 4, Culvert at route 45
Lake Co ID	**Photo**	**Photo Description**
nm002	86	Cut-off channel
nm002	99	Erosion
nm002	84	Debris
nm002	82	Debris
nm002	81	Debris
nm002	80	Representative reach 1
nm002	97	Representative reach 3 and erosion
nm002	87	Erosion
nm002	89	Open channel
nm002	88	Representative reach 2
nm002	78	Steel pipe
nm003	116	Representative reach 2
nm003	119	Representative reach 3
nm003	105	Dam and armoring
nm003	113	Clay pipe
nm003	112	Clay pipe
nm003	109	Clay pipe
nm003	114	Bank erosion
nm003	117	Wood fence
nm003	120	Culvert at Haven Rd.
nm003	115	Foot bridge
nm003	111	Failed armor
nm003	110	Foot bridge
nm003	106	Armoring
nm003	104	Armoring
nm003	103	Representative reach 1, Culvert topped with drainage path
nm003	118	Culvert
nm004	130	Channel with oil discharge
nm004	126	Clay pipe with strong odor
nm004	127	Culvert structure
nm004	131	Erosion
nm004	134	Representative reach 2
nm004	128	Erosion due to structure in photo 127
nm004	129	Debris
nm004	135	Failed armor
nm004	137	Swale
nm004	132	Debris
nm004	125	Debris
nm004	124	Two culverts
nm004	123	Armoring
nm004	122	Armoring
nm004	121	Representative reach 1
nm004	136	Representative reach 3
nm005	140	Lake

nm005	139	Dam
Lake Co ID	**Photo**	**Photo Description**
nm006	142	Beginning of channel
nm006	141	Bridge between lakes
nm007		
nm007	155	Culvert at Beck Rd from small lake
nm007	146	Bridge
nm007	153	Steel pipe
nm007	154	Culvert under Beck Road
nm007	150	Representative reach 2, erosion
nm007	152	Representative reach 3
nm007	152	Tributary
nm007	147	Debris
nm007	148	Debris
nm007	145	Debris
nm007	144	Debris
nm007	143	Tributary
nm007	142	Representative reach 1
nm008		
nm008	162	Debris
nm008	161	Representative reach 2, debris
nm008	157	Channelization
nm008	156	Culvert at pleasant Plaines
nm008	164	Representative reach 3
nm008	163	Foot bridge
nm008	159	Culverts and fence at walk way
nm008	158	Representative reach 1
nm009	192	Concrete dam
nm009	177	Debris
nm009	176	Swale
nm009	175	Erosion
nm009	174	Debris
nm009	173	Representative reach 2
nm009	172	Debris
nm009	171	Debris
nm009	170	Debris
nm009	168	Debris
nm009	191	Debris and erosion
nm009	194	Tributary
nm009	195	Representative reach 4, dam
nm009	182	Representative reach 3
nm009	180	Open channel
nm009	185	Steel pipe
nm009	178	Debris
nm009	187	Tributary
nm009	184	Debris
nm009	183	Timber foot bridge

nm009	190	Steel pipe with erosion
Lake Co ID	**Photo**	**Photo Description**
nm009	179	Tributary
nm009	167	Representative reach 1, beginning at Millburn bridge
nm010	222	Plastic pipe
nm010	197	Dam at reach beginning
nm010	218	Erosion
nm010	205	Open channel
nm010	211	Tributary
nm010	215	Tributary
nm010	223	Open channel, runoff from ag field
nm010	198	Debris behind dam (one of two -199), causing backwater
nm010	207	Erosion
nm010	214	Failed plastic drainage pipe with no flow, flow from channel
nm010	200	Representative reach 1
nm010	201	Backwater
nm010	203	Failed armoring
nm010	206	Runoff from field
nm010	209	Tributary
nm010	213	Representative reach 2
nm010	217	Debris
nm010	224	Debris
nm010	225	Debris
nm010	226	Representative reach 4, bridge at Kelly Rd
nm010	221	Representative reach 3
nm010	199	Second debris jam upstream of 198, causing backwater
nm011	227	Representative reach 1, debris
nm011	233	Concrete culvert
nm011	232	Representative reach 3
nm011	230	Representative reach 2
nm011	228	Erosion
nm011	229	Debris
nm011	231	Debris
nm012	238	Representative reach 1
nm012	242	Steel culvert at old farm crossing
nm012	243	Representative reach 3
nm012	241	Representative reach 2
nm012	236	Plastic pipe
nm012	239	Steel Culvert
nm012	237	Steel Culvert
nm012	244	Debris
nm012	240	Debris
nm012	235	Debris
nm013	256	Representative reach 3

nm013	245	Steel fence
Lake Co ID	**Photo**	**Photo Description**
nm013	253	Representative reach 2
nm013	251	Pond leading to channel entering North Mill Creek-Dutch Gap Canal
nm013	258	Concrete Dam
nm013	248	Representative reach 1
nm013	250	Open channel
nm013	254	Small water falls
nm013	246	Debris behind fence
nm013	255	Falls downstream of dam at Rasmussen lake
nm015	264	Debris
nm015	261	Representative reach 1
nm015	266	Representative reach 2, steel culvert under old farm road
nm015	269	Representative reach 3
nm015	260	Concrete culvert
nm015	271	Wood and steel bridge , possible dam, in ruins, some of pillar eroded and over half of wood missing
nm015	273	Clay pipe
nm015	267	Debris
nm015	270	Debris
nm015	263	Debris
nm015	262	Debris
nm015	268	Debris w/ cutoff channel
nm016	290	Representative reach 3
nm016	291	Steel culvert
nm016	292	Concrete culvert
nm016	276	Steel pipe, drainage pipe, with erosion and debris jam
nm016	275	Open channel, runoff from rd
nm016	277	Plastic pipe
nm016	274	Representative reach 1, route 45 culvert
nm016	279	Swale from farm backwater in photo 280
nm016	280	Backwater leading to swale in photo 279
nm016	281	Representative reach 2
nm016	289	Plastic pipe
nm016	288	Concrete pipe
nm016	287	Steel pipe
nm016	285	Steel pipe, broken pipe with erosion undercut
nm016	284	Open channel
nm016	283	Plastic pipe
nm016	282	Open channel
nm016	278	Open channel
nm017	297	Concrete pipe
nm017	295	Open channel
nm017	293	Representative reach 1
nm017	301	Concrete culvert
nm017	301	Representative reach 2

nm017	296	Debris
Lake Co ID	**Photo**	**Photo Description**
nm017	294	Debris
nm017	298	Concrete structure with steel pipe
nm017	299	Discharge pipe under concrete structure, brownish color to discharge water
nm018	319	Representative reach 4
nm018	302	Representative reach 1
nm018	306	Representative reach 3
nm018	326	End of steel fence from water treatment plant
nm018	304	Wood bridge
nm018	328	Concrete culvert at Beck Rd.
nm018	308	Concrete pipe, broken
nm018	312	Open channel
nm018	313	Concrete pipe with erosion
nm018	315	Open channel
nm018	318	Concrete swale w/ discharge from water treatment plant, flow alternates temperature from warm to cool.
nm018	322	Plastic pipe
nm018	328	Plastic pipe, two discharge pipes on either side of culvert, drainage off of beck rd
nm018	305	Representative reach 2
nm018	306	Wood bridge
nm018	323	Beaver dam
nm018	317	Beaver dam with problem
nm018	303	Debris
nm018	325	Steel fence crossing stream and in both directions, with barbed wire
nm018	316	Debris
nm018	311	Wood bridge
nm018	307	Open channel, concrete abutment, swale w/ water
nm019	331	Representative reach 2
nm019	332	Representative reach 3
nm019	330	Wood foot bridge
nm019	334	Tributary
nm019	329	Representative reach 1
nm022	343	Beaver dam
nm022	344	Wood bridge
nm022	347	Tributary, eroded
nm022	349	Open channel from Sand Lake Rd
nm022	350	Concrete culvert at Sand Lake Rd
nm022	338	5 dead or dying fish, not sure of cause
nm022	346	Representative reach 3, debris
nm022	348	3 dead fish, human activities or water level possibly?
nm022	342	Beaver dam
nm022	345	Representative reach 2
nm022	341	Representative reach 1

Lake Co ID	Photo	Photo Description
nm023	353	Open channel
nm023	351	Representative reach, steel fence
nm023	354	Representative reach 2
nm023	352	Wood bridge
nm023	358	Steel culvert, end of stream, rusted culvert pipe, surrounded by concrete rubble, eroded horseshoe shape around pipe, very little flow, dead fish in reach
nm025	364	Representative reach 3
nm025	363	Plastic pipe
nm025	362	Debris
nm025	361	Representative reach 2, 2 concrete culverts and one steel
nm025	359	Representative reach 1
nm026	376	Old concrete structure, erosion on right bank upstream, concrete under water across most of channel, metal gear structure, possible old dam
nm026	380	Concrete armoring
nm026	386	Steel pipe w/ swale for rd discharge
nm026	365	Beaver dam
nm026	385	Swales from road discharge on either side of culvert
nm026	372	Tributary
nm026	368	Tributary
nm026	389	Concrete bridge
nm026	384	Concrete culvert
nm026	381	Combination of a beaver dam, concrete armoring and tree blocking channel, approx 5 foot drop
nm026	378	Very wide beaver dam
nm026	377	Representative reach 3
nm026	379	Beaver dam
nm026	371	Representative reach 2
nm026	375	3 beaver dams
nm026	369	Erosion
nm026	374	Erosion
nm026	366	Beaver dam
nm026	367	Steel bridge, old farm crossing
nm026	370	Beaver dam
nm026	373	Beaver dam
nm026	366	Representative reach 1, beaver dam
nm027	391	Erosion
nm027	410	Steel fence
nm027	405	Representative reach 4
nm027	397	Erosion
nm027	390	Representative reach 1
nm027	395	Representative reach 2
nm027	398	Representative reach 3
nm027	393	Clay pipe

nm027	387	Steel fence w/ utility line, barbed wire either side of fence
nm027	406	Wood with steel bridge
Lake Co ID	**Photo**	**Photo Description**
nm027	407	Open channel
nm027	403	Open channel
nm027	394	Open channel
nm027	388	Open channel
nm027	408	Steel culvert
nm027	404	Steel fence
nm027	402	Beaver dam
nm027	401	Beaver dam
nm027	400	Concrete bridge
nm027	392	Beaver dam
nm027	396	Open channel
nm028	412	Representative reach 1
nm028	420	Steel fence
nm028	417	Armor
nm028	419	Steel pipe
nm028	421	Steel fence
nm028	418	Concrete culvert
nm028	416	Wood dam
nm028	415	Wood bridge
nm028	413	3 plastic culverts
nm028	414	Representative reach 2
nm028	420	Representative reach 3
nm029	426	Open channel
nm029	430	debris
nm029	428	Debris
nm029	428	Representative reach 1
nm029	431	Beaver dam
nm029	429	Representative reach 2
nm029	422	Concrete culvert
nm029	423	Concrete dam
nm029	432	Representative reach 3, concrete culvert
nm029	425	Steel pipe
nm030	441	Open channel
nm030	442	Debris
nm030	439	Exposed bank within 2 feet from crop
nm030	437	Fence line on eroded bank, metal posts in or at the edge of stream
nm030	443	Open channel
nm030	440	Plastic pipe
nm030	435	Clay pipe
nm030	434	Open channel
nm030	433	Clay pipe
nm030	446	Representative reach 3, concrete culvert

nm030	444	Representative reach 2
nm030	436	Representative reach 1
nm030	445	Open channel
Lake Co ID	**Photo**	**Photo Description**
nm031	449	Open channel
nm031	450	Representative reach 1
nm031	452	Representative reach 2
nm031	448	Concrete pipe
nm031	451	Debris
nm031	447	Concrete culvert
nm032	454	Representative reach 1
nm032	455	Representative reach 2
nm032	458	Representative reach 3
nm032	461	Representative reach 4
nm032	463	Concrete culvert
nm032	457	Tributary from drain tile
nm032	462	Open channel
nm032	458	Debris
nm032	456	Gravel rd crossing stream
nm033	479	Steel pipe
nm033	466	Trib water with sediment entering main channel
nm033	472	Debris
nm033	465	Representative reach 1
nm033	476	Steel pipe
nm033	474	Steel pipe
nm033	473	Open channel
nm033	470	Open channel
nm033	464	Steel pipe
nm033	480	Concrete culvert
nm033	467	Concrete culvert which tributary flows through
nm033	477	Representative reach 4
nm033	471	Representative reach 3
nm033	468	Representative reach 2
nm033	469	Open channel
nm033	475	Debris
nm034	489	Debris
nm034	499	Plastic pipe
nm034	503	Plastic pipe
nm034	509	Debris
nm034	504	Plastic pipe
nm034	505	Plastic pipe
nm034	506	Clay pipe
nm034	508	Steel pipe
nm034	510	Plastic pipe
nm034	512	Steel pipe
nm034	498	Clay pipe
nm034	484	Steel pipe

nm034	511	Steel pipe
nm034	482	Steel pipe
nm034	481	Representative reach 1
Lake Co ID	**Photo**	**Photo Description**
nm034	486	Representative reach 2
nm034	497	Representative reach 3
nm034	502	Representative reach 4
nm034	513	Representative reach 5
nm034	494	Concrete bridge
nm034	490	Clay pipe
nm034	515	Concrete bridge
nm034	496	Steel pipe
nm034	488	Clay pipe
nm034	491	Erosion
nm034	492	Tributary
nm034	493	Open channel
nm034	495	Steel pipe
nm034	514	Concrete bridge
nm035	522	Concrete culvert
nm035	518	Steel pipe
nm035	516	Erosion
nm035	517	Representative reach 1, steel culvert
nm035	519	Wood bridge
nm035	520	Representative reach 2
nm035	521	Representative reach 3
nm036	525	Representative reach 2
nm036	528	Representative reach 3
nm036	524	Beaver dam
nm036	526	Steel culvert
nm036	523	Representative reach 1
nm036	527	Wetland
nm037	558	Wood bridge
nm037	557	Armoring
nm037	561	Failed armor
nm037	555	George lake
nm037	559	Steel culvert
nm037	556	Concrete dam from spill in George Lake
nm037	533	Steel culvert
nm037	531	2 Concrete culverts
nm037	564	Representative reach 3
nm037	562	Representative reach 2
nm037	532	Representative reach 1, wood bridge
nm037	560	Erosion
nm037	563	Steel fence
nm038	535	Representative reach 1
nm038	536	Debris
nm038	538	Open channel

nm038	540	Wood and concrete dam
nm038	539	Steel culvert
nm038	537	Representative reach 2
Lake Co ID	**Photo**	**Photo Description**
nm038	534	Plastic culvert
nm039	541	Representative reach 1
nm039	542	Open channel
nm039	546	Steel culvert
nm039	544	Erosion
nm039	547	Representative reach 4, wood bridge
nm039	543	Representative reach 2
nm039	545	Representative reach 3
nm040	554	Steel culvert
nm040	551	Wood bridge
nm040	553	Representative reach 2
nm040	550	Representative reach 1
nm040	552	Erosion

12/15/2015

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

2015

NEWPORT DRAINAGE DITCH WATERSHED

Stream Inventory Summary | Fall 2015

Newport Drainage Ditch Watershed

INTRODUCTION

The Lake County Stormwater Management Commission (SMC) conducted a Stream Inventory in the Newport Drainage Ditch Watershed during the fall of 2015 in addition to a number of other studies and projects related to the development of a watershed plan in the Newport Drainage Ditch Watershed. The purpose of this assessment was to record quantitative and qualitative stream information, including the capture of visual information on the stream conditions in the Newport Watershed. The information collected will provide a baseline of the overall stream conditions; which can be further extrapolated to indicate the conditions of the stream network of the watershed. The assessments results will be incorporated into the watershed plan and provide a framework for prioritizing and implementing watershed management strategies.

WATERSHED OVERVIEW

The Newport Drainage Ditch watershed is a drainage ditch that consists of one main branch and multiple tributaries. It runs through the municipalities of Beach Park, Wadsworth, and Zion. The watershed is contained in an area South from Russel Road to just South of Wadsworth Rd. It extends eastward from just west of the Chicago/Milwaukee/St. Paul/Pacific railroad tracks to just west of Green Bay Road. This ditch is responsible for the drainage of approximately 5,018 acres (8 mi^2). It flows north/northwest until it reaches the Des Plaines River. The largest tributary called the East Branch splits off the mainstem just about 350 feet south of 9th Street, just east of the railroad tracks. Two smaller tributaries split off the mainstem as well. Just north of Adams Road there are two small tributaries that run along each other and both are completely in a nursery. These are the "nursery tributaries." The other small tributary is just south of Highway 173 and branches off of the mainstem to the west.

TABLE NP-01: STREAM REACHES

	Number of Reaches	Average reach length (ft.)	Total length (ft.)	% of watershed length
Mainstem	18	1836.8	33062.46	63.6%
Tributaries	9	2096.32	18866.87	36.3%
Inaccessible Reaches	1	1623.06	1623.06	3.1%
Total inventoried reaches	26	1934.86	50306.27	96.87%

THE STREAM INVENTORY ASSESSMENT

The stream assessment includes the geomorphic characterization of the channel; identifying erosion, evaluating discharge points and hydraulic structures, obstructions, areas of deficient buffer zones, and areas with significant detrimental impact on the stream. Visual observations regarding vegetation, water quality conditions, habitat assessments, and aquatic and terrestrial life are included in the stream inventory and allow for a more comprehensive assessment of the stream conditions. Also, information captured during the inventory process includes notes and comments about the stream that may not be well represented in the other forms, such as specific restrictions to stream, restoration efforts or conversations with local residents. The stream inventory data is captured through a uniform and standard process to ensure it is accurate and reproducible.

DATA COLLECTION AND METHODOLGY

The stream network within the watershed is divided into reaches, smaller geographically-defined segments, for which data is aggregated. Data is collected by a team of two observers walking the entire length of every assessment reach. At representative points within each reach, the observers measure the channel dimensions, relative velocity (at the surface) of the stream, noting streambank and riparian conditions, and document hydraulic structures and discharge points using a standardized database. For the purpose of determining bank erosion (lateral recession) additional measurements are obtained, including bank height, lateral recession rate, severity, and lateral recession characteristics. The Rapid Assessment, Point Method (RAP-M) was used for observing lateral recession rates. The observers use a camera that is equipped with a GPS (global positioning system) to photograph areas of moderate to severe erosion, significant sediment deposition and debris jams, hydraulic structures and discharge points, and photos of the stream channel that are representative of the conditions throughout the reach. This combined method and technology allows for analysis and mapping of the collected data.

CHANNEL CONDITIONS

TABLE NP-02: CHANNEL DIMENSIONS

Watershed Branch	Range and Average	Bank Height (ft.)	Water Depth (ft.)	Velocity (ft./s)	Top Channel Width (ft.)	Bottom Channel Width (ft.)
Mainstem	Range	.5 to 15	0 to 4.5	0 to 1	3 to 400	.5 to 23
	Average	2.15	1.19	.33	26.39	8.37
Tributaries	Range	.5 to 4.5	0 to 1.5	0 to 1.67	3 to 600.5	.5 to 25
	Average	1.39	.50	.22	29.91	3.93

CHANNELIZATION

Stream channelization describes any activity that moves, straightens, shortens, cuts off, diverts, or fills in a stream channel. These activities, which include widening, narrowing, or lining a stream channel, alter the discharge and velocity of water flowing through it (Stevens). Consequently, modifications aimed to address a problem in one area of the watershed or stream channel is shifted to another area upstream, downstream or within the immediate area. For instance, shortening the reach of a stream moves flooding from the channelized reach to a downstream reach. The degree of channelization is ranked according to the percent of channelization. Reaches with channelization of 1%-33% are ranked “low”, 33%-66% ranked “moderate”, and >66% of a reach is channelized ranked “high”. Reaches ranked as “None” have no indication of channelization. Table NP-03 summarizes the degree of channelization in the Newport Drainage Ditch Watershed.

TABLE NP-03: DEGREE OF CHANNELIZATION

Degree of Channelization	Mainstem			Tributaries			Watershed Total		
	Reaches	Miles	% of	Reaches	Miles	% of	Reaches	Miles	% of

			Miles			Miles			Miles
None	12	4.35	73%	7	2.75	78%	8	7.1	75%
Low	1	0.12	2%	0	0	0%	2	0.12	1%
Moderate	2	0.41	7%	2	0.8	22%	6	1.21	13%
High	2	1.07	18%	0	0	0%	12	1.07	11%

POOL/RIFFLE DEVELOPMENT

Under baseflow conditions, pools are low-gradient areas of deeper water with slower velocity and riffles are high-gradient areas of shallow water with higher velocity. In general, pools represent localized deeper areas, whereas riffles represent localized shallows areas. During baseflow conditions, sediment erodes from riffles and is deposited into pools. During bankfull conditions, the relationship of relative velocity in riffles and pools is reversed and sediments along with substrate material are scoured from pools and the channel bed and deposited on riffles or bars. During periods of elevated flow when the velocity in pools exceeds that over riffles, deposition and bar formation tend to occur in areas adjacent to pools. Channelization often reduces the extent of pool-riffle sequences in a stream. Most stream channels in the Newport watershed exhibit some degree of pool-riffle development (see Table NP-04).

TABLE NP-04: POOL/RIFFLE DEVELOPMENT

Degree of pool/riffle development	**Mainstem reaches**		**East Trib branch**		**West Trib branch**		**Nursery branch**	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**
None	8	47	2	40	1	50	2	100
Low	3	17.5	3	60	1	50	0	0
Moderate	4	23.5	0	0	0	0	0	0
High	2	12	0	0	0	0	0	0
None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had pool/riffle development. Percent based on total number of reaches for each branch.								

STREAMBANK EROSION

Streams are dynamic systems, in a perpetual state of flux, therefore, all banks exhibit some form of erosion. Streambank erosion in the Newport Watershed tends to occur in developed areas, particularly residential neighborhoods and urban areas. Surface runoff to streams contributes to streambank erosion and is dependent upon key factors such as storm events, their duration, timing, and amount of precipitation that falls and subsequently runs off; the type and condition of soil within watershed; and land use and vegetative buffers. In some reaches streambank erosion is severe, with several potential causes including increased runoff from urban development, channelization, sediment “starvation” caused by dams, and local changes in stream gradient and soil type all possibly contributing to severity of erosion. The qualitative assessment criterion for each rating is slight, moderate, and severe and can be found in Table NP-05. Table NP-06 summarizes streambank erosion in the Newport Drainage Ditch Watershed.

TABLE NP-05: BANK EROSION CRITERIA

Category	**Description**

Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
Moderate	Bank is predominantly bare with some rills and vegetative overhang.
Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped.

TABLE NP-06: STREAMBANK EROSION

Extent of Erosion	Mainstem	East Trib	West Trib	Nursery Tribs	Watershed Total
None-Slight	12	5	1	2	20
Moderate	5	0	1	0	6
Severe	0	0	0	0	0

Of the 26 walked reaches in the Newport drainage ditch, none of them were visually categorized with severe bank erosion. Only 23 percent of reaches had moderate erosion (34%-67% eroded), and 77 percent had between 0 and 33 percent erosion.

LATERAL RECESSION

The lateral recession rate is a qualitative way to assess width or thickness of eroding surface of a channel. The Rapid Assessment Point Method (RAP-M) for assessing lateral recession was employed to determine the degree of streambank erosion in the Newport Drainage Ditch Watershed. Lateral Recession Rate (LRR) evaluates streambanks along the right and left bank (facing upstream) for each assessed reach. Within each reach, a segment of the channel with specific LRR characteristics is identified. Measurements include bank height/width and the lateral recession rate in feet per year, while several criteria including undercutting, bare bank, overhanging vegetation, fallen trees, exposed roots and slips or slides are noted. This is repeated up left and right side of each bank, connecting each segment to the end of the reach. All segments of every reach are captured with a camera equipped with GPS which is then transferred to a geographic information system (GIS) which then manipulates, analyzes, and presents the data geographically. For the Newport Drainage Ditch Watershed, all stream reaches were described as having slight recession rates (See appendix C).

SEDIMENT ACCUMULATION

Typically a stream generates, suspends, and transports sediment through high-gradient reaches and deposits sediment in low gradient reaches and/or in areas where velocity decreases. These low-velocity areas may be naturally occurring areas such as pools or sloughs. They may also occur behind debris jams or beaver dams or upstream of channel constrictions (such as culverts) or dams. Decreasing discharge in the downstream direction thus promotes a stepwise movement of deposition and storage of sediment within stream network. The effect results in sediment movement that doesn't always reach the watershed outlet, but is instead remobilized during the next flow and redistributed within the watershed's channel network. The amount of sediment transported downstream during storm events will increase sedimentation rates in downstream channels. This increased sediment load can have negative effects on channel stability, fish, invertebrates, and overall stream productivity. When small or headwater streams are replaced with paved floodways during land development, sediment production may decrease, causing an increase in downstream erosion as sediment starved waters move through the watershed. Sediment deposition can have varying effects. The majority of reaches in the Newport Watershed exhibit some sediment accumulation (see Table NP-07).

TABLE NP-07: SEDIMENT ACCUMULATION

Degree of sediment accumulation	Mainstem reaches		East Trib reaches		West Trib reaches		Nursery Tribs	
	#	%	#	%	#	%	#	%
None	5	29.4	3	60	0	0	2	100
Low	7	41.1	2	40	2	100	0	0
Moderate	4	23.5	0	0	0	0	0	0
High	1	6	0	0	0	0	0	0

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had sediment accumulations.
*Percent based on total number of reaches for each branch.

STREAM DEBRIS LOAD

Debris Jam in mainstem branch

Like sediment, most or all streams transport some amount of debris. Large organic debris such as tree limbs and branches can provide habitat, divert currents to create pools, bars, and slow-water habitat for aquatic organisms, and provide allochthonous energy inputs to the ecosystem that are not produced within the stream. Allochthonous inputs are those that enter the stream from some outside source, such as organic matter like leaves from terrestrial plants and trees that is washed into the stream). However, too much debris can be problematic and may result in debris jams. These debris jams may cause backwater flooding and sediment deposition and can divert current into one or both banks, leading to streambank erosion.

Table NP-08 summarizes the debris loading in the Newport watershed. A reach that has failed the debris loading test has a level of debris higher than 33%. The only failed reaches are in the mainstem branch. Each branch of the tributaries had none or low amounts of debris load.

TABLE NP-08: DEBRIS LOADING

Failed Test*	Mainstem reaches		East Trib reaches		West Trib reaches		Nursery	
	#	%	#	%	#	%	#	%
Instream	3	17.6	0	0	0	0	0	0
Overbank	1	6	0	0	0	0	0	0
Both	1	6	0	0	0	0	0	0

*Reaches that failed the test for debris accumulation.

HYDRAULIC STRUCTURES

Hydraulic structures are any bridges, culverts, dams, weirs, levees, and fences in or across the stream channel. These structures modify the pattern or amount of flow and may act as constriction points causing backwater flooding. Culverts may act as temporary or permanent barriers if, over time, a plunge pool develops, causing the bottom of the culvert to become elevated above the water level of the pool. Additionally, dams and weirs can impede the movements of fish and other aquatic organisms within the stream network.

Each area of the Newport drainage ditch contained many hydraulic structures per mile. Overall, the mainstem contained the most hydraulic structures but yielded the lowest structure per stream mile. On average the drainage ditch has about 10 hydraulic structures per mile. The East tributary had the highest percentage of structures per mile at 12.25 percent. About 10 percent of hydraulic structures in the ditch were described as problematic and needing maintenance while all others were in good, fair, or new condition.

TABLE NP-09: HYDRAULIC STRUCTURES

Hydraulic structures	Mainstem (5.95 mi)		East Trib (2.04 mi)		West Trib (.53 mi)		Nursery Tribs (.99 mi)	
Bridges	11		15		3		0	
Culverts	17		10		3		10	
Dams	0		0		0		0	
Weirs	0		0		0		0	
Other	0		0		0		0	
Total	28		25		6		10	
Hydraulic structures per stream mile	4.7		12.25		11.32		10.1	
Problem hydraulic structures and percentages*	5	18%	1	4%	1	17%	0	0%

* Percent based on total number of hydraulic structures for each branch.

DISCHARGE POINTS

Discharge points include sanitary, storm sewer, agricultural drain tile and sump pump pipes greater than 4 inches in diameter. They also include open channels, swales, gullies and other significant tributaries. In the Newport Watershed, 38 points of discharge were recorded into stream channels, of which 16 were pipes, storm sewers, culverts or drain tiles (see Table NP-10). Discharge points are most common in urban and residential areas where sump pump and stormsewer outfalls are numerous. Problem discharge points in the Watershed contribute to streambank erosion and/or transport excess sediment to the stream channel. Problematic discharges are most common in highly developed urban and residential areas. Another problem frequently noted during the stream inventory is the state of disrepair of some drain tiles, particularly those constructed of clay and concrete. As the streambank erodes, longer sections of the tile become exposed and eventually collapse under their own weight. This effectively shortens the pipe, causing the point at which runoff discharges from the pipe to retreat from the channel, further eroding the streambank.

Discharge point in the east tributary

TABLE NP-10: DISCHARGE POINTS

Discharge Points	Mainstem	East Trib	West Trib	Nursery Tribs	Watershed Total
Swales, gullies, and tributaries	14	6	2	0	22
Pipes, storm sewers, culverts and drain tiles	5	7	0	4	16
Total Discharge Points	19	13	2	4	38
Discharge Points (per stream mile)	3.19	6.37	3.77	4.04	4

VEGETATION & LAND USE

TABLE NP-11: DOMINANT LAND USE

	Mainstem	East Trib	West Trib	Nursery Tribs	Percentage of Watershed

	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	
Agriculture	34%	26%	28%	16%	50%	50%	0%	0%	26%
Open Space	37%	32%	46%	48%	38%	0%	0%	0%	33%
Recreational	0%	0%	6%	6%	0%	0%	0%	0%	1%
Commercial/Industrial	8%	14%	2%	4%	0%	33%	100%	75%	18%
Residential	21%	28%	18%	22%	13%	18%	0%	25%	22%
Other	0%	0%	0%	4%	0%	0%	0%	0%	1%

FLOODPLAIN VEGETATION

Floodplain vegetation serves as an important function in protecting the physical, biological, and chemical integrity of water. Vegetation acts as a natural barrier by dissipating the energy of lowing water and provides protection from flooding and erosion. Vegetation filters sediments originating from land while slowing overland flows and surface run-off into water bodies, and filters incoming floodwaters from materials scoured from the channel bank and bed. This filtering process can add nutrients to the floodplain soil. Slowed runoff across the floodplain allows additional time for infiltration and groundwater recharge. The slowing of runoff provides the additional benefit of natural purification of water as local runoff or overbank floodwater infiltrates through the floodplain alluvium. Vegetation provides habitat and nutrients for a wide variety of terrestrial and aquatic organisms in, adjacent to, and for downstream ecosystems.

Floodplain vegetation in the Newport Drainage Ditch

The Floodplain Vegetation (Land Cover) is vegetation within 100 feet of the stream bank and summarized in Table NP-12. Land cover refers to the percent of the area occupied by the given land cover. Herbaceous plants, shrubs, trees, and wetland vegetation composed the majority of floodplain vegetation throughout the watershed. In the mainstem, trees, law, and crops were the predominant land cover. Additionally, many areas within the floodplain area and adjacent to streambanks have little or no vegetation due to human activities. The assessment of this area, referred to as the "Riparian Zone" or "Vegetated Buffer Zone" is summarized in Tables NP-13 and NP-14.

TABLE NP-12: LAND COVER

Land Cover	Mainstem		East Trib		West Trib		Nursery Tribs		Percentage of Watershed
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	
Tree	18%	21%	15%	17%	10%	10%	0%	0%	16%

Lawn	12%	22%	4%	13%	10%	20%	100%	100%	24%
Wetland	8%	5%	31%	22%	10%	10%	0%	0%	11%
Crop	24%	17%	10%	8%	50%	0%	0%	0%	16%
Shrub	15%	19%	22%	19%	20%	10%	0%	0%	16%
Herbaceous	11%	6%	18%	18%	0%	0%	0%	0%	10%
Impervious	5%	1%	0%	0%	0%	50%	0%	0%	3%
Water	1%	1%	0%	3%	0%	0%	0%	0%	1%
Other	6%	8%	0%	0%	0%	0%	0%	0%	4%

VEGETATED BUFFER (RIPARIAN ZONE)

The riparian zone is the area extending 100 feet from the stream channel on both the left and right side of the stream channel. Riparian vegetation also provides beneficial shading to streams and lakes which helps to avoid temperature stress on fish and aquatic organisms. The quality of the riparian zone, the width, and land use characteristics were visually assessed during the Newport Drainage Ditch Inventory. Table NP-13 summarizes the assessment criterion for the width of the Riparian Zone is a visual representation of the quality of the riparian zone observed in 2015.

TABLE NP-13: RIPARIAN ZONE ASSESSMENT CRITERIA

Riparian Zone	**None**	**Low**	**Moderate**	**High**
Buffer Width	**<20 feet**	**20-40 feet**	**40-60 feet**	**>60 feet**
Description	Zone contains little or no riparian vegetation due to human activities	Zone is impacted a great deal by human activities	Zone is impacted minimally by human activities	Zone is not impacted by human activities (i.e., no parking lots, roadbeds, lawns, crops)

Throughout the Newport Drainage Ditch Watershed, the width of the riparian zone is impacted by anthropogenic changes in land use resulting in wide riparian buffers (“High” buffer width) in locations where the stream flows through open space areas with minimal to no impact and narrow buffers (“Low” buffer width) in locations where the stream flows through developed areas. Generally, the stream network has wider riparian buffers and flows through more open space areas, with the exception of “build out” neighborhoods. There are only a few reaches in the watershed in which there is no riparian buffer. Table NP-14 summarizes the Riparian Zones assessed in the Newport Watershed.

TABLE NP-14: RIPARIAN ZONE

	Mainstem			**East Trib**			**West Trib**			**Nursery Trib**			**Watershed Total**		
	Reaches	**Miles**	**% of Miles**	**Reaches**	**Miles**	**% of Miles**	**Reaches**	**Miles**	**% of Miles**	**Reaches**	**Miles**	**% of Miles**	**Reaches**	**Miles**	**% of Miles**
None (<20 ft.)	1	0.32	5%	0	0	0%	1	0.2	38%	2	0.99	100%	4	1.51	16%
Low (20-40 ft.)	5	1.75	29%	1	0.42	21%	1	0.33	62%	0	0	0%	7	2.5	26%

Moderate (40-60 ft.)	2	0.54	9%	1	0.38	19%	0	0	0%	0	0	0%	3	0.92	10%
High (>60 ft.)	9	3.36	56%	3	1.24	61%	0	0	0%	0	0	0%	12	4.7	49%

Bank Vegetation (Predominant Vegetation) is vegetation existing within 10 feet of the stream bank. The most significant role of bank vegetation is its ability to control erosion, which in turn prevents sediment and other forms of pollution from entering the stream. Sedimentation is a very significant problem and though erosion is a natural process, it is often sped up through human activities, directly or indirectly. The increased rate of erosion and sedimentation affects the geomorphology of the stream channel, water quality, and aquatic life in the stream channel and throughout the watershed. Streams surrounded by vegetated riparian zones, have intricate root systems that help to stabilize the bank and prevent erosion. Woody stemmed plants, sedges, and grasses help physically trap sediment by slowing water runoff from the surrounding areas, allowing the sediment to settle out instead of entering the stream. Additionally, vegetated banks lend to deep and narrow channels as a result of their stability and lack of heavy sedimentation.

In the Newport Watershed, the streambank vegetation is predominantly unmowed grass, shrubs, and wetlands. The mainstem has the greatest portion of unmowed grass (55%), Wast tributary has a greater percentage of shrubs (43%), and the Nursery tributaries have the greatest percentage of wetlands (23%) (See Table NP-15). Many of the plants that dominate these categories are non-native species such as as Buckthorn. These species form dense stands, outcompete and displace native species, displace and threaten wildlife habitat and biodiversity, limit the diversity of bank vegetation and change the aesthetics of the landscape. These plants were recorded in a majority of assessed reaches.

TABLE NP-15: PREDOMINANT BANK VEGETATION

Bank Vegetation	**Mainstem**		**East Trib**		**West Trib**		**Nursery Tribs**		**Percentage of Watershed**
	Left Bank	**Right Bank**	**Left Bank**	**Right Bank**	**Left Bank**	**Right Bank**	**Left Bank**	**Right Bank**	
Unmowed Grass	55%	55%	33%	32%	28%	8%	28%	28%	45%
Lawn	6%	7%	2%	3%	10%	10%	45%	45%	10%
Wetland	6%	4%	21%	22%	5%	5%	23%	23%	11%
Trees	9%	10%	11%	9%	15%	10%	3%	3%	9%
Shrubs	17%	21%	19%	20%	43%	18%	3%	3%	18%
Crops	5%	0%	0%	0%	0%	0%	0%	0%	3%
Herbaceous	2%	2%	14%	14%	0%	0%	0%	0%	3%
Other/None	0%	1%	0%	0%	0%	50%	0%	0%	1%

INSTREAM COVER FOR FISH

A diverse habitat with regard to instream cover is essential for diverse fish assemblages and other aquatic organisms. Instream fish cover availability was evaluated based on the presence of a number of structural elements and habitats, consisting of undercut banks, pools over 28 inches deep, aquatic macrophytes, logs, overhanging vegetation, rootwads, boulders, and backwaters. The presence of woody debris (logs and rootwads) in streams is a significant component of fish habitat which they utilize for spawning, rearing, and foraging. Woody debris creates areas of low flow, providing a refuge for fish during periods of high flow. Woody debris also provides cover for fish, lowering the risk of predation. Overhanging vegetation and canopy cover provide two important benefits; providing shade to the stream helps keep the temperature in the stream cool, and leaf litter and organic material provide nutrients to macroinvertebrates and other aquatic organisms. These aquatic organisms in turn, become an important source of food for fish and other animals in the ecosystem.

Macrophytes and logs are the most abundant cover type, appearing in all of the assessed reaches, whereas boulders and rootwads are least abundant. Boulders appear only in the Mainstem and rootwads are in the mainstem and 50% of the nursery tribs. Logs and other large woody debris (LWD) in stream systems and habitat restoration efforts is a matter of consideration. The presence of logs and other LWD divert flow, provide habitat and play an important role in pool, riffle, and bar development. The attenuation of flood flows, drainage of riparian wetlands, land use changes, management of beaver populations and invasive species are all factors that can contribute to the reestablishment of the riparian forest. Backwater areas have decreased over time and presently occur in wetlands and low-lying areas behind dams and debris jams.

TABLE NP-16: INSTREAM COVER FOR FISH

Cover type	Mainstem reaches		East Trib reaches		West Trib reaches		Nursery Trib reaches	
	#	%	#	%	#	%	#	%
Undercut banks	2	11.8	0	0	1	50	0	0
Pools	8	47	0	0	0	0	0	0
Macrophytes	13	76.5	4	80	2	100	1	50
Logs	9	53	2	40	1	50	0	0
Overhanging vegetation	8	47	1	20	0	0	0	0
Rootwads	5	29.4	0	0	0	0	1	50
Boulders	1	5.9	0	0	0	0	0	0
Backwaters	6	35.3	2	40	0	0	0	0

AQUATIC INSTREAM VEGETATION

Aquatic instream vegetation is an important part of the watershed ecosystem. Plants in the stream are important in food webs: each organism has characteristic feeding preferences and patterns, and can itself be prey to other consumers. Plants provide habitat and shelter for fish, waterfowl, and other wildlife. Since all plants, including those that grow underwater, produce oxygen as they photosynthesize, they are the major source of oxygen for aquatic animal life. Rooted plants stabilize shorelines and stream beds. They absorb nutrients and filter pollutants from runoff, which improves water quality.
Certain non-native plant species milfoil can be extremely aggressive, taking over large areas of aquatic habitat. Invasive plant species can completely destroy stands of native vegetation. An overabundance of aquatic plants and algae can reduce oxygen levels in the water, which can contribute to fish kills. Decomposing of dead fish and algae also contributes to oxygen depletion. Too much vegetation can impede water flow in stream channels, drainage ditches, and culverts or back up water completely. These areas can trap sediment and debris, and over time lead to a gradual filling in of lake and channels.

The Aquatic Instream Vegetation assessed in the Newport Watershed show a majority of reaches with a significant portion of surface area without vegetation, indicating a low prevalence of aquatic vegetation. The Newport reaches have an even percentage of each type of vegetation with the greatest percentage of “No Vegetation” (56%). This distribution is somewhat preferred and indicates a variety of aquatic plant life without one dominant type. (See Table NP-17).

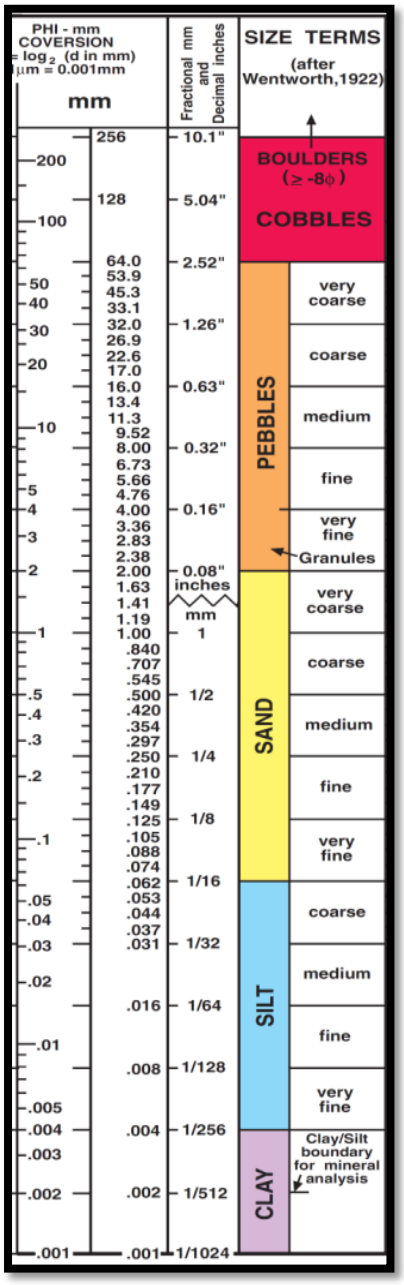
TABLE NP-17: AQUATIC INSTREAM VEGETATION

Instream Aquatic Vegetation	Mainstem	East Trib	West Trib	Nursery Tribs	Percentage of Watershed
Rooted Emergent	8%	20%	5%	43%	14%
Rooted Submergent	10%	14%	0%	0%	9%
Rooted Floating	0%	0%	0%	0%	0%
Free Floating	3%	0%	0%	0%	2%
Floating Algae	11%	2%	0%	0%	7%
Attached Algae	13%	7%	20%	10%	12%
No Vegetation	55%	57%	75%	47%	56%

SUBSTRATE COMPOSITION AND WATER QUALITY

Newport Watershed streambeds are composed of a variety of sediment grains that range in diameter from extremely fine clays (<1/1000th of an inch) to relatively coarse cobbles and boulders (>1 foot). Generally, fine sediments are transported in suspension until velocity slows enough that they are deposited on the streambed. Larger sediments are not transported as readily and may only move during increased flows. Clays are typically regarded as cohesive sediments that naturally adhere to one another (and are therefore more difficult to erode) while silts are more easily eroded. Sands and larger sediments (e.g., gravels and cobbles) are less cohesive. Clay and silt-dominated banks and beds, therefore, tend to be associated with narrow, incised channels while sand, gravel, and cobble-dominated channels are more often shallow and wide. Clay/silt channels tend to incise or deepen in response to increased flows while sand/gravel channels tend to widen. These relationships, however, are also contingent upon a number of other contributing factors such as gradient, bank slope, and bank vegetation.

Substrate is also an important measure of habitat quality. Extremely fine sediments, such as clays, adhere closely to one another and may bury the streambed. Coarse-grained sediments like gravels present abundant interstices, allowing water, oxygen, and other dissolved and suspended materials to infiltrate the hyporheic zone. The hyporheic zone refers to the area surrounding the stream channel that is saturated and through which there is some percolation or flow. Essentially, the hyporheic zone is the area where the surface water and groundwater interface and mix. These interstitial pores also provide habitat to benthic (bottom-dwelling) macroinvertebrates, which play important roles in both aquatic food webs and ecosystem functioning. Excessive deposition of clays, silts, and fine particulate organic matter reduces the potential for infiltration and accessibility to the hyporheic zone. Excessive deposition also negatively affects filter feeders such as mussels, and may cause anoxia, or oxygen depletion, in the streambed as organic materials decompose.



Wentworth Grain Size Chart US Geological Survey (Williams)

In the Newport watershed, most reaches contain a mixture of sediment types. Table NP-18 summarizes the relationship of these substrate types in the watershed. Across the entire watershed and among each geographic section, silt (27%) and organic matter (53%) are the predominant substrate types recorded. Most reaches exceed 20% composition of any of these two substrate groups, suggesting that throughout a reach no one type dominates, but that combinations of the top two types likely occur.

TABLE NP-18: SUBSTRATE COMPOSITION

Substrate Composition	Mainstem	East Trib	West Trib	Nursery Tribs	Percentage of Watershed
Claypan	6%	6%	0%	0%	5%
Silt	34%	28%	0%	0%	27%
Sand	12%	1%	0%	0%	7%
Gravel	10%	2%	0%	0%	6%
Cobble	1%	0%	0%	0%	1%
Boulder	0%	0%	0%	0%	0%
Concrete	0%	0%	12%	0%	1%
Organic Matter	38%	63%	88%	100%	53%

WATER QUALITY

Turbidity

Visual inspections of several water quality indicators were made during the stream inventory. Turbidity, water color, and the presence of grease and oil in the sediment or water column were assessed. Turbidity is the measure of relative clarity of water. Material that causes water to be turbid includes clay, silt, fine inorganic and organic matter, algae, organic compounds, and plankton and other microscopic organisms (Turbidity). During periods of low flow, water in streams is a clear green color, and turbidities are low. During high flow events, sediment and material from the surrounding surfaces are washed into the stream. As the velocity and volume of water increases, sediments and other materials are stirred up causing the water to become muddy, brown, and turbid.

Turbidity among the three geographic areas is not a significant problem in the Newport Watershed under baseflow conditions. The mainstem and nursery have areas of “moderate” turbidity with extensive low gradient, depositional or backwater areas that collect fine sediment from upstream. In the mainstem, where 6% of the reaches have “high” turbidity, constrictions and debris jams in stream channels cause turbid conditions. Overall, the greatest percentage of reaches in the watershed have a “none” (45%) or “low” (42%) rating for turbidity. See Table NP-19.

TABLE NP-19: WATER QUALITY

Water Quality	Mainstem		East Trib		West Trib		Nursery Tribs		Percentage of Watershed	
	Reaches	% of Total Reaches	Reaches	% of Total Reaches	Reaches	% of total reaches	Reaches	% of Total Reaches	Reaches	% of Total Reaches
Turbidity										

None	7	41%	3	60%	1	50%	1	50%	12	46%
Low	8	47%	2	40%	0	0%	1	50%	11	42%
Moderate	1	6%	0	0%	1	50%	0	0%	2	8%
High	1	6%	0	0%	0	0%	0	0%	1	4%
Grease & Oil										
In Water & Sediment	7	41%	2	40%	1	50%	1	50%	11	42%
In Sediment Only	1	6%	0	0%	0	0%	0	0%	1	4%
In Water Only	2	12%	0	0%	1	50%	0	0%	3	12%
No Grease & Oil in Water or Sediment	7	41%	3	60%	0%	0%	1	50%	11	42%

Grease & Oil

Grease and oil is present in most of the channel. In each of the branches, almost half of all the reaches had oil in the water and sediment (41%-50%). The Newport Drainage ditch has equal parts no grease and oil as it does grease and oil in the sediment and water (see table NP-19). Where grease and oil is present, it was detected in both the sediment and the water column. The origination of the grease and oil does not relate to any one particular site or land use and therefore is likely due to non-point source run-off. An additional note: iron bacteria are present in many soils in Illinois and can cause yellow, orange, red, or brown stains and colored water. It can also cause a rainbow colored, oil-like sheen on the water or in soil and sediments. Simple water testing is available to determine if the oil-like substance present is iron bacteria.

Grease and oils enter the stream from during rain storms as oil and grease from surrounding parking lots, roads, and bridges flush into the storm sewer system, often overflowing directly into the stream. Other potential sources of oil and grease results from illegal dumping that originate from automotive and transportation related services. Grease and oil in the water column and sediment will degrade the water quality of receiving streams by adding biological and chemical oxygen demand to the stream. Table NP-19 summarizes the turbidity, grease and oil in the Newport Drainage Ditch Watershed.

Algae

Algae are an indicator of high nutrient loads. Generally, algae were not a significant problem in Newport Watershed streams; however, some areas contained extremely high populations. Excessive algae growth can negatively impact aquatic organisms and habitat by causing large daily fluctuations in dissolved oxygen levels. Algae are photosynthetic and therefore take up carbon dioxide during the day and release oxygen into the water column and the air. At night, algae respire, taking oxygen out of the water column and releasing carbon dioxide. Therefore, larger populations of algae have greater potential to cause large daily oxygen fluctuations. In addition, abundant algae populations are often aesthetically undesirable and typically detract from the visual quality of water resources.

AQUATIC AND TERRESTRIAL ORGANISMS

Stream aquatic integrity in urban settings is directly affected by physical changes in the watershed, some of which result in the degradation of the chemical and/or physical condition of the stream. Habitat information is extremely important for discriminating between physical and chemical effects.

The inventory addressed aquatic and riparian life where possible or identifiable. Organisms were not specifically sampled during the stream inventory, but some animals were observed during the inventory. Other species of fish present included bluegill and fathead minnows. Freshwater mussels and clams can be found in the Newport Drainage Ditch. Snails, native crayfish (non- native rusty crayfish) and dragon and damsel fly nymphs were visible in Newport. Mallard ducks, Canadian geese, Great Blue Herons, Green Frogs, Bull Frogs, beavers, muskrats and deer were also encountered during the inventory.

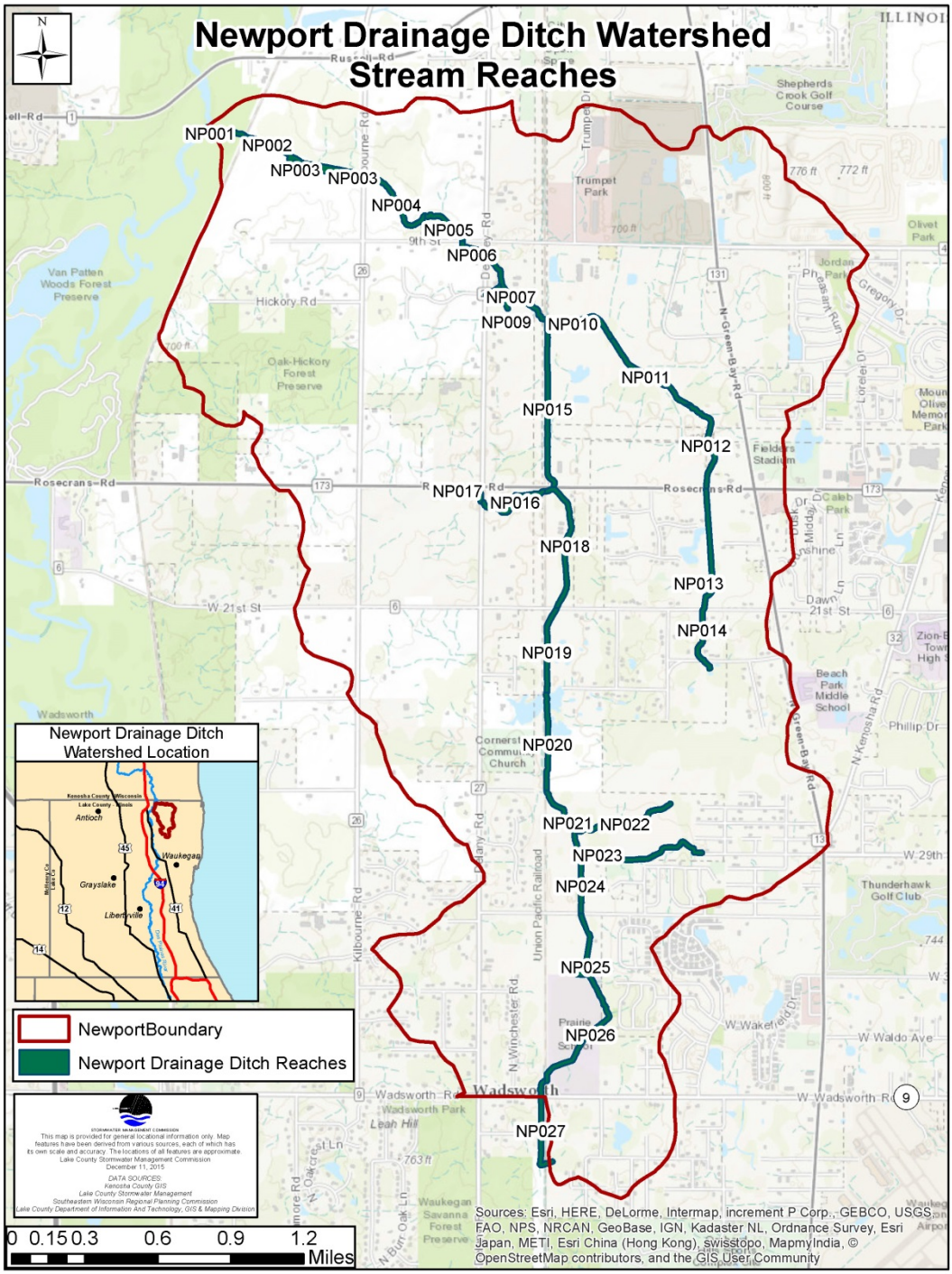
Newport Drainage Ditch Stream Inventory Data

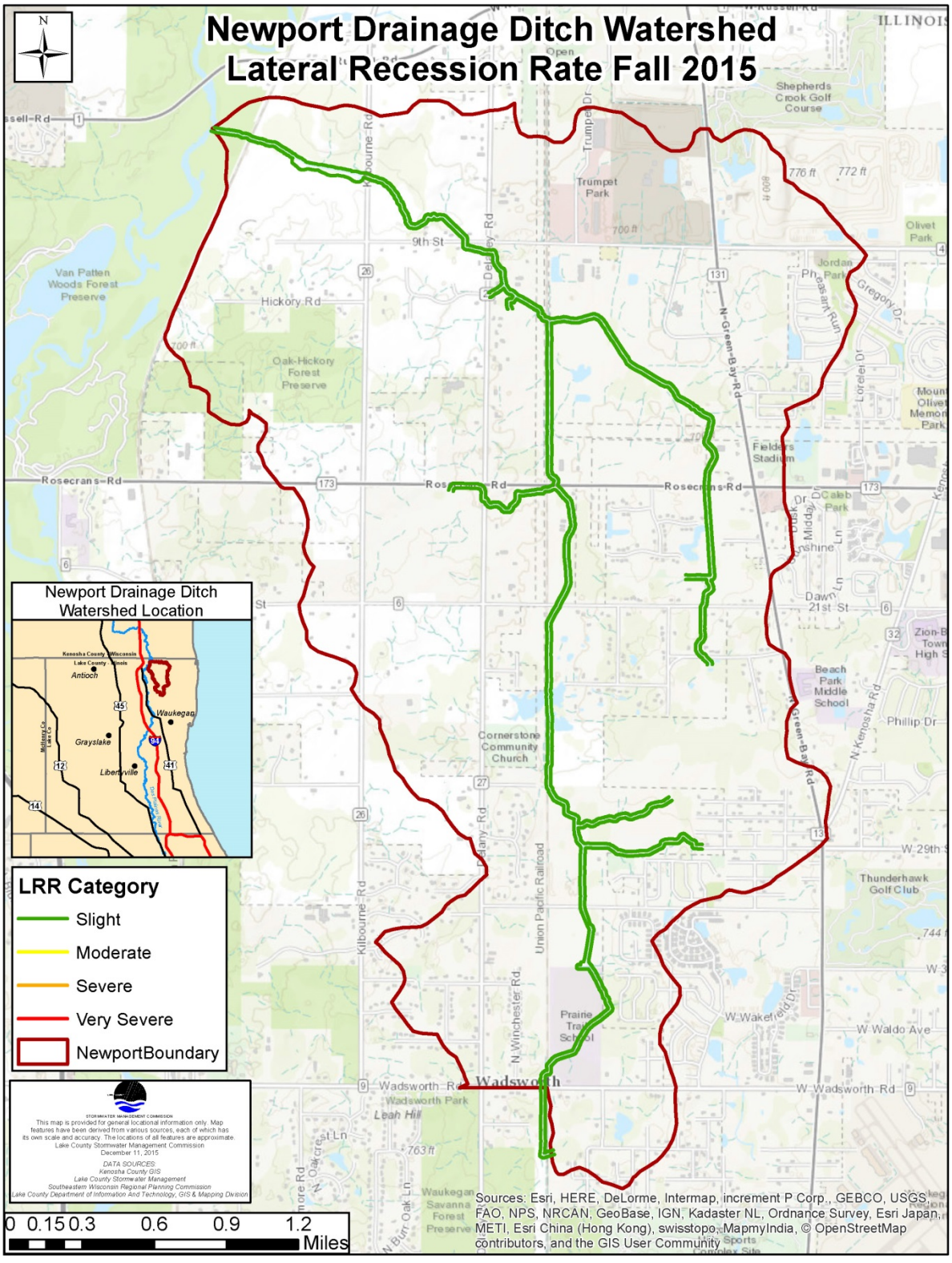
Reach	Debris		SUBSTRATE STABILITY	Channelization	Erosion	Length		Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
NP001	NONE	NONE	LOW	MOD	NONE	852	0.16	2.25	3.25	19.00	28.00	6.00	15.00	22.67	0.92
NP002	NONE	NONE	MOD	MOD	MOD	1,037	0.20	2.00	4.00	10.00	11.00	7.00	8.00	10.67	0.67
NP003	LOW	LOW	MOD	MOD	NONE	3,505	0.66	2.00	3.00	9.00	22.00	3.00	18.00	13.33	2.17
NP004	LOW	MOD	MOD	LOW	MOD	2,055	0.39	2.50	5.00	15.00	24.00	7.00	12.00	18.33	3.33
NP005	LOW	LOW	MOD	MOD	NONE	1,121	0.21	2.00	3.50	15.00	18.00	6.00	12.00	16.33	1.33
NP006	NONE	NONE	MOD	MOD	NONE	633	0.12	1.25	2.50	10.00	20.00	6.00	8.00	14.67	1.83
NP007	LOW	NONE	MOD	LOW	NONE	2,236	0.42	1.38	2.00	17.00	22.00	11.00	15.00	19.33	1.67
NP008	NONE	NONE	MOD	HIGH	NONE	423	0.08	0.50	0.75	3.00	20.50	0.50	1.50	9.33	0.27
NP009	LOW	LOW	MOD	NONE	NONE	401	0.08	1.00	2.00	7.00	7.00	1.00	5.00	7.00	0.50
NP010	NONE	LOW	MOD	HIGH	NONE	1,675	0.32	1.00	1.00	7.00	12.00	2.00	10.00	9.00	1.17
NP011	NONE	NONE	LOW	LOW	NONE	2,279	0.43	1.00	1.00	5.00	-	0.50	2.00	-	1.08
NP012	LOW	LOW	MOD	MOD	NONE	2,220	0.42	1.00	2.00	6.00	16.00	2.00	12.00	10.00	0.75
NP013	LOW	LOW	LOW	HIGH	NONE	2,584	0.49	0.50	2.25	3.00	12.00	2.00	4.00	8.67	0.17
NP014	NONE	LOW	LOW	MOD	NONE	2,019	0.38	1.00	1.00	3.00	30.00	1.00	25.00	12.67	0.67
NP015	MOD	LOW	LOW	HIGH	NONE	3,739	0.71	1.00	2.00	11.00	20.00	5.00	17.00	15.33	1.08
NP016	LOW	LOW	MOD	MOD	MOD	1,762	0.33	1.25	4.50	6.00	13.00	4.00	4.50	8.50	0.43
NP017	NONE	NONE	HIGH	HIGH	NONE	1,051	0.20	1.00	2.75	3.00	8.50	1.00	3.00	5.50	0.13
NP018	MOD	LOW	LOW	MOD	NONE	3,011	0.57	1.00	4.00	14.00	22.00	6.00	20.00	17.33	1.17
NP019	MOD	MOD	LOW	HIGH	NONE	1,910	0.36	1.00	3.00	18.00	28.00	12.00	22.00	21.33	2.25
NP020	LOW	NONE	MOD	HIGH	NONE	2,150	0.41	1.13	8.50	9.00	-	1.00	12.00	-	0.58
NP021	LOW	LOW	MOD	HIGH	MOD	1,671	0.32	1.00	1.75	9.50	12.00	4.50	7.00	10.83	3.48
NP022	NONE	NONE	HIGH	MOD	NONE	2,322	0.44	0.40	1.00	3.00	5.00	1.00	1.00	3.67	0.00
NP023	NONE	NONE	MOD	MOD	NONE	2,955	0.56	1.00	2.00	4.50	10.00	2.50	4.00	7.67	0.12
NP024	LOW	LOW	LOW	HIGH	MOD	1,374	0.26	1.00	1.75	14.00	38.00	8.00	23.00	22.67	1.33
NP026	LOW	LOW	LOW	HIGH	MOD	3,153	0.60	1.00	1.50	3.00	9.00	1.00	4.00	6.33	0.48
NP027	MOD	NONE	LOW	MOD	NONE	2,169	0.41	0.50	6.00	5.00	13.00	2.50	10.00	9.67	0.00

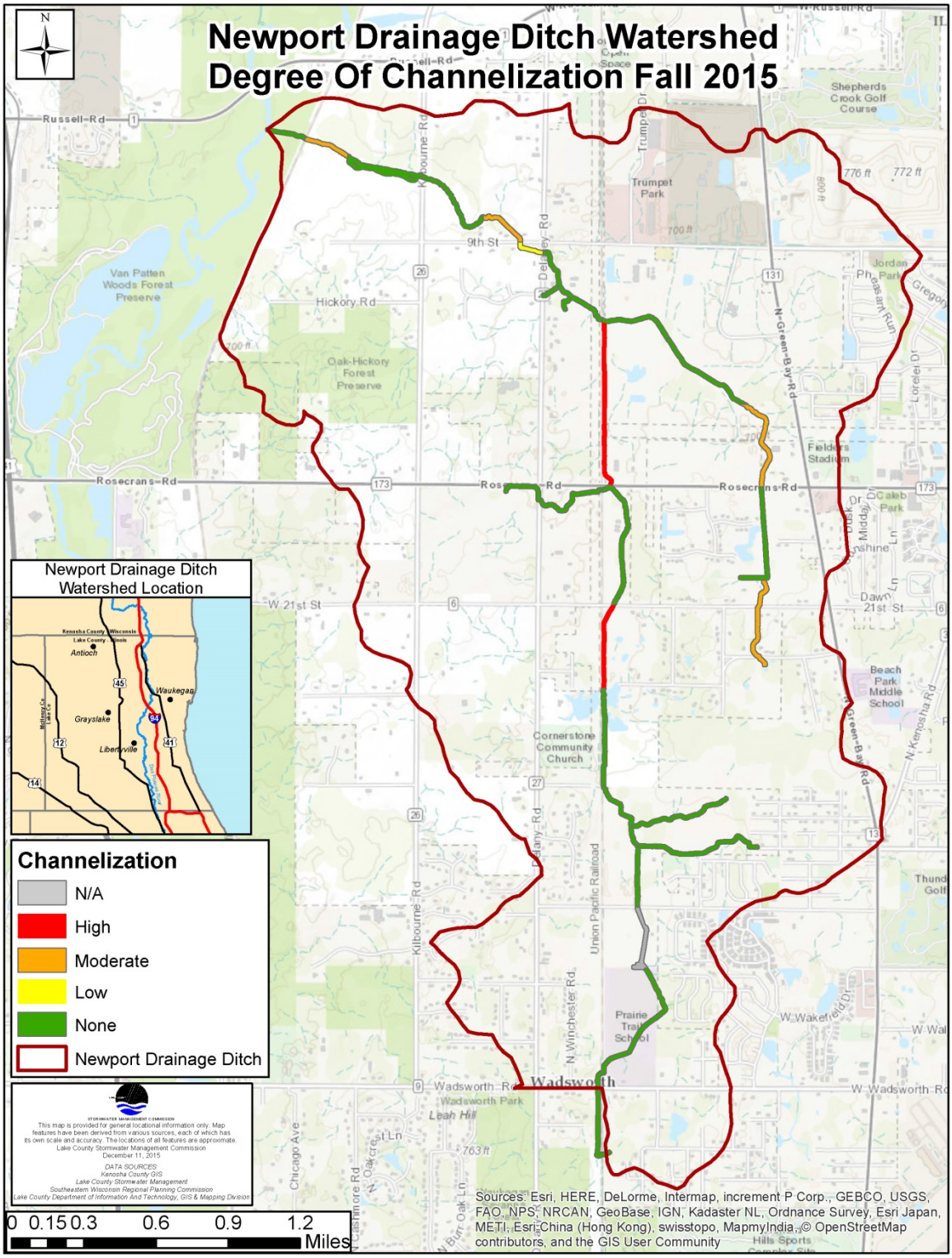
- : Not Collected

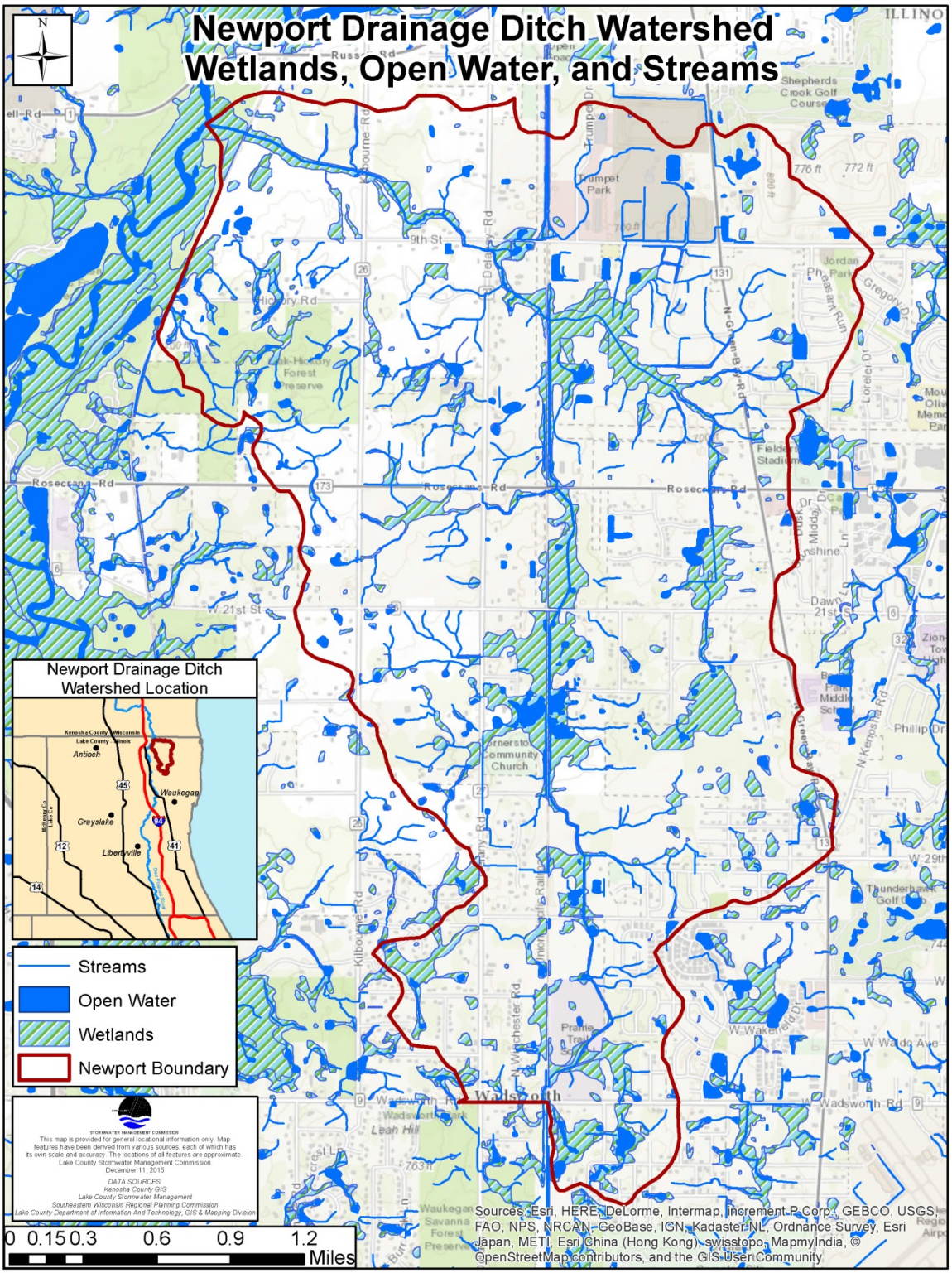
APPENDIX C

STREAM MAPS




Newport Drainage Ditch Watershed
Lateral Recession Rate Fall 2015
N
Newport Drainage Ditch Watershed Location
LRR Category
Slight
Moderate
Severe
Very Severe
NewportBoundary
0 0.15 0.3 0.6 0.9 1.2
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Rosecrans Rd
Hickory Rd
9th St
Wadsworth Rd
Cornerstone Community Church
Shepherds Crook Golf Course
Trumpet Park
Van Patten Woods Forest Preserve
Oak-Hickory Forest Preserve
Fielders Stadium
Beach Park Middle School
Thunderhawk Golf Club
Union Pacific Railroad
Waukegan Savanna Forest Preserve
Wadsworth Park
Leah Hill
Prairie Trail School
Antioch
Grayslake
Libertyville
Waukegan


Newport Drainage Ditch Watershed
Degree Of Channelization Fall 2015
Newport Drainage Ditch Watershed Location
Channelization
N/A
High
Moderate
Low
None
Newport Drainage Ditch
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.15 0.3 0.6 0.9 1.2
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Russell Rd
Hickory Rd
9th St
Rosecrans Rd
W 21st St
Wadsworth Rd
Kilbourne Rd
Delaney Rd
N Green Bay Rd
Van Patten Woods Forest Preserve
Oak-Hickory Forest Preserve
Trumpet Park
Shepherds Crook Golf Course
Fielders Stadium
Cornerstone Community Church
Beach Park Middle School
Prairie Trail School
Wadsworth Park
Leah Hill
Union Pacific Railroad
N Winchester Rd
Chicago Ave
Antioch
Waukegan
Grayslake
Libertyville


Newport Drainage Ditch Watershed
Wetlands, Open Water, and Streams
N
Newport Drainage Ditch Watershed Location
Kenosha County, Wisconsin
Lake County, Illinois
Antioch
Waukegan
Grayslake
Libertyville
Streams
Open Water
Wetlands
Newport Boundary
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.15 0.3 0.6 0.9 1.2
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

APPENDIX D

Miscellaneous points

In the fall 2015 inventory of the Newport Drainage Ditch watershed, a category of points were collected as miscellaneous points. These included incidences that were not classified as channel characteristics but were worthy of being noted in the inventory. Below is a table of total miscellaneous points. These contributed to things such as debris jams, bank erosion, water quality and water levels.

Mainstem Miscellaneous Points	No culvert under tracks to other side, drainage ditch along tracks
	Large amounts of oil
	Large wooden structure
	Old broken drain tile concrete
	Evident bank modification and mud dumped into stream, excavator up stream at work
	Water is orange and contained large amounts of oil
	Farmer's crops are underwater
	Concrete structure in stream
	Barbed wire fence
	Ruts in field
	Pond with multiple islands
	Metal/concrete structure
Tributary Miscellaneous Points	Point of re-entrance into stream
	Excessive amounts of grease
	Fence
	Barbed wire fence
	Wire fence
	Boat
	Unknown concrete structure
Total Points	**19**

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

2015

BULL CREEK WATERSHED

STREAM INVENTORY SUMMARY

BULL CREEK WATERSHED

INTRODUCTION

The Lake County Stormwater Management Commission (SMC) conducted a Stream Inventory on the Bull Creek Watershed during the fall of 2015 in addition to a number of other studies and projects related to the development of a watershed plan in the Bull Creek Watershed. The purpose of this assessment was to record quantitative and qualitative stream information, including the capture of visual information on the stream conditions in the Bull Creek Watershed. The information collected will provide a baseline of the overall stream conditions; which can be further extrapolated to indicate the conditions of the stream network of the Bull Creek Watershed. The assessments results will be incorporated into the watershed plan and provide a framework for prioritizing and implementing watershed management strategies.

GENERAL DESCRIPTION

The Bull Creek Watershed is made up of three main branches: Bull Creek North Branch, Bull Creek South Branch, and Bull's Brook. These three branches flow approximately 16 miles through central Lake County. The North Branch of Bull Creek includes about 6.5 miles of stream, all of which were assessed during this study. The South Branch of Bull Creek encompasses approximately 5 miles of stream; 4.5 miles were assessed. Bull's Brook, an area located north of Bull Creek North Branch, contains approximately 4.5 miles of stream, all of which were assessed during this inventory. South Branch, North Branch, and Bull's Brook drain a combined area of 14 square miles (8970 acres) through portions of Mundelein, Libertyville, Grayslake, Wildwood, Fremont Township, Libertyville Township, and various unincorporated areas. The boundaries of the watershed are roughly from IL 120 to the north, IL 83 to the west, and IL 176 to the south before draining into the Des Plaines River northeast of the IL 21/IL137 intersection in the Independence Grove Forest Preserve.

STREAM ASSESSMENT

An extensive stream inventory was performed for the Bull Creek Watershed during the fall of 2015. The stream network within the watershed is divided into reaches, smaller geographically-defined, homogeneous segments, for which data is aggregated. Data is collected by a team of two observers walking the entire length of every assessment reach. At representative points within each reach, the observers measure the channel dimensions, relative velocity (at the surface) of the stream, noting streambank and

riparian conditions, and document hydraulic structures and discharge points using a standardized database. For the purpose of determining bank erosion (lateral recession) additional measurements are obtained, including bank height, lateral recession rate, severity, and lateral recession characteristics. The observers use a camera that is equipped with a GPS (global positioning system) to photograph areas of moderate to severe erosion, significant sediment deposition and debris jams, hydraulic structures and discharge points, and photos of the stream channel that are representative of the conditions throughout the reach. This combined method and technology allows for analysis and mapping of the collected data. A total of 1178 photos and Global Positioning System (GPS) points were taken of Bull Creek and Bull's Brook.

Bull Creek Watershed Reaches

Tributary	South Branch	North Branch	Bull's Brook	Bull Creek Watershed Total
# of Reaches	9	11	15	35
Length (miles)	4.85	6.55	4.6	16
Average Reach Length (feet)	2844	3143	1619	2535

The major stream characteristics inventoried include:

1. **Channel Conditions** (physical size, pool/riffle development, degree of bank erosion, sediment accumulation, debris load and channelization), hydraulic structures (bridges, culverts, man-made dams, beaver dams, or weirs), and discharge points (swale and storm sewer outfall, sizes, material, and locations)

2. **Riparian Corridor** (vegetated buffer width, land use and cover, bank vegetation, and instream vegetation)

3. **Aquatic Habitat** (substrate composition, water quality (color, turbidity, amount of oil/grease present, algae level), instream fish cover (undercut banks, pools, logs, overhanging vegetation, macrophytes) and organisms (terrestrial, aquatic))

Although some quantitative data was collected within the channel, outfall measurements, hydraulic structure measurements, and the condition of the river was largely assessed using a qualitative method that involved visually inspecting and rating each stream reach for the characteristics being evaluated.

CHANNEL CONDITIONS

Channel Measurements

Physical measurements such as the bank height, bottom and top channel width, water depth, and water velocity reflect the shape of the channel and the amount of water that is transported by the stream under both high and low flow (precise definitions and recommended methods for measuring bank height, width, etc. can be found in the Inventory Procedures & Form Guide: Appendix A). Table 1 includes a summary of channel shape characteristics for the South Branch of Bull Creek, the North Branch of Bull Creek, and Bull's Brook.

Table 1: Channel Shape Characteristics

Tributary	Range* and Average	Left Bank Height (ft.)	Right Bank Height (ft.)	Top Channel Width (ft.)	Bottom Channel Width (ft.)	Water Depth (ft.)	Water Velocity (ft./sec.)
South Branch	Range	.5 - 10	.5 - 10	1.5 - 52.0	1.5 - 46.0	.125 - 3.0	.01 - 1.75
	Average	2.55		15.6	9.7	0.94	0.38
North Branch	Range	.5 - 6.0	.5 - 6.0	4.0 - 24.0	2.0 - 20.0	.1 - 6.0	0.0 - 1.2
	Average	2.15		12.3	7.1	0.81	0.4
Bull's Brook	Range	.25 - 7.0	0.25 - 5.0	3.0 - 26.0	1.0 - 20.0	0.0 - 2.0	0.0 - 1.2
	Average	1.9		9.95	5.74	0.52	0.26

*Range was calculated by pulling the lowest and highest numbers record in each branch

Bull's Brook and its channel shape characteristics, make up the lowest averages in the table above and South Branch the highest aside from water velocity where North Branch's (.4 ft/s) was recorded to be slightly higher than the water velocity for South Branch(.38 ft/s). While the mean channel width (both top and bottom) was greatest for South Branch , Bull's Brook was narrower than that of the other two branches in the watershed, and North Branch fell between the two (Table 1). The mean bank heights of the three branches were relatively comparable—2.55, 2.15, and 1.9 feet for the South Branch of Bull Creek, the North Branch of Bull Creek, and Bull's Brook, respectively.

Channelization

Stream channelization (Table 2) describes any activity that moves straightens, shortens, cuts off, diverts, or fills in a stream channel. These activities, which include widening, narrowing, or lining a stream channel, alter the discharge and velocity of water flowing

through it. Consequently, modifications aimed to address a problem in one area of the watershed or stream channel is shifted to another area upstream, downstream or within the immediate area. Evidence of channelization was generally low to none in the Bull Creek Watershed with 86% of the reaches being categorized as such. Only 2 reaches in the watershed displayed high channelization totaling 5% of the reaches in the watershed.

Table 2: Channelization

Degree of Channelization	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%	#	%	#	%	#	%
None	1	11	3	27	6	40	10	29
Low	7	78	6	55	7	47	20	57
Moderate	0	0	2	18	1	6.5	3	9
High	1	11	0	0	1	6.5	2	5
*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach displayed channelization								

Pool/Riffle Development

A pool is a location in an active stream channel usually at the outside bends of meanders where the water is deepest and has reduced current velocities. A riffle is a shallow rapid, usually located at the crossover in the meander of an active channel (see Appendix A). The development of a pool/riffle complex is associated with the natural meandering of stream channels. Pool/riffle complexes also offer streambank erosion relief by directing stream flow through the center of the channel and away from the banks. Pool/riffle development information can be found on Table 3. The degree of pool/riffle development within the watershed was generally low to none; 74% of the reaches in the Bull Creek Watershed had low to no amount of pools and riffles (Table 3). Bull's Brook had the highest percentage of moderate to high pool/riffle development with 33% of its reach falling into those categories. North Branch showed a similar development with 28% of its reaches having a moderate to high pool/riffle level. South Branch showed the lowest amount of pool/riffle development with 88% of its reaches being categorized as having low to no pool/riffle development. In South branch, no reaches were categorized as having a high pool/riffle development and only one reach was recorded as having a moderate level of pool/riffle development.

Table 3: Pool/Riffle Development

Degree of Pool/Riffle Development*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%	#	%	#	%	#	%
None	2	22	0	0	4	27	6	17
Low	6	66	8	72	6	40	20	57
Moderate	1	12	2	18	3	20	6	17
High	0	0	1	10	2	13	3	9

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had pool/riffle development.

Bank Erosion

Several factors are responsible for streambank and streambed erosion. The greatest amount of streambank and streambed erosion will occur if a stream system is flashy and highly channelized combined with a lack of deep-rooted native bank vegetation and steep bank slopes. Poorly maintained or improperly installed point discharges can also result in isolated cases of severe bank erosion. Detailed information about how erosion rates are estimated can be found in the *Lateral Recession Rates* section of Appendix A and a map for this watershed and be found in Appendix E. Overall, bank erosion (Table 4-A) in the Bull Creek Watershed rated relatively low; 91% of the reaches fell into categories that placed bank erosion for each reach at 33% or less. Of the watershed, only 3 reaches or 9% of the reaches were found to have 34-66% of its banks eroded. Two of these reaches were in Bull's Brook and one in North Branch. These reaches were particularly sinuous. The outer banks of a meandering stream are prone to erosion as the water moves faster around the turns as it flows. Reach 14 of North Branch, located between Countryside Drive in the Bull Creek subdivision of Libertyville and IL Rt. 137 displayed a relatively high level of erosion in an area where residential properties ran right up to the stream banks. The two reaches in Bull's Brook that were of greatest concern were Reaches 4 & 6 (see Appendix B). Reach 4 is located north of the culvert at Casey Road and between the culvert at Almond Road and Almond Marsh. Reach 6 is located in the Casey Road North Open

Space; just off of Rt. 45 in Libertyville. Unlike reach 14, reach 4 and 6 were surrounded largely by an open space recreational area with little to no residential properties running up to the streambank.

Table 4-A Streambank Erosion

Extent of Erosion*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%**	#	%	#	%	#	%
None/Slight	3	33	4	36	7	47	14	40
Moderate	6	67	6	55	6	40	18	51
Severe	0	0	1	9	2	13	3	9
Very Severe	0	0	0	0	0	0	0	0

*None/Slight = 0-4%; Moderate = 5-33%; Severe= 34-66%; and Very Severe = 67-100% of the reach had eroded streambanks.

**Percent based on the number of reaches in each branch with erosion present

LRR (ft./yr.)	Category	Description
0.01 - 0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
0.3 - 0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross-section is U-shaped and stream course or gully may be meandering.

The lateral recession rate is a qualitative way to assess width or thickness of eroding surface of a channel. The Rapid Assessment Point Method (RAP-M) for assessing lateral recession was employed to determine the degree of streambank erosion in the Bull Creek Watershed. Lateral Recession Rate (LRR) evaluates streambanks along the right and left bank (facing upstream) for each assessed reach. Within each reach, a segment of the channel with specific LRR characteristics is identified. Measurements include bank height/width and the lateral recession rate in feet per year, while several criteria including undercutting, bare bank, overhanging vegetation, fallen trees, exposed roots and slips or slides are noted (Appendix E). This is repeated up left and right side

of each bank, connecting each segment to the end of the reach. All segments of every reach are captured with a camera equipped with GPS which is then transferred to a geographic information system (GIS) which then manipulates, analyzes, and presents the data geographically.

Table 4-B: Lateral Recession Rates

Recession Rate	South Branch		North Branch		Bull's Brook		Bull Creek Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Total %
Slight	89	88	90	91	91	88	90
Moderate	11	12	9	9	9	11	9.5
Severe	0	0	1	0	0	1	0.5
Very Severe	0	0	0	0	0	0	0

To combat erosion, armoring can be placed against the streambank. Placement of gibbons, wood, metal, riprap or other artificial materials along banks can lessen erosion. Table 4-C shows the level of armoring present for the three branches of Bull Creek.

Table 4-C: Bank Armoring

Level of Armoring*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%**	#	%	#	%	#	%
None	3	33	7	64	11	73	21	60
Low	5	56	1	9	3	20	9	26
Moderate	1	11	3	27	1	7	5	14
High	0	0	0	0	0	0	0	0

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100%

**Percent based on the number of reaches in each branch with armoring present

The armoring level for the Bull Creek Watershed was relatively low with 86% of the reaches having little to no level of armoring. South Branch had the highest level of armoring with 67% of the reaches having at least some degree of armoring. Bull's Brook had the lowest amount of armoring with only 27% of its reaches having some degree of armoring. None of the reaches in the watershed contained a high level of armoring.

Sediment Accumulation

Sediment accumulation at any point in a stream is influenced by the degree of streambank erosion upstream, the stream gradient and other impacts such as development that may be contributing sediment to the stream (Table 5). Fast moving water picks up and transports the sediment downstream as suspended material in the water column. Sediment accumulation occurs as the stream flow rate decreases allowing the suspended particles to settle. The stream flow rate declines as the channel gradient lowers or an obstruction in the channel is present, resulting in areas with higher amounts of accumulated sediment (more information in Appendix A). Low accumulation levels may be due to fairly low rates of erosion in the watershed and the presence of several significant lakes and wetlands that act as sediment traps. These areas decrease the gradient on the channel and allow the sediments to settle out of the water column.

Table 5: Sediment Accumulation

Sediment Accumulation Level*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%**	#	%	#	%	#	%
None	2	22	1	9	5	33	8	23
Low	5	56	9	82	9	60	23	66
Moderate	1	11	1	9	1	7	3	8
High	1	11	0	0	0	0	1	3

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had sediment accumulation
**Percent based on the number of reaches in each branch with armoring present

Of the reaches assessed in the Bull Creek Watershed, 31 reaches, or 89% of the reaches had little to no sediment accumulation, which is expected of a stream with a low bank erosion level (Table 4-A). The sediment accumulation level is comparable across the three branches with South, North, and Bull's Creek having 78%, 89%, and 93% of their reaches containing low to no accumulation. Each reach contained a single reach with a moderate level of accumulation, totaling 8% of the entire watershed. South Branch was the only branch to have a reach that contained a high level of sediment accumulation; Reach 6 is a stretch approximately ½ a mile in length located between Butler's Lake

and St. Mary's Lake (see Appendix B).

Debris Load

Like sediment, most or all streams transport some amount of debris. Large organic debris such as tree limbs and branches can provide habitat, divert currents to create pools, bars, and slow-water habitat for aquatic organisms, and provide allochthonous energy inputs to the ecosystem that are not produced within the stream. Allochthonous inputs are those that enter the stream from some outside source, such as organic matter like leaves from terrestrial plants and trees that is washed into the stream). However, too much debris can be problematic and may result in debris jams. These debris jams may cause backwater flooding and sediment deposition and can divert current into one or both banks, leading to streambank erosion. Debris accumulation and blockages, both instream and overbank, are a concern throughout the Bull Creek Watershed (Table 6). Reaches that failed the instream or overbank test were characterized by large accumulations of lodged and partially compacted debris across the stream channel or on the banks. A reach failed the instream or overbank tests if greater than 33% of the reach contained instream or overbank debris.

Table 6: Instream and Overbank

Failed Test*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%	#	%	#	%	#	%
Instream	4	44	4	36	7	47	15	43
Overbank	5	55	2	18	6	40	13	37
Both	4	44	2	18	6	40	12	34

*Reaches that failed the test for debris accumulation had debris levels >33%

The Bull Creek Watershed had 80% of its reaches fail either the instream or overbank debris test; 34% of the reaches in this watershed failed both tests. Instream debris accumulation was highest in Bull's Brook where 47% of the reaches failed the test. South Branch followed closely with 44% of its reaches failing the instream debris load test. South Branch had the highest level of overbank debris with 55% of its reaches failing the debris test, Bull's Brook followed with 40% of its reaches failing the test. North Branch ranked lowest in both instream and overbank debris loads, 52% of the reaches failed either the overbank or instream test. In South branch, 99% of the reaches failed either the instream or overbank debris load test, 87% failed either test in Bull's Brook. The highest levels of debris jams were often found in open space/non-residential areas where tree and shrub levels were high.

Hydraulic Structures

Hydraulic structures are any bridges, culverts, dams, weirs, levees, and fences in or across the stream channel. These structures modify the pattern or amount of flow and may act as constriction points causing backwater flooding. Culverts may act as temporary or permanent barriers if, over time, a plunge pool develops, causing the bottom of the culvert to become elevated above the water level of the pool. Additionally, dams and weirs can impede the movements of fish and other aquatic organisms within the stream network (Table 7). Bull Creek South Branch had the largest number of hydraulic structures (45) as well as the highest number of hydraulic structures per mile (10/mi). North Branch had the lowest number of hydraulic structures (30) as well as only having 4.3 structures per mile of stream. Culverts were the most common structure recorded making up 64% of the total number of hydraulic structures in the watershed, bridges came next at 32%, while dams, weirs, and other structures made up less than 15% of the total number of hydraulic structures. North and South Branch each had 6 problem structures, while Bull's Brook had 7. Problems most commonly occurred with hydraulic structures due to the rusting of their material or erosion of their material from the water constantly flowing past it. A detailed list of the problematic hydraulic structures for the Bull Creek Watershed can be found in Appendix C. Another important structure to note is the extensive beaver dam located in Reach 13 of North Branch, an area owned by the Libertyville Township. The dam has caused the water to pool as well as move outward from the normal bank line.

Table 7: Hydraulic Structures

Hydraulic structures	South Branch		North Branch Bull Creek		Bull's Brook		Bull Creek Watershed	
Bridges	13		8		11		32	
Culverts	26		19		19		64	
Dams	2		2		1		5	
Weirs	3		1		2		6	
Other	1		0		0		1	
Total	45		30		33		108	
Hydraulic Structures per Stream Mile	10		4.3		7.3		6.75	
Problem Hydraulic Structures and Percentages*	6	13%	6	20%	7	21%	19	18%

* Percent based on total number of hydraulic structures for each branch.

Discharge Points

Discharge points include sanitary, storm sewer, agricultural drain tile and sump pump pipes greater than 4 inches in diameter. They also include open channels, swales, gullies and other significant tributaries. Point discharges greatly contribute to the degradation of water quality in a stream. During a rain event, various pollutants are transported by outfalls into the channel, diminishing the quality of the water in the channel (Table 8).

Table 8: Discharge Points

Discharge Points	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
Swales/Open Channels								
Natural	24		17		25		66	
Cobble	1		2		1		4	
Swales/Open Channels Total	**25**		**19**		**26**		**70**	
Pipes/Fallouts								
HDPE	17		10		13		40	
RCP	15		9		10		34	
PVC	5		3		2		10	
Ductile Iron	1		0		1		2	
CMP	5		8		2		15	
Clay	0		0		0		0	
Pipes/Fallouts Total	**43**		**30**		**28**		**101**	
Total Discharge Points	**68**		**49**		**54**		**171**	
Discharge Points per Stream Mile	15.1		7		12		10.7	
Problem Swales and Pipes*	**13**	**19%**	**8**	**16%**	**8**	**15%**	**29**	**17%**

* Percent based on total number of hydraulic structures for each branch.

Between open channels and pipes, there were 171 discharge points recorded in the Bull Creek Watershed. Swales made up the largest number of discharge points, followed by HDPE pipes and then RCP. South Branch had the highest number of total discharge points and discharge points per mile, 68 and 15.1 respectively. North Branch had the fewest number of discharge points (49) and fewest points per mile (7). Bull's Brook and North Branch each had 8 problematic discharge points, while South Branch had 13. Problematic pipes made up 17% of the total number of discharge points recorded in the watershed. A detailed list of the problematic discharge points for the Bull Creek Watershed can be found in Appendix C.

RIPARIAN CORRIDOR

Vegetated Buffer

Throughout the Bull Creek Watershed, the width of the riparian zone is impacted by anthropogenic changes in land use resulting in wide riparian buffers ("High" buffer width) in locations where the stream flows through open space areas with minimal to no impact and narrow buffers ("Low" buffer width) in locations where the stream flows through developed areas. Generally there was some sort of vegetated buffer around the stream in the Bull Creek Watershed. Only 2 reaches (6%) had no vegetated buffer present. Low and moderate buffers were found relatively evenly across all three branches (34%) and (31%). The highest concentration of reaches with a high buffer width was found in Bull's Brook where nearly half of the reaches fell into this category.

Vegetated Buffer Width

Buffer Width*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%	#	%	#	%	#	%
None	0	0	1	9	1	7	2	6
Low	4	44	4	36	4	27	12	34
Moderate	4	44	4	36	3	20	11	31
High	1	12	2	19	7	47	10	29

*None:<20 feet; Low: 20-40 feet; Moderate: 40-60 feet; High: >60 feet

Floodplain Land Use & Coverage

The stream inventory included an assessment of land use within 100 feet on either side of the stream channel. Land use within the 100-foot riparian corridor was categorized into six classifications: agricultural, recreational, residential, vacant/open space

(includes forest, grassland, and wetland), commercial/industrial, and other. Estimates are qualitative and made after walking the stream reach and observing the percent of land in each of these categories. See Table 9-A for a summary of land use in the riparian corridor and floodplain. The most abundant use for land for the entire Bull Creek Watershed as well as each individual branch was open space which made up 58% of the area. After open space, residential areas made up 27.5% of the floodplain area, while agriculture, recreational, and commercial combined made up less than 15% of the land use area.

Table 9-A: Land Use in the Riparian Corridor

Land Use*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Total %
Agricultural	0	10	0	4	15.5	11	6
Open Space	46	44	70	61	66	54	58
Recreational	17	11	0	0	0	0	4
Commercial	0	0	9	7	0.5	0	4
Residential	38	35	21	25	18	34.5	27.5
Other	0	0	0	3	0	0.5	0.5

*Land use within 100 ft. of each side of river based on visual observation.

Floodplain vegetation (Table 9-B) serves as an important function in protecting the physical, biological, and chemical integrity of water. Vegetation acts as a natural barrier by dissipating the energy of lowing water and provides protection from flooding and erosion. Vegetation filters sediments originating from land while slowing overland flows and surface run-off into water bodies, and

filters incoming floodwaters from materials scoured from the channel bank and bed. This filtering process can add nutrients to the floodplain soil. Slowed runoff across the floodplain allows additional time for infiltration and groundwater recharge. The slowing of runoff provides the additional benefit of natural purification of water as local runoff or overbank floodwater infiltrates through the floodplain alluvium. Vegetation provides habitat and nutrients for a wide variety of terrestrial and aquatic organisms in, adjacent to, and for downstream ecosystems.

Table 9-B: Floodplain Vegetation

Floodplain Vegetation*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed
	Left %**	Right %	Left%	Right%	Left%	Right%	Total %
Trees	22.5	24	24	20	33	38	25
Lawn	26	21	14	16	4	15	16
Wetland	18	12	19	15	13	7	14
Crops	0	7	2	9	9	7	6
Shrubs	18	15	25	22	31.5	25.5	23
Herbaceous	5	5.5	5	4	6	6	5
Impervious	2	2	1	3	0.5	1	2
Water	2.5	0.5	5	7	3	0.5	4
Other	6	13	5	4	0	0	5

*Percent of vegetative type within 100 feet of each side of channel based on visual estimates.

The most abundant floodplain vegetation for the entire Bull Creek Watershed was trees (25%). After trees, shrubs made up 23% of the area and lawn and wetland together made up 30%. The remaining 22% was split almost evenly amongst crops, herbaceous plants, impervious areas, water and other. Trees covered the most area for both South Branch

and Bull's Brook, followed by shrubs. North Branch however was covered more by shrubs than by trees.

Bank Vegetation

Bank Vegetation is vegetation existing within 10 feet of the stream bank. The most significant role of bank vegetation is its ability to control erosion, which in turn prevents sediment and other forms of pollution from entering the stream. Sedimentation is a very significant problem and though erosion is a natural process, it is often sped up through human activities, directly or indirectly. The increased rate of erosion and sedimentation affects the geomorphology of the stream channel, water quality, and aquatic life in the stream channel and throughout the watershed. Streams surrounded by vegetated riparian zones, have intricate root systems that help to stabilize the bank and prevent erosion. Woody stemmed plants, sedges, and grasses help physically trap sediment by slowing water runoff from the surrounding areas, allowing the sediment to settle out instead of entering the stream. Additionally, vegetated banks lend to deep and narrow channels as a result of their stability and lack of heavy sedimentation.

Table 10: Bank Vegetation

Predominant Vegetation*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Total %
Grass	8	9	20.5	23	19	22	20
Lawn	12	7	12	9	2	5	8
Wetland	16	11	16	14.5	13	7	13
Trees	20	20	19	19	30	30	22
Shrub	27	29	25	27	25	28	26
Crop	0	4	0.5	0.5	0	0	1
Herbaceous	6	4	5	5	4	5	5
None	4	4	2	2	3	3	2
Other	7	12	1	0	4	0	3

*Percent of vegetative type within 10 feet of each side of channel based on visual estimates.

The banks of the Bull Creek Watershed were primarily composed of four different types of vegetation. Shrubs made up 26% of the vegetation, trees 22%, unmowed grass 20%, and wetlands 13%. The remaining 19% of the banks were covered by lawn, crops, herbaceous plants, or had no vegetation. Shrubs made up the largest portion of vegetation for the entire watershed as well as each of the three branches. South Branch had the highest percentage of bare bank at 4%, followed by Bull's Brook at 3% and North Branch with only 2% of its banks not having any type of vegetation.

Instream Vegetation

Aquatic instream vegetation is an important part of the watershed ecosystem. Plants in the stream are important in food webs: each organism has characteristic feeding preferences and patterns, and can itself be prey to other consumers. Plants provide habitat and shelter for fish, waterfowl, and other wildlife. Since all plants, including those that grow underwater, produce oxygen as they photosynthesize, they are the major source of oxygen for aquatic animal life. Rooted plants stabilize shorelines and stream beds. They absorb nutrients and filter pollutants from runoff, which improves water quality. In the Bull Creek Watershed approximately ¾ of the streams contained no instream vegetation. South Branch had the largest amount of vegetation with 59% of the stream containing some type of vegetation. Unlike South Branch, North Branch only had 18% of its length have vegetation instream and Bull's book only had 16%. Where there was vegetation, attached algae was the most common for each individual branch and the watershed as a whole.

Table 11: Instream Vegetation

Instream Vegetation	South Branch	North Branch	Bull's Brook	Bull Creek Watershed
	%	%	%	%
Rooted Emergent	11	2	6	6
Rooted Submergent	15	6	3	8
Rooted Floating	0	0	0	0
Free Floating	5	0	3	2
Floating Algae	11	1	0	3
Attached Algae	17	9	3	9
No Vegetation	41	82	84	72

AQUATIC HABITAT

Substrate Composition

Bull Creek Watershed streambeds are composed of a variety of sediment grains that range in diameter from extremely fine clays to relatively coarse cobbles and boulders (see Table 12-A). Generally, fine sediments are transported in suspension until velocity slows enough that they are deposited on the streambed. Larger sediments are not transported as readily and may only move during increased flows. Clays are typically

regarded as cohesive sediments that naturally adhere to one another (and are therefore more difficult to erode) while silts are more easily eroded. Sands and larger sediments (e.g., gravels and cobbles) are less cohesive. Clay and silt-dominated banks and beds, therefore, tend to be associated with narrow, incised channels while sand, gravel, and cobble-dominated channels are more often shallow and wide. Clay/silt channels tend to incise or deepen in response to increased flows while sand/gravel channels tend to widen. These relationships, however, are also contingent upon a number of other contributing factors such as gradient, bank slope, and bank vegetation. Substrate is also an important measure of habitat quality. Extremely fine sediments, such as clays, adhere closely to one another and may bury the streambed. Coarse-grained sediments like gravels present abundant interstices, allowing water, oxygen, and other dissolved and suspended materials to infiltrate the hyporheic zone. The hyporheic zone refers to the area surrounding the stream channel that is saturated and through which there is some percolation or flow. Essentially, the hyporheic zone is the area where the surface water and groundwater interface and mix.

Table 12-A: Substrate Particle Size

Particle	Diameter (inches)
Claypan	< 0.0002
Silt	0.0002 to 0.002
Sand	0.002 to 0.08
Gravel	0.08 to 2.5
Cobble	2.5 to 10
Boulder	>10 or large slabs

Table 12-B: Substrate Composition

Predominant Substrate	South Branch	North Branch	Bull's Brook	Bull Creek Watershed
	%	%	%	%
Clay	6	21	10	13
Silt	13	6	32	15
Sand	9	8	6	15
Gravel	17	17	9	8
Cobble	11	20	20	17
Boulder	3	3	3	4
Concrete	7	0	4	3
Organic	35	25	16	25

No one substrate material dominated the Bull Creek reaches, though organic material made up 25% of the watershed. The highest percentage of substrate occurrence differed across the three branches. South Branch contained 35% organic material followed by 17% gravel. North Branch contained 25% organic material followed by 21% clay. Bull's Brook contained 32% silt followed by 20% cobble. The least common

substrate compositions were concrete and boulder, making up less than 7% of the entire substrate composition for the Bull Creek Watershed.

Water Quality

The water quality indicators that were evaluated during the stream assessments of the Bull Creek Watershed were turbidity and water color, filamentous algae, the presence of grease and oil in the sediment and water column. These water quality indicators were assessed by visual inspection of the stream during the stream inventory.

Turbidity

Turbidity is the measure of relative clarity of water. Material that causes water to be turbid includes clay, silt, fine inorganic and organic matter, algae, organic compounds, and plankton and other microscopic organisms. During periods of low flow, water in streams is a clear green color, and turbidities are low. Turbidity can increase, however, during storm events when the volume of water in the channel increases and erodes the streambanks or stirs the sediment in the bottom of the channel. Despite having a substrate that is composed largely in part of silt and organic material, all of the reaches in the Bull Creek watershed, aside from one, displayed turbidity levels that were either low or none. Reach 10 (see Appendix B for the Bull Creek Watershed Reach Map) located on the west end of Bull Creek's South Branch had a turbidity level that was moderate. This is likely do to the failure of a beaver dam. Beaver dams act as sediment traps when properly built, accumulating material that would normally cause turbidity in water. When the beaver dam (located near the eastern end of the reach, just past Kettering Road in Mundelein) failed, there was an unusually high level of sediment released as the water began to flow from a standstill, contributing to the moderate level of turbidity in this one stretch of stream.

Filamentous Algae

Filamentous algae is a good indicator of elevated nutrient levels. Filamentous algae are not only aesthetically displeasing, but also form mat-like blooms that cause substantial swings in diurnal oxygen levels (dissolved oxygen levels can get very low during the night). This fluctuation can limit the habitat of many aquatic animals. Algae blooms were not a big concern in the Bull Creek Watershed.

Grease & Oil

Grease and oil enter the stream during rain storms as oil and grease from surrounding parking lots, roads, and bridges flush into the storm sewer system, often overflowing directly into the stream. Other potential sources of oil and grease results from illegal dumping that originate from automotive and transportation related services. Grease and oil in the water column and sediment will degrade the water quality of receiving streams by adding biological and chemical oxygen demand to the stream.

Table 13: Grease/Oil Level

Grease/Oil Level*	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%	#	%	#	%	#	%
In Water								
None	2	22	1	9	8	53	11	31
Low	6	67	6	55	7	47	19	54
Moderate	1	11	4	36	0	0	5	15
High	0	0	0	0	0	0	0	0
In Sediment								
None	3	33	3	27	11	73	17	49
Low	5	56	7	64	4	27	16	45
Moderate	1	11	1	9	0	0	2	6
High	0	0	0	0	0	0	0	0

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had oil present

Instream Fish Cover

A diverse habitat with regard to instream cover is essential for diverse fish assemblages and other aquatic organisms. Instream fish cover availability was evaluated based on the presence of a number of structural elements and habitats, consisting of undercut banks, pools over 28 inches deep, aquatic macrophytes, logs, overhanging vegetation, rootwads, boulders, and backwaters. The presence of woody debris (logs and

rootwads) in streams is a significant component of fish habitat which they utilize for spawning, rearing, and foraging. Woody debris creates areas of low flow, providing a refuge for fish during periods of high flow. Woody debris also provides cover for fish, lowering the risk of predation. Overhanging vegetation and canopy cover provide two important benefits; providing shade to the stream helps keep the temperature in the stream cool, and leaf litter and organic material provide nutrients to macroinvertebrates and other aquatic organisms. Table 14 contains the fish coverage categories and the abundance of those types of coverage.

Table 14: Fish Coverage

Cover Type	South Branch		North Branch		Bull's Brook		Bull Creek Watershed	
	#	%*	#	%	#	%	#	%
Undercut Banks	7	78	9	82	7	47	23	66
28in Deep Pools	2	22	6	55	5	45	13	37
Macrophytes	7	78	11	100	8	53	26	74
Logs	8	89	11	100	13	87	32	91
Overhanging Vegetation	4	44	11	100	9	60	24	69
Rootwads	5	56	8	73	10	67	23	66
Boulders	5	56	7	63	9	60	21	60
Backwaters	4	44	3	27	3	20	10	29
* Percent total will exceed 100% as more than one type of coverage can occur simultaneously in each reach								

The most common form of fish cover was the occurrence of logs, appearing in 91% of the reaches. Macrophytes were the second most common type of cover at 74% followed by overhanging vegetation at 69%. The least common type of fish habitat was backwaters at 29% followed by 28-inch deep pools at 37%. South Branch had 89% of its reaches have logs present and 78% of the reaches had undercut banks. North branch had 100% of its reach have logs, macrophytes, and overhanging vegetation available for fish to utilize. Bull's Brook had 87% of its reaches contain logs and 67% of its reaches contained rootwads for fish cover.

Aquatic & Terrestrial Organisms

The inventory addressed aquatic and riparian life where possible or identifiable. Organisms were not specifically sampled during the stream inventory, but some animals were observed during the inventory.

South Branch

Dragonfly nymphs, snails, leeches, beetles, carp, shiners, other fish, and mussel beds were found in this portion of the watershed.

BC-Reaches 6 & 7 both contained an extensive amount of zebra mussels where they met with St. Mary's Lake. Zebra mussels are an invasive species in Illinois. Known for their ability to reproduce rapidly, they are capable of taking over a body of water in a short amount of time, pushing native mussels out of the area.

North Branch

Sowbugs, fish, ducks, geese, heron, terns, snakes, frogs, and deer were present in this part of the watershed.

While no beavers were seen, there was a high amount of physical evidence pointing towards their inhabitance of this area. BC-Reach

13 contained a lodge and an extensive dam that caused the water level to stretch beyond its normal realms.

Bull's Brook

Dragonfly nymphs, creek chubs, shiners, snakes, toads, frogs, deer, ducks, geese, and heron were observable in this portion of the watershed.

SUMMARY

The degree of pool/riffle development within the Bull Creek Watershed was low to none for 74% of the reaches. Thirty-two of the 35 reaches (91%) within the watershed were characterized as having low or moderate streambank erosion problems, and about 9% of the reaches were experiencing severe erosion at the time of the stream inventories. Likewise, most (89%) of the reaches within the Bull Creek Watershed had a low to no amount of sediment accumulation. Evidence of channelization was generally low to none in the Bull Creek Watershed with 86% of the reaches being categorized as such. A little less than half of the reaches in the watershed had moderate to high amounts of debris located instream (43%) or on the banks (37%).

The Bull Creek Watershed contained 108 hydraulic structures and 171 total discharge points. Eighteen percent of the hydraulic structures within the watershed were experiencing problems, and likewise 17% of the discharge points within the watershed were considered problematic. The South Branch (45) had the most hydraulic structures while the North Branch (30) and Bull's Brook (33) had nearly the same number of structures. The South Branch also had the largest number of discharge points (68) as the North Branch (49) and Bull's Brook (54) we're nearly equal again. The South Branch also had a higher density of pipes per stream mile (15.1) than the North Branch (7) and Bull's Creek (12).

The riparian corridor within the Bull Creek Watershed is predominantly open space (58%). The next largest land use within its corridor is residential (27.5%). Recreational, commercial and industrial, and agricultural land uses each make up less than 15% of the riparian corridor. The vegetated buffer width was found to be about uniform across all three categories (low, moderate, and high), with only 2 reaches in the watershed having no buffer. Trees (26%) and shrubs (23%) make up nearly half of the floodplain vegetation. Bank vegetation was comprised mainly of shrubs (26%), trees (22%), and unmowed grass (20%).

The predominant substrates for each branch differed from each other. South Branch was primarily organic material and gravel, North branch was organic material and clay, while Bull's Brook was silt and cobble.

Most of the reaches in the Bull Creek Watershed were characterized as having low to no turbidity. Only one reach within South Branch was found to be moderately turbid. A majority of the reaches within the Bull Creek Watershed were characterized as having

low to no amount of filamentous algae (88%). Twenty-four of the 30 reaches (69%) within the Bull Creek Watershed had grease/oil in the water column and 18 reaches (51%) had oil/grease present in the sediment. The North Branch had the highest percentage of reaches with grease and oil present in both the sediment (73%) and water column (91%) compared to Bull's Brook (73%) and (53%).

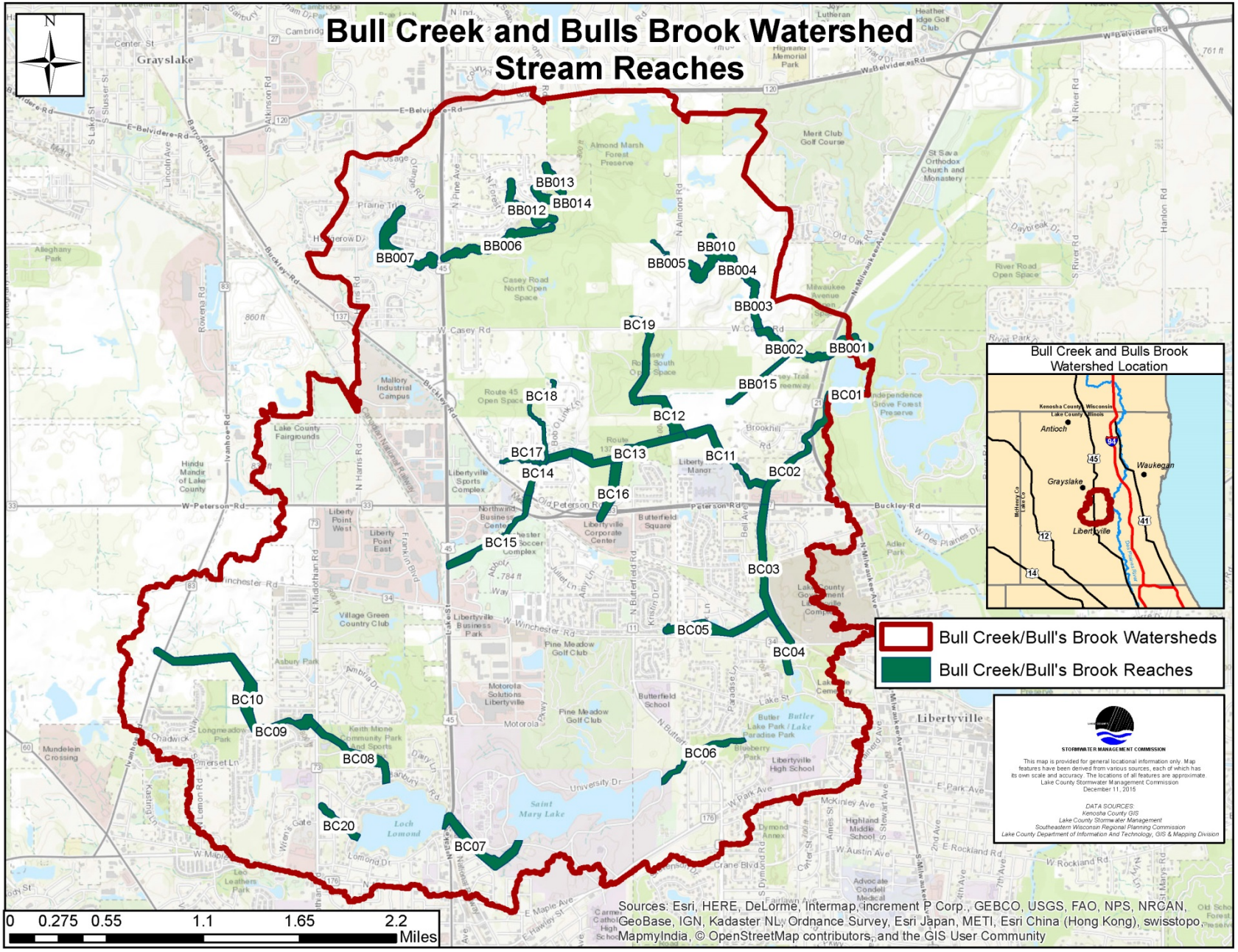
In the Bull Creek Watershed, the most common types of instream fish cover were logs, macrophytes, and overhanging vegetation; these habitat types were present in 69% percent or more of the reaches within the watershed.

Bulls Brook Bull Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
BB001	HIGH	MOD	MOD	NONE	MOD	1,481	0.28	0.5	2.5	4.5	16.0	3.5	15.0	10.8	0.6
BB002	MOD	MOD	MOD	LOW	MOD	2,904	0.55	1.0	3.0	8.0	15.0	5.0	10.0	10.7	1.0
BB003	LOW	NONE	MOD	LOW	MOD	1,698	0.32	1.5	3.0	8.0	12.0	2.5	7.0	9.7	0.5
BB004	HIGH	MOD	MOD	NONE	SEV	4,499	0.85	1.0	5.0	11.0	16.0	4.0	8.0	14.0	0.6
BB005	LOW	LOW	MOD	LOW	NONE	1,153	0.22	1.0	1.0	8.0	22.0	5.0	20.0	14.0	0.7
BB006	MOD	MOD	MOD	LOW	SEV	2,898	0.55	1.0	1.5	4.0	10.0	2.0	5.0	6.6	0.3
BB007	NONE	NONE	LOW	MOD	NONE	245	0.05	1.0	3.0	11.0	26.0	6.0	17.0	18.7	1.5
BB008	LOW	LOW	LOW	NONE	NONE	254	0.05	0.5	1.0	7.0	20.0	3.0	10.0	12.3	1.1
BB009	LOW	LOW	MOD	LOW	NONE	217	0.04	1.0	2.0	4.0	4.0	2.0	2.0	4.0	0.5
BB010	MOD	MOD	HIGH	NONE	MOD	1,040	0.20	1.0	5.0	3.0	14.0	2.0	8.0	9.3	0.2
BB011	LOW	LOW	MOD	LOW	NONE	896	0.17	1.0	3.0	4.0	8.0	2.0	4.0	6.7	0.5
BB012	MOD	LOW	MOD	LOW	MOD	2,679	0.51	0.5	7.0	11.0	-	2.0	10.0	-	0.4
BB013	LOW	LOW	HIGH	NONE	NONE	1,012	0.19	0.3	5.0	5.0	11.0	1.5	4.0	7.7	0.0
BB014	MOD	MOD	MOD	NONE	MOD	754	0.14	1.0	4.0	6.0	12.0	4.0	6.0	9.7	0.1
BB015	LOW	LOW	HIGH	HIGH	NONE	2,552	0.48	2.5	4.5	3.0	7.0	1.0	3.0	5.0	0.0
BB016	-	-	-	-	-	2,552	0.48	-	-	-	-	-	-	-	-
BLC01	LOW	MOD	HIGH	MOD	MOD	2,652	0.50	1.0	6.0	22.0	30.0	8.0	20.0	25.3	2.5
BLC02	LOW	LOW	MOD	LOW	NONE	2,752	0.52	1.0	3.0	10.0	22.0	4.0	10.0	14.7	0.7
BLC03	MOD	MOD	MOD	LOW	MOD	4,499	0.85	1.0	9.0	10.0	14.0	6.0	10.0	11.7	0.8
BLC04	LOW	LOW	LOW	LOW	MOD	1,861	0.35	2.0	3.0	12.0	52.0	6.0	46.0	38.0	1.7
BLC05	NONE	LOW	MOD	HIGH	NONE	1,769	0.34	1.0	6.0	1.5	285.0	1.5	265.0	98.8	0.9
BLC06	MOD	MOD	MOD	LOW	MOD	2,662	0.50	1.0	4.0	10.0	35.0	6.0	25.0	19.0	0.5
BLC07	MOD	MOD	MOD	LOW	MOD	3,675	0.70	1.0	30.0	6.0	180.0	4.0	150.0	66.7	1.3
BLC08	LOW	LOW	MOD	LOW	NONE	2,762	0.52	0.5	3.0	7.0	11.5	2.0	7.5	9.5	0.6
BLC09	HIGH	MOD	MOD	LOW	MOD	2,448	0.46	2.0	10.0	13.5	24.0	4.0	10.0	17.5	1.2
BLC10	LOW	LOW	LOW	NONE	NONE	4,341	0.82	1.0	4.0	8.0	-	5.0	10.0	-	1.4
BLC11	HIGH	MOD	MOD	NONE	NONE	4,090	0.77	1.0	2.0	10.0	15.0	8.0	12.0	13.3	0.6
BLC12	LOW	NONE	MOD	NONE	NONE	1,679	0.32	0.5	3.0	4.0	5.5	2.0	2.5	4.8	0.3
BLC13	LOW	LOW	LOW	LOW	MOD	4,324	0.82	2.0	3.0	12.0	12.0	5.0	8.0	12.0	1.3
BLC14	LOW	LOW	MOD	MOD	SEV	2,607	0.49	1.0	6.0	9.0	19.0	6.0	9.0	13.3	0.3
BLC15	MOD	MOD	MOD	LOW	MV	5,817	1.10	1.0	4.0	10.0	24.0	8.0	18.0	16.0	1.0
BLC16	LOW	LOW	MOD	LOW	MOD	1,532	0.29	1.0	1.0	5.0	13.0	3.0	5.0	9.3	0.7
BLC17	LOW	LOW	HIGH	LOW	MOD	2,663	0.50	1.0	4.0	9.0	10.0	4.0	5.0	9.3	0.3
BLC18	MOD	LOW	MOD	LOW	MOD	4,787	0.91	1.0	3.5	5.0	13.5	3.0	8.0	9.5	0.9
BLC19	MOD	LOW	MOD	NONE	MOD	1,666	0.32	1.0	6.0	4.3	12.0	2.3	6.0	7.9	0.4
BLC20	LOW	MOD	MOD	LOW	MOD	1,579	0.30	0.5	4.0	3.0	16.0	3.0	7.5	12.8	0.3

- : Not Collected

APPENDIX B:


Bull Creek and Bulls Brook Watershed
Stream Reaches
N
BB013
BB012
BB014
BB007
BB006
BB010
BB005
BB004
BB003
BC19
BB002
BB001
BB015
BC01
BC18
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BC06
BC20
BC07
Bull Creek and Bulls Brook Watershed Location
Antioch
Waukegan
Grayslake
Libertyville
Bull Creek/Bull's Brook Watersheds
Bull Creek/Bull's Brook Reaches
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.275 0.55 1.1 1.65 2.2
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

APPENDIX C:

Problematic Hydraulic Structures & Discharge Points: Bull Creek Watershed						
Bull's Brook						
Pipes/Fallouts	**Reach #**	**Size (in.)**	**Material**	**L/R/C**	**Flow**	**Comments**
	BB007	16	RCP	Right	Trickle	None
	BB012	10	CMP	Right	None	Rusted out bottom
	BB014	4	HDPE	Left	Trickle	Under debris jam
	BB014	4	HDPE	Center	Trickle	None
	BB014	12	HDPE	Right	Trickle	None
Swales/Open Channels		**Dimensions (ft.)**				
	BB002	1W x 1H	Natural	Left	Trickle	None
	BB014	3W x 1.5H	Natural	Right	Trickle	Full of debris
	BB004	4W x 10H	Natural	Left	None	None
Hydraulic Structures				**Type**	**Grade***	
	BB004	15L x 2W x 2H	Wood	Bridge	C	None
	BB012	1L x 70W x 6H	Concrete	Dam	D	Damaged
	BB013	25L x 1W x 5H	Concrete	Spillway	D	None
	BB013	10L x 3W x 4H	Concrete	Spillway	F	None
	BB014	10L x 2.5W x 2.5H	CMP	Culvert	D	Bottom rusted away
	BB014	10L x 1W x 1H	CMP	Culvert	C	Armored around
	BB015	2L x 2W x 8H	CMP	Culvert	D	None
North Branch						
Pipes/Fallouts	**Reach #**	**Size (in.)**	**Material**	**L/R/C**	**Flow**	**Comments**
	BC001	12	HDPE	Left	Trickle	Iron/oil deposits at bank broken at bottom
	BC001	12	CMP	Left	None	Rusted out
	BC002	12	RCP	Right	None	Pipe is not totally attached armored
	BC002	12	CMP	Left	None	Rusted out bottom
	BC017	18	RCP	Left	None	Orange discharge
	BC015	18	CMP	Left	None	Missing bottom half
Swales/Open Channels		**Dimensions (ft.)**				
	BC011	15W x 1H	Natural	Left	Moderate	Under debris jam
	BC016	6W x 2H	Concrete	Right	None	None
Hydraulic Structures				**Type**	**Grade**	
	BC013	100L x 7W x 5H	Natural	Beaver Dam	D	None

	BC013	8L x 4W x 4H	Natural	Beaver Dam	D	None
	BC017	8L x 3W x 2H	Wood	Bridge	F	None
	BC017	5L x 25W x 3H	CMP	Culvert	D	Warping
	BC018	8 L x 1.5W x 1H	CMP	Culvert	D	None
	BC018	1L x 1W x 15H	CMP	Culvert	F	None
South Branch						
Pipes/Fallouts		**Size (in.)**	**Material**	**L/R/C**	**Flow**	**Comments**
	BC004	12	RCP	Right	None	Buried under sediment
	BC003	4	PVC	Left	Moderate	None
	BC005	6	PVC	Right	None	Chipped
	BC006	36	RCP	Right	Trickle	Disconnected at base
	BC006	6	RCP	Right	None	Not completely attached
	BC020	4	HDPE	Left	None	Pipe disconnected and broken into 2 pieces
	BC007	4	HDPE	Left	None	Clogged with soil
Swales/Open Channels		**Dimensions (ft.)**				
	BC003	2W x 1H	Natural	Left	Moderate	Highly concentrated iron
	BC003	1W x 1H	Natural	Left	Trickle	Iron present
	BC003	2W x 1H	Natural	Right	None	None
	BC003	1W x 2H	Natural	Right	None	None
Hydraulic Structures				**Type**	**Grade**	
	BC005	20L x 1.25W x 1.25H	CMP	Culvert	D	Bottom part of pipe damaged
	BC007	300 L x 12W x 80H	Concrete	Bridge	D	Erosion of bridge present
	BC007	25L x 6W x 6H	CMP	Culvert	D	Round damaged rim
	BC007	12L x 2W x 3H	Metal	Bridge	D	None
	BC010	25L x 6W x 6H	Concrete	Culvert/Bridge	D	None
	BC020	20L x 3.5W x 3.5H	CMP	Culvert	D	Rusted circular

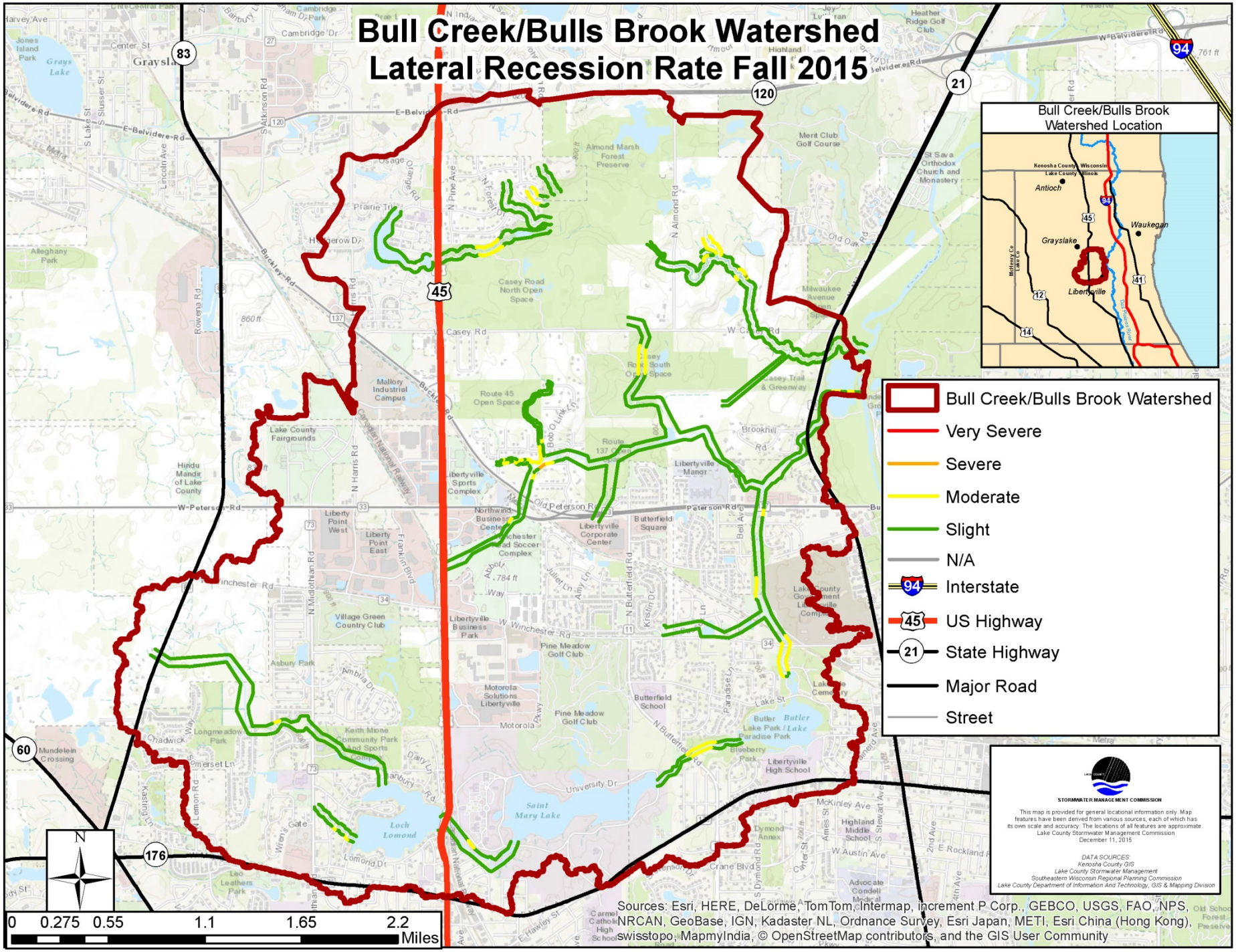
*C=Fair; D=Needs Repair or Maintenance; F=Failure

APPENDIX E:

LRR (ft./yr.)	Category	Description
0.01 - 0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
0.3 - 0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross-section is U-shaped and streamcourse or gully may be meandering.

This rate is a qualitative way to assess width or thickness of eroding surface on a channel. It is used to estimate an actual quantitative measurement. Recession rates of eroding banks for Illinois streams and gullies typically range from 0.05 feet 0.5 feet per year. Values in the range of 0.05 feet to 0.40 feet are the most typical in perennial streams and rates of 0.05 feet to 0.3 feet most typical in intermittent flow channels. Stream banks with retreat rates of 1 or more feet per year do occur, but are uncommon and not usually widespread within a given watershed. Apply the rates as uniformly and consistently as you can along both sides of each channel. Remember, these numbers are used to obtain *average annual rates*, not those that occur after a 4-inch rain that washes out a bridge abutment. Rates in the “Very Severe” category of 0.5+ feet of bank recession per year generally only occur in Illinois on segments of channels scattered throughout steep watersheds. If these rates were applied throughout the entire watershed, so much sediment would be produced that the current stream systems could not move it through; it would pile up as huge sediment bars that would block the actual flow of water. Bottom scour of some channels also occurs in some watersheds. Usually this is not as noticeable or as severe as bank erosion for a given channel. Rates of 0.05 feet to 0.4 feet are typical where the scour is occurring. Include any scour erosion totals with the bank erosion on the Channel Inventory Form.

BULL CREEK WATERSHED | 2015



2015

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

INDIAN CREEK WATERSHED STREAM INVENTORY SUMMARY

INTRODUCTION

The Lake County Stormwater Management Commission conducted an extensive stream inventory of the Indian Creek watershed during the fall of 2015. Throughout the assessment, numerous individual instream characteristics, as well as entire reach encapsulating data, were recorded. The information collected in the field assessments will be used in the development of a watershed management plan for Indian Creek which will address water quality impairments, flooding problems, and natural resource protection along with additional issues and opportunities as identified by watershed stakeholders.

WATERSHED OVERVIEW

The Indian Creek watershed is a sub-watershed of the Des Plaines River basin and covers almost 38 square miles (24,151 acres) in south-central Lake County. Land usage of the Indian Creek watershed is represented largely by residential and open space, while agricultural, recreational, commercial and industrial land use areas occupy the remainder of the watershed. The Indian Creek watershed includes a 32.48 -mile stream network, almost 3,700 acres of wetland, and 146 major water bodies, both named and unnamed, which cover another 1,100 acres.

The Indian Creek watershed is bordered to the north by Illinois Route 176 and to the south by Aptakisic Road and Cuba Road. The easternmost boundary of the watershed is about a half mile from IL 21 (Milwaukee Road) while the western boundary extends to within a mile and a half from U.S. Highway 12. Generally, Indian Creek flows from north-west to south east from four sub-basins (below) and empties into the Des Plaines River, encompassing ten different municipalities including Buffalo Grove, Hawthorn Woods, Indian Creek, Kildeer, Lake Zurich, Lincolnshire, Libertyville, Long Grove, Mundelein, and Vernon Hills.

INDIAN CREEK MAIN BRANCH

The Indian Creek main branch is the largest sub-basin within the Indian Creek watershed and consists of many smaller tributaries including Forest Lake Drain, Sylvan Lake Drain, Countryside Lake Drain, West Branch Indian Creek, and Manning Slough. The main branch begins between Fairfield Road and Gilmer Road in the town of Hawthorn Woods. As it flows southeast, the main branch intercepts a tributary from Sylvan Lake and two additional tributaries before continuing north of Windward Lake and further south east towards the Des Plaines River.

SEAVEY-HAWTHORN DITCH

The Seavey-Hawthorn ditch is the northernmost and second largest sub-basin in the Indian Creek watershed. Beginning near US 45 in Mundelein, the Seavey-Hawthorn ditch flows east towards Butterfield Road and heads south after crossing Greggs Parkway into Vernon Hills. A single tributary enters the ditch before it meets the Indian Creek main branch southwest of US 45 in Sullivan Woods.

KILDEER CREEK

Kildeer Creek is the southernmost sub-basin of the Indian Creek Watershed and starts just northwest of the IL 22 and North Quentin Rd intersection in Lake Zurich. Acquiring the Willowbrook tributary and an additional, smaller tributary, Kildeer Creek flows southeast until turning north, crossing IL 22 and continues through the Arboretum Golf Club where it later meets the Indian Creek main branch just north of the golf course in Long Grove.

DIAMOND LAKE DRAIN

The Diamond Lake Drain is the smallest sub-basin of the Indian Creek watershed and starts northwest of Diamond Lake in Mundelein. The creek flows through Diamond Lake and southeast towards US 45 and continues south until it meets the Indian Creek main branch west of IL 83 in Long Grove.

THE STREAM INVENTORY ASSESSMENT

The stream assessment evaluates numerous aspects of the physical stream channel and surrounding riparian features, along with individual points of interest, in order to form a more comprehensive understanding of hydraulic capacity and the general state of the stream. In addition to quantifiable aspects of the stream, other characteristics such as aquatic and terrestrial life, fish habitat availability, and water quality impairments are collected. The stream inventory data is captured through a uniform and standard process to ensure it is accurate and reproducible.

DATA COLLECTION AND METHODOLOGY

Indian Creek was divided into 53 reaches; areas of homogenous hydraulic, geomorphic, riparian cover and land use characteristics, for data collection purposes. Teams of two observers start at the downstream boundary of a reach and begin walking upstream along the entire length of the reach to collect data. At representative points within each reach, the observers measure the channel dimensions and relative velocity (at the surface) of the stream. Bank conditions are captured through several mediums; armoring, bank erosion, and lateral recession rates and are recorded when a variation in stream bank erosion conditions are evident, while natural features including swales, tributaries, open channels, debris jams, mid-stream bars and islands, and sediment deposits are collected as they occur. Man-made features, such as hydraulic structures' and point discharges' dimensions, materials, and conditions are also recorded. Data is collected using an iPad and esri's ® Arc GIS Collector application, which allows for geo-referenced data collection in real time, and a GPS equipped digital camera when necessary. (See APPENDIX B for a more detailed description of data collection).

CHANNEL CONDITIONS

TABLE IN-01: CHANNEL DIMENSIONS

Channel Dimensions	Bank Height		Channel Width Top		Channel Width Bottom	
	Min.	Max.	Min.	Max.	Min.	Max.
Diamond Lake Drain	0.5	8	16	72	7	70
Indian Creek Mainstem	1	20	3	220	2	200
Kildeer Creek	0.5	15	4	67	2	47
Seavey-Hawthorn Ditch	1	12	12	55	7	50

*Higher values may be representative of the visible width extent of wetland complexes. Unit=feet

CHANNELIZATION

Channelization refers to any channel modifications performed by humans that moves straightens, shortens, cuts off, diverts, or fills in a stream channel. Any alteration made to a channel affects the velocity of water flowing through the modified area which, consequently, changes the hydrology of an upstream or downstream reach. Channelization is categorized using the “one-third’ rule where low means 1 to 33% of the reach is channelized, moderate means 33 to 66% and high means >66% of the reach is channelized. A reach denoted “None” has no indication of channelization. As a natural channelization recovery process, narrow, meandering channels called pilot channels can develop within the ditch that was excavated during the channelization effort. The presence of a pilot channel is indicated on a yes or no basis.

TABLE IN-02: CHANNELIZATION

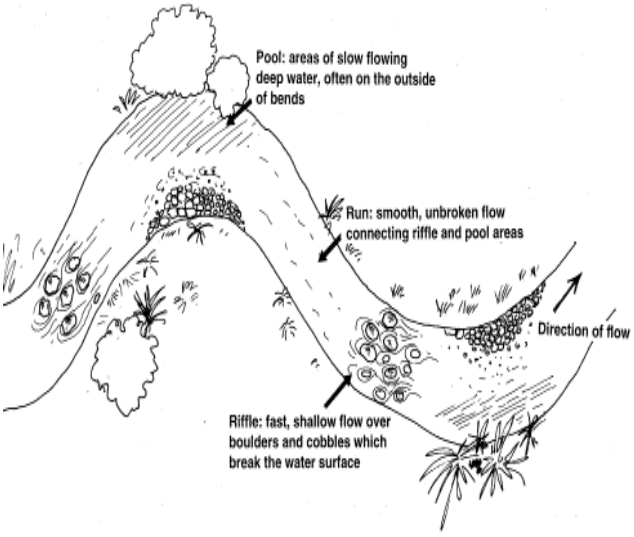
Degree of Channelization	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
	Reaches	% of Miles	Reaches	% of Miles	Reaches	% of Miles	Reaches	% of Miles	Reaches	% of Miles
None	3	38%	6	19%	3	18%	2	15%	14	20%
Low	2	62%	16	64%	10	81%	5	78%	33	70%
Moderate	0	0%	3	15%	1	1%	0	0%	4	8%
High	0	0%	1	2%	0	0%	1	7%	2	2%

*Percentage of miles is based off of the number of stream miles per sub-basin of the Indian Creek watershed.

POOL/RIFFLE DEVELOPMENT

Pool and riffle development is another form of gradient control in riparian environments. Shallower areas of higher velocity over coarse substrate are known as riffles. Riffles classically form on the inside edge of a meander where initially slower velocity conditions of a less established stream allow for greater sediment deposition. As the stream gets closer to reaching equilibrium, riffles acquire more coarse sediment, raising the stream bottom and increasing the velocity of the water flowing over it. Riffle formation becomes critical to the ecological health of a stream in several ways; macroinvertebrates and periphyton use the large substrate as habitat, while the same substrate generates turbulence when water moves rapidly over the raised surface creating dissolved oxygen. Dissolved oxygen provides usable oxygen to aquatic life and is also a critical component in decomposing stream pollutants. Pools, in contrast, are formed when fast moving water scours out the outside edge of a meander, creating well defined areas of deeper than average water and slower velocity which generally only extend three to four times the stream width. In low to base flow conditions, pools provide habitat to an array of aquatic life and also serve as a sediment sink from substrate eroded from banks and riffles. During bank full events, when overall stream velocity is higher, the role of pools and riffles are changed. As faster moving water rushes through pools, loosely deposited sediment is stirred and carried downstream, often redepositing on the shallower riffles. Pools should almost immediately follow a riffle environment for the stream to be characterized as having high pool/riffle development, however, many streams in Lake County exhibit low to no pool riffle development. The Indian Creek watershed, however, is above county averages, with the majority of reaches characterized by low to moderate pool/riffle development.

Figure IN-1: Pool-Riffle Sequence



http://www.niwa.co.nz/our-science/freshwater/tools/shmak/manual/9catchment (National Institute of Water and Atmospheric Research Ltd)

TABLE IN-03: POOL/RIFFLE DEVELOPMENT

Pool / Riffle Development	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%	Reaches	%
None (<5%)	1	20%	1	4%	4	29%	0	0%	6	11%
Low (5-33%)	4	80%	15	58%	8	57%	4	50%	31	57%
Moderate (34-66%)	0	0%	8	31%	1	7%	1	13%	10	21%
High (>67%)	0	0%	2	8%	1	7%	3	38%	6	11%

*Percentage column based off of number of total reaches in sub-basin

BANK EROSION

Bank erosion in Indian Creek

Severe stream bank erosion is a significant concern for the health of Lake County's streams and rivers as well as for establishments on or near water's edge, as more and more of the county develops. Most commonly found on the outside edge of a meandering stream, highly eroded streambanks contribute heavy loads of sediment downstream after storms and other bank full events carry the exposed material away. During the inventory of the Indian Creek watershed, bank erosion points were noted as areas of particularly severe erosion that were not representative of a stretch of a reach that was otherwise noted by a lateral recession point. In total, 175 bank erosion points were collected during the inventory. At the end of each reach, general bank erosion conditions were recorded according to the following criteria:

TABLE IN-04: BANK EROSION CRITERIA

Category	Description
None-Slight (0-5%)	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
Moderate (5-33%)	Bank is predominantly bare with some rills and vegetative overhang.
Severe (33-66%)	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped.

*Values above 66% are considered "Very Severe" but were not seen on Indian Creek.

TABLE IN-05: STREAMBANK EROSION

Extent of Erosion	Diamond Lake Drain	Indian Creek Mainstem	Kildeer Creek	Seavey-Hawthorn Ditch	Watershed Totals
None-Slight	4	7	8	2	21
Moderate	1	19	6	5	31
Severe	0	0	0	1	1

*Values are representative of the number of reaches in each sub-basin exhibiting respective erosion characteristics.

LATERAL RECESSION RATE

The lateral recession rate is a quantitative way to assess width or thickness of eroding surface of a channel. The Rapid Assessment Point Method (RAP-M) for assessing lateral recession was employed to determine the degree of streambank erosion in the Indian Creek Watershed. Lateral Recession Rate (LRR) evaluates streambanks along the right and left bank (facing upstream) for each assessed reach. Within each reach, a segment of the channel with specific LRR characteristics is identified. Measurements include bank height/width and the lateral recession rate in feet per year, while several criteria including undercutting, bare bank, overhanging vegetation, fallen trees, exposed roots and slips or slides are noted (See TABLE IN-04) This is repeated up left and right side of each bank, connecting each segment to the end of the reach. All segments of every reach are captured with a camera equipped with GPS which is then transferred to a geographic information system (GIS) which then manipulates, analyzes, and presents the data geographically.

Lateral Recession Rate: Slight

Lateral Recession Rate: Severe

TABLE IN-06: LATERAL RECESSION

Lateral Recession Rate	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank
Slight	88.3%	66.7%	87.7%	92.0%	87.8%	84.8%	72.4%	55.6%	85.3%	82.2%
Moderate	12.2%	31.6%	11.7%	7.6%	12.2%	15.2%	27.6%	43.4%	14.4%	17.3%
Severe	0.0%	1.7%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
Very Severe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.2%

*Values based off of percentage of miles per bank per sub-basin/ watershed total.

SEDIMENT ACCUMULATIONS and MIDSTREAM BARS AND ISLANDS

Sediment accumulations that affect channel capacity and stream flow were described in the stream inventory. Typically a stream generates, suspends, and transports sediment through high-gradient reaches and deposits sediment in low gradient reaches and/or in areas where velocity decreases. These low-velocity areas may be naturally occurring areas such as pools or sloughs. They may also occur behind debris jams or beaver dams or upstream of channel constrictions such as culverts or dams. As sediment is deposited, the formation of islands, point bars, or shoals can occur. Mid-stream bars and islands also reduce the unobstructed stream width and can be responsible for additional debris accumulations. Most of the reaches in Indian Creek exhibit some form of sediment accumulation.

TABLE IN-07: SEDIMENT ACCUMULATION

Sedimentation	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%	Reaches	%
None (<5% of reach)	1	20%	3	12%	3	21%	1	13%	8	15%
Low (5-33%)	2	40%	17	65%	9	64%	4	50%	32	60%
Moderate (34-66%)	2	40%	6	23%	1	7%	3	38%	12	23%
High (67-100%)	0	0%	0	0%	1	7%	0	0%	1	2%

*Percentage value based off of total number of reaches in each sub-basin.

STREAM DEBRIS LOAD

Debris jam on Indian Creek

Like sediment, most or all streams transport some amount of debris. Large organic debris such as tree limbs and branches can provide habitat, divert currents to create pools, bars, and slow-water habitat for aquatic organisms, and provide allochthonous energy inputs. Allochthonous inputs are those that enter the stream from some outside source, such as organic matter like leaves from terrestrial plants and trees that are washed into the stream). However, too much debris can be problematic and may result in debris jams. These debris jams may cause backwater flooding and sediment deposition and can divert current into one or both banks, leading to streambank erosion. About 40% of all reaches in the Indian Creek watershed exhibit moderate to high debris loads, while 36% of reaches exhibit moderate to high overbank debris loads.

TABLE IN-08: DEBRIS LOADING

Moderate or High Debris Load	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
	Reaches	%	Reaches	%	Reaches	%	Reaches	%	Reaches	%
Instream	2	40%	11	42%	6	43%	2	25%	21	40%
Overbank	2	40%	9	35%	5	36%	3	38%	19	36%

HYDRAULIC STRUCTURES

Dam on Indian Creek

Hydraulic structures are any bridges, culverts, dams, weirs, levees, and fences in or across the stream channel. These structures modify the pattern or amount of flow and may act as constriction points causing backwater flooding. Culverts may act as temporary or permanent barriers if, over time, a plunge pool develops, causing the bottom of the culvert to become elevated above the water level of the pool. Additionally, dams and weirs can impede the movements of fish and other aquatic organisms within the stream network. Within the Indian Creek Watershed, there have been substantial modifications to the stream system.

TABLE IN-09: HYDRAULIC STRUCTURES

Hydraulic Structures	Diamond Lake Drain	Indian Creek Mainstem	Kildeer Creek	Seavey-Hawthorn Ditch	Watershed Totals
Beaver Dams	1	1	1	0	3
Bridges	4	38	20	28	90
Culverts	14	42	25	21	102
Dams	1	9	7	2	19
Total Hydraulic Structures	20	90	53	51	214
Hydraulic Structures per mile	7	5	7	10	7
Problematic Hydraulic Structures	0	15	7	2	24

*Multiple culverts within the same structure were counted as one culvert. Bridges built over culverts were counted as separate structures but may only exist as one structure on the map.

POINT DISCHARGES

Discharge on Indian Creek surrounded by iron bacteria

Discharge points include sanitary, storm sewer, agricultural drain tile and sump pump pipes greater than 4 inches in diameter. They also include open channels, swales, gullies and other significant tributaries. In the Indian Creek watershed, 431 points of discharge were recorded into stream channels, of which 297 were pipes, storm sewers, culverts or drain tiles (see Table IN-10). The Indian Creek Mainstem contained 49% of the discharge points in the watershed, and also contained the highest numbers of pipes, storm sewers, culverts and drain tiles. Discharge points are most common in urban and residential areas where sump pumps and storm sewer outfalls are numerous. Problem discharge points in the Indian Creek watershed contribute to streambank erosion and/or transport excess sediment to the stream channel.

TABLE IN-10: DISCHARGE POINTS

Discharge Points	Diamond Lake Drain	Indian Creek Mainstem	Kildeer Creek	Seavey-Hawthorn Ditch	Watershed Totals
Swales, gullies, and tributaries	10	87	27	10	134
Pipes, storm sewers, and drain tiles	34	123	52	88	297
Total Discharge Points	44	210	79	98	431
Discharge Points Per Stream Mile	16.28	12.29	10.34	18.74	13.20
Problem Discharge Points	4	12	5	4	25

*Problem discharge points refers to any discharge that may be blocked, cracked, etc.

VEGETATION AND LAND USE

TABLE IN-11: DOMINANT LAND USE

Dominant Land Use	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Percentage of Watershed	
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank
Agriculture	0%	0%	4%	7%	4%	8%	0%	0%	3%	5%
Open Space	11%	10%	24%	33%	47%	49%	22%	23%	28%	33%
Recreational	5%	3%	3%	6%	2%	1%	23%	25%	6%	8%
Commercial/ Industrial	18%	30%	1%	3%	3%	0%	0%	15%	3%	7%
Residential	36%	38%	64%	48%	43%	41%	42%	35%	53%	43%
Other	30%	19%	3%	3%	0%	0%	13%	2%	4%	4%

*Values based off of aerial, in-field experiences and estimates from within 100 feet of the stream.

FLOODPLAIN VEGETATION

Floodplain vegetation plays an important role in protecting physical, biological, and chemical water quality. Unobstructed flow carries more energy than water that must pass through roots and other vegetative features. A riparian buffer acts as a natural barrier by dissipating the amount of energy carried by water flow, providing protection from flooding and erosion. In the process, vegetation filters sediments and other materials from incoming floodwaters, adding the additional benefit of natural purification. Furthermore, by slowing floodwater flow, vegetative buffers allow additional time for infiltration and groundwater recharge.

Floodplain Vegetation of Indian Creek

Floodplain vegetation refers to the dominant land use and land cover as percentages within 100 feet of the bank, and includes the width of the riparian buffer. Trees, lawn, and shrub respectively, cover the largest percentages of land in the Indian Creek watershed. Further information can be seen in TABLE IN-12 below.

TABLE IN-12: LAND COVER

Land Cover	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Percentage of Watershed	
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank
Tree	18%	21%	31%	30%	33%	35%	35%	26%	31%	30%
Lawn	26%	25%	25%	24%	19%	20%	19%	26%	23%	24%
Wetland	5%	5%	11%	10%	8%	8%	6%	7%	9%	9%
Crop	0%	0%	2%	2%	4%	7%	0%	0%	2%	3%
Shrub	26%	35%	22%	23%	18%	19%	23%	20%	22%	23%
Herbaceous	7%	8%	3%	4%	8%	6%	3%	3%	4%	5%
Impervious	5%	3%	3%	3%	4%	3%	6%	10%	4%	4%
Water	8%	1%	3%	2%	6%	2%	8%	6%	5%	3%
Other	4%	3%	0%	0%	0%	0%	0%	1%	0%	1%

*Values based off of aerial, in-field experiences and estimates from within 100 feet of the stream.

PREDOMINANT BANK VEGETATION

Bank vegetation is indicative of bank stability and the potential for the development of debris blockages in the channel. Streams surrounded by vegetated riparian zones, have intricate root systems that help to stabilize the bank and prevent erosion. Woody stemmed plants, sedges, and grasses help physically trap sediment by slowing water runoff from the surrounding areas, allowing the sediment to settle out instead of entering the stream. Additionally, vegetated banks lend to deep and narrow channels as a result of their stability and lack of heavy sedimentation.

TABLE IN-13: PREDOMINANT BANK VEGETATION

Bank Vegetation	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Percentage of Watershed	
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank
Grass	0%	0%	10%	10%	24%	24%	6%	5%	12%	12%
Lawn	10%	10%	10%	10%	9%	11%	10%	20%	10%	12%
Wetland	20%	20%	13%	14%	5%	5%	4%	9%	11%	12%
Trees	24%	26%	31%	29%	26%	26%	42%	32%	31%	29%
Shrubs	34%	32%	32%	31%	28%	27%	29%	27%	31%	30%
Crops	0%	0%	0%	0%	2%	0%	0%	0%	1%	0%
Herbaceous	10%	9%	3%	4%	7%	6%	7%	4%	5%	5%
None	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Other	1%	1%	1%	2%	0%	0%	2%	2%	1%	1%

*Values based off of percentage of stream miles a specific type of vegetation was present multiplied by the number of stream miles of the respective reach.

RIPARIAN BUFFER

The riparian zone is the area extending 100 feet from the stream channel on both the left and right side of the stream channel. Riparian vegetation, in addition to all of the benefits listed in the previous section, also provides shading to streams and lakes which helps to avoid temperature stress on fish and aquatic organisms. The quality of the riparian zone, the width, and land use characteristics were visually assessed during the Indian Creek Stream Inventory. TABLE IN-14 summarizes the assessment criterion for the width of the riparian zone and TABLE IN-15 is a visual representation of the quality of the riparian zone observed in 2015.

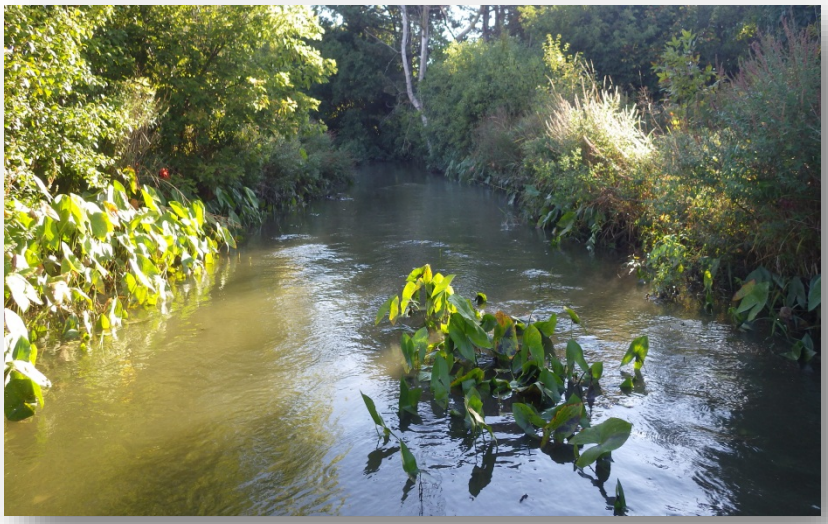
TABLE IN-14: RIPARIAN ZONE ASSESSMENT CRITERIA

Riparian Zone	None	Low	Moderate	High
Buffer Width	**<20 feet**	**20-40 feet**	**40-60 feet**	**>60 feet**
Description	Zone contains little of no riparian vegetation due to human activities	Zone is impacted a great deal by human activities	Zone is impacted minimally by human activities	Zone is not impacted by human activites (i.e., no parking lots, roadbeds, lawns, crops)

TABLE IN-15: RIPARIAN ZONE WIDTH

Riparian Zone	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Total	
	Reaches	% of Miles	Reaches	% of Miles	Reaches	% of Miles	Reaches	% of Miles	Reaches	% of Miles
None (<20ft)	0	0%	1	2%	3	12%	4	45%	8	11%
Low (20-40ft)	4	93%	9	36%	5	29%	3	47%	21	41%
Moderate (40-60ft)	0	0%	12	46%	3	32%	0	0%	15	31%
High (>60ft)	0	7%	4	16%	3	28%	1	8%	8	17%

AQUATIC VEGETATION



Rooted emergent aquatic vegetation in Indian Creek

The general type and relative dominance of aquatic plants were documented during the stream inventory. Aquatic vegetation is the primary source of oxygen in stream ecosystems and also provides habitat for fish and other aquatic organisms. The extensive root systems of various types of aquatic vegetation offer additional shoreline stabilization and also absorb nutrients and filter pollution from runoff, improving water quality. An overabundance of aquatic vegetation, however, can be a problem. Aquatic invasive species such as Eurasian watermilfoil (Myriophyllum spicatum) quickly out-compete native species and decrease biodiversity. Dense populations of these plants and algae can deplete oxygen levels in a given area, especially during decomposition. Furthermore, dense populations of aquatic vegetation can impede water flow and trap sediment, which gradually causes lakes and channels to fill in.

TABLE IN-16: INSTREAM AQUATIC VEGETATION

Instream Aquatic Vegetation	Diamond Lake Drain	Indian Creek Mainstem	Kildeer Creek	Seavey-Hawthorn Ditch	Percentage of Watershed
Rooted Emergent	6%	9%	2%	2%	6%
Rooted Submergent	6%	10%	2%	17%	9%
Rooted Floating	3%	1%	0%	0%	1%
Free Floating	6%	3%	2%	2%	3%
Floating Algae	4%	2%	0%	0%	1%
Attached Algae	0%	8%	17%	3%	9%
No Vegetation	75%	67%	77%	75%	71%

*Values based off of percentage of stream miles of each sub-basin.

AQUATIC AND TERRESTRIAL ORGANISMS

The inventory addressed aquatic and riparian life where possible or identifiable. Organisms were not specifically sampled for during the stream inventory, but some organisms, such as macroinvertebrates, fish, and birds were observed. The presence of various species can be an important indicator of habitat and forage availability as well as water quality. Fish habitat availability was also assessed during the stream inventory. A large percentage of each sub-basin (see TABLE IN-18) contained many of the necessary features to support fish populations.

TABLE IN-17: PRECENSE OF AQUATIC ORGANISMS

Aquatic Organisms	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
	Reaches	% Total Area	Reaches	% Total Area	Reaches	% Total Area	Reaches	% Total Area	Reaches	% Total Area
Observed	2	48%	19	81%	5	44%	6	83%	32	70%
Mussel Beds										
Observed	0	0%	0	0%	0	0%	1	25%	1	4%

*Aquatic organisms includes: mayflies, caddisflies, dragonflies, snails, scuds, sow bugs, leeches, worms, water pennies, beetles and other macroinvertebrates. Values based on percentage of mileage per sub-basin.

TABLE IN-18: INSTREAM FISH HABITAT

Instream Cover for Fish	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch	
	% of Reach Miles	% of Watershed	% of Reach Miles	% of Watershed	% of Reach Miles	% of Watershed	% of Reach Miles	% of Watershed
Undercut Banks	58%	5%	85%	44%	84%	20%	91%	15%
Pools >28”	87%	7%	66%	35%	43%	10%	100%	16%
Macrophytes	81%	7%	95%	50%	97%	23%	69%	11%
Logs	81%	7%	97%	51%	97%	23%	91%	15%
Overhanging Vegetation	81%	7%	88%	46%	55%	13%	80%	13%
Rootwads	55%	5%	95%	50%	84%	20%	72%	11%
Boulders	81%	7%	74%	39%	40%	9%	26%	4%
Backwaters	100%	8%	66%	35%	55%	13%	49%	8%

SUBSTRATES

A variety of sediment types constitute stream bed of the Indian Creek Watershed, ranging from the densely packed particles of clay (<0.0002 inches in diameter) to larger, coarse substrate such as boulders (>10 inches in diameter). Generally, fine sediments are transported in suspension until velocity slows enough that they are deposited on the streambed. Larger sediments are not transported as readily and may only move during increased flows. Clays are typically regarded as cohesive sediments that naturally adhere to one another (and are therefore more difficult to erode) while silts are more easily eroded. Sands and larger sediments (e.g., gravels and cobbles) are less cohesive. Clay and silt-dominated banks and beds, therefore, tend to be associated with narrow, incised channels while sand, gravel, and cobble-dominated channels are more often shallow and wide. Clay/silt channels tend to incise or deepen in response to increased flows while sand/gravel channels tend to widen. These relationships, however, are also contingent upon a number of other contributing factors such as gradient, bank slope, and bank vegetation. Substrate is also an important measure of habitat quality. Extremely fine sediments, such as clays, adhere closely to one another and may bury the streambed. Coarse-grained sediments like gravels present abundant interstices, allowing water, oxygen, and other dissolved and suspended materials to infiltrate the hyporheic zone. The hyporheic zone refers to the area surrounding the stream channel that is saturated and through which there is some percolation or flow. Essentially, the hyporheic zone is the area where the surface water and groundwater interface and mix. These interstitial pores also provide habitat to benthic (bottom-dwelling) macroinvertebrates, which play important roles in both aquatic food webs and ecosystem functioning. Excessive deposition of clays, silts, and fine particulate organic matter reduces the potential for infiltration and accessibility to the hyporheic zone. Excessive deposition also negatively affects filter feeders such as mussels, and may cause anoxia, or oxygen depletion, in the streambed as organic materials decompose.

TABLE IN-19: SUBSTRATE COMPOSITION

Substrate Composition	Diamond Lake Drain	Indian Creek Mainstem	Kildeer Creek	Seavey-Hawthorn Ditch	Percentage of Watershed
Claypan	35%	15%	31%	7%	19%
Silt	13%	14%	20%	17%	16%
Sand	7%	12%	8%	21%	12%
Gravel	10%	15%	6%	35%	16%
Cobble	0%	18%	5%	3%	11%
Boulder	5%	5%	2%	5%	4%
Concrete	2%	0%	12%	3%	3%
Organic Matter	28%	21%	17%	9%	19%

*Values based off of percentage of mileage per reach.

TURBIDITY

Visual inspections of several water quality indicators were made during the stream inventory. Turbidity, water color, and the presence of grease and oil in the sediment or water column were assessed. Turbidity is the measure of relative clarity of water. Material that causes water to be turbid includes clay, silt, fine inorganic and organic matter, algae, and plankton and other microscopic organisms. During periods of low flow, water in streams is a clear green, brown or yellow color, and turbidities are low. During high flow events, sediment and material from the surrounding surfaces are washed into the stream. As the velocity and volume of water increases, sediments and other materials are stirred up causing the water to become muddy, brown, and turbid.

Turbid water on Indian Creek after a heavy rain

GREASE AND OIL

The origination of the grease and oil does not relate to any one particular site or land use and therefore is likely due to non-point source run-off. Grease and oils enter the stream from during rain storms as oil and grease from surrounding parking lots, roads, and bridges flush into the storm sewer system, often overflowing directly into the stream. Other potential sources of oil and grease results from illegal dumping that originate from automotive and transportation related services. Grease and oil in the water column and sediment will degrade the water quality of receiving streams by adding biological and chemical oxygen demand to the stream. In addition, iron bacteria are present in many soils in Illinois and can cause yellow, orange, red, or brown stains and colored water. It can also cause a rainbow colored, oil-like sheen on the water or in soil and sediments. Simple water testing is available to determine if the oil-like substance present is iron bacteria.

Grease in sediment, leeching into the water of Indian Creek

TABLE IN-20 WATER QUALITY PARAMETERS

Water Quality	Diamond Lake Drain		Indian Creek Mainstem		Kildeer Creek		Seavey-Hawthorn Ditch		Watershed Totals	
Turbidity	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Total Watershed**
None	0	0	3	8%	1	3%	3	29%	7	10%
Low	1	7%	21	85%	10	89%	3	40%	35	72%
Moderate	3	61%	2	7%	3	8%	1	22%	9	14%
High	1	32%	0	0%	0	0%	1	9%	2	4%
Grease & Oil	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Sub-Basin**	**Reaches**	**% of Total Watershed**
In Water & Sediment	0	0%	14	62%	7	31%	0	0%	21	40%
In Sediment Only	0	0%	1	5%	0	0%	0	0%	1	3%
In Water Only	1	32%	5	17%	3	29%	1	25%	10	22%
No Grease & Oil in Water or Sediment	4	68%	6	16%	4	40%	7	75%	21	35%

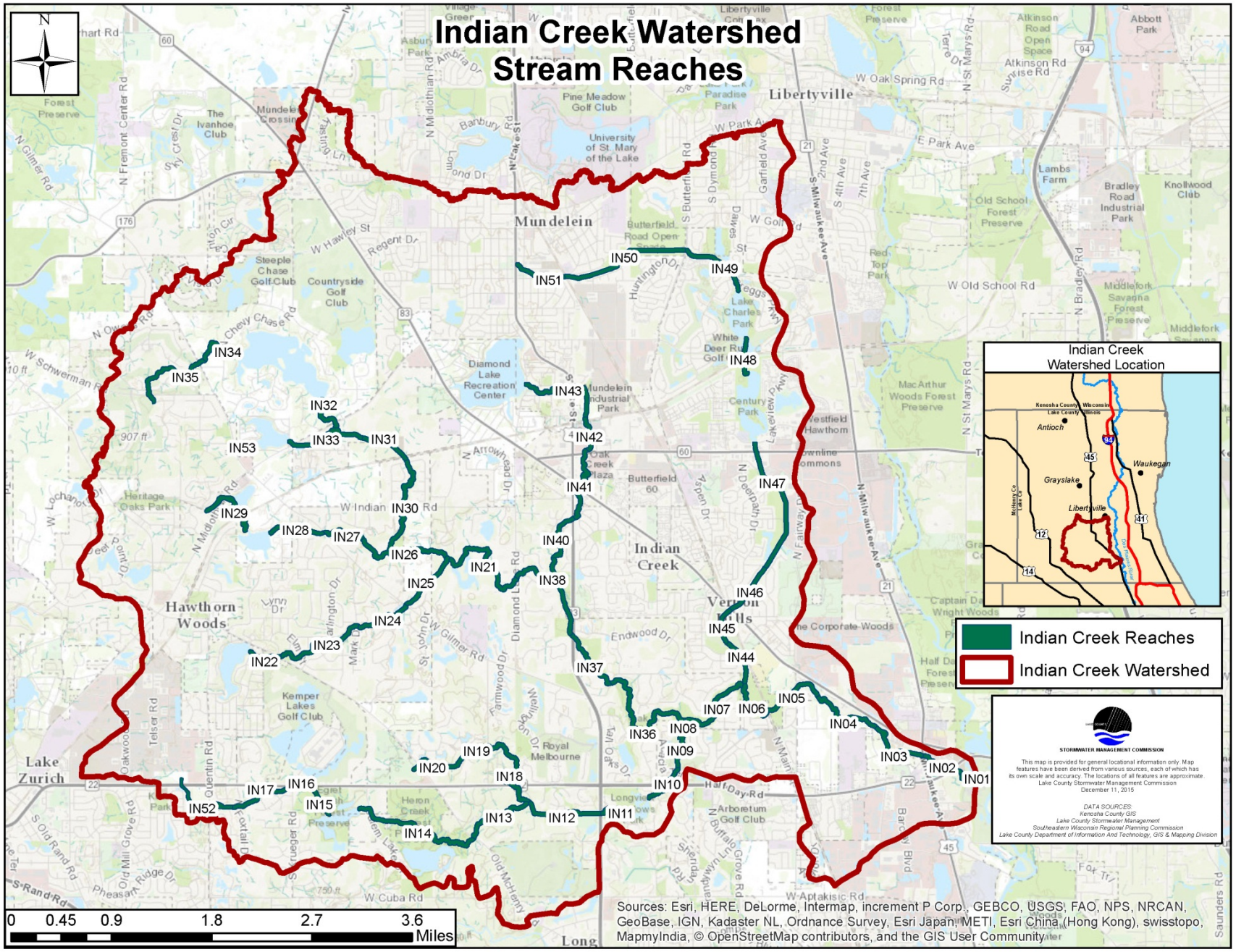
Indian Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
IN01	LOW	NONE	MOD	HIGH	MOD	2,088	0.40	4.0	13.0	39.0	49.0	31.0	44.0	44.0	1.9
IN02	MOD	LOW	HIGH	LOW	MOD	2,117	0.40	3.0	20.0	30.0	50.0	26.0	40.0	42.3	0.8
IN03	MOD	MOD	MOD	LOW	MOD	3,255	0.62	2.0	10.0	30.0	70.0	22.0	60.6	47.0	1.3
IN04	LOW	LOW	MOD	LOW	MOD	4,247	0.80	2.0	4.0	23.0	62.0	18.0	55.0	45.0	1.7
IN05	LOW	LOW	MOD	MOD	NONE	3,450	0.65	3.0	5.0	25.0	62.0	20.0	55.0	45.7	1.3
IN06	LOW	LOW	HIGH	LOW	NONE	2,609	0.49	2.0	4.0	20.0	27.0	15.0	20.0	23.3	1.3
IN07	LOW	LOW	HIGH	LOW	MOD	4,267	0.81	1.0	3.5	19.0	28.0	13.0	15.0	22.3	0.5
IN08	LOW	LOW	LOW	NONE	MOD	509	0.10	1.0	4.0	13.0	21.0	10.0	15.0	16.3	1.0
IN09	LOW	NONE	MOD	MOD	NONE	1,830	0.35	2.0	7.0	14.0	42.0	6.0	40.0	26.3	2.3
IN10	LOW	MOD	MOD	LOW	MOD	2,785	0.53	2.0	15.0	13.0	31.0	6.2	12.0	20.0	0.8
IN11	MOD	MOD	MOD	LOW	NONE	2,408	0.46	1.0	2.0	15.0	34.0	9.0	30.0	24.3	1.0
IN12	LOW	LOW	MOD	LOW	MOD	3,783	0.72	1.0	6.5	10.0	21.0	6.0	14.0	16.7	1.0
IN13	LOW	NONE	MOD	NONE	NONE	3,847	0.73	1.0	2.0	7.5	14.0	5.5	10.0	11.2	1.4
IN14	HIGH	MOD	MOD	LOW	MOD	7,850	1.49	0.5	2.0	15.0	40.0	4.0	11.0	23.7	1.1
IN15	MOD	LOW	MOD	LOW	NONE	2,848	0.54	2.5	3.5	10.0	25.0	6.0	15.0	17.3	0.9
IN16	NONE	NONE	HIGH	LOW	NONE	1,295	0.25	1.0	3.0	11.0	16.0	8.0	10.0	13.0	0.3
IN17	MOD	MOD	MOD	LOW	MOD	3,484	0.66	1.5	8.0	10.0	15.0	5.0	6.5	13.3	0.3
IN18	LOW	LOW	HIGH	LOW	NONE	5,645	1.07	0.5	1.0	8.0	11.0	3.0	6.5	9.8	0.4
IN19	MOD	LOW	LOW	LOW	NONE	1,150	0.22	2.5	8.0	20.0	26.0	10.0	12.0	23.7	0.6
IN20	LOW	LOW	LOW	NONE	NONE	3,781	0.72	1.0	2.0	4.0	67.0	2.0	47.0	27.0	1.8
IN21	LOW	LOW	MOD	LOW	MOD	6,941	1.31	2.0	8.0	13.0	28.0	9.0	19.0	18.7	1.0
IN22	LOW	LOW	LOW	LOW	NONE	1,733	0.33	1.0	1.0	10.0	12.5	3.0	6.5	10.8	0.4
IN23	MOD	MOD	MOD	LOW	MOD	4,912	0.93	1.0	3.0	12.0	12.0	3.0	7.0	12.0	0.4
IN24	MOD	NONE	MOD	LOW	MOD	2,846	0.54	1.0	4.0	8.0	15.0	4.0	7.0	11.0	1.0
IN25	LOW	LOW	LOW	NONE	MOD	3,551	0.67	1.0	6.0	10.0	26.0	4.0	23.0	19.0	1.2
IN26	LOW	LOW	LOW	NONE	MOD	5,180	0.98	2.0	4.0	11.5	21.0	6.5	11.0	14.8	1.2
IN27	LOW	LOW	LOW	LOW	NONE	2,460	0.47	1.0	4.0	7.5	21.0	4.5	16.0	16.2	0.9
IN28	LOW	HIGH	MOD	MOD	MOD	3,854	0.73	2.0	6.0	10.0	25.0	5.0	15.0	15.3	1.5
IN29	LOW	MOD	MOD	LOW	MOD	3,994	0.76	1.0	15.0	6.8	53.0	2.8	35.0	31.6	2.3
IN30	HIGH	MOD	MOD	LOW	MOD	5,931	1.12	1.0	10.0	15.0	17.0	8.0	9.0	16.3	4.5
IN31	MOD	LOW	LOW	NONE	MOD	4,496	0.85	1.0	6.0	19.0	30.0	10.0	25.0	25.7	0.9
IN32	HIGH	MOD	MOD	NONE	MOD	4,408	0.83	1.0	3.0	10.0	10.5	4.0	5.0	10.2	0.3
IN33	MOD	LOW	MOD	LOW	NONE	2,994	0.57	1.0	6.0	18.0	-	2.0	-	107.7	1.8
IN34	HIGH	MOD	MOD	LOW	MOD	6,160	1.17	2.0	8.0	18.0	45.0	5.0	8.0	28.3	1.5
IN35	LOW	LOW	LOW	NONE	NONE	5,452	1.03	1.5	5.0	3.0	73.0	3.0	11.0	31.3	1.3
IN36	LOW	LOW	MOD	MOD	MOD	7,078	1.34	1.0	4.0	16.0	25.0	9.0	16.0	20.0	1.3
IN37	MOD	MOD	MOD	LOW	NONE	3,615	0.68	1.5	10.0	18.0	45.0	12.0	28.0	32.3	1.2
IN38	HIGH	LOW	LOW	LOW	MOD	5,469	1.04	1.0	3.0	20.0	34.0	14.0	28.0	27.3	1.5
IN39	HIGH	MOD	MOD	NONE	NONE	1,079	0.20	0.5	2.5	17.0	72.0	16.0	70.0	46.3	1.5
IN40	LOW	LOW	MOD	NONE	NONE	2,652	0.50	1.0	5.0	20.0	72.0	10.0	70.0	38.0	1.5
IN41	HIGH	MOD	LOW	LOW	MOD	4,250	0.80	2.0	8.0	18.0	34.0	10.0	22.0	24.0	1.5
IN42	LOW	NONE	LOW	NONE	NONE	1,783	0.34	0.5	7.0	20.0	37.0	14.5	19.0	29.0	1.5
IN43	LOW	LOW	LOW	LOW	NONE	4,867	0.92	1.0	7.0	16.0	22.0	7.0	17.0	19.7	1.8
IN44	HIGH	HIGH	LOW	NONE	MOD	2,344	0.44	2.5	5.0	24.0	37.0	16.0	25.0	29.7	1.1
IN45	NONE	NONE	MOD	HIGH	NONE	1,877	0.36	4.0	12.0	22.0	50.0	16.0	25.0	37.3	1.5
IN46	NONE	NONE	LOW	LOW	MOD	2,578	0.49	4.0	10.0	25.0	45.0	15.0	30.0	38.0	1.3
IN47	LOW	LOW	MOD	LOW	NONE	6,883	1.30	2.5	10.0	25.0	55.0	15.0	50.0	35.3	2.0
IN48	NONE	NONE	HIGH	NONE	SEV	7,214	1.37	1.0	12.0	17.5	36.0	17.5	33.8	26.2	1.8

Indian Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
IN49	LOW	LOW	MOD	LOW	MOD	4,366	0.83	1.0	6.5	18.0	42.0	13.0	42.0	27.3	1.5
IN50	HIGH	HIGH	MOD	LOW	MOD	6,141	1.16	3.0	10.0	15.0	35.0	7.0	25.0	22.7	1.5
IN51	LOW	HIGH	HIGH	LOW	MOD	2,468	0.47	3.0	7.0	12.0	28.0	7.0	15.0	21.7	1.5
IN52	HIGH	HIGH	MOD	LOW	MOD	3,594	0.68	1.0	3.0	6.0	12.0	2.0	6.0	9.7	0.4
IN53	NONE	MOD	MOD	NONE	MOD	782	0.15	1.0	15.0	5.0	29.5	3.0	5.0	19.8	0.4

- : Not Collected


Indian Creek Watershed
Stream Reaches
N
Indian Creek Watershed Location
Kenosha County, Wisconsin
Lake County, Illinois
Antioch
Waukegan
Grayslake
Libertyville
McHenry Co
Lake Co
Indian Creek Reaches
Indian Creek Watershed
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
IN01
IN02
IN03
IN04
IN05
IN06
IN07
IN08
IN09
IN10
IN11
IN12
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IN14
IN15
IN16
IN17
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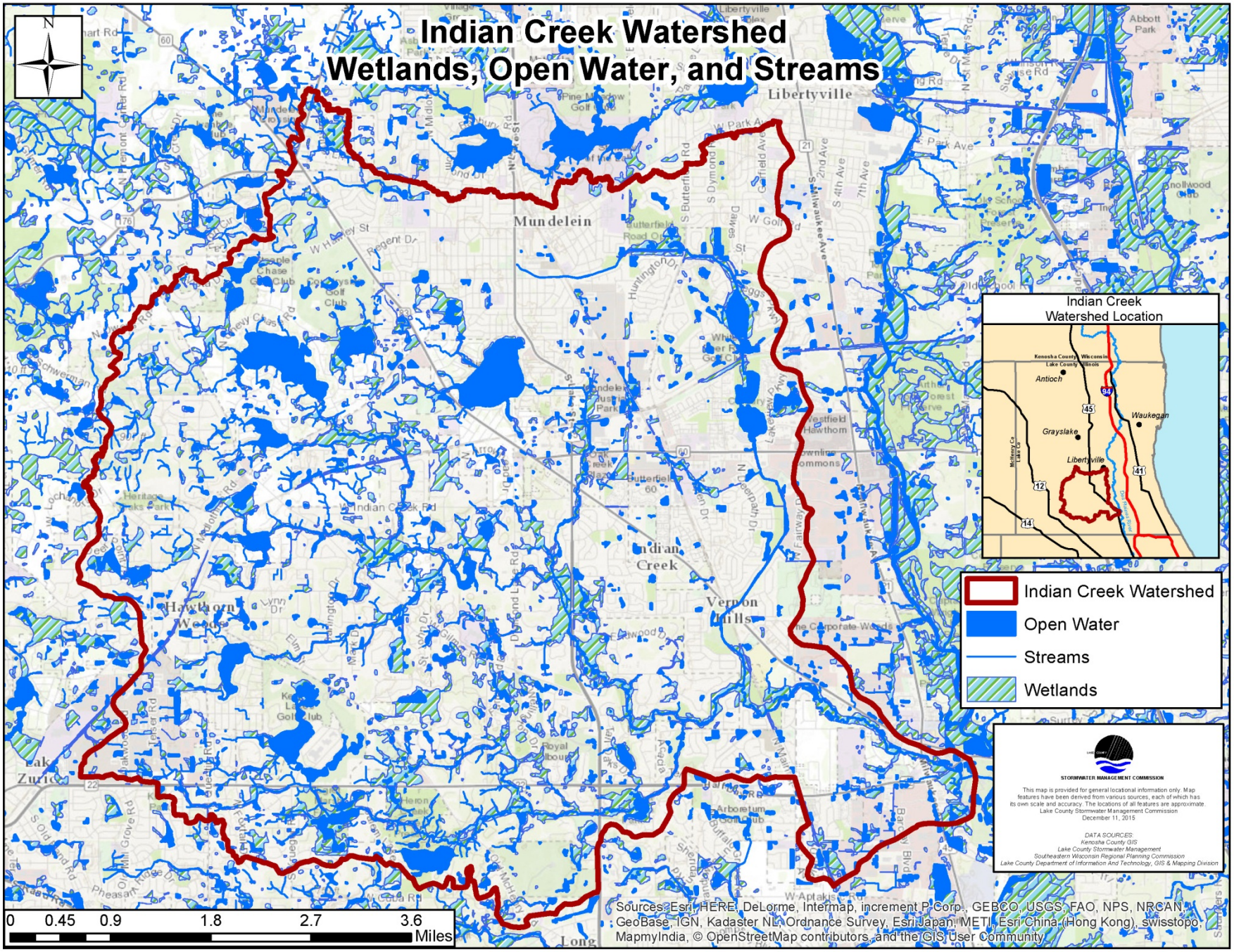
IN47
IN48
IN49
IN50
IN51
IN52
IN53
Libertyville
Mundelein
Hawthorn Woods
Lake Zurich
Indian Creek
Vernon Hills
Long
0 0.45 0.9 1.8 2.7 3.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Indian Creek Watershed
Wetlands, Open Water, and Streams
N
Libertyville
Mundelein
Indian Creek
Vernon Hills
Hawthorn Woods
Lake Zurich
Indian Creek Watershed Location
Kenosha County, Wisconsin
Lake County, Illinois
Antioch
Waukegan
Grayslake
Libertyville
Indian Creek Watershed
Open Water
Streams
Wetlands
STORMWATER MANAGEMENT COMMISSION
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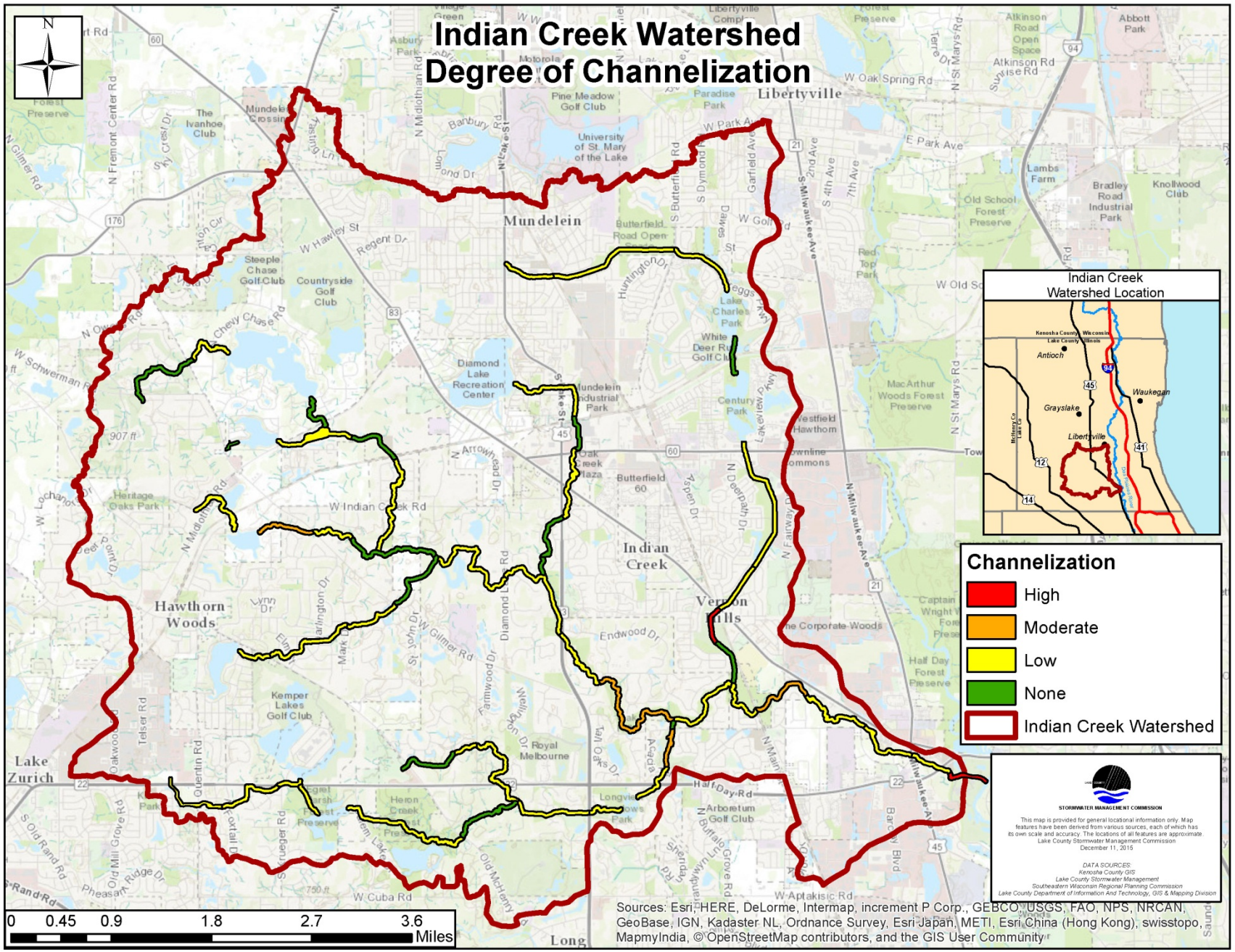
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.45 0.9 1.8 2.7 3.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Indian Creek Watershed
Degree of Channelization
Indian Creek Watershed Location
Channelization
High
Moderate
Low
None
Indian Creek Watershed
0 0.45 0.9 1.8 2.7 3.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
STORMWATER MANAGEMENT COMMISSION
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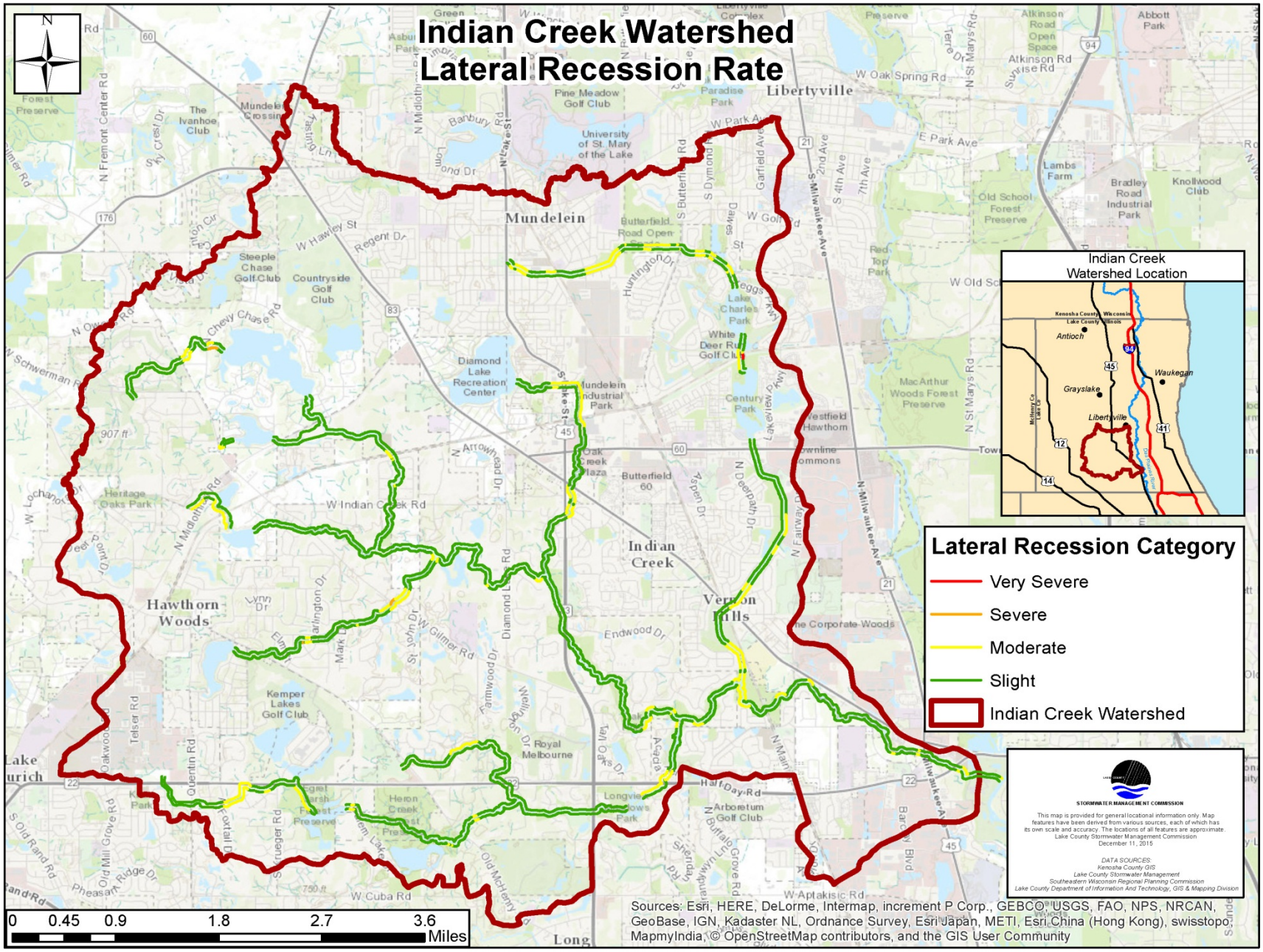
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
Mundelein
Libertyville
Vernon Hills
Indian Creek
Hawthorn Woods
Lake Zurich
Long
Antioch
Grayslake
Waukegan
Kenosha County, Wisconsin
Lake County, Illinois


Indian Creek Watershed
Lateral Recession Rate
Indian Creek
Watershed Location
Lateral Recession Category
Very Severe
Severe
Moderate
Slight
Indian Creek Watershed
STORMWATER MANAGEMENT COMMISSION
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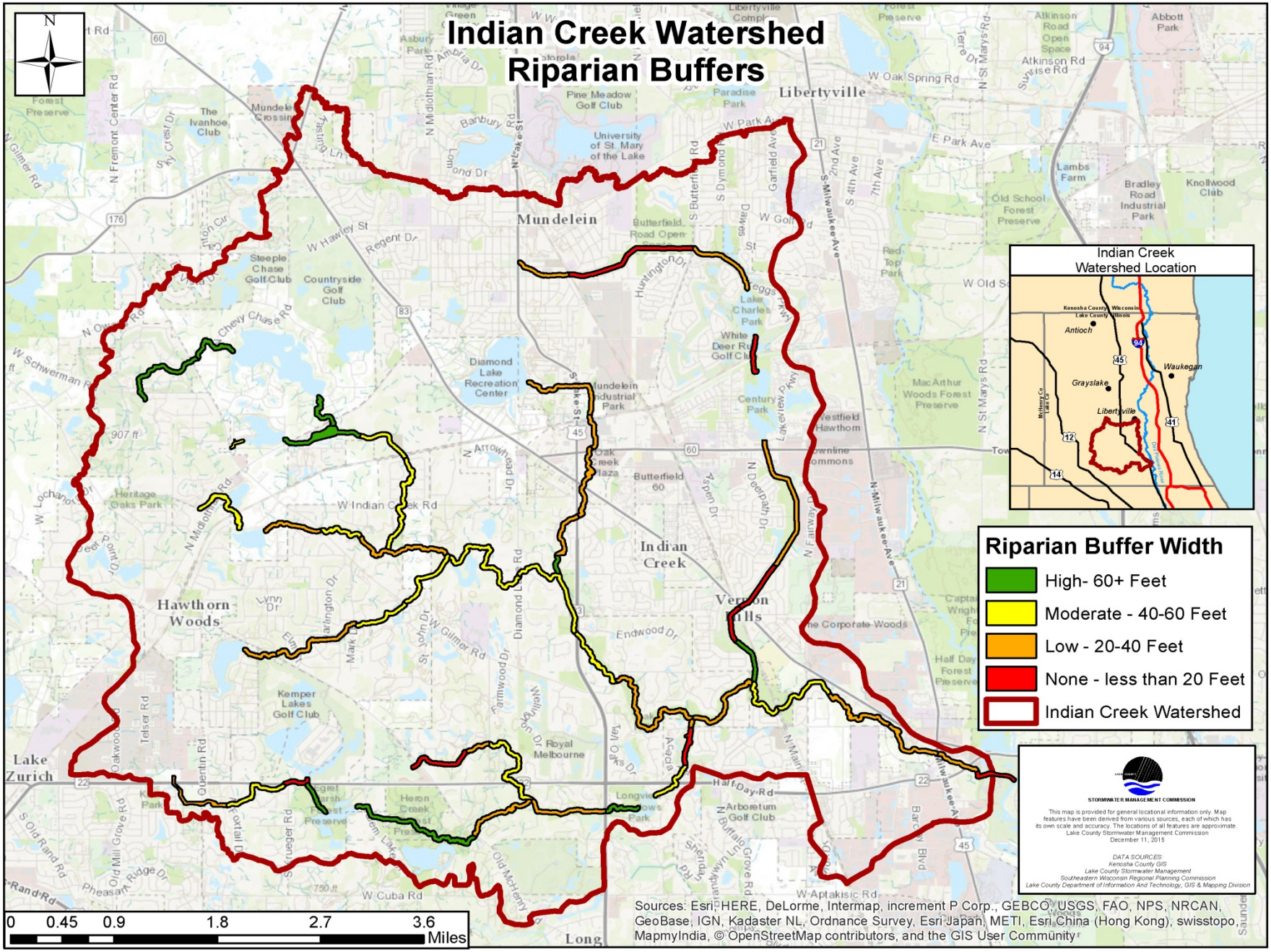
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.45 0.9 1.8 2.7 3.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Indian Creek Watershed
Riparian Buffers
N
Indian Creek Watershed Location
Kenosha County, Wisconsin
Lake County, Illinois
Antioch
Waukegan
Grayslake
Libertyville
Riparian Buffer Width
High- 60+ Feet
Moderate - 40-60 Feet
Low - 20-40 Feet
None - less than 20 Feet
Indian Creek Watershed
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
December 11, 2015
DATA SOURCES:
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.45 0.9 1.8 2.7 3.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Mundelein
Libertyville
Hawthorn Woods
Indian Creek
Vernon Hills
Lake Zurich
Pine Meadow Golf Club
University of St. Mary of the Lake
Steeple Chase Golf Club
Countryside Golf Club
Kemper Lakes Golf Club
Royal Melbourne
Arboretum Golf Club
Diamond Lake Recreation Center
Heritage Oaks Park
Lake Charles Park
Century Park
Paradise Park
Bradley Road Industrial Park
Lambs Farm
Knollwood Club
MacArthur Woods Forest Preserve
Half Day Forest Preserve
Old School Forest Preserve
Red Top Park
Abbott Park
Atkinson Road Open Space
Butterfield Road Open
Mundelein Industrial Park
Oak Creek Plaza
Westfield Hawthorn
Townline Commons
The Corporate Woods
Heron Creek Forest Preserve
Longview Park
Mundelein Cross
The Ivanhoe Club
Butterfield 60
W Indian Creek Rd
W Hawley St
W Gilmer Rd
W Cuba Rd
W Aptakisic Rd
W Oak Spring Rd
E Park Ave
W Park Ave
W Old Rand Rd
Half Day Rd
Endwood Dr
Huntington Dr
Regent Dr
Chevy Chase Rd
Banbury Rd
Garfield Ave
Lakeview Pkwy
N Milwaukee Ave
N Fairway Dr
N Deerpath Dr
Aspen Dr
Diamond Lake Rd
Fairfield Dr
Farmwood Dr
Lynn Dr
Mark Dr
Telser Rd
Quentin Rd
Old Mill Grove Rd
Pheasant Ridge Dr
Old McHenry Rd
N Buffalo Grove Rd
Barrington Rd
N Arrowhead Dr
N Midlothian Rd
N Fremont Center Rd
N Gilmer Rd
W Schwerman Rd
Sky Crest Dr
Ambria Dr
Asbury Park
Libertyville Comp
Forest Preserve
Terre Dr
N St Marys Rd
Sunrise Rd
Atkinson Rd
Lake Zurich
Long

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

2015

APTAKISIC WATERSHED

STREAM INVENTORY SUMMARY

APTAKISIC WATERSHED

INTRODUCTION

The Lake County Stormwater Management Commission (SMC) conducted a Stream Inventory on the Aptakisic Creek Watershed during the fall of 2015 in addition to a number of other studies and projects related to the development of a watershed plan in the Aptakisic Watershed. The purpose of this assessment was to record quantitative and qualitative stream information, including the capture of visual information on the stream conditions in the Aptakisic Watershed. The information collected will provide a baseline of the overall stream conditions; which can be further extrapolated to indicate the conditions of the stream network of the Aptakisic Watershed. The assessments results will be incorporated into the watershed plan and provide a framework for prioritizing and implementing watershed management strategies.

GENERAL DESCRIPTION

The Aptakisic watershed is a subwatershed of the Des Plaines River Basin and encompasses approximately 6.18 square miles (3,954.68 acres) in Southeastern Lake County. The Aptakisic watershed includes a 14.65 mile stream network. The watershed is located in northeastern Illinois, in southern Lake County and drains approximately from north to south through the West Branch, joining with Aptakisic Creek, and then flowing east to the Des Plaines River. The southern portion flows south to north, from Cook to Lake County throughout the William Rogers Diversion Channel and Unnamed Tributaries, where it joins the Chevy Chase Ditch and connects to Aptakisic Creek right near the Des Plaines River.

William Rogers Diversion Channel

The William Rogers Diversion Channel is 1.62 miles of reach that runs through Cook County west to east starting at the intersection of the Wisconsin Central railroad and Dundee Road and flows into the Des Plaines River. The reaches extend to Lake Cook Road to the north, and the Wheeling Drainage Ditch to the south.

Chevy Chase Ditch

The Chevy Chase Ditch is 2.02 miles of reach that run through the Chevy Chase Country Club. It starts just south of the Covington Corporate center along the Wisconsin Central railroad line and runs south to Lake Cook Road. It extends eastward from the Wisconsin central tracks to the eastern end of the Chevy Chase golf course.

West branch

The West branch is a 2.45 mile stretch of reach that runs south from Half Day Road to just south of Aptakisic Road and runs east from Illinois Route 83 to just past Buffalo Grove Road. It is the northern most point in the watershed and connects to Aptakisic Creek.

Unnamed Tributaries

The Unnamed Tributaries consists of three different sections of reaches. Altogether they run 2.38 miles. One reach lies in Cook County and runs north to south in Wheeling from Lake Cook Road to Northgate Parkway. Another section has two reaches and branches off of Aptakisic Creek just north of Busch parkway and both extend eastward towards route Milwaukee Avenue. The last two reaches of this tributary branch off of Aptakisic just south of Pekara Drive and extend from the Lake County Public Works building southeastward until Inverrary lane.

Aptakisic Creek

The Main stretch of the creek runs for 6.18 miles extending from the Des Plaines River westward to Buffalo Grove. It flows north to south starting just south of Half Day Road. The southernmost point is just south of the intersection of Milwaukee Avenue and Pekara Drive. This is the main channel leading to the Des Plaines River.

STREAM ASSESSMENT

An extensive stream inventory was performed for the Aptakisic Creek Watershed during the fall of 2015. The stream network within the watershed is divided into reaches, smaller geographically-defined, homogeneous segments, for which data is aggregated. Data is collected by a team of two observers walking the entire length of every assessment reach. At representative points within each reach, the observers measure the channel dimensions, relative velocity (at the surface) of the stream, noting streambank and riparian conditions, and document hydraulic structures and discharge points using a standardized database. For the purpose of determining bank erosion (lateral recession) additional measurements are obtained, including bank height, lateral recession rate, severity, and lateral recession characteristics. The observers use a camera that is equipped with a GPS (global positioning system) to photograph areas of moderate to severe erosion, significant sediment deposition and debris jams, hydraulic structures and discharge points, and photos of the stream channel that are representative of the conditions throughout the reach. This combined method and

technology allows for analysis and mapping of the collected data. Approximately 600 photos and Global Positioning System (GPS) points were taken of Aptakisic Creek.

TABLE AP-01: APTAKISIC WATERSHED REACHES

Tributary	Aptakisic Creek	West Branch	Chevy Chase Ditch	William Rogers Diversion Channel	Unnamed Tributaries	Aptakisic Watershed
# of Reaches	13	5	4	3	5	30
Length (miles)	6.18	2.45	2.02	1.62	2.38	14.65

The major stream characteristics inventoried include:

1. **Channel Conditions** (physical size, pool/riffle development, degree of bank erosion, sediment accumulation, debris load and channelization), hydraulic structures (bridges, culverts, man-made dams, beaver dams, or weirs), and discharge points (swale and storm sewer outfall, sizes, material, and locations)

2. **Riparian Corridor** (vegetated buffer width, land use and cover, bank vegetation, and instream vegetation)

3. **Aquatic Habitat** (substrate composition, water quality (color, turbidity, amount of oil/grease present, algae level), instream fish cover (undercut banks, pools, logs, overhanging vegetation, macrophytes) and organisms (terrestrial, aquatic))

Although some quantitative data was collected within the channel, outfall measurements, hydraulic structure measurements, and the condition of the river was largely assessed using a qualitative method that involved visually inspecting and rating each stream reach for the characteristics being evaluated.

CHANNEL CONDITIONS

Channel Measurements

Physical measurements such as the bank height, bottom and top channel width, water depth, and water velocity reflect the shape of the channel and the amount of water that is transported by the stream under both high and low flow (precise definitions and recommended methods for measuring bank height, width, etc. can be found in the Inventory Procedures & Form Guide: Appendix A). Table 2 includes a summary of channel shape characteristics for Aptakisic Creek, West Branch, Chevy Chase Ditch,

William Rogers Diversion Channel, and the Unnamed Tributaries of the Aptakisic watershed.

TABLE AP-02: CHANNEL SHAPE CHARACTERISTICS

Tributary	Range* and Average	Bank Height (ft.)	Top Channel Width (ft.)	Bottom Channel Width (ft.)	Water Depth (ft.)
Aptakisic Creek	Range	1.0-10.0	4.5-54.0	30.5-50.0	0.3-4.5
	Average	3	17.1	11.2	1.85
West Branch	Range	.5-10.0	4.0-50.0	1.0-30.0	0.5-2.0
	Average	2.36	19.6	9.46	0.8
Chevy Chase Ditch	Range	1.0-10.0	4.0-330.0	2.0-300.0	.2-10.0
	Average	2.65	53.7	50	3.7
William Rogers Diversion Channel	Range	.5-10.0	5.0-26.0	1.0-16.0	0.0-0.5
	Average	2.14	10.5	7	0.38
Unnamed Tributaries	Range	.5-6.0	3.0-54.0	1.0-50.0	0.0-4.5
	Average	2.3	15.8	9.67	1.22
*Range was calculated by pulling the lowest and highest numbers record in each branch					

The William Rogers Diversion Channel and its channel shape characteristics, make up the lowest averages in the table above and Chevy Chase Ditch the highest seeing as it was composed primarily of ponds. The mean bank heights of the five branches were relatively comparable—3.0, 2.36, 2.65, 2.14, and 2.3 feet for Aptakisic Creek, West Branch, Chevy Chase Ditch, the William Rogers Diversion Channel, and the Unnamed Tributaries, respectively. The deepest water levels were found in Aptakisic Creek and the shallowest were in the William Rogers Diversion Channel.

Channelization

Stream channelization (Table 3) describes any activity that moves straightens, shortens, cuts off, diverts, or fills in a stream channel. These activities, which include widening, narrowing, or lining a stream channel, alter the discharge and velocity of water flowing through it. Consequently, modifications aimed to address a problem in one area of the watershed or stream channel is shifted to another area upstream, downstream or within the immediate area. There was a range of channelization levels found in the Aptakisic Watershed ranging from no channelization to a high level of channelization. The highest percentage of channelization occurred in the West Branch where 60% of the reaches in that section were highly channelized. The lowest amount of channelization occurred in

Aptakisic Creek where 38% of the reaches displayed no channelization. Overall, 4 times as many reaches were channelized to some extent than were not channelized at all.

TABLE AP-03: CHANNELIZATION

Degree of Channelization	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%	#	%	#	%	#	%	#	%	#	%
None	5	38	1	20	0	0	0	0	0	0	6	20
Low	5	38	1	20	0	0	1	33	2	40	9	30
Moderate	1	8	0	0	2	50	1	33	1	20	5	17
High	2	16	3	60	2	50	1	33	2	40	10	33
*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach displayed channelization												

Pool/Riffle Development

A pool is a location in an active stream channel usually at the outside bends of meanders where the water is deepest and has reduced current velocities. A riffle is a shallow rapid, usually located at the crossover in the meander of an active channel (see Appendix A). The development of a pool/riffle complex is associated with the natural meandering of stream channels. Pool/riffle complexes also offer streambank erosion relief by directing stream flow through the center of the channel and away from the banks. Pool/riffle development information can be found on Table 4. The degree of pool/riffle development within the watershed was generally low to moderate; 70% of the reaches in the Aptakisic Watershed contained some level of pool/riffle development. Chevy Chase Ditch had the highest percentage of moderate to high pool/riffle development with 75% of its reaches falling into those categories followed by West Branch and the Unnamed Tributaries each having 40% of their reaches fall into a high or moderate category. The William Rogers Diversion Channel showed the lowest amount of pool/riffle development with 67% of its reaches being categorized as having low to no pool/riffle development, followed by Aptakisic Creek where 61.5% of the reaches had low to no pool/riffle development.

TABLE AP-04: POOL/RIFFLE DEVELOPMENT

Degree of Pool/Riffle Development*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%	#	%	#	%	#	%	#	%	#	%
None	6	46	1	20	0	0	2	67	0	0	9	30
Low	2	15.5	1	20	1	25	0	0	3	40	7	23
Moderate	2	15.5	3	40	1	25	1	33	1	20	8	27
High	3	23	0	0	2	50	0	0	1	20	6	20

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had pool/riffle development.

Lateral Recession Rate

More information about lateral recession rates can be found in Appendix A as well as a LRR map for this watershed. The lateral recession rate is a qualitative way to assess width or thickness of eroding surface of a channel. The Rapid Assessment Point Method (RAP-M) for assessing lateral recession was employed to determine the degree of streambank erosion in the Aptakisic Watershed. Lateral Recession Rate (LRR) evaluates streambanks along the right and left bank (facing upstream) for each assessed reach. Within each reach, a segment of the channel with specific LRR characteristics is identified. Measurements include bank height/width and the lateral recession rate in feet per year, while several criteria including undercutting, bare bank, overhanging vegetation, fallen trees, exposed roots and slips or slides are noted. This is repeated up left and right side of each bank, connecting each segment to the end of the reach. All segments of every reach are captured with a camera equipped with GPS which is then transferred to a geographic information system (GIS) which then manipulates, analyzes,

and presents the data geographically. A particular point of interest in Aptakisic Creek is near Pekara Drive. AC03 was the only reach to have a severe lateral recession rate (Appendix C). This is a .25 mile stretch that had severe bank erosion resulting in the loss of fences into the stream on residential properties.

TABLE AP-05: LATERAL RECESSION RATE

Recession Rate	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Left %	Right %	Left %	Right %	Total %
Slight	92	76	100	100	100	100	100	100	100	100	92
Moderate	8	22	0	0	0	0	0	0	0	0	7
Severe	0	2	0	0	0	0	0	0	0	0	1
Very Severe	0	0	0	0	0	0	0	0	0	0	0

Bank Erosion

Several factors are responsible for streambank and streambed erosion. The greatest amount of streambank and streambed erosion will occur if a stream system is flashy and highly channelized combined with a lack of deep-rooted native bank vegetation and steep bank slopes. Poorly maintained or improperly installed point discharges can also result in isolated cases of severe bank erosion. Overall, bank erosion (Table 6) in the Aptakisic Watershed rated relatively low; 97% of the reaches fell into categories that placed bank erosion for each reach at 33% or less. Of the watershed, only 1 reach was found to have 34-66% of its banks eroded. This reach was number AC08 (Appendix C). AC08 is a 0.6 mile stretch of stream that runs through portions of Lincolnshire and Buffalo Grove, between Deerfield Parkway and the Wisconsin Central railroad tracks. This stream is surrounded by solely by Industrial/Commercial properties on its left and right side. The lowest level of erosion was found in the Unnamed Tributaries were none of the reaches had unstable banks.

TABLE AP-06: BANK EROSION

Level of Erosion*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%**	#	%	#	%	#	%	#	%	#	%
None	5	38	3	60	3	75	2	67	5	100	18	60
Moderate	7	54	2	40	1	1	1	33	0	0	11	37
Severe	1	8	0	0	0	0	0	0	0	0	1	3
Very Severe	0	0	0	0	0	0	0	0	0	0	0	0

**None/Slight = 0-4%; Moderate = 5-33%; Severe= 34-66%; and Very Severe = 67-100% of the reach had eroded streambanks

**Percent based on the number of reaches in each branch with eroded banks

To combat erosion, armoring can be placed against the streambank. Placement of gibbons, wood, metal, riprap or other artificial materials along banks can lessen erosion. Table 7 shows the level of armoring present for the five branches of the Aptakisic Watershed.

TABLE AP-07: BANK ARMORING

Level of Armoring*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%**	#	%	#	%	#	%	#	%	#	%
None	7	54	4	80	1	25	1	33	1	20	14	47
Low	4	30	0	0	2	50	0	0	3	60	9	30
Moderate	1	8	1	20	1	25	0	0	0	0	3	10
High	1	8	0	0	0	0	2	67	1	20	4	13

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100%

**Percent based on the number of reaches in each branch with armoring present

The armoring level for the Aptakisic Watershed was relatively low with 77% of the reaches having little to no level of armoring. The William Rogers Diversion Channel had the highest level of armoring with 67% of the reaches having a high degree of armoring. West Branch had the lowest amount of armoring with only 20% of its reaches having some degree of armoring.

Sediment Accumulation

Sediment accumulation at any point in a stream is influenced by the degree of streambank erosion upstream, the stream gradient and other impacts such as development that may be contributing sediment to the stream (Table 8). Fast moving

water picks up and transports the sediment downstream as suspended material in the water column. Sediment accumulation occurs as the stream flow rate decreases allowing the suspended particles to settle. The stream flow rate declines as the channel gradient lowers or an obstruction in the channel is present, resulting in areas with higher amounts of accumulated sediment (more information in Appendix A). Low accumulation levels may be due to fairly low rates of erosion in the watershed and the presence of several significant lakes and wetlands that act as sediment traps. These areas decrease the gradient on the channel and allow the sediments to settle out of the water column.

TABLE AP-08: SEDIMENT ACCUMULATION

Sediment Accumulation Level*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%**	#	%	#	%	#	%	#	%	#	%
None	6	46	2	40	2	50	1	33	2	40	13	43
Low	7	54	3	60	2	50	2	67	3	60	17	57
Moderate	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had sediment accumulation												
**Percent based on the number of reaches in each branch sediment accumulation												

All of the reaches in the Aptakisic Watershed had little to no sediment accumulation, which is expected of a stream with a low bank erosion level. Seventeen reaches (57%) had a low sediment accumulation level and 13 (43%) had no sediment accumulation.

Debris Load

Like sediment, most or all streams transport some amount of debris. Large organic debris such as tree limbs and branches can provide habitat, divert currents to create pools, bars, and slow-water habitat for aquatic organisms, and provide allochthonous energy inputs to the ecosystem that are not produced within the stream. Allochthonous inputs are those that enter the stream from some outside source, such as organic

matter like leaves from terrestrial plants and trees that is washed into the stream). However, too much debris can be problematic and may result in debris jams. These debris jams may cause backwater flooding and sediment deposition and can divert current into one or both banks, leading to streambank erosion. Debris accumulation and blockages, both instream and overbank, are a concern throughout the Aptakisic Watershed (Table 9). Reaches that failed the instream or overbank test were characterized by large accumulations of lodged and partially compacted debris across the stream channel or on the banks. A reach failed the instream or overbank tests if greater than 33% of the reach contained instream or overbank debris.

TABLE AP-09: INSTREAM AND OVERBANK

Failed Test*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%	#	%	#	%	#	%	#	%	#	%
Instream	1	8	0	0	0	0	0	0	1	20	2	7
Overbank	2	15	0	0	0	0	0	0	0	0	2	7
Both	1	8	0	0	0	0	0	0	0	0	1	3
*Reaches that failed the test for debris accumulation had debris levels >33%												

The Aptakisic Watershed had only 14% of its reaches fail either the instream or overbank debris test; only 3% of the reaches in this watershed failed both tests. Both Aptakisic Creek and the Unnamed Tributaries had a single reach fail the instream debris test; this reaches were AC15 and AC30 (Appendix C). Both of the reaches that failed the overbank debris test we located in Aptakisic Creek, AC15 and AC19. This makes AC15 the only reach in the watershed that failed both the instream and overbank debris load test; AC15 is a 0.44 mile stretch of stream located in Buffalo Grove between Twin Creeks Park and Buffalo Grove Road.

Hydraulic Structures

Hydraulic structures are any bridges, culverts, dams, or weirs that are in or across the stream channel. These structures modify the pattern or amount of flow and may act as constriction points causing backwater flooding. Culverts may act as temporary or permanent barriers if, over time, a plunge pool develops, causing the bottom of the culvert to become elevated above the water level of the pool. Additionally, dams and weirs can impede the movements of fish and other aquatic organisms within the stream network (Table 10). Aptakisic Creek had the largest number of hydraulic structures (40). The William Rogers Diversion Channel had the lowest number of hydraulic structures (6) as well as only having 4 structures per mile of stream. Culverts were the most common structure recorded making up 66% of the total number of hydraulic structures

in the watershed, bridges came next at 29%, while dams, weirs, and other structures made up less than 5% of the total number of hydraulic structures. Aptakisic Creek, Chevy Chase Ditch and the Unnamed Tributaries each had 2 problematic hydraulic structures. Another important structure to note is the extensive beaver dam located in AC05 of Aptakisic Creek, an area that runs through the Arbor Creek Business Park.

TABLE AP-10: HYDRAULIC STRUCTURES

Hydraulic structures	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
Bridges	15		5		10		0		4		34	
Culverts	21		19		17		5		15		77	
Dams	1		0		0		0		1		2	
Weirs	3		0		0		1		0		4	
Other	0		0		0		0		0		0	
Total	40		24		27		6		20		117	
Hydraulic Structures per Stream Mile	7		9		14		4		7		8	
Problem Hydraulic Structures and Percentages*	2	5%	0	0%	2	7%	0	0%	2	10	6	5

* Percent based on total number of hydraulic structures for each branch.

Discharge Points

Discharge points include sanitary, storm sewer, agricultural drain tile and sump pump pipes greater than 4 inches in diameter. They also include open channels, swales, gullies and other significant tributaries. Point discharges greatly contribute to the degradation of water quality in a stream. During a rain event, various pollutants are transported by outfalls into the channel, diminishing the quality of the water

in the channel (Table 11).

TABLE AP-11: DISCHARGE POINTS

Discharge Points	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
Swales/Open Channels												
Natural	11		2		1		0		2		16	
Cobble	3		0		0		0		3		6	
Swales/Open Channels Total	**14**		**2**		**1**		**0**		**5**		**22**	
Pipes/Fallouts												
HDPE	10		16		42		0		3		71	
RCP	40		6		16		3		12		77	
PVC	13		1		4		1		3		22	
Ductile Iron	0		0		0		0		1		1	
CMP	9		1		0		1		6		17	
Clay	1		0		0		0		0		1	
Pipes/Fallouts Total	**73**		**24**		**62**		**5**		**25**		**189**	
Total Discharge Points	**87**		**26**		**63**		**5**		**30**		**211**	
Discharge Points per Stream Mile	15		10		32		4		11		14	
Problem Swales and Pipes*	**7**	**8%**	**4**	**15%**	**2**	**3%**	**0**	**0%**	**1**	**3**	**21**	**10%**

* Percent based on total number of hydraulic structures for each branch.

Between open channels and pipes, there were 211 discharge points recorded in the Aptakisic Watershed. RCPs made up the largest number of discharge points, followed by HDPE pipes and then PVC pipes and swales. Aptakisic Creek had the highest number of total discharge points (87), while the Chevy Chase Ditch had the highest number of discharge points per mile (32). The William Rogers Diversion Channel had the fewest number of discharge points (5) as well as the fewest discharge points per mile (4). Aptakisic Creek contained 7 problematic discharge points while West Branch had 4, The Chevy Chase Ditch had 2 and the Unnamed Tributaries had 1.Problematic pipes made up 10% of the total number of discharge points recorded in the watershed.

RIPARIAN CORRIDOR

Vegetated Buffer

Throughout the Aptakisic Watershed, the width of the riparian zone is impacted by anthropogenic changes in land use resulting in wide riparian buffers ("High" buffer width) in locations where the stream flows through open space areas with minimal to no impact and narrow buffers ("Low" buffer width) in locations where the stream flows through developed areas. Generally there was some sort of vegetated buffer around the stream in the Aptakisic Watershed. Only 9 reaches (30%) had no vegetated buffer present while 47% of the reaches had a low buffer. Seven reaches (26%) had a moderate or high buffer width. Both of the reaches that had a high buffer width were found in West Branch.

TABLE AP-12: VEGETATED BUFFER WIDTH

Buffer Width*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%	#	%	#	%	#	%	#	%	#	%
None	3	23	1	20	1	25	1	33	3	60	9	30
Low	9	69	1	20	1	25	2	67	1	20	14	47
Moderate	1	8	1	20	2	50	0	0	1	20	5	17
High	0	0	2	40	0	0	0	0	0	0	2	6

*None:<20 feet; Low: 20-40 feet; Moderate: 40-60 feet; High: >60 feet

Floodplain Land Use & Coverage

The stream inventory included an assessment of land use within 100 feet on either side of the stream channel. Land use within the 100-foot riparian corridor was categorized into six classifications: agricultural, recreational, residential, vacant/open space (includes forest, grassland, and wetland), commercial/industrial, and other. Estimates are qualitative and made after walking the stream reach and observing the percent of land in each of these categories. See Table 13 for a summary of land use in the riparian corridor and floodplain. The most abundant use of land for the Aptakisic Watershed was commercial/industrial (30%). After industrial/commercial, residential areas made up 26% of the land use and open space made up 24%. The remaining 20% of land was used for agriculture, recreation, or fell into the other category.

TABLE AP-13: LAND USE IN THE RIPARIAN CORRIDOR

Land Use*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Left %	Right %	Left %	Right %	Total %
Agricultural	0	2.7	20	20	0	0	0	0	0	2	6
Open Space	30.3	17.6	36	46	2.5	5	25	66.67	18	6	24
Recreational	7.5	5	17	18	46.8	63.75	0	0	0	0	13.2
Commercial	31.5	40.4	0	0	43.2	5	58.33	33.33	24	60	30
Residential	30.7	33.5	27	16	7.5	26.25	16.67	0	55	30	26.2
Other	0	0.8	0	0	0	0	0	0	3	2	0.6
*Land use within 100 ft. of each side of river based on visual observation.											

Floodplain vegetation (Table 14) serves as an important function in protecting the physical, biological, and chemical integrity of water. Vegetation acts as a natural barrier by dissipating the energy of lowing water and provides protection from flooding and erosion. Vegetation filters sediments originating from land while slowing overland flows and surface run-off into water bodies, and filters incoming floodwaters from materials scoured from the channel bank and bed. This filtering process can add nutrients to the floodplain soil. Slowed runoff across the floodplain allows additional time for infiltration and groundwater recharge. The slowing of runoff provides the additional benefit of natural purification of water as local

runoff or overbank floodwater infiltrates through the floodplain alluvium. Vegetation provides habitat and nutrients for a wide variety of terrestrial and aquatic organisms in, adjacent to, and for downstream ecosystems.

TABLE AP-14: FLOODPLAIN VEGETATION

Floodplain Vegetation*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Left%	Right%	Left%	Right%	Total %
Trees	8	9	15	18	9	4	5	23	10	13	11
Lawn	35	36	21	23	31	42	47	28	42	42	35
Wetland	7	10	21	25	15	0	13	3	5	3	10
Crops	0	2	20	20	0	0	0	0	0	2	4
Shrubs	14	15	19	13	19	14	15	22	24	22	17
Herbaceous	0	1	0	0	12	8	0	0	0	0	3
Impervious	14	18	3	1	11	25	15	17	0	1	10
Water	15	7	1	0	3	0	5	7	19	17	8
Other	7	2	0	0	0	7	0	0	0	0	2

*Percent of vegetative type within 100 feet of each side of channel based on visual estimates.

The most abundant floodplain vegetation for the entire Aptakisic Watershed was lawn (35%), it was also the most common form of vegetation across all 5 branches. After lawn, shrubs made up 17%; trees, wetland, and impervious materials made up about 10% each. The remaining 17% was split almost evenly amongst crops, herbaceous plants, water and other.

Bank Vegetation

Bank Vegetation is vegetation existing within 10 feet of the stream bank. The most significant role of bank vegetation is its ability to control erosion, which in turn prevents sediment and other forms of pollution from entering the stream. Sedimentation is a very significant problem and though erosion is a natural process, it is often sped up through human activities, directly or indirectly. The increased rate of erosion and sedimentation affects the geomorphology of the stream channel, water quality, and aquatic life in the stream channel and throughout the watershed. Streams surrounded by vegetated riparian zones, have intricate root systems that help to stabilize the bank and prevent erosion. Woody stemmed plants, sedges, and grasses help physically trap sediment by slowing water runoff from the surrounding areas, allowing the sediment to settle out instead of entering the stream. Additionally, vegetated banks lend to deep and narrow channels as a result of their stability and lack of heavy sedimentation.

TABLE AP-15: BANK VEGETATION

Predominant Vegetation*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed
	Left %	Right %	Left %	Right %	Left %	Right %	Left %	Right %	Left %	Right %	Total %
Grass	12	12	30	28	28	33	23	28	18	16	20
Lawn	31	28	20	21	15	28	50	55	41	45	31
Wetland	17	16	25	24	10	3	7	3	3	3	13
Trees	5	7	8	10	8	8	5	3	7	8	7
Shrub	25	30	15	15	18	8	8	3	24	23	20
Crop	0	0	2	2	0	0	0	0	0	0	0.5
Herbaceous	0	1	0	0	17	5	7	8	6	5	3.5
None	3	3	0	0	0	12	0	0	1	0	2
Other	7	3	0	0	4	3	0	0	0	0	3

*Percent of vegetative type within 10 feet of each side of channel based on visual estimates.

The banks of the Aptakisic Watershed were primarily composed of three different types of vegetation. Lawn made up 31% of the vegetation, grass 20%, and shrub 20%. Wetland and trees together covered 20% of the banks. The remaining 9% was spread amongst crop, herbaceous plants, other, or had no vegetation. Chevy Chase Ditch had the highest percentage of bare bank at 6%, followed by Aptakisic Creek at 3% and then the Unnamed Tributaries at 1%.

Instream Vegetation

Aquatic instream vegetation is an important part of the watershed ecosystem. Plants in the stream are important in food webs: each organism has characteristic feeding preferences and patterns, and can itself be prey to other consumers. Plants provide habitat and shelter for fish, waterfowl, and other wildlife. Since all plants, including those that grow underwater, produce oxygen as they photosynthesize, they are the major source of oxygen for aquatic animal life. Rooted plants stabilize shorelines and stream beds. They absorb nutrients and filter pollutants from runoff, which improves water quality. In the Aptakisic Watershed approximately ½ of the streams contained no instream vegetation. The William Rogers Diversion Channel had the largest amount of vegetation with 72% of the stream containing some type of vegetation. Inversely, Chevy Chase Ditch only had 5% of its length have vegetation instream. Where there was vegetation, rooted emergent and attached algae were the two most common forms found.

TABLE AP-16: INSTREAM VEGETATION

Instream Vegetation	Aptakisic Creek	West Branch	Chevy Chase Ditch	William Rogers Diversion Channel	Unnamed Tributaries	Aptakisic Watershed
	%	%	%	%	%	%
Rooted Emergent	11	5	0	58	20	14
Rooted Submergent	14	4	5	0	12	9
Rooted Floating	0	0	0	0	0	0
Free Floating	2	0	0	0	0	1
Floating Algae	0	8	0	0	1	2
Attached Algae	12	18	0	14	28	15
No Vegetation	61	65	95	28	39	59

AQUATIC HABITAT

Substrate Composition

Aptakisic Watershed streambeds are composed of a variety of sediment grains that range in diameter from extremely fine clays to relatively coarse cobbles and boulders (see Table 17). Generally, fine sediments are transported in suspension until velocity slows enough that they are deposited on the streambed. Larger sediments are not transported as readily and may only move during increased flows. Clays are typically regarded as cohesive sediments that naturally adhere to one another (and are therefore more difficult to erode) while silts are more easily eroded. Sands and larger sediments (e.g., gravels and cobbles) are less cohesive. Clay and silt-dominated banks and beds, therefore, tend to be associated with narrow, incised channels while sand, gravel, and cobble-dominated channels are more often shallow and wide. Clay/silt channels tend to incise or deepen in response to increased flows while sand/gravel channels tend to widen. These relationships, however, are also contingent upon a number of other contributing factors such as gradient, bank slope, and bank vegetation. Substrate is also an important measure of habitat quality. Extremely fine sediments, such as clays, adhere closely to one another and may bury the streambed. Coarse-grained sediments like gravels present abundant interstices, allowing water, oxygen, and other dissolved and suspended materials to infiltrate the hyporheic zone. The hyporheic zone refers to the area surrounding the stream channel that is saturated and through which there is

some percolation or flow. Essentially, the hyporheic zone is the area where the surface water and groundwater interface and mix.

TABLE AP-17: SUBSTRATE COMPOSITION

Predominant Substrate	Aptakisic Creek	West Branch	Chevy Chase Ditch	William Rogers Diversion Channel	Unnamed Tributaries	Aptakisic Watershed
	%	%	%	%	%	%
Clay	12	0	5	33	38	16
Silt	7	50	70	0	0	21
Sand	3	5	3	0	13	5
Gravel	16	11	1	8	10	11.5
Cobble	11.5	0	0	25	11	9
Boulder	0	1	0	4	0	0.5
Concrete	0.5	0	10	0	10	3.5
Organic matter	50	33	11	30	18	33.5

No one substrate material dominated the Aptakisic reaches, though organic material made up 33.5% of the watershed followed by silt at 21%. The highest percentage of substrate occurrence differed across the three branches. Aptakisic Creek contained 50% organic material followed by 16% gravel. West Branch contained 50% silt followed by 33% organic material. Chevy Chase Ditch contained 70% silt followed by 11% organic material. The William Rogers Diversion Channel was 33% clay followed by 30% organic material. The Unnamed Tributaries were 38% clay followed by 18% organic material. The least common substrate compositions were concrete and boulder, making up 4% of the entire substrate composition for the Aptakisic Watershed.

Water Quality

The water quality indicators that were evaluated during the stream assessments of the Aptakisic Watershed were turbidity and water color, filamentous algae, the presence of grease and oil in the sediment and water column. These water quality indicators were assessed by visual inspection of the stream during the stream inventory (Table 18).

Turbidity

Turbidity is the measure of relative clarity of water. Material that causes water to be turbid includes clay, silt, fine inorganic and organic matter, algae, organic compounds, and plankton and other microscopic organisms. During periods of low flow, water in streams is a clear green color, and turbidities are low. Turbidity can increase, however,

during storm events when the volume of water in the channel increases and erodes the streambanks or stirs the sediment in the bottom of the channel.

Filamentous Algae

Filamentous algae are a good indicator of elevated nutrient levels. Filamentous algae are not only aesthetically displeasing, but also form mat-like blooms that cause substantial swings in diurnal oxygen levels (dissolved oxygen levels can get very low during the night). This fluctuation can limit the habitat of many aquatic animals. Filamentous algae were not a big concern in the Aptakisic Watershed.

Grease & Oil

Grease and oil enter the stream during rain storms as oil and grease from surrounding parking lots, roads, and bridges flush into the storm sewer system, often overflowing directly into the stream. Other potential sources of oil and grease results from illegal dumping that originate from automotive and transportation related services. Grease and oil in the water column and sediment will degrade the water quality of receiving streams by adding biological and chemical oxygen demand to the stream.

TABLE AP-18: WATER QUALITY

Water Quality*	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%	#	%	#	%	#	%	#	%	#	%
Turbidity												
None	3	23	0	0	0	0	0	0	0	0	3	10
Low	5	38	4	80	4	100	2	67	3	60	18	60
Moderate	4	31	1	20	0	0	0	0	2	40	7	23
High	1	8	0	0	0	0	1	33	0	0	2	7
Grease & Oil												
In Water & Sediment	1	8	2	40	2	50	0	0	1	20	6	20
In Sediment Only	0	0	0	0	0	0	0	0	0	0	0	0
In Water Only	0	0	0	0	0	0	0	0	0	0	0	0
No Grease & Oil in Water or Sediment	12	92	3	60	2	50	3	100	4	80	24	80

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had oil present

Instream Fish Cover

A diverse habitat with regard to instream cover is essential for diverse fish assemblages and other aquatic organisms. Instream fish cover availability was evaluated based on the presence of a number of structural elements and habitats, consisting of undercut banks, pools over 28 inches deep, aquatic macrophytes, logs, overhanging vegetation, rootwads, boulders, and backwaters. The presence of woody debris (logs and rootwads) in streams is a significant component of fish habitat which they utilize for spawning, rearing, and foraging. Woody debris creates areas of low flow, providing a refuge for fish during periods of high flow. Woody debris also provides cover for fish, lowering the risk of predation. Overhanging vegetation and canopy cover provide two important benefits; providing shade to the stream helps keep the temperature in the stream cool, and leaf litter and organic material provide nutrients to macroinvertebrates and other aquatic organisms. Table 19 contains the fish coverage categories and the abundance of those types of coverage.

TABLE AP-19: FISH COVERAGE

Cover Type	Aptakisic Creek		West Branch		Chevy Chase Ditch		William Rogers Diversion Channel		Unnamed Tributaries		Aptakisic Watershed	
	#	%*	#	%	#	%	#	%	#	%	#	%
Undercut Banks	8	62	2	40	0	0	0	0	2	40	12	40
28in Deep Pools	8	61	1	20	3	75	0	0	2	40	14	47
Macrophytes	7	54	3	60	4	100	2	67	3	60	19	63
Logs	7	54	2	40	0	0	0	0	3	60	12	40
Overhanging Vegetation	6	46	4	80	3	75	0	0	0	0	13	43
Rootwads	2	15	2	40	0	0	0	0	1	20	5	17
Boulders	0	0	0	0	0	0	1	33	0	0	1	3
Backwaters	1	8	3	60	1	25	0	0	0	0	5	17

* Percent total will exceed 100% as more than one type of coverage can occur simultaneously in each reach

The most common form of fish cover was macrophytes appearing in 63% of the reaches. 28 inch deep pools were the second most common type of cover at 47% followed by overhanging vegetation at 43%. The least common type of fish habitat was boulders at 3%. The most common fish cover in Aptakisic Creek was undercut banks (62%), in West Branch is was overhanging vegetation (80%), in Chevy Chase Ditch and William Rogers Diversion Channel is was macrophytes 100% and 67% respectively,

and for the Unnamed Tributaries macrophytes and logs were each found in 60% of the reaches.

Aquatic & Terrestrial Organisms

The inventory addressed aquatic and riparian life where possible or identifiable. Organisms were not specifically sampled during the stream inventory, but some animals were observed during the inventory.

Aptakisic Creek

Fish, ducks, geese, heron, birds, deer, other mammals, and snapping turtles were found in this branch. Although no beavers were seen, there was a high amount of physical evidence to support the claim that they also inhabit this area.

West Branch

Ducks, geese, heron, birds, fish, and mammals were observed in this branch.

Chevy Chase Ditch

Carp, other fish, ducks, geese, heron, other birds, and mammals were observed in this branch.

William Rogers Diversion Channel

Ducks, geese, heron, other birds and mammals were observed in this branch.

Unnamed Tributaries

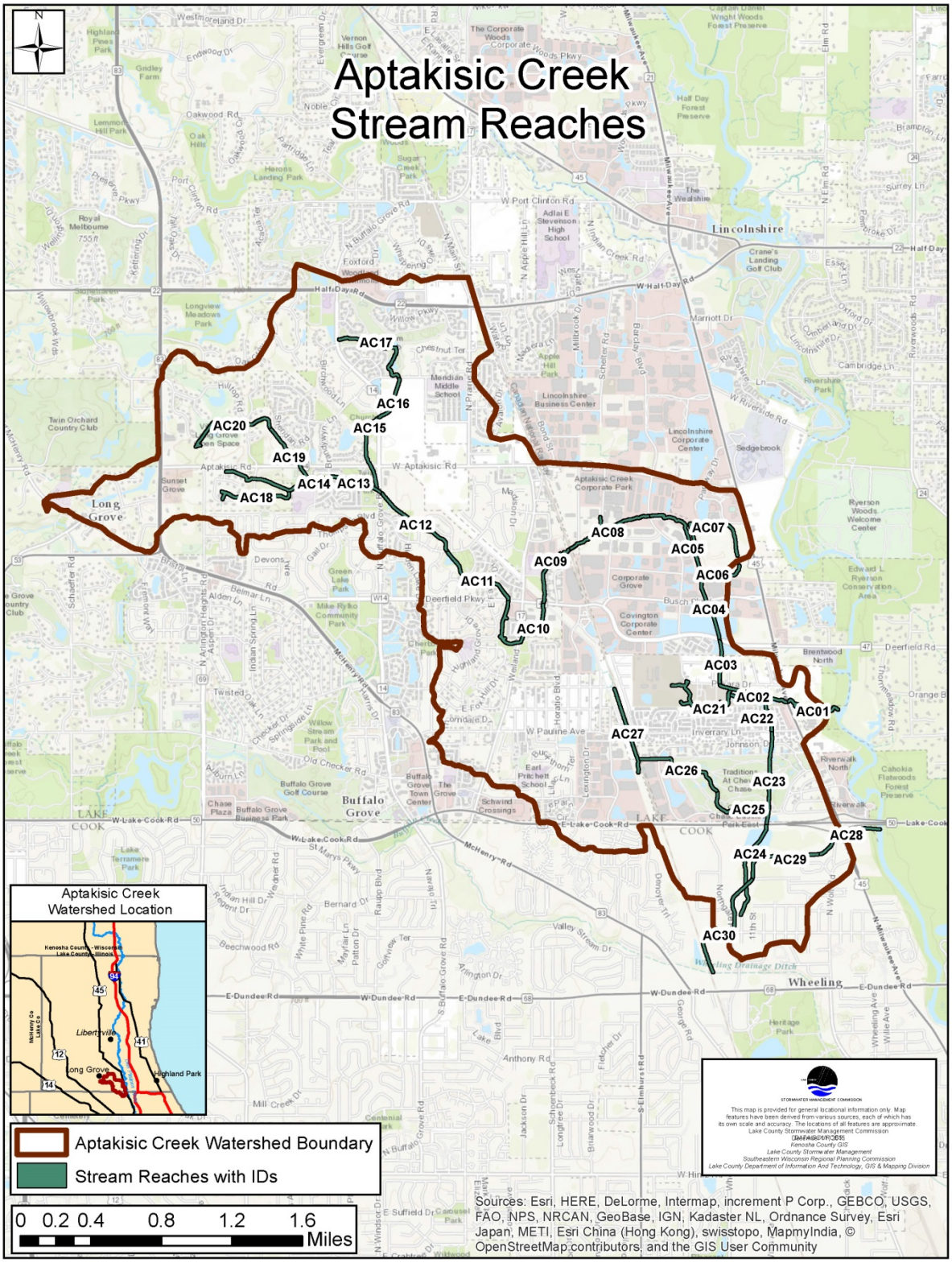
Darters, other fish, ducks, geese, heron, other birds, amphibians, skunks, and other mammals were seen inhabiting this branch.

Aptakisic Creek Stream Inventory Data

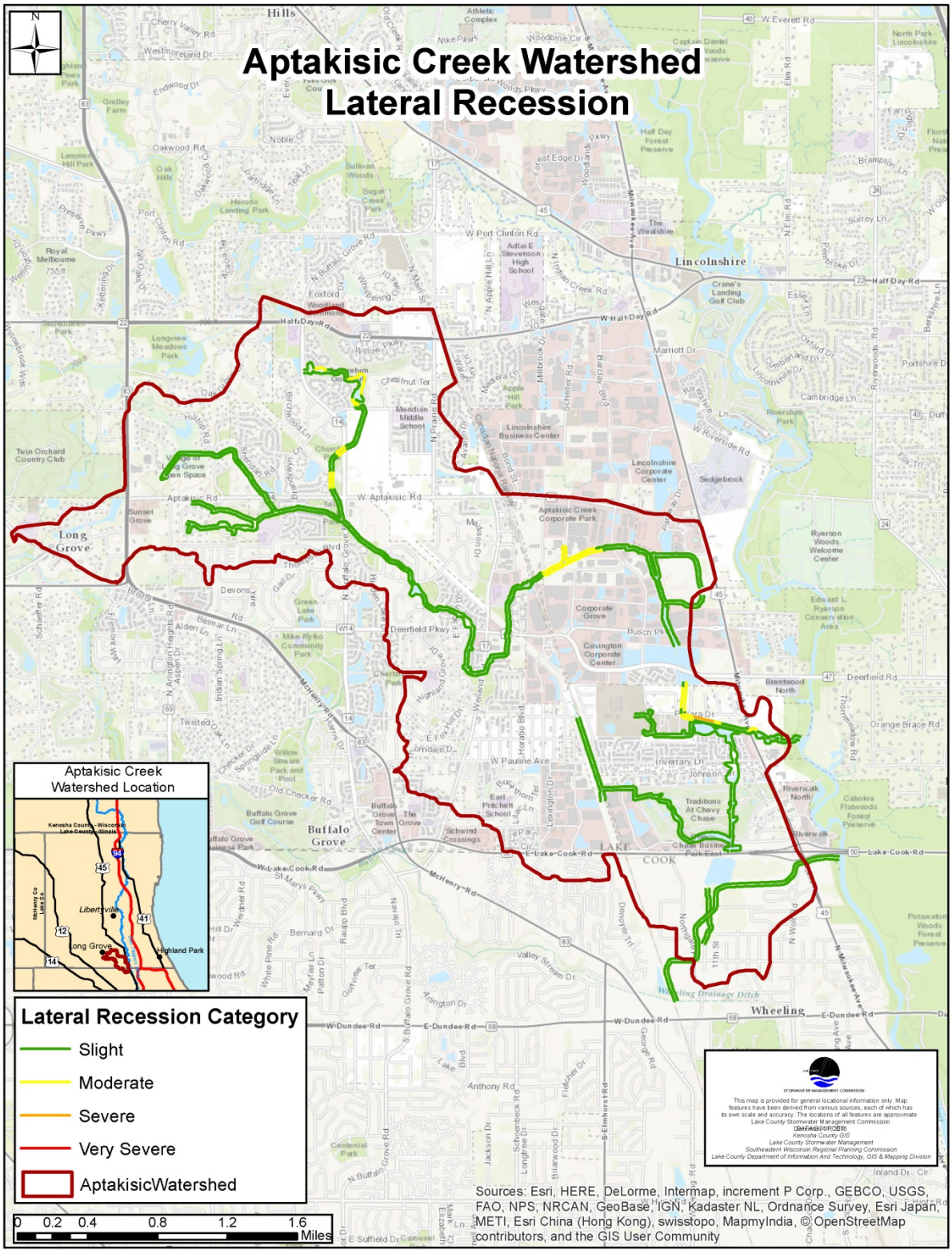
Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
AC01	LOW	LOW	HIGH	NONE	NONE	2,324	0.44	1.5	2.5	18.0	45.0	15.0	35.0	32.0	1.3
AC02	NONE	LOW	MOD	HIGH	MOD	2,211	0.42	1.0	4.5	13.0	20.5	9.0	14.0	16.7	2.7
AC03	LOW	NONE	LOW	LOW	MOD	1,343	0.25	1.5	2.0	11.0	16.0	7.0	12.0	14.2	2.7
AC04	NONE	LOW	LOW	LOW	NONE	2,142	0.41	1.0	3.0	13.0	34.0	7.0	30.0	20.7	2.5
AC05	LOW	LOW	MOD	LOW	MOD	3,004	0.57	0.5	3.0	8.0	16.0	5.0	10.0	11.7	3.8
AC06	NONE	NONE	MOD	NONE	NONE	1,302	0.25	1.0	6.0	3.0	11.5	1.0	3.0	7.8	0.3
AC07	LOW	LOW	MOD	LOW	MOD	2,900	0.55	0.5	3.0	11.0	21.0	1.0	12.0	14.7	0.6
AC08	LOW	LOW	MOD	LOW	SEV	3,206	0.61	1.0	7.0	10.0	15.0	8.0	10.0	12.7	1.2
AC09	LOW	LOW	MOD	LOW	NONE	2,417	0.46	1.0	4.0	13.0	16.0	8.0	10.0	14.8	1.5
AC10	LOW	NONE	HIGH	HIGH	NONE	3,612	0.68	1.0	2.5	9.0	12.0	5.0	5.0	10.0	0.5
AC11	NONE	NONE	MOD	MOD	NONE	2,620	0.50	1.0	2.0	7.5	14.0	5.5	11.0	11.5	1.1
AC12	NONE	LOW	MOD	LOW	MOD	2,784	0.53	2.5	10.0	10.0	15.0	8.0	10.0	12.3	0.5
AC13	LOW	LOW	LOW	NONE	MOD	1,740	0.33	1.0	5.5	15.0	38.0	10.0	30.0	25.7	1.3
AC14	LOW	LOW	MOD	MOD	NONE	3,493	0.66	1.0	2.0	7.0	50.0	3.0	20.0	32.3	0.8
AC15	MOD	MOD	LOW	NONE	MOD	2,320	0.44	2.0	7.0	4.5	25.0	3.5	9.0	16.8	0.7
AC16	NONE	NONE	MOD	MOD	NONE	1,458	0.28	3.0	5.0	8.0	11.0	4.0	6.0	9.7	0.3
AC17	NONE	NONE	MOD	MOD	MOD	3,166	0.60	2.0	12.0	18.0	36.0	10.0	20.0	26.7	1.2
AC18	LOW	LOW	MOD	NONE	NONE	2,712	0.51	1.0	2.5	7.0	12.0	1.0	6.0	9.7	0.2
AC19	LOW	MOD	LOW	NONE	MOD	1,981	0.38	0.5	6.0	4.0	28.0	2.0	10.0	13.3	0.7
AC20	LOW	LOW	LOW	LOW	MOD	3,017	0.57	1.0	5.0	10.0	25.0	5.0	15.0	15.3	1.0
AC21	LOW	LOW	HIGH	HIGH	NONE	3,306	0.63	2.0	2.0	8.0	16.0	2.0	12.0	11.8	0.3
AC22	LOW	NONE	MOD	HIGH	NONE	2,013	0.38	1.0	3.0	28.0	54.0	22.0	50.0	38.7	4.8
AC23	LOW	NONE	MOD	HIGH	NONE	2,883	0.55	1.5	10.0	32.0	-	30.0	-	136.0	3.3
AC24	NONE	LOW	MOD	LOW	NONE	3,021	0.57	3.0	30.0	5.0	7.0	3.0	4.0	6.0	0.5
AC25	LOW	LOW	MOD	MOD	NONE	2,032	0.38	2.0	4.0	24.0	90.0	20.0	80.0	51.3	6.7
AC26	LOW	LOW	HIGH	HIGH	MOD	3,077	0.58	1.0	3.0	9.0	52.0	3.0	50.0	23.3	2.8
AC27	LOW	LOW	MOD	MOD	NONE	2,695	0.51	1.0	5.0	4.0	17.0	2.0	5.0	10.7	0.3
AC28	NONE	NONE	MOD	HIGH	NONE	2,171	0.41	1.5	10.0	10.5	26.0	5.0	16.0	15.8	0.3
AC29	NONE	NONE	HIGH	MOD	NONE	2,507	0.47	0.5	1.5	7.5	10.5	4.0	5.5	8.7	0.4
AC30	MOD	LOW	HIGH	MOD	NONE	3,883	0.74	0.5	0.5	10.0	11.0	1.0	8.0	10.3	0.3

- : Not Collected

APPENDIX C:


Aptakisic Creek
Stream Reaches
AC17
AC16
AC15
AC20
AC19
AC14
AC13
AC18
AC12
AC11
AC10
AC09
AC08
AC07
AC05
AC06
AC04
AC03
AC02
AC21
AC22
AC01
AC27
AC26
AC23
AC25
AC28
AC24
AC29
AC30
Lincolnshire
Long Grove
Buffalo Grove
Wheeling
Aptakisic Creek
Watershed Location
Aptakisic Creek Watershed Boundary
Stream Reaches with IDs
0 0.2 0.4 0.8 1.2 1.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

APPENDIX D:


Aptakisic Creek Watershed
Lateral Recession
Aptakisic Creek Watershed Location
Lateral Recession Category
Slight
Moderate
Severe
Very Severe
AptakisicWatershed
0 0.2 0.4 0.8 1.2 1.6
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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Lake County Stormwater Management Commission
Kenosha County GIS
Lake County Stormwater Management
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division

Buffalo Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
BC001	LOW	LOW	HIGH	HIGH	NONE	3,885	0.74	1.5	1.5	31.5	62.2	31.5	45.2	52.0	2.0
BC002	MOD	MOD	HIGH	HIGH	MOD	2,484	0.47	0.5	8.0	22.5	31.5	20.0	31.5	28.3	1.6
BC003	-	-	-	-	-	1,800	0.34	-	-	-	-	-	-	-	-
BC004	-	-	-	-	-	1,315	0.25	-	-	-	-	-	-	-	-
BC005	LOW	LOW	HIGH	HIGH	SEV	2,480	0.47	1.4	2.9	15.0	31.0	14.5	24.0	25.3	2.6
BC006	HIGH	LOW	HIGH	HIGH	SEV	2,101	0.40	0.8	3.7	40.0	48.0	20.2	23.1	44.0	3.0
BC007	HIGH	LOW	MOD	LOW	MOD	1,822	0.35	1.6	7.7	28.0	53.5	25.0	25.5	40.5	1.7
BC008	LOW	LOW	HIGH	MOD	LOW	1,989	0.38	0.7	2.5	36.5	60.0	18.5	28.5	46.7	0.7
BC009	LOW	LOW	HIGH	MOD	MOD	2,361	0.45	2.0	8.8	40.5	43.5	18.5	36.0	42.0	0.8
BC010	LOW	LOW	HIGH	NONE	MOD	2,209	0.42	1.7	5.5	25.0	47.0	18.4	29.0	36.0	1.4
BC011	LOW	LOW	HIGH	LOW	MOD	1,298	0.25	1.7	9.0	25.0	49.5	18.4	27.0	37.3	4.7
BC012	MOD	LOW	HIGH	LOW	MOD	1,353	0.26	1.0	5.0	43.5	67.5	25.5	29.0	58.7	1.0
BC013	MOD	LOW	HIGH	MOD	SEV	1,565	0.30	1.0	2.9	36.0	47.0	18.0	29.0	42.7	1.2
BC014	LOW	LOW	HIGH	LOW	MOD	1,434	0.27	2.7	4.5	17.0	63.0	17.0	22.5	41.7	1.0
BC015	LOW	LOW	HIGH	MOD	MOD	1,862	0.35	3.0	3.4	31.5	63.0	22.5	31.5	47.3	1.0
BC016	-	-	-	-	-	365	0.07	-	-	-	-	-	-	-	-
BC017	LOW	LOW	HIGH	MOD	MOD	2,103	0.40	-	-	-	-	-	-	47.3	1.0
BC018	LOW	LOW	HIGH	LOW	SEV	1,752	0.33	0.3	0.4	7.0	31.5	29.0	31.5	19.3	0.9
BC019	LOW	MOD	MOD	HIGH	MOD	2,128	0.40	0.5	1.0	25.0	33.5	10.5	27.5	29.3	0.5
BC020	-	-	HIGH	HIGH	NONE	2,178	0.41	0.1	3.5	0.1	22.5	0.1	1.3	11.3	0.0
BC021	LOW	LOW	NONE	HIGH	MOD	1,803	0.34	-	-	44.5	44.5	14.0	19.0	44.5	1.5
BC022	-	-	-	-	-	538	0.10	-	-	-	-	-	-	-	-
BC023	HIGH	MOD	NONE	HIGH	MOD	1,433	0.27	1.0	1.0	51.0	75.0	3.8	6.0	63.0	1.0
BC024	HIGH	HIGH	NONE	LOW	NONE	3,164	0.60	1.0	1.5	49.0	67.5	8.5	27.0	58.3	1.4
BC025	LOW	LOW	HIGH	HIGH	NONE	2,480	0.47	-	-	8.0	36.5	0.5	3.5	22.3	0.6
BC026	-	-	-	-	-	1,903	0.36	-	-	-	-	-	-	-	-
BC027	-	-	-	-	-	1,384	0.26	-	-	-	-	-	-	-	-
BC028	MOD	HIGH	LOW	LOW	MOD	2,126	0.36	1.2	2.0	31.5	75.0	0.7	1.5	53.3	0.3
BC029	MOD	HIGH	LOW	LOW	MOD	1,924	0.36	0.5	1.2	44.0	75.0	1.5	9.0	59.5	0.2
BC030	HIGH	HIGH	LOW	MOD	SEV	2,013	0.38	0.6	6.0	18.5	23.5	12.5	18.0	21.0	0.8
BC031	MOD	LOW	MOD	MOD	MOD	2,819	0.53	2.6	4.5	40.5	45.0	18.0	27.5	42.8	2.8
BC032	-	-	-	-	-	2,305	0.44	-	-	-	-	-	-	-	-
BC033	-	-	-	-	-	2,201	0.42	-	-	-	-	-	-	-	-
BC034	LOW	LOW	HIGH	MOD	MOD	2,055	0.39	3.0	5.0	10.0	12.0	8.0	8.0	10.7	6.0
BC035	LOW	LOW	-	MOD	MOD	2,031	0.38	3.0	5.0	10.0	12.0	7.0	12.0	11.3	5.0
BC036	LOW	LOW	-	MOD	MOD	2,138	0.40	0.3	5.0	1.2	15.0	0.8	5.0	12.0	4.7
BC037	LOW	LOW	-	MOD	MOD	2,126	0.40	3.0	4.0	15.0	20.0	10.0	10.0	17.5	3.5
BC038	HIGH	HIGH	LOW	MOD	MOD	2,059	0.39	0.5	1.9	40.0	75.0	3.0	13.5	56.3	1.4
BC039	-	-	-	-	-	1,349	0.26	-	-	-	-	-	-	-	-
BC040	-	-	-	-	-	1,812	0.34	-	-	-	-	-	-	-	-
BC041	-	-	-	-	-	1,430	0.27	-	-	-	-	-	-	-	-
BC042	LOW	LOW	MOD	LOW	NONE	1,677	0.32	0.5	2.0	0.7	6.0	1.0	4.0	5.3	0.5
BC043	MOD	HIGH	HIGH	MOD	SEV	2,167	0.41	1.3	3.0	13.5	17.5	13.5	17.5	15.5	0.8
BC044	LOW	LOW	HIGH	LOW	MOD	2,153	0.41	3.0	3.0	25.0	30.0	15.0	25.0	27.5	1.3
BC045	MOD	MOD	MOD	MOD	SEV	2,277	0.43	0.8	1.8	14.7	31.5	8.5	20.0	23.4	1.1
BC046	MOD	HIGH	MOD	LOW	SEV	2,548	0.48	2.0	15.0	15.0	18.0	0.8	15.0	24.5	1.5
BC047	MOD	MOD	MOD	LOW	MOD	1,969	0.37	0.6	1.5	11.0	70.0	11.0	20.0	43.0	1.7
BC048	HIGH	MOD	LOW	LOW	MOD	4,671	0.88	0.5	3.7	15.0	45.0	10.0	18.0	30.5	1.6
BC050	HIGH	MOD	MOD	LOW	MOD	1,794	0.34	1.4	2.3	28.0	31.5	12.0	18.0	29.8	1.1
BC051	LOW	LOW	LOW	NONE	MOD	2,113	0.40	0.5	2.0	25.0	36.0	9.0	27.0	20.4	1.4

Buffalo Creek Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
BC052	-	-	-	-	-	978	0.19	-	-	-	-	-	-	-	-
BC053	-	-	-	-	-	1,850	0.35	-	-	-	-	-	-	-	-
BC055	HIGH	HIGH	MOD	LOW	MOD	3,335	0.63	0.8	2.6	15.0	28.0	4.5	18.0	21.5	1.1
BC056	HIGH	HIGH	MOD	NONE	SEV	1,968	0.37	0.1	2.6	15.0	36.0	5.5	45.0	24.5	0.6
BC057	HIGH	HIGH	MOD	NONE	SEV	2,589	0.49	2.0	3.2	34.5	55.0	5.5	16.0	26.0	0.8
BC058	LOW	LOW	HIGH	LOW	MOD	2,282	0.43	1.7	3.2	5.5	38.0	5.5	13.5	21.8	0.7
BC059	LOW	LOW	MOD	LOW	MOD	2,024	0.38	0.5	0.5	4.5	61.5	4.5	7.5	33.0	2.6
BC060	LOW	LOW	HIGH	LOW	MOD	2,726	0.52	0.5	0.5	24.0	61.5	4.5	7.5	42.8	3.0
BC061	-	-	-	-	-	1,999	0.38	-	-	-	-	-	-	-	-
BC062	MOD	MOD	MOD	MOD	MOD	830	0.16	0.5	2.0	38.0	60.0	2.5	3.5	49.0	1.0
BC063	-	-	-	-	-	1,435	0.27	-	-	-	-	-	-	-	-
BC064	HIGH	LOW	LOW	NONE	MOD	1,806	0.34	1.0	2.0	3.6	-	3.6	22.0	66.8	1.8
BC065	MOD	HIGH	LOW	NONE	MOD	1,792	0.34	0.1	6.2	18.5	60.0	9.0	24.0	38.8	1.2
BC066	-	-	-	-	-	1,079	0.20	-	-	-	-	-	-	-	-
BC067	LOW	LOW	MOD	NONE	MOD	1,913	0.36	0.9	3.5	11.0	68.5	6.8	14.5	47.2	1.1
BC068	NONE	LOW	HIGH	LOW	NONE	863	0.16	0.1	0.1	4.0	16.5	2.0	2.0	10.3	0.1
BC069	MOD	LOW	HIGH	LOW	MOD	2,149	0.41	2.6	2.8	51.5	60.0	11.0	20.0	55.8	1.4
BC070	MOD	MOD	-	LOW	MOD	2,366	0.45	3.0	6.0	10.0	20.0	6.0	10.0	15.0	3.3
BC071	MOD	HIGH	LOW	LOW	SEV	959	0.18	1.4	3.5	44.0	45.0	5.0	6.5	44.8	1.1
BC072	LOW	MOD	MOD	NONE	MOD	1,929	0.37	1.5	12.0	15.0	25.0	3.0	5.0	14.2	0.8
BC073	MOD	MOD	-	NONE	MOD	1,443	0.27	2.0	4.0	5.0	30.0	3.0	20.0	14.3	3.3
BC074	-	-	MOD	LOW	MOD	2,285	0.43	1.0	4.0	8.0	20.0	3.0	15.0	12.7	0.8
BC075	LOW	LOW	NONE	MOD	MOD	1,950	0.37	0.9	2.0	3.6	15.5	9.0	36.0	22.2	1.2
BC076	MOD	MOD	-	LOW	MOD	2,190	0.41	1.0	3.0	4.0	10.0	1.5	7.0	6.0	0.5
BC077	HIGH	HIGH	LOW	LOW	NONE	766	0.15	0.4	3.0	10.0	31.5	3.0	7.0	20.8	0.7

- : Not Collected

7/19/2016

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

2016

DES PLAINES RIVER

Stream Inventory Summary | Summer 2016

Stream Inventory Summary | Summer 2016

INTRODUCTION

The Lake County Stormwater Management Commission (SMC) conducted a stream inventory of the Des Plaines River watershed during the summer of 2016 in addition to a number of other studies and projects related to the development of a watershed plan in the Des Plaines River watershed. The purpose of this assessment was to record quantitative and qualitative stream information, including the capture of visual information on the stream conditions in the Des Plaines River. The information collected will provide a baseline of the overall stream conditions, which can be further extrapolated to indicate the conditions of the stream network of the watershed. The results will be incorporated into the watershed plan and provide a framework for prioritizing and implementing watershed management strategies.

CHANNEL OVERVIEW

The Des Plaines River is one of the larger rivers that flows south from Southern Wisconsin into Northeastern Illinois. It runs through the municipalities of Waukegan, Wadsworth, Gurnee, Libertyville, Mettawa, Vernon Hills, Riverwoods, Lincolnshire, and Wheeling. The section of the Des Plaines River studied is contained in an area starting at the Wisconsin-Illinois border to south of Wheeling Dam #1. The Des Plaines River watershed is responsible for the drainage of approximately 235 square miles. It flows south until it reaches the Kankakee River, which forms the Illinois River. As a whole, the Des Plaines River watershed contains nine subwatersheds. The main channel flows through two of these subwatersheds, the Upper and Lower Des Plaines. There are several tributaries that flow into the main channel throughout both Kenosha and Lake Counties. The Des Plaines has become known for its flooding potential with the greatest flood event recorded in 1986.

TABLE DP-01: STREAM REACHES

	Number of Reaches	Average reach length (mi.)	Total length (mi.)	% of watershed length
Mainstem	19	1.9	37	38%
Tributaries	107	0.57	61	62%
Inaccessible Reaches	8	0.50	4	4%
Total Inventoried Reaches	118	0.84	98	100%

THE STREAM INVENTORY ASSESSMENT

The stream assessment includes the geomorphic characterization of the channel by identifying erosion, evaluating discharge points and hydraulic structures, obstructions, areas of deficient buffer zones, and areas with significant detrimental impact on the stream. Visual observations regarding vegetation, water quality conditions, habitat assessments, and aquatic and terrestrial life are included in the stream inventory and allow for a more comprehensive assessment of the stream conditions. Also, information captured during the inventory process includes notes and comments about the stream that may not be well represented in the other forms, such as

specific restrictions to streams, restoration efforts or conversations with local residents. The stream inventory data is captured through a uniform and standard process to ensure it is accurate and reproducible.

DATA COLLECTION AND METHODOLOGY

The stream network within the watershed was divided into reaches, smaller geographically-defined segments, for which data is aggregated. Data was collected by teams of two observers who walked the tributaries and canoed the mainstem for the entire length of every reach assessed. At representative points within each reach, the observers measured the channel dimensions and relative velocity (at the surface) of the stream, noted streambank and riparian conditions, and documented hydraulic structures and discharge points using a standardized database. For the purpose of determining bank erosion (lateral recession) additional measurements were obtained, including bank height, lateral recession rate, severity, and lateral recession characteristics. The Rapid Assessment Point Method (RAP-M) was used for observing lateral recession rates. The observers used an iPad along with ESRI's Collector Application to take photos and record data. Data collected includes points of erosion, significant sediment deposition and debris jams, hydraulic structures and discharge points, and photos of the stream channel that are representative of the conditions throughout the reach. Then the data is transferred to a geographic information system (GIS) which then manipulates, analyzes, and presents the data geographically. This combined method and technology allows for analysis and mapping of the collected data.

CHANNEL CONDITIONS

TABLE DP-02: CHANNEL DIMENSIONS

Watershed Branch	Range and Average	Bank Height (ft.)	Water Depth (ft.)	Velocity (ft./s)	Top Channel Width (ft.)	Bottom Channel Width (ft.)
Mainstem	Range	1-11	.5-6	0-2	80-370	60-230
	Average	4.64	2.5	0.7	182	111
Tributaries	Range	0-10	0-10	0-3	0-26	0-50
	Average	2.18	0.90	0.30	11.27	6.40

CHANNELIZATION

Stream channelization describes any activity that moves, straightens, shortens, cuts off, diverts, or fills in a stream channel. These activities, which include widening, narrowing, or lining a stream channel, alter the discharge and velocity of water flowing through it (Stevens). Consequently, modifications aimed to address a problem in one area of the watershed or stream channel is shifted to another area upstream, downstream or within the immediate area.

For instance, shortening the reach of a stream moves flooding from the channelized reach to a downstream reach. The degree of channelization is ranked according to the percent of channelization. Reaches with channelization of 1%-33% are ranked "low", 33%-66% are ranked "moderate", and >66% are ranked "high". Reaches ranked as "none" have no indication of channelization. Table DP-03 summarizes the degree of channelization in the Des Plaines River. The mainstem exhibited a low degree of channelization aside from two reaches. Also, about half of the tributary reaches showed a low degree of channelization.

TABLE DP-03: DEGREE OF CHANNELIZATION

Degree of Channelization	Mainstem			Tributaries			Watershed Total		
	Reaches	Miles	% of Miles	Reaches	Miles	% of Miles	Reaches	Miles	% of Miles
None	1	3.7	10%	19	11	29%	20	15	16%
Low	17	31.3	84%	47	26	46%	64	57	62%
Moderate	1	2.1	6%	25	15	26%	25	16	17%
High	0	0	0%	6	5	9%	6	5	5%

POOL/RIFFLE DEVELOPMENT

Under baseflow conditions, pools are low-gradient areas of deeper water with slower velocity and riffles are high-gradient areas of shallow water with higher velocity. In general, pools represent localized deeper areas, whereas riffles represent localized shallow areas. During baseflow conditions, sediment erodes from riffles and is deposited into pools. During bankfull conditions, the relationship of relative velocity in riffles and pools is reversed and sediments along with substrate material are scoured from pools and the channel bed, then are deposited on riffles or bars. During periods of elevated flow when the velocity in pools exceeds that over riffles, deposition and bar formation tend to occur in areas adjacent to pools. Channelization often reduces the extent of pool-riffle sequences in a stream. Most stream channels in the Des Plaines River watershed exhibit some degree of pool-riffle development (see Table DP-04). Specifically, the mainstem had equal percentages for low and moderate pool/riffle development.

TABLE DP-04: POOL/RIFFLE DEVELOPMENT

Degree of pool/riffle development	Mainstem reaches		Upper DP tributaries		Lower DP tributaries	
	#	%	#	%	#	%
None	0	0.00%	7	10%	6	24%
Low	9	47.37%	27	38%	6	24%
Moderate	10	52.63%	22	30%	12	48%
High	0	0.00%	16	22%	1	4%

None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had pool/riffle development. Percent based on total number of reaches for each branch.

STREAMBANK EROSION

Streams are dynamic systems, in a perpetual state of flux, therefore, all banks exhibit some form of erosion. Streambank erosion on the Des Plaines River tends to occur in developed areas, particularly residential neighborhoods and urban areas. Surface runoff to streams contributes to streambank erosion and is dependent upon key factors such as storm events (the duration, timing, and amount of precipitation that falls and subsequently runs off). Other key factors include the type and condition of the soil, land use, and vegetative buffers. In some reaches there is severe streambank erosion due to increased runoff from urban development, channelization, sediment "starvation" caused by dams, local changes in stream gradient, and soil type. The qualitative assessment criterion for each rating is slight, moderate, and severe which can be found in Table DP-05. Table DP-06 summarizes streambank erosion on the Des

Plaines River. Generally, all of the reaches throughout the mainstem and tributaries had a moderate extent of erosion.

TABLE DP-05: BANK EROSION CRITERIA

Category	Description
Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
Moderate	Bank is predominantly bare with some rills and vegetative overhang.
Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross-section becomes more U-shaped as opposed to V-shaped.

TABLE DP-06: STREAMBANK EROSION

Extent of Erosion	Mainstem	Upper Tribs	Lower Tribs	Watershed Total
None-Slight	0	11	0	11
Moderate	15	58	25	98
Severe	4	3	0	7

LATERAL RECESSION

The lateral recession rate is a qualitative way to assess width or thickness of eroding surfaces of a channel. The Rapid Assessment Point Method (RAP-M) for assessing lateral recession was employed to determine the degree of streambank erosion in the Des Plaines River. Lateral Recession Rate (LRR) evaluates streambanks along the right and left bank (facing upstream) for each assessed reach. Within each reach, a segment of the channel with specific LRR characteristics is identified. Measurements include bank height/width and the lateral recession rate in feet per year, while several criteria including undercutting, bare bank, overhanging vegetation, fallen trees, exposed roots, and slips or slides are noted. This is repeated up the left and right side of each bank, connecting each segment to the end of the reach. For the Des Plaines River, lateral recession rates ranged from slight to severe throughout the entire watershed.

SEDIMENT ACCUMULATION

Typically, a stream generates, suspends, and transports sediment through high-gradient reaches and deposits sediment in low gradient reaches and/or in areas where velocity decreases. These low-velocity areas may be naturally occurring areas such as pools or sloughs. They may also occur behind debris jams, beaver dams, or

upstream of channel constrictions (such as culverts). Decreasing discharge in the downstream direction thus promotes a stepwise movement of deposition and storage of sediment within a stream network. The effect results in sediment movement that does not always reach the watershed outlet, but is instead remobilized during the next flow and redistributed within the watershed's channel network. The amount of sediment transported downstream during storm events will increase sedimentation rates in downstream channels. This increased sediment load can have negative effects on channel stability, fish, invertebrates, and overall stream productivity. When small or headwater streams are replaced with paved floodways during land development, sediment production may decrease, causing an increase in downstream erosion as sediment starved waters move through the watershed. The majority of reaches in the Des Plaines River watershed exhibit a moderate degree of sediment accumulation (see Table DP-07).

TABLE DP-07: SEDIMENT ACCUMULATION

Degree of sediment accumulation	Mainstem reaches		Upper Trib reaches		Lower Trib reaches	
	#	%	#	%	#	%
None	0	0	9	13%	0	0%
Low	3	16%	26	37%	8	31%
Moderate	16	84%	32	46%	18	69%
High	0	0	3	4%	0	0%

*None = 0%; Low = 1-33%; Moderate = 34-66%; and High = 67-100% of the reach had sediment accumulations.
*Percent based on total number of reaches for each branch.

STREAM DEBRIS LOAD

Like sediment, all streams transport some amount of debris. Large organic debris such as tree limbs and branches can provide habitat, divert currents to create pools, bars, and slow-water habitat for aquatic organisms, and provide allochthonous energy inputs to the ecosystem that are not produced within the stream. Allochthonous inputs are those that enter the stream from some outside source, such as organic matter like leaves from terrestrial plants and trees that are washed into the stream. However, too much debris can be problematic and may result in debris jams. These debris jams may cause backwater flooding and sediment deposition and can divert current into one or both banks, leading to streambank erosion.
Table DP-08 summarizes the debris loading in the Des Plaines watershed. A reach that has failed the debris loading test has a level of debris higher than 33%. Many reaches failed the debris loading test with 50% of the upper tributaries failing both the instream and overbank tests.

TABLE DP-08: DEBRIS LOADING

Failed Test*	Mainstem reaches		Upper Trib reaches		Lower Tribs reaches	
	#	%	#	%	#	%
Instream	7	37%	16	20%	2	8%
Overbank	9	47%	24	30%	3	12%
Both	7	37%	40	50%	5	20%

*Reaches that failed the test for debris accumulation.

HYDRAULIC STRUCTURES

Hydraulic structures are any bridges, culverts, dams, weirs, levees, and fences in or across the stream channel. These structures modify the pattern or amount of flow and may act as constriction points causing backwater flooding. Culverts may act as temporary or permanent barriers if a plunge pool develops, causing the bottom of the culvert to become elevated above the water level of the pool. Additionally, dams and weirs can impede the movements of fish and other aquatic organisms within the stream network. On average, the Des Plaines River watershed contained approximately 3 hydraulic structures per mile. Overall, the lower tributaries contained the most structures per mile. The upper tributaries had the most structures in total at 200 structures. About 9 percent of hydraulic structures in the watershed were described as problematic and needing maintenance while all others were in good, fair, or new condition. The mainstem reaches were the only ones to contain dams.

TABLE DP-09: Hydraulic Structures

Hydraulic structures	Mainstem (37 mi)		Upper Tribs (49.38 mi)		Lower Trib (10.97 mi)		Total	
Bridges	37		63		29		129	
Culverts	5		141		49		195	
Dams	5		0		0		5	
Weirs	0		1		0		1	
Other	1		3		1		5	
Total	48		208		79		335	
Hydraulic structures per stream mile	1.30		4.05		7.2		3.36	
Problem hydraulic structures and percentages*	2	4.17%	25	12%	4	5%	30	9%

* Percent based on total number of hydraulic structures for each branch.

DISCHARGE POINTS

Discharge points include sanitary, storm sewer, agricultural drain tile, and sump pump pipes. They also include open channels, swales, gullies, and other significant tributaries. In the Des Plaines River watershed there were 606 discharge points, of which 432 were pipes, storm sewers, culverts or drain tiles (see Table DP-10). Discharge points are most common in urban and residential areas where sump pump and stormsewer outfalls are numerous. Problem discharge points in the watershed contribute to streambank erosion and/or transport excess sediment to the stream channel. Another problem noted during the stream inventory is the state of disrepair of some drain tiles, particularly those constructed of clay and concrete. As the streambank erodes, longer sections of the tile become exposed and eventually collapse under their own weight. This effectively shortens the pipe, causing the point at which runoff discharges from the pipe to retreat from the channel, further eroding the streambank.

TABLE DP-10: DISCHARGE POINTS

Discharge Points	Mainstem	Upper Tribs	Lower Tribs	Watershed Total
Swales, gullies, and tributaries	74	85	15	174
Pipes, storm sewers, culverts and drain tiles	105	265	63	432
Total Discharge Points	179	350	78	606
Discharge Points (per stream mile)	4.84	3.70	3.29	4.09

VEGETATION & LAND USE

TABLE DP-11: DOMINANT LAND USE

	Mainstem		Upper Tribs		Lower Tribs		Percentage of Watershed
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	
Agriculture	0%	1%	11%	9%	0%	0%	7.0%
Open Space	80%	90%	56%	63%	70%	70%	70.4%
Recreational	0%	2%	2%	2%	0%	0%	1.4%
Commercial/Industrial	10%	2%	7%	4%	0%	0%	5.1%
Residential	10%	5%	17%	15%	30%	30%	14.3%
Other	0%	0%	6%	7%	0%	0%	3.3%

FLOODPLAIN VEGETATION

Floodplain vegetation serves as an important function in protecting the physical, biological, and chemical integrity of water. Vegetation acts as a natural barrier by dissipating the energy of flowing water and provides protection from flooding and erosion. Vegetation filters sediments originating from land while slowing overland flows and surface run-off into water bodies, and filters incoming floodwaters from materials scoured from the channel bank and bed. This filtering process can add nutrients to the floodplain soil. Slowed runoff across the floodplain allows additional time for infiltration and groundwater recharge. The slowing of runoff provides the additional benefit of natural purification of water as local runoff or overbank floodwater infiltrates through the floodplain alluvium. Vegetation provides habitat and nutrients for a wide variety of terrestrial and aquatic organisms in, adjacent to, and for downstream ecosystems.

The Floodplain Vegetation (Land Cover) is vegetation within 100 feet of the stream bank and summarized in Table DP-12. Land cover refers to the percent of the area occupied by the given land cover. Each tributary was assessed for land cover and percentages are represented in Table DP-12. Along the mainstem, trees, herbaceous plants, and shrubs were the predominant land cover. Wetlands, lawn, and areas of little or no vegetation due to human activity also cover the area around the Des Plaines mainstem, but are not as common. Throughout the entire watershed, trees were the main type of land cover found on both right and left banks.

TABLE DP-12: LAND COVER

Land Cover	Mainstem		Upper Tribs		Lower Tribs	
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank
Tree	52%	51%	49%	24%	40%	40%
Lawn	7%	7%	5%	5%	1%	1%
Wetland	1%	1%	15%	15%	0%	0%
Crop	0%	0%	2%	3%	0%	0%
Shrub	15%	16%	17%	18%	26%	27%
Herbaceous	23%	24%	23%	23%	30%	30%
Impervious	2%	0%	0%	1%	2%	1%
Water	1%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%

VEGETATED BUFFER (RIPARIAN ZONE)

The riparian zone is the area extending 100 feet from the stream channel on both the left and right side of the stream channel. Riparian vegetation also provides beneficial shading to streams and lakes which helps to avoid temperature stress on fish and aquatic organisms. The quality of the riparian zone, the width, and land use characteristics were visually assessed during the Des Plaines River Inventory. Table DP-13 summarizes the assessment criterion for the width of the riparian zone and is a visual representation of the quality of the riparian zone observed in 2016.

TABLE DP-13: RIPARIAN ZONE ASSESSMENT CRITERIA

Riparian Zone	None	Low	Moderate	High
Buffer Width	**<20 feet**	**20-40 feet**	**40-60 feet**	**>60 feet**
Description	Zone contains little or no riparian vegetation due to human activities	Zone is impacted a great deal by human activities	Zone is impacted minimally by human activities	Zone is not impacted by human activities (i.e., no parking lots, roadbeds, lawns, crops)

Throughout the Des Plaines River watershed, the width of the riparian zone is impacted by anthropogenic changes in land use resulting in two types of riparian buffers. In wide riparian buffer zones (“High” buffer width) the stream flows through open space areas with minimal to no impact and in narrow buffer zones (“Low” buffer width) the stream flows through developed areas. Generally, the stream network has wider riparian buffers and flows through more open space areas, with the exception of neighborhoods. There are only a few reaches in the watershed in which there is no riparian buffer. Table DP-14 summarizes the Riparian Zones assessed along the Des Plaines River.

TABLE DP-14: RIPARIAN ZONE

	Mainstem Bank		Upper Trib Bank		Lower Trib Bank	
Buffer Width	Left	Right	Left	Right	Left	Right
None	1	0	1	1	0	0
Low	2	1	14	15	0	0
Moderate	3	1	23	20	7	8
High	13	17	35	37	19	18

BANK VEGETATION

Bank Vegetation (Predominant Vegetation) is vegetation existing within 10 feet of the stream bank. The most significant role of bank vegetation is its ability to control erosion, which in turn prevents sediment and other forms of pollution from entering the stream. Sedimentation is a very significant problem and though erosion is a natural process, it is often sped up through human activities, directly or indirectly. The increased rate of erosion and sedimentation affects the geomorphology of the stream channel, water quality, and aquatic life in the stream channel and throughout the watershed. Streams surrounded by vegetated riparian zones, have intricate root systems that help to stabilize the bank and prevent erosion. Woody stemmed plants, sedges, and grasses help physically trap sediment by slowing water runoff from the surrounding areas, allowing the sediment to settle out instead of entering the stream. Additionally, vegetated banks tend to lead to deep and narrow channels as a result of their stability and lack of heavy sedimentation. In the Des Plaines River watershed, the streambank vegetation is predominantly trees, shrubs, and herbaceous. The mainstem has the greatest portion of trees (~50%), The upper tributaries have a higher percentage of wetlands (15%) than the other reaches. The lower tributaries are composed almost entirely of trees, shrubs, and herbaceous bank vegetation (See Table DP-15).

TABLE DP-15: PREDOMINANT BANK VEGETATION

Bank Vegetation	Mainstem		Upper Tribs		Lower Tribs	
	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank
Unmowed Grass	0%	0%	12%	11%	0%	1%
Lawn	7%	7%	3%	3%	1%	1%
Wetland	1%	1%	14%	14%	0%	0%
Trees	52%	51%	23%	23%	40%	40%
Shrubs	15%	16%	17%	17%	27%	26%
Crops	0%	0%	0%	1%	0%	0%
Herbaceous	23%	24%	19%	19%	30%	30%
Other/None	3%	0%	0%	0%	0%	0%

INSTREAM COVER FOR FISH

A diverse habitat with regard to instream cover is essential for diverse fish assemblages and other aquatic organisms. Instream fish cover availability was evaluated based on the presence of a number of structural elements and habitats, consisting of undercut banks, pools over 28 inches deep, aquatic macrophytes, logs, overhanging vegetation, rootwads, boulders, and backwaters. The presence of woody debris (logs and rootwads) in streams is a significant component of fish habitat which they utilize for spawning, rearing, and foraging. Woody debris creates areas of low flow, providing a refuge for fish during periods of high flow. Woody debris also provides cover for fish, lowering the risk of predation. Overhanging vegetation and canopy cover provide two important benefits: providing shade to the stream helps keep the temperature in the stream cool, and leaf litter and organic material provide nutrients to macroinvertebrates and other aquatic organisms. These aquatic organisms in turn, become an important source of food for fish and other animals in the ecosystem.

For the Des Plaines River watershed, overhanging vegetation and logs are the most abundant cover type, appearing in most of the assessed reaches, whereas macrophytes and rootwads

are least abundant. Boulders and undercutting appear more frequently in the mainstem. Logs and other large woody debris (LWD) in stream systems and habitat restoration efforts is a matter of consideration. The presence of logs and other LWD divert flow, provide habitat and play an important role in pool, riffle, and bar development. The attenuation of flood flows, drainage of riparian wetlands, land use changes, management of beaver populations, and invasive species are all factors that can contribute to the reestablishment of the riparian forest. Backwater areas have decreased over time and presently occur in wetlands and low-lying areas behind dams and debris jams.

TABLE DP-16: INSTREAM COVER FOR FISH

Cover type	Mainstem reaches		Upper Trib reaches		Lower Trib reaches	
	#	%	#	%	#	%
Undercut banks	17	90%	28	39%	6	24%
Pools	9	47%	28	38%	5	20%
Macrophytes	1	5%	20	27%	1	4%
Logs	10	53%	46	65%	9	36%
Overhanging vegetation	17	90%	58	82%	20	80%
Rootwads	7	37%	5	7%	0	0%
Boulders	14	74%	19	25%	2	8%
Backwaters	8	42%	17	24%	3	12%

AQUATIC INSTREAM VEGETATION

Aquatic instream vegetation is an important part of the watershed ecosystem. Plants in the stream are important in food webs. Each organism has characteristic feeding preferences and patterns, and can itself be prey to other consumers. Plants provide habitat and shelter for fish, waterfowl, and other wildlife. Since all plants, including those that grow underwater, produce oxygen as they photosynthesize, they are the major source of oxygen for aquatic animal life. Rooted plants stabilize shorelines and stream beds. They also absorb nutrients and filter pollutants from runoff, which improves water quality.

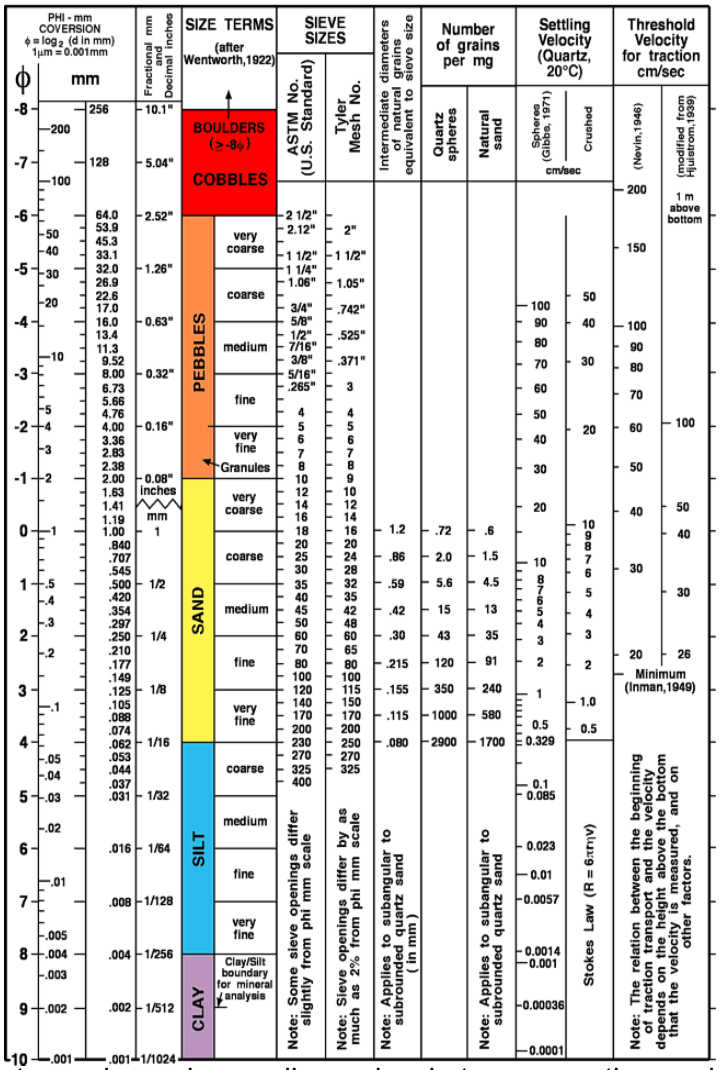
Certain non-native plant species such as milfoil can be extremely aggressive, taking over large areas of aquatic habitat. Invasive plant species can completely destroy stands of native vegetation. An overabundance of aquatic plants and algae can reduce oxygen levels in the water, which can contribute to fish kills. Decomposing of dead fish and algae also contributes to oxygen depletion. Too much vegetation can impede water flow in stream channels, drainage ditches, and culverts or back up water completely. These areas can trap sediment and debris, and over time lead to a gradual filling in of lakes and channels.

The Aquatic Instream Vegetation assessed along the Des Plaines River show a majority of reaches with a significant portion of surface area without vegetation. The Des Plaines reaches have each type of aquatic vegetation within the watershed, with rooted submergent being the most abundant at 17%. This distribution is not preferred and indicates a low variety of aquatic plant life with one dominant type. The mainstem predominantly had rooted submergent vegetation, such as Eurasian Water Milfoil (See Table DP-17).

TABLE DP-17: AQUATIC INSTREAM VEGETATION

Instream Aquatic Vegetation	Mainstem	Upper Tribs	Lower Tribs	Percentage of Watershed
Rooted Emergent	2%	7%	10%	5%
Rooted Submergent	31%	9%	7%	17%
Rooted Floating	0%	1%	0%	1%
Free Floating	13%	2%	0%	6%
Floating Algae	3%	6%	3%	5%
Attached Algae	0%	8%	6%	5%
No Vegetation	52%	64%	70%	60%

SUBSTRATE COMPOSITION AND WATER QUALITY



The Des Plaines River streambeds are composed of a variety of sediment grains that range in diameter from extremely fine clays (<1/1000th of an inch) to relatively coarse cobbles and boulders (>1 foot). Generally, fine sediments are transported in suspension until velocity slows enough that they are deposited on the streambed. Larger sediments are not transported as readily and may only move during increased flows. Clays are typically regarded as cohesive sediments that naturally adhere to one another (and are therefore more difficult to erode) while silts are more easily eroded. Sands and larger sediments (e.g., gravels and cobbles) are less cohesive. Clay and silt-dominated banks and beds, therefore, tend to be associated with narrow, incised channels while sand, gravel, and cobble-dominated channels are more often shallow and wide. These relationships, however, are also contingent upon a number of other contributing factors such as gradient, bank slope, and bank vegetation.

Substrate is also an important measure of habitat quality. Extremely fine sediments, such as clays, adhere closely to one another and may bury the streambed. Coarse-grained sediments like gravels present abundant interstices, allowing water, oxygen, and other dissolved and suspended materials to infiltrate the hyporheic

zone. The hyporheic zone refers to the area surrounding the stream channel that is saturated and through which there is some percolation or flow. Essentially, the hyporheic zone is the area where the surface water and groundwater interface and mix. These interstitial pores also provide habitat to benthic (bottom-dwelling) macroinvertebrates, which play important roles in both aquatic food webs and ecosystem functioning. Excessive deposition of clays, silts, and fine particulate organic matter reduces the potential for infiltration and accessibility to the hyporheic zone. Excessive deposition also negatively affects filter feeders such as mussels, and may cause oxygen depletion in the streambed as organic materials decompose.

In the Des Plaines River, most reaches contain a mixture of sediment types. Table DP-18 summarizes the relationship of these substrate types in the river. Across the entire watershed and among each geographic section, silt (24%), sand (23%), and organic matter (18%) are the predominant substrate types recorded. Sand and gravel was most common in the mainstem and less common in the tributaries. The tributaries contained higher percentages of silt and organic matter.

TABLE DP-18: SUBSTRATE COMPOSITION

Substrate Composition	Mainstem	Upper Tribs	Lower Tribs	Percentage of Watershed
Claypan	10%	9%	6%	9%
Silt	15%	28%	35%	24%
Sand	30%	17%	28%	23%
Gravel	25%	10%	10%	16%
Cobble	15%	5%	1%	8%
Boulder	3%	2%	0%	2%
Concrete	0%	1%	0%	1%
Organic Matter	3%	28%	20%	18%

WATER QUALITY

Turbidity

Visual inspections of several water quality indicators were made during the stream inventory. Turbidity, water color, and the presence of grease and oil in the sediment or water column were assessed. Turbidity is the measure of relative clarity of water. Material that causes water to be turbid includes clay, silt, fine inorganic and organic matter, algae, organic compounds, and plankton and other microscopic organisms. During periods of low flow, water in streams is clear, and the turbidity is low. During high flow events, sediment and material from the surrounding surfaces are washed into the stream. As the velocity and volume of water increases, sediments and other materials are stirred up causing the water to become muddy, brown, and turbid.

Turbidity is not a significant problem in the Des Plaines River under baseflow conditions. In the tributaries for both the upper and lower Des Plaines a majority had low or no turbidity. The mainstem always had some degree of turbidity with almost all falling in the low to moderate classification. See Table DP-19.

TABLE DP-19: WATER QUALITY

Water Quality	Mainstem		Upper Tribs		Lower Tribs		Percentage of Watershed	
	Reaches	% of Total Reaches	Reaches	% of Total Reaches	Reaches	% of total reaches	Reaches	% of Total Reaches
Turbidity								
None	0	0%	36	51%	8	32%	44	39%
Low	8	42%	26	37%	6	24%	39	35%
Moderate	8	42%	8	12%	7	28%	23	20%
High	3	16%	0	0%	4	16%	7	6%
Grease & Oil								
In Water								
None	16	84%	57	80%	22	88%	94	82%
Low	3	16%	8	11%	2	8%	13	11%
Moderate	0	0%	6	9%	1	4%	7	6%
High	0	0%	0	0%	0	0%	0	0%
In Sediment								
None	18	95%	57	80%	22	88%	96	84%
Low	1	5%	10	14%	3	12%	14	12%
Moderate	0	0%	4	6%	0	0%	4	4%
High	0	0%	0	0%	0	0%	0	0%

Grease & Oil

Grease and oil is present in only a small percentage of the channel. There were 20 reaches that had some degree of grease and oil in the water and 18 in the sediment. Where grease and oil is present, it was commonly detected in both the sediment and the water column. The origination of the grease and oil does not relate to any one particular site or land use and therefore is likely due to non-point source run-off. An additional note: iron bacteria are present in many soils in Illinois and can cause yellow, orange, red, or brown stains and colored water. It can also cause a rainbow colored, oil-like sheen on the water or in soil and sediments. Simple water testing is available to determine if the oil-like substance present is iron bacteria.

Grease and oils enter the stream during rain storms as oil and grease from surrounding parking lots, roads, and bridges flush into the storm sewer system, often overflowing directly into the stream. Other potential sources of oil and grease results from illegal dumping that originate from automotive and transportation related services. Grease and oil in the water column and sediment will degrade the water quality of receiving streams by adding biological and chemical

oxygen demand to the stream. Table DP-19 summarizes the turbidity, grease and oil in the Des Plaines River.

Algae

Algae are an indicator of high nutrient loads. Generally, algae were not a significant problem in the Des Plaines River; however, some areas contained extremely high populations. Excessive algae growth can negatively impact aquatic organisms and habitat. Algae are photosynthetic and therefore take up carbon dioxide during the day and release oxygen into the water column and the air. At night, algae respire, taking oxygen out of the water column and releasing carbon dioxide. Therefore, larger populations of algae have greater potential to cause large daily oxygen fluctuations. In addition, abundant algae populations are often aesthetically undesirable and typically detract from the visual quality of water resources.

AQUATIC AND TERRESTRIAL ORGANISMS

Stream aquatic integrity in urban settings is directly affected by physical changes in the watershed, some of which result in the degradation of the chemical and/or physical condition of the stream. Habitat information is extremely important for discriminating between physical and chemical effects. The inventory addressed aquatic and riparian life where possible or identifiable. Organisms were not specifically sampled during the stream inventory, but some animals were observed during the inventory. Species of fish present included carp, bluegill and fathead minnows. Freshwater mussels and clams can be found in the Des Plaines River. Snails, native crayfish (non- native rusty crayfish) and dragon and damsel fly nymphs were visible in the Des Plaines. Mallard ducks, Canadian geese, great blue herons, egrets, red-tailed hawk, great horned owl, green frogs, bull frogs, beavers, muskrats, and deer were also encountered during the inventory.

Des Plaines River Main Stem Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
DP001	LOW	LOW	HIGH	LOW	MOD	7,475	1.42	0.0	0.0	185.0	225.0	110.0	135.0	205.0	1.0
DP002	LOW	LOW	HIGH	LOW	MOD	5,347	1.01	0.0	0.0	220.0	220.0	160.0	160.0	220.0	1.0
DP003	LOW	LOW	HIGH	LOW	MOD	7,285	1.38	3.0	6.0	11.0	160.0	4.0	115.0	93.7	1.1
DP004	LOW	LOW	MOD	LOW	SEV	12,037	2.28	1.0	8.0	7.0	150.0	2.0	110.0	73.8	1.7
DP005	LOW	LOW	MOD	LOW	MOD	4,843	0.92	3.0	7.0	34.0	180.0	25.0	100.0	107.0	2.0
DP006	LOW	LOW	MOD	LOW	MOD	9,681	1.83	1.0	7.0	22.0	210.0	12.0	120.0	116.0	1.5
DP007	LOW	LOW	MOD	LOW	MOD	9,428	1.79	4.0	9.0	135.0	230.0	80.0	125.0	175.0	2.7
DP008	LOW	LOW	MOD	LOW	MOD	6,659	1.26	0.0	0.0	110.0	110.0	80.0	80.0	110.0	6.0
DP009	LOW	LOW	MOD	LOW	MOD	10,358	1.96	2.0	4.0	18.0	20.0	10.0	12.0	19.0	1.0
DP010	LOW	LOW	MOD	LOW	MOD	6,696	1.27	1.0	10.0	6.0	170.0	4.0	130.0	88.0	0.8
DP011	MOD	MOD	HIGH	MOD	MOD	10,813	2.05	2.0	6.0	13.0	150.0	3.0	90.0	62.7	0.9
DP012	LOW	MOD	HIGH	LOW	MOD	3,486	0.66	6.0	11.0	170.0	260.0	125.0	190.0	215.0	2.0
DP013	LOW	MOD	HIGH	LOW	MOD	14,587	2.76	2.0	8.0	105.0	215.0	70.0	75.0	160.0	4.5
DP014	MOD	MOD	MOD	LOW	MOD	9,336	1.77	4.0	7.0	100.0	100.0	80.0	80.0	100.0	3.0
DP015	MOD	MOD	MOD	LOW	MOD	5,433	1.03	2.0	6.0	80.0	230.0	65.0	145.0	155.0	2.0
DP016	MOD	MOD	MOD	LOW	SEV	7,372	1.40	1.0	5.0	125.0	250.0	65.0	100.0	187.5	1.9
DP017	MOD	MOD	MOD	LOW	SEV	27,096	5.13	2.0	6.0	125.0	215.0	108.0	190.0	170.0	3.5
DP018	MOD	MOD	MOD	NONE	MOD	19,584	3.71	1.5	2.0	12.0	280.0	5.0	60.0	146.0	0.5
DP019	MOD	MOD	MOD	LOW	MOD	18,066	3.42	0.5	3.0	6.0	370.0	1.0	230.0	114.0	2.2

- : Not Collected

Upper Des Plaines River Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
BR001	LOW	LOW	HIGH	MOD	MOD	2,432	0.46	2.0	10.0	13.0	25.0	12.0	15.0	20.3	0.8
BR002	MOD	MOD	MOD	LOW	MOD	3,897	0.74	4.0	5.0	12.0	23.0	7.0	16.0	17.5	4.0
BR003	-	-	-	MOD	-	5,011	0.95	2.0	5.0	5.0	12.0	5.0	9.0	8.0	2.2
BR004	LOW	LOW	MOD	MOD	MOD	4,532	0.86	0.5	4.0	6.5	8.0	4.5	6.0	7.5	0.7
DL001	LOW	MOD	LOW	HIGH	MOD	5,181	0.98	2.0	3.0	8.0	15.0	4.0	9.0	10.3	1.7
GL001	MOD	MOD	HIGH	MOD	MOD	2,230	0.42	2.0	5.0	10.0	16.0	4.0	9.0	12.0	1.0
GL002	NONE	LOW	MOD	MOD	SEV	2,279	0.43	3.0	10.0	15.0	20.0	6.0	15.0	17.5	6.3
GL003	MOD	MOD	HIGH	MOD	MOD	2,712	0.51	2.0	5.0	12.0	14.0	7.0	8.0	13.0	1.0
GL004	LOW	MOD	LOW	MOD	MOD	2,619	0.50	1.0	5.0	8.0	16.0	2.0	8.0	12.3	0.8
GT001	MOD	MOD	HIGH	HIGH	MOD	3,575	0.68	1.0	6.0	17.0	31.0	10.0	26.0	24.0	1.5
GT002	MOD	MOD	HIGH	MOD	MOD	3,583	0.68	1.0	3.0	10.0	13.0	7.0	10.0	11.3	0.7
GT003	LOW	LOW	HIGH	HIGH	MOD	2,107	0.40	1.0	6.0	10.0	20.0	4.0	10.0	14.0	0.6
ID001	MOD	MOD	MOD	MOD	MOD	5,708	1.08	1.0	3.0	7.0	10.0	5.0	6.0	9.0	1.3
MH001	LOW	LOW	MOD	LOW	MOD	2,471	0.47	1.0	5.0	3.0	25.0	3.0	10.0	11.7	0.7
MH002	LOW	LOW	MOD	LOW	MOD	4,832	0.92	1.0	3.0	6.0	15.0	2.0	7.0	8.8	0.1
MH003	LOW	MOD	MOD	NONE	MOD	4,148	0.79	2.0	6.0	13.0	21.0	5.0	8.0	17.0	0.4
MH004	MOD	MOD	MOD	MOD	MOD	3,115	0.59	0.5	2.0	4.5	18.0	3.0	8.0	11.5	0.8
SC001	NONE	NONE	-	LOW	MOD	2,821	0.53	1.0	4.0	13.0	18.0	10.0	15.0	15.0	1.8
SC002	LOW	LOW	MOD	HIGH	NONE	9,163	1.74	0.5	1.0	15.0	20.0	15.0	20.0	17.3	3.7
SC003	LOW	LOW	-	MOD	MOD	3,854	0.73	2.0	2.0	4.0	4.0	3.0	3.0	4.0	4.0
SC004	NONE	NONE	MOD	LOW	MOD	3,415	0.65	1.0	4.0	12.0	13.0	10.0	10.0	12.5	1.5
SC005	LOW	NONE	LOW	MOD	NONE	1,195	0.23	0.5	0.5	10.0	16.0	10.0	15.0	13.0	2.3
SC006	LOW	LOW	MOD	LOW	MOD	3,632	0.69	1.0	2.0	7.0	13.0	6.0	12.0	10.0	1.5
SC007	MOD	MOD	LOW	LOW	MOD	4,494	0.85	1.0	1.0	10.0	15.0	6.0	13.0	12.5	2.0
SC008	MOD	MOD	LOW	NONE	MOD	3,104	0.59	2.0	6.0	12.0	20.0	4.0	6.0	15.0	0.7
SF001	LOW	LOW	LOW	LOW	MOD	1,696	0.32	0.3	5.0	7.0	13.0	4.0	10.0	6.7	1.0
SR001	LOW	LOW	HIGH	MOD	MOD	3,377	0.64	1.0	4.0	9.0	15.0	3.0	8.0	12.7	0.5
SR002	LOW	LOW	MOD	MOD	MOD	3,519	0.67	2.0	3.0	9.0	16.0	5.0	10.0	11.7	1.0
SR003	LOW	LOW	MOD	MOD	MOD	4,046	0.77	0.5	2.0	3.0	12.0	3.0	10.0	7.7	0.8
ST001	MOD	MOD	MOD	LOW	MOD	2,792	0.53	2.0	4.0	15.0	21.0	10.0	15.0	17.7	2.2
ST002	LOW	HIGH	MOD	LOW	SEV	4,967	0.94	0.5	8.0	8.0	17.0	5.0	15.0	13.3	2.0
ST003	LOW	MOD	MOD	LOW	MOD	1,991	0.38	1.0	5.0	30.0	30.0	10.0	17.0	30.0	2.5
ST004	LOW	LOW	HIGH	LOW	MOD	3,536	0.67	1.0	4.0	6.0	28.0	6.0	20.0	13.7	3.8
ST005	LOW	MOD	LOW	MOD	MOD	3,406	0.65	1.0	15.0	16.0	21.0	5.0	15.0	18.3	2.0
ST006	LOW	LOW	LOW	HIGH	MOD	2,364	0.45	2.0	5.0	15.0	19.0	10.0	13.0	17.0	1.0
TN001	LOW	LOW	MOD	MOD	MOD	3,209	0.61	2.0	5.0	9.0	15.0	3.0	8.0	12.7	1.2
TN002	LOW	LOW	-	NONE	MOD	4,354	0.82	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TN003	NONE	NONE	HIGH	LOW	NONE	1,778	0.34	0.5	1.0	4.5	11.0	1.0	3.0	6.8	0.0
TN004	LOW	LOW	MOD	NONE	MOD	5,266	1.00	1.0	4.0	9.0	14.0	3.0	6.0	12.0	0.0
TR021	LOW	LOW	HIGH	MOD	MOD	3,149	0.60	2.0	4.0	7.0	14.0	3.0	4.0	11.3	0.3
TR022	LOW	LOW	MOD	MOD	MOD	2,207	0.42	1.0	2.0	6.0	10.0	1.0	2.0	7.7	0.1
TR023	LOW	LOW	MOD	LOW	MOD	3,116	0.59	1.0	6.0	13.0	16.0	3.0	10.0	14.7	1.4
TR024	LOW	LOW	MOD	MOD	MOD	2,272	0.43	1.0	3.0	8.0	13.0	4.0	5.0	11.0	0.8
TR025	LOW	LOW	LOW	MOD	MOD	2,841	0.54	1.0	1.0	15.0	15.0	15.0	15.0	15.0	1.0
TR026	NONE	LOW	MOD	LOW	MOD	2,714	0.51	0.3	2.0	2.5	4.0	1.5	3.0	3.5	0.3
TR028	LOW	LOW	MOD	NONE	MOD	3,750	0.71	0.5	4.0	3.0	9.0	2.0	5.0	6.0	0.3
TR029	LOW	LOW	MOD	HIGH	MOD	3,319	0.63	1.0	5.0	9.0	14.0	5.0	6.0	11.7	0.4
TR030	LOW	LOW	LOW	LOW	NONE	1,243	0.24	0.3	0.3	3.0	6.0	3.0	4.0	4.7	0.8

Upper Des Plaines River Stream Inventory Data

Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
TR031	MOD	MOD	MOD	LOW	MOD	4,820	0.91	1.0	3.0	4.0	8.0	4.0	6.0	6.3	1.2
TR032	LOW	LOW	MOD	LOW	MOD	4,123	0.78	1.0	2.0	9.0	12.0	3.0	5.0	10.5	0.0
TR033	LOW	LOW	MOD	LOW	MOD	5,771	1.09	0.0	4.0	3.0	20.0	1.0	15.0	9.5	0.3
TR034	MOD	MOD	MOD	LOW	MOD	3,390	0.64	1.0	2.0	13.0	20.0	10.0	15.0	16.0	2.2
TR035	LOW	MOD	MOD	LOW	MOD	2,570	0.49	1.0	2.0	11.0	14.0	8.0	10.0	12.5	1.5
TR036	MOD	MOD	-	LOW	MOD	4,338	0.82	1.0	2.0	6.0	10.0	3.0	8.0	8.0	0.8
TR037	MOD	MOD	LOW	LOW	MOD	3,362	0.64	0.5	2.0	6.0	15.0	3.0	10.0	10.5	1.6
TR041	NONE	NONE	-	NONE	NONE	5,071	0.96	1.0	1.0	3.0	9.0	3.0	7.0	6.0	0.2
TR042	NONE	NONE	-	NONE	NONE	1,340	0.25	1.0	1.0	6.0	6.0	4.0	4.0	6.0	0.5
TR044	NONE	NONE	HIGH	NONE	NONE	4,769	0.90	0.5	1.0	3.0	3.0	0.0	1.0	3.0	0.2
TR047	NONE	LOW	MOD	NONE	MOD	5,166	0.98	2.0	3.0	9.0	11.0	3.0	7.0	9.7	0.1
TR048	MOD	MOD	LOW	LOW	NONE	1,521	0.29	0.5	3.0	20.0	50.0	15.0	20.0	33.3	2.3
TR049	MOD	LOW	MOD	LOW	MOD	4,156	0.79	1.0	3.0	8.0	26.0	4.0	8.0	15.3	1.0
TR050	LOW	LOW	MOD	LOW	MOD	3,464	0.66	1.0	3.0	6.0	12.0	4.0	8.0	8.7	0.7
TR051	LOW	MOD	HIGH	NONE	MOD	1,586	0.30	1.0	3.0	4.0	7.0	3.0	4.0	5.7	0.0
TR053	LOW	LOW	MV	LOW	NONE	4,241	0.80	1.0	2.0	9.0	11.0	6.0	7.0	10.0	1.5
TR054	NONE	NONE	MV	NONE	MOD	1,550	0.29	1.0	3.0	7.0	12.0	3.0	8.0	8.7	0.4
TR055	NONE	LOW	MOD	LOW	NONE	2,816	0.53	0.0	2.0	2.0	8.5	1.5	3.0	5.2	0.2
TR056	NONE	LOW	HIGH	NONE	MOD	4,284	0.81	0.5	3.0	3.0	14.0	2.0	10.0	10.0	0.6
TR057	LOW	LOW	MOD	LOW	MOD	2,238	0.42	2.0	4.0	7.0	10.0	1.0	1.0	8.5	0.2
TR061	LOW	LOW	MOD	HIGH	SEV	1,965	0.37	0.5	4.0	6.0	10.0	1.0	6.0	8.0	0.6
WS001	LOW	LOW	MOD	MOD	MOD	2,424	0.46	0.3	1.5	2.0	8.0	2.0	6.0	5.0	1.0

- : Not Collected

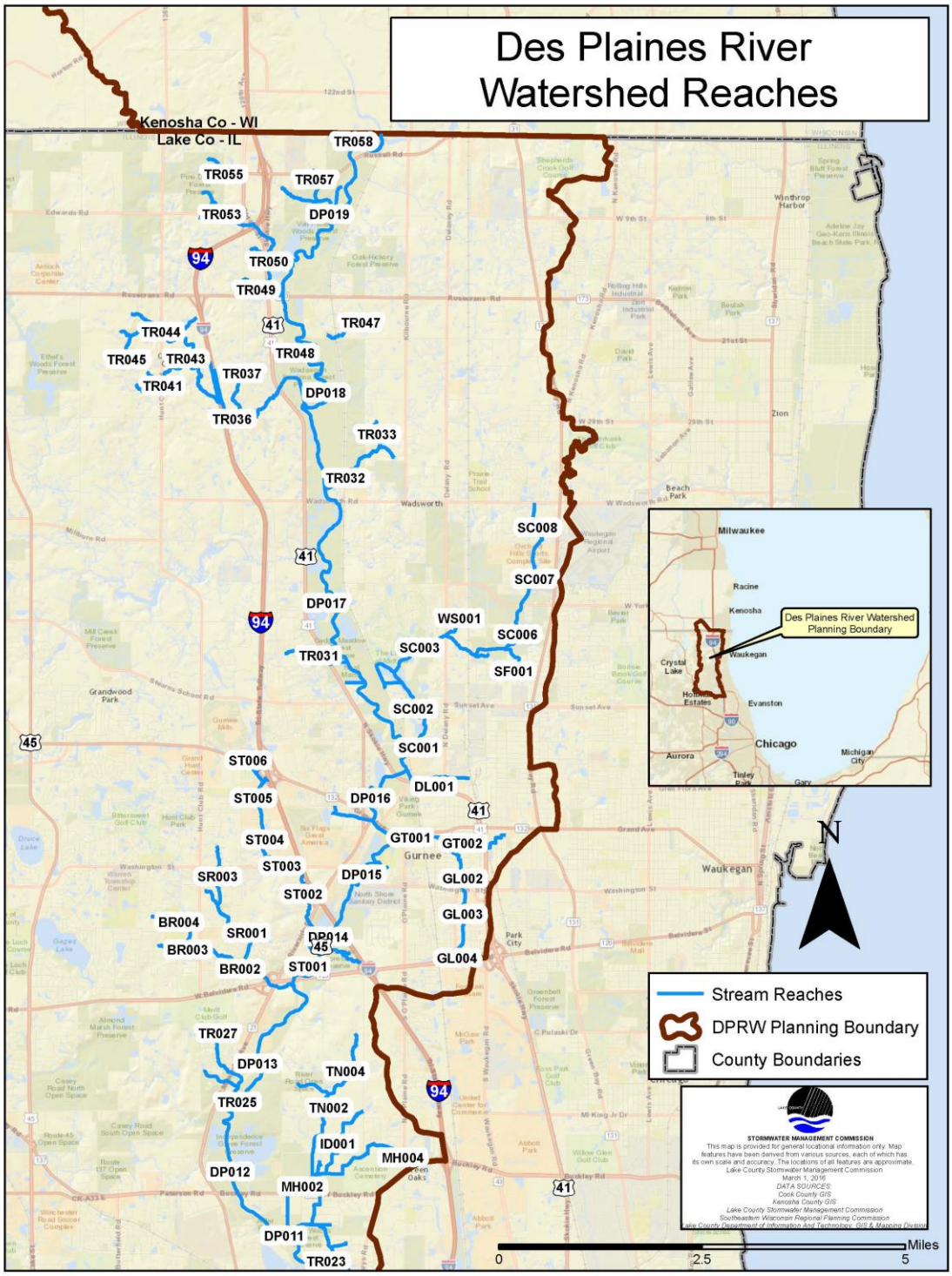
Lower Des Plaines River Stream Inventory Data

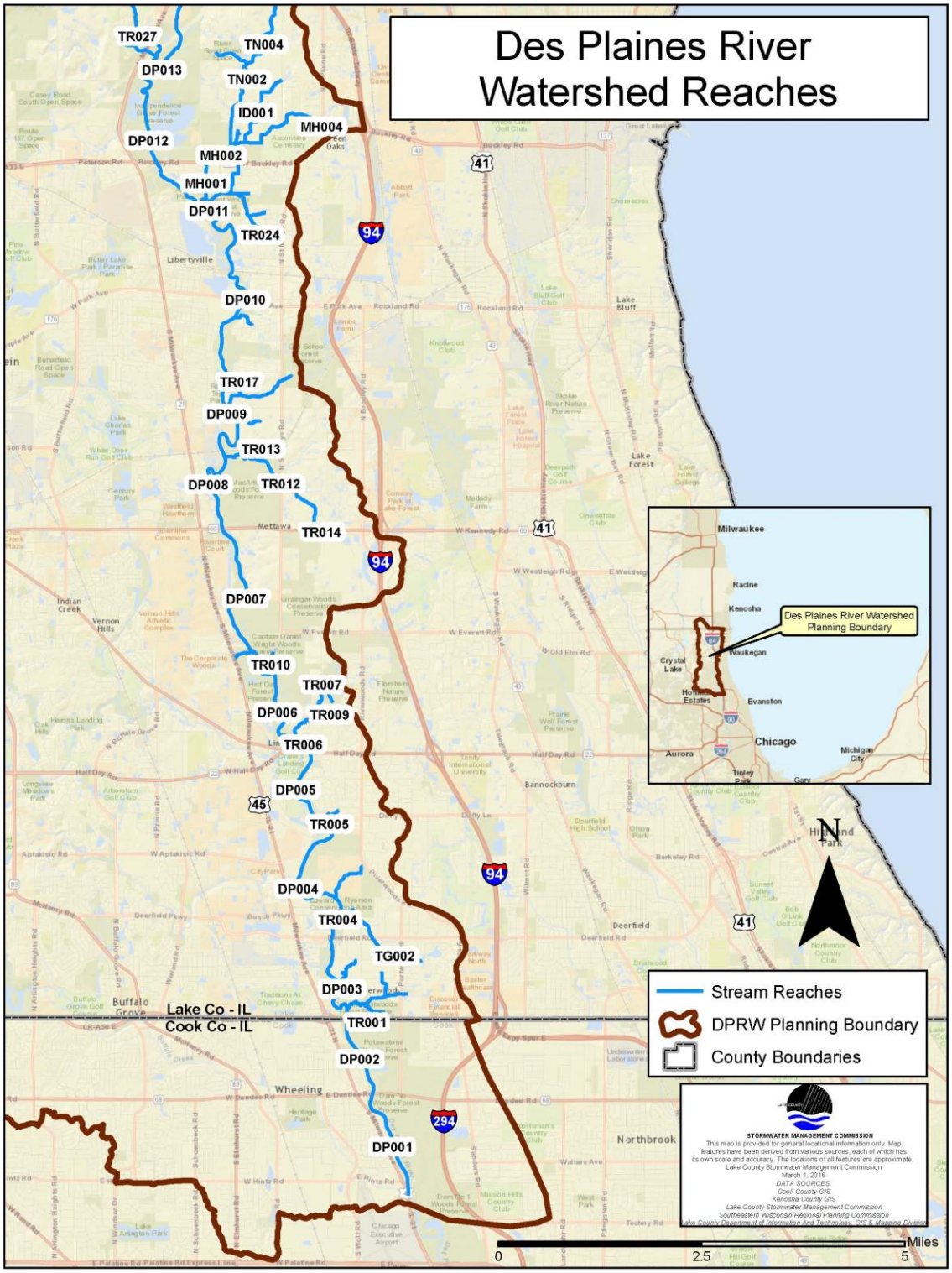
Reach	Debris		Substrate Stability	Channelization	Erosion	Length	Length	Bank Height		T-Channel Width		B-Channel Width		Mean Channel Width	Mean Channel Depth
	Instream	Overbank				Ft.	Mi.	Min	Max	Min	Max	Min	Max		
TG001	LOW	LOW	HIGH	LOW	MOD	3,140	0.59	2.0	5.0	13.0	17.0	5.0	9.0	14.7	1.2
TG002	LOW	LOW	LOW	MOD	MOD	3,848	0.73	2.0	6.0	14.0	20.0	6.0	15.0	16.7	0.8
TG003	NONE	LOW	MOD	NONE	MOD	783	0.15	1.0	3.0	9.0	9.0	3.0	3.0	9.0	0.0
TG004	NONE	LOW	MOD	LOW	MOD	617	0.12	1.0	2.0	8.0	8.0	3.0	3.0	8.0	0.0
TR001	LOW	LOW	HIGH	LOW	MOD	3,580	0.68	0.0	4.0	8.0	11.0	0.0	6.0	9.7	0.1
TR002	MOD	MOD	MOD	LOW	MOD	3,008	0.57	1.0	8.0	7.0	15.0	4.0	5.0	10.3	0.4
TR003	LOW	LOW	MOD	LOW	MOD	1,844	0.35	1.0	3.0	7.0	10.0	4.0	5.0	8.0	0.1
TR004	LOW	LOW	MOD	LOW	MOD	3,329	0.63	1.0	3.0	5.0	8.0	2.0	4.0	6.7	0.3
TR005	LOW	LOW	MOD	LOW	MOD	2,053	0.39	2.0	4.0	6.0	34.0	5.0	25.0	16.7	1.5
TR006	LOW	LOW	MOD	NONE	MOD	2,935	0.56	1.0	4.0	4.0	15.0	3.0	9.0	10.3	0.6
TR007	LOW	LOW	MOD	LOW	MOD	3,211	0.61	1.0	5.0	5.0	6.0	2.0	4.0	5.7	0.6
TR008	NONE	LOW	HIGH	LOW	MOD	1,672	0.32	1.0	1.0	5.0	5.0	3.0	3.0	5.0	0.0
TR009	LOW	NONE	HIGH	LOW	MOD	779	0.15	1.0	1.0	5.0	5.0	3.0	3.0	5.0	0.0
TR010	LOW	LOW	LOW	LOW	MOD	1,627	0.31	1.0	8.0	16.0	22.0	6.0	12.0	18.3	0.7
TR011	LOW	LOW	HIGH	NONE	MOD	1,447	0.27	4.0	5.0	10.0	14.0	5.0	6.0	12.0	0.5
TR012	LOW	MOD	MOD	LOW	MOD	4,869	0.92	2.0	5.0	9.0	17.0	5.0	8.0	13.0	0.8
TR013	NONE	NONE	MOD	NONE	MOD	2,241	0.42	2.0	5.0	7.0	13.0	3.0	4.0	10.0	0.8
TR014	LOW	LOW	MOD	LOW	MOD	4,694	0.89	2.0	6.0	10.0	12.0	3.0	8.0	11.0	1.0
TR015	MOD	LOW	LOW	NONE	MOD	1,110	0.21	1.0	2.0	5.0	18.0	3.0	12.0	11.5	0.8
TR016	LOW	LOW	MOD	LOW	MOD	2,090	0.40	3.0	4.0	11.0	13.0	5.0	5.0	12.3	1.1
TR017	LOW	LOW	MOD	LOW	MOD	3,070	0.58	0.5	4.0	3.0	20.0	2.0	10.0	10.8	0.6
TR018	NONE	LOW	MOD	NONE	MOD	1,111	0.21	0.3	0.5	3.0	9.0	1.0	4.0	6.0	0.3
TR019	LOW	LOW	MOD	NONE	MOD	2,634	0.50	1.0	4.0	1.0	13.0	1.0	5.0	7.0	0.2
TR020	LOW	LOW	MOD	MOD	MOD	1,717	0.33	1.0	2.0	6.0	7.0	4.0	5.0	6.3	0.4
TR059	-	-	-	-	-	1,611	0.31	0.0	-	-	-	-	-	0.0	-
TR060	LOW	MOD	MOD	LOW	MOD	966	0.18	0.5	2.0	7.0	14.0	5.0	8.0	10.3	0.3

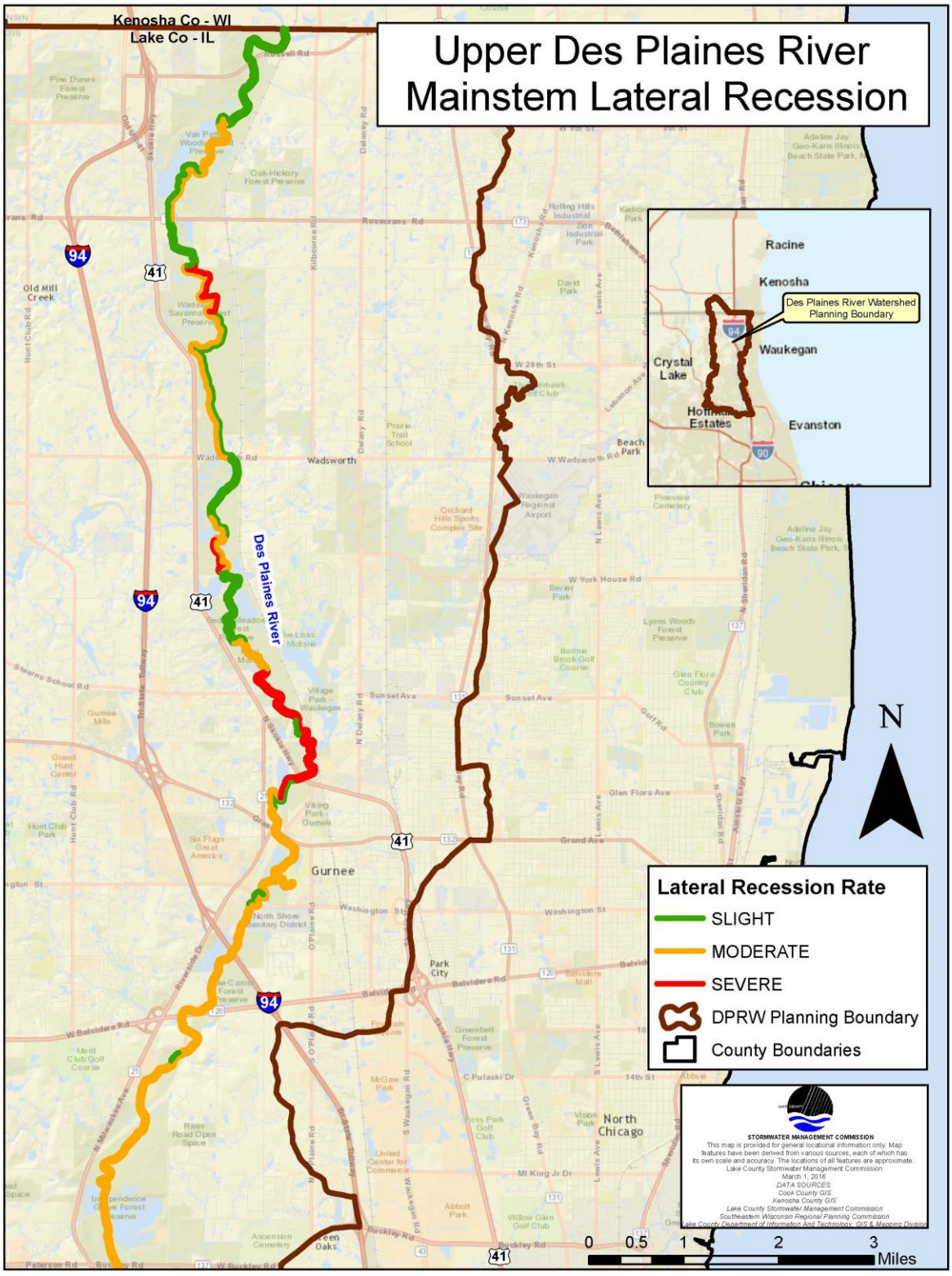
- : Not Collected

APPENDIX C

STREAM MAPS




Des Plaines River
Watershed Reaches
TR027
TN004
DP013
TN002
ID001
MH004
DP012
MH002
MH001
DP011
TR024
DP010
TR017
DP009
TR013
DP008
TR012
TR014
DP007
TR010
TR007
DP006
TR009
TR006
DP005
TR005
DP004
TR004
TG002
DP003
TR001
DP002
DP001
Lake Co - IL
Cook Co - IL
Libertyville
Mettawa
Wheeling
Buffalo Grove
Deerfield
Bannockburn
Northbrook
Lake Bluff
Lake Forest
Highland Park
Milwaukee
Racine
Kenosha
Waukegan
Des Plaines River Watershed Planning Boundary
Crystal Lake
Evanston
Chicago
Aurora
Michigan City
Gary
Stream Reaches
DPRW Planning Boundary
County Boundaries
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
March 1, 2016
DATA SOURCES:
Cook County GIS
Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0
2.5
5
Miles


Upper Des Plaines River
Mainstem Lateral Recession
Kenosha Co - WI
Lake Co - IL
Des Plaines River
Racine
Kenosha
Des Plaines River Watershed Planning Boundary
Waukegan
Crystal Lake
Hoffman Estates
Evanston
Wadsworth
Gurnee
Park City
North Chicago
Old Mill Creek
Lateral Recession Rate
SLIGHT
MODERATE
SEVERE
DPRW Planning Boundary
County Boundaries
N
0 0.5 1 2 3
Miles
STORMWATER MANAGEMENT COMMISSION
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Lake County Stormwater Management Commission
March 1, 2016
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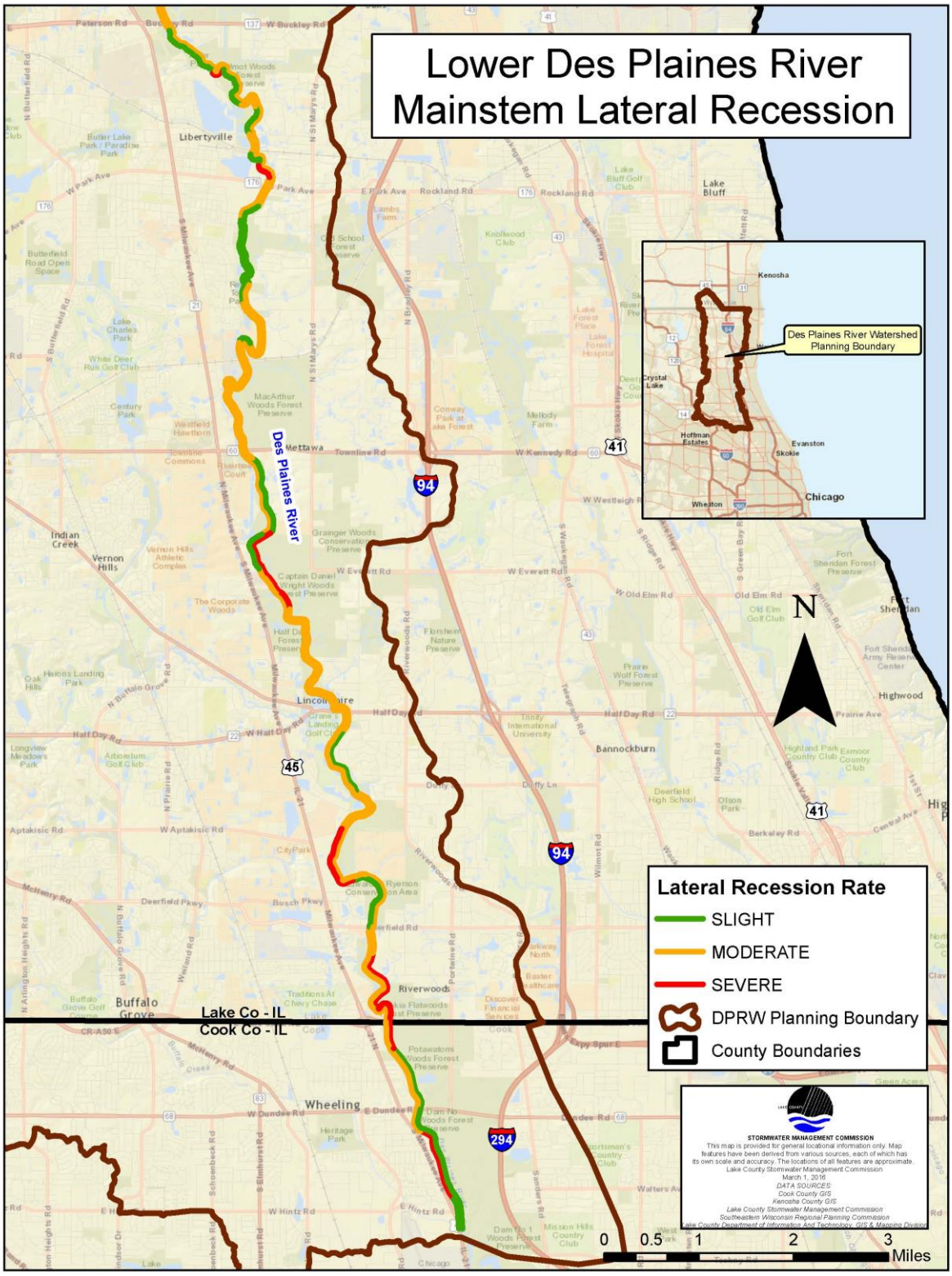
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division


Lower Des Plaines River
Mainstem Lateral Recession
Des Plaines River Watershed Planning Boundary
Kenosha
Crystal Lake
Hoffman Estates
Evanston
Skokie
Chicago
Wheaton
Des Plaines River
Libertyville
Mettawa
Indian Creek
Vernon Hills
Lincolnshire
Bannockburn
Highwood
Lake Bluff
Riverwoods
Buffalo Grove
Lake Co - IL
Cook Co - IL
Wheeling
N
Lateral Recession Rate
SLIGHT
MODERATE
SEVERE
DPRW Planning Boundary
County Boundaries
STORMWATER MANAGEMENT COMMISSION
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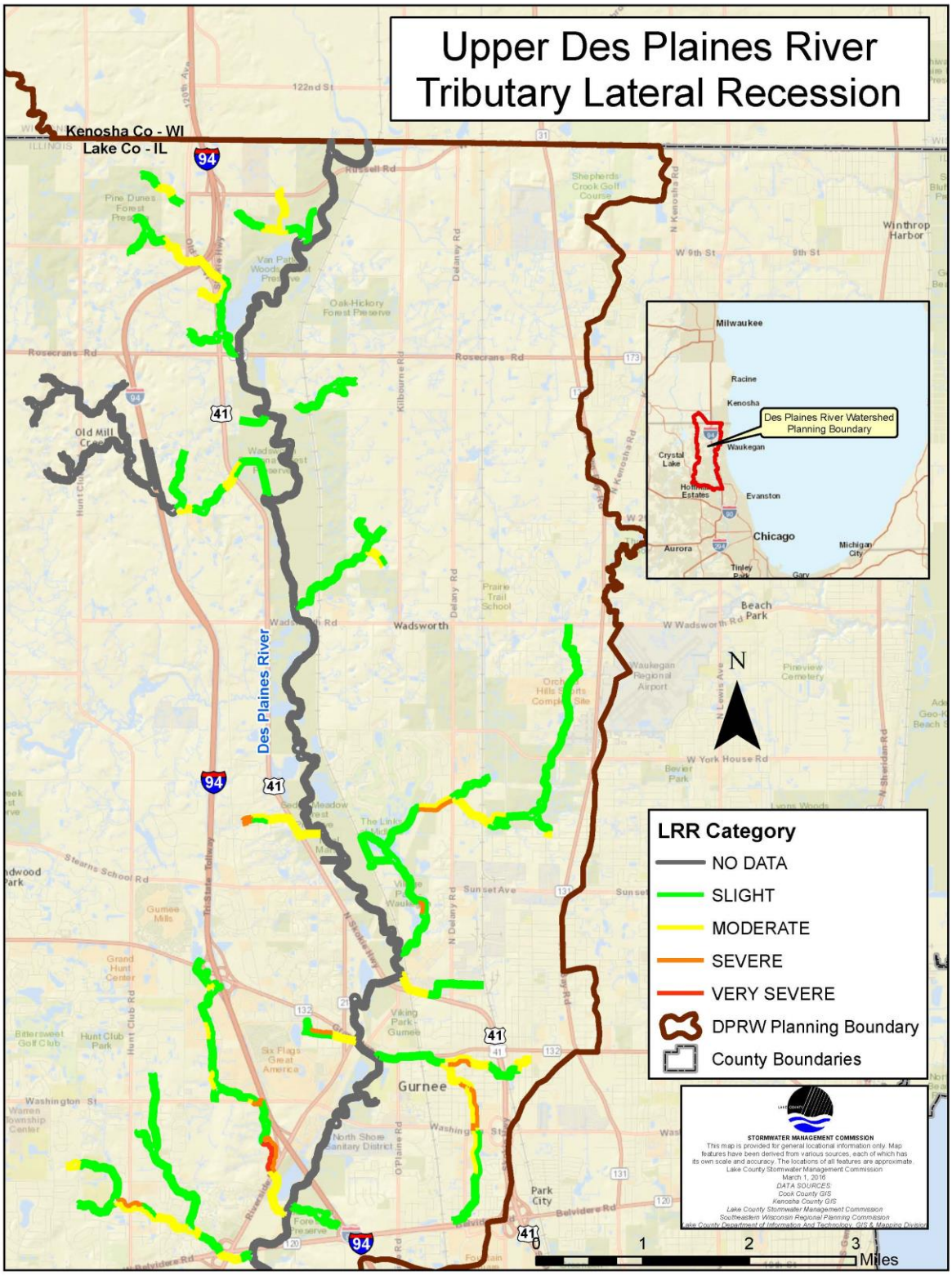
Lake County Stormwater Management Commission
March 1, 2016
DATA SOURCES:
Cook County GIS
Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
0 0.5 1 2 3
Miles


Upper Des Plaines River
Tributary Lateral Recession
Kenosha Co - WI
Lake Co - IL
Des Plaines River
Wadsworth
Gurnee
Waukegan
Park City
Beach Park
Winthrop Harbor
Des Plaines River Watershed Planning Boundary
Milwaukee
Racine
Kenosha
Waukegan
Crystal Lake
Evanston
Chicago
Aurora
Michigan City
N
LRR Category
NO DATA
SLIGHT
MODERATE
SEVERE
VERY SEVERE
DPRW Planning Boundary
County Boundaries
STORMWATER MANAGEMENT COMMISSION
0
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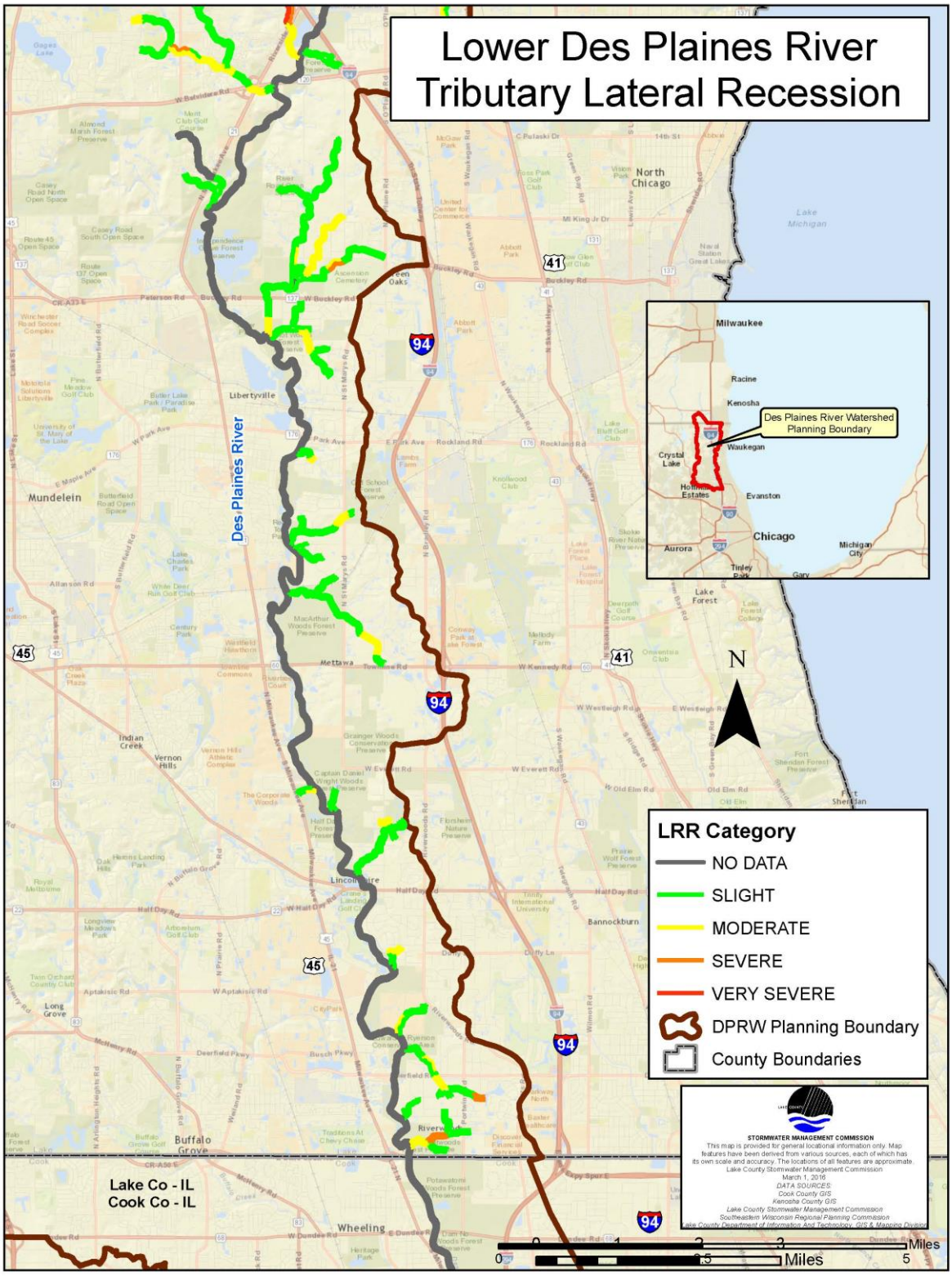
Miles


Lower Des Plaines River
Tributary Lateral Recession
Des Plaines River
Des Plaines River Watershed
Planning Boundary
Milwaukee
Racine
Kenosha
Waukegan
Crystal Lake
Evanston
Chicago
Aurora
Michigan City
Gary
Tinley Park
Libertyville
Mundelein
North Chicago
Lake Michigan
Lake Forest
Buffalo Grove
Wheeling
Lake Co - IL
Cook Co - IL
N
LRR Category
NO DATA
SLIGHT
MODERATE
SEVERE
VERY SEVERE
DPRW Planning Boundary
County Boundaries
STORMWATER MANAGEMENT COMMISSION
Miles
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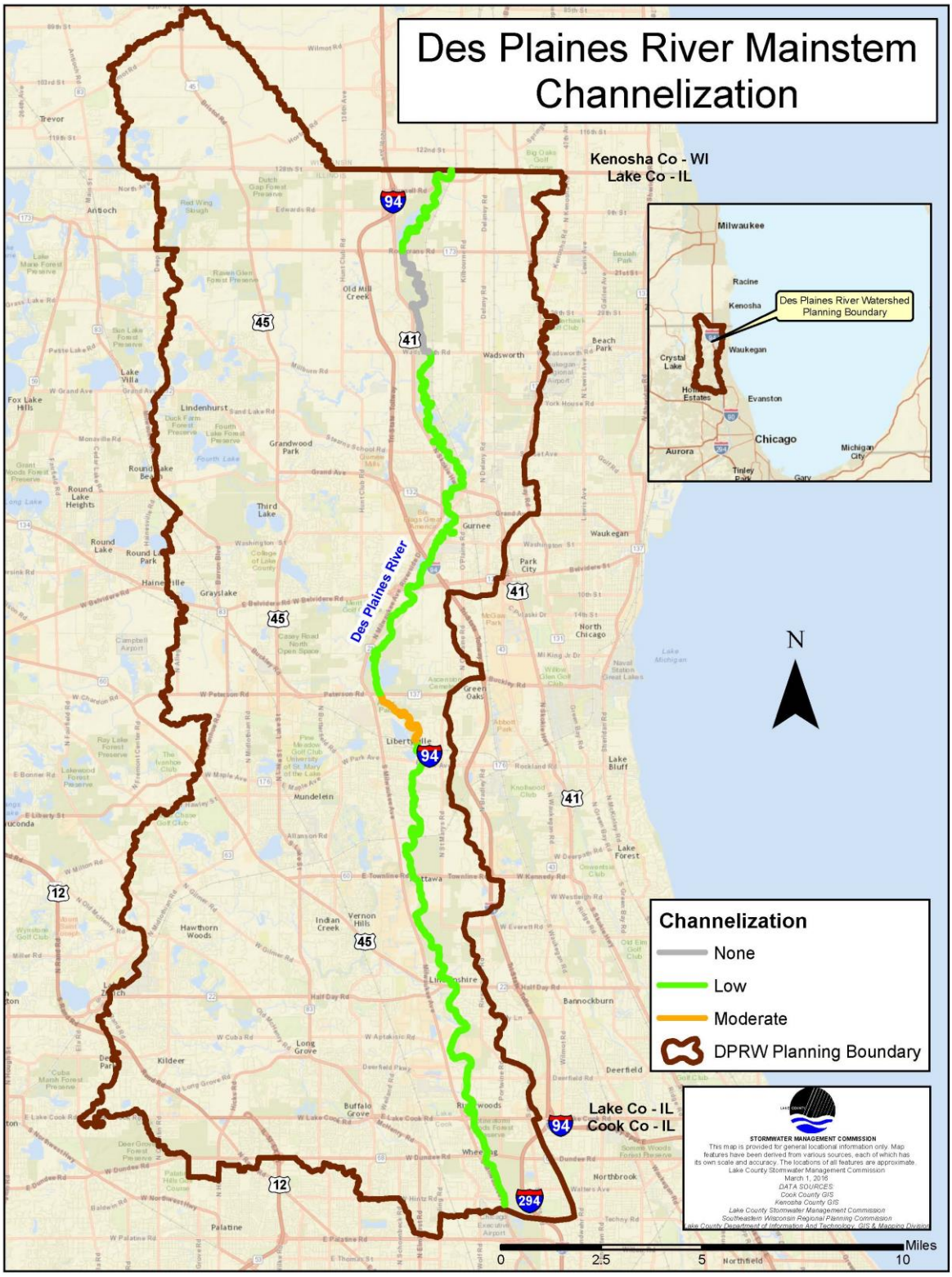
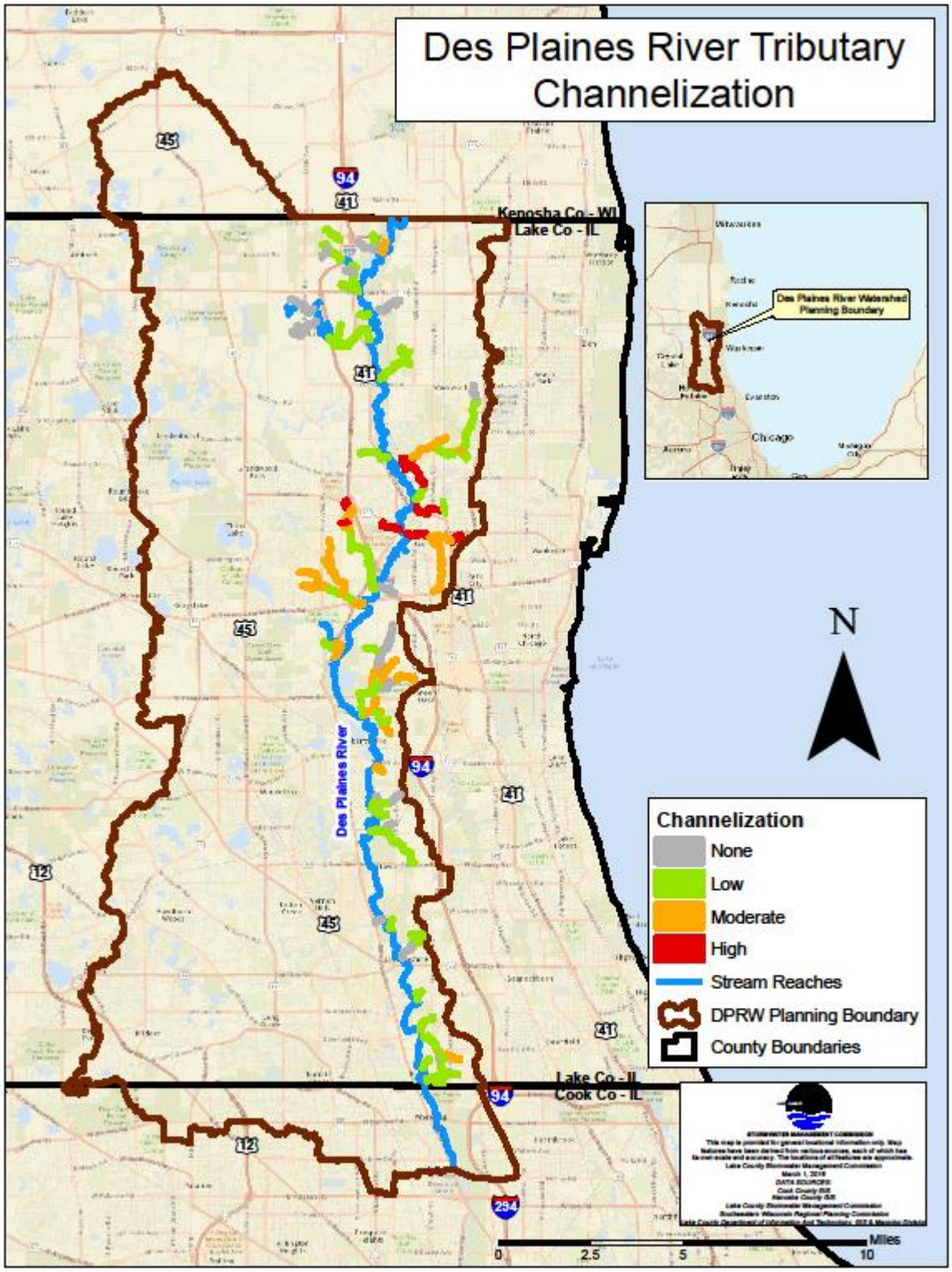
3
0
2.5
5


Des Plaines River Mainstem Channelization
Kenosha Co - WI
Lake Co - IL
Des Plaines River Watershed Planning Boundary
Milwaukee
Racine
Kenosha
Waukegan
Crystal Lake
Evanston
Chicago
Aurora
Michigan City
Des Plaines River
Channelization
None
Low
Moderate
DPRW Planning Boundary
N
Lake Co - IL
Cook Co - IL
STORMWATER MANAGEMENT COMMISSION
Miles
0
2.5
5
10


Des Plaines River Tributary Channelization
Kenosha Co - WI
Lake Co - IL
Des Plaines River Watershed Planning Boundary
Chicago
Des Plaines River
N
Channelization
None
Low
Moderate
High
Stream Reaches
DPRW Planning Boundary
County Boundaries
Lake Co - IL
Cook Co - IL
Miles
0
2.5
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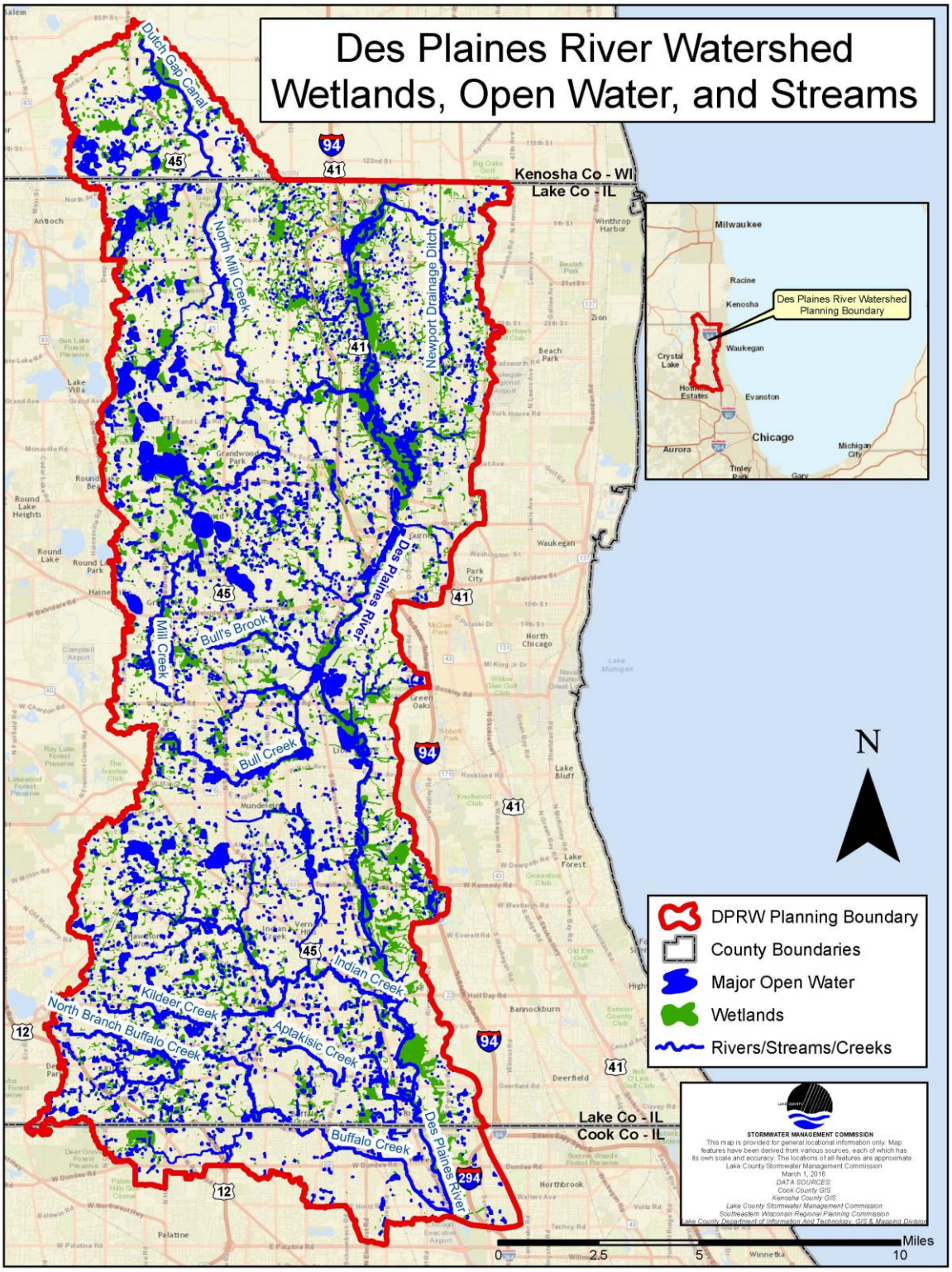
Des Plaines River Watershed
Wetlands, Open Water, and Streams
Kenosha Co - WI
Lake Co - IL
Lake Co - IL
Cook Co - IL
Des Plaines River Watershed Planning Boundary
Milwaukee
Racine
Kenosha
Waukegan
Chicago
Evanston
Aurora
Crystal Lake
Ditch Gab Canal
North Mill Creek
Newport Drainage Ditch
Des Plaines River
Mill Creek
Bull's Brook
Bull Creek
Indian Creek
Kildeer Creek
North Branch Buffalo Creek
Aptakisic Creek
Buffalo Creek
N
DPRW Planning Boundary
County Boundaries
Major Open Water
Wetlands
Rivers/Streams/Creeks
STORMWATER MANAGEMENT COMMISSION
This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.
Lake County Stormwater Management Commission
March 1, 2016
DATA SOURCES:
Cook County GIS
Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division
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10
Miles

APPENDIX D

Miscellaneous points

In the summer 2016 inventory of the Des Plaines River watershed some points were collected as miscellaneous points. These included incidences that were not classified as channel characteristics but were considered worthy of being noted in the inventory. Below is a table of total miscellaneous points. These contributed to things such as debris jams, bank erosion, water quality and water levels.

Main Channel	Pipes dumped
	Old pipes don't appear to be discharge points
	Wetland- won't walk since not a stream
	All wetland until industry site
	Debris and concrete from industrial
	Chain link fence
	Backwater type thing, maybe midstream bar
	Telephone poles sliding into river
	Weird armoring
	Weird structure
	Lake
	Weird structure, gauge?
	Metal object
	Previously a pier?
	Manmade riffle
	Random structure
	Many backyards being eroded away
	Dam-like structure
	Dock
	Work/ hazard area
	Potential old bridge
	Dead deer
	Bike path
	Rock dump
Tributaries	Tree undercut 3 ft back, will fall very soon
	Private property with bridge. Could not access
	Private property, couldn't access
	Exposed pipe from swale near road
	Fence in residential area. Couldn't access rest of reach
	Storm drain completely underwater
	Overflowing storm drain
	Broken pipe
	Storm drain
	Broken 12" clay pipe
	Broken Cmp 12" pipe

Tributaries	Type of irrigation system./ discharge point
	Pipe running through stream
	Several pots dumped through second half of reach
	Pipes in stream
	Cable in stream
	Cable gate
	Concrete pipes in channel. Plastic sheet catching debris. Resident said it was a problem
	Rusted pipe
	Fence
	Sick waterfall
	Fenced in property- no access
	Private property. Couldn't access
	Fenced in, couldn't access
	Fence
	Pipes dumped
	Old pipes don't appear to be discharge points
	Sewer dome thing overtaken by ants in gummy part
	3 Cables over River with debris stuck on it
	Old pipes
	Fenced in
	Tree on power line
	Flow from pond
	Fence blocking access
	Pipe across stream
	Fenced in, could not access.
	Manhole in middle of stream
	Flooded floodplain, no clear channel
	Concrete path underwater
	Grass dumped in stream
	Water is very orange- grease?
	Netting needs to be taken out. Plants are trying to grow through.
	Fenced in property. Can't go further.
	Path being undercut
	Tarp with discharge
	Open pipe
	Pipe or cable across stream
	Pond
	Fence, industrial site
	Pond
	Wetland
	Dry
	Pool
	Wetland
	Pipe across channel
	Orange residue in channel

Tributaries	Dry wetland basin
	Stream still dry
	Potential Discharge point/hydraulic structure
	Area intended for wetland- no stream
	Bank is a compost pile
	Gray water
	Pipe across stream
	Hole in ground with pipe
	3 sets of logs cut and positioned in stream. Possible armoring
	Log rip rap
	3 more log rip rap/ debris jam
	Stream dries up into vegetation
	Very slight Evidence of preexisting channel
	Netting in stream dangerous to wildlife
	Dry stream looks like it used to flood this field
	Pretty waterfall
	Random discharge with weird smell. No evidence of pipe.
	No distinct channel
	No stream at all.
	May have been stream bed but now overgrown grass
	Fenced off can't access any further.
	0.5ft wide dry channel runs perpendicular through stream
	Fenced off, couldn't access
	Stream still nonexistent, and fenced off
	Fenced off wetland, probably still dry
	All wetland until industry site
	Large concrete pipe part of debris jam? Possibly unnecessary.
	Tree potentially damming pond
	Orange water/oil
	Fence
	No access to rest of stream because of crops (rest of stream is just a dry ag ditch)
	No stream
	No stream
	Wetland with no water
	Exposed pipe
	Cable running through stream
	Empties into wetland/pond
	Grass dumping
	No real stream
	Pipe that transports the water that created the big swale
	Too steep and vegetated to get through.
Total	**121**

Appendix D: Detention Basin Inventory

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
10-01-001	10-01-001	-88.04724439	42.46009255	Bmb Associates I Llc	Wet	Yes	Antioch	Agricultural	Install aerator	North Mill Creek 2009
10-01-002	10-01-002	-88.03455763	42.46884753	Deercrest Homeowners Association	Wet	Yes	Antioch	Residential/ Wetland	1. Repair overflow structure 2. Remove woody vegetation 3. Add native vegetation.	North Mill Creek 2009
10-01-003	10-01-003	-88.03765312	42.47004837	Deercrest Homeowners Association	Wetland	Yes	Antioch	Residential/ Wetland	1. Add rip rap 2. Remove invasive plants 3. Repair or replace silt fencing	North Mill Creek 2009
10-01-004	10-01-004	-88.03804383	42.46989577	Village of Antioch	Wet	Yes	Antioch	Residential/ Wetland	Clear clutter from inlet and outlet	North Mill Creek 2009
10-01-005	10-01-005	-88.03977154	42.47022676	Deercrest Homeowners Association	Wetland	Yes	Antioch	Residential/ Undeveloped	1. Remove invasive species 2. Clear outlet of debris	North Mill Creek 2009
10-01-006	10-01-006	-88.03585582	42.47140991	Neuman Homes	Wet	Yes	Antioch	Residential	Remove woody vegetation	North Mill Creek 2009
10-01-007	10-01-007	-88.04006556	42.473219	Deercrest Homeowners Association	Wet	Yes	Antioch	Residential/ Wetland	1. Install aerator 2. Remove of invasive plants 3. Remove woody vegetation	North Mill Creek 2009
10-01-008	10-01-008	-88.04721704	42.47172929	Pulte Homes	Wet	Yes	Antioch	Residential/ Farm	1. Fix input problem from other basin 2. Remove excess woody vegetation	North Mill Creek 2009
10-01-009	10-01-009	-88.04294505	42.47066539	Pulte Homes	Wet	Yes	Antioch	Residential	1. Install additional riprap at inlets 2. Install native vegetation	North Mill Creek 2009
10-01-010	10-01-010	-88.04299419	42.46682079	Pulte Homes	Wet	Yes	Antioch	Residential	1. Install aerator 2. Add riprap	North Mill Creek 2009
10-01-011	10-01-011	-88.05142794	42.45449207	Bmb Associates I Llc	Wet	Yes	Antioch	Residential	1. Add Rip Rap to inlets 2. Remove invasive plants.	North Mill Creek 2009
10-01-012	10-01-012	-88.03851612	42.46695009	Deercrest Homeowners Association	Wet	Yes	Antioch	Residential/ Wetland	1. Line channel from drainage ditch with riprap 2. Add riprap at southeastern inlet 3. Remove woody vegetation 4. Add native vegetation	North Mill Creek 2009
10-01-013	10-01-013	-88.04608154	42.47086285	Pulte Homes	Wetland	Yes	Antioch	Residential	1. Add aerator 2. Add riprap 3. Fix erosion to bank	North Mill Creek 2009
10-01-014	10-01-014	-88.03956609	42.47569645	Deercrest Homeowners Association	Wet	Yes	Antioch	Residential	1. Add aerator 2. Add of native plants 3. Remove of invasive plants	North Mill Creek 2009
10-01-015	10-01-015	-88.04087668	42.46800381	Deercrest Homeowners Association	Wet	Yes	Antioch	Residential	Remove excess woody vegetation	North Mill Creek 2009
10-01-016	10-01-016	-88.03403458	42.44745266	Bmb Associates I Llc	Wetland	Yes	Antioch	Agricultural	1. Unclog outlet 2. Add restrictor at overflow	North Mill Creek 2009
10-01-017	10-01-017	-88.03704103	42.45685707	Bmb Associates I Llc	Wetland	Yes	Antioch	Residential	1. Remove invasive plant species 2. Add Rip Rap at inlets	North Mill Creek 2009
10-01-018	10-01-018	-88.03726732	42.45283765	Bmb Associates I Llc	Wet	Yes	Antioch	Residential	1. Add native plant species 2. Add aerator 3. Manage erosion	North Mill Creek 2009
10-01-019	10-01-019	-88.03631091	42.4527292	Bmb Associates I Llc	Wet	Yes	Antioch	Residential	None	North Mill Creek 2009

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
10-01-020	10-01-020	-88.04891662	42.45698968	Bmb Associates I Llc	Wetland	Yes	Antioch	Residential	1. Remove invasive plant species 2. Add sediment basin	North Mill Creek 2009
10-01-021	10-01-021	-88.04431782	42.47543081	Pulte Homes	Wetland	Yes	Antioch	Residential	1. Add aerator 2. Add riprap at inlets/outlets 3. Install native vegetation	North Mill Creek 2009
10-01-022	10-01-022	-88.04446187	42.46915438	Pulte Homes	Wet	Yes	Antioch	Residential	1. Add aerator(s) 2. Place riprap at inlets 3. Remove excess woody vegetation	North Mill Creek 2009
10-01-023	10-01-023	-88.05010328	42.45800233	Bmb Associates I Llc	Wet	Yes	Antioch	Residential	1. Unclog outlet 2. Add sediment basin 3. Manage short-circuiting	North Mill Creek 2009
10-01-024	10-01-024	-88.04306904	42.45648133	Bmb Associates I Llc	Wet	Yes	Antioch	Residential	1. Add aerator. 2.Install native vegetation to minimize erosion.	North Mill Creek 2009
10-01-025	10-01-025	-88.04407112	42.47457673	Pulte Homes	Wetland	Yes	Antioch	Residential	1. Add riprap to inlets 2. Install native vegetation	North Mill Creek 2009
10-01-026	10-01-026	-88.05777149	42.4739782	Paul Serio	Wet	No	Antioch	Residential	Add riprap or some energy dissipater	North Mill Creek 2009
10-01-027	10-01-027	-88.06206152	42.46923689	Christian Life Fellowship Assembly	Wet	Yes	Antioch	Commercial	1. Add Grates to inlets/outlets 2. Add Rip Rap to inlets/outlets 3. Convert to a wet bottom or wetland basin	North Mill Creek 2009
10-01-028	10-01-028	-88.03672754	42.4670466	Deercrest Homeowners Association	Wetland	Yes	Antioch	Residential/ Wetland	1. Remove woody vegetation 2. Add native vegetation 3. Add aerator	North Mill Creek 2009
10-1220	1220	-88.04664024	42.49747929	Rainbow lake manor large	Wet	Yes	Kenosha County	Residential	1. Replace riprap 2. Fix geo textile matting 3. Plant native vegetation 4. Don't mow to edge of water	DPRW 2016
10-1221	1221	-88.04664399	42.49628963	Rainbow manor small	Wet	Yes	Kenosha County	Residential	1. Plant native vegetation buffer 2. Don't mow to water edge 3. Replace failing riprap	DPRW 2016
10-24-001	10-24-001	-88.05821956	42.41623958	Bp Property Tax Department	Dry	No	Lake Villa	Residential	Convert to a wet bottom or wetland basin	North Mill Creek 2009
10-24-002	10-24-002	-88.05891773	42.41370237	Lake Villa Public Library	Wetland	Yes	Lake Villa	Residential	1. Remove Woody vegetation 2. Add Rip Rap 3. Remove Invasive Plant Species	North Mill Creek 2009
10-24-003	10-24-003	-88.06038264	42.40657201	Cedar Crossing Homeowners Association	Wetland	Yes	Lake Villa	Residential	1. Add aerator 2. Add riprap 3. Remove of excess woody vegetation	North Mill Creek 2009
10-24-004	10-24-004	-88.06090988	42.41327137	G Buschman M Buschman	Wet	Yes	Lake Villa	Residential	1. Install sediment basin 2. Add native vegetation	North Mill Creek 2009
10-24-005	10-24-005	-88.0584199	42.40486093	Brentwood Preserves	Wetland	Yes	Lake Villa	Residential	None	North Mill Creek 2009
10-24-006	10-24-006	-88.06227478	42.41243356	G Buschman M Buschman	Wet	Yes	Lake Villa	Residential	1. Add aerator 2. Remove of excess woody vegetation 3. Remove debris 4. Add native vegetation	North Mill Creek 2009
10-24-007	10-24-007	-88.05593223	42.40649096	Cedar Crossing Pond 9	Wetland	Yes	Lake Villa	Residential	1. Install aerator 2. Add riprap to inlets	North Mill Creek 2009

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
									3. Unclog Outlet 4. Remove excess woody vegetation	
10-24-008	10-24-008	-88.06309568	42.41156176	Cedar Crossing Homeowners Association	Wet	Yes	Lake Villa	Residential	1. Install aerator 2. Install sediment basin at inlet 3. Remove excess woody vegetation 4. Add natural vegetation	North Mill Creek 2009
10-24-009	10-24-009	-88.06314076	42.41067209	Cedar Crossing Homeowners Association	Wet	Yes	Lake Villa	Residential	1. Install aerator 2. Add native vegetation	North Mill Creek 2009
10-24-010	10-24-010	-88.05945416	42.41370432	G Buschman M Buschman	Wet	Yes	Lake Villa	Residential	1. Install aerator 2. Add native vegetation	North Mill Creek 2009
10-29-001	10-29-001	-88.00902745	42.42700229	Heritage Trails Homeowners Association	Wet	Yes	Lindenhurst	Residential	Install aerator(s)	North Mill Creek 2009
10-29-002	10-29-002	-88.00780922	42.42310191	Chicago Title Land Trust Co	Wet	Yes	Lindenhurst	Residential	1. Install aerator 2. Add native vegetation	North Mill Creek 2009
10-29-003	10-29-003	-88.04192259	42.42220332	Mallard Ridge Estates Homeowners Association	Wet	No	Lindenhurst	Residential	1. Install aerator 2. Install native vegetation in basin bottom 3. Remove excess algae	North Mill Creek 2009
10-29-004	10-29-004	-88.04655935	42.4245272	Northern Trust Company	Wetland	No	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-005	10-29-005	-88.02272831	42.43111017	Waterford Commons Owners Association	Wetland	No	Lindenhurst	Residential	Remove excess algae	North Mill Creek 2009
10-29-006	10-29-006	-88.01381187	42.43268849	Heritage Trails Homeowners Association	Wet	Yes	Lindenhurst	Residential	Add native vegetation	North Mill Creek 2009
10-29-007	10-29-007	-88.01122541	42.43303457	Bd of Educ Millburn Com Con Sch Dist 24	Wetland	Yes	Lindenhurst	Public	Repair erosion	North Mill Creek 2009
10-29-008	10-29-008	-88.01326992	42.42660424	Providence Woods Homeowners Association	Wet	No	Lindenhurst	Residential	1. Manage erosion 2. Unclog outlet	North Mill Creek 2009
10-29-009	10-29-009	-88.00638545	42.42293953	Forest Trail Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Add aerator 2. Limit woody vegetation 3. Add native vegetation	North Mill Creek 2009
10-29-010	10-29-010	-88.05628133	42.41272463	Community Health Systems Inc	Wet	No	Lindenhurst	Residential	Removal of excess algae	North Mill Creek 2009
10-29-011	10-29-011	-88.01003982	42.42393282	Forest Trail Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Add riprap at inlet and outlet 2. Install native vegetation	North Mill Creek 2009
10-29-012	10-29-012	-88.05471744	42.41498735	Franciscan Communities, Inc	Wetland	No	Lindenhurst	Residential	1. Add aerator 2. Add riprap at inlet 3. Remove excess algae	North Mill Creek 2009
10-29-013	10-29-013	-88.05387993	42.41498714	Franciscan Communities, Inc	Wetland	No	Lindenhurst	Residential	Add riprap at Inlet	North Mill Creek 2009
10-29-014	10-29-014	-88.03334727	42.43301825	Auburn Meadows Homeowners Association	Wet	Yes	Lindenhurst	Residential	None	North Mill Creek 2009

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
10-29-015	10-29-015	-88.05503041	42.42425793	Property Specialists Inc.	Dry	Yes	Lindenhurst	Residential	1. Add grate on inlet 2. Convert to wet bottom or wetland basin	North Mill Creek 2009
10-29-016	10-29-016	-88.05522538	42.41480963	Community Health Systems Inc	Wetland	Yes	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-017	10-29-017	-88.00484486	42.4229813	Forest Trail Homeowners Association	Wetland	Yes	Lindenhurst	Residential	1. Add aerator 2. Clear debris from outlet 3. Remove Excess woody vegetation 4. Add native vegetation 5. Remove invasive vegetation	North Mill Creek 2009
10-29-018	10-29-018	-88.04966515	42.43562509	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Add native vegetation 2. Remove excess algae	North Mill Creek 2009
10-29-019	10-29-019	-88.03830789	42.43653132	Auburn Meadows Phase III Homeowners	Dry	Yes	Lindenhurst	Residential	1. Limit woody vegetation around basin 2. Convert to a wet bottom or wetland basin	North Mill Creek 2009
10-29-020	10-29-020	-88.04502458	42.43691871	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-021	10-29-021	-88.04603515	42.43659857	Grants Grove Homeowners Association	Wetland	Yes	Lindenhurst	Residential	Add of riprap at outlet	North Mill Creek 2009
10-29-022	10-29-022	-88.05153915	42.4370348	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Install native vegetation 2. Remove excess algae	North Mill Creek 2009
10-29-023	10-29-023	-88.05115794	42.43596779	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	Replace perforated riser with concrete outlet	North Mill Creek 2009
10-29-024	10-29-024	-88.04811886	42.43400692	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Add native vegetation to basin bottom 2. Add aerator 3. Remove excess woody vegetation 4. Remove excess algae	North Mill Creek 2009
10-29-025	10-29-025	-88.04627914	42.43468345	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	Manage clogging potential at inlet and outlet	North Mill Creek 2009
10-29-026	10-29-026	-88.04807529	42.43501117	Grants Grove Homeowners Association	Wetland	Yes	Lindenhurst	Residential	Install outlet with grate	North Mill Creek 2009
10-29-027	10-29-027	-88.04870284	42.43625581	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Add sediment basin at outlet 2. Add native vegetation 3. Remove excess woody vegetation and debris	North Mill Creek 2009
10-29-028	10-29-028	-88.05659081	42.42322665	Property Specialists Inc.	Wetland	Yes	Lindenhurst	Residential	Remove excess woody vegetation	North Mill Creek 2009
10-29-029	10-29-029	-88.05552373	42.42039015	Property Specialists Inc	Dry	Yes	Lindenhurst	Residential	Convert to wet bottom or wetland basin	North Mill Creek 2009
10-29-030	10-29-030	-88.0551708	42.41812262	Property Specialists Inc	Wetland	Yes	Lindenhurst	Residential	1. Add native bottom vegetation 2. Remove excess algae	North Mill Creek 2009
10-29-031	10-29-031	-88.05461165	42.4170628	-	Wetland	Yes	Lindenhurst	Residential	None	North Mill Creek 2009

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
10-29-032	10-29-032	-88.0058148	42.42909456	L.b. Andersen & Company, Inc	Wet	Yes	Lindenhurst	Residential	1. Add grate for inlet 2. Install energy dissipaters at inlet/outlet	North Mill Creek 2009
10-29-033	10-29-033	-88.01375416	42.43489563	Heritage Trails Homeowners Association	Wetland	Yes	Lindenhurst	Residential	Remove excess algae	North Mill Creek 2009
10-29-034	10-29-034	-88.03909885	42.42004399	Lindenhurst Park District	Wetland	No	Lindenhurst	Open Water	None	North Mill Creek 2009
10-29-035	10-29-035	-88.03539635	42.41274855	Thomas Olsen	Dry	No	Lindenhurst	Commercial	1. Remove debris 2. Fix Erosion 3. Convert to wet bottom or wetland basin	North Mill Creek 2009
10-29-036	10-29-036	-88.04605307	42.43392698	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	Remove excess woody vegetation	North Mill Creek 2009
10-29-037	10-29-037	-88.01246025	42.42964748	Providence Woods Homeowners Association	Wetland	Yes	Lindenhurst	Residential	Add Native vegetation (particularly around inlets).	North Mill Creek 2009
10-29-038	10-29-038	-88.03560449	42.44031141	Natures Ridge Homeowners Association	Wet	No	Lindenhurst	Residential	1. Add aerator 2. Add native vegetation	North Mill Creek 2009
10-29-039	10-29-039	-88.05067025	42.43171281	Rebecca A Abel	Wetland	Yes	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-040	10-29-040	-88.00923207	42.43109603	Bd of Educ Millburn Com Con Sch Dist 24	Dry	Yes	Lindenhurst	Government Institutional	1. Remove obstruction from inlet 2. Convert to a wet bottom or wetland basin	North Mill Creek 2009
10-29-041	10-29-041	-88.04509801	42.43998372	Wedgewood Subdivision Homeowners Association	Wetland	Yes	Lindenhurst	Residential	1. Add aerator 2. Clear sediment basin at outlet	North Mill Creek 2009
10-29-042	10-29-042	-88.04340965	42.43585616	Grants Grove Homeowners Association	Wet	Yes	Lindenhurst	Residential	1. Add native vegetation 2. Add aerator	North Mill Creek 2009
10-29-043	10-29-043	-88.03610286	42.43546549	Auburn Meadows Homeowners Association	Dry	Yes	Lindenhurst	Residential	1. Manage erosion at inlets/outlets 2. Convert to wet bottom or wetland basin	North Mill Creek 2009
10-29-044	10-29-044	-88.02300791	42.43332629	Waterford Commons Owners Association	Wet	No	Lindenhurst	Residential	Remove excess woody debris	North Mill Creek 2009
10-29-045	10-29-045	-88.04447088	42.43741563	Wedgewood Subdivision Homeowners Assocaitin	Wetland	Yes	Lindenhurst	Residential	1. Add aerator 2. Add sediment basin 3. Install grate at outlet	North Mill Creek 2009
10-29-046	10-29-046	-88.03595927	42.41358534	Saint Mark Lutheran Church	Dry	No	Lindenhurst	Commercial	1. Plant native vegetation 2. Enable access to manhole 3. Convert to wet bottom or wetland basin	North Mill Creek 2009
10-29-047	10-29-047	-88.03957115	42.44037145	Natures Ridge Homeowners Association	Wetland	Yes	Lindenhurst	Residential	1. Add native vegetation at inlet 2. Remove woody debris at outlets	North Mill Creek 2009
10-29-048	10-29-048	-88.04203883	42.41825045	Mallard Ridge Estates Homeowners Association	Wet	No	Lindenhurst	Residential	1. Add native vegetation to basin bottom 2. Add aerator 3. Remove excess algae	North Mill Creek 2009

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10-29-049	10-29-049	-88.05740622	42.41371344	Community Health Systems Inc	Wetland	Yes	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-050	10-29-050	-88.05758588	42.40945111	Community Health Systems	Wetland	Yes	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-051	10-29-051	-88.03455504	42.41341901	Thomas Olsen	Dry	No	Lindenhurst	Residential	1. Remove Excess Debris 2. Leave Bottom Unmowed 3. Convert to a wet bottom or wetland basin	North Mill Creek 2009
10-29-052	10-29-052	-88.02472199	42.41761355	The Preserves At McDonald Woods, Llc	Wetland	No	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-053	10-29-053	-88.05364076	42.41201793	Franciscan Communities Inc	Wet	Yes	Lindenhurst	Residential	1. Add aerator 2. Remove excess woody vegetation 3. Remove excess algae	North Mill Creek 2009
10-29-054	10-29-054	-88.05071733	42.43038248	-	Wetland	Yes	Lindenhurst	Residential	None	North Mill Creek 2009
10-29-055	10-29-055	-88.03581923	42.43075138	Lake Villa Fire Protection District	Wet	Yes	Lindenhurst	Government Institutional	1. Add aerator 2. Add riprap at outlet 3. Add native bottom vegetation	North Mill Creek 2009
10-623	623	-88.05324945	42.46492322	Eagle Ridge Pond 1	Wet	Yes	Antioch	Residential	None	DPRW 2016
10-628	628	-88.05521256	42.46123968	Eagle Ridge Pond 3	Wet	Yes	Antioch	Residential	None	DPRW 2016
10-630	630	-88.04974108	42.45255044	Clublands of Antioch Pond 4	Wet	Yes	Antioch	Residential	None	DPRW 2016
10-634	634	-88.0357418	42.43900361	Nature Ridge Pond 1	Wet	Yes	Lindenhurst	Residential	Add aerator to increase water circulation	DPRW 2016
10-635	635	-88.03843258	42.43785311	Nature Ridge Pond 4	Dry	Yes	Lindenhurst	Residential	None	DPRW 2016
10-XX-001	10-XX-001	-87.99190348	42.48650271	Michael G Mclaughlin	Wet	Yes	Unincorporated	Residential/ Private	None	North Mill Creek 2009
11-012	11-012	-88.04511398	42.41776998	Mallard Ridge Park Pond	Dry	Yes	Lindenhurst	Public	1. Remove low flow bypass with Installation of FES Inlet 1 and Outlet A. 2. Plant bottom and slopes with native plants 3. Remove concrete channel at Inlet 2.	Mill Creek 2013
11-014	11-014	-88.04504044	42.41674304	Eagle Ridge Center Pond 2	Wet	Yes	Lindenhurst	Commercial	1. Clear banks of woody vegetation 2. Install aerators.	Mill Creek 2013
11-015	11-015	-88.00917344	42.41591678	Farmington Green Estates Pond	Wet	Yes	Lindenhurst	Residential	None	Mill Creek 2013
11-017	11-017	-88.00464829	42.41584137	-	Wet	Yes	Lindenhurst	Residential	Install aerator	Mill Creek 2013
11-020	11-020	-88.00981871	42.41480699	Harvest Hill Pond	Wet	Yes	Lindenhurst	Residential	1. Clear inlet 6 2. Remove woody vegetation 3. Install native plants	Mill Creek 2013
11-025	11-025	-88.00936715	42.41104396	Country Place - Lindenhurst Pond 1	Wet	Yes	Lindenhurst	Residential	1. Disconnect sump pump 2. Plant natives on slopes 3. Clear inlet 3 of debris.	Mill Creek 2013
11-026	11-026	-88.01198229	42.41056031	Country Place - Lindenhurst Pond 2	Wet	Yes	Lindenhurst	Residential	Install aerators.	Mill Creek 2013
11-027	11-027	-88.00610416	42.40932954	Cross Creek Pond	Wet	Yes	Lindenhurst	Residential	1. Fix aerator 2. Disconnect sump pump 3. Remove woody vegetation 4. Plant native plants on all slopes.	Mill Creek 2013

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
11-028	11-028	-88.01365437	42.40872068	Country Place - Lindenhurst Pond 3	Wet	Yes	Lindenhurst	Residential/ Public	1. Clear inlet 3 of debris 2. Put more riprap in front of Inlet 2	Mill Creek 2013
11-029	11-029	-88.0342709	42.40898419	Venetian Village Pond 1	Dry	Yes	Lindenhurst	Commercial/ Residential	1. Remove concrete channel 2. Replace Inlet 1 and install riprap in front 3. Clear Outlet A of debris 4. Plant bottom and slopes with native plants.	Mill Creek 2013
11-030	11-030	-87.96605471	42.40704302	Tempel Smith Lake 1 - ADID 47	Wetland	No	Old Mill Creek	Residential	1. Plant natural plants where inlet is bare 2. Install aerators	Mill Creek 2013
11-031	11-031	-88.01384838	42.40730527	Country Place - Lindenhurst Pond 4	Wet	Yes	Lindenhurst	Residential	1. Clear Outlet of debris 2. Install an aerator.	Mill Creek 2013
11-033	11-033	-88.01412429	42.40627206	Country Place - Lindenhurst Pond 5	Wet	Yes	Lindenhurst	Residential	1. Replace turf grass with native plants 2. Install aerator on east side.	Mill Creek 2013
11-036	11-036	-88.00426744	42.40510817	Falling Waters Pond 2	Wet	Yes	Lindenhurst	Public	1. Install an aerator 2. Clear woody vegetation 3. Plant native plants.	Mill Creek 2013
11-039	11-039	-88.00337744	42.40408212	Deerpath - Lake Villa Pond 5	Wet	Yes	Unincorporated	Residential	1. Install aerator 2. Shift Inlet 1 to southern bank 3. Clear outlet of debris.	Mill Creek 2013
11-040	11-040	-87.99688576	42.40304646	Deerpath - Lake Villa Pond 1	Wet	Yes	Unincorporated	Residential	None	Mill Creek 2013
11-041	11-041	-88.01743883	42.40381154	Country Place - Lindenhurst Pond 6	Wet	Yes	Lindenhurst	Residential	Install an aerator.	Mill Creek 2013
11-042	11-042	-87.96681715	42.40352681	Hunt Club Farms Pond 20	Wet	No	Unincorporated	Residential	Plant slopes with native grasses	Mill Creek 2013
11-046	11-046	-88.02293483	42.40206537	-	Wet	No	Unincorporated	Public	Plant slopes with native grasses	Mill Creek 2013
11-047	11-047	-88.0234024	42.40190922	-	Wet	No	Unincorporated	Public	Replace riprap with native plants	Mill Creek 2013
11-049	11-049	-87.95998477	42.3993868	Hunt Club Farms Lake	Wet	No	Unincorporated	Residential	Plant native plants on channels that turf grass lined.	Mill Creek 2013
11-050	11-050	-87.99978013	42.40063964	Deerpath - Lake Villa Pond 2	Wet	Yes	Unincorporated	Residential	Install an aerator near Inlet 2.	Mill Creek 2013
11-054	11-054	-87.97268948	42.39732762	Hunt Club Farms Pond 14	Wet	No	Unincorporated	Residential	1. Replace turf grass with native plants. 2. Install an aerator. 3. Reduce east bank's slope.	Mill Creek 2013
11-056	11-056	-88.02274809	42.39708458	Emerald Ridge Pond 1	Wet	No	Lindenhurst	Residential	1. Clear Inlet 1 2. Add riprap to inlet 2 3. Reduce slope on north bank 4. Plant banks with native plants.	Mill Creek 2013
11-057	11-057	-88.01964129	42.39626295	Emerald Ridge Pond 2	Wet	No	Lindenhurst	Commercial/ Residential	1. Disconnect downspouts 2. Replace riprap/grass banks with native plants 3. Expand by Inlet 1 to make a riprap forebay 4. Riprap in front of Inlet 2	Mill Creek 2013
11-060	11-060	-87.9782301	42.39492107	Mill Creek Crossing Pond 4	Wet	No	Unincorporated	Residential	1. Regrade slope to 3:1 or lower 2. Plant native grasses and plants on banks	Mill Creek 2013
11-062	11-062	-87.98516094	42.39443286	Mill Creek Crossing Pond 5	Wet	No	Unincorporated	Residential	1. Replant with native vegetation 2. Disconnect sumps 3. Replace inlet 2	Mill Creek 2013

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
11-063	11-063	-87.97826676	42.39389895	Mill Creek Crossing Pond 8	Wet	No	Unincorporated	Residential	Replace turf grass and riprap slopes with native vegetation	Mill Creek 2013
11-065	11-065	-87.97469691	42.39371952	Hunt Club Farms Pond 11	Wet	No	Unincorporated	Residential	None	Mill Creek 2013
11-066	11-066	-87.98299605	42.39370133	Mill Creek Crossing Pond 6	Wet	No	Unincorporated	Residential	1. Replace inlet 1 2. Line slopes with native plants	Mill Creek 2013
11-067	11-067	-87.9817507	42.39309843	Mill Creek Crossing Pond 7	Wet	No	Unincorporated	Residential	1. Replant slopes with native plants 2. Install aerator by outlet	Mill Creek 2013
11-069	11-069	-88.0558055	42.3918741	Foxchase Pond 1	Dry	Yes	Round Lake Beach	Residential	1. Plant native vegetation 2. Replace inlet 2 3. Unclog outlet A	Mill Creek 2013
11-071	11-071	-88.05451088	42.39126268	Coventry Estates Pond 2	Wet	Yes	Round Lake Beach	Residential	1. Install aerator 2. Plant native vegetation on the rest of the bank	Mill Creek 2013
11-072	11-072	-87.97293454	42.39051136	Brookside Pond 3	Wet	No	Unincorporated	Public	1. Fix slope of east bank to 3:1 or lower 2. Plant banks with native plants	Mill Creek 2013
11-073	11-073	-87.97879481	42.39022735	Bridlewood - Gurnee Pond 1	Wet	No	Unincorporated	Residential	1. Replant slopes with native plants 2. Unclog Inlet 3 3. Install an aerator on the west side.	Mill Creek 2013
11-074	11-074	-88.05557086	42.38970206	-	Dry	Yes	Round Lake Beach	Residential	Plant native vegetation on banks and rest of bottom	Mill Creek 2013
11-075	11-075	-87.97388662	42.38980938	Brookside Pond 1	Wet	No	Unincorporated	Residential	1. Replant slopes with native plants 2. Remove Inlet 1 and connect that to basin 11-072	Mill Creek 2013
11-076	11-076	-87.97851287	42.38896755	Bridlewood - Gurnee Pond 2	Wet	No	Unincorporated	Residential	1. Disconnect downspouts 2. Reduce slopes and plant native plants.	Mill Creek 2013
11-078	11-078	-88.05717944	42.3886298	Foxchase Pond 2	Dry	Yes	Round Lake Beach	Residential	Plant bottom and slopes with native vegetation	Mill Creek 2013
11-080	11-080	-87.97360917	42.3873197	Brookside Pond 2	Wet	No	Unincorporated	Residential	1. Decrease slope 2. Plant native plants instead of grass and riprap 3. Replace inlet 2 with new due to scour.	Mill Creek 2013
11-083	11-083	-88.04920826	42.38583698	Prairies of Grayslake Pond	Wet	Yes	Grayslake	Residential	1. Disconnect sump pump 2. Plant native vegetation on banks	Mill Creek 2013
11-084	11-084	-88.05938716	42.38543456	Sweetwater Mill Pond 1	Wet	No	Round Lake Beach	Public	1. Plant native vegetation on banks 2. Disconnect downspouts 3. Clear inlet 4	Mill Creek 2013
11-085	11-085	-87.97822603	42.38474406	Gurnee Town Centre Pond	Dry	Yes	Gurnee	Commercial	1. Remove low-flow bypass 2. Slope bottom more for greater water removal 3. Clear Inlets 1 and 6 of debris 4. Replace Inlet 7 due to scour.	Mill Creek 2013
11-086	11-086	-87.98018135	42.38529597	Concord Oaks Pond	Wet	Yes	Gurnee	Residential/ Commercial	1. Disconnect sump pumps 2. Fix aerator 3. Replace outlet 4. Install trash grate on Inlet 5.	Mill Creek 2013
11-087	11-087	-87.98881955	42.38519997	Elysian Fields Pond 1	Wet	Yes	Gurnee	Commercial	1. Replant slopes with native plants 2. Replace outlet.	Mill Creek 2013
11-088	11-088	-87.99333715	42.38388215	Greystone Commercial Pond 2	Wet	Yes	Gurnee	Residential	Remove Inlet 2, run to stormsewer then basin/new inlet on SE corner.	Mill Creek 2013

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
11-089	11-089	-87.9971103	42.38385423	-	Wet	Yes	Gurnee	Public	1. Remove bricks and plant native grasses 2. Fix aerator.	Mill Creek 2013
11-094	11-094	-88.03920455	42.38314602	Carillon North Pond 1	Wet	Yes	Grayslake	Public	None	Mill Creek 2013
11-095	11-095	-87.99719987	42.38250436	Greystone Pond	Dry	Yes	Gurnee	Residential	None	Mill Creek 2013
11-096	11-096	-88.04093003	42.38243114	Carillon North Pond 2	Wet	No	Grayslake	Residential	1. Clear inlets 3 and 4 of debris 2. Install riprap in front of inlet 5	Mill Creek 2013
11-097	11-097	-88.06394691	42.38266814	-	Wet	No	Round Lake Beach	Commercial	1. Clear litter from water 2. Disconnect sump pump	Mill Creek 2013
11-099	11-099	-87.99802967	42.38202826	Ravinia Woods Pond 1	Dry	Yes	Gurnee	Residential	Clear outlet of debris	Mill Creek 2013
11-100	11-100	-87.9771373	42.38039342	Villas of Stonebrook Pond	Wet	No	Gurnee	Residential	1. Install aerator for algae 2. Put trash grate and riprap on inlet. 3. Disconnect from sump pumps.	Mill Creek 2013
11-103	11-103	-88.04270193	42.3792241	Carillon North Pond 3	Wet	Yes	Grayslake	Residential	Clear inlet 3 and outlet A	Mill Creek 2013
11-104	11-104	-87.98139399	42.37861641	Bittersweet Golf Club Pond 13	Wetland	Yes	Gurnee	Residential/ Public	1. Clear inlets of debris 2. Riprap inlets 3. Remove inlet 7 and redirect flow to Inlet 6 to prevent short-circuiting	Mill Creek 2013
11-106	11-106	-87.98791023	42.37848174	Elysian Fields Pond 3	Wetland	Yes	Gurnee	Residential	1. Clear outlet 2. Locate and clear inlets.	Mill Creek 2013
11-109	11-109	-88.00240545	42.37788583	-	Wet	No	Unincorporated	Residential/ Public	1. Disconnect downspouts 2. Spread aerators out to handle algae better.	Mill Creek 2013
11-110	11-110	-87.98696491	42.3771963	Bittersweet Golf Club Pond 22	Wet	Yes	Gurnee	Residential	1. Remove brick wall and slope 2. Replace turf grass with native grasses 3. Install aerators for algae.	Mill Creek 2013
11-111	11-111	-88.03942502	42.37775174	Carillon North Golf Course Pond 1	Wet	Yes	Grayslake	Public	1. Disconnect sump pump 2. Clear outlet of clogging 3. Install aerator	Mill Creek 2013
11-112	11-112	-87.99331492	42.37756702	Ravinia Woods Pond 3	Wet	Yes	Gurnee	Residential	Find Outlet	Mill Creek 2013
11-113	11-113	-88.03595829	42.37748693	Carillon North Golf Course Pond 3	Wetland	No	Grayslake	Public	Install riprap in front of inlet 1	Mill Creek 2013
11-114	11-114	-88.03827905	42.37756024	Carillon North Golf Course Pond 2	Wet	Yes	Grayslake	Public	None	Mill Creek 2013
11-1213	1213	-88.00597116	42.41467872	Farmington Neubauer basin	Wet	Yes	Lindenhurst	Residential	Increase native buffer	DPRW 2016
11-1214	1214	-88.0058345	42.41194846	Neubauer-45 basin	Wetland	Yes	Lindenhurst	Residential	None needed	DPRW 2016
11-1215	1215	-87.99911548	42.39292811	The shires basin 1	Wet	Yes	Warren Township	Residential	None needed	DPRW 2016
11-1216	1216	-88.05028036	42.37646772	Grayslake North High School Pond 2	Wet	Yes	Grayslake	Public	None needed	DPRW 2016
11-1217	1217	-88.05465609	42.37653248	Grayslake North High School Pond 3	Wetland	Yes	Grayslake	Public	None needed	DPRW 2016
11-1218	1218	-88.05265501	42.32605517	-	Wet	Yes	Grayslake	Public	1. Install aerators 2. Clean up oil	DPRW 2016

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
									3. Install more native plants 4. Put riprap at all inlets	
11-1219	1219	-88.01200039	42.33623079	-	Wetland	Yes	Grayslake	Commercial	Clear area around outlet	DPRW 2016
11-122	11-122	-87.98823682	42.37418793	Village of Gurnee Lake	Wet	Yes	Gurnee	Residential/ Public	1. Fix inlet 1's FES and grate 2. Clear inlet 6 3. Riprap 1,2,5, and 6 4. Install aerators.	Mill Creek 2013
11-127	11-127	-87.98404506	42.37459679	Bittersweet Golf Club Pond 1	Wet	Yes	Gurnee	Public	1. Install aerator 2. Put riprap in front of Inlets 1 and 2	Mill Creek 2013
11-128	11-128	-87.97698904	42.37299092	Bittersweet Golf Club Pond 7	Wet	Yes	Gurnee	Public/ Residential	Clear away debris from inlets so they can flow smoothly.	Mill Creek 2013
11-129	11-129	-87.9684057	42.37466666	Woodside Park Subdivision Pond 1	Wet	No	Gurnee	Residential	None	Mill Creek 2013
11-1299	1299	-87.98491012	42.36273124	-	Wet	Yes	Warren Township	Public	1. Install another aerator 2. Raise water level 3. Spray for algae 4. Implement more native plants 5. Unclog inlets/outlets	DPRW 2016
11-1304	1304	-87.9821682	42.36363028	Warren Township Center Pond	Wet	Yes	Warren Township	Public	1. Fix aerator 2. Fix cracked outlet 3. Implement native plants along east side	DPRW 2016
11-131	11-131	-87.97264802	42.37392887	Woodside Park Subdivision Pond 3	Wet	Yes	Gurnee	Residential	Move Inlet 1 to Northern Bank	Mill Creek 2013
11-1310	1310	-88.02551716	42.35872837	Cherry Creek Pond	Wet	Yes	Grayslake	Residential	1. Install aerator 2. Clean up trash 3. Install more inlets near road	DPRW 2016
11-1311	1311	-88.03269454	42.35327045	Frederick School Pond	Wet	Yes	Grayslake	Residential	1. Install aerator 2. Implement riprap near inlets 3. Clear plant debris from inlets	DPRW 2016
11-1312	1312	-88.03455432	42.3484658	-	Wet	Yes	Grayslake	Public	1. Implement more native plants 2. Unclog outlets/inlets 3. Clean up trash	DPRW 2016
11-1313	1313	-88.04124653	42.34904198	Grayslake Aquatic Center Pond	Wet	Yes	Grayslake	Public	1. Carp need to be managed (shock, fishing) 2. Install netting or more native plants 3. Clean up trash around basin 4. Unclog outlet 5. Fix inlets	DPRW 2016
11-1314	1314	-88.03556695	42.34496756	Grayslake Senior Residence Pond	Wet	Yes	Grayslake	Public	1. Clean up trash 2. Plant more native plants 3. Put riprap under inlets	DPRW 2016
11-1316	1316	-88.02538822	42.34545671	Walden Square Pond	Wet	Yes	Grayslake	Residential	1. Implement more native plants 2. Fix aerator 3. Put more riprap at inlets	DPRW 2016
11-1317	1317	-88.02587719	42.342818	Atkinson Center Pond	Wet	Yes	Grayslake	Public	1. Raise up inlets/outlets 2. Thin area around inlets/outlets 3. Clean up trash 4. Install aerator 5. Spray algae	DPRW 2016

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11-1318	1318	-88.02525795	42.34336652	-	Wet	Yes	Grayslake	Public	1. Install aerator 2. Fix area around inlet 3. Clean up trash 4. Implement native plants along perimeter	DPRW 2016
11-132	11-132	-87.96862055	42.37370635	Woodside Park Subdivision Pond 4	Wet	No	Gurnee	Residential	1. Riprap the inlets 2. Add trash grates	Mill Creek 2013
11-1323	1323	-87.96865385	42.37289359	-	Wet	Yes	Gurnee	Residential	1. Install more aerators 2. Unclog inlets 3. Thin out vegetation around inlets 4. Clean up trash	DPRW 2016
11-1330	1330	-88.02272197	42.33538599	Canterbury Estates Pond 2	Wet	Yes	Grayslake	Residential	1. Install aerator 2. Install more native plants 3. Clean up trash 4. Incorporate riprap near inlets	DPRW 2016
11-1331	1331	-88.02093675	42.33713125	Canterbury Estates Pond 1	Wet	Yes	Grayslake	Residential	1. Install more native plants along perimeter 2. Install aerator or two 3. Put more riprap near inlets 4. Clean up trash 5. Install another inlet at north end	DPRW 2016
11-1332	1332	-88.02815536	42.33533512	Mapleview Pond	Wet	Yes	Grayslake	Commercial	1. Install aerator 2. Clean up trash 3. Unclog inlets 4. Fix large erosion crack near outlet 5. Thin vegetation around inlets	DPRW 2016
11-1333	1333	-88.02833437	42.33474331	-	Wet	Yes	Grayslake	Commercial	Well maintained	DPRW 2016
11-1334	1334	-88.03181715	42.33502735	Hidden Pond 1	Wet	Yes	Grayslake	Residential	1. Install 2 aerators 2. Let native plants grow more instead of mowing	DPRW 2016
11-1335	1335	-88.03110618	42.33334329	Hidden Pond 2	Wet	Yes	Grayslake	Residential	1. Install aerator 2. Clean up trash 3. Thin vegetation around inlets/outlets 4. Unclog inlets/outlets	DPRW 2016
11-1336	1336	-88.03355786	42.3325094	Phil-Mar Pond	Wet	Yes	Grayslake	Residential	1. Implement more native plants 2. Clean up cinder blocks along shore 3. Clean up trash 4. Install an aerator 5. Make inlet discharge cleaner	DPRW 2016
11-1339	1339	-88.03538189	42.34667078	Grayslake Area Public Library Pond	Dry	Yes	Grayslake	Public	1. Spread out inlets/outlets to utilize entire basin 2. Incorporate parking lot runoff into basin slope 3. Plant native plants	DPRW 2016
11-1340	1340	-88.03683795	42.3459964	-	Wetland	Yes	Grayslake	Public	1. Clean up trash 2. Angle basin more towards outlet	DPRW 2016
11-136	11-136	-87.9686966	42.37288949	Hunt Club Park Pond 2	Wet	Yes	Gurnee	Public	1. Install a 3rd aerator in the middle 2. Put riprap around inlets and trash grates.	Mill Creek 2013
11-138	11-138	-88.0405238	42.3731531	Sunrise Park Pond 1	Wet	Yes	Grayslake	Public and Residential	Plant native grasses on turf grass slopes	Mill Creek 2013
11-140	11-140	-87.98603361	42.37250293	Bittersweet Golf Club Pond 20	Wet	Yes	Gurnee	Public/ Residential	None	Mill Creek 2013

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11-142	11-142	-87.97556561	42.37140673	Bittersweet Golf Club Pond 12	Wet	Yes	Gurnee	Public	Install aerator to combat algae problem	Mill Creek 2013
11-143	11-143	-87.98921134	42.37117302	Kingsport Woods Pond 1	Dry	Yes	Gurnee	Residential	Plant banks and bottom with native vegetation	Mill Creek 2013
11-145	11-145	-87.98579134	42.37075537	Timberwoods Pond 1	Wet	Yes	Gurnee	Residential	1. Install aerator 2. Plant native grasses on slopes.	Mill Creek 2013
11-146	11-146	-88.04494859	42.37084368	Normandy Woods Pond	Wet	Yes	Grayslake	Residential	1. Plant native vegetation on banks 2. Clear inlet 2	Mill Creek 2013
11-147	11-147	-87.97005194	42.37015598	Oak Knoll PUD Pond 2	Wet	No	Unincorporated	Residential	1. Flair the Inlet 2. Add riprap and trash grate.	Mill Creek 2013
11-148	11-148	-87.97166557	42.37015122	Oak Knoll PUD Pond 1	Wet	No	Unincorporated	Residential	Install riprap and a trash grate at Inlet 1.	Mill Creek 2013
11-149	11-149	-87.97742325	42.37006721	Bittersweet Golf Club Pond 15	Wet	Yes	Gurnee	Public	1. Riprap inlet 1 2. Clear outlets of debris	Mill Creek 2013
11-153	11-153	-87.97557161	42.36799624	Bittersweet Golf Club Pond 16	Wet	Yes	Gurnee	Public	None	Mill Creek 2013
11-157	11-157	-87.98134826	42.36719795	Washington Park Subdivision Pond 2	Dry	Yes	Gurnee	Residential	1. Remove low flow bypass from Inlet 1 to Outlet 2. Plant native vegetation.	Mill Creek 2013
11-159	11-159	-87.97963427	42.36750202	Aberdare Estates Pond 2	Wet	Yes	Gurnee	Residential	Plants banks with native plants instead of turf grass.	Mill Creek 2013
11-160	11-160	-87.97263178	42.36716014	Oak Knoll PUD Pond 3	Wet	No	Unincorporated	Residential	None	Mill Creek 2013
11-161	11-161	-87.97428236	42.36724757	Bittersweet Golf Club Pond 17	Wet	Yes	Gurnee	Public	1. Install aerator to reduce algae 2. Remove concrete wall and replace with slope.	Mill Creek 2013
11-163	11-163	-87.97494062	42.36661262	Bittersweet Golf Club Pond 18	Wet	Yes	Gurnee	Residential/ Public	Clear emergency overflow of debris	Mill Creek 2013
11-165	11-165	-88.04205751	42.3664804	Churchill Pond	Wet	Yes	Grayslake	Public	1. Plant slopes with native vegetation 2. Clear outlet of debris 3. Disconnect sump pump	Mill Creek 2013
11-167	11-167	-87.99279103	42.3662177	Ravinia Woods Pond 10	Wet	Yes	Gurnee	Public	1. Reposition inlet to north bank 2. Replant banks with native vegetation 3. Clean outlet.	Mill Creek 2013
11-168	11-168	-88.04350037	42.36631179	-	Wet	Yes	Grayslake	Commercial	Plant bottom and slope with native vegetation	Mill Creek 2013
11-169	11-169	-87.99231625	42.36554425	Ravinia Woods Pond 11	Wet	No	Gurnee	Residential	1. Install aerator to reduce algae 2. Investigate flooding at 440 and 456 Hillview Dr. 3. Instead of having pipe turn to 11-167 go straight to 111-169 - this may prevent flooding	Mill Creek 2013
11-171	11-171	-87.99818705	42.36343787	Ravinia Woods Pond 13	Wet	Yes	Gurnee	Public and Residential	1. Install aerator 2. Install riprap at inlets	Mill Creek 2013
11-173	11-173	-88.00822572	42.36419659	Mariners Cove Pond 2	Wet	No	Third Lake	Residential	1. Put trash grates over inlets 2. Downspouts disconnected 3. Plant native vegetation on northwest bank.	Mill Creek 2013
11-174	11-174	-87.99207694	42.3647211	Ravinia Woods Pond 12	Wet	Yes	Gurnee	Public	1. Clear outlet 2. Reduce algae	Mill Creek 2013
11-176	11-176	-87.98979048	42.36453195	Kingsport Woods Pond 4	Wet	No	Gurnee	Public	1. Move outlet to southwest corner 2. Put trash grate on inlet 3. Plant native plants on slopes	Mill Creek 2013

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11-177	11-177	-87.99048927	42.36444765	Kingsport Woods Pond 3	Wet	Yes	Gurnee	Public	1. Move outlet to southwest corner 2. Add trash grate and riprap to inlet 3. Replant banks with native species	Mill Creek 2013
11-178	11-178	-88.04943499	42.36392289	Meadowview Woods Park Pond 3	Wet	Yes	Grayslake	Residential	None	Mill Creek 2013
11-179	11-179	-87.9821771	42.3636301	Warren Township Center Pond 1	Wet	No	Unincorporated	Public	1. Plant native plants along banks 2. Repair aerator	Mill Creek 2013
11-180	11-180	-87.98870474	42.36367897	Tangueray Meadows Pond 1	Wet	No	Unincorporated	Residential	1. Move outlet to northwest corner 2. Riprap inlet	Mill Creek 2013
11-183	11-183	-88.00660918	42.36278067	Mariners Cove Pond 3	Dry	No	Third Lake	Residential	1. Disconnect downspout 2. Plant native grasses on bottom and slopes 3. Remove low-flow bypass.	Mill Creek 2013
11-184	11-184	-87.98491743	42.36273359	Warren Township Center Pond 3	Wet	No	Unincorporated	Residential	1. Replace turf with native plants 2. Remove inlet 1 and connect to stormsewer 3. Riprap at Inlet 2.	Mill Creek 2013
11-185	11-185	-87.98377122	42.36227292	Warren Township Center Pond 4	Dry	No	Unincorporated	Public	1. Remove oaks and plant native prairie plants 2. Riprap inlets 3. Replace inlet 3, scoured mostly away.	Mill Creek 2013
11-186	11-186	-88.00846577	42.36158602	Valley Forge Park Pond	Wet	No	Grayslake	Public	1. Disconnect downspout 2. Remove turf/invasive grasses and plant natives 3. Clear trash and debris by inlet 1.	Mill Creek 2013
11-187	11-187	-88.00145372	42.36170124	Mariners Commercial Village Pond	Dry	Yes	Third Lake	Public	None	Mill Creek 2013
11-188	11-188	-88.03897605	42.36079501	Chesapeake Farms Pond 1	Wet	Yes	Grayslake	Residential	Disconnect downspout	Mill Creek 2013
11-189	11-189	-88.04512319	42.36078275	Doolittle Park Pond 7	Wet	No	Grayslake	Public	None	Mill Creek 2013
11-190	11-190	-88.00146041	42.36086568	CVS - Third Lake Pond	Wet	Yes	Third Lake	Commercial	1. Remove metal pipe if possible 2. Remove walls 3. Put in natural slopes with riprap on inlets	Mill Creek 2013
11-192	11-192	-88.03404928	42.36082843	Augie Pond 1	Dry	Yes	Grayslake	Commercial	Plant bottom and slopes with native plants	Mill Creek 2013
11-194	11-194	-88.01633218	42.35906968	Lake County High School Technology Campus Lake	Wet	No	Grayslake	Public	1. Riprap and install FES in inlets missing them 2. Replace turf grass with native plants 3. Cut back bank slope for planting	Mill Creek 2013
11-195	11-195	-88.04184763	42.35947555	Chesapeake Landing Pond 1	Wet	Yes	Grayslake	Residential	Disconnect Downspout	Mill Creek 2013
11-196	11-196	-88.00556218	42.36014239	Meadows of Grayslake Pond	Dry	No	Grayslake	Residential	1. Replace turf grass with native grass 2. Put riprap on inlet 1	Mill Creek 2013
11-197	11-197	-88.01061595	42.35982195	University Center of Lake County - Grayslake Pond	Wet	Yes	Grayslake	Public	None	Mill Creek 2013
11-198	11-198	-88.03435037	42.35936154	Chesapeake Farms Pond 4	Wet	Yes	Grayslake	Residential	1. Disconnect downspouts 2. Clear Inlet 1 of plants	Mill Creek 2013
11-199	11-199	-88.00403985	42.35915841	Rouse Basin 1	Dry	Yes	Third Lake	Commercial	1. Plant native grasses on banks 2. Unclog inlet 1	Mill Creek 2013
11-200	11-200	-88.0395931	42.35870184	Chesapeake Farms Pond 2	Wet	No	Grayslake	Residential	1. Disconnect downspout 2. Expand strip of native plants	Mill Creek 2013

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11-202	11-202	-88.0255204	42.35872826	Cherry Creek Pond 4	Wet	Yes	Grayslake	Residential	Clear Inlet 2	Mill Creek 2013
11-206	11-206	-88.02021309	42.35521635	Mill Creek Park Lake	Wet	Yes	Grayslake	Public	Add riprap to inlets	Mill Creek 2013
11-208	11-208	-88.05251459	42.35626487	Haryan Farm Pond 1	Wet	No	Grayslake	Residential	Plant native vegetation on the slopes.	Mill Creek 2013
11-209	11-209	-88.02681429	42.35592698	Cherry Creek Pond 2	Wet	Yes	Grayslake	Residential	None, good basin	Mill Creek 2013
11-211	11-211	-88.01677684	42.35594389	College of Lake County Pond 1	Wet	Yes	Grayslake	Public	None	Mill Creek 2013
11-213	11-213	-88.05488096	42.35487999	Mollys Lake	Wet	No	Grayslake	Residential	Plant natives on slopes	Mill Creek 2013
11-214	11-214	-88.01666565	42.3549095	College of Lake County Pond 3	Wet	Yes	Grayslake	Public	Install riprap on inlets	Mill Creek 2013
11-216	11-216	-88.03692505	42.3546812	Manor Lake	Wet	No	Grayslake	Residential	1. Install aerators 2. Put in native vegetation on non-beach banks	Mill Creek 2013
11-219	11-219	-88.01540675	42.35329124	Willow Lake	Wet	No	Grayslake	Public	Pull back inlets to banks and put riprap on them	Mill Creek 2013
11-222	11-222	-88.03268204	42.35326296	Frederick School Pond 1	Wet	Yes	Grayslake	Public	Clear Inlets 2 and 3 and Outlet A of plants	Mill Creek 2013
11-225	11-225	-88.05425257	42.35072486	West Trail Pond 3	Wet	No	Grayslake	Residential	Plant native plants on banks	Mill Creek 2013
11-226	11-226	-88.00681767	42.35045778	Brae Loch Golf Club Pond 2	Wet	No	Unincorporated	Golf Course	Plant native plants on banks	Mill Creek 2013
11-227	11-227	-88.05643429	42.35054945	West Trail Pond 2	Wet	No	Grayslake	Residential	1. Plant native plants on banks 2. Install aerators 3. Clear inlets 1 and 3 and Outlet A of debris 4. Disconnect downspout	Mill Creek 2013
11-228	11-228	-88.01089755	42.35010944	Brae Loch Golf Club Pond 1	Wet	No	Unincorporated	Golf Course	1. Resoil eroded areas 2. Lower outlet to expose submerged inlets.	Mill Creek 2013
11-229	11-229	-88.01946034	42.34755947	College Trail Lake	Wet	No	Grayslake	Residential	1. Disconnect downspout 2. Install aerators 3. Plant slopes with native grasses	Mill Creek 2013
11-230	11-230	-88.03435582	42.34952353	Grayslake Aquatic Center Pond 4	Dry	No	Grayslake	Public	1. Disconnect bypass 2. Install FES Inlet 3. Plant banks and bottom with native plants.	Mill Creek 2013
11-231	11-231	-88.04125166	42.34904615	Grayslake Aquatic Center Pond 1	Wet	No	Grayslake	Public	1. Install aerator 2. Replace soil around Inlet 2 3. Replace inlets 2 And 3	Mill Creek 2013
11-232	11-232	-88.00729799	42.34849652	Brae Loch Golf Club Pond 3	Wet	No	Unincorporated	Golf Course	Disconnect downspout	Mill Creek 2013
11-233	11-233	-88.03455878	42.34846735	Grayslake Aquatic Center Pond 5	Wet	No	Grayslake	Public	1. Move inlet 1 to center of west bank 2. Plant slopes with native vegetation	Mill Creek 2013
11-234	11-234	-88.02766402	42.34805791	Creekside Park Pond	Wet	No	Grayslake	Residential	1. Clear Inlet 3 of Debris 2. Riprap the opening of Outlet 4	Mill Creek 2013
11-235	11-235	-88.01328314	42.34770367	Brae Loch Golf Club Pond 4	Wet	No	Unincorporated	Golf Course	None	Mill Creek 2013

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11-236	11-236	-88.0348936	42.3469798	Grayslake Area Public Library Pond 1	Dry	No	Grayslake	Public	1. Plant native vegetation on bottom and banks 2. Remove low flow bypass and put in FES inlet.	Mill Creek 2013
11-237	11-237	-88.03538242	42.3466759	Grayslake Area Public Library Pond 2	Dry	No	Grayslake	Public	1. Disconnect low flow bypass 2. Install FES inlet 3. Plant native grasses on banks and bottom.	Mill Creek 2013
11-238	11-238	-88.03488422	42.3464135	Grayslake Area Public Library Pond 3	Dry	No	Grayslake	Public	1. Remove low flow bypass and install FES inlet 2. Replant slopes and bottoms with native plants	Mill Creek 2013
11-239	11-239	-88.03686835	42.34598521	Grayslake Senior Residence Pond 1	Dry	Yes	Grayslake	Public	Replant banks with native vegetation	Mill Creek 2013
11-240	11-240	-88.02539085	42.34546585	Walden Square Pond	Wet	No	Grayslake	Commercial	1. Disconnect downspouts 2. Place additional riprap at Inlet 1 3. Plant slopes with native plants	Mill Creek 2013
11-241	11-241	-88.03557276	42.34499351	Grayslake Senior Residence Pond 2	Wet	No	Grayslake	Public	Plant slopes with native vegetation	Mill Creek 2013
11-242	11-242	-88.02526358	42.3433762	Atkinson Center Pond 1	Wet	No	Grayslake	Commercial	1. Clean garbage out 2. Repair slope behind inlet 1	Mill Creek 2013
11-243	11-243	-88.02587612	42.3428254	Atkinson Center Pond 2	Wet	No	Grayslake	Commercial	Move outlet to southwestern end of basin	Mill Creek 2013
11-246	11-246	-88.03182104	42.34166565	NJB Operations Inc 1	Wetland	No	Grayslake	Commercial	Put in trash grate and rip rap on inlet	Mill Creek 2013
11-247	11-247	-88.00237641	42.34136119	Country Faire Pond 2	Wet	Yes	Grayslake	Residential	1. Disconnect downspout 2. Add trash grate to inlets	Mill Creek 2013
11-249	11-249	-88.00513982	42.34054415	Ddr/Skw Grayslake Llc 1	Wet	No	Grayslake	Wetland	Remove plastic pipe and replace with concrete outlet	Mill Creek 2013
11-250	11-250	-88.01153693	42.34055583	H Rothacker	Wet	No	Grayslake	Commercial	1. Remove algae 2. Prevent fertilizer runoff through buffer zone.	Mill Creek 2013
11-253	11-253	-88.00560076	42.33984523	Aldworth Pond	Dry	Yes	Grayslake	Public	1. Remove algae 2. Plant native prairie/hydrophilic plants. 3. Connect to gas station's storm sewer. 4. Clear inlets	Mill Creek 2013
11-254	11-254	-88.02076175	42.33979498	Center Street Square Pond 2	Wet	No	Grayslake	Commercial	Clear inlets and outlet	Mill Creek 2013
11-255	11-255	-88.0229101	42.33844238	Center Street Square Pond 3	Wet	No	Grayslake	Commercial	1. Replace CMP with RCP and FES Grate. 2. Combine this basin with 11-259.	Mill Creek 2013
11-258	11-258	-88.01932364	42.33812928	Canterbury Park Pond 1	Wet	Yes	Grayslake	Residential	None	Mill Creek 2013
11-259	11-259	-88.02261563	42.33835166	Center Street Square Pond 4	Wet	No	Grayslake	Commercial	Clear manhole cover	Mill Creek 2013
11-262	11-262	-88.02095877	42.33712966	Canterbury Estates Pond 2	Wet	Yes	Grayslake	Residential	1. Disconnect downspout 2. Replant with native grasses 3. Redesign SW inlet to increase water quality	Mill Creek 2013
11-263	11-263	-88.01312794	42.33693827	Lake Forest Hospital - Grayslake Pond 1	Wetland	No	Grayslake	Public	None	Mill Creek 2013
11-264	11-264	-88.0374453	42.33665373	Eastlake Farm Park Pond	Wet	Yes	Grayslake	Residential	1. Plant slopes with native vegetation 2. Clear Inlet 1 3. Fix outlet's trash grate.	Mill Creek 2013
11-266	11-266	-88.03339712	42.33627099	Hidden Ponds Pond 1	Wet	Yes	Grayslake	Residential	1. Continue with native vegetation along banks 2. Remove turf grass on southeast banks.	Mill Creek 2013

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11-267	11-267	-88.02273098	42.33539132	Canterbury Estates Pond 1	Wet	Yes	Grayslake	Residential	1. Disconnect downspout 2. Plant banks with wetland grass 3. Plant bed with native pond plants	Mill Creek 2013
11-268	11-268	-88.02816605	42.33534075	Mapleview Pond 1	Wet	Yes	Grayslake	Commercial	Clean clogged inlets	Mill Creek 2013
11-269	11-269	-88.0318324	42.33503043	Hidden Ponds Pond 3	Wet	Yes	Grayslake	Residential	Continue native vegetation maintenance	Mill Creek 2013
11-270	11-270	-88.02474546	42.33521556	Mapleview Pond 2	Wet	Yes	Grayslake	Commercial	Clear Inlets	Mill Creek 2013
11-273	11-273	-88.03118259	42.33324808	Hidden Ponds Pond 5	Wet	Yes	Grayslake	Residential	1. Clear partially plugged inlets 2. Reinstall riprap at some locations	Mill Creek 2013
11-274	11-274	-88.02874636	42.33304763	-	Dry	Yes	Grayslake	Commercial	1. Riprap in front of Inlet 1 2. Remove walls and slope to 3:1 3. Plant native plants.	Mill Creek 2013
11-276	11-276	-88.03357113	42.33250358	Phil-Mar Pond	Wet	No	Grayslake	Residential	1. Install grate over inlet 2. Open manhole for restrictor	Mill Creek 2013
11-277	11-277	-88.04170947	42.33219509	Grayslake Rail Station Pond 1	Dry	Yes	Grayslake	Public	1. Plant native vegetation on slopes and bottom 2. Clear and riprap inlet 3. Remove low flow bypass 4. Install FES outlet by Emergency Overflow Structure.	Mill Creek 2013
11-279	11-279	-88.04908483	42.33219013	-	Wet	Yes	Grayslake	Residential	1. Plant native grasses on slopes and Inlet 2. Install more riprap at Inlet 1.	Mill Creek 2013
11-283	11-283	-88.01724647	42.33065699	Prairie Crossing Pond 10	Wet	Yes	Grayslake	Residential	Disconnect downspout	Mill Creek 2013
11-286	11-286	-88.01886981	42.32891679	Prairie Crossing Pond 9	Wet	Yes	Grayslake	Residential	1. Disconnect downspout 2. Plant hydrophilic plants in the channel	Mill Creek 2013
11-291	11-291	-88.03015257	42.32172291	Countryside Landfill Pond 18	Wet	Yes	Unincorporated	Industrial	None	Mill Creek 2013
11-292	11-292	-88.04881558	42.32356314	-	Wet	No	Grayslake	Commercial	Plant banks with native plants	Mill Creek 2013
11-293	11-293	-88.03302676	42.32128522	-	Dry	Yes	Grayslake	Industrial	Put riprap in front of Inlet 2	Mill Creek 2013
11-308	11-308	-88.02798192	42.31263099	Countryside Landfill Pond 12	Wet	Yes	Grayslake	Commercial	Install aerator	Mill Creek 2013
11-313	11-313	-87.98990907	42.36930807	-	Wetland	No	Gurnee	Residential	Plant slopes with native plants	Mill Creek 2013
11-314	11-314	-87.99765216	42.37426516	Ravinia Woods 4 of 6	Wetland	No	Gurnee	Residential	Clear inlet 2 of vegetation and locate outlet	Mill Creek 2013
11-315	11-315	-88.01389942	42.33748448	Northwestern Lake Forest Hospital 3	Wet	Yes	Grayslake	Public	Plant native vegetation on banks and in bed	Mill Creek 2013
11-316	11-316	-88.00888073	42.33832141	Lake Forest Hospital Detention 1	Wet	Yes	Grayslake	Public	1. Clear outlet entrance of reeds 2. Put riprap at inlet	Mill Creek 2013
11-318	11-318	-87.98510586	42.39232294	-	Wet	Yes	Unincorporated	Residential	1. Disconnect downspout 2. Install aerator 3. Clean up trash.	Mill Creek 2013
11-319	11-319	-87.99919437	42.38873638	-	Wet	Yes	Unincorporated	Residential	Install aerator	Mill Creek 2013

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11-320	11-320	-88.00082024	42.39593658	-	Wet	Yes	Unincorporated	Residential	1. Disconnect sump pumps 2. Clear inlets and outlets	Mill Creek 2013
11-321	11-321	-88.00029685	42.39453158	-	Wet	Yes	Unincorporated	Residential	1. Install aerators 2. Clear inlet 4 3. Disconnect downspout	Mill Creek 2013
11-322	11-322	-87.99776453	42.39464535	-	Wet	Yes	Unincorporated	Residential	None	Mill Creek 2013
11-323	11-323	-87.99783712	42.39645145	-	Wet	Yes	Unincorporated	Residential	Disconnect downspout	Mill Creek 2013
11-325	11-325	-88.00075325	42.36414847	Waterstone Third Lake LLC Basin 1	Wet	Yes	Third Lake	Public	Remove algae	Mill Creek 2013
11-328	11-328	-88.02398756	42.33591253	Canterbury Estates Subdivision 4	Wet	No	Grayslake	Residential	Unclog the inlet	Mill Creek 2013
11-329	11-329	-88.0443481	42.33007495	-	Wet	No	Grayslake	Residential	Plant native grasses on rest of the slopes.	Mill Creek 2013
11-332	11-332	-88.04696342	42.33201586	-	Wet	Yes	Grayslake	Residential	1. Clear outlet of debris 2. Fix aerator.	Mill Creek 2013
11-333	11-333	-87.99932676	42.36615627	JY&I Properties LLC Basin 1	Wet	Yes	Third Lake	Public	Remove algae	Mill Creek 2013
11-334	11-334	-87.99665902	42.36200077	Stonebridge Homeowners Association Basin 1	Wet	Yes	Unincorporated	Residential	Remove algae	Mill Creek 2013
11-335	11-335	-87.98875598	42.36797957	Kingsport Woods Homeowners Association Basin 3	Dry	Yes	Gurnee	Residential	1. Plant native vegetation 2. Install riprap on inlets	Mill Creek 2013
11-336	11-336	-88.05583541	42.37520716	-	Wet	Yes	Round Lake Beach	Public	1. Clear outlet of debris 2. Sweep the basin for trash 3. Install aerator	Mill Creek 2013
11-337	11-337	-88.05537735	42.37552321	-	Wet	Yes	Round Lake Beach	Public	1. Plant slopes with native vegetation 2. Install aerators 3. Clear debris and sediment from inlet 1	Mill Creek 2013
11-338	11-338	-88.05749893	42.37619533	-	Wet	Yes	Round Lake Beach	Public	1. Clear sediment and debris from inlet 2. Install aerators	Mill Creek 2013
11-339	11-339	-88.04887733	42.37491666	-	Wet	Yes	Grayslake	Public	1. Clear inlet 2 and outlet 2. Dredge	Mill Creek 2013
11-340	11-340	-88.04837812	42.3771986	-	Wet	Yes	Grayslake	Public	1. Clear outlet of debris 2. Install aerator	Mill Creek 2013
11-341	11-341	-88.05077892	42.37497812	-	Wet	Yes	Grayslake	Public	Install aerator	Mill Creek 2013
11-342	11-342	-88.0226042	42.40222825	-	Wet	No	Unincorporated	Public	Replace riprap with native plants	Mill Creek 2013
11-343	11-343	-88.01358797	42.33831047	Northwestern Lake Forest Hospital 1	Wet	Yes	Grayslake	Public	Replace vegetation on bank that was removed because of construction.	Mill Creek 2013
11-640	640	-88.00509396	42.40451179	Falling Waters Pond 1	Wet	Yes	Lindenhurst	Residential	Indenture and clear around inlet	DPRW 2016
11-641	641	-88.00473319	42.4028153	Falling Waters Pond 4	Wet	Yes	Lindenhurst	Residential	Identify and clear around inlet	DPRW 2016
11-642	642	-88.00344442	42.40175773	Deerpath - Lake Villa Pond 4	Dry	Yes	Warren Township	Residential	Create curb cuts to increase inflow to basin	DPRW 2016

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11-643	643	-88.00499347	42.40194026	Falling Waters Pond 5	Wet	Yes	Lindenhurst	Residential	Install aerator	DPRW 2016
11-644	644	-87.99635449	42.38728616	Grandwood Park Pond 1	Wet	Yes	Warren Township	Residential	1. Increase native buffer 2. Install outlet to prevent overflow	DPRW 2016
11-645	645	-87.99309248	42.38636923	Grandwood Park Pond 2	Wet	Yes	Warren Township	Industrial	None needed	DPRW 2016
11-646	646	-87.99726197	42.3852226	Greystone Commercial Pond 1	Wet	Yes	Gurnee	Commercial	None needed	DPRW 2016
11-647	647	-88.05935047	42.38370894	Sweetwater Mill Pond 2	Wet	Yes	Round Lake Beach	Residential	1. Install aerator 2. Increase native buffer 3. Stabilize bank with riprap	DPRW 2016
11-648	648	-88.06133569	42.3826204	Bosco Pond	Wet	Yes	Round Lake Beach	Residential	None needed	DPRW 2016
11-649	649	-87.99795615	42.37795268	Ravinia Woods Pond 2	Wetland	Yes	Gurnee	Residential	Educate landowners about dumping yard waste	DPRW 2016
11-650	650	-88.05051662	42.37699877	Grayslake North High School Pond 1	Wetland	Yes	Grayslake	Public	None needed	DPRW 2016
11-651	651	-87.9981178	42.36995617	Platinum Auto Basin	Dry	Yes	Warren Township	Commercial	None needed	DPRW 2016
11-652	652	-87.97847011	42.36800785	Aberdare Estates Pond 3	Wet	Yes	Gurnee	Residential	1. Remove riprap and install native buffer 2. Install aerator	DPRW 2016
11-653	653	-87.98418284	42.36636393	Timberwoods Pond 3	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
11-654	654	-88.00829376	42.3657082	Mariners Cove Pond 1	Wet	Yes	Third Lake	Residential	1. Replant and stabilize slopes 2. Increase unmowed buffer	DPRW 2016
11-655	655	-87.98483084	42.36180786	Warren Township Center Pond 5	Dry	Yes	Warren Township	Public	None	DPRW 2016
11-656	656	-87.98570248	42.36159366	Warren Township Center Pond 7	Dry	Yes	Warren Township	Public	None	DPRW 2016
11-658	658	-88.03799868	42.35796128	Chesapeake Farms Pond 3	Wet	Yes	Grayslake	Residential	1. Increase buffer 2. Add native plantings 3. Add riprap to reduce erosion	DPRW 2016
11-659	659	-88.03974669	42.3574528	Shepherd of the Lakes Lutheran Church Pond	Dry	Yes	Grayslake	Residential	None	DPRW 2016
11-660	660	-88.04549207	42.35661051	Haryan Farm Pond 2	Wetland	Yes	Grayslake	Residential	1. Add riprap by inlets 2. Remove illicit pipes	DPRW 2016
11-661	661	-88.01800292	42.35528729	College of Lake County Pond 2	Dry	Yes	Grayslake	Public	None	DPRW 2016
11-662	662	-88.00623515	42.35420023	College of Lake County Pond 14	Wetland	Yes	Grayslake	Public	1. Reduce vegetation near inlet 2. Clear inlet	DPRW 2016
11-663	663	-88.02957963	42.35412382	Grayslake public works	Dry	Yes	Grayslake	Public	None needed	DPRW 2016
11-664	664	-88.02673071	42.35273136	Cherry Creek Pond 1	Wet	Yes	Grayslake	Residential	None	DPRW 2016
11-665	665	-87.99142863	42.34164931	Savanna Ridge Apartments Pond 1	Wet	Yes	Warren Township	Residential	1. Clear a path around basin 2. Thin vegetation around inlets/outlets	DPRW 2016
11-666	666	-88.00042767	42.34107092	Country Faire Pond 1	Wet	Yes	Grayslake	Residential	1. Make RCP inlets/outlet above water 2. Make 1 main channel for roof runoff 3. Clean up trash	DPRW 2016

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									4. Implement native plants	
11-667	667	-88.00909239	42.33642479	Lake Forest Hospital - Grayslake Pond 2	Wet	Yes	Grayslake	Public	None	DPRW 2016
12-1050	1050	-87.87867856	42.47157179	Tabor park 5	Wet	Yes	Zion	Residential	1. Increase buffer 2. Provide access easement by houses	DPRW 2016
12-1051	1051	-87.87951638	42.47105207	Tabor park 4	Wetland	Yes	Zion	Residential	Increase buffer by houses	DPRW 2016
12-1052	1052	-87.88121818	42.47106081	Tabor park 3	Wetland	Yes	Zion	Residential	Increase buffer by road	DPRW 2016
12-1053	1053	-87.87947484	42.4669839	Fielder park	Wet	Yes	Zion	Public	Remove invasive species	DPRW 2016
12-1054	1054	-87.89429017	42.4847444	Trumpet park small	Wet	Yes	Zion	Industrial	None needed	DPRW 2016
12-1055	1055	-87.89424289	42.48357051	Trumpet park large	Wet	Yes	Zion	Industrial	None needed	DPRW 2016
12-1056	1056	-87.89745012	42.48103899	FedEx 2	Wet	Yes	Zion	Industrial	None	DPRW 2016
12-1057	1057	-87.8965612	42.4802314	FedEx 1	Wet	Yes	Zion	Industrial	None	DPRW 2016
12-1058	1058	-87.89744912	42.47676444	Calpine 3	Wet	Yes	Zion	Industrial	Increase buffer	DPRW 2016
12-1059	1059	-87.89751181	42.46740815	Kramer's Kampers Basin 1	Dry	Yes	Zion	Industrial	None needed	DPRW 2016
12-1060	1060	-87.89676771	42.46747199	Kramer's Kampers non basin	Dry	Yes	Zion	Industrial	None	DPRW 2016
12-1061	1061	-87.89692164	42.46897088	Calpine 4	Wet	Yes	Zion	Residential	Don't mow the buffer	DPRW 2016
12-1062	1062	-87.90861605	42.47497409	Heritage trails basin 1	Wet	Yes	Newport Township	Residential	None needed	DPRW 2016
12-1063	1063	-87.90395171	42.47535728	Heritage trails basin 2	Wet	Yes	Newport Township	Residential	None needed	DPRW 2016
12-1064	1064	-87.88246694	42.47174605	Tabor park 2	Wet	Yes	Zion	Residential	None needed	DPRW 2016
12-1065	1065	-87.88245599	42.47154294	Tabor park 1	Wet	Yes	Zion	Residential	None	DPRW 2016
12-1066	1066	-87.90458652	42.47083409	Horse farm basin 1	Wetland	Yes	Wadsworth	Agricultural	None needed	DPRW 2016
12-1067	1067	-87.90565856	42.47190453	Maas airport pond	Wet	Yes	Newport Township	Agricultural	None	DPRW 2016
12-1068	1068	-87.90558155	42.47049873	Horse farm 2	Wet	Yes	Wadsworth	Agricultural	Install outlet if one not present	DPRW 2016
12-1069	1069	-87.90635018	42.47021613	Horse farm 3	Wet	Yes	Wadsworth	Agricultural	None needed	DPRW 2016
12-1070	1070	-87.88203469	42.46941972	Stone bridge 1	Wet	Yes	Zion	Residential	None needed	DPRW 2016
12-1071	1071	-87.88163175	42.46922052	Stone bridge 2	Wet	Yes	Zion	Residential	None needed	DPRW 2016
12-1072	1072	-87.88080384	42.46349153	Shell-Dunkins Basin 1	Dry	Yes	Zion	Commercial	Install native buffer	DPRW 2016
12-1073	1073	-87.90060958	42.44998243	Cornerstone Community Church Basin	Wet	Yes	Newport Township	Commercial	None needed	DPRW 2016
12-1074	1074	-87.89631977	42.44071031	Adams North Basin	Wetland	Yes	Wadsworth	Industrial	None	DPRW 2016
12-1075	1075	-87.89255786	42.44213969	Piccadilly Basin 1	Wet	Yes	Beach Park	Residential	Increase native buffer in lawn areas	DPRW 2016
12-1076	1076	-87.88499283	42.44221939	Bucksburn Basin	Wet	Yes	Beach Park	Residential	1. Increase buffer 2. Install native plants	DPRW 2016
12-1077	1077	-87.89485028	42.43867917	Adams South Basin	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
12-1078	1078	-87.89353157	42.43769698	Queensbury Basin 1	Wet	Yes	Beach Park	Residential	Locate and clear north outlet	DPRW 2016

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12-1079	1079	-87.8934732	42.43493827	Castleford- Victoria Basin 1	Wet	Yes	Beach Park	Residential	None needed	DPRW 2016
12-1080	1080	-87.89482957	42.43459251	Prairie Trail Basin 2	Wetland	Yes	Wadsworth	Public	None needed	DPRW 2016
12-1081	1081	-87.89720471	42.43205285	Prairie Trail Basin 1	Wetland	Yes	Wadsworth	Public	None needed	DPRW 2016
12-1082	1082	-87.89330025	42.43254278	Castleford Basin 1	Wetland	Yes	Beach Park	Residential	Increase buffer along lawn side	DPRW 2016
12-1083	1083	-87.8887093	42.42884959	Ogden Basin	Dry	Yes	Beach Park	Residential	None needed	DPRW 2016
12-1262	1262	-87.88059633	42.46709706	Fielders Park 2	Wet	Yes	Northbrook	Public	None needed	DPRW 2016
12-1263	1263	-87.88193644	42.48535429	Shepard Crook Golf Course Basin 10	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
12-1264	1264	-87.88266909	42.48387957	Shepards Crook Golf Course Basin 11	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
12-1265	1265	-87.88405446	42.48009663	Zion Landfill Basin 2	Wet	Yes	Zion	Industrial	None needed	DPRW 2016
12-1271	1271	-87.88413183	42.48204357	Zion Landfill Basin 1	Wet	Yes	Zion	Industrial	Install native buffer	DPRW 2016
12-1273	1273	-87.87607119	42.47989552	Zion Landfill Basin 3	Wet	Yes	Zion	Industrial	None needed	DPRW 2016
12-374	374	-87.87482995	42.47980146	Zion Landfill	Wet	No	Zion Township	Commercial	Not a basin according to Zion landfill. They are for sledge and have nothing to do with stormwater or any kind of water detention	Newport Drainage Ditch 2003
12-375	375	-87.88413655	42.48011903	Zion Landfill	Wet	No	Zion Township	Commercial	Not a basin according to Zion landfill. They are for sledge and have nothing to do with stormwater or any kind of water detention	Newport Drainage Ditch 2003
12-376	376	-87.88413391	42.4820625	Zion Landfill	Dry	No	Newport Township	Commercial	None	Newport Drainage Ditch 2003
12-377	377	-87.88189638	42.48538824	Shepard's Crook Golf Course	Wet	Yes	Zion	Commercial	Decrease erosion and turbidity.	Newport Drainage Ditch 2003
12-378	378	-87.88283499	42.48380387	Shepard's Crook Golf Course	Wet	Yes	Zion	Commercial	Decrease shoreline erosion	Newport Drainage Ditch 2003
12-378	379	-87.88701682	42.48263317	Zion Landfill	Wet	No	Zion	Commercial	Decrease sediment	Newport Drainage Ditch 2003
12-380	380	-87.87501989	42.47736121	Countrywood Hills	Dry	Yes	Zion	Residential	Some standing water in areas intending to be dry.	Newport Drainage Ditch 2003
12-381	381	-87.91099839	42.45762086	Kilbourne and 21st	Wet	No	Newport Township	Residential	Decrease algae content	Newport Drainage Ditch 2003
12-382	382	-87.90312749	42.46184662	Delany and 21st	Wet	No	Wadsworth	Commercial	1. Improve buffer area. 2. Plant natives around basin. 3. Fix crack in pipe.	Newport Drainage Ditch 2003
12-383	383	-87.89957965	42.46003956	Delany and 21st	Wet	No	Wadsworth	Commercial	Decrease algae	Newport Drainage Ditch 2003

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12-384	384	-87.90247117	42.46834854	Chestnut Trails	Wet	No	Wadsworth	Residential	1. Decrease erosion. 2. Unclog inlet A. 3. Decrease sediment and turbidity.	Newport Drainage Ditch 2003
12-385	385	-87.88060214	42.46709563	Chestmut Trails	Wet	Yes	Wadsworth	Residential	1. Remove litter 2. Decrease algae.	Newport Drainage Ditch 2003
12-386	386	-87.87780555	42.44583678	Adelphi Ave	Wet	No	Beach Park	Residential	1. Install native plants 2. Decrease amount of algae.	Newport Drainage Ditch 2003
12-387	387	-87.90450548	42.43427588	August Zupec Dr.	Dry	No	Wadsworth	Residential	None	Newport Drainage Ditch 2003
12-388	388	-87.90669308	42.42778367	Wadsworth Village Hall	Wet	Yes	Wadsworth	Commercial	1. Decrease algae. 2. Plant natives along banks.	Newport Drainage Ditch 2003
12-389	389	-87.90213382	42.42520285	Elm Ln.	Wet	No	Wadsworth	Residential	1. Decrease algae. 2. Plant natives along banks.	Newport Drainage Ditch 2003
12-45	45	-87.88831669	42.4292196	Cambridge at Heatherstone Pond 9	Dry	Yes	Beach Park	Residential	None	DPRW 2016
12-612	612	-87.88815223	42.48410847	North Shore Sanitary District - Zion Pond 1	Wet	Yes	Zion	Industrial	None	DPRW 2016
12-613	613	-87.8881818	42.48337612	North Shore Sanitary District - Zion Pond 2	Wet	Yes	Zion	Industrial	None	DPRW 2016
12-615	615	-87.89759244	42.47787085	Calpine 5	Wet	Yes	Zion	Industrial	Increase buffer	DPRW 2016
12-616	616	-87.89355105	42.47778839	Calpine 1	Wet	Yes	Zion	Industrial	Increase buffer	DPRW 2016
12-617	617	-87.91695315	42.47707165	Prairie View Pond-private property?	Wet	Yes	Newport Township	Residential	None	DPRW 2016
12-618	618	-87.90122155	42.47542568	-	Dry	Yes	Wadsworth	Residential	None	DPRW 2016
12-619	619	-87.87818445	42.47320296	Countrywood Hills Pond	Dry	Yes	Zion	Residential	1. Remove concrete channel 2. Allow channel to mimic natural stream	DPRW 2016
12-620	620	-87.89541423	42.47009835	Calpine Coproration Pond 2	Wetland	Yes	Zion	Industrial	Add riprap to swales to reduce erosion	DPRW 2016
12-621	621	-87.90271484	42.47003156	Bergman Landscaping Basin 1	Wet	Yes	Wadsworth	Agricultural	None needed	DPRW 2016
12-622	622	-87.90118107	42.4696353	Bergman Landscaping Basin 2	Wet	Yes	Wadsworth	Agricultural	None needed	DPRW 2016
12-624	624	-87.8834614	42.46440144	Minogue Pond 1	Wetland	Yes	Wadsworth	Residential	Locate and clear inlet	DPRW 2016
12-625	625	-87.8792418	42.46289366	Schwagers Pond	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
12-626	626	-87.89294153	42.46227376	Wadsworth Trails PUD Pond 1	Wet	Yes	Wadsworth	Residential	Increase unmowed buffer	DPRW 2016
12-627	627	-87.886539	42.46121108	Wadsworth Trails PUD Pond 2	Wet	Yes	Wadsworth	Residential	1. Increase buffer 2. Add aerator	DPRW 2016
12-629	629	-87.90185182	42.46034538	Delaney between 173 & 21st	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
12-632	632	-87.8945918	42.44128848	Adams Basin 1	Wet	Yes	Wadsworth	Residential	None	DPRW 2016

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12-633	633	-87.88895208	42.43894098	Carillon at Heatherstone Pond 1	Wet	Yes	Beach Park	Residential	Increase native buffer	DPRW 2016
12-636	636	-87.8893797	42.43326341	Cambridge at Heatherstone Pond 6	Dry	Yes	Beach Park	Residential	None	DPRW 2016
13-1	1	-87.94720992	42.49396822	Kirchhoff Farms basin	Wet	No	Newport Township	Agricultural	None	DPRW 2016
13-10	10	-87.8713267	42.4888897	Shepherds Crook Golf Course Pond 2	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
13-100	100	-87.89215713	42.39358127	American Outfitters Basin	Dry	Yes	Waukegan	Industrial	Install pipe inlet and outlet	DPRW 2016
13-101	101	-87.94189953	42.39330191	Chapel Hill Basin 1	Dry	No	Warren Township	Residential	None needed	DPRW 2016
13-102	102	-87.95418835	42.39337954	Gurnee Mills Pond 1	Wet	No	Gurnee	Commercial	Replace unmowed turf buffer with natives	DPRW 2016
13-103	103	-87.94469817	42.39283632	Church of the Ammunication to Our Lady Pond	Dry	No	Gurnee	Residential	Remove concrete channel and create meanders to aid water quality	DPRW 2016
13-104	104	-87.95276581	42.39239165	Gurnee Mills Pond 3	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-105	105	-87.89828677	42.39159895	Hawthorn Industrial Center - Gurnee Pond 1	Wet	No	Gurnee	Industrial	None	DPRW 2016
13-106	106	-87.90588397	42.39166289	Amli Osprey Lake Apartments Pond 1	Dry	Yes	Gurnee	Residential	None needed	DPRW 2016
13-107	107	-87.8881671	42.39099107	Pickus-Schwartz Industrial Park Pond 3	Dry	Yes	Waukegan	Residential	1. Remove channel 2. Improve meander	DPRW 2016
13-108	108	-87.93402162	42.39098125	Pembrook Pond 1	Dry	Yes	Gurnee	Residential	None	DPRW 2016
13-109	109	-87.92939808	42.39102963	Spruce Pointe Pond	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-11	11	-87.87297187	42.48825036	Shepherds Crook Golf Course Pond 4	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
13-110	110	-87.8890426	42.39074279	Pickus-Schwartz Industrial Park Pond 2	Wet	Yes	Waukegan	Residential	None needed	DPRW 2016
13-111	111	-87.90682601	42.39044378	Amli Osprey Lake Apartments Pond 2	Wet	Yes	Gurnee	Residential	Install native buffer	DPRW 2016
13-112	112	-87.93893456	42.39003625	Ridgeway Estates Pond	Wetland	Yes	Gurnee	Residential	Install native buffer	DPRW 2016
13-113	113	-87.88995239	42.38929116	Spaulding School Pond	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-115	115	-87.96602174	42.38915605	Wal-Mart - Gurnee Pond	Wet	Yes	Gurnee	Industrial	Install native buffer	DPRW 2016
13-116	116	-87.9296967	42.38880382	Pembrook Pond 2	Dry	No	Gurnee	Residential	None	DPRW 2016
13-117	117	-87.90015899	42.38868349	Anchor Glass Pond	Dry	No	Gurnee	Industrial	None	DPRW 2016
13-118	118	-87.94083654	42.38785552	Pembrook Pond 4	Wet	No	Gurnee	Residential	Install aerator	DPRW 2016
13-119	119	-87.95156148	42.38689113	Gurnee Mills Pond 5	Wetland	Yes	Gurnee	Commercial	None needed	DPRW 2016
13-12	12	-87.88444936	42.48667616	Shepherds Crook Golf Course Pond 9	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016

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13-120	120	-87.94824133	42.38661364	Townhomes of Westgate Pond 1	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-121	121	-87.94404164	42.3863352	Townhomes of Westgate Pond 2	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-122	122	-87.92683487	42.3854835	Pine Crest Estates Pond	Wet	Yes	Gurnee	Residential	1. Increase native buffer 2. Locate outlet	DPRW 2016
13-123	123	-87.90684944	42.38529429	Gurnee Center for Commerce and Industry Pond	Wet	No	Gurnee	Industrial	None	DPRW 2016
13-124	124	-87.95927507	42.38506444	Gurnee Mills Pond 10	Wet	No	Gurnee	Commercial	Install native buffer	DPRW 2016
13-125	125	-87.97271687	42.3851754	Shiner Pond 1	Wet	Yes	Gurnee	Commercial	Install native buffer	DPRW 2016
13-126	126	-87.9709098	42.38526302	Shiner Pond 2	Wet	Yes	Gurnee	Commercial	None	DPRW 2016
13-1266	1266	-87.94523795	42.48649282	Russell Rd & 94 SE 2	Dry	Yes	Wadsworth	Public	None needed	DPRW 2016
13-1267	1267	-87.93505757	42.39479251	Steeple Point Pond	Dry	Yes	Gurnee	Residential	None needed	DPRW 2016
13-1268	1268	-87.93228176	42.39619263	Churchill Park Basin	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-127	127	-87.96836376	42.38501545	Grand Hunt Center Pond 1	Wet	Yes	Gurnee	Commercial	Add native plants to buffer	DPRW 2016
13-1270	1270	-87.93750906	42.40004107	Bayswater Basin 3	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-1274	1274	-87.89397762	42.36783211	North Shore Pond 4	Wet	No	Gurnee	Residential	None needed	DPRW 2016
13-1275	1275	-87.89377002	42.367488	North Shore Gardens Pond 3	Dry	No	Gurnee	Residential	1. Remove concrete 2. Install meanders and native plants	DPRW 2016
13-1276	1276	-87.92537636	42.3660679	Riverside Plaza Basin 2	Dry	Yes	Gurnee	Commercial	None needed	DPRW 2016
13-1277	1277	-87.94952576	42.35271487	Heather Ridge Pond 9	Wet	Yes	Gurnee	Residential	1. Install aerator 2. Spray for algae 3. Implement native plants	DPRW 2016
13-1278	1278	-87.91290288	42.36218719	Brookhaven Basin	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-1279	1279	-87.90731836	42.35057988	Country Trails Pond 2	Wetland	Yes	Gurnee	Residential	Install native buffer	DPRW 2016
13-128	128	-87.9637711	42.38477899	Grand Hunt Center Pond 2	Wet	No	Gurnee	Commercial	1. Install native buffer 2. Install aerator	DPRW 2016
13-1282	1282	-87.9238594	42.32079781	Creekside Pond 4	Dry	Yes	Green Oaks	Residential	Plant natives near channel and reinforce with riprap to reduce further erosion	DPRW 2016
13-1284	1284	-87.91202274	42.40618763	Midlane Country Club Pond 29	Wet	No	Waukegan	Residential	None needed	DPRW 2016
13-1285	1285	-87.91401603	42.40263938	Midlane Country Club Pond 28	Wet	No	Waukegan	Commercial	Increase native buffer	DPRW 2016
13-1287	1287	-87.91273373	42.40148914	Midlane Country Club Pond 34	Wet	Yes	Waukegan	Commercial	None needed	DPRW 2016
13-1289	1289	-87.97187064	42.38486096	SHINER POND 3	Wet	Yes	Gurnee	Residential	Install native buffer	DPRW 2016
13-129	129	-87.96401412	42.38424973	Grand Hunt Center Pond 3	Wet	Yes	Gurnee	Commercial	1. Install native buffer 2. Install aerator	DPRW 2016
13-1293	1293	-87.91574275	42.40268964	Midlane Country Club Pond 32	Wet	Yes	Waukegan	Commercial	None needed	DPRW 2016
13-1294	1294	-87.96042597	42.3765696	Woodland Basin 2	Dry	Yes	Gurnee	Commercial	None needed	DPRW 2016

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13-13	13	-87.87443053	42.4862422	Zion Landfill Pond 4	Wetland	Yes	Zion	Commercial	None needed	DPRW 2016
13-130	130	-87.93367172	42.38399038	Pines Townhomes Pond	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-1302	1302	-87.98139849	42.35744121	-	Wetland	Yes	Warren Township	Public	Thin out vegetation near inlets/outlets	DPRW 2016
13-1303	1303	-87.98104043	42.35669833	-	Wetland	Yes	Warren Township	Public	1. Thin vegetation around inlets/outlets 2. Clean up trace amounts of trash	DPRW 2016
13-131	131	-87.95916422	42.38370642	Menards Pond 1	Wet	Yes	Gurnee	Commercial	1. Install native buffer 2. Install aerator	DPRW 2016
13-132	132	-87.92267587	42.38307455	Victorian Village Pond 1	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-1325	1325	-87.99010866	42.36000897	Tangueray Meadows Pond	Wet	Yes	Warren Township	Residential	1. Eliminate carp 2. Incorporate aerators 3. Clean up trace amounts of trash 4. Clean water 5. Implement more native plants 6. Make inlets/outlets at water surface	DPRW 2016
13-133	133	-87.95624264	42.38310212	Warrendale Acres Pond	Wet	No	Gurnee	Commercial	None	DPRW 2016
13-134	134	-87.95864602	42.3829803	Menards Pond 3	Wetland	Yes	Gurnee	Commercial	Plant more natives on side slopes.	DPRW 2016
13-135	135	-87.89424689	42.38282692	Gurnee Meadowwoods Pond	Wetland	Yes	Gurnee	Residential	None needed	DPRW 2016
13-136	136	-87.97256213	42.38282014	Townhomes of Stonebrook Pond 1	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-137	137	-87.924849	42.38201803	Prairie Oaks Park Pond	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-138	138	-87.97152181	42.38237877	Townhomes of Stonebrook Pond 2	Wet	Yes	Gurnee	Residential	Install outlet to promote water circulation	DPRW 2016
13-139	139	-87.96390355	42.38173347	Grand Hunt Center Pond 4	Wet	Yes	Gurnee	Commercial	1. Clean up 2. Add aerator 3. Install native plants as a buffer.	DPRW 2016
13-14	14	-87.94906855	42.4859509	Truckstops of America Pond 1	Wetland	No	Zion	Industrial	1. Remove asphalt riprap and garbage 2. Don't mow up to overflow/storage dry basin	DPRW 2016
13-140	140	-87.92274391	42.3818006	Victorian Village Pond 2	Wet	Yes	Gurnee	Residential	Increase native buffer	DPRW 2016
13-141	141	-87.97512383	42.38192439	Stonebrook Crossing Pond 2	Wet	Yes	Gurnee	Residential	None	DPRW 2016
13-142	142	-87.9680023	42.38171564	Grand Hunt Center Pond 11	Wet	Yes	Gurnee	Residential	1. Add a native buffer 2. Fix aerator.	DPRW 2016
13-143	143	-87.89938427	42.38143925	Gallagher Basin	Onstream	No	Gurnee	Industrial	None needed	DPRW 2016
13-144	144	-87.93663449	42.38106421	Gurnee Meadows Pond 1	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-145	145	-87.92288623	42.38095779	Victorian Village Pond 3	Wet	Yes	Gurnee	Residential	Increase native buffer	DPRW 2016
13-146	146	-87.9679213	42.38071354	Grand Hunt Center Pond 10	Wet	Yes	Gurnee	Residential	1. Add outlet if need. 2. Increase buffer with native plants	DPRW 2016

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13-147	147	-87.96403361	42.37984738	Grand Hunt Center Pond 5	Wet	Yes	Gurnee	Commercial	1. Investigate clogging issues 2. Fix aerator 3. Add buffer of native plants.	DPRW 2016
13-148	148	-87.96682708	42.37996126	Grand Hunt Center Pond 6	Wet	Yes	Gurnee	Commercial	1. Repair plastic inlet. 2. Add aerator and native buffer 3. Fix smell problem.	DPRW 2016
13-149	149	-87.97199362	42.38054134	Coach Homes of Stonebrook Pond	Wet	Yes	Gurnee	Residential	1. Install native buffer 2. Install aerator	DPRW 2016
13-15	15	-87.94608261	42.44565345	Willows at Wadsworth Pond 7	Wetland	No	Wadsworth	Residential	None	DPRW 2016
13-150	150	-87.9228663	42.37967182	Victorian Village Pond 4	Wet	Yes	Gurnee	Residential	Increase native buffer	DPRW 2016
13-151	151	-87.93452892	42.37977934	Gurnee Meadows Pond 2	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-152	152	-87.96948868	42.37954891	Townhomes of Stonebrook Pond 3	Wet	No	Gurnee	Residential	1. Create more circulation throughout basin. 2. Add a native plant buffer and/or riprap.	DPRW 2016
13-153	153	-87.93344328	42.37947281	Pembrook Apartments Pond	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-154	154	-87.96869072	42.37898372	Grand Hunt Center Pond 9	Wet	Yes	Gurnee	Residential	Add native buffer and riprap to stop erosion of shoreline	DPRW 2016
13-155	155	-87.96744518	42.37895953	Grand Hunt Center Pond 8	Wet	Yes	Gurnee	Residential	1. Add another aerator on west side of basin 2. Add larger buffer of natives	DPRW 2016
13-156	156	-87.94437758	42.37860176	Northridge Plaza Pond 1	Wet	Yes	Gurnee	Residential	1. Stabilize slopes 2. Increase native buffer	DPRW 2016
13-157	157	-87.96656214	42.37876142	Grand Hunt Center Pond 7	Wet	Yes	Gurnee	Commercial	Add a bigger buffer with natives and an inlet if necessary	DPRW 2016
13-158	158	-87.9312079	42.37759707	Pembrook Coach Houses Pond	Dry	No	Gurnee	Residential	None	DPRW 2016
13-159	159	-87.94930407	42.37783267	Grand Tri-State Business Park Pond 1	Wet	No	Gurnee	Industrial	Install native buffer	DPRW 2016
13-16	16	-87.94860114	42.44469037	Kelly Rd Basin 1	Wet	No	Newport Township	Residential	None	DPRW 2016
13-160	160	-87.93529344	42.37775067	Shops of Pembrook Colonade Pond	Wet	Yes	Gurnee	Industrial	Install native buffer	DPRW 2016
13-161	161	-87.96551986	42.37790653	Stonebrook Estates Pond 4	Wetland	Yes	Gurnee	Residential	Remove dead pine trees for residents' yards.	DPRW 2016
13-162	162	-87.96894475	42.3778369	Stonebrook Estates Pond 1	Wet	Yes	Gurnee	Residential	Utilize a native plant buffer.	DPRW 2016
13-163	163	-87.96403795	42.37777739	Stonebrook Estates Pond 5	Wet	Yes	Gurnee	Residential	None	DPRW 2016
13-164	164	-87.967948	42.37797941	Stonebrook Estates Pond 2	Wetland	Yes	Gurnee	Residential	Add riprap to inlets to prevent erosion	DPRW 2016
13-165	165	-87.96672546	42.37771055	Stonebrook Estates Pond 3	Wet	No	Gurnee	Residential	None	DPRW 2016
13-166	166	-87.95311015	42.37755069	Grand Tri-State Business Park Pond 2	Wet	No	Gurnee	Industrial	1. Add another aerator 2. Install native plant buffer.	DPRW 2016
13-167	167	-87.8987871	42.37714334	SWALCO Basin	Dry	Yes	Gurnee	Industrial	None needed	DPRW 2016
13-168	168	-87.88212437	42.37701328	North View Pond 2	Wet	Yes	Waukegan	Residential	1. Remove riprap	DPRW 2016

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									2. Install native buffer	
13-169	169	-87.88252201	42.37689476	North View Pond 1	Dry	Yes	Waukegan	Residential	1. Remove riprap 2. Install native buffer	DPRW 2016
13-17	17	-87.9458908	42.44329584	Jonathan Knolls Pond 2	Wet	Yes	Wadsworth	Residential	Install outlet to improve circulation of water	DPRW 2016
13-170	170	-87.93953211	42.37693476	Northridge Plaza Pond 2	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-171	171	-87.93749169	42.37689235	Spruce Park Office Condominium Pond	Dry	Yes	Gurnee	Residential	Remove channel and create meander	DPRW 2016
13-172	172	-87.8827861	42.3765538	North View Pond 3	Dry	Yes	Waukegan	Residential	None needed	DPRW 2016
13-173	173	-87.95136245	42.37663464	Grand Tri-State Business Park Pond 3	Wet	No	Gurnee	Industrial	Increase native buffer	DPRW 2016
13-174	174	-87.96410189	42.37644891	Stonebrook Estates Pond 6	Wet	No	Gurnee	Residential	1. Increase native buffer 2. Install aerator	DPRW 2016
13-175	175	-87.93929425	42.37640622	Northridge Plaza Pond 3	Wet	No	Gurnee	Residential	Increase buffer	DPRW 2016
13-176	176	-87.96510846	42.37648375	Stonebrook Estates Pond 8	Wet	No	Gurnee	Residential	1. Add a larger buffer 2. Install riprap for erosion along shoreline	DPRW 2016
13-177	177	-87.9150226	42.37567748	Viking Park Pond	Dry	No	Gurnee	Public	None needed	DPRW 2016
13-178	178	-87.94881197	42.37510799	Grand Tri-State Business Park Pond 4	Wet	No	Gurnee	Industrial	Increase buffer where possible	DPRW 2016
13-179	179	-87.8843949	42.37497758	Grandview Court Pond	Dry	No	Waukegan	Residential	1. Remove concrete 2. Create more natural meanders 3. Plant natives	DPRW 2016
13-18	18	-87.9476016	42.44305074	Jonathan Knolls Pond 1	Wet	Yes	Wadsworth	Residential	1. Increase natural buffer 2. Add aerator for better circulation. 3. Identify elicit discharge.	DPRW 2016
13-180	180	-87.94846541	42.37115005	Grand Tri-State Business Park Pond 5	Wet	Yes	Gurnee	Industrial	None needed	DPRW 2016
13-181	181	-87.96392387	42.37323636	Hunt Club Park Pond 1	Dry	Yes	Gurnee	Public	None needed	DPRW 2016
13-182	182	-87.91386729	42.37301091	Viking Middle School Pond 1	Wet	Yes	Gurnee	Public	None needed	DPRW 2016
13-183	183	-87.91412374	42.37271777	Viking Middle School Pond 2	Wet	Yes	Gurnee	Public	None needed	DPRW 2016
13-184	184	-87.91357531	42.37274114	Viking Middle School Pond 3	Wet	Yes	Gurnee	Public	None needed	DPRW 2016
13-185	185	-87.95643029	42.3724207	Orchard Valley Pond	Wet	No	Warren Township	Residential	1. Increase buffer 2. Install aerator	DPRW 2016
13-186	186	-87.88710997	42.37024063	North Shore Gardens Pond 1	Dry	Yes	Gurnee	Commercial	Remove concrete channels	DPRW 2016
13-187	187	-87.91731736	42.37025194	Mc Cullough Pond	Wet	Yes	Gurnee	Industrial	1. Install native buffer 2. Create meanders and/ or widen basin	DPRW 2016
13-188	188	-87.95890537	42.36978427	Orchard Valley Estates Pond	Wet	Yes	Gurnee	Commercial	Install native buffer	DPRW 2016
13-189	189	-87.96409543	42.36761817	Sunrise Gurnee Pond 2	Wet	Yes	Gurnee	Commercial	Install native buffer	DPRW 2016

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13-19	19	-87.94159829	42.44312158	Jonathan Knolls Pond 3	Wet	Yes	Wadsworth	Residential	None needed	DPRW 2016
13-190	190	-87.92438956	42.36757345	Windsor Court Pond	Wet	Yes	Gurnee	Commercial	Increase native buffer	DPRW 2016
13-191	191	-87.92483023	42.36716266	Riverside Plaza Pond	Wetland	Yes	Gurnee	Commercial	None needed	DPRW 2016
13-192	192	-87.89358847	42.36617938	North Shore Gardens Pond 2	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-193	193	-87.96383804	42.36558704	Lakeland Evangelical Free Church Pond	Dry	Yes	Gurnee	Commercial	1. Remove concrete 2. Create meander 3. Plant natives	DPRW 2016
13-194	194	-87.92849501	42.3660187	Great America Pond 2	Wet	No	Gurnee	Commercial	Stabilize banks to reduce erosion	DPRW 2016
13-195	195	-87.95833456	42.36541388	Winchester Estates - Gurnee Pond	Wet	Yes	Gurnee	Residential	None	DPRW 2016
13-196	196	-87.91397227	42.36434805	Gurnee Village Hall Pond	Wet	No	Gurnee	Public	None needed	DPRW 2016
13-197	197	-87.97046855	42.3644965	Oak Knoll PUD Pond 5	Wet	No	Warren Township	Residential	None needed	DPRW 2016
13-198	198	-87.94210154	42.36439795	Centerpoint Business Center Pond 2	Onstream	No	Gurnee	Commercial	None	DPRW 2016
13-199	199	-87.97383248	42.36342562	Country Towne Pond 1	Dry	No	Warren Township	Residential	1. Thin out storm drain ends so they're visible 2. Unclog inlets 3. Plant more native plants	DPRW 2016
13-2	2	-87.91233581	42.49374909	Russell post office non-basin	Dry	No	Russell	Industrial	None	DPRW 2016
13-20	20	-87.93921834	42.44191265	Jonathan Knolls Pond 4	Wet	Yes	Wadsworth	Residential	Increase buffer by road	DPRW 2016
13-200	200	-87.96939801	42.36344257	Townhomes of Woodland Hills Pond	Wet	No	Warren Township	Residential	1. Eliminate carp by promoting fishing/shocking 2. Plant more native plants along perimeter (especially near road) 3. Clean up trash 4. Fix cracked outlet	DPRW 2016
13-201	201	-87.89963762	42.36315764	Gurnee Business Center Pond	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-202	202	-87.99274664	42.36324238	-	Wet	Yes	Warren Township	Residential	None	DPRW 2016
13-203	203	-87.91158834	42.36291166	Kensington Townhomes Pond 2	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-204	204	-87.92823019	42.36285735	Saratoga Square Basin	Wet	No	Gurnee	Commercial	Increase native buffer	DPRW 2016
13-205	205	-87.91236116	42.36238141	Kensington Townhomes Pond 1	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-206	206	-87.96192472	42.36229672	Rule Pond	Dry	Yes	Gurnee	Residential	1. Put outlet closer to low point or raise low point 2. Don't mow basin 3. Let native plants grow	DPRW 2016
13-207	207	-87.96818176	42.36237809	Crossings at Gurnee Glen Pond 1	Wet	Yes	Warren Township	Residential	1. Place inlet further away from outlet 2. Install aerator 3. Continue to allow native plant growth	DPRW 2016

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13-208	208	-87.96267199	42.36227668	National City Bank - Gurnee Pond	Dry	Yes	Gurnee	Residential	1. Don't mow basin 2. Let native plants grow 3. Possibly construct inlet from road runoff	DPRW 2016
13-209	209	-87.96827615	42.36220944	Crossings at Gurnee Glen Pond 2	Wet	Yes	Warren Township	Residential	1. Continue to grow a native buffer 2. Increase water circulation with aerator 3. Space inlet further from outlet	DPRW 2016
13-21	21	-87.90538449	42.44152204	Pratum terra marsh?	Wetland	No	Newport Township	Residential	Add outlet to decrease flooding	DPRW 2016
13-210	210	-87.96418905	42.36210975	Crossings at Gurnee Glen Pond 3	Wet	Yes	Gurnee	Residential	1. Install aerator 2. Unclog outlet 3. Clean up trash 4. Plant more native plants along perimeter	DPRW 2016
13-211	211	-87.91074318	42.36179555	Kensington Townhomes Pond 3	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-212	212	-87.99069655	42.36178314	Tangueray Meadows Pond 2	Wet	Yes	Warren Township	Residential	1. Eliminate carp 2. Implement more native plants 3. Install second aerator towards north end 4. Clean up water	DPRW 2016
13-213	213	-87.96411544	42.36138813	Crossings at Gurnee Glen Pond 4	Wetland	Yes	Gurnee	Residential	Clean up trash	DPRW 2016
13-214	214	-87.95283485	42.36106279	Southridge Pond 5	Wet	No	Gurnee	Residential	1. Install netting to deter muskrats 2. Install second outlet towards southwest corner 3. Implement more native plants	DPRW 2016
13-215	215	-87.99377332	42.36105311	Stoneridge Pond 2	Wet	Yes	Warren Township	Residential	None	DPRW 2016
13-216	216	-87.91226461	42.36083831	USPS - Gurnee Pond	Wetland	Yes	Gurnee	Public	None needed	DPRW 2016
13-217	217	-87.99545449	42.36094477	Stoneridge Pond 1	Wetland	Yes	Warren Township	Residential	1. Clear dead trees 2. Make better flowing channel in basin 3. Thin out vegetation near inlets/outlets	DPRW 2016
13-218	218	-87.99554999	42.35981189	Tangueray Meadows Pond 5	Wet	No	Warren Township	Residential	1. Install aerator 2. Unclog/dig up inlet & outlet	DPRW 2016
13-219	219	-87.96202005	42.35963181	Southridge Pond 2	Wetland	No	Gurnee	Residential	1. Implement more riprap near inlet mouths 2. Clean up trash	DPRW 2016
13-22	22	-87.86931028	42.44026042	Thunderhawk Golf Club Pond 6	Wet	Yes	Beach Park	Commercial	None	DPRW 2016
13-220	220	-87.98863963	42.35931902	Tangueray Meadows Pond 4	Wet	Yes	Warren Township	Residential	1. Stop dying water (environmental harm) 2. Install another aerator 3. Clean up trash 4. Make inlets/outlets visible 5. Implement more native plants	DPRW 2016
13-221	221	-87.96092761	42.35946273	Southridge Pond 3	Wetland	No	Gurnee	Residential	Incorporate forebay or riprap around inlet	DPRW 2016
13-222	222	-87.99392491	42.35927358	Tangueray Meadows Pond 6	Wet	Yes	Warren Township	Residential	1. Dig up inlet & make visible 2. Install aerator	DPRW 2016
13-223	223	-87.95274492	42.35913657	Southridge Pond 4	Wet	No	Gurnee	Residential	1. Implement native plant along basin perimeter 2. Install another inlet	DPRW 2016
13-224	224	-87.89935999	42.35911627	Greenleaf Center East Pond 1	Dry	Yes	Gurnee	Commercial	None needed	DPRW 2016

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13-225	225	-87.98794388	42.35922986	Country Towne Pond 3	Wet	Yes	Warren Township	Residential	1. Implement more native plants 2. Reconstruct outlet so it is on water surface 3. Install another inlet 4. Clean up trash	DPRW 2016
13-226	226	-87.89994448	42.35901502	Greenleaf Center East Pond 4	Dry	No	Gurnee	Commercial	Move the inlets away from outlet	DPRW 2016
13-227	227	-87.89942272	42.35853618	Greenleaf Center East Pond 2	Dry	Yes	Gurnee	Commercial	None needed	DPRW 2016
13-228	228	-87.89995214	42.35843159	Greenleaf Center East Pond 3	Dry	No	Gurnee	Commercial	Move inlets to reduce short circuiting	DPRW 2016
13-229	229	-87.98640711	42.35865602	Country Towne Pond 2	Dry	Yes	Warren Township	Residential	None	DPRW 2016
13-23	23	-87.94322985	42.44004775	Jonathan Knolls Pond 9	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-230	230	-87.90322908	42.35734948	Seday Pond	Dry	Yes	Gurnee	Residential	None needed	DPRW 2016
13-231	231	-87.95929898	42.35712117	Southridge Pond 1	Wetland	No	Gurnee	Residential	1. Cut paths to inlets 2. Reattach FES to inlets	DPRW 2016
13-232	232	-87.89797649	42.35666484	Greenleaf Center East Pond 5	Dry	Yes	Gurnee	Residential	None needed	DPRW 2016
13-233	233	-87.99387362	42.35640409	Tangueray Meadows Pond 10	Dry	Yes	Warren Township	Residential	None	DPRW 2016
13-234	234	-87.98356462	42.35628746	Cyd Lash Academy Pond	Dry	Yes	Warren Township	Public	1. Implement more native plants as buffer 2. Replant constructed parts 3. Clean up trace amounts of trash	DPRW 2016
13-235	235	-87.97866374	42.35647414	Townhomes of Woodland Greens Pond 1	Dry	Yes	Warren Township	Public	1. Incorporate channels/swales 2. Plant more native plants 3. Put riprap by outlet 4. Clean up trace amounts of trash in center	DPRW 2016
13-236	236	-87.96760552	42.35616446	Hunt Club Meadows Pond	Wet	No	Warren Township	Residential	1. Maybe spray for duckweed 2. Unclog channel/clear of debris 3. Install aerator 4. Clear vegetation along perimeter/near drain	DPRW 2016
13-237	237	-87.95817168	42.35583964	Rolling Ridge Pond 2	Wet	Yes	Gurnee	Residential	1. Install aerator for more water flow 2. Clean up trace amounts of trash	DPRW 2016
13-238	238	-87.9908809	42.35562275	Wooded Glen Gardens Pond 1	Wet	Yes	Warren Township	Residential	1. Angle water level more towards outlet 2. Unclog inlets/outlets mouths of debris 3. Implement more native plants along perimeter 4. Clean up trash	DPRW 2016
13-239	239	-87.90280541	42.35548566	Greenleaf Professional Campus Pond	Wet	Yes	Park City	Residential	Install native buffer	DPRW 2016
13-24	24	-87.9434512	42.44039794	Jonathan Knolls Pond 10	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-240	240	-87.97437274	42.35548414	Pinewood Creek Pond 1	Dry	Yes	Warren Township	Residential	1. Let inlet drain to basin edge instead of drain 2. Incorporate more native vegetation 3. Install fence around outlet	DPRW 2016
13-241	241	-87.98648239	42.35538084	Gages Lake School Pond	Wet	No	Warren Township	Public	None	DPRW 2016

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13-242	242	-87.95673837	42.35548333	Rolling Ridge Pond 1	Wet	Yes	Gurnee	Residential	None	DPRW 2016
13-243	243	-87.95826786	42.35527625	Rolling Ridge Pond 3	Wet	Yes	Gurnee	Residential	1. Clear excess woody vegetation 2. Add aerator to control algae	DPRW 2016
13-244	244	-87.97815991	42.35503033	Townhomes of Woodland Greens Pond 2	Dry	Yes	Warren Township	Residential	1. Incorporate more riprap 2. Implement native plants in basin	DPRW 2016
13-245	245	-87.97251712	42.35457765	Pinewood Creek Pond 2	Dry	Yes	Warren Township	Residential	1. Reconstruct inlets to basin perimeter 2. Unclog outlet 3. Incorporate more native vegetation	DPRW 2016
13-246	246	-87.9558335	42.35386001	Rolling Ridge Pond 4	Wet	Yes	Gurnee	Residential	Remove excess woody vegetation	DPRW 2016
13-247	247	-87.95729882	42.35401071	Rolling Ridge Pond 6	Wetland	Yes	Gurnee	Residential	1. Clear out dead plant debris (control burn) 2. Thin out woody vegetation 3. Remove invasive species	DPRW 2016
13-248	248	-87.96827457	42.35375229	Summerfields Pond	Wetland	Yes	Warren Township	Residential	1. Clear out excess vegetation 2. Raise up outlet	DPRW 2016
13-249	249	-87.97248965	42.35346091	Pinewood Creek Pond 3	Dry	Yes	Warren Township	Residential	1. Put inlets & outlet at basin perimeter 2. Implement more native plants 3. Unclog outlet	DPRW 2016
13-25	25	-87.93959885	42.44034866	Jonathan Knolls Pond 5	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-250	250	-87.98616524	42.35345965	-	Dry	No	Warren Township	Commercial	None	DPRW 2016
13-251	251	-87.95435676	42.35335806	First Christian Church Pond	Dry	No	Gurnee	Residential	1. Incorporate more native plants 2. Create forebays near inlets	DPRW 2016
13-252	252	-87.96893276	42.35333093	Woodland Primary School Pond 2	Dry	Yes	Warren Township	Public	1. Implement more native plants 2. Use more riprap at inlet 3. Unclog outlet 4. Thin debris from basin bottom	DPRW 2016
13-253	253	-87.96987902	42.35331029	Woodland Primary School Pond 1	Dry	No	Warren Township	Public	1. Incorporate native plants 2. Raise middle so no water sits	DPRW 2016
13-254	254	-87.97115113	42.35282338	Woodland Elementary School Pond 1	Dry	Yes	Warren Township	Public	None	DPRW 2016
13-255	255	-87.95617806	42.35282037	Fairway Ridge Pond 1	Wet	No	Gurnee	Residential	None	DPRW 2016
13-256	256	-87.9700335	42.35270198	Woodland Elementary School Pond 2	Dry	Yes	Warren Township	Public	Implement native plants	DPRW 2016
13-257	257	-87.96647832	42.35277659	Gagewood Pond	Wet	No	Warren Township	Residential	1. Install aerator 2. Clean out inlet 3. Spray for algae 4. Clean up trash 5. Install more native plants	DPRW 2016
13-258	258	-87.94878851	42.35272752	Heather Ridge Pond 10	Wet	No	Gurnee	Residential	1. Install aerator to decrease algae 2. Implement muskrat control to reduce erosion	DPRW 2016
13-259	259	-87.95047209	42.35272943	Heather Ridge Pond 8	Wet	No	Gurnee	Residential	Perhaps more outlets	DPRW 2016
13-26	26	-87.87028537	42.43962922	Thunderhawk Golf Club Pond 7	Wetland	Yes	Beach Park	Commercial	None	DPRW 2016

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13-260	260	-87.94963288	42.35271658	Heather Ridge Pond 9	Wet	No	Gurnee	Residential	1. Install aerator 2. Spray for algae 3. Implement native plants	DPRW 2016
13-263	263	-87.9513209	42.3522641	Fairway Ridge Pond 6	Wet	No	Gurnee	Residential	1. Install aerator 2. Install larger outlet diameter 3. Clean up trace amounts of trash on north side 4. Spray for algae	DPRW 2016
13-264	264	-87.89653145	42.3520111	North Woods Pond 3	Dry	No	Park City	Residential	None needed	DPRW 2016
13-266	266	-87.94957558	42.35184646	Heather Ridge Pond 7	Wet	No	Gurnee	Residential	1. Implement native plants 2. Install aerator	DPRW 2016
13-268	268	-87.95404667	42.35147614	Heather Ridge Golf Club Pond 1	Wet	No	Gurnee	Commercial	Install aerator	DPRW 2016
13-269	269	-87.90723335	42.35142652	Country Trails Pond 1	Dry	Yes	Gurnee	Residential	Create a meander to decrease short circuiting	DPRW 2016
13-27	27	-87.94648993	42.43971254	Jonathan Knolls Pond 11	Wet	Yes	Wadsworth	Residential	1. Install aerator 2. Increase native buffer by road	DPRW 2016
13-270	270	-87.95941322	42.35173848	Saint Paul The Apostle Pond	Dry	Yes	Gurnee	Residential	1. Incorporate more native plants 2. Divert channel	DPRW 2016
13-271	271	-87.94689209	42.35131846	Heather Ridge Pond 11	Wet	No	Gurnee	Residential	1. Incorporate more native plants 2. Install aerator 3. Implement riprap around inlets	DPRW 2016
13-272	272	-87.95222727	42.35106786	Heather Ridge Golf Club Pond 2	Wet	No	Gurnee	Commercial	1. Outlet is severely clogged 2. Spray for algae 3. Install aerator	DPRW 2016
13-273	273	-87.94060484	42.35087535	Cobble Creek Pond	Wet	No	Gurnee	Residential	1. Increase native plants in buffer 2. Clean out trash 3. Install aerator	DPRW 2016
13-274	274	-87.94332689	42.35073821	Heather Ridge Pond 13	Wet	No	Gurnee	Residential	1. Install netting around basin (reduce muskrats) 2. Increase outlet size 3. Spray for algae	DPRW 2016
13-275	275	-87.94678618	42.35059937	Heather Ridge Pond 12	Wet	No	Gurnee	Residential	None	DPRW 2016
13-276	276	-87.95015751	42.35003664	Heather Ridge Pond 6	Wet	No	Gurnee	Residential	1. Incorporate native plants 2. Install aerator	DPRW 2016
13-277	277	-87.9724325	42.35005162	Meadowbrook Estates Pond	Dry	Yes	Warren Township	Residential	None	DPRW 2016
13-278	278	-87.96419726	42.34990663	Lake County DOT Pond	Wet	Yes	Warren Township	Residential	1. Stop mowing surrounding basin area 2. Clean up trash	DPRW 2016
13-279	279	-87.95243085	42.34976613	Heather Ridge Golf Club Pond 3	Wet	No	Gurnee	Residential	An aerator and more considerate maintenance strategies for contaminants may help this basin	DPRW 2016
13-28	28	-87.95493208	42.43903228	I-94 basin 1	Wet	No	Newport Township	Residential	None	DPRW 2016
13-280	280	-87.96414602	42.34910079	Cunningham Square Condominium Pond 2	Dry	Yes	Warren Township	Residential	1. Implement more native plants 2. Clean up trash	DPRW 2016
13-281	281	-87.94856094	42.3490232	Heather Ridge Pond 4	Wet	No	Gurnee	Residential	Install aerator	DPRW 2016
13-282	282	-87.95038569	42.34876481	Heather Ridge Pond 5	Wet	No	Gurnee	Residential	Add more outlets to improve short-circuiting	DPRW 2016
13-283	283	-87.96568186	42.34826742	Cunningham Square Condominium Pond 1	Dry	Yes	Warren Township	Residential	Plant more native trees and bushes	DPRW 2016

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13-284	284	-87.94819002	42.34819817	Heather Ridge Pond 3	Wet	No	Gurnee	Residential	1. Implement native plants 2. Move inlet away from outlet 3. Fix outlet	DPRW 2016
13-285	285	-87.94391154	42.347853	Spinney Run Pond 1	Wet	No	Gurnee	Residential	Incorporate more native plants	DPRW 2016
13-286	286	-87.96012328	42.3475885	Hunt Club East Condominium Pond	Wet	Yes	Warren Township	Residential	1. Incorporate more native vegetation 2. Install aerator	DPRW 2016
13-287	287	-87.96515212	42.34764112	Woodland Meadows Pond 1	Wet	No	Warren Township	Residential	1. Install aerators 2. Implement more native vegetation 3. Eliminate carp	DPRW 2016
13-288	288	-87.94241319	42.34775317	Spinney Run Pond 3	Wetland	No	Gurnee	Residential	1. Clean up debris 2. Unclog pipes	DPRW 2016
13-289	289	-87.94817507	42.34752076	Heather Ridge Pond 2	Wet	No	Gurnee	Commercial	None	DPRW 2016
13-29	29	-87.87336505	42.43901637	Thunderhawk Golf Club Pond 11	Wetland	Yes	Beach Park	Commercial	None	DPRW 2016
13-290	290	-87.96422635	42.34730873	Woodland Meadows Pond 2	Wet	Yes	Warren Township	Residential	More riprap along shore to decrease erosion	DPRW 2016
13-291	291	-87.94272695	42.34734566	Spinney Run Pond 2	Wet	No	Gurnee	Residential	Clear debris from swale & outlet.	DPRW 2016
13-292	292	-87.94834897	42.34699735	Heather Ridge Pond 1	Wet	No	Gurnee	Residential	1. Incorporate native plants 2. Install aerator	DPRW 2016
13-293	293	-87.96125394	42.34674236	-	Wet	Yes	Gurnee	Residential	1. Clear dead reeds 2. Thin out basin perimeter around outlet.	DPRW 2016
13-294	294	-87.95156861	42.34629951	Heather Ridge Golf Club Pond 5	Wet	No	Gurnee	Residential	None	DPRW 2016
13-295	295	-87.94963664	42.34516801	Heather Ridge Golf Club Pond 6	Wet	No	Gurnee	Commercial	1. Install aerators 2. Unclog and fix inlets 3. Implement riprap 4. Clean up trash	DPRW 2016
13-296	296	-87.95946095	42.34558045	Cambridge at Gurnee Pond	Dry	Yes	Gurnee	Residential	1. Incorporate native plants 2. Fix erosion around inlets	DPRW 2016
13-297	297	-87.91021781	42.34508436	Bayberry Pond 1	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-298	298	-87.95396722	42.34526034	Heather Ridge Pond 23	Wet	No	Gurnee	Residential	1. Install aerator 2. Incorporate native plants	DPRW 2016
13-299	299	-87.95337507	42.34402229	Heather Ridge Pond 19	Wet	No	Gurnee	Residential	1. Install aerator 2. Increase distance between inlet and outlets	DPRW 2016
13-3	3	-87.87444752	42.49278436	Camp Saint George Pond	Wet	No	Benton Township	Commercial	1. Increase native buffer 2. Install outlet to promote circulation	DPRW 2016
13-30	30	-87.87402894	42.43819975	Thunderhawk Golf Club Pond 12	Wetland	Yes	Beach Park	Commercial	None	DPRW 2016
13-300	300	-87.94986896	42.34387187	Heather Ridge Pond 17	Wet	No	Gurnee	Residential	Install aerator	DPRW 2016
13-301	301	-87.95555861	42.34376832	Heather Ridge Pond 22	Wet	No	Gurnee	Residential	Water should be tested for possible harmful contaminants	DPRW 2016
13-302	302	-87.912501	42.34350256	Bayberry Pond 2	Dry	Yes	Waukegan	Residential	None needed	DPRW 2016
13-303	303	-87.94904097	42.34389455	Heather Ridge Pond 16	Wet	No	Gurnee	Residential	1. Install aerator 2. Put riprap near inlets 3. Incorporate native plants	DPRW 2016

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13-304	304	-87.91046205	42.3434671	Bayberry Pond 3	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-305	305	-87.95125129	42.34351688	Heather Ridge Pond 18	Wet	No	Gurnee	Residential	1. Add riprap to some inlets to prevent scouring 2. Repair outlet	DPRW 2016
13-306	306	-87.91179544	42.34337109	Diversity Park Pond	Wetland	Yes	Waukegan	Residential	None needed	DPRW 2016
13-307	307	-87.9557607	42.34327864	Heather Ridge Pond 21	Wet	Yes	Gurnee	Residential	1. Install aerator 2. Fix discharge problem 3. Implement more native plants 4. Unclog outlet (maybe use a grate)	DPRW 2016
13-308	308	-87.95468097	42.34317811	Heather Ridge Pond 20	Wet	No	Gurnee	Residential	Possibly add more inlets and outlets to prevent short-circuiting	DPRW 2016
13-309	309	-87.90989368	42.34282649	Bayberry Pond 4	Wetland	Yes	Waukegan	Residential	1. Increase buffer 2. Reduce/ eliminate yard waste dumping	DPRW 2016
13-31	31	-87.88596652	42.43808852	Carillon at Heatherstone Pond 2	Wet	Yes	Beach Park	Residential	None	DPRW 2016
13-310	310	-87.97809742	42.34296793	Greenfields Pond 1	Wet	Yes	Warren Township	Residential	Fairly well maintained, do something about muskrat to cut back on erosion	DPRW 2016
13-311	311	-87.97792158	42.34281114	Greenfields Pond 2	Wet	Yes	Warren Township	Residential	Install new RCP outlet	DPRW 2016
13-312	312	-87.91031293	42.34251782	Bayberry Pond 5	Wetland	Yes	Waukegan	Residential	None needed	DPRW 2016
13-313	313	-87.97429412	42.34283798	Greenfields Pond 3	Wet	Yes	Warren Township	Residential	1. Cover black lining 2. Implement more native plants 3. Install aerator	DPRW 2016
13-314	314	-87.9124461	42.34208869	Bayberry Pond 6	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-315	315	-87.97539024	42.34212754	Greenfields Pond 4	Wet	Yes	Warren Township	Residential	1. Install aerator 2. Implement more native plants along perimeter 3. Unclog inlet	DPRW 2016
13-316	316	-87.97731399	42.34167932	Greenfields Pond 5	Wet	Yes	Warren Township	Residential	1. Install aerator to circulate water 2. Implement native plants along perimeter	DPRW 2016
13-317	317	-87.95440169	42.34108339	Stonehenge Farms Basin	Wet	No	Gurnee	Commercial	None	DPRW 2016
13-318	318	-87.97603751	42.34132175	Greenfields Pond 6	Wet	Yes	Warren Township	Residential	1. Install aerator 2. Implement native plants around perimeter 3. Cover up exposed lining	DPRW 2016
13-319	319	-87.97445447	42.34113223	Greenfields Pond 7	Wet	Yes	Warren Township	Residential	1. Install aerator 2. Implement more native plants	DPRW 2016
13-32	32	-87.94042339	42.43791828	Jonathan Knolls Pond 7	Wet	Yes	Wadsworth	Residential	Increase native buffer	DPRW 2016
13-321	321	-87.95959297	42.33862513	Reserve at the Merit Club Pond 4	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-322	322	-87.96359586	42.33872816	Reserve at the Merit Club Pond 3	Wet	No	Gurnee	Commercial	Increase unmowed buffer	DPRW 2016
13-323	323	-87.9596542	42.33687898	Reserve at the Merit Club Pond 5	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-324	324	-87.951633	42.33507475	Reserve at the Merit Club Pond 18	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-325	325	-87.96043683	42.33412602	Reserve at the Merit Club Pond 9	Wet	No	Gurnee	Commercial	None needed	DPRW 2016

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13-326	326	-87.96484358	42.33425358	Reserve at the Merit Club Pond 7	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-327	327	-87.96121432	42.33431486	Reserve at the Merit Club Pond 8	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-328	328	-87.95973015	42.33261088	Reserve at the Merit Club Pond 10	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-329	329	-87.95970104	42.33175745	Reserve at the Merit Club Pond 11	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-33	33	-87.93989379	42.43736988	Jonathan Knolls Pond 6	Wet	Yes	Wadsworth	Residential	1. Increase native buffer 2. Install aerator	DPRW 2016
13-330	330	-87.94363788	42.33148009	Daybreak Farms Pond 3	Wet	No	Waukegan	Residential	None	DPRW 2016
13-331	331	-87.95600898	42.33172382	Reserve at the Merit Club Pond 19	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-332	332	-87.95588452	42.33133718	Reserve at the Merit Club Pond 20	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-333	333	-87.95584547	42.33109961	Reserve at the Merit Club Pond 21	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-334	334	-87.95599337	42.33095337	Reserve at the Merit Club Pond 22	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-335	335	-87.95648127	42.33083847	Reserve at the Merit Club Pond 23	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-336	336	-87.95945563	42.33015306	Reserve at the Merit Club Pond 12	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-337	337	-87.93535068	42.33001135	South River Road Basin 1	Wet	No	Waukegan	Residential	None	DPRW 2016
13-338	338	-87.95595935	42.33010226	Reserve at the Merit Club Pond 24	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-339	339	-87.95560049	42.32994034	Reserve at the Merit Club Pond 25	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-34	34	-87.87459557	42.43697222	Thunderhawk Golf Club Pond 13	Wet	Yes	Beach Park	Commercial	None	DPRW 2016
13-340	340	-87.95541972	42.32952899	Reserve at the Merit Club Pond 26	Wet	No	Gurnee	Residential	None needed	DPRW 2016
13-341	341	-87.94062833	42.32901233	Daybreak Farms Pond 4	Wet	Yes	Waukegan	Residential	1. Increase buffer 2. Install native buffer	DPRW 2016
13-342	342	-87.9589937	42.3289398	Reserve at the Merit Club Pond 13	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-343	343	-87.96318396	42.32881026	Reserve at the Merit Club Pond 16	Wet	Yes	Gurnee	Residential	Install native buffer	DPRW 2016
13-344	344	-87.95798941	42.32843778	Reserve at the Merit Club Pond 14	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-345	345	-87.93641985	42.32805399	Daybreak Farms Pond 2	Wet	No	Waukegan	Residential	Increase buffer	DPRW 2016
13-346	346	-87.93939256	42.32814983	Daybreak Farms Pond 1	Wet	No	Waukegan	Residential	Increase buffer or install native buffer	DPRW 2016
13-347	347	-87.9628167	42.32801948	Reserve at the Merit Club Pond 17	Wet	Yes	Gurnee	Residential	Install native buffer	DPRW 2016

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13-348	348	-87.95676328	42.32781511	Reserve at the Merit Club Pond 15	Wet	No	Gurnee	Residential	Install native buffer	DPRW 2016
13-35	35	-87.91605413	42.43642117	Forest View Pond	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-350	350	-87.93310853	42.32471934	River Bend Pond	Wet	No	Waukegan	Residential	Install new sod or native buffer along banks	DPRW 2016
13-352	352	-87.93471711	42.32237006	Nickels and Dimes Farm Pond 1	Wet	No	Waukegan	Residential	None	DPRW 2016
13-353	353	-87.92315951	42.32116953	Creekside Pond 1	Wet	Yes	Green Oaks	Residential	Install native buffer	DPRW 2016
13-354	354	-87.94361097	42.32080227	Nickels and Dimes Farm Pond 4	Wet	Yes	Waukegan	Residential	Install riprap or native buffer to reduce shoreline erosion	DPRW 2016
13-355	355	-87.92415272	42.32065637	Creekside Pond 2	Wet	Yes	Green Oaks	Residential	Install native buffer	DPRW 2016
13-356	356	-87.94108905	42.32051139	Nickels and Dimes Farm Pond 3	Wet	No	Waukegan	Residential	None	DPRW 2016
13-357	357	-87.9241547	42.32021492	Creekside Pond 3	Wet	Yes	Green Oaks	Residential	Install native buffer	DPRW 2016
13-358	358	-87.94372219	42.31997509	Huntington Lakes Pond 1	Wet	No	Waukegan	Residential	1. Increase buffer 2. Install native buffer	DPRW 2016
13-359	359	-87.93473347	42.31950524	Nickels and Dimes Farm Pond 2	Wet	No	Waukegan	Residential	None	DPRW 2016
13-36	36	-87.94149264	42.43441323	Van Zelst Pond 1	Wetland	Yes	Wadsworth	Industrial	None needed	DPRW 2016
13-360	360	-87.94152317	42.31926824	Huntington Lakes Pond 2	Wet	No	Waukegan	Residential	Increase buffer	DPRW 2016
13-361	361	-87.9338672	42.31912083	Huntington Lakes Pond 7	Wet	No	Waukegan	Residential	Install native buffer	DPRW 2016
13-362	362	-87.93393431	42.31855057	Huntington Lakes Pond 8	Wet	No	Waukegan	Residential	Increase native buffer	DPRW 2016
13-363	363	-87.93998309	42.317118	Huntington Lakes Pond 3	Wet	No	Waukegan	Residential	Install native buffer	DPRW 2016
13-364	364	-87.91040048	42.31611545	Reigate Woods Pond 8	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-365	365	-87.90961357	42.31651817	Reigate Woods Pond 9	Wetland	Yes	Green Oaks	Public	None	DPRW 2016
13-366	366	-87.93923972	42.31656615	Huntington Lakes Pond 4	Wet	No	Waukegan	Residential	1. Increase buffer 2. Install native buffer	DPRW 2016
13-367	367	-87.92934009	42.31644971	Irondale Farm Pond 1	Dry	No	Green Oaks	Residential	None	DPRW 2016
13-368	368	-87.93849461	42.3160661	Huntington Lakes Pond 5	Wet	No	Waukegan	Residential	Install native buffer	DPRW 2016
13-369	369	-87.92931811	42.31609926	Irondale Farm Pond 2	Wet	No	Green Oaks	Residential	None	DPRW 2016
13-37	37	-87.93920155	42.43278467	Van Zelst Pond 2	Wet	No	Wadsworth	Industrial	Install native buffer and/or aerator	DPRW 2016
13-370	370	-87.91254569	42.31532771	Reigate Woods Pond 7	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-371	371	-87.93757589	42.31576703	Huntington Lakes Pond 6	Wet	No	Waukegan	Residential	Install native buffer	DPRW 2016
13-372	372	-87.91797554	42.3141747	Prairie Ridge Farm Pond 1	Wet	Yes	Green Oaks	Residential	1. Increase buffer near houses 2. Install riprap to stabilize banks	DPRW 2016
13-373	373	-87.9153638	42.31366657	Prairie Ridge Farm Pond 2	Wet	Yes	Green Oaks	Residential	Install native buffer where possible	DPRW 2016

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13-374	374	-87.91269134	42.31323438	Reigate Woods Pond 5	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-375	375	-87.91040373	42.31294231	Reigate Woods Pond 6	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-376	376	-87.91286429	42.31188785	Reigate Woods Pond 3	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-377	377	-87.91441497	42.31180397	Reigate Woods Pond 2	Dry	Yes	Green Oaks	Residential	None	DPRW 2016
13-378	378	-87.91092426	42.31142995	Reigate Woods Pond 4	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-379	379	-87.912857	42.3108389	Reigate Woods Pond 1	Wet	Yes	Green Oaks	Residential	None needed	DPRW 2016
13-38	38	-87.91333542	42.43085876	Kilbourne and Wadsworth	Wet	No	Wadsworth	Residential	Install outlet to increase circulation	DPRW 2016
13-380	380	-87.92074932	42.30732943	Ascension Cemetery Pond	Wet	No	Libertyville Township	Commercial	Install native buffer	DPRW 2016
13-382	382	-87.95886893	42.30566888	Augie Landing Pond 1	Wetland	Yes	Libertyville	Commercial	1. Thin out vegetation 2. Clean up trash 3. Unclog outlet	DPRW 2016
13-383	383	-87.95828617	42.30570214	Augie Landing Pond 2	Wetland	Yes	Libertyville	Commercial	1. Clean up trash 2. Redo brick siding 3. Trim back foliage 4. Replace inlet FES 5. Unclog inlets/outlets	DPRW 2016
13-384	384	-87.95792965	42.30121786	Libertyville Fire Department Station 1 Pond	Dry	No	Libertyville	Commercial	1. Install additional outlet at south end 2. Unclog inlet 3. Let basin bottom grow out (don't mow)	DPRW 2016
13-385	385	-87.95056621	42.29913757	Carriage Hill Park Pond 3	Wet	No	Libertyville	Residential	1. Examine short circuiting 2. Add aerator 3. Add native vegetation 4. Increase buffer	DPRW 2016
13-386	386	-87.95106398	42.29941588	Carriage Hill Park Pond 2	Wet	No	Libertyville	Residential	1. Add inlet and outlet 2. Install aerator 3. Install native plants.	DPRW 2016
13-387	387	-87.95731666	42.29901246	Prairie View Townhomes Pond 1	Wet	No	Libertyville	Commercial	Clean out bottom of debris	DPRW 2016
13-388	388	-87.95529504	42.29855395	Carriage Hill Park Pond 1	Wet	No	Libertyville	Residential	Add aerators and flow to the smaller connecting basin that is stagnant.	DPRW 2016
13-389	389	-87.95773428	42.2985625	Prairie View Townhomes Pond 2	Wet	Yes	Libertyville	Residential	1. Clean up trash 2. Clean out sediment	DPRW 2016
13-39	39	-87.93915421	42.4304682	Wadsworth Plaza Basin 2	Wet	Yes	Wadsworth	Industrial	Increase native buffer around wet portion of basin	DPRW 2016
13-390	390	-87.93222505	42.29628284	Terre Fair Pond 1	Wet	No	Libertyville Township	Residential	None	DPRW 2016
13-391	391	-87.92690033	42.29291649	Holy Cross Lutheran Church of Libertyville Pond	Dry	No	Libertyville Township	Residential	None needed	DPRW 2016

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13-392	392	-87.9293672	42.29288848	Terre Fair Pond 2	Wet	No	Libertyville Township	Residential	None needed	DPRW 2016
13-393	393	-87.92970729	42.29269634	Oak Spring Woods Pond 1	Dry	No	Libertyville Township	Residential	None needed	DPRW 2016
13-394	394	-87.92983482	42.29248948	Oak Spring Woods Pond 2	Dry	No	Libertyville Township	Residential	None needed	DPRW 2016
13-395	395	-87.96057583	42.29246145	Village of Libertyville Pond	Wetland	Yes	Libertyville Township	Public	None	DPRW 2016
13-396	396	-87.93309217	42.2839592	Camelot Pond	Wet	No	Libertyville	Residential	1. Install native buffer 2. Install more aerators	DPRW 2016
13-4	4	-87.94988886	42.48996797	Truck city basin	Wet	Yes	Wadsworth	Industrial	None	DPRW 2016
13-40	40	-87.93011494	42.43013089	Campanella & Sons Basin	Wet	Yes	Wadsworth	Industrial	Find/Re-install outlet to improve flow	DPRW 2016
13-41	41	-87.87939213	42.43000747	Troon Basin	Wet	Yes	Beach Park	Industrial	Remove garbage	DPRW 2016
13-42	42	-87.93856354	42.4300251	Wadsworth Plaza Basin 1	Dry	Yes	Wadsworth	Industrial	None needed	DPRW 2016
13-43	43	-87.88552587	42.4291606	Cambridge at Heatherstone Pond 8	Wet	Yes	Beach Park	Residential	Increase native buffer	DPRW 2016
13-44	44	-87.93972779	42.42948588	Wadsworth Plaza Basin 3	Wetland	Yes	Wadsworth	Industrial	Install native buffer	DPRW 2016
13-46	46	-87.87997232	42.4289513	Cambridge at Heatherstone Pond 11	Dry	Yes	Beach Park	Residential	None needed	DPRW 2016
13-47	47	-87.91091213	42.42848284	Wadsworth Oaks Pond	Dry	No	Wadsworth	Residential	None	DPRW 2016
13-48	48	-87.88578439	42.42749462	Pickford basin	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-49	49	-87.88354946	42.42747946	North Shore Hills Pond 8	Wet	Yes	Beach Park	Residential	Install outlet if it is a basin.	DPRW 2016
13-5	5	-87.88116594	42.48961433	Shepherds Crook Golf Course Pond 7	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
13-50	50	-87.90276159	42.42541863	Elm Acres Pond 2	Wet	No	Wadsworth	Residential	None	DPRW 2016
13-51	51	-87.91557554	42.42427159	Wadsworth Woods Pond 1	Wet	No	Wadsworth	Residential	None	DPRW 2016
13-510	510	-87.90234612	42.49330922	Russell/Delaney	Wetland	Yes	Newport Township	Agricultural	None	DPRW 2016
13-511	511	-87.88430699	42.41920377	Waukegan Sports Complex Basin	Wetland	Yes	Waukegan	Public	None needed	DPRW 2016
13-512	512	-87.91026723	42.40769279	Midlane Country Club Pond 29	Wet	Yes	Waukegan	Residential	None needed	DPRW 2016
13-513	513	-87.90998307	42.40924021	Midlane Country Club Pond 31	Wet	Yes	Waukegan	Residential	None needed	DPRW 2016
13-514	514	-87.94395317	42.40009405	Dilley-Westminster Basin	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-515	515	-87.94546503	42.40106277	Coventry Estates Basin	Wet	Yes	Gurnee	Residential	Increase unmowed buffer	DPRW 2016
13-517	517	-87.90256357	42.37594823	Oakwood - Greenleaf Basin	Wet	Yes	Gurnee	Residential	Increase native buffer	DPRW 2016

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13-518	518	-87.95410281	42.37701893	Woodland Intermediate School Basin 1	Wet	Yes	Gurnee	Industrial	None	DPRW 2016
13-519	519	-87.96109409	42.37703482	Woodland Basin 1	Wet	Yes	Gurnee	Public	Increase buffer	DPRW 2016
13-52	52	-87.91695121	42.42271553	Wadsworth Woods Pond 2	Wet	No	Wadsworth	Residential	1. Add aerator to improve circulation 2. Add native buffer 3. Increase buffer	DPRW 2016
13-520	520	-87.94720699	42.37090524	Grand Tri-State Business Park Pond 7	Wet	Yes	Gurnee	Industrial	None needed	DPRW 2016
13-521	521	-87.97079734	42.36363675	-	Wet	Yes	Warren Township	Residential	1. Install aerator 2. Incorporate more native plants 3. Don't mow to water edge 4. Clean up trash on road side	DPRW 2016
13-522	522	-87.99591144	42.3564081	WPC Pond	Wetland	Yes	Warren Township	Residential	1. Thin out invasive species along perimeter 2. Clear inlet/outlet mouths of debris 3. Possibly install inlet near NE corner of parking	DPRW 2016
13-523	523	-87.96007494	42.34829313	-	Wet	Yes	Gurnee	Residential	Install aerator	DPRW 2016
13-524	524	-87.93266809	42.32943492	Mansie Basin	Wet	Yes	Waukegan	Residential	Install riprap or buffer to reduce shore erosion	DPRW 2016
13-525	525	-87.9617976	42.30710157	-	Wet	Yes	Libertyville	Commercial	1. Thin out vegetation 2. Clear debris of outlet/inlet 3. Clean up trash	DPRW 2016
13-526	526	-87.95818924	42.30653326	-	Wetland	Yes	Libertyville Township	Public	1. Unclog inlet 2. Clean up trash	DPRW 2016
13-527	527	-87.96217318	42.30108081	-	Wetland	Yes	Libertyville	Public	Remove some excess litter/debris	DPRW 2016
13-528	528	-87.96310678	42.29987677	-	Wetland	Yes	Libertyville	Public	None	DPRW 2016
13-529	529	-87.96195362	42.29893851	Lake County Building Basin 1	Wetland	Yes	Libertyville	Public	None	DPRW 2016
13-53	53	-87.91813374	42.42186645	Wadsworth Woods Pond 3	Wet	No	Wadsworth	Residential	None	DPRW 2016
13-530	530	-87.95930707	42.29718272	CPF super basin	Wetland	Yes	Libertyville	Public	1. Extend both riprap channels closer to basin 2. Clean up trash & debris in southwest corner	DPRW 2016
13-54	54	-87.92769697	42.42132866	Whispering Oaks - Wadsworth Pond	Wet	No	Wadsworth	Residential	1. Add another aerator 2. Plant native plantings 3. Create buffer on houses side 4. Add riprap to slow erosion	DPRW 2016
13-55	55	-87.91101263	42.42114855	Wadsworth Ridge Pond 1	Wet	No	Wadsworth	Residential	None needed	DPRW 2016
13-56	56	-87.92734338	42.41987724	Schlosser basin	Wet	No	Wadsworth	Residential	None needed	DPRW 2016
13-57	57	-87.91346285	42.41819107	Wadsworth Ridge Pond 3	Wet	No	Wadsworth	Residential	Increase native buffer	DPRW 2016
13-572	572	-87.91686276	42.31798415	Lake Somerset Pond	Wet	Yes	Green Oaks	Residential	Install native buffer	DPRW 2016
13-576	576	-87.90717668	42.34143416	Pleasant Hill Basin	Wet	Yes	Waukegan	Residential	Increase native buffer near houses	DPRW 2016
13-577	577	-87.90075784	42.35540939	Lake County Courthouse Basin1	Wetland	Yes	Park City	Public	None needed	DPRW 2016
13-578	578	-87.99464	42.36157251	-	Wet	Yes	Warren Township	Residential	1. Clean up trace amounts of trash 2. Install aerator	DPRW 2016

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13-579	579	-87.99526675	42.36150629	-	Wet	Yes	Warren Township	Residential	1. Clean up trace amounts of trash 2. Install aerator	DPRW 2016
13-58	58	-87.88814761	42.41557632	Townline Rd Basin	Dry	Yes	Newport Township	Agricultural	None	DPRW 2016
13-580	580	-87.96068282	42.36520191	Thomas Senior Residences Pond 1	Wet	Yes	Gurnee	Residential	Increase native buffer	DPRW 2016
13-581	581	-87.9486362	42.37288581	Grand Tri-State Business Park Pond 6	Wet	No	Gurnee	Industrial	Install native buffer	DPRW 2016
13-582	582	-87.94273018	42.365051	Centerpoint Pond 1	Wet	Yes	Gurnee	Industrial	None needed	DPRW 2016
13-583	583	-87.91690885	42.36127446	Gurnee Police Department Basin	Dry	Yes	Gurnee	Public	None	DPRW 2016
13-584	584	-87.97418367	42.3832061	Stonebrook Crossing Pond 1	Wet	Yes	Gurnee	Residential	None	DPRW 2016
13-585	585	-87.9595642	42.38167545	Menards Pond 4	Wet	Yes	Gurnee	Commercial	1. Add an inlet 2. Install native plants as a buffer 3. Install aerator to improve water quality.	DPRW 2016
13-586	586	-87.96042722	42.38064023	Meyer Pond	Wet	Yes	Gurnee	Commercial	None needed	DPRW 2016
13-587	587	-87.95925672	42.38420314	Menards Basin	Wetland	No	Gurnee	Commercial	1. Clean up trash 2. Incorporate more natives.	DPRW 2016
13-588	588	-87.95168581	42.38367863	Gurnee mills- toys r us basin	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-589	589	-87.94629132	42.38503247	Key Lime Cove Basin	Wet	Yes	Gurnee	Commercial	Increase buffer by parking lot	DPRW 2016
13-59	59	-87.94044334	42.41393788	Dilleys Basin 2	Wet	No	Warren Township	Commercial	None	DPRW 2016
13-590	590	-87.92983544	42.38256579	Lawson Basin 1	Dry	No	Gurnee	Residential	None needed	DPRW 2016
13-591	591	-87.90136091	42.3965115	Trinity Basin 1	Wet	Yes	Waukegan	Industrial	Install native buffer	DPRW 2016
13-592	592	-87.93349752	42.39361262	Notting Hill Basin 1	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-593	593	-87.93635648	42.39866459	Westminster - Chancery Basin	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-594	594	-87.9331109	42.39746198	Churchill Hunt Park Basin	Wet	No	Gurnee	Residential	None	DPRW 2016
13-595	595	-87.93772137	42.39671043	Notting Hill- Turnham Green Basin	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-596	596	-87.95223775	42.39309503	Gurnee Mills Pond 2	Wet	No	Gurnee	Commercial	None needed	DPRW 2016
13-597	597	-87.93458579	42.40167071	Bayswater Basin 2	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-598	598	-87.93520038	42.40289587	Bayswater Basin 1	Wet	Yes	Gurnee	Residential	None needed	DPRW 2016
13-599	599	-87.940688	42.41322598	Gold Pyramid Basin	Wet	No	Wadsworth	Commercial	None	DPRW 2016
13-6	6	-87.87301044	42.48925664	Shepherds Crook Golf Course Pond 5	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
13-60	60	-87.91638541	42.41368327	Midlane Country Club Pond 16	Wet	Yes	Waukegan	Commercial	Install Native Buffer	DPRW 2016
13-600	600	-87.88162875	42.42887977	Welsh-Wadsworth Basin	Wet	Yes	Beach Park	Residential	1. Install aerator to improve circulation 2. Locate and clear outlet	DPRW 2016
13-601	601	-87.88004956	42.43404587	Wakefield Basin 1	Wet	Yes	Beach Park	Residential	Increase native buffer near houses	DPRW 2016

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13-602	602	-87.88494353	42.4308281	Cambridge Basin 1	Wet	Yes	Beach Park	Residential	None needed	DPRW 2016
13-603	603	-87.88316579	42.43536901	Carillon at Heatherstone Pond 1	Wet	Yes	Beach Park	Residential	None	DPRW 2016
13-604	604	-87.92192074	42.43673801	Concord roundabout basin	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-605	605	-87.91641332	42.43730574	Concord lane north	Wet	Yes	Wadsworth	Residential	None	DPRW 2016
13-606	606	-87.94655183	42.48816224	Russell/94 NE 1	Dry	No	Wadsworth	Public	None	DPRW 2016
13-607	607	-87.94615799	42.48642564	Russell /94 SE 1	Dry	No	Wadsworth	Public	None	DPRW 2016
13-608	608	-87.89123618	42.49043574	Trumpet Zion landfill 3	Wet	Yes	Zion	Agricultural	None needed	DPRW 2016
13-609	609	-87.89334915	42.48943423	Trumpet-Zion landfill 2	Wet	Yes	Zion	Agricultural	None	DPRW 2016
13-61	61	-87.91639589	42.41311265	Midlane Country Club Pond 17	Wet	Yes	Waukegan	Commercial	1. Install native buffer 2. Reinforce riprap buffer	DPRW 2016
13-610	610	-87.89454078	42.48943971	Trumpet-Zion landfill 1	Wet	Yes	Zion	Agricultural	Install aerator	DPRW 2016
13-611	611	-87.93306283	42.37286661	Six Flags Great America	Wet	No	Gurnee	Commercial	Remove excess woody vegetation	DPRW 2016
13-62	62	-87.91691432	42.4131219	Midlane Country Club Pond 13	Wet	Yes	Waukegan	Commercial	Install native buffer	DPRW 2016
13-63	63	-87.91685371	42.41277386	Midlane Country Club Pond 14	Wet	Yes	Waukegan	Commercial	None	DPRW 2016
13-631	631	-87.91263919	42.45093453	Private property	Dry	Yes	Newport Township	Residential	None	DPRW 2016
13-637	637	-87.87464654	42.42700641	North Shore Hills Pond 10	Dry	Yes	Beach Park	Industrial	None	DPRW 2016
13-638	638	-87.90120334	42.42669888	Elm Acres Pond 1	Dry	Yes	Wadsworth	Residential	None	DPRW 2016
13-64	64	-87.91404097	42.41246124	Midlane Country Club Pond 19	Wet	No	Waukegan	Commercial	Install native buffer	DPRW 2016
13-65	65	-87.91678462	42.41239225	Midlane Country Club Pond 15	Wet	Yes	Waukegan	Commercial	Install native buffer	DPRW 2016
13-66	66	-87.91402722	42.41184968	Midlane Country Club Pond 20	Wet	No	Waukegan	Residential	Install Native Buffer	DPRW 2016
13-67	67	-87.87763457	42.41202108	Waukegan Fire Department Station 5 Pond	Wetland	Yes	Waukegan	Residential	None needed	DPRW 2016
13-679	679	-87.96105171	42.30655861	-	Dry	Yes	Libertyville	Residential	Clean up trash	DPRW 2016
13-68	68	-87.92658639	42.41211198	Country Lane Pond 2	Wet	Yes	Waukegan	Residential	Install plants/riprap to stabilize bank near outlet	DPRW 2016
13-687	687	-87.92062623	42.29297362	Lands High Divide Pond	Wet	No	Green Oaks	Residential	None	DPRW 2016
13-69	69	-87.94307306	42.41144635	Dilleys Rd Basin 1	Wet	No	Warren Township	Residential	None	DPRW 2016
13-7	7	-87.87093068	42.48877898	Shepherds Crook Golf Course Pond 1	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
13-70	70	-87.90110311	42.41063232	Oak Grove Business Park Pond 2	Wet	Yes	Waukegan	Industrial	Increase native buffer	DPRW 2016

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13-71	71	-87.91618419	42.41051972	Midlane Country Club Pond 21	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-72	72	-87.90199509	42.41014517	Oak Grove Business Park Pond 3	Wet	Yes	Waukegan	Industrial	Increase native buffer	DPRW 2016
13-73	73	-87.91972125	42.40974903	Midlane Country Club Pond 10	Wet	Yes	Waukegan	Residential	None	DPRW 2016
13-74	74	-87.90356791	42.40914453	Oak Grove Business Park Pond 4	Wet	Yes	Waukegan	Industrial	Install native buffer	DPRW 2016
13-76	76	-87.90236123	42.40956357	Oak Grove Business Park Pond 5	Dry	Yes	Waukegan	Industrial	None	DPRW 2016
13-77	77	-87.91903036	42.40907964	Midlane Country Club Pond 9	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-78	78	-87.91851683	42.40843322	Midlane Country Club Pond 8	Wet	Yes	Waukegan	Residential	1. Install native buffer 2. Install aerator	DPRW 2016
13-79	79	-87.89905017	42.40802708	ComEd Pond	Wetland	Yes	Waukegan	Industrial	None	DPRW 2016
13-8	8	-87.88136633	42.48894719	Shepherds Crook Golf Course Pond 8	Wetland	Yes	Zion	Commercial	None needed	DPRW 2016
13-80	80	-87.92176927	42.40845309	Midlane Country Club Pond 5	Wet	Yes	Waukegan	Residential	None Needed	DPRW 2016
13-81	81	-87.91513592	42.40710836	Midlane Country Club Pond 22	Wet	Yes	Waukegan	Residential	None	DPRW 2016
13-82	82	-87.92317924	42.4069775	Midlane Country Club Pond 4	Wet	Yes	Waukegan	Residential	1. Increase native buffer 2. Install aerator	DPRW 2016
13-83	83	-87.92065796	42.40641356	Midlane Country Club Pond 3	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-84	84	-87.91563187	42.40496312	Midlane Country Club Pond 25	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-85	85	-87.91417863	42.40474722	Midlane Country Club Pond 24	Wet	No	Waukegan	Commercial	1. Install native buffer 2. Install aerator	DPRW 2016
13-86	86	-87.91345872	42.40400379	Midlane Country Club Pond 26	Wet	No	Waukegan	Commercial	Install native buffer	DPRW 2016
13-87	87	-87.9217473	42.40348651	Midlane Country Club Pond 2	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-88	88	-87.90207033	42.40276785	Schumaker Pond	Wet	Yes	Waukegan	Industrial	Install native buffer	DPRW 2016
13-89	89	-87.92029001	42.40259721	Midlane Country Club Pond 1	Wet	Yes	Waukegan	Residential	Install native buffer	DPRW 2016
13-9	9	-87.87194797	42.48829268	Shepherds Crook Golf Course Pond 3	Wet	Yes	Zion	Commercial	Increase native buffer	DPRW 2016
13-90	90	-87.94307512	42.40185102	Mulberry Pond	Wet	No	Wadsworth	Residential	None	DPRW 2016
13-91	91	-87.91475996	42.40152778	Midlane Country Club Pond 30	Wet	No	Waukegan	Commercial	Install native buffer	DPRW 2016
13-92	92	-87.90354279	42.39701962	Griffel Pond	Dry	Yes	Waukegan	Industrial	1. Remove channel 2. Create meander with native plants	DPRW 2016
13-93	93	-87.9064142	42.39703657	Hickory Manor Apartments Pond	Wet	No	Waukegan	Residential	Add vegetation on the slopes	DPRW 2016
13-94	94	-87.9355709	42.39697811	Estates at Churchill Hunt Pond 6	Wetland	No	Gurnee	Residential	None needed	DPRW 2016

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
13-95	95	-87.89735261	42.39601375	Hawthorn Industrial Center - Waukegan Pond 2	Dry	Yes	Waukegan	Industrial	None needed	DPRW 2016
13-96	96	-87.94759941	42.39585727	Immanuel Baptist Church Pond	Wetland	Yes	Gurnee	Residential	1. Increase native buffer 2. Install 3rd aerator on south end	DPRW 2016
13-97	97	-87.89209486	42.39565669	Hawthorn Industrial Center - Waukegan Pond 3	Dry	Yes	Waukegan	Industrial	None needed	DPRW 2016
13-98	98	-87.89802983	42.39521952	Hawthorn Industrial Center - Waukegan Pond 1	Dry	Yes	Waukegan	Industrial	None needed	DPRW 2016
13-99	99	-87.88662001	42.39468755	Waukegan Gurnee Industrial Park Pond	Wet	Yes	Waukegan	Industrial	Install native buffer	DPRW 2016
14-0	0	-87.97780419	42.30847866	-	Dry	Yes	Libertyville	Residential	None	Bull Creek 2004
14-1205	1205	-88.00813368	42.31807875	-	Wet	Yes	Grayslake	Commercial	1. Clear inlets/outlets 2. Thin out perimeter vegetation	DPRW 2016
14-1206	1206	-88.01534863	42.31229355	-	Wet	Yes	Grayslake	Public	1. Could benefit from additional channel or inlets on west side to reduce runoff erosion 2. Clean up trash	DPRW 2016
14-1207	1207	-87.96520522	42.30791784	-	Wet	Yes	Libertyville	Residential	1. Unclog outlet 2. Install aerator 3. Thin vegetation around storm drains	DPRW 2016
14-1208	1208	-87.95915969	42.29530839	Lake County DOT Detention Pond 2	Wet	Yes	Libertyville	Public	Looks as though wetland is under some maintenance.	DPRW 2016
14-1209	1209	-88.00965298	42.30368629	-	Wet	Yes	Libertyville	Industrial	1. Reomve or cover netting 2. Unclog outlet 3. Clean up trash 4. Implement higher native plant density	DPRW 2016
14-1210	1210	-88.0096684	42.30254356	-	Wet	Yes	Libertyville	Industrial	1. Eliminate netting or cover it 2. Install aerator to prevent sediment 3. Thin out weeds 4. Plant more native plants 5. Clean up trash	DPRW 2016
14-1211	1211	-88.01469431	42.30359546	-	Wet	Yes	Libertyville	Industrial	1. Could benefit from multiple aerators 2. Unclog outlet 3. Spray for algae 4. Install 2nd outlet	DPRW 2016
14-1212	1212	-87.96679763	42.2972682	-	Wetland	Yes	Libertyville	Agricultural	None	DPRW 2016
14-349	349	-88.00740022	42.32593517	Prairie Crossing Pond 3	Wet	Yes	Gurnee	Residential	1. Add riprap in front of outlets/inlets 2. Install aerator 3. Spray for algae 4. Unclog outlets/inlets	DPRW 2016
14-351	351	-88.01101699	42.32393351	Prairie Crossing Pond 6	Dry	Yes	Grayslake	Residential	None	DPRW 2016
14-371	371	-88.0263153	42.28087479	Fieldcrest	Wet	Yes	Mundelein	Residential	1. Decrease algae 2. Increase buffer area 3. Unclog outlet B.	Bull Creek 2004

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14-372	372	-88.02571303	42.28336772	Fieldcrest	Wet	Yes	Mundelein	Residential	Improve buffer area, turbidity, and algae	Bull Creek 2004
14-373	373	-88.02097117	42.27833209	Mundelein Fire Station	Wet	Yes	Mundelein	Commercial	None, nice basin	Bull Creek 2004
14-374	374	-88.0197749	42.281565	Fremont Public Library	Wet	Yes	Mundelein	commercial	1. Remove algae 2. Increase buffer area	Bull Creek 2004
14-375	375	-88.01208885	42.28434167	Mundelein Park	Dry	Yes	Mundelein	Residential	1. Improve buffer area 2. Plant natives on slopes	Bull Creek 2004
14-376	376	-88.01932433	42.29002501	Cambridge Country North	Wet	Yes	Mundelein	Residential	1. Remove litter 2. Improve buffer area 3. Reduce algae. 4. Plant natives on slopes.	Bull Creek 2004
14-377	377	-88.01936102	42.29177803	Cambridge Country North	Wet	Yes	Mundelein	Residential	1. Improve buffer area. 2. Remove small amount of trash. 3. Plant natives on slopes.	Bull Creek 2004
14-378	378	-88.02003188	42.29383618	Cambridge Country North	Wet	Yes	Mundelein	Residential	1. Plant natives on sides 2. Remove litter 3. Improve sedimentation, turbidity, and erosion.	Bull Creek 2004
14-379	379	-88.01606681	42.29679177	Village Green Country Club	Wet	No	Mundelein	Commercial	1.. Plant natives on sides 2. Decrease erosion and algae.	Bull Creek 2004
14-380	380	-88.01066499	42.2964733	Village Green Country Club	Wet	No	Mundelein	Commercial	1. Plant natives along slopes 2. Decrease erosion on banks 3. Decrease sediment amount.	Bull Creek 2004
14-381	381	-88.0157344	42.29968991	Winchester Business Park	Wet	Yes	Libertyville	Commercial	Unclog minor clog in A, B	Bull Creek 2004
14-382	382	-88.01137896	42.29893614	Winchester Business Park	Wet	Yes	Libertyville	Commercial	Some excess woody vegetation.	Bull Creek 2004
14-383	383	-88.00624402	42.29966323	Winchester Business Park	Wet	No	Libertyville	Commercial	1. Unclog vegetation from A. 2. Reduce algae	Bull Creek 2004
14-384	384	-88.00362387	42.29706006	Candlewood Suites	Wet	Yes	Libertyville	Commercial	1. Unclog C 2. Remove Geese 3. Plant natives along banks.	Bull Creek 2004
14-385	385	-88.00329793	42.28991259	Motorola Campus	Wet	No	Libertyville	Commercial	1. Plant natives along banks 2. Remove Geese	Bull Creek 2004
14-386	386	-87.99779899	42.29090793	Motorola Campus	Wet	No	Libertyville	Commercial	Plant natives along banks.	Bull Creek 2004
14-387	387	-87.99488116	42.29315793	Technology Way	Wet	Yes	Libertyville	Commercial	1. Remove geese 2. Unclog outlets B and C	Bull Creek 2004
14-388	388	-88.00327486	42.30302573	Northwind Blvd.	Wet	Yes	Libertyville	Commercial	Plant native along banks.	Bull Creek 2004
14-389	389	-87.99909011	42.3043283	Northwind Blvd.	Wet	Yes	Libertyville	Commercial	1. Remove/reduce algae. 2. Plant natives along banks. 3. Stop shoreline erosion. 4. Stop pollution of basin from trailer park.	Bull Creek 2004
14-390	390	-87.99941863	42.30847418	Libertyville Sports Complex	Dry	Yes	Libertyville Township	Commercial	Access Problems: No clear route of access. Lots of "No trespassing" signs and heavy construction	Bull Creek 2004
14-391	391	-88.00706884	42.30701436	Industrial Dr.	Dry	No	Libertyville	Commercial	Plant natives along banks.	Bull Creek 2004

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14-392	392	-88.00533507	42.30856008	Industrial Dr.	Wet	No	Libertyville	commercial	Remove small amount of litter.	Bull Creek 2004
14-393	393	-88.00709021	42.30782651	Industrial Dr.	Dry	No	Libertyville	Commercial	Plant natives along banks	Bull Creek 2004
14-394	394	-88.02129148	42.31460498	Countryside Landfill	Wet	No	Libertyville Township	landfill	Access Issues: Site is on a landfill in an inaccessible area.	Bull Creek 2004
14-395	395	-88.00738937	42.31530792	Central Lake County Water Agency	Wet	Yes	Libertyville	Commercial	None	Bull Creek 2004
14-396	396	-88.0151017	42.31836807	Libertyville Prarie Crossing Station	Wet	Yes	Libertyville	Commercial	None, I think entire wetland area is 1 detention basin.	Bull Creek 2004
14-397	397	-88.00952424	42.32414597	Prarie Crossing	Wet	Yes	Grayslake	Residential	None, basin is a shallow wetland that is full of water because of rain event.	Bull Creek 2004
14-398	398	-88.00742524	42.32596035	Prarie Crossing	Wet	Yes	Grayslake	Residential	Increase buffer area.	Bull Creek 2004
14-399	399	-88.00601524	42.32629344	Prarie Crossing	Wet	Yes	Grayslake	Residential	Remove minor clog at inlet B	Bull Creek 2004
14-400	400	-87.98522319	42.30725352	Timber Creek	Wet	No	Libertyville	Residential	1. Unclog A, B. 2. Plant natives along banks.	Bull Creek 2004
14-401	401	-87.98294763	42.30812305	Timber Creek	Wet	No	Libertyville	Residential	1. Plant natives along banks. 2. Decrease turbidity and sediment.	Bull Creek 2004
14-402	402	-87.97999061	42.30902414	Timber Creek	Wet	No	Libertyville	Residential	1. Unclog A 2. Plant natives along banks 3. Improve turbidity and algae.	Bull Creek 2004
14-403	403	-87.97176238	42.30744573	Forest Creek Ln.	Wet	No	Libertyville	Residential	Decrease turbidity and sediment in water.	Bull Creek 2004
14-404	404	-87.98323674	42.30512374	Butterfield Square	Dry	Yes	Libertyville	Commercial	1. Plant native plants. 2. Remove channels 3. Improve drainage at C and D	Bull Creek 2004
14-405	405	-87.98802143	42.30213806	Interlaken Ridge	Dry	No	Libertyville	Residential	1. Plant natives along bottom and banks 2. Clear up bad drainage areas.	Bull Creek 2004
14-406	406	-87.98437094	42.29710422	Concord at Interlaken	Wet	Yes	Libertyville	Residential	1. Plant natives along banks. 2. Reduce sediment, erosion, turbidity. 3. Unclog C	Bull Creek 2004
14-407	407	-87.97983746	42.29580935	Interlaken Ridge	Wet	No	Libertyville	Residential	1. Plant natives along banks. 2. Reduce sediment and turbidity.	Bull Creek 2004
14-408	408	-87.98065645	42.29550848	Interlaken Ridge	Wet	No	Libertyville	Residential	1. Plant natives along banks. 2. Reduce turbidity.	Bull Creek 2004
14-409	409	-87.97986165	42.2900603	Butterfield School	Dry	Yes	Libertyville	Commercial	1. Plant natives on banks. 2. Reduce algae. 3. Clear grass around B.	Bull Creek 2004
14-410	410	-87.97479744	42.2957937	Interlaken Ridge	Dry	No	Libertyville	Residential	1. Plant natives along banks and bottom. 2. Remove concrete channels.	Bull Creek 2004
14-411	411	-87.96696221	42.29233052	Stonegate Rd.	Dry	No	Libertyville	Residential	1. Plant natives on bottom and banks. 2. Increase buffer area.	Bull Creek 2004
14-413	413	-87.98017215	42.30370328	Newcastle Rd.	Dry	No	Libertyville Township	Residential	Not a basin. Home stands where basin is supposedly located.	Bull Creek 2004
14-414	414	-87.97483376	42.30540117	Elderberry Dr.	Dry	No	Libertyville	Residential	1. Plant natives on sides and bottom. 2. Outlet A clogged with vegetation.	Bull Creek 2004

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14-416	416	-87.96177844	42.30710534	Liberty Grove	Wet	Yes	Libertyville	Residential	1. Plant natives along banks. 2. Reduce turbidity.	Bull Creek 2004
14-417	417	-87.96527162	42.30975317	Janus Ct.	Dry	No	Libertyville Township	Residential	Plant natives along banks.	Bull Creek 2004
14-418	418	-87.96210422	42.30775408	Liberty Grove	Wet	Yes	Libertyville	Residential	1. Plant natives along banks 2. Improve buffer area.	Bull Creek 2004
14-419	419	-88.01104498	42.32880271	Prarie Crossing	Wet	Yes	Grayslake	Residential	1. Remove Geese. 2. Plant more natives on East side of basin.	Bull Creek 2004
14-420	420	-88.01206584	42.33352445	Prarie Crossing	Wet	Yes	Grayslake	Residential	None	Bull Creek 2004
14-421	421	-88.0364935	42.28094976	Long Meadow Estates	Wet	Yes	Mundelein	Residential	1. Reduce turbidity and erosion. 2. Plant natives along banks.	Bull Creek 2004
14-422	422	-88.03682729	42.28365444	Long Meadow Estates	Wet	Yes	Mundelein	Residential	1. Unclog inlet B. 2. Plant natives along banks.	Bull Creek 2004
14-423	423	-88.03759973	42.28401016	Long Meadow Estates	Wet	No	Mundelein	Residential	Increase buffer area	Bull Creek 2004
14-424	424	-88.02963935	42.28628859	Long Meadow Estates	Wet	Yes	Mundelein	Residential	1. Remove geese 2. Remove clog at A. 3. Remove excess woody vegetation near A.	Bull Creek 2004
14-425	425	-88.03420842	42.28970522	Long Meadow Estates	Wet	No	Unincorporated Mundelein	Residential	Access Issues: No trespassing signs. Gated with electric fence.	Bull Creek 2004
14-426	426	-88.03444377	42.29031012	Long Meadow Estates	Wet	No	Unincorporated Mundelein	Residential	Access Issues: No trespassing signs. Gated with electric fence.	Bull Creek 2004
14-427	427	-88.03380366	42.29134016	Long Meadow Estates	Wet	No	Unincorporated Mundelein	Residential	Reduce algae	Bull Creek 2004
14-428	428	-88.03101048	42.29012426	Long Meadow Estates	Wet	Yes	Mundelein	Residential	Increase buffer area	Bull Creek 2004
14-429	429	-88.01282047	42.28498499	Mundelein Community Park	Wet	No	Mundelein	Commercial	1. Plant natives along banks 2. Remove trash 3. Reduce algae.	Bull Creek 2004
14-430	430	-88.0090627	42.28814157	Ambria Dr.	Wet	No	Mundelein	Residential	None	Bull Creek 2004
14-431	431	-87.98663776	42.29109426	Pine Meadow Golf Course	Wet	No	Mundelein	Commercial	1. Plant natives along banks. 2. Stop putting blue dye in basin.	Bull Creek 2004
14-432	432	-87.98926659	42.29233087	Pine Meadow Golf Course	Wet	No	Mundelein	Commercial	1. Reduce algae 2. Plant more natives along banks. 3. Stop putting blue dye in basin.	Bull Creek 2004
14-433	433	-87.99103815	42.29342835	Pine Meadow Golf Course	Wet	No	Mundelein	Commercial	1. Stop minor shoreline erosion. 2. Stop putting blue dye in basin.	Bull Creek 2004
14-434	434	-87.96058797	42.2924557	Butler Lake Park	Wet	No	Libertyville	Commercial	None	Bull Creek 2004
14-435	435	-87.9856923	42.29906271	Amy Ln.	Dry	No	Libertyville	Residential	Not a detention basin	Bull Creek 2004
14-436	436	-87.99864774	42.30655015	Peterson Rd.	Wet	No	Libertyville Township	Commercial	Access Issues: No trespassing signs and construction equipment operating.	Bull Creek 2004
14-437	437	-87.99251239	42.31557192	Bob-O-Link Ln.	Wet	No	Libertyville Township	Residential	1. Plant natives along banks. 2. Remove riprap 3. Reduce algae, turbidity, and sediment.	Bull Creek 2004

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14-439	439	-88.03817614	42.28585442	Long Meadow Estates	Wet	Yes	Mundelein	Residential	Decrease amount of woody vegetation in pond	Bull Creek 2004
14-440	440	-88.03740955	42.28776261	Long Meadow Estates	Wet	Yes	Mundelein	Residential	Remove litter and debris.	Bull Creek 2004
14-441	441	-88.03583373	42.2800132	Long Meadow Estates	Wet	Yes	Mundelein	Residential	1. Decrease algae and woody vegetation 2. Plant natives along banks.	Bull Creek 2004
14-442	442	-88.03680236	42.28009421	Long Meadow Estates	Wet	Yes	Mundelein	Residential	1. Plant natives along banks. 2. Stop erosion 3. Decrease sediment, algae, and turbidity.	Bull Creek 2004
14-443	443	-88.03426812	42.27949887	Long Meadow Estates	Wet	Yes	Mundelein	Residential	1. Plant natives along banks. 2. Decrease algae 3. Improve buffer area.	Bull Creek 2004
14-444	444	-88.00325418	42.32740983	Arbor Vista	Dry	No	Unincorp Grayslake	Residential	None	Bull Creek 2004
14-447	447	-88.00152288	42.30658415	Libertyville Sports Complex (behind gym)	Dry	Yes	Libertyville	Commercial	1. Clear rip-rap from around outlet 2. Plant more natives in basin bottom 3. Reduce algae	Bull Creek 2004
14-448	448	-88.00080784	42.30953295	American Corporate Center	Wet	Yes	Libertyville	Commercial	1. Remove concrete channels 2. Reduce sediment 3. Plant native vegetation on bottom and buffer	Bull Creek 2004
14-450	450	-88.00240476	42.30018444	Hawthorne Community Church	Dry	Yes	Libertyville	Commercial	1. Stop erosion in channels 2. Plant native vegetation on side slopes 3. Create shallower slopes	Bull Creek 2004
14-451	451	-88.00014279	42.29793314	Motorola	Dry	Yes	Libertyville	Commercial	None. Could be made into a retention pond.	Bull Creek 2004
14-452	452	-87.99763192	42.2970779	Winchester Court	Wet	Yes	Libertyville	Commercial	Plant native vegetation on bottom and slopes	Bull Creek 2004
14-453	453	-87.99601064	42.29648345	Winchester Court	Wet	Yes	Libertyville	Commercial	Plant native vegetation on bottom and slopes	Bull Creek 2004
14-454	454	-87.99418827	42.29616189	Interlaken Meadows	Dry	No	Libertyville	Residential	Plant native vegetation on bottom and slopes	Bull Creek 2004
14-455	455	-87.98633587	42.30129848	Interlaken Meadows	Dry	No	Libertyville	Residential	1. Plant natives on bottom 2. Turn part into retention basin	Bull Creek 2004
14-457	457	-87.97476716	42.28589118	Libertyville Manor	Dry	Yes	Libertyville	Residential, woods	1. Plant native vegetation on slopes 2. Remove trees from basin	Bull Creek 2004
14-458	458	-87.97405654	42.308689	Forest Creek	Dry	Yes	Libertyville	Residential	1. Plant native vegetation on bottom and slopes 2. Don't have pipes drain directly into manhole	Bull Creek 2004
14-459	459	-87.97090761	42.30874917	Sattle Shop	Dry	Yes	Libertyville	Commercial	1. Plant native vegetation. 2. Decrease algae	Bull Creek 2004
14-46	446	-87.96588122	42.30748437	Libertyville Sports Complex	Dry	Yes	Libertyville	Commercial	1. Remove trees 2. Clear inlets	Bull Creek 2004
14-460	460	-87.96334525	42.30467801	ACE hardware	Dry	No	Libertyville	Commercial	Clear out bushes and trees and control cattails	Bull Creek 2004
14-461	461	-87.9613683	42.29735674	Lake County Public Works Campus	Dry	No	Libertyville	Public	None	Bull Creek 2004
14-462	462	-87.9590525	42.29481967	Lake County Division of Transportation	Wet	Yes	Libertyville	Public	Reduce algae and turbidity	Bull Creek 2004

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14-463	463	-87.97252335	42.30160023	Wineberry (S. of Kildare Ave.)	Dry	No	Libertyville	Residential	1. Add stilling basins 2. Force a non direct path to outlet 3. Plant natives on bottom and in 10' buffer zone	Bull Creek 2004
14-464	464	-87.97063305	42.30075109	Providence Acres	Dry	No	Libertyville Township	Residential	1. Plant native vegetation 2. Fill in channel and force flow to spread out	Bull Creek 2004
14-465	465	-87.97020477	42.29795422	Wineberry	Dry	Yes	Libertyville	Residential	1. Plant native vegetation 2. Add a stilling basin at inlet	Bull Creek 2004
14-466	466	-87.97025331	42.29625024	Cambridge North, Unit 2	Dry	Yes	Libertyville	Residential	1. Fill in grass channel 2. Plant bottom and buffer area with natives 3. Reduce algae	Bull Creek 2004
14-467	467	-87.97978263	42.29469164	Interlaken Willows	Dry	No	Libertyville	Residential	1. Remove trees 2. Plant native vegetation	Bull Creek 2004
14-469	469	-88.0019029	42.29889393	American Way Professional Center	Dry	Yes	Libertyville	Commercial	1. Stop erosion 2. Plant native vegetation	Bull Creek 2004
14-471	471	-88.02902048	42.27923592	The Woodlands	Dry	Yes	Unincorporated Mundelein	Residential	None	Bull Creek 2004
14-472	472	-88.02351262	42.28377332	-	Dry	Yes	Mundelein	Residential	1. Plant a native vegetation. 2. Add stilling basin	Bull Creek 2004
14-473	473	-88.02190581	42.28517446	-	Dry	Yes	Mundelein	Residential	Install sediment basin	Bull Creek 2004
14-474	474	-88.01979472	42.28734771	-	Wet	Yes	Mundelein	Residential	1. Install sediment basin at inlet 2. Remove sediment	Bull Creek 2004
14-475	475	-88.01986695	42.28861596	-	Dry	Yes	Mundelein	Residential	Add sediment basins	Bull Creek 2004
14-476	476	-88.01144137	42.29137649	-	Wet	Yes	Mundelein	Residential	None	Bull Creek 2004
14-477	477	-88.01027918	42.292153	-	Wet	Yes	Mundelein	Residential	None	Bull Creek 2004
14-478	478	-88.00967834	42.29064277	-	Wet	Yes	Mundelein	Residential	None	Bull Creek 2004
14-479	479	-88.00780195	42.28905604	-	Wet	Yes	Mundelein	Residential	None	Bull Creek 2004
14-480	480	-88.01245313	42.28349047	-	Wet	Yes	Mundelein	Residential	1. Plant native vegetation 2. Add Stilling basin	Bull Creek 2004
14-481	481	-88.01403498	42.28441957	-	Dry	Yes	Mundelein	Residential	1. Plant native vegetation 2. Add Stilling basin	Bull Creek 2004
14-573	573	-88.0059817	42.32635043	-	Wet	Yes	Grayslake	Residential	1. Unclog inlets 2. Thin out vegetation near inlets 3. Use riprap near inlets	DPRW 2016
14-574	574	-88.00714057	42.33124148	-	Dry	Yes	Grayslake	Residential	Clear outlet	DPRW 2016
14-575	575	-88.01220538	42.333559	-	Wetland	Yes	Grayslake	Residential	Create larger space for outlet	DPRW 2016
14-669	669	-88.00824116	42.32114993	Prairie Crossing Pond 4	Wetland	Yes	Grayslake	Residential	Unclog inlets & outlets	DPRW 2016
14-670	670	-88.01331235	42.32054017	Prairie Crossing Pond 7	Wetland	Yes	Grayslake	Residential	1. Clear dead vegetation from inlets and outlets 2. Clear woody vegetation from inlets and outlets	DPRW 2016
14-671	671	-88.00494679	42.31710196	Electricians Condominium Pond	Wet	Yes	Grayslake	Commercial	1. Implement native plant in and around basin 2. Clean out outlet	DPRW 2016

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14-672	672	-87.99218867	42.31645726	Wood Hollow Pond 2	Wetland	Yes	Libertyville Township	Residential	None needed	DPRW 2016
14-673	673	-88.00793686	42.31607138	Mallory Industrial Campus Pond 1	Wet	Yes	Libertyville	Commercial	None	DPRW 2016
14-674	674	-88.00803954	42.31535638	Mallory Industrial Campus Pond 2	Wet	Yes	Libertyville	Commercial	None	DPRW 2016
14-675	675	-87.99137464	42.31576585	Wood Hollow Pond 3	Dry	Yes	Libertyville Township	Residential	None	DPRW 2016
14-676	676	-88.00696111	42.31464553	Mallory Industrial Campus Pond 6	Wet	Yes	Libertyville	Commercial	None	DPRW 2016
14-677	677	-88.00610429	42.30981909	Libertyville Center for Industry Pond 3	Dry	Yes	Libertyville	Industrial	1. Put outlet at opposite end of channel 2. Plant native plants 3. Install another channel	DPRW 2016
14-678	678	-88.00801147	42.30981221	Libertyville Center for Industry Pond 2	Dry	Yes	Libertyville	Industrial	1. Install native plants 2. Unclog outlet drain	DPRW 2016
14-680	680	-87.99602046	42.30654922	TriPower Automotive Basin	Wet	Yes	Libertyville	Residential	None needed	DPRW 2016
14-681	681	-88.00117068	42.30104647	GLSA Pond	Wetland	Yes	Libertyville Township	Industrial	1. Clear vegetation around inlets/outlets 2. Clean up trash 3. Reattach FES	DPRW 2016
14-682	682	-88.00261472	42.29988183	American Corporate Center Pond 1	Wet	Yes	Libertyville	Industrial	1. Clean up trash 2. Reinstall outlet	DPRW 2016
14-683	683	-88.00213484	42.29937511	American Corporate Center Pond 2	Dry	Yes	Libertyville	Industrial	1. Don't mow center (let native plants grow) 2. Raise outlet up out of ground 3. Remove manhole	DPRW 2016
14-684	684	-88.00110323	42.29819187	J.J.B. Pond	Dry	Yes	Libertyville	Commercial	1. Greater slope towards outlet 2. Implement more native plants (don't mow)	DPRW 2016
14-685	685	-87.99528757	42.2963414	Winchester Court Pond 1	Wet	Yes	Libertyville	Commercial	Repairing rip rap by eliminating back lining.	DPRW 2016
14-686	686	-87.95946062	42.29475643	Lake County DOT Detention Pond	Wet	Yes	Libertyville	Public	Looks as though some maintenance is being done currently.	DPRW 2016
14-688	688	-87.99459126	42.29121922	Motorola - Libertyville Pond 3	Wetland	Yes	Libertyville	Commercial	1. Clean up trash and concrete debris 2. Unclog inlets 3. Implement riprap near outlet	DPRW 2016
14-689	689	-88.01599541	42.28550221	Keith Mione Community Park Pond 1	Dry	Yes	Mundelein	Public	Create meander to slow flow	DPRW 2016
14-691	691	-88.01312807	42.27455308	Cairo Pond 1	Dry	Yes	Mundelein	Residential	1. Plant natives 2. Try to divert inlet from outlet	DPRW 2016
15-1001	1001	-88.05794454	42.1676684	L.B. Anderson Pond	Wet	Yes	Kildeer	Industrial	None needed	DPRW 2016
15-1002	1002	-88.06105659	42.1673872	Quentin Collection Basin 1	Dry	Yes	Kildeer	Commercial	None	DPRW 2016
15-1004	1004	-88.02280948	42.16596528	Wyncrest of Long Grove Pond 1	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016
15-1005	1005	-88.02343908	42.16612701	Wyncrest of Long Grove Pond 2	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016
15-1006	1006	-88.0232887	42.16580586	Wyncrest of Long Grove Pond 3	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016

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15-1009	1009	-88.04961628	42.16314888	Shops at Kildeer Shopping Center Pond 3	Wet	Yes	Kildeer	Commercial	None needed	DPRW 2016
15-1011	1011	-88.04927781	42.16285633	Shops at Kildeer Shopping Center Pond 4	Wetland	Yes	Kildeer	Commercial	None needed	DPRW 2016
15-1030	1030	-87.95964501	42.15823773	Winchester Estates - Buffalo Grove Pond 1	Wet	Yes	Buffalo Grove	Residential	None	DPRW 2016
15-1047	1047	-88.03671921	42.24161091	Indian Creek Club Pond 5	Wetland	Yes	Long Grove	Residential	1. Unclog outlets 2. Clean up trash and debris	DPRW 2016
15-1048	1048	-88.0548733	42.229943	Meadows Pond 1	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1049	1049	-88.05520856	42.15548992	Deer Park Office Center Pond 4	Wet	Yes	Deer Park	Commercial	Replant the bare spots	DPRW 2016
15-1108	1108	-88.03977654	42.28594137	-	Wetland	Yes	Mundelein	Residential	1. Clean up trash 2. Thin perimeter vegetation 3. Clear outlet of debris	DPRW 2016
15-1109	1109	-88.0439139	42.26709944	Old Dominion Basin 1	Wet	Yes	Mundelein	Residential	None needed	DPRW 2016
15-1110	1110	-88.04436503	42.27077069	Grand Dominion Basin 2	Wet	Yes	Mundelein	Residential	None needed	DPRW 2016
15-1111	1111	-88.04380934	42.27369814	Comstock South Basin	Wet	Yes	Mundelein	Residential	None needed	DPRW 2016
15-1112	1112	-88.06367952	42.25704437	Hawthorne Woods Basin 1	Wet	Yes	Hawthorn Woods	Residential	Install native buffer	DPRW 2016
15-1113	1113	-88.07022989	42.25334245	Tournament Drive Basin 1	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1114	1114	-88.0620587	42.2530301	Hawthorn Woods Country Club Pond 10	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1115	1115	-88.06642612	42.25569253	Hawthorn Woods Country Club Pond 11	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1116	1116	-88.06835422	42.2578926	Owens Road Basin 1	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1117	1117	-88.07423964	42.25044671	Hawthorn Woods Country Club Pond 2	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1118	1118	-88.07085892	42.24861109	Doral Basin 1	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1119	1119	-88.06916026	42.24849026	Doral Basin 2	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1120	1120	-88.06843948	42.25140545	Hawthorn Woods Country Club Pond 8	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1121	1121	-88.06713673	42.24985838	Hawthorn Woods Country Club Pond 6	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1122	1122	-88.06762499	42.25235705	Tournament Drive Basin 2	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1123	1123	-88.06858738	42.25060866	Hawthorn Woods Country Club Pond 7	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1124	1124	-88.06019171	42.25042372	Hawthorn Woods Country Club Pond 9	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016

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15-1125	1125	-88.07131916	42.24554417	Hawthorn Woods Country Club Pond 3	Wet	Yes	Hawthorn Woods	Residential	Increase unmowed buffer	DPRW 2016
15-1126	1126	-88.06863179	42.24715812	Hawthorn Woods Country Club Pond 4	Wet	Yes	Hawthorn Woods	Residential	Install riprap to stabilize shoreline	DPRW 2016
15-1127	1127	-88.06683671	42.24408285	Hawthorn Woods Country Club Pond 5	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1128	1128	-88.06066732	42.24194306	Peter Road Basin	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1129	1129	-88.0551445	42.24401923	Countryside Meadows Pond 4	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1130	1130	-88.05441329	42.24268767	Countryside Meadows Pond 1	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1131	1131	-88.03403462	42.24679695	Jack Pine Basin	Wet	Yes	Fremont Township	Residential	Install native buffer	DPRW 2016
15-1132	1132	-88.00079405	42.24365342	Village Green Townhomes Pond	Dry	Yes	Libertyville Township	Residential	1. Eliminate channel 2. Move inlet/outlet further apart 3. Increase native vegetation	DPRW 2016
15-1133	1133	-87.99555924	42.24453024	-	Wet	Yes	Mundelein	Residential	1. Clean up trash 2. Let native plants grow 3. Install aerator 4. Unclog inlet	DPRW 2016
15-1134	1134	-87.96882079	42.2379966	Aspen Drive Basin 1	Dry	Yes	Vernon Hills	Public	None	DPRW 2016
15-1135	1135	-87.97468543	42.23923819	Aspen Point Basin 1	Wetland	Yes	Vernon Hills	Residential	None	DPRW 2016
15-1136	1136	-87.97521304	42.23862752	-	Wetland	Yes	Vernon Hills	Residential	None	DPRW 2016
15-1137	1137	-87.9746492	42.23868558	-	Wetland	Yes	Vernon Hills	Residential	None	DPRW 2016
15-1138	1138	-87.97644318	42.23680663	-	Wet	Yes	Mundelein	Commercial	1. Make outlet visible 2. Thin out invasive species	DPRW 2016
15-1139	1139	-87.98606893	42.24107303	Medline pond	Wet	Yes	Mundelein	Industrial	1. Implement more native plants by parking lot 2. Install more riprap in some channels	DPRW 2016
15-1140	1140	-87.98143897	42.23676968	-	Dry	Yes	Mundelein	Industrial	Implement native plants	DPRW 2016
15-1141	1141	-87.99528508	42.23208785	-	Wet	Yes	Long Grove	Residential	1. Add aerator to decrease excess algae 2. Increase native plants along shoreline	DPRW 2016
15-1142	1142	-88.07686377	42.23801749	Open Parkway Basin 1	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1143	1143	-88.07567475	42.23780949	Open Parkway Basin 2	Wet	Yes	Hawthorn Woods	Residential	1. Repair pipe 2. Install riprap to stabilize area by outlet	DPRW 2016
15-1144	1144	-88.06578781	42.2368641	Tournament Basin 2	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-1145	1145	-88.06794971	42.23691167	Tournament Basin 3	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-1146	1146	-88.06768316	42.23595857	Tournament Basin 1	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-1147	1147	-88.07018733	42.23414899	Heritage Oaks Park Basin1	Wet	Yes	Hawthorn Woods	Residential	1. Install native buffer 2. Remove debris from outlet	DPRW 2016
15-1148	1148	-87.99603645	42.22853576	-	Wet	Yes	Long Grove	Residential	Add aerator to decrease excess algae	DPRW 2016
15-1149	1149	-87.99624392	42.23042218	-	Wet	Yes	Long Grove	Residential	Remove excess litter/debris	DPRW 2016

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15-1150	1150	-87.99705153	42.23088906	-	Wet	Yes	Long Grove	Residential	1. Add aerator to decrease excess algae 2. Consider excess scouring at inlets and outlet	DPRW 2016
15-1151	1151	-87.99937567	42.2310278	-	Wet	Yes	Long Grove	Residential	Add aerator to decrease excess algae	DPRW 2016
15-1152	1152	-88.00071876	42.22876603	-	Wetland	Yes	Long Grove	Residential	Perhaps remove some excess woody vegetation	DPRW 2016
15-1153	1153	-88.0015755	42.23046419	-	Wet	Yes	Long Grove	Residential	Install aerator to decrease excess algae	DPRW 2016
15-1154	1154	-88.0026043	42.22986129	-	Wet	Yes	Long Grove	Residential	Install aerator to decrease excess algae	DPRW 2016
15-1155	1155	-87.98130134	42.22916066	-	Wet	Yes	Indian Creek	Residential	1. Fix aerator 2. Unclog inlet 3. Implement more native plants	DPRW 2016
15-1156	1156	-87.97192587	42.22615676	-	Wet	Yes	Indian Creek	Residential	Implement more native plants	DPRW 2016
15-1157	1157	-87.9571439	42.22503461	-	Wet	Yes	Vernon Hills	Public	None	DPRW 2016
15-1158	1158	-87.95712394	42.22575544	-	Wet	Yes	Vernon Hills	Public	None	DPRW 2016
15-1159	1159	-88.06319655	42.21293693	Bish Creative Enterprises Basin	Wet	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1160	1160	-88.06683814	42.21421027	885 Tesler Basin 2	Wet	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1161	1161	-88.07305706	42.20362265	Donata Court Basin	Wet	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1162	1162	-88.06823717	42.2103152	1030 Commerce Basin	Dry	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1163	1163	-88.06267309	42.20412574	Alpine Automotive Basin	Wet	Yes	Lake Zurich	Industrial	None	DPRW 2016
15-1164	1164	-88.06338687	42.21156333	Flex Basin	Wet	Yes	Lake Zurich	Industrial	None	DPRW 2016
15-1165	1165	-88.05349019	42.20319673	Empress Basin 2	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1166	1166	-88.02352752	42.2063945	Old Meadow Trail Basiin 1	Wetland	Yes	Ela Township	Residential	None needed	DPRW 2016
15-1167	1167	-88.0266128	42.20352359	Lake County Community Jewish Campus Basin 3	Wet	Yes	Ela Township	Public	None	DPRW 2016
15-1168	1168	-88.01538176	42.20489384	Trillium Trail Basin 1	Wet	Yes	Long Grove	Residential	Identify and clear outlet or install outlet to improve water circulation	DPRW 2016
15-1169	1169	-88.00991137	42.20946716	Thimbleweed Trail Basin 1	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016
15-1170	1170	-88.01204353	42.2105226	Thimbleweed Basin 2	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016
15-1171	1171	-87.94578998	42.20826749	The Oaks Basin 1	Wetland	Yes	Vernon Hills	Residential	None needed	DPRW 2016
15-1172	1172	-87.94919276	42.20969914	The Oaks Basin 3	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
15-1173	1173	-87.93040956	42.19922432	Fresh Market Basin	Wetland	Yes	Lincolnshire	Commercial	None needed	DPRW 2016
15-1174	1174	-87.95135807	42.19431124	Waterbury Lane Basin 3	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
15-1175	1175	-87.95147986	42.19535167	Waterbury Lane Basin 1	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
15-1176	1176	-87.95065565	42.19528095	Waterbury Lane Basin 2	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
15-1177	1177	-87.95287631	42.19621503	Taylor Court Basin	Wet	Yes	Buffalo Grove	Residential	Plant native buffer	DPRW 2016

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15-1178	1178	-87.95071691	42.19197296	Waterbury Lane Basin 4	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
15-1179	1179	-88.01708374	42.19677647	Orchard Lane Basin 1	Wet	Yes	Long Grove	Residential	Increase buffer	DPRW 2016
15-1180	1180	-88.025485	42.20121594	Lake County Community Jewish Campus Basin 1	Wet	Yes	Ela Township	Public	None	DPRW 2016
15-1181	1181	-88.0218282	42.19889729	Long Grove Commons Basin 4	Wet	Yes	Long Grove	Public	None needed	DPRW 2016
15-1182	1182	-88.02078601	42.19789762	Long Grove Commons Basin 1	Wet	Yes	Long Grove	Public	None needed	DPRW 2016
15-1183	1183	-88.02208355	42.19750088	Long Grove Commons Basin 2	Wet	Yes	Long Grove	Public	None needed	DPRW 2016
15-1184	1184	-88.02385878	42.19807643	Long Grove Commons Basin 3	Wet	Yes	Long Grove	Public	None needed	DPRW 2016
15-1185	1185	-88.05418253	42.19788362	Providence Basin 1	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1186	1186	-88.05393029	42.19910419	Future Catalpa Drive Basin 1	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1187	1187	-88.05360406	42.20073233	Empress Basin 1	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-1188	1188	-88.05681531	42.20104832	Acacia Basin	Wet	Yes	Hawthorn Woods	Residential	Install outlet of other sided to reduce short circuiting	DPRW 2016
15-1189	1189	-88.06494671	42.19946856	Termax Basin 2	Wet	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1190	1190	-88.06552538	42.1997444	Termax Basin 1	Wet	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1191	1191	-88.06547306	42.20144171	Rose Basin 2	Wet	Yes	Lake Zurich	Industrial	Increase buffer	DPRW 2016
15-1192	1192	-88.0659587	42.20142302	Rose Basin 1	Wet	Yes	Lake Zurich	Industrial	Increase buffer	DPRW 2016
15-1193	1193	-88.06806014	42.18332688	Partridge Lane Basin 1	Wet	Yes	Lake Zurich	Residential	None	DPRW 2016
15-1194	1194	-88.05889277	42.19077827	Lea Lane Basin	Wetland	Yes	Lake Zurich	Residential	1. Increase native buffer where possible 2. Remove wire mesh fence	DPRW 2016
15-1195	1195	-88.04415605	42.18702412	Greenmeadow Basin 1	Wet	Yes	Kildeer	Residential	Increase native buffer	DPRW 2016
15-1196	1196	-88.03884347	42.1904914	Summit Yorkshire Basin	Wet	Yes	Kildeer	Residential	None	DPRW 2016
15-1197	1197	-88.00724776	42.19001347	Old McHenry Basin 1	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016
15-1198	1198	-88.00434335	42.18576026	Twin Orchard Country Club Pond 2	Wet	Yes	Ela Township	Commercial	None needed	DPRW 2016
15-1199	1199	-88.0017749	42.18354281	Twin Orchard Country Club Pond 12	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-1200	1200	-88.00134361	42.18354165	Twin Orchard Country Club Pond 13	Wet	Yes	Vernon Township	Commercial	Increase buffer	DPRW 2016
15-1201	1201	-87.99523985	42.18358849	Twin Orchard Country Club Pond 8-B	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016

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15-1203	1203	-87.9957231	42.18426192	Twin Orchard Country Club Pond 7-B	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-1204	1204	-87.99122983	42.1833715	Twin Orchard Country Club Pond 11	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-1224	1224	-88.01266781	42.15042232	Hwy 53 Basin 1	Wet	Yes	Arlington Heights	Residential	Install native buffer	DPRW 2016
15-1225	1225	-88.03114181	42.14492419	Hicks Basin 1	Wet	Yes	Palatine	Residential	Install native buffer	DPRW 2016
15-1226	1226	-88.04520027	42.15447444	Continental Basin	Wet	Yes	Deer Park	Residential	None needed	DPRW 2016
15-1227	1227	-87.96071005	42.15442312	-	Wet	Yes	Buffalo Grove	Public	None	DPRW 2016
15-1228	1228	-87.94854067	42.15419406	-	Wet	Yes	Buffalo Grove	Residential	Consider inlet in need of repair	DPRW 2016
15-1229	1229	-87.91018161	42.12386717	-	Dry	Yes	Wheeling	Public	Remove excess litter/debris	DPRW 2016
15-1230	1230	-87.91957868	42.11789389	-	Wet	Yes	Wheeling	Industrial	None	DPRW 2016
15-1235	1235	-87.89956893	42.12511562	-	Wet	Yes	Wheeling	Residential	1. Remove some excess woody vegetation 2. Increase native plants along shore	DPRW 2016
15-1243	1243	-87.91854341	42.11965021	-	Wet	Yes	Wheeling	Industrial	None	DPRW 2016
15-1245	1245	-88.06066595	42.16797306	Quentin Collection Basin 2	Wet	Yes	Kildeer	Commercial	None needed	DPRW 2016
15-1246	1246	-88.00048029	42.14897435	Creekside Park	Onstream	Yes	Arlington Heights	Residential	None	DPRW 2016
15-1324	1324	-88.04362834	42.26997627	Grand Dominion Basin 3	Wet	Yes	Mundelein	Residential	None needed	DPRW 2016
15-1326	1326	-88.05170254	42.26440381	Stockholm Lake Basin	Wet	Yes	Mundelein	Residential	None needed	DPRW 2016
15-1327	1327	-88.05309891	42.26082396	Mary Lee Lake Basin 1	Wet	Yes	Mundelein	Commercial	None needed	DPRW 2016
15-1328	1328	-88.0550742	42.26183612	Steeple Chase Golf Course Pond 3	Wetland	Yes	Mundelein	Commercial	Increase native buffer	DPRW 2016
15-1329	1329	-88.06498732	42.26110997	Steeple Chase Golf Course Pond 2	Wet	Yes	Mundelein	Residential	Fix outlet at tree nursery	DPRW 2016
15-1343	1343	-88.065955	42.19679625	Lake Zurich Estates Pond 5	Wet	Yes	Lake Zurich	Residential	Install native buffer	DPRW 2016
15-1344	1344	-88.07287842	42.20418412	Oakwood Basin	Dry	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-1345	1345	-87.99521049	42.18409397	Twin Orchard Country Club Pond 7-C	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-2437	437	-87.95464419	42.239895	Continental Executive Park Pond 1	Wet	Yes	Vernon Hills	Commercial	1. Clean up basin perimeter 2. Make inlet more visible 3. Grow more native plants 4. Implement riprap in high run off areas.	DPRW 2016
15-2471	471	-87.94551211	42.21114381	Not a basin	Wet	Yes	Vernon Hills	Residential	None	DPRW 2016
15-2547	547	-88.06556174	42.19468536	Knox Park Pond	Dry	Yes	Lake Zurich	Residential	Remove channel or create meander to reduce short circuiting	DPRW 2016
15-2548	548	-88.07919606	42.19283423	Jonquil Estates Pond	Dry	Yes	Lake Zurich	Residential	Install grate to pipe on top of bank	DPRW 2016
15-2549	549	-88.06490983	42.19096892	Cedar Creek Pond 3	Dry	Yes	Lake Zurich	Residential	1. Cover pipes 2. Add riprap	DPRW 2016

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									3. Install native plants to slow the flow	
15-2554	554	-88.04576612	42.18044232	Farmington Pond 8	Wet	Yes	Kildeer	Residential	Add native plants to shoreline	DPRW 2016
15-3001	1	-88.02160326	42.22168529	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3002	2	-88.01941416	42.21606386	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3003	3	-88.02336768	42.21277929	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3004	4	-88.02297927	42.21464286	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3005	5	-88.02356351	42.21604462	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3006	6	-88.03103708	42.21563476	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3009	9	-88.0397075	42.21851629	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3010	10	-88.0427036	42.21935127	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3011	11	-88.04991861	42.21800276	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3012	12	-88.0512732	42.2179519	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3013	13	-88.03905649	42.22853058	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3016	16	-88.06269278	42.19698288	-	Wet	No	Lake Zurich	Residential	Not assessed	Indian Creek
15-3017	17	-88.06360217	42.19705123	-	Dry	No	Lake Zurich	Residential	Not assessed	Indian Creek
15-3018	18	-88.06818751	42.19892654	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3022	22	-88.06836222	42.20167442	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3023	23	-88.06836471	42.20432221	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3024	24	-88.06536239	42.20056987	-	Dry	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3025	25	-88.06733852	42.20083619	-	Dry	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3026	26	-88.06440495	42.20137612	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3027	27	-88.06070375	42.20017918	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3028	28	-88.06333695	42.20723125	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3029	29	-88.06421496	42.20951023	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek

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15-3031	31	-88.07097828	42.20554935	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3032	32	-88.07090563	42.20705055	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3033	33	-88.07094576	42.20805739	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3036	36	-88.07061686	42.2113818	-	Wet	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3037	37	-88.06963621	42.21020062	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3038	38	-88.06816797	42.21418887	-	Wet	Yes	Lake Zurich	Residential	Not assessed	Indian Creek
15-3044	44	-88.05839858	42.20410084	-	Dry	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3045	45	-88.05839292	42.20327931	-	Wet	Yes	Lake Zurich	Residential	Not assessed	Indian Creek
15-3048	48	-88.06930738	42.21149474	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3049	49	-88.07362389	42.20156784	-	Wet	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3050	50	-88.06133143	42.20699703	-	Wet	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3058	58	-88.02188132	42.20867557	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3059	59	-88.03313047	42.21780947	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3060	60	-88.05160289	42.21935838	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3061	61	-88.05252164	42.22113332	-	Wet	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3062	62	-88.05904601	42.23711974	-	Wet	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3063	63	-88.05839232	42.23554307	-	Wet	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3064	64	-88.05706811	42.23404539	-	Wet	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3066	66	-88.05651273	42.21906985	-	Wet	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3069	69	-88.05046478	42.19963781	-	Wet	No	Kildeer	Residential	Not assessed	Indian Creek
15-3070	70	-88.05585426	42.19702932	-	Wet	No	Kildeer	Residential	Not assessed	Indian Creek
15-3071	71	-88.05595315	42.19488058	-	Wet	No	Kildeer	Residential	Not assessed	Indian Creek
15-3072	72	-88.05542664	42.19449993	-	Wet	No	Kildeer	Residential	Not assessed	Indian Creek
15-3073	73	-88.05708581	42.1915499	-	Wet	No	Kildeer	Residential	Not assessed	Indian Creek

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15-3074	74	-88.04944928	42.19461838	-	Wet	No	Kildeer	Residential	Not assessed	Indian Creek
15-3075	75	-88.0497693	42.18907023	-	Wet	Yes	Kildeer	Residential	Not assessed	Indian Creek
15-3077	77	-88.04114284	42.19344088	-	Wet	Yes	Kildeer	Residential	Not assessed	Indian Creek
15-3078	78	-88.04311486	42.1933248	-	Wet	Yes	Kildeer	Residential	Not assessed	Indian Creek
15-3079	79	-88.04231309	42.19163103	-	Wet	Yes	Kildeer	Residential	Not assessed	Indian Creek
15-3080	80	-88.038957	42.18675098	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3082	82	-88.02813833	42.18831704	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3083	83	-88.00583591	42.18156675	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3084	84	-87.99782918	42.18227252	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3085	85	-87.98199051	42.19441858	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3086	86	-87.98509917	42.20095732	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3087	87	-87.98763826	42.19783706	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3088	88	-87.98518926	42.19757136	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3089	89	-87.98858093	42.201021	-	Dry	No	Long Grove	Residential	Not assessed	Indian Creek
15-3090	90	-87.99863073	42.19670032	-	Dry	No	Long Grove	Residential	Not assessed	Indian Creek
15-3091	91	-87.99695773	42.1964145	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3092	92	-87.99546545	42.19485386	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3093	93	-87.99058665	42.19831652	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3094	94	-87.98262378	42.2036071	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3095	95	-87.99588547	42.20417066	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3096	96	-87.99088783	42.20302459	-	Wet	No	Long Grove	Commercial	Not assessed	Indian Creek
15-3097	97	-87.9903609	42.20227148	-	Wet	No	Long Grove	Commercial	Not assessed	Indian Creek
15-3098	98	-87.99088015	42.2063271	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3099	99	-87.99744613	42.20645285	-	Dry	Yes	Long Grove	Residential	Not assessed	Indian Creek

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15-3100	100	-88.00141765	42.2046804	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3101	101	-88.00240215	42.20778065	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3102	102	-87.99979821	42.20776556	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3103	103	-88.00590908	42.20697846	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3104	104	-88.00628425	42.2114363	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3105	105	-88.00528638	42.21087159	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3106	106	-88.0061427	42.20918093	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3107	107	-88.00262919	42.20927719	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3108	108	-88.00274156	42.2111754	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3109	109	-88.00016248	42.21026444	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3110	110	-87.99952246	42.209663	-	Wet	No	Long Grove	Commercial	Not assessed	Indian Creek
15-3111	111	-87.99835646	42.21002388	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3112	112	-87.99502123	42.20920938	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3113	113	-87.99896111	42.20709597	-	Dry	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3114	114	-87.99814917	42.20795353	-	Dry	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3115	115	-87.9985005	42.20843649	-	Dry	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3116	116	-88.01291231	42.20331599	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3117	117	-88.0171309	42.20108816	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3118	118	-88.0153815	42.20376329	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3119	119	-88.01947691	42.20366823	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3120	120	-88.02306071	42.20375379	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3121	121	-88.02287529	42.20195418	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3122	122	-88.02061259	42.20108227	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3124	124	-88.00988817	42.2180598	-	Wet	Yes	Long Grove	Public	Not assessed	Indian Creek

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15-3125	125	-88.00992859	42.21429981	-	Wet	Yes	Long Grove	Public	Not assessed	Indian Creek
15-3126	126	-88.00824368	42.21758625	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3127	127	-88.00848495	42.21633872	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3128	128	-88.00768159	42.21660673	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3129	129	-88.00867681	42.21437551	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3130	130	-88.00691866	42.21529288	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3131	131	-88.01717622	42.21873767	-	Dry	No	Long Grove	Residential	Not assessed	Indian Creek
15-3132	132	-88.00357744	42.21945779	-	Dry	No	Long Grove	Residential	Not assessed	Indian Creek
15-3133	133	-88.0037184	42.22420926	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3134	134	-87.99632913	42.22763505	-	Dry	No	Long Grove	Residential	Not assessed	Indian Creek
15-3135	135	-87.99637021	42.22720058	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3136	136	-87.99535787	42.23156826	-	Wet	No	Long Grove	Residential	Not assessed	Indian Creek
15-3137	137	-88.04236456	42.23781406	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3138	138	-88.04012452	42.23759568	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3139	139	-88.04083583	42.24209404	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3140	140	-88.0380905	42.2380405	-	Dry	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3141	141	-88.0381419	42.23889576	-	Dry	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3142	142	-88.03507718	42.23960781	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3143	143	-88.03567238	42.24064868	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3144	144	-87.95297382	42.20961311	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3145	145	-87.95181042	42.20834833	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3146	146	-87.95543016	42.20908853	-	Dry	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3147	147	-87.95121013	42.18806223	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3148	148	-87.94865695	42.19540552	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek

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15-3149	149	-87.94630964	42.19560171	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3150	150	-87.94375166	42.19614736	-	Wet	Yes	Buffalo Grove	Industrial	Not assessed	Indian Creek
15-3151	151	-87.94311155	42.19154709	-	Wet	Yes	Buffalo Grove	Industrial	Not assessed	Indian Creek
15-3152	152	-87.94318477	42.19029191	-	Wet	Yes	Buffalo Grove	Industrial	Not assessed	Indian Creek
15-3153	153	-87.94623998	42.19084045	-	Dry	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3154	154	-87.95800287	42.20394286	-	Dry	No	Buffalo Grove	Commercial	Not assessed	Indian Creek
15-3155	155	-87.95569262	42.20414349	-	Dry	No	Buffalo Grove	Commercial	Not assessed	Indian Creek
15-3156	156	-87.95773774	42.20313969	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3157	157	-87.95571156	42.19933554	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3158	158	-87.96185071	42.20399278	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3159	159	-87.96472906	42.20399452	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3160	160	-87.96447184	42.2001516	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3163	163	-87.9703903	42.2032696	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3164	164	-87.97672681	42.20516953	-	Wet	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3165	165	-87.97516657	42.20352232	-	Wet	No	Buffalo Grove	Commercial	Not assessed	Indian Creek
15-3166	166	-87.97522361	42.20232607	-	Wet	No	Buffalo Grove	Commercial	Not assessed	Indian Creek
15-3167	167	-87.97612021	42.201058	-	Wet	No	Buffalo Grove	Commercial	Not assessed	Indian Creek
15-3168	168	-87.97613488	42.20017376	-	Wet	No	Buffalo Grove	Commercial	Not assessed	Indian Creek
15-3169	169	-87.97511806	42.20075645	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3170	170	-87.97712861	42.20180925	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3171	171	-87.92494885	42.19958928	-	Wet	No	Lincolnshire	Commercial	Not assessed	Indian Creek
15-3172	172	-87.92089622	42.19922594	-	Wet	No	Lincolnshire	Commercial	Not assessed	Indian Creek
15-3174	174	-87.92849112	42.19998121	-	Wet	Yes	Lincolnshire	Public	Not assessed	Indian Creek
15-3175	175	-87.92951031	42.2001052	-	Wet	Yes	Lincolnshire	Residential	Not assessed	Indian Creek

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15-3176	176	-87.93623124	42.19702302	-	Wet	No	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3177	177	-87.93762375	42.19697398	-	Wet	No	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3178	178	-87.93819141	42.19285943	-	Wet	No	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3179	179	-87.94116292	42.19658892	-	Wet	Yes	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3180	180	-87.9405868	42.19419752	-	Wet	Yes	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3181	181	-87.93868022	42.19184407	-	Wet	Yes	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3182	182	-87.94088854	42.19120541	-	Wet	Yes	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3183	183	-87.94840069	42.18936384	-	Wet	Yes	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3184	184	-87.9442586	42.19773003	-	Wet	No	Lincolnshire	Residential	Not assessed	Indian Creek
15-3185	185	-87.94353209	42.20372687	-	Wet	No	Lincolnshire	Public	Not assessed	Indian Creek
15-3186	186	-87.94618652	42.19702961	-	Wet	No	Lincolnshire	Public	Not assessed	Indian Creek
15-3187	187	-87.93798781	42.20213998	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3188	188	-87.94026454	42.20540952	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3189	189	-87.94183655	42.20613213	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3190	190	-87.94570505	42.20704774	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3191	191	-87.96849284	42.25223057	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3192	192	-87.95031751	42.21015927	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3193	193	-87.95232445	42.21279171	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3194	194	-87.95167265	42.2107692	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3195	195	-87.95313138	42.21142165	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3196	196	-87.9563041	42.2134216	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3197	197	-87.96166172	42.21875989	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3198	198	-87.96350836	42.21514159	-	Wet	Yes	Vernon Hills	Public	Not assessed	Indian Creek
15-3199	199	-87.96436796	42.21538721	-	Wet	Yes	Vernon Hills	Public	Not assessed	Indian Creek

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15-3202	202	-87.95993341	42.22857471	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3203	203	-87.95958855	42.23430325	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3204	204	-87.97227898	42.22847531	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3205	205	-87.9567805	42.23280128	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3206	206	-87.9798185	42.22426157	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3207	207	-87.9874184	42.22325639	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3208	208	-87.98541325	42.22098268	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3209	209	-87.98688047	42.22263598	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3210	210	-87.9906055	42.21932338	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3212	212	-87.99202088	42.22128071	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3213	213	-87.99378855	42.22511672	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3214	214	-87.99302651	42.2331255	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3215	215	-87.98583233	42.22938568	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3216	216	-87.98818698	42.22864297	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3217	217	-87.9751901	42.23912431	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3219	219	-87.96292034	42.23751024	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3221	221	-87.95342563	42.24592445	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3222	222	-87.95504262	42.24858401	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3223	223	-87.9556509	42.24931663	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3224	224	-87.97629451	42.24923457	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3225	225	-87.97545865	42.25302909	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3227	227	-87.9736328	42.25047447	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3228	228	-87.96994849	42.25385694	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3229	229	-87.97857294	42.25375943	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek

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15-3230	230	-87.97654569	42.25365229	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3231	231	-87.97745908	42.25543776	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3233	233	-87.96674555	42.25505757	-	Wet	Yes	Vernon Hills	Commercial	Not assessed	Indian Creek
15-3234	234	-87.9644416	42.25417894	-	Wet	Yes	Vernon Hills	Commercial	Not assessed	Indian Creek
15-3235	235	-87.9616189	42.25382339	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3236	236	-87.9580229	42.25634412	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3237	237	-87.97197347	42.25840376	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3238	238	-87.97087425	42.26054582	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3239	239	-87.96953156	42.25867834	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3240	240	-87.96504028	42.25865063	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3241	241	-87.9618475	42.25963575	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3242	242	-87.96361854	42.26260439	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3244	244	-87.97272029	42.26161428	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3245	245	-87.97086489	42.26379135	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3246	246	-87.96719121	42.26565628	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3247	247	-87.97091319	42.26696948	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3248	248	-87.98296748	42.22790099	-	Wet	Yes	Indian Creek	Residential	Not assessed	Indian Creek
15-3249	249	-87.98057972	42.22861674	-	Wet	Yes	Indian Creek	Residential	Not assessed	Indian Creek
15-3250	250	-87.97333949	42.22377904	-	Wet	No	Indian Creek	Residential	Not assessed	Indian Creek
15-3251	251	-87.97836553	42.27336933	-	Wet	No	Libertyville	Residential	Not assessed	Indian Creek
15-3252	252	-87.99140361	42.24399241	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3253	253	-87.98304157	42.24830455	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3254	254	-87.98362877	42.25006976	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3255	255	-87.98537559	42.25119877	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek

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15-3256	256	-87.98289061	42.25314088	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3257	257	-87.99491516	42.25361192	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3258	258	-87.99593418	42.25455923	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3259	259	-88.00127134	42.24934013	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3260	260	-88.02461905	42.25236655	-	Wet	Yes	Mundelein	Public	Not assessed	Indian Creek
15-3261	261	-88.02264898	42.25518421	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3262	262	-88.0240806	42.25626204	-	Dry	No	Mundelein	Residential	Not assessed	Indian Creek
15-3263	263	-88.02392585	42.25788235	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3264	264	-88.01927897	42.26093074	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3265	265	-88.01351449	42.25558992	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3267	267	-87.9837058	42.25785667	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3269	269	-88.00932671	42.26188681	-	Dry	No	Mundelein	Residential	Not assessed	Indian Creek
15-3270	270	-88.01250834	42.26279616	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3272	272	-88.02016737	42.26336408	-	Wet	No	Mundelein	Public	Not assessed	Indian Creek
15-3273	273	-87.99966817	42.2662836	-	Wet	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3274	274	-87.99775225	42.26617717	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3275	275	-87.98526777	42.26660748	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3276	276	-87.98327462	42.26535389	-	Wet	No	Mundelein	Residential	Not assessed	Indian Creek
15-3277	277	-88.0417984	42.2737553	-	Wet	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3280	280	-88.02482958	42.27462777	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3282	282	-88.01204248	42.21896179	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3283	283	-88.01820764	42.23112958	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3284	284	-88.01321829	42.23144949	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek
15-3285	285	-88.00900395	42.23074636	-	Wet	Yes	Long Grove	Residential	Not assessed	Indian Creek

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15-3286	286	-88.04865192	42.20336969	-	Dry	No	Kildeer	Residential	Not assessed	Indian Creek
15-3287	287	-88.06066828	42.24636545	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3288	288	-88.05487937	42.24477785	-	Dry	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3289	289	-87.95460939	42.19506168	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3290	290	-87.9524946	42.19307791	-	Dry	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3291	291	-87.94028822	42.19507428	-	Dry	Yes	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3292	292	-87.95649535	42.25301694	-	Wet	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3293	293	-87.96188712	42.22298812	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3294	294	-87.96144946	42.22380343	-	Dry	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3295	295	-87.96841295	42.26720617	-	Dry	No	Libertyville	Residential	Not assessed	Indian Creek
15-3299	299	-87.98700797	42.23740207	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3300	300	-87.97774892	42.23419386	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3301	301	-87.94107113	42.19897256	-	Dry	Yes	Lincolnshire	Residential	Not assessed	Indian Creek
15-3302	302	-87.93283332	42.20136865	-	Dry	Yes	Lincolnshire	Commercial	Not assessed	Indian Creek
15-3303	303	-87.94383375	42.18899662	-	Dry	No	Lincolnshire	Industrial	Not assessed	Indian Creek
15-3304	304	-87.94078585	42.19816105	-	Wet	Yes	Lincolnshire	Residential	Not assessed	Indian Creek
15-3305	305	-87.93906122	42.19795161	-	Dry	Yes	Lincolnshire	Residential	Not assessed	Indian Creek
15-3306	306	-87.95713832	42.20777298	-	Dry	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3307	307	-87.96530079	42.20012998	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3308	308	-87.96932053	42.20380623	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3309	309	-87.95072591	42.18721312	-	Wet	Yes	Buffalo Grove	Residential	Not assessed	Indian Creek
15-3310	310	-88.06795111	42.21113186	-	Dry	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3311	311	-88.06974215	42.20963869	-	Dry	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3312	312	-88.07099988	42.20642787	-	Dry	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek

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15-3313	313	-88.0753313	42.20566078	-	Wet	Yes	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3314	314	-88.06656735	42.20142666	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3315	315	-88.07434614	42.20093321	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3316	316	-88.0730588	42.19945734	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3317	317	-88.07281613	42.19875075	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3318	318	-88.0705657	42.20057159	-	Wet	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3319	319	-88.0689602	42.20082354	-	Dry	No	Lake Zurich	Industrial	Not assessed	Indian Creek
15-3320	320	-88.06315606	42.24758858	-	Dry	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3321	321	-88.06842508	42.23376831	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3322	322	-88.06343188	42.23021867	-	Dry	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3323	323	-88.05533069	42.23691627	-	Dry	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3324	324	-88.07496018	42.22687656	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3325	325	-88.06197056	42.21742	-	Dry	No	Hawthorn Woods	Commercial	Not assessed	Indian Creek
15-3326	326	-88.05852588	42.21855565	-	Dry	Yes	Hawthorn Woods	Commercial	Not assessed	Indian Creek
15-3327	327	-88.05539803	42.22510017	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3328	328	-88.05964099	42.20625722	-	Dry	Yes	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3329	329	-88.03899079	42.23065679	-	Dry	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3330	330	-88.03098487	42.23027905	-	Wet	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3331	331	-88.02907346	42.22912509	-	Dry	No	Hawthorn Woods	Residential	Not assessed	Indian Creek
15-3332	332	-87.96294504	42.24829957	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3333	333	-87.96313608	42.24388151	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3334	334	-87.95675809	42.24692928	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3335	335	-87.97733005	42.24005052	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3336	336	-87.97371225	42.23687941	-	Dry	Yes	Vernon Hills	Public	Not assessed	Indian Creek

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15-3337	337	-87.96915132	42.23511131	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3338	338	-87.96631808	42.23608183	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3339	339	-87.95707212	42.23567269	-	Wet	Yes	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3340	340	-87.96771979	42.23306209	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3341	341	-87.97555013	42.22883264	-	Dry	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3342	342	-87.9749379	42.22746432	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3343	343	-87.98806733	42.23561213	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3344	344	-87.98542723	42.23252883	-	Dry	Yes	Vernon Hills	Residential	Not assessed	Indian Creek
15-3345	345	-87.99313607	42.22437437	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3346	346	-87.98604065	42.22276835	-	Wet	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3347	347	-87.98036699	42.22046346	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3348	348	-87.97070149	42.22315487	-	Wet	Yes	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3349	349	-87.97198089	42.22006824	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3350	350	-87.96954653	42.2192034	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3351	351	-87.97058706	42.21571781	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3352	352	-87.96218829	42.20614504	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3353	353	-87.95178547	42.21187391	-	Wet	No	Vernon Hills	Industrial	Not assessed	Indian Creek
15-3355	355	-88.01997091	42.27371866	-	Dry	Yes	Mundelein	Public	Not assessed	Indian Creek
15-3356	356	-88.02210502	42.25212326	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3357	357	-88.01828077	42.25692882	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3358	358	-88.01643539	42.25570196	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3359	359	-87.99735366	42.26559293	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3364	364	-87.97997946	42.25606812	-	Wet	Yes	Mundelein	commercial	Not assessed	Indian Creek
15-3365	365	-87.97989477	42.25525805	-	Wet	Yes	Mundelein	commercial	Not assessed	Indian Creek

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15-3366	366	-87.99593554	42.25491874	-	Wet	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3367	367	-87.99481801	42.2544868	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3369	369	-87.99061589	42.24967519	-	Wet	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3370	370	-87.98670634	42.24752499	-	Wet	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3371	371	-87.98675959	42.24695886	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3372	372	-87.98508706	42.24655144	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3373	373	-87.99776135	42.24655661	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3374	374	-87.9966919	42.24548394	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3375	375	-87.99738384	42.24453181	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3376	376	-87.9964251	42.24511037	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3377	377	-87.99471514	42.2454293	-	Dry	Yes	Mundelein	Residential	Not assessed	Indian Creek
15-3378	378	-87.98842746	42.24443439	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3379	379	-87.98380727	42.24511119	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3380	380	-87.98524356	42.24335286	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3381	381	-87.98038836	42.24306409	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3382	382	-87.9905054	42.24113049	-	Wet	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3383	383	-87.98884003	42.24094862	-	Wet	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3384	384	-87.99452017	42.24279679	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3385	385	-87.99450936	42.24247574	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3386	386	-87.99465254	42.24146193	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3387	387	-87.99459331	42.24082903	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3388	388	-88.00058924	42.24017913	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3389	389	-87.99827011	42.24017332	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3390	390	-87.99638862	42.23912503	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek

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15-3391	391	-87.99483444	42.23655421	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3392	392	-87.98474553	42.24012298	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3393	393	-87.97843352	42.23917011	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3394	394	-87.98267509	42.23630085	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3395	395	-87.98170244	42.236258	-	Dry	Yes	Mundelein	Industrial	Not assessed	Indian Creek
15-3396	396	-88.05327107	42.19197033	-	Dry	No	Kildeer	Residential	Not assessed	Indian Creek
15-3397	397	-88.0498196	42.19210501	-	Dry	No	Kildeer	Residential	Not assessed	Indian Creek
15-3398	398	-88.04910025	42.19352418	-	Dry	No	Kildeer	Residential	Not assessed	Indian Creek
15-3399	399	-88.05208431	42.19590686	-	Dry	No	Kildeer	Residential	Not assessed	Indian Creek
15-3400	400	-88.04477813	42.19381031	-	Dry	No	Kildeer	Residential	Not assessed	Indian Creek
15-3401	401	-87.97858241	42.22371748	-	Dry	No	Indian Creek	Residential	Not assessed	Indian Creek
15-3402	402	-87.98024704	42.23216143	-	Dry	Yes	Indian Creek	Residential	Not assessed	Indian Creek
15-3403	403	-87.99301965	42.26157431	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3404	404	-87.98977541	42.26110107	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3405	405	-87.98845527	42.25555459	-	Wet	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3406	406	-87.98543797	42.25530565	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3407	407	-87.99032486	42.25269963	-	Dry	No	Mundelein	Industrial	Not assessed	Indian Creek
15-3408	408	-87.95472041	42.2399293	-	Wet	No	Vernon Hills	industrial	Not assessed	Indian Creek
15-3600	600	-87.98713284	42.2313359	-	Dry	No	Vernon Hills	Residential	Not assessed	Indian Creek
15-3603	603	-87.95574899	42.19517988	-	Dry	No	Buffalo Grove	Residential	Not assessed	Indian Creek
15-550	550	-88.06446359	42.18980414	Bristol Trail Pond 1	Dry	Yes	Lake Zurich	Residential	None needed	DPRW 2016
15-551	551	-88.05944135	42.18967954	Bristol Trail Pond 2	Dry	Yes	Lake Zurich	Residential	None	DPRW 2016
15-552	552	-88.06329904	42.18310458	Hunters Creek Pond	Dry	Yes	Lake Zurich	Residential	None needed	DPRW 2016
15-553	553	-88.05344392	42.18083111	Ponds of Killdeer Pond 7	Dry	Yes	Kildeer	Residential	None, appears well maintained	DPRW 2016
15-690	690	-88.04340872	42.27546506	Comstock North Basin	Dry	Yes	Fremont Township	Industrial	None	DPRW 2016

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15-692	692	-88.0116824	42.27439199	Cairo Pond 2	Dry	Yes	Mundelein	Residential	None needed	DPRW 2016
15-693	693	-88.0390884	42.27339679	Ivanhoe - Mundelein Pond 2	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-694	694	-88.02226799	42.27377349	Leo Leathers Park Pond 2	Wet	Yes	Mundelein	Public	1. Install native buffer 2. Remove riprap	DPRW 2016
15-695	695	-87.96073442	42.27198123	Hecht Estates Pond 2	Dry	Yes	Mundelein	Residential	Install a swale or inlet near eroded landscaping	DPRW 2016
15-696	696	-88.01928423	42.27189034	Mundelein High School Pond	Wet	Yes	Mundelein	Public	1. Remove garbage 2. Increase native buffer	DPRW 2016
15-697	697	-87.98492722	42.27107261	Carmel High School Pond	Dry	Yes	Mundelein	Public	None needed	DPRW 2016
15-698	698	-88.04940149	42.26788371	Epstein Circle Basin	Dry	Yes	Mundelein	Residential	None needed	DPRW 2016
15-699	699	-88.04252807	42.26612238	Countryside K	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-700	700	-88.03276606	42.26491326	Countryside D	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-701	701	-88.04828269	42.26502972	Steeple Chase Golf Club Pond 5	Wet	Yes	Mundelein	Commercial	None needed	DPRW 2016
15-702	702	-88.03386296	42.26481407	Countryside G	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-703	703	-88.03963534	42.26437547	Countryside E	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-704	704	-87.96517732	42.26387127	White Deer Run Pond 27	Dry	Yes	Vernon Hills	Residential	Concrete slab near outlet	DPRW 2016
15-705	705	-88.03193469	42.2634071	Countryside F	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-706	706	-88.04769104	42.26288897	Steeple Chase Golf Club Pond 6	Wet	Yes	Mundelein	Residential	None needed	DPRW 2016
15-707	707	-88.0362463	42.26243091	Countryside B	Wet	Yes	Fremont Township	Commercial	1. Increase buffer where needed 2. Install riprap to stabilize bank erosion	DPRW 2016
15-708	708	-87.96471241	42.26254456	White Deer Run Pond 9	Wet	Yes	Vernon Hills	Residential	None	DPRW 2016
15-709	709	-88.03118212	42.26262138	Countryside C	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-710	710	-88.04067026	42.26152794	Countryside A	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-711	711	-88.06316957	42.26236038	Steeple Chase Golf Club Pond 1	Wet	Yes	Mundelein	Residential	Install native buffer	DPRW 2016
15-712	712	-87.96398791	42.26211169	White Deer Run Pond 33	Wetland	Yes	Vernon Hills	Commercial	None	DPRW 2016
15-713	713	-87.97332032	42.26195196	White Deer Run Pond 3	Wet	Yes	Vernon Hills	Commercial	1. Fix inlet 2. Plant more native plants on north side	DPRW 2016
15-714	714	-87.97331905	42.26168241	White Deer Run Pond 4	Wet	Yes	Vernon Hills	Commercial	Cut back vegetation slightly	DPRW 2016
15-715	715	-88.05875507	42.26139474	Steeple Chase Golf Club Pond 4	Dry	Yes	Mundelein	Commercial	None needed	DPRW 2016
15-716	716	-88.06671223	42.26092079	Owens Road Basin 3	Wet	Yes	Fremont Township	Residential	None	DPRW 2016

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15-717	717	-88.06671814	42.26025887	Owns Road Basin 2	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-718	718	-88.02157894	42.25964954	Keswick Basin	Wet	Yes	Mundelein	Residential	None	DPRW 2016
15-719	719	-87.96817448	42.25944271	White Deer Run Pond 28	Wetland	Yes	Vernon Hills	Commercial	Thin out woody vegetation	DPRW 2016
15-720	720	-88.03460644	42.25945672	Countryside H	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-721	721	-87.96868924	42.25931461	White Deer Run Pond 29	Wetland	Yes	Vernon Hills	Commercial	None	DPRW 2016
15-722	722	-87.99152701	42.25918212	Pet Factory Pond	Wet	Yes	Mundelein	Industrial	1. Clean up trash 2. Unclog outlet 3. Install aerator	DPRW 2016
15-723	723	-87.98834676	42.25920146	Allanson Industrial Park Pond 5	Wet	Yes	Mundelein	Industrial	1. Install aerator 2. Expose outlet 3. Unclog outlet 4. Implement more native plants 5. Clean up trash	DPRW 2016
15-724	724	-88.03562829	42.25857358	Countryside J	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-725	725	-87.98928135	42.25837324	Allanson Industrial Park Pond 4	Dry	Yes	Mundelein	Industrial	1. Clear and unclog outlet (remove leaf debris) 2. Let natural plants grow (don't mow)	DPRW 2016
15-726	726	-87.99376158	42.25783383	Commercial Plastics Pond	Wet	Yes	Mundelein	Residential	1. Regulate company discharge 2. Clean up trash and debris 3. Thin bank foliage 4. Unclog outlet 5. Install aerator	DPRW 2016
15-727	727	-88.04257076	42.25812103	Countryside Estates Pond 2	Wet	Yes	Fremont Township	Residential	1. Increase buffer 2. Install native plants	DPRW 2016
15-728	728	-87.99176267	42.25788073	-	Wetland	Yes	Mundelein	Residential	None	DPRW 2016
15-729	729	-88.02993808	42.25757909	Countryside I	Wet	Yes	Fremont Township	Commercial	None needed	DPRW 2016
15-730	730	-88.06000955	42.25648859	Gilmer Road Basin 1	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-731	731	-88.05497011	42.25610231	Chevy Chase Basin 1	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-732	732	-88.03753444	42.25578063	Countryside Shores Pond	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-733	733	-87.96101044	42.25483248	White Deer Run Pond 32	Wetland	Yes	Vernon Hills	Commercial	None needed	DPRW 2016
15-734	734	-87.96309973	42.25405274	White Deer Run Pond 23	Wet	Yes	Vernon Hills	Commercial	None needed	DPRW 2016
15-735	735	-87.99258703	42.25391623	Bio-Logic Systems Pond	Wet	Yes	Mundelein	Industrial	1. Fix inlet FES 2. Install aerator 3. Eliminate carp	DPRW 2016
15-736	736	-87.98929959	42.25330923	Mundelein Industrial Park Pond 1	Wetland	Yes	Mundelein	Industrial	1. Clear a perimeter along building edge 2. Clean up trash 3. Design channel to filter out sediment/debris 4. Unclog outlet	DPRW 2016

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									5. Thin vegetation	
15-737	737	-87.97516802	42.25220351	White Deer Run Pond 18	Wetland	Yes	Vernon Hills	Residential	1. Clear small shoreline 2. Elevate outlet	DPRW 2016
15-738	738	-88.0237308	42.25165676	-	Dry	Yes	Long Grove	Commercial	None	DPRW 2016
15-739	739	-87.99084522	42.25150829	Mundelein Industrial Park Pond 2	Dry	Yes	Mundelein	Industrial	1. Raise inlets/outlets to eliminate erosion holes 2. Implement native plants	DPRW 2016
15-740	740	-88.02874196	42.25124463	Countryside Highlands Pond 1	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-741	741	-87.9912856	42.2507179	Cairo Industrial Park Pond	Dry	Yes	Mundelein	Industrial	1. Clean up trash and debris 2. Install parking lot inlet 3. Unclog outlet 4. Let native plants grow	DPRW 2016
15-742	742	-88.02975123	42.24998804	Countryside Highlands Pond 2	Dry	Yes	Fremont Township	Residential	None	DPRW 2016
15-743	743	-88.04771139	42.24963317	Countryside Oaks Pond 1	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-744	744	-87.98988164	42.24969591	Mundelein Industrial Park Pond 4	Dry	Yes	Mundelein	Industrial	1. Angle basin more towards outlet 2. Lower outlet level	DPRW 2016
15-745	745	-87.99042034	42.24910436	Mundelein Industrial Park Pond 5	Wetland	Yes	Mundelein	Industrial	Clean up trash	DPRW 2016
15-746	746	-88.04630369	42.24790139	Countryside Oaks Pond 2	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-747	747	-88.07352151	42.24748344	Hawthorn Woods Country Club Pond 1	Wetland	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-748	748	-87.9943227	42.24719247	Consumers Co-op Credit Union - Mundelein Pond	Dry	Yes	Mundelein	Commercial	1. Eliminate concrete channel 2. Implement native plant bottom 3. Install riprap in channels	DPRW 2016
15-749	749	-87.98445398	42.2475778	-	Wet	Yes	Mundelein	Industrial	None	DPRW 2016
15-750	750	-88.04562212	42.24714075	Countryside Oaks Pond 3	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-752	752	-88.05080934	42.24672353	Countryside Oaks Pond 4	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-753	753	-88.04887084	42.24615887	Countryside Oaks Pond 5	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-754	754	-87.99204831	42.24568841	Century Assembly of God Pond 1	Onstream	Yes	Mundelein	Residential	1. Clean up trace amounts of trash 2. Reattach inlet FES 3. Incorporate riprap at inlet mouth	DPRW 2016
15-755	755	-87.96757584	42.24595779	New Century Town Pond 2	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
15-756	756	-87.96641384	42.24589793	New Century Town Pond 3	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
15-757	757	-88.05344999	42.24537797	Countryside Oaks Pond 6	Wet	Yes	Fremont Township	Residential	None	DPRW 2016
15-758	758	-87.9923326	42.24520145	Century Assembly of God Pond 2	Dry	Yes	Mundelein	Residential	1. Install more native plants into basin bottom 2. Fix outlet FES 3. Install riprap near outlet mouth	DPRW 2016

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15-759	759	-88.01687525	42.24427233	West Oak Middle School Pond	Wetland	Yes	Fremont Township	Public	Implement more riprap around outlet	DPRW 2016
15-760	760	-88.05436	42.24395636	Countryside Meadows Pond 2	Wet	Yes	Hawthorn Woods	Residential	Stabilize bank and remove silt fence	DPRW 2016
15-761	761	-87.99596452	42.24337974	C.D.S. Pond	Wet	Yes	Mundelein	Industrial	1. Clean up trash and oil 2. Put inlet at opposite end of basin	DPRW 2016
15-762	762	-88.05572747	42.24335533	Countryside Meadows Pond 3	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-763	763	-88.00313492	42.24267308	Towner - Mundelein Pond	Wet	Yes	Libertyville Township	Industrial	1. Install aerator 2. Implement more native plants	DPRW 2016
15-764	764	-87.97881473	42.24205337	Butterfield Corners Pond	Wet	Yes	Mundelein	Industrial	1. Clean up trash & debris 2. Install aerator 3. Thin out invasive species	DPRW 2016
15-765	765	-88.02477588	42.24174882	-	Dry	Yes	Long Grove	Residential	None	DPRW 2016
15-766	766	-87.97894564	42.24132928	Seigle Pond	Dry	Yes	Mundelein	Industrial	1. Install parking lot runoff inlets 2. Clean up trash and debris 3. Unclog outlet 4. Implement native plants	DPRW 2016
15-767	767	-88.05980307	42.24139963	Cardinal Andrew Basin	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-768	768	-88.00071265	42.24155959	84 Lumber Co. Pond	Wet	Yes	Mundelein	Commercial	None	DPRW 2016
15-769	769	-88.04195263	42.24112979	Indian Creek Club Pond 4	Wetland	Yes	Long Grove	Residential	1. Thin out invasive species 2. Thin vegetation around outlets/inlets	DPRW 2016
15-770	770	-87.97842444	42.24083408	-	Wet	Yes	Mundelein	Commercial	None	DPRW 2016
15-771	771	-87.96325233	42.24077751	New Century Town Pond 5	Wet	Yes	Vernon Hills	Commercial	1. Make basin smaller (currently dried out) 2. Fix aerator 3. Implement native plants 4. Spray for algae 5. Clean up trash	DPRW 2016
15-772	772	-88.00823992	42.23963848	Indian Trails Pond 4	Wet	Yes	Ela Township	Residential	1. Add aerator to remove excess algae 2. Add native plants to decrease erosion	DPRW 2016
15-773	773	-88.05204644	42.23993994	Cherry Hill Basin 2	Wet	Yes	Hawthorn Woods	Commercial	None needed	DPRW 2016
15-774	774	-88.05032051	42.23959945	Cherry Hill Basin 1	Wet	Yes	Hawthorn Woods	Commercial	None needed	DPRW 2016
15-775	775	-87.98671133	42.23953701	Oak Creek Plaza Pond 1	Wet	Yes	Mundelein	Industrial	None	DPRW 2016
15-776	776	-88.03417324	42.23915721	Forest Edge Pond 3	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-777	777	-88.05365613	42.23898156	Yankee Tavern Pond	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-778	778	-87.99160386	42.238721	Oak Creek Plaza Pond 2	Dry	Yes	Mundelein	Industrial	1. Downsize basin 2. Put inlet further north 3. Clean up trash & debris	DPRW 2016
15-779	779	-88.00391873	42.23902777	Diamond Lake School Pond 1	Dry	Yes	Vernon Township	Residential	None	DPRW 2016
15-780	780	-88.03875329	42.23784154	Indian Creek Club Pond 3	Dry	Yes	Long Grove	Residential	None	DPRW 2016

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15-781	781	-87.97655851	42.23745607	-	Dry	Yes	Mundelein	Industrial	None	DPRW 2016
15-782	782	-87.98347876	42.2377595	Butterfield 60 Pond 1	Dry	Yes	Mundelein	Industrial	1. Install parking lot runoff inlet 2. Install different outlet (more elevation)	DPRW 2016
15-783	783	-88.00375431	42.23755897	Diamond Lake School Pond 2	Dry	Yes	Vernon Township	Residential	Remove clogging from inlet and outlet	DPRW 2016
15-784	784	-87.98348396	42.23710596	Butterfield 60 Pond 2	Dry	Yes	Mundelein	Industrial	1. Make outlet visible 2. Raise up inlet 3. Unclog inlet/outlet 4. Implement more native plants	DPRW 2016
15-785	785	-88.00495647	42.2370023	Indian Trails Pond 3	Wet	Yes	Ela Township	Residential	Install aerator to decrease excess algae	DPRW 2016
15-786	786	-87.98191087	42.236766	Butterfield 60 Pond 3	Dry	Yes	Mundelein	Industrial	Implement more native plants	DPRW 2016
15-788	788	-87.97268848	42.2362571	Hawthorn Middle School South Pond	Wet	Yes	Vernon Hills	Public	Replant bank to reduce erosion where needed	DPRW 2016
15-789	789	-87.97834963	42.23625617	Butterfield 60 Pond 6	Dry	Yes	Mundelein	Residential	1. Implement more riprap in channel 2. Clean up trash & debris	DPRW 2016
15-790	790	-87.97160983	42.23600737	Aspen Park Pond	Wet	Yes	Vernon Hills	Public	None needed	DPRW 2016
15-792	792	-88.00380058	42.23470211	Millers Manor Pond 2	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-793	793	-88.00499641	42.23410838	Indian Trails Pond 2	Wet	Yes	Ela Township	Residential	1. Add native plants to decrease erosion 2. Remove some excess woody vegetation	DPRW 2016
15-794	794	-88.00079321	42.23391036	Towner - Long Grove Pond 1	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-795	795	-88.04371524	42.23407887	-	Wet	Yes	Ela Township	Commercial	None	DPRW 2016
15-796	796	-88.00611992	42.23404649	Indian Trails Pond 1	Wet	Yes	Long Grove	Residential	Install aerator	DPRW 2016
15-797	797	-88.04070484	42.23377728	-	Wet	Yes	Ela Township	Commercial	1. Install aerator 2. Put more riprap in channel to prevent erosion	DPRW 2016
15-798	798	-88.0341176	42.23330851	Indian Creek Country Estates Pond 1	Wet	Yes	Hawthorn Woods	Residential	Install aerator	DPRW 2016
15-799	799	-88.05018483	42.23287978	Railroad Gilmer Basin	Dry	Yes	Ela Township	Agricultural	Can't access, private property and railroad basin	DPRW 2016
15-800	800	-88.00076514	42.23192552	Braeburn West Pond	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-801	801	-88.0198283	42.23171503	-	Wet	Yes	Ela Township	Agricultural	None	DPRW 2016
15-802	802	-87.98251781	42.23195005	Hawthorne Church of Christ Pond	Wet	Yes	Indian Creek	Commercial	None	DPRW 2016
15-803	803	-88.0551886	42.23141059	Hawthorn Woods Aquatic and Railroad Basin	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-804	804	-88.03673133	42.23123236	Indian Creek Country Estates Pond 2	Dry	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-805	805	-87.98368318	42.23057933	Courts of Indian Creek Pond 1	Wet	Yes	Indian Creek	Residential	1. Install aerator 2. Spray for algae	DPRW 2016
15-806	806	-88.02942552	42.22961147	Tiffany Estates of Hawthorn Woods Pond	Wet	Yes	Hawthorn Woods	Residential	Install aerator	DPRW 2016
15-807	807	-88.01443368	42.22834975	Creekside of Long Grove Pond 2	Wet	Yes	Long Grove	Residential	1. Install another aerator 2. Lower outlet 3. Implement more native plants	DPRW 2016

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15-808	808	-87.95747476	42.22811241	Continental Executive Park Pond 17	Wet	Yes	Vernon Hills	Public	None	DPRW 2016
15-809	809	-87.95636505	42.22750335	Continental Executive Park Pond 16	Wet	Yes	Vernon Hills	Industrial	Thin foliage to cut back on turbidity	DPRW 2016
15-810	810	-87.9553716	42.22715152	Continental Executive Park Pond 15	Wet	Yes	Vernon Hills	Industrial	None	DPRW 2016
15-811	811	-87.95566651	42.2266117	Continental Executive Park Pond 13	Wet	Yes	Vernon Hills	Industrial	None	DPRW 2016
15-812	812	-88.04866897	42.22621623	Pheasant Creek Estates of Hawthorn Woods Pond 1	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-813	813	-88.0780574	42.22591706	Copperfield of Hawthorn Woods Pond 3	Wet	Yes	Hawthorn Woods	Residential	Perhaps reduce some excess woody vegetation	DPRW 2016
15-814	814	-88.03118961	42.22250344	Rambling Hills Pond 1	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-815	815	-88.06447214	42.22256678	Hawthorn Woods Business Park Pond 2	Wet	Yes	Hawthorn Woods	Residential	1. Remove excess litter 2. Install aerator to decrease excess algae	DPRW 2016
15-816	816	-88.0664682	42.22221195	Hawthorn Woods Business Park Pond 1	Wetland	Yes	Hawthorn Woods	Residential	1. Remove excess litter and algae 2. Consider inlet clogging	DPRW 2016
15-817	817	-88.072613	42.222186	White Birch Lakes Pond 3	Dry	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-818	818	-88.06479611	42.2220206	Hawthorn Woods Business Park Pond 3	Wetland	Yes	Hawthorn Woods	Residential	Remove excess litter	DPRW 2016
15-819	819	-88.06995227	42.22166938	White Birch Lakes Pond 4	Dry	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-820	820	-88.0676895	42.22118102	Midlothian and Old McHenry Basin 1	Wetland	Yes	Hawthorn Woods	Residential	Increase unmowed buffer	DPRW 2016
15-821	821	-88.06633119	42.22079141	Hawthorn Woods Business Park Pond 4	Wet	Yes	Hawthorn Woods	Residential	Increase buffer	DPRW 2016
15-822	822	-88.06832816	42.22076929	Old McHenry and Fairfield Basin	Dry	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-823	823	-88.02474201	42.22023784	Hawthorn Grove Pond 1	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-824	824	-87.95798756	42.21987649	High School District 125 Pond	Wet	Yes	Vernon Hills	Public	1. Clear up woody vegetation 2. Kill invasive species	DPRW 2016
15-825	825	-88.06069126	42.21997524	Hawthorn Woods Community Park Basin	Wetland	Yes	Hawthorn Woods	Public	None needed	DPRW 2016
15-826	826	-88.05597542	42.21959974	Park Place Estates Pond 2	Wet	Yes	Ela Township	Residential	None	DPRW 2016
15-827	827	-88.06954925	42.21951035	Lake Zurich Fire Department Station 3 Pond 2	Wet	Yes	Lake Zurich	Residential	None needed	DPRW 2016
15-828	828	-88.06904844	42.21943139	Lake Zurich Fire Department Station 3 Pond 1	Wet	Yes	Lake Zurich	Residential	None needed	DPRW 2016

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15-829	829	-88.03137919	42.21913715	Rambling Hills Pond 2	Dry	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-830	830	-88.02464937	42.21858911	Hawthorn Grove Pond 2	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-831	831	-88.06653663	42.21916775	Burnet Basin 1	Dry	Yes	Hawthorn Woods	Agricultural	None needed	DPRW 2016
15-832	832	-87.96887315	42.21814898	Vernon Hills Golf Club Pond 2	Wet	Yes	Vernon Hills	Commercial	None needed	DPRW 2016
15-834	834	-88.02438726	42.21770593	Hawthorn Grove Pond 3	Dry	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-835	835	-88.01818336	42.2170826	Waud Farm Pond 1	Wet	Yes	Long Grove	Residential	Replace detached FES	DPRW 2016
15-836	836	-88.06463995	42.21725707	Horse Farm Basin 1	Wet	Yes	Hawthorn Woods	Agricultural	None	DPRW 2016
15-837	837	-88.06614239	42.21590686	Horse Farm Basin 2	Wet	Yes	Hawthorn Woods	Agricultural	None	DPRW 2016
15-838	838	-88.02547924	42.21500228	Hawthorn Grove Pond 4	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-839	839	-88.02599313	42.21335909	Hawthorn Grove Pond 5	Wet	Yes	Hawthorn Woods	Residential	None needed	DPRW 2016
15-840	840	-88.04742964	42.21407305	Kemper Lakes Golf Club Pond 1	Wet	Yes	Kildeer	Commercial	None needed	DPRW 2016
15-841	841	-88.06740773	42.21387724	885 Tesler Basin 1	Wet	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-842	842	-87.95904278	42.21342415	Willow Lawn Memorial Park Pond	Wet	Yes	Vernon Township	Public	Install native buffer	DPRW 2016
15-843	843	-87.97501927	42.21293834	Old Gridley Farm PUD Pond 9	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-844	844	-88.06158238	42.21284324	Quentin Road Christian School Pond	Dry	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-845	845	-88.01913252	42.21263074	Rambling Hills East Pond 5	Wet	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-846	846	-87.95084705	42.2124368	Corporate Woods Pond 15	Wet	Yes	Vernon Hills	Industrial	None needed	DPRW 2016
15-847	847	-88.00782085	42.21078954	Fields of Long Grove Pond 3	Wet	Yes	Long Grove	Agricultural	None needed	DPRW 2016
15-848	848	-88.05882616	42.21168116	Forest Lake Farm Pond 1	Wet	Yes	Vernon Township	Commercial	Increase buffer	DPRW 2016
15-849	849	-87.94585016	42.2107456	The Oaks Basin 2	Wetland	Yes	Vernon Hills	Industrial	Removed mesh fence as basin is well established	DPRW 2016
15-850	850	-88.03712797	42.21086371	Enclave of Hawthorn Woods Pond	Dry	Yes	Hawthorn Woods	Residential	None	DPRW 2016
15-851	851	-88.06106623	42.21051594	Forest Lake Farm Pond 2	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-852	852	-88.07286289	42.20955682	Insight Beverages Basin	Dry	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-853	853	-87.97154454	42.20856907	Herons Landing Pond 1	Wet	Yes	Long Grove	Residential	Consider removing some excess woody vegetation to decrease sediment accumulation	DPRW 2016
15-854	854	-88.03883302	42.20809399	Kemper Lakes Golf Club Pond 3	Wet	Yes	Kildeer	Commercial	None needed	DPRW 2016

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15-855	855	-88.06934547	42.20734059	Lake Zurich Industrial Center Pond 1	Dry	Yes	Lake Zurich	Commercial	None	DPRW 2016
15-856	856	-88.01064911	42.20678399	Prairie Trails of Long Grove PUD Pond	Wet	Yes	Long Grove	Residential	None needed	DPRW 2016
15-857	857	-87.98758636	42.20682616	Oak Hills Pond 1	Wetland	Yes	Long Grove	Residential	Remove some excess woody vegetation	DPRW 2016
15-858	858	-87.96677254	42.20640439	Herons Landing Pond 2	Wetland	Yes	Long Grove	Residential	Consider removing some excess vegetation to decrease excess sediment	DPRW 2016
15-859	859	-88.02814992	42.20619406	Long Meadow Farms Pond	Wet	Yes	Ela Township	Residential	None	DPRW 2016
15-860	860	-88.02589323	42.20338138	Lake County Community Jewish Campus Basin 2	Wet	Yes	Ela Township	Public	None	DPRW 2016
15-861	861	-87.97750894	42.20275458	Arboretum Golf Club Pond 1	Dry	Yes	Buffalo Grove	Residential	None	DPRW 2016
15-862	862	-88.05827712	42.20260382	Lake Zurich Estates Pond 1	Wet	Yes	Ela Township	Residential	None	DPRW 2016
15-863	863	-87.95854647	42.20109338	Brentwood Station Pond	Wet	Yes	Buffalo Grove	Residential	Increase native buffer	DPRW 2016
15-864	864	-87.92710004	42.20062383	Lincolnshire Village Hall Pond	Wetland	Yes	Lincolnshire	Public	None needed	DPRW 2016
15-865	865	-87.96315001	42.19966838	Woodlands at Fiore Pond 5	Dry	Yes	Buffalo Grove	Residential	Move outlet out of inlet	DPRW 2016
15-866	866	-87.99441044	42.19931337	Royal Melbourne Golf Course Pond 9	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-867	867	-87.94013422	42.19907753	Interlacken Estates Pond	Wet	Yes	Vernon Township	Residential	None	DPRW 2016
15-868	868	-87.96528207	42.19893513	Woodland Commons Shopping Center Pond 1	Dry	Yes	Buffalo Grove	Residential	None	DPRW 2016
15-869	869	-88.07862901	42.19906163	320 Main Street Basin	Dry	Yes	Lake Zurich	Industrial	None needed	DPRW 2016
15-870	870	-88.07232038	42.19871727	Lake Zurich Estates Pond 4	Dry	Yes	Lake Zurich	Industrial	1. Increase buffer 2. Replant and stabilize slopes	DPRW 2016
15-872	872	-87.94025652	42.19824776	Beaconsfield of Lincolnshire Pond 1	Wet	Yes	Lincolnshire	Residential	None needed	DPRW 2016
15-873	873	-87.93750661	42.19815822	Beaconsfield of Lincolnshire Pond 2	Wet	Yes	Lincolnshire	Residential	None needed	DPRW 2016
15-874	874	-87.93515523	42.19778787	Half Day School Pond	Dry	Yes	Lincolnshire	Public	None	DPRW 2016
15-882	882	-87.93163045	42.19559372	Lincolnshire Corporate Center Pond 7	Wet	Yes	Lincolnshire	Commercial	1. Add aerator to decrease excess algae 2. Add native plants to decrease erosion	DPRW 2016
15-888	888	-88.07454226	42.19547194	Old Mill Grove Pond 1	Wet	Yes	Lake Zurich	Residential	Repair structures	DPRW 2016
15-889	889	-88.04971878	42.19509636	Herons Crossing Pond 2	Wetland	Yes	Kildeer	Residential	None needed	DPRW 2016
15-892	892	-87.92807594	42.19419174	-	Wet	Yes	Lincolnshire	Commercial	1. Remove some excess woody vegetation 2. Remove excess litter/debris	DPRW 2016

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15-893	893	-87.93096884	42.19396983	Lincolnshire Corporate Center Pond 8	Wet	Yes	Lincolnshire	Commercial	1. Add native plants to decrease erosion 2. Remove excess litter/debris	DPRW 2016
15-895	895	-88.0112036	42.19417247	Oak Leaf PUD Pond	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-896	896	-88.08712544	42.19427067	Ela Library Pond	Wet	Yes	Lake Zurich	Public	Install native buffer	DPRW 2016
15-898	898	-87.92544271	42.19373752	Rivershire Commercial Area Pond 2	Wetland	Yes	Lincolnshire	Residential	Remove some excess woody vegetation	DPRW 2016
15-901	901	-87.9277357	42.19303731	Rivershire Commercial Area Pond 1	Wetland	Yes	Lincolnshire	Residential	Remove some excess woody vegetation along shoreline	DPRW 2016
15-903	903	-87.93062196	42.19291936	Lincolnshire Corporate Center Pond 9	Wet	Yes	Lincolnshire	Commercial	1. Add native plants to decrease erosion 2. Repair damaged inlets	DPRW 2016
15-907	907	-87.9911518	42.19151992	Skycrest Estates Pond 1	Wetland	Yes	Long Grove	Residential	None needed	DPRW 2016
15-909	909	-88.02825016	42.18996653	Glenstone Pond 1	Wet	Yes	Long Grove	Commercial	None needed	DPRW 2016
15-910	910	-88.08925574	42.18968672	Heatherleigh Pond 1	Wet	Yes	Lake Zurich	Residential	1. Clear inlets and outlets 2. Install aerator to increase water circulation	DPRW 2016
15-913	913	-87.99996686	42.18981533	Twin Orchard Country Club Pond 4	Wet	Yes	Vernon Township	Commercial	Install outlet to increase water flow	DPRW 2016
15-914	914	-88.00498486	42.18921654	Twin Orchard Country Club Pond 1	Wet	Yes	Ela Township	Commercial	None needed	DPRW 2016
15-917	917	-88.0537592	42.18930587	Prairie Creek of Kildeer Pond 2	Wetland	Yes	Kildeer	Residential	None needed	DPRW 2016
15-918	918	-87.99379135	42.1875259	Skycrest Estates Pond 2	Wet	Yes	Long Grove	Commercial	Stabilize bank from erosion and muskrats	DPRW 2016
15-921	921	-87.99554136	42.18854634	Twin Orchard Country Club Pond 6	Wet	Yes	Vernon Township	Commercial	Increase native buffer for install riprap to stabilize bank in areas	DPRW 2016
15-922	922	-87.94990488	42.18798586	Lincolnshire Business Center Pond 1	Wetland	Yes	Lincolnshire	Industrial	None	DPRW 2016
15-923	923	-88.00900997	42.18857282	Prairie Wind Pond 1	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-924	924	-88.07949251	42.18752055	Red Bridge Farm Pond	Wet	Yes	Lake Zurich	Residential	None	DPRW 2016
15-926	926	-87.94477273	42.18668738	Lincolnshire Business Center Pond 3	Wet	Yes	Lincolnshire	Industrial	1. Increase native plants to decrease erosion 2. Repair damaged inlets	DPRW 2016
15-927	927	-87.95102859	42.18680016	Mirielle Pond 2	Wet	Yes	Buffalo Grove	Residential	None	DPRW 2016
15-928	928	-88.00876685	42.18666103	Pine Valley - Long Grove Pond 1	Wet	Yes	Long Grove	Residential	Unable to access, surrounded by private property	DPRW 2016
15-929	929	-88.00796999	42.18664023	Pine Valley -Long Grove Pond 3	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-930	930	-88.05411677	42.18634764	Prairie Creek of Kildeer Pond 3	Wet	Yes	Kildeer	Residential	1. Increase native buffer 2. Install riprap to stabilize shore	DPRW 2016
15-931	931	-88.00497736	42.18656521	Twin Orchard Country Club Pond 3	Wet	Yes	Ela Township	Commercial	None needed	DPRW 2016
15-932	932	-87.99312421	42.1863268	Twin Orchard Country Club Pond 9	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016

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15-933	933	-87.94685736	42.18566004	Lincolnshire Business Center Pond 2	Wet	Yes	Lincolnshire	Industrial	1. Add native plants to decrease erosion 2. Add aerator to decrease excess algae 3. Remove excess litter 4. Repair damaged inlets	DPRW 2016
15-934	934	-88.0281847	42.18547535	Glenstone Pond 3	Wetland	Yes	Long Grove	Residential	Install outlet for overflow to other conservancy areas	DPRW 2016
15-936	936	-88.01429759	42.18575218	Oak Island Estates Pond 1	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-937	937	-88.03651661	42.18531583	Beaver Creek Estates Pond 1	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-938	938	-88.0098833	42.18572133	Pine Valley - Long Grove Pond 2	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-939	939	-88.01332227	42.184812	Pine Valley - Long Grove Pond 4	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-941	941	-87.99492696	42.18473422	Twin Orchard Country Club Pond 7-A	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-942	942	-88.05549999	42.18455473	Prairie Creek of Kildeer Pond 5	Wet	Yes	Kildeer	Residential	None needed	DPRW 2016
15-943	943	-87.99202291	42.18445098	Twin Orchard Country Club Pond 10	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-944	944	-88.05646468	42.18454601	Prairie Creek of Kildeer Pond 4	Wet	Yes	Kildeer	Residential	None needed	DPRW 2016
15-945	945	-88.02521174	42.18405831	Glenstone Pond 4	Wet	Yes	Long Grove	Residential	None	DPRW 2016
15-947	947	-88.0854735	42.18405227	Deerpath Court Retail Center Pond 4	Dry	Yes	Lake Zurich	Residential	1. Remove garbage 2. Increase buffer 3. Stabilize bank with riprap or vegetation	DPRW 2016
15-949	949	-87.99722157	42.18351101	Twin Orchard Country Club Pond 8-A	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-950	950	-88.0562901	42.18364371	Prairie Creek of Kildeer Pond 6	Wetland	Yes	Kildeer	Residential	None needed	DPRW 2016
15-951	951	-88.00282091	42.18334922	Twin Orchard Country Club Pond 5	Wet	Yes	Vernon Township	Commercial	None needed	DPRW 2016
15-971	971	-88.01929081	42.17766298	De Palma Pond	Wet	Yes	Long Grove	Residential	None	DPRW 2016
16-1094	1094	-87.91254651	42.14090045	-	Wet	No	Wheeling	Commercial	None	DPRW 2016
16-1095	1095	-87.91243291	42.14160553	-	Wet	Yes	Wheeling	Commercial	None	DPRW 2016
16-1232	1232	-87.90258321	42.1306217	-	Wet	Yes	Wheeling	Residential	Remove some excess woody vegetation on shore	DPRW 2016
16-1233	1233	-87.90193723	42.12951413	-	Wet	Yes	Wheeling	Residential	Remove excess overhanging woody vegetation	DPRW 2016
16-1234	1234	-87.90175748	42.12931908	-	Wet	Yes	Wheeling	Residential	Remove excess overhanging woody vegetation	DPRW 2016
16-1240	1240	-87.91095647	42.14297374	-	Wet	No	Wheeling	Residential	1. Remove excess woody vegetation 2. Assess turquoise tint of water	DPRW 2016
16-1241	1241	-87.91065294	42.14199638	-	Wet	No	Wheeling	Residential	None	DPRW 2016
16-1242	1242	-87.90983367	42.14164113	-	Wet	No	Wheeling	Residential	None	DPRW 2016
16-1247	1247	-87.87542522	42.11839728	-	Wet	No	Northbrook	Residential	None	DPRW 2016

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16-1248	1248	-87.87585542	42.12137092	-	Wet	No	Northbrook	Commercial	None	DPRW 2016
16-1249	1249	-87.87607972	42.12186555	-	Wet	No	Northbrook	Commercial	None	DPRW 2016
16-1250	1250	-87.87191672	42.12223619	-	Wet	No	Northbrook	Commercial	None	DPRW 2016
16-1251	1251	-87.8718517	42.12180438	-	Wet	No	Northbrook	Commercial	None	DPRW 2016
16-1252	1252	-87.87167553	42.13200066	-	Wet	No	Northbrook	Commercial	None	DPRW 2016
16-1253	1253	-87.88616036	42.13780614	-	Wet	No	Northbrook	Residential	1. Add native plants to decrease erosion 2. Remove excess litter	DPRW 2016
16-1254	1254	-87.87438455	42.13534541	-	Wet	No	Northbrook	Residential	None	DPRW 2016
16-1255	1255	-87.88390301	42.14152801	-	Wet	No	Northbrook	Residential	Add native plants	DPRW 2016
16-1256	1256	-87.88914296	42.14654133	-	Wet	No	Northbrook	Residential	1. Add native plants to decrease erosion 2. Remove excess litter	DPRW 2016
16-1257	1257	-87.89214479	42.14714179	-	Wet	No	Northbrook	Residential	1. Evaluate short-circuiting 2. Add native plants to decrease erosion	DPRW 2016
16-1258	1258	-87.88980893	42.14851317	-	Wet	No	Northbrook	Residential	1. Remove excess litter 2. Add native plants to decrease excess erosion	DPRW 2016
16-1259	1259	-87.88700064	42.1513773	-	Wet	Yes	Northbrook	Residential	1. Remove excess algae 2. Add native plants to decrease erosion	DPRW 2016
16-1260	1260	-87.89208804	42.15141215	-	Wet	No	Northbrook	Residential	1. Consider excessive overhanging trees 2. Add native plants to decrease erosion	DPRW 2016
16-1261	1261	-87.89096677	42.15195571	-	Wet	No	Northbrook	Residential	1. Remove excess algae 2. Remove overhanging trees	DPRW 2016
16-1281	1281	-87.89160619	42.15349606	Chapel Hill Pond 1	Wet	Yes	Riverwoods	Commercial	1. Add aerator to clear algae 2. Clean inlets	DPRW 2016
16-397	397	-87.92931835	42.27997179	Ashbury Woods Pond 1	Dry	Yes	Libertyville	Residential	None needed	DPRW 2016
16-398	398	-87.92965928	42.27930565	Ashbury Woods Pond 2	Dry	Yes	Libertyville	Residential	None needed	DPRW 2016
16-399	399	-87.93026463	42.27865663	Ashbury Woods Pond 3	Wet	Yes	Libertyville	Residential	Increase native buffer	DPRW 2016
16-400	400	-87.95560733	42.2728671	Libertyville Centre Club Pond 1	Wetland	Yes	Libertyville	Commercial	1. Clear outlet manhole cover 2. Clear invasive species and reed debris 3. Remove woody vegetation around outlet	DPRW 2016
16-401	401	-87.95414076	42.2724761	Libertyville Centre Club Pond 2	Dry	Yes	Libertyville	Commercial	1. Clear larger trees/buckthorn away from outlet 2. Clear area around manhole cover 3. Clear trash from inlets	DPRW 2016
16-402	402	-87.95314508	42.27112118	Hecht Estates Pond 3	Dry	No	Libertyville	Commercial	1. Construct inlets at far end from outlet 2. Plant native vegetation to filter water 3. Clear outlet	DPRW 2016
16-403	403	-87.93976696	42.27036453	Riverside Golf Course Pond 2	Wet	No	Libertyville	Public	None needed	DPRW 2016
16-404	404	-87.94845575	42.26299986	Red Top Plaza Pond	Wet	No	Libertyville	Commercial	1. Fill in scoured inlet areas with more riprap 2. Implement more native plants 3. Install aerator.	DPRW 2016
16-405	405	-87.95416827	42.2626754	Bayhill Pond 1	Wet	Yes	Vernon Hills	Residential	1. Thin out weed bed 2. Re-cover netting	DPRW 2016
16-406	406	-87.95292224	42.26015366	Bayhill Pond 2	Wet	Yes	Vernon Hills	Residential	1. Thin out algae and aquatic plant life	DPRW 2016

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									2. Deter erosion	
16-407	407	-87.9398048	42.25996986	Riva Ridge Pond	Dry	Yes	Libertyville	Residential	Implement native plants	DPRW 2016
16-408	408	-87.95542903	42.25953716	White Deer Run Pond 26	Wet	Yes	Vernon Hills	Residential	1. Clear debris out of perimeter riprap 2. Thin out aquatic plants	DPRW 2016
16-409	409	-87.94915053	42.2596169	-	Wet	Yes	Vernon Hills	Commercial	None	DPRW 2016
16-410	410	-87.94364958	42.2588925	Artaius Pond 1	Dry	Yes	Libertyville	Residential	Implement native plants	DPRW 2016
16-411	411	-87.94041197	42.25862733	Florsheim Pond 4	Wetland	Yes	Libertyville	Residential	1. Increase native plants on western slope 2. Unclog/thin out outlet	DPRW 2016
16-412	412	-87.94080355	42.2577234	Florsheim Pond 3	Dry	Yes	Libertyville	Residential	1. Implement native plants 2. Unclog outlet	DPRW 2016
16-413	413	-87.9472385	42.25674727	Artaius Pond 2	Wet	No	Libertyville	Commercial	1. Unclog outlet 2. Install aerator 3. Clean up trash 4. Implement native plants	DPRW 2016
16-414	414	-87.94858553	42.25743714	-	Wet	Yes	Vernon Hills	Commercial	1. Implement more native vegetation 2. Clean up trash by energy dissipater/riprap used on inlets	DPRW 2016
16-415	415	-87.94705661	42.25617908	Artaius Pond 3	Wet	No	Libertyville	Commercial	Install aerator to diminish algae	DPRW 2016
16-416	416	-87.9258849	42.25629022	Novak Pond 1	Wet	No	Mettawa	Residential	None	DPRW 2016
16-417	417	-87.94543321	42.2558821	Artaius Pond 4	Wet	No	Libertyville	Commercial	1. Implement native plants 2. Clean up garbage 3. Install aerator 4. Reinstall lining	DPRW 2016
16-418	418	-87.95188193	42.25466014	Oakmont Pond 2	Wet	Yes	Vernon Hills	Commercial	1. Remove netting 2. Thin out algae	DPRW 2016
16-419	419	-87.95600417	42.25310706	Pinehurst Pond	Wet	Yes	Vernon Hills	Residential	Make inlets/outlets exposed	DPRW 2016
16-420	420	-87.91252573	42.25198012	Longwood Basin	Wet	No	Libertyville Township	Residential	None	DPRW 2016
16-421	421	-87.92130782	42.24980873	Sanctuary Estates Pond	Wet	No	Mettawa	Residential	None	DPRW 2016
16-422	422	-87.9437676	42.2498725	Grand Oaks Health Center Basin	Wet	Yes	Libertyville	Commercial	Increase buffer	DPRW 2016
16-423	423	-87.91221515	42.24906922	Mettawa Estates Pond 1	Dry	No	Mettawa	Residential	None	DPRW 2016
16-424	424	-87.94348813	42.24858227	Hollister Pond 2	Wet	No	Libertyville	Commercial	Increase buffer	DPRW 2016
16-425	425	-87.94531727	42.24861536	Hollister Pond 1	Wet	No	Libertyville	Commercial	Increase buffer	DPRW 2016
16-426	426	-87.91168481	42.24801822	Mettawa Estates Pond 2	Wet	No	Mettawa	Residential	None	DPRW 2016
16-427	427	-87.94312003	42.24697877	Hollister Pond 3	Wet	No	Libertyville	Commercial	Increase buffer	DPRW 2016
16-428	428	-87.90667437	42.2478472	Indian Ridge Basin	Wet	No	Libertyville Township	Residential	None	DPRW 2016
16-429	429	-87.91178231	42.24778346	Mettawa Estates Pond 3	Wet	No	Mettawa	Residential	None	DPRW 2016
16-430	430	-87.91480912	42.24760827	Forest Haven Pond 5	Wet	No	Libertyville Township	Residential	None	DPRW 2016

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16-431	431	-87.94936876	42.24721215	AMLI Museum Gardens Pond 1	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
16-432	432	-87.9084065	42.2471863	Farnsworth Pond 1	Wet	No	Mettawa	Residential	None	DPRW 2016
16-433	433	-87.94892786	42.24614295	AMLI Museum Gardens Pond 2	Wet	Yes	Vernon Hills	Residential	1. Thin out vegetation around inlet/outlet 2. Install aerator to thin algae	DPRW 2016
16-434	434	-87.90919761	42.2414355	Mettawa Woods Pond 2	Wet	Yes	Mettawa	Residential	None needed	DPRW 2016
16-435	435	-87.90456945	42.2410542	Hamilton Office Pond 3	Wet	Yes	Mettawa	Commercial	None needed	DPRW 2016
16-436	436	-87.90500728	42.24071468	Hamilton Office Pond 4	Wet	Yes	Mettawa	Commercial	Increase buffer	DPRW 2016
16-438	438	-87.94885288	42.24009819	Continental Executive Park Pond 2	Wet	No	Vernon Hills	Commercial	1. Implement an energy dissipater at inlets 2. Plant native wetland plants 3. Clean up perimeter.	DPRW 2016
16-439	439	-87.89992657	42.23827035	Opus Landmark of Lake Forest Pond 3	Wet	Yes	Lake Forest	Commercial	Increase buffer where needed	DPRW 2016
16-440	440	-87.94825978	42.23671248	Continental Executive Park Pond 3	Wet	No	Vernon Hills	Commercial	Clean up trash/debris	DPRW 2016
16-441	441	-87.9375613	42.23630097	Market Place at Vernon Hills Pond 2	Wet	No	Vernon Hills	Commercial	None needed	DPRW 2016
16-442	442	-87.95485057	42.23626829	Glacier YMCA Pond 1	Wet	No	Vernon Hills	Commercial	1. Clean up trash 2. Fix cracked inlets 3. Implement aerator 4. Grow native wetland plants	DPRW 2016
16-443	443	-87.94323298	42.23572511	Bradford Pond 2	Wet	No	Vernon Hills	Commercial	1. Clear reed/trash debris 2. Build larger buffer on roadside	DPRW 2016
16-444	444	-87.94450553	42.23506346	Continental Executive Park Pond 5	Wet	No	Vernon Hills	Commercial	1. Clean basin 2. Thin out wooded areas 3. Make inlets/outlets visible by thinning aquatic plants	DPRW 2016
16-445	445	-87.9430154	42.23473916	Bradford Pond 1	Wet	No	Vernon Hills	Commercial	1. Don't cut wetland vegetation 2. Clean up trash 3. Put up a larger plant barrier next to 21	DPRW 2016
16-446	446	-87.8967479	42.23392983	Saunders Road Basin 1	Dry	No	Lake Forest	Residential	None	DPRW 2016
16-447	447	-87.94563208	42.23280118	Continental Executive Park Pond 6	Wet	Yes	Vernon Hills	Commercial	None	DPRW 2016
16-448	448	-87.94373801	42.2318987	Continental Executive Park Pond 7	Wet	No	Vernon Hills	Commercial	Clean up trash/debris	DPRW 2016
16-449	449	-87.94647265	42.23140004	Continental Executive Park Pond 9	Wet	No	Vernon Hills	Commercial	Clean up & thin out	DPRW 2016
16-450	450	-87.94243769	42.22861284	Computer Discount Warehouse Pond 2	Wet	Yes	Vernon Hills	Commercial	1. Fix aerator 2. Unclog outlet 3. Implement riprap at inlets 4. Clean up trash	DPRW 2016
16-451	451	-87.93951889	42.22808284	Residential Resorts Pond	Wet	Yes	Vernon Hills	Commercial	Increase buffer	DPRW 2016

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16-452	452	-87.94670068	42.22739507	Computer Discount Warehouse Pond 1	Wet	Yes	Vernon Hills	Commercial	1. Clean up perimeter 2. Trim back trees 3. Eliminate soapy discharge	DPRW 2016
16-453	453	-87.94932505	42.22589052	New Century Town STP Pond	Dry	Yes	Libertyville Township	Public	Increase unmowed buffer	DPRW 2016
16-454	454	-87.94083793	42.22469347	Continental Executive Park Pond 11	Wet	Yes	Vernon Hills	Commercial	Increased riprap to prevent scouring and erosion at inlets and outlet	DPRW 2016
16-455	455	-87.93992898	42.22267723	Continental Executive Park Pond 12	Wet	Yes	Vernon Hills	Commercial	1. Install bigger outlet or another outlet to carry outlet flow 2. Unclog outlet 3. Clean up trash 4. Fix outlet grate 5. Install aerator 6. Implement native plants	DPRW 2016
16-456	456	-87.95073072	42.21779558	Corporate Woods Pond 1	Wet	No	Vernon Hills	Commercial	None	DPRW 2016
16-457	457	-87.93706504	42.2174705	Corporate Woods Pond 16	Wet	No	Vernon Hills	Commercial	Increase buffer	DPRW 2016
16-458	458	-87.95072003	42.21688292	Corporate Woods Pond 2	Wet	No	Vernon Hills	Commercial	None	DPRW 2016
16-459	459	-87.95346719	42.21696408	Corporate Woods Pond 14	Wet	Yes	Vernon Hills	Commercial	None	DPRW 2016
16-460	460	-87.94043911	42.21633233	Corporate Woods Pond 8	Wet	No	Vernon Hills	Commercial	1. Inspect inlets for possible repair/replacements 2. Install aerators to decrease algae 3. Assess erosion problems	DPRW 2016
16-461	461	-87.94779354	42.21629407	Corporate Woods Pond 4	Wet	No	Vernon Hills	Commercial	1. Fix outlet 2. Riprap in front of inlets 3. Clean up litter 4. Implement native plants	DPRW 2016
16-462	462	-87.93655565	42.21639524	Corporate Woods Pond 17	Wet	No	Vernon Hills	Commercial	Increase buffer	DPRW 2016
16-463	463	-87.94474063	42.21596542	Corporate Woods Pond 6	Wet	No	Vernon Hills	Commercial	1. Install aerator 2. Fix and fill in cracked/eroded outlet 3. Incorporate riprap at inlets 4. Clean up trace amounts of trash 5. Install more native plant (erosion)	DPRW 2016
16-464	464	-87.9418837	42.2157758	Corporate Woods Pond 7	Wet	No	Vernon Hills	Commercial	1. Install aerator 2. Unclog outlet 3. Introduce forebay to prevent future clogging 4. Clean up trash 5. Fix inlet 6. Implement native plants	DPRW 2016
16-465	465	-87.95074878	42.2154115	Corporate Woods Pond 3	Wet	No	Vernon Hills	Commercial	1. Install aerators 2. Clean trash 3. Implement native plants	DPRW 2016
16-466	466	-87.94673827	42.21516456	Corporate Woods Pond 5	Wet	No	Vernon Hills	Commercial	1. Pick up excess litter 2. Add more riprap at inlets to prevent scouring 3. Test for possible contaminants such as oil	DPRW 2016

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16-467	467	-87.93837351	42.21305205	Corporate Woods Pond 20	Wet	No	Vernon Hills	Commercial	None needed	DPRW 2016
16-468	468	-87.93547153	42.21370681	Corporate Woods Pond 18	Wet	Yes	Vernon Hills	Commercial	Increase buffer	DPRW 2016
16-469	469	-87.93530627	42.21317836	Corporate Woods Pond 19	Wet	No	Vernon Hills	Commercial	Increase buffer	DPRW 2016
16-470	470	-87.93495734	42.2120018	Corporate Woods Pond 21	Wet	No	Vernon Hills	Commercial	None needed	DPRW 2016
16-472	472	-87.93872051	42.21013052	Corporate Woods Pond 22	Wet	No	Vernon Hills	Commercial	Increase buffer	DPRW 2016
16-473	473	-87.93817243	42.20752498	Corporate Woods Pond 23	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
16-474	474	-87.93603409	42.20796749	Georgetown Square Pond	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
16-475	475	-87.93744311	42.20621472	CLC Southlake Educational Center Pond	Wet	Yes	Vernon Hills	Public	None needed	DPRW 2016
16-476	476	-87.92971003	42.20610562	Heritage Creek of Lincolnshire Pond	Wet	Yes	Lincolnshire	Residential	Increase buffer	DPRW 2016
16-477	477	-87.92089458	42.19924862	Cranes Landing Golf Club Pond 2	Wet	No	Lincolnshire	Public	None	DPRW 2016
16-478	478	-87.9172025	42.19851236	Spring Lake	Wet	Yes	Lincolnshire	Public	None needed	DPRW 2016
16-479	479	-87.92299007	42.19284264	Cranes Landing Golf Club Pond 3	Wet	No	Lincolnshire	Public	None	DPRW 2016
16-480	480	-87.9218284	42.19240055	Cranes Landing Golf Club Pond 4	Wet	No	Lincolnshire	Public	None	DPRW 2016
16-481	481	-87.9301353	42.19150893	Lincolnshire Corporate Center Pond 10	Wet	No	Lincolnshire	Public	1. Add native plants to decrease erosion 2. Add aerator to decrease excess algae 3. Remove excess litter/debris	DPRW 2016
16-482	482	-87.92002141	42.19112144	Cranes Landing Golf Club Pond 5	Wet	No	Lincolnshire	Commercial	None	DPRW 2016
16-483	483	-87.92877518	42.19070392	Rivershire Pond 3	Wet	Yes	Lincolnshire	Commercial	1. Repair cracked inlet 2. Remove excess litter/debris	DPRW 2016
16-484	484	-87.94125726	42.18756689	Heathrow Schelter Pond	Wet	No	Lincolnshire	Commercial	Increase buffer	DPRW 2016
16-485	485	-87.94131825	42.18682989	Lincolnshire Business Center Pond 4	Wet	No	Lincolnshire	Commercial	1. Increase buffer 2. Repair outlet FES	DPRW 2016
16-486	486	-87.93630428	42.18491763	Lincolnshire Corporate Center Pond 2	Wet	No	Lincolnshire	Industrial	1. Install aerator to decrease excess algae 2. Implement native plants to decrease erosion	DPRW 2016
16-487	487	-87.92013994	42.18425433	-	Wet	Yes	Vernon Township	Residential	None	DPRW 2016
16-488	488	-87.9437722	42.18302996	Lincolnshire Business Center Pond 5	Wet	No	Lincolnshire	Industrial	1. Remove litter/debris 2. Install aerator to decrease excess algae	DPRW 2016
16-489	489	-87.94680894	42.18302685	Tucker Group Pond	Wet	No	Lincolnshire	Industrial	1. Remove litter/debris 2. Add native plants to decrease erosion 3. Consider possible illicit oily substance present	DPRW 2016
16-490	490	-87.93169536	42.18188279	G.K. Pond	Wet	No	Lincolnshire	Residential	None	DPRW 2016

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16-491	491	-87.92733309	42.18122757	Shell Oil Company Pond 1	Dry	Yes	Lincolnshire	Commercial	Consider inlet clogging	DPRW 2016
16-492	492	-87.92741774	42.18101639	Shell Oil Company Pond 2	Wetland	Yes	Lincolnshire	Commercial	Remove excess litter/debris	DPRW 2016
16-493	493	-87.92275859	42.1772967	Tripps Pond 1	Wet	Yes	Lincolnshire	Commercial	None	DPRW 2016
16-494	494	-87.92688312	42.17241584	Corporate Grove Pond 10	Wet	No	Buffalo Grove	Commercial	Increase native vegetation to decrease excess erosion	DPRW 2016
16-495	495	-87.9235346	42.17222996	Corporate Grove Pond 12	Wet	No	Buffalo Grove	Commercial	1. Add aerator to decrease excess algae 2. Remove excess litter/debris	DPRW 2016
16-496	496	-87.92642209	42.17119906	Corporate Grove Pond 11	Wet	No	Buffalo Grove	Commercial	1. Add native plants to decrease erosion 2. Remove excess debris	DPRW 2016
16-497	497	-87.923263	42.17119761	Corporate Grove Pond 13	Wet	No	Buffalo Grove	Commercial	Remove excess litter/debris	DPRW 2016
16-498	498	-87.91966018	42.16800602	Federal Life Insurance Pond	Wet	No	Riverwoods	Commercial	1. Repair detached inlet and outlet 2. Add native plants	DPRW 2016
16-500	500	-87.89075037	42.16065662	Thorngate Pond 2	Wet	Yes	Riverwoods	Residential	Repair inlets	DPRW 2016
16-501	501	-87.88698837	42.1588332	Saunders Woods Corporate Center Pond	Wet	Yes	Riverwoods	Residential	Add riprap and native plants along shoreline to decrease erosion	DPRW 2016
16-502	502	-87.88691427	42.15814013	-	Wetland	Yes	Riverwoods	Residential	None	DPRW 2016
16-503	503	-87.91457963	42.15445112	Riverwalk - Buffalo Grove Pond 1	Wet	No	Buffalo Grove	Commercial	Add native plants to decrease erosion	DPRW 2016
16-504	504	-87.89481207	42.15403086	-	Wet	No	Riverwoods	Commercial	None	DPRW 2016
16-505	505	-87.88906759	42.15341788	Novus Credit Union Pond 3	Wet	Yes	Riverwoods	Commercial	None	DPRW 2016
16-506	506	-87.89116697	42.15340273	Chapel Hill Pond 2	Wet	Yes	Riverwoods	Commercial	Add aerator to decrease excess algae	DPRW 2016
16-507	507	-87.89205158	42.15340776	Chapel Hill Pond 1	Wet	Yes	Riverwoods	Commercial	1. Add aerator to clear algae 2. Clean inlets	DPRW 2016
16-508	508	-87.91315289	42.24052037	Deerpath Farm Pond 10	Wet	Yes	Mettawa	Residential	None needed	DPRW 2016
16-531	531	-87.94984944	42.26220814	-	Wet	Yes	Vernon Hills	Commercial	None	DPRW 2016
16-532	532	-87.94617143	42.24596706	Ring Drive Basin 1	Wet	Yes	Vernon Hills	Residential	None needed	DPRW 2016
16-533	533	-87.8969187	42.23665928	Saunders Rd Basin 2	Wet	Yes	Lake Forest	Commercial	None needed	DPRW 2016
16-534	534	-87.93878427	42.2207799	Smithe Basin	Wet	Yes	Vernon Hills	Commercial	Increase unmowed buffer	DPRW 2016
16-535	535	-87.93770586	42.22102422	Juvenile Detention Center Basin	Wet	No	Vernon Township	Commercial	None needed	DPRW 2016
16-536	536	-87.93456206	42.20929268	By The Yard Basin	Wetland	Yes	Vernon Hills	Residential	None needed	DPRW 2016
16-537	537	-87.93690604	42.20470149	Windward Basin	Wetland	Yes	Vernon Hills	Commercial	None needed	DPRW 2016
16-538	538	-87.93388173	42.20293334	Beer Market Basin	Wet	Yes	Vernon Hills	Commercial	Stabilize mulch	DPRW 2016
16-539	539	-87.92202606	42.18432492	-	Wet	Yes	Lincolnshire	Commercial	None	DPRW 2016
16-540	540	-87.9392758	42.18371443	-	Wetland	Yes	Lincolnshire	Commercial	Remove some excess woody vegetation	DPRW 2016
16-541	541	-87.93713242	42.18361699	-	Wetland	Yes	Lincolnshire	Commercial	Remove some excess woody vegetation	DPRW 2016
16-542	542	-87.93629631	42.18323624	-	Wet	Yes	Lincolnshire	Industrial	None	DPRW 2016

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16-543	543	-87.92203088	42.17115461	-	Wetland	Yes	Riverwoods	Residential	Remove excessive litter from shoreline	DPRW 2016
16-544	544	-87.88883388	42.15749721	-	Wet	Yes	Riverwoods	Industrial	None	DPRW 2016
16-545	545	-87.88219315	42.1547614	-	Wet	Yes	Deerfield	Industrial	None	DPRW 2016
16-546	546	-87.88986575	42.15416613	-	Wet	Yes	Riverwoods	Industrial	None	DPRW 2016
16-555	555	-87.88878003	42.16470953	-	Wet	Yes	Riverwoods	Residential	Install aerator	DPRW 2016
16-556	556	-87.89167707	42.16347014	-	Wet	Yes	Riverwoods	Residential	Install aerator	DPRW 2016
16-557	557	-87.89070319	42.15755007	-	Wet	No	Riverwoods	Industrial	None	DPRW 2016
16-558	558	-87.88866321	42.15577928	-	Wet	Yes	Riverwoods	Industrial	None	DPRW 2016
16-559	559	-87.9264668	42.18106458	-	Dry	Yes	Lincolnshire	Commercial	Remove excess litter/debris	DPRW 2016
16-560	560	-87.93476753	42.18515591	-	Wet	No	Lincolnshire	Commercial	1. Install aerator to decrease excess algae 2. Implement native plants to decrease erosion	DPRW 2016
16-562	562	-87.91539159	42.20805171	Hamilton Basin	Wet	Yes	Lincolnshire	Residential	1. Replace construction outlet with permanent outlet 2. Increase unmowed buffer	DPRW 2016
16-563	563	-87.94865759	42.22295577	-	Wet	Yes	Vernon Hills	Public	Spray for algae	DPRW 2016
16-564	564	-87.94691429	42.22927195	-	Wet	Yes	Vernon Hills	Industrial	Clean up perimeter	DPRW 2016
16-565	565	-87.93890376	42.22944225	Extended Stay Vernon Hills Basin	Wet	No	Vernon Hills	Commercial	None needed	DPRW 2016
16-566	566	-87.93776385	42.23230794	Vernon Hills Shopping Center	Wet	No	Vernon Hills	Commercial	None needed	DPRW 2016
16-567	567	-87.9467371	42.23474294	-	Wet	No	Vernon Hills	Industrial	1. Clean up basin 2. Possible removal of carp 3. Add another inlet on the north end of basin	DPRW 2016
16-568	568	-87.94719129	42.23229423	-	Wet	No	Vernon Hills	Industrial	Clear debris/trash from riprap side slope	DPRW 2016
16-569	569	-87.95226795	42.25703589	-	Wet	Yes	Vernon Hills	Residential	Remove erosion control netting	DPRW 2016
16-570	570	-87.95314488	42.27011735	-	Dry	No	Libertyville	Commercial	None	DPRW 2016
16-571	571	-87.94010253	42.26815504	Riverside Park Basin 1	Wet	No	Libertyville	Residential	None needed	DPRW 2016
16-885	885	-87.92378558	42.19518123	Marriott Lincolnshire Pond	Wet	No	Long Grove	Commercial	Remove excess litter/debris	DPRW 2016
17-001	17-001	-88.08503784	42.19968395	Landings of Lake Zurich Pond 2	Wet	Yes	Lake Zurich	Residential	Dredge lake bottom and put native aquatic plant seeds in	Buffalo Creek 2013
17-003	17-003	-88.08372412	42.19460203	Standard Liberty Venture Basin 1	Dry	No	Lake Zurich	Public	1. Remove woody vegetation 2. Plant slopes and bottom with native plants	Buffalo Creek 2013
17-005	17-005	-88.08456482	42.19224021	Good Shepherd Pond	Wet	No	Lake Zurich	Residential/ Commercial	None	Buffalo Creek 2013
17-008	17-008	-88.08628689	42.18934993	Heatherleigh Pond 2	Wet	No	Lake Zurich	Residential	Install aerator	Buffalo Creek 2013
17-009	17-009	-88.08495624	42.18879388	Heatherleigh Pond 3	Wet	Yes	Lake Zurich	Residential	None	Buffalo Creek 2013
17-016	17-016	-88.0865251	42.18447634	Deerpath Court Retail Center Pond 3	Wet	No	Lake Zurich	Commercial/ Residential	Install aerator	Buffalo Creek 2013
17-019	17-019	-88.03721472	42.18304781	Villa Lucerne Pond	Dry	Yes	Lake Zurich	Residential	1. Plant slopes and bottom with native plants 2. Remove low flow bypass	Buffalo Creek 2013

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17-020	17-020	-88.08063609	42.18202404	Beaver Creek Estates Pond 2	Wet	No	Long Grove	Residential	1. Plant native plants on banks 2. Replace inlet 2	Buffalo Creek 2013
17-021	17-021	-88.05565283	42.18237754	Plaza on the Pond Pond 1	Wet	No	Lake Zurich	Commercial	Remove woody vegetation	Buffalo Creek 2013
17-022	17-022	-88.05154772	42.18198691	Lexington Health Care Center of Lake Zurich Basin 1	Wet	Yes	Lake Zurich	Public	1. Install aerator 2. Remove woody vegetation 3. Install RCP outlet to adjacent basin	Buffalo Creek 2013
17-024	17-024	-88.059017	42.18130571	Ponds of Killdeer Pond 9	Wet	Yes	Kildeer	Residential	1. Disconnect downspout and sump pump 2. Install an aerator 3. Realign outlet A's grate 4. Reattach inlet 2's grate 5. Clear sediment from inlet 1 6. Replant banks with native plants	Buffalo Creek 2013
17-025	17-025	-88.056874	42.18146019	Hickory Hills Pond 1	Wet	No	Kildeer	Residential	Plant slopes and banks with native plants	Buffalo Creek 2013
17-026	17-026	-88.05524334	42.18073269	Chestnut Corners Pond 1	Dry	No	Lake Zurich	Residential	1. Clear inlet 3 and 5 of debris 2. Install riprap in front of inlets 1, 2, and 3 3. Remove turf grass 4. Plant native vegetation	Buffalo Creek 2013
17-027	17-027	-88.05248201	42.18098731	Ponds of Killdeer Pond 8	Wet	Yes	Kildeer	Residential	1. Clear outlet A of debris 2. Fix inlet 1's grate 3.Install an aerator 4.Remove invasive plants and plant native.	Buffalo Creek 2013
17-029	17-029	-88.07876819	42.18021216	Ponds of Killdeer Pond 6	Wet	Yes	Kildeer	Residential	1. Clear inlet of debris 2. Remove invasives and plant natives	Buffalo Creek 2013
17-030	17-030	-88.05331441	42.17881219	Teiche Woods Pond 2	Wet	No	Kildeer	Residential	None	Buffalo Creek 2013
17-032	17-032	-88.05693818	42.17897172	Plaza on the Pond Pond 2	Dry	Yes	Lake Zurich	Commercial	1. Clear inlet 2 of clogging 2. Remove turf grass and invasive plants 3. Plant native vegetation	Buffalo Creek 2013
17-034	17-034	-88.08294222	42.17909266	Ponds of Killdeer Pond 5	Dry	Yes	Kildeer	Residential	Plant basin with native plants	Buffalo Creek 2013
17-035	17-035	-88.07796317	42.17838956	Ponds of Killdeer Pond 3	Wet	Yes	Kildeer	Residential	1. Clear outlet A of debris 2. Clear invasive plants and plant native species.	Buffalo Creek 2013
17-036	17-036	-88.06373727	42.17804899	Chasewood North Pond 1	Dry	No	Lake Zurich	Residential	1. Clear all inlets of debris and sediment 2. Plant banks and bottom with native plants	Buffalo Creek 2013
17-037	17-037	-88.05602005	42.17759055	Sparrow Ridge Park Pond	Dry	No	Lake Zurich	Residential	1. Plant native vegetation on slopes and bottom 2. Install riprap areas in front of inlets 1 and 2	Buffalo Creek 2013
17-038	17-038	-88.05538952	42.17612975	Bishops Ridge Pond 1	Wet	No	Kildeer	Residential	1. Replace turf grass with native plants 2. Install aerator	Buffalo Creek 2013
17-039	17-039	-88.07526686	42.17593778	Ponds of Killdeer Pond 2	Wet	No	Kildeer	Residential	1. Disconnect sump pump 2. Fix inlet 1's grate 3. Plant native plants along banks	Buffalo Creek 2013
17-042	17-042	-87.99163559	42.1751291	Ponds of Killdeer Pond 1	Wet	No	Kildeer	Residential	1. Remove woody vegetation and invasive plants 2. Plant native plants on banks	Buffalo Creek 2013
17-044	17-044	-88.03843052	42.17526349	Village of Lake Zurich Basin 6	Dry	No	Lake Zurich	Residential	1. Remove low flow bypass and put in RCP inlets and outlets on bank 2. Plant slopes and bottom with native plants	Buffalo Creek 2013

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17-045	17-045	-88.0105759	42.17490545	Courtyard of Lake Zurich Pond	Dry	No	Lake Zurich	Commercial	1. Clear build up away from inlet 1 2. Plant slopes and bottom with native plants	Buffalo Creek 2013
17-047	17-047	-87.96341695	42.1735622	Crossings Pond 2	Wet	No	Buffalo Grove	Residential and Public	1. Install aerator 2. Plant native plants on banks	Buffalo Creek 2013
17-048	17-048	-87.98530078	42.1743853	Farmington Pond 1	Wet	No	Kildeer	Residential	1. Replace outlet A 2. Plant native plants on test of slopes	Buffalo Creek 2013
17-049	17-049	-88.04024438	42.17422207	Miller Farm Pond 1	Wet	No	Long Grove	Residential	None	Buffalo Creek 2013
17-051	17-051	-87.98023379	42.1734122	Westchester Estates Pond 1	Wet	No	Buffalo Grove	Residential	Disconnect sump pumps and downspouts	Buffalo Creek 2013
17-053	17-053	-87.96925845	42.17251477	LaSalle Bank Professional Center Pond	Wet	No	Buffalo Grove	Commercial	1. Plant native plants on slopes 2. Replace inlet 1 3. Refill soil around outlet A 4. Clear inlets 2-4 of buildup and fix aerator.	Buffalo Creek 2013
17-054	17-054	-87.99012661	42.17300559	Farmington Pond 5	Wet	No	Kildeer	Residential	1. Remove turf grass and invasive plants 2. Plant native plants on slopes and inlet 2	Buffalo Creek 2013
17-055	17-055	-87.9928982	42.17323507	Spoerlein Farm Pond	Dry	No	Buffalo Grove	Residential	Plant slopes and bottom with native plants	Buffalo Creek 2013
17-056	17-056	-88.06137132	42.17269846	Green Lake Park Pond	Wet	No	Buffalo Grove	Residential	1. Replace outlet 2. Remove riprap and replace with native plants	Buffalo Creek 2013
17-057	17-057	-88.05260046	42.17286382	Crossings Pond 1	Wet	No	Buffalo Grove	Residential	1. Reduce slope of banks to 3:1 2. Plant native vegetation on banks 3. Install an aerator on north end	Buffalo Creek 2013
17-058	17-058	-88.0744077	42.17123964	Bridgewater Farm Park Pond	Wet	No	Long Grove	Residential	1. Plant native vegetation on slopes 2. Replace inlets 1 and 2 3. Install riprap in front of inlet 2 4. Disconnect sump PUMP	Buffalo Creek 2013
17-059	17-059	-88.0122139	42.17200037	Pine Valley - Kildeer Pond 1	Wet	No	Kildeer	Residential	1. Remove woody vegetation 2. Plant native plants along banks	Buffalo Creek 2013
17-061	17-061	-88.06587886	42.17159327	Boschome Farm Pond 3	Wet	No	Kildeer	Residential	1. Plant native vegetation along banks 2. Install aerator (irises esp.)	Buffalo Creek 2013
17-062	17-062	-87.98535181	42.1710893	Village of Lake Zurich Pond	Wet	No	Lake Zurich	Residential	1. Plant rest of bank with native vegetation 2. Install aerator 3. Install an inlet on south bank to fix short-circuit	Buffalo Creek 2013
17-064	17-064	-87.99400959	42.17015578	Victorian Oak Estates Pond 3	Wet	No	Long Grove	Residential	1. Increase power of southern aerator 2. Plant slopes and inlet 2 with native vegetation	Buffalo Creek 2013
17-065	17-065	-88.00788269	42.17063925	Pine Valley - Kildeer Pond 3	Wet	No	Kildeer	Residential	1. Disconnect downspout 2. Remove woody vegetation and plant natives	Buffalo Creek 2013
17-068	17-068	-88.03424103	42.17046891	Concord Place Pond	Wet	Yes	Buffalo Grove	Residential	Plant slopes and banks with native vegetation	Buffalo Creek 2013
17-069	17-069	-88.04106496	42.17073662	Crossings Park Pond	Wet	No	Long Grove	Residential	1. Remove duck week 2. Replace inlet B 3. Clear inlet 5 of buildup 4. Plant slopes with native plants	Buffalo Creek 2013
17-070	17-070	-88.03197153	42.17111255	Country Club Woods Pond	Dry	Yes	Long Grove	Residential	Maintain native plants and remove invasives	Buffalo Creek 2013
17-071	17-071	-87.96281413	42.17031431	Bennington Pond 3	Wet	No	Long Grove	Residential	1. Reduce slope to 3:1 2. Plant native vegetation on banks	Buffalo Creek 2013

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									3. Replace inlet 2 4. Disconnect downspout	
17-072	17-072	-87.9990121	42.17035256	Farmington Pond 6	Wet	No	Kildeer	Residential	None	Buffalo Creek 2013
17-073	17-073	-88.00062512	42.16908014	Bennington Pond 4	Wet	No	Long Grove	Residential	Clear plants from outlet	Buffalo Creek 2013
17-074	17-074	-88.05965901	42.16978275	Hidden Lake Village Pond 1	Wet	No	Buffalo Grove	Residential	1. Clear inlet 2 and 4 of debris 2. Replace inlet 5 3. Remove riprap and turf grass and plant natives 3. Disconnect sump pump	Buffalo Creek 2013
17-075	17-075	-88.03333602	42.16965126	Bridgewater Farm Pond 1	Wet	No	Long Grove	Residential and Public	None	Buffalo Creek 2013
17-077	17-077	-88.0573807	42.16968967	Hillcrest Country Club Pond	Wet	No	Long Grove	Public	1. Replace wall on north end 2. Replace inlet 3 3. Plant native buffer around wall	Buffalo Creek 2013
17-078	17-078	-87.96400766	42.16867395	Hidden Valley of Kildeer Pond 1	Wet	No	Ela Township	Residential	1. Install aerator 2. Stop dying water 3. Plant native vegetation	Buffalo Creek 2013
17-079	17-079	-88.06989056	42.16940118	Bennington Pond 5	Wet	No	Long Grove	Residential	1. Plant native plants along bank	Buffalo Creek 2013
17-080	17-080	-88.05739103	42.16913893	Hidden Valley of Kildeer Pond 2	Wet	No	Kildeer	Residential	1. Disconnect downspouts 2. Plant native vegetation on slopes	Buffalo Creek 2013
17-081	17-081	-88.03410002	42.1688392	Hidden Lake Village Pond 2	Wet	No	Buffalo Grove	Residential	1. Remove riprap and turf grass 2. Plant native vegetation on slopes	Buffalo Creek 2013
17-082	17-082	-88.01232141	42.16824898	Rand 12 Centre Pond 1	Wet	No	Deer Park	Commercial	1. Install aerator 2. Replace inlets 1 and 2 3. Fill soil around inlet 2 4. Plant native vegetation on banks	Buffalo Creek 2013
17-084	17-084	-87.96964663	42.16781802	Hidden Valley of Kildeer Pond 3	Wet	No	Ela Township	Residential	1. Clear outlet of debris 2. Plant native plants on slopes and banks.	Buffalo Creek 2013
17-085	17-085	-88.06829343	42.16783689	Bennington Pond 6	Wet	No	Long Grove	Residential	1. Fix 2nd aerator 2. Replace turf grass and riprap with native plants	Buffalo Creek 2013
17-086	17-086	-87.964016	42.16767161	Yankee Lake	Wet	No	Long Grove	Public	1. Disconnect sump pump 2. Replace walls and riprap with native plants	Buffalo Creek 2013
17-089	17-089	-88.03458511	42.16801047	Busch Grove Community Park Pond 1	Dry	Yes	Buffalo Grove	Public	1. Replace invasive plants with native plants 2. Clear inlets 1, 2, and 3 and outlet A of clogging	Buffalo Creek 2013
17-091	17-091	-88.0508879	42.16794396	Sturm Pond 1	Wet	No	Deer Park	Residential	Remove invasive plants from wetland and plant native wetland plants instead	Buffalo Creek 2013
17-092	17-092	-88.0354543	42.16740891	Cherborough Pond 1	Wet	Yes	Buffalo Grove	Residential	None	Buffalo Creek 2013
17-093	17-093	-88.07475959	42.16685292	Bennington Pond 8	Wet	Yes	Long Grove	Residential	1. Install aerator 2. Remove retaining wall and plant natives	Buffalo Creek 2013
17-094	17-094	-88.01937908	42.16741417	Farmington Pond 7	Wet	No	Kildeer	Residential	Plant banks and outlet A with native plants	Buffalo Creek 2013
17-096	17-096	-87.96171814	42.16593421	Willow Valley Pond 4	Wet	No	Long Grove	Residential	1. Install aerator 2. Plant native vegetation on banks 3. Remove woody vegetation	Buffalo Creek 2013

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17-097	17-097	-88.03846862	42.16701198	Swansway Ponds Pond	Wet	No	Deer Park	Residential	1. Fix 3rd aerator 2. Plant native vegetation along banks	Buffalo Creek 2013
17-098	17-098	-88.06899699	42.16638837	Maple Hill Nursing Center Pond	Wet	Yes	Long Grove	Public	1. Remove turf grass 2. Plant native vegetation on slopes 3. Kill algae	Buffalo Creek 2013
17-099	17-099	-88.0353513	42.16667225	Cherborough Pond 3	Wet	No	Buffalo Grove	Residential	1. Replace inlet 3 2. Plant native vegetation	Buffalo Creek 2013
17-100	17-100	-88.06585403	42.16675912	Farmington Pond 4	Wet	No	Long Grove	Residential	1. Install aerator in the center of pond 2. Plant native vegetation along banks 3. Install better outlet system	Buffalo Creek 2013
17-102	17-102	-88.07834722	42.16676016	Sturm Pond 2	Wet	No	Kildeer	Residential	Replace invasive plants in wetland with native wetland plants	Buffalo Creek 2013
17-103	17-103	-87.9673912	42.16596009	Kildeer Glen Pond	Dry	No	Long Grove	Residential	1. Plant slopes and bottom with native plants 2. Clear sediment from outlet A	Buffalo Creek 2013
17-104	17-104	-88.07742391	42.16633567	-	Wet	No	Kildeer	Commercial	1. Disconnect downspout 2. Plant slopes with native vegetation	Buffalo Creek 2013
17-105	17-105	-88.08341628	42.16536605	Country Corners Pond 1	Wet	No	Deer Park	Residential	Plant slopes with native plants	Buffalo Creek 2013
17-106	17-106	-88.00012398	42.16568611	Busch Grove Community Park Pond 2	Wet	No	Buffalo Grove	Public	Plant native plants on slopes and bottom and remove invasive plants	Buffalo Creek 2013
17-107	17-107	-88.08017597	42.16550515	Country Corners Pond 2	Wet	Yes	Deer Park	Residential	1. Replace riprap and turf grass with native plants 2. Install aerator	Buffalo Creek 2013
17-111	17-111	-88.07512148	42.16387209	Deerpath Estates Pond 2	Wet	No	Deer Park	Residential	1. Disconnect downspouts and sump pump 2. Plant native vegetation on slopes.	Buffalo Creek 2013
17-112	17-112	-88.04551451	42.16438914	Country Club Meadows of Long Grove Pond 4	Wet	No	Long Grove	Residential	Install aerator	Buffalo Creek 2013
17-113	17-113	-88.01454758	42.16441727	Country Corners Pond 3	Wet	No	Deer Park	Residential	1. Install aerator in east part 2. Plant native plants	Buffalo Creek 2013
17-114	17-114	-88.00756367	42.16387112	Swansway Pond	Wet	No	Deer Park	Residential	1. Plant slopes with native plants 2. Remove steel wall and slope 3. Install aerator at north end 4. Replace inlet 3	Buffalo Creek 2013
17-115	17-115	-87.96402758	42.1642578	Prestonfield Pond 4	Wet	No	Kildeer	Residential	1. Plant native plants where turf grass currently is 2. Install aerator in the southern part of the basin 3. Disconnect sump pump	Buffalo Creek 2013
17-116	17-116	-88.03790727	42.1641312	Sentinal Lake	Wet	No	Long Grove	Residential and Public	1. Plant slopes with native plants 2. Replace inlet 2 3. Reconnect parts of inlet 3 4. Install more riprap on inlet 2	Buffalo Creek 2013
17-117	17-117	-88.05069649	42.1637734	Country Club Meadows of Long Grove Pond 5	Wet	No	Long Grove	Residential	Remove invasive plants and replace with native plants	Buffalo Creek 2013
17-118	17-118	-88.0490172	42.16273799	-	Wet	No	Buffalo Grove	Residential	1. Replace outlet A 2. Plant native plants	Buffalo Creek 2013
17-119	17-119	-88.03782947	42.1625682	Meadows of Killdeer Pond 1	Wet	No	Kildeer	Residential	1. Disconnect downspout 2. Replace outlet A	Buffalo Creek 2013

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									3. Remove invasive plants and plant natives	
17-121	17-121	-88.04170848	42.1624237	Shops at Kildeer Shopping Center Pond 2	Wet	Yes	Kildeer	Commercial	1. Clear litter from the basin 2.Remove invasive plants and plant natives	Buffalo Creek 2013
17-122	17-122	-87.96956836	42.15961644	Shops at Kildeer Shopping Center Pond 5	Wet	Yes	Kildeer	Commercial	1. Clear debris and litter from the basin 2. Install an aerator 3. Remove invasive plants 4. Reattach grate on inlet 1	Buffalo Creek 2013
17-123	17-123	-88.03989985	42.16224538	Prestonfield Pond 2	Wet	No	Kildeer	Residential	1. Install aerator on east side 2. Replace riprap and turf grass with native plants	Buffalo Creek 2013
17-124	17-124	-88.05804668	42.16181531	Prestonfield Pond 1	Wet	No	Kildeer	Residential	Plant banks and inlet 2 with native plants	Buffalo Creek 2013
17-125	17-125	-88.00534869	42.16094857	Willow Stream Park Pond	Wet	No	Buffalo Grove	Residential and Public	1. Remove invasive plants and plant native plants 2. Install aerator on south end of the basin	Buffalo Creek 2013
17-126	17-126	-88.05729867	42.16031544	Prestonfield Pond 3	Wet	No	Kildeer	Residential	1. Clear inlets 2 and 3 of sediment 2. Install aerator near the outlet 3. Plant native plants along banks	Buffalo Creek 2013
17-127	17-127	-87.96346635	42.16004792	Deer Park Town Center Pond 2	Wet	Yes	Deer Park	Commercial	Remove invasive plants and plant native species	Buffalo Creek 2013
17-128	17-128	-88.08690083	42.15954863	Country Club Meadows of Long Grove Pond 8	Wet	No	Long Grove	Residential	Remove invasive and woody vegetation from banks and plant native plants	Buffalo Creek 2013
17-129	17-129	-88.07028323	42.15872744	Deer Park Town Center Pond 3	Wet	No	Deer Park	Commercial	1. Plant slopes with native plants 2. Clear inlets 6 and 9 of debris 3. Replace inlet 1	Buffalo Creek 2013
17-130	17-130	-87.98213884	42.15841126	Buffalo Grove Town Center Pond 1	Wet	No	Buffalo Grove	Residential	None	Buffalo Creek 2013
17-132	17-132	-87.97322708	42.1582105	Lies Pond	Wet	No	Deer Park	Residential	Plant banks with native plants	Buffalo Creek 2013
17-133	17-133	-88.06816969	42.15839205	Dover Pond Detention Pond	Dry	No	Deer Park	Residential	1. Remove bypass and install FES inlets and outlets 2. Plant slopes and bottom with native plants	Buffalo Creek 2013
17-134	17-134	-87.9951309	42.15804667	Lexington Glen Pond	Wet	No	Buffalo Grove	Residential	1. Disconnect downspouts 2. Plant slopes with native plants	Buffalo Creek 2013
17-135	17-135	-87.97889314	42.15766852	Roseglen Pond	Wet	Yes	Buffalo Grove	Public and Residential	Remove riprap and plant native vegetation along banks	Buffalo Creek 2013
17-136	17-136	-88.09126063	42.15750712	Deer Valley Estates Pond	Wet	Yes	Deer Park	Residential	1. Remove invasive species 2. Plant native plants	Buffalo Creek 2013
17-137	17-137	-88.05532509	42.15775225	LCFPD Pond	Wet	Yes	Lake County Forest Preserve	Residential	Plant native plants on slopes	Buffalo Creek 2013
17-138	17-138	-87.96960702	42.15732894	Buffalo Grove Golf Course Pond 1	Wet	No	Buffalo Grove	Public	1. Replace inlets 2 and 4 2. Plant native plants on banks	Buffalo Creek 2013
17-139	17-139	-88.03979796	42.15668567	Oak Ridge Pond	Wet	No	Deer Park	Residential	1. Disconnect downspouts 2. Plant banks with native plants 3. Install another aerator by outlet 4. Replace outlet with a larger size pipe	Buffalo Creek 2013
17-140	17-140	-87.98054129	42.15625824	Deer Park Town Center Pond 9	Wet	Yes	Deer Park	Commercial	1. Plant slopes with native plants 2. Clear inlets 4 and 5 of debris	Buffalo Creek 2013

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17-141	17-141	-87.97380456	42.1558127	Buffalo Grove Golf Course Pond 4	Wet	No	Buffalo Grove	Public	1. Plant slopes with native plants 2. Install aerator on north side	Buffalo Creek 2013
17-142	17-142	-87.97616029	42.15555037	-	Wet	No	Ela Township	Commercial/ Residential	None	Buffalo Creek 2013
17-143	17-143	-88.06093163	42.15536947	Buffalo Grove Business Park Pond 2	Wet	No	Buffalo Grove	Commercial	1. Fix aerator 2. Remove riprap and plant native plants	Buffalo Creek 2013
17-145	17-145	-88.06232304	42.15519746	Buffalo Grove Golf Course Pond 3	Wet	No	Buffalo Grove	Public	1. Replace inlet 3 2. Upkeep native plants and remove invasives	Buffalo Creek 2013
17-146	17-146	-88.06944445	42.15547975	Buffalo Grove Golf Course Pond 2	Wet	No	Buffalo Grove	Public	1. Replace inlet 3 and outlet 2. Maintain native plants and remove invasives	Buffalo Creek 2013
17-148	17-148	-88.07366554	42.1553521	Deer Park Office Center Pond 2	Wet	Yes	Deer Park	Commercial	None	Buffalo Creek 2013
17-149	17-149	-87.97766447	42.1550131	Deer Park Office Center Pond 1	Wet	Yes	Deer Park	Commercial	1. Remove invasive plants 2. Install larger outlet 3. Plant slopes and banks with native plants	Buffalo Creek 2013
17-150	17-150	-88.04954454	42.15445819	Deer Valley Highlands Pond 2	Wet	No	Deer Park	Residential	Plant more native wetland plants along banks	Buffalo Creek 2013
17-151	17-151	-88.04518507	42.15448435	Hartz Farm Pond	Wet	No	Deer Park	Residential	1. Plant native plants on banks 2. Install a second aerator by the outlet	Buffalo Creek 2013
17-152	17-152	-87.9607008	42.1543936	Buffalo Grove Business Park Pond 1	Wet	No	Buffalo Grove	Commercial	1. Plant banks with native plants 2. Reconnect sections of inlet 1	Buffalo Creek 2013
17-155	17-155	-88.09562844	42.15446437	Motorola - Deer Park Pond 5	Wet	Yes	Deer Park	Commercial	1. Remove invasive species 2. Plant native plants 3. Clear outlet A 4. Reattach outlet A grate	Buffalo Creek 2013
17-156	17-156	-88.07052805	42.15413005	Motorola - Deer Park Pond 6	Wet	Yes	Deer Park	Public	1. Clear outlet A 2. Remove invasive plants and plant native plants	Buffalo Creek 2013
17-157	17-157	-87.95761553	42.14195355	Buffalo Grove Town Center Pond 2	Wet	No	Buffalo Grove	Commercial	1. Plant native plants on slopes 2. Install riprap in front of inlet 1 3. Clear litter out of basin	Buffalo Creek 2013
17-159	17-159	-87.96095472	42.14186371	Park Hill Countryside Estates Pond 1	Wet	No	Deer Park	Residential	Disconnect downspout	Buffalo Creek 2013
17-161	17-161	-87.99214784	42.1414517	Deer Valley Highlands Pond 1	Wet	No	Deer Park	Residential and Public	Remove woody vegetation and plant native plants on slope and banks	Buffalo Creek 2013
17-165	17-165	-87.99066641	42.14124667	-	Wet	No	Wheeling	Residential and Public	Plant native plants on slope	Buffalo Creek 2013
17-166	17-166	-87.97129698	42.14062932	-	Wet	No	Buffalo Grove	Residential	Plant slopes with native plants	Buffalo Creek 2013
17-167	17-167	-87.97646207	42.13992333	-	Wet	No	Arlington Heights	Commercial/ Residential	1. Replace inlet 3 2. Plant native vegetation	Buffalo Creek 2013
17-168	17-168	-87.95458649	42.13736333	-	Dry	Yes	Arlington Heights	Residential/ Commercial	1. Plant native plants on slopes and bottom 2. Remove concrete channel	Buffalo Creek 2013
17-169	17-169	-87.95666363	42.13759431	-	Wet	No	Buffalo Grove	Residential	None	Buffalo Creek 2013
17-170	17-170	-87.97748387	42.13722905	-	Wet	No	Buffalo Grove	Residential	1. Reduce slope to 3:1 2. Plant native plants on rest of slope	Buffalo Creek 2013
17-171	17-171	-87.98570221	42.13692553	-	Wet	No	Buffalo Grove	Residential	1. Plant slopes with native plants 2. Increase size of outlets	Buffalo Creek 2013

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17-172	17-172	-87.98565416	42.13588524	-	Wet	No	Buffalo Grove	Residential and Public	1. Reduce slopes to 3:1 2. Plant native plants on slopes 3. Clear litter	Buffalo Creek 2013
17-173	17-173	-87.95855784	42.1302271	-	Dry	No	Buffalo Grove	Commercial	1. Remove woody and invasive plants and grass 2. Plant native plants on slopes and bottom	Buffalo Creek 2013
17-174	17-174	-87.90576586	42.12974753	-	Wet	No	Buffalo Grove	Commercial and Residential	1. Remove riprap and turf grass 2. Plant native plants on slopes and banks	Buffalo Creek 2013
17-175	17-175	-87.9569793	42.12968025	-	Wet	No	Buffalo Grove	Commercial and Residential	1. Remove riprap and turf grass 2. Plant native plants on slopes 3. Stop mowing	Buffalo Creek 2013
17-177	17-177	-87.91030409	42.12902735	-	Wet	No	Wheeling	Residential	1. Disconnect downspout 2. Remove riprap and plant native plants	Buffalo Creek 2013
17-178	17-178	-87.95383701	42.12914059	-	Wet	No	Wheeling	Residential	1. Disconnect downspout 2. Remove riprap 3. Plant native plants on banks	Buffalo Creek 2013
17-179	17-179	-87.9619948	42.12803709	-	Wet	No	Wheeling	Residential	1. Disconnect downspout 2. Replace inlets 1, 4, and 5 3. Clear inlet 7 of debris 4. Remove riprap and plant native vegetation 5. Install aerator on east segment.	Buffalo Creek 2013
17-180	17-180	-87.95274776	42.12699061	-	Wet	No	Wheeling	Residential	1. Remove riprap and invasive plants 2. Plant native vegetation on slopes	Buffalo Creek 2013
17-181	17-181	-87.95800303	42.12709968	-	Wet	No	Wheeling	Residential	1. Replace outlet 2. Plant banks and slopes with native plants	Buffalo Creek 2013
17-182	17-182	-87.92852836	42.12546843	-	Wet	No	Arlington Heights	Residential	Remove invasive species and plant native plants on slopes and banks	Buffalo Creek 2013
17-183	17-183	-87.90638032	42.12640887	-	Wet	No	Wheeling	Residential	1. Replace inlet 4 2. Plant native plants on slopes and banks 3. Stop mowing slopes	Buffalo Creek 2013
17-184	17-184	-87.91485916	42.12616822	-	Wet	No	Wheeling	Residential	Remove riprap siding and plant native plants	Buffalo Creek 2013
17-185	17-185	-87.95320132	42.1259101	-	Wet	No	Wheeling	Commercial	1. Remove woody vegetation 2. Plant native plants on slopes	Buffalo Creek 2013
17-186	17-186	-87.90696979	42.12607819	-	Wet	No	Wheeling	Residential	Plant native plants on slopes after removing invasive turf grass	Buffalo Creek 2013
17-187	17-187	-87.96282131	42.1261551	-	Wet	No	Wheeling	Commercial and industrial	1. Remove riprap and invasive plants and grass 2. Plant native plants on slopes.	Buffalo Creek 2013
17-188	17-188	-87.90553029	42.12556044	-	Wet	No	Wheeling	Residential	1. Plant native plants on slopes 2. Replace inlets 2 and 4 3. Fix aerator	Buffalo Creek 2013
17-189	17-189	-87.90410649	42.12552825	-	Wet	No	Wheeling	Residential	1. Remove debris from outlet 2. Replace inlet 1 3. Replant slopes with native plants	Buffalo Creek 2013
17-190	17-190	-87.9539496	42.12538911	-	Wet	No	Arlington Heights	Residential and Public	Remove riprap sides and plant native plants on slopes and bank	Buffalo Creek 2013
17-191	17-191	-87.91064199	42.12466688	-	Wet	No	Wheeling	Residential	1. Plant native plants on slopes 2. Disconnect sump pump and downspout	Buffalo Creek 2013

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17-192	17-192	-87.92918371	42.12353386	-	Wet	No	Wheeling	Residential	1. Disconnect sump pump 2. Plant native plants on slopes 3. Repair aerator	Buffalo Creek 2013
17-193	17-193	-87.92789486	42.11822713	-	Wet	No	Wheeling	Residential	1. Remove walls and slope to 3:1 2. Plant native plants on slopes and banks	Buffalo Creek 2013
17-194	17-194	-87.97712091	42.1533369	-	Wet	No	Wheeling	Industrial	1. Fix aerator 2. Plant native plants on slope 3. Replace inlet 5	Buffalo Creek 2013
17-196	17-196	-87.97340403	42.15279473	-	Wet	No	Wheeling	Residential and Public	1. Remove woody vegetation 2. Reduce initial slope to 3:1 3. Plant native plants on slopes and banks	Buffalo Creek 2013
17-197	17-197	-87.97350257	42.15223091	-	Wet	No	Wheeling	Residential	1. Reduce slope to 3:1 2. Plant native plants on slopes 3. Remove litter 4. Clear outlet 5. Clear inlet 4 and reconnect segments	Buffalo Creek 2013
17-198	17-198	-87.94774875	42.15211637	-	Wet	No	Buffalo Grove	Commercial	Plant slopes with native vegetation	Buffalo Creek 2013
17-199	17-199	-87.94652792	42.15165986	-	Wet	No	Buffalo Grove	Commercial	1. Plant native plants along banks 2. Install aerator on the east segment	Buffalo Creek 2013
17-200	17-200	-87.93429029	42.14955918	-	Wet	No	Buffalo Grove	Commercial	1. Install an aerator 2. Plant native along banks	Buffalo Creek 2013
17-201	17-201	-87.93967317	42.14913569	-	Wet	No	Wheeling	Residential	1. Disconnect downspouts 2. Plant slope with native plants 3. Replace inlet	Buffalo Creek 2013
17-202	17-202	-87.93533211	42.14559563	-	Wet	No	Wheeling	Residential	Remove riprap and invasive plants and plant native plants on banks	Buffalo Creek 2013
17-203	17-203	-87.94959078	42.14553321	-	Wet	Yes	Wheeling	Residential	1. Remove woody and invasive species 2. Plant native plants on slopes and bottom 3. Install aerator on the open water	Buffalo Creek 2013
17-204	17-204	-87.93446305	42.14479444	-	Wet	No	Wheeling	Residential	1. Run aerator at night 2. Replace inlet 3 3. Plant native plants on slopes	Buffalo Creek 2013
17-205	17-205	-87.93367297	42.14403819	-	Wet	No	Wheeling	Residential	1. Remove retaining walls and slope banks at 3:1 2. Plant native plants on slopes 3. Clear inlet 2	Buffalo Creek 2013
17-206	17-206	-87.93558504	42.1440683	-	Wet	No	Wheeling	Residential	1. Reduce slope to 3:1 2. Install aerators 3. Plant native plants on slopes 4. Replace inlets 1 and 2	Buffalo Creek 2013
17-207	17-207	-87.95504433	42.14291951	-	Wet	No	Wheeling	Residential	1. Remove retaining wall and slope to 3:1 2. Plant native plants on slopes	Buffalo Creek 2013
17-208	17-208	-87.98584619	42.14339749	-	Wet	No	Wheeling	Residential	1. Fix the aerator 2. Replace inlet 3	Buffalo Creek 2013
17-209	17-209	-87.93281236	42.14303893	-	Wet	No	Wheeling	Residential	1. Remove riprap 2. Reduce slope to 3:1 3. Plant native plants on slopes	Buffalo Creek 2013

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17-211	17-211	-87.98561304	42.14242791	-	Wet	No	Wheeling	Residential	None	Buffalo Creek 2013
17-212	17-212	-87.91193598	42.11842538	-	Wet	No	Arlington Heights	Residential	1. Remove turf grass and riprap 2. Plant native vegetation 3. Increase size of outlets.	Buffalo Creek 2013
17-213	17-213	-87.91962067	42.11753873	-	Wet	No	Wheeling	Residential	1. Reduce slope to 3:1 2. Clear litter 3. Remove woody vegetation 4. Plant native plants on slopes	Buffalo Creek 2013
17-214	17-214	-87.92288162	42.11711111	-	Wet	No	Arlington Heights	Residential	1. Disconnect downspouts 2. Remove riprap and turf grass 3. Plant native vegetation on slopes and banks 4. Increase size of outlet	Buffalo Creek 2013
17-216	17-216	-87.90828599	42.11545461	-	Wet	No	Wheeling	Commercial	1. Install aerator 2. Plant native plants on slopes and banks	Buffalo Creek 2013
17-217	17-217	-87.92982697	42.11448976	-	Dry	No	Wheeling	Industrial	1. Install riprap in front of inlet 3 2. Plant native vegetation on slopes and bottom 3. Stop mowing	Buffalo Creek 2013
17-218	17-218	-87.92129503	42.11367925	-	Dry	No	Wheeling	Industrial	1. Remove sediment buildup from inlets/ outlet 2. Plant native plants on slopes and bottom 3. Remove concrete channel 4. Stop mowing	Buffalo Creek 2013
17-220	17-220	-87.9199769	42.1132387	-	Wet	No	Wheeling	Commercial	Plant slopes with native vegetation.	Buffalo Creek 2013
17-221	17-221	-87.91019585	42.11159232	-	Wet	No	Wheeling	Residential	1. Disconnect sump pump 2. Remove turf grass 3. Plant native plants on slopes and banks	Buffalo Creek 2013
17-222	17-222	-87.90808531	42.11002121	-	Wet	No	Wheeling	Industrial	1. Remove woody and invasive species 2. Plant native plants on slopes and bottom	Buffalo Creek 2013
17-223	17-223	-88.09885155	42.15276468	-	Dry	No	Wheeling	Industrial	Remove woody vegetation and plant native plants in place	Buffalo Creek 2013
17-226	17-226	-88.00844975	42.15281281	-	Wet	No	Wheeling	Commercial	1. Clear inlets 1 and 5 of clogging 2. Plant native plants on slopes and banks.	Buffalo Creek 2013
17-227	17-227	-88.00778915	42.15261536	-	Wet	No	Wheeling	Commercial	1. Reconnect segments of outlet 2. Remove turf grass 3. Plant native vegetation on slopes and banks	Buffalo Creek 2013
17-230	17-230	-88.02483828	42.15217294	-	Wet	No	Palatine Township	Residential	Clear inlets 1 and 3 of debris	Buffalo Creek 2013
17-231	17-231	-88.00597344	42.15214208	-	Wet	No	Arlington Heights	Residential	1. Disconnect downspouts 2. Plant native plants on slope	Buffalo Creek 2013
17-232	17-232	-88.00880219	42.15238423	-	Wet	No	Arlington Heights	Residential	1. Install more riprap at inlet 3 2. Plant native vegetation on banks 3. Disconnect downspout	Buffalo Creek 2013
17-233	17-233	-88.00791811	42.15172109	-	Wet	No	Palatine	Residential	1. Disconnect downspout 2. Replace inlet 1 3. Remove buildup from inlets 2, 3, and 4 4. Reduce slope to 3:1 or less 5. Plant native plants on slopes	Buffalo Creek 2013

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17-234	17-234	-88.02892725	42.15148328	-	Wet	No	Arlington Heights	Residential	1. Replace riprap with native plants 2. Disconnect downspout	Buffalo Creek 2013
17-235	17-235	-88.00725654	42.15136675	-	Wet	No	Arlington Heights	Residential	1. Disconnect downspout 2. Plant native plants on slopes 3. Clear inlet 8 of buildup	Buffalo Creek 2013
17-236	17-236	-88.01063919	42.15131461	-	Wet	No	Arlington Heights	Residential	1. Plant native plants on slopes 2. Disconnect downspout	Buffalo Creek 2013
17-237	17-237	-88.08706089	42.15057456	-	Wet	No	Palatine	Residential	1. Disconnect downspout 2. Replace inlet 2 3. Plant slopes with native plants	Buffalo Creek 2013
17-239	17-239	-88.0099819	42.15016723	-	Wet	No	Arlington Heights	Residential	1.Plant slopes with native vegetation 2. Repair inlets 6, 7, and 8	Buffalo Creek 2013
17-240	17-240	-88.01234855	42.14979724	-	Wet	No	Palatine Township	Residential	1. Disconnect downspout 2. Remove turf grass 3. Plant native plants on slopes and banks 4. Remove excess litter and debris	Buffalo Creek 2013
17-242	17-242	-88.0114051	42.14945937	-	Wet	No	Palatine Township	Residential	1. Remove turf grass 2. Plant native plants on slopes 3. Install aerator	Buffalo Creek 2013
17-243	17-243	-88.01002179	42.14940645	-	Wet	No	Palatine Township	Residential	1. Disconnect downspout 2. Clear blockage from inlet 1 3. Dredge basin 4. Remove invasive plants and plant natives	Buffalo Creek 2013
17-244	17-244	-88.08409679	42.14933326	-	Wet	No	Palatine Township	Residential	1. Clear outlet of buildup 2. Remove invasive species 3. Plant native plants on slopes and bottom	Buffalo Creek 2013
17-245	17-245	-88.06005847	42.1484942	-	Wet	No	Palatine Township	Residential	1. Disconnect downspouts 2. Remove buildup from inlets 1 and 4 3. Plant native plants on slopes and banks	Buffalo Creek 2013
17-246	17-246	-88.06136165	42.1482299	-	Wet	No	Palatine Township	Residential	1. Disconnect downspouts 2. Remove invasive plants and turf grass 3. Plant native plants on slopes and bottom 4. clear inlet 3 of clogging	Buffalo Creek 2013
17-247	17-247	-88.02760544	42.14860893	-	Wet	No	Palatine Township	Residential	1. Plant native plants on the slopes 2. Install an aerator	Buffalo Creek 2013
17-248	17-248	-88.00995521	42.14848936	-	Wet	No	Palatine	Residential	None	Buffalo Creek 2013
17-249	17-249	-88.05779329	42.14829227	-	Wet	No	Palatine	Residential	1. Remove buildup from inlet 1 2. Dredge basin to remove excess sediment	Buffalo Creek 2013
17-250	17-250	-88.09675139	42.14786996	-	Wet	Yes	Palatine	Residential	1. Repair aerator 2. Remove turf grass 3. Clear inlet 1 4. Dredge basin 5. Plant native plants on slopes and banks	Buffalo Creek 2013
17-251	17-251	-88.09359798	42.14805825	-	Wet	No	Palatine Township	Residential	Remove riprap and turf grass and plant native plants on slopes	Buffalo Creek 2013
17-252	17-252	-88.01613795	42.14701619	-	Wet	No	Palatine	Residential	Remove invasive plants and plants natives	Buffalo Creek 2013

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
17-254	17-254	-88.00956935	42.14733582	-	Wet	No	Palatine Township	Residential	1. Install aerator 2. Plant slopes with native plants	Buffalo Creek 2013
17-255	17-255	-88.06245889	42.14709882	-	Wet	No	Palatine Township	Residential	Plants slopes with native vegetation	Buffalo Creek 2013
17-256	17-256	-88.01334823	42.14699367	-	Wet	No	Palatine	Residential	1. Disconnect downspouts 2. Reconnect inlet 2 segments 3. Reduce slope to 3:1 4. Plant native plants on slopes.	Buffalo Creek 2013
17-257	17-257	-88.00480789	42.14611162	-	Wet	No	Palatine Township	Residential	1. Disconnect downspout 2. Remove riprap and plant native plants	Buffalo Creek 2013
17-258	17-258	-88.00673203	42.14555817	-	Wet	No	Palatine	Residential	1. Fix aerator 2. Increase size of outlet	Buffalo Creek 2013
17-259	17-259	-88.00612158	42.14560908	-	Wet	No	Palatine	Residential	1. Plant native plants along banks 2. Disconnect sump pump and downspout 3. Replace inlet 2	Buffalo Creek 2013
17-264	17-264	-88.00490859	42.1453633	-	Wet	No	Arlington Heights	Commercial	1. Reconnect segments of inlet 1 2. Plant slopes with native plants	Buffalo Creek 2013
17-265	17-265	-88.03522765	42.14392625	-	Wet	No	Arlington Heights	Commercial	Plant native plants on slopes	Buffalo Creek 2013
17-266	17-266	-88.00801574	42.13975354	-	Wet	No	Arlington Heights	Commercial	1. Dredge excess sediment 2. Plant native vegetation on slopes	Buffalo Creek 2013
17-267	17-267	-88.04028899	42.1382553	-	Wet	No	Arlington Heights	Commercial	1. Install aerator by outlet 2. Replace inlet 1 3. Plant native plants on slopes	Buffalo Creek 2013
17-269	17-269	-88.04647757	42.13742815	-	Wet	No	Palatine	Public	1. Increase outlet size 2. Replace riprap and woody plants with natives	Buffalo Creek 2013
17-271	17-271	-88.02130033	42.13704923	-	Wet	No	Palatine	Commercial	1. Reduce initial slope from 2:1 to 3:1 or 4:1 2. Remove turf grass 3. Plant native plants on slopes 4. Reconnect inlet segments 5. Remove buildup from outlet 6. Increase outlet size	Buffalo Creek 2013
17-272	17-272	-88.03775006	42.1370826	-	Wet	No	Palatine	Residential	1. Increase size of outlet 2. Plant native plants on rest of slopes	Buffalo Creek 2013
17-273	17-273	-88.04929695	42.13358749	-	Wet	No	Palatine	Residential	Remove turf grass from slopes and plant native plants	Buffalo Creek 2013
17-274	17-274	-87.99312311	42.14995864	-	Wet	Yes	Palatine	Commercial and Residential	1. Clear litter 2. Remove turf grass 3. Plant native plants on slopes and banks	Buffalo Creek 2013
17-275	17-275	-87.99903552	42.14664102	-	Wet	No	Palatine	Residential and Public	Install aerators to remove algae and duckweed	Buffalo Creek 2013
17-276	17-276	-88.00184831	42.14308411	-	Wet	No	Palatine	Residential	1. Disconnect sump pump 2. Install an aerator on south end 3. Clear inlets 1 and 6 of clogging 4. Remove turf grass 5. Plant slopes with native plants	Buffalo Creek 2013
17-277	17-277	-88.01086644	42.14410041	-	Wet	No	Arlington Heights	Residential	1. Increase outlet size 2. Remove turf grass	Buffalo Creek 2013

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									3. Plant native plants on slopes and banks	
17-278	17-278	-88.0623845	42.14808597	-	Wet	Yes	Arlington Heights	Public	1. Remove riprap, turf grass, and retaining walls 2. Plant native plants on slopes	Buffalo Creek 2013
17-279	17-279	-88.05549268	42.15444137	-	Wet	No	Arlington Heights	Commercial	1. Remove invasive and woody plants, and grass 2. Plant native plants on slopes and banks	Buffalo Creek 2013
17-280	17-280	-88.05304382	42.15499829	-	Wet	No	Palatine	Residential	1. Dredge basin 2. Replace sections of retaining walls 3. Replace inlets 6, 9, 15, 16, 17 4. Clear inlets 4 and 17 of blockages 5. Install trash grate on inlet 13	Buffalo Creek 2013
17-281	17-281	-88.05070113	42.15550191	-	Wet	Yes	Palatine	Residential	1. Dredge basin to remove excess sediment 2. Plant native plants on slopes and banks 3. Install an inlet on southern portion of basin 4. Disconnect sump pump and downspout	Buffalo Creek 2013
17-284	17-284	-87.94853771	42.15419483	-	Wet	Yes	Deer Park	Commercial	1. Disconnect downspout 2. Clear outlet of debris and reattach grate	Buffalo Creek 2013
17-291	17-291	-88.04110986	42.15516102	-	Wet	Yes	Deer Park	Public	Install inlet on south side	Buffalo Creek 2013
17-292	17-292	-87.94311347	42.13479384	-	Wet	Yes	Deer Park	Commercial	1. Clear inlet 2 of debris 2. Remove invasive plants and plant native plants	Buffalo Creek 2013
17-294	17-294	-88.00550802	42.14404208	-	Wet	No	Buffalo Grove	Residential	1. Plant native plants on slopes 2. Replace inlet 1	Buffalo Creek 2013
17-296	17-296	-88.00242421	42.14545068	-	Wet	No	Deer Park	Commercial	1. Remove woody plants and install native plants 2. Install an aerator	Buffalo Creek 2013
17-297	17-297	-88.08498634	42.19535801	-	Wet	Yes	Wheeling	Residential and Public	1. Remove invasive plants 2. Install native plants	Buffalo Creek 2013
17-298	17-298	-88.08379645	42.19100977	-	Wet	No	Arlington Heights	Commercial	1. Remove riprap 2. Plant native plants on slopes 3. Replace inlet 3 4. Reconnect inlets 4 and 5	Buffalo Creek 2013
17-299	17-299	-88.08426236	42.18039902	-	Wet	No	Arlington Heights	Commercial	1. Remove riprap and invasive plants 2. Plant native vegetation 3. Clear inlet 7 of clogging 4. Replace inlet 6	Buffalo Creek 2013
17-300	17-300	-88.08186783	42.17979941	Catholic Bishop of Chicago Basin 7	Wet	Yes	Lake Zurich	Public	None	Buffalo Creek 2013
17-301	17-301	-88.07523958	42.18602351	Zurich Town Hall Basin 1	Wet	Yes	Lake Zurich	Commercial	Install aerator	Buffalo Creek 2013
17-302	17-302	-88.04667817	42.18562127	Village of Lake Zurich Basin 3	Wet	Yes	Lake Zurich	Commercial/ Residential	Clear inlet 2 of debris	Buffalo Creek 2013
17-303	17-303	-88.04461607	42.18317691	Village of Lake Zurich Basin 4	Wet	Yes	Lake Zurich	Residential	1. Install aerator 2. Clear inlet 1 of debris	Buffalo Creek 2013
17-304	17-304	-88.00345823	42.17450924	-	Dry	No	Lake Zurich	Residential and Public	1. Remove invasive plants 2. Plant native plants	Buffalo Creek 2013
17-307	17-307	-87.98518009	42.17512101	-	Wet	Yes	Kildeer	Residential	1. Clear inlet 1 of debris and sediment 2. Remove invasive plants and plant with natives	Buffalo Creek 2013
17-308	17-308	-87.96694623	42.16783456	-	Wet	Yes	Kildeer	Residential	1. Clear outlet A of debris 2. Remove invasive plants and plant native plants	Buffalo Creek 2013

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17-310	17-310	-87.96765514	42.1688575	-	Wet	Yes	Long Grove	Residential	Install aerator	Buffalo Creek 2013
17-311	17-311	-88.05628035	42.16340739	-	Wet	Yes	Buffalo Grove	Commercial	1. Disconnect downspout 2. Plant turf grass slopes with native plants 3. Install an aerator	Buffalo Creek 2013
17-312	17-312	-88.05938169	42.16297355	-	Wet	Yes	Buffalo Grove	Public	1. Clear inlet 1 of debris 2. Plant native plants and remove invasives	Buffalo Creek 2013
17-313	17-313	-88.0615742	42.16026678	-	Wet	Yes	Buffalo Grove	Public	1. Clear inlet 1 of debris 2. Remove sediment buildup from outlet A 3. Plant native plants on slopes and bottom	Buffalo Creek 2013
17-314	17-314	-88.02603417	42.15646838	-	Wet	Yes	Deer Park	Commercial	Remove invasive plants and plant native vegetation	Buffalo Creek 2013
17-315	17-315	-87.9122207	42.11247942	-	Wet	Yes	Deer Park	Commercial	1. Remove invasive species and plant natives 2. Clear outlet A of buildup	Buffalo Creek 2013
17-316	17-316	-87.92285019	42.11787794	-	Wet	Yes	Deer Park	Residential	Remove invasive plants and plant native vegetation	Buffalo Creek 2013
17-320	17-320	-87.91978354	42.1187211	-	Wet	Yes	Long Grove	Commercial	Plant slopes with native vegetation	Buffalo Creek 2013
17-333	17-333	-87.92468242	42.12161234	-	Wet	No	Wheeling	Commercial	1. Clear inlet 3 of debris 2. Remove turf grass and invasive plants 3. Plant native vegetation on slopes and banks	Buffalo Creek 2013
17-337	17-337	-88.07814932	42.16572922	-	Dry	No	Wheeling	Industrial	1. Remove concrete channel and outlet blockage 2. Plant native vegetation on slopes and bottom	Buffalo Creek 2013
17-338	17-338	-88.08835311	42.15902282	-	Dry	No	Wheeling	Industrial	1. Remove turf grass 2. Plant native vegetation on slopes and bottom	Buffalo Creek 2013
17-341	17-341	-88.06796993	42.16465045	-	Dry	No	Wheeling	Industrial	None	Buffalo Creek 2013
17-343	17-343	-88.0673614	42.16517841	Village of Deer Park Basin 2	Wet	No	Deer Park	Residential	1. Disconnect downspout 2. Install aerator	Buffalo Creek 2013
17-344	17-344	-88.03895747	42.18209161	Village of Deer Park Basin 7	Wet	No	Deer Park	Residential	1. Disconnect downspouts and sump pump 2. Plant slopes with native plants	Buffalo Creek 2013
17-345	17-345	-87.99148476	42.17475255	Barry Basin 1	Wet	Yes	Deer Park	Residential	1. Replace inlet 1 and refill soil around it 2. Plant native wetland plants instead of invasive	Buffalo Creek 2013
17-346	17-346	-88.01510246	42.16136434	Diamond Basin 1	Wet	No	Kildeer	Residential	1. Remove woody vegetation from east side 2. Clear outlet A of debris 3. Plant basin with native plants	Buffalo Creek 2013
17-347	17-347	-88.00506008	42.16327556	-	Dry	Yes	Kildeer	Residential	1. Clear inlet 2 of debris 2. Stop mowing outlet plants 3. Remove invasives and plant native vegetation	Buffalo Creek 2013
17-348	17-348	-88.08169334	42.1831683	-	Wet	Yes	Buffalo Grove	Residential and Public	1. Put FES on inlet 1 2. Plant slopes with native vegetation	Buffalo Creek 2013
17-349	17-349	-88.08025747	42.18266507	-	Wet	No	Long Grove	Public and Residential	1. Disconnect downspouts 2. Plant banks with native plants	Buffalo Creek 2013
17-350	17-350	-88.08081053	42.17597337	-	Wet	No	Long Grove	Residential	Replace invasive and woody vegetation with native plants	Buffalo Creek 2013
17-352	17-352	-88.05855949	42.16242068	-	Wet	Yes	Deer Park	Residential	1. Clear inlet 1 of debris 2. Remove invasive plants	Buffalo Creek 2013

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17-353	17-353	-88.06254364	42.14848954	-	Wet	Yes	Palatine	Residential	Remove invasive vegetation and plant native plants on slopes and bottom	Buffalo Creek 2013
17-354	17-354	-87.95724396	42.13741569	-	Wet	No	Buffalo Grove	Residential	1. Plant native plants on slopes 2. Increase outlet size	Buffalo Creek 2013
17-355	17-355	-87.95374161	42.13631683	-	Wet	No	Buffalo Grove	Residential and Public	1. Replace inlet 2 2. Reduce slope to 3:1 3. Plant native plants on slopes	Buffalo Creek 2013
17-356	17-356	-87.920718	42.1140728	-	Dry	No	Wheeling	Industrial	Plant native plants on slopes and bottom	Buffalo Creek 2013
17-357	17-357	-87.9184135	42.12034452	-	Dry	No	Wheeling	Industrial	1. Stop mowing 2. Plant native plants and remove turf grass	Buffalo Creek 2013
17-358	17-358	-87.91888951	42.12094208	-	Dry	No	Wheeling	Industrial	1. Remove turf grass 2. Plant native plants 3. Install riprap in front of inlet 1	Buffalo Creek 2013
17-359	17-359	-88.03527185	42.14482929	-	Wet	No	Arlington Heights	Commercial	Plant native plants on slopes	Buffalo Creek 2013
17-361	17-361	-88.04633721	42.13826851	-	Dry	No	Palatine	Residential	1. Remove low flow bypass and stilling basin 2. Plant native vegetation on slopes and bottom	Buffalo Creek 2013
17-362	17-362	-88.00643072	42.14491968	-	Wet	No	Palatine	Residential	Remove turf grass and plant native plants on slopes and banks	Buffalo Creek 2013
17-363	17-363	-87.97605105	42.14205354	-	Dry	No	Buffalo Grove	Residential	1. Remove low flow bypass by installing an inlet on south side 2. Remove turf grass 3. Plant native plants on slopes and bottom	Buffalo Creek 2013
18-1000	1000	-87.94192303	42.16688068	Covington Corporate Center Pond 7	Wet	No	Buffalo Grove	Industrial	1. Add native plants along parts of shore 2. Add aerator to decrease excess algae 3. Remove some excess woody vegetation	DPRW 2016
18-1003	1003	-87.94132084	42.16605158	Horatio Gardens Pond	Wetland	No	Buffalo Grove	Industrial	Remove excess litter/debris	DPRW 2016
18-1007	1007	-87.92148065	42.16484357	Pekara Pond	Wet	No	Vernon Township	Commercial	Remove excess litter/debris	DPRW 2016
18-1008	1008	-87.93586968	42.16345683	Lake County Public Works Pond	Wet	Yes	Vernon Township	Residential	None	DPRW 2016
18-1010	1010	-87.93974499	42.16259914	Candelwood Detention Pond 1	Dry	No	Buffalo Grove	Residential	1. Remove excess litter 2. Unclog outlet	DPRW 2016
18-1012	1012	-87.92213593	42.16124868	Park East Townhome Pond	Wet	No	Vernon Township	Residential	Add native plants to decrease erosion	DPRW 2016
18-1013	1013	-87.9169822	42.16129114	-	Wet	Yes	Riverwoods	Commercial	None	DPRW 2016
18-1014	1014	-87.93909568	42.16085986	Candelwood Detention Pond 2	Dry	Yes	Buffalo Grove	Residential	Consider outlet clogging	DPRW 2016
18-1015	1015	-87.94446808	42.16014829	Northwood Park Detention Pond	Dry	No	Buffalo Grove	Residential	Remove excess debris and litter	DPRW 2016
18-1016	1016	-87.92223617	42.16021739	Inverray Condominium Pond	Wet	No	Vernon Township	Residential	1. Remove excess woody vegetation 2. Install aerator to decrease excess algae	DPRW 2016
18-1017	1017	-87.92233137	42.15926276	Lincoln Club Pond 5	Wet	No	Buffalo Grove	Residential	Add native plants to reduce erosion	DPRW 2016
18-1018	1018	-87.9187179	42.15923656	Lincoln Club Pond 8	Wet	Yes	Buffalo Grove	Residential	1. Add inlet for better water flow 2. Decrease riprap and add native plants	DPRW 2016

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18-1019	1019	-87.93207181	42.15927917	Lincoln Club Pond 2	Wet	No	Buffalo Grove	Residential	Remove excess algae	DPRW 2016
18-1020	1020	-87.92496041	42.15911372	Lincoln Club Pond 4	Wet	No	Buffalo Grove	Residential	1. Examine water for impurities 2. Repair outlet	DPRW 2016
18-1021	1021	-87.93831343	42.1589182	Missner Hastings Pond	Wet	Yes	Buffalo Grove	Commercial	1. Remove excess litter 2. Add native plants to decrease erosion	DPRW 2016
18-1022	1022	-87.9205761	42.15904189	Lincoln Club Pond 6	Wet	No	Buffalo Grove	Residential	Replace some riprap with native plants	DPRW 2016
18-1023	1023	-87.92706687	42.15893924	Lincoln Club Pond 3	Wet	No	Buffalo Grove	Residential	Repair aerator to decrease excess algae	DPRW 2016
18-1024	1024	-87.91982286	42.15898724	Lincoln Club Pond 7	Wet	No	Buffalo Grove	Residential	Repair aerator to decrease excess algae	DPRW 2016
18-1025	1025	-87.9339574	42.15884138	Lincoln Club Pond 1	Wet	No	Buffalo Grove	Residential	1. Test water for illicit or dangerous substances 2. Control excess algae along shoreline	DPRW 2016
18-1026	1026	-87.94972524	42.15835633	Ridgewood - Buffalo Grove Pond	Wet	No	Buffalo Grove	Residential	1. Remove litter 2. Increase native plants to decrease erosion	DPRW 2016
18-1027	1027	-87.9223374	42.15821513	Chevy Chase Country Club Pond 1	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1028	1028	-87.92138712	42.15817517	Chevy Chase Country Club Pond 2	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1029	1029	-87.95800661	42.15853401	Winchester Estates - Buffalo Grove Pond 2	Wet	No	Buffalo Grove	Residential	None	DPRW 2016
18-1031	1031	-87.91968348	42.15743707	Chevy Chase Country Club Pond 4	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1032	1032	-87.93842044	42.15722211	Chevy Chase Business Park Pond 2	Wet	No	Buffalo Grove	Industrial	1. Increase native plants to decrease erosion 2. Remove excess litter and debris	DPRW 2016
18-1033	1033	-87.93161414	42.15715293	Chevy Chase Country Club Pond 12	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1034	1034	-87.91999851	42.1572474	Chevy Chase Country Club Pond 5	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1035	1035	-87.92228659	42.15721842	Chevy Chase Country Club Pond 6	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1036	1036	-87.93284947	42.15548056	Chevy Chase Business Park Pond 1	Wet	No	Buffalo Grove	Commercial	1. Add native plants along shoreline 2. Remove excess algae with possible aerators	DPRW 2016
18-1037	1037	-87.922548	42.1565278	Chevy Chase Country Club Pond 7	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1038	1038	-87.92984285	42.15705015	Chevy Chase Country Club Pond 9	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1039	1039	-87.92233006	42.15546135	Chevy Chase Country Club Pond 8	Wet	Yes	Vernon Township	Commercial	None	DPRW 2016
18-1040	1040	-87.92466938	42.15440303	Chevy Chase Country Club Lake	Wet	No	Buffalo Grove	Commercial	1. Evaluate and repair damaged inlets 2. Install aerator to decrease algae 3. Clear excess woody vegetation	DPRW 2016
18-1041	1041	-87.94548173	42.15463065	Northwood Grove Pond 1	Wet	No	Buffalo Grove	Residential	Add native plants to help remove excessive shoreline erosion	DPRW 2016
18-1042	1042	-87.93917582	42.15399214	Chevy Chase Business Park Pond 3	Wet	No	Buffalo Grove	Industrial	Remove excess debris and litter	DPRW 2016
18-1043	1043	-87.94396549	42.15450532	Northwood Grove Pond 3	Wet	No	Buffalo Grove	Residential	1. Add native plants to reduce erosion 2. Address riprap scouring at inlets and outlets	DPRW 2016
18-1044	1044	-87.94489792	42.15417879	Northwood Grove Pond 2	Wet	No	Buffalo Grove	Residential	Add native plants to decrease excessive erosion	DPRW 2016

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18-1046	1046	-87.92231096	42.153484	Chevy Chase Business Park Pond 5	Wet	No	Buffalo Grove	Commercial	Add aerator to decrease excess algae	DPRW 2016
18-1084	1084	-87.99067279	42.17931667	-	Wet	No	Long Grove	Commercial	None	DPRW 2016
18-1085	1085	-87.98664215	42.18217559	-	Wet	Yes	Long Grove	Commercial	1. Repair outlet 2. Assess scouring at inlets	DPRW 2016
18-1086	1086	-87.98773051	42.18793327	-	Wetland	Yes	Long Grove	Residential	Remove excess litter	DPRW 2016
18-1087	1087	-87.98706911	42.19014241	-	Wetland	No	Long Grove	Residential	None	DPRW 2016
18-1088	1088	-87.97964335	42.18061811	-	Wetland	Yes	Long Grove	Residential	Consider removing woody vegetation	DPRW 2016
18-1089	1089	-87.97799632	42.1787596	-	Wet	No	Buffalo Grove	Residential	None	DPRW 2016
18-1090	1090	-87.97846835	42.18039672	-	Wet	Yes	Long Grove	Residential	Remove some excess woody vegetation	DPRW 2016
18-1091	1091	-87.97588554	42.19489534	-	Wetland	No	Long Grove	Residential	Remove some excess woody vegetation	DPRW 2016
18-1092	1092	-87.97304425	42.19008389	Buffalo Grove Bike Path Basin 1	Dry	No	Buffalo Grove	Residential	None	DPRW 2016
18-1093	1093	-87.95241011	42.16187669	-	Dry	No	Buffalo Grove	Residential	None	DPRW 2016
18-1097	1097	-87.92719901	42.15197078	Not a basin. Agricultural field.	Wet	Yes	Wheeling	Commercial	None	DPRW 2016
18-1098	1098	-87.91760741	42.14951426	-	Wet	Yes	Wheeling	Residential	Increase native plants around shore	DPRW 2016
18-1099	1099	-87.92018572	42.14904118	-	Wet	Yes	Wheeling	Residential	Increase native plants to decrease erosion	DPRW 2016
18-1100	1100	-87.9201708	42.15009384	-	Wet	Yes	Wheeling	Residential	Repair inlets and outlet	DPRW 2016
18-1101	1101	-87.93024142	42.16954274	-	Wet	Yes	Buffalo Grove	Industrial	1. Assess short circuiting 2. Increase native plants to decrease erosion	DPRW 2016
18-1102	1102	-87.92715944	42.16937451	-	Wet	Yes	Buffalo Grove	Commercial	None	DPRW 2016
18-1103	1103	-87.92433759	42.16321819	-	Wet	No	Vernon Township	Residential	None	DPRW 2016
18-1104	1104	-87.94975839	42.17648468	-	Dry	No	Buffalo Grove	Residential	Consider inlet and outlet erosion/scouring	DPRW 2016
18-1105	1105	-87.94772991	42.18212067	-	Wet	No	Buffalo Grove	Commercial	Remove excess litter/debris	DPRW 2016
18-1106	1106	-87.95093818	42.1822623	-	Wet	Yes	Buffalo Grove	Residential	1. Repair aerator to decrease excess algae 2. Remove excess litter/debris	DPRW 2016
18-1107	1107	-87.92787466	42.15450803	-	Wet	Yes	Buffalo Grove	Commercial	None	DPRW 2016
18-1222	1222	-87.94408187	42.15415557	-	Wet	Yes	Buffalo Grove	Residential	Add native plants to decrease excess erosion	DPRW 2016
18-1236	1236	-87.92971812	42.15258797	-	Wet	No	Wheeling	Industrial	Add native plants to decrease shoreline erosion	DPRW 2016
18-871	871	-87.97188577	42.19810104	Arboretum Golf Club Pond 6	Wet	No	Buffalo Grove	Public	None	DPRW 2016
18-875	875	-87.96658061	42.19708608	Woodland Commons Shopping Center Pond 3	Wet	No	Buffalo Grove	Commercial	Stabilized the banks with native planting or riprap	DPRW 2016
18-876	876	-87.96713223	42.19718323	Woodland Commons Shopping Center Pond 2	Wet	No	Buffalo Grove	Commercial	Increase buffer	DPRW 2016
18-877	877	-87.96422478	42.19704397	Woodland Commons Shopping Center Pond 4	Wet	No	Buffalo Grove	Residential	Increase native buffer	DPRW 2016

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
18-878	878	-87.95946667	42.19655094	Half Day and Easton Basin	Wet	Yes	Vernon Township	Industrial	None needed	DPRW 2016
18-879	879	-87.9605736	42.19658231	Buffalo Grove Fire Department Station 27 Pond	Dry	Yes	Buffalo Grove	Industrial	Increase buffer	DPRW 2016
18-881	881	-87.96394938	42.19630353	Woodland Commons Shopping Center Pond 5	Wet	No	Buffalo Grove	Residential	Install native buffer	DPRW 2016
18-883	883	-87.95502477	42.19615027	Half Day and Main Metra Basin	Dry	Yes	Buffalo Grove	Industrial	None needed	DPRW 2016
18-884	884	-87.97384232	42.1958424	Oak Hills Pond 5	Wet	No	Long Grove	Public	None	DPRW 2016
18-886	886	-87.96491721	42.19570819	Woodlands at Fiore Pond 7	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-887	887	-87.96421406	42.19562022	Woodlands at Fiore Pond 8	Wet	No	Buffalo Grove	Residential	Install native buffer	DPRW 2016
18-891	891	-87.97105905	42.19450865	Woodland Park - Buffalo Grove Pond	Dry	Yes	Buffalo Grove	Residential	Removed concrete to reduce short circuiting	DPRW 2016
18-894	894	-87.97053218	42.19367065	Woodlands at Fiore Pond 10	Dry	No	Buffalo Grove	Residential	Install riprap to reduce channelization and create meander	DPRW 2016
18-897	897	-87.97364788	42.19333229	Oak Hills Pond 6	Wet	No	Long Grove	Residential	None needed	DPRW 2016
18-899	899	-87.95968697	42.19360706	-	Wet	No	Buffalo Grove	Public	None	DPRW 2016
18-900	900	-87.96863503	42.19326893	-	Wet	No	Buffalo Grove	Public	None	DPRW 2016
18-902	902	-87.96260464	42.19338371	-	Wet	No	Buffalo Grove	Public	None	DPRW 2016
18-905	905	-87.96370284	42.19174013	-	Wet	No	Buffalo Grove	Public	None	DPRW 2016
18-908	908	-87.95992068	42.19142222	Carlyle of Buffalo Grove Pond	Dry	No	Buffalo Grove	Residential	None needed	DPRW 2016
18-911	911	-87.95922077	42.18974697	Meridan Middle School Pond 1	Dry	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-912	912	-87.96554446	42.18940018	Woodlands at Fiore Pond 11	Dry	No	Buffalo Grove	Residential	Move outlets	DPRW 2016
18-916	916	-87.95976851	42.18923473	Meridan Middle School Pond 2	Dry	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-919	919	-87.98314115	42.18824165	Briarcrest Pond 1	Wetland	No	Long Grove	Residential	None	DPRW 2016
18-920	920	-87.95591364	42.1876284	Prairie Grove Pond	Dry	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-925	925	-87.97151121	42.18703264	Churchill Park Pond	Wet	No	Buffalo Grove	Residential	None	DPRW 2016
18-935	935	-87.96897072	42.18484341	Churchill Lane Pond	Wet	No	Buffalo Grove	Residential	None	DPRW 2016
18-940	940	-87.95413475	42.18452716	Mirielle Pond 3	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-946	946	-87.97267935	42.18358082	Rolling Hills Pond 1	Wet	Yes	Buffalo Grove	Residential	Increase buffer	DPRW 2016
18-948	948	-87.97399022	42.18348417	Rolling Hills Pond 2	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-953	953	-87.97425241	42.18294701	Rolling Hills Pond 3	Wet	Yes	Buffalo Grove	Residential	None needed	DPRW 2016
18-954	954	-87.99132012	42.18158192	Lakes of Long Grove Pond 4	Wet	No	Long Grove	Residential	1. Add aerator to decrease excess algae 2. Increase native plants to decrease erosion	DPRW 2016
18-955	955	-87.96575973	42.18218641	Reservoir 7 Pond	Dry	No	Buffalo Grove	Public	1. Remove excess litter/debris 2. Consider short-circuiting	DPRW 2016

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
18-956	956	-87.94593509	42.1818843	U-Stor-It Buffalo Grove Pond	Dry	Yes	Buffalo Grove	Commercial	None	DPRW 2016
18-957	957	-87.97343044	42.18130908	-	Wetland	No	Buffalo Grove	Residential	Remove some excess woody vegetation	DPRW 2016
18-958	958	-87.93575746	42.1810315	Arbor Creek Business Center Pond 1	Wet	No	Buffalo Grove	Industrial	1. Remove excessive litter 2. Add native plants to decrease excess erosion	DPRW 2016
18-959	959	-87.94298757	42.1801157	Peerless Group Pond	Wet	Yes	Buffalo Grove	Industrial	None	DPRW 2016
18-960	960	-87.93498232	42.18079452	Arbor Creek Business Center Pond 2	Wet	No	Buffalo Grove	Industrial	1. Remove excess litter 2. Increase native plants to decrease erosion	DPRW 2016
18-962	962	-87.9647866	42.18060603	Walgreens Pond	Wetland	Yes	Buffalo Grove	Industrial	Remove excess litter/debris	DPRW 2016
18-963	963	-87.97535267	42.18043976	Congregation B'nai Shalom Pond	Wet	No	Long Grove	Public	None	DPRW 2016
18-964	964	-87.99610769	42.17996131	Lakes of Long Grove Pond 5	Wet	No	Long Grove	Residential	Remove some excess woody vegetation	DPRW 2016
18-965	965	-87.93599431	42.17982758	Arbor Creek Business Center Pond 3	Wet	No	Buffalo Grove	Industrial	1. Remove excess litter 2. Add native plants to decrease excess erosion	DPRW 2016
18-966	966	-87.93335114	42.17936926	Arbor Creek Business Center Pond 4	Wetland	No	Buffalo Grove	Industrial	1. Add aerator to decrease excessive algae 2. Decrease some excess woody vegetation	DPRW 2016
18-967	967	-87.92956079	42.17890294	ECD-Lincolnshire Assoc. Pond	Wet	No	Long Grove	Industrial	1. Add native plants to decrease excess erosion 2. Remove some excess woody vegetation at south end	DPRW 2016
18-968	968	-87.96430699	42.17936144	Westchester Estates Pond 2	Wet	No	Buffalo Grove	Residential	1. Consider short-circuiting 2. Remove excess litter/debris	DPRW 2016
18-969	969	-87.99276681	42.17848806	Fairfield Village - Long Grove Pond	Wet	No	Long Grove	Residential	1. Decrease excess woody vegetation 2. Evaluate water quality	DPRW 2016
18-970	970	-87.93960847	42.17807164	Asbury Corporate Pond	Wet	No	Buffalo Grove	Industrial	None	DPRW 2016
18-972	972	-87.93388694	42.17637712	Arbor Creek Business Center Pond 5	Wet	Yes	Buffalo Grove	Industrial	1. Add aerator to decrease excess algae 2. Remove excess litter	DPRW 2016
18-973	973	-87.95732018	42.17485266	Old Farm Park Pond	Wet	No	Buffalo Grove	Residential	1. Install aerator to decrease excess algae 2. Remove excess litter/debris	DPRW 2016
18-974	974	-87.93686487	42.17466496	Corporate Grove Pond 1	Wet	No	Buffalo Grove	Industrial	1. Remove excess litter 2. Add native plants to decrease erosion	DPRW 2016
18-975	975	-87.94466712	42.17493894	Corporate Grove Pond 14	Wetland	Yes	Buffalo Grove	Industrial	Remove some excess woody vegetation	DPRW 2016
18-976	976	-87.93420913	42.1744933	Corporate Grove Pond 2	Wet	No	Buffalo Grove	Industrial	1. Fix short circuiting 2. Add native plants to decrease excess erosion	DPRW 2016
18-977	977	-87.93104071	42.17407002	Arbor Creek Business Center Pond 6	Wet	Yes	Buffalo Grove	Industrial	Remove excess litter and debris	DPRW 2016
18-978	978	-87.92966903	42.17256735	Corporate Grove Pond 8	Wet	No	Buffalo Grove	Commercial	None	DPRW 2016
18-979	979	-87.95196893	42.17247536	Old Farm Village Pond	Wet	No	Buffalo Grove	Residential	Increase native plants to decrease erosion	DPRW 2016
18-981	981	-87.93254275	42.1726907	Corporate Grove Pond 6	Wet	No	Buffalo Grove	Industrial	1. Add aerator to decrease excess algae 2. Add native plants to decrease excess erosion	DPRW 2016
18-982	982	-87.93135454	42.17261502	Corporate Grove Pond 7	Wet	No	Buffalo Grove	Industrial	1. Repair broken and detached inlets 2. Add aerator to decrease algae 3. Add native plants to decrease algae	DPRW 2016

DPRWP Basin ID	Previous ID	Longitude	Latitude	Basin Name	Basin Type	Post 92	Political Jurisdiction	Predominate Land Use	Preliminary Retrofit Opportunities	Original Inventory
18-983	983	-87.94056567	42.17205985	Corporate Grove Pond 3	Wet	No	Buffalo Grove	Industrial	1. Remove excess litter/debris 2. Increase native plants	DPRW 2016
18-984	984	-87.93944837	42.1721501	Corporate Grove Pond 4	Wet	No	Buffalo Grove	Industrial	1. Add native plants to decrease excess erosion 2. Consider removing overhanging woody plants	DPRW 2016
18-985	985	-87.93401487	42.17107804	Corporate Grove Pond 5	Wet	No	Buffalo Grove	Industrial	1. Add native plants to decrease erosion 2. Repair broken inlet	DPRW 2016
18-986	986	-87.92879063	42.17080781	Corporate Grove Pond 15	Wet	No	Buffalo Grove	Industrial	None	DPRW 2016
18-987	987	-87.93061365	42.17089776	Corporate Grove Pond 9	Wet	No	Buffalo Grove	Industrial	1. Add native plants to decrease erosion 2. Remove excess litter	DPRW 2016
18-988	988	-87.94782223	42.17075701	Busch and Weiland Pond	Wetland	Yes	Buffalo Grove	Industrial	1. Remove excess litter/debris 2. Remove some excess woody vegetation	DPRW 2016
18-989	989	-87.93733538	42.16982004	Covington Corporate Center Pond 1	Wet	No	Buffalo Grove	Industrial	1. Remove excessive litter/debris 2. Consider inlet/outlet scouring	DPRW 2016
18-990	990	-87.93431409	42.16921044	Covington Corporate Center Pond 2	Wet	Yes	Buffalo Grove	Industrial	Increase native plants to decrease excessive shoreline erosion	DPRW 2016
18-991	991	-87.9408199	42.16993874	Covington Corporate Center Pond 5	Wet	No	Buffalo Grove	Industrial	1. Remove some excess woody vegetation 2. Consider identifying possible illicit discharge	DPRW 2016
18-992	992	-87.93325853	42.16929781	Barclay Station Pond 1	Wet	No	Buffalo Grove	Industrial	None	DPRW 2016
18-993	993	-87.9420367	42.1690819	Covington Corporate Center Pond 6	Wet	No	Buffalo Grove	Industrial	Add second aerator to decrease excess algae	DPRW 2016
18-994	994	-87.94937796	42.16889276	Sterling Creek Pond	Wet	Yes	Buffalo Grove	Residential	1. Add aerator to decrease excess algae 2. Remove some excess woody vegetation 3. Remove excess litter/debris	DPRW 2016
18-995	995	-87.93966105	42.16771329	Covington Corporate Center Pond 4	Wet	No	Buffalo Grove	Industrial	Remove excessive litter/debris	DPRW 2016
18-996	996	-87.92823874	42.16757907	Barclay Station Pond 4	Wet	Yes	Buffalo Grove	Residential	Add native plants to decrease some embankment erosion	DPRW 2016
18-997	997	-87.94936792	42.16775437	Parkchester Park Pond	Wet	No	Buffalo Grove	Residential	1. Install aerator to remove excess algae 2. Remove excess litter/debris	DPRW 2016
18-998	998	-87.93440783	42.16760201	Covington Corporate Center Pond 3	Wet	No	Buffalo Grove	Residential	Add native plants to decrease excessive shoreline erosion	DPRW 2016
18-999	999	-87.92693695	42.16748994	Barclay Station Pond 5	Wet	Yes	Buffalo Grove	Residential	Replant native plants along parts of shore to decrease excessive erosion	DPRW 2016

Appendix E: Lake Shoreline Assessment Summary

Lake Shoreline Assessment

Visual assessments of lake shorelines were conducted to characterize shoreline erosion. The degree of shoreline erosion was categorically defined as none, slight, moderate, or severe. Below are brief descriptions of each category.

None – Includes man-made erosion control such as beach, rip-rap and sea wall.

Slight – Minimal or no observable erosion; generally considered stable; no erosion control practices will be recommended except for small problem areas noted within an area otherwise designated as "slight".

Moderate – Recession is characterized by past or recently eroded banks; area may exhibit some exposed roots, fallen vegetation or minor slumping of soil material; erosion control practices may be recommended although the section is not deemed to warrant immediate remedial action.

Severe – Recession is characterized by eroding of exposed soil on nearly vertical banks, exposed roots, fallen vegetation or extensive slumping of bank material, undercutting, washouts or fence posts exhibiting realignment; erosion control practices are recommended and immediate remedial action may be warranted.

The lake shoreline assessment results are summarized in **table 1**.

Table 1 Lake shoreline assessment results.

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
Ames Lake	AME01	21.8	4	478.7	77	121.5	20	0	0	622.0	0.04	2016
	AME02	226.3	43	156.9	30	142.9	27	0	0	526.0	0.04	2016
	AME03	558.2	74	174.5	23	18.8	2	0	0	751.6	0.02	2016
	AME04	217.5	60	102.4	28	40.6	11	0	0	360.5	0.02	2016
	AME05	800.5	100	0.0	0	0.0	0	0	0	800.5	0.01	2016
	AME06	467.4	85	80.2	15	0.0	0	0	0	547.7	0.01	2016
	AME07	284.2	46	238.0	39	91.6	15	0	0	613.8	0.03	2016
Big Bear Lake	BBL001	741.4	100	0.0	0	0.0	0	0	0	741.4	0.01	2016
	BBL002	1049.4	93	0.0	0	81.8	7	0	0	1131.1	0.02	2016
	BBL003	609.5	35	758.0	43	382.5	22	0	0	1750.0	0.03	2016
	BBL004	185.0	22	663.5	78	0.0	0	0	0	848.6	0.02	2016
	BBL005	315.5	38	505.1	62	0.0	0	0	0	820.5	0.02	2016
Bresen Lake	BRS01	793.9	96	37.3	4	0.0	0	0.0	0	831.2	0.01	2016
	BRS02	129.4	60	85.2	40	0.0	0	0.0	0	214.6	0.02	2016
	BRS03	284.5	32	594.6	68	0.0	0	0.0	0	879.1	0.02	2016
	BRS04	0.0	0	996.8	100	0.0	0	0.0	0	996.8	0.03	2016
	BRS05	0.0	0	415.2	100	0.0	0	0.0	0	415.2	0.03	2016
	BRS06	0.0	0	413.2	94	26.8	6	0.0	0	440.0	0.03	2016
	BRS07	555.2	37	958.7	63	0.0	0	0.0	0	1513.9	0.02	2016
Butler Lake	BL01	497.3	100	0.0	0	0.0	0	0.0	0	497.3	0.01	2015
	BL02	40.6	3	1058.2	89	94.5	8	0.0	0	1193.2	0.02	2015
	BL03	846.3	85	147.7	15	0.0	0	0.0	0	994.0	0.01	2015
	BL04	1292.0	100	0.0	0	0.0	0	0.0	0	1292.0	0.01	2015
	BL05	469.7	27	890.7	52	355.7	21	0.0	0	1716.1	0.04	2015
	BL06	1954.3	83	123.4	5	233.6	10	34.6	2	2345.8	0.03	2015
	BL07	0.0	0.0	50.9	15	276.5	81	12.3	4	339.7	0.20	2015
	BL08	1044.6	49	560.1	26	532.9	25	0.0	0	2137.7	0.07	2015
	BL09	914.4	84	175.6	16	0.0	0	0.0	0	1090.0	0.03	2015
	BL10	205.4	28	256.4	34	284.0	38	0.0	0	745.8	0.03	2015
	BL11	616.2	100.0	0.0	0	0.0	0	0.0	0	616.2	0.01	2015
Lake Carina	CAR01	725.5	97	19.1	3	0.0	0	0.0	0	744.6	0.01	2016

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
	CAR02	586.4	79	159.7	21	0.0	0	0.0	0	746.1	0.01	2016
	CAR03	550.0	72	215.9	28	0.0	0	0.0	0	765.9	0.01	2016
	CAR04	677.0	61	376.5	34	64.5	6	0.0	0	1117.9	0.02	2016
	CAR05	1154.1	88	111.1	8	52.3	4	0.0	0	1317.4	0.01	2016
Countryside Lake	CSG001	760.4	37	211.1	10	517.8	25	583.9	28	2073.3	0.14	2016
	CSG002	318.3	100	0.0	0	0.0	0	0.0	0	318.3	0.01	2016
	CSG003	850.5	43	317.8	16	416.1	21	416.7	21	2001.1	0.11	2016
	CSG004	802.8	57	0.0	0	571.7	40	45.0	3	1419.4	0.06	2016
	CSG005	191.3	43	249.1	57	0.0	0	0.0	0	440.4	0.02	2016
	CSG006	967.1	52	592.6	32	191.5	10	102.5	6	1853.7	0.13	2016
	CSG007	415.3	73	155.6	27	0.0	0	0.0	0	570.9	0.01	2016
	CSG008	321.3	89	39.3	11	0.0	0	0.0	0	360.6	0.01	2016
	CSG009	349.2	16	973.0	44	553.1	25	357.9	16	2233.2	0.10	2016
	CSG010	1655.4	80	44.8	2	149.6	7	221.6	11	2071.3	0.06	2016
	CSG011	260.3	30	206.5	24	395.2	46	0.0	0	862.0	0.05	2016
	CSG012	1903.1	74	657.4	26	0.0	0	0.0	0	2560.5	0.01	2016
	CSG013	200.3	36	223.9	41	126.0	23	0.0	0	550.1	0.03	2016
	CSG014	318.1	25	646.2	50	230.1	18	97.4	8	1291.7	0.06	2016
	CSG015	346.8	45	425.5	55	0.0	0	0.0	0	772.3	0.02	2016
	CSG016	114.2	7	324.7	21	403.1	26	733.1	47	1575.2	0.22	2016
Des Plaines Lake	DSP001	94.4	59	65.6	41	0.0	0	0.0	0	160.0	0.05	2016
	DSP002	280.9	96	11.9	4	0.0	0	0.0	0	292.8	0.01	2016
	DSP003	402.7	40	330.6	33	241.8	24	24.9	2	1000.0	0.06	2016
	DSP004	771.7	80	195.6	20	0.0	0	0.0	0	967.3	0.05	2016
	DSP005	908.3	67	438.4	33	0.0	0	0.0	0	1346.7	0.05	2016
	DSP006	381.3	51	328.4	44	32.1	4	0.0	0	741.8	0.06	2016
	DSP007	433.2	56	254.5	33	86.2	11	0.0	0	773.9	0.07	2016
Diamond Lake	DIA01	438.7	79	116.1	21	0.0	0	0.0	0	554.8	0.01	2016
	DIA02	577.5	60	377.5	40	0.0	0	0.0	0	955.0	0.02	2016
	DIA03	616.8	61	397.4	39	0.0	0	0.0	0	1014.2	0.02	2016
	DIA04	1436.4	83	285.2	17	0.0	0	0.0	0	1721.6	0.01	2016
	DIA05	295.1	58	217.4	42	0.0	0	0.0	0	512.5	0.02	2016

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
	DIA06	775.4	100	0.0	0	0.0	0	0.0	0	775.4	0.01	2016
	DIA07	607.7	26	56.2	2	1632.6	71	0.0	0	2296.5	0.07	2016
	DIA08	1675.3	77	385.8	18	109.4	5	0.0	0	2170.5	0.02	2016
	DIA09	339.8	40	508.2	60	0.0	0	0.0	0	848.0	0.02	2016
	DIA10	846.2	66	435.8	34	0.0	0	0.0	0	1282.0	0.01	2016
	DIA11	1279.7	74	455.8	26	0.0	0	0.0	0	1735.5	0.02	2016
	DIA12	1278.5	36	2237.0	64	0.0	0	0.0	0	3515.5	0.01	2016
	DIA13	885.5	68	420.2	32	0.0	0	0.0	0	1305.7	0.02	2016
Forest Lake	FOR01	437.8	87	67.2	13	0.0	0	0.0	0	505.0	0.01	2016
	FOR02	107.2	100	0.0	0	0.0	0	0.0	0	107.2	0.01	2016
	FOR03	917.9	89	75.9	7	38.5	4	0.0	0	1032.2	0.01	2016
	FOR04	594.5	60	325.1	33	69.3	7	0.0	0	988.9	0.02	2016
	FOR05	485.3	85	87.6	15	0.0	0	0.0	0	572.9	0.01	2016
	FOR06	154.5	33	308.2	67	0.0	0	0.0	0	462.7	0.02	2016
	FOR07	1004.9	81	65.6	5	164.8	13	0.0	0	1235.3	0.02	2016
	FOR08	284.3	84	54.4	16	0.0	0	0.0	0	338.8	0.01	2016
	FOR09	58.6	14	254.6	63	92.0	23	0.0	0	405.2	0.04	2016
	FOR10	385.6	70	118.9	22	47.3	9	0.0	0	551.8	0.02	2016
	FOR11	181.6	41	262.7	59	0.0	0	0.0	0	444.3	0.02	2016
	FOR12	458.5	45	552.8	55	0.0	0	0.0	0	1011.3	0.02	2016
	FOR13	673.0	89	84.0	11	0.0	0	0.0	0	757.0	0.01	2016
Independence Grove	IDG01	94.8	3	1393	50	689.5	25	591.8	21	2769.1	0.12	2016
	IDG02	465.2	53	306.8	35	110.5	13	0.0	0	882.5	0.03	2016
	IDG03	14	1	1604.1	88	203.4	11	0.0	0	1821.5	0.03	2016
	IDG04	1076.4	91	104.4	9	0.0	0	0.0	0	1180.8	0.01	2016
	IDG05	532.9	33	1029.5	64	48.6	3	0.0	0	1611	0.02	2016
	IDG06	72.5	11	472.8	73	100.7	16	0.0	0	646	0.03	2016
	IDG07	706.3	97	18.6	3	0.0	0	0.0	0	724.9	0.01	2016
	IDG08	1082.8	64	389.3	23	210.3	13	0.0	0	1682.4	0.02	2016
	IDG09	637.7	50	606.1	48	22.8	2	0.0	0	1266.6	0.02	2016
	IDG10	606.6	39	788.2	51	142.8	9	0.0	0	1537.6	0.03	2016
	IDG11	275.2	54	234.1	46	0.0	0	0.0	0	509.3	0.02	2016

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
	IDG12	572	77	100.3	14	68.3	9	0.0	0	740.6	0.02	2016
	IDG13	490	61	314.4	39	0.0	0	0.0	0	804.4	0.02	2016
	IDG14	656	83	0.0	0	131	17	0.0	0	787	0.02	2016
	IDG15	449.9	49	363.6	39	107.7	12	0.0	0	921.2	0.03	2016
	IDG16	534	62	236.9	28	88.8	10	0.0	0	859.7	0.02	2016
	IDG17	475.9	41	426.7	36	269.6	23	0.0	0	1172.2	0.03	2016
	IDG18	147.6	12	858.4	69	241.2	19	0.0	0	1247.2	0.04	2016
	IDG19	92.2	22	323.1	78	0.0	0	0.0	0	415.3	0.02	2016
	IDG20	557.2	60	367.5	40	0.0	0	0.0	0	924.7	0.02	2016
	IDG21	1250.5	74	437.5	26	0.0	0	0.0	0	1688	0.01	2016
Kemper Lake #1	KMP01	1361.1	53	558.1	22	625.7	24	34.6	1	2579.5	0.04	2016
	KMP03	0.0	0	250.7	92	0.0	0	23.1	8	273.8	0.06	2016
	KMP04	1361.9	56	891.3	37	149.8	6	23.9	1	2426.9	0.02	2016
	KMP05	1880.1	95	99.1	5	0.0	0	0.0	0	1979.2	0.01	2016
	KMP06	642.0	85	110.2	15	0.0	0	0.0	0	752.2	0.01	2016
	KMP07	855.4	57	654.0	43	0.0	0	0.0	0	1509.4	0.02	2016
	KMP08	1462.4	86	236.4	14	0.0	0	0.0	0	1698.7	0.01	2016
	KMP09	469.5	72	185.7	28	0.0	0	0.0	0	655.2	0.01	2016
	KMP10	412.4	76	128.5	24	0.0	0	0.0	0	540.8	0.01	2016
	KMP11	527.7	94	0.0	0	35.4	6	0.0	0	563.1	0.02	2016
	KMP12	1489.2	81	349.5	19	0.0	0	0.0	0	1838.7	0.01	2016
Kemper Lake #2	KMP01	407.8	43	392.5	41	102.9	11	51.4	5	954.6	0.05	2016
	KMP02	536.2	44	598.1	49	93.3	8	0.0	0	1227.6	0.02	2016
	KMP03	436.2	37	597.8	51	102.3	9	40.6	3	1176.9	0.04	2016
	KMP04	426.6	39	564.0	51	110.6	10	0.0	0	1101.3	0.03	2016
	KMP05	56.1	7	609.2	72	164.1	19	21.4	3	850.8	0.05	2016
	KMP06	363.0	33	735.2	67	0.0	0	0.0	0	1098.2	0.02	2016
	KMP07	223.6	16	930.5	66	202.3	14	47.8	3	1404.2	0.05	2016
	KMP08	686.0	43	892.6	57	0.0	0	0.0	0	1578.6	0.02	2016
	KMP09	422.2	33	734.4	57	90.3	7	46.8	4	1293.7	0.04	2016
	KMP10	387.4	64	70.3	12	62.9	10	87.8	14	608.3	0.08	2016
	KMP11	180.6	19	567.0	60	162.3	17	42.1	4	952.0	0.05	2016

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
	KMP12	0.0	0	0.0	0	0.0	0	321.5	100	321.5	0.10	2016
Lake Charles	CH001	1212.8	68	390.5	22	69.6	4	109.5	6	1782.4	0.04	2016
	CH002	532.0	51	324.3	31	112.6	11	80.4	8	1049.3	0.05	2016
	CH003	1063.7	100	0.0	0	0.0	0	0.0	0	1063.7	0.01	2016
	CH004	1183.5	89	51.5	4	100.3	8	0.0	0	1335.3	0.02	2016
	CH005	907.8	96	0.0	0	40.2	4	0.0	0	948.0	0.01	2016
Little Bear Lake	LBR001	1300.4	100	0.0	0	0.0	0	0.0	0	1300.4	0.01	2016
	LBR002	1111.3	98	26.3	2	0.0	0	0.0	0	1137.6	0.01	2016
	LBR003	70.3	63	0.0	0	0.0	0	40.6	37	110.9	0.15	2016
	LBR004	796.8	100	0.0	0	0.0	0	0.0	0	796.8	0.01	2016
	LBR005	0.0	0	227.4	20	921.5	80	0.0	0	1148.9	0.08	2016
	LBR006	0.0	0	155.3	48	125.9	39	43.4	13	324.5	0.10	2016
	LBR007	65.5	30	127.0	57	0.0	0	28.4	13	220.8	0.07	2016
	LBR008	554.8	84	0.0	0	79.3	12	23.0	4	657.2	0.03	2016
	LBR009	0.0	0	89.0	55	73.0	45	0.0	0	162.0	0.06	2016
	LBR010	2609.1	91	63.7	2	39.2	1	152.1	5	2864.0	0.03	2016
Loch Lomand	LL01	602.8	73	223.7	27	0.0	0	0.0	0	826.5	0.02	2015
	LL02	1294.4	71	155.1	9	49.7	2.7	318.0	18	1817.1	0.03	2015
	LL03	629.6	100	0.0	0	0.0	0	0.0	0	629.6	0.01	2015
	LL04	1593.8	91	155.4	9	0.0	0	0.0	0	1749.2	0.02	2015
	LL05	231.8	49	245.3	51	0.0	0	0.0	0	477.2	0.03	2015
	LL06	829.1	71	343.9	29	0.0	0	0.0	0	1173.0	0.02	2015
	LL07	571.8	76	186.0	25	0.0	0	0.0	0	757.8	0.01	2015
	LL08	2242.0	85	304.0	12	93.0	3.5	0.0	0	2639.0	0.02	2015
	LL09	1119.4	74	394.6	26	0.0	0	0.0	0	1514.0	0.01	2015
	LL10	266.9	48	292.3	52	0.0	0	0.0	0	559.2	0.02	2015
	LL11	104.1	42	142.0	58	0.0	0	0.0	0	246.0	0.01	2015
Lake Minear	LM01	0.0	0	1090.0	62	657.4	38	0.0	0	1747.4	0.30	2015
	LM02	327.6	71	136.3	29	0.0	0	0.0	0	463.9	0.01	2015
	LM03	303.2	48	323.7	52	0.0	0	0.0	0	626.9	0.01	2015
	LM04	0.0	0	249.1	59	170.6	41	0.0	0	419.7	0.30	2015
	LM05	17.0	2	217.5	29	523.4	69	0.0	0	757.9	0.20	2015

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
	LM06	0.0	0	275.7	39	404.9	57	34.6	5	715.3	0.20	2015
	LM07	0.0	0	249.8	95	0.0	0	12.3	5	262.1	0.01	2015
	LM08	0.0	0	175.8	48	188.9	52	0.0	0	364.7	0.30	2015
	LM09	750.5	72	64.5	6	225.6	22	0.0	0	1040.5	0.15	2015
	LM10	1527.7	67	280.3	12	458.8	20	0.0	0	2266.8	0.03	2015
	LM11	5079.1	100	0.0	0	0.0	0	0.0	0	5079.1	0.02	2015
	LM12	149.2	9	46.8	3	1384.0	88	0.0	0	1579.9	0.60	2015
St. Mary's	SM01	0.0	0	140.0	13	795.5	73	149.9	14	1085.4	0.35	2015
	SM02	30.3	2	134.8	8	663.0	37	952.9	54	1781.0	0.40	2015
	SM03	1278.2	66	580.5	30	91.8	5	0.0	0	1950.4	0.08	2015
	SM04	15.3	1	196.4	17	543.7	48	371.6	33	1127.0	0.40	2015
	SM05	115.2	7	818.0	49	448.4	27	295.9	18	1677.5	0.30	2015
	SM06	529.1	100	0.0	0	0.0	0	0.0	0	529.1	0.00	2015
	SM07	454.2	19	1286.2	54	555.3	24	70.0	3	2365.7	0.20	2015
	SM08	0.0	0	319.4	42	435.0	58	0.0	0	754.4	0.20	2015
	SM09	0.0	0	53.6	4	217.7	16	1123.9	81	1395.3	0.50	2015
	SM10	0.0	0	108.7	11	320.4	32	565.1	57	994.1	0.50	2015
	SM11	0.0	0	218.2	23	322.0	35	391.4	42	931.6	0.40	2015
	SM12	22.5	2	581.7	54	419.5	39	47.4	4	1071.1	0.20	2015
	SM13	125.8	19	418.0	63	123.3	19	0.0	0	667.1	0.05	2015
	SM14	1417.0	92	0.0	0	0.0	0	123.1	8	1540.1	0.05	2015
	SM15	14.2	2	211.8	25	533.4	64	73.7	9	833.2	0.30	2015
	SM16	205.1	25	59.2	7	470.1	57	89.8	11	824.2	0.30	2015
Sterling Lake	STR001	570.3	68	267.5	32	0.0	0	0.0	0	837.8	0.01	2016
	STR002	518.1	61	335.5	39	0.0	0	0.0	0	853.6	0.02	2016
	STR003	463.0	60	313.3	40	0.0	0	0.0	0	776.3	0.02	2016
	STR004	711.1	70	264.2	26	42.4	4	0.0	0	1017.7	0.02	2016
	STR005	1503.8	98	37.8	2	0.0	0	0.0	0	1541.6	0.01	2016
	STR006	1930.5	92	176.2	8	0.0	0	0.0	0	2106.7	0.01	2016
	STR007	933.2	93	54.4	5	18.3	2	0.0	0	1005.9	0.01	2016
	STR008	1267.8	87	194.3	13	0.0	0	0.0	0	1462.1	0.01	2016
	STR009	948.1	80	236.1	20	0.0	0	0.0	0	1184.2	0.01	2016

Lake	Reach	No Erosion (ft)	No Erosion (%)	Slight Erosion (ft)	Slight Erosion (%)	Moderate Erosion (ft)	Moderate Erosion (%)	Severe Erosion (ft)	Severe Erosion (%)	Total (ft)	Lateral Recession Rate (ft/yr)	Year Assessed
	STR010	1412.2	68	568.2	27	89.1	4	0.0	0	2069.5	0.02	2016
	STR011	1175.3	80	287.4	20	0.0	0	0.0	0	1462.7	0.01	2016
Sylvan Lake	SYV01	889.7	76	275.8	24	0.0	0	0.0	0	1165.5	0.01	2016
	SYV02	150.6	46	125.2	38	49.6	15	0.0	0	325.4	0.03	2016
	SYV03	325.3	52	71.1	11	225.7	36	0.0	0	622.1	0.04	2016
	SYV04	220.8	34	436.8	66	0.0	0	0.0	0	657.6	0.02	2016
	SYV05	546.6	67	274.3	33	0.0	0	0.0	0	820.9	0.02	2016
	SYV06	0.0	0	293.0	100	0.0	0	0.0	0	293.0	0.03	2016
	SYV07	229.4	100	0.0	0	0.0	0	0.0	0	229.4	0.01	2016
	SYV08	918.0	81	194.1	17	26.8	2	0.0	0	1139.0	0.01	2016
	SYV09	308.9	30	699.0	67	33.5	3	0.0	0	1041.4	0.02	2016
	SYV10	452.7	56	297.2	37	60.6	7	0.0	0	810.5	0.02	2016

Lakeshore Buffer Condition

Lakeshore buffer condition was assessed using an area up to 25 feet inland from the shoreline for each reach. A 25 foot buffer was chosen based on research that indicates a 25-foot vegetated buffer is the minimum effective width for in-lake habitat maintenance (a 15 foot buffer is the minimum effective width for bank stability). The assessment was conducted utilizing 2014 aerial images in ArcGIS. The aerial images were visually assessed to determine vegetation and impervious surface cover. The lakeshore buffers were categorized as good, fair, or poor using the criteria summarized in **table 2**. Results for the lakeshore buffer condition assessment are summarized in **table 3.**

Table 2: Shoreline buffer condition categories

Category	Criteria	Percentage
Good	Unmowed grasses & forbs + tree trunks + shrubs	≥70%
	and	
	impervious surfaces	≤5%
Fair	Unmowed grasses & forbs + tree trunks + shrubs	≥50% and <70%
	and	
	impervious surface	≤10%
Poor	Unmowed grasses & forbs +tree trunks + shrubs	<50%
	and	
	impervious surface	≥50%

Table 3: Shoreline buffer condition assessment results

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
Ames Lake	AME01	0.0	0	302.1	49	319.9	51	622.0	2016
	AME02	184.6	35	85.0	16	256.4	49	526.0	2016
	AME03	0.0	0	0.0	0	751.6	100	751.6	2016
	AME04	0.0	0	0.0	0	360.5	100	360.5	2016
	AME05	0.0	0	0.0	0	800.5	100	800.5	2016
	AME06	0.0	0	0.0	0	547.7	100	547.7	2016
	AME07	0.0	0	0.0	0	613.8	100	613.8	2016
Big Bear Lake	BBL001	587.0	79	154.4	21	0.0	0	741.4	2016
	BBL002	1049.4	93	81.8	7	0.0	0	1131.1	2016
	BBL003	409.7	23	1053.1	60	287.3	16	1750.1	2016
	BBL004	142.4	17	42.6	5	663.5	78	846.6	2016
	BBL005	12.8	2	807.7	98	0.0	0.0	820.5	2016
Bresen Lake	BRS01	739.3	89	91.6	11	0.0	0	830.9	2016
	BRS02	46.3	22	150.6	70	17.6	8	214.5	2016
	BRS03	0.0	0	322.2	37	556.6	63	878.8	2016
	BRS04	0.0	0	98.3	10	898.2	90	996.5	2016
	BRS05	0.0	0	415.1	100	0.0	0	415.1	2016
	BRS06	0.0	0	0.0	0	439.8	100	439.8	2016
	BRS07	0.0	0	0.0	0	1513.5	100	1513.5	2016
Butler Lake	BL01	497	100	0	0	0	0	497	2015
	BL02	177	15	1016	85	0	0	1193	2015
	BL03	50	5	228	23	716	72	944	2015
	BL04	60	5	0	0	1232	95	1292	2015
	BL05	1706	77	300	14	208	9	1716	2015
	BL06	0	0	0	0	2346	100	2346	2015
	BL07	340	100	0	0	0	0	340	2015
	BL08	0	0	0	0	2138	100	2138	2015
	BL09	0	0	0	0	1090	100	1090	2015
	BL10	50	3	696	48	696	48	746	2015
	BL11	0	0	0	0	616	100	616	2015
Lake Carina	CAR01	0	0	0.0	0	744.6	100	744.6	2016
	CAR02	0	0	231.2	31	514.8	69	746.1	2016
	CAR03	0	0	51.9	7	714.0	93	765.9	2016

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
	CAR04	0	0	353.1	32	764.8	68	1117.9	2016
	CAR05	96.5	7	0.0	0	1220.9	93	1317.4	2016
Countryside Lake	CSG001	815.5	39	262.4	13	996.0	48	2073.9	2016
	CSG002	288.2	91	30.2	9	0.0	0	318.4	2016
	CSG003	379.5	19	873.2	44	748.5	37	2001.2	2016
	CSG004	555.0	39	864.4	61	0.0	0	1419.4	2016
	CSG005	212.5	48	227.8	52	0.0	0	440.3	2016
	CSG006	579.0	31	0.0	0	1274.7	69	1853.7	2016
	CSG007	570.9	100	0.0	0	0.0	0	570.9	2016
	CSG008	360.6	100	0.0	0	0.0	0	360.6	2016
	CSG009	0.0	0	628.1	28	1605.0	72	2233.1	2016
	CSG010	230.2	11	310.4	15	1530.7	74	2071.3	2016
	CSG011	12.7	1	0.0	0	845.5	99	858.2	2016
	CSG012	229.7	9	1672.0	65	652.7	26	2554.4	2016
	CSG013	0.0	0	0.0	0	550.1	100	550.1	2016
	CSG014	0.0	0	0.0	0	1291.8	100	1291.8	2016
	CSG015	302.5	39	0.0	0	469.7	61	772.2	2016
	CSG016	0.0	0	74.5	5	1500.7	95	1575.2	2016
Des Plaines Lake	DSP001	0.0	0	0.0	0	160.0	100.0	160.0	2016
	DSP002	0.0	0	0.0	0	292.8	100.0	292.8	2016
	DSP003	0.0	0	82.0	9	872.0	91.4	954.0	2016
	DSP004	0.0	0	0.0	0	1013.1	100.0	1013.1	2016
	DSP005	0.0	0	0.0	0	1346.7	100.0	1346.7	2016
	DSP006	0.0	0	0.0	0	741.8	100.0	741.8	2016
	DSP007	0.0	0	0.0	0	773.9	100.0	773.9	2016
Diamond Lake	DIA01	1366.0	100	0.0	0	0.0	0	1366.0	2016
	DIA02	955.3	100	0.0	0	0.0	0	955.3	2016
	DIA03	665.6	66	80.0	8	265.9	26	1011.5	2016
	DIA04	1714.7	100	0.0	0	0.0	0	1714.7	2016
	DIA05	528.1	100	0.0	0	0.0	0	528.1	2016
	DIA06	614.1	79	162.3	21	0.0	0	776.4	2016
	DIA07	2374.7	94	154.3	6	0.0	0	2529.0	2016
	DIA08	1712.3	88	61.9	3	162.8	8	1937.0	2016
	DIA09	479.8	78	0.0	0	137.3	22	617.1	2016

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
	DIA10	1056.7	100	0.0	0	0.0	0	1056.7	2016
	DIA11	1476.2	83	309.4	17	0.0	0	1785.6	2016
	DIA12	1700.9	100	0.0	0	0.0	0	1700.9	2016
	DIA13	492.2	100	0.0	0	0.0	0	492.2	2016
Forest Lake	FOR01	505.0	100	0.0	0	0.0	0	505.0	2016
	FOR02	107.2	100	0.0	0	0.0	0	107.2	2016
	FOR03	831.3	81	201.0	19	0.0	0	1032.3	2016
	FOR04	946.0	96	42.9	4	0.0	0	988.9	2016
	FOR05	451.5	79	121.3	21	0.0	0	572.9	2016
	FOR06	462.7	100	0.0	0	0.0	0	462.7	2016
	FOR07	1235.3	100	0.0	0	0.0	0	1235.3	2016
	FOR08	338.8	100	0.0	0	0.0	0	338.8	2016
	FOR09	263.2	65	142.0	35	0.0	0	405.2	2016
	FOR10	360.0	65	191.8	35	0.0	0	551.8	2016
	FOR11	444.3	100	0.0	0	0.0	0	444.3	2016
	FOR12	947.8	94	63.5	6	0.0	0	1011.3	2016
	FOR13	626.9	83	130.1	17	0.0	0	757.0	2016
Independence Grove	IDG01	16.0	3	164.7	30	375.2	68	555.9	2016
	IDG02	0.0	0	443.0	88	58.8	12	501.8	2016
	IDG03	0.0	0	0.0	0	472.3	100	472.3	2016
	IDG04	46.5	9	45.4	9	405.7	82	497.6	2016
	IDG05	8.0	2	83.9	17	399.0	81	490.9	2016
	IDG06	151.6	77	0.0	0	45.3	23	196.9	2016
	IDG07	53.4	24	167.5	76	0.0	0	220.9	2016
	IDG08	56.1	11	274.2	53	184.7	36	515.0	2016
	IDG09	100.8	26	122.3	32	160.5	42	383.6	2016
	IDG10	0.0	0	207.0	44	261.5	56	468.5	2016
	IDG11	0.0	0	16.7	11	138.5	89	155.2	2016
	IDG12	113.4	50	61.1	27	51.1	23	225.6	2016
	IDG13	0.0	0	193.7	79	51.4	21	245.1	2016
	IDG14	0.0	0	0.0	0	244.6	100	244.6	2016
	IDG15	0.0	0	80.7	29	195.2	71	275.9	2016
	IDG16	6.8	3	18.9	7	236.3	90	262.0	2016
	IDG17	7.2	2	142.1	40	207.9	58	357.2	2016

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
	IDG18	26.8	7	76.3	20	277.0	73	380.1	2016
	IDG19	68.9	54	30.3	24	27.4	22	126.6	2016
	IDG20	0.0	0	31.3	11	250.5	89	281.8	2016
	IDG21	0.0	0	37.9	7	476.5	93	514.4	2016
Kemper Lake #1	KMP01	0.0	0	0.0	0	2579.5	100	2579.5	2016
	KMP03	0.0	0	23.1	8	250.7	92	273.8	2016
	KMP04	2403.0	99	23.9	1	0.0	0	2426.9	2016
	KMP05	766.6	39	0.0	0	1212.5	61	1979.2	2016
	KMP06	641.3	85	110.9	15	0.0	0	752.2	2016
	KMP07	1509.4	100	0.0	0	0.0	0	1509.4	2016
	KMP08	957.1	56	419.8	25	321.8	19	1698.7	2016
	KMP09	655.2	100	0.0	0	0.0	0	655.2	2016
	KMP10	474.4	88	0.0	0	66.5	12	540.8	2016
	KMP11	563.1	100	0.0	0	0.0	0	563.1	2016
	KMP12	1606.9	87	85.9	5	146.0	8	1838.7	2016
Kemper Lake #2	KMP01	444.4	47	239.7	25	270.5	28	954.6	2016
	KMP02	750.4	66	379.4	34	0.0	0	1129.8	2016
	KMP03	1176.9	100	0.0	0	0.0	0	1176.9	2016
	KMP04	1101.3	100	0.0	0	0.0	0	1101.3	2016
	KMP05	292.3	34	0.0	0	558.5	66	850.8	2016
	KMP06	1098.2	100	0.0	0	0.0	0	1098.2	2016
	KMP07	1404.2	100	0.0	0	0.0	0	1404.2	2016
	KMP08	1578.6	100	0.0	0	0.0	0	1578.6	2016
	KMP09	1293.7	100	0.0	0	0.0	0	1293.7	2016
	KMP10	311.6	51	296.7	49	0.0	0	608.3	2016
	KMP11	838.1	88	114.0	12	0.0	0	952.0	2016
	KMP12	321.5	100	0.0	0	0.0	0	321.5	2016
Lake Charles	CH001	75.7	4	1702.6	96	0.0	0	1778.3	2016
	CH002	0.0	0	1048.1	100	0.0	0	1048.1	2016
	CH003	0.0	0	0.0	0	1067.7	100	1067.7	2016
	CH004	8.6	1	0.0	0	1312.4	99	1321.0	2016
	CH005	0.0	0	0.0	0	935.9	100	935.9	2016
Liberty Lake	LIB01	1013.8	65	539.3	35	0.0	0	1553.1	2016
	LIB02	63.4	5	159.7	14	951.3	81	1174.4	2016

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
	LIB03	0.0	0	494.1	100	0.0	0	494.1	2016
	LIB04	0.0	0	1078.0	51	1021.7	49	2099.7	2016
Little Bear Lake	LBR001	1300.4	100	0.0	0	0.0	0	1300.4	2016
	LBR002	1137.6	100	0.0	0	0.0	0	1137.6	2016
	LBR003	70.3	100	0.0	0	0.0	0	70.3	2016
	LBR004	837.4	100	0.0	0	0.0	0	837.4	2016
	LBR005	0.0	0	1148.9	100	0.0	0	1148.9	2016
	LBR006	0.0	0	324.5	100	0.0	0	324.5	2016
	LBR007	220.8	100	0.0	0	0.0	0	220.8	2016
	LBR008	657.2	100	0.0	0	0.0	0	657.2	2016
	LBR009	121.4	75	40.6	25	0.0	0	162.0	2016
	LBR010	2772.1	97	91.9	3	0.0	0	2864.0	2016
Loch Lomond	LL01	725.0	88	102.0	12	0.0	0	827.0	2015
	LL02	1499.0	100	0.0	0	0.0	0	1499.0	2015
	LL03	581.0	92	49.0	8	0.0	0	630.0	2015
	LL04	1749.0	100	0.0	0	0.0	0	1749.0	2015
	LL05	477.0	100	0.0	0	0.0	0	477.0	2015
	LL06	1173.0	100	0.0	0	0.0	0	1173.0	2015
	LL07	708.0	93	50.0	7	0.0	0	758.0	2015
	LL08	2383.0	90	256.0	10	0.0	0	2639.0	2015
	LL09	1514.0	100	0.0	0	0.0	0	1514.0	2015
	LL10	559.0	100	0.0	0	0.0	0	559.0	2015
	LL11	246.0	100	0.0	0	0.0	0	246.0	2015
Lake Minear	LM01	0.0	0	0.0	0	1912.0	100	1912.0	2015
	LM02	0.0	0	0.0	0	464.0	100	464.0	2015
	LM03	0.0	0	0.0	0	627.0	100	627.0	2015
	LM04	0.0	0	210.0	24	662.0	76	872.0	2015
	LM05	365.0	48	197.0	26	195.0	26	758.0	2015
	LM06	680.0	80	165.0	20	0.0	0	845.0	2015
	LM07	250.0	100	0.0	0	0.0	0	250.0	2015
	LM08	0.0	0	56.0	6	828.0	94	884.0	2015
	LM09	1043.0	81	250.0	19	0.0	0	1293.0	2015
	LM10	1813.0	80	454.0	20	0.0	0	2267.0	2015
	LM11	0.0	0	0.0	0	5079.0	100	5079.0	2015

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
	LM12	580.0	37	1000.0	63	0.0	0	1580.0	2015
St. Mary's	SM01	360.0	33	0.0	0	725.0	67	1085.0	2015
	SM02	40.0	2	0.0	0	1741.0	98	1781.0	2015
	SM03	140.0	7	0.0	0	1810.0	93	1950.0	2015
	SM04	10.0	1	0.0	0	1117.0	99	1127.0	2015
	SM05	0.0	0	0.0	0	1677.0	100	1677.0	2015
	SM06	NA	NA	NA	NA	NA	NA	NA	2015
	SM07	25.0	1	300.0	13	2041.0	86	2366.0	2015
	SM08	0.0	0	45.0	6	709.0	94	754.0	2015
	SM09	55.0	4	105.0	8	1235.0	89	1395.0	2015
	SM10	0.0	0	100.0	10	894.0	90	994.0	2015
	SM11	0.0	0	45.0	5	887.0	95	932.0	2015
	SM12	160.0	15	110.0	10	801.0	75	1071.0	2015
	SM13	575.0	86	0.0	0	92.0	15	667.0	2015
	SM14	1417.0	92	123.0	8	0	0	1540.0	2015
	SM15	120.0	14	713.0	86	0	0	833.0	2015
	SM16	459.0	56	365.0	44	0	0	824.0	2015
Sterling Lake	STR001	329.5	36.7	293.3	32.6	275.8	30.7	898.6	2016
	STR002	264.8	27.0	397.8	40.5	319.8	32.6	982.4	2016
	STR003	0.0	0.0	0.0	0.0	599.8	100.0	599.8	2016
	STR004	41.1	4.1	454.2	45.2	509.2	50.7	1004.5	2016
	STR005	0.0	0.0	0.0	0.0	1541.6	100.0	1541.6	2016
	STR006	0.0	0.0	168.4	16.2	872.9	83.8	1041.3	2016
	STR007	41.4	2.0	277.3	13.4	1752.8	84.6	2071.5	2016
	STR008	229.5	15.7	300.5	20.6	930.6	63.7	1460.6	2016
	STR009	0.0	0.0	135.1	11.4	1052.8	88.6	1187.9	2016
	STR010	345.0	17.0	155.9	7.7	1533.5	75.4	2034.4	2016
	STR011	164.3	11.0	1018.5	68.1	312.8	20.9	1495.6	2016
Sylvan Lake	SYV01	1180.7	100	0.0	0	0.0	0	1180.7	2016
	SYV02	117.1	36	0.0	0	205.4	64	322.6	2016
	SYV03	603.7	97	0.0	0	18.3	3	622.1	2016
	SYV04	534.5	81	0.0	0	123.1	19	657.6	2016
	SYV05	820.9	100	0.0	0	0.0	0	820.9	2016
	SYV06	293.0	100	0.0	0	0.0	0	293.0	2016

Lake	Reach	Poor (ft)	Poor (%)	Fair (ft)	Fair (%)	Good (ft)	Good (%)	Total (ft)	Year Completed
	SYV07	229.4	100	0.0	0	0.0	0	229.4	2016
	SYV08	784.6	69	159.0	14	198.3	17	1141.8	2016
	SYV09	0.0	0	1041.4	100	0.0	0	1041.4	2016
	SYV10	795.2	100	0.0	0	0.0	0	795.2	2016
Wadsworth Sand and Gravel	CHS001	0.0	0	0.0	0	949.0	100	949.0	2016
	CHS002	0.0	0	0.0	0	638.8	100	638.8	2016
	CHS003	16.9	1	116.3	9	1224.4	90	1357.6	2016
	CHS004	282.0	34	542.9	66	0.0	0	824.9	2016
	CHS005	0.0	0	0.0	0	763.5	100	763.5	2016
	CHS006	0.0	0	0.0	0	743.2	100	743.2	2016
	CHS007	0.0	0	0.0	0	746.7	100	746.7	2016

Appendix F: Biological & Water Quality Assessment of the Upper Des Plaines River & Tributaries

Full report can be found:
http://www.drww.org/plans/reports

Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries 2016

Des Plaines River at Wright Woods Dam (removed)

Indian Creek at Sullivan Woods Preserve

Peter A. Precario, MBI Executive Director
James Lane, MBI Board President

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EXECUTIVE SUMMARY

Summary of Findings

Aquatic Life Condition Assessment

The primary indicator of overall condition in terms of aquatic life is the status of the Illinois General Use using the Illinois fish and macroinvertebrate Indices of Biotic Integrity and generally following the guidance in the 2016 Integrated Report (IEPA 2016). The status of aquatic life is portrayed in an attainment table (Table 1) and expressed as full or non-support and based on the most limiting of either the fish or macroinvertebrate results. Non-support is further subdivided into non-support fair and non-support poor; a partial support category was added to clarify instances where only one of the two assemblages attained the General Use support threshold. Of the 70 sites assessed for General Use aquatic life use none were in full support, 22 non-support-fair, 26 non-support poor, and 21 partial support. One site was sampled for macroinvertebrates only and while it attained the mIBI threshold for full support, the attainment status was not determined. The fish assemblage was the limiting factor in many of the non-support and all of the partial support determinations failing to meet the IEPA General Use threshold for the fIBI at any sampling site in the 2016 study area which is similar to results observed in 2013 by IDNR (Pescitelli 2016). The Modified Index of Well-Being (MIwb; Ohio EPA 1987) was calculated for the fish assemblage at sites >20 mi.^{2} and met an interim General Use support threshold at 10 of 24 sites. Macroinvertebrate assemblages attained the General Use threshold for the mIBI at 34 of the 70 biological sampling sites including all except the uppermost three mainstem sites.

Causes and Sources of Non-attainment[1]

Causes and sources were determined for each impaired site and included categorical or parameter level associations and their sources (if known). These were compared to the IEPA derived causes listed in the 2016 Integrated Report (IEPA 2016) for coinciding sites. Assigning causes involves using a lines of evidence approach where chemical and physical indicators of a causal category or parameter is logically related to a biological impairment, not just simply based on the coincidental exceedance of a criterion or other threshold. Knowing about relationships that are supported by prior empirical observations in other studies or our own experiences helps boost the confidence in causal assignments. This process varies somewhat from that of IEPA in that additional effect thresholds were used to assign causes beyond those used by IEPA.

Eleven (11) different causal categories and four different source categories were identified for the 2016 study area (Table 1; Figure 1). Of these causes, four (4) were habitat related (siltation, no riparian, bank erosion, and channel modification) and seven (7) were chemical (low dissolved oxygen, organic enrichment, nutrients, chlorides, conductivity, manganese, and

[1] A ***Cause*** is an agent or agents associated with an aquatic life or recreational use impairment; a ***Source*** is the origin of the causal agent. Nomenclature generally follows U.S. EPA and state 303[d] listing guidelines.

Table 1. *Aquatic life use attainment status in the 2016 Upper Des Plaines River watershed study area with associated causes and sources of impairment listed for partial and non-supporting sites determined by this study and by IEPA (2016) for matching sites (see footnote for fIBI and mIBI use support thresholds). fIBI, MIwb, and mIBI values that do not meet the threshold are asterisked (*) and poor values are underlined. The most limiting assemblage for partial support is indicated by a F (fish) or M (macroinvertebrates). Causes of impairment that exceed thresholds in the Illinois 2016 Integrated Report guidance are underlined.*

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
Des Plaines River										
13-6	109.30	123.7	22*	5.9*	21.2*	51.0	Non - Fair	Siltation; Dissolved Oxygen; Org. Enrich.; Nutrients; Chlorides	Urban runoff	D.O., TSS
13-5	106.60	137.3	24*	7.7*	29.5*	50.3	Non - Fair	Siltation; Chlorides	Urban runoff	D.O., TSS
13-4	102.90	145.6	23*	7.8^{ns}	35.3*	48.5	Non - Fair	Siltation; Chlorides	Urban runoff	D.O., Siltation, TSS
13-3	98.70	220.3	33*	9.7	57.9	81.0	Partial (F)[3]	Org. Enrich; Siltation; Chlorides, PAHs	WWTP, Urban runoff	NA[4]
13-2	96.82	225.4	31*	9.2	49.4	83.0	Partial (F)	Org. Enrich; Siltation; Chlorides	WWTP, Urban runoff	NA
13-1	94.20	232.0	32*	9.4	42.2	80.8	Partial (F)	Org. Enrich; Nutrient; Siltation; Chlorides	WWTP, Urban runoff	NA
13-16	90.60	253.8	28*	6.9*	44.8	74.8	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides	WWTP, Urban runoff	Arsenic, Chlorides, TP

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
16-7	84.60	266.5	35*	9.3	51.6	78.3	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides[5]	WWTP, Urban runoff	NA
16-5	83.60	268.1	19*	7.1*	54.9	71.0	Non - Poor	Org. Enrich; Nutrients; Siltation; Chlorides, PAHs	WWTP, Urban runoff	NA
16-8	82.90	268.9	33*	9.1	49.8	79.8	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides[5]	WWTP, Urban runoff	NA
16-4	80.00	273.2	34*	8.6	58.8	73.5	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides	WWTP, Urban runoff	NA
16-3	76.70	314.7	19*	4.9*	57.4	80.5	Non - Poor	Org. Enrich; Nutrients; Siltation; Chlorides	WWTP, Urban runoff	NA
16-2	75.40	324.0	36*	8.8	45.4	77.5	Partial (F)	Nutrients; Siltation; Chlorides	WWTP, Urban runoff	NA
16-1	71.70	358.7	38*	8.5	53.2	78.0	Partial (F)	Nutrients; Siltation; Chlorides; PAHs	WWTP, Urban runoff	NA
Seavey Drainage Ditch										
15-3	3.66	5.05	15	N/A	26.0	65.6	Non-Poor	Channelization; Siltation; Chlorides	Habitat Alteration; Urban Runoff	

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
15-8	0.45	9.77	24	N/A	25.7	54.0	Non-Fair	No riparian; Siltation; Channelization	Habitat Alteration; Urban Runoff	
Bull Creek										
14-6	5.95	1.32	12	N/A	22.1	54.5	Non-Poor	Dissolved Oxygen; Siltation	Habitat Alteration; Urban Runoff	
14-5	4.70	2.42	25	N/A	17. 5	52.0	Non-Poor	Dissolved Oxygen; Siltation	Habitat Alteration; Urban Runoff	
14-2	1.00	8.44	28	N/A	35.3	57.5	Non-Fair	Siltation; Chlorides	Habitat Alteration; Urban Runoff	
14-1	0.50	11.69	36	N/A	62. 9	89.5	Partial	Chlorides	Urban Runoff	
Aptakisic Creek										
18-4	4.70	1.09	27*	N/A	18.5*	52.5	Non - Poor	Dissolved Oxygen; Siltation	Urban Runoff; Altered Hydrology	NA
18-3	4.30	2.30	17*	N/A	25.6*	57.0	Non - Poor	No riparian; Channelization; PAHs	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
18-2	0.80	4.94	26*	N/A	30.7*	46.0	Non - Fair	Siltation; Bank Erosion; Channelization; Chlorides	Habitat Alteration; Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
18-1	0.50	5.50	24*	N/A	23.0*	52.0	Non - Fair	Channelized; Siltation; No riparian; Chlorides	WWTP; Habitat Alteration; Urban Runoff; Altered Hydrology	NA
Hastings Creek										
10-5	3.12	3.91	13*	N/A	31.6*	57.0	Non - Poor	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
10-4	1.68	6.80	11*	N/A	17. 5	38.5	Non - Poor	Channelized, Siltation; Chlorides	Habitat Alteration; Urban Runoff; Altered Hydrology	Arsenic, TP, siltation
Buffalo Creek										
17-5	14.00	1.37	25*	N/A	24.6*	66.0	Non - Fair	Siltation; Bank erosion;	Urban Runoff; Altered Hydrology	TSS
17-3	7.70	9.61	12*	N/A	48.1	69.0	Non - Poor	Siltation; Bank erosion; Chlorides	Urban Runoff; Altered Hydrology	TSS
17-2	6.10	22.1	21*	6.9*	50. 5	60.5	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	TSS

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
17-1	0.75	29.2	25*	6.2*	42.6	51.0	Partial (F)	Channelization; Chlorides; PAHs	Habitat Alteration; Urban Runoff; Altered Hydrology	TSS
Bull's Brook										
13-15	1.95	1.92	15*	N/A	32.4*	63.3	Non - Poor	Siltation; Bank erosion;	Urban Runoff; Altered Hydrology	NA
13-7	0.25	2.69	26*	N/A	39.9*	64.0	Non - Fair	Siltation; Conductivity; Manganese	Urban Runoff; Altered Hydrology	NA
Forest Lake Drain										
15-11	0.83	1.70	16*	N/A	28.5*	58.0	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA
Indian Creek										
15-9	10.83	2.68	18*	N/A	20.9*	62.3	Non - Poor	Siltation; Manganese	Urban Runoff; Altered Hydrology	D.O.
15-6	9.83	3.70	21*	N/A	23.7*	65.5	Non - Fair	Siltation; Bank erosion; Chlorides; Manganese	Urban Runoff; Altered Hydrology	D.O.

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
15-5	5.40	17.3	27*	N/A	37.7*	59.8	Non - Fair	Siltation; Chlorides	Urban Runoff; Altered Hydrology	D.O.
15-2	2.41	35.0	35*	6.7*	58.5	79.0	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	D.O.
15-1	0.17	36.4	22*	4.9*	57.3	64.5	Partial (F)	Channelization; Siltation; Chlorides; Manganese	Habitat Alteration; Urban Runoff; Altered Hydrology	D.O.
Killdeer Creek										
15-12	5.20	2.08	20*	N/A	37.0*	46.5	Non - Fair	Siltation	Urban Runoff; Altered Hydrology	NA
15-7	4.60	2.86	17*	N/A	32.4*	53.5	Non - Poor	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
15-13	2.21	5.01	20*	N/A	56.1	58.0	Partial (F)	Siltation; Bank erosion;	Urban Runoff	NA
15-4	0.17	6.80	23*	N/A	42.0	61.0	Partial (F)	Siltation; Bank erosion; No riparian; Chlorides	Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
Newport Drainage Ditch										
12-2	3.03	2.81	21*	N/A	33.7*	38.0	Non - Fair	Siltation; Channelization	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
12-1	0.70	7.35	29*	N/A	46.5	47.0	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
Stoneroller Creek										
13-9	0.42	4.08	34*	N/A	57.9	72.8	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
Suburban Country Club Tributary										
13-12	2.75	2.37	15*	N/A	31.6*	41.5	Non - Poor	Siltation; Channelization	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
13-10	2.00	4.02	22*	N/A	19.2*	47	Non - Poor	Siltation; Channelization; Chlorides	Habitat Alteration; Urban Runoff	NA

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
Slocum Corners Creek										
13-11	1.36	2.39	24*	N/A	41.4	61.5	Non - Fair	Siltation; No riparian; Chlorides	Urban Runoff; Altered Hydrology	NA
Unnamed Tributary to Aptakisic Creek										
18-5	0.05	0.99	27*	N/A	21.7*	47	Non - Fair	Channelization; Siltation	Habitat Alteration;	NA
Unnamed Tributary to Buffalo Creek										
17-4	0.68	8.55	12*	N/A	27.0*	63	Non - Poor	Siltation; No riparian; Chlorides	Urban Runoff; Altered Hydrology	NA
Unnamed Tributary to Des Plaines River										
13-17	0.13	0.86	18*	N/A	22.9*	62	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA
Unnamed Tributary to North Branch Mill Creek										
10-6	0.04	0.99	12*	N/A	26.8*	61	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA
Unnamed Tributary to Greenleaf Creek										
13-13	0.40	1.06	28*	N/A	20.3*	68.5	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
West Branch Indian Creek										
15-10	0.80	2.22	13*	N/A	25.9*	63	Non - Poor	Bank erosion; Siltation	Urban Runoff; Altered Hydrology	NA
West Branch Bull Creek										
14-4	2.54	5.10	16*	N/A	18.7*	32.5	Non - Poor	Dissolved Oxygen; Channelized; Siltation	Habitat Alteration; Urban Runoff	NA
14-3	1.60	7.05	26*	N/A	64.2	64	Partial	Siltation; No riparian;	Urban Runoff; Altered Hydrology	NA
West Fork Belvidere Rd. Tributary										
13-14	0.21	2.30	15*	N/A	28.3*	57.5	Non - Poor	Siltation; Channelization; Manganese	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
13-8	0.15	3.75	31*	N/A	48.9	69.5	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
Werhane Lake Drain										
16-9	0.40	1.19	35*	N/A	41.4	59	Non - Fair	Siltation	Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
Unnamed Tributary to Werhane Lake Drain										
16-10	0.10	0.22	22*	N/A	-	49.5	Non - Fair	Siltation	Urban Runoff; Altered Hydrology	NA
16-10B	0.80	0.22	-	-	43.4	-	NA			
Mill Creek										
11-6	17.20	4.51	21*	N/A	32.5*	40	Non - Fair	Siltation; Chlorides; PAHs	Urban Runoff; Altered Hydrology	NA
11-5	13.80	10.4	20*	N/A	30. 8*	49	Non - Fair	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
11-4	10.10	18.3	22*	N/A	36. 6*	57	Non - Fair	Siltation; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH
11-3	7.20	21.4	14*	4.6*	48.3	63	Non - Poor	Siltation; Bank erosion; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH
11-2	1.71	62.3	32*	9.3	25. 8*	79	Non - Fair	Siltation; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH
11-1	0.70	63.8	31*	7.9^{ns}	50.7	71	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH

DRWW Site ID	River Mile	Drain-age Area (mi.^{2})	fIBI	MIwb[1]	mIBI	QHEI	Attain-ment Status[2]	MBI Causes	MBI Sources	IEPA Causes
North Branch Mill Creek										
10-3	10.20	20.8	14*	7.3*	33.1*	52	Non - Poor	Siltation; Conductivity	Urban Runoff; Altered Hydrology	D.O., TP
10-2	8.10	29.4	13*	3.8*	31.6*	75.5	Non - Poor	Siltation; Conductivity	Urban Runoff; Altered Hydrology	NA
10-1	1.10	32.0	22*	5.3*	55.3	70	Partial (F)	Siltation; Conductivity	Urban Runoff; Altered Hydrology	As, Mn, TP, Siltation

[1] The Modified Index of Well-Being (MIwb; Gammon 1976; Ohio EPA 1987) does not have a biocriterion in IL – the default is the Ohio value for the E. Corn Belt Plains (ECBP) ecoregion wading (8.3) and boat sites (8.5) with a 0.5 unit allowable departure designated as [ns]; the MIwb is not calculated for headwater sites <20 mi.^{2}.

[2] - **IEPA Aquatic Life Use Support Thresholds**

AQLU Status	fIBI	mIBI
Full Support	≥41	≥41.8
Non-Support Fair	>20,<41	≥20.9,<41.8
Non-Support Poor	≤20	<20.9

[3] Partial support is a non-IEPA designation to a site with the non-attaining assemblage below the full support level for the fIBI or mIBI.

[4] NA – Status and causes were not assessed at this location by IEPA.

[5] – Extrapolated from field conductivity measures.

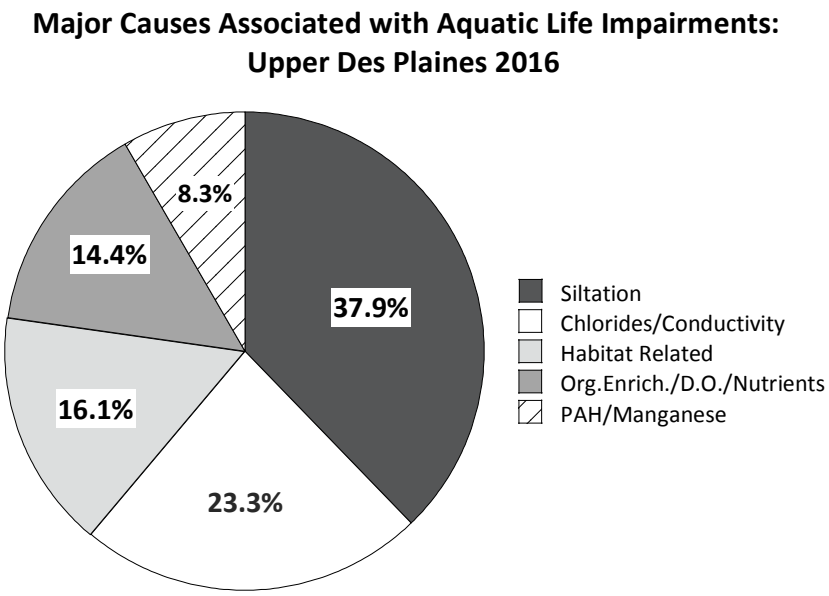

***Figure 1**. Major causes associated with aquatic life impairments in the Upper Des Plaines study area, 2016.*

PAHs). Certain causes such as siltation (66 of 70 sites) and chlorides (41 of 70 sites) were pervasive throughout the study area while others were either localized or sporadic throughout the study area. Sources included urban runoff, habitat alterations, altered hydrology, and WWTP effluent. These constitute the principal causes and sources that would need to be addressed to resolve the aquatic life impairments listed in Table 1. Illinois EPA (2016a) listed a different set of causes at 20 of the 64 biological sites including arsenic, chlorides, low dissolved oxygen, pH, fecal coliform bacteria, iron, manganese, methoxychlor, mercury, phosphorous, polychlorinated biphenyls, and total suspended solids. Some of this is likely due to the different interpretation of effect threshold exceedances and that IEPA sampled less than one-third of the sites sampled in the 2016 Upper Des Plaines watershed bioassessment.

Synthesis of Results

Biological signatures of siltation related impacts, altered hydrology, and organic enrichment from multiples sources were evident throughout the 2016 study area. Organic enrichment related biological responses in the form of increases in tolerant species, reductions in numbers and biomass, and increased DELT anomalies on fish occurred downstream from WWTPs in Aptakisic Creek and Mill Creek with the former revealing a toxic response signature in the macroinvertebrate results. Sediment contamination was revealed with PAH compounds exceeding consensus based threshold and probable effect levels in the mainstem and several tributaries correlated with the degree of urbanization. Only a few D.O. exceedances were measured by daytime grab sampling and those were largely in the very sluggish and highly enriched upper Des Plains River mainstem - continuous monitoring is needed to better reveal where such exceedances may be limiting to aquatic life. Continuous monitoring is also needed to reveal where nutrient enrichment is contributing to excessive diel D.O. fluctuations that rarely coincide with exceedances of the average and minimum D.O. criteria. The most prevalent stressor across all sites in the Upper Des Plaines River watershed is heavy siltation associated with habitat alterations and altered hydrology from urban and suburban runoff. Dissolved materials in the form of elevated chlorides and conductivity were prevalent in the most urbanized parts of the mainstem Upper Des Plaines River and tributary subwatersheds. A trend analysis revealed that chlorides are increasing at the rate of 1.7 to 3.6 mg/L on an annual

basis. Chlorides were the second most prevalent cause associated with the biological impairments.

Recreational Use Assessment

Levels of fecal bacteria in the form of *Escherichia coli* (*E. coli*) cfu/100 mL were used to assess the status of the General Use for recreational in and on the water. The IEPA criteria are expressed as counts of fecal coliform bacteria, which were not measured, so the U.S. EPA national criteria for *E. coli* were used instead. Fecal bacteria criteria are generally in terms of a geometric mean and a statistical threshold value (STV) which is the 90th percentile of the data distribution that is not be exceeded by more than 10 percent of the samples. Given the low sample size, the maximum values were used here as an approximation of the STV. The recommended geometric mean criteria value is 126 cfu/100 ml and the STV criteria value is 410 cfu/100 ml (U.S. EPA 2012). There were numerous exceedances of the U.S. EPA recommended criteria (Table 2). With one exception, the exceedances of both the geometric mean and maximum in the Des Plaines mainstem occurred downstream from the discharge of treated sewage effluent. An exceedance of the maximum occurred at RM 102.9 (site 13-4) which is upstream of all major WWTPs. Two tributaries with exceedances of the geometric mean and maximum included Hastings Creek and Aptakisic Creek and both were downstream of WWTP discharges. Exceedances of both the geometric mean and maximum occurred in other tributaries and with no apparent relationship to a specific source or sources, except generalized urban and agricultural runoff. Even so, these results will be valuable for more detailed investigation of possible sources of fecal contamination. The low frequency of sampling is less than what IEPA requires for an impaired waters listing based on recreational use impairment.

Table 2. *E. coli values (cfu/100 ml) for samples collected in the Upper Des Plaines study area during May-October 2016. Yellow shaded values exceed the recommended U.S. EPA (2012) recreation use criteria.*

DRWW Site ID	Basin Code	Stream Code	River Mile	N	Minimum (cfu/100 mL)	Geometric Mean (cfu/100 mL)	Maximum (cfu/100 mL)
Des Plaines River							
13-6	95	656	109.3	6	27.2	92.6	387
13-5	95	656	106.6	5	6.3	49.9	131
13-4	95	656	102.9	6	42.2	111.6	548
13-3	95	656	98.7	5	65.7	214.4	1050
13-2	95	656	96.82	6	1	106.1	816
13-1	95	656	94.2	6	88.4	147.1	219
16-6	95	656	87.1	6	81.6	126.3	326
16-5	95	656	83.6	6	55.4	139.6	435
16-4	95	656	80	6	64.4	145.8	228
16-3	95	656	76.7	6	65.1	138.3	411
16-2	95	656	75.4	6	54.6	121.1	308
16-1	95	656	71.7	6	2	49.9	387

DRWW Site ID	Basin Code	Stream Code	River Mile	N	Minimum (cfu/100 mL)	Geometric Mean (cfu/100 mL)	Maximum (cfu/100 mL)
Hastings Creek							
10-5	95	702	3.12	5	3.1	106.2	921
10-4	95	702	1.68	5	179	390.9	980
North Mill Creek							
10-3	95	996	10.2	5	1	115.3	816
10-2	95	996	8.1	6	98.5	374.2	1050
10-1	95	996	1.1	6	1	150	866
Mill Creek							
11-6	95	995	17.2	6	435	656.3	921
11-5	95	995	13.8	6	1	50.8	201
11-4	95	995	10.1	6	115	189.7	345
11-3	95	995	7.2	5	1	74.5	488
11-2	95	995	1.71	6	52.1	239.4	866
11-1	95	995	0.7	6	80.9	258.9	727
Newport Drainage Ditch							
12-1	95	708	0.7	6	1	90.4	517
Hastings Creek							
13-9	95	702	0.42	5	27.9	106.9	649
Bull's Brook							
13-7	95	704	0.25	6	1	16.9	980
Suburban Country Club Tributary							
13-10	95	710	2	6	1	130.7	816
Slocum Corners Creek							
13-11	95	711	1.36	5	162	655.7	1200
West Fork Belvidere Rd. Tributary							
13-8	95	720	0.15	6	21.6	86.7	326
Bull Creek							
14-2	95	051	1	6	86.5	216.2	345
14-1	95	051	0.5	6	201	410.4	921
Seavey Drainage Ditch							
15-3	95	390	3.66	5	196	**346.3**	649
Indian Creek							
15-6	95	706	9.83	5	1	101.8	770
15-5	95	706	5.4	6	1	105.3	579
15-2	95	706	2.41	6	131	296.1	579
15-1	95	706	0.17	6	59.8	299.9	980
Killdeer Creek							
15-7	95	707	4.6	6	93.3	156	219
15-4	95	707	0.01	6	88.4	368.7	886

DRWW Site ID	Basin Code	Stream Code	River Mile	N	Minimum (cfu/100 mL)	Geometric Mean (cfu/100 mL)	Maximum (cfu/100 mL)
Buffalo Creek							
17-3	95	703	7.7	5	1	84.7	687
17-2	95	703	6.1	5	30.9	73.4	167
17-1	95	703	0.75	4	1	66.3	816
Unnamed Tributary to Buffalo Creek							
17-4	95	713	0.68	6	1	15.2	276
Aptakisic Creek							
18-2	95	701	0.8	6	1	94.7	345
18-1	95	701	0.5	6	93.3	225.4	488

Appendix G: Pollutant Load Methodology & Flow and Load Duration Results

SWAMM™ Results & Methodology

Spatial Watershed Assessment & Management Model

Des Plaines River Watershed

Illinois, Wisconsin

Prepared By:
Northwater Consulting
For:
Lake County Stormwater management Commission (LCSMC)

February, 2018

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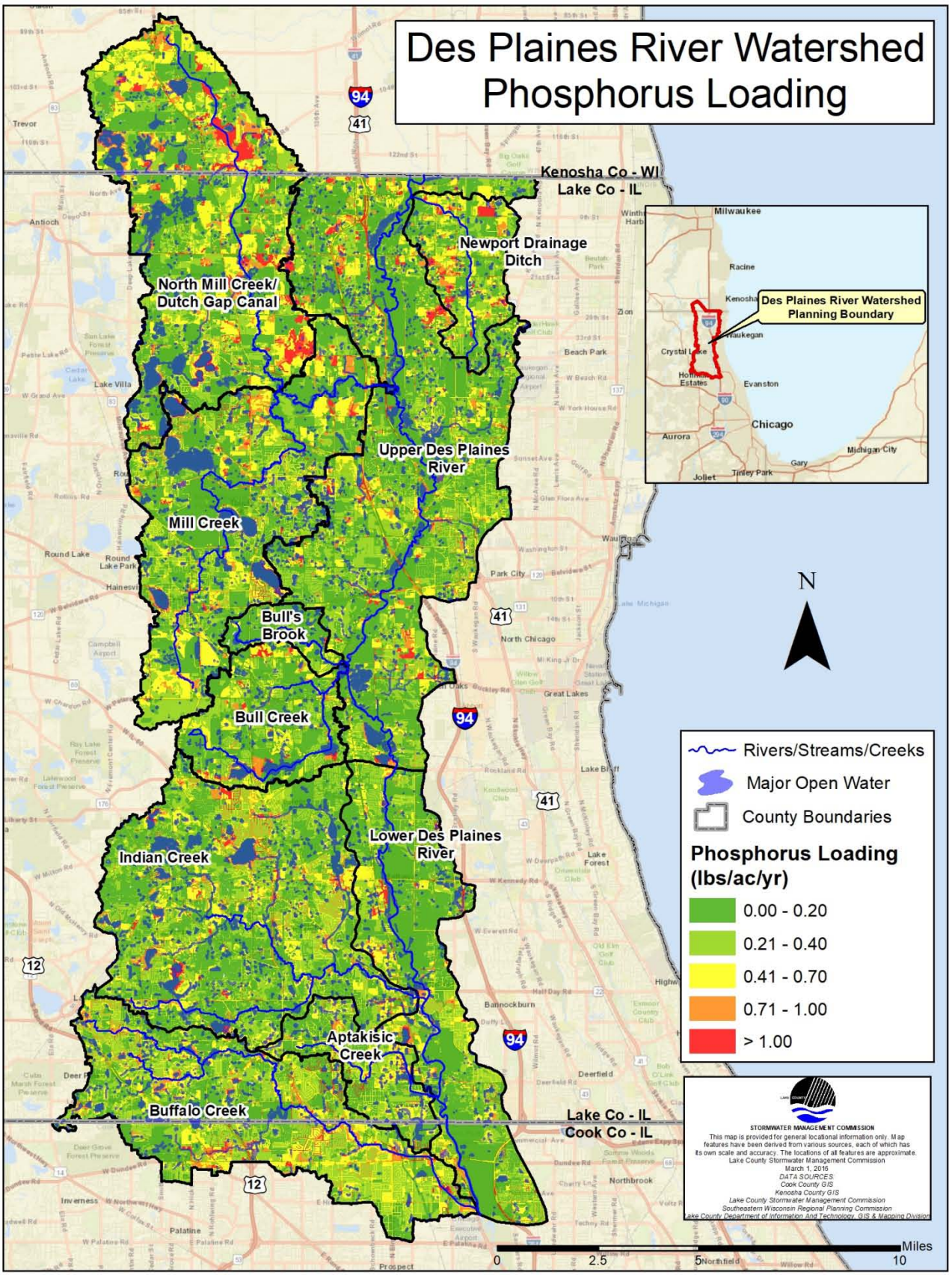
Figure 1 - Model Extent; Location Map



SWAMM™ Methodology

1.0 Introduction

A customized SWAMM™ (Spatial Watershed Assessment and Management Model) was developed for the Des Plaines River Watershed for both current and future landuse. The custom model estimates parcel level pollutant loading of Total Nitrogen (TN), Total Phosphorus (TP), Sediment (TSS), Chloride (Cl) and Fecal Coliform Bacteria. This paper summarizes the results and methodology of the model.

The model is built using custom GIS data layers and existing public data layers that encompass soils, landuse, and climate. Model results are aggregated into individual units of pollution loading based on landuse, parcel boundaries and soil types. A series of industry standard equations are built into the model to estimate runoff, soil erosion, delivery ratios and ultimately estimate total nonpoint-source pollutant loading of the selected parameters. For this model, Northwater worked directly with SMC to compile Event Mean Concentration (EMC) values for different land uses, which were incorporated into the model.

The model was calibrated to acceptable ranges by comparing USGS gauge data and DRWW monitoring results for the watershed. Climate data from 1980 through 2016 were used to generate rainfall statistics for the model.

The model results can be analyzed by subwatershed, catchments, and landuse. Results can also be analyzed based on user defined boundaries and presented in map format, easily overlaid on existing base maps. The model includes 191,905 unique records for current landuse and 69,651 unique records for future landuse from which pollution loading is analyzed.

2.0 SWAMM™ Methodology

The custom SWAMM™ model consists of two primary components:

- Universal Soil Loss Equation (USLE) Component
- Event Mean Concentration (EMC) Component

2.1 Universal Soil Loss Equation (USLE) Component

The overall analysis methodology was modified by Northwater from:

> *Mitasova and Lubos Mitas: Modeling soil detachment with RUSLE3d using GIS, 1999; University of Illinois. http:/skagit.meas.ncsu.edu/~helena/gmslab/erosion/usle.html*

The USLE component of the model was applied to agricultural land uses within the watershed. The USLE methodology incorporated into the model is summarized below:

- 1:24,000 NRCS Soil Survey Geographic Database (SSURGO) Digital Soils.
- Selected appropriate soil types and relevant USLE factors identified and calculated from SSURGO soils dataset.

Table 1 - USLE Parameters

USLE EQUATION: Annual Soil Loss = LS □ K □C □ R □ P

Land Use	C factor	K factor	LS factor	R factor	P factor
Row Crops	Spring-Till/Mulch-Till/Reduced-Till = 0.25 Alfalfa/Wheat = 0.02 No-Till = 0.12 Strip-Till = 0.16 No-Till with Cover Crops = 0.04 Hay = 0.01 Conventional-Till = 0.42 0.18 used for all future landuse (watershed average)	Values included in SSURGO tabular data	SSURGO tabular data; calculated from slope and slope length values or from local NRCS	140	0.5-1 0.82 used for all future landuse (watershed average)

2.2 Event Mean Concentration (EMC) Component

All formulas and selected variables were derived from: *STEPL (Spreadsheet Tool for Estimation of Pollutant Load) Version 3, Tetra Tech, 2004.*

EMC values and runoff curve numbers were derived from several sources, which are annotated in section 5.0.

Bacteria

For Bacteria, Schueler's Simple Method (1987) was modified for estimating bacterial loads.

Precipitation

Annual precipitation, number of rain days and correction factors were determined using the Elgin and Antioch weather stations. A period of 36 years was used (1980-2016) to determine the parameters outlined in Table 3:

Table 2 – Rainfall Factors

Average Number of Rain Days	Rain Days Correction Factor	Average P Value (inches)
112.81	**0.434**	**0.65**

Delivery Ratio

A distance based delivery ratio was applied to soil, based on:

Minnesota Board of Water & Soil Resources, Pollution Reduction Estimator Water Erosion - Microsoft Excel® Version September 2010.

Delivery Ratio = Polygon Distance from Stream ^$^{-0.2069}$

Table 3 - Model Parameters

Model	Rain days	Correction Factor (precipitation and rain days)	Curve Number (by soil hydrologic group)	Runoff (by soil hydrologic group in inches)	EMC for N, P, Chloride, TSS, Bacteria
All landuse	see Table 2 above	see Table 2 above	see Table 4 below	Calculated using the following equation: $Q = \frac{((P - (IaXS))^{\wedge 2}}{P + 0.8 X S}$ $S = \frac{1000}{CN} - 10$ Q = Runoff (inches) P = Precipitation (inches) S = Potential max retention (inches) CN = Curve Number Ia = Initial abstraction factor; set to 0 for annual runoff	see Table 4 below

Table 4 - Event Mean Concentrations & Curve Numbers; Current Landuse

Landuse Category	EMC Chloride (mg/l)	EMC N (mg/l)	EMC P (mg/l)	EMC TSS (mg/l)	Bacteria (counts/ 100ml)	Curve # A Group	Curve # B Group	Curve # C Group	Curve # D Group
Airport (High)	300	2.3	0.34	153	1700	89	92	94	95
Airport (Medium)	300	2.3	0.34	153	1700	77	85	90	92
Beaches	0.91	2.5	0.2	30	3846	63	N/A	N/A	N/A
Bus Facility (Very High)	200	2.3	0.34	240	1400	96	96	96	96
Bus Facility (Medium)	148	2.3	0.34	240	1400	81	88	91	93
Cemetery (High)	148	3.1	0.46	84	1400	68	79	86	89
Cemetery (Medium)	148	3.1	0.46	84	1400	49	69	79	84
Cemetery (Low)	74	3.1	0.46	84	1400	39	61	74	80
Commercial/Retail (Very High)	250	3	0.42	206	1800	96	96	96	96
Commercial/Retail (High)	250	3	0.42	206	1800	89	92	94	95
Commercial/Retail (Medium)	148	3	0.4	153	1400	77	85	90	92
Commercial/Retail (low)	148	2.8	0.4	153	1400	61	75	83	87
Cultural and Entertainment (Very High)	148	2.16	0.3	206	1800	96	96	96	96
Cultural and Entertainment (High)	148	2.16	0.3	206	1800	89	92	94	95
Cultural and Entertainment (Medium)	148	1.3	0.29	153	1400	77	85	90	92
Cultural and Entertainment (Low)	148	1.3	0.29	153	1400	61	75	83	87
Equestrian Pasture (Very High)	0.91	13.5	2.6	390	36000	77	86	91	94
Equestrian Pasture (High)	0.91	10.1	1.5	300	22000	75	84	89	91
Equestrian Pasture (Medium)	0.91	6	0.6	150	13000	57	72	81	86
Equestrian Pasture (Low)	0.91	3.6	0.36	70	10500	39	61	74	80
Farm Building (Very High)	71	7.1	0.45	240	9000	96	96	96	96
Farm Building (High)	71	7.1	0.45	240	9000	81	88	91	93
Farm Building (Medium)	15	6.8	0.42	160	8400	61	75	83	87
Farm Building (Low)	15	6.8	0.33	72	8400	51	68	79	84

Landuse Category	EMC Chloride (mg/l)	EMC N (mg/l)	EMC P (mg/l)	EMC TSS (mg/l)	Bacteria (counts/ 100ml)	Curve # A Group	Curve # B Group	Curve # C Group	Curve # D Group
Feed Lot (High)	0.91	13.5	2.6	390	36000	77	86	91	94
Feed Lot (Medium)	0.91	10.1	1.5	280	13000	76	85	90	93
Feed Lot (Low)	0.91	6.75	0.75	240	10500	68	79	86	89
Forest	0.91	1.4	0.15	30	1000	30	55	70	77
Golf Courses	0.91	3.6	0.6	84	2600	76	79	80	81
Government/Institutional (Very High)	148	3.2	0.42	206	1800	96	96	96	96
Government/Institutional (High)	148	3.2	0.42	206	1800	89	92	94	95
Government/Institutional (Medium)	148	3	0.4	153	1400	77	85	90	92
Government/Institutional (Low)	148	2.8	0.4	153	1400	61	75	83	87
Grassland	0.91	0.7	0.13	15	1000	39	61	74	80
Hotel/Motel (Very High)	148	3	0.42	206	2500	96	96	96	96
Hotel/Motel (High)	148	3	0.42	206	2500	89	92	94	95
Industrial (Very High)	148	2.4	0.31	230	2500	96	96	96	96
Industrial (High)	148	2.4	0.31	230	2500	89	92	94	95
Industrial (Medium)	148	2.2	0.31	215	2300	81	88	91	93
Industrial (Low)	148	2	0.29	153	1400	61	75	83	87
Junk Yard (High)	148	2.6	0.31	300	2500	72	80	85	87
Junk Yard (Medium)	148	2.6	0.31	300	2500	61	75	83	87
Landfill	148	2.6	0.31	230	2500	81	88	91	93
Mobile Homes (Very High)	50	3.3	0.4	153	8700	81	88	91	93
Mobile Homes (High)	50	3.3	0.4	153	8700	77	85	90	92
Mobile Homes (Medium)	50	3.2	0.39	150	8700	61	75	83	87
Office/Research (Very High)	148	3.2	0.42	153	1400	96	96	96	96
Office/Research (High)	148	3.2	0.42	153	1400	89	92	94	95
Open Space Road	15	3.6	0.7	84	1000	39	61	74	80
Open Water	120	0.375	0.025	1.5	276	100	100	100	100
Stream	70	1.25	0.11	3.1	500	100	100	100	100
Orchards and Nurseries	0.91	6.8	0.42	160	5200	51	68	79	84
Other Conservation	0.91	0.7	0.15	15	1000	35	58	72	79
Other Open Space	0.91	1.4	0.15	30	1000	30	55	70	77
Parking Lot	250	2.3	0.34	153	1700	98	98	98	98
Parks and Recreation (Very High)	15	2.5	0.2	30	1000	72	80	85	87
Parks and Recreation (High)	15	2.5	0.2	30	1000	68	79	86	89
Parks and Recreation (Medium)	15	2.5	0.2	30	1000	49	69	79	84
Parks and Recreation (Low)	0.91	2.5	0.2	30	1000	39	61	74	80
Pasture (Very High)	0.91	13.5	2.6	390	36000	77	86	91	94
Pasture (High)	0.91	10.1	1.5	300	22000	75	84	89	91
Pasture (Medium)	0.91	6	0.6	150	13000	57	72	81	86
Pasture (Low)	0.91	3.6	0.36	70	10500	39	61	74	80
Rail Station (Very High)	148	2.3	0.34	240	1400	96	96	96	96
Rail Station (High)	148	2.3	0.34	240	1400	89	92	94	95
Rail Station (Medium)	148	2.3	0.34	120	1400	77	85	90	92
Railroad	148	2	0.34	240	1700	89	89	89	89

Landuse Category	EMC Chloride (mg/l)	EMC N (mg/l)	EMC P (mg/l)	EMC TSS (mg/l)	Bacteria (counts/ 100ml)	Curve # A Group	Curve # B Group	Curve # C Group	Curve # D Group
Recreational Trails	15	2.5	0.15	72	1000	85	85	85	85
Residential Multi-Family (Medium)	148	3.2	0.3	153	8400	61	75	83	87
Residential Multi-Family (Low)	148	3.2	0.3	73	8300	54	70	80	85
Residential Single-Family (Very High)	148	3.2	0.3	206	8400	94	94	94	94
Residential Single-Family (High)	148	3.2	0.3	206	8400	81	88	91	93
Residential Single-Family (Medium)	148	3.2	0.3	153	8400	61	75	83	87
Residential Single-Family (Low)	148	3.2	0.3	73	8300	54	70	80	85
Residential Farm (Very High)	74	3.3	0.32	260	10500	81	88	91	93
Residential Farm (High)	74	3.3	0.32	260	10500	77	85	90	92
Residential Farm (Medium)	74	3.3	0.32	130	10500	61	75	83	87
Residential Farm (Low)	74	3.3	0.32	65	10500	51	68	79	84
Under Development	15	1.3	0.18	153	1300	77	85	91	94
Roads	300	2.3	0.34	153	1700	98	98	98	98
Row Crops (Conventional Tillage)	0.91	7.1	0.6	N/A	2600	72	81	88	91
Row Crops (Spring Till/Reduced-Till)	0.91	7.1	0.6	N/A	2600	71	80	87	90
Row Crops (No Till)	0.91	6	0.5	N/A	2600	67	78	85	89
Row Crops (No Till and Cover Crop)	0.91	5	0.42	N/A	2600	64	75	82	85
Row Crops (Wheat)	0.91	5	0.42	N/A	2600	65	76	84	88
Row Crops (Hay)	0.91	2.5	0.2	N/A	2600	39	58	71	78
Row Crop with Nutrient Management Plan	-	4.5	0.275	-	-	-	-	-	-
Urban Open Space	0.91	2.5	0.15	30	1000	49	69	79	84
Utilities (Very High)	148	2.1	0.34	153	1400	96	96	96	96
Utilities (High)	148	2.1	0.34	153	1400	89	92	94	95
Utilities (Medium)	148	2.1	0.3	77	1400	77	85	90	92
Utilities (Low)	148	1.3	0.3	65	1400	57	72	81	86
Utility ROW	0.91	2.5	0.15	30	1000	39	61	74	80
Vacant	0.91	1.3	0.15	30	1000	34	57	72	78
Vehicle Dealership (Very High)	250	3	0.42	206	1400	96	96	96	96
Vehicle Dealership (High)	250	3	0.42	206	1400	89	92	94	95
Vehicle Dealership (Medium)	148	3	0.4	153	1200	77	85	90	92
Vehicle Dealership (Low)	148	2.8	0.4	153	1200	61	75	83	87
Warehousing (Very High)	148	2.6	0.4	206	2300	96	96	96	96
Warehousing (High)	148	2.6	0.4	206	2300	92	93	94	95
Warehousing (Medium)	148	2.6	0.4	153	2200	77	85	90	92
Warehousing (Low)	148	1.3	0.3	65	1400	61	75	83	87
Wetlands	0.91	0.7	0.19	10.2	500	38	60	74	80

Table 5 - Event Mean Concentrations & Curve Numbers; Future Landuse

Landuse Category	EMC Chloride (mg/l)	EMC N (mg/l)	EMC P (mg/l)	EMC TSS (mg/l)	Bacteria (counts/ 100ml)	Curve # A Group	Curve # B Group	Curve # C Group	Curve # D Group
Agricultural	0.91	7.1	0.6	N/A*	2600	71	80	87	90
Government/Institutional	148	3.2	0.42	206	1800	89	92	94	95
Industrial	148	2.4	0.31	230	2500	89	92	94	95
Mixed Use/General	148	3	0.42	153	1400	77	85	90	92
Residential	148	3.2	0.3	153	8400	81	88	91	93
Office and Research Parks	148	3.2	0.42	153	1800	89	92	94	95
Public/Private Open Space	15	2.5	0.2	30	1000	49	69	79	84
Low Residential with Sewer	113	2.6	0.24	51	7055	54	70	80	85
Retail/Commercial	250	3	0.42	206	1800	89	92	94	95
Vacant	0.91	1.3	0.15	30	1000	34	57	72	78
Medium Density Urban	148	3.2	0.3	153	8400	61	75	83	87
Low Density Urban	148	3.2	0.3	153	8400	51	68	79	84
Utility/Transport	148	2.1	0.34	153	1400	89	92	94	95
Gateway	148	3.2	0.42	153	1800	69	79	86	89
Water	120	0.375	0.025	1.5	276	100	100	100	100

3.0 Model Calibration

The model was calibrated using a load duration analysis based on USGS gauge data and DRWW monitoring results. Average per acre loading data from several regionally-derived plans, publications, and other documents was also utilized. Calibration was performed for:

1. Quality Assurance / Quality Control – to find and correct user errors in the model scripts and algorithms.
2. To evaluate whether stream-flow (runoff) and pollutant loading were in the correct ranges based on existing data analysis and literature.
3. To calibrate model by adjusting parameters so that cumulative model results represent regional averages.

The model is estimating accumulated/delivered pollutant loading, represented mostly in the literature. Important notes on the model include:

- The model does not directly account for point-source pollution.
- The model estimates annual pollutant mobilization from individual parcels of land and does not take into account storage, fate, and transport watershed processes.
- The model accounts for precipitation runoff; but not base flow, point source discharges or drainage-tile contributions.

A total 2 calibration runs were performed on the initial model results. For the first calibration run, the existing detention correction (see section 5.0) was decreased for TSS and TP; all TN and Cl EMC's were doubled. For the second and final calibration run, the existing detention correction (see section 5.0) was decreased slightly for TN and Cl.

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5.0 Supplemental Model Notes & Output GIS Metadata

1. The most current landuse data were used. Landuse data were modified to represent a hybrid landuse/landcover layer by interpreting recent aerial imagery, digitizing/labeling polygons and reclassifying existing land use categories. Additional information was appended to the landuse to represent type of row crops tillage. Where applicable, many landuse categories were modified and classified into very high, high, medium, and low density.
2. Individual locations were coded as detained if they drained to an existing retention/detention basin and a correction factor was applied and adjusted during the calibration phase.
3. EMC values for nitrogen and phosphorus were reduced if a farm field was known to have a Nutrient Management Plan.
4. Individual site adjustments were made if a known or previously implemented BMP was identified.
5. Equestrian and pasture areas were further delineated to represent living quarters/buildings and dry/concentrated feeding areas versus grazing or grass areas. These areas were classified into very high, high, medium, and low based on pasture quality based on a field assessment or an interpretation of aerial imagery.
6. The stream/waterbody file used to run proximity calculations for the purposes of determining a delivery ratio was modified using a National Hydrography Dataset (NHD) file and a streams and lake file provided by the Lake County Stormwater Management Commission representing linear water features and the outer boundary of water feature areas (e.g., lakes and ponds). These stream and lake files were combined into one GIS file, overlaid on aerial imagery and edited to ensure they represent actual watershed features. This line file represents lake, pond, and lagoon outlines and perennial and intermittent stream centerlines.

Appendix H: Impervious Cover by Land Use

APPENDIX H - SUBWATERSHED IMPERVIOUS COVER BY LAND USE

Land Use	Aptakisic Creek					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	97.36	2.23%	24.80	0.57%	45.32	1.04%
Commercial and Services	1.29	0.03%	13.75	0.31%	153.43	3.51%
Forest, Grassland, And Wetlands	60.19	1.38%	80.59	1.84%	92.96	2.13%
Industrial, Warehousing, And Wholesale	8.83	0.20%	29.95	0.68%	539.00	12.32%
Institutional	14.83	0.34%	22.86	0.52%	68.40	1.56%
Open Space	143.69	3.28%	216.14	4.94%	95.29	2.18%
Residential	103.88	2.37%	410.82	9.39%	1,059.16	24.21%
Transportation, Communication, and Utilities	57.50	1.31%	153.02	3.50%	691.46	15.81%
Overall Impervious Cover	487.56	11.15%	951.92	21.76%	2,745.01	62.75%

Land Use	Buffalo Creek					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	269.82	1.55%	121.48	0.70%	88.93	0.51%
Commercial and Services	12.70	0.07%	68.87	0.40%	983.64	5.66%
Forest, Grassland, And Wetlands	655.14	3.77%	381.78	2.20%	203.32	1.17%
Industrial, Warehousing, And Wholesale	6.80	0.04%	53.04	0.30%	661.98	3.81%
Institutional	42.94	0.25%	109.66	0.63%	341.79	1.97%
Open Space	1,263.63	7.27%	565.57	3.25%	262.40	1.51%
Residential	952.90	5.48%	2,466.64	14.18%	4,365.35	25.10%
Transportation, Communication, and Utilities	56.13	0.32%	416.55	2.39%	2,345.38	13.48%
Overall Impervious Cover	3,260.05	18.74%	4,183.57	24.05%	9,252.78	53.20%

Land Use	Bull Creek					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	513.19	7.19%	75.17	1.05%	153.37	2.15%
Commercial and Services	2.34	0.03%	8.41	0.12%	143.92	2.02%
Forest, Grassland, And Wetlands	688.46	9.65%	192.51	2.70%	160.16	2.24%
Industrial, Warehousing, And Wholesale	5.66	0.08%	9.04	0.13%	300.77	4.21%
Institutional	66.68	0.93%	71.51	1.00%	153.96	2.16%
Open Space	1,065.64	14.93%	333.58	4.67%	171.27	2.40%
Residential	196.53	2.75%	635.16	8.90%	773.04	10.83%
Transportation, Communication, and Utilities	161.80	2.27%	181.62	2.54%	669.92	9.39%
Overall Impervious Cover	2,700.31	37.84%	1,506.99	21.12%	2,526.41	35.40%

Land Use	Bull's Brook					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	193.51	10.65%	4.41	0.24%	4.28	0.24%
Commercial and Services	0.04	0.00%	0.04	0.00%	11.62	0.64%
Forest, Grassland, And Wetlands	257.90	14.20%	13.73	0.76%	16.17	0.89%
Industrial, Warehousing, And Wholesale		0.00%		0.00%		0.00%
Institutional	5.01	0.28%	1.87	0.10%	3.81	0.21%
Open Space	679.77	37.42%	84.78	4.67%	41.67	2.29%
Residential	70.22	3.87%	101.70	5.60%	83.97	4.62%
Transportation, Communication, and Utilities	24.33	1.34%	27.46	1.51%	88.02	4.84%
Overall Impervious Cover	1,230.79	67.74%	234.00	12.88%	249.55	13.74%

Land Use	Indian Creek					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	2,682.38	11.11%	448.41	1.86%	300.05	1.24%
Commercial and Services	23.67	0.10%	68.98	0.29%	728.66	3.02%
Forest, Grassland, And Wetlands	1,670.63	6.92%	1,039.29	4.30%	702.82	2.91%
Industrial, Warehousing, And Wholesale	4.43	0.02%	50.28	0.21%	792.03	3.28%
Institutional	109.95	0.46%	127.21	0.53%	400.12	1.66%
Open Space	1,800.46	7.45%	1,328.37	5.50%	577.45	2.39%
Residential	1,189.67	4.93%	3,152.55	13.05%	3,633.90	15.05%
Transportation, Communication, and Utilities	127.72	0.53%	600.57	2.49%	2,346.55	9.72%
Overall Impervious Cover	7,608.92	31.51%	6,815.65	28.22%	9,481.58	39.26%

Land Use	Lower Des Plaines River					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	164.52	1.13%	37.73	0.26%	60.00	0.41%
Commercial and Services	56.03	0.38%	99.52	0.68%	1,049.42	7.18%
Forest, Grassland, And Wetlands	1,207.91	8.27%	253.89	1.74%	317.44	2.17%
Industrial, Warehousing, And Wholesale	7.82	0.05%	21.67	0.15%	365.16	2.50%
Institutional	22.26	0.15%	25.94	0.18%	136.76	0.94%
Open Space	4,027.99	27.58%	430.25	2.95%	341.53	2.34%
Residential	1,171.31	8.02%	1,263.62	8.65%	1,512.64	10.36%
Transportation, Communication, and Utilities	93.38	0.64%	219.13	1.50%	1,099.41	7.53%
Overall Impervious Cover	6,751.23	46.22%	2,351.76	16.10%	4,882.36	33.42%

Land Use	Mill Creek					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	3,743.91	18.92%	166.68	0.84%	173.92	0.88%
Commercial and Services	40.06	0.20%	29.18	0.15%	359.18	1.82%
Forest, Grassland, And Wetlands	2,830.34	14.31%	387.91	1.96%	299.47	1.51%
Industrial, Warehousing, And Wholesale	16.21	0.08%	11.98	0.06%	120.79	0.61%
Institutional	52.07	0.26%	73.71	0.37%	335.09	1.69%
Open Space	2,203.93	11.14%	485.01	2.45%	416.00	2.10%
Residential	598.33	3.02%	1,099.91	5.56%	2,290.85	11.58%
Transportation, Communication, and Utilities	253.83	1.28%	271.16	1.37%	1,802.76	9.11%
Overall Impervious Cover	9,738.67	49.23%	2,525.54	12.77%	5,798.07	29.31%

Land Use	Newport Drainage Ditch					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	1,738.49	34.64%	107.23	2.14%	170.00	3.39%
Commercial and Services	1.82	0.04%	1.97	0.04%	4.24	0.08%
Forest, Grassland, And Wetlands	848.09	16.90%	89.92	1.79%	96.57	1.92%
Industrial, Warehousing, And Wholesale	1.64	0.03%	0.78	0.02%	10.89	0.22%
Institutional	0.58	0.01%	1.86	0.04%	0.33	0.01%
Open Space	41.45	0.83%	20.22	0.40%	12.54	0.25%
Residential	463.44	9.24%	243.74	4.86%	192.97	3.85%
Transportation, Communication, and Utilities	419.91	8.37%	136.95	2.73%	310.92	6.20%
Overall Impervious Cover	3,515.42	70.06%	602.68	12.01%	798.46	15.91%

Land Use	North Mill Creek/Dutch Gap Canal					
	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	10,179.09	43.26%	288.44	1.23%	233.56	0.99%
Commercial and Services	21.20	0.09%	5.99	0.03%	42.04	0.18%
Forest, Grassland, And Wetlands	2,376.36	10.10%	180.88	0.77%	183.75	0.78%
Industrial, Warehousing, And Wholesale	20.08	0.09%	1.22	0.01%	15.77	0.07%
Institutional	64.08	0.27%	15.61	0.07%	41.01	0.17%
Open Space	4,368.95	18.57%	218.95	0.93%	127.87	0.54%
Residential	1,063.51	4.52%	503.79	2.14%	875.97	3.72%
Transportation, Communication, and Utilities	211.05	0.90%	157.92	0.67%	763.68	3.25%
Overall Impervious Cover	18,304.31	77.78%	1,372.80	5.83%	2,283.66	9.70%

Land Use	Upper Des Plaines River

	0-9% Impervious Cover		10-29% Impervious Cover		30-100% Impervious Cover	
	Acres	% Area	Acres	% Area	Acres	% Area
Agricultural Land	3,584.68	11.01%	270.04	0.83%	273.06	0.84%
Commercial and Services	12.93	0.04%	24.30	0.07%	1,112.79	3.42%
Forest, Grassland, And Wetlands	4,601.96	14.14%	738.72	2.27%	682.04	2.10%
Industrial, Warehousing, And Wholesale	51.04	0.16%	38.39	0.12%	571.09	1.75%
Institutional	166.87	0.51%	175.88	0.54%	380.80	1.17%
Open Space	6,171.30	18.96%	768.50	2.36%	589.07	1.81%
Residential	1,788.86	5.50%	2,173.30	6.68%	2,514.41	7.73%
Transportation, Communication, and Utilities	696.04	2.14%	701.46	2.16%	2,867.48	8.81%
Overall Impervious Cover	17,073.69	52.46%	4,890.59	15.03%	8,990.76	27.62%

Appendix I: Flood Audit Questionnaire and Flood Problem Area Update

STORMWATER MANAGEMENT COMMISSION

Des Plaines River Watershed Plan

Flood and Stormwater Questionnaire

We need information from you to effectively address flood damage.

Flooding is a problem that many Lake County residents have experienced, whether at home, in their yard, in their neighborhood, at work, or on area roadways. The Lake County Stormwater Management Commission (SMC) is currently preparing the Des Plaines River Watershed Plan (Plan). As we prepare this Plan, we want to learn more about when and where flooding occurs that impacts residents in the watershed. As part of the watershed planning process, SMC is trying to identify those structures in the watershed that are at risk of flooding so that the watershed plan can include reasonable solutions to reduce flood damage.

You may own a property in the Des Plaines River watershed that is in a neighborhood that was previously reported as a flood problem area, or all or part of your property is in a special flood hazard area as mapped by the Federal Emergency Management Agency (FEMA). You can help inform the SMC's efforts to address the County's flooding issues and needs by providing information about flood damage at your home or business. Therefore, we are requesting that you provide us with information regarding the flood history of your property by way of the attached questionnaire. If you have not experienced flooding on your property, please let us know by answering questions 1-15 of the questionnaire. The collective information received from the questionnaires will be summarized (without any address specific data) and used for flood mitigation planning purposes in the watershed assessment and action plan.

Completing the attached questionnaire and taking flood protection steps are voluntary. You are under no obligation to participate in this program. The requested information will help us develop a useful and cost-effective watershed improvement plan that properly addresses flood damage.

You may access the online questionnaire at: http://www.lakecountyil.gov/STORMWATER/Pages/default.aspx, or alternatively you may fill out the form that is attached and return it to the address below. **Please complete the questionnaire online, or mail the attached form by May 1, 2016.**

If you have any questions about the watershed plan or this questionnaire, feel free to email or call 847-377-7710.

Please return completed questionnaire via mail, e-mail, or fax to:

Lake County Stormwater Management Commission
ATTN: Sharon Osterby
500 W. Winchester Rd., Ste. 201
Libertyville, IL 60048
F: (847) 984-5747
E: sosterby@lakecountyil.gov

You may also complete this survey online at: http://www.lakecountyil.gov/STORMWATER/Pages/default.aspx

Thank you for your input!

1.	**First Name:**	**Last Name:**	
2.	**Street address:**		
	City:	**State:**	**Postal Code:**
	(If you have experienced flooding at this address, having this information can help us better understand where flooding occurs.)		
3.	**How long have you owned this property?**		
4.	**Type of Property:** ☐ Single Family Residential ☐ Multi-Family Residential ☐ Commercial/Business ☐ Other (please specify):		
5.	**Type of Foundation:** ☐ Basement ☐ Slab ☐ Crawlspace ☐ Don't know		
6.	**Type of Basement:** ☐ Finished ☐ Unfinished ☐ N/A		
7.	**Type of Water Supply:** ☐ Private Well ☐ Public water ☐ Don't know		
8.	**Type of Sewage Disposal:** ☐ Public Sanitary ☐ Private Septic ☐ Don't know		
9.	**Please indicate if you participate in the National Flood Insurance Program:** ☐ Yes ☐ No, skip to question 11		
10.	**If YES, please indicate what type of structure(s) have Flood Insurance at this property:** ☐ House with attached garage ☐ House and detached garage ☐ House only ☐ Garage only		

11. **Do you have a sewer/basement rider to your homeowner's insurance policy?**

☐ Yes
☐ No

12. **Has this property ever been flooded?**

☐ Yes
☐ No

13. **If YES, please indicate in what year(s) this property has flooded:**

14. **Has this property ever had a stormwater drainage problem?**

☐ Yes
☐ No

If YES, please indicate in what year(s) this property has had stormwater drainage problems:

If NO, you have finished this survey! Please accept our sincerest gratitude for your participation.

15. **Please indicate when the flooding occurs and how often the flooding occurs at this property:**

	All the time	Frequently	Infrequently	Seldom	Not at all
During light rain fall?					
During moderate rain fall?					
During heavy rainfall?					
During severe storms (e.g., April 2013)?					

16. **Please indicate where the flooding occurs and characterize how severe it typically is.**

	Not a problem	Nuisance	Moderate	Severe
Yard	☐	☐	☐	☐
Garage	☐	☐	☐	☐
Crawl space	☐	☐	☐	☐
Basement	☐	☐	☐	☐
First floor	☐	☐	☐	☐

17. **Please indicate how deep the flooding typically is:**

Depth	1-6 inches	6-12 inches	1-3 feet	3 feet or more
Yard				
Garage				
Crawl space				
Basement				
First floor				

18.	**What do you believe to be the main source(s) of this flooding? (check all that apply)**	
	Sump pump failure/power failure	☐
	Sanitary sewer backup	☐
	Overland flow from nearby lake or stream	☐
	Overland flow from adjacent property or public right-of-way (e.g., street)	☐
	Overland flow from this property (e.g., yard, rooftop, driveway)	☐
	Water entering through a building opening (e.g., door, window)	☐
	Water seeping through foundation cracks or joints (e.g., basement wall, basement floor)	☐
	Improper/poor grading of this property	☐
	Improper/poor grading of adjacent property or public right-of-way (e.g., street)	☐
	Poor/inadequate drainage of this property	☐
	Poor/inadequate drainage on adjacent property or public right-of-way (e.g., street)	☐
	Poorly maintained stormwater management infrastructure adjacent to this property (e.g., clogged ditches, culverts, inlets, or storm sewers)	☐
	Inadequate stormwater management infrastructure adjacent to this property (e.g., too few or poorly placed inlets; undersized ditches, culverts, or storm sewers)	☐
	Other (please specify):	☐
19.	**What additional mitigation measures have been taken? (Check all that apply)**	
	Installed a sump pump	☐
	Installed a back-up sump pump	☐
	Installed a backup power system/generator	☐
	Installed overhead sewers or a sanitary sewer backup prevention valve	☐
	Installed a sanitary sewer plug or standpipe	☐
	Sealed foundation/waterproof walls	☐
	Regraded yard to keep water away from building	☐
	Installed a ditch or storm sewer to drain water away from building	☐
	Installed larger downspouts	☐
	Disconnected downspouts	☐
	Installed a rain barrel or cistern	☐
	Installed a rain garden	☐
	Replaced traditional landscaping with native plants	☐
	Replaced typical hardscape materials (e.g., concrete, asphalt) with materials (e.g., permeable pavers) that allow water to soak into the ground	☐

20.	**Are there any flood-reducing actions not listed above that you have implemented?**	
21.	**Do you have any additional comments about flooding and/or stormwater management issues in your community?**	
22.	**Are there any project or programs that you believe would help reduce flooding and/or improve local stormwater management efforts?**	
23.	**Would you be interested in further discussing the flooding occurring on this property? If so, please provide your name and e-mail address and/or phone number below.**	
	First Name:	Last Name:
	e-mail:	
	Phone Number:	
24.	**If this property experiences severe, repetitive flooding, would you consider participating in a voluntary property buyout? If so, please provide your name and an e-mail address and/or phone number below.**	
	First Name:	Last Name:
	e-mail:	
	Phone Number:	

Thank you again! We appreciate your time and responses to this survey!

DES PLAINES RIVER WATERSHED
NEW FLOOD PROBLEM AREA (FPA) FORM

DATE: _____ **COMMUNITY:** _____

CONTACT NAME: _____ **TITLE:** _____ **PHONE:** _____

PROBLEM AREA DESCRIPTION

Location Name:
(subdivision name,
street intersection, etc.) _____

Property owner:
(if known) _____

Is Property located in:

Drainage District ☐Yes ☐No Name of Drainage District: _____

Park District ☐Yes ☐No Name of Park District: _____

Problem Description (Damage-Causing or Nuisance):

What do you feel was the cause of the flooding? Check all that apply.

☐Storm sewer back up ☐Sanitary sewer backup

☐Sump pump failure/power failure ☐Saturated plug or standpipe

☐Standing water next to house ☐Other:

☐ Depressional ☐ Poor Drainage

☐Overbank flooding from Dutch Gap, Hastings Creek or North Mill Creek.

Has the flooding resulted in: Sewer Backup ☐Yes ☐No Septic Failure ☐Yes ☐No

DAMAGE POTENTIAL / KNOWN DAMAGE LEVEL (During a 100-Year Flood)

Number & Type of Buildings (indicate building use if not residential):

Critical Facilities (include names of police or fire stations, schools, water sanitary treatment facilities, public utility providers and nursing homes):

DES PLAINES RIVER WATERSHED
NEW FLOOD PROBLEM AREA (FPA) FORM

Street, Highways, Bridges with damage or loss of access:

HISTORICAL FLOOD DAMAGE (Confidential Information)

Month/Yr.	Depth	Frequency of Occurrence	# Bldgs.	$ Damage	Other

Other known damage level (such as flooding damages to basements, 1st floor, garage/outbuilding, crawl space, septic systems, utilities, roadway, erosion, limited access, etc.):

PLANS FOR THE AREA

Flood Control Projects:

Community/Neighborhood Plans:

OTHER HAZARDS (e.g. , soil constraints, hazardous materials in area or upstream, erosion)

OTHER DATA SOURCES (persons or studies where other information may be found)

DES PLAINES RIVER WATERSHED
FLOOD PROBLEM AREAS (FPA) INVENTORY UPDATE FORM

DATE:_____ COMMUNITY:_____ FPA#_____

INSTRUCTION	FLOOD PROBLEM AREA* UPDATE INFORMATION	
Subdivision name, street intersection etc.	**LOCATION NAME:**	
If the flood damage location is different than the area mapped, please mark the map with the correct approximate boundary of the FPA, describe and provide reason for change.	**LOCATION DESCRIPTION:**	
If the primary type or cause of flood damage is incorrect as shown on the map, please update to reflect whether it is caused by overbank flooding, located in depressional area, local drainage system is insufficient, sanitary sewer backup or septic failure.	**TYPE OF FLOODING:**	
	FLOOD SOURCE (IF KNOWN):	
Number of buildings damaged. Indicate building use if not single-family residence.	**BUILDINGS DAMAGED AT THIS SITE:**	
	BUILDING USE:	
Names of streets where flooding results in road damage or loss of access.	**STREETS FLOODED:**	
Indicate whether flooding damages basement, 1st floor, garage/outbuilding, crawl space, septic system, utilities, roadway, causes erosion, or limits access.	**KNOWN DAMAGE LEVEL:**	
Include names of police or fire stations, schools, water or sanitary treatment facilities or other public utility providers, and nursing homes in FPA.	**CRITICAL FACILITIES:**	
Approximately how often does the FPA flood: ≥annually; 2-5 years; 6-10 years; 11-50 years; or 51+ years.	**FREQUENCY OF OCCURRENCE:**	

DES PLAINES RIVER WATERSHED
FLOOD PROBLEM AREAS (FPA) INVENTORY UPDATE FORM

<table>
<tr><th>INSTRUCTION</th><th colspan="2">FLOOD PROBLEM AREA* UPDATE INFORMATION</th></tr>
<tr><td rowspan="4">What if any measures have been taken to mitigate the level of flood damage to this FPA. Please provide the year and funding source(s) for the mitigation project or activity and describe its level of flood protection.</td><td colspan="2"><u>FLOOD DAMAGE MITIGATION:</u></td></tr>
<tr><td>WHAT HAS BEEN DONE?</td><td></td></tr>
<tr><td>WHEN ?</td><td></td></tr>
<tr><td>FUNDING SOURCE(S)?</td><td></td></tr>
<tr><td></td><td>LEVEL OF PROTECTION</td><td></td></tr>
<tr><td>Name, position, address, email, phone, fax etc. of the person completing this form.</td><td colspan="2">CONTACT INFORMATION:</td></tr>
<tr><td>In your opinion, should this FPA be eliminated from the inventory because the site does not match the definition of a flood problem area as described below. Please explain why.</td><td colspan="2">NOTES:</td></tr>
</table>

Appendix J: Potential Wetland Restoration Site Methodology

POTENTIALLY RESTORABLE WETLAND SITE IDENTIFICATION METHODOLOGY

Geographic data from the Lake County Wetland Restoration and Preservation Plan (WRAPP) and the USEPA/Tetra Tech pilot study "Region 5 Wetland Management Opportunities and Marketing Plan: *Select Watersheds in the Lower Fox and Des Plaines River Watersheds*" (Tetra Tech, 2015) were used as the baseline for potential wetland restoration site selection and prioritization. The Lake County WRAPP data cover the planning area within Lake County, Illinois. The USEPA/Tetra Tech pilot study produced similar data for the North Mill, Mill, and Buffalo Creek subwatersheds, and were added to the WRAPP data for the areas of the Buffalo Creek subwatershed in Cook County, Illinois and the North Mill Creek subwatershed in Kenosha County, Wisconsin. This combined dataset was augmented with polygons form the National Wetlands Inventory for the portion of the Lower Des Plaines River in Cook County.

The data include qualitative predictions of significance level (High, moderate, low) for various beneficial wetland functions, including ***flood water storage, nutrient transformation, sediment and particulate retention, streambank stabilization, baseflow maintenance, and stream shading***. Due to the sheer number (n>5,000) of potentially restorable wetland polygons (PRWs), additional filtering and prioritization criteria were applied to obtain a reasonable number of potential restoration sites for cost and pollutant load reduction and inclusion in the action plan. In addition, "high priority" wetland restoration sites from the five previously-completed watershed-based plans (North Mill Creek, Mill Creek, Bull Creek-Bull's Brook, Indian Creek, and Buffalo Creek) were considered in the process. The method for prioritization is outlined below.

1) "High Priority" sites identified in previously-completed watershed-based plans were manually spot-checked against the potentially restorable wetland polygons for the planning area. Those that were coincident with PRWs or in close enough proximity to be considered the same site were retained for further analysis.
2) Additional PRWs from all subwatersheds that met ALL of the following criteria were retained for further analysis:
    a. Centroid located on publicly protected open space, as identified in the watershed planning area green infrastructure network
    b. PRW polygon > 1 acre in size
    c. Wetland functional significance rated "High" for at least 2 of the functions identified in the narrative above
3) PRWs selected through steps 1 & 2 were compared to the top 20% of the highest nutrient and sediment loading catchments from the pollutant load model. Those within the top 20% catchments were retained for further analysis.
4) Additionally, PRWs not within those catchments, but estimated as having "high" functional significance for at least 4 of the functions identified above, were retained for further analysis.
5) PRWs >10 acres, regardless of ownership or functional significance, were retained for further analysis.
6) The remaining PRWs were reviewed within the geographic information system to ensure that they are reasonable site locations.

Appendix K: Cost Assumptions for BMP's

COST ASSUMPTIONS FOR BEST MANAGEMENT PRACTICES

1. **Basin wide detention practices** include a combination of rain barrels and rain gardens. Assumes an average treatment area of 0.25 acres. Each treatment area assumes two 60 gallon rain barrels and one rain garden or infiltration trench. Assumed costs are $160.00 for rain barrels and $3,500 for each rain garden ($7.00/sq ft) or infiltration trench.
2. **Porous/Permeable pavement/infiltration basin retrofits** assume an average material and construction cost of $12/square foot. Final costs will be dependent on the surface type used.
3. **Costs for field borders, filter strips, grass conversion, and riparian buffer strips** are calculated at $4,000/ac, assuming a minimum width of 50 feet. Costs are generated using NRCS cost-share rates and professional judgment and include land preparation, materials and seeding.
4. **Bioswales:** $15.00/ sq/ft (http://greenvalues.cnt.org/national/cost_detail.php). This practice is focused on vegetation enhancement.
5. **Cover Crops:** based on NRCS cost-share rates and are assumed to cost $60/ac/yr on average.
6. **No-till/strip-till:** based on NRCS rates and are assumed to cost $35/ac/yr on average.
7. **Nutrient Management:** estimated to be $20.00 an acre based on NRCS cost-share rates.
8. **Riffles/Grade Control Structures:** based on professional judgment and field experience and range from $8,000 - $50,000 per individual structure.
9. **Streambank/Lake Bank Stabilization:** based on local experience and are assumed at $100/ft for lake bank stabilization and $300/ft for streambank stabilization.
10. **Wetland creation/restoration:** assumes all materials, engineering and earthwork or excavation costs of $80,000/acre based on local costs. This does not include land acquisition or monitoring and mitigation costs.
11. **Wetland Enhancement:** assumes a cost of $30,000/acre based on local costs.
12. **New Detention Basins/Ponds:** based on site conditions and professional judgment/experience and range from $50,000-$100,000 each. This does not include land acquisition.
13. **Grassed Waterways:** assume a cost of $8,000/acre based on typical NRCS cost-share rates and local experience judgment.
14. **WASCOBs:** based on NRCS cost-share rates and professional experience and assume an average of $4,000/basin including tile.
15. **Pasture Enhancement BMPs:** include a combination of costs for multiple practices and are based on both NRCS cost-share rates and professional experience and judgment. Costs assume some fencing, grass planting, a watering system, and a diversion. An average cost of $40,000 is assumed for each site.
16. **Feed Area Management:** assumes a waste management basin/system and is based on professional judgment at a cost of $50,000/system.
17. In the absence of a solid foundation for estimating costs for **problem discharge locations, hydrologic impediments, and detention basin retrofits**, a range of costs are used
    a. $10,000 - $80,000 for hydraulic impediments
    b. $5,000 - $30,000 for maintenance of problem discharge locations
    c. $5,000 - $50,000 for detention basin retrofits
18. **In-Lake/Low Flow Dams:** based on professional judgment, assume an earth embankment structure at a cost of $1,200/ft at an average length of 300 ft plus a 30% contingency for permitting and engineering.

Note – An additional 20% should be placed on top of total estimated costs for all BMPs to account for engineering/permitting, annual maintenance or any other contingencies.

Appendix L: Potential Funding Sources

Des Plaines River Watershed
Potential Sources of Technical Assistance and Funding for Watershed Projects/Programs

The following list of potential funding sources is compiled from a variety of sources. Funding and program availability are contingent upon federal, state, and local budgets and appropriations for the budget year in which funding is being sought, so changes may have occurred that are not reflected in the list. Contact the program representative for updates or changes to program details.

The ***Catalog of Federal Domestic Assistance (CFDA)*** is the good resource to search federal funding sources. The catalog should be available at local libraries and can also be accessed on the CFDA website on-line at: http://www.cfda.gov. The website lists all federal funding programs available, including those for conservation. Federal agency websites will provide more detailed information about federal programs and provide information on other opportunities for assistance. All organizations applying for federal funding must have a Data Universal Numbering System (DUNS) identification number.

There are a number of ***Federal Tax Incentives for Conservation*** for owners of environmentally sensitive land that has been donated for conservation purposes, or has been placed in a conservation easement, or simply managed for conservation. Individuals, organizations, and others are all eligible. Information can be found at https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR, www.irs.gov/, www.ailt.org, and https://www.irs.gov/pub/irs-drop/n-04-41.pdf. You can also contact the Illinois EPA, 1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois, 62794-9276. Phone: 217-782-3397.

Des Plaines River Watershed

Potential Sources of Technical Assistance and Funding for Watershed Projects/Programs

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
U.S. Environmental Protection Agency (USEPA) - issues federal environmental regulations, enforces federal environmental law, and manages many grant programs.					
Brownfields Grants – Assessment Grants, Revolving Loan Fund Grant & Cleanup Grants	EPA's Brownfields program provides direct funding for Brownfields assessment, cleanup, revolving loans, and environmental job training. EPA's Brownfields Program collaborates with other EPA programs, other federal partners, and state agencies to identify and make available resources that can be used for Brownfields activities. In addition to direct Brownfields funding, EPA also provides technical information on Brownfields financing matters.	Local governments, private not-for-profit (501C3) groups, and others	$2 to $3 million annually. Cleanup grants require 25% cost-share, grants range from under $15,000 to over $50,000	https://www.epa.gov/brownfields/types-brownfields-grant-funding	EPA Region 5 77 West Jackson Boulevard Mail Code SM-7J Chicago, IL 60604-3507 Phone (800) 621-8431
Environmental Education Grants Program	Funds environmental education activities such as curricula design or dissemination, designing or demonstrating educational field methods for the public, and training educators	Educational organizations, private not-for profit groups, and local governments	Minimum of 25% matching funds or in kind services required. Awards of $25,000 or less are granted by regional offices	https://www.epa.gov/education/environmental-education-ee-grants	Megan Gavin U.S. EPA, Region 5 77 West Jackson Boulevard Mail Code AT-18J Chicago, IL 60604 gavin.megan@epa.gov
Environmental Justice Small Grants Programs	Supports and empowers communities working on solutions to local environmental and public health issues. The program is designed to help communities understand and address exposure to multiple environmental harms and risks. Projects include clean air projects, healthy waters projects, land revitalization projects and environmental health projects.	Educational organizations, private not-for profit groups	Projects up to $30,000, depending on the availability of funds in a given year.	https://www.epa.gov/environmentaljustice/environmental-justice-small-grants-program	US EPA, REGION 5 Alan Walts walts.alan@epa.gov 77 West Jackson Blvd. Chicago, IL 60604-3507 312-353-8894
Smart Growth Technical Assistance Opportunities	Offers grants to support activities that improve the quality of development and protect human health and the environment	Local governments, private not-for-profit groups, and others	In-kind contributions with assistance preferred	https://www.epa.gov/smartgrowth/epa-smart-growth-grants-and-other-funding	Office of Sustainable Communities USEPA 1200 Pennsylvania Avenue NW Washington, DC 20460 202-566-2878 smartgrowth@epa.gov

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Five Star Restoration Challenge Grants	Bring together citizen groups, corporations, youth groups and students, landowners, and government agencies to undertake projects that restore streambanks and wetlands. Projects must include a strong wetland or riparian restoration component, and should include education, outreach, and community stewardship. Jointly administered by the national fish and wildlife foundation, the national association of counties, and the wildlife habitat council, and mainly funded by USEPA.	Requires at least five or more partnering organizations	$5,000 to $20,000 with a 1 to 1 match requirement	https://www.epa.gov/wetlands/5-star-wetland-and-urban-waters-restoration-grants	USEPA Wetlands Division, Room 6105 (4502T), 1200 Pennsylvania Ave., NW, Washington, DC. Email: price.myra@epa.gov
USEPA Office of Wastewater Management (OWM)	OWM supports the Clean Water Act by promoting effective and responsible water use, wastewater treatment, disposal and management and by encouraging the protection and restoration of watersheds. OWM provides regulatory standards, voluntary management approaches, and financial and technical assistance to states, tribes, communities, and regulated entities to protect human health and aquatic ecosystems, reduce flooding, and protect the nation's infrastructure investment.	Varies	Informational only	http://www.epa.gov/owow/funding.html	see website
USEPA Financial Tools and Funding Sources for Environmental Programs	Used for identifying financial tools and funding sources for environmental programs	Anyone can access	Informational only	https://www.epa.gov/envirofinance/tools	see website
Wetland Program Development Grants	Support strengthening state comprehensive wetland programs, developing a comprehensive wetland monitoring and assessment program, improving the effectiveness of compensatory mitigation, and refining the protection of vulnerable wetlands and aquatic resources.	States, local governments, public agencies, and interstate agencies	$50,000 to $420,000 grants with 25 percent local match requirement	https://www.epa.gov/wetlands/wetland-program-development-grants	US EPA Region 5 77 West Jackson Blvd., Chicago, IL, 60604. Phone: 312-886-0241 Email: garra.catherine@epa.gov

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Illinois Environmental Protection Agency (IL EPA) administers state and federal environmental programs and regulations.					
Clean Water Act Section 319 Grants	Provide funding for implementing corrective and preventative best management practices on a watershed scale, for the demonstration of innovative BMPs on a sub-watershed scale, and the development of information and education nonpoint source pollution control programs. Administered by Illinois EPA	State and local governments, nonprofits, individuals, businesses	Federal cost share at 60 percent maximum	http://www.epa.illinois.gov/topics/water-quality/watershed-management/nonpoint-sources/grants/index	Illinois EPA, 1021 North Grand Avenue East, P.O. Box 19276, Springfield, IL, 62794 Phone: 217-782-3397
Clean Water State Revolving Loan Funds (CWSRF)	Initially designed for wastewater treatment plant upgrades, supports watershed and non-point source control measures. Approximately 20% set aside for nonpoint source control green infrastructure projects. These can include projects such as agricultural and urban runoff control, wet weather flow control including stormwater and sewer overflows, buffers, wetland protection, habitat restoration, and community-based comprehensive watershed management.	State and local governments, nonprofits, individuals, businesses	Funds projects at 100% at a national average interest rate of 2.2 percent, subject to change	USEPA: https://www.epa.gov/cwsrf Illinois EPA: http://www.epa.illinois.gov/topics/grants-loans/state-revolving-fund/index	Illinois EPA, 1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois, 62794-9276. Phone: 217-782-3397
Streambank Cleanup and Lakeshore Enhancement (SCALE)	Program provides funds to assist groups that have established a recurring stream or lakeshore cleanup. Funds can be used for safety attire, litter bags, event promotion, logistical needs and dumpster or landfill fees	Organizations that have an established streambank/lakeshore cleanup; environmental groups, soil and water conservation districts, park districts and nonprofit organizations	Ranges from $500 to $3,500	http://www.epa.illinois.gov/topics/water-quality/surface-water/scale/index	217-782-3362
Volunteer Lake Management Program (VLMP)	Administered by the Illinois EPA, serves as an educational program for Illinois citizens to learn about lake ecosystems and utilizes the time and talents of citizen volunteers to gather fundamental information on inland lakes.	Lake owners	Technical assistance only	http://www.epa.illinois.gov/topics/water-quality/monitoring/vlmp/index	Alana Bartolai - Lake County Health Department 500 W. Winchester Road, Unit 102 Libertyville, IL 60048 Phone: 847-377-8009

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Federal Emergency Management Agency (FEMA) manages programs that assist communities in disaster planning and hazard mitigation					
Flood Mitigation Assistance (FMA)	Helps states and communities identify and implement measures to reduce the risk of flood damage to structures insured under the National Flood Insurance Program (NFIP). Green Infrastructure projects such as rain gardens, roadside swales, infiltration trenches, vegetative buffers, etc.… can fit into the minor localized flood reduction projects or soil stabilization categories. These projects lessen the frequency or severity of flooding and decrease flood damages. This designation can include a system of LID/GI-based stormwater management devices that reduce runoff volumes by infiltration, evapotranspiration, or storage of rainwater for beneficial uses, as long as the system demonstrably reduces the extent of flooding. These projects must not duplicate flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.	State agencies, NFIP communities, qualified local organizations, tribal governments	Federal cost share maximum of 75 percent	https://www.fema.gov/flood-mitigation-assistance-grant-program	FEMA Region 5, 536 South Clark St., Chicago, IL 60605. Phone: 312-408-5500
Hazard Mitigation Grant Program (HMGP)	Implements long-term hazard mitigation measures following a major disaster declaration and, in Illinois, for post-disaster floodplain building buy-outs, elevation, relocation, retrofit, and demolition on public and private land. Green infrastructure projects such as rain gardens, roadside swales, infiltration trenches, vegetative buffers, etc.… can fit into the minor localized flood reduction projects or soil stabilization categories. These projects lessen the frequency or severity of flooding and decrease flood damages. This designation can include a system of LID/GI-based stormwater management devices that reduce runoff volumes by infiltration, evapotranspiration, or storage of rainwater for beneficial uses, as long as the system demonstrably reduces the extent of flooding.	State and local governments, qualified nonprofit organizations, tribal governments	Federal cost share maximum of 75 percent. These projects must not duplicate flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.	https://www.fema.gov/hazard-mitigation-grant-program	Mr. Ron Davis, Illinois Emergency Management Agency, 110 East Adams Street, Springfield, IL 62701-1109. Phone: 217-782-8719 E-mail: RDavis@iema.state.il.us

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
National Flood Insurance, Increased Cost of Compliance Program	Provides flood insurance policyholders with flood damaged homes and businesses in high-risk areas, also known as Special Flood Hazard Areas, with assistance to help pay the Costs to bring their home or business into compliance with their community's floodplain ordinance, including building elevation, relocation, demolition, or floodproofing.	Flood insurance policy holders	Federal assistance up to $30,000	https://www.fema.gov/increased-cost-compliance-coverage	FEMA Region 5, 536 South Clark St., Chicago, IL 60605. Phone: 800-427-4661
Pre-Disaster Mitigation Program (PDM)	Implements the pre-disaster mitigation program for states and communities to reduce risk to the population, the costs and disruption caused by severe property damage and the cost to all taxpayers of Federal disaster relief efforts. Eligible projects include: acquisition, relocation, elevation, and strengthening of structures, development of standards to protect structures from disaster damage, and drainage improvement projects. Green Infrastructure projects such as rain gardens, roadside swales, infiltration trenches, vegetative buffers, etc.… can fit into the minor localized flood reduction projects or soil stabilization categories. These projects lessen the frequency or severity of flooding and decrease flood damages. This designation can include a system of LID/GI-based stormwater management devices that reduce runoff volumes by infiltration, evapotranspiration, or storage of rainwater for beneficial uses, as long as the system demonstrably reduces the extent of flooding. These projects must not duplicate flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.	State and local governments, universities, Tribal governments	Federal cost share maximum of 75 percent with a $3 million cap	https://www.fema.gov/pre-disaster-mitigation-grant-program	Mr. Ron Davis, Illinois Emergency Management Agency, 110 East Adams Street, Springfield, IL 62701-1109. Phone: 217-782-8719. E-mail: RDavis@iema.state.il.us
U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) partners with state conservationist offices and provides funding and technical assistance to landowners to promote soil and water conservation.					
Conservation Reserve Program (CRP)	Offers annual rental payments, incentive payments for certain activities, and cost-share assistance to remove highly erodible cropland or	Non-federal landowners engaged in	Farmers receive compensation, based on agricultural rent,	https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/progra	In Lake County: James Rospopo, District Conservationist,

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	sensitive acres from crop production. Program encourages farmers to plant long term resource conserving vegetative covers to improve soil, water, and wildlife resources. Eligible practices include riparian buffers along streams, ditches, lakes, wetlands, and ponds, grass or contour filter strips, and windbreaks. Funds also may be used to retire agricultural floodplain land.	farming or ranching	for retiring sensitive land over a multiyear contract, usually 10-15 years. Program is administered by the Farm Service Agency.	ms/?cid=stelprdb1041269	McHenry County Email: james.rospopo@il.usda.gov. Phone: 815-338-0099 ext. 3 http://www.mchenryswcd.org/index.htm In Kenosha County: Dan Treloar, County Conservationist 262-857-1900 http://www.co.kenosha.wi.us/677/Programs-Services
Conservation Stewardship Program (CSP)	Promotes the conservation of soil, water, air, energy, plant and animal life located on working lands.	Individuals, organizations, and others. Contact administrator for details	Check with the county-based USDA Service Centers for application deadlines and most current information. In-kind services or operations are required	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/	
Emergency Watershed Protection Program (EWP)	Provides assistance to reduce hazards to life and property in watersheds from erosion and flooding due to severe natural events. May be used to establish vegetative cover, open restricted channels, repair diversions and levees, and purchase floodplain easements on flooded land in non-urban areas. Applications must be submitted within 60 days of disaster or 10 days in an emergency	Public and private landowners with a project sponsor, i.e., a state or local government or special government district.	Up to 75 percent federal cost-share for projects	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ewp/	In Lake County: James Rospopo, District Conservationist, McHenry County Email: james.rospopo@il.usda.gov. Phone: 815-338-0099 ext. 3 http://www.mchenryswcd.org/index.htm In Kenosha County: Dan Treloar, County Conservationist 262-857-1900 http://www.co.kenosha.wi.us/677/Programs-Services
Environmental Quality Incentives Program (EQIP)	Provides financial and technical assistance to agricultural producers through contracts up to a maximum term of ten years in length. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland.	Non-federal landowners engaged in farming or ranching	Federal share maximum of 75 percent, $450,000 aggregate cap on EQIP contracts. Beginning farmers and ranchers, as well as limited resource producers, may qualify for a 90 percent cost-share.	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/	
Rural Development Water &	WEP provides funding for the construction of water and waste facilities in rural communities and is proud to be the only Federal program	Rural communities with	Varies	https://www.rd.usda.gov/programs-services/all-	USDA Rural Development Rural Utilities Service STOP 1510, Rm 5135

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Environmental Programs	exclusively focused on rural water and waste infrastructure needs of rural communities with populations of 10,000 or less. WEP also provides funding to organizations that provide technical assistance and training to rural communities in relation to their water and waste activities.	populations of 10,000 or less		programs/water-environmental-programs	1400 Independence Ave., SW Washington, DC 20250-1510 (202)720-9540
Streambank Stabilization Restoration Program	Administered by the mchenry/Lake Soil and Water Conservation District, goals are to develop and demonstrate vegetative, stone structure and other low-cost bio-engineering techniques for stabilizing streambanks and to encourage the adoption of low-cost streambank stabilization practices by making available financial incentives, technical assistance and educational information to landowners with critically eroding streambanks	All landowners and project sites (rural and urban) in each Illinois county	Check with the Lake/mchenry County SWCD for details	http://www.mchenryswcd.org/pdfs/SSRP%20FY14%20Guidelines.pdf	In Lake County: James Rospopo, District Conservationist, McHenry County Email: james.rospopo@il.usda.gov. Phone: 815-338-0099 ext. 3
Watershed and Flood Prevention Operations Program (WFPO)	Includes the Flood Prevention Operations Program authorized by the Flood Control Act of 1944 (P.L. 78-534) and the provisions of the Watershed Protection and Flood Prevention Act of 1954 (P.L. 83-566). The Watershed and Flood Prevention Operations (WFPO) Program provides technical and financial assistance to States, local governments and Tribes (project sponsors) to plan and implement authorized watershed project plans for the purpose of watershed protection, Flood mitigation, water quality improvements, Soil erosion reduction, rural, municipal and industrial water supply, irrigation, water management, sediment control, fish and wildlife enhancement and hydropower	Public sponsorship Watershed projects up to 250,000 acres. Benefits that are directly related to agriculture, including rural communities, that are at least 20 percent of the total benefits of the project	Project grants	https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/landscape/wfpo/?cid=nrcs143_008271	Contact: Kevin Farmer, 202-720-3413 kevin.farmer@wdc.usda.gov
U.S. Department of Agriculture, Forest Service (USDA-FS) manages programs that promote forestry and natural enhancement of urban areas through urban forestry programs.					

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Urban and Community Forestry (UCF) Program	The Urban and Community Forestry Program provides technical, financial, research and educational services to local government, non profit organizations community groups, educational institutions, and tribal governments. • Conserve working forest landscapes, • Protect forests from harm, and • Enhance benefits associated with trees and forests.	Local governments, educational organizations, individuals, and others	Non-federal match of 50% required	https://www.fs.fed.us/managing-land/urban-forests/ucf/program	Renee Hildebrandt Urban Conservation Program Admin. IDNR One Natural Resources Way, Springfield, IL 62702 217-785-8771 reinee.hildebrandt@illinois.gov
U.S. Department of Energy (USDOE) compiles and distributes a list of monthly funding opportunities relating to energy and the environment. Go to http://www.eere.energy.gov/ and click on financial opportunities.					
U.S. Department of the Interior, Fish and Wildlife Service (USFWS) manages programs to protect wildlife and habitat by means such as issuing rules for hunters and anglers, administering the Endangered Species Act, and awarding grants for environmental restoration.					
Challenge Cost Share Program	Provides grants for conservation practices, ecosystem protection, and enhancement of wildlife and plant habitat.	Individuals, businesses, federal, state, and local governments, universities, and non-profit organizations	Grants at 50 percent local match. Average award is about $7,800	See Catalog of Federal Domestic Assistance (15.642), http://www.cfda.gov; https://www.cfda.gov/index?s=program&mode=form&tab=step1&id=e0c1d3ddfa48dcbb0b0a8a83ab56474e	Assistant Director, National Wildlife Refuge System, U.S. Fish and Wildlife Service, Department of the Interior, 5275 Leesburg Pike, MS: NWRS,, Falls Church, Virginia 22041-3803 Phone: (703) 358-2248
National Fish and Wildlife Foundation Chi-Cal Rivers Fund	The Chi-Cal Rivers Fund is a public-private partnership working to restore the health, vitality and accessibility of the waterways in the Chicago and Calumet region by supporting green stormwater infrastructure, habitat enhancement, and public-use improvements	Non-profit organizations, educational institutions, and State, tribal, and local governments	Grant awards ranging from $50,000 - $300,000	http://www.nfwf.org/chi-cal/Pages/home.aspx	Aislinn Gauchay Great Lakes, Prgm. Director 612-564-7284 aislinn.gauchay@nfwf.org Traci Giefer Great Lakes Prgm. Manager 612-564-7296 traci.giefer@nfwf.org
National Fish and Wildlife Foundation General Matching and Special	Supports habitat restoration and protection on private lands	Varies	Sample grant sizes in Illinois range from $3,000 to over $100,000	http://www.nfwf.org	http://www.nfwf.org/whatwedo/grants/search/Pages/Grant-Search.aspx?Keyword=Special%20Grant%20Programs&Project=&Org=&FromYear=

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Grants					&ToYear=&program=%28All%29
Private Stewardship Program	Provides cost share funding for conservation practices by private landowners or community groups that benefit threatened, endangered, and at-risk species	Individuals, businesses, private nonprofit organizations, local or county governments.	Project grants at 10 percent local match. Average award about $70,000	https://training.fws.gov/courses/csp/csp3115/resources/ESA_Folder/private_stewardship5_04.pdf	USFWS Peter Fasbender Bishop Henry Whipple Federal Building One Federal Drive Fort Snelling, MN 55111-4056 Phone: 612/713-534
Partners for Fish and Wildlife Programs	Assist private landowners in restoring habitat in accordance with USFWS goals, including, for example, restoration of wetland hydrology, use of prescribed burns, and planting with native vegetation. Wetlands are the primary focus of the program in Illinois. Landowners enter into at least a 10-15 year agreement to refrain from returning the land to its former use or otherwise nullifying the restoration. Eligible projects include restoration or enhancement of transient waterfowl habitat, improve water quality, flood protection, and groundwater recharge	Non-state and non-federal landowners, individuals, local government, and non-government organizations	Project grants at 50-60 percent local cost share with matching or in-kind services preferred, but not required.	https://www.fws.gov/partners/	USFWS, Division of Habitat and Resource Conservation 4401 N. Fairfax Drive, Suite 840 Arlington, Virginia 22203 703/358-2161 or 703/358-2183
Resilient Communities 2017	Wells Fargo and NFWF have partnered to create the Resilient Communities program. Through improvements to natural features and enhanced community capacity, the program will help communities prepare for future impacts associated with sea level rise, water quantity and quality and forest conservation. The program places special emphasis on inclusion and helping traditionally underserved, low- and moderate-income communities build capacity for resiliency planning and investments in "greener" infrastructure. Conserve critical land, create green infrastructure and protect water resources to address water quantity issues such as floods and droughts, and sustain water quality through enhanced natural filtering capacity. Project Types: Cover Crops &	Eligible applicants include non-profit 501(c) organizations, local governments, Indian tribes.	Grants range from $100,000 to $500,000. Projects that meet or exceed a 1:1 match will be more competitive (Lake County: Countywide)	http://www.nfwf.org/resilientcommunities/Pages/2017rfp.aspx	Danny Bowater Coordinator, Community-Based Conservation 202-595-2434 Daniel.Bowater@nfwf.org

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
	Permaculture, Nutrient Management, Green Infrastructure and Urban Tree Canopy, Invasive Species Management and Stream Buffer Enhancements				
Environmental Solutions for Communities	Designed to support projects that link economic development and community well-being to the stewardship and health of the environment. Funding priorities include: supporting sustainable agricultural practices and private lands stewardship, conserving critical land and water resources and improving local water quality, restoring and managing natural habitat, species and ecosystems that are important to community livelihoods, facilitating investments in green infrastructure, renewable energy and energy efficiency and encouraging broad-based citizen participation in project implementation.	Tax-exempt status under Section 501(c)(3) of the U.S. Internal Revenue Code, as well as qualified tribal and governmental agencies	Based on Request for Proposal (RFP) – posted annually	http://www.nfwf.org/environmentalsolutions/Pages/home.aspx	Wells Fargo & NFWF Carrie Clingan Program Director, Community Stewardship and Youth carrie.clingan@nfwf.org Daniel Bowater Coordinator, Community-Based Conservation Programs daniel.bowater@nfwf.org
National Park Service (NPS) manages the nation's system of national parks, historic sites, etc. and serves as a conduit for some recreation-related conservation funding. Https://www.nps.gov/index.htm					
Rivers, Trails, and Conservation Assistance Program	The NPS Rivers, Trails, and Conservation Assistance program extends and expands the benefits of the National Park Service to communities throughout the nation. When a community asks for assistance with a river, trail, or conservation assistance (enhancement) project through NPS, their staff provides free, on-location facilitation and planning expertise. Including: define project vision and goals, inventory and map community resources, identify and analyze key issues and opportunities, engage collaborative partners and stakeholders, design community outreach and participation strategies, develop concept plans for trails, parks, and natural areas, set priorities and build consensus, identify funding sources, and develop a sustainable organizational framework to support the project.	Nonprofit organizations, community groups, tribes or tribal governments, and local, state, or federal government agencies	This program does not award monetary grants or loans. Instead, an NPS staff with extensive experience in community-based outdoor recreation and conservation will work with you and your partners to get your project on the ground. If funding is necessary to achieve project goals, NPS can often assist partners in identifying and	https://www.nps.gov/orgs/rtca/index.htm	RTCA, NPS 25 E. Washington, Ste. 1650 Chicago, IL 60602 • Diane Banta diane_banta@nps.gov (708) 280-3890 • Michael Mencarini michael_mencarini@nps.gov (312) 833-8280

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
			securing sources of financial assistance.		
U.S. Department of Transportation (DOT) regulates the federally mandated metropolitan planning process and administers federal transportation funding.					
Illinois Transportation Enhancement Program (ITEP)	These set-aside funds include all projects and activities that were previously eligible under TAP, encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, community improvements such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity.	Local government units with taxing authority	80 percent federal share of project costs in general, 50 percent for acquisition. Awards up to $2 million	https://www.fhwa.dot.gov/fastact/factsheets/transportationalternativesfs.cfm (Federal), http://www.idot.illinois.gov/transportation-system/local-transportation-partners/county-engineers-and-local-public-agencies/funding-opportunities/ITEP (Illinois)	USDOT David Bartz Office of Program Administration 512-536-5906 david.bartz@dot.gov Illinois DOT, 2300 S. Dirksen Pkwy., Springfield, IL 62764. Phone: 217-782-7820
Illinois Department of Natural Resources (IDNR) manages, conserves and protects Illinois' natural, recreational and cultural resources, further the public's understanding and appreciation of those resources, and promotes the education, science and public safety of Illinois' natural resources for present and future generations.					
Conservation Reserve Enhancement Program (CREP)	Cooperative effort between landowners, state, local and federal agencies designed to enhance the Illinois River by protecting water quality and land in the Illinois River Watershed. Landowners who take environmentally sensitive land out of agricultural production in the Illinois River Watershed will receive financial incentives, cost-share incentives and technical assistance for establishing long-term, resource conserving covers. Supported practices include: tree planting, habitat, wetlands, filter strips, and buffers. Terms may be 15, 30, or 50 years or permanent	Individuals, corporations, non-governmental organizations	Varies by practice and type of land	https://www.dnr.illinois.gov/conservation/CREP/Pages/default.aspx	In Lake County: James Rospopo, District Conservationist, McHenry County Email: james.rospopo@il.usda.gov. Phone: 815-338-0099 ext. 3
Federal Recreational	This program provides funding assistance for acquisition, development, rehabilitation and	Federal, state and local government	This grant maximum represents a total	https://www.dnr.illinois.gov/AEG/Pages/Fed	IDNR-

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Trails Program (RTP)	maintenance of both motorized and non-motorized recreation trails. By law, 30% of each states' RTP funding must be earmarked for motorized trail projects, 30% for non-motorized trail projects and the remaining 40% for multi-use (diversified) motorized and non-motorized trails or a combination of either.	agencies, not-for-profits organizations and private operators of motorized recreational facilities open to the public.	minimum project cost of $250,000 per application. Up to 80% project funding.	eralRecreationalTrailsProgram.aspx	Office of Grant Management and Assistance One Natural Resources Way Springfield, Illinois 62702 dnr.grants@illinois.gov telephone: (217) 782-7481
Special Wildlife Funds Habitat Fund	The Illinois Habitat Fund is one of three programs funded through the purchase of a State Habitat Stamp. For the Illinois Habitat Fund Grant Program, eligible projects are limited to those seeking to preserve, protect, acquire or manage habitat (all wetlands, woodlands, grasslands, and agricultural lands, natural or altered) in Illinois that have the potential to support populations of wildlife in any or all phases of their life cycles	Not-for-profit organization or government agency and Permission from the landowner (if applicable) to develop and/or manage habitat	Projects designed to protect, preserve, acquire, or manage habitat. Contact program administrator for assistance Amounts	https://www.dnr.illinois.gov/grants/Documents/2017HabitatNOFO.pdf	IDNR Office of Grant Management and Assistance One Natural Resources Way Springfield, IL 62702-1271 DNR.specialfunds@illinois.gov Federal Aid/ Special Funds Unit (217) 782-2602
Open Space Lands Acquisition and Development (OSLAD) Program **Land & Water Conservation Fund program (LWCF)**	A state-financed grant program that provides funding assistance to local government agencies for acquisition and/or development of land for public parks and open space	Local units of government	Funding assistance up to 50% of approved project costs can be obtained. Grant awards up to $750,000 for acquisition projects; development/renovation projects are limited to a $400,000 grant maximum.	https://www.dnr.illinois.gov/AEG/Pages/OpenSpaceLandsAquisitionDevelopment-Grant.aspx https://www.nps.gov/subjects/lwcf/index.htm	Illinois Department of Natural Resources One Natural Resources Way Springfield, IL 62702-1271 DNR.Grants@illinois.gov 217-785-2361
Acres for Wildlife	Intended to encourage landowners to reforest land, increase wildlife, and control erosion (Division of Wildlife or Resource Protection and Stewardship)	Individuals; landowner must have an approved management / conservation plan	Varies	https://www.dnr.illinois.gov/conservation/wildlife/Pages/AcresWildlife.aspx	

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Schoolyard Habitat Action Grants	Support enhancement of wildlife habitat, with emphasis on youth involvement and education	Educational organizations and others. Project must involve a trained Project WILD educator or facilitator	The maximum annual award is $1,000 per applicant. Funds are provided on a reimbursement basis.	https://www.dnr.illinois.gov/education/Pages/GrantsSHAG.aspx	Illinois Department of Natural Resources' Division of Education One Natural Resources Way Springfield, IL 62702-1271 Phone: 217-524-4126 dnr.teachkids@illinois.gov
Illinois Biodiversity Field Trip Grants & Free Educational Materials	Supports field trips for students to visit natural areas, natural history museums, and other natural resource related activities. Conservation education materials, including lesson plans, can be used separately.	Educational organizations and teachers in Illinois	The maximum annual award is $1,000 per applicant. Funds are provided on a reimbursement basis.	https://www.dnr.illinois.gov/education/Pages/GrantsIBFTG.aspx	Illinois Department of Natural Resources' Division of Education One Natural Resources Way Springfield, IL 62702-1271 Phone: 217-524-4126 dnr.teachkids@illinois.gov
Illinois Department of Agriculture (IDOA)					
Streambank Stabilization Restoration Program	Goals are to develop and demonstrate vegetative, stone structure and other low-cost bio-engineering techniques for stabilizing streambanks and to encourage the adoption of low-cost streambank stabilization practices by making available financial incentives, technical assistance and educational information to landowners with critically eroding streambanks	All landowners and project sites (rural and urban) in each Illinois county	Check with the Lake/McHenry County SWCD for details	http://www.mchenryswcd.org/pdfs/SSRP%20FY14%20Guidelines.pdf	In Lake County: James Rospopo, District Conservationist, McHenry County Email: james.rospopo@il.usda.gov. Phone: 815-338-0099 ext. 3
Sustainable Agriculture Grant Program	Supports projects include those that carry out research, education, and on-farm demonstration projects that support sustainable agriculture, conserve soil, protect the environment, and maintain profitability; 10 year term	Individuals, corporations, local governments. Landowner must have an approved management/conservation plan	Grants awarded up to $10,000 per individual; $20,000 per unit of government, or other eligible organization. 60% cost-share	https://www.agr.state.il.us/conservation-2000	
Illinois State Board of Education (ISBE) Useful website to search for educational grants at https://www.isbe.net/.					
Lake County: https://il-lakecounty.civicplus.com/					

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Lake County SMC **Watershed Management Board (WMB)** **Stormwater Infrastructure Repair Fund (SIRF)** **Stream & River Clean Up Projects**	Watershed Management Board (WMB) grants provide up to 50% cost-share for pro-jects that address flood damage mitigation, water quality improvement and natural re-sources enhancement within Lake County (includes green infrastructure). Flood mitigation/ reduction criteria receive the greatest weight in determining funding awards. The $100,000/year SIRF can assist local units of government in resolving interjurisdictional drainage and flooding related problems (i.e., stormwater management system infrastructure needs). The SIRF program is a 50/50 cost share match for SIRF eligible projects in Lake County. SMC offers small grants for stream and river clean-up projects.	Watershed Management Board members in good standing with the National Flood Insurance Program and comply with SMC policies	Cost-share at least 50% with funds or in-kind services or a combination of both. Approximately $100,000 to $150,000 is available each year for planning, engineering analysis, alternate solution evaluation, design, capital construction, maintenance and repairs projects. Up to $500 for stream and river clean-up projects.	http://www.lakecountyil.gov/3635/Watershed-Management-Board-WMB	Lake County Stormwater Management Commission, 500 W Winchester Road, Libertyville, Illinois, 60048 847-377-7710 For information on WMB/SIRF programs Sharon Osterby 847.377.7706 sosterby@lakecountyil.gov For information on Stream & River Cleanup Projects contact Haley Meents 847.377.7714 hmeents@lakecountyil.gov
Lake County Deicing Workshop	The Annual Lake County Deicing Workshop provides an opportunity to focus on sensible salting practices for roadways, parking lots and sidewalks. This workshop snow and ice removal presentations include the effects of weather conditions & storing materials, surface safety, environmental effects (chloride use), materials selection, maintenance best management practices and application rate & calibration. The workshop also includes truck calibration demonstrations/expos, being added to the preferred provider list maintained by Lake County SMC, showcasing local vendors who specialize in deicing, anti-icing, and snow removal services and equipment and valuable resources for additional winter maintenance practices information.	Public works superintendents, managers, directors, snow plow operators/de-icing applicators, contractors maintaining private/public walkways And/or parking lots, property managers writing de-icing contracts, facility/grounds maintenance staff, distributors of anti-icing/de-icing products	Technical and informational assistance	http://www.lakecountyil.gov/2284/Winter-Maintenance-Best-Practices	Lake County Stormwater Management Commission & Lake County Health Department and Community Health Center 500 W Winchester Road, Libertyville, Illinois, 60048 For information on the Deicing Workshop Mike Adam 847-377-8020 madam@lakecountyil.gov

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Lake County Voluntary Buyout Program	Using federal and state matching grants, SMC offers a voluntary buyout program for repetitively flood damaged structures in Lake County.	SMC maintains a list of properties that are candidates for buyouts when funds become available	Buyouts are typically 75% federal and 25% local cost share for qualified structures	http://www.lakecountyil.gov/2372/Voluntary-Floodplain-Buyout-Program	Contact Sharon Osterby 847.377.7706 sosterby@lakecountyil.gov
Chicago Metropolitan Agency for Planning (CMAP)					
Local Technical Assistance Program (LTAP)	Addressing local issues at the intersection of transportation, land use, and housing, including the natural environment (including green infrastructure components), economic growth, and community development. CMAP initiated the Local Technical Assistance (LTA) program in 2010. The program involves providing assistance to communities across the Chicago metropolitan region to undertake planning projects that advance the principles of GO TO 2040 (comprehensive regional plan to help the seven counties and 284 communities plan together for sustainable prosperity through mid-century and beyond).	Local governments, nonprofits, and intergovernmental organizations	Technical Assistance & CMAP recommendations based on the GO TO 2040 Program Local match between 5-20% of the value of the assistance from applicants	http://www.cmap.illinois.gov/programs-and-resources/lta	Tony Manno, CMAP 312.386.8606 tmanno@cmap.illinois.gov
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	A federally-funded program of surface transportation improvements designed to improve air quality and mitigate congestion. The program development and review is overseen by the CMAQ Project Selection Committee. CMAP staff performs technical analyses of all projects and oversees the implementation of the program. The Illinois Department of Transportation administers the program funding. Green fleets programs and alternative fueling stations have received funding. Emissions reduction was the primary criteria.	Transit (trails, roads, etc…) projects - intersection improvements, signal interconnects, transit access projects, etc… that reduce vehicle emissions	80% federal / 20% local match	http://www.cmap.illinois.gov/mobility/strategic-investment/cmaq/program-development USDOT Website https://www.fhwa.dot.gov/environment/air_quality/cmaq/	CMAP program manager Doug Ferguson 312.386.8824 dferguson@cmap.illinois.gov
Transportation Alternatives	Transportation Alternatives is targeted at off-street trails (bicycle facility projects). GO TO	Local gov'ts, regional transportation	80% federal / 20% local match	http://www.cmap.illinois.gov/mobility/strategic-	CMAP program manager Doug Ferguson 312.386.8824

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
(non-motorized trails)	2040 specifically recommends prioritizing greenway trails in the programming of Transportation Enhancements (now Transportation Alternatives) funding. CMAP coordinates planning for trails and greenways in the region. The officially adopted Northeastern Illinois Greenways and Trails Plan (RGTP) is a long-range, multi-jurisdictional plan which envisions a network of continuous greenway and trail corridors, linked across jurisdictions, providing scenic beauty, natural habitat, and recreational and transportation opportunities.	authorities, transit agencies, natural resource or public land agencies, school districts, and any other local or regional governmental entity with responsibility for oversight of transportation or recreational trails		investment/transportation-alternatives	dferguson@cmap.illinois.gov
Surface Transportation Program (STP)	Provide all members of the County's Council of Mayors the possibility to participate in receiving federal transportation funds at some point in time by offering a variety of possible projects. Reduce traffic congestion by investing in the transportation system. Maximize, as much as possible, the amount of Federal and other transportation funds. Phase II Engineering, Construction and Construction Engineering. Non-motorized travel accommodations are eligible as part of roadway projects.	Any local agency having jurisdiction of a federally eligible roadway.	Lake County: 80% federal/20% local STP funding match	http://www.cmap.illinois.gov/about/involvement/committees/advisory-committees/council-of-mayors/surface-transportation-program	Lake County DOT Bruce Christensen 847-377-7455 bchristensen@lakecountyil.gov
Metropolitan Water Reclamation District of Greater Chicago (MWRD)					
Green Infrastructure Program	Partnership with local communities and agencies to assist in the implementation of GI projects. Goals of the program are to supplement conventional gray infrastructure in reducing wet-weather flows to combined sewer systems, reducing combined sewer overflows to local waterways, reducing basement backups, reducing runoff volumes, and improving water quality in separate sewer service areas.	Municipalities, townships and other government agencies within the District's corporate limits	Financial assistance of up to half the cost on selected GI projects, based on project cost and location in flood prone areas.	mwrd.org (TBD) – website currently under construction	Jim Yurik yurikj@mwrd.org 708-588-3608
Other Public & Private Organizations					

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Climate & Cultural Resilience Grants	Enterprise's Climate & Cultural Resilience Grants support organizations seeking to use the tools of creative placemaking in the context of a climate resilience project. Projects should identify a climate resilience challenge and propose a plan for building cultural resilience in the process of addressing that challenge. Projects may be at the building or neighborhood scale and can range from planning to implementation. Examples of projects from other communities include: stormwater infrastructure with artistic and educational public elements, community-driven cultural asset mapping for neighborhood resilience plan, creation and installation of a solar powered neighborhood utility, rain barrel builds to capture rainwater and reduce flooding, maker festival that initiates formation of a neighbor-to-neighbor network, build-a-bike workshops to increase carbon-neutral mobility, community collaborations that address resilient food systems	Community Housing Development Organizations (CHDOs); Community Development Corporations (CDCs) as defined by the HUD Section 4 program definition; or Organizations serving Native American Populations with a defined mission that includes affordable housing including Tribes, Tribally Designated Housing Entities (TDHEs) or Tribal Housing Authorities (THAs).	5 grants of $100,000 each available	http://www.enterprisecommunity.org/financing-and-development/grants	Enterprise Community Partners, Inc. Marissa Pio Roda Director, Grants & Contracts Management Columbia Headquarters 70 Corporate Center 11000 Broken Land Parkway, Suite 700 Columbia, MD 21044 410.772.2784 mpioroda@enterprisecommunity.org
Urban Water Management (Surdna Foundation)	Funds available to create pilot projects or expand promising projects in cities and metro areas that demonstrate innovative stormwater management practices. Particularly interested in cities responding to federal regulatory action regarding stormwater management. Also seek green infrastructure solutions that create quality jobs, businesses, and other equitable economic benefits and engage the community in design decisions.	Federally-recognized not-for-profit organizations	Varies	http://www.surdna.org/what-we-fund/sustainable-environments/urban-water-management.html	330 Madison Avenue 30th Floor, New York, NY 10017 Phone 212 557 0010 grants@surdna.org
HUD Community Development	Program that works to ensure decent affordable housing, provide services to the most vulnerable in our communities, and create jobs through the	Allocated between States and local jurisdictions	HUD determines the amount of each grant by using a formula	https://portal.hud.gov/hudportal/HUD?src=/program_offices/comm	Chicago Regional Office Ralph Metcalfe

FUNDING SOURCE	DESCRIPTION	ELIGIBILITY	ASSISTANCE	WEBSITE	CONTACT
Block Grant (CDBG) Program	expansion and retention of businesses. CDBG-financed projects could incorporate green infrastructure into their design and construction.	called "non-entitlement" and "entitlement" communities respectively	comprised of several measures of community need, including the extent of poverty, population, housing overcrowding, age of housing, and population growth lag in relationship to other metropolitan areas	_planning/community development/programs	Federal Building, 24th Floor, 77 W. Jackson Boulevard Chicago, IL 60604-3507 P: 312-913-8713 Lake County Public Building & Development Jodi Gingiss, Community Development Admin. 847-377-2475 communitydevelopment@lakecountyil.gov
Illinois Clean Energy Community Foundation	Supports projects that enhance natural areas, increase renewable energy, or improve energy efficiency. Can be used to purchase land.	Private not-for-profit organizations, educational organizations, local governments	Call for details, which change year to year	http://www.illinoiscleanenergy.org	Illinois Clean Energy 2 N. LaSalle St., Suite 1140 Chicago, IL 60602 Phone: 312-372-5191 info@illinoiscleanenergy.org
Illinois Conservation and Climate Initiative (ICCI)	A joint project of the State of Illinois and the Delta Institute that allows farmers and landowners to earn greenhouse gas emissions credits when they use conservation tillage, plant grasses and trees, or capture methane with manure digesters.	Individuals and corporations	See contact information for more details	http://www.epa.state.il.us/air/climatechange/documents/icci-brochure.pdf	The Delta Institute 312-554-1909 or Illinois EPA Richard Breckenridge (217) 558-6818 richard.breckenridge@illinois.gov
Riverwatch	Is a volunteer-driven effort to collect stream data from Illinois streams and submit the data to the Illinois Natural History Survey. This former IDNR program is now being administered by The National Great Rivers Research & Education Center	All Illinois streams	Monitoring training, forms, and kits	http://www.ngrrec.org/riverwatch/about/	National Great Rivers Research & Education Center One Confluence Way East Alton, IL 62024 Phone: (618) 468-2900
Trust for Public Lands (TPL)	Works with local organizations to conserve lands for a variety of uses, to include farms, ranches, natural lands and lands of historic importance	Local government, private not-for-profit organizations, educational organizations, and others	Technical and informational assistance to identify lands to be protected and assist in financing and land transactions	http://www.tpl.org	Call 312-427-1979 & 314-436-7255

Note: Orange rows indicate that funding source applies to technical and informational assistance.

Reference Sources

Several grant search engines and organizations exist to help identify funding sources. Fees for services or products may be charged by these organizations. When searching, be sure to clarify whether charges will be incurred. For "do-it-your-selfers," local grant data collection centers are available throughout Illinois.

Resources	Reference information
USEPA green infrastructure funding opportunities	Https://www.epa.gov/green-infrastructure/green-infrastructure-funding-opportunities#Funding Tools
Environmental Grant maker's Association	Provides a list of environmental grant foundations. Http://www.ega.org
Minnesota Office of Environmental Assistance	https://www.seek.state.mn.us/resource/minnesota-office-environmental-assistance
The Foundation Cent	79 Fifth Street, New York, New York 10003. Phone: 212-620-4230. Http://www.fdncenter.org
Sonoran Research Institute	Look for Conservation Assistance Tools (CAT) at http://www.sonoran.org
Illinois Department of Natural Resources (IDNR) Grant Opportunities	Funding information: Https://www.dnr.illinois.gov/grants/pages/default.aspx
The Donor's Forum of Chicago	208 S. LaSalle St., suite 735, Chicago, il 60604. Phone: 312-578-0175. Http://www.donorsforum.org. E-mail: info@donorsforum.org
eCivis Grants Network	Assistance for local governments to improve their grants success through expert grant research, information, grant training, and technology. eCivis, Inc. 3452 E. Foothill Blvd, Floor 9, Pasadena, CA 91107. Phone: 877-232-4847. Email info@ecivis.com; http://www.ecivis.com/

Appendix M: Evaluation Scorecards

WATERSHED GOAL #1 MILESTONE SCORECARD: WATER QUALITY IMPROVEMENTS

Improve water quality and prevent future pollution impacts to streams, lakes, ponds, and wetlands within the DPR planning area.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
1a	Watershed stream annual monitoring program support. **Goal #1 Actions 1-4**	**S**	Continue water quality monitoring through DRWW monitoring program	
		M		
		L		
	Implementation of watershed monitoring program for lakes. **Goal #1 Actions 5-7**	**S**	1. Enroll 15 lakes in the Volunteer Lake Monitoring Program (VLMP) 2. Install staff gauges 3. Begin Lake inlet water quality monitoring	
		M	1. Enroll 30 lakes in the Volunteer Lake Monitoring Program 2. Analysis of monitoring and VLMP data 1. Estimate/assess nutrient loads from watershed for 5 lakes with sufficient data.	
		L	1. Enroll 40 lakes in the Volunteer Lake Monitoring Program 2. Analysis of 5-10 year water quality trends for lakes with sufficient data	
1b	Number of water bodies removed from the Illinois EPA's impairments list. **Goal #1 Actions 1-10**	**S**	2 Lakes / 1 stream segment	
		M	6 Lakes / 3 stream segments	
		L	30 Lakes / 6 steam segments	
	Number of causes of impairment removed. **Goal #1 Actions 1-7**	**S**	5 lakes / 2 streams	
		M	10 lakes / 5 streams	
		L	40 lakes / 13 streams	
1c	Winter Maintenance Program establishment including: policy and manual development, de-icing workshop attendance and certification. **Goal #1 Actions 8-9**	**S**	20% of municipal programs	
		M	40% of municipal programs	
		L	100% of municipal programs	
1d	Number of local units of government that adopt a phosphorous ordinance. **Goal #1 Action 14**	**S**	8	
		M	20	
		L	All municipalities	
	Number of exceedances of permitted phosphorus concentrations from wastewater treatment plant effluent. **Goal #1 Action 16**	**S**	0% reduction in exceedances	
		M	25% reduction in exceedances	
		L	50% reduction in exceedances	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
	Number of agricultural BMPs implemented that target phosphorous. **Goal #1 Action 10**	**S**	1. 5 acres grass conversion 2. 10 WASCOBs 3. 5 equestrian facility/ livestock operations 4. 5 grass waterways 5. 250 acres no-till and cover crops 6. 5 field borders	
		M	1) 10 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/ livestock operation 4) 10 grass waterways 5) 1,000 acres no-till and cover crops 6) 10 field borders	
		L	1) 5 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/ livestock operations, 4) 10 grass waterways, 5) 3,000 acres no-till and cover crops 6) 10 field borders	
	Number of upgraded septic systems. **Goal #1 Action 15**	**S**	500	
		M	1,200	
		L	2,000	
	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #1 Actions 11-13**	**S**	8	
		M	20	
		L	All municipalities	
1e	Number of dams and impoundments removed or retrofitted. **Goal #1 Actions 17-18**	**S**	1	
		M	2	
		L	3	
1f	Reduction in concentrations of total suspended solids (TSS). **Goal #1 Action 19**	**S**	10%	
		M	20%	
		L	45%	
	Linear feet of streambank and shoreline restored. **Goal #1 Action 20**	**S**	5,000 linear ft	
		M	15,000 Linear ft	
		L	30,000 Linear ft	
1g	Number of algae blooms reported. **Goal #1 Action 21**	**S**	Quantify baseline number of algae blooms	
		M	10% reduction	
		L	20% reduction	
1h	Percentage of identified sources of fecal coliform addressed. **Goal #1 Actions 22-24**	**S**	Identify and quantify sources of fecal coliform pollution	
		M	50% addressed	
		L	75% addressed	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
1i	Concentration of PAHs detected in water quality/sediment monitoring efforts. **Goal #1 Action 25**	**S**	Identify locations of high PAH concentrations	
		M	Develop a management and remedial action plan	
		L	Plan Implementation	
1j	Number of MS4 communities maintaining a database of pollution prevention plans that address emergency response to catastrophic events. **Goal #1 Actions 26-27**	**S**	10	
		M	20	
		L	All	
1k	Number of action recommendations completed. **Goal #1 Actions 28-43**	**S**	50	
		M	100	
		L	All	

Milestone Grading System

A *= Met or exceeded milestone(s)*
B *= Milestone(s) 75% complete*
C *= Milestone(s) 50% complete*
D *= Milestone(s) 25% complete*
F *= No progress towards milestone(s)*

WATERSHED GOAL #2 MILESTONE SCORECARD: REGIONAL GREEN INFRASTRUCTURE & NATURAL RESOURCES

Protect, enhance, and restore natural resources (soil, water, plant communities, and fish and wildlife) by employing good natural resource management practices. Using green infrastructure on public and private properties to maintain, enhance, or restore natural hydrology, native plant and wildlife communities, provide buffers for streams, lakes, wetlands, and high-quality areas. Expand environmental corridors to provide ecological, educational, and recreational benefits.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
2a	Number of water bodies removed from the Illinois EPA's impairments list. **Goal #1 Actions 1-10**	**Addressed by Objective ID 1b (1)**		
	Number of causes of impairment removed. **Goal #1 Actions 1-7**	**Addressed by Objective ID 1b (2)**		
	Area of open space identified and preserved for environmental and recreational natural areas. **Goal #2 Actions 17-24**	**S**	1,000 acres (in addition to 2018 baseline of 27,000 acres preserved)	
		M	2,000 acres (in addition to 2018 baseline of 27,000 acres preserved)	
		L	3,000 acres (in addition to 2018 baseline of 27,000 acres preserved)	
	Acres of invasive species removal/management projects. **Goal #2 Actions 28-29**	**S**	2,500	
		M	5,000	
		L	10,000	
2b	Area of degraded natural communities restored. **Goal #2 Actions 1-3, 6, 7-11, 15, 16, 23, and 25-28**	**S**	1,000 acres	
		M	5,000 acres	
		L	20,000 acres	
2c	Length of native plant buffers along water bodies maintained, expanded, and/or restored. **Goal #2 Actions 12-13**	**S**	10 miles	
		M	20 miles	
		L	50 miles	
2d	Acres of wetlands enhanced and/or restored. **Goal #2 Actions 14-15**	**S**	500 acres	
		M	1,500 acres	
		L	3,000 acres	
2e	Area of open space identified and preserved for environmental and recreational natural areas. **Goal #2 Actions 17-24**	**Addressed by Objective ID 2a**		
2f	Number of new trail connections. **Goal #2 Action 25**	**S**	5	
		M	10	
		L	20	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
2g	Number of lake management plans developed to address aquatic resource trends based on lake reports. **Goal #2 Action 26**	**S**	5 plans	
		M	10 plans	
		L	25 plans	
	Number of lake management plan project recommendations implemented. **Goal #2 Action 26**	**S**	5 plans	
		M	5 projects implemented	
		L	10 projects implemented	
2h	Number of lakes with Aquatic Plant Management Plans (APMP). **Goal #2 Action 27**	**S**	5	
		M	10	
		L	25	
2i	Acres of invasive species removal/management projects. **Goal #2 Actions 28-29**	**Addressed by Objective ID 2a**		
2j	Number of successful reintroductions of threatened and endangered native species into natural habitats. **Goal #2 Action 30**	**S**	1 attempted	
		M	5 attempted	
		L	2 successful	

Milestone Grading System

A *= Met or exceeded milestone(s)*
B *= Milestone(s) 75% complete*
C *= Milestone(s) 50% complete*
D *= Milestone(s) 25% complete*
F *= No progress towards milestone(s)*

WATERSHED GOAL #3 MILESTONE SCORECARD: FLOOD DAMAGE REDUCTION

Reduce current flood damage in the DPR planning area and prevent future flooding from worsening in the watershed and along the Des Plaines River downstream of Lake County.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
3a	Area of new or restored flood storage sites. **Goal #3 Actions 1-9**	**S**	25 acres	
		M	50 acres	
		L	100 acres	
3b	Number of flood problem areas positively affected by flood mitigation projects implemented. **Goal #3 Actions 1-9**	**S**	10	
		M	20	
		L	30	
3c	Number of flood insurance policies in the watershed communities. **Goal #3 Action 24**	**S**	Track number of NFIP policies	
		M	Track number of NFIP policies	
		L	Track number of NFIP policies	
	Number of Lake County Floodproofing Workshop attendees. **Goal #7 Actions 1-2, 4-5, 9, 13, 17-18**	**S**	300	
		M	600	
		L	900	
3d	Number of action recommendations completed. **Goal #1 Actions 28-43** **Goal #3 Actions 6-9**	**Addressed by Objective ID 1k**		
3e	Number of mapped overland flow routes. **Goal #3 Action 10**	**S**	1 subwatershed	
		M	5 subwatersheds	
		L	All 10 subwatersheds	
3f	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #1 Actions 11-13**	**Addressed by Objective ID 1d**		
3g	Number of local drainage system improvement projects implemented. **Goal #3 Actions 1-10, 22, 25**	**S**	25	
		M	50	
		L	100	
3h	Number of communities with established stream maintenance programs. **Goal #3 Action 18**	**S**	10	
		M	15	
		L	All municipalities	
3i	Number of updated FEMA floodplain maps (less than 10 years old).	**S**	2	
		M	5	
		L	Entire planning area	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
	Goal #3 Actions 19-21			
3j	Number of Voluntary Floodplain Buyouts. **Goal #3 Action 22**	**S**	20	
		M	50	
		L	400	
3k	Number/value of claims filed each year per community in the watershed. **Goal #3 Actions 24**	**S**	Reduce by 5%	
		M	Reduce by 10%	
		L	Reduce by 25%	

Milestone Grading System

A *= Met or exceeded milestone(s)*

B *= Milestone(s) 75% complete*

C *= Milestone(s) 50% complete*

D *= Milestone(s) 25% complete*

F *= No progress towards milestone(s)*

WATERSHED GOAL #4 MILESTONE SCORECARD:

FUNDING, INSTALLING, AND MAINTAINING STORMWATER INFRASTRUCTURE

Reduce the volume and improve the quality of stormwater runoff by installing appropriate gray or green stormwater infrastructure. Improving the condition of existing stormwater infrastructure.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
4a	Number of action recommendations completed. **Goal #1 Actions 28-43** **Goal #3 Actions 6-9** **Goal #4 Actions 2-4**	**Addressed by Objective ID 1k**		
4b	Number of cost-sharing programs available in the DPR planning area. **Goal #4 Actions 5-7, 9**	**S**	5	
		M	7	
		L	10	
	Amount of grant funding available for stormwater green infrastructure and BMPs. **Goal #4 Actions 5 and 9**	**S**	$2,500,000	
		M	$3,000,000	
		L	$5,000,000	
4c	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #1 Actions 11-13** **Goal #4 Actions 8-9, 11**	**Addressed by Objective ID 3f**		
4d	Number of local, county, and state representatives provided educational outreach materials for improving local and countywide regulations. **Goal #4 Action 9**	**S**	20	
		M	40	
		L	50	
4e	Funding increase for in-the-ground stormwater BMPs. **Goal #4 Actions 5 and 9**	**S**	10% increase from 2018 baseline	
		M	10% increase from 2018 baseline	
		L	20% increase from 2018 baseline	
4f	Number of existing stormwater management structures retrofitted. **Goal #4 Actions 10-11**	**S**	30	
		M	100	
		L	500	
	Number of developments built using conservation design principles and/or green infrastructure. **Goal #2 Action 19** **Goal #3 Action 11-15** **Goal#4 Action 4, 8**	**S**	30	
		M	60	
		L	80	
4g	Potential maintenance needs identified in future stream and detention basin inventories. **Goal #3 Action 18** **Goal #4 Action 11, 15**	**S**	N/A	
		M	10% aggregate reduction from 2018 baseline	
		L	20% aggregate reduction from 2018 baseline	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
4h	Number of communities with established stream maintenance programs. **Goal #3 Action 18**	**Addressed by Objective ID 3h**		
4i	Lane miles of roadway retrofitted or constructed with BMPs. **Goal #4 Actions 12-13**	**S**	5 miles	
		M	10 miles	
		L	15 miles	
4j	Number of informational guides on roles and responsibilities for stormwater gray/green infrastructure maintenance distributed. **Goal #7 Action 9**	**S**	2,000	
		M	5,000	
		L	10,000	
4k	Number of compliant site inspections performed during the 10-year operation and maintenance period for Illinois EPA 319 grant funded projects. **Goal #4 Actions 14-16**	**S**	All 319 grant funded projects	
		M	All 319 grant funded projects	
		L	All 319 grant funded projects	

Milestone Grading System

A *= Met or exceeded milestone(s)*

B *= Milestone(s) 75% complete*

C *= Milestone(s) 50% complete*

D *= Milestone(s) 25% complete*

F *= No progress towards milestone(s)*

WATERSHED GOAL #5 MILESTONE SCORECARD: COMMUNITY AND AGENCY COORDINATION

Improve coordination, research, and decision-making among public, private, and non-profit entities to help achieve watershed plan goals and objectives.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
5a	Number of municipalities, counties, and natural resource agencies that adopt the Des Plaines River Watershed-Based Plan. **Goal #5 Actions 1 and 2**	**S**	25 Agencies	
		M	All agencies	
		L	All agencies	
5b	Watershed stream annual monitoring program support. **Goal #1 Actions 1-4** **Goal #5 Action 3**	**Addressed by Objective ID 1a**		
5c	Establishment of lead organization (watershed planning committee) with budget and executive committee. **Goal #5 Actions 4-6**	**S**	1 lead organization	
		M		
		L		
	Number of projects advanced/undertaken with the support of the watershed planning committee. **Goal #5 Actions 7-8**	**S**	100 action plan recommendations	
		M	250 action plan recommendations	
		L	500 action plan recommendations	
5d	Communities that have a designated individual or board member(s) to participate on the watershed planning committee. **Goal #5 Action 4, 13**	**S**	10 communities	
		M	20 communities	
		L	All communities	
5e	Number of jurisdictions implementing watershed site-specific and programmatic actions. **Goal #5 Actions 9-11**	**S**	10	
		M	20	
		L	All	
5f	Number of jurisdictions that have ordinances and programs that protect and preserve watershed natural resource areas. **Goal #5 Actions 12-14**	**S**	10	
		M	20	
		L	All	
	Number of municipalities that have codes that allow or require green infrastructure for stormwater management. **Goal #5 Actions 10, 14**	**Addressed by Objective IDs 3f & 4c**		
5g	Number of RiverWatch sites/lakes enrolled in volunteer/citizen scientist river and lake monitoring programs. **Goal #1 Action 2** **Goal #7 Actions 13**	**S**	25	
		M	50	
		L	75	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
5h	Number of watershed stakeholders providing feedback for the watershed report cards. **Goal #5 Action 15**	**S**	30	
		M	100	
		L	200	

Milestone Grading System

A *= Met or exceeded milestone(s)*

B *= Milestone(s) 75% complete*

C *= Milestone(s) 50% complete*

D *= Milestone(s) 25% complete*

F *= No progress towards milestone(s)*

WATERSHED GOAL #6 MILESTONE SCORECARD: SUSTAINABLE AGRICULTURE SYSTEMS

Watershed stakeholders participate in farmland preservation programs and implement sustainable agricultural practices to accomplish other watershed goals and objectives.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
6a	Number and area of agricultural BMPs installed. **Goal #6 Actions 1-9**	**S**	25 BMPs cumulatively treating greater than 1,000 acres.	
		M	50 BMPs cumulatively treating greater than 2,000 acres	
		L	100 BMPs cumulatively treating greater than 5,000 acres	
6b	Number or percent of farms, equestrian facilities, and nurseries with Resource Management Plans. **Goal #6 Action 10**	**S**	5%	
		M	25%	
		L	50%	
6c	Number of high priority sediment reduction agriculture BMPs installed. **Goal #6 Actions 11-12**	**S**	15	
		M	30	
		L	60	
	Demonstration sites established and monitored. **Goal #7 Action 2, 7, 13**	**S**	3	
		M	5	
		L	7	
	Length of drain tile removed or disabled. **Goal #6 Action 12**	**S**	5,000 ft	
		M	10,000 ft	
		L	30,000 ft	
6d	Number of county and municipal agencies that have adopted a farmland preservation program(s). **Goal #6 Action 13**	**L**	Community dependent	
6e	Acres of cover crops or crop residue left on fall agricultural fields. **Goal #6 Action 1, 8, 10, 13**	**S**	5% of all conventional or reduced tilled fields (500 acres)	
		M	25% of all conventional or reduced tilled fields (2,500 acres)	
		L	50% of all conventional or reduced tilled fields (5,000 acres)	
	Acres of waterway, wetland, WASCOB, field border, filter strip, GSS and other erosion control agriculture BMPs that are implemented, enhanced or restored. **Goal #6 Actions 1-9, 11-12**	**S**	1) 5 acres grass conversion 2) 10 WASCOBs, 3) 5 equestrian facility/livestock operations, 4) 5 grass waterways, 5) 250 acres no-till and cover crops, 6) 5 field borders 7) 5 acres filter strips, 8) 50 acres of wetlands 9) 10 nutrient management plans	

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
		M	1) 10 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/livestock operations 4) 10 grass waterways 5) 1,000 acres no-till and cover crops 6) 10 field borders 7) 10 acres filter strips 8) 100 acres of wetlands 9) 50 nutrient management plans	
		L	1) 5 acres grass conversion 2) 10 WASCOBs 3) 10 equestrian facility/livestock operations, 4) 10 grass waterways, 5) 3,000 acres no-till and cover crops, 6) 10 field borders, 7) 10 acres filter strips, 8) 200 acres of wetlands 9) 100 nutrient management plans	
6f	Number of prime farmland acres in production. **Goal #6 Action 14**	**L**	75% of all prime farmland (2018 baseline)	

Milestone Grading System

A *= Met or exceeded milestone(s)*

B *= Milestone(s) 75% complete*

C *= Milestone(s) 50% complete*

D *= Milestone(s) 25% complete*

F *= No progress towards milestone(s)*

WATERSHED GOAL #7 MILESTONE SCORECARD: EDUCATION AND OUTREACH

Provide watershed stakeholders with the knowledge, skills, and motivation needed to take action to implement the watershed plan. Watershed stakeholders include (but are not limited to): residents, property owners, property owner associations, government agencies, jurisdictions, and developers.

Timeframe: Short (**S**): 1-5 years, Medium (**M**): 6-10 years, Long (**L**): 10+ years

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
7a	Number of landowners that receive information about best practices for stream and lake shoreline restoration and maintenance. **Goal #7 Action 1-2, 4, 13**	**S**	500	
		M	500	
		L	2,000	
7b	Number of people reached by watershed outreach campaign. **Goal #7 Actions 2, 4, 10-11, 16**	**S**	Establish outreach campaign	
		M	5,000	
		L	10,000	
7c	Number of public agencies and local private contractors attending the annual Lake County De-icing Workshop. **Goal #1 Actions 8-9** **Goal #7 Action 3**	**S**	20 public agencies; 100 local private contractors	
		M	35 public agencies; 150 local private contractors	
		L	All public agencies with winter maintenance responsibilities; 200 local private contractors	
	Number of public agencies with winter maintenance responsibilities that use alternative de-icing products. **Goal #1 Actions 8-9** **Goal #7 Action 3**	**S**	20	
		M	35	
		L	All	
7d	Number of property owners that receive information about the importance of watershed health. **Goal #7 Actions 2, 4, 11**	**S**	2,000	
		M	5,000	
		L	10,000	
7e	Number of landowners that receive information about watershed programs and projects. **Goal #7 Actions 2, 10, 12**	**S**	2,000	
		M	5,000	
		L	10,000	
	Number of workshops. **Goal #7 Actions 13, 16, 18**	**S**	10	
		M	20	
		L	30	
	Number of action recommendations completed. **Goal #1 Actions 28-43** **Goal #3 Actions 6-9** **Goal #4 Actions 2-4** **Goal #7 Actions 20-21**	**Addressed by Objective IDs 1k**		

OBJECTIVE ID	INDICATOR	TIMEFRAME	MILESTONE	GRADE
	Continuous increase in number of contacts on the SMC Des Plaines River watershed contact database. **Goal #7 Actions 2, 4, 10-11, 16**	**S**	5% increase	
		M	7% increase	
		L	10% increase	
7f	Pollution prevention campaign established. **Goal #7 Actions 2-5, 8, 17, 22**	**S**	Establish campaign	
		M	Maintain campaign	
		L	Maintain campaign	
7g	Number of volunteers for lake, stream, and natural area stewardship and maintenance. **Goal #7 Actions 13-14**	**S**	500	
		M	500	
		L	1,000	
7h	Number of native plant demonstration sites established, and trainings held. **Goal #7 Actions 15-16, 21-22**	**S**	1 site / 1 training/yr.	
		M	2 sites / 2 trainings/yr.	
		L	2 sites / 2 trainings/yr.	
7i	Number of communities that adopt the "no adverse impact standard." **Goal #7 Action 17**	**S**	2	
		M	5	
		L	All applicable communities	
7j	Number of educational flyers or mailings to high flood risk property owners about flood mitigation measures. **Goal #7 Action 18**	**M**	5,000	
	Number of clicks (overall activity) on SMC website with flooding resources. **Goal #7 Action 4, 18**	**S**	5% increase in 2018 baseline	
		M	7% increase in 2018 baseline	
		L	10% increase in 2018 baseline	
7k	Number of educational signs regarding aquatic invasive species installed. **Goal #7 Actions 20-22**	**S**	10	
		M	20	
		L	At least one sign at every lake with public access	

Milestone Grading System

A *= Met or exceeded milestone(s)*

B *= Milestone(s) 75% complete*

C *= Milestone(s) 50% complete*

D *= Milestone(s) 25% complete*

F *= No progress towards milestone(s)*

Appendix N: Site Specific Action Plan Recommendations

TABLE OF CONTENTS
Separated by Jurisdiction & Basin-Wide Site-Specific Action Plan Recommendations

Stakeholder Action Recommendations	Village of Lake Villa
Antioch Township	Village of Lake Zurich
Avon Township	Village of Libertyville
Benton Township	Village of Lincolnshire
City of Lake Forest	Village of Lindenhurst
City of Park City	Village of Long Grove
City of Waukegan	Village of Mettawa
City of Zion	Village of Mundelein
Ela Township	Village of Northbrook
Forest Preserve District of Cook County	Village of Old Mill Creek
Fremont Township	Village of Palatine
Lake County Forest Preserve District	Village of Riverwoods
Lake Villa Township	Village of Round Lake Beach
Libertyville Township	Village of Round Lake Park
Newport Township	Village of Salem Lakes
Northfield Township	Village of Third Lake
Palatine Township	Village of Vernon Hills
State of Illinois	Village of Wadsworth
Vernon Township	Village of Wheeling
Village of Antioch	Vernon Township
Village of Arlington Heights	Warren Township
Village of Beach Park	Waukegan Township
Village of Bristol	West Deerfield Township
Village of Buffalo Grove	Wheeling Township
Village of Deerfield	**Site-Specific Action Plan Recommendation Maps**
Village of Deer Park	Map 1
Village of Glenview	Map 2
Village of Grayslake	Map 3
Village of Green Oaks	Map 4
Village of Gurnee	Map 5
Village of Hainesville	Map 6
Village of Hawthorn Woods	Map 7
Village of Indian Creek	Map 8
Village of Kildeer	Map 9

STAKEHOLDER SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS

PLAN ID	ISSUE DESCRIPTION	ACTION	SUBWATERSHED	JUISDICTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS
DSTF5	Natural Area being filled by residents	Investigate report of illegal fill	Buffalo Creek	Lake County Forest Preserve District	42.1569678	-88.01471	H	S	2, 3, 4	FPD	M, SMC, USACE
DSTFP01	MWRD Buffalo Creek Reservoir Expansion	MWRD Buffalo Creek Reservoir Expansion	Buffalo Creek	Lake County Forest Preserve District	42.1559995	-88.00197	H	S	2, 3, 4	MWRD, FPD	IDNR, USACE, SMC
DSTFP02	Oakdale, Grove, Fairview, and Circle. Storm Sewer improvements. Have design but no funding or easement area. Fremont Township	Oakdale, Grove, Fairview, and Circle Storm Sewer improvements	Indian Creek	Fremont Township	42.2525737	-88.01293	H	S	3, 4	T, DOT, PO	PB&D, SMC
DSTFP03	Owens Rd and adjacent residential. Storm sewer. Concept only. Fremont Township	Owens Rd and adjacent residential Storm sewer	Indian Creek	Fremont Township	42.2582562	-88.06961	H	S	3. 4	T, DOT, PO	PB&D, SMC, HOA/POA
DSTFP04	Libertyville Highlands Subdivision Interim Stormwater Improvements Project	Libertyville Highlands Subdivision Interim Stormwater Improvements Project	Indian Creek	Village of Libertyville	42.2796907	-87.96417	H	S	3, 4	M	WPC, DH, SMC, DOT
DSTFP06	West Ellis Ave. Detention Basin/East Ellis Storm Sewer Enlargement Project.	West Ellis Ave. Detention Basin/East Ellis Storm Sewer Enlargement Project.	Upper Des Plaines River	Village of Libertyville	42.2936091	-87.95524	H	S	1, 3, 4	M, DOT	DH, HOA/POA

STAKEHOLDER SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS

PLAN ID	ISSUE DESCRIPTION	ACTION	SUBWATERSHED	JUISDICTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS
DSTG100	Enhance Wetland (1.5 acres)	Enhance Wetland (1.5 acres)	Lower Des Plaines River	Village of Riverwoods	42.1578902	-87.89433	H	S	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC Illinois EPA, M
DSTG101	Enhance Wetland (1.5 acres)	Enhance Wetland (1.5 acres)	Lower Des Plaines River	Village of Riverwoods	42.1578686	-87.89524	H	S	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC Illinois EPA, M
DSTG102	Enhance Wetland (2.4 acres)	Enhance Wetland (2.4 acres)	Lower Des Plaines River	Village of Riverwoods	42.1580505	-87.89614	H	S	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC Illinois EPA, M
DSTG30	Improvement or replace two aerators in Third Lake	Improve or replace two aerators in Third Lake	Mill Creek	Avon Township	42.3703208	-88.01468	H	S	1, 2	M	PR/RL, LA, LCHD
DSTG31	Weed Remediation	Manage invasive/nuisance aquatic plants	Mill Creek	Village of Third Lake	42.3681524	-88.00456	H	S	1, 2	PO, M, LA	HOA/POA, PR/RL, LCHD
DSTG45	North Libertyville Estates Retention Basin. Clear out existing debris, retrofit/expand existing basin for storage.	North Libertyville Estates Retention Basin. Clear out existing debris, retrofit/expand existing basin for storage.	Upper Des Plaines River	Libertyville Township	42.3033262	-87.95032	H	S	1, 3, 4	HOA/POA, PO	PB&D, SMC, LCPW
DSTG48	Diamond Lake. Remove or control exotic or invasive species around entire lake and replace with native vegetation.	Remove/control invasive species & create riparian buffer of native vegetation	Indian Creek	Fremont Township	42.2497763	-88.0075	H	S	1, 2	PD, PO, PR/RL	IDNR, IIllinois EPA, USFWS, LA, LCHD, WPC
DSTG60	Sylvan Lake Spillway and Dam. Design in place. Fremont Township	Sylvan Lake dam & spilway restoration	Indian Creek	Fremont Township	42.2420777	-88.04387	H	S	1, 3, 4	T, LA	WPC, SMC, LA, LCHD
DSTG66	Lake Charles in Vernon Hills dredging project.	Lake Charles dredging project	Indian Creek	Village of Vernon Hills	42.2609594	-87.96507	H	S	1, 3, 4	M, PD, PO	HOA/POA, LCHD, SMC, IDNR, USACE

STAKEHOLDER SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS

PLAN ID	ISSUE DESCRIPTION	ACTION	SUBWATERSHED	JUISDICTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS
DSTG67	Dam removal on Indian Creek downstream of Buffalo Grove Road.	Investigate feasibility of dam removal	Indian Creek	Village of Buffalo Grove	42.2102046	-87.95439	H	S	1, 2, 3, 4	M, PO, T	WPC, DRWW, SMC, USACE, IDNR, Illinois EPA

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR AVON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TAVN-CC	Cover Crops	54	ac	54	ac	Mill Creek	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$3,240.00	200	8.4	10	0	18	Y	N
TAVN-ICE	De-icing practices/salt management	33	ac	32.75	ac	Mill Creek	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, EIG, IDNR, KRLT	N/A	0	0	0	10,516	0	N/A	N
DSTG30	Detention Basin Retrofit	1	ea.	N/A	N/A	Mill Creek	Improve or replace two aerators in Third Lake	42.37032084	-88.01467998	H	S	1, 2	M	PR/RL, LA, LCHD	N/A	N/A	N/A	N/A	N/A	N/A	N	N
DST6	Filter Strip	2.7	ac	43	ac	Mill Creek	Install filter strip	42.37002292	-88.01942776	H	S	1, 2	LA, PO	SMC, M, PB&D	$10,613.83	53	3.5	1.4	2,048	36	N	N
DST5	Lake Shoreline Stabilization	4,051	ft	4,051	ft	Mill Creek	Stabilize lake shorelines	42.37032084	-88.01467998	H	S	1, 2	PR/RL	M, LA, SMC	$405,100.00	3.1	1.6	1.6	0	0	N	N
TAVN-TIL	No-Till / Strip-Till	45	ac	45	ac	Mill Creek, Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$1,575.00	60	13	17	0	8.7	Y	N
TAVN-NU	Nutrient Management	54	ac	54	ac	Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$1,080.00	100	20	0	0	0	Y	N
TAVN-RVR	Runoff Volume Reduction Practices	73	ac	N/A	N/A	Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$1,068,760	155	15	5	7,959	82	Y	N
TAVN-WLE	Wetland Enhancement	12	ac	12	ac	Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$360,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR BENTON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TBEN-CC	Cover Crops	82	ac	82	ac	Newport Drainage Ditch, Upper Des Plaines River	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$4,920.00	N/A	373	15	23	0	32	Y	N
TBEN-ICE	De-icing practices/salt management	1.9	ac	1.9	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	787	0	N/A	N
DD136	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.49277642	-87.87444163	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TBEN-FAM	Feed Area Management	0.59	ac	0.59	ac	Newport Drainage Ditch, Upper Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	16	0.87	0.09	0.05	7.6	Y	N
TBEN-TIL	No-Till / Strip-Till	68	ac	68	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$2,380.00	N/A	108	23	39	0	16	Y	N
TBEN-NU	Nutrient Management	82	ac	82	ac	Newport Drainage Ditch, Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$1,640.00	N/A	186	35	0	0	0	Y	N
TBEN-RVR	Runoff Volume Reduction Practices	0.25	ac	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,626	N/A	1	0	0	42	0	N	N
TBEN-WLR	Wetland Creation/ Restoration	0.75	ac	0.75	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA	$60,000.00	N/A	5.7	0.14	0.03	1.7	0.81	Y	N
TBEN-WLE	Wetland Enhancement	1.1	ac	1.1	ac	Newport Drainage Ditch	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$33,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF LAKE FOREST

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS	IN PREVIOUS PLANS
LFT-ICE	De-icing practices/ salt management	19	ac	19	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	6,552	0	N/A	N
DD475	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Increase buffer where needed	42.23826246	-87.8999207	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
LFT-RVR	Runoff Volume Reduction Practices	25	ac	N/A	N/A	Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$360,610	N/A	59	7	2	4,129	22	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF PARK CITY

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1035	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34922857	-87.9014006	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1039	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34941411	-87.90124939	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1041	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34957525	-87.90115568	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1045	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34966933	-87.90090497	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1046	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34971003	-87.90082585	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1048	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35002632	-87.90052259	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1056	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35291133	-87.90043835	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1057	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35297482	-87.90048236	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1060	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3532091	-87.90043651	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1063	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35366637	-87.90008606	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1064	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35382836	-87.89998241	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1065	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3540001	-87.89991272	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1066	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35401855	-87.89984765	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1072	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35460207	-87.89983809	L	S	1, 3, 4	PO	M, SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
PRK-ICE	De-icing practices/salt management	33	ac	33	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	13,039	0	N/A	N
DD279	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.35547774	-87.90279953	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF PARK CITY

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD102	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Potentially broken off. Investigate and repair if determined problematic.	42.35628496	-87.90034875	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD103	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Filled. Investigate and repair if determined problematic.	42.35538399	-87.9000294	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD104	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Two same pipes sticking out next to each other. Investigate and repair if determined problematic.	42.35425251	-87.89982051	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD105	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Partially submerged. Investigate and repair if determined problematic.	42.35374024	-87.90003863	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD106	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Log and debris inside. Investigate and remove if determined problematic.	42.35236127	-87.90033752	M	S	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH48	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Falling apart. Investigate and repair if determined problematic.	42.34913604	-87.90155994	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
PRK-RVR	Runoff Volume Reduction Practices	65	ac	N/A	N/A	Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$958,420	N/A	133	13	4	6,697	79	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF WAUKEGAN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
WAK-CC	Cover Crops	512	ac	512	ac	Bull's Brook, Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$30,720.00	N/A	1,732	72	101	0	186	Y	N
DPH1284	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40252649	-87.90001272	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1295	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40695188	-87.89906271	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1296	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40700594	-87.89895836	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH912	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30932879	-87.93351694	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH914	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31032796	-87.93677365	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH928	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31457117	-87.93649688	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH931	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31487502	-87.93646083	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH933	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31515841	-87.93639478	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH937	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31601491	-87.93569339	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH938	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31810632	-87.93406554	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH942	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31825053	-87.92748591	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH943	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31837119	-87.92737116	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH944	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31873283	-87.92685819	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH945	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31898106	-87.92687923	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH946	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31904128	-87.92688929	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH949	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31968962	-87.92619057	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH950	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31975739	-87.92615973	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH951	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31991283	-87.9260573	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH952	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31997972	-87.9256108	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH953	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32029106	-87.92478342	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH962	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3238877	-87.93151409	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH963	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32456923	-87.93143387	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH964	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32498992	-87.9296813	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH965	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32516334	-87.93697607	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH966	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3259284	-87.95923379	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH967	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32586679	-87.92887278	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH969	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32611003	-87.92846416	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH971	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32632846	-87.9283417	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH972	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32750134	-87.92883297	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH973	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32828631	-87.92876491	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH974	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32846216	-87.92864186	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH975	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32871584	-87.92785203	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH976	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32873801	-87.92800567	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH977	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32876689	-87.92752648	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH979	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32922215	-87.92688778	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH980	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32984421	-87.92684134	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH982	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33024751	-87.92704025	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH983	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33061962	-87.92704611	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH984	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3322828	-87.92618781	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH986	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33258002	-87.92639367	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
WAK-ICE	De-icing practices/salt management	231	ac	231	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	86,279	0	N/A	N
DD163	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.41367534	-87.91637953	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD164	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer, reinforce riprap buffer	42.41310472	-87.91639	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD165	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.41311398	-87.91690843	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD166	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.41245331	-87.91403508	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD167	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.41238433	-87.91677873	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD168	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Upper Des Plaines River	Install native buffer	42.41184175	-87.91402133	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD169	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Upper Des Plaines River	Install plants or riprap to stabilize bank near outlet	42.41210406	-87.9265805	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD170	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.41062439	-87.90109723	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD171	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.4105118	-87.91617831	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD172	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.41013724	-87.90198921	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD173	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40913661	-87.90356203	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD174	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40907172	-87.91902447	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD175	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator and native buffer	42.40842529	-87.91851094	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD176	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer, install aerator	42.40696957	-87.92317335	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD177	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40640563	-87.92065207	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD178	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.4049552	-87.91562598	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD179	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer, aerator	42.40473929	-87.91417275	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD180	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.4042209	-87.91340522	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD181	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40347858	-87.92174141	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD182	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40275992	-87.90206445	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD183	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40258928	-87.92028412	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD184	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.40151985	-87.91475408	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD185	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove channel, create meander with native plants	42.39701169	-87.90353691	M	M	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD186	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Vegetate the slopes	42.39702864	-87.90640832	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD188	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.39467963	-87.88661413	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD189	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install pipe inlet and outlet	42.39357335	-87.89215125	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD192	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove channel, improve meander	42.39098315	-87.88816123	M	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD233	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove riprap and Install native buffer	42.37700536	-87.88211849	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD234	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove riprap and Install native buffer	42.37688684	-87.88251614	L	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD240	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove concrete, create more natural meanders, plant natives	42.37496966	-87.88438902	M	M	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD299	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer, install native buffer	42.32900441	-87.94062244	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD300	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer	42.32804607	-87.93641397	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD301	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer or Install native buffer	42.32814192	-87.93938668	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD302	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer along banks	42.32471143	-87.93310264	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD304	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install riprap or native buffer to reduce shoreline erosion	42.32079436	-87.94360509	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD307	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer, Install native buffer	42.31996718	-87.94371631	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD308	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer	42.31926032	-87.94151728	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD309	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.31911292	-87.93386131	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD310	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.31854266	-87.93392843	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD311	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.31711009	-87.93997721	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD312	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer, install native buffer	42.31655824	-87.93923383	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD313	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.31605818	-87.93848873	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD314	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.31575912	-87.93757001	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD332	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install riprap or buffer to reduce shore erosion	42.329427	-87.9326622	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD344	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.39650358	-87.90135503	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD389	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.40263145	-87.91401014	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD422	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.34507644	-87.91021193	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD428	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.34345918	-87.91045617	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF WAUKEGAN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD432	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer, reduce/eliminate yard waste dumping	42.34281858	-87.9098878	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD436	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.34208077	-87.91244022	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD444	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.3278072	-87.95675739	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD446	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer near houses	42.34142624	-87.90717081	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD129	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.41909193	-87.88313106	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD130	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.41919838	-87.88312017	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD131	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.41929779	-87.88309829	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD132	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Same type of pipe 10ft away, same condition. Investigate and repair if determined problematic.	42.41937206	-87.88308748	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD133	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.41953165	-87.8829941	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD134	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.42013971	-87.88278866	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD135	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.42055788	-87.88249312	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD136	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.42055977	-87.88249848	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD146	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.31715519	-87.93445873	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD147	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.31716902	-87.93442504	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD158	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Half buried. Investigate and repair if determined problematic.	42.32974405	-87.92680254	M	S	1, 3, 4	M, PR/RL	AG, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD159	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Can't find end it disappears into vegetation. Investigate and repair if determined problematic.	42.32486985	-87.93048462	M	S	1, 3, 4	M, PR/RL	HOA/POA, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
WAK-FAM	Feed Area Management	5.7	ac	5.7	ac	Upper Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	290	18	1.9	6.4	139	Y	N
SSD67	Field Border	1.0	ac	17	ac	Upper Des Plaines River	Install field border	42.34412973	-87.91486148	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$4,000.00	N/A	54	3.1	6.6	4.7	4.6	N	N
SSD80	Field Border	1.4	ac	28	ac	Upper Des Plaines River	Install field border	42.32036987	-87.92676231	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$5,600.00	N/A	254	14	20	22	28	Y	N
SSD73	Filter Strip	2.5	ac	81	ac	Upper Des Plaines River	Install filter strip	42.32807877	-87.92768401	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT, T	$10,000.00	N/A	192	13	26	146	19	Y	N
SSD74	Filter Strip	2.3	ac	19	ac	Upper Des Plaines River	Install filter strip	42.32821724	-87.92832902	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT, T	$9,200.00	N/A	115	6.8	10	173	17	Y	N
DPH52	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Corroded away. Investigate and repair if determined problematic.	42.40706529	-87.89891066	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH56	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.42079698	-87.88224359	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH61	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.31601835	-87.9357166	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF WAUKEGAN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
WAK-TIL	No-Till / Strip-Till	184	ac	184	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$6,440.00	N/A	354	75	135	0	51	Y	N
WAK-NU	Nutrient Management	512	ac	512	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$10,240.00	N/A	866	167	0	0	0	Y	N
WAK-PE	Pasture Enhancement	1.1	ac	1.1	ac	Upper Des Plaines River	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	7.5	0.51	0.09	0.46	4.7	Y	N
WAK-RVR	Runoff Volume Reduction Practices	291	ac	N/A	N/A	Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$4,260,802	N/A	643	69	21	38,141	227	Y	N
DSB191	Stream Buffer	0.27	ac	0.56	ac	Upper Des Plaines River	Install stream buffer	42.31996908	-87.93402311	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,093.22	N/A	2.2	0.08	0.03	70	1.6	Y	N
DSB192	Stream Buffer	0.09	ac	0.34	ac	Upper Des Plaines River	Install stream buffer	42.32486015	-87.92986045	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$356.97	N/A	0.94	0.04	0.03	28	0.68	Y	N
DSB193	Stream Buffer	0.31	ac	1.4	ac	Upper Des Plaines River	Install stream buffer	42.32370843	-87.93224263	H	S	1, 2	T	M, SMC, IDNR, Illinois EPA	$1,232.62	N/A	8.4	0.47	0.05	1.0	1.3	Y	N
DSB194	Stream Buffer	0.64	ac	7.0	ac	Upper Des Plaines River	Install stream buffer	42.3268058	-87.96081657	H	S	1, 2	T	M, SMC, IDNR, Illinois EPA	$2,579.30	N/A	78	5.1	1.1	107	54	N	N
DSB197	Stream Buffer	0.47	ac	4.4	ac	Upper Des Plaines River	Install stream buffer	42.3265448	-87.96025031	H	S	1, 2	T	M, SMC, IDNR, Illinois EPA	$1,899.05	N/A	27	1.6	0.37	10	18	N	N
DSB206	Stream Buffer	0.32	ac	1.5	ac	Upper Des Plaines River	Install stream buffer	42.32568479	-87.95815197	H	S	1, 2	T	M, SMC, IDNR, Illinois EPA	$1,298.90	N/A	3.8	0.11	0.04	0.62	0.52	N	N
SBD18	Streambank Stabilization	781	ft	781	ft	Upper Des Plaines River	Install 11 stream riffles and stabilize stream banks	42.40349532	-87.90805151	H	S	1, 2	PD, M, PB&D	DOT, SMC, IDNR, Illinois EPA	$509,161.10	$784,161.10	6.6	3.3	10	0	0	N	N
SBD23	Streambank Stabilization	264	ft	264	ft	Upper Des Plaines River	Stabilize stream banks	42.32905286	-87.9487967	H	S	1, 2	FPD, PR/RL	M, PB&D, M, UT, IDNR, Illinois EPA	$79,230.15	$79,230.15	9.5	4.8	4.8	0	0	Y	N
DPD17	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.31819362	-87.92777316	M	M	1, 3, 4	PB&D	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS30	Wetland Creation/Restoration	0.39	ac	91	ac	Upper Des Plaines River	Create new wetlands	42.37590387	-87.88205487	H	M	1, 2, 3, 4	PO, DOT	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$30,964.64	N/A	112	4.7	1.5	2,206	38	N	N
DWS35	Wetland Creation/Restoration	1.1	ac	586	ac	Upper Des Plaines River	Create new wetlands	42.34769952	-87.90108306	H	M	1, 2, 3, 4	PD, PO, DOT, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$86,625.46	N/A	382	16	7.5	12,814	156	N	N
DWS45	Wetland Creation/Restoration	6.5	ac	249	ac	Upper Des Plaines River	Create new wetlands	42.32296307	-87.95949312	H	M	1, 2, 3, 4	PB&D, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$520,884.13	N/A	1,050	37	20	9,445	346	N	N
DWS46	Wetland Creation/Restoration	19	ac	453	ac	Upper Des Plaines River	Create new wetlands	42.32483359	-87.93786206	H	M	1, 2, 3, 4	PB&D, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$1,511,918.49	N/A	1,569	50	57	6,306	390	Y	N
SSD60	Wetland Creation/Restoration	30	ac	725	ac	Upper Des Plaines River	Create new wetlands	42.40510141	-87.90382583	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$2,400,000.00	N/A	1,181	54	39	11,567	221	Y	N
SSD79	Wetland Creation/Restoration	2.0	ac	194	ac	Upper Des Plaines River	Create new wetlands	42.32019064	-87.92513852	H	M	1, 3, 4	PB&D	MC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	591	38	29	9,141	211	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF ZION

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
ZIO-CC	Cover Crops	115	ac	115	ac	Newport Drainage Ditch, Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$6,900.00	N/A	440	15	22	0	38	Y	N
DPH1457	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46538842	-87.89786716	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1458	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46542131	-87.89793778	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1460	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.4654652	-87.89798646	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1461	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46552389	-87.89803894	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1468	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46625344	-87.88482269	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1481	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.4685418	-87.88497801	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1483	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46871477	-87.88495605	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1485	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46889407	-87.88503794	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1486	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Platform on left bank. Investigate and remove if determined problematic.	42.46903164	-87.88539283	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1487	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46959423	-87.88649161	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1488	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46966438	-87.88659734	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
ZIO-ICE	De-icing practices/salt management	53	ac	53	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	19,344	0	N/A	N
DD137	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase native buffer	42.48960638	-87.88116006	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD138	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer	42.4892487	-87.87300456	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD139	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer	42.48877103	-87.8709248	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD140	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer	42.48828473	-87.87194209	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD141	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer	42.48888176	-87.87132081	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD142	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase native buffer	42.48824241	-87.87296598	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD143	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase native buffer	42.48666822	-87.88444347	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD349	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer	42.47786291	-87.89758655	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD350	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase buffer	42.47778045	-87.89354516	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF ZION

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD351	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Remove concrete channel, meander stream	42.47319502	-87.87817856	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD352	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Add riprap to Swales to reduce erosion	42.47009041	-87.89540834	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD371	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer, provide access easement by houses	42.47156385	-87.87867268	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD372	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer by houses	42.47104413	-87.8795105	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD373	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer by road	42.47105287	-87.8812123	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD374	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Remove invasives (garlic mustard), plant natives for erosion control and nutrient/pollutant uptake	42.4670016	-87.87966259	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD375	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer	42.4767565	-87.89744323	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD376	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Don't mow the buffer	42.46896295	-87.89691575	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD378	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Install native buffer	42.46348359	-87.88079796	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
SSD30	Field Border	0.60	ac	4.3	ac	Newport Drainage Ditch	Install field border	42.45786163	-87.89501654	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,400.00	N/A	14	0.78	1.1	1.4	1.4	N	N
DPH85	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Round. Investigate and repair if determined problematic.	42.47477519	-87.89795249	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
ZIO-TIL	No-Till / Strip-Till	81	ac	81	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$2,835.00	N/A	108	17	32	0	15	Y	N
ZIO-NU	Nutrient Management	115	ac	115	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$2,300.00	N/A	220	35	0	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE CITY OF ZION

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
ZIO-RVR	Runoff Volume Reduction Practices	36	ac	N/A	N/A	Newport Drainage Ditch	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, SI, MWRD, T, HOA/POA	$520,726	N/A	81	8	2	4,428	34	Y	N
DSB12	Stream Buffer	0.39	ac	3.0	ac	Upper Des Plaines River	Install stream buffer	42.46605714	-87.88485063	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$1,579.45	N/A	13	0.75	0.35	7.7	1.8	Y	N
DSB13	Stream Buffer	0.76	ac	9.6	ac	Upper Des Plaines River	Install stream buffer	42.46575052	-87.88523922	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$3,021.75	N/A	37	1.6	0.35	8.8	8.5	Y	N
DSB7	Stream Buffer	0.70	ac	2.9	ac	Upper Des Plaines River	Install stream buffer	42.46931439	-87.88614764	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$2,819.59	N/A	1.0	0.14	0.01	2.2	0.34	Y	N
DSB8	Stream Buffer	0.68	ac	1.4	ac	Newport Drainage Ditch	Install stream buffer	42.46946174	-87.88598804	H	S	1, 2	AG, PR/RL	M, SMC, IDNR, Illinois EPA	$2,736.00	N/A	0.60	0.07	0.003	10	0.14	Y	N
DWS10	Wetland Creation/ Restoration	5.6	ac	520	ac	Newport Drainage Ditch	Create new wetlands	42.46724509	-87.88434348	H	M	1, 2, 3, 4	PO	UT, M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$451,889.19	N/A	649	16	13	8,358	226	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR ELA TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TELA-CC	Cover Crops	298	ac	298	ac	Indian Creek	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$17,880.00	N/A	1,200	49	106	0	112	Y	N
DPH502	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22777105	-88.019185	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
TELA-ICE	De-icing practices/salt management	77	ac	77	ac	Buffalo Creek, Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, PD	N/A	N/A	0	0	0	31,668	0	N/A	N
DD59	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator, add native plants to decrease erosion	42.23963058	-88.008234	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD66	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add native plants to decrease erosion, remove some excess woody vegetation	42.23410049	-88.0049905	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD68	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install aerator, put more riprap in channel to prevent erosion	42.23376939	-88.0406989	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD84	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.21167327	-88.0588202	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD66	Discharge Point	1	no.	N/A	N/A	Indian Creek	Smashed. Investigate and repair if determined problematic.	42.19747731	42.19747731	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD67	Discharge Point	1	no.	N/A	N/A	Indian Creek	Armored by concrete clay gutter, Investigate and repair if determined problematic.	42.19747819	42.19747819	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DST10	Filter Strip	2.5	ac	29	ac	Indian Creek	Install filter strip	42.22835296	-88.0485533	H	S	1, 2	LA, PO	SMC, PB&D	$10,010.89	N/A	120	7.2	17	832	36	N	N
SSD131	Grass Waterway	0.90	ac	54	ac	Buffalo Creek, Indian Creek	Install grass waterway	42.23710828	-88.0356468	H	S	1	AG	EXT, NRCS/SWCD, FB	$7,200.00	N/A	240	10	25	337	30	Y	N
DPH8	Hydraulic Structure	1	no.	N/A	N/A	Buffalo Creek, Indian Creek	Investigate and repair or remove if determined problematic.	42.2312316	-88.0446492	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DL25	Lake Shoreline Stabilization	21	ft	21	ft	Indian Creek	Stabilize lake shorelines	42.2025783	-88.0341719	H	S	1, 2	PR/RL	PB&D, LA, SMC	$2,137.01	N/A	0.33	0.16	0.16	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR ELA TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL30	Lake Shoreline Stabilization	51	ft	51	ft	Indian Creek	Stabilize lake shorelines	42.19934748	-88.0414961	H	S	1, 2	PR/RL	PB&D, LA, SMC	$5,134.99	N/A	0.79	0.39	0.39	0	0	Y	N
DL31	Lake Shoreline Stabilization	41	ft	41	ft	Indian Creek	Stabilize lake shorelines	42.19956599	-88.0412291	H	S	1, 2	PR/RL	PB&D, LA, SMC	$4,063.96	N/A	0.62	0.31	0.31	0	0	Y	N
TELA-TIL	No-Till / Strip-Till	138	ac	138	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$4,830.00	N/A	215	44	106	0	31	Y	N
TELA-NU	Nutrient Management	298	ac	298	ac	Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$5,960.00	N/A	600	114	0	0	0	Y	N
TELA-PE	Pasture Enhancement	1.6	ac	1.6	ac	Indian Creek	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	15	0.84	0.19	0.91	9.0	N	N
TELA-RVR	Runoff Volume Reduction Practices	317	ac	N/A	N/A	Buffalo Creek, Indian Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$4,640,152	N/A	743	62	26	26,194	592	Y	N
SSD125	Sediment Forebay	300	ft	722	ac	Indian Creek	Install sediment forebay	42.1660441	-88.055427	H	L	1, 4	PO	LCHD, IDNR, SMC, M	$468,000.00	N/A	1,739	80	35	79,270	1,085	N	N
DSB52	Stream Buffer	0.52	ac	1.5	ac	Indian Creek	Install stream buffer	42.19761757	-88.0432055	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,088.58	N/A	5.3	0.23	0.05	3.3	1	N	N
DSB53	Stream Buffer	0.70	ac	0.54	ac	Indian Creek	Install stream buffer	42.19756815	-88.0411186	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,809.42	N/A	1.4	0.08	0.03	79	0.27	N	N
DSB54	Stream Buffer	0.23	ac	0.71	ac	Indian Creek	Install stream buffer	42.19760789	-88.03997	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$923.04	N/A	3.3	0.12	0.12	119	2.3	N	N
DSB78	Stream Buffer	0.39	ac	0.69	ac	Buffalo Creek	Install stream buffer	42.22761252	-88.0196072	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$1,559.75	N/A	3.0	0.11	0.11	96	2.2	Y	N
DSB79	Stream Buffer	0.33	ac	2.3	ac	Buffalo Creek, Indian Creek	Install stream buffer	42.22773773	-88.0208323	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$1,337.18	N/A	5.4	0.20	0.14	176	3.9	Y	N
DSB80	Stream Buffer	0.82	ac	5.5	ac	Indian Creek	Install stream buffer	42.22821838	-88.020234	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$3,298.19	N/A	10	0.36	0.24	315	7.3	Y	N
DSB81	Stream Buffer	0.25	ac	2.2	ac	Indian Creek	Install stream buffer	42.22747099	-88.0231154	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$988.48	N/A	4.8	0.21	0.12	126	3.1	Y	N
DPD14	Swale/Open Channel	1	no.	N/A	N/A	Indian Creek	Blocked by beaver dam. Investigate and remove if determined problematic.	42.22774381	-88.0192504	H	S	1, 3, 4	PR/RL	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
SSD130	WASCoB	2	no.	4.5	ac	Indian Creek	Install WASCoB	42.23528701	-88.0383314	H	S	1, 3, 4	PO, AG	FB, NRCS/SWCD	$8,000.00	N/A	2.9	1.3	1.1	0.82	0.25	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR ELA TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS66	Wetland Creation/ Restoration	0.36	ac	344	ac	Indian Creek	Create new wetlands	42.23984741	-88.0283513	H	M	1, 2, 3, 4	M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$28,896.56	N/A	1,108	41	41	7,698	256	N	N
DWS79	Wetland Creation/ Restoration	3.2	ac	172	ac	Indian Creek	Create new wetlands	42.21360226	-88.059957	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$255,770.63	N/A	352	11	8.3	6,302	124	N	N
SSD108	Wetland Creation/ Restoration	2.0	ac	8.7	ac	Indian Creek	Create new wetlands	42.23368539	-88.0367639	H	M	1, 3, 4	PO	PB&D, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	45	9.7	9.1	113	5.0	N	N
SSD124	Wetland Creation/ Restoration	2.0	ac	73	ac	Indian Creek	Create new wetlands	42.16973013	-88.0608096	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	274	13	5.7	12,617	106	N	N
TELA-WLR	Wetland Creation/ Restoration	4.6	ac	4.6	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PR/RL, CL, EIG, IDNR, KRLT, OL, SMC, IDNR, Illinois EPA	$368,000.00	N/A	7.3	0.38	0.04	9.5	1.9	N	N
TELA-WLE	Wetland Enhancement	10	ac	10	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$300,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE FOREST PRESERVE DISTRICT OF COOK COUNTY

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH547	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.12287745	-87.89545467	L	S	1, 3, 4	M, FPD	MWRD	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Dam No. 1 Woods Forest Preserve	N	N
DPH548	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.12737724	-87.89774837	L	S	1, 3, 4	M, FPD	MWRD	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Dam No. 1 Woods Forest Preserve	N	N
DPH549	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.13263583	-87.90004996	L	S	1, 3, 4	M, FPD	MWRD	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Dam No. 1 Woods Forest Preserve	N	N
DPH551	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.14323232	-87.90521874	L	S	1, 3, 4	M, FPD	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Potawatomi Woods Forest Preserve	N	N
DPH554	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.1507736	-87.91022131	L	S	1, 3, 4	M, FPD	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Potawatomi Woods Forest Preserve	N	N
CFP-ICE	De-icing practices/ salt management	20.7	ac	20.7	ac	Buffalo Creek, Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1, 2	M	DOT, EO, CL, EIG, KRLT	N/A	N/A	0	0	0	13,576	0	N/A	N/A	N
DPD186	Discharge Point	1	no.	N/A	N/A	Buffalo Creek, Lower Des Plaines River	Broken off. Investigate and repair if determined problematic.	42.12332714	-87.89547931	H	M	1, 3, 4	M, FPD	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Dam No. 1 Woods Forest Preserve	N	N
CFP-RVR	Runoff Volume Reduction Practices	62	ac	N/A	N/A	Lower Des Plaines River, Buffalo Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$901,419	N/A	138	14	4	7,289	31	N/A	Y	N
SBD25	Streambank Stabilization	1,334	ft	1,334	ft	Lower Des Plaines River	Install 2 stream riffles and stabilize stream banks	42.13782185	-87.90485045	H	S	1, 2	M, FPD	SMC, MWRD, IDNR, Illinois EPA	$450,235.31	$500,235.31	101	50	50	0	0	Dam No. 1 Woods Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE FOREST PRESERVE DISTRICT OF COOK COUNTY

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD25	Streambank Stabilization	3,577	ft	3,577	ft	Lower Des Plaines River	Install 4 stream riffles and stabilize stream banks	42.14621673	-87.90681064	H	S	1, 2	M, FPD	SMC, MWRD, IDNR, Illinois EPA	$1,173,232.49	$1,273,232.49	270	135	135	0	0	Potawatomi Woods Forest Preserve	Y	N
CFP-WLR	Wetland Creation/ Restoration	74	ac	74	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO, FPD	IDNR, Illinois EPA, MWRD	$5,964,000.00	N/A	219	12	1	2,739	24	Deer Grove Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR FREMONT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH177	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25242788	-88.0594027	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH178	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25250835	-88.05891261	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH179	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25270105	-88.05874942	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH273	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25312247	-88.05841607	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH274	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.253314	-88.05835545	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH275	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25417523	-88.05749959	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH276	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25445471	-88.05746426	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH277	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25461882	-88.0574094	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH278	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25494663	-88.05720774	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH279	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25483886	-88.05651343	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH280	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25448478	-88.05609504	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH281	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25422654	-88.05596964	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH282	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2542135	-88.05585397	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH283	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2540646	-88.05557578	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH284	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25383144	-88.05555658	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH285	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25393072	-88.05532533	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH286	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25404161	-88.05490707	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH287	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25435755	-88.05433911	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH288	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25422513	-88.05363041	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH289	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25422111	-88.05342994	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH290	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25490611	-88.0568398	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR FREMONT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH506	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24471951	-88.03575359	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH507	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24478883	-88.03586515	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH508	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24500311	-88.03625877	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH509	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2450156	-88.03667744	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH510	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24493691	-88.03672874	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH511	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24483606	-88.0369595	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH512	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24481754	-88.03747859	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH513	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24493543	-88.03777614	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH514	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24502198	-88.03776845	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH515	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24504213	-88.0378064	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH516	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24524187	-88.03823748	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH517	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24540972	-88.03825534	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH518	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24557013	-88.03807851	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH519	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24560355	-88.03817437	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH520	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24577425	-88.03829079	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH521	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24597562	-88.03821192	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH522	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24606042	-88.03799643	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH523	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24607557	-88.03785303	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH524	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24606466	-88.03771789	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH525	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24610326	-88.0375909	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH526	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24619049	-88.03761094	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR FREMONT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH527	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24623128	-88.03762561	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH528	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24646172	-88.03759622	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH529	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24669713	-88.03754262	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH530	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2468155	-88.03773511	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH531	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2470586	-88.0374899	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH540	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25415213	-88.05397431	L	S	1, 3, 4	PO	PB&D, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
TFRE-ICE	De-icing practices/salt management	106	ac	106	ac	Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, PD	N/A	N/A	0	0	0	43,035	0	N/A	N
DD106	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.24678905	-88.03402871	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD48	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Increase buffer, install native plants	42.25811314	-88.04256485	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD54	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Implement more riprap around outlet	42.24426444	-88.01686935	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD72	Discharge Point	1	no.	N/A	N/A	Indian Creek	Iron bacteria. Investigate and repair if determined problematic.	42.24214622	42.24214622	M	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
TFRE-FAM	Feed Area Management	0.87	ac	0.87	ac	Indian Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	17	0.93	0.10	0.03	8.1	N	N
SSD91	Field Border	0.80	ac	7.9	ac	Bull Creek, Indian Creek, Mill Creek	Install field border	42.30596295	-88.05690659	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$3,200.00	N/A	28	1.6	3.3	47	4.0	Y	N
DST9	Filter Strip	16	ac	221	ac	Bull Creek, Indian Creek, Mill Creek	Install filter strip	42.29494053	-88.03177617	H	S	1, 2	PO	SMC, M, PB&D	$65,436.20	N/A	336	22	11	468	42	Y	N
SSD103	Grass Conversion	6.5	ac	6.5	ac	Bull Creek	Convert current cover to native grasses	42.25122977	-88.05640024	H	S	1, 2	PO, AG	M, PB&D	$26,000.00	N/A	53	2.8	3.0	3.9	2.8	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR FREMONT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH16	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek, Indian Creek	Investigate and repair or remove if determined problematic.	42.29383006	-88.03603379	M	M	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH43	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Resting on logs. Investigate and repair if determined problematic.	42.24500045	-88.03633716	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH45	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek, Indian Creek, Mill Creek	Rusted bottom. Investigate and repair if determined problematic.	42.24104939	-88.05213159	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DST3	Lake Shoreline Stabilization	300	ft	300	ft	Indian Creek	Stabilize lake shorelines	42.24283207	-88.0468936	H	S	1, 2	PR/RL	M, LA, SMC, PB&D	$30,000.00	N/A	0.56	0.28	0.28	0	0	N	N
DSTFP02	N/A	1.0	ea.	N/A	N/A	Indian Creek	Oakdale, Grove, Fairview, and Circle Storm Sewer improvements	42.25257373	-88.01293413	H	S	3, 4	T, DOT, PO	PB&D, SMC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
DSTFP03	N/A	1.0	ea.	N/A	N/A	Indian Creek	Owens Rd and adjacent residential Storm sewer	42.25825625	-88.06961362	H	S	3. 4	T, DOT, PO	PB&D, SMC, HOA/POA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
DSTG48	N/A	1.0	ea.	N/A	N/A	Indian Creek	Remove/control invasive species & create riparian buffer of native vegetation	42.24977628	-88.00749531	H	S	1, 2	PD, PO, PR/RL	IDNR, Illinois EPA, USFWS, LA, LCHD, WPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
DSTG60	N/A	1.0	ea.	N/A	N/A	Indian Creek	Sylvan Lake dam & spillway restoration	42.24207773	-88.043866	H	S	1, 3, 4	T, LA	WPC, SMC, LA, LCHD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
TFRE-TIL	No-Till / Strip-Till	75	ac	75	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$2,625.00	N/A	88	17	38	0	13	Y	N
TFRE-NU	Nutrient Management	648	ac	648	ac	Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$12,960.00	N/A	832	159	0	0	0	Y	N
TFRE-PE	Pasture Enhancement	4.0	ac	4	ac	Bull Creek, Indian Creek	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	33	3.4	0.39	1.9	22	N	N
SSD101	Rain Barrel/Garden	160/80	barrels/gardens	41	ac	Indian Creek	Install rain barrel/rain garden	42.26130645	-88.04635329	H	M	1, 3, 4	PO	HOA/POA, EIG	$292,800.00	N/A	84	4.6	1.1	3,027	48	N	N
TFRE-RVR	Runoff Volume Reduction Practices	510	ac	N/A	N/A	Bull Creek, Indian Creek, Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$7,470,638	N/A	1,195	103	41	46,284	896	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR FREMONT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD53	Streambank Stabilization	226	ft	226	ft	Indian Creek	Install 3 stream riffles and stabilize stream banks	42.25418835	-88.05357826	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$142,949.48	$217,949.48	37	18	18	0	0	N	N
SBD54	Streambank Stabilization	177	ft	177	ft	Mill Creek	Install 3 stream riffles and stabilize stream banks	42.25401323	-88.05470516	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$128,054.44	$203,054.44	29	14	14	0	0	N	N
SBD55	Streambank Stabilization	295	ft	295	ft	Bull Creek, Indian Creek, Mill Creek	Install 3 stream riffles and stabilize stream banks	42.25420295	-88.05477034	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$163,427.52	$238,427.52	6.0	3.0	3.0	0	0	N	N
DWS49	Wetland Creation/ Restoration	2.0	ac	136	ac	Indian Creek	Create new wetlands	42.29548171	-88.0060966	H	M	1, 2, 3, 4	PD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$160,754.64	N/A	140	4.5	2.3	1,913	60	Y	N
DWS65	Wetland Creation/ Restoration	3.2	ac	98	ac	Indian Creek	Create new wetlands	42.25343955	-88.00928123	H	M	1, 2, 3, 4	PD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$258,741.85	N/A	433	22	7.6	12,765	175	N	N
DWS66	Wetland Creation/ Restoration	2.0	ac	344	ac	Indian Creek	Create new wetlands	42.24876713	-88.02917027	H	M	1, 2, 3, 4	M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$156,476.04	N/A	1,108	41	41	7,698	256	N	N
SSD102	Wetland Creation/ Restoration	2.0	ac	684	ac	Indian Creek	Create new wetlands	42.25404128	-88.055445	H	M	1, 3, 4	PO	PB&D, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	502	12	7.2	10,467	180	N	N
SSD92	Wetland Creation/ Restoration	5.0	ac	41	ac	Indian Creek	Create new wetlands	42.3058866	-88.02506544	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$400,000.00	N/A	120	7.5	5.1	298	15	Y	N
TFRE-WLR	Wetland Creation/ Restoration	10	ac	10	ac	Bull Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA	$760,000.00	N/A	24	1.1	0.47	29	2.4	Y	N
TFRE-WLE	Wetland Enhancement	89	ac	89	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$2,670,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LFP-CC	Cover Crops	1,851	ac	1,851	ac	Upper Des Plaines River, Dutch Gap Canal/North Mill Creek, Bull Creek, Bull's Brook, Mill Creek	Implement cover crop use	N/A	N/A	H	S	1, 2, 6	AG, PO, FPD	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$111,085	N/A	6677	266	417	0	659	N/A	Y	N
DPH1003	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33928881	-87.93869394	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1004	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33942711	-87.93861079	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1005	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33969068	-87.93832547	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1006	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34071294	-87.93839311	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1007	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34093267	-87.93870902	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1008	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34100811	-87.9388967	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1009	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34158084	-87.94039479	L	S	1, 3, 4	FPD	M, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1010	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34198284	-87.94097298	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1011	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34265092	-87.94112502	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH1014	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3448199	-87.93646234	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1015	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Severe debris. Investigate and remove if determined problematic.	42.34528317	-87.93572649	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1016	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34603964	-87.93460541	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1019	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34685335	-87.93487606	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1023	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34835095	-87.93493926	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1024	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34872742	-87.92921434	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1025	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34876078	-87.93058847	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1027	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34895348	-87.93065486	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1028	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Channel has changed course. Investigate and remove if determined problematic.	42.34903898	-87.93196067	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1029	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34905884	-87.93243131	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1030	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34905654	-87.93078897	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1033	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34910616	-87.931614	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1034	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34923063	-87.93294513	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1047	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35008931	-87.93392581	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1052	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.35103114	-87.93355063	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1055	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35250636	-87.9317238	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1058	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35313802	-87.9311374	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1101	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35761886	-87.92882483	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1108	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35948651	-87.9274414	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1115	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36044419	-87.92701619	L	S	1, 3, 4	FPD	PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1120	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Two jams. Investigate and remove if determined problematic.	42.36094635	-87.92665887	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1121	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36102048	-87.92642199	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1122	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36112044	-87.92563527	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1123	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36135853	-87.9258532	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1125	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36220988	-87.92464285	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1127	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36250656	-87.92403728	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1131	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3635263	-87.92457705	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1134	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36400423	-87.92392611	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1136	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36430363	-87.92323662	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1140	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36437023	-87.92204522	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1142	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36454147	-87.92158262	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1143	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36471182	-87.92165972	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1152	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36588517	-87.92190616	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1156	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36598969	-87.92071794	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1157	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36613215	-87.92095557	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1160	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36657974	-87.92019977	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1162	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36750938	-87.91854192	L	S	1, 3, 4	FPD	SMC, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1165	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36793467	-87.9180478	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1185	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Severe, large impoundment. Investigate and remove if determined problematic.	42.36966093	-87.91835257	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

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DPH1188	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37010973	-87.91936301	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	Y	N
DPH1189	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37032536	-87.91970222	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	Y	N
DPH1202	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37903684	-87.91933887	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPH1216	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37981665	-87.91285857	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1218	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38030256	-87.91320853	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1219	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38042027	-87.91494633	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1220	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38070919	-87.91343331	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1221	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38114145	-87.9138167	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	Y	N
DPH1223	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38139462	-87.91385149	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	Y	N
DPH1224	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38213672	-87.91472237	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	Y	N

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DPH1225	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38299506	-87.91471868	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	Y	N
DPH1226	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38330067	-87.91433848	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	Y	N
DPH1227	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38416576	-87.914516	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1228	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38474081	-87.9146383	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1231	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.386464	-87.91513601	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1232	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38686344	-87.91681449	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1233	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38690032	-87.91629976	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1234	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38725927	-87.91693301	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1235	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38841606	-87.91719235	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1236	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38874878	-87.91708187	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1238	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39031502	-87.92000556	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1239	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39134776	-87.92107752	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1240	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39165047	-87.92103704	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1241	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39190863	-87.92055818	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1242	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39201609	-87.92050202	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1243	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39269347	-87.92074241	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1244	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39288894	-87.92158966	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1245	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39360287	-87.92312078	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1256	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40038122	-87.92801614	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1259	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40080531	-87.92983636	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1260	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40093774	-87.92820189	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1263	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40146593	-87.93076817	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1264	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40133211	-87.89413994	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1265	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	One log. Investigate and remove if determined problematic.	42.40148763	-87.89704544	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1266	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40164442	-87.93082685	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1268	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40191985	-87.93081209	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1274	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40214582	-87.88857662	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1280	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40235583	-87.89361389	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1281	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40254992	-87.93136496	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1282	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40243479	-87.89163475	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N

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DPH1283	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40245968	-87.8900919	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1285	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40251655	-87.89089396	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1286	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40319566	-87.93085283	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1287	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4032467	-87.88814872	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1288	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40327734	-87.88849288	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1289	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40328325	-87.88831603	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1290	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40365293	-87.88766081	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1291	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40437193	-87.88791872	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1292	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40486583	-87.88713795	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1297	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40889149	-87.8869968	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N

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DPH1298	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4091906	-87.8865772	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1299	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40983932	-87.92930662	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1300	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41055593	-87.93192471	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1301	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41078656	-87.93141241	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1302	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41085596	-87.9321278	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1303	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Tree about to fall in water. Investigate and remove if determined problematic.	42.41114422	-87.93188296	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1304	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41161897	-87.93285267	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1305	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4119156	-87.88444174	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1306	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4119156	-87.88444174	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N
DPH1307	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4119156	-87.88444174	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Waukegan Savanna Forest Preserve	N	N

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DPH1308	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41211362	-87.93198514	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1309	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41272953	-87.93253198	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1311	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41397818	-87.93275887	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1312	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41507332	-87.93392773	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1313	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41615596	-87.93377593	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1314	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4174174	-87.93183779	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1315	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver chew present. Investigate and remove if determined problematic.	42.42053471	-87.93465469	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DPH1320	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43491624	-87.93387034	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1322	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43544004	-87.92515154	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1325	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43727002	-87.93486206	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N

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DPH1332	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43860668	-87.93469417	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1334	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Several fallen and falling trees. Investigate and remove if determined problematic.	42.44131437	-87.93567611	L	S	1, 3, 4	FPD	M, SMC, HOA/POA	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1335	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44344014	-87.93625404	L	S	1, 3, 4	FPD	M, SMC, HOA/POA	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1336	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44390417	-87.93645856	L	S	1, 3, 4	FPD	M, SMC, HOA/POA	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1341	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Sticks piled up on riffle. Investigate and remove if determined problematic.	42.44512294	-87.93788809	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1344	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44530772	-87.9382382	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1346	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44546215	-87.93668571	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1348	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44565666	-87.93841012	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1353	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.44599168	-87.93454371	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1367	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44722353	-87.93240063	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1371	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44804202	-87.93838581	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1374	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Could be beaver dam. Investigate and remove if determined problematic.	42.44939842	-87.93872519	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1376	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44974099	-87.93887447	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1379	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4499225	-87.94320884	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1381	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.45055294	-87.93410534	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1382	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45057021	-87.93407986	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1384	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4507492	-87.9347914	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1385	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.45080754	-87.94005272	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1386	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45081601	-87.9417016	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1387	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45109529	-87.93518317	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1388	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45142416	-87.93458118	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1389	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45157994	-87.93395505	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1392	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45320229	-87.93394684	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1393	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Several fallen trees. Investigate and remove if determined problematic.	42.45321503	-87.93340545	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1397	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45400733	-87.93603091	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH1404	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45665086	-87.93583402	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1405	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45722783	-87.93828598	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1407	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45816459	-87.93815958	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1424	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46006192	-87.93823066	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1425	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46026032	-87.93860801	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1426	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.4602982	-87.93943103	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1428	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	There's multiple jams. Investigate and remove if determined problematic.	42.4606093	-87.94069468	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1430	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46083209	-87.94159465	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1431	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46105073	-87.94188919	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1432	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46107541	-87.94189422	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1439	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46198858	-87.94217593	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	Y	N
DPH1456	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46552859	-87.94290868	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1466	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.46633736	-87.94478153	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1469	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4667529	-87.94483652	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1472	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.46747831	-87.94472872	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1475	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4679926	-87.94589463	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1476	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46801668	-87.94624576	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1480	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46865869	-87.94610273	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1482	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46875948	-87.94212153	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1484	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46898345	-87.94154771	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1491	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47062999	-87.94619816	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1492	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47238629	-87.93597131	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1493	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.47264875	-87.93982766	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1495	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47297101	-87.93989061	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1497	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4731394	-87.9377518	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1498	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47336798	-87.93872276	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1503	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47396716	-87.93520437	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1511	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.47656772	-87.93452233	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1512	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.476695	-87.93431145	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1513	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47699591	-87.93410081	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1519	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Dam. Investigate and remove if determined problematic.	42.48054171	-87.93213802	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N
DPH1520	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48080934	-87.93175371	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	N	N

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DPH1521	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48107844	-87.96056765	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Pine Dunes Forest Preserve	N	N
DPH1524	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48173827	-87.96026483	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Pine Dunes Forest Preserve	N	N
DPH1525	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4823465	-87.93719482	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1526	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48245698	-87.93826108	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1527	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48250186	-87.93836074	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1528	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4827353	-87.93862184	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1530	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48324161	-87.94106877	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1535	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.486021	-87.95376106	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Pine Dunes Forest Preserve	N	N
DPH1536	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4864512	-87.93540947	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1537	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Multiple jams along bank. Investigate and remove if determined problematic.	42.48658309	-87.92537156	M	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1538	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48663389	-87.93534946	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1539	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48668975	-87.92533745	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1540	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48719191	-87.92535765	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1542	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48968142	-87.92616508	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1543	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48999884	-87.9264488	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1544	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.49017692	-87.92646129	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1545	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.49120361	-87.92025005	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1546	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Formed island. Investigate and remove if determined problematic.	42.49148022	-87.92258659	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1547	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.49183425	-87.92407955	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPH1548	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.49233186	-87.92609819	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH244	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32903905	-87.99262753	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH245	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32893863	-87.99272593	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH246	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32885343	-87.99277161	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH247	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32881458	-87.99286323	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH248	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32891554	-87.99313195	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH249	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32882225	-87.99357603	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH250	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32878511	-87.99376864	L	S	1, 3, 4	FPD	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Almond Marsh Forest Preserve	N	Y
DPH308	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19381191	-88.03723116	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH309	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19394974	-88.03738807	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH310	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19401998	-88.03741129	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH311	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19423246	-88.03775285	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH312	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19467555	-88.03833078	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH313	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1947731	-88.03842264	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH314	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19528562	-88.038642	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH315	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19539466	-88.03862482	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH316	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1956234	-88.03875331	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH317	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19579565	-88.03885054	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH318	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19614366	-88.03913159	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH319	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19614366	-88.03913159	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH320	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19618708	-88.03916981	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH321	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19651419	-88.03945312	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Egret Marsh Forest Preserve	N	Y
DPH556	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15469029	-87.90441014	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH557	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15480923	-87.90462455	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH558	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15541675	-87.90923644	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH559	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15541675	-87.90923644	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH560	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15555254	-87.90909168	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH561	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15555254	-87.90909168	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH562	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15555405	-87.90559366	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH563	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15568543	-87.90692446	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH564	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15581062	-87.90561403	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH565	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15587004	-87.90723174	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH566	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15604435	-87.90771353	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH567	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15611111	-87.90771722	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH568	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15617343	-87.9048113	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH569	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15625171	-87.90463016	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH570	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15670614	-87.90425314	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH571	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15703287	-87.91243195	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH580	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15856214	-87.91063563	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH582	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16018413	-87.91285189	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH583	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16097286	-87.91420917	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

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DPH584	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16140595	-87.9145752	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH585	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16164274	-87.91461032	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH587	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Collecting garbage. Investigate and remove if determined problematic.	42.16225676	-87.91650488	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH588	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.16235349	-87.91619249	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	Y	N
DPH593	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16305996	-87.91372461	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH603	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16472179	-87.91339637	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH604	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16504848	-87.91341289	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH607	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16657981	-87.91361807	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Cahokia Flatwoods Forest Preserve	N	N
DPH608	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16859662	-87.91334273	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH609	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16887762	-87.91332144	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH610	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16937002	-87.91299949	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH611	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.1696752	-87.91311457	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH613	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17165941	-87.9078074	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH614	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17194833	-87.91144297	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH615	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17221484	-87.90972543	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH616	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17223518	-87.91053504	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH617	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17223518	-87.91053504	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH618	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17225213	-87.91028141	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH619	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17225213	-87.91028141	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH620	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17225434	-87.9107839	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH621	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17225434	-87.9107839	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH623	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17369881	-87.9116526	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH626	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17474001	-87.91288457	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH627	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17498392	-87.91791111	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH630	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17539309	-87.91577608	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH631	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17548261	-87.92028101	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH634	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17623413	-87.91229432	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH635	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17647502	-87.92109573	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH636	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17647867	-87.92116245	L	S	1, 3, 4	T	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH639	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17691449	-87.91191403	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH641	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17745114	-87.92164022	L	S	1, 3, 4	T	SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH646	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17894291	-87.92106983	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH647	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17894387	-87.90766181	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH648	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.17894642	-87.90788661	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH649	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Logs cut with saw, placement looks intentional. Investigate and remove if determined problematic.	42.1790191	-87.90692529	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH671	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Stuck on potential island. Investigate and remove if determined problematic.	42.18442153	-87.91706764	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	N	N
DPH714	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20343046	-87.92406142	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Half Day Forest Preserve	N	N
DPH720	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20710555	-87.92418656	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Half Day Forest Preserve	N	N
DPH723	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20874195	-87.92642293	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH726	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21000414	-87.92701888	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Half Day Forest Preserve	N	N
DPH727	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21121633	-87.91537525	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH728	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2116907	-87.91178419	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH729	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21170985	-87.91208879	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH730	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21174946	-87.9150637	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH731	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2119119	-87.911218	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH732	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21199375	-87.91508867	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH733	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21247085	-87.92674622	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH734	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21254872	-87.91522597	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH735	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21460794	-87.92858974	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH736	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21536948	-87.92883239	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH737	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21578711	-87.92848496	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH738	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21613403	-87.92830425	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH739	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21617536	-87.92816092	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH740	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21648067	-87.92783218	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH741	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21656109	-87.92777191	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH742	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21711157	-87.92782799	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH743	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21724074	-87.92767502	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH744	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Many low lying trees. Investigate and remove if determined problematic.	42.21764537	-87.93090934	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH745	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21770824	-87.9309515	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH746	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2180933	-87.93574511	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Half Day Forest Preserve	Y	N
DPH747	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21821761	-87.93540087	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Half Day Forest Preserve	Y	N
DPH748	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21821987	-87.93520054	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Half Day Forest Preserve	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH749	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.21979579	-87.93334705	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH751	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22088448	-87.93437828	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH752	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22144543	-87.93514589	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH753	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22211565	-87.93563112	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH756	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2236596	-87.93679142	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH757	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22417517	-87.9368268	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH758	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2247912	-87.93709535	L	S	1, 3, 4	FPD	OL, SMC, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH759	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.2283605	-87.93400193	L	S	1, 3, 4	FPD	OL, SMC, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	N	N
DPH760	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22947966	-87.93351963	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH761	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Several debris jams on right bank. Investigate and remove if determined problematic.	42.23301686	-87.93513977	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	Y	N
DPH762	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.23475242	-87.93587294	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	Y	N
DPH764	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.23879932	-87.93713349	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Captain Daniel Wright Woods Forest Preserve	Y	N
DPH773	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24570327	-87.94028203	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH775	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24776264	-87.94190983	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH783	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24964408	-87.92670339	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH784	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25036606	-87.94076383	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH785	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25033005	-87.92735089	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH786	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25045233	-87.94037103	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH787	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25052154	-87.92736187	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH788	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25059123	-87.94008808	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH789	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25067472	-87.94173184	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH790	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.25079724	-87.93941382	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH791	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25107215	-87.94240829	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH792	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25165616	-87.92833115	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH793	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25242452	-87.92916867	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH794	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25244242	-87.93061455	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH795	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25257163	-87.93087179	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH796	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25257523	-87.93003083	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH797	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25270628	-87.93133296	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH798	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Long stretch of fallen trees. Investigate and remove if determined problematic.	42.25283597	-87.93825556	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH799	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2529204	-87.93202765	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH800	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25299935	-87.93163689	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH801	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25314319	-87.93667466	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH802	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25325354	-87.93620938	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH803	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25327835	-87.93277498	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH804	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25330232	-87.93280499	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH805	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25333937	-87.93391023	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH806	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25336409	-87.93366413	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH807	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25340479	-87.93463694	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH808	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25351984	-87.93144972	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH810	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25378566	-87.93488513	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH811	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25383176	-87.93594737	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH812	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25383755	-87.9351474	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH813	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	If there was water would likely be impounded. Investigate and remove if determined problematic.	42.25441803	-87.93027936	L	S	1, 3, 4	FPD	OL, M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH814	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2551105	-87.93663813	L	S	1, 3, 4	FPD	OL, SMC, PB&D	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH816	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25619255	-87.9381996	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	N	N
DPH817	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25665426	-87.93977942	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPH832	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26437431	-87.93493055	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH838	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2651055	-87.93500549	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPH844	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Multiple fallen trees. Investigate and remove if determined problematic.	42.26696601	-87.93873269	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPH846	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.27083637	-87.93913721	L	S	1, 3, 4	FPD	M,SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPH848	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27249216	-87.93941258	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPH849	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27283442	-87.9392134	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPH851	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27491846	-87.93922759	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPH860	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.28290133	-87.9336384	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH861	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.28494144	-87.93535392	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH862	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.28498476	-87.93516964	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH867	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29352187	-87.93889134	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH868	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29365238	-87.93865539	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH869	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29410936	-87.93799213	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH870	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29415592	-87.94068917	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH871	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.2941897	-87.93672587	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH872	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.2943878	-87.93764595	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH873	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29465351	-87.94094046	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH874	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29560498	-87.94031467	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH875	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29639259	-87.94056646	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH877	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29760968	-87.94116124	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH878	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29786432	-87.94206699	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH879	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.2978805	-87.94186859	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH881	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.2984928	-87.94419942	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH882	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29853152	-87.9336757	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH883	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29872942	-87.94187579	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH884	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29872942	-87.94187579	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH885	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29885523	-87.9420053	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH886	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29885523	-87.9420053	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH887	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29887313	-87.94227544	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH888	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29887313	-87.94227544	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH890	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Collapsed bridge. Investigate and remove if determined problematic.	42.29932973	-87.94136785	H	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH891	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29960327	-87.94093375	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH892	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29971509	-87.94278079	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH893	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29971509	-87.94278079	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH895	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.2998083	-87.93430459	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH896	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30006311	-87.94019715	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH898	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30118222	-87.94276285	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPH903	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30657723	-87.95520813	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH904	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30713257	-87.95556151	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH905	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30743851	-87.95574306	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH906	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30756767	-87.93674481	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH907	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30782588	-87.93960706	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH908	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30793396	-87.93931973	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH909	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30826748	-87.95606048	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH910	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3085541	-87.93628859	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH911	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Several jams from fallen trees. Investigate and remove if determined problematic.	42.30935147	-87.95641546	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH913	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3098807	-87.95660086	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH916	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31215936	-87.9368568	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH917	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31265239	-87.93687859	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH920	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31303393	-87.95706623	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH924	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31397178	-87.9573083	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH927	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31452918	-87.9574212	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH930	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31487808	-87.95748683	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH935	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31595603	-87.95741332	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH939	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31822229	-87.95712691	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH941	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31829768	-87.95774801	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH947	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31930967	-87.95849844	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH948	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.31949022	-87.95861629	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH954	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32045028	-87.9567716	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH955	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32058007	-87.95714938	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH956	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32089641	-87.95749236	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH957	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32178325	-87.95662643	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH958	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32186049	-87.95589259	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH959	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32196418	-87.95624329	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DPH960	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32212	-87.95508223	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH961	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32370229	-87.95300285	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH968	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32601867	-87.95012652	L	S	1, 3, 4	FPD	M ,SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH970	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32629674	-87.94943384	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH978	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.32927257	-87.94964045	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH981	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Huge tree underwater. Investigate and remove if determined problematic.	42.33002652	-87.949952	L	S	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

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DPH993	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33489703	-87.94646103	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH994	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33534802	-87.94598795	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH995	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33604766	-87.94366038	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH996	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33646118	-87.9431433	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH997	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3366553	-87.94320667	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH998	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33795659	-87.94164361	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DPH999	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33802348	-87.94129568	L	S	1, 3, 4	FPD	PB&D, M	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
LFP-ICE	**De-icing practices/salt management**	**20.85**	**ac**	**20.85**	**ac**	**Upper Des Plaines River, Mill Creek, Dutch Gap Canal/North Mill Creek, Newport Drainage Ditch, Indian Creek, Buffalo Creek, Lower Des Plaines River**	**Reduce road salt application**	**N/A**	**N/A**	**H**	**S**	**1, 2**	**M**	**DOT, EO, CL, EIG, KRLT**	**N/A**	**N/A**	**0**	**0**	**0**	**6,910.8**	**0**	**N/A**	**N/A**	**N**

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD333	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Unclog inlet, clean up trash	42.30652535	-87.95818335	M	S	1, 3, 4	PO, HOA/POA, CBL, FPD	SMC, PB&D	$5,000	$50,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	N
DD4	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer where needed, install riprap to stabilize bank erosion	42.26242301	-88.03624039	M	S	1, 2, 3, 4	PO, HOA/POA, CB, FPD	SMC, PB&D	$5,000	$50,000	N/A	N/A	N/A	N/A	N/A	Countryside Golf Club Forest Preserve	N	Y
DD94	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove some excess woody vegetation	42.19372963	-87.92543684	L	S	1, 3, 4	PO, HOA/POA, CB, FPD	SMC, M	$5,000	$50,000	N/A	N/A	N/A	N/A	N/A	Edward L. Ryerson Conservation Area Forest Preserve	Y	Y
DPD160	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Front disconnected. Investigate and repair if determined problematic.	42.28244917	-87.93338325	M	M	1, 3, 4	FPD	PB&D, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPD164	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Concrete structure under pvc; maybe FES. Investigate and repair if determined problematic.	42.28002298	-87.9348718	H	M	1, 3, 4	FPD	SMC, M, PR/RL	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPD167	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River, Upper Des Plaines River	Eroded and broken structure. Investigate and repair if determined problematic.	42.27721207	-87.93892331	H	M	1, 3, 4	FPD	M, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPD180	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Under water. Investigate and repair if determined problematic.	42.36858574	-87.91775905	H	M	1, 3, 4	FPD	M, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Lake Carina Forest Preserve	N	N
DPD183	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Mud filled. Investigate and repair if determined problematic.	42.29356168	-87.93925234	H	S	1, 3, 4	FPD	M, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Wilmot Woods Forest Preserve	N	N
DPD55	Discharge Point	1	no.	N/A	N/A	Bull Creek	Rusted out. Investigate and repair if determined problematic.	42.31496624	42.31496624	H	M	1, 3, 4	FPD	PB&D, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD56	Discharge Point	1	no.	N/A	N/A	Bull Creek	Iron/oil deposits at bank broken at bottom. Investigate and repair if determined problematic.	42.31527852	42.31527852	H	M	1, 3, 4	FPD	PB&D, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	N	Y
LFP-FAM	Feed Area Management	3.8	ac	3.8	ac	Lower Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 2, 6	AG, PO, FPD, EQ	AG, FB, EXT, NRCS/SWCD	$50,000	N/A	263	14	2	11	125	Grainger Woods Conservation Forest Preserve	Y	N
SSD116	Field Border	1.4	ac	18	ac	Indian Creek	Install field border	42.19695214	-88.03679865	H	M	1, 2, 6	FPD	FB, NRCS/SWCD, EXT	$5,600	N/A	73	4	7	5	9	Egret Marsh Forest Preserve	N	N
SSD53	Field Border	2.4	ac	24	ac	Upper Des Plaines River	Install field border	42.41224578	-87.89612808	H	M	1, 2, 6	FPD	FB, NRCS/SWCD, EXT, AG	$9,600	N/A	111	7	12	11	11	Waukegan Savanna Forest Preserve	Y	N
SSD61	Field Border	2.3	ac	21	ac	Upper Des Plaines River	Install field border	42.40452885	-87.89401928	H	M	1, 2, 6	FPD	FB, NRCS/SWCD, EXT	$9,200	N/A	61	3	4	14	6	Waukegan Savanna Forest Preserve	Y	N
SSD31	Grade Control	1	no.	15	ac	Dutch Gap Canal/North Mill Creek	Install rock grade control structure	42.45511406	-88.01444068	H	S	1, 2	DOT	FPD, SMC	$8,000	N/A	19	7	7	5	1	Raven Glen Forest Preserve	Y	N
SSD82	Grass Waterway	2.3	ac	57	ac	Bull Creek	Install grass waterway	42.32131775	-87.98375738	H	S	1, 2	FPD	EXT, NRCS/SWCD, FB	$18,400	N/A	222	37	53	234	30	Almond Marsh Forest Preserve	N	N
DPH1	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Two rusted culverts left culvert collapsed in middle. Investigate and repair if determined problematic.	42.1929701	-88.02830225	H	M	1, 3, 4	FPD	DOT, CL, EIG, IDNR, KRLT	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Heron Creek Forest Preserve	N	Y
DPH66	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Very corroded. Investigate and repair if determined problematic.	42.44908242	-87.93866216	H	M	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPH71	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.48251288	-87.95977231	M	M	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Pine Dunes Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH75	Hydraulic Structure	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek	Probably leftover after preserve construction. Investigate and repair or remove if determined problematic.	42.48837309	-87.95783156	M	M	1, 3, 4	FPD	PB&D, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Pine Dunes Forest Preserve	N	N
DPH77	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek, Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.3300199	-87.94994765	M	M	1, 3, 4	FPD	M, SMC	$10,000	$80,000	N/A	N/A	N/A	N/A	N/A	Independence Grove Forest Preserve	Y	N
DL33	Lake Shoreline Stabilizatio n	25	ft	25	ft	Upper Des Plaines River	Stabilize lake shorelines	42.40729964	-87.92867486	H	S	1, 2	FPD	PB&D, LA, SMC	$2,486	N/A	0	0	0	0	0	Sedge Meadow Forest Preserve	N	N
DL4	Lake Shoreline Stabilizatio n	18	ft	18	ft	Upper Des Plaines River	Stabilize lake shorelines	42.35084186	-87.93494631	H	S	1, 2	FPD	PB&D, LA, SMC	$1,766	N/A	0	0	0	0	0	Lake Carina Forest Preserve	N	N
DL5	Lake Shoreline Stabilizatio n	31	ft	31	ft	Upper Des Plaines River	Stabilize lake shorelines	42.35076821	-87.93517755	H	S	1, 2	FPD	PB&D, LA, SMC	$3,127	N/A	0	0	0	0	0	Lake Carina Forest Preserve	N	N
DL58	Lake Shoreline Stabilizatio n	53	ft	53	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40559412	-88.04553547	H	S	1, 2	FPD	PB&D, LA, SMC	$5,306	N/A	1	0	0	0	0	Duck Farm Forest Preserve	Y	N
DL59	Lake Shoreline Stabilizatio n	97	ft	97	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40359498	-88.04417344	H	S	1, 2	FPD	PB&D, LA, SMC	$9,651	N/A	1	1	1	0	0	Duck Farm Forest Preserve	Y	N
DL6	Lake Shoreline Stabilizatio n	36	ft	36	ft	Upper Des Plaines River	Stabilize lake shorelines	42.35070311	-87.93526316	H	S	1, 2	FPD	PB&D, LA, SMC	$3,635	N/A	1	0	0	0	0	Lake Carina Forest Preserve	N	N
DL60	Lake Shoreline Stabilizatio n	82	ft	82	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40199644	-88.04534898	H	S	1, 2	FPD	PB&D, LA, SMC	$8,203	N/A	1	1	1	0	0	Duck Farm Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL61	Lake Shoreline Stabilization	33	ft	33	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40151617	-88.0456033	H	S	1, 2	FPD	PB&D, LA, SMC	$3,281	N/A	1	0	0	0	0	Duck Farm Forest Preserve	N	N
DL62	Lake Shoreline Stabilization	26	ft	26	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40175186	-88.04545447	H	S	1, 2	FPD	PB&D, LA, SMC	$2,625	N/A	0	0	0	0	0	Duck Farm Forest Preserve	N	N
DL63	Lake Shoreline Stabilization	66	ft	66	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.4008817	-88.04625792	H	S	1, 2	FPD	PB&D, LA, SMC	$6,563	N/A	1	1	1	0	0	Duck Farm Forest Preserve	Y	N
DL64	Lake Shoreline Stabilization	193	ft	193	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40072352	-88.04668485	H	S	1, 2	FPD	PB&D, LA, SMC	$19,302	N/A	3	1	1	0	0	Duck Farm Forest Preserve	Y	N
DL65	Lake Shoreline Stabilization	43	ft	43	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.40149127	-88.04811279	H	S	1, 2	FPD	PB&D, LA, SMC	$4,343	N/A	1	0	0	0	0	Duck Farm Forest Preserve	N	N
DL68	Lake Shoreline Stabilization	93	ft	93	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42153465	-88.0153213	H	S	1, 2	FPD	PB&D, LA, SMC	$9,301	N/A	1	1	1	0	0	McDonald Woods Forest Preserve	Y	N
DL69	Lake Shoreline Stabilization	200	ft	200	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42166665	-88.01362453	H	S	1, 2	FPD	PB&D, LA, SMC	$19,980	N/A	3	2	2	0	0	McDonald Woods Forest Preserve	Y	N
DL7	Lake Shoreline Stabilization	16	ft	16	ft	Dutch Gap Canal/North Mill Creek, Mill Creek	Stabilize lake shorelines	42.35064413	-87.93531679	H	S	1, 2	FPD	PB&D, LA, SMC	$1,553	N/A	0	0	0	0	0	Lake Carina Forest Preserve	N	N
DL70	Lake Shoreline Stabilization	81	ft	81	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.421533	-88.01503949	H	S	1, 2	FPD	PB&D, LA, SMC	$8,113	N/A	1	1	1	0	0	McDonald Woods Forest Preserve	Y	N
DL71	Lake Shoreline Stabilization	66	ft	66	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42172694	-88.01230937	H	S	1, 2	FPD	PB&D, LA, SMC	$6,594	N/A	1	1	1	0	0	McDonald Woods Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL72	Lake Shoreline Stabilization	248	ft	248	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42549232	-88.04208965	H	S	1, 2	FPD	PB&D, LA, SMC	$24,833	N/A	4	2	2	0	0	Hastings Lake Forest Preserve	Y	N
DL84	Lake Shoreline Stabilization	893	ft	893	ft	Buffalo Creek	Stabilize lake shorelines	42.15563912	-87.99375009	H	S	1, 2	FPD	M, LA, SMC	$89,271	N/A	14	7	7	0	0	Buffalo Creek Forest Preserve	Y	N
DL85	Lake Shoreline Stabilization	418	ft	418	ft	Upper Des Plaines River	Stabilize lake shorelines	42.46371726	-87.93974993	H	S	1, 2	FPD	PB&D, LA, SMC	$41,836	N/A	6	3	3	0	0	Wadsworth Savanna Forest Preserve	Y	N
DL86	Lake Shoreline Stabilization	39	ft	39	ft	Upper Des Plaines River	Stabilize lake shorelines	42.46281742	-87.93827823	H	S	1, 2	FPD	PB&D, LA, SMC	$3,929	N/A	1	0	0	0	0	Wadsworth Savanna Forest Preserve	N	N
DSTF5	N/A	1	ea.	N/A	N/A	Buffalo Creek	Investigate report of illegal fill in natural areas	42.1569678	-88.01470947	H	S	2, 3, 4	FPD	M, SMC, USACE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
DSTFP01	N/A	1	ea.	N/A	N/A	Buffalo Creek	MWRD Buffalo Creek Reservoir Expansion	42.15599946	-88.00197001	H	S	2, 3, 4	MWRD, FPD	IDNR, USACE, SMC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
LFP-TIL	No-Till / Strip-Till	415	ac	415	ac	Dutch Gap Canal/North Mill Creek, Upper Des Plaines River, Mill Creek, Bull Creek, Bull's Brook	Practice no-till or strip-till	N/A	N/A	H	M	1, 2, 6	AG, PO, FPD	FB, EXT, NRCS/SWCD	$14,509	N/A	568	119	299	0	83	N/A	Y	N
LFP-NU	Nutrient Management	1,851	ac	1,851	ac	Upper Des Plaines River, Dutch Gap Canal/North Mill Creek, Bull Creek, Bull's Brook, Mill Creek, Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$37,028	N/A	3338	620	0	0	0	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

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LFP-PE	Pasture Enhancement	2.7	ac	2.7	ac	Dutch Gap Canal/North Mill Creek, upper Des Plaines River	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG, FPD	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	20	1	0	1	12	Pine Dunes Forest Preserve	N	N
LFP-RVR	Runoff Volume Reduction Practices	60	ac	N/A	N/A	Bull Creek, Upper Des Plaines River, Lower Des Plaines River, Dutch Gap Canal/North Mill Creek, Buffalo Creek, Indian Creek, Bull's Brook,	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$872,543	N/A	148	13	4	5,388	58	N/A	Y	N
DSB235	Stream Buffer	0.47	ac	1.9	ac	Upper Des Plaines River	Install stream buffer	42.38016568	-87.91322334	H	S	1,2	FPD	M, SMC, IDNR, Illinois EPA	$1,880	N/A	7	0	0	26	2	Sedge Meadow Forest Preserve	N	N
DSB44	Stream Buffer	0.49	ac	2.5	ac	Upper Des Plaines River	Install stream buffer	42.38016568	-87.91322334	H	S	1, 2	M, FPD	PB&D, SMC, IDNR, Illinois EPA	$1,893	N/A	7	0	0	26	2	Sedge Meadow Forest Preserve	N	N
SBD1	Streambank Stabilization	435	ft	435	ft	Lower Des Plaines River	Install 5 stream riffles and stabilize stream banks	42.15615994	-87.9051717	H	S	1, 2	FPD	M, SMC, IDNR, Illinois EPA	$255,544	$380,544	13	7	7	0	0	Cahokia Flatwoods Forest Preserve	Y	N
SBD21	Streambank Stabilization	1,824	ft	1,824	ft	Lower Des Plaines River	Install 2 stream riffles and stabilize stream banks	42.17036025	-87.91269074	H	S	1, 2	FPD, M	SMC, IDNR, Illinois EPA	$597,137	$647,137	75	37	37	0	0	Edward L. Ryerson Conservation Area Forest Preserve	N	N
SBD21	Streambank Stabilization	994	ft	994	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.16612186	-87.91315032	H	S	1, 2	FPD, PR/RL	M, SMC, IDNR, Illinois EPA	$323,319	$348,319	41	20	20	0	0	Cahokia Flatwoods Forest Preserve	N	N
SBD22	Streambank Stabilization	847	ft	847	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.17372856	-87.91135167	H	S	1, 2	FPD, OL	M, DOT, SMC, IDNR, Illinois EPA	$279,003	$304,003	35	17	17	0	0	Edward L. Ryerson Conservation Area Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

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SBD23	Streambank Stabilization	10,598	ft	10,598	ft	Bull Creek, Bull's Brook, Upper Des Plaines	Install 16 stream riffles and stabilize stream banks	42.31952553	-87.95591988	H	S	1, 2	FPD, PR/RL	M, PB&D, M, UT, IDNR, Illinois EPA	$3,579,488	$3,979,488	383	191	191	0	0	Independence Grove Forest Preserve	Y	N
SBD26	Streambank Stabilization	496	ft	496	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.17538949	-87.91368739	H	S	1, 2	FPD, OL	M, DOT, SMC, IDNR, Illinois EPA	$173,676	$198,676	20	10	10	0	0	Edward L. Ryerson Conservation Area Forest Preserve	N	N
SBD28	Streambank Stabilization	4,092	ft	4,092	ft	Lower Des Plaines River	Install 4 stream riffles and stabilize stream banks	42.22854869	-87.93372474	H	S	1, 2	FPD, PR/RL	M, PB&D, SMC, IDNR, Illinois EPA	$1,327,568	$1,427,568	497	248	248	0	0	Captain Daniel Wright Woods Forest Preserve	Y	N
SBD29	Streambank Stabilization	1,158	ft	1,158	ft	Upper Des Plaines River	Install 3 stream riffles and stabilize stream banks	42.28461797	-87.93593201	H	S	1, 2	FPD	M, SMC, IDNR, Illinois EPA	$422,478	$497,478	43	21	21	0	0	Wilmot Woods Forest Preserve	N	N
SBD31	Streambank Stabilization	3,639	ft	3,639	ft	Upper Des Plaines River	Install 6 stream riffles and stabilize stream banks	42.38069769	-87.91516237	H	S	1, 2	FPD	UT, DOT, PB&D, SMC, IDNR, Illinois EPA	$1,241,668	$1,391,668	223	112	112	0	0	Sedge Meadow Forest Preserve	N	N
SBD32	Streambank Stabilization	933	ft	933	ft	Upper Des Plaines River	Install 2 stream riffles and stabilize stream banks	42.38766494	-87.91709347	H	S	1, 2	FPD	PB&D, SMC, IDNR, Illinois EPA	$329,753	$379,753	19	10	10	0	0	Sedge Meadow Forest Preserve	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD35	Streambank Stabilization	667	ft	667	ft	Upper Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.40070461	-87.92914424	H	S	1, 2	FPD	PB&D, SMC, IDNR, Illinois EPA	$225,141	$250,141	5	3	3	0	0	Sedge Meadow Forest Preserve	N	N
SBD36	Streambank Stabilization	2,056	ft	2,056	ft	Mill Creek	Install 4 stream riffles and stabilize stream banks	42.41672613	-87.93283433	H	S	1, 2	FPD	PB&D, SMC, IDNR, Illinois EPA	$716,886	$816,886	76	38	38	0	0	Sedge Meadow Forest Preserve	N	N
SBD37	Streambank Stabilization	168	ft	168	ft	Upper Des Plaines River	Stabilize stream banks	42.46553202	-87.94263792	H	S	1, 2	FPD, DOT	OL, DOT, PB&D, SMC, IDNR, Illinois EPA	$50,295	$50,295	3	2	2	0	0	Van Patten Woods Forest Preserve	N	N
SBD37	Streambank Stabilization	3,194	ft	3,194	ft	Upper Des Plaines River	Install 5 stream riffles and stabilize stream banks	42.46100985	-87.94110461	H	S	1, 2	FPD, DOT	OL, DOT, PB&D, SMC, IDNR, Illinois EPA	$1,083,269	$1,208,269	65	32	32	0	0	Wadsworth Savanna Forest Preserve	Y	N
SBD4	Streambank Stabilization	942	ft	942	ft	Lower Des Plaines River	Stabilize stream banks	42.15622212	-87.90465759	H	S	1, 2	FPD, OL	M, DOT, SMC, IDNR, Illinois EPA	$282,598	$282,598	62	31	31	0	0	Cahokia Flatwoods Forest Preserve	Y	N
SBD40	Streambank Stabilization	237	ft	237	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.19816072	-87.92616459	H	S	1, 2	FPD, OL	PB&D, SMC, IDNR, Illinois EPA	$96,104	$121,104	19	10	10	0	0	Edward L. Ryerson Conservation Area Forest Preserve	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD20	Swale/Open Channel	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Some orange discharge. Investigate and repair if determined problematic.	42.48235727	-87.93724821	M	M	1, 3, 4	FPD	PB&D, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Van Patten Woods Forest Preserve	Y	N
DPD21	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Down tree at confluence. Investigate and remove if determined problematic.	42.26508588	-87.93917906	H	S	1, 3, 4	FPD	M, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Old School Forest Preserve	N	N
DPD23	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove or repair if determined problematic.	42.24257497	-87.93960901	M	M	1, 3, 4	FPD	OL, M, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	MacArthur Woods Forest Preserve	Y	N
DPD24	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.44606879	-87.93365179	M	M	1, 3, 4	FPD	OL, PB&D, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Wadsworth Savanna Forest Preserve	N	N
DPD25	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Full of debris jams. Investigate and remove if determined problematic.	42.40126468	-87.92908151	H	S	1, 3, 4	FPD	OL, PB&D, SMC	$5,000	$30,000	N/A	N/A	N/A	N/A	N/A	Sedge Meadow Forest Preserve	N	N
DWS12	Wetland Creation/Restoration	20	ac	214	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.47512308	-88.00598374	H	M	1, 2, 3, 4	FPD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,598,280	N/A	751	37	33	1419	134	Dutch Gap Forest Preserve	Y	N
DWS13	Wetland Creation/Restoration	46	ac	319	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.47732141	-88.02659857	H	M	1, 2, 3, 4	FPD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$3,714,987	N/A	1718	73	59	2420	218	Prairie Stream Forest Preserve	N	N
DWS22	Wetland Creation/Restoration	6.7	ac	244	ac	Upper Des Plaines River	Create new wetlands	42.40482073	-87.88151223	H	M	1, 2, 3, 4	FPD, PO	UT, M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$538,425	N/A	552	25	10	4240	116	Waukegan Savanna Forest Preserve	N	N
DWS23	Wetland Creation/Restoration	3.8	ac	317	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.41224869	-88.05294873	H	M	1, 2, 3, 4	FPD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$301,503	N/A	227	4	5	5175	101	Duck Farm Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS24	Wetland Creation/Restoration	0.50	ac	22	ac	Mill Creek	Create new wetlands	42.40998025	-88.01549479	H	M	1, 2, 3, 4	FPD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$40,203	N/A	102	3	2	3133	29	McDonald Woods Forest Preserve	N	N
DWS32	Wetland Creation/Restoration	12	ac	249	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.41224869	-88.05294873	H	M	1, 2, 3, 4	FPD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$977,885	N/A	801	29	59	8891	170	Duck Farm Forest Preserve	N	N
DWS37	Wetland Creation/Restoration	0.79	ac	192	ac	Upper Des Plaines River	Create new wetlands	42.35520655	-87.9223836	H	M	1, 2, 3, 4	FPD, PO, PB&D	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$62,883	N/A	157	5	3	3918	56	Lake Carina Forest Preserve	N	N
DWS44	Wetland Creation/Restoration	2.7	ac	81	ac	Bull Creek	Create new wetlands	42.32124157	-87.98471897	H	M	1, 2, 3, 4	FPD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$218,172	N/A	444	17	61	208	59	Almond Marsh Forest Preserve	N	N
DWS5	Wetland Creation/Restoration	11	ac	142	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.49052109	-88.00655945	H	M	1, 2, 3, 4	FPD, PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$911,326	N/A	462	22	12	311	61	Dutch Gap Forest Preserve	Y	N
DWS51	Wetland Creation/Restoration	0.92	ac	68	ac	Upper Des Plaines River	Create new wetlands	42.30187913	-87.94393142	H	M	1, 2, 3, 4	FPD, PD	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$73,230	N/A	126	3	2	1670	54	Wilmot Woods Forest Preserve	N	N
DWS6	Wetland Creation/Restoration	6.7	ac	76	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.48927049	-88.01453576	H	M	1, 2, 3, 4	FPD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$532,612	N/A	360	9	5	458	38	Dutch Gap Forest Preserve	Y	N
DWS7	Wetland Creation/Restoration	7.5	ac	50	ac	Upper Des Plaines River	Create new wetlands	42.4936611	-87.98254772	H	M	1, 2, 3, 4	FPD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$596,471	N/A	192	12	9	144	25	Pine Dunes Forest Preserve	N	N
DWS8	Wetland Creation/Restoration	11	ac	234	ac	Upper Des Plaines River	Create new wetlands	42.48201993	-87.93392666	H	M	1, 2, 3, 4	FPD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$847,835	N/A	627	26	28	1793	86	Van Patten Woods Forest Preserve	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE LAKE COUNTY FOREST PRESERVE DISTRICT

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LFP-WLR	Wetland Creation/Restoration	544	ac	543	ac	Upper Des Plaines River, Mill Creek, Dutch Gap Canal/North Mill Creek, Lower Des Plaines River, Indian Creek, Bull Creek, Bull's Brook, Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	FPD, PO	IDNR, Illinois EPA, SMC	$480,000	N/A	2794	125	45	1901	312	N/A	Y	N
LFP-WLE	Wetland Enhancement	349	ac	349	ac	Upper Des Plaines River, Mill Creek, Dutch Gap Canal/North Mill Creek, Lower Des Plaines River, Indian Creek, Bull Creek, Bull's Brook, Buffalo Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	FPD, PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$10,484,100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LAKE VILLA TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TLVA-CC	Cover Crops	346	ac	346	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$20,760.00	N/A	1,228	51	141	0	113	Y	N
TVLA-ICE	De-icing practices/salt management	165	ac	165	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	59,958	0	N/A	N
TLVA-FAM	Feed Area Management	0.56	ac	0.56	ac	Dutch Gap Canal/North Mill Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	16	1.5	0.09	0.05	8.0	Y	N
SSD33	Field Border	1.5	ac	16	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.44157338	-88.03815848	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$6,000.00	N/A	49	2.8	7.9	43	4.2	Y	N
SSD37	Field Border	0.70	ac	5.6	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.44167899	-88.04586823	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$2,800.00	N/A	26	1.5	11	2.3	2.2	N	N
SSD35	Grass Waterway	1.3	ac	19	ac	Dutch Gap Canal/North Mill Creek	Install grass waterway	42.44437261	-88.03336693	H	S	1	AG	EXT, NRCS/SWCD, FB	$10,080.00	N/A	69	20	21	382	6.2	N	N
DL37	Lake Shoreline Stabilization	198	ft	198	ft	Mill Creek	Stabilize lake shorelines	42.4145538	-88.04248126	H	S	1, 2	PR/RL	PB&D, LA, SMC	$19,809.18	N/A	3.0	1.5	1.5	0	0	Y	N
DL38	Lake Shoreline Stabilization	87	ft	87	ft	Mill Creek	Stabilize lake shorelines	42.41454414	-88.04300283	H	S	1, 2	PR/RL	PB&D, LA, SMC	$8,742.15	N/A	1.3	0.67	0.67	0	0	Y	N
DL39	Lake Shoreline Stabilization	47	ft	47	ft	Mill Creek	Stabilize lake shorelines	42.41447637	-88.04323342	H	S	1, 2	PR/RL	PB&D, LA, SMC	$4,743.37	N/A	0.73	0.36	0.36	0	0	Y	N
DL40	Lake Shoreline Stabilization	304	ft	304	ft	Mill Creek	Stabilize lake shorelines	42.41427808	-88.04380131	H	S	1, 2	PR/RL	PB&D, LA, SMC	$30,355.66	N/A	4.7	2.3	2.3	0	0	Y	N
DL41	Lake Shoreline Stabilization	52	ft	52	ft	Mill Creek	Stabilize lake shorelines	42.41404372	-88.04434613	H	S	1, 2	PR/RL	PB&D, LA, SMC	$5,164.39	N/A	0.79	0.40	0.40	0	0	Y	N
DL42	Lake Shoreline Stabilization	115	ft	115	ft	Mill Creek	Stabilize lake shorelines	42.40805388	-88.03929031	H	S	1, 2	PR/RL	PB&D, LA, SMC	$11,497.39	N/A	1.8	0.88	0.88	0	0	Y	N
DL43	Lake Shoreline Stabilization	104	ft	104	ft	Mill Creek	Stabilize lake shorelines	42.39382047	-88.04524893	H	S	1, 2	PR/RL	PB&D, LA, SMC	$10,368.18	N/A	1.6	0.80	0.80	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LAKE VILLA TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL73	Lake Shoreline Stabilization	35	ft	35	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42693702	-88.0537291	H	S	1, 2	PR/RL	PB&D, LA, SMC	$3,500.08	N/A	0.54	0.27	0.27	0	0	Y	N
DL80	Lake Shoreline Stabilization	41	ft	41	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42680707	-88.05396739	H	S	1, 2	PR/RL	PB&D, LA, SMC	$4,146.42	N/A	0.64	0.32	0.32	0	0	Y	N
DL81	Lake Shoreline Stabilization	58	ft	58	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42692242	-88.04725005	H	S	1, 2	PR/RL	PB&D, LA, SMC	$5,810.14	N/A	0.89	0.45	0.45	0	0	Y	N
TLVA-TIL	No-Till / Strip-Till	196	ac	196	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$6,860.00	N/A	265	56	202	0	39	Y	N
TLVA-NU	Nutrient Management	346	ac	346	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$6,920.00	N/A	614	120	0	0	0	Y	N
TLVA-PE	Pasture Enhancement	0.81	ac	0.81	ac	Dutch Gap Canal/North Mill Creek	Enhance existing pasture operation	N/A	N/A	L	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	5.0	0.41	0.06	0.31	3.2	Y	N
SSD44	Pond	1	no.	22	ac	Dutch Gap Canal/North Mill Creek	Install pond in rural area	42.4404888	-88.02305294	L	S	1, 3, 4	PO	M, SMC, PB&D, USACE	$50,000.00	N/A	24	2.0	0.41	705	12	Y	N
TLVA-RVR	Runoff Volume Reduction Practices	613	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek, Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$8,969,038	N/A	1,255	116	38	56,881	809	Y	N
SSD34	WASCoB	2	no.	6.1	ac	Dutch Gap Canal/North Mill Creek	Install WASCoB	42.44275737	-88.03416898	H	S	1, 3, 4	PO, AG	DD, FB, NRCS/SWCD	$8,000.00	N/A	34	13	14	2.1	1.6	N	N
SSD36	WASCoB	3	no.	12	ac	Dutch Gap Canal/North Mill Creek	Install WASCoB	42.44360673	-88.03378867	H	S	1, 3, 4	PO, AG	DD, FB, NRCS/SWCD	$12,000.00	N/A	28	8.0	9.6	133	2.5	N	N
DWS15	Wetland Creation/ Restoration	3.1	ac	77	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.44370574	-88.02538897	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$247,857.87	N/A	345	13	11	18	27	Y	N
DWS32	Wetland Creation/ Restoration	0.023	ac	249	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.40112539	-88.05181643	H	M	1, 2, 3, 4	FPD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,808.91	N/A	801	29	59	8,891	170	N	N
DWS33	Wetland Creation/ Restoration	0.65	ac	33	ac	Mill Creek	Create new wetlands	42.40253908	-88.04166919	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$51,844.57	N/A	83	3.9	1.1	2,323	31	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LAKE VILLA TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TLVA-WLR	Wetland Creation/ Restoration	0.39	ac	0.39	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, IDNR, SMC, Illinois EPA	$31,200.00	N/A	0.22	0.02	0.001	0.22	0.06	Y	N
TLVA-WLE	Wetland Enhancement	15	ac	15	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$450,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TLIB-CC	Cover Crops	401	ac	401	ac	Bull Creek, Bull's Brook, Upper Des Plaines River	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$24,060.00	N/A	1,659	69	202	0	149	Y	N
TLIB-CC	Cover Crops	3.9	ac	3.9	ac	Bull Creek	Implement cover crop use	N/A	N/A	H	S	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$234.00	N/A	13.98	0.59	1.4	0	1.2	Y	N
TLIB-CC	Cover Crops	0.17	ac	0.17	ac	Bull Creek	Implement cover crop use	N/A	N/A	L	S	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$10.46	N/A	0.81	0.03	0.06	0	0.08	N	N
TLIB-CC	Cover Crops	0.51	ac	0.51	ac	Bull Creek, Bull's Brook	Implement cover crop use	N/A	N/A	L	S	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$30.60	N/A	2.0	0.09	0.44	0	0.17	Y	N
DPH192	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26675251	-87.97717852	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH193	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26676646	-87.9775516	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH194	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2667782	-87.97932621	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH195	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26678469	-87.98105708	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH196	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26680938	-87.98186434	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH197	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26681537	-87.98145446	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH198	Debris Jam	1	no.	N/A	N/A	Bull Creek, Bull's Brook	Investigate and remove if determined problematic.	42.32698351	-87.97492085	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH199	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32700237	-87.97424032	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH200	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32700675	-87.97505295	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH201	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32700606	-87.97385182	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH202	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32706932	-87.97471599	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH215	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.3154172	-87.99344175	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH216	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31542899	-87.99339556	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH217	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31528442	-87.99391943	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH218	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31534541	-87.99405237	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH219	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31522077	-87.99425035	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH220	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31516455	-87.99425639	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH221	Debris Jam	1	no.	N/A	N/A	Bull Creek	Fallen tree and roots blocking off creek. Investigate and remove if determined problematic.	42.31500036	-87.99438463	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH222	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.3147819	-87.99451564	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH223	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31472432	-87.99466081	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH224	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31462529	-87.99480607	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH225	Debris Jam	1	no.	N/A	N/A	Bull Creek	Fallen trees roots and all. Investigate and remove if determined problematic.	42.31454816	-87.99498461	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH226	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31442814	-87.99502241	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH227	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31417393	-87.99507438	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH228	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31394583	-87.99511461	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH229	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31408467	-87.99506365	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH230	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31402044	-87.99506633	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH231	Debris Jam	1	no.	N/A	N/A	Bull Creek	Huge fallen tree. Investigate and remove if determined problematic.	42.31352882	-87.99484748	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH232	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31356274	-87.99487011	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH233	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31343643	-87.99489517	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH234	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31286801	-87.99385162	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH235	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.30983322	-87.9971784	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH236	Debris Jam	1	no.	N/A	N/A	Bull Creek	Uprooted tree. Investigate and remove if determined problematic.	42.31086628	-87.99336874	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH237	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.3160419	-87.98267796	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH238	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31723855	-87.9822447	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH239	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31811521	-87.98218351	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH240	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31881823	-87.98210623	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH241	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.31896874	-87.98226666	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH242	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.3203201	-87.98182888	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH243	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.32042976	-87.98186266	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH251	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32674545	-87.97970147	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH252	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32687265	-87.97963332	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH253	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32690745	-87.97988771	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH254	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.327004	-87.98023749	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH255	Debris Jam	1	no.	N/A	N/A	Bull's Brook	Investigate and remove if determined problematic.	42.32754965	-87.98096906	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH259	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26560373	-87.96902511	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH853	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27745733	-87.93298084	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH854	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27769957	-87.93299656	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH855	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27776113	-87.9330137	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH856	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Dumping- wood furniture. Investigate and remove if determined problematic.	42.27829078	-87.93443912	M	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH857	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27833574	-87.93429273	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH858	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27839417	-87.93413486	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH863	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.2873535	-87.93665488	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH864	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29012988	-87.93775475	L	S	1, 3, 4	FPD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH865	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29089611	-87.936849	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH866	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29262019	-87.93593303	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH876	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29739858	-87.93307891	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH889	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29921075	-87.94559334	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH900	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Currently no water around it. Investigate and remove if determined problematic.	42.30178772	-87.93660098	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH901	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30380388	-87.93571906	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH902	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30472629	-87.95379888	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH915	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31206037	-87.92671662	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
TLIB-ICE	**De-icing practices/salt management**	**77**	**ac**	**77**	**ac**	**Upper Des Plaines River, Lower Des Plaines River**	**Reduce road salt application**	**N/A**	**N/A**	**H**	**S**	**1**	**M**	**HOA/POA, DOT, EO, PD**	**N/A**	**N/A**	**0**	**0**	**0**	**29,691**	**0**	**N/A**	**N**
DD107	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook	Increase native vegetation	42.24364552	-88.00078816	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD317	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook	Install native buffer	42.30732151	-87.92074344	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD34	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Clear vegetation around inlets/outlets, clean up trash, reattach FES	42.30103857	-88.00116478	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD57	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Install aerator, implement more native plants	42.24266519	-88.00312902	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD124	Discharge Point	1	no.	N/A	N/A	Bull Creek	Partially submerged. Investigate and repair if determined problematic.	42.30062561	-87.93693081	H	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD137	Discharge Point	1	no.	N/A	N/A	Bull Creek, Bull's Brook, Upper Des Plaines River	Under water. Investigate and repair if determined problematic.	42.29782329	-87.93332391	H	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD148	Discharge Point	1	no.	N/A	N/A	Bull Creek, Bull's Brook, Upper Des Plaines River	Broken in middle and trickling through there. Investigate and repair if determined problematic.	42.27722125	-87.93255948	H	M	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD149	Discharge Point	1	no.	N/A	N/A	Bull's Brook, Upper Des Plaines River	Long and perforated. Investigate and repair if determined problematic.	42.27704871	-87.93254037	H	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD166	Discharge Point	1	no.	N/A	N/A	Bull Creek	Eroded and cracked structure. Investigate and repair if determined problematic.	42.27827601	-87.93634996	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD176	Discharge Point	1	no.	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River	Broken and smashed. Investigate and repair if determined problematic.	42.25452843	-87.93964561	M	M	1, 3, 4	RR	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD182	Discharge Point	1	no.	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River, Upper Des Plaines River	Four discharge points. Investigate and repair if determined problematic.	42.30216726	-87.95054503	H	M	1, 3, 4	PB&D	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD54	Discharge Point	1	no.	N/A	N/A	Indian Creek	Orange discharge. Investigate and repair if determined problematic.	42.30962225	42.30962225	H	M	1, 3, 4	DOT	PB&D, PR/RL, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
SSD78	Field Border	1.0	ac	12	ac	Bull's Brook	Install field border	42.32254138	-87.97831943	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,000.00	N/A	33	1.9	5.4	2.8	3.6	Y	N
SSD78	Field Border	1.0	ac	12	ac	Bull's Brook	Install field border	42.32400399	-87.97833209	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,000.00	N/A	7.7	0.43	1.3	0.66	0.84	Y	N
SSD81	Field Border	2.1	ac	14	ac	Bull's Brook	Install field border	42.32130874	-87.96538462	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$8,400.00	N/A	45	2.5	5.2	3.9	4.9	Y	N
SSD137	Grass Waterway	1.7	ac	22	ac	Bull Creek	Install grass waterway	42.3214946	-87.98235934	H	S	1	PO	PB&D, UT	$13,600.00	N/A	112	11	25	52	17	N	N
SSD75	Grass Waterway	2.2	ac	82	ac	Bull Creek	Install grass waterway	42.32090606	-87.99895816	H	S	1	AG	EXT, NRCS/SWCD, FB	$17,600.00	N/A	371	56	90	317	39	Y	N
SSD76	Grass Waterway	4.1	ac	49	ac	Bull Creek	Install grass waterway	42.32158444	-87.9947337	H	S	1	AG	EXT, NRCS/SWCD, FB	$32,800.00	N/A	578	83	139	41	38	Y	N
DPH18	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.31546804	-87.97076116	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH19	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.32650381	-87.97340339	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH29	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.31528996	-87.99417022	M	M	1, 3, 4	T, PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH30	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek	Investigate and repair or remove if determined problematic.	42.31327286	-87.99450717	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH31	Hydraulic Structure	1	no.	N/A	N/A	Bull's Brook	Investigate and repair or remove if determined problematic.	42.30963123	-87.99433425	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH32	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Warping. Investigate and repair if determined problematic.	42.3096699	-87.9981885	H	M	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH53	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek, Bull's Brook, Indian Creek, Upper Des Plaines River	Foul smelling matter filling stream. Investigate and repair if determined problematic.	42.30063173	-87.93693911	M	S	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH54	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek	White mold. Investigate and repair if determined problematic.	42.30548171	-87.93505133	M	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH57	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek	Investigate and repair or remove if determined problematic.	42.29571223	-87.93212027	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH62	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Needs repair badly. Investigate and repair if determined problematic.	42.27753666	-87.93298981	H	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DSTG45	N/A	1	ea	N/A	N/A	Upper Des Plaines River	North Libertyville Estates Retention Basin. Clear out existing debris, retrofit/expand existing basin for storage.	42.30332623	-87.95031916	H	S	1, 3, 4	HOA/POA, PO	PB&D, SMC, LCPW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
TLIB-TIL	No-Till / Strip-Till	264	ac	264	ac	Bull Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$9,240.00	N/A	414	87	310	0	60	Y	N
TLIB-TIL	No-Till / Strip-Till	3.9	ac	3.9	ac	Bull's Brook	Practice no-till or strip-till	N/A	N/A	H	M	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD	$136.50	N/A	4.7	0.98	2.5	0	0.68	Y	N
TLIB-TIL	No-Till / Strip-Till	0.51	ac	0.51	ac	Bull Creek, Bull's Brook	Practice no-till or strip-till	N/A	N/A	M	M	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD	$17.85	N/A	0.67	0.14	0.77	0	0.10	Y	N
TLIB-NU	Nutrient Management	401	ac	401	ac	Bull Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	AG, PO	PR/RL, FB, EXT	$8,020.00	N/A	830	162	0	0	0	Y	N
TLIB-NU	Nutrient Management	3.9	ac	3.9	ac	Bull Creek, Bull's Brook	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$78.00	N/A	7.0	1.4	0	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TLIB-NU	Nutrient Management	0.17	ac	0.17	ac	Bull Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$3.40	N/A	0.41	0.08	0	0	0	N	N
TLIB-NU	Nutrient Management	0.51	ac	0.51	ac	Bull Creek, Bull's Brook	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$10.20	N/A	1.0	0.20	0	0	0	Y	N
TLIB-PE	Pasture Enhancement	0.45	ac	0.45	ac	Upper Des Plaines River	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	2.8	0.28	0.03	0.17	1.8	N	N
SSD77	Pond	1	no.	51	ac	Upper Des Plaines River	Install pond in rural area	42.32105732	-87.99369335	L	S	1, 3, 4	PO	S, SMC, PB&D, USACE	$50,000.00	N/A	403	95	177	28	40	Y	N
TLIB-RVR	Runoff Volume Reduction Practices	490	ac	N/A	N/A	Bull Creek, Bull's Brook, Indian Creek, Lower Des Plaines River, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$7,180,226	N/A	876	75	25	32,804	649	Y	N
DSB183	Stream Buffer	0.26	ac	2.6	ac	Indian Creek	Install stream buffer	42.24664168	-87.99176881	H	S	1, 2	PR/RL	PB& D, SMC, IDNR, Illinois EPA	$1,043.25	N/A	8.4	0.49	1.8	0.83	0.94	Y	N
DSB248	Stream Buffer	1.2	ac	0.25	ac	Lower Des Plaines River	Install stream buffer	42.31707336	-87.96835771	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$4,702.87	N/A	0.95	0.04	0.02	15	0.84	Y	N
DSB249	Stream Buffer	0.72	ac	10	ac	Bull Creek	Install stream buffer	42.32153724	-87.97007273	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,887.22	N/A	45	2.5	5.4	4.0	4.9	Y	N
DSB36	Stream Buffer	0.12	ac	3.4	ac	Bull Creek, Indian Creek, Upper Des Plaines, Lower Des Plaines	Install stream buffer	42.31676779	-87.98228048	H	S	1, 2	FPD, T	PB&D, SMC, IDNR, Illinois EPA	$463.74	N/A	6.1	0.22	0.07	31	3.9	N	N
DSB37	Stream Buffer	0.11	ac	0.57	ac	Upper Des Plaines River	Install stream buffer	42.30947246	-87.99392051	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$438.45	N/A	2.0	0.12	0.25	1.8	0.26	N	N
DSB38	Stream Buffer	0.11	ac	1.7	ac	Bull's Brook	Install stream buffer	42.31295859	-87.99415225	H	S	1, 2	UT, AG	PB&D, SMC, IDNR, Illinois EPA	$446.92	N/A	9.3	0.52	0.55	3.7	1.2	Y	N
DSB86	Stream Buffer	0.11	ac	1.8	ac	Bull's Brook	Install stream buffer	42.24764182	-87.99165416	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$424.89	N/A	0.53	0.07	0.004	0.46	0.21	Y	N
SBD48	Streambank Stabilization	122	ft	122	ft	Bull Creek	Install 2 stream riffles and stabilize stream banks	42.26681461	-87.97500118	H	S	1, 2	OL	PB&D, SMC, IDNR, Illinois EPA	$86,716.85	$136,716.85	3.7	1.9	1.9	0	0	Y	N
SBD49	Streambank Stabilization	55	ft	55	ft	Bull Creek	Install 1 stream riffle and stabilize stream banks	42.2670606	-87.98379641	H	S	1, 2	PD, UT	M, PB&D, SMC, IDNR, Illinois EPA	$41,358.21	$66,358.21	2.3	1.2	1.2	0	0	Y	N
SBD56	Streambank Stabilization	316	ft	316	ft	Bull Creek	Install 3 stream riffles and stabilize stream banks	42.30952644	-87.99341983	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$169,903.63	$244,903.63	26	13	13	0	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD57	Streambank Stabilization	41	ft	41	ft	Bull Creek	Install 1 stream riffle and stabilize stream banks	42.32503759	-87.97092334	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$37,250.50	$62,250.50	1.7	0.87	0.87	0	0	N	N
SBD7	Streambank Stabilization	1,177	ft	1,177	ft	Upper Des Plaines River	Install 13 stream riffles and stabilize stream banks	42.31203018	-87.92663381	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$678,079.86	$1,003,079.86	36	18	18	0	0	N	N
DPD5	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.30070998	-87.96906551	M	M	1, 3, 4	PB&D	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD7	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.31872381	-87.96563731	M	M	1, 3, 4	UT	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD8	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove or repair if determined problematic.	42.3253161	-87.97170664	M	M	1, 3, 4	PO	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DWS43	Wetland Creation/ Restoration	9.5	ac	173	ac	Lower Des Plaines River	Create new wetlands	42.32071648	-87.99822982	H	M	1, 2, 3, 4	PB&D	SMC, IDNR, Illinois EPA, USACE, USFWS	$756,643.82	N/A	1,129	38	168	380	101	Y	N
DWS44	Wetland Creation/ Restoration	2.4	ac	81	ac	Lower Des Plaines River	Create new wetlands	42.32156879	-87.98215548	H	M	1, 2, 3, 4	FPD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$188,826.50	N/A	444	17	61	208	59	N	N
DWS45	Wetland Creation/ Restoration	1.5	ac	249	ac	Lower Des Plaines River	Create new wetlands	42.32428695	-87.9641703	H	M	1, 2, 3, 4	PB&D, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$120,856.87	N/A	1,050	37	20	9,445	346	N	N
DWS47	Wetland Creation/ Restoration	5.0	ac	111	ac	Bull Creek	Create new wetlands	42.30293645	-87.99887638	H	M	1, 2, 3, 4	PB&D, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$399,520.68	N/A	200	7.0	2.1	3,019	29	Y	N
DWS50	Wetland Creation/ Restoration	2.0	ac	405	ac	Bull's Brook	Create new wetlands	42.30069373	-87.96982311	H	M	1, 2, 3, 4	PB&D, PO, PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$163,622.21	N/A	387	9.9	6.3	4,796	150	Y	N
DWS51	Wetland Creation/ Restoration	1.1	ac	68	ac	Bull's Brook	Create new wetlands	42.30216707	-87.94362551	H	M	1, 2, 3, 4	FPD, PD	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$86,597.04	N/A	126	2.7	1.8	1,670	54	N	N
DWS52	Wetland Creation/ Restoration	1.7	ac	186	ac	Upper Des Plaines River	Create new wetlands	42.30459911	-87.93607928	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$133,066.20	N/A	178	5.7	1.7	1,880	101	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR LIBERTYVILLE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS53	Wetland Creation/ Restoration	0.49	ac	21	ac	Upper Des Plaines River	Create new wetlands	42.28928708	-87.93275157	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$39,203.55	N/A	64	1.9	0.47	751	26	N	N
DWS55	Wetland Creation/ Restoration	0.45	ac	97	ac	Lower Des Plaines River	Create new wetlands	42.29277469	-87.92548509	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$35,890.22	N/A	119	4.2	0.94	1,730	63	N	N
DWS59	Wetland Creation/ Restoration	11	ac	592	ac	Upper Des Plaines River	Create new wetlands	42.26696508	-87.98082536	H	M	1, 2, 3, 4	PD, PO, M , PB&D	SMC, IDNR, Illinois EPA, USACE, USFWS	$871,543.75	N/A	988	34	15	20,280	452	Y	N
DWS62	Wetland Creation/ Restoration	0.24	ac	58	ac	Bull Creek	Create new wetlands	42.25569816	-87.9151943	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$18,907.66	N/A	119	5.9	1.4	2,885	64	N	N
SSD135	Wetland Creation/ Restoration	1.0	ac	19	ac	Indian Creek	Create new wetlands	42.31277018	-87.99398547	H	M	1, 3, 4	PO	PB&D, SMC, USACE, IDNR, Illinois EPA, USFWS	$80,000.00	N/A	51	6.3	4.1	724	23	Y	N
TLIB-WLR	Wetland Creation/ Restoration	73	ac	73	ac	Bull Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, IDNR, SMC, Illinois EPA	$5,849,600.00	N/A	726	32	40	202	57	Y	N
TLIB-WLE	Wetland Enhancement	18	ac	18	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$540,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TNEW-CC	Cover Crops	1,809	ac	1809	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$108,540.00	N/A	8,502	345	745	0	782	Y	N
DPH1333	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.439842	-87.91907357	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1337	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Bunch of logs caught on decrepit bridge. Investigate and remove if determined problematic.	42.44411455	-87.95037151	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1338	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44436333	-87.95250182	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1339	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44437477	-87.95140307	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1340	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44440348	-87.95189433	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1342	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Living tree in middle of stream. Investigate and remove if determined problematic.	42.44519649	-87.95347289	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1343	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Stuck on decrepit wooden bridge. Investigate and remove if determined problematic.	42.44527842	-87.94853218	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1345	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44547079	-87.95337759	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1349	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44575795	-87.95352754	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1352	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Couple logs tucked together. Investigate and remove if determined problematic.	42.44594225	-87.95356916	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1354	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Caused channel to be way deeper downstream. Investigate and remove if determined problematic.	42.4460786	-87.95371689	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1355	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44608593	-87.95374994	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1357	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44639347	-87.95438778	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1359	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4465663	-87.95448961	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1360	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44658524	-87.95448132	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1362	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Tree root. Investigate and remove if determined problematic.	42.44688259	-87.95508389	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1427	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46055708	-87.9268741	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1429	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46072534	-87.92607606	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1433	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46110475	-87.92525891	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1434	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46142833	-87.92462172	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1435	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4614653	-87.9243509	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1478	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46823069	-87.88506007	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1479	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46830897	-87.8850288	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1514	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47812969	-87.95318832	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1515	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4787031	-87.95398352	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1517	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.48002513	-87.90520859	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1518	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.48011629	-87.90531535	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1522	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.48104109	-87.90773738	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1523	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.48106497	-87.90791741	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1529	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Beaver dam high velocity over the top after rain. Investigate and remove if determined problematic.	42.48272649	-87.9107982	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1531	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Possibly a beaver dam. Investigate and remove if determined problematic.	42.48314949	-87.91141974	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1532	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Possibly a beaver dam. Investigate and remove if determined problematic.	42.48364476	-87.91360404	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1533	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Possibly a beaver dam. Investigate and remove if determined problematic.	42.48369046	-87.91405574	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1534	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Possibly a beaver dam. Investigate and remove if determined problematic.	42.48395837	-87.9156121	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1541	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.48797596	-87.95694241	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
TNEW-ICE	De-icing practices/ salt management	283	ac	283	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	111,981	0	N/A	N
DPD139	Discharge Point	1	no.	N/A	N/A	Newport Drainage Ditch	Two discharge points; both extend really far out of the bank. Investigate and repair if determined problematic.	42.44458983	-87.94908138	M	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD140	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Two discharge points; both extend really far out of the bank, looks like irrigation. Investigate and repair if determined problematic.	42.44456017	-87.94911856	M	M	1, 3, 4	M, PD	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
TNEW-FAM	Feed Area Management	11	ac	10.6	ac	Newport Drainage Ditch	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	298	28	1.6	6.1	149	Y	N
SSD32	Field Border	0.60	ac	6.6	ac	Newport Drainage Ditch	Install field border	42.45559	-87.90392886	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,400.00	N/A	30	1.7	4.8	2.6	2.6	Y	N
SSD41	Field Border	0.80	ac	13	ac	Upper Des Plaines River	Install field border	42.44458971	-87.91398555	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$3,200.00	N/A	104	5.7	6.0	8.9	10	Y	N
SSD14	Filter Strip	1.8	ac	15	ac	Upper Des Plaines River	Install filter strip	42.48429145	-87.91629168	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$7,200.00	N/A	84	4.7	7.1	8.5	11	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD15	Filter Strip	2.5	ac	48	ac	Newport Drainage Ditch	Install filter strip	42.48347263	-87.91296098	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$10,000.00	N/A	76	7.0	4.8	132	32	Y	N
SSD17	Filter Strip	0.20	ac	1.5	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install filter strip	42.47985736	-87.95515909	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$800.00	N/A	11	0.62	4.6	0.95	1.2	N	N
SSD145	Grass Waterway	2.5	ac	31	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install grass waterway	42.48871735	-87.94329007	H	S	1	AG	EXT, NRCS/SWCD, FB	$20,000.00	N/A	145	9.9	28	18	17	Y	N
SSD146	Grass Waterway	2.4	ac	27	ac	Dutch Gap Canal/North Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install grass waterway	42.45498513	-87.90599038	H	S	1	AG	EXT, NRCS/SWCD, FB	$19,200.00	N/A	187	16	26	392	21	Y	N
DPH58	Hydraulic Structure	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Partially underwater and blocked by rocks. Investigate and repair if determined problematic.	42.44705552	-87.95517313	H	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH60	Hydraulic Structure	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek, Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.44422985	-87.95075925	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH76	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Bottom completely corroded, and causing debris jam. Investigate and repair if determined problematic.	42.43979083	-87.91921489	H	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH88	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair or remove if determined problematic.	42.47552129	-87.89903647	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TNEW-TIL	No-Till / Strip-Till	971	ac	971	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$33,985.00	N/A	1,921	391	1,059	0	278	Y	N
TNEW-TIL	No-Till / Strip-Till	0.31	ac	0.31	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	M	M	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD	$10.85	N/A	0.36	0.08	0.17	0	0.05	N	N
TNEW-NU	Nutrient Management	1,809	ac	1809	ac	Newport Drainage Ditch	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$36,180.00	N/A	4,251	805	0	0	0	Y	N
TNEW-NU	Nutrient Management	0.31	ac	0.31	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$6.29	N/A	0.43	0.09	0	0	0	N	N
TNEW-PE	Pasture Enhancement	42	ac	42	ac	Newport Drainage Ditch	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	278	21	3.4	17	175	Y	N
TNEW-RVR	Runoff Volume Reduction Practices	525	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek, Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$7,683,711	N/A	1,426	137	43	72,700	695	N	N
DSB10	Stream Buffer	0.35	ac	0.56	ac	Dutch Gap Canal/North Newport Drainage Ditch, Upper Des Plaines River	Install stream buffer	42.46790326	-87.88505322	H	S	1, 2	RR, DOT	UT, PB&D, SMC, IDNR, Illinois EPA	$1,397.78	N/A	1.5	0.10	0.04	43	1.1	Y	N
DSB2	Stream Buffer	0.43	ac	2.7	ac	Newport Drainage Ditch	Install stream buffer	42.48323353	-87.91141225	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$1,717.61	N/A	2.5	0.11	0.01	0.66	0.30	Y	N
DSB246	Stream Buffer	0.075	ac	6.0	ac	Dutch Gap Canal/North Mill Creek	Install stream buffer	42.44421123	-87.95456449	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$300.61	N/A	16	1.0	0.42	530	11	N	N
DSB252	Stream Buffer	0.40	ac	2.5	ac	Upper Des Plaines River	Install stream buffer	42.48162705	-87.9101432	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$1,586.97	N/A	4.6	0.25	0.10	116	2.8	Y	N
DSB253	Stream Buffer	0.26	ac	9.6	ac	Newport Drainage Ditch	Install stream buffer	42.48308925	-87.91159658	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$1,058.50	N/A	10	0.50	0.07	4.1	1.5	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR NEWPORT TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB9	Stream Buffer	0.38	ac	4.4	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install stream buffer	42.46799872	-87.8852932	H	S	1, 2	UT	PB&D, SMC, IDNR, Illinois EPA	$1,521.39	N/A	8.8	0.38	0.06	48	1.1	Y	N
SBD37	Streambank Stabilization	67	ft	67	ft	Upper Des Plaines River	Stabilize stream banks	42.46538623	-87.9426236	H	S	1, 2	FPD, DOT	OL, DOT, PB&D, SMC, IDNR, Illinois EPA	$20,246.80	$20,246.80	1.4	0.68	0.68	0	0	Y	N
DWS10	Wetland Creation/ Restoration	1.3	ac	520	ac	Upper Des Plaines River	Create new wetlands	42.46795195	-87.88518483	H	M	1, 2, 3, 4	PO	UT, M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$100,700.72	N/A	649	16	13	8,358	226	Y	N
DWS12	Wetland Creation/ Restoration	0.11	ac	214	ac	Newport Drainage Ditch	Create new wetlands	42.47687043	-87.99763088	H	M	1, 2, 3, 4	FPD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$8,582.44	N/A	751	37	33	1,419	134	Y	N
DWS14	Wetland Creation/ Restoration	9.3	ac	91	ac	Upper Des Plaines River	Create new wetlands	42.44363379	-87.91618588	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$742,770.61	N/A	686	28	34	807	75	Y	N
DWS9	Wetland Creation/ Restoration	16	ac	317	ac	Upper Des Plaines River	Create new wetlands	42.48344232	-87.91569998	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,305,777.78	N/A	802	23	32	1,359	101	Y	N
TNEW-WLR	Wetland Creation/ Restoration	19	ac	19	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA	$1,552,000.00	N/A	118	5.2	1.9	104	18	Y	N
TNEW-WLE	Wetland Enhancement	68	ac	68	ac	Upper Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$2,040,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR PALATINE TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TPAL-ICE	De-icing practices/ salt management	9.6	ac	9.6	ac	Buffalo Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	3,443	0	N/A	N
DD629	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Install native buffer	42.15041444	-88.01266192	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TPAL-WLR	Wetland Creation/ Restoration	0.26	ac	0.26	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, IDNR, Illinois EPA, MWRD	$20,800.00	N/A	1.7	0.11	0.02	188	0.23	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE STATE OF ILLINOIS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	FOREST PRESERVE/ STATE PROPERTY	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
IL-CC	Cover Crops	15	ac	14.7	ac	Dutch Gap Canal/North Mill Creek	Implement cover crop use	N/A	N/A	H	S	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$880	N/A	11.43	0.50	0.58	0	2.13	Red Wing Slough	N	N
IL-ICE	De-icing practices/salt management	0.84	ac	0.84	ac	Dutch Gap Canal/North Mill Creek	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, EIG, IDNR, KRLT	N/A	N/A	0	0	0	213	0	N/A	N/A	N
IL-TIL	No-Till / Strip-Till	1	ac	1	ac	Mill Creek	Practice no-till or strip-till	N/A	N/A	L	M	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD	$42	N/A	1.30	0.27	5.12	0.00	0.19	Red Wing Slough State Park	N	N
IL-NU	Nutrient Management	14.6	ac	14.6	ac	Dutch Gap Canal/North Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$292	N/A	5.69	9.28	0.00	0.00	0.00	Red Wing Slough State Park	N	N
IL-RVR	Runoff Volume Reduction Practices	2	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$26,223	N/A	8	0	0	126	4	N/A	N	N
DWS13	Wetland Creation/ Restoration	0.02	ac	319	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.4806209	-88.0284233	H	M	1, 2, 3, 4	IDNR	PR/RL, HOA/POA, CL, EIG, KRLT, IDNR, Illinois EPA, USFWS, KRLT, PD, Antioch Township, Village of Antioch, FPD, State	$1,320	N/A	1,718	73	59	2,420	218	Red Wing Slough State Park	N	N
IL-WLR	Wetland Creation/ Restoration	15	ac	15	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC	$1,200,000	N/A	7.6	0.60	0.04	8.06	1.8	Red Wing Slough State Park	N	N
IL-WLE	Wetland Enhancement	0.78	ac	0.78	ac	Dutch Gap Canal/North Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	IDNR	USACE, USFWS, SMC, Illinois EPA	$23,400	N/A	N/A	N/A	N/A	N/A	N/A	Red Wing Slough State Park	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TVRN-CC	Cover Crops	110	ac	110	ac	Aptakisic Creek, Indian Creek	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$6,600.00	N/A	360	15	14	0	34	Y	N
DPH136	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21288387	-87.96415867	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH137	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21293605	-87.9641922	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH138	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21346012	-87.9642932	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH574	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15759001	-87.93656522	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH576	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15765269	-87.93313427	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH577	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15837379	-87.93683742	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH579	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15859484	-87.93695493	L	S	1, 3, 4	RR	M, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH581	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15870996	-87.92225281	L	S	1, 3, 4	PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH586	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1622318	-87.93855854	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH606	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.16589993	-87.9277209	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH632	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17568909	-87.94455802	L	S	1, 3, 4	RR	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH637	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17671937	-87.94222625	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH638	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17685381	-87.94164346	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH701	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18705066	-87.96439802	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH713	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20108571	-87.92017565	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH715	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20506079	-87.92178238	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH716	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20591352	-87.9248235	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH717	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20635897	-87.91940669	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH718	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20649883	-87.91900394	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH719	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20689345	-87.91807674	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH721	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20755918	-87.91739034	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH722	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20789215	-87.92502265	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH724	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20894768	-87.91649357	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH725	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20897283	-87.9165664	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH750	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2201902	-87.93374117	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH754	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22242955	-87.93582759	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH755	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22254317	-87.93625523	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
TVRN-ICE	De-icing practices/ salt management	135	ac	135	ac	Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	52,574	0	N/A	N
DD129	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase buffer	42.18353377	-88.00133772	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD485	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase unmowed buffer	42.22588263	-87.94931917	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD590	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek	Remove excess litter/debris	42.16483568	-87.92147479	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD592	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek	Add native plants to decrease erosion	42.16124079	-87.92213006	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD595	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Remove excess woody vegetation, install aerator	42.1602095	-87.92223031	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD62	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Remove clogging from inlet and outlet	42.23755107	-88.00374841	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD83	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Install native buffer	42.21341626	-87.95903689	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD98	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Stabilize bank from erosion	42.18751802	-87.99378548	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD99	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native buffer for install riprap to stabilize bank in areas	42.18853846	-87.99553547	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD157	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Gray discharge. Investigate and repair if determined problematic.	42.20789245	-87.91691652	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD185	Discharge Point	1	no.	N/A	N/A	Indian Creek	Blocked by debris, Investigate and remove if determined problematic.	42.18166078	-87.91983946	H	S	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD191	Discharge Point	1	no.	N/A	N/A	Indian Creek	Rusted and broken. Investigate and repair if determined problematic.	42.17690224	-87.94158454	H	M	1, 3, 4	M, PR/RL	SMC, CLB	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD193	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Rusted out. Investigate and repair if determined problematic.	42.18935021	-87.9631686	H	M	1, 3, 4	PB&D, PR/RL	AG, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD197	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Broken pipe in water. Investigate and repair if determined problematic.	42.15804854	-87.92071252	H	M	1, 3, 4	PD	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD30	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Investigate and repair if determined problematic.	42.20551689	42.20551689	M	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
SSD120	Filter Strip	1.5	ac	17	ac	Indian Creek	Install filter strip	42.18796498	-87.96381489	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$6,000.00	N/A	71	3.9	2.8	15	9.1	Y	N
SSD121	Filter Strip	1.4	ac	8.2	ac	Indian Creek	Install filter strip	42.18819299	-87.96401318	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$5,600.00	N/A	44	2.4	1.9	25	5.7	Y	N
DPH80	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Debris in pipe in other end. Investigate and repair if determined problematic.	42.15847388	-87.92222059	H	S	1, 3, 4	PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH81	Hydraulic Structure	1	no.	N/A	N/A	Aptakisic Creek	Investigate and repair or remove if determined problematic.	42.15415696	-87.9273021	M	M	1, 3, 4	PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TVRN-TIL	No-Till / Strip-Till	44	ac	44	ac	Aptakisic Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$1,540.00	N/A	42	8.8	13	0	6.3	Y	N
TVRNNI	Nutrient Management	110	ac	110	ac	Aptakisic Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$2,200.00	N/A	180	35	0	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TVRN-RVR	Runoff Volume Reduction Practices	263	ac	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,847,073	N/A	560	47	17	20,027	386	Y	N
DSB140	Stream Buffer	0.10	ac	0.59	ac	Aptakisic Creek, Lower Des Plaines River	Install stream buffer	42.16460396	-87.93139762	H	S	1, 2	PB&D	SMC, IDNR, Illinois EPA	$416.84	N/A	1.3	0.09	0.01	3.3	0.20	Y	N
DSB141	Stream Buffer	0.33	ac	2.8	ac	Aptakisic Creek	Install stream buffer	42.16353144	-87.92222254	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$1,333.24	N/A	13	0.74	2.3	5.2	1.7	Y	N
DSB142	Stream Buffer	0.11	ac	0.51	ac	Indian Creek	Install stream buffer	42.16404077	-87.92498537	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$456.53	N/A	1.8	0.11	0.17	0.21	0.24	Y	N
DSB145	Stream Buffer	0.69	ac	17	ac	Aptakisic Creek	Install stream buffer	42.165805	-87.92783667	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,757.89	N/A	63	3.5	7.3	7.5	8.1	Y	N
DSB146	Stream Buffer	0.67	ac	1.1	ac	Lower Des Plaines River	Install stream buffer	42.16581812	-87.92760485	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,699.74	N/A	3.9	0.22	0.68	0.41	0.51	Y	N
DSB43	Stream Buffer	0.47	ac	0.26	ac	Lower Des Plaines River	Install stream buffer	42.20210714	-87.93950308	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$1,893.83	N/A	1.3	0.07	0.04	48	0.90	N	N
DSB44	Stream Buffer	0.49	ac	2.5	ac	Aptakisic Creek	Install stream buffer	42.20576105	-87.94808248	H	S	1, 2	M	PB&D, SMC, IDNR, Illinois EPA	$1,962.50	N/A	10	0.43	0.09	4.9	2.3	N	N
SBD27	Streambank Stabilization	903	ft	903	ft	Indian Creek	Install 1 stream riffle and stabilize stream banks	42.1839361	-87.91835687	H	S	1, 2	PR/RL	M, PB&D, SMC, IDNR, Illinois EPA	$295,990.53	$320,990.53	46	23	23	0	0	N	N
SBD38	Streambank Stabilization	704	ft	704	ft	Lower Des Plaines River	Install 5 stream riffles and stabilize stream banks	42.16405498	-87.92541887	H	S	1, 2	PB&D, PR/RL	SMC, IDNR, Illinois EPA	$336,111.79	$461,111.79	19	9.7	9.7	0	0	N	N
DWS73	Wetland Creation/ Restoration	2.1	ac	82	ac	Aptakisic Creek	Create new wetlands	42.20174118	-87.93882309	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$164,671.75	N/A	266	8.7	4.5	5,601	129	N	N
DWS74	Wetland Creation/ Restoration	0.1	ac	235	ac	Aptakisic Creek	Create new wetlands	42.1985883	-87.96094811	H	M	1, 2, 3, 4	PD, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$5,766.69	N/A	532	14	9.3	11,437	230	N	N
DWS83	Wetland Creation/ Restoration	23	ac	579	ac	Aptakisic Creek	Create new wetlands	42.18774609	-87.96288278	H	M	1, 2, 3, 4	PD, UT, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,866,129.30	N/A	2,013	67	36	36,298	714	Y	N
DWS87	Wetland Creation/ Restoration	12	ac	344	ac	Aptakisic Creek	Create new wetlands	42.18853842	-87.99620127	H	M	1, 2, 3, 4	PD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$986,215.67	N/A	911	39	8.8	10,125	284	N	N
DWS88	Wetland Creation/ Restoration	0.55	ac	515	ac	Indian Creek	Create new wetlands	42.17667702	-87.94296933	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$43,845.79	N/A	692	19	15	18,835	142	Y	N
DWS89	Wetland Creation/ Restoration	6.3	ac	251	ac	Indian Creek	Create new wetlands	42.17989257	-87.95742669	H	M	1, 2, 3, 4	PD, PO, M	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$506,657.09	N/A	254	6.8	5.2	7,038	99	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS90	Wetland Creation/ Restoration	1.0	ac	441	ac	Indian Creek	Create new wetlands	42.18102937	-87.95896024	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$83,937.86	N/A	905	29	17	21,577	265	Y	N
SSD115	Wetland Creation/ Restoration	3.0	ac	61	ac	Indian Creek	Create new wetlands	42.20426437	-87.9519357	H	M	1, 3, 4	PO	PB&D, SMC, USACE, IDNR, Illinois EPA, USFWS	$240,000.00	N/A	225	14	12	2,586	55	N	N
TVRN-WLR	Wetland Creation/ Restoration	86	ac	86	ac	Aptakisic Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, IDNR, Illinois EPA, SMC	$6,868,800.00	N/A	793	38	5	666	106	Y	N
TVRN-WLE	Wetland Enhancement	5.4	ac	5.4	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$162,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF ANTIOCH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
ANT-CC	Cover Crops	234	ac	234	ac	Dutch Gap Canal/North Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$14,040.00	N/A	898	38	72	0	77	Y	N
ANT-ICE	De-icing practices/ salt management	101	ac	101	ac	Dutch Gap Canal/North Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT	N/A	N/A	0	0	0	39,155	0	N/A	N
ANT-NU	Nutrient Management	234	ac	234	ac	Dutch Gap Canal/North Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$4,680.00	N/A	449	88	0	0	0	Y	N
ANT-PE	Pasture Enhancement	0.01	ac	0.01	ac	Dutch Gap Canal/North Mill Creek	Enhance existing pasture operation	N/A	N/A	L	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	0.08	0.008	0.001	0.005	0.05	Y	N
ANT-RVR	Runoff Volume Reduction Practices	59	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$857,654	N/A	158	17	5	10,045	57	N	N
ANT-TIL	No-Till / Strip-Till	246	ac	246	ac	Dutch Gap Canal/North Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$8,610.00	N/A	283	61	146	0	43	Y	N
ANT-WLE	Wetland Enhancement	3.1	ac	3.1	ac	Dutch Gap Canal/North Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$93,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N
ANT-WLR	Wetland Creation/Restoration	11	ac	11	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$914,725.44	N/A	49	1.8	0.5	1,420	4.5	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF ARLINGTON HEIGHTS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS	IN PREVIOUS PLANS
ARL-ICE	De-icing practices/salt management	143	ac	143	ac	Buffalo Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	55,164	0	N/A	N
ARL-RVR	Runoff Volume Reduction Practices	203	ac	N/A	N/A	Buffalo Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$2,966,585	N/A	371	36	13	17,378	197	Y	N
ARL-WLR	Wetland Creation/ Restoration	32	ac	32	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, MWRD, M	$2,525,699.36	N/A	185	5.9	2.4	11,419	47	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BEACH PARK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
BEA-CC	Cover Crops	123	ac	123	ac	Newport Drainage Ditch, Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$7,380.00	N/A	544	22	23	0	54	Y	N
DPH1257	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40036584	-87.88653378	L	S	1, 3, 4	DOT	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1258	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Bridge on private property. Investigate and remove if determined problematic.	42.40062882	-87.88655842	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1261	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40078619	-87.88703267	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1262	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40095174	-87.88739586	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1310	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.41279629	-87.88410865	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1316	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.42142868	-87.88142686	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1317	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.42155818	-87.88136257	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1318	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.42156367	-87.88133606	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1319	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.42663372	-87.88286133	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
BEA-ICE	De-icing practices/salt management	114	ac	114	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	39,453	0	N/A	N
DD156	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove garbage	42.42999954	-87.87938625	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BEACH PARK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD157	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.42915267	-87.88551999	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD345	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator to improve circulation, locate and clear outlet	42.42887184	-87.88162287	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD346	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer near houses	42.43403794	-87.88004367	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD356	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer	42.43893304	-87.88894619	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD379	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase native buffer in lawn areas	42.44213175	-87.89255198	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD380	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer, install native plants	42.44221145	-87.88498695	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD381	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Locate and clear north outlet	42.43768906	-87.89352569	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD382	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer along lawn side	42.43253485	-87.89329436	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
BEA-FAM	Feed Area Management	0.62	ac	0.62	ac	Newport Drainage Ditch, Upper Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	21	1.2	0.13	0.15	10	N	N
DPH55	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair or remove if determined problematic.	42.41384394	-87.88365611	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
BEA-TIL	No-Till / Strip-Till	5.1	ac	5.1	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$178.50	N/A	6.8	0.83	0.87	0	0.93	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BEACH PARK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
BEA-NU	Nutrient Management	123	ac	123	ac	Newport Drainage Ditch	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$2,460.00	N/A	272	51	0	0	0	Y	N
BEA-PE	Pasture Enhancement	3.6	ac	3.6	ac	Newport Drainage Ditch	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	23	1.7	0.30	1.4	14	N	N
BEA-RVR	Runoff Volume Reduction Practices	209	ac	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,060,192	N/A	445	41	15	19,264	292	N	N
DSB32	Stream Buffer	0.22	ac	0.72	ac	Newport Drainage Ditch	Install stream buffer	42.43393965	-87.89384963	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$869.01	N/A	1.0	0.03	0.01	0.31	0.12	N	N
DSB33	Stream Buffer	0.09	ac	0.81	ac	Newport Drainage Ditch	Install stream buffer	42.43316188	-87.89390855	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$347.85	N/A	0.94	0.03	0.01	0.29	0.11	N	N
BEA-WLR	Wetland Creation/Restoration	5.2	ac	5.2	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PR/RL, CL, EIG, IDNR, KRLT, OL	$417,099.68	N/A	24	0.5	0.06	1,577	2.1	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BRISTOL

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
BRI-CC	Cover Crops	3,442	ac	3,442	ac	Dutch Gap Canal/North Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$206,520.00	N/A	16,004	655	1,406	0	1,437	Y	N
BRI-ICE	De-icing practices/ salt management	215	ac	215	ac	Dutch Gap Canal/North Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	85,016	0	N/A	N
DD384	Detention Basin Retrofit	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek	Replace riprap, fix geo textile matting, plant native veg, don't mow to edge of water	42.49747136	-88.0466343	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD385	Detention Basin Retrofit	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek	Plant native veg buffer, don't mow to water edge, replace failing riprap	42.4962817	-88.04663805	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
BRI-FAM	Feed Area Management	21	ac	21	ac	Dutch Gap Canal/North Mill Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	482	38	2.6	3.4	236	Y	N
SSD12	Field Border	1.0	ac	23	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.50453987	-87.99041906	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,000.00	N/A	72	4.1	10	186	8.2	N	N
SSD13	Field Border	0.80	ac	7.9	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.49580789	-88.02218562	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$3,200.00	N/A	47	2.6	5.2	4.0	5.1	Y	N
SSD4	Field Border	2.8	ac	87	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.53731367	-88.06622836	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$11,200.00	N/A	197	11	19	21	26	N	N
SSD5	Field Border	0.80	ac	19	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.53920371	-88.03284092	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$3,200.00	N/A	66	3.7	13	6.1	7.3	N	N
SSD6	Field Border	0.30	ac	1.5	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.51730031	-88.02353154	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$1,200.00	N/A	4.7	0.27	0.76	0.40	0.52	N	N
SSD7	Field Border	1.3	ac	33	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.51698399	-88.02285065	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$5,200.00	N/A	166	9.3	16	149	22	Y	N
SSD8	Field Border	0.50	ac	12	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.51658178	-88.03523476	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,000.00	N/A	12	0.69	2.2	2.3	1.4	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BRISTOL

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD10	Filter Strip	0.70	ac	4.1	ac	Dutch Gap Canal/North Mill Creek	Install filter strip	42.5087565	-88.00674225	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,800.00	N/A	53	3.0	3.5	4.5	5.8	N	N
SSD9	Filter Strip	1.1	ac	22	ac	Dutch Gap Canal/North Mill Creek	Install filter strip	42.50921143	-88.0058949	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,400.00	N/A	129	7.3	5.4	13	17	N	N
SSD3	Grass Conversion	4.2	ac	4.2	ac	Dutch Gap Canal/North Mill Creek	Convert current cover to native grasses	42.538751	-88.06356437	H	S	1, 2	PO, AG	M	$16,800.00	N/A	36	1.4	2.3	2.3	1.7	N	N
SSD2	Grass Waterway	1.0	ac	14	ac	Dutch Gap Canal/North Mill Creek	Install grass waterway	42.53951124	-88.05316193	H	S	1	AG	EXT, NRCS/SWCD, FB	$8,000.00	N/A	47	3.6	5.8	6.3	6.0	N	N
BRI-TIL	No-Till / Strip-Till	2,581	ac	2,581	ac	Dutch Gap Canal/North Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$90,335.00	N/A	4,260	869	2,335	0	618	Y	N
BRI-NU	Nutrient Management	3,442	ac	3,442	ac	Dutch Gap Canal/North Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$68,840.00	N/A	8,002	1,529	0	0	0	Y	N
BRI-PE	Pasture Enhancement	16	ac	16	ac	Dutch Gap Canal/North Mill Creek	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	108	9.2	1.4	6.6	69	Y	N
BRI-RVR	Runoff Volume Reduction Practices	418	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$6,113,800	N/A	1,133	105	34	54,601	585	Y	N
BRI-WLR	Wetland Creation/ Restoration	1.9	ac	1.9	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	WI DNR, M	$152,200.12	N/A	16	0.91	0.19	1,290	4.6	N	N
DWS1	Wetland Creation/ Restoration	20	ac	273	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.54220715	-88.04202158	H	M	1, 2, 3, 4	PO	M, USACE, USFWS, WI DNR	$1,609,664.92	N/A	1,251	78	132	4,410	169	Y	N
DWS2	Wetland Creation/ Restoration	15	ac	146	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.53302005	-88.0258049	H	M	1, 2, 3, 4	PO	M, USACE, USFWS, WI DNR	$1,224,651.71	N/A	905	56	59	464	97	N	N
DWS3	Wetland Creation/ Restoration	9.0	ac	154	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.52790417	-88.05079273	H	M	1, 2, 3, 4	PO	M, USACE, USFWS, WI DNR	$718,077.32	N/A	742	31	112	636	68	N	N
DWS4	Wetland Creation/ Restoration	10	ac	90	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.51873732	-88.00411976	H	M	1, 2, 3, 4	PO	M, USACE, USFWS, WI DNR	$819,866.18	N/A	296	7.3	8.4	19	28	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
BUF-CC	Cover Crops	24	ac	24	ac	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,440.00	N/A	81	3.2	3.4	0	7.0	Y	N
DPH110	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19852731	-87.97670679	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH112	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19877162	-87.97655491	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH578	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Railroad ties. Investigate and remove if determined problematic.	42.15847842	-87.93479783	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH612	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1709235	-87.9472989	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH622	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17260808	-87.94718708	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH624	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Remains of a beaver dam. Investigate and remove if determined problematic.	42.17384521	-87.92975972	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH625	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17397124	-87.94707309	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH628	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17518838	-87.94609827	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH629	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17543638	-87.94489807	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH633	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Debris jam causing 2 ft water level difference. Investigate and remove if determined problematic.	42.17632325	-87.94285808	H	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH640	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Debris blocking water flow causing bank erosion. Investigate and remove if determined problematic.	42.17744991	-87.94007672	H	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH642	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17776064	-87.93915865	L	S	1, 3, 4	PO	M,SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH643	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17817949	-87.93768595	L	S	1, 3, 4	PO	M,SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH644	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17822456	-87.93729166	L	S	1, 3, 4	PO	M,SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH645	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17843913	-87.93574336	L	S	1, 3, 4	PO	M,SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH654	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18077351	-87.96575044	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH655	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18106222	-87.96563784	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH656	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18109784	-87.96566205	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH657	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18121173	-87.96568254	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH658	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18137517	-87.96720107	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH659	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18139931	-87.96573584	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH660	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18232004	-87.96603714	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH661	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1824004	-87.96606137	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH662	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18297276	-87.96649437	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH663	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1830797	-87.9666025	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH664	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18319304	-87.96666017	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH665	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18353779	-87.96679715	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH666	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18370118	-87.96677642	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH667	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1838207	-87.96675471	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH668	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18392976	-87.96679252	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH669	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18419223	-87.9668107	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH670	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18454138	-87.96682354	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH673	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18530335	-87.96677751	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH676	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18573851	-87.96675102	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH677	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18584849	-87.96668179	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH682	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1860127	-87.96648515	L	S	1, 3, 4	PD	M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH689	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1862772	-87.9660083	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
BUF-ICE	**De-icing practices/salt management**	**1,060**	**ac**	**1,060**	**ac**	**Aptakisic Creek**	**Reduce road salt application**	**N/A**	**N/A**	**H**	**S**	**1**	**M**	**HOA/POA, DOT, EO, PD**	**N/A**	**N/A**	**0**	**0**	**0**	**440,277**	**0**	N/A	N
DD123	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Plant native buffer	42.19620714	-87.95287044	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD517	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator, remove excess litter/debris	42.17222208	-87.92352873	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD518	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to decrease erosion, remove excess debris	42.17119117	-87.92641622	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD519	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris	42.17118972	-87.92325713	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD523	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to decrease erosion	42.15444323	-87.91457377	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD536	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Stabilized the banks with native planting or riprap	42.19707819	-87.96657473	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD537	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Increase buffer	42.19717534	-87.96712635	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD538	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Increase native buffer	42.19703608	-87.9642189	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD539	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Increase buffer	42.19657442	-87.96056772	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD540	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Install native buffer	42.19629564	-87.9639435	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD541	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Install native buffer	42.19561233	-87.96420818	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD543	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Removed concrete to reduce short circuiting	42.19450076	-87.97105316	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD544	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Install riprap to reduce channelization and create meander	42.19366276	-87.9705263	L	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD550	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase buffer	42.18357294	-87.97267347	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD553	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris, consider short-circuiting	42.18217853	-87.96575385	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD554	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove some excess woody vegetation	42.1813012	-87.97342455	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD555	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excessive litter, add native plants to decrease excess erosion	42.18102362	-87.93575159	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD556	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter, increase native plants to decrease erosion	42.18078663	-87.93497645	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD557	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris	42.18059814	-87.96478072	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD559	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter, add native plants to decrease excess erosion	42.17981969	-87.93598844	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD560	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator, decrease woody vegetation	42.17936137	-87.93334527	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD562	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Consider short-circuiting, remove excess litter/debris	42.17935355	-87.96430111	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD564	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator, remove litter	42.17636923	-87.93388108	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD565	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator, remove litter	42.17484478	-87.95731431	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD566	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter, add native plants to decrease erosion	42.17465708	-87.936859	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD567	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove some excess woody vegetation	42.17493106	-87.94466125	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD568	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Fix short circuiting, add native plants to decrease excess erosion	42.17448541	-87.93420325	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD569	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter and debris	42.17374263	-87.93084951	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD570	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native plants to decrease erosion	42.17246747	-87.95196306	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD571	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator, add native plants to decrease erosion	42.17268282	-87.93253688	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD572	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Repair broken and detached inlets, install aerator and native buffer	42.17260714	-87.93134867	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD573	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter/debris, increase native plants to prevent further erosion	42.17205196	-87.9405598	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD574	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add native plants to decrease excess erosion, remove overhanging woody vegetation	42.17214222	-87.9394425	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD575	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add native plants to decrease erosion, repair broken inlet	42.17107016	-87.934009	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD576	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add native plants to decrease erosion, remove excess litter	42.17088987	-87.93060778	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD577	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter/debris, remove some excess woody vegetation	42.17074431	-87.94781833	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD578	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excessive litter/debris, consider inlet/outlet scouring	42.16981216	-87.93732951	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD579	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase native plants to decrease excessive shoreline erosion	42.16920256	-87.93430822	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD580	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess woody vegetation, possible illicit discharge	42.16993085	-87.94081403	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD582	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator, remove some excess woody vegetation, remove excess litter/debris	42.16888488	-87.94937209	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD583	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Remove excessive litter/debris	42.16770541	-87.93965518	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD584	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Add native plants to decrease some embankment erosion	42.16757118	-87.92823288	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD585	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek	Install aerator, remove excess litter/debris	42.16774649	-87.94936205	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD586	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add native plants to decrease shoreline erosion	42.16759413	-87.93440196	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD587	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Replant native plants along parts of shore to decrease erosion	42.16748205	-87.92693109	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD588	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants along parts of shore to decrease erosion, add aerator, remove excess woody vegetation	42.1668728	-87.94191716	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD589	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris	42.16604369	-87.94131497	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD591	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter, consider outlet clogging	42.16259126	-87.93973912	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD593	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Consider outlet clogging	42.16085198	-87.93908981	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD594	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess debris and litter	42.1601404	-87.94446221	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD596	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Add native plants to reduce erosion	42.15925488	-87.92232551	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD597	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	decrease riprap and add native plants	42.15922982	-87.91870664	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD599	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek	Repair outlet	42.15910584	-87.92495455	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD600	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter, add native plants to decrease erosion	42.15891031	-87.93830756	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD601	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Replace some riprap with native plants	42.15903401	-87.92057023	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD604	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Evaluate water for possible illicit or dangerous substances	42.15883349	-87.93395154	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD605	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter, increase native plants to decrease erosion	42.15834844	-87.94971937	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD606	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native plants to decrease erosion, remove excess litter and debris	42.15721396	-87.93841388	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD607	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants along shoreline to decrease erosion, install aerators	42.15547268	-87.93284361	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD608	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Evaluate and repair damaged inlets, install aerator, clear excess woody vegetation	42.15439514	-87.92466352	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD609	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to help remove excessive shoreline erosion	42.15462277	-87.94547586	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD610	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess debris and litter	42.15398426	-87.93916995	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD611	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to reduce erosion, consider riprap scouring at inlets and outlets	42.15449998	-87.94396106	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD612	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to decrease excessive erosion	42.15417091	-87.94489205	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD613	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator	42.15347612	-87.92230509	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD623	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Assess short circuiting, increase native plants to decrease erosion	42.16953485	-87.93023556	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD624	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Consider inlet and outlet erosion/scouring	42.17647679	-87.94975252	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD625	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris	42.18211278	-87.94772404	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD626	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris	42.18225441	-87.95093231	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD628	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to decrease excess erosion	42.15414769	-87.944076	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD631	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Consider inlet in need of repair	42.15418618	-87.9485348	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD660	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native vegetate to decrease excess erosion	42.17240795	-87.92687725	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD88	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native buffer	42.2010855	-87.95854059	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD89	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Move outlet out of inlet	42.19966049	-87.96314413	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD189	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and repair if determined problematic.	42.17824138	-87.93738747	M	M	1, 3, 4	M, PR/RL	SMC, CLB	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD190	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Broken. Investigate and repair if determined problematic.	42.17800219	-87.93856452	H	M	1, 3, 4	M, PR/RL	SMC, CLB	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD192	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Buried under mud. Investigate and repair if determined problematic.	42.18145936	-87.96580974	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD194	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Submerged. Investigate and repair if determined problematic.	42.17388767	-87.9298225	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD196	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Broken end. Investigate and repair if determined problematic.	42.19154116	-87.96411508	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD199	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Investigate and repair if determined problematic.	42.15918898	-87.92176587	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD203	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Slightly warped. Investigate and repair if determined problematic.	42.19027049	-87.96398265	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD28	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Cracked. Investigate and repair if determined problematic.	42.20386332	42.20386332	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD29	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Broken. Investigate and repair if determined problematic.	42.20408271	42.20408271	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH78	Hydraulic Structure	1	no.	N/A	N/A	Aptakisic Creek	Investigate and repair or remove if determined problematic.	42.17416456	-87.92994958	M	M	1, 3, 4	M, PR/RL	PR/RL, HOA/POA, AG, DD, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH79	Hydraulic Structure	1	no.	N/A	N/A	Aptakisic Creek	Investigate and repair or remove if determined problematic.	42.19308101	-87.96730612	M	M	1, 3, 4	M, PR/RL	PR/RL, HOA/POA, AG, DD, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSTG67	N/A	1	ea.	N/A	N/A	Indian Creek	Investigate feasibility of dam removal	42.21020465	-87.95439449	H	S	1, 2, 3, 4	M, PO, T	WPC, DRWW, SMC, USACE, IDNR, Illinois EPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
BUF-TIL	No-Till / Strip-Till	18	ac	18	ac	Aptakisic Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$630.00	N/A	23	4.9	5.7	0	3.4	Y	N
BUF-NU	Nutrient Management	24	ac	24	ac	Aptakisic Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$480.00	N/A	40	7.5	0	0	0	Y	N
BUF-PV	Porous / Permeable Pavement	275	ac	275	ac	Aptakisic Creek	Install porous pavement in parking lots	N/A	N/A	L	L	1, 3, 4	PO, CBL, SI	M, SMC	$143,748,000.00	N/A	1,011	58	30	161,673	141	Y	N
BUF-RVR	Runoff Volume Reduction Practices	1,437	ac	N/A	**N/A**	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$21,034,491	**N/A**	3,240	298	110	141,965	2,063	Y	N
DSB147	Stream Buffer	0.32	ac	1.0	ac	Aptakisic Creek	Install stream buffer	42.17098888	-87.92852878	H	S	1, 2	PR/RL	M, CBL, SMC, IDNR, Illinois EPA	$1,274.79	N/A	5.3	0.27	0.14	255	0.83	Y	N
DSB148	Stream Buffer	0.53	ac	4.2	ac	Aptakisic Creek	Install stream buffer	42.17251018	-87.92930594	H	S	1, 2	PR/RL	M, CBL, SMC, IDNR, Illinois EPA	$2,112.76	N/A	19	0.96	0.43	812	2.8	Y	N
DSB149	Stream Buffer	0.27	ac	1.7	ac	Aptakisic Creek	Install stream buffer	42.17331233	-87.93012921	H	S	1, 2	PR/RL	M, CBL, SMC, IDNR, Illinois EPA	$1,088.11	N/A	8.5	0.44	0.24	354	1.2	Y	N
DSB150	Stream Buffer	1.8	ac	11	ac	Aptakisic Creek	Install stream buffer	42.16926632	-87.95163317	H	S	1, 2	PD	M, PR/RL, SMC, IDNR, Illinois EPA	$7,146.07	N/A	21	0.70	0.41	568	7.8	Y	N
DSB151	Stream Buffer	1.5	ac	3.9	ac	Aptakisic Creek	Install stream buffer	42.1692065	-87.95145814	H	S	1, 2	PD	M, PR/RL, SMC, IDNR, Illinois EPA	$5,957.08	N/A	8.4	0.29	0.16	196	2.6	Y	N
DSB152	Stream Buffer	0.13	ac	1.0	ac	Aptakisic Creek	Install stream buffer	42.17176315	-87.9470361	H	S	1, 2	UT, PR/RL	M, SMC, IDNR, Illinois EPA	$534.40	N/A	1.7	0.07	0.04	50	1.2	Y	N
DSB155	Stream Buffer	0.79	ac	2.4	ac	Aptakisic Creek	Install stream buffer	42.17332498	-87.95455297	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$3,147.35	N/A	5.8	0.18	0.11	122	2.3	Y	N
DSB156	Stream Buffer	0.66	ac	2.6	ac	Indian Creek	Install stream buffer	42.17349869	-87.95440807	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$2,620.57	N/A	6.1	0.21	0.12	164	2.3	Y	N
DSB158	Stream Buffer	0.34	ac	2.1	ac	Indian Creek	Install stream buffer	42.17673065	-87.95881774	H	S	1, 2	M	PR/RL, SMC, IDNR, Illinois EPA	$1,361.45	N/A	8.7	0.55	0.28	267	6.8	Y	N
DSB159	Stream Buffer	0.70	ac	3.9	ac	Aptakisic Creek	Install stream buffer	42.17958522	-87.96386374	H	S	1, 2	AG, UT	M, SMC, IDNR, Illinois EPA	$2,781.27	N/A	15	0.88	0.87	1.4	1.7	Y	N
DSB162	Stream Buffer	0.27	ac	0.48	ac	Aptakisic Creek	Install stream buffer	42.18106271	-87.96616286	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,095.35	N/A	0.65	0.02	0.00	2.6	0.07	Y	N
DSB164	Stream Buffer	0.36	ac	1.6	ac	Aptakisic Creek	Install stream buffer	42.1809147	-87.96620647	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,456.25	N/A	1.7	0.05	0.01	0.43	0.19	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB166	Stream Buffer	0.05	ac	0.11	ac	Aptakisic Creek	Install stream buffer	42.18109356	-87.96576677	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$198.19	N/A	0.16	0.005	0.001	0.65	0.02	Y	N
DSB167	Stream Buffer	0.38	ac	0.95	ac	Aptakisic Creek	Install stream buffer	42.18186735	-87.96578478	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,524.74	N/A	1.0	0.05	0.02	33	0.16	Y	N
DSB169	Stream Buffer	0.34	ac	1.4	ac	Aptakisic Creek	Install stream buffer	42.19315629	-87.96661729	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,355.12	N/A	4.7	0.30	0.06	1.2	0.95	Y	N
DSB170	Stream Buffer	0.49	ac	2.4	ac	Aptakisic Creek	Install stream buffer	42.19296636	-87.96649173	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,969.62	N/A	7.3	0.47	0.09	3.3	1.5	Y	N
DSB171	Stream Buffer	0.16	ac	2.0	ac	Aptakisic Creek	Install stream buffer	42.1931427	-87.96523417	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$628.76	N/A	5.9	0.38	0.07	1.4	1.2	Y	N
DSB172	Stream Buffer	0.10	ac	0.49	ac	Aptakisic Creek	Install stream buffer	42.19024776	-87.96319477	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$413.06	N/A	1.5	0.09	0.03	21	0.50	Y	N
DSB177	Stream Buffer	0.34	ac	1.5	ac	Aptakisic Creek	Install stream buffer	42.15854521	-87.93568019	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,340.47	N/A	2.0	0.07	0.04	63	1.5	Y	N
DSB178	Stream Buffer	0.21	ac	0.25	ac	Aptakisic Creek	Install stream buffer	42.15843414	-87.93393554	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$848.70	N/A	0.66	0.03	0.02	21	0.15	Y	N
DSB186	Stream Buffer	0.18	ac	0.51	ac	Aptakisic Creek	Install stream buffer	42.20074807	-87.97586754	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$706.18	N/A	1.2	0.07	0.01	1.8	0.23	N	N
DSB187	Stream Buffer	0.04	ac	0.39	ac	Aptakisic Creek	Install stream buffer	42.20419951	-87.97483847	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$162.97	N/A	1.2	0.08	0.01	0.20	0.24	N	N
DSB188	Stream Buffer	0.08	ac	0.17	ac	Aptakisic Creek	Install stream buffer	42.20418483	-87.97514057	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$320.28	N/A	0.49	0.03	0.01	0.09	0.10	N	N
DSB189	Stream Buffer	0.15	ac	0.63	ac	Aptakisic Creek	Install stream buffer	42.20157727	-87.97590909	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$603.22	N/A	2.0	0.13	0.02	0.81	0.41	N	N
DSB45	Stream Buffer	0.12	ac	0.25	ac	Aptakisic Creek	Install stream buffer	42.20469848	-87.97500317	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$463.88	N/A	0.91	0.03	0.03	28	0.66	N	N
DSB47	Stream Buffer	0.12	ac	1.1	ac	Aptakisic Creek	Install stream buffer	42.20035025	-87.97595596	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$490.51	N/A	2.5	0.16	0.03	0.54	0.51	N	N
DSB48	Stream Buffer	0.12	ac	0.15	ac	Aptakisic Creek	Install stream buffer	42.19977633	-87.97586858	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$497.89	N/A	0.47	0.03	0.01	3.0	0.09	N	N
DSB49	Stream Buffer	0.02	ac	0.16	ac	Aptakisic Creek	Install stream buffer	42.19961014	-87.97615399	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$95.19	N/A	0.51	0.03	0.01	0.91	0.10	N	N
DSB50	Stream Buffer	0.35	ac	2.0	ac	Aptakisic Creek	Install stream buffer	42.20011515	-87.9762758	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,419.97	N/A	5.7	0.36	0.07	7.0	1.2	N	N
DSB51	Stream Buffer	0.06	ac	1.0	ac	Aptakisic Creek	Install stream buffer	42.1980069	-87.97730584	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$259.73	N/A	3.0	0.13	0.09	144	1.8	N	N
SBD42	Streambank Stabilization	37	ft	37	ft	Indian Creek	Stabilize stream banks	42.19824744	-87.97710669	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$11,109.61	$11,109.61	1.1	0.57	0.57	0	0	N	N
DPD1	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove or repair if determined problematic.	42.2053353	-87.97499764	M	M	1, 3, 4	PB&D	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF BUFFALO GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD122	Urban Detention	1	no.	66	ac	Aptakisic Creek	Install detention basin	42.17193913	-87.97530113	H	L	1, 3, 4	M	HOA/POA, SMC	$100,000.00	N/A	125	8.0	3.8	9,549	71	Y	N
BUF-WLR	Wetland Creation/Restoration	211	ac	211	ac	Aptakisic Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, MWRD, SMC, M	$16,852,813.60	N/A	1,685	87	10	4,647	219	Y	N
DWS74	Wetland Creation/Restoration	5.2	ac	235	ac	Indian Creek	Create new wetlands	42.19819521	-87.96189544	H	M	1, 2, 3, 4	PD, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$413,340.62	N/A	532	14	9.3	11,437	230	Y	N
DWS76	Wetland Creation/Restoration	7.8	ac	191	ac	Aptakisic Creek	Create new wetlands	42.19836892	-87.97718111	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$624,917.69	N/A	623	16	10	10,811	247	N	N
DWS83	Wetland Creation/Restoration	31	ac	579	ac	Aptakisic Creek	Create new wetlands	42.18504975	-87.96605376	H	M	1, 2, 3, 4	PD, UT, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$2,490,123.11	N/A	2,013	67	36	36,298	714	Y	N
DWS88	Wetland Creation/Restoration	13	ac	515	ac	Aptakisic Creek	Create new wetlands	42.17462993	-87.94657781	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,004,477.65	N/A	692	19	15	18,835	142	Y	N
DWS89	Wetland Creation/Restoration	6.2	ac	251	ac	Aptakisic Creek	Create new wetlands	42.17687274	-87.94939406	H	M	1, 2, 3, 4	PD, PO, M	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$497,161.43	N/A	254	6.8	5.2	7,038	99	Y	N
DWS90	Wetland Creation/Restoration	31	ac	441	ac	Aptakisic Creek	Create new wetlands	42.16423634	-87.95522967	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$2,488,564.44	N/A	905	29	17	21,577	265	Y	N
DWS91	Wetland Creation/Restoration	2.8	ac	30	ac	Aptakisic Creek	Create new wetlands	42.17528207	-87.98439631	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$223,914.18	N/A	89	6.1	1.5	3,302	33	N	N
DWS94	Wetland Creation/Restoration	6.2	ac	67	ac	Aptakisic Creek	Create new wetlands	42.17911999	-87.97214163	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$495,999.48	N/A	167	4.8	3.2	3,782	75	Y	N
DWS97	Wetland Creation/Restoration	35	ac	202	ac	Aptakisic Creek	Create new wetlands	42.15173911	-87.96983953	H	M	1, 2, 3, 4	PD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$2,769,186.44	N/A	597	23	11	13,166	245	Y	N
DWS98	Wetland Creation/Restoration	10	ac	236	ac	Aptakisic Creek	Create new wetlands	42.15182288	-87.96421529	H	M	1, 2, 3, 4	PO, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$831,873.86	N/A	751	34	30	18,551	283	Y	N
DWS99	Wetland Creation/Restoration	26	ac	835	ac	Indian Creek	Create new wetlands	42.1431878	-87.97554092	H	M	1, 2, 3, 4	PO, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$2,050,733.02	N/A	761	20	12	25,089	371	Y	N
BUF-WLE	Wetland Enhancement	47	ac	47	ac	Aptakisic Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$1,410,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF DEERFIELD

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DFD-ICE	De-icing practices/salt management	3.5	ac	3.5	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	968	0	N/A	N
DFD-RVR	Runoff Volume Reduction Practices	0	ac	N/A	N/A	Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, SI, MWRD, T, HOA/POA	$842	N/A	0	0	0	11	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF DEER PARK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPK-CC	Cover Crops	8.9	ac	8.9	ac	Buffalo Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$534.00	N/A	33	0.81	1.5	0	2.7	N	N
DPK-ICE	De-icing practices/salt management	126	ac	126	ac	Buffalo Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	45,061	0	N/A	N
DD614	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Replant the bare spots	42.15548204	-88.05520265	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPK-TIL	No-Till / Strip-Till	8.9	ac	8.9	ac	Buffalo Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$311.50	N/A	11	1.3	2.7	0	1.5	N	N
DPK-NU	Nutrient Management	8.9	ac	8.9	ac	Buffalo Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$178.00	N/A	17	1.9	0	0	0	N	N
DPK-RVR	Runoff Volume Reduction Practices	164	ac	N/A	N/A	Buffalo Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$2,405,519	N/A	393	33	14	15,044	309	N	N
DPK-WLR	Wetland Creation/ Restoration	4.8	ac	4.8	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$386,545.47	N/A	16	0.37	0.05	6.1	1.2	N	N
DPK-WLE	Wetland Enhancement	0.14	ac	0.14	ac	Buffalo Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$4,200.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GLENVIEW

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
GLV-ICE	De-icing practices/salt management	1.2	ac	1.2	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	342	0	N/A	N
GLV-RVR	Runoff Volume Reduction Practices	1	ac	N/A	N/A	Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$17,387	N/A	3	0	0	205	1	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GRAYSLAKE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
GRY-CC	Cover Crops	1,260	ac	1,260	ac	Bull Creek, Bull's Brook, Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$75,600.00	N/A	4,025	164	246	0	381	Y	N
GRY-ICE	De-icing practices/salt management	661	ac	661	ac	Bull Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	224,569	0	N/A	N
DD28	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook	Clear outlet	42.33123357	-88.00713466	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD29	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Unclog inlets & outlets	42.32114202	-88.00823526	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD30	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Basin's inlets & outlet should be cleared of dead vegetation, inlets & outlet should be thinned of woody vegetation	42.32053226	-88.01330644	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD31	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Implement native plant in and around basin, clean out outlet	42.31709405	-88.00494089	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD367	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Increase buffer, add. Native planting seeds, riprap erosion sale	42.35795336	-88.03799276	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD368	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Riprap by inlets. Remove illicit pipes	42.3566026	-88.04548615	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD369	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Re veg near inlet, clear inlet	42.35419231	-88.00622925	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD395	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install aerator, clean up trash	42.35872046	-88.02551124	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD396	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook	Install aerator, implement riprap near inlets, clear plant debris from inlets	42.35326253	-88.03268863	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD41	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Clear inlets/outlets	42.31807084	-88.00812777	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD42	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Investigate and address cause of shoreline erosion	42.31228565	-88.01534272	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD448	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Make RCP inlets/outlet above water, make 1 main channel for roof runoff, clean up trash, implement native plants	42.34106301	-88.00042176	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GRAYSLAKE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD449	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Bull's Brook, Mill Creek	Install aerators, clean up oil/implement more native plants to filter, put riprap at all inlets	42.32604727	-88.05264909	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD450	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Bull's Brook, Mill Creek	Clear area around outlet	42.33622288	-88.01199448	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD57	Discharge Point	1	no.	N/A	N/A	Bull's Brook	Investigate and repair if determined problematic.	42.33024464	42.33024464	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	I
SSD133	Field Border	0.90	ac	27	ac	Bull Creek, Bull's Brook, Mill Creek	Install field border	42.3059584	-88.03581134	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$3,600.00	N/A	64	4.9	5.0	72	8.9	Y	N
SSD89	Field Border	1.7	ac	61	ac	Bull Creek, Bull's Brook, Mill Creek	Install field border	42.30630409	-88.04286735	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$6,800.00	N/A	155	8.6	13	16	22	Y	N
SSD90	Field Border	1.2	ac	24	ac	Bull Creek, Bull's Brook, Mill Creek	Install field border	42.31084056	-88.05337964	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT, DD	$4,800.00	N/A	64	4.5	5.6	189	10	N	N
SSD71	Filter Strip	1.8	ac	6.6	ac	Mill Creek	Install filter strip	42.33666147	-87.99957897	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$7,200.00	N/A	21	0.81	1.5	2.3	2.2	Y	N
SSD134	Grass Waterway	1.2	ac	124	ac	Mill Creek	Install grass waterway	42.31578583	-88.04570183	H	S	1	AG	EXT, NRCS/SWCD, FB	$9,600.00	N/A	392	18	31	850	57	N	N
SSD83	Grass Waterway	1.4	ac	19	ac	Mill Creek	Install grass waterway	42.32242859	-88.04961693	H	S	1	AG	EXT, NRCS/SWCD, FB	$11,200.00	N/A	80	12	13	245	8.7	Y	N
SSD87	Grass Waterway	2.9	ac	67	ac	Mill Creek	Install grass waterway	42.31264965	-88.03702892	H	S	1	AG	EXT, NRCS/SWCD, FB	$23,200.00	N/A	232	11	18	408	33	Y	N
DPH23	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek, Bull's Brook, Mill Creek	Investigate and repair or remove if determined problematic.	42.33355916	-87.99278134	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	I
DPH24	Hydraulic Structure	1	no.	N/A	N/A	Bull's Brook	Investigate and repair or remove if determined problematic.	42.33378962	-87.99298242	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	I
GRY-TIL	No-Till / Strip-Till	442	ac	442	ac	Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$15,470.00	N/A	582	116	209	0	84	Y	N
GRY-NU	Nutrient Management	1,260	ac	1,260	ac	Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	AG, PO	PR/RL, FB, EXT, PD	$25,200.00	N/A	2,013	382	0	0	0	Y	N
GRY-PE	Pasture Enhancement	14	ac	14	ac	Mill Creek	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	48	2.8	0.63	2.9	30	Y	N
GRY-RVR	Runoff Volume Reduction Practices	920	ac	N/A	N/A	Bull Creek, Bull's Brook, Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$13,466,867	N/A	1,895	189	64	95,600	954	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GRAYSLAKE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS42	Wetland Creation/ Restoration	4.2	ac	144	ac	Mill Creek	Create new wetlands	42.33428712	-88.02612742	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$335,600.51	N/A	285	7.6	8.8	2,063	45	N	N
GRY-WLR	Wetland Creation/ Restoration	46	ac	46	ac	Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$3,711,864.28	N/A	160	5.8	1.3	259	18	Y	N
SSD68	Wetland Creation/ Restoration	2.0	ac	109	ac	Bull Creek	Create new wetlands	42.34405468	-88.00573902	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	375	11	5.8	11,177	134	N	N
SSD72	Wetland Creation/ Restoration	100	ac	602	ac	Bull Creek	Create new wetlands	42.3317132	-88.03988042	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$8,000,000.00	N/A	1,566	90	81	10,159	173	Y	N
SSD84	Wetland Creation/ Restoration	1.6	ac	169	ac	Bull's Brook	Create new wetlands	42.31943007	-88.05074737	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$128,000.00	N/A	489	20	28	3,685	77	N	N
GRY-WLE	Wetland Enhancement	156	ac	156	ac	Bull's Brook	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$4,680,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GREEN OAKS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
GRN-CC	Cover Crops	28	ac	28	ac	Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,680.00	N/A	42	1.7	0.43	0	9.6	Y	N
DPH918	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31290674	-87.93094856	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH919	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31291922	-87.93163563	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH921	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31297061	-87.93168759	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH922	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31332897	-87.93059124	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH923	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31369585	-87.92345338	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH925	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31417052	-87.92331852	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH926	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31430505	-87.93076977	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH929	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31459808	-87.93083331	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH932	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31505963	-87.93086994	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH934	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.31565721	-87.93051631	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH936	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3158699	-87.93016158	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH940	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3181515	-87.92765825	L	S	1, 3, 4	DOR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
GRN-ICE	**De-icing practices/salt management**	**82**	**ac**	**82**	**ac**	**Upper Des Plaines River**	**Reduce road salt application**	**N/A**	**N/A**	**H**	**S**	**1**	**M**	**HOA/POA, DOT, EO, PD**	**N/A**	**N/A**	**0**	**0**	**0**	**38,332**	**0**	**N/A**	**N**
DD303	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.32116162	-87.92315363	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD305	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.32064845	-87.92414684	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD306	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.32020701	-87.92414881	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD315	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buff near houses, install riprap to stabilize banks	42.31416679	-87.91796967	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GREEN OAKS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD316	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River, Upper Des Plaines River	Install native buffer where possible	42.31365866	-87.91535792	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD336	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River, Upper Des Plaines River	Install native buffer	42.31797623	-87.91685688	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD388	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Plant natives near channel and reinforce with riprap to reduce further erosion	42.3207899	-87.92385352	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD125	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.31450022	-87.92225343	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD126	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	2 pipes, one underwater Investigate and repair if determined problematic.	42.31457306	-87.92206743	H	M	1, 3, 5	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD127	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.31455089	-87.92209258	H	M	1, 3, 6	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
GRN-FAM	Feed Area Management	0.14	ac	0.14	ac	Upper Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	3.2	0.30	0.02	0.003	1.6	Y	N
DPH63	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.31590427	-87.93015194	M	M	1, 3, 4	T	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH64	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.31770424	-87.92939674	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH65	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.32034249	-87.92465074	M	M	1, 3, 4	T	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
GRN-TIL	No-Till / Strip-Till	0.51	ac	0.51	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	M	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$17.85	N/A	1.0	0.22	0.32	0	0.15	Y	N
GRN-NU	Nutrient Management	28	ac	28	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$560.00	N/A	21	3.9	0	0	0	Y	N
SSD136	Pond	1	no.	51	ac	Upper Des Plaines River	Install pond in rural area	42.32301051	-87.92278375	L	S	1, 3, 4	PO	M, SMC, PB&D, USACE	$50,000.00	N/A	109	7.8	13	133	18	Y	N
GRN-RVR	Runoff Volume Reduction Practices	244	ac	N/A	N/A	Lower Des Plaines River, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,567,893	N/A	622	54	21	25,714	463	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GREEN OAKS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS55	Wetland Creation/Restoration	1.2	ac	97	ac	Upper Des Plaines River	Create new wetlands	42.29106527	-87.9243226	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$99,401.89	N/A	119	4.2	0.94	1,730	63	N	N
GRN-WLR	Wetland Creation/Restoration	3.9	ac	3.9	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$310,900.91	N/A	22	0.44	0.07	213	1.9	N	N
GRN-WLE	Wetland Enhancement	9.7	ac	9.7	ac	Upper Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$291,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
GUR-CC	Cover Crops	67	ac	67	ac	Mill Creek, Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$4,020.00	N/A	158	5.9	5.0	0	18	Y	N
DPH1012	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34280477	-87.94633002	L	S	1, 3, 4	DOT	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1013	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34388302	-87.94763659	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1017	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34657285	-87.95411253	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1018	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Beaver dam. Investigate and remove if determined problematic.	42.3466723	-87.95481158	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1020	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34797225	-87.95661025	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1021	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34814475	-87.95847329	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1022	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34819601	-87.9593223	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1026	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34884024	-87.9521287	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1031	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34913319	-87.95197246	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1032	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34916622	-87.96091075	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1036	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34938712	-87.93677959	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1037	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34941486	-87.93691915	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1042	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34974096	-87.93725326	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1051	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Many debris jams in one area. Investigate and remove if determined problematic.	42.35025477	-87.93740832	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1059	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35329015	-87.95627112	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1062	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3538657	-87.9568752	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1069	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35434258	-87.93764922	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1070	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35444631	-87.93775072	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1077	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35492232	-87.9380026	L	S	1, 3, 4	DOT	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1079	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35501372	-87.93787134	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1080	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35502483	-87.93784753	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1085	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35528936	-87.93774075	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1089	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3555873	-87.95835452	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1090	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35551722	-87.93749708	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1091	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Several jams, about 50 yds. Investigate and remove if determined problematic.	42.35606523	-87.93763111	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1092	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35623853	-87.9373794	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1093	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35646622	-87.90036049	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1094	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35668457	-87.90041346	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1095	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35674446	-87.90043131	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1096	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35694724	-87.90029186	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1097	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3569843	-87.90029921	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1098	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35740207	-87.93719356	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1099	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3573824	-87.90000275	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1100	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35757607	-87.93722719	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1102	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35757364	-87.89984575	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1103	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35775309	-87.93783858	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1107	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35807035	-87.89980426	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1109	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35946061	-87.90014767	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1112	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36018865	-87.90028511	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1116	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36040701	-87.90032637	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1124	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36210841	-87.90045026	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1126	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3623035	-87.90039527	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1128	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36261375	-87.9004051	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1133	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36381581	-87.90078629	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1135	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36417807	-87.95863783	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1137	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36439726	-87.94804705	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1138	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36442165	-87.94330155	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1139	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3644188	-87.94223311	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1141	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Trees in middle of channel.	42.36452584	-87.94800086	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1144	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36479737	-87.94363104	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1145	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.36485395	-87.94808946	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1146	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36507569	-87.95886959	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1147	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36505268	-87.94430067	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1148	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3650966	-87.9436924	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1149	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36496065	-87.9013353	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1150	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36513084	-87.94558184	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1151	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.36576167	-87.94768601	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1153	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36584821	-87.90179371	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1154	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36585177	-87.90145541	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1155	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Caught on fallen tree. Investigate and remove if determined problematic.	42.36608207	-87.94772937	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1158	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36647422	-87.90335481	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1159	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36647731	-87.90354116	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1161	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Sediment bar. Investigate and remove if determined problematic.	42.36679625	-87.94832901	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1163	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36783313	-87.94804822	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1164	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36801569	-87.94829624	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1166	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36789507	-87.89244344	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1167	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36796733	-87.89318365	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1168	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36800345	-87.89662635	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1169	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36806665	-87.8967447	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1170	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36853071	-87.89238033	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1171	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36865124	-87.90584032	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1172	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3686051	-87.89240665	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1173	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36884771	-87.89239013	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1174	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36905425	-87.94838224	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1175	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36899223	-87.9052539	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1176	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36895014	-87.89109983	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1177	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3690845	-87.90467163	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1178	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36910956	-87.90429227	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1179	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36929338	-87.89104335	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1180	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36930888	-87.89087745	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

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PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1181	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36935964	-87.90312282	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1182	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36931404	-87.89051259	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1183	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36934975	-87.89092263	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1184	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36956231	-87.91562971	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1186	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36989654	-87.91725932	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1187	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36995014	-87.9174895	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1190	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37312844	-87.92959253	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1191	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37331854	-87.9305417	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1192	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37335684	-87.93086976	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1193	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37430903	-87.92227589	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1194	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37476146	-87.95237625	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1195	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37476794	-87.95088784	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1196	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37476404	-87.94970767	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1197	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37478963	-87.94978577	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1198	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37587569	-87.92231997	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1199	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37688202	-87.92235166	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1200	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3774245	-87.92234722	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1205	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37950025	-87.89930614	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1206	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37951033	-87.90102852	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1207	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37950312	-87.89869576	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1208	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37952441	-87.89990015	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1209	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3795592	-87.90033039	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1210	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3795993	-87.90431892	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1211	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37958757	-87.89854203	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1212	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37969083	-87.9038471	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1214	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37976841	-87.91754388	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1215	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37978618	-87.9182053	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1217	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37985701	-87.89863784	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1229	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38508153	-87.9120788	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1272	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40226917	-87.93617131	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1273	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40228161	-87.93685687	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1275	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40237365	-87.93614198	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1276	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.402385	-87.93656082	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1277	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40240994	-87.93607836	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1279	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40250889	-87.93629218	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
GUR-ICE	De-icing practices/salt management	879	ac	879	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	319,031	0	N/A	N
DD187	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Increase native buffer, install 3rd aerator on south end	42.39584934	-87.94759352	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD190	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Replace unmowed turf buffer with natives	42.39337162	-87.95418245	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD191	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove concrete channel and create meanders to aid water quality	42.3928284	-87.94469228	M	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD193	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install native buffer	42.39043586	-87.90682012	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD194	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Install native buffer	42.39002833	-87.93892867	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD195	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Install native buffer	42.38928324	-87.88994651	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD196	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Add native buffer	42.38914813	-87.96601584	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD197	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator	42.38784759	-87.94083065	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD198	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.38660572	-87.94823543	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD199	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add native buffer	42.38632728	-87.94403575	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD200	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer, locate outlet	42.38547558	-87.92682899	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD201	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add native buffer	42.38505652	-87.95926918	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD202	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.38516747	-87.97271096	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD203	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Native plants as a buffer	42.38500753	-87.96835786	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD204	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add an aerator and buffer of native plants	42.38477107	-87.9637652	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD205	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add native plant buffer and maybe aerator.	42.38424181	-87.96400822	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD206	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add a buffer of native plants and an aerator.	42.3836985	-87.95915832	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD207	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Plant more natives on side slopes.	42.38297238	-87.95864012	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD208	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.38281222	-87.97255623	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD210	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up, and add aerator and native plants as a buffer.	42.38172555	-87.96389765	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD211	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.38179267	-87.92273802	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD212	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add a native buffer and fix aerator.	42.38170772	-87.9679964	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD213	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.38105629	-87.93662859	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD214	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.38094986	-87.92288034	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD215	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer with native plants	42.38070562	-87.9679154	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD216	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Investigate clogging issues, fix aerator, add buffer of native plants.	42.37983946	-87.96402771	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD217	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Repair plastic inlet. Add aerator and native buffer. Fix smell problem.	42.37995334	-87.96682118	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD218	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add an aerator and native plant buffer	42.38053342	-87.97198772	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD219	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.3796639	-87.92286041	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD220	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.37977142	-87.93452303	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD221	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Create more circulation throughout basin. Add a native plant buffer and/or riprap.	42.37954099	-87.96948278	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD222	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.37946489	-87.93343739	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD223	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add native buffer and riprap to stop erosion of shoreline	42.3789758	-87.96868482	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD224	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add another aerator on west side of basin. Add larger buffer of natives	42.37895161	-87.96743928	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD225	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Stabilize slopes increase native buffer	42.37859384	-87.94437169	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD226	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add a bigger buffer with natives and an inlet if necessary	42.3787535	-87.96655624	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD227	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.37782475	-87.94929817	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD228	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.37774275	-87.93528755	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD230	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Utilize a native plant buffer.	42.37782898	-87.96893885	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD231	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add riprap to inlets to prevent erosion	42.37797149	-87.9679421	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD232	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add another aerator and native plant buffer.	42.37754277	-87.95310426	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD235	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.37692684	-87.93952622	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD236	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove channel and create meander	42.37688443	-87.93748579	M	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD237	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add a larger buffer of native plants and an aerator	42.37644099	-87.96409599	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD238	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer	42.3763983	-87.93928836	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD239	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add a larger buffer, and riprap for erosion along shoreline	42.37647583	-87.96510256	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD242	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove concrete channels	42.37023271	-87.8871041	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD243	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Install native buffer, create meanders and/ or widen basin	42.37024401	-87.91731148	M	M	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD244	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.36977636	-87.95889947	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD245	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.36761025	-87.96408953	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD246	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.36756553	-87.92438368	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD247	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove concrete, create meander, plant natives	42.36557912	-87.96383215	M	M	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD248	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Stabilize banks to reduce erosion	42.36601079	-87.92848911	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD251	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.36290374	-87.91158246	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD252	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.36284943	-87.9282243	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD253	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.36237349	-87.91235527	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD254	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install native buffer	42.36228881	-87.96191882	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD256	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Don't mow basin, let native plants grow, possibly construct inlet from road runoff	42.36226876	-87.96266609	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD258	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Could benefit from aerator, unclog outlet, clean up trash, plant more native plants along perimeter	42.36210183	-87.96418315	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD259	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.36178763	-87.91073729	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD261	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trash	42.36138021	-87.96410955	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD262	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install netting to deter muskrats, install second outlet towards southwest corner, implement more native plants	42.36105487	-87.95282896	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD265	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement more riprap near inlet mouths, clean up trash	42.3596239	-87.96201415	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD267	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate forebay or riprap around inlet	42.35945481	-87.96092171	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD269	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement native plant along basin perimeter, install another inlet	42.35912865	-87.95273903	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD271	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Move the inlets away from outlet	42.3590071	-87.8999386	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD272	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Move inlets to reduce short circuiting	42.35842367	-87.89994627	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD273	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Reattach FES to inlets	42.35711325	-87.95929309	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD277	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator for more water flow, clean up trace amounts of trash	42.35583173	-87.95816579	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD281	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clear excess woody vegetation, aerator to control algae	42.35526833	-87.95826197	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD284	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove excess woody vegetation	42.35385209	-87.95582761	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD285	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clear out dead plant debris (control burn), thin out woody vegetation, remove invasive species	42.35400279	-87.95729293	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD288	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate more native plants, create forebays near inlets	42.35335014	-87.95435087	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD293	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator to decrease algae, muskrat control to reduce erosion	42.35272034	-87.94876191	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD295	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, implement native plants	42.35267434	-87.94953412	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD296	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, clean up trace amounts of trash on north side.	42.35225618	-87.95131501	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD297	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement native plants, install aerator for better water flow, maybe waterfall	42.35183854	-87.94956969	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD327	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase unmowed buffer	42.40105485	-87.94545914	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD328	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.37594031	-87.90255769	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD329	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer	42.3770269	-87.9610882	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD339	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.36519399	-87.96067693	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD340	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.3728779	-87.9486303	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD341	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.38166753	-87.9595583	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD342	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trash. Also, incorporate more natives.	42.38419522	-87.95925083	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD343	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer by parking lot	42.38502455	-87.94628543	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD348	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove excess woody vegetation	42.3728587	-87.93305695	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD365	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove riprap and Install native buffer, install aerator	42.36799993	-87.97846421	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD386	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove concrete, install meanders and native plants	42.36748008	-87.89376414	M	M	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD387	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, implement native plants	42.35267838	-87.94936082	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD390	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.38485304	-87.97186474	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD397	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install more aerators, unclog inlets, thin out vegetation around inlets, clean up trash	42.37288567	-87.96864796	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD399	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Create a meander to decrease short circuiting	42.3514186	-87.90722747	L	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD400	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate more native plants, install aerator, implement riprap around inlets	42.35131055	-87.9468862	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD401	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clear outlet- it is severely clogged, install aerator	42.35105995	-87.95222137	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD402	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native plants in buffer, clean out trash, install aerator	42.35086743	-87.94059895	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD404	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate native plants, install aerator	42.35002873	-87.95015162	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD411	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement native plants, move inlet away from outlet, fix outlet	42.34819026	-87.94818413	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD412	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate more native plants	42.34784509	-87.94390565	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD415	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up debris, unclog pipes	42.34774525	-87.9424073	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD417	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clear debris from swale & outlet.	42.34733775	-87.94272106	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD418	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate native plants, install aerator	42.34698943	-87.94834308	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD420	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerators, unclog & fix inlets, implement riprap, clean up trash	42.3451601	-87.94963076	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD421	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate native plants, fix erosion around inlets	42.34557253	-87.95945506	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD423	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, incorporate native plants	42.34525242	-87.95396133	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD424	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Could benefit from an aerator and inlet/outlets being further apart	42.34401438	-87.95336917	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD426	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Water should be tested for possible harmful contaminants	42.3437604	-87.95555271	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD427	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, put riprap near inlets, incorporate native plants	42.34388663	-87.94903508	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD429	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Add riprap to some inlets to prevent scouring, repair outlet	42.34350896	-87.9512454	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD430	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, implement more native plants, unclog outlet (maybe use a grate)	42.34327072	-87.95575481	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD441	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase unmowed buffer	42.33872025	-87.96358997	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD442	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.32880235	-87.96317807	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD443	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.32801157	-87.96281081	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD451	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.35057196	-87.90731248	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD647	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, reduce erosion	42.35270774	-87.94907597	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD648	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, impliment native plants	42.35270774	-87.94907597	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD649	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, impliment native plants	42.35271694	-87.94965323	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD650	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, impliment native plants	42.35271694	-87.94965323	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD651	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator to decrease algae, muskrat control to reduce erosion	42.35274836	-87.94910076	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD652	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, impliment native plants	42.35274836	-87.94910076	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD653	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, impliment native plants	42.35274836	-87.94910076	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD655	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.37662672	-87.95135656	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD656	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer where possible	42.37510007	-87.94880608	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD657	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate more native plants around channel & perimeter	42.35173057	-87.95940733	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD100	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Water seeping out under pipe. Investigate and repair if determined problematic.	42.35875415	-87.89982324	M	M	1, 3, 4	M, PR/RL	SMC, CBL	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD101	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Water seeping out under pipe. Investigate and repair if determined problematic.	42.35871722	-87.89981596	M	M	1, 3, 4	M, PR/RL	SMC, CBL	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD107	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Partially underwater. Investigate and repair if determined problematic.	42.37947651	-87.90711521	H	M	1, 3, 4	M, PR/RL	SMC, CBL	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD108	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Submerged. Investigate and repair if determined problematic.	42.37952533	-87.89879039	H	M	1, 3, 4	M, PR/RL	SMC, CBL	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD109	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.37007864	-87.91778088	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD110	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Under water. Investigate and repair if determined problematic.	42.3695699	-87.91604872	H	M	1, 3, 4	PD, DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD111	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Looks broken, no flow. Investigate and repair if determined problematic.	42.36978586	-87.91428567	H	M	1, 3, 4	PD, DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD112	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.36912733	-87.90715754	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD113	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Storm drain in front of it. Investigate and repair if determined problematic.	42.36211961	-87.95928877	M	S	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD114	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Filled w sediment. Investigate and repair if determined problematic.	42.35579974	-87.95863213	H	S	1, 3, 4	M, PR/RL	HOA/POA, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD116	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Broken off from bank. Pipe is 8ft long. Investigate and repair if determined problematic.	42.34913172	-87.95197246	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD117	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Broken and underwater. Investigate and repair if determined problematic.	42.35194083	-87.95528926	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD118	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Three pipes; one needs repair. Investigate and repair if determined problematic.	42.34635187	-87.95267436	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD119	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.3466879	-87.95355999	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD120	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.34728037	-87.95589209	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD121	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Completely submerged couldn't get it out. Investigate and repair if determined problematic.	42.34760224	-87.95599762	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD122	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.34812916	-87.95879541	M	M	1, 3, 4	M, PR/RL	HOA/POA, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD123	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.34809379	-87.95871796	M	M	1, 3, 4	M, PR/RL	HOA/POA, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD128	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.35396217	-87.93730698	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD153	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Submerged. Investigate and repair if determined problematic.	42.37272497	-87.92605763	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD154	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Erosion. Investigate and repair if determined problematic.	42.37277778	-87.92669407	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD155	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.37301038	-87.92683405	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD156	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Erosion. Investigate and repair if determined problematic.	42.37303146	-87.92930059	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD80	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Full of mud. Investigate and repair if determined problematic.	42.3663212	-87.94797404	H	S	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD81	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Underwater with piece broken off a couple ft away. Investigate and repair if determined problematic.	42.36688581	-87.94838559	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD82	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Half submerged. Investigate and repair if determined problematic.	42.37476924	-87.95209743	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD83	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Half submerged. Investigate and repair if determined problematic.	42.37478005	-87.95272599	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD84	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Resident says pipe gets too much water causes prob. Investigate and repair if determined problematic.	42.35508019	-87.93799983	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD86	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Lots of mud in pipe. Investigate and repair if determined problematic.	42.36708667	-87.89383316	H	S	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD87	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Top smashed in, still functions. Investigate and repair if determined problematic.	42.36784272	-87.89377348	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD88	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Pipe broken; water coming out of bank ~4 ft away. Investigate and repair if determined problematic.	42.36917553	-87.90358752	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD89	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.36931903	-87.90177376	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD90	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.36866226	-87.89956898	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD91	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Debris (basket) stuck in grate. Investigate and remove if determined problematic.	42.36657354	-87.90451347	M	S	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD92	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Underwater pipe. Investigate and repair if determined problematic.	42.36645325	-87.9041652	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD93	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Hangs down like elephants trunk. Investigate and repair if determined problematic.	42.36596635	-87.90187208	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD94	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.36414023	-87.90079048	M	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD95	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Full of sediment. Investigate and repair if determined problematic.	42.3639795	-87.90083339	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD96	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Full of sediment. Investigate and repair if determined problematic.	42.36397418	-87.90081168	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD97	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Grass dumped in front of pipe. Investigate and repair if determined problematic.	42.36371095	-87.90078385	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD98	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Full of sediment. Investigate and repair if determined problematic.	42.36091332	-87.90023509	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD99	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Debris in grate. Investigate and remove if determined problematic.	42.35950466	-87.90036962	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH47	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Smaller pipe corroding away. Investigate and repair if determined problematic.	42.36802046	-87.89338071	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH49	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Grass growing inside pipe. Investigate and repair if determined problematic.	42.36118159	-87.9594378	M	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH69	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.37308753	-87.93022251	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH70	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.38909524	-87.90958611	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
GUR-TIL	No-Till / Strip-Till	7.4	ac	7.4	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$259.00	N/A	6.3	0.77	2.0	0	0.86	Y	N
GUR-NU	Nutrient Management	67	ac	67	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$1,340.00	N/A	79	14	0	0	0	Y	N
GUR-RVR	Runoff Volume Reduction Practices	1,590	ac	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$23,280,658	N/A	3,004	290	103	140,211	1,722	Y	N
DSB207	Stream Buffer	0.35	ac	1.4	ac	Upper Des Plaines River	Install stream buffer	42.34721931	-87.95559304	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,383.41	N/A	4.1	0.46	0.05	3.1	0.89	Y	N
DSB208	Stream Buffer	0.15	ac	0.63	ac	Upper Des Plaines River	Install stream buffer	42.34695107	-87.95554678	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$610.25	N/A	1.8	0.20	0.02	0.89	0.39	Y	N
DSB209	Stream Buffer	0.08	ac	0.23	ac	Upper Des Plaines River	Install stream buffer	42.34748418	-87.95597163	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$316.82	N/A	0.68	0.07	0.01	1.7	0.14	Y	N
DSB210	Stream Buffer	0.10	ac	0.60	ac	Upper Des Plaines River	Install stream buffer	42.34658008	-87.9549725	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$408.20	N/A	1.8	0.19	0.02	12	0.54	Y	N
DSB211	Stream Buffer	0.27	ac	0.68	ac	Upper Des Plaines River	Install stream buffer	42.34673946	-87.9539886	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,069.68	N/A	2.1	0.22	0.02	9.5	0.43	Y	N
DSB212	Stream Buffer	0.13	ac	0.34	ac	Upper Des Plaines River	Install stream buffer	42.34659744	-87.95347332	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$530.37	N/A	1.0	0.12	0.01	0.52	0.22	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB213	Stream Buffer	0.14	ac	0.30	ac	Upper Des Plaines River	Install stream buffer	42.34643715	-87.95224463	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$551.85	N/A	0.96	0.06	0.01	2.1	0.19	Y	N
DSB214	Stream Buffer	0.08	ac	0.11	ac	Upper Des Plaines River	Install stream buffer	42.34655158	-87.95256676	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$332.03	N/A	0.29	0.02	0.003	1.5	0.06	Y	N
DSB215	Stream Buffer	0.13	ac	0.56	ac	Upper Des Plaines River	Install stream buffer	42.34625785	-87.95233739	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$525.22	N/A	1.8	0.11	0.02	0.55	0.36	Y	N
DSB216	Stream Buffer	0.03	ac	0.12	ac	Upper Des Plaines River	Install stream buffer	42.34632028	-87.95268296	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$101.57	N/A	0.39	0.04	0.00	1.6	0.08	Y	N
DSB217	Stream Buffer	0.13	ac	0.29	ac	Upper Des Plaines River	Install stream buffer	42.34590535	-87.95115475	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$505.04	N/A	0.93	0.06	0.01	4.8	0.19	Y	N
DSB219	Stream Buffer	0.10	ac	0.66	ac	Upper Des Plaines River	Install stream buffer	42.34568593	-87.95117971	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$383.10	N/A	2.1	0.14	0.03	2.3	0.44	Y	N
DSB220	Stream Buffer	0.14	ac	0.94	ac	Upper Des Plaines River	Install stream buffer	42.34891683	-87.95198092	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$548.71	N/A	2.5	0.14	0.04	12	0.68	Y	N
DSB221	Stream Buffer	0.17	ac	1.3	ac	Upper Des Plaines River	Install stream buffer	42.34989927	-87.95166885	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$670.07	N/A	3.6	0.22	0.05	8.2	0.84	Y	N
DSB222	Stream Buffer	0.14	ac	0.41	ac	Upper Des Plaines River	Install stream buffer	42.35117035	-87.95315589	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$540.09	N/A	1.2	0.08	0.02	0.57	0.25	Y	N
DSB223	Stream Buffer	0.24	ac	0.76	ac	Upper Des Plaines River	Install stream buffer	42.35197357	-87.95503861	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$950.41	N/A	2.4	0.16	0.03	3.1	0.49	Y	N
DSB224	Stream Buffer	0.29	ac	0.82	ac	Upper Des Plaines River	Install stream buffer	42.37426528	-87.94917395	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,162.52	N/A	0.33	0.03	0.003	0.97	0.12	Y	N
DSB225	Stream Buffer	0.14	ac	0.67	ac	Upper Des Plaines River	Install stream buffer	42.37413509	-87.94888693	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$565.22	N/A	0.67	0.02	0.00	0.55	0.08	Y	N
DSB226	Stream Buffer	0.67	ac	2.3	ac	Upper Des Plaines River	Install stream buffer	42.37652126	-87.94994963	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$2,673.39	N/A	0.70	0.08	0.01	4.1	0.25	Y	N
DSB227	Stream Buffer	0.06	ac	0.77	ac	Upper Des Plaines River	Install stream buffer	42.37576117	-87.94975471	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$220.63	N/A	0.18	0.01	0.002	0.16	0.07	Y	N
DSB228	Stream Buffer	0.13	ac	0.36	ac	Upper Des Plaines River	Install stream buffer	42.37272908	-87.92552704	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$538.42	N/A	0.30	0.02	0.00	4.9	0.14	Y	N
DSB229	Stream Buffer	0.09	ac	0.46	ac	Upper Des Plaines River	Install stream buffer	42.37296559	-87.92672726	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$364.76	N/A	0.54	0.04	0.01	27	0.31	Y	N
DSB230	Stream Buffer	0.10	ac	0.63	ac	Upper Des Plaines River	Install stream buffer	42.37290407	-87.92810603	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$391.03	N/A	0.23	0.02	0.003	3.8	0.12	Y	N
DSB231	Stream Buffer	0.11	ac	0.68	ac	Upper Des Plaines River	Install stream buffer	42.37301194	-87.92810679	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$441.60	N/A	0.52	0.03	0.01	16	0.41	Y	N
DSB232	Stream Buffer	0.07	ac	0.33	ac	Upper Des Plaines River	Install stream buffer	42.37308725	-87.92865281	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$264.73	N/A	0.24	0.02	0.00	7.5	0.19	Y	N
DSB233	Stream Buffer	0.07	ac	0.40	ac	Upper Des Plaines River	Install stream buffer	42.37301946	-87.92748724	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$282.20	N/A	0.32	0.02	0.01	10	0.25	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB234	Stream Buffer	0.10	ac	0.39	ac	Upper Des Plaines River	Install stream buffer	42.372695	-87.9261161	H	S	1, 2	PR/RL	M, DOT, SMC, IDNR, Illinois EPA	$416.11	N/A	0.64	0.05	0.02	39	0.31	Y	N
DSB237	Stream Buffer	0.30	ac	1.6	ac	Upper Des Plaines River	Install stream buffer	42.37969977	-87.90281952	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,219.56	N/A	0.42	0.02	0.01	24	0.10	N	N
DSB238	Stream Buffer	1.2	ac	7.1	ac	Upper Des Plaines River	Install stream buffer	42.37964196	-87.90036796	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$4,739.27	N/A	1.7	0.10	0.03	84	0.45	N	N
DSB240	Stream Buffer	0.12	ac	1.2	ac	Upper Des Plaines River	Install stream buffer	42.36910571	-87.90738053	H	S	1, 2	DOT, M	SMC, IDNR, Illinois EPA	$483.04	N/A	3.6	0.25	0.09	94	2.4	N	N
DSB241	Stream Buffer	0.14	ac	1.3	ac	Upper Des Plaines River	Install stream buffer	42.36886193	-87.90112787	H	S	1, 2	PR/RL	M, DOT, SMC, IDNR, Illinois EPA	$557.18	N/A	3.7	0.13	0.11	115	2.7	N	N
SBD10	Streambank Stabilization	104	ft	104	ft	Upper Des Plaines River	Install 2 stream riffles and stabilize stream banks	42.36374654	-87.93961747	H	S	1, 2	PR/RL, DOT	PB&D, SMC, IDNR, Illinois EPA	$81,262.05	$131,262.05	6.4	3.2	3.2	0	0	Y	N
SBD11	Streambank Stabilization	298	ft	298	ft	Upper Des Plaines River	Stabilize stream banks	42.36385493	-87.94087656	H	S	1, 2	DOT	PB&D, SMC, IDNR, Illinois EPA	$89,378.44	$89,378.44	24	12	12	0	0	Y	N
SBD12	Streambank Stabilization	418	ft	418	ft	Upper Des Plaines River	Install 9 stream riffles and stabilize stream banks	42.36589546	-87.90221017	H	S	1, 2	M, PR/RL	DOT, SMC, IDNR, Illinois EPA	$350,284.15	$575,284.15	13	6.4	6.4	0	0	N	N
SBD13	Streambank Stabilization	816	ft	816	ft	Upper Des Plaines River	Install 11 stream riffles and stabilize stream banks	42.36459179	-87.90079019	H	S	1, 2	PR/RL	DOT, M, SMC, IDNR, Illinois EPA	$519,751.32	$794,751.32	21	10	10	0	0	N	N
SBD14	Streambank Stabilization	238	ft	238	ft	Upper Des Plaines River	Stabilize stream banks	42.36058112	-87.90041984	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$71,371.19	$71,371.19	12	6.1	6.1	0	0	N	N
SBD15	Streambank Stabilization	130	ft	130	ft	Upper Des Plaines River	Stabilize stream banks	42.36007862	-87.90040335	H	S	1, 2	M	DOT, SMC, IDNR, Illinois EPA	$39,082.19	$39,082.19	4.0	2.0	2.0	0	0	N	N
SBD16	Streambank Stabilization	1,274	ft	1,274	ft	Upper Des Plaines River	Install 17 stream riffles and stabilize stream banks	42.36938293	-87.90294675	H	S	1, 2	M, PR/RL	DOT, SMC, IDNR, Illinois EPA	$807,321.95	$1,232,321.95	2.3	1.2	1.2	0	0	N	N
SBD17	Streambank Stabilization	1,122	ft	1,122	ft	Upper Des Plaines River	Install 27 stream riffles and stabilize stream banks	42.37301796	-87.92841684	H	S	1, 2	PR/RL	DOT, M, SMC, IDNR, Illinois EPA	$1,011,582.86	$1,686,582.86	46	23	23	0	0	Y	N
SBD3	Streambank Stabilization	1,264	ft	1,264	ft	Upper Des Plaines River	Install 14 stream riffles and stabilize stream banks	42.36052721	-87.90012026	H	S	1, 2	M, PR/RL	SMC, IDNR, Illinois EPA	$729,315.36	$1,079,315.36	31	15	15	0	0	N	N
SBD8	Streambank Stabilization	1,795	ft	1,795	ft	Upper Des Plaines River	Install 2 stream riffles and stabilize stream banks	42.35431274	-87.93718617	H	S	1, 2	PR/RL	M, PB&D, DOT, SMC, IDNR, Illinois EPA	$588,551.30	$638,551.30	29	14	14	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

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SBD9	Streambank Stabilization	1,360	ft	1,360	ft	Upper Des Plaines River	Install 15 stream riffles and stabilize stream banks	42.35631978	-87.93789256	H	S	1, 2	PR/RL	M, PB&D, DOT, SMC, IDNR, Illinois EPA	$782,967.80	$1,157,967.80	50	25	25	0	0	Y	N
DPD15	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.36778179	-87.9046625	M	M	1, 3, 4	DOT, M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD18	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Eroded and broken. Investigate and repair if determined problematic.	42.37255067	-87.92530569	H	S	1, 3, 4	PR/RL	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD19	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.38407755	-87.91250946	M	M	1, 3, 4	PR/RL	SMC, M	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DWS26	Wetland Creation/ Restoration	1.6	ac	81	ac	Upper Des Plaines River	Create new wetlands	42.38928313	-87.8980198	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$129,147.09	N/A	285	15	6.1	9,586	63	N	N
DWS27	Wetland Creation/ Restoration	4.7	ac	208	ac	Upper Des Plaines River	Create new wetlands	42.38767936	-87.92836838	H	M	1, 2, 3, 4	PO, FPD, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$378,425.52	N/A	220	5.3	3.5	6,183	140	N	N
DWS28	Wetland Creation/ Restoration	1.1	ac	61	ac	Upper Des Plaines River	Create new wetlands	42.38190483	-87.90175619	H	M	1, 2, 3, 4	PO, RR	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$86,502.70	N/A	142	6.2	3.3	5,154	29	N	N
DWS29	Wetland Creation/ Restoration	3.6	ac	195	ac	Upper Des Plaines River	Create new wetlands	42.3820753	-87.92485877	H	M	1, 2, 3, 4	PD, M, PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$290,001.76	N/A	209	5.5	3.4	7,628	103	N	N
DWS34	Wetland Creation/ Restoration	2.7	ac	73	ac	Upper Des Plaines River	Create new wetlands	42.36838609	-87.89754241	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$217,706.06	N/A	234	6.4	3.3	4,931	93	N	N
DWS35	Wetland Creation/ Restoration	6.1	ac	586	ac	Upper Des Plaines River	Create new wetlands	42.3590197	-87.89939344	H	M	1, 2, 3, 4	PD, PO, DOT, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$484,958.50	N/A	382	16	7.5	12,814	156	N	N
DWS36	Wetland Creation/ Restoration	1.5	ac	94	ac	Upper Des Plaines River	Create new wetlands	42.36142723	-87.917021	H	M	1, 2, 3, 4	M	SMC, IDNR, Illinois EPA, USACE, USFWS	$118,920.30	N/A	150	3.8	2.2	2,891	33	N	N
DWS37	Wetland Creation/ Restoration	1.4	ac	192	ac	Upper Des Plaines River	Create new wetlands	42.35394727	-87.92175236	H	M	1, 2, 3, 4	FPD, PO, PB&D	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$115,645.90	N/A	157	4.9	2.5	3,918	56	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF GURNEE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS39	Wetland Creation/ Restoration	0.88	ac	85	ac	Upper Des Plaines River	Create new wetlands	42.36812926	-87.98749698	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$70,187.34	N/A	219	7.0	3.4	4,283	128	N	N
DWS41	Wetland Creation/ Restoration	0.62	ac	29	ac	Upper Des Plaines River	Create new wetlands	42.3493687	-87.95926874	H	M	1, 2, 3, 4	PO, DOT	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$49,637.80	N/A	93	2.9	0.89	677	28	Y	N
DWS45	Wetland Creation/ Restoration	12	ac	249	ac	Upper Des Plaines River	Create new wetlands	42.33050753	-87.95959522	H	M	1, 2, 3, 4	PB&D, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$999,884.18	N/A	1,050	37	20	9,445	346	N	N
GUR-WLR	Wetland Creation/ Restoration	49	ac	49	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$3,924,130.96	N/A	257	14	1.4	145	33	Y	N
SSD65	Wetland Creation/ Restoration	2.6	ac	34	ac	Upper Des Plaines River	Create new wetlands	42.3769386	-87.93114821	H	M	1, 3, 4	M	SMC, USACE, IDNR, Illinois EPA, USFWS	$207,999.99	N/A	90	4.4	1.6	3,813	35	Y	N
GUR-WLE	Wetland Enhancement	34	ac	34	ac	Upper Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$1,017,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAINESVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
HNS-ICE	De-icing practices/ salt management	0.98	ac	0.98	ac	Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	249	0	N/A	N
HNS-RVR	Runoff Volume Reduction Practices	0.75	ac	N/A	N/A	Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$11,013	N/A	1	0	0	117	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAWTHORN WOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
HAW-CC	Cover Crops	143	ac	143	ac	Indian Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$8,580.00	N/A	536	21	47	0	48	Y	N
DPH159	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24825336	-88.06799214	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH163	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2492322	-88.06831568	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH164	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24923807	-88.06826455	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH165	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2494661	-88.06822239	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH166	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24970222	-88.0683353	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH167	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24980104	-88.06834745	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH168	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25019897	-88.06822063	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH169	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25047167	-88.06715722	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH170	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25088696	-88.06214384	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH171	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25097109	-88.06667207	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH172	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25118652	-88.06104614	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH173	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25159707	-88.0608402	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH174	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25167464	-88.06080961	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH175	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25174321	-88.06079318	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH176	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25217924	-88.05998424	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH329	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21619452	-88.03479806	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH330	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21605491	-88.03640227	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH331	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21604372	-88.03707835	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH332	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21597353	-88.03749938	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH333	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21580771	-88.03961153	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH334	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21555871	-88.03972193	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH335	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21548566	-88.03977364	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH336	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21460065	-88.04027982	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH337	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21462387	-88.04057319	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH338	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21455497	-88.0412101	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAWTHORN WOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH339	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21449194	-88.04137064	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH340	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21408165	-88.04203181	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH341	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21388321	-88.04212602	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH342	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21384268	-88.04250438	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH343	Debris Jam	1	no.	N/A	N/A	Indian Creek	Debris on hydraulic structure. Investigate and remove if determined problematic.	42.21378608	-88.04290914	H	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH344	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21390709	-88.04297804	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH345	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.214036	-88.0432313	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH346	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21402888	-88.04341013	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH347	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21410973	-88.04511777	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH493	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2284504	-88.03000847	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH494	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22795114	-88.0292603	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH495	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22692482	-88.02878161	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
HAW-ICE	De-icing practices/salt management	243	ac	243	ac	Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	85,173	0	N/A	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAWTHORN WOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD104	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase unmowed buffer	42.24553628	-88.07131324	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD105	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install riprap to stabilize shoreline	42.24715023	-88.06862588	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD111	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Repair pipe, install riprap to stabilize area by outlet	42.2378016	-88.07566883	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD112	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install native buffer, remove debris from outlet	42.23414109	-88.07018141	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD125	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install outlet on other side to reduce short circuiting	42.20104043	-88.05680941	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD23	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install native buffer	42.25703648	-88.06367361	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD55	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Stabilize bank and remove silt fence	42.24394847	-88.05435409	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD76	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter, install aerator	42.22255889	-88.06446623	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD77	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter, consider inlet clogging	42.22220407	-88.06646229	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD78	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter	42.22201272	-88.0647902	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD79	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase unmowed buffer	42.22117314	-88.06768358	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD80	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.22078352	-88.06632528	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD31	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.2178053	42.2178053	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD33	Discharge Point	1	no.	N/A	N/A	Indian Creek	Crushed. Investigate and repair if determined problematic.	42.23080245	42.23080245	H	M	1, 3, 4	PD	M ,SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAWTHORN WOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD34	Discharge Point	1	no.	N/A	N/A	Indian Creek	Rusted and dilapidated. Investigate and repair if determined problematic.	42.23162936	42.23162936	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD37	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.23443014	42.23443014	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD39	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.23445378	42.23445378	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD68	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.21794298	42.21794298	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD69	Discharge Point	1	no.	N/A	N/A	Indian Creek	Flared end broken. Investigate and repair if determined problematic.	42.21607707	42.21607707	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
HAWNU	Feed Area Management	0.90	ac	0.90	ac	Indian Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	23	2.1	0.13	0.08	11	N	N
DPH10	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.23329971	-88.02443927	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH11	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.23931768	-88.02307914	M	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH26	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Currently being worked on. Investigate and repair if determined problematic.	42.23424129	-88.02368084	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH27	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Holes in side wall. Investigate and repair if determined problematic.	42.22097128	-88.02307471	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH38	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Rusted out bottom. Investigate and repair if determined problematic.	42.21375827	-88.04291182	M	M	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH39	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Two rusted. Investigate and repair if determined problematic.	42.22240119	-88.02096063	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH7	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.22994622	-88.03318572	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH9	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.23236307	-88.02402711	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
HAW-TIL	No-Till / Strip-Till	87	ac	87	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$3,045.00	N/A	110	21	57	0	16	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAWTHORN WOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
HAW-NU	Nutrient Management	143	ac	143	ac	Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$2,860.00	N/A	268	49	0	0	0	Y	N
HAW-RVR	Runoff Volume Reduction Practices	560	ac	N/A	N/A	Indian Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$8,204,934	N/A	1,235	102	41	44,723	969	Y	N
DSB58	Stream Buffer	0.44	ac	1.3	ac	Indian Creek	Install stream buffer	42.21452872	-88.04351944	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$1,757.24	N/A	1.9	0.11	0.01	5.7	0.34	N	N
DSB59	Stream Buffer	0.15	ac	0.53	ac	Indian Creek	Install stream buffer	42.21394391	-88.04246847	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$614.31	N/A	0.72	0.05	0.00	1.2	0.10	N	N
DSB60	Stream Buffer	0.12	ac	0.47	ac	Indian Creek	Install stream buffer	42.21504913	-88.03965657	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$490.10	N/A	1.7	0.11	0.05	53	1.4	N	N
DSB61	Stream Buffer	0.09	ac	0.16	ac	Indian Creek	Install stream buffer	42.21489972	-88.03994482	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$364.29	N/A	0.45	0.03	0.01	13	0.34	N	N
DSB62	Stream Buffer	0.07	ac	0.17	ac	Indian Creek	Install stream buffer	42.21533367	-88.03987711	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$290.65	N/A	0.64	0.04	0.02	19	0.49	N	N
DSB63	Stream Buffer	0.09	ac	0.21	ac	Indian Creek	Install stream buffer	42.21568701	-88.03985387	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$365.33	N/A	0.80	0.05	0.02	24	0.62	N	N
DSB64	Stream Buffer	0.23	ac	0.61	ac	Indian Creek	Install stream buffer	42.21613111	-88.03806596	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$906.26	N/A	2.0	0.13	0.05	59	1.5	N	N
DSB65	Stream Buffer	0.16	ac	0.77	ac	Indian Creek	Install stream buffer	42.21593727	-88.03855863	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$625.72	N/A	3.0	0.19	0.08	91	2.2	N	N
DSB67	Stream Buffer	1.0	ac	2.3	ac	Indian Creek	Install stream buffer	42.21624225	-88.03511529	H	S	1, 2	PR/RL, M	SMC, IDNR, Illinois EPA	$4,104.35	N/A	9.2	0.36	0.25	282	6.4	N	N
DSB68	Stream Buffer	0.31	ac	1.1	ac	Indian Creek	Install stream buffer	42.21621449	-88.0359747	H	S	1, 2	PR/RL, M	SMC, IDNR, Illinois EPA	$1,253.93	N/A	2.0	0.07	0.03	27	0.75	N	N
DSB69	Stream Buffer	0.38	ac	2.4	ac	Indian Creek	Install stream buffer	42.21673425	-88.034245	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$1,523.09	N/A	5.2	0.21	0.14	135	3.1	N	N
DSB74	Stream Buffer	0.22	ac	0.52	ac	Indian Creek	Install stream buffer	42.21794399	-88.03170483	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$886.19	N/A	2.9	0.11	0.10	93	2.1	N	N
DSB75	Stream Buffer	0.04	ac	0.27	ac	Indian Creek	Install stream buffer	42.21811303	-88.03179962	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$165.76	N/A	1.5	0.05	0.05	48	1.1	N	N
DSB76	Stream Buffer	0.22	ac	0.57	ac	Indian Creek	Install stream buffer	42.21807076	-88.03063981	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$862.20	N/A	2.9	0.11	0.10	93	2.1	N	N
DSB77	Stream Buffer	0.24	ac	1.1	ac	Indian Creek	Install stream buffer	42.21818832	-88.03076209	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$954.36	N/A	6.0	0.21	0.20	179	4.2	N	N
SBD43	Streambank Stabilization	95	ft	95	ft	Indian Creek	Install 2 stream riffles and stabilize stream banks	42.21592046	-88.0385281	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$78,610.61	$128,610.61	2.9	1.5	1.5	0	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF HAWTHORN WOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD44	Streambank Stabilization	363	ft	363	ft	Indian Creek	Install 5 stream riffles and stabilize stream banks	42.21596798	-88.03774028	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$233,886.38	$358,886.38	16	7.8	7.8	0	0	N	N
SBD45	Streambank Stabilization	351	ft	351	ft	Indian Creek	Install 4 stream riffles and stabilize stream banks	42.22086497	-88.02345218	H	S	1, 2	PR/RL, DOT	M, SMC, IDNR, Illinois EPA	$205,341.54	$305,341.54	13	6.4	6.4	0	0	N	N
DPD12	Swale/Open Channel	1	no.	N/A	N/A	Indian Creek	Investigate and remove or repair if determined problematic.	42.2217882	-88.02102369	M	M	1, 3, 4	PR/RL	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
SSD105	Urban Detention	2.0	ac	44	ac	Indian Creek	Install detention basin	42.24746947	-88.0628295	H	L	1, 3, 4	OL, M	HOA/POA, SMC	$100,000.00	N/A	78	3.8	2.0	2,744	52	N	N
SSD109	WASCoB	2	no.	3.9	ac	Indian Creek	Install WASCoB	42.2275264	-88.06015732	H	S	1, 3, 4	PO, AG	FB, NRCS/SWCD	$8,000.00	N/A	10	1.8	4.9	1.1	0.34	N	N
DWS66	Wetland Creation/ Restoration	1.8	ac	344	ac	Indian Creek	Create new wetlands	42.23666658	-88.02309236	H	M	1, 2, 3, 4	M, PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$141,403.30	N/A	1,108	41	41	7,698	256	N	N
DWS79	Wetland Creation/ Restoration	5.4	ac	172	ac	Indian Creek	Create new wetlands	42.21656347	-88.06067477	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$429,387.86	N/A	352	11	8.3	6,302	124	N	N
HAW-WLR	Wetland Creation/ Restoration	11	ac	11	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$847,529.98	N/A	27	0.79	0.08	98	2.1	N	N
SSD107	Wetland Creation/ Restoration	2.0	ac	853	ac	Indian Creek	Create new wetlands	42.23471904	-88.05574134	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	424	15	12	10,221	121	N	N
SSD110	Wetland Creation/ Restoration	2.0	ac	102	ac	Indian Creek	Create new wetlands	42.22536365	-88.06424329	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	230	12	22	2,367	39	N	N
SSD112	Wetland Creation/ Restoration	3.0	ac	24	ac	Indian Creek	Create new wetlands	42.22043618	-88.06566785	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$240,000.00	N/A	88	5.5	6.6	642	14	N	N
SSD113	Wetland Creation/ Restoration	4.0	ac	707	ac	Indian Creek	Create new wetlands	42.21605105	-88.03761549	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$320,000.00	N/A	641	18	15	17,171	244	N	N
HAW-WLE	Wetland Enhancement	8.6	ac	8.6	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$258,000.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF INDIAN CREEK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
IND-ICE	De-icing practices/ salt management	24	ac	24	ac	Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	8,064	0	N/A	N
DD120	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Fix aerator, unclog inlet, implement more native plants	42.22915277	-87.98129545	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD121	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement more native plants	42.22614887	-87.97191999	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
IND-RVR	Runoff Volume Reduction Practices	83	ac	N/A	N/A	Indian Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$1,209,557	N/A	103	10	3	4,363	65	Y	N
DWS67	Wetland Creation/Restoration	0.15	ac	233	ac	Indian Creek	Create new wetlands	42.2308701	-87.98421747	H	M	1, 2, 3, 4	PD, UT, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$11,720.93	N/A	510	13	9.3	11,193	179	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF KILDEER

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
KLD-CC	Cover Crops	29	ac	29	ac	Indian Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,740.00	N/A	70	2.7	5.8	0	8.3	Y	N
DPH100	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19667862	-88.04494321	L	S	1, 3, 4	PO, PR/RL	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH101	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19674027	-88.0447148	L	S	1, 3, 4	HOA/POA	PR/RL, M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH102	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19680831	-88.04452894	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH103	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1968718	-88.04438846	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH105	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19693953	-88.04943814	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH106	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19701784	-88.04422412	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH107	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19710958	-88.04425301	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH108	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19713835	-88.04927997	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH322	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19721567	-88.04005888	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH89	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19514305	-88.05092601	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH90	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19538552	-88.05010266	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH91	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19546984	-88.04980828	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH92	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19572031	-88.04954325	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH97	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19650949	-88.04946027	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH99	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19665858	-88.04943814	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
KLD-ICE	**De-icing practices/salt management**	**296**	**ac**	**296**	**ac**	**Indian Creek**	**Reduce road salt application**	**N/A**	**N/A**	**H**	**S**	**1**	**M**	**HOA/POA, DOT, EO**	**N/A**	**N/A**	**0**	**0**	**0**	**124,765**	**0**	**N/A**	**N**
DD128	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase native buffer	42.18701624	-88.04415015	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF KILDEER

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD26	Discharge Point	1	no.	N/A	N/A	Indian Creek	Broken and full of sediment. . Investigate and repair if determined problematic.	42.1967799	42.1967799	H	S	1, 3, 4	M, PR/RL	HOA/POA, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD65	Discharge Point	1	no.	N/A	N/A	Indian Creek	Underwater and broken. Investigate and repair if determined problematic.	42.19735112	42.19735112	M	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH2	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.19443606	-88.0537062	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH25	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Concrete face on south side needs maintenance. Investigate and repair if determined problematic.	42.19727936	-88.04392728	M	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH36	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.1972539	-88.04007044	M	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH5	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.21377432	-88.04798991	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH6	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Bottom rusted out. Investigate and repair if determined problematic.	42.21396606	-88.04646281	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DL1	Lake Shoreline Stabilization	24	ft	24	ft	Indian Creek	Stabilize lake shorelines	42.20457022	-88.04280174	H	S	1, 2	PR/RL	M, LA, SMC	$2,392.46	N/A	0.37	0.18	0.18	0	0	N	N
DL2	Lake Shoreline Stabilization	35	ft	35	ft	Indian Creek	Stabilize lake shorelines	42.20426738	-88.04489748	H	S	1, 2	PR/RL	M, LA, SMC	$3,463.45	N/A	0.53	0.27	0.27	0	0	N	N
DL26	Lake Shoreline Stabilization	48	ft	48	ft	Buffalo Creek, Indian Creek	Stabilize lake shorelines	42.2032376	-88.03158141	H	S	1, 2	PR/RL	M, LA, SMC	$4,776.19	N/A	0.73	0.37	0.37	0	0	Y	N
DL27	Lake Shoreline Stabilization	47	ft	47	ft	Buffalo Creek, Indian Creek	Stabilize lake shorelines	42.19940132	-88.03632672	H	S	1, 2	PR/RL	M, LA, SMC	$4,680.19	N/A	0.72	0.36	0.36	0	0	Y	N
DL28	Lake Shoreline Stabilization	88	ft	88	ft	Indian Creek	Stabilize lake shorelines	42.19929537	-88.03705	H	S	1, 2	PR/RL	M, LA, SMC	$8,775.92	N/A	1.3	0.67	0.67	0	0	Y	N
DL29	Lake Shoreline Stabilization	42	ft	42	ft	Indian Creek	Stabilize lake shorelines	42.19837812	-88.03899692	H	S	1, 2	PR/RL	M, LA, SMC	$4,206.76	N/A	0.65	0.32	0.32	0	0	Y	N
DL3	Lake Shoreline Stabilization	23	ft	23	ft	Indian Creek	Stabilize lake shorelines	42.2045423	-88.0428802	H	S	1, 2	PR/RL	M, LA, SMC	$2,309.95	N/A	0.35	0.18	0.18	0	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF KILDEER

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL32	Lake Shoreline Stabilization	322	ft	322	ft	Indian Creek	Stabilize lake shorelines	42.2023307	-88.03211921	H	S	1, 2	PR/RL	M, LA, SMC	$32,154.57	N/A	4.9	2.5	2.5	0	0	Y	N
KLD-TIL	No-Till / Strip-Till	7.2	ac	7.2	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$252.00	N/A	8.8	1.9	7.2	0	1.3	N	N
KLD-NU	Nutrient Management	29	ac	29	ac	Buffalo Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$580.00	N/A	35	6.4	0	0	0	Y	N
KLD-RVR	Runoff Volume Reduction Practices	473	ac	N/A	N/A	Buffalo Creek, Indian Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$6,922,470	N/A	1,296	110	46	50,393	1,020	Y	N
DSB136	Stream Buffer	0.09	ac	0.48	ac	Indian Creek	Install stream buffer	42.1950065	-88.05641508	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$343.98	N/A	2.7	0.10	0.10	86	2.0	N	N
DSB137	Stream Buffer	0.64	ac	2.3	ac	Indian Creek	Install stream buffer	42.19468425	-88.05477515	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$2,570.42	N/A	11	0.42	0.39	364	8.5	N	N
DSB138	Stream Buffer	0.10	ac	0.21	ac	Indian Creek	Install stream buffer	42.19483312	-88.0563752	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$408.74	N/A	1.1	0.04	0.04	35	0.81	N	N
KLD-WLR	Wetland Creation/ Restoration	1.2	ac	1.2	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$98,347.06	N/A	18	0.75	0.19	2.8	1.5	N	N
SSD117	Wetland Creation/ Restoration	6.0	ac	440	ac	Indian Creek	Create new wetlands	42.19714356	-88.04937074	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$480,000.00	N/A	439	12	10	16,063	172	N	N
SSD123	Wetland Creation/ Restoration	2.0	ac	134	ac	Indian Creek	Create new wetlands	42.17030783	-88.0694913	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	196	4.7	3.1	6,626	101	N	N
KLD-WLE	Wetland Enhancement	1.5	ac	1.5	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$45,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LAKE VILLA

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LVA-CC	Cover Crops	22	ac	22	ac	Dutch Gap Canal/North Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,320.00	N/A	87	3.6	11	0	7.4	Y	N
LVA-ICE	De-icing practices/salt management	24	ac	24	ac	Dutch Gap Canal/North Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	8,116	0	N/A	N
LCA-TIL	No-Till / Strip-Till	22	ac	22	ac	Dutch Gap Canal/North Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$770.00	N/A	29	6.0	19	0	4.2	Y	N
LVA-NU	Nutrient Management	22	ac	22	ac	Dutch Gap Canal/North Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$440.00	N/A	43	8.4	0	0	0	Y	N
LVA-RVR	Runoff Volume Reduction Practices	3	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$41,344	N/A	6	1	0	337	1	Y	N
DWS32	Wetland Creation/ Restoration	0.19	ac	249	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.4044237	-88.05804751	H	M	1, 2, 3, 4	FPD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$15,252.65	N/A	801	29	59	8,891	170	N	N
LVA-WLR	Wetland Creation/ Restoration	0.49	ac	0.49	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$39,532.24	N/A	2.2	0.04	0.01	0.8	0.17	Y	N
LVA-WLE	Wetland Enhancement	0.66	ac	0.66	ac	Dutch Gap Canal/North Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$19,800.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LAKE ZURICH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LZR-CC	Cover Crops	14	ac	14	ac	Indian Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$840.00	N/A	57	2.4	2.9	0	5.7	N	N
DPH291	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19476581	-88.05845128	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH292	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19477628	-88.05858346	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH293	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19476878	-88.0593406	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH294	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19483194	-88.05969339	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH295	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19485838	-88.06021701	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH296	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19475571	-88.06045757	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH297	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19474607	-88.06078438	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH298	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19476342	-88.06099183	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH299	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19502611	-88.06090198	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH300	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19526323	-88.06113517	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH301	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19542894	-88.06128252	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH302	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1955488	-88.06136206	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH303	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19565115	-88.0615131	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH304	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19584728	-88.06167764	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH305	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19592041	-88.06168502	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH306	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19629886	-88.06162894	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH307	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19672596	-88.06192901	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
LZR-ICE	De-icing practices/ salt management	308	ac	308	ac	Buffalo Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	109,680	0	N/A	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LAKE ZURICH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD126	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.20143383	-88.06546715	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD127	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek, Indian Creek	Increase buffer	42.20141514	-88.06595279	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD130	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek, Indian Creek	Install native buffer	42.19678837	-88.06594909	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD529	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove channel or create meander to reduce short circuiting	42.19467748	-88.06555583	L	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD530	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Cover pipes, add riprap, install native plants to slow the flow	42.19096104	-88.06490392	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD542	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Repair structures	42.19546406	-88.07453635	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD545	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install native buffer	42.19426279	-88.08711952	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD546	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Clear inlets and outlets, install aerator to increase water circulation	42.18967884	-88.08924982	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD551	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Remove garbage, increase buffer, stabilize bank with riprap (shade area) or shade tolerant veg	42.18404439	-88.08546759	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD627	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Increase native buffer where possible, remove wire mesh fence as it s failing and creating hazard for wildlife	42.19077039	-88.05888686	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD661	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install grate to pipe on top of bank	42.19282634	-88.07919015	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD90	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Increase buffer, replant and stabilize slopes	42.19870938	-88.07231447	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LAKE ZURICH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH35	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Debris under bridge. Investigate and repair if determined problematic.	42.19468406	-88.05878312	H	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
LZR-NU	Nutrient Management	14	ac	14	ac	Buffalo Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$280.00	N/A	29	5.5	0	0	0	N	N
LZR-RVR	Runoff Volume Reduction Practices	360	ac	N/A	N/A	Buffalo Creek, Indian Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$5,277,572	N/A	727	67	25	33,166	472	Y	N
DST1	Streambank Stabilization	487	ft	487	ft	Buffalo Creek	Stabilize stream banks	42.19460991	-88.05920832	H	S	1, 2	M, PR/RL	SMC, IDNR, Illinois EPA	$146,047.39	$146,047.39	0.95	0.47	0.47	0	0	N	N
DST2	Streambank Stabilization	477	ft	477	ft	Buffalo Creek	Stabilize stream banks	42.19500531	-88.05916207	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$142,991.42	$142,991.42	0.82	0.41	0.41	0	0	N	N
DPD11	Swale/Open Channel	1	no.	N/A	N/A	Indian Creek	Orange discharge. Investigate and repair if determined problematic.	42.19471099	-88.05826269	M	M	1, 3, 4	HOA/POA	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DWS79	Wetland Creation/Restoration	0.55	ac	172	ac	Buffalo Creek	Create new wetlands	42.21319709	-88.06323909	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$43,984.69	N/A	352	11	8.3	6,302	124	N	N
DWS85	Wetland Creation/Restoration	4.5	ac	337	ac	Buffalo Creek	Create new wetlands	42.19009588	-88.06416107	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$360,335.92	N/A	307	11	5.6	7,391	139	N	N
DWS92	Wetland Creation/Restoration	4.4	ac	108	ac	Indian Creek	Create new wetlands	42.18602086	-88.07502176	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$353,006.00	N/A	230	9.3	3.9	4,657	119	N	N
DWS96	Wetland Creation/Restoration	3.0	ac	33	ac	Indian Creek	Create new wetlands	42.17825484	-88.07823474	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$237,592.43	N/A	107	5.2	1.7	2,170	51	N	N
LZR-WLR	Wetland Creation/Restoration	11	ac	11	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$904,724.07	N/A	27	0.89	0.08	22	2.1	N	N
SSD118	Wetland Creation/Restoration	2.5	ac	206	ac	Indian Creek	Create new wetlands	42.1971175	-88.06222963	H	M	1, 3, 4	M	SMC, USACE, IDNR, Illinois EPA, USFWS	$200,000.00	N/A	266	9.5	5.2	10,034	69	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD93	Bioswale	0.23	ac	6.8	ac	Bull Creek	Install bioswale	42.29701439	-87.96329302	H	S	1	C	SMC	$150,282.00	N/A	6.0	1.4	0.68	1,808	3.0	Y	N
LIB-CC	Cover Crops	88	ac	88	ac	Bull Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$5,280.00	N/A	249	11	18	0	22	Y	N
DPH774	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24632807	-87.94094105	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH815	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Jams on both sides from trees. Investigate and remove if determined problematic.	42.25533933	-87.93980539	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH819	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25762774	-87.9356746	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH835	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26452405	-87.93933831	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH845	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26969561	-87.93912392	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH847	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27228458	-87.93981546	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH850	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Debris accumulation. Investigate and remove if determined problematic.	42.27312918	-87.93945463	M	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH852	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.27675685	-87.93926192	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH859	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.28098091	-87.93406319	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH880	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29843714	-87.94510802	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH894	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.29974841	-87.94731028	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH897	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30035346	-87.94779182	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH899	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.30134277	-87.94919169	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
LIB-ICE	De-icing practices/ salt management	86	ac	86	ac	Bull Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	25,721	0	N/A	N
DD1	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install a swale or inlet near eroded landscaping to prevent erosion & keep wood chip debris contained	42.27197333	-87.96072853	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD318	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up a lot of trash, unclog outlet	42.30566097	-87.95886304	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD319	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Clean up lots of trash, redo brick siding, trim back foliage, replace inlet FES, unclog inlets/outlets	42.30569423	-87.95828028	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD32	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Put outlet at opposite end of channel, plant native plants, install another channel	42.30981119	-88.00609839	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD320	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Unclog inlet, let basin bottom grow out (don't mow)	42.30120996	-87.95792376	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD321	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Install native buffer.	42.29940797	-87.95105809	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD322	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean out bottom of debris	42.29900455	-87.95731077	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD323	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Add aerators and flow to the smaller connecting basin that is stagnant.	42.29854604	-87.95528915	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD324	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trash, clean out sediment	42.29855459	-87.95772839	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD325	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer and more aerators	42.2839513	-87.93308629	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD326	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.27864872	-87.93025875	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD33	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement native plant channel & along perimeter, unclog outlet drain	42.3098043	-88.00800557	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD334	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Remove some excess litter/debris	42.3010729	-87.96216729	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD335	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Extend both riprap channels closer to basin, clean up trash & debris in southwest corner	42.29717482	-87.95930118	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD35	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Don't mow center (let native plants grow)	42.29936721	-88.00212893	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD36	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.29818397	-88.00109733	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD37	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Repairing rip rap by eliminating back lining	42.29633349	-87.99528167	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD370	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trash	42.3065507	-87.96104582	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD38	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trash &'concrete debris, unclog inlets, implement riprap near outlet	42.29121131	-87.99458536	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD43	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Unclog outlet, install aerator, thin vegetation around storm drains	42.30790994	-87.96519933	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD44	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Unclog outlet, clean up trash, install native plants	42.30367839	-88.00964708	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD45	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer, clean up trash	42.30253565	-88.00966249	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD452	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clear outlet manhole cover, clear invasive species & reed debris (control burn?), remove excess woody veg. around outlet	42.27285919	-87.95560144	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD453	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clear larger trees/buckthorn away from outlet to avoid clogging, clear area around manhole cover, clear trash from inlets	42.2724682	-87.95413488	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD454	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	plant native vegetation, clear outlet	42.27111328	-87.9531392	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD455	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Fill in scoured inlet areas with more riprap, implement more native plants, install aerator.	42.26299196	-87.94844987	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD458	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Implement native plants	42.25996196	-87.93979892	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD46	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River, Mill Creek, Upper Des Plaines River	Could benefit from multiple aerators, unclog outlet	42.30358756	-88.01468841	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD460	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River, Upper Des Plaines River	Implement native plants	42.2588846	-87.9436437	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD461	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native plants on western slope, unclog/thin out outlet	42.25861943	-87.94040609	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD462	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River, Upper Des Plaines River	Implement native plants, unclog outlet	42.2577155	-87.94079767	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD463	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Unclog outlet, install aerator, clean up trash, implement native plants	42.25673937	-87.94723262	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD466	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Implement native plants, clean up garbage, install aerator, reinstall lining	42.2558742	-87.94542733	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD468	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Increase buffer	42.2498646	-87.94376172	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD469	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer	42.24857437	-87.94348225	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD470	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek	Increase buffer	42.24860746	-87.94531139	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD471	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.24697087	-87.94311416	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD658	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Examine short circuiting, add aerator, add native vegetation and increase buffer	42.29912967	-87.95056033	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD659	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Thin out vegetation, clear debris of outlet/inlet, clean up trash	42.30709366	-87.96179171	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD161	Discharge Point	1	no.	N/A	N/A	Indian Creek	Rusted. Investigate and repair if determined problematic.	42.28219708	-87.9335633	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD162	Discharge Point	1	no.	N/A	N/A	Bull Creek	Crushed. Investigate and repair if determined problematic.	42.28171528	-87.93381893	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD163	Discharge Point	1	no.	N/A	N/A	Bull Creek, Lower Des Plaines River, Upper Des Plaines River	Slumped storm sewer structure. Investigate and repair if determined problematic.	42.28041695	-87.93482838	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD165	Discharge Point	1	no.	N/A	N/A	Bull Creek	Eroded storm sewer structure. Investigate and repair if determined problematic.	42.27924233	-87.93547328	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD168	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Crushed and rusted. Investigate and repair if determined problematic.	42.27188111	-87.93987275	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD169	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Rusted. Investigate and repair if determined problematic.	42.27014133	-87.9392523	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD170	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Half sediment. Investigate and repair if determined problematic.	42.26848604	-87.93848256	M	S	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD171	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Submerged. Investigate and repair if determined problematic.	42.26168364	-87.93841976	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD172	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Broken pipe with swale into river. Investigate and repair if determined problematic.	42.26125687	-87.93774253	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD173	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Submerged. Investigate and repair if determined problematic.	42.25763633	-87.93940886	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD174	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Rusted through. Investigate and repair if determined problematic.	42.25759958	-87.93949403	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD175	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Crushed. Investigate and repair if determined problematic.	42.25750997	-87.93962131	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD177	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Fully submerged. Investigate and repair if determined problematic.	42.2513764	-87.94194663	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD178	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Broken in pieces. Investigate and repair if determined problematic.	42.24834535	-87.94286372	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD44	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Not completely attached. Investigate and repair if determined problematic.	42.28512238	42.28512238	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD45	Discharge Point	1	no.	N/A	N/A	Bull Creek	Disconnected at base. Investigate and repair if determined problematic.	42.28634611	42.28634611	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD46	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Sections of pipe broken off. Investigate and repair if determined problematic.	42.29282479	42.29282479	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD47	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Bottom rusted out. Investigate and repair if determined problematic.	42.29363439	42.29363439	H	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD48	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Buried under sediment. Investigate and repair if determined problematic.	42.29460666	42.29460666	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD49	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Chipped. Investigate and repair if determined problematic.	42.29522126	42.29522126	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD50	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.29675847	42.29675847	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD51	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Missing bottom half. Investigate and repair if determined problematic.	42.30615964	42.30615964	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD52	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Rusted out bottom. Investigate and repair if determined problematic.	42.30618112	42.30618112	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD53	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Pipe is not totally attached armored. Investigate and repair if determined problematic.	42.30703995	42.30703995	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
SSD86	Field Border	2.3	ac	26	ac	Lower Des Plaines River	Install field border	42.30706206	-88.01274339	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$9,200.00	N/A	70	4.0	8.6	11	8.5	Y	N
DPH17	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek	Bottom part of pipe damaged. Investigate and repair if determined problematic.	42.29682317	-87.96929307	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DL10	Lake Shoreline Stabilization	362	ft	362	ft	Upper Des Plaines River	Stabilize lake shorelines	42.29358397	-87.94792395	H	S	1, 2	PR/RL	M, LA, SMC	$36,249.38	N/A	5.6	2.8	2.8	0	0	Y	N
DL11	Lake Shoreline Stabilization	202	ft	202	ft	Upper Des Plaines River	Stabilize lake shorelines	42.29384121	-87.94762892	H	S	1, 2	PR/RL	M, LA, SMC	$20,218.50	N/A	3.1	1.6	1.6	0	0	Y	N
DL12	Lake Shoreline Stabilization	201	ft	201	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29513406	-87.9464865	H	S	1, 2	PR/RL	M, LA, SMC	$20,073.59	N/A	3.1	1.5	1.5	0	0	Y	N
DL13	Lake Shoreline Stabilization	425	ft	425	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29597569	-87.94802157	H	S	1, 2	PR/RL	M, LA, SMC	$42,514.46	N/A	6.5	3.3	3.3	0	0	Y	N
DL14	Lake Shoreline Stabilization	164	ft	164	ft	Lower Des Plaines River	Stabilize lake shorelines	42.2961987	-87.94731819	H	S	1, 2	PR/RL	M, LA, SMC	$16,437.74	N/A	2.5	1.3	1.3	0	0	Y	N
DL15	Lake Shoreline Stabilization	453	ft	453	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29115451	-87.94187573	H	S	1, 2	PR/RL	M, LA, SMC	$45,275.30	N/A	7.0	3.5	3.5	0	0	Y	N
DL16	Lake Shoreline Stabilization	121	ft	121	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29070153	-87.94372045	H	S	1, 2	PR/RL	M, LA, SMC	$12,123.04	N/A	1.9	0.93	0.93	0	0	Y	N
DL17	Lake Shoreline Stabilization	44	ft	44	ft	Lower Des Plaines River	Stabilize lake shorelines	42.2905389	-87.94390445	H	S	1, 2	PR/RL	M, LA, SMC	$4,354.30	N/A	0.67	0.33	0.33	0	0	N	N
DL18	Lake Shoreline Stabilization	105	ft	105	ft	Lower Des Plaines River	Stabilize lake shorelines	42.28923977	-87.94505956	H	S	1, 2	PR/RL	M, LA, SMC	$10,470.21	N/A	1.6	0.80	0.80	0	0	Y	N
DL19	Lake Shoreline Stabilization	414	ft	414	ft	Lower Des Plaines River	Stabilize lake shorelines	42.28955536	-87.94660993	H	S	1, 2	PR/RL	M, LA, SMC	$41,436.10	N/A	6.4	3.2	3.2	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL20	Lake Shoreline Stabilization	67	ft	67	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29176092	-87.94791112	H	S	1, 2	PR/RL	M, LA, SMC	$6,698.62	N/A	1.0	0.51	0.51	0	0	Y	N
DL21	Lake Shoreline Stabilization	100	ft	100	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29225043	-87.94784679	H	S	1, 2	PR/RL	M, LA, SMC	$10,045.00	N/A	1.5	0.77	0.77	0	0	Y	N
DL22	Lake Shoreline Stabilization	56	ft	56	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29247251	-87.94809272	H	S	1, 2	PR/RL	M, LA, SMC	$5,611.56	N/A	0.86	0.43	0.43	0	0	Y	N
DL23	Lake Shoreline Stabilization	30	ft	30	ft	Lower Des Plaines River	Stabilize lake shorelines	42.29053159	-87.94154531	H	S	1, 2	PR/RL	M, LA, SMC	$3,033.28	N/A	0.47	0.23	0.23	0	0	Y	N
DL24	Lake Shoreline Stabilization	29	ft	29	ft	Bull Creek	Stabilize lake shorelines	42.28994282	-87.94724912	H	S	1, 2	PR/RL	M, LA, SMC	$2,869.92	N/A	0.44	0.22	0.22	0	0	Y	N
DL8	Lake Shoreline Stabilization	64	ft	64	ft	Bull Creek	Stabilize lake shorelines	42.29045256	-87.94150858	H	S	1, 2	PR/RL	M, LA, SMC	$6,390.29	N/A	0.98	0.49	0.49	0	0	Y	N
DL9	Lake Shoreline Stabilization	99	ft	99	ft	Bull Creek	Stabilize lake shorelines	42.29022314	-87.94139971	H	S	1, 2	PR/RL	M, LA, SMC	$9,915.67	N/A	1.5	0.76	0.76	0	0	Y	N
DSTFP04	N/A	1	ea.	N/A	N/A	Indian Creek	Libertyville Highlands Subdivision Interim Stormwater Improvements Project	42.27969067	-87.96417267	H	S	3, 4	M	WPC, DH, SMC, DOT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
DSTFP06	N/A	1	ea.	N/A	N/A	Upper Des Plaines River	West Ellis Ave. Detention Basin/East Ellis Storm Sewer Enlargement Project.	42.29360907	-87.95524026	H	S	1, 3, 4	M, DOT	DH, HOA/POA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
LIB-TIL	No-Till / Strip-Till	75	ac	75	ac	Bull Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$2,625.00	N/A	72	15	30	0	10	Y	N
LIB-NU	Nutrient Management	88	ac	88	ac	Lower Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$1,760.00	N/A	125	25	0	0	0	Y	N
LIB-RVR	Runoff Volume Reduction Practices	1,966	ac	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$28,785,371	N/A	3,109	283	104	116,141	1,989	Y	N
SBD30	Streambank Stabilization	3,966	ft	3,966	ft	Bull Creek	Install 5 stream riffles and stabilize stream banks	42.29978089	-87.94737071	H	S	1, 2	FPD, PD, M	SMC, IDNR, Illinois EPA	$1,314,747.23	$1,439,747.23	162	81	81	0	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD22	Swale/Open Channel	1	no.	N/A	N/A	Bull Creek	Debris blocking flow. Investigate and remove if determined problematic.	42.25740542	-87.93975635	H	S	1, 3, 4	PR/RL	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD3	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove or repair if determined problematic.	42.29672543	-87.96771082	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD4	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove or repair if determined problematic.	42.29734469	-87.96811265	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD6	Swale/Open Channel	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove or repair if determined problematic.	42.30563452	-87.98674813	M	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD9	Swale/Open Channel	1	no.	N/A	N/A	Bull Creek	Investigate and remove or repair if determined problematic.	42.29840714	-87.96926852	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DWS47	Wetland Creation/ Restoration	0.93	ac	111	ac	Upper Des Plaines River	Create new wetlands	42.30018077	-88.00272945	H	M	1, 2, 3, 4	PB&D, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$74,353.47	N/A	200	7.0	2.1	3,019	29	Y	N
DWS48	Wetland Creation/ Restoration	5.7	ac	136	ac	Lower Des Plaines River	Create new wetlands	42.30380209	-87.98780126	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$452,151.41	N/A	140	4.5	2.3	1,913	60	N	N
DWS49	Wetland Creation/ Restoration	1.6	ac	300	ac	Bull Creek	Create new wetlands	42.29731617	-88.00850435	H	M	1, 2, 3, 4	PD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$124,197.31	N/A	821	28	17	5,728	155	Y	N
DWS50	Wetland Creation/ Restoration	21	ac	405	ac	Bull Creek	Create new wetlands	42.29141516	-87.96626887	H	M	1, 2, 3, 4	PB&D, PO, PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,671,160.87	N/A	387	10	6.3	4,796	150	Y	N
DWS51	Wetland Creation/ Restoration	2.3	ac	68	ac	Bull Creek	Create new wetlands	42.30238529	-87.94795663	H	M	1, 2, 3, 4	FPD, PD	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$185,676.29	N/A	126	2.7	1.8	1,670	54	N	N
DWS59	Wetland Creation/ Restoration	13	ac	592	ac	Bull Creek	Create new wetlands	42.27153976	-87.97622339	H	M	1, 2, 3, 4	PD, PO, M , PB&D	SMC, IDNR, Illinois EPA, USACE, USFWS	$1,017,042.35	N/A	988	34	15	20,280	452	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LIBERTYVILLE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS60	Wetland Creation/ Restoration	8.7	ac	135	ac	Bull Creek	Create new wetlands	42.27542204	-87.96777017	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$698,402.22	N/A	178	7.3	2.7	1,818	113	Y	N
DWS61	Wetland Creation/ Restoration	5.4	ac	269	ac	Bull Creek	Create new wetlands	42.26842626	-87.96760699	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$432,001.27	N/A	347	14	5.1	3,711	219	Y	N
DWS63	Wetland Creation/ Restoration	1.4	ac	168	ac	Bull Creek	Create new wetlands	42.25801515	-87.94233271	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$112,937.81	N/A	218	6.8	3.1	3,443	64	Y	N
DWS64	Wetland Creation/ Restoration	0.94	ac	689	ac	Bull Creek	Create new wetlands	42.26433328	-87.96329566	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$74,982.66	N/A	1,767	73	23	42,490	650	Y	N
LIB-WLR	Wetland Creation/ Restoration	46	ac	46	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$3,716,290.32	N/A	165	9	1.2	1,370	19	Y	N
SSD94	Wetland Creation/ Restoration	2.0	ac	3,873	ac	Lower Des Plaines River	Create new wetlands	42.28627336	-87.97434647	H	M	1, 3, 4	PD	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	2,245	50	42	57,291	760	Y	N
LIB-WLE	Wetland Enhancement	22	ac	22	ac	Bull Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$660,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINCOLNSHIRE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LSH-CC	Cover Crops	23	ac	23	ac	Lower Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,380.00	N/A	68	2.9	3.1	0	5.8	Y	N
DPH109	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19795506	-87.92622554	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH111	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19843999	-87.92639778	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH113	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1989503	-87.92734972	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH696	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18617959	-87.91362008	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH700	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18660493	-87.91397439	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH702	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18784176	-87.91619685	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH703	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18935616	-87.91460353	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH704	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18950071	-87.91481199	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH705	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18954689	-87.91324717	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH706	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.18995466	-87.91229348	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH707	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.19021401	-87.91191948	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH708	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.19054693	-87.9188989	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH709	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.19103107	-87.91869449	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH710	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.19242942	-87.9213651	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH711	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.19736783	-87.92007778	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH712	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.19772184	-87.91942581	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
LSH-ICE	De-icing practices/salt management	270	ac	270	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	108,245	0	N/A	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINCOLNSHIRE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD100	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Increase native plants to decrease erosion, repair damaged inlets	42.18667949	-87.94476686	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD102	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants to decrease excessive erosion, add aerator to decrease excess algae, remove excess litter, repair damaged inlets	42.18565215	-87.94685149	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD499	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Increase buffer	42.20609773	-87.92970416	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD500	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants, add aerator, remove excess litter/debris	42.19150104	-87.93012943	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD501	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Repair cracked inlet, remove excess litter/debris	42.19069603	-87.92876931	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD504	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Replace construction outlet with permanent outlet, increase unmowed buffer	42.20804382	-87.91538572	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD510	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Increase buffer	42.187559	-87.94125139	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD511	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Increase buffer, repair outlet FES	42.186822	-87.94131238	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD512	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Install aerator, implement native plants	42.18490974	-87.93629841	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD513	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Remove excess litter/debris, install aerator	42.18302208	-87.94376633	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINCOLNSHIRE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD514	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excessive litter/debris, add native plants to decrease erosion, consider possible illicit oily substance present	42.18301896	-87.94680307	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD515	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Consider inlet clogging	42.18121968	-87.92732722	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD516	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove excess litter/debris	42.1810085	-87.92741187	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD526	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove some excess woody vegetation	42.18370655	-87.93926993	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD527	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Lower Des Plaines River	Remove some excess woody vegetation	42.1836091	-87.93712655	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD534	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter/debris	42.18105669	-87.92646093	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD535	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Install aerator, implement native plants to decrease excess erosion	42.18514802	-87.93476166	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD561	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants to decrease excess erosion, remove some excess woody vegetation at south end	42.17889506	-87.92955492	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD654	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove excess litter/debris	42.19517334	-87.92377972	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD91	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add aerator, add native plants to decrease erosion	42.19558583	-87.93162458	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD92	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove some excess woody vegetation, remove excess litter/debris	42.19418385	-87.92807007	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINCOLNSHIRE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD93	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to decrease erosion, remove excess litter/debris	42.19396194	-87.93096297	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD95	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove some excess woody vegetation along shoreline	42.19302942	-87.92772983	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD96	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants to decrease erosion, repair damaged inlets	42.19291147	-87.93061609	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD150	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Broken. Investigate and repair if determined problematic.	42.18888355	-87.91392661	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD184	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and repair if determined problematic.	42.18479209	-87.91498985	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD204	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Cracked. Investigate and repair if determined problematic.	42.1976132	-87.92026118	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD205	Discharge Point	1	no.	N/A	N/A	Indian Creek	Warped. Investigate and repair if determined problematic.	42.19807131	-87.92322764	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD206	Discharge Point	1	no.	N/A	N/A	Indian Creek	Warped can't flow. Investigate and repair if determined problematic.	42.19809504	-87.92332034	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
LSH-TIL	No-Till / Strip-Till	23	ac	23	ac	Lower Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$805.00	N/A	23	4.8	5.4	0	3.3	Y	N
LSH-NU	Nutrient Management	23	ac	23	ac	Lower Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$460.00	N/A	34	6.7	0	0	0	Y	N
LSH-RVR	Runoff Volume Reduction Practices	661	ac	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$9,681,270	N/A	1,164	108	37	50,233	730	Y	N
DSB160	Stream Buffer	0.31	ac	1.2	ac	Indian Creek	Install stream buffer	42.17596688	-87.94372191	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,234.38	N/A	5.3	0.31	0.22	209	1.3	Y	N
DSB41	Stream Buffer	0.14	ac	1.1	ac	Indian Creek	Install stream buffer	42.20402543	-87.94064107	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$559.01	N/A	3.2	0.21	0.09	114	2.3	N	N
DSB42	Stream Buffer	0.35	ac	1.5	ac	Indian Creek	Install stream buffer	42.2034697	-87.94022685	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,403.93	N/A	4.5	0.28	0.12	139	3.5	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINCOLNSHIRE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD27	Streambank Stabilization	256	ft	256	ft	Lower Des Plaines River	Stabilize stream banks	42.18480078	-87.91670276	H	S	1, 2	PR/RL	M, PB&D, SMC, IDNR, Illinois EPA	$76,716.08	$76,716.08	13	6.5	6.5	0	0	N	N
SBD40	Streambank Stabilization	285	ft	285	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.19903041	-87.92648976	H	S	1, 2	FPD, M	SMC, IDNR, Illinois EPA	$110,466.06	$135,466.06	23	12	12	0	0	Y	N
DPD10	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Water looks orange. Investigate and repair if determined problematic.	42.20089197	-87.93272218	M	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DWS73	Wetland Creation/ Restoration	1.0	ac	82	ac	Indian Creek	Create new wetlands	42.20069884	-87.93410883	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$82,587.80	N/A	266	8.7	4.5	5,601	129	N	N
DWS80	Wetland Creation/ Restoration	4.9	ac	275	ac	Indian Creek	Create new wetlands	42.19795186	-87.91229453	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$388,797.65	N/A	411	16	8.1	6,925	247	N	N
DWS81	Wetland Creation/ Restoration	0.45	ac	49	ac	Lower Des Plaines River	Create new wetlands	42.18434307	-87.90142957	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$36,377.11	N/A	131	5.6	2.5	2,019	68	N	N
DWS82	Wetland Creation/ Restoration	3.4	ac	100	ac	Lower Des Plaines River	Create new wetlands	42.19122805	-87.91796638	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$274,218.36	N/A	123	4.6	2.4	2,107	74	N	N
DWS88	Wetland Creation/ Restoration	0.99	ac	515	ac	Lower Des Plaines River	Create new wetlands	42.17636164	-87.94385568	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$79,248.63	N/A	692	19	15	18,835	142	Y	N
LSH-WLR	Wetland Creation/ Restoration	2.0	ac	2.0	ac	Lower Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$157,852.32	N/A	8.6	0.23	0.03	110	0.69	Y	N
LSH-WLE	Wetland Enhancement	6.5	ac	6.5	ac	Lower Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$195,000.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINDENHURST

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LND-CC	Cover Crops	197	ac	197	ac	Dutch Gap Canal/North Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$11,820.00	N/A	926	39	114	0	79	Y	N
LND-ICE	De-icing practices/salt management	447	ac	447	ac	Mill Creek	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	179,088	0	N/A	N
DD357	Detention Basin Retrofit	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek	Add aerator to increase water circulation	42.43899569	-88.03573587	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD358	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	clear around inlet	42.40450387	-88.00508805	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD359	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Identify and clear around inlet	42.40280738	-88.00472728	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD361	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Add aerator	42.40193234	-88.00498756	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD383	Detention Basin Retrofit	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek	Increase native buffer	42.4146708	-88.00596524	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
SSD46	Field Border	0.60	ac	7.3	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.43517778	-88.00890234	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,400.00	N/A	46	2.6	5.1	3.9	3.9	Y	N
DL34	Lake Shoreline Stabilization	44	ft	44	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.41050327	-88.03581152	H	S	1, 2	PR/RL	M, LA, SMC	$4,350.62	N/A	0.67	0.33	0.33	0	0	N	N
DL35	Lake Shoreline Stabilization	66	ft	66	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.41146833	-88.03657083	H	S	1, 2	PR/RL	M, LA, SMC	$6,567.88	N/A	1.0	0.50	0.50	0	0	Y	N
DL36	Lake Shoreline Stabilization	136	ft	136	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.41152922	-88.03686343	H	S	1, 2	PR/RL	M, LA, SMC	$13,606.01	N/A	2.1	1.0	1.0	0	0	Y	N
DL47	Lake Shoreline Stabilization	31	ft	31	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42529687	-88.02549015	H	S	1, 2	PD, PR/RL	M, LA, SMC	$3,131.93	N/A	0.48	0.24	0.24	0	0	N	N
DL48	Lake Shoreline Stabilization	44	ft	44	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42519183	-88.0254926	H	S	1, 2	PD, PR/RL	M, LA, SMC	$4,431.99	N/A	0.68	0.34	0.34	0	0	N	N
DL49	Lake Shoreline Stabilization	9.4	ft	9.4	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.4251211	-88.02549584	H	S	1, 2	PR/RL	M, LA, SMC	$938.94	N/A	0.14	0.07	0.07	0	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINDENHURST

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL50	Lake Shoreline Stabilization	46	ft	46	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42504394	-88.02550393	H	S	1, 2	PR/RL	M, LA, SMC	$4,607.23	N/A	0.71	0.35	0.35	0	0	N	N
DL51	Lake Shoreline Stabilization	21	ft	21	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42495121	-88.02551863	H	S	1, 2	PR/RL	M, LA, SMC	$2,089.53	N/A	0.32	0.16	0.16	0	0	N	N
DL52	Lake Shoreline Stabilization	16	ft	16	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42490291	-88.02552818	H	S	1, 2	PR/RL	M, LA, SMC	$1,621.69	N/A	0.25	0.12	0.12	0	0	N	N
DL53	Lake Shoreline Stabilization	22	ft	22	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42485357	-88.02553589	H	S	1, 2	PD	M, LA, SMC	$2,160.54	N/A	0.33	0.17	0.17	0	0	N	N
DL54	Lake Shoreline Stabilization	22	ft	22	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42479535	-88.02553408	H	S	1, 2	PD	M, LA, SMC	$2,188.12	N/A	0.34	0.17	0.17	0	0	N	N
DL55	Lake Shoreline Stabilization	218	ft	218	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.43015686	-88.02356719	H	S	1, 2	PR/RL	M, LA, SMC	$21,821.34	N/A	3.4	1.7	1.7	0	0	Y	N
DL66	Lake Shoreline Stabilization	110	ft	110	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.43217369	-88.02454138	H	S	1, 2	PR/RL	M, LA, SMC	$11,044.64	N/A	1.7	0.85	0.85	0	0	Y	N
DL67	Lake Shoreline Stabilization	96	ft	96	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.43296087	-88.02636984	H	S	1, 2	PR/RL	M, LA, SMC	$9,575.19	N/A	1.5	0.74	0.74	0	0	Y	N
DL74	Lake Shoreline Stabilization	300	ft	300	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42390362	-88.05459138	H	S	1, 2	PR/RL	M, LA, SMC	$30,000.00	N/A	4.6	2.3	2.3	0	0	Y	N
DL75	Lake Shoreline Stabilization	29	ft	29	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42295599	-88.05418466	H	S	1, 2	PR/RL	M, LA, SMC	$2,940.59	N/A	0.45	0.23	0.23	0	0	Y	N
DL76	Lake Shoreline Stabilization	29	ft	29	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42302519	-88.05423893	H	S	1, 2	PR/RL	M, LA, SMC	$2,940.56	N/A	0.45	0.23	0.23	0	0	Y	N
DL77	Lake Shoreline Stabilization	29	ft	29	ft	Dutch Gap Canal/North Mill Creek, Mill Creek	Stabilize lake shorelines	42.42310175	-88.05426118	H	S	1, 2	PR/RL	M, LA, SMC	$2,940.55	N/A	0.45	0.23	0.23	0	0	Y	N
DL78	Lake Shoreline Stabilization	29	ft	29	ft	Dutch Gap Canal/North Mill Creek	Stabilize lake shorelines	42.42349421	-88.05436647	H	S	1, 2	PR/RL	M, LA, SMC	$2,940.58	N/A	0.45	0.23	0.23	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LINDENHURST

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DL79	Lake Shoreline Stabilization	29	ft	29	ft	Dutch Gap Canal/North Mill Creek, Mill Creek	Stabilize lake shorelines	42.42341756	-88.05433498	H	S	1, 2	PR/RL	M, LA, SMC	$2,940.57	N/A	0.45	0.23	0.23	0	0	Y	N
DL82	Lake Shoreline Stabilization	118	ft	118	ft	Dutch Gap Canal/North Mill Creek, Mill Creek	Stabilize lake shorelines	42.42153426	-88.05515851	H	S	1, 2	PR/RL	M, LA, SMC	$11,754.11	N/A	1.8	0.90	0.90	0	0	Y	N
DL83	Lake Shoreline Stabilization	176	ft	176	ft	Dutch Gap Canal/North Mill Creek, Mill Creek	Stabilize lake shorelines	42.42228239	-88.05466181	H	S	1, 2	PR/RL	M, LA, SMC	$17,631.14	N/A	2.7	1.4	1.4	0	0	Y	N
LND-TIL	No-Till / Strip-Till	192	ac	192	ac	Dutch Gap Canal/North Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$6,720.00	N/A	305	64	197	0	44	Y	N
LND-NU	Nutrient Management	197	ac	197	ac	Dutch Gap Canal/North Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$3,940.00	N/A	463	90	0	0	0	Y	N
LND-RVR	Runoff Volume Reduction Practices	493	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek, Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$7,219,004	N/A	1,436	129	50	61,852	984	Y	N
DWS19	Wetland Creation/ Restoration	3.4	ac	197	ac	Mill Creek	Create new wetlands	42.4158801	-88.03691685	H	M	1, 2, 3, 4	PO, PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$271,982.78	N/A	203	4.4	2.9	5,120	97	Y	N
DWS23	Wetland Creation/ Restoration	1.5	ac	317	ac	Mill Creek	Create new wetlands	42.41189597	-88.05410386	H	M	1, 2, 3, 4	FPD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$122,037.78	N/A	227	4.3	4.8	5,175	101	Y	N
DWS24	Wetland Creation/ Restoration	0.07	ac	22	ac	Mill Creek	Create new wetlands	42.4100871	-88.01567701	H	M	1, 2, 3, 4	M	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$5,875.19	N/A	102	3.2	1.8	3,133	29	N	N
DWS25	Wetland Creation/ Restoration	0.43	ac	29	ac	Mill Creek	Create new wetlands	42.40616304	-88.02657454	H	M	1, 2, 3, 4	FPD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$34,416.09	N/A	89	3.2	1.4	2,193	28	N	N
LND-WLR	Wetland Creation/ Restoration	6.0	ac	6.0	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$482,084.24	N/A	19	0.53	0.06	31	1.5	Y	N
LND-WLE	Wetland Enhancement	5.7	ac	5.7	ac	Dutch Gap Canal/North Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$171,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
LNG-CC	Cover Crops	485	ac	485	ac	Aptakisic Creek, Buffalo Creek, Indian Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$29,100.00	N/A	1,395	53	91	0	132	Y	N
DPH104	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19670244	-87.97796944	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH146	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22736843	-87.99623662	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH263	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22468366	-87.99745937	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH264	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22516252	-87.99768375	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH265	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22520297	-87.99766858	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH266	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22521914	-87.99767177	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH267	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22526033	-87.99762986	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH268	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22557523	-87.99784385	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH269	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2258143	-87.99782541	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH270	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2258431	-87.99779188	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH271	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22598558	-87.99755342	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH272	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22671358	-87.99762174	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH323	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20224171	-88.0100847	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH324	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20213974	-88.01028905	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH325	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20208897	-88.01115261	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH326	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20180433	-88.01161087	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH327	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20171515	-88.01190139	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH328	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20143616	-88.01287822	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH348	Debris Jam	1	no.	N/A	N/A	Indian Creek	Fallen tree over rock pile. Investigate and remove if determined problematic.	42.21047206	-87.98785992	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH349	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21042787	-87.98806452	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH350	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21046329	-87.98825001	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH351	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21055179	-87.9883433	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH352	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21070723	-87.98835084	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH353	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21082435	-87.98830951	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH354	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21142234	-87.98908447	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH355	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21209535	-87.98971047	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH356	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21217551	-87.99040265	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH357	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21213241	-87.99059711	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH358	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21223966	-87.99076644	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH359	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21236236	-87.99068161	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH360	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21289726	-87.99119642	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH361	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21310984	-87.99130186	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH362	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21332358	-87.99173244	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH363	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21365991	-87.99150001	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH364	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21378301	-87.99166848	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH365	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21416059	-87.99212	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH366	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21425365	-87.99196692	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH367	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21443967	-87.99206934	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH368	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.214505	-87.992219	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH369	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21460671	-87.99234772	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH370	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21524755	-87.99331276	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH371	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21650151	-87.99393931	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH372	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2175383	-87.99477716	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH373	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21761258	-87.99469485	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH374	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21779578	-87.99473199	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH375	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21811397	-87.99466543	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH376	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21858026	-87.9945185	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH377	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21886142	-87.99455261	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH378	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21911477	-87.99457298	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH379	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21917342	-87.99461799	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH380	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21947259	-87.99492376	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH381	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21971417	-87.99510917	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH382	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22010785	-87.9954644	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH383	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22043956	-87.99547487	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH384	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22089102	-87.99588869	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH385	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22112873	-87.99581979	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH386	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22129054	-87.99584837	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH387	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22134095	-87.99591048	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH388	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22140952	-87.9959653	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH389	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22185108	-87.99606161	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH390	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22190963	-87.99594342	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH391	Debris Jam	1	no.	N/A	N/A	Indian Creek	Blocking pipe. Investigate and remove if determined problematic.	42.22215166	-87.99597804	H	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH392	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22222546	-87.99600017	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH393	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22276664	-87.99647508	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH394	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22334738	-87.99688555	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH395	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22359523	-87.99702762	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH396	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22383365	-87.99727564	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH397	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2244655	-87.997336	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH398	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2243672	-87.9980211	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH399	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22453287	-88.00008156	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH400	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22531033	-88.0027766	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH401	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22515615	-88.00267652	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH402	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24362622	-88.03525076	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH403	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24366976	-88.03524984	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH404	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20577782	-87.97560658	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH405	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20601448	-87.97578118	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH406	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2062203	-87.97593826	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH407	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2062752	-87.97591378	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH408	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20654313	-87.97871384	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

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DPH409	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20666337	-87.97925313	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH410	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20682799	-87.97996987	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH411	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2060237	-87.98017673	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH412	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20557951	-87.98053728	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH413	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20528943	-87.98084439	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH414	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20495863	-87.98109517	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH415	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20462484	-87.98101471	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH416	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20480465	-87.98112468	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH417	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20424439	-87.98171104	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH418	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20419133	-87.98246181	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH419	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20435235	-87.98269013	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH420	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20467296	-87.98342111	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH421	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20469907	-87.98354324	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH422	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2056857	-87.98400793	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH423	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20585741	-87.98411731	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH424	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20706134	-87.98464127	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH425	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20792078	-87.98457715	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH426	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20909969	-87.98453968	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH427	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20963454	-87.9846318	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH428	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20970637	-87.98482902	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH429	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19387624	-87.98491963	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH430	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21027111	-87.98546831	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH431	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21036951	-87.98507553	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH432	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1939247	-87.98505986	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH433	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21075473	-87.98560829	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH434	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21086797	-87.98591004	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH435	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21089876	-87.98668117	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH436	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19385135	-87.98612976	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH437	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19375439	-87.98617985	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH438	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19391793	-87.98656225	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH439	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19412947	-87.98686859	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH440	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19390554	-87.9869483	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH441	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19390926	-87.98712524	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH442	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19390863	-87.98734007	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH443	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1938422	-87.98746119	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH444	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19390301	-87.98767778	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH445	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19425447	-87.98800023	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH446	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19425283	-87.98811389	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH447	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19419603	-87.98835931	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH448	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1940514	-87.98866802	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH449	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19392283	-87.98875946	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH450	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19372373	-87.98877111	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH451	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19367756	-87.98889533	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH452	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.1935814	-87.98901888	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH453	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19360788	-87.99044573	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH454	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19361275	-87.99025932	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH455	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19362121	-87.98997761	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH456	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19361153	-87.99068454	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH457	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19361702	-87.99084614	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH458	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19363538	-87.99116608	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH459	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19361275	-87.99154603	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH460	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19362448	-87.99181693	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH461	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19358634	-87.99305133	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH462	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19355864	-87.99321193	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH463	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19372389	-87.99344025	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH464	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19379044	-87.99366631	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH465	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19379648	-87.99401114	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH466	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19366166	-87.99504237	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH467	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19364988	-87.99536373	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH468	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19373818	-87.99564335	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH469	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19360638	-87.99579255	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH470	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19340517	-87.99627225	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH471	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19337001	-87.99634802	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH472	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19319135	-87.99730523	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH473	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19342872	-87.99839672	L	S	1, 3, 4	PD	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH474	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19355265	-88.00011459	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH475	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19366107	-88.00047376	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH476	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19453685	-88.00166608	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH477	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19479334	-88.00163038	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH478	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19462272	-88.00255398	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH479	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19438564	-88.00324515	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH480	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19444385	-88.00411879	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH481	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19400846	-88.0057536	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH482	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19384564	-88.00605845	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH483	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19370512	-88.00618158	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH484	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19352972	-88.00662305	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH485	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19292711	-88.00952546	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH486	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19284811	-88.00989619	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH487	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19236791	-88.01072943	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH488	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19232864	-88.01081727	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH489	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19152532	-88.01122111	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH490	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19135948	-88.01118306	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH491	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20639043	-87.97594206	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH492	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20660301	-87.97629879	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH496	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22726323	-88.01655074	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH497	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22759696	-88.01688593	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH498	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22765186	-88.01737301	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH499	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22779653	-88.0182718	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH500	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22781183	-88.0183749	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH501	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22791853	-88.01878578	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH503	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24417959	-88.03544309	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH504	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24422707	-88.03550096	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH505	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24431513	-88.0355358	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH532	Debris Jam	1	no.	N/A	N/A	Indian Creek	Blocking culvert. Investigate and remove if determined problematic.	42.22618941	-88.00968295	H	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH533	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22728037	-88.00919386	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH534	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22785721	-88.00906931	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH535	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22797393	-88.01043933	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH536	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22800982	-88.01082444	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH537	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22712833	-88.01320159	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH538	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22653673	-88.01532338	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH539	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22664019	-88.01543776	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH541	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20007381	-88.00421544	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH542	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20083275	-88.00442272	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH543	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20123743	-88.0055754	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH544	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20249199	-88.00658114	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH545	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20207277	-88.00823221	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH650	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18038366	-87.98188857	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH651	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18048381	-87.98228612	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH652	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Left of culvert. Investigate and remove if determined problematic.	42.18070536	-87.9750533	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH653	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Mostly submerged. Investigate and remove if determined problematic.	42.18075335	-87.97513579	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH672	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18525905	-87.9767627	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH674	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Intentional board across stream. Investigate and remove if determined problematic.	42.18553057	-87.97707862	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH675	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18572144	-87.97725891	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH678	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18588471	-87.97743744	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH679	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18592827	-87.97747114	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH680	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18597426	-87.97751154	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH681	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18602742	-87.97751263	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH683	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18612031	-87.97950241	L	S	1, 3, 4	PD	M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH684	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18614515	-87.97967238	L	S	1, 3, 4	PD	M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH685	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18628194	-87.98007062	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH686	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1862979	-87.98049273	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH687	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1863047	-87.9801906	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH688	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18631526	-87.98124006	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH690	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18632555	-87.98140876	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH691	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18633113	-87.98193947	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH692	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18633324	-87.98160084	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH693	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.186337	-87.98212237	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH694	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18634433	-87.98274433	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH695	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18636847	-87.97752344	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH697	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18655373	-87.97833951	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH698	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18659371	-87.97816407	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH699	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Debris jam caused by fence. Investigate and remove if determined problematic.	42.18662742	-87.97805594	M	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH93	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19595209	-87.98017589	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH94	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19612562	-87.97957994	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH95	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19615893	-87.97949126	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH96	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19621135	-87.97937626	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH98	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.19642915	-87.97874276	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
LNG-ICE	De-icing practices/salt management	672	ac	672	ac	Aptakisic Creek, Buffalo Creek, Indian Creek	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, EIG, IDNR, KRLT	N/A	N/A	0	0	0	236,235	0	N/A	N
DD103	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Unclog outlets, clean up trace amounts of trash & debris	42.24160301	-88.0367133	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD110	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator to decrease excess algae, increase native plants along shoreline to decrease excess erosion	42.23207995	-87.99527919	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD113	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator to decrease excess algae	42.22852787	-87.99603056	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD114	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Remove excess litter/debris	42.23041428	-87.99623802	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD115	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator to decrease excess algae, consider excess scouring at inlets and outlet	42.23088116	-87.99704563	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD116	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator to decrease excess algae	42.23101991	-87.99936977	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD117	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Perhaps remove some excess woody vegetation	42.22875814	-88.00071286	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD118	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Install aerator to decrease excess algae	42.23045629	-88.00156961	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD119	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Install aerator to decrease excess algae	42.2298534	-88.0025984	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD122	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Identify and clear outlet or install outlet to improve water circulation	42.20488595	-88.01537586	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD124	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase buffer	42.19676859	-88.01707784	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD552	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Add aerator, increase native plants to decrease erosion	42.18157404	-87.99131422	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD558	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Remove some excess woody vegetation	42.17997288	-87.99595143	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD563	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Decrease excess woody vegetation, evaluate water quality	42.17848018	-87.99276092	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD58	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Thin out invasive species, thin vegetation around outlets/inlets	42.2411219	-88.04194672	L	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD615	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Repair outlet, assess scouring at inlets	42.18216771	-87.98663626	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD616	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Remove excess litter	42.18792538	-87.98772462	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD617	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Consider removing some excess woody vegetation	42.18061023	-87.97963747	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD618	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek	Remove some excess woody vegetation	42.18038883	-87.97846247	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD619	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Remove some excess woody vegetation	42.19488746	-87.97587965	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD73	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement more native plants	42.22834185	-88.01442778	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD82	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Replace detached FES	42.21707471	-88.01817746	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD85	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Consider removing some excess woody vegetation	42.20856118	-87.97153866	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD86	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Remove some excess woody vegetation	42.20681828	-87.98758047	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD87	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Consider removing some excess woody vegetation	42.20639649	-87.96676666	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD98	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Stabilize bank from erosion	42.18751802	-87.99378548	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD187	Discharge Point	1	no.	N/A	N/A	Indian Creek	Damaged. Investigate and repair if determined problematic.	42.18649302	-87.97754239	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD188	Discharge Point	1	no.	N/A	N/A	Indian Creek	Flared end disconnected. Investigate and repair if determined problematic.	42.18435813	-87.98564299	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD195	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.17986769	-87.98272031	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD70	Discharge Point	1	no.	N/A	N/A	Indian Creek	Under water and sediment. Investigate and repair if determined problematic.	42.21142739	42.21142739	H	S	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD71	Discharge Point	1	no.	N/A	N/A	Indian Creek	Badly rusted. Investigate and repair if determined problematic.	42.22399434	42.22399434	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD73	Discharge Point	1	no.	N/A	N/A	Indian Creek	Rusted. Investigate and repair if determined problematic.	42.20619226	42.20619226	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD74	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.19359097	42.19359097	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD75	Discharge Point	1	no.	N/A	N/A	Buffalo Creek	Filled w rocks and dirt. Investigate and repair if determined problematic.	42.19355018	42.19355018	M	S	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD76	Discharge Point	1	no.	N/A	N/A	Indian Creek	Broken. Investigate and repair if determined problematic.	42.19359678	42.19359678	M	M	1, 3, 4	M, PR/RL	PR/RL, HOA/POA, AG, DD, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD77	Discharge Point	1	no.	N/A	N/A	Indian Creek	Crushed near bank. Investigate and repair if determined problematic.	42.22274768	42.22274768	H	M	1, 3, 4	M, PR/RL	PR/RL, HOA/POA, AG, DD, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD78	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Bottom half missing. Investigate and repair if determined problematic.	42.22444012	42.22444012	H	M	1, 3, 4	M, PR/RL	PR/RL, HOA/POA, AG, DD, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD79	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Disconnected in the middle. Investigate and repair if determined problematic.	42.22451007	42.22451007	M	M	1, 3, 4	M, PR/RL	PR/RL, HOA/POA, AG, DD, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
LNG-FAM	Feed Area Management	0.70	ac	0.70	ac	Indian Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	19	1.0	0.11	0.04	9.1	N	N
SSD126	Field Border	5.6	ac	32	ac	Indian Creek	Install field border	42.16430077	-88.0332019	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$22,400.00	N/A	160	6.0	13	14	16	N	N
SSD132	Grass Waterway	0.40	ac	6.1	ac	Indian Creek	Install grass waterway	42.24972947	-88.02014129	H	S	1	AG	EXT, NRCS/SWCD, FB	$3,200.00	N/A	18	1.5	2.7	2.1	2.0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD144	Grass Waterway	0.60	ac	15	ac	Indian Creek	Install grass waterway	42.21182683	-87.98192785	H	S	1	AG	EXT, NRCS/SWCD, FB	$4,800.00	N/A	45	3.4	4.3	20	5.4	N	N
DPH3	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Path over culvert washed out. Investigate and repair if determined problematic.	42.20007867	-88.02111377	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH37	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Bottom rusted out. Investigate and repair if determined problematic.	42.20242133	-88.00944734	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH40	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.24172579	-88.04297295	M	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH41	Hydraulic Structure	1	no.	N/A	N/A	Aptakisic Creek	Investigate and repair or remove if determined problematic.	42.19391503	-87.98643147	M	M	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH42	Hydraulic Structure	1	no.	N/A	N/A	Buffalo Creek	Damaged wall face. Investigate and repair if determined problematic.	42.24437239	-88.0355744	M	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH44	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.20253448	-88.00706302	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
LNG-TIL	No-Till / Strip-Till	225	ac	225	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$7,875.00	N/A	262	47	100	0	37	Y	N
LNG-NU	Nutrient Management	485	ac	485	ac	Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$9,700.00	N/A	697	123	0	0	0	Y	N
LNG-PE	Pasture Enhancement	0.60	ac	0.60	ac	Indian Creek	Enhance existing pasture operation	N/A	N/A	L	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	2.2	0.22	0.03	0.13	1.4	N	N
SSD119	Permeable Pavement	1.2	ac	1.2	ac	Indian Creek	Install porous pavement	42.19034151	-87.98889441	H	M	1, 3, 4	PO, AG	SMC, SMC	$627,264.00	N/A	5.0	0.24	0.13	747	0.62	Y	N
LNG-RVR	Runoff Volume Reduction Practices	1,319	ac	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$19,317,031	N/A	2,918	258	96	122,535	2,032	Y	N
DSB168	Stream Buffer	0.49	ac	1.8	ac	Aptakisic Creek	Install stream buffer	42.18595862	-87.9772231	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,971.22	N/A	5.2	0.21	0.14	154	3.6	Y	N
DSB55	Stream Buffer	0.57	ac	1.5	ac	Indian Creek	Install stream buffer	42.19405493	-88.00546977	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$2,260.76	N/A	0.97	0.10	0.01	18	0.46	N	N
DSB56	Stream Buffer	0.19	ac	1.2	ac	Indian Creek	Install stream buffer	42.20243914	-88.01002347	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$753.52	N/A	2.4	0.13	0.05	73	1.8	N	N
DST7	Streambank Stabilization	1,036	ft	1,036	ft	Indian Creek	Stabilize stream banks	42.16852281	-87.99398719	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$310,827.54	$310,827.54	54	27	27	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD13	Swale/Open Channel	1	no.	N/A	N/A	Indian Creek	Investigate and remove or repair if determined problematic.	42.19405699	-87.98879567	M	M	1, 3, 4	PR/RL	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD2	Swale/Open Channel	1	no.	N/A	N/A	Indian Creek	Orange discharge	42.20829897	-87.96933508	M	M	1, 3, 4	PD	M, SMC, HOA/POA	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DWS66	Wetland Creation/ Restoration	16	ac	344	ac	Indian Creek	Create new wetlands	42.24298146	-88.02620853	H	M	1, 2, 3, 4	M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$1,258,222.12	N/A	1,108	41	41	7,698	256	N	N
DWS71	Wetland Creation/ Restoration	0.27	ac	990	ac	Indian Creek	Create new wetlands	42.21608903	-87.97506261	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$21,671.43	N/A	2,563	96	42	49,541	892	Y	N
DWS74	Wetland Creation/ Restoration	0.70	ac	235	ac	Aptakisic Creek	Create new wetlands	42.20869364	-87.96504918	H	M	1, 2, 3, 4	PD, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$56,120.86	N/A	532	14	9.3	11,437	230	N	N
DWS75	Wetland Creation/ Restoration	10	ac	131	ac	Aptakisic Creek	Create new wetlands	42.20630741	-87.97563439	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$825,392.47	N/A	307	8.6	4.9	5,801	159	N	N
DWS77	Wetland Creation/ Restoration	12	ac	183	ac	Indian Creek	Create new wetlands	42.20551202	-87.97621688	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$935,114.62	N/A	414	17	12	4,819	229	N	N
DWS78	Wetland Creation/ Restoration	2.8	ac	182	ac	Indian Creek	Create new wetlands	42.21644534	-87.99287888	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$227,245.40	N/A	589	30	33	7,702	127	N	N
DWS84	Wetland Creation/ Restoration	4.3	ac	37	ac	Indian Creek	Create new wetlands	42.19744405	-87.99601068	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$340,526.06	N/A	80	3.6	1.2	1,279	33	N	N
DWS86	Wetland Creation/ Restoration	2.6	ac	40	ac	Indian Creek	Create new wetlands	42.19246606	-87.99893177	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$210,503.69	N/A	68	4.2	0.62	971	29	N	N
DWS87	Wetland Creation/ Restoration	9.3	ac	344	ac	Indian Creek	Create new wetlands	42.18757559	-87.9944156	H	M	1, 2, 3, 4	PD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$742,192.50	N/A	911	39	8.8	10,125	284	N	N
DWS93	Wetland Creation/ Restoration	0.62	ac	24	ac	Indian Creek	Create new wetlands	42.18493516	-88.03888108	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$49,249.09	N/A	63	1.6	1.2	1,056	32	N	N
LNG-WLR	Wetland Creation/ Restoration	67	ac	67	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$5,377,403.60	N/A	285	14	3.7	157	30	Y	N
SSD104	Wetland Creation/ Restoration	6.0	ac	1,542	ac	Indian Creek	Create new wetlands	42.24387262	-88.03558133	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$480,000.00	N/A	1,167	29	17	43,273	478	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF LONG GROVE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD111	Wetland Creation/ Restoration	7.0	ac	38	ac	Indian Creek	Create new wetlands	42.22547522	-88.0080158	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$560,000.00	N/A	95	5.5	0.56	69	62	N	N
LNG-WLE	Wetland Enhancement	31	ac	31	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$930,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF METTAWA

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
MET-CC	Cover Crops	4.0	ac	4.0	ac	Lower Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$240.00	N/A	3.3	0.08	0.02	0	0.75	N	N
DPH763	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.23591281	-87.93590579	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH765	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Two jams. Investigate and remove if determined problematic.	42.24065138	-87.93909911	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH766	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24081626	-87.91640094	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH767	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24126452	-87.91692665	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH768	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2416599	-87.91731851	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH769	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24383064	-87.91697158	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH771	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24472663	-87.91796484	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH772	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24523859	-87.91914291	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH776	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24784218	-87.92246131	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH777	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24797432	-87.92278669	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH778	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24815671	-87.92309422	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH779	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24824958	-87.9234663	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH780	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2482606	-87.92346822	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF METTAWA

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH781	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2487784	-87.9241692	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH782	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.24883284	-87.92423433	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH818	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25748146	-87.93530305	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH820	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2587638	-87.93533688	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH821	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25954111	-87.93004646	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH822	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26101115	-87.93563614	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH823	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26108651	-87.93583974	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH824	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26119589	-87.93613344	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH825	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26119589	-87.93613344	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH826	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26139534	-87.93565391	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH827	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26150732	-87.93476225	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH828	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26163041	-87.93445564	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH829	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26179956	-87.93409823	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF METTAWA

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH830	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Two jams, similar size, 4ft apart. Investigate and remove if determined problematic.	42.2641669	-87.93444834	L	S	1, 3, 4	DOT	M, SMC, PR/RL	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH831	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26426715	-87.93639068	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH833	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26440264	-87.92896809	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH834	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26447435	-87.92861504	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH836	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26452539	-87.9283371	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH837	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26464085	-87.92788674	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH839	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26543558	-87.92683532	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH840	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26585719	-87.92627649	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH841	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26586847	-87.92623878	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH842	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Fence caught organic material and sediment. Investigate and remove if determined problematic.	42.2664218	-87.92580317	M	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH843	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.26689793	-87.92479625	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
MET-ICE	De-icing practices/salt management	138	ac	138	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, EIG, IDNR, KRLT	N/A	N/A	0	0	0	44,505	0	N/A	N
DD473	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Increase buffer	42.24070678	-87.90500141	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF METTAWA

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD138	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Submerged. Investigate and repair if determined problematic.	42.26047417	-87.93446662	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
MET-FAM	Feed Area Management	0.26	ac	0.26	ac	Lower Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	6.5	0.35	0.04	0.008	3.1	N	N
DPH67	Hydraulic Structure	1	no.	N/A	N/A	Lower Des Plaines River	Underwater, not functioning properly. Investigate and repair if determined problematic.	42.26246206	-87.93778769	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH68	Hydraulic Structure	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and repair or remove if determined problematic.	42.26528752	-87.92692752	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
MET-NU	Nutrient Management	4.0	ac	4.0	ac	Lower Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$80.00	N/A	1.6	0.18	0	0	0	N	N
MET-PE	Pasture Enhancement	1.6	ac	1.6	ac	Lower Des Plaines River	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	10	0.59	0.13	0.64	6.3	N	N
MET-RVR	Runoff Volume Reduction Practices	214	ac	N/A	N/A	Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,139,357	N/A	494	48	15	27,211	243	Y	N
SBD28	Streambank Stabilization	597	ft	597	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.23626837	-87.9358087	H	S	1, 2	FPD, PR/RL	M, SMC, IDNR, Illinois EPA	$203,977.51	$228,977.51	72	36	36	0	0	Y	N
DWS62	Wetland Creation/ Restoration	2.9	ac	58	ac	Lower Des Plaines River	Create new wetlands	42.25549846	-87.91674014	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$232,173.67	N/A	119	5.9	1.4	2,885	64	N	N
MET-WLR	Wetland Creation/ Restoration	0.004	ac	0.004	ac	Lower Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$351.82	N/A	0.002	0	0	0.002	0	N	N
MET-WLE	Wetland Enhancement	1.5	ac	1.5	ac	Lower Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA	$45,000.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF MUNDELEIN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
MND-CC	Cover Crops	108	ac	108	ac	Bull Creek, Indian Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$6,480.00	N/A	442	17	63	0	35	Y	N
DPH157	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24558533	-87.99172133	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH158	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24606207	-87.99166848	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH160	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24842443	-87.99783446	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH161	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24888372	-87.99549943	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH162	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.24889939	-87.99604551	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH182	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26348449	-88.00043209	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH184	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26411728	-87.98851135	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH185	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26442301	-87.9872073	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH186	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26449577	-87.98696137	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH187	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26457841	-87.98665158	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH188	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26464714	-87.98644656	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH189	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2648061	-87.98621756	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH190	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26492883	-87.98605611	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF MUNDELEIN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH207	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.27879972	-88.01471301	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH208	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.27878949	-88.01486435	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH209	Debris Jam	1	no.	N/A	N/A	Bull Creek	In front of culvert. Investigate and remove if determined problematic.	42.27893078	-88.01495687	M	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH210	Debris Jam	1	no.	N/A	N/A	Bull Creek	Held by three metal posts in front of culvert. Investigate and remove if determined problematic.	42.27910245	-88.01514736	M	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH211	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.27926444	-88.01552555	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH212	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.27935948	-88.01552575	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH213	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.27969318	-88.01617263	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH214	Debris Jam	1	no.	N/A	N/A	Bull Creek	Investigate and remove if determined problematic.	42.2797278	-88.01619803	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH256	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26613464	-87.98504091	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH257	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26390187	-87.98935851	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH258	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26388829	-87.98948608	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH809	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.25361644	-87.93906972	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF MUNDELEIN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
MND-ICE	De-icing practices/salt management	558	ac	558	ac	Bull Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, PD	N/A	N/A	0	0	0	217,935	0	N/A	N
DD10	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install aerator, expose outlet, unclog outlet, implement more native plants, clean up trash	42.25919356	-87.98834086	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD108	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash, let native plants grow, install aerator, unclog inlet	42.24452235	-87.99555335	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD109	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement native plants	42.23676179	-87.98143308	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD11	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clear & unclog outlet (remove leaf debris), let natural plants grow (don't mow)	42.25836535	-87.98927546	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD12	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Regulate company discharge, clean up trash & debris, thin bank foliage, unclog outlet, install aerator	42.25782593	-87.99375568	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD13	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Fix inlet FES, install aerator, eliminate carp	42.25390833	-87.99258114	L	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD131	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement more native plants into basin bottom, fix outlet FES, install riprap near outlet mouth	42.24519356	-87.99232671	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD14	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Clear a perimeter along building edge, clean up trash, design channel to filter out more yard sediment/debris, unclog outlet, thin vegetation	42.25330134	-87.98929369	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF MUNDELEIN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD16	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Reduce erosion. Implement native plants	42.25150039	-87.99083933	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD17	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash & debris, install aerator, thin out invasive species	42.24204548	-87.97880884	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD18	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek	Clean up trash and debris, unclog outlet, implement native plants	42.24132139	-87.97893975	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD2	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek	Remove garbage, increase native buffer	42.27188244	-88.01927833	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD21	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek	Implement more riprap in channel, clean up trash & debris	42.23624827	-87.97834374	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD22	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek	Clean up trash, clear outlet of debris	42.28593347	-88.03977063	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD24	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Make outlet visible, thin out invasive species	42.23679873	-87.97643729	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD25	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement more native plants by parking lot, install more riprap in some channels	42.24106513	-87.98606304	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD26	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase native buffer	42.26182823	-88.05506828	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD27	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Inspect outlet and determine if repair is needed.	42.26109971	-88.06497762	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD39	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Create meander to slow flow	42.28549431	-88.01598951	L	M	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD40	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Plant natives and try to divert inlet from outlet	42.27454519	-88.01312217	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

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DD47	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install native buffer, remove riprap	42.27376559	-88.02226208	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD49	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Clean up trash & debris, unclog outlet, let native plants grow	42.25071001	-87.99127971	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD5	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek	Install native buffer	42.26235248	-88.06316365	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD51	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash	42.24909647	-87.99041445	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD52	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Eliminate concrete channel, implement native plant bottom, install riprap in channels	42.24718457	-87.9943168	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD53	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trace amounts of trash, reattach inlet FES, incorporate riprap at inlet mouth	42.24568051	-87.99204241	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD56	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash & oil, put inlet at opposite end of basin	42.24337184	-87.99595862	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD60	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	clean up trash & debris	42.23871311	-87.99159797	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD63	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	unclog inlet/outlet, implement more native plants	42.23709806	-87.98347807	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD65	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement more native plants	42.23675811	-87.98190498	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD9	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Indian Creek	Clean up trash, unclog outlet, install aerator	42.25917423	-87.99152111	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD38	Discharge Point	1	no.	N/A	N/A	Bull Creek	Investigate and repair if determined problematic.	42.23428731	42.23428731	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

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DPD41	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.23706343	42.23706343	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD42	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.24173266	42.24173266	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD43	Discharge Point	1	no.	N/A	N/A	Indian Creek	Clogged with soil. Investigate and repair if determined problematic.	42.27732682	42.27732682	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD62	Discharge Point	1	no.	N/A	N/A	Bull Creek, Indian Creek	Pipe disconnected and broken into 2 pieces. Investigate and repair if determined problematic.	42.2796358	42.2796358	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DST9	Filter Strip	1.8	ac	221	ac	Indian Creek	Install filter strip	42.28977507	-88.02591522	H	S	1, 2	PO	SMC, M, PB&D	$7,033.02	N/A	36	2.3	1.2	50	4.5	Y	N
SSD97	Grass Conversion	14	ac	14	ac	Indian Creek	Convert current cover to native grasses	42.27484014	-88.03694846	H	S	1, 2	PO, AG	M	$56,400.00	N/A	219	8.2	82	14	4.1	N	N
SSD98	Grass Conversion	9.0	ac	9.0	ac	Indian Creek	Convert current cover to native grasses	42.27659167	-88.03726008	H	S	1, 2	PD, PO, AG	M	$36,000.00	N/A	124	4.7	25	8.4	2.4	N	N
DPH12	Hydraulic Structure	1	no.	N/A	N/A	Bull Creek, Indian Creek	Investigate and repair or remove if determined problematic.	42.26335922	-87.99749583	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH13	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Erosion of bridge present. Investigate and repair if determined problematic.	42.2780041	-87.99669812	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH14	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Round damaged rim. Investigate and repair if determined problematic.	42.27895086	-88.00264768	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH15	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Investigate and repair or remove if determined problematic.	42.27965163	-88.00336835	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH28	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Rusted circular. Investigate and repair if determined problematic.	42.27894669	-88.01504484	M	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

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MND-TIL	No-Till / Strip-Till	52	ac	52	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$1,820.00	N/A	68	12	88	0	6.2	Y	N
MND-NU	Nutrient Management	108	ac	108	ac	Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$2,160.00	N/A	221	39	0	0	0	Y	N
SSD100	Rain Barrel/Garden	350/170	barrels/gardens	43	ac	Indian Creek	Install rain barrel/rain garden	42.27681181	-88.02731202	H	M	1, 3, 4	PO, PD	HOA/POA, EIG	$623,000.00	N/A	198	13	4.0	12,125	82	Y	N
MND-RVR	Runoff Volume Reduction Practices	1,824	ac	N/A	N/A	Bull Creek, Indian Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$26,704,233	N/A	4,226	396	146	184,456	2,556	Y	N
SSD95	Sediment Forebay	300	ft	1,823	ac	Indian Creek	Install sediment forebay	42.2844397	-87.99649139	H	L	1, 4	PO	LCHD, IDNR, SMC, M	$468,000.00	N/A	3,089	155	81	87,681	937	N	N
SSD96	Sediment Forebay	300	ft	1,345	ac	Indian Creek	Install sediment forebay	42.27738277	-87.99762595	H	L	1, 4	PO	LCHD, IDNR, SMC, M	$468,000.00	N/A	3,593	195	105	107,290	1,425	N	N
DST4	Stormwater Management BMP	1	no.	1,243	ft	Indian Creek	Install stormwater BMPs	42.28095254	-88.00468142	H	S	1	LA	PO, HOA/POA, SMC	$250,000.00	N/A	1,644	86	40	57,864	947	N	N
DSB129	Stream Buffer	0.19	ac	0.66	ac	Indian Creek	Install stream buffer	42.26385929	-87.98932128	H	S	1, 2	M	PR/RL, SMC, IDNR, Illinois EPA	$776.79	N/A	1.8	0.12	0.04	55	1.2	Y	N
DSB130	Stream Buffer	0.24	ac	1.3	ac	Bull Creek	Install stream buffer	42.26342466	-87.99202096	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$946.33	N/A	4.8	0.30	0.12	139	3.5	Y	N
DSB131	Stream Buffer	0.84	ac	2.5	ac	Bull Creek	Install stream buffer	42.26321972	-87.99269617	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$3,347.12	N/A	7.8	0.47	0.13	148	3.3	Y	N
DSB134	Stream Buffer	0.28	ac	0.70	ac	Bull Creek	Install stream buffer	42.26339629	-87.9937142	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,103.05	N/A	2.2	0.14	0.03	44	0.55	Y	N
DSB135	Stream Buffer	0.40	ac	0.44	ac	Bull Creek	Install stream buffer	42.26330383	-87.99650618	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA, CBL	$1,584.67	N/A	0.63	0.07	0.02	25	0.21	Y	N
DSB185	Stream Buffer	0.23	ac	1.7	ac	Indian Creek	Install stream buffer	42.23460733	-87.99300403	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$936.47	N/A	8.9	0.87	0.28	637	1.9	Y	N
DSB251	Stream Buffer	0.07	ac	0.53	ac	Indian Creek	Install stream buffer	42.2813075	-88.01839998	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$292.85	N/A	0.77	0.05	0.02	23	0.58	N	N
DSB39	Stream Buffer	0.05	ac	0.27	ac	Indian Creek	Install stream buffer	42.28110591	-88.0182283	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$214.31	N/A	0.40	0.02	0.01	12	0.30	N	N
DSB40	Stream Buffer	0.08	ac	0.39	ac	Indian Creek	Install stream buffer	42.28082188	-88.01770165	H	S	1, 2	PR/RL	DOT, M, SMC, IDNR, Illinois EPA	$323.23	N/A	0.58	0.04	0.01	16	0.43	N	N
DSB82	Stream Buffer	0.08	ac	0.16	ac	Bull Creek	Install stream buffer	42.23626779	-87.99308193	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$329.69	N/A	0.05	0.009	0	0.23	0.01	Y	N
DSB83	Stream Buffer	0.06	ac	0.14	ac	Bull Creek	Install stream buffer	42.23563985	-87.99317292	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$227.89	N/A	0.04	0.005	0	0.27	0.01	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF MUNDELEIN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB84	Stream Buffer	0.05	ac	0.11	ac	Bull Creek	Install stream buffer	42.23573775	-87.99336962	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$189.56	N/A	0.17	0.01	0.003	7.3	0.03	Y	N
DSB87	Stream Buffer	0.41	ac	1.5	ac	Indian Creek	Install stream buffer	42.24882798	-87.99106701	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,645.07	N/A	1.9	0.10	0.01	4.9	0.23	Y	N
SBD49	Streambank Stabilization	44	ft	44	ft	Indian Creek	Install 1 stream riffle and stabilize stream banks	42.2670444	-87.98397569	H	S	1, 2	PD, UT	M, PB&D, SMC, IDNR, Illinois EPA	$38,208.82	$63,208.82	1.9	0.94	0.94	0	0	Y	N
SBD50	Streambank Stabilization	254	ft	254	ft	Indian Creek	Install 2 stream riffles and stabilize stream banks	42.2646274	-87.98590719	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$126,102.08	$176,102.08	19	9.3	9.3	0	0	Y	N
SBD52	Streambank Stabilization	187	ft	187	ft	Indian Creek	Install 1 stream riffle and stabilize stream banks	42.2639353	-87.98932418	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$81,179.76	$106,179.76	14	6.9	6.9	0	0	Y	N
SSD106	Urban Detention	0.70	ac	13	ac	Indian Creek	Install detention basin	42.24052519	-87.99820608	H	L	1, 3, 4	PO	SMC, M	$100,000.00	N/A	28	2.0	0.82	1,990	6.3	Y	N
DWS49	Wetland Creation/ Restoration	18	ac	300	ac	Indian Creek	Create new wetlands	42.29659078	-88.0102837	H	M	1, 2, 3, 4	PD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,447,427	N/A	821	28	17	5,728	155	Y	N
DWS56	Wetland Creation/ Restoration	1.6	ac	42	ac	Indian Creek	Create new wetlands	42.27077681	-88.02750663	H	M	1, 2, 3, 4	DOT	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$130,774.46	N/A	95	2.2	1.7	2,044	50	Y	N
DWS57	Wetland Creation/ Restoration	7.8	ac	91	ac	Indian Creek	Create new wetlands	42.26378726	-87.9982473	H	M	1, 2, 3, 4	PO, PD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$620,555.47	N/A	475	24	9.3	14,854	142	Y	N
DWS58	Wetland Creation/ Restoration	1.8	ac	35	ac	Indian Creek	Create new wetlands	42.26089468	-87.99240455	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$141,195.43	N/A	70	2.2	1.5	1,872	11	Y	N
DWS59	Wetland Creation/ Restoration	25	ac	592	ac	Indian Creek	Create new wetlands	42.25566836	-87.98662376	H	M	1, 2, 3, 4	PD, PO, M , PB&D	SMC, IDNR, Illinois EPA, USACE, USFWS	$2,035,094.92	N/A	988	34	15	20,280	452	Y	N
DWS65	Wetland Creation/ Restoration	3.3	ac	98	ac	Indian Creek	Create new wetlands	42.2547165	-88.00384	H	M	1, 2, 3, 4	PD, PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$265,255.34	N/A	433	22	7.6	12,765	175	N	N
DWS67	Wetland Creation/ Restoration	7.5	ac	233	ac	Indian Creek	Create new wetlands	42.23637717	-87.9907927	H	M	1, 2, 3, 4	PD, UT, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$599,523.66	N/A	510	13	9.3	11,193	179	Y	N
MND-WLR	Wetland Creation/ Restoration	45	ac	45	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$3,630,876	N/A	188	12	0.9	354	25	Y	N
SSD99	Wetland Creation/ Restoration	3.0	ac	278	ac	Indian Creek	Create new wetlands	42.27607189	-88.03527585	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$240,000.00	N/A	275	18	46	5,861	93	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF MUNDELEIN

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
MND-WLE	Wetland Enhancement	109	ac	109	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$3,270,000	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF NORTHBROOK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
NBK-ICE	De-icing practices/salt management	122	ac	122	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0.0	0.00	0.00	41,834	0.00	N/A	N
DD639	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants to decrease erosion, remove excess litter	42.13779826	-87.88615451	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD640	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants	42.14152013	-87.88389716	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD641	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add native plants to decrease erosion, remove excess litter	42.14653344	-87.8891371	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD642	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Evaluate short-circuiting, add native plants to decrease erosion	42.1471339	-87.89213894	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD643	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove excess litter, add native plants to decrease excess erosion	42.14850528	-87.88980307	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD644	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Install native buffer	42.15136941	-87.88699479	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD645	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Consider excessive overhanging trees, add native plants to decrease erosion	42.15140427	-87.89208218	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD646	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Install native buffer	42.15194783	-87.89096091	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
NBK-RVR	Runoff Volume Reduction Practices	192	ac	N/A	N/A	Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$2,810,224	N/A	400	36	13	17,598	267	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF OLD MILL CREEK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
OLD-CC	Cover Crops	2,932	ac	2,932	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$175,920.00	N/A	12,549	521	1,036	0	1,189	Y	N
OLD-ICE	De-icing practices/salt management	173	ac	173	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	69,624	0	N/A	N
OLD-FAM	Feed Area Management	1.4	ac	1.4	ac	Mill Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	48	4.5	0.26	0.72	24	N	N
SSD19	Field Border	1.1	ac	23	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.46571651	-87.98651242	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,400.00	N/A	122	6.8	24	11	14	Y	N
SSD20	Field Border	1.2	ac	13	ac	Upper Des Plaines River	Install field border	42.46563012	-87.9810996	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,800.00	N/A	43	2	7.0	4.1	5.3	N	N
SSD42	Field Border	0.70	ac	14	ac	Mill Creek	Install field border	42.44149928	-87.97251137	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,800.00	N/A	32	1.8	2.6	3.4	3.3	N	N
SSD45	Field Border	1.2	ac	18	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.4387402	-88.00893189	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,800.00	N/A	36	2.0	1.1	4.4	4.4	Y	N
SSD47	Field Border	3.2	ac	36	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.43414335	-87.97273281	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$12,800.00	N/A	249	14	30	21	21	Y	N
SSD48	Field Border	0.70	ac	14	ac	Mill Creek	Install field border	42.4290223	-87.96108697	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,800.00	N/A	97	5.5	11	8.4	8.3	N	N
SSD55	Field Border	1.1	ac	23	ac	Mill Creek	Install field border	42.40707631	-87.99835968	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,400.00	N/A	111	11	16	356	11	Y	N
SSD57	Field Border	2.3	ac	24	ac	Mill Creek	Install field border	42.40883831	-87.96178018	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$9,200.00	N/A	84	4.7	10	7.8	7.1	N	N
SSD63	Field Border	1.0	ac	14	ac	Mill Creek	Install field border	42.40539247	-87.9948591	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,000.00	N/A	65	3.7	7.0	20	5.6	N	N
SSD54	Grade Control	1	no.	29	ac	Mill Creek	Install rock grade control structure	42.41447491	-87.95828007	H	S	1	PO	AG, NRCS/SWCD	$8,000.00	N/A	47	9.1	14	212	6.4	N	N
SSD139	Grass Waterway	0.50	ac	14	ac	Mill Creek	Install grass waterway	42.40890855	-88.00135532	H	S	1	AG	EXT, NRCS/SWCD, FB	$4,000.00	N/A	82	5.0	8.2	401	10	Y	N
SSD140	Grass Waterway	0.60	ac	11	ac	Mill Creek	Install grass waterway	42.4092632	-87.99493074	H	S	1	AG	EXT, NRCS/SWCD, FB	$4,800.00	N/A	58	4.9	9.0	6.7	6.3	N	N
SSD141	Grass Waterway	1.5	ac	34	ac	Mill Creek	Install grass waterway	42.41147101	-87.99456015	H	S	1	AG	EXT, NRCS/SWCD, FB	$12,000.00	N/A	187	20	28	20	19	N	N
SSD38	Grass Waterway	0.50	ac	11	ac	Upper Des Plaines River	Install grass waterway	42.44689299	-87.97309021	H	S	1	AG	EXT, NRCS/SWCD, FB	$4,000.00	N/A	46	11	11	242	4.0	N	N
SSD39	Grass Waterway	1.4	ac	17	ac	Upper Des Plaines River	Install grass waterway	42.44678914	-87.97415214	H	S	1	AG	EXT, NRCS/SWCD, FB	$11,200.00	N/A	78	11	11	42	8.8	N	N
SSD40	Grass Waterway	1.8	ac	13	ac	Upper Des Plaines River	Install grass waterway	42.44709044	-87.97529216	H	S	1	AG	EXT, NRCS/SWCD, FB	$14,400.00	N/A	99	25	26	48	9.3	N	N
SSD43	Grass Waterway	4.1	ac	86	ac	Dutch Gap Canal/North Mill Creek	Install grass waterway	42.44051535	-87.97881879	H	S	1	AG	EXT, NRCS/SWCD, FB	$32,800.00	N/A	465	41	46	1,077	90	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF OLD MILL CREEK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD49	Grass Waterway	0.30	ac	8.4	ac	Dutch Gap Canal/North Mill Creek	Install grass waterway	42.43208151	-88.00626169	H	S	1	AG	EXT, NRCS/SWCD, FB	$2,400.00	N/A	22	5.7	5.8	2.4	1.8	Y	N
SSD51	Grass Waterway	1.2	ac	21	ac	Mill Creek	Install grass waterway	42.42276094	-87.97213531	H	S	1	AG	EXT, NRCS/SWCD, FB	$9,600.00	N/A	100	13	18	316	10	N	N
SSD52	Grass Waterway	0.60	ac	19	ac	Mill Creek	Install grass waterway	42.41611601	-87.99988332	H	S	1	AG	EXT, NRCS/SWCD, FB	$4,800.00	N/A	56	5.6	5.2	119	8.4	N	N
SSD58	Grass Waterway	3.7	ac	58	ac	Mill Creek	Install grass waterway	42.41103059	-87.95392909	H	S	1	AG	EXT, NRCS/SWCD, FB	$29,600.00	N/A	353	63	77	1,954	43	N	N
DPH72	Hydraulic Structure	1	no.	N/A	N/A	Dutch Gap Canal/North Mill Creek, Mill Creek, Upper Des Plaines River	Minimal water. Investigate and repair if determined problematic.	42.45002585	-87.97215967	H	M	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
OLD-TIL	No-Till / Strip-Till	1,732	ac	1,732	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$60,620.00	N/A	3,072	642	1,518	0	447	Y	N
OLD-NU	Nutrient Management	2,932	ac	2,932	ac	Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$58,640.00	N/A	6,274	1,215	0	0	0	Y	N
SSD56	Pond	1	no.	162	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Upper Des Plaines River	Install pond in rural area	42.40600513	-87.99598354	L	S	1, 3, 4	PO	M, SMC, PB&D, USACE	$50,000.00	N/A	394	22	24	11,378	158	N	N
OLD-RVR	Runoff Volume Reduction Practices	216	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek, Mill Creek, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,156,343	N/A	645	69	20	40,396	214	Y	N
DSB242	Stream Buffer	0.18	ac	1.2	ac	Upper Des Plaines River	Install stream buffer	42.44933623	-87.9779111	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$705.50	N/A	6.4	0.36	0.73	0.68	0.84	N	N
DSB243	Stream Buffer	0.17	ac	0.80	ac	Upper Des Plaines River	Install stream buffer	42.44852991	-87.97519093	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$688.13	N/A	3.6	0.20	0.33	0.38	0.47	N	N
DSB244	Stream Buffer	0.07	ac	0.30	ac	Upper Des Plaines River	Install stream buffer	42.44854977	-87.97588367	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$295.60	N/A	0.19	0.02	0.003	0.08	0.03	N	N
DSB245	Stream Buffer	0.12	ac	0.41	ac	Dutch Gap Canal/North Mill Creek, Mill Creek	Install stream buffer	42.448382	-87.97596231	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$467.16	N/A	1.8	0.10	0.14	0.19	0.23	N	N
DWS16	Wetland Creation/ Restoration	14	ac	80	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	42.43829182	-87.99701739	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,088,389.82	N/A	379	19	28	492	36	N	N
DWS20	Wetland Creation/ Restoration	36	ac	471	ac	Mill Creek	Create new wetlands	42.42731284	-87.9854406	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$2,899,449.16	N/A	3,831	142	301	191	336	Y	N
DWS21	Wetland Creation/ Restoration	15	ac	748	ac	Dutch Gap Canal/North Mill Creek, Mill Creek, Upper Des Plaines River	Create new wetlands	42.41133961	-87.9661656	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,188,559.72	N/A	810	18	39	9,811	128	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF OLD MILL CREEK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
OLD-WLR	Wetland Creation/ Restoration	0.12	ac	0.12	ac	Dutch Gap Canal/North Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$9,925.92	N/A	0.21	0.01	0.002	0.13	0.03	N	N
OLD-WLE	Wetland Enhancement	78	ac	78	ac	Upper Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$2,340,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF PALATINE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
PAL-ICE	De-icing practices/salt management	169	ac	169	ac	Buffalo Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	77,494	0	N/A	N
DD630	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Install native buffer	42.14491631	-88.03113592	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
PAL-RVR	Runoff Volume Reduction Practices	655	ac	N/A	N/A	Buffalo Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$9,587,679	N/A	1,577	150	56	68,583	908	Y	N
PAL-WLR	Wetland Creation/ Restoration	5.9	ac	5.9	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, MWRD, M	$473,130.46	N/A	35	1.8	0.56	1,956	10.0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF RIVERWOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH572	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15714024	-87.90060978	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH573	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.1572531	-87.89978593	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH575	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.15748	-87.89325483	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH589	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.16242616	-87.91854588	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH590	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1625409	-87.918035	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH591	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.16256799	-87.91803508	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH592	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.16257326	-87.91710092	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH594	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.163154	-87.90789558	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH595	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16343471	-87.8934736	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH596	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16343408	-87.89308938	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH597	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16345763	-87.89232486	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH598	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16353408	-87.89401088	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH599	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16357097	-87.89423598	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH600	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16368767	-87.89430081	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH601	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16429582	-87.89548291	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH602	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16438916	-87.8960336	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH605	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.16514706	-87.89895763	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
RIV-ICE	De-icing practices/salt management	158	ac	158	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, EIG, IDNR, KRLT	N/A	N/A	0	0	0	57,898	0	N/A	N
DD520	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Repair detached inlet and outlet, add native plants to decrease shoreline erosion	42.16799813	-87.91965432	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF RIVERWOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD521	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Repair inlets	42.16064873	-87.89074452	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD522	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Add riprap and native plants along shoreline to decrease erosion	42.15882531	-87.88698251	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD525	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Lower Des Plaines River	Add aerator, clean inlets	42.15339988	-87.89204572	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD528	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Lower Des Plaines River	Remove excessive litter from shoreline	42.17114672	-87.92202501	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD141	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Broken end. Investigate and repair if determined problematic.	42.16675512	-87.90314908	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD142	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Under water. Investigate and repair if determined problematic.	42.16504881	-87.898	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD143	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Broken. Investigate and repair if determined problematic.	42.16343844	-87.89246266	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD144	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Under water. Investigate and repair if determined problematic.	42.16342184	-87.89209687	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD145	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Full of sediment. Investigate and repair if determined problematic.	42.15700139	-87.90129609	H	S	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH59	Hydraulic Structure	1	no.	N/A	N/A	Lower Des Plaines River	Broken grate. Investigate and repair if determined problematic.	42.16035797	-87.90149332	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
RIV-RVR	Runoff Volume Reduction Practices	436	ac	N/A	N/A	Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$6,386,453	N/A	893	75	30	33,361	719	Y	N
SBD1	Streambank Stabilization	943	ft	943	ft	Lower Des Plaines River	Install 11 stream riffles and stabilize stream banks	42.15678958	-87.90161772	H	S	1, 2	FPD, PR/RL	M, SMC, IDNR, Illinois EPA	$558,044.80	$833,044.80	29	15	15	0	0	Y	N
SBD21	Streambank Stabilization	455	ft	455	ft	Lower Des Plaines River	Install 1 stream riffle and stabilize stream banks	42.15692534	-87.90272092	H	S	1, 2	FPD, OL	M, DOT, SMC, IDNR, Illinois EPA	$161,413.03	$186,413.03	19	9.3	9.3	0	0	N	N
SBD4	Streambank Stabilization	322	ft	322	ft	Lower Des Plaines River	Stabilize stream banks	42.16428853	-87.91325792	H	S	1, 2	FPD, PR/RL	M, PB&D, SMC, IDNR, Illinois EPA	$96,501.99	$96,501.99	21	11	11	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF RIVERWOODS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD5	Streambank Stabilization	799	ft	799	ft	Lower Des Plaines River	Install 11 stream riffles and stabilize stream banks	42.16356094	-87.89339526	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$514,848.55	$789,848.55	13	6.5	6.5	0	0	Y	N
SBD6	Streambank Stabilization	787	ft	787	ft	Lower Des Plaines River	Stabilize stream banks	42.163372	-87.8934865	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$236,123.60	$236,123.60	16	8.0	8.0	0	0	Y	N
DPD16	Swale/Open Channel	1	no.	N/A	N/A	Lower Des Plaines River	Orange in color. Investigate and repair if determined problematic.	42.16342875	-87.89376961	M	M	1, 3, 4	PR/RL	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DWS95	Wetland Creation/ Restoration	2.1	ac	92	ac	Lower Des Plaines River	Create new wetlands	42.16449396	-87.88770486	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$164,727.27	N/A	107	2.3	2.0	2,544	37	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF ROUND LAKE BEACH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
RLB-CC	Cover Crops	0.02	ac	0.02	ac	Mill Creek	Implement cover crop use	N/A	N/A	L	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1.20	N/A	0.03	0.001	0	0	0.007	N	N
RLB-ICE	De-icing practices/salt management	65	ac	65	ac	Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	25,729	0	N/A	N
DD363	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install aerator and increase native buffer, stabilize bank with riprap	42.38370102	-88.05934455	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
RLB-NU	Nutrient Management	0.02	ac	0.02	ac	Mill Creek	Develop nutrient-management plan	N/A	N/A	L	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$0.40	N/A	0.01	0.003	0	0	0	N	N
RLB-RVR	Runoff Volume Reduction Practices	139	ac	N/A	N/A	Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$2,029,795	N/A	338	35	12	17,810	160	N	N
RLB-WLR	Wetland Creation/ Restoration	4.8	ac	4.8	ac	Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$381,805.47	N/A	9.4	0.32	0.02	19	0.76	N	N
RLB-WLE	Wetland Enhancement	3.3	ac	3.3	ac	Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$99,000.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF ROUND LAKE PARK

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
RLP-CC	Cover Crops	29	ac	29	ac	Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,740.00	N/A	97	4.1	7.8	0	9.8	N	N
RLP-ICE	De-icing practices/salt management	1.4	ac	1.4	ac	Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	485	0	N/A	N
RLP-TIL	No-Till / Strip-Till	11	ac	11	ac	Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$385.00	N/A	14	3.1	10	0	2.1	N	N
RPL-NU	Nutrient Management	29	ac	29	ac	Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$580.00	N/A	48	9.5	0	0	0	N	N
RLP-RVR	Runoff Volume Reduction Practices	3	ac	N/A	N/A	Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$42,072	N/A	8	1	0	330	3	N	N
RLP-WLE	Wetland Enhancement	0.06	ac	0.06	ac	Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$1,800.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF SALEM LAKES

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SAL-CC	Cover Crops	290	ac	290	ac	Dutch Gap Canal/North Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$17,400.00	N/A	941	39	102	0	82	N	*N*
SAL-ICE	De-icing practices/ salt management	48	ac	48	ac	Dutch Gap Canal/North Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	21,346	0	N/A	N
SAL-FAM	Feed Area Management	2.3	ac	2.3	ac	Dutch Gap Canal/North Mill Creek	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	47	4.2	0.25	0.09	23	N	*N*
SSD4	Field Border	1.2	ac	87	ac	Dutch Gap Canal/North Mill Creek	Install field border	42.53512109	-88.07110085	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,800.00	N/A	87	5.4	8.9	9.4	11	N	*N*
SAL-TIL	No-Till / Strip-Till	255	ac	255	ac	Dutch Gap Canal/North Mill Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$8,925.00	N/A	284	59	170	0	41	N	*N*
SAL-NU	Nutrient Management	290	ac	290	ac	Dutch Gap Canal/North Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$5,800.00	N/A	471	90	0	0	0	N	*N*
SAL-PE	Pasture Enhancement	2.4	ac	2.4	ac	Dutch Gap Canal/North Mill Creek	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	10	0.87	0.12	0.61	6.5	Y	*N*
SAL-RVR	Runoff Volume Reduction Practices	139	ac	N/A	N/A	Dutch Gap Canal/North Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$2,038,351	N/A	443	40	15	19,851	290	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF THIRD LAKE

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TRD-CC	Cover Crops	18	ac	18	ac	Mill Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$1,080.00	N/A	31	1.3	0.57	0	3.7	N	N
TRD-ICE	De-icing practices/ salt management	50	ac	50	ac	Mill Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	20,993	0	N/A	N
DD366	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Replant and stabilize slopes, increase unmowed buffer	42.36570028	-88.00828785	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DST6	Filter Strip	4.8	ac	43	ac	Mill Creek	Install filter strip	42.37147809	-88.0129728	H	S	1, 2	LA, PO	SMC, M, PB&D	$19,065.69	N/A	96	6.3	2.6	3,679	65	N	N
DL46	Lake Shoreline Stabilization	73	ft	73	ft	Mill Creek	Stabilize lake shorelines	42.37100728	-88.0082574	H	S	1, 2	PR/RL	M, LA, SMC	$7,332.14	N/A	1.1	0.56	0.56	0	0	Y	N
DSTG31	N/A	1	ea.	N/A	N/A	Mill Creek	Manage invasive/nuisance aquatic plants	42.36815237	-88.00456103	H	S	1, 2	PO, M, LA	HOA/POA, PR/RL, LCHD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
TRD-TIL	No-Till / Strip-Till	0.001	ac	0.001	ac	Mill Creek	Practice no-till or strip-till	N/A	N/A	L	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$0.03	N/A	0.001	0	0.001	0	0	N	N
TRD-NU	Nutrient Management	18	ac	18	ac	Mill Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$360.00	N/A	16	3.0	0	0	0	N	N
TRD-RVR	Runoff Volume Reduction Practices	52	ac	N/A	N/A	Mill Creek	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$759,918	N/A	149	13	5	6,375	102	Y	N
TRD-WLR	Wetland Creation/ Restoration	0.34	ac	0.34	ac	Mill Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$26,860.30	N/A	0.49	0.008	0.001	0.24	0.04	N	N
TRD-WLE	Wetland Enhancement	1.7	ac	1.7	ac	Mill Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$51,000.00	N/A	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
VRN-CC	Cover Crops	80	ac	80	ac	Lower Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$4,800.00	N/A	332	13	19	0	28	Y	N
DPH114	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20468799	-87.94142694	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH115	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20621204	-87.96097899	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH116	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20739678	-87.96339944	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH117	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20741187	-87.96311931	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH118	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20748869	-87.96379389	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH119	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20752842	-87.96278555	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH120	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20786039	-87.96429018	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH121	Debris Jam	1	no.	N/A	N/A	Indian Creek	On island. Investigate and remove if determined problematic.	42.20798058	-87.96417803	L	S	1, 3, 4	PD	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH122	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20892895	-87.96402883	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH123	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20927605	-87.96403403	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH124	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.20978181	-87.96446712	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPH125	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21045836	-87.96426579	L	S	1, 3, 4	PD	M SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH126	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21110565	-87.96412782	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH127	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21123259	-87.96414542	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH128	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21131757	-87.96411726	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH129	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21143138	-87.9641238	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH130	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21148189	-87.96408214	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH131	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21159506	-87.96405104	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH132	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21194687	-87.96397837	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH133	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21242672	-87.96411106	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH134	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21259829	-87.9641088	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH135	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2127288	-87.96414383	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH139	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2135135	-87.96436006	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH140	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21397511	-87.96451549	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH141	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21418784	-87.96481363	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH142	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2142704	-87.96498537	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH143	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21462916	-87.96556775	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH144	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2149367	-87.96605239	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH145	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2151231	-87.96640812	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH147	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22765827	-87.9586412	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH148	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22786089	-87.95853758	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH149	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.22865949	-87.95781466	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH150	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.23020222	-87.95691888	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH151	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2332547	-87.95689281	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH152	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2354935	-87.9577787	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH153	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2354935	-87.9577787	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH154	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.23714829	-87.96057792	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH155	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.23714829	-87.96057792	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH156	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.2381429	-87.96109935	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH180	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26166191	-87.96505779	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH181	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26285074	-87.96551603	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH183	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26399499	-87.96624182	L	S	1, 3, 4	PD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH191	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26592475	-87.9707755	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH260	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.26593586	-87.97204025	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH261	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25517509	-87.96373328	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH262	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.25095241	-87.96403646	L	S	1, 3, 4	PD	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH770	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Many logs. Investigate and remove if determined problematic.	42.24433029	-87.94067534	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
VRN-ICE	De-icing practices/salt management	598	ac	598	ac	Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO, PD	N/A	N/A	0	0	0	213,243	0	N/A	N
DD134	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Removed mesh fence as basin is well established	42.21073771	-87.94584429	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD135	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Clean up trash, fix cracked inlets, implement aerator, grow native wetland plants	42.23626039	-87.95484469	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD19	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Fix aerator, implement native plants, clean up trash	42.24076961	-87.96324645	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD20	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Replant bank to reduce erosion where needed	42.23624921	-87.97268259	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD456	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	re-cover netting	42.2626675	-87.95416239	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD457	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Reduce shoreline erosion	42.26014576	-87.95291636	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD459	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Clear debris out of perimeter riprap	42.25952926	-87.95542314	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD464	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek, Lower Des Plaines River	Implement more native vegetation, clean up trash, energy dissipater/riprap used on inlets	42.25742924	-87.94857965	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD472	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Thin out vegetation around inlet/outlet, install aerator	42.24613506	-87.94892198	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD474	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Implement an energy dissipater at inlets, plant native wetland plants, clean up perimeter.	42.24009029	-87.948847	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD476	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash/debris	42.23670458	-87.9482539	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD477	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clear reed/trash debris, build larger buffer on roadside	42.23571721	-87.9432271	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD479	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Don't cut wetland vegetation, clean up trash, put up a larger plant barrier next to 21	42.23473126	-87.94300952	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD480	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash/debris	42.23189081	-87.94373213	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD481	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up trash/debris	42.23139214	-87.94646677	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD482	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Fix aerator, unclog outlet, implement riprap at inlets, clean up trash	42.22860495	-87.94243182	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD483	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.22807494	-87.93951302	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD484	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up perimeter, trim back trees, eliminate soapy discharge	42.22738718	-87.9466948	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD486	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increased riprap to prevent scouring and erosion at inlets and outlet	42.22468558	-87.94083206	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD487	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Unclog outlet, clean up trash, fix outlet grate, install aerator, implement native plant buffer	42.22266934	-87.9399231	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD488	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.21746261	-87.93705917	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD489	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Evaluate inlets for potential repairs and replacements, install aerators, assess erosion problems	42.21632444	-87.94043324	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD490	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Fix outlet, riprap in front of inlets, clean up litter, implement native plants	42.21628618	-87.94778766	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD491	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.21638735	-87.93654977	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD492	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install aerator, fix & fill in cracked/eroded outlet, incorporate riprap at inlets, clean up trace amounts of trash, more native plant (erosion)	42.21595752	-87.94473476	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD493	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install aerator, unclog outlet, introduce forebay to prevent future clogging, clean up trash, fix inlet, implement native plants	42.2157679	-87.94187782	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD494	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Install aerators, clean trash, implement native plants	42.21540361	-87.9507429	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD495	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Pick up excess litter, more riprap at inlets to prevent scouring, test for possible contaminants such as oil	42.21515666	-87.94673239	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD496	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.21369892	-87.93546566	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD497	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.21317047	-87.9353004	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD498	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase buffer	42.21012262	-87.93871464	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD502	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Increase unmowed buffer	42.22077201	-87.93877839	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD503	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Stabilize mulch	42.20292545	-87.93387586	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD506	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek, Lower Des Plaines River	Clean up perimeter	42.22926405	-87.94690841	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD507	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clean up basin, possible removal of carp	42.23473504	-87.94673123	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD508	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clear debris/trash from riprap side slope	42.23228634	-87.94718541	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD509	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove black erosion control netting around water edge, it's killing fish	42.257028	-87.95226207	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD6	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek, Lower Des Plaines River	Fix inlet, plant more native plants on north side to prevent erosion	42.26194406	-87.97331443	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD8	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Thin out woody vegetation	42.25943481	-87.96816859	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DD81	Detention Basin Retrofit	1	no.	N/A	N/A	Indian Creek	Clear up woody vegetation, kill invasive species	42.2198686	-87.95798168	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD27	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.20112033	42.20112033	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD32	Discharge Point	1	no.	N/A	N/A	Indian Creek	Investigate and repair if determined problematic.	42.22285343	42.22285343	M	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD35	Discharge Point	1	no.	N/A	N/A	Indian Creek	Looks crushed. Investigate and repair if determined problematic.	42.23205086	42.23205086	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD36	Discharge Point	1	no.	N/A	N/A	Indian Creek	In the middle of stream. Investigate and repair if determined problematic.	42.23297747	42.23297747	H	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD40	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and repair if determined problematic.	42.23692954	42.23692954	H	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD63	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Broken. Investigate and repair if determined problematic.	42.25207835	42.25207835	H	M	1, 3, 4	PD	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD64	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and repair if determined problematic.	42.25238982	42.25238982	M	M	1, 3, 4	M	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
SSD114	Field Border	5.3	ac	54	ac	Lower Des Plaines River	Install field border	42.21382991	-87.94222188	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$21,200.00	N/A	248	15	25	16	27	Y	N
DPH33	Hydraulic Structure	1	no.	N/A	N/A	Lower Des Plaines River	Rusted CMP. Investigate and repair if determined problematic.	42.25248806	-87.96410753	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH34	Hydraulic Structure	1	no.	N/A	N/A	Lower Des Plaines River	Heavy damage couch under bridge missing concrete. Investigate and repair if determined problematic.	42.2528313	-87.96419135	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH4	Hydraulic Structure	1	no.	N/A	N/A	Lower Des Plaines River	Rusting away. Investigate and repair if determined problematic.	42.21024495	-87.95430407	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DSTG66	N/A	1.00	ea.	N/A	N/A	Indian Creek	Lake Charles dredging project	42.26095937	-87.96507497	H	S	1, 3, 4	M, PD, PO	HOA/POA, LCHD, SMC, IDNR, USACE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N
VRN-TIL	No-Till / Strip-Till	80	ac	80	ac	Indian Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$2,800.00	N/A	111	21	33	0	16	Y	N
VRN-NU	Nutrient Management	80	ac	80	ac	Indian Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$1,600.00	N/A	166	30	0	0	0	Y	N
VRN-RVR	Runoff Volume Reduction Practices	1,227	ac	N/A	N/A	Indian Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$17,956,995	N/A	2,501	246	82	122,206	1,319	Y	N
DSB102	Stream Buffer	0.12	ac	0.69	ac	Lower Des Plaines River	Install stream buffer	42.21985378	-87.96662816	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$486.02	N/A	1.0	0.06	0.01	20	0.32	Y	N
DSB103	Stream Buffer	0.31	ac	1.9	ac	Lower Des Plaines River	Install stream buffer	42.22049368	-87.96535726	H	S	1, 2	PR/RL, PD	M, SMC, IDNR, Illinois EPA	$1,249.08	N/A	5.9	0.39	0.16	207	4.3	Y	N
DSB104	Stream Buffer	0.78	ac	2.2	ac	Lower Des Plaines River	Install stream buffer	42.22161987	-87.96403173	H	S	1, 2	PD, PR/RL	M, SMC, IDNR, Illinois EPA	$3,127.59	N/A	5.0	0.26	0.12	147	3.3	Y	N
DSB110	Stream Buffer	0.29	ac	0.94	ac	Lower Des Plaines River	Install stream buffer	42.22521868	-87.96065818	H	S	1, 2	PD, PR/RL	M, SMC, IDNR, Illinois EPA	$1,142.90	N/A	2.3	0.10	0.06	72	1.5	Y	N
DSB111	Stream Buffer	0.07	ac	0.28	ac	Indian Creek	Install stream buffer	42.22605576	-87.95987923	H	S	1, 2	PD, DOT	M, SMC, IDNR, Illinois EPA	$284.81	N/A	0.66	0.03	0.02	21	0.45	Y	N
DSB115	Stream Buffer	0.50	ac	3.0	ac	Lower Des Plaines River	Install stream buffer	42.22898714	-87.95746085	H	S	1, 2	PO	M, SMC, IDNR, Illinois EPA	$1,991.15	N/A	9.5	0.55	0.22	415	1.4	Y	N
DSB116	Stream Buffer	0.85	ac	6.7	ac	Lower Des Plaines River	Install stream buffer	42.22925907	-87.95756443	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$3,402.89	N/A	7.0	0.38	0.04	7.8	0.84	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB117	Stream Buffer	0.60	ac	4.6	ac	Lower Des Plaines River	Install stream buffer	42.23117877	-87.9570306	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$2,419.83	N/A	7.6	0.61	0.14	324	1.4	Y	N
DSB118	Stream Buffer	0.09	ac	0.89	ac	Lower Des Plaines River	Install stream buffer	42.23379874	-87.95675948	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$363.10	N/A	3.1	0.18	0.08	191	0.57	Y	N
DSB119	Stream Buffer	0.05	ac	0.24	ac	Lower Des Plaines River	Install stream buffer	42.23703634	-87.95974401	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$193.20	N/A	1.1	0.09	0.03	41	0.18	Y	N
DSB120	Stream Buffer	0.08	ac	0.09	ac	Lower Des Plaines River	Install stream buffer	42.23808527	-87.96100305	H	S	1, 2	PD, PR/RL, DOT	M, SMC, IDNR, Illinois EPA	$322.95	N/A	0.42	0.04	0.01	19	0.07	Y	N
DSB121	Stream Buffer	0.50	ac	2.6	ac	Lower Des Plaines River	Install stream buffer	42.23747296	-87.96062131	H	S	1, 2	PD, PR/RL	M, SMC, IDNR, Illinois EPA	$2,005.36	N/A	10	0.92	0.27	458	1.9	Y	N
DSB122	Stream Buffer	0.27	ac	1.8	ac	Lower Des Plaines River	Install stream buffer	42.24119159	-87.96247732	H	S	1, 2	PD, PR/RL	M, SMC, CBL, IDNR, Illinois EPA	$1,094.96	N/A	9.1	0.45	0.23	341	1.2	Y	N
DSB123	Stream Buffer	0.21	ac	0.74	ac	Lower Des Plaines River	Install stream buffer	42.24119202	-87.96192946	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$855.27	N/A	1.8	0.14	0.03	50	0.24	Y	N
DSB124	Stream Buffer	0.12	ac	0.16	ac	Lower Des Plaines River	Install stream buffer	42.26505634	-87.96783477	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$489.85	N/A	0.32	0.04	0.003	0.86	0.07	Y	N
DSB125	Stream Buffer	0.03	ac	1.3	ac	Lower Des Plaines River	Install stream buffer	42.26493033	-87.96751423	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$114.56	N/A	1.9	0.13	0.02	0.35	0.38	Y	N
DSB126	Stream Buffer	0.31	ac	2.5	ac	Lower Des Plaines River	Install stream buffer	42.26461093	-87.96698304	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,231.31	N/A	5.7	0.32	0.09	59	2.1	Y	N
DSB127	Stream Buffer	0.26	ac	0.93	ac	Lower Des Plaines River	Install stream buffer	42.26499429	-87.9680871	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$1,026.08	N/A	1.6	0.18	0.02	0.53	0.34	Y	N
DSB128	Stream Buffer	0.07	ac	0.23	ac	Lower Des Plaines River	Install stream buffer	42.26478135	-87.96768741	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$289.13	N/A	0.17	0.02	0.002	0.46	0.04	Y	N
DSB182	Stream Buffer	0.88	ac	2.0	ac	Lower Des Plaines River	Install stream buffer	42.23935758	-87.96145104	H	S	1, 2	PR/RL	M, CBL, SMC, IDNR, Illinois EPA	$3,527.75	N/A	4.3	0.35	0.10	213	0.76	Y	N
DSB85	Stream Buffer	0.03	ac	0.09	ac	Lower Des Plaines River	Install stream buffer	42.23204371	-87.99350037	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$112.46	N/A	0.20	0.008	0.01	6.1	0.14	Y	N
DSB90	Stream Buffer	1.3	ac	23	ac	Lower Des Plaines River	Install stream buffer	42.21769837	-87.96792723	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$5,368.59	N/A	52	5.5	0.58	127	13	Y	N
DSB95	Stream Buffer	1.9	ac	18	ac	Indian Creek	Install stream buffer	42.21762487	-87.96773156	H	S	1, 2	PD	M, SMC, IDNR, Illinois EPA	$7,477.23	N/A	35	3.8	0.39	54	7.5	Y	N
SBD41	Streambank Stabilization	124	ft	124	ft	Indian Creek	Install 1 stream riffle and stabilize stream banks	42.25146793	-87.96417972	H	S	1, 2	M, PR/RL	SMC, IDNR, Illinois EPA	$62,099.65	$87,099.65	9.1	4.5	4.5	0	0	Y	N
SBD46	Streambank Stabilization	556	ft	556	ft	Indian Creek	Install 2 stream riffles and stabilize stream banks	42.22057851	-87.96505328	H	S	1, 2	PD	FPD, M, SMC, IDNR, Illinois EPA	$216,660.58	$266,660.58	20	10	10	0	0	Y	N
SBD47	Streambank Stabilization	272	ft	272	ft	Indian Creek	Install 1 stream riffle and stabilize stream banks	42.25234498	-87.96406431	H	S	1, 2	PD	UT, FPD, M, SMC, IDNR, Illinois EPA	$106,546.04	$131,546.04	17	8.3	8.3	0	0	Y	N
SBD51	Streambank Stabilization	260	ft	260	ft	Indian Creek	Install 3 stream riffles and stabilize stream banks	42.23223472	-87.9931777	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$153,062.17	$228,062.17	2.1	1.1	1.1	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF VERNON HILLS

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS59	Wetland Creation/ Restoration	1.4	ac	592	ac	Lower Des Plaines River	Create new wetlands	42.26640582	-87.9728917	H	M	1, 2, 3, 4	PD, PO, M , PB&D	SMC, IDNR, Illinois EPA, USACE, USFWS	$108,873.93	N/A	988	34	15	20,280	452	Y	N
DWS61	Wetland Creation/ Restoration	6.4	ac	269	ac	Lower Des Plaines River	Create new wetlands	42.26599503	-87.96796338	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$513,150.48	N/A	347	14	5.1	3,711	219	Y	N
DWS63	Wetland Creation/ Restoration	4.3	ac	168	ac	Indian Creek	Create new wetlands	42.26012531	-87.95162841	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$340,079.27	N/A	218	6.8	3.1	3,443	64	Y	N
DWS64	Wetland Creation/ Restoration	44	ac	689	ac	Indian Creek	Create new wetlands	42.25540811	-87.96310926	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$3,547,933.96	N/A	1,767	73	23	42,490	650	Y	N
DWS67	Wetland Creation/ Restoration	6.7	ac	233	ac	Indian Creek	Create new wetlands	42.23276225	-87.99016778	H	M	1, 2, 3, 4	PD, UT, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$535,919.90	N/A	510	13	9.3	11,193	179	Y	N
DWS68	Wetland Creation/ Restoration	1.2	ac	11	ac	Lower Des Plaines River	Create new wetlands	42.24248926	-87.96325603	H	M	1, 2, 3, 4	PD, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$93,315.20	N/A	63	3.3	1.1	2,503	15	Y	N
DWS69	Wetland Creation/ Restoration	5.7	ac	241	ac	Indian Creek	Create new wetlands	42.24388718	-87.94413141	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$457,108.99	N/A	559	25	10	15,234	109	Y	N
DWS70	Wetland Creation/ Restoration	8.9	ac	162	ac	Indian Creek	Create new wetlands	42.2364668	-87.97144167	H	M	1, 2, 3, 4	PO, PD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$710,862.96	N/A	442	11	7.4	9,193	98	Y	N
DWS71	Wetland Creation/ Restoration	79	ac	990	ac	Lower Des Plaines River	Create new wetlands	42.21562811	-87.97042496	H	M	1, 2, 3, 4	PD, PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$6,338,040.96	N/A	2,563	96	42	49,541	892	Y	N
DWS72	Wetland Creation/ Restoration	3.3	ac	70	ac	Indian Creek	Create new wetlands	42.22324358	-87.98045569	H	M	1, 2, 3, 4	PD, PO, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$263,978.18	N/A	144	4.4	2.3	3,002	64	Y	N
DWS74	Wetland Creation/ Restoration	2.8	ac	235	ac	Indian Creek	Create new wetlands	42.20664614	-87.9626935	H	M	1, 2, 3, 4	PD, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$227,656.02	N/A	532	14	9.3	11,437	230	N	N
DWS75	Wetland Creation/ Restoration	0.01	ac	131	ac	Indian Creek	Create new wetlands	42.2096869	-87.96484297	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,185.23	N/A	307	8.6	4.9	5,801	159	N	N
VRN-WLR	Wetland Creation/ Restoration	88	ac	88	ac	Indian Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$7,024,497.44	N/A	372	16	1.9	624	45	Y	N
VRN-WLE	Wetland Enhancement	7.4	ac	7.4	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$222,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
WAD-CC	Cover Crops	685	ac	685	ac	Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$41,100.00	N/A	2,429	101	207	0	245	Y	N
WAD-CC	Cover Crops	0.42	ac	0.42	ac	Upper Des Plaines River	Implement cover crop use	N/A	N/A	M	S	1, 2, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$25.20	N/A	1.1	0.05	0.10	0	0.11	N	N
DPH1267	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Sticks caught on rip rap. Investigate and remove if determined problematic.	42.40188737	-87.94240049	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1321	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.43511687	-87.894467	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1323	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43658421	-87.9165647	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1324	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43658748	-87.91669278	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1326	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43732412	-87.92174874	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1327	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43750178	-87.91727582	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1328	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43759008	-87.91734397	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1329	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43769456	-87.91737917	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1330	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. May not be impounded-stream is dry. Investigate and remove if determined problematic.	42.43809578	-87.91803335	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1331	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.43844818	-87.91948755	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1347	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.445508	-87.94761545	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1350	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44578632	-87.94742963	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1351	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44588665	-87.94734908	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1356	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44628957	-87.94683711	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1358	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44650423	-87.94695035	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1361	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44679228	-87.94664516	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1363	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4468658	-87.94656427	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1364	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44697324	-87.94629774	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1365	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44720538	-87.94581351	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1366	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44724092	-87.94582433	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1368	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.44764924	-87.94510122	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1369	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.447522	-87.89832384	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1370	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.44768114	-87.89832242	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

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DPH1372	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.44866793	-87.89825494	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1373	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.44925161	-87.89823608	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1375	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.44944242	-87.89822536	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1377	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.44961624	-87.8981925	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1378	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.44969908	-87.89819434	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1380	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45006803	-87.89821706	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1383	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45061591	-87.89818328	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1390	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Mostly mud present at pond entrance. Investigate and remove if determined problematic.	42.45266373	-87.89825813	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1391	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45287137	-87.89825556	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1394	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.4532571	-87.8982536	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1395	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45364959	-87.89824488	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1396	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45374758	-87.89820641	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1398	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45390214	-87.89828772	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1399	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.4543411	-87.89822661	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1400	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45469668	-87.89822049	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1401	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45498139	-87.89823575	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1402	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45519111	-87.89823399	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1403	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45633913	-87.89825771	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1406	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45801511	-87.89723889	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1408	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45811568	-87.89714451	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1409	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45833897	-87.89697226	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1410	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45839798	-87.89692893	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1411	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45844103	-87.89690349	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1412	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45850822	-87.8968338	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1413	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45859265	-87.8967892	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1414	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.45891867	-87.92838586	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1415	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45882581	-87.89666	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1416	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45891465	-87.89662114	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1417	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45909053	-87.89662206	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1418	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45922833	-87.89659792	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1419	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45924858	-87.88510592	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1420	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45932453	-87.88489905	L	S	1, 3, 4	PO	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1421	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45937443	-87.88490241	L	S	1, 3, 4	PO	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1422	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45953662	-87.89664101	L	S	1, 3, 4	PO	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1423	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.45964491	-87.8966514	L	S	1, 3, 4	PO	SMC, M	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1436	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46152703	-87.92386249	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1437	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46158223	-87.92243597	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1438	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.46168096	-87.9231911	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1440	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46196227	-87.89646918	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1441	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46353035	-87.90126916	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1442	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46366656	-87.90292659	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1443	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Log buried under grass. Investigate and remove if determined problematic.	42.46366999	-87.8853101	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1444	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46373214	-87.89652324	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1445	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46379302	-87.89652628	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1446	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46382904	-87.90318191	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1447	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46434133	-87.8970254	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1448	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46443936	-87.90068754	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1449	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46447959	-87.88537867	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1450	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46453828	-87.88537221	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1451	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46463823	-87.89742339	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1452	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46460033	-87.88536967	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1453	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46497398	-87.8853676	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

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DPH1454	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46503556	-87.88535461	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1455	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Thick shrubs. Investigate and remove if determined problematic.	42.46506041	-87.88535176	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1459	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46540896	-87.88530666	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1462	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46562539	-87.89809128	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1463	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46558741	-87.88528402	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1464	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46570179	-87.89811731	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1465	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46576405	-87.89811589	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1467	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46621165	-87.89810583	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1470	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46664989	-87.8981075	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1471	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46704504	-87.89811077	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1473	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46771216	-87.89815746	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1474	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Downed telephone pole. Investigate and remove if determined problematic.	42.46781485	-87.89813935	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1477	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46813028	-87.89810784	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

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PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1489	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Beaver dam. Investigate and remove if determined problematic.	42.4697679	-87.8981092	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1490	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.47022443	-87.898092	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1494	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Beaver dam. Investigate and remove if determined problematic.	42.4727835	-87.89810868	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1496	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.47288823	-87.89811102	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1499	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47358461	-87.94917691	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1500	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.47348271	-87.89808722	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1501	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47387864	-87.94957967	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1502	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Fallen tree. Investigate and remove if determined problematic.	42.47391718	-87.94992275	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1504	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.47451594	-87.89809198	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1505	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47561417	-87.94582493	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1506	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47568071	-87.94610252	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1507	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Whole section is Impounded. Investigate and remove if determined problematic.	42.47568425	-87.94603268	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1508	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47570049	-87.94607695	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1509	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47571747	-87.94614183	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1510	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.47572103	-87.946147	L	S	1, 3, 4	DOT	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1516	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.4788062	-87.90250893	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH203	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Log buried under grass. Investigate and remove if determined problematic.	42.46366999	-87.8853101	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH204	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46447959	-87.88537867	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH205	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46453828	-87.88537221	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH206	Debris Jam	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and remove if determined problematic.	42.46460033	-87.88536967	L	S	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
WAD-ICE	De-icing practices/salt management	361	ac	361	ac	Lower Des Plaines River, Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1, 2	M	HOA/POA, DOT, EO, EIG, IDNR, KRLT	N/A	N/A	0	0	0	157,825	0	N/A	N
DD144	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Remove asphalt riprap and garbage, don't mow up to overflow/storage dry basin	42.48594296	-87.94906265	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD146	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase natural buffer and add aerator for better circulation. Also, identify elicit discharge.	42.44304281	-87.9475957	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD147	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer by road	42.44190472	-87.93921244	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD149	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, increase native buffer by road	42.43970461	-87.94648403	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD150	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase native buffer	42.43791035	-87.94041749	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD151	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer, install aerator	42.43736195	-87.9398879	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD152	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install native buffer and/or aerator	42.43277674	-87.93919565	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD154	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch, Upper Des Plaines River	Increase native buffer around wet portion of basin	42.43046027	-87.93914831	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD155	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Find/Re-install outlet to improve flow	42.43012296	-87.93010904	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD158	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Install native buffer	42.42947795	-87.93972189	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD160	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Add aerator to improve circulation, add native buffer, increase buffer	42.4227076	-87.91694532	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD161	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Another aerator, native plantings, create buffer on houses side, riprap to slow erosion	42.42132073	-87.92769108	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD162	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase native buffer	42.41818315	-87.91345696	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD353	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Locate and clear inlet	42.46435002	-87.88339602	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD354	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase unmowed buffer	42.46226582	-87.89293565	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD355	Detention Basin Retrofit	1	no.	N/A	N/A	Newport Drainage Ditch	Increase buffer, add aerator	42.46120315	-87.88653311	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD700	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.427767	-87.90668	M	S	1,2,3,4	M	SMC	$5,000	$50,000	N/A	N/A	N/A	N/A	N/A	Y	N
DPD200	Discharge Point	1	no.	N/A	N/A	Newport Drainage Ditch	Rusted. Investigate and repair if determined problematic.	42.44309842	-87.89400733	M	M	1, 3, 4	M, PR/RL	AG, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD201	Discharge Point	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair if determined problematic.	42.44267283	-87.89145856	M	M	1, 3, 4	M, PR/RL	AG, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD202	Discharge Point	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair if determined problematic.	42.47778474	-87.9018201	M	M	1, 3, 4	M, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
WAD-FAM	Feed Area Management	10	ac	10	ac	Newport Drainage Ditch	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	239	22	1.3	2.6	119	Y	N
SSD25	Field Border	1.7	ac	41	ac	Newport Drainage Ditch	Install field border	42.45919521	-87.95289456	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$6,800.00	N/A	136	9.1	38	14	12	Y	N
SSD26	Field Border	0.80	ac	12	ac	Newport Drainage Ditch	Install field border	42.46552895	-87.90402526	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$3,200.00	N/A	46	2.6	4.7	4.0	5.1	Y	N
SSD27	Field Border	0.35	ac	3.1	ac	Newport Drainage Ditch	Install field border	42.46449417	-87.9037926	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$1,400.00	N/A	30	1.7	7.6	2.6	3.3	Y	N
SSD29	Field Border	1.1	ac	6.4	ac	Newport Drainage Ditch	Install field border	42.46234059	-87.90371805	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$4,400.00	N/A	31	1.8	5.4	2.7	3.4	Y	N
SSD21	Grass Waterway	1.4	ac	25	ac	Newport Drainage Ditch	Install grass waterway	42.46633168	-87.96255514	H	S	1	AG	EXT, NRCS/SWCD, FB	$11,200.00	N/A	126	19	25	15	14	Y	N
SSD28	Grass Waterway	3.0	ac	73	ac	Newport Drainage Ditch	Install grass waterway	42.46388704	-87.90366551	H	S	1	AG	EXT, NRCS/SWCD, FB	$24,000.00	N/A	1,060	362	399	154	44	Y	N
DPH74	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair or remove if determined problematic.	42.45818744	-87.9294731	M	M	1, 3, 4	FPD	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH82	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Smashed. Investigate and repair if determined problematic.	42.4294767	-87.89848897	H	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH83	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair or remove if determined problematic.	42.4636961	-87.90280933	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH84	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair or remove if determined problematic.	42.44323564	-87.89571456	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH86	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Investigate and repair or remove if determined problematic.	42.47759964	-87.9018413	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH87	Hydraulic Structure	1	no.	N/A	N/A	Newport Drainage Ditch	Concrete base cracked. Investigate and repair if determined problematic.	42.47680567	-87.90194356	M	M	1, 3, 4	PO	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
WAD-TIL	No-Till / Strip-Till	292	ac	292	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$10,220.00	N/A	482	101	298	0	76	Y	N
WAD-NU	Nutrient Management	685	ac	685	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$13,700.00	N/A	1,214	236	0	0	0	Y	N
WAD-NU	Nutrient Management	0.10	ac	0.1	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 2, 6	PO, AG	NRCS/SWCD, FB, EXT	$2.01	N/A	0.14	2.72	0	0	0	N	N
WAD-PE	Pasture Enhancement	23	ac	23	ac	Upper Des Plaines River	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	183	16	2.2	11	121	Y	N
WAD-RVR	Runoff Volume Reduction Practices	952	ac	N/A	N/A	Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$13,936,251	N/A	2,380	221	75	111,084	1,473	Y	N
DSB1	Stream Buffer	0.67	ac	2.2	ac	Newport Drainage Ditch, Upper Des Plaines River	Install stream buffer	42.46470882	-87.90533863	H	S	1, 2	AG, PR/RL	M, SMC, IDNR, Illinois EPA	$2,678.29	N/A	20	1.1	5.0	1.8	2.2	Y	N
DSB11	Stream Buffer	0.07	ac	0.69	ac	Newport Drainage Ditch	Install stream buffer	42.46745375	-87.88547526	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$293.31	N/A	3.1	0.14	0.03	1.9	0.70	Y	N
DSB14	Stream Buffer	0.60	ac	3.5	ac	Upper Des Plaines River	Install stream buffer	42.46359652	-87.90107888	H	S	1, 2	PR/RL, M	SMC, IDNR, Illinois EPA	$2,381.29	N/A	5.1	0.40	0.05	11	3.7	Y	N
DSB15	Stream Buffer	1.2	ac	9.8	ac	Upper Des Plaines River	Install stream buffer	42.44544133	-87.89678903	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$4,645.97	N/A	42	1.8	0.39	13	10	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DSB16	Stream Buffer	1.6	ac	11	ac	Upper Des Plaines River	Install stream buffer	42.44480272	-87.89670623	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$6,516.58	N/A	51	2.2	0.48	22	12	Y	N
DSB17	Stream Buffer	0.49	ac	2.2	ac	Upper Des Plaines River	Install stream buffer	42.44373085	-87.89586711	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$1,967.65	N/A	10	0.44	0.09	5.5	2.3	Y	N
DSB18	Stream Buffer	2.8	ac	20	ac	Upper Des Plaines River	Install stream buffer	42.44508887	-87.89224452	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$11,211.38	N/A	78	3.2	0.73	6.9	18	Y	N
DSB19	Stream Buffer	2.9	ac	16	ac	Mill Creek, Newport Drainage Ditch, Upper Des Plaines River	Install stream buffer	42.44495876	-87.89206871	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$11,457.00	N/A	63	2.6	0.60	5.7	14	Y	N
DSB20	Stream Buffer	0.31	ac	3.3	ac	Upper Des Plaines River	Install stream buffer	42.44323787	-87.89453413	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$1,249.91	N/A	16	0.67	0.15	3.8	3.9	Y	N
DSB21	Stream Buffer	2.8	ac	23	ac	Upper Des Plaines River	Install stream buffer	42.44318975	-87.89007833	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$11,021.66	N/A	122	5.1	1.3	14	28	N	N
DSB24	Stream Buffer	0.17	ac	1.4	ac	Newport Drainage Ditch	Install stream buffer	42.44304996	-87.89466741	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$660.15	N/A	7.1	0.36	0.14	3.8	1.4	N	N
DSB25	Stream Buffer	1.5	ac	4.7	ac	Newport Drainage Ditch	Install stream buffer	42.44325738	-87.88830228	H	S	1, 2	AG	PB&D, SMC, IDNR, Illinois EPA	$6,140.43	N/A	28	1.1	0.32	2.7	6.3	N	N
DSB254	Stream Buffer	0.24	ac	1.5	ac	Newport Drainage Ditch	Install stream buffer	42.46526744	-87.8851371	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$976.00	N/A	1.6	0.13	0.03	36	1.0	Y	N
DSB26	Stream Buffer	0.32	ac	0.90	ac	Newport Drainage Ditch	Install stream buffer	42.44297594	-87.89339221	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$1,295.56	N/A	4.9	0.12	0.06	7.2	1.7	N	N
DSB27	Stream Buffer	0.55	ac	1.8	ac	Newport Drainage Ditch	Install stream buffer	42.44180003	-87.89547077	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$2,181.47	N/A	8.7	0.49	0.26	8.6	1.5	N	N
DSB29	Stream Buffer	0.67	ac	3.3	ac	Newport Drainage Ditch	Install stream buffer	42.4419713	-87.89571919	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$2,699.22	N/A	5.7	0.43	0.05	6.4	1.3	Y	Y
DSB3	Stream Buffer	0.04	ac	0.10	ac	Upper Des Plaines River	Install stream buffer	42.47642007	-87.90292827	H	S	1, 2	PR/RL	DOT, M, SMC, IDNR, Illinois EPA	$157.75	N/A	0.34	0.03	0.01	18	0.18	Y	N
DSB30	Stream Buffer	0.32	ac	0.93	ac	Upper Des Plaines River	Install stream buffer	42.44054424	-87.89546888	H	S	1, 2	AG	M, SMC, IDNR, Illinois EPA	$1,299.04	N/A	4.3	0.26	0.17	4.5	0.57	N	N
DSB31	Stream Buffer	0.27	ac	0.82	ac	Upper Des Plaines River	Install stream buffer	42.43989228	-87.8958115	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,066.30	N/A	4.0	0.18	0.04	7.3	1.4	N	N
DSB34	Stream Buffer	0.54	ac	2.2	ac	Upper Des Plaines River	Install stream buffer	42.43246452	-87.89501523	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$2,142.05	N/A	2.4	0.07	0.01	0.71	0.28	N	N
DSB35	Stream Buffer	0.43	ac	1.3	ac	Upper Des Plaines River	Install stream buffer	42.43226244	-87.89498889	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$1,700.53	N/A	0.56	0.06	0.00	5.9	0.16	N	N
DSB4	Stream Buffer	0.15	ac	0.11	ac	Upper Des Plaines River	Install stream buffer	42.47633835	-87.9028025	H	S	1, 2	PR/RL	DOT, M, SMC, IDNR, Illinois EPA	$588.25	N/A	0.16	0.02	0.00	12	0.05	Y	N
DSB5	Stream Buffer	0.26	ac	0.40	ac	Upper Des Plaines River	Install stream buffer	42.47665333	-87.90215175	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,022.43	N/A	2.4	0.15	0.08	73	1.8	Y	N
DSB6	Stream Buffer	0.33	ac	1.1	ac	Newport Drainage Ditch	Install stream buffer	42.47672664	-87.90237166	H	S	1, 2	PR/RL	M, SMC, IDNR, Illinois EPA	$1,310.85	N/A	4.8	0.32	0.14	180	3.4	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WADSWORTH

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD19	Streambank Stabilization	469	ft	469	ft	Newport Drainage Ditch	Install 22 stream riffles and stabilize stream banks	42.40219553	-87.94203306	H	S	1, 2	PR/RL	M, DOT, SMC, IDNR, Illinois EPA	$690,708.64	$1,240,708.64	7.2	3.6	3.6	0	0	N	N
SBD20	Streambank Stabilization	497	ft	497	ft	Newport Drainage Ditch	Stabilize stream banks	42.40178449	-87.94183739	H	S	1, 2	PR/RL	M, DOT, SMC, IDNR, Illinois EPA	$148,966.24	$148,966.24	9.1	4.6	4.6	0	0	N	N
SSD22	WASCoB	3	no.	4.3	ac	Upper Des Plaines River	Install WASCoB	42.46337524	-87.95081439	H	S	1, 3, 4	PO, AG	FB, NRCS/SWCD	$12,000.00	N/A	49	21	22	137	1.4	Y	N
SSD23	WASCoB	5	no.	10	ac	Newport Drainage Ditch	Install WASCoB	42.46151044	-87.95232161	H	S	1, 3, 4	PO, AG	FB, NRCS/SWCD	$20,000.00	N/A	57	20	22	465	3.6	Y	N
SSD24	WASCoB	8	no.	15	ac	Upper Des Plaines River	Install WASCoB	42.46080109	-87.95031536	H	S	1, 3, 4	PO, AG	FB, NRCS/SWCD	$32,000.00	N/A	92	33	36	213	4.5	Y	N
DWS10	Wetland Creation/Restoration	6.4	ac	520	ac	Upper Des Plaines River	Create new wetlands	42.4659028	-87.88594662	H	M	1, 2, 3, 4	PO	UT, M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$514,968.64	N/A	649	16	13	8,358	226	Y	N
DWS11	Wetland Creation/Restoration	4.9	ac	116	ac	Upper Des Plaines River	Create new wetlands	42.46812439	-87.95432326	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$393,705.56	N/A	517	19	25	619	73	Y	N
DWS17	Wetland Creation/Restoration	0.62	ac	14	ac	Upper Des Plaines River	Create new wetlands	42.43472192	-87.91317497	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$49,459.09	N/A	46	2.1	0.68	1,017	24	N	N
DWS18	Wetland Creation/Restoration	2.0	ac	50	ac	Newport Drainage Ditch	Create new wetlands	42.43011558	-87.91127345	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$159,506.17	N/A	88	3.7	1.1	838	32	N	N
SSD18	Wetland Creation/Restoration	0.50	ac	21	ac	Newport Drainage Ditch	Create new wetlands	42.47411208	-87.95120751	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$40,000.00	N/A	92	10	5.4	348	34	N	N
SSD50	Wetland Creation/Restoration	0.50	ac	12	ac	Upper Des Plaines River	Create new wetlands	42.42306888	-87.91882957	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$40,000.00	N/A	17	1.1	0.18	1,027	8.3	N	N
WAD-WLR	Wetland Creation/Restoration	14	ac	14	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, SMC, M	$1,132,539.02	N/A	44	1.2	0.18	956	4.1	Y	N
WAD-WLE	Wetland Enhancement	28	ac	28	ac	Upper Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, M	$840,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WHEELING

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
WHE-CC	Cover Crops	61	ac	61	ac	Buffalo Creek	Implement cover crop use	N/A	N/A	M	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$3,660.00	N/A	292	12	47	0	25	Y	N
DPH550	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.13567762	-87.90118478	L	S	1, 3, 4	M	MWRD	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH552	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.1434146	-87.90885833	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH553	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.14803406	-87.90820647	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH555	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15092088	-87.91602871	L	S	1, 3, 4	M	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
WHE-ICE	De-icing practices/salt managemen t	621	ac	621	ac	Aptakisic Creek, Buffalo Creek, Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	224,693	0	N/A	N
DD620	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native plants around shore to prevent minor erosion	42.14950637	-87.91760155	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD621	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native plants to decrease erosion	42.1490333	-87.92017986	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD622	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Repair inlets and outlet	42.15008596	-87.92016494	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD632	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Remove excess litter/debris	42.12385929	-87.91017575	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD633	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove some excess woody vegetation on one shore	42.13061382	-87.90257735	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD634	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Consider removing some excess overhanging woody vegetation	42.12950625	-87.90193138	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD635	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Consider removing some excess overhanging woody vegetation	42.1293112	-87.90175162	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WHEELING

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD636	Detention Basin Retrofit	1	no.	N/A	N/A	Buffalo Creek	Remove some excess woody vegetation, increase native plants along shore to decrease erosion	42.12510774	-87.89956308	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD637	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Add native plants to decrease shoreline erosion	42.15258009	-87.92971225	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD638	Detention Basin Retrofit	1	no.	N/A	N/A	Lower Des Plaines River	Remove excess woody vegetation	42.14296586	-87.91095061	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, M	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
WHE-TIL	No-Till / Strip Till	61	ac	61	ac	Buffalo Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$2,135.00	N/A	97	21	83	0	14	Y	N
WHE-NU	Nutrient Management	61	ac	61	ac	Buffalo Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$1,220.00	N/A	146	29	0	0	0	Y	N
WHE-RVR	Runoff Volume Reduction Practices	1,899	ac	N/A	N/A	Buffalo Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$27,804,935	N/A	3,740	364	131	172,760	1,945	Y	N
DSB173	Stream Buffer	0.67	ac	1.6	ac	Aptakisic Creek	Install stream buffer	42.14522823	-87.92620735	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$2,680.55	N/A	3.8	0.17	0.10	143	1.3	Y	N
DSB174	Stream Buffer	0.60	ac	1.1	ac	Aptakisic Creek	Install stream buffer	42.14522042	-87.9264594	H	S	1, 2	M	SMC, IDNR, Illinois EPA	$2,402.65	N/A	2.7	0.14	0.08	201	0.52	Y	N
DSB175	Stream Buffer	0.17	ac	0.29	ac	Aptakisic Creek	Install stream buffer	42.14647558	-87.92663226	H	S	1, 2	PR/RL	M, CBL, SMC, IDNR, Illinois EPA	$690.75	N/A	1.3	0.07	0.04	41	0.21	Y	N
DSB176	Stream Buffer	0.19	ac	0.42	ac	Aptakisic Creek	Install stream buffer	42.14651074	-87.92636118	H	S	1, 2	PR/RL	M, CBL, SMC, IDNR, Illinois EPA	$765.51	N/A	1.4	0.07	0.04	46	0.23	Y	N
DSB179	Stream Buffer	1.2	ac	4.4	ac	Aptakisic Creek	Install stream buffer	42.15121589	-87.91580254	H	S	1, 2	M, PR/RL	CBL, SMC, IDNR, Illinois EPA	$4,839.65	N/A	12	0.51	0.30	564	6.8	Y	N
SSD127	Urban Detention	1	no.	40	ac	Buffalo Creek	Install detention basin	42.15123303	-87.95413651	H	L	1, 3, 4	PO	M, SMC	$100,000.00	N/A	107	13	3.9	6,455	28	Y	N
DWS100	Wetland Creation/ Restoration	30	ac	149	ac	Buffalo Creek	Create new wetlands	42.13508011	-87.91445674	H	M	1, 2, 3, 4	PO	M, MWRD, IDNR, Illinois EPA, USACE, USFWS	$2,399,274.77	N/A	524	35	9.4	17,049	201	Y	N
DWS98	Wetland Creation/ Restoration	7.5	ac	236	ac	Buffalo Creek	Create new wetlands	42.15178294	-87.95774843	H	M	1, 2, 3, 4	PO, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$596,634.60	N/A	751	34	30	18,551	283	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR THE VILLAGE OF WHEELING

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SSD128	Wetland Creation/ Restoration	2.0	ac	51	ac	Buffalo Creek	Create new wetlands	42.14104934	-87.92688934	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$160,000.00	N/A	140	12	4.0	5,120	39	Y	N
SSD129	Wetland Creation/ Restoration	3.0	ac	78	ac	Buffalo Creek	Create new wetlands	42.14069326	-87.92723729	H	M	1, 3, 4	PO	M, SMC, USACE, IDNR, Illinois EPA, USFWS	$240,000.00	N/A	223	20	5.5	9,429	50	Y	N
WHE-WLR	Wetland Creation/ Restoration	108	ac	108	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	IDNR, Illinois EPA, MWRD, M	$8,605,924.56	N/A	708	37	10	44,666	119	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TVRN-CC	Cover Crops	110	ac	110	ac	Aptakisic Creek, Indian Creek	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$6,600.00	N/A	360	15	14	0	34	Y	N
DPH136	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21288387	-87.96415867	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH137	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21293605	-87.9641922	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH138	Debris Jam	1	no.	N/A	N/A	Indian Creek	Investigate and remove if determined problematic.	42.21346012	-87.9642932	L	S	1, 3, 4	PO	M, SMC, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH574	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15759001	-87.93656522	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH576	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15765269	-87.93313427	L	S	1, 3, 4	PD	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH577	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15837379	-87.93683742	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH579	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15859484	-87.93695493	L	S	1, 3, 4	RR	M, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH581	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.15870996	-87.92225281	L	S	1, 3, 4	PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH586	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.1622318	-87.93855854	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH606	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.16589993	-87.9277209	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH632	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17568909	-87.94455802	L	S	1, 3, 4	RR	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH637	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17671937	-87.94222625	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH638	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.17685381	-87.94164346	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH701	Debris Jam	1	no.	N/A	N/A	Aptakisic Creek	Investigate and remove if determined problematic.	42.18705066	-87.96439802	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH713	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20108571	-87.92017565	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH715	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20506079	-87.92178238	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH716	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20591352	-87.9248235	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH717	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20635897	-87.91940669	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH718	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20649883	-87.91900394	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH719	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20689345	-87.91807674	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH721	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20755918	-87.91739034	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH722	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20789215	-87.92502265	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH724	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20894768	-87.91649357	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH725	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.20897283	-87.9165664	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH750	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.2201902	-87.93374117	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH754	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22242955	-87.93582759	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH755	Debris Jam	1	no.	N/A	N/A	Lower Des Plaines River	Investigate and remove if determined problematic.	42.22254317	-87.93625523	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
TVRN-ICE	De-icing practices/ salt management	135	ac	135	ac	Indian Creek	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	52,574	0	N/A	N
DD129	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase buffer	42.18353377	-88.00133772	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD485	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase unmowed buffer	42.22588263	-87.94931917	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD590	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek	Remove excess litter/debris	42.16483568	-87.92147479	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD592	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek	Add native plants to decrease erosion	42.16124079	-87.92213006	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD595	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Remove excess woody vegetation, install aerator	42.1602095	-87.92223031	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD62	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Remove clogging from inlet and outlet	42.23755107	-88.00374841	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD83	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Install native buffer	42.21341626	-87.95903689	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD98	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Stabilize bank from erosion	42.18751802	-87.99378548	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DD99	Detention Basin Retrofit	1	no.	N/A	N/A	Aptakisic Creek	Increase native buffer for install riprap to stabilize bank in areas	42.18853846	-87.99553547	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
DPD157	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Gray discharge. Investigate and repair if determined problematic.	42.20789245	-87.91691652	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD185	Discharge Point	1	no.	N/A	N/A	Indian Creek	Blocked by debris, Investigate and remove if determined problematic.	42.18166078	-87.91983946	H	S	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD191	Discharge Point	1	no.	N/A	N/A	Indian Creek	Rusted and broken. Investigate and repair if determined problematic.	42.17690224	-87.94158454	H	M	1, 3, 4	M, PR/RL	SMC, CLB	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD193	Discharge Point	1	no.	N/A	N/A	Lower Des Plaines River	Rusted out. Investigate and repair if determined problematic.	42.18935021	-87.9631686	H	M	1, 3, 4	PB&D, PR/RL	AG, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD197	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek	Broken pipe in water. Investigate and repair if determined problematic.	42.15804854	-87.92071252	H	M	1, 3, 4	PD	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD30	Discharge Point	1	no.	N/A	N/A	Aptakisic Creek, Indian Creek, Lower Des Plaines River	Investigate and repair if determined problematic.	42.20551689	42.20551689	M	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	Y
SSD120	Filter Strip	1.5	ac	17	ac	Indian Creek	Install filter strip	42.18796498	-87.96381489	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$6,000.00	N/A	71	3.9	2.8	15	9.1	Y	N
SSD121	Filter Strip	1.4	ac	8.2	ac	Indian Creek	Install filter strip	42.18819299	-87.96401318	H	S	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$5,600.00	N/A	44	2.4	1.9	25	5.7	Y	N
DPH80	Hydraulic Structure	1	no.	N/A	N/A	Indian Creek	Debris in pipe in other end. Investigate and repair if determined problematic.	42.15847388	-87.92222059	H	S	1, 3, 4	PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH81	Hydraulic Structure	1	no.	N/A	N/A	Aptakisic Creek	Investigate and repair or remove if determined problematic.	42.15415696	-87.9273021	M	M	1, 3, 4	PD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TVRN-TIL	No-Till / Strip-Till	44	ac	44	ac	Aptakisic Creek	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$1,540.00	N/A	42	8.8	13	0	6.3	Y	N
TVRNNI	Nutrient Management	110	ac	110	ac	Aptakisic Creek	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$2,200.00	N/A	180	35	0	0	0	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TVRN-RVR	Runoff Volume Reduction Practices	263	ac	N/A	N/A	Aptakisic Creek, Buffalo Creek, Indian Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$3,847,073	N/A	560	47	17	20,027	386	Y	N
DSB140	Stream Buffer	0.10	ac	0.59	ac	Aptakisic Creek, Lower Des Plaines River	Install stream buffer	42.16460396	-87.93139762	H	S	1, 2	PB&D	SMC, IDNR, Illinois EPA	$416.84	N/A	1.3	0.09	0.01	3.3	0.20	Y	N
DSB141	Stream Buffer	0.33	ac	2.8	ac	Aptakisic Creek	Install stream buffer	42.16353144	-87.92222254	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$1,333.24	N/A	13	0.74	2.3	5.2	1.7	Y	N
DSB142	Stream Buffer	0.11	ac	0.51	ac	Indian Creek	Install stream buffer	42.16404077	-87.92498537	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$456.53	N/A	1.8	0.11	0.17	0.21	0.24	Y	N
DSB145	Stream Buffer	0.69	ac	17	ac	Aptakisic Creek	Install stream buffer	42.165805	-87.92783667	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,757.89	N/A	63	3.5	7.3	7.5	8.1	Y	N
DSB146	Stream Buffer	0.67	ac	1.1	ac	Lower Des Plaines River	Install stream buffer	42.16581812	-87.92760485	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$2,699.74	N/A	3.9	0.22	0.68	0.41	0.51	Y	N
DSB43	Stream Buffer	0.47	ac	0.26	ac	Lower Des Plaines River	Install stream buffer	42.20210714	-87.93950308	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$1,893.83	N/A	1.3	0.07	0.04	48	0.90	N	N
DSB44	Stream Buffer	0.49	ac	2.5	ac	Aptakisic Creek	Install stream buffer	42.20576105	-87.94808248	H	S	1, 2	M	PB&D, SMC, IDNR, Illinois EPA	$1,962.50	N/A	10	0.43	0.09	4.9	2.3	N	N
SBD27	Streambank Stabilization	903	ft	903	ft	Indian Creek	Install 1 stream riffle and stabilize stream banks	42.1839361	-87.91835687	H	S	1, 2	PR/RL	M, PB&D, SMC, IDNR, Illinois EPA	$295,990.53	$320,990.53	46	23	23	0	0	N	N
SBD38	Streambank Stabilization	704	ft	704	ft	Lower Des Plaines River	Install 5 stream riffles and stabilize stream banks	42.16405498	-87.92541887	H	S	1, 2	PB&D, PR/RL	SMC, IDNR, Illinois EPA	$336,111.79	$461,111.79	19	9.7	9.7	0	0	N	N
DWS73	Wetland Creation/ Restoration	2.1	ac	82	ac	Aptakisic Creek	Create new wetlands	42.20174118	-87.93882309	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$164,671.75	N/A	266	8.7	4.5	5,601	129	N	N
DWS74	Wetland Creation/ Restoration	0.1	ac	235	ac	Aptakisic Creek	Create new wetlands	42.1985883	-87.96094811	H	M	1, 2, 3, 4	PD, M, PO	SMC, IDNR, Illinois EPA, USACE, USFWS	$5,766.69	N/A	532	14	9.3	11,437	230	N	N
DWS83	Wetland Creation/ Restoration	23	ac	579	ac	Aptakisic Creek	Create new wetlands	42.18774609	-87.96288278	H	M	1, 2, 3, 4	PD, UT, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$1,866,129.30	N/A	2,013	67	36	36,298	714	Y	N
DWS87	Wetland Creation/ Restoration	12	ac	344	ac	Aptakisic Creek	Create new wetlands	42.18853842	-87.99620127	H	M	1, 2, 3, 4	PD, M	SMC, IDNR, Illinois EPA, USACE, USFWS	$986,215.67	N/A	911	39	8.8	10,125	284	N	N
DWS88	Wetland Creation/ Restoration	0.55	ac	515	ac	Indian Creek	Create new wetlands	42.17667702	-87.94296933	H	M	1, 2, 3, 4	PO	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$43,845.79	N/A	692	19	15	18,835	142	Y	N
DWS89	Wetland Creation/ Restoration	6.3	ac	251	ac	Indian Creek	Create new wetlands	42.17989257	-87.95742669	H	M	1, 2, 3, 4	PD, PO, M	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$506,657.09	N/A	254	6.8	5.2	7,038	99	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR VERNON TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS90	Wetland Creation/ Restoration	1.0	ac	441	ac	Indian Creek	Create new wetlands	42.18102937	-87.95896024	H	M	1, 2, 3, 4	PD	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$83,937.86	N/A	905	29	17	21,577	265	Y	N
SSD115	Wetland Creation/ Restoration	3.0	ac	61	ac	Indian Creek	Create new wetlands	42.20426437	-87.9519357	H	M	1, 3, 4	PO	PB&D, SMC, USACE, IDNR, Illinois EPA, USFWS	$240,000.00	N/A	225	14	12	2,586	55	N	N
TVRN-WLR	Wetland Creation/ Restoration	86	ac	86	ac	Aptakisic Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, IDNR, Illinois EPA, SMC	$6,868,800.00	N/A	793	38	5	666	106	Y	N
TVRN-WLE	Wetland Enhancement	5.4	ac	5.4	ac	Indian Creek	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$162,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TWAR-CC	Cover Crops	510	ac	510	ac	Bull Creek, Mill Creek, Upper Des Plaines River	Implement cover crop use	N/A	N/A	H	S	1, 6	AG, PO	FB, EXT, NRCS/SWCD, EIG, IL/WI DOA	$30,600.00	N/A	1,486	58	82	0	147	Y	N
DPH1000	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33836806	-87.9399337	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1001	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33840398	-87.93999665	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1002	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3390514	-87.93912158	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1038	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34949751	-87.96118668	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1040	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Causing multiple swales. Investigate and remove if determined problematic.	42.3497786	-87.96736314	M	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1043	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34989033	-87.9711681	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1044	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.34989008	-87.9709034	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1049	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35027753	-87.96583394	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1050	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35029572	-87.96530748	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1053	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35232615	-87.96594257	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1054	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35249119	-87.96588197	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1061	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35356982	-87.9663211	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1067	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35426296	-87.96674045	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1068	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35436828	-87.9668852	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1071	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35460909	-87.96705913	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1073	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35491448	-87.96930891	L	S	1, 3, 4	PO	SMC, M, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1074	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35495202	-87.96841281	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1075	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35498489	-87.96828934	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1076	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35498631	-87.96838112	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1078	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35510328	-87.9743668	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1081	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35516363	-87.96876006	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1082	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35524628	-87.9698881	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1083	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35531023	-87.97301706	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1084	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35536061	-87.97028272	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1086	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35542423	-87.97017946	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1087	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35544585	-87.97166465	L	S	1, 3, 4	T	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1088	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35561756	-87.97241256	L	S	1, 3, 4	PO	SMC, PB&D, HOA/POA	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1104	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35782205	-87.93806272	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1105	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3581271	-87.93850383	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1106	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35817257	-87.93893894	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1110	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.35978344	-87.93859503	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1111	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36014868	-87.93855295	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1113	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36034918	-87.93865161	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1114	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36035769	-87.9386387	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1117	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36071283	-87.93848145	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1118	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36084136	-87.93837777	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1119	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36095519	-87.93847969	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1129	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36292133	-87.93912409	L	S	1, 3, 4	DOT	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1130	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36298742	-87.93922032	L	S	1, 3, 4	DOT	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1132	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.36372667	-87.93955903	L	S	1, 3, 4	DOT	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1201	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37887348	-87.94825031	L	S	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1203	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37925779	-87.94853211	L	S	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1204	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37948439	-87.94871056	L	S	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1213	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.37975253	-87.91906009	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1222	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38136143	-87.95071819	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH1230	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38575522	-87.91569442	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1237	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.38944578	-87.91734976	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1246	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Many jams in this area. Investigate and remove if determined problematic.	42.39460362	-87.92444713	M	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1247	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39485562	-87.92503395	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1248	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39532702	-87.92525724	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1249	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39571423	-87.92480946	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1250	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39584754	-87.92401002	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1251	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39702444	-87.92395771	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1252	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39825638	-87.92515762	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1253	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Many fallen trees. Investigate and remove if determined problematic.	42.39906028	-87.92700839	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1254	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.39925042	-87.92706186	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1255	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3997157	-87.88655616	L	S	1, 3, 4	PO	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH1269	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40180087	-87.89819552	L	S	1, 3, 4	RR	SMC, PB&D	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1270	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40191065	-87.89836794	L	S	1, 3, 4	RR	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1271	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.4019162	-87.89832561	L	S	1, 3, 4	RR	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1278	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40228169	-87.89906305	L	S	1, 3, 4	RR	M, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1293	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40661694	-87.88691382	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPH1294	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.40685754	-87.90044338	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH985	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3325887	-87.94943291	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH987	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33308948	-87.94940106	L	S	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH988	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33397934	-87.94857033	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH989	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33419268	-87.94711066	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH990	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33429873	-87.94753508	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH991	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.3344038	-87.94710459	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH992	Debris Jam	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and remove if determined problematic.	42.33459604	-87.94666345	L	S	1, 3, 4	PB&D	SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TWAR-ICE	De-icing practices/salt management	523	ac	523	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, PD	N/A	N/A	0	0	0	209,796	0	N/A	N
DD241	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase buffer and install aerator	42.37241278	-87.95642439	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD249	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Thin out storm drain ends so they're visible, unclog inlets, plant more native plants	42.3634177	-87.97382658	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD250	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Eliminate carp by promoting fishing/shocking, plant more native plants along perimeter (especially near road), clean up trash, fix cracked outlet	42.36343465	-87.96939211	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD255	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Place inlet further away from outlet, could benefit from aerator, continue to allow native plant growth	42.36237017	-87.96817586	L	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD257	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Continue to grow a native buffer, increase water circulation w/ aerator, space inlet further from outlet	42.36220152	-87.96827025	L	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD260	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Eliminate carp, implement more native plants, install second aerator towards north end	42.36177522	-87.99069065	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD263	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Clear dead trees, make better flowing channel in basin, thin out vegetation near inlets/outlets	42.36093685	-87.99544858	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD264	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Could benefit from aerator installation, unclog/dig up inlet & outlet	42.35980397	-87.99554408	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD266	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install another aerator, clean up trash, make inlets/outlets visible, implement more native plants	42.3593111	-87.98863372	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD270	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement more native plants, clean up trash	42.35922194	-87.98793798	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD274	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement more native plants as buffer, replant constructed parts, clean up trace amounts of trash	42.35627955	-87.98355872	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD275	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate channels/swales, plant more native plants, put riprap by outlet, clean up trace amounts of trash in center	42.35646623	-87.97865784	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD276	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Unclog channel/clear of debris.	42.35615654	-87.96759963	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD278	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Unclog inlets/outlets mouths of debris, implement more native plants along perimeter, clean up trash	42.35561484	-87.990875	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD280	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install native buffer	42.35547622	-87.97436684	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD282	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Incorporate more riprap, implement native plants in basin	42.35502242	-87.97815401	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD283	Detention Basin Retrofit	1	no.	N/A	N/A	Bull Creek, Mill Creek, Upper Des Plaines River	Unclog outlet, incorporate more native vegetation	42.35456974	-87.97251122	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD286	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek, Upper Des Plaines River	Clear out excess vegetation or clear area around inlets.	42.35374438	-87.96826868	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD287	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Implement more native plants, unclog outlet.	42.35345299	-87.97248375	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD289	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Implement more native plants, use more riprap at inlet, unclog outlet, thin debris from basin bottom	42.35332302	-87.96892686	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD290	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Incorporate native plants.	42.35330238	-87.96987312	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD291	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement native plants	42.35269407	-87.9700276	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD292	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, clean out inlet, clean up trash, implement more native plants around perimeter	42.35276868	-87.96647242	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD330	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, incorporate more native plants, don't mow to water edge, clean up trash on road side	42.36362883	-87.97079144	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD331	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Thin out invasive species along perimeter, clear inlet/outlet mouths of debris,	42.35640018	-87.99590553	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD337	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trace amounts of trash, install aerator	42.36156459	-87.9946341	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD338	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Clean up trace amounts of trash, install aerator	42.36149838	-87.99526084	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD362	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Increase native buffer	42.38727824	-87.99634858	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD391	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement more native plants, unclog inlets/outlets	42.36272333	-87.98490422	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD392	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Thin out vegetation near inlets/outlets	42.35743329	-87.98139259	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD393	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Thin vegetation around inlets/outlets (pathways), clean up trace amounts of trash	42.35669041	-87.98103453	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD394	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Fix aerator, fix cracked outlet, implement native plants along east side	42.36362236	-87.9821623	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DD398	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Eliminate carp, incorporate aerators, clean up trace amounts of trash, implement more native plants	42.36000106	-87.99010275	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD405	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Stop mowed surrounding basin area, clean up trash	42.34989871	-87.96419136	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD407	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Implement more native plants, clean up trash	42.34909288	-87.96414013	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD410	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install native buffer	42.34825951	-87.96567597	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DD413	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Incorporate more native vegetation around eastern side, install aerator	42.34758058	-87.96011738	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD414	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install aerators, implement more native vegetation, eliminate carp	42.34763321	-87.96514622	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD416	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	More riprap along shore to decrease erosion	42.34730082	-87.96422045	M	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD434	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install new RCP outlet	42.34280323	-87.97791568	L	S	1, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD435	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Cover black lining, implement more native plants, install aerator	42.34283006	-87.97428823	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD437	Detention Basin Retrofit	1	no.	N/A	N/A	Mill Creek	Install aerator, implement more native plants along perimeter, unclog inlet	42.34211963	-87.97538434	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD438	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator to circulate water, implement native plants along perimeter	42.34167141	-87.97730809	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD439	Detention Basin Retrofit	1	no.	N/A	N/A	Upper Des Plaines River	Install aerator, implement native plants around perimeter, cover up exposed lining	42.34131383	-87.97603161	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DD440	Detention Basin Retrofit	1	no.	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Install aerator, implement more native plants	42.34112431	-87.97444858	M	S	1, 2, 3, 4	PO, HOA/POA, CBL	SMC, PB&D	$5,000.00	$50,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD115	Discharge Point	1	no.	N/A	N/A	Bull's Brook	Submerged. Investigate and repair if determined problematic.	42.35197579	-87.96594643	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD179	Discharge Point	1	no.	N/A	N/A	Bull's Brook	Investigate and repair if determined problematic.	42.33455593	-87.94676747	H	M	1, 3, 4	PB&D	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPD181	Discharge Point	1	no.	N/A	N/A	Bull's Brook	Overgrown vegetation and broken concrete. Investigate and repair if determined problematic.	42.36204127	-87.92589209	H	S	1, 3, 4	DOT	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DPD198	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Broken . Investigate and repair if determined problematic.	42.16223799	-87.9228463	H	M	1, 3, 4	M, HOA/POA	PR/RL, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPD58	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Under debris jam. Investigate and repair if determined problematic.	42.33152462	42.33152462	H	S	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD59	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.33182036	42.33182036	M	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD60	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair if determined problematic.	42.33225879	42.33225879	H	M	1, 3, 4	PB&D, PR/RL	SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD61	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Rusted out bottom. Investigate and repair if determined problematic.	42.33242562	42.33242562	H	M	1, 3, 4	DOT	PB&D, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPD85	Discharge Point	1	no.	N/A	N/A	Upper Des Plaines River	Grate blocked by debris. Investigate and remove if determined problematic.	42.36373924	-87.93941101	M	M	1, 3, 4	DOT	M, SMC	$5,000.00	$30,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
TWAR-FAM	Feed Area Management	7.3	ac	7.3	ac	Upper Des Plaines River	Install feed area basin	N/A	N/A	H	M	1, 6	AG, PO, EQ	AG, FB, EXT, NRCS/SWCD	$50,000.00	N/A	165	10	0.97	2.5	79	Y	N
SSD59	Field Border	0.20	ac	9.3	ac	Upper Des Plaines River	Install field border	42.40719516	-87.94536206	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$800.00	N/A	27	1.5	2.5	35	2.4	N	N
SSD61	Field Border	2.3	ac	21	ac	Upper Des Plaines River	Install field border	42.40661828	-87.89363083	H	M	1, 2, 6	FPD	FB, NRCS/SWCD, EXT, AG	$9,200.00	N/A	7.4	0.41	0.53	1.7	0.74	Y	N
SSD64	Field Border	0.80	ac	8.7	ac	Upper Des Plaines River	Install field border	42.39398905	-87.95147341	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$3,200.00	N/A	70	2.3	5.2	11	5.6	N	N
SSD66	Field Border	0.60	ac	46	ac	Upper Des Plaines River	Install field border	42.35319686	-87.95175768	H	M	1, 2, 6	AG	FB, NRCS/SWCD, EXT	$2,400.00	N/A	56	3.6	1.7	9.2	7.3	Y	N
SSD138	Grass Waterway	2.0	ac	42	ac	Mill Creek	Install grass waterway	42.33484652	-87.94150734	H	S	1	AG	EXT, NRCS/SWCD, FB	$16,000.00	N/A	87	12	13	566	23	Y	N
SSD143	Grass Waterway	0.15	ac	4.6	ac	Upper Des Plaines River	Install grass waterway	42.3399708	-87.97425937	H	S	1	AG	EXT, NRCS/SWCD, FB	$1,200.00	N/A	18	2.8	3.3	2.0	1.9	Y	N
SSD69	Grass Waterway	0.70	ac	8.8	ac	Mill Creek	Install grass waterway	42.33991104	-87.97457458	H	S	1	AG	EXT, NRCS/SWCD, FB	$5,600.00	N/A	37	6.8	7.7	3.8	3.6	Y	N
DPH20	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Damaged. Investigate and repair if determined problematic.	42.33119071	-87.99728245	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH21	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Bottom rusted away round. Investigate and repair if determined problematic.	42.33148443	-87.99342171	H	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH22	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Armored round. Investigate and repair if determined problematic.	42.33228011	-87.99446325	M	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	Y
DPH46	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Fence and muck in the way; can't access. Investigate and repair if determined problematic.	42.38197604	-87.95131619	M	S	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DPH50	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Full of sediment. Investigate and repair if determined problematic.	42.35297047	-87.96595288	H	S	1, 3, 4	DOT	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH51	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	One pipe is blocked. Investigate and repair if determined problematic.	42.35000273	-87.96211816	H	M	1, 3, 4	PO	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	Y	N
DPH73	Hydraulic Structure	1	no.	N/A	N/A	Upper Des Plaines River	Investigate and repair or remove if determined problematic.	42.40466882	-87.88724557	M	M	1, 3, 4	FPD	PB&D, SMC	$10,000.00	$80,000.00	N/A	N/A	N/A	N/A	N/A	N	N
DL44	Lake Shoreline Stabilization	1,634	ft	1,634	ft	Upper Des Plaines River	Stabilize lake shorelines	42.38936603	-87.99378011	H	S	1, 2	PD, PR/RL	PB&D, LA, SMC	$163,437.12	N/A	25	13	13	0	0	Y	N
DL45	Lake Shoreline Stabilization	116	ft	116	ft	Upper Des Plaines River	Stabilize lake shorelines	42.39119848	-87.99250483	H	S	1, 2	PD	PB&D, LA, SMC	$11,564.04	N/A	1.8	0.89	0.89	0	0	Y	N
TWAR-TIL	No-Till / Strip-Till	181	ac	181	ac	Upper Des Plaines River	Practice no-till or strip-till	N/A	N/A	H	M	1, 6	AG, PO	FB, EXT, NRCS/SWCD	$6,335.00	N/A	284	53	111	0	41	Y	N
TWAR-NU	Nutrient Management	510	ac	510	ac	Upper Des Plaines River	Develop nutrient-management plan	N/A	N/A	M	S	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$10,200.00	N/A	743	136	0	0	0	Y	N
TWAR-PE	Pasture Enhancement	1.9	ac	1.9	ac	Upper Des Plaines River	Enhance existing pasture operation	N/A	N/A	M	L	1, 6	PO, AG	NRCS/SWCD, FB, EXT	$40,000 per site	N/A	11	0.77	0.14	0.65	6.7	Y	N
TWAR-RVR	Runoff Volume Reduction Practices	1,370	ac	N/A	N/A	Bull's Brook, Mill Creek, Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	H, M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$20,063,840	N/A	3,134	286	102	131,684	1,961	Y	N
DST8	Streambank Stabilization	4,863	ft	5,620	ft	Upper Des Plaines River	Stabilize stream banks	42.39013876	-87.98992821	H	S	1, 2	PR/RL, PB&D, PD	SMC, IDNR, Illinois EPA	$1,458,863.74	$1,458,863.74	346	173	173	0	0	Y	N
SBD10	Streambank Stabilization	420	ft	420	ft	Upper Des Plaines River	Install 6 stream riffles and stabilize stream banks	42.3636729	-87.94010077	H	S	1, 2	PR/RL, DOT	PB&D, SMC, IDNR, Illinois EPA	$276,093.93	$426,093.93	26	13	13	0	0	Y	N
SBD18	Streambank Stabilization	924	ft	924	ft	Upper Des Plaines River	Install 7 stream riffles and stabilize stream banks	42.40357518	-87.90998449	H	S	1, 2	PD, M, PB&D	DOT, SMC, IDNR, Illinois EPA	$452,328.17	$627,328.17	7.8	3.9	4.7	0	0	N	N
SBD2	Streambank Stabilization	1,627	ft	1,627	ft	Upper Des Plaines River	Install 23 stream riffles and stabilize stream banks	42.34956927	-87.96376049	H	S	1, 2	PR/RL, PB&D	DOT, SMC, IDNR, Illinois EPA	$1,063,007.96	$1,638,007.96	67	33	33	0	0	Y	N
SBD23	Streambank Stabilization	2,180	ft	2,180	ft	Aptakisic Creek	Install 3 stream riffles and stabilize stream banks	42.33310853	-87.94880844	H	S	1, 2	FPD, PR/RL	M, PB&D, M, UT, IDNR, Illinois EPA	$728,973.02	$803,973.02	79	39	39	0	0	Y	N
SBD24	Streambank Stabilization	1,560	ft	1,560	ft	Bull's Brook	Stabilize stream banks	42.39839419	-87.926243	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$468,028.29	$468,028.29	13	6.4	6.4	0	0	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
SBD31	Streambank Stabilization	433	ft	433	ft	Bull's Brook	Stabilize stream banks	42.38026331	-87.9169342	H	S	1, 2	FPD	UT, DOT, PB&D, SMC, IDNR, Illinois EPA	$129,946.92	$129,946.92	27	13	13	0	0	N	N
SBD33	Streambank Stabilization	1,476	ft	1,476	ft	Upper Des Plaines River	Install 10 stream riffles and stabilize stream banks	42.39608365	-87.92413567	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$692,702.76	$942,702.76	12	6.0	6.0	0	0	N	N
SBD34	Streambank Stabilization	1,653	ft	1,653	ft	Mill Creek	Install 3 stream riffles and stabilize stream banks	42.39907898	-87.92523672	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$570,872.90	$645,872.90	108	54	54	0	0	N	N
SBD39	Streambank Stabilization	1,018	ft	1,018	ft	Upper Des Plaines River	Stabilize stream banks	42.39682813	-87.92627959	H	S	1, 2	PR/RL	PB&D, SMC, IDNR, Illinois EPA	$305,468.07	$305,468.07	8.3	4.2	4.2	0	0	N	N
SBD8	Streambank Stabilization	271	ft	271	ft	Upper Des Plaines River	Install 3 stream riffles and stabilize stream banks	42.35873254	-87.93805397	H	S	1, 2	PR/RL	M, PB&D, DOT, SMC, IDNR, Illinois EPA	$156,386.31	$231,386.31	4.3	2.2	2.2	0	0	Y	N
SBD9	Streambank Stabilization	466	ft	466	ft	Upper Des Plaines River	Stabilize stream banks	42.35833765	-87.93844732	H	S	1, 2	PR/RL	M, PB&D, DOT, SMC, IDNR, Illinois EPA	$139,933.80	$139,933.80	17	8.6	8.6	0	0	Y	N
SSD70	WASCoB	6	no.	14	ac	Upper Des Plaines River	Install WASCoB	42.33865685	-87.93355944	H	S	1, 3, 4	PO, AG	FB, NRCS/SWCD	$24,000.00	N/A	45	9.1	12	5.9	4.7	Y	N
DWS22	Wetland Creation/ Restoration	0.67	ac	244	ac	Upper Des Plaines River	Create new wetlands	42.40626472	-87.88551232	H	M	1, 2, 3, 4	FPD, PO	UT, M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$53,521.89	N/A	552	25	10	4,240	116	N	N
DWS27	Wetland Creation/ Restoration	0.001	ac	208	ac	Upper Des Plaines River	Create new wetlands	42.38819697	-87.92950316	H	M	1, 2, 3, 4	PO, FPD, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$53.02	N/A	220	5.3	3.5	6,183	140	N	N
DWS28	Wetland Creation/ Restoration	0.24	ac	61	ac	Upper Des Plaines River	Create new wetlands	42.38156447	-87.90197488	H	M	1, 2, 3, 4	PO, RR	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$19,342.92	N/A	142	6.2	3.3	5,154	29	N	N
DWS29	Wetland Creation/ Restoration	0.52	ac	195	ac	Upper Des Plaines River	Create new wetlands	42.38259994	-87.928421	H	M	1, 2, 3, 4	PD, M, PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$41,743.19	N/A	209	5.5	3.4	7,628	103	N	N
DWS31	Wetland Creation/ Restoration	1.8	ac	89	ac	Upper Des Plaines River	Create new wetlands	42.39482927	-87.98754525	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$145,597.56	N/A	330	10	11	5,686	107	Y	N
DWS35	Wetland Creation/ Restoration	0.11	ac	586	ac	Mill Creek	Create new wetlands	42.34749783	-87.90464112	H	M	1, 2, 3, 4	PD, PO, DOT, M	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$8,924.23	N/A	382	16	7.5	12,814	156	N	N
DWS37	Wetland Creation/ Restoration	3.0	ac	192	ac	Upper Des Plaines River	Create new wetlands	42.35716001	-87.9184518	H	M	1, 2, 3, 4	FPD, PO, PB&D	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$238,598.90	N/A	157	4.9	2.5	3,918	56	N	N
DWS38	Wetland Creation/ Restoration	1.7	ac	68	ac	Upper Des Plaines River	Create new wetlands	42.36340147	-87.94796253	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$139,005.53	N/A	170	5.9	2.5	692	33	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WARREN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
DWS39	Wetland Creation/ Restoration	0.19	ac	85	ac	Upper Des Plaines River	Create new wetlands	42.36764085	-87.98916283	H	M	1, 2, 3, 4	PO	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$15,170.06	N/A	219	7.0	3.4	4,283	128	N	N
DWS40	Wetland Creation/ Restoration	2.7	ac	123	ac	Upper Des Plaines River	Create new wetlands	42.34630876	-87.99511848	H	M	1, 2, 3, 4	PD	PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$212,274.69	N/A	385	12	6.0	10,196	184	N	N
DWS41	Wetland Creation/ Restoration	1.2	ac	29	ac	Upper Des Plaines River	Create new wetlands	42.34982948	-87.95997185	H	M	1, 2, 3, 4	PO, DOT	M, SMC, IDNR, Illinois EPA, USACE, USFWS	$98,390.67	N/A	93	2.9	0.89	677	28	Y	N
SSD62	Wetland Creation/ Restoration	0.80	ac	142	ac	Upper Des Plaines River	Create new wetlands	42.40034401	-87.88682517	H	M	1, 3, 4	PO	PB&D, SMC, USACE, IDNR, Illinois EPA, USFWS	$64,000.00	N/A	216	11	3.9	7,746	78	N	N
TWAR-WLR	Wetland Creation/ Restoration	17	ac	17	ac	Upper Des Plaines River	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, SMC, IDNR, Illinois EPA	$1,361,600.00	N/A	92	3.7	1.7	211	7.7	Y	N
TWAR-WLE	Wetland Enhancement	20	ac	20	ac	Upper Des Plaines River	Enhance existing wetlands	N/A	N/A	M	M	1, 2, 3, 4	PO	USACE, USFWS, IDNR, SMC, Illinois EPA, PB&D	$600,000.00	N/A	N/A	N/A	N/A	N/A	N/A	Y	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WAUKEGAN TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TWAK-ICE	De-icing practices/salt management	11	ac	11	ac	Upper Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	2,319	0	N/A	N
TWAK-RVR	Runoff Volume Reduction Practices	65	ac	N/A	N/A	Upper Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$949,012	N/A	83	7	3	3,349	60	N	N
DWS30	Wetland Creation/ Restoration	0.59	ac	91	ac	Upper Des Plaines River	Create new wetlands	42.37580808	-87.8815336	H	M	1, 2, 3, 4	PO, DOT	M, PB&D, SMC, IDNR, Illinois EPA, USACE, USFWS	$47,589.51	N/A	112	4.7	1.5	2,206	38	N	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WEST DEERFIELD TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TWDF-ICE	De-icing practices/salt management	0.67	ac	0.67	ac	Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	158	0	N/A	N

SITE-SPECIFIC ACTION PLAN RECOMMENDATIONS FOR WHEELING TOWNSHIP

PLAN ID	BMP TYPE	QUANTITY	UNIT	AREA BENEFITED	UNIT 2	SUBWATERSHED	ACTION	LATITUTDE	LONGITUDE	PRIORITY	TIME FRAME	PLAN GOALS ASSESSED	LEAD PARTNERS	SUPPORTING PARTNERS	TOTAL/LOW-END COST	HIGH-END COST	N REDUCTION (lbs/yr)	P REDUCTION (lbs/yr)	SEDIMENT REDUCTION (tons/yr)	CHLORIDE REDUCTION (lbs/yr)	BACTERIA REDUCTION (billions CFU/yr)	IN CRITICAL AREAS?	IN PREVIOUS PLANS?
TWHE-ICE	De-icing practices/salt management	19	ac	19	ac	Aptakisic Creek, Buffalo Creek, Lower Des Plaines River	Reduce road salt application	N/A	N/A	H	S	1	M	HOA/POA, DOT, EO	N/A	N/A	0	0	0	5,955	0	N/A	N
TWHE-RVR	Runoff Volume Reduction Practices	79	ac	N/A	N/A	Buffalo Creek, Lower Des Plaines River	Install detention basins, rain barrels, rain gardens	N/A	N/A	M	L	1, 2, 3, 4	PO, DOT, PR/RL, CBL	M, PB&D, SMC, MWRD, T, HOA/POA, SI	$1,159,397	N/A	139	12	4	6,248	99	Y	N
TWHE-WLR	Wetland Creation/ Restoration	0.93	ac	0.93	ac	Buffalo Creek	Create new wetlands	N/A	N/A	H	M	1, 2, 3, 4	PO	PB&D, IDNR, Illinois EPA, MWRD	$74,400.00	N/A	9.1	0.77	0.29	673	1.5	Y	N

Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 1

STORMWATER MANAGEMENT COMMISSION

This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. Lake County Stormwater Management Commission

DATA SOURCES:
Cook County GIS
Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division

N

- DPR Watershed Planning Boundary
- Subwatershed Boundaries
- County Boundaries
- Jurisdiction Boundaries
- Rivers/Streams/Creeks
- Debris Jam
- Discharge Point
- Hydraulic Structure
- Swale/Open Channel
- Detention Basin Retrofit
- Field Border
- Filter Strip
- Grass Conversion
- Permeable Pavement
- Rain Barrel/Garden
- Stream Buffer
- Lake Shoreline Stabilization
- Streambank Stabilization
- Stakeholder Identified Flood Damage Reduction Projects
- Bioswale
- General Stakeholder Recommendation
- Grade Control
- Grass Waterway
- Lake Shoreline Stabilization
- Pond
- Sediment Forebay
- Stormwater Management BMP
- Urban Detention
- WASCoB
- Wetland Creation/Restoration
- Wetland Creation/Restoration
- Wetland Enhancement
- No-Till / Strip-Till
- Runoff Volume Reduction
- Pasture Enhancement
- Porous / Permeable Pavement
- Nutrient Management
- Feed Area Management
- Cover Crops

SSD1
SSD2
SSD3
SSD4
SSD4
SSD5
SSD6
SSD7
SSD8
SSD9
SSD10
SSD11
SSD12
SSD13
DD384
DD385
Dutch Gap Canal
North Mill Creek/Dutch Gap Canal
Bristol Woods
Village of Bristol
Town of Salem Lakes
Village of Antioch
Redwing Slough
Antioch Township
Prairie Stream
Dutch Gap
Newport Township
Pine Dunes
Upper Des Plaines River

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

0.95 0 0.95 1.9 Miles

Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 2

STORMWATER MANAGEMENT COMMISSION

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Lake County Stormwater Management Commission

DATA SOURCES:

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Kenosha County GIS

Lake County Stormwater Management Commission

Southeastern Wisconsin Regional Planning Commission

Lake County Department of Information And Technology, GIS & Mapping Division

Town of Salem Lakes
Village of Bristol
Pine Dunes
Dutch Gap
Redwing Slough
Prairie Stream
Newport Township
Upper Des Plaines River
Antioch Township
Village of Antioch
North Mill Creek/Dutch Gap Canal
Raven Glen
Ethel's Woods
Village of Old Mill Creek
Hastings Lake
Village of Lindenhurst
McDonald Woods
Village of Lake Villa
Duck Farm
Lake Villa Township
Fourth Lake
Mill Creek
Warren Township
Village of Round Lake Beach
Village of Third Lake
Village of Grayslake
Rollins Savanna
Avon Township
Village of Gurnee

DD384
DD385
SSD13
SSD16
SSD142
SSD31
SSD35
SSD36
SSD34
SSD33
SSD37
SSD44
SSD45
SSD46
SSD49
SSD43
DD357
DD383
SSD52
SSD141
SSD140
SSD139
SSD55
SSD56
SSD63
DD358
DD359
DD361
DD360
DD362
DD363
SSD19
SSD20
DSB242
DSB245

North Mill Creek
Mill Creek

N

- DPR Watershed Planning Boundary
- Subwatershed Boundaries
- County Boundaries
- Jurisdiction Boundaries
- Rivers/Streams/Creeks
- Debris Jam
- Discharge Point
- Hydraulic Structure
- Swale/Open Channel
- Detention Basin Retrofit
- Field Border
- Filter Strip
- Grass Conversion
- Permeable Pavement
- Rain Barrel/Garden
- Stream Buffer
- Lake Shoreline Stabilization
- Streambank Stabilization
- Stakeholder Identified Flood Damage Reduction Projects
- Bioswale
- General Stakeholder Recommendation
- Grade Control
- Grass Waterway
- Lake Shoreline Stabilization
- Pond
- Sediment Forebay
- Stormwater Management BMP
- Urban Detention
- WASCoB
- Wetland Creation/Restoration
- Wetland Creation/Restoration
- Wetland Enhancement
- No-Till / Strip-Till
- Runoff Volume Reduction
- Pasture Enhancement
- Porous / Permeable Pavement
- Nutrient Management
- Feed Area Management
- Cover Crops

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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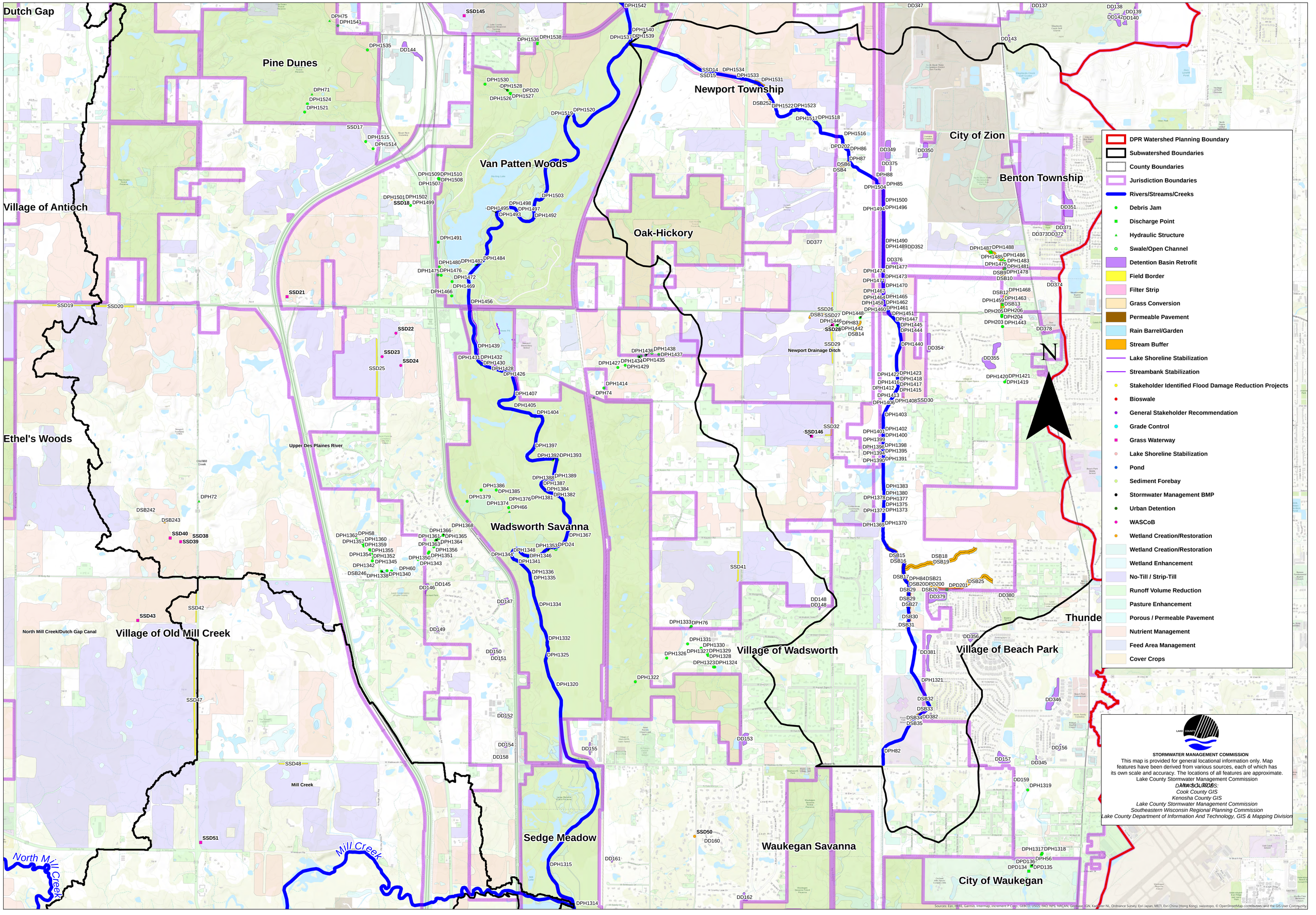
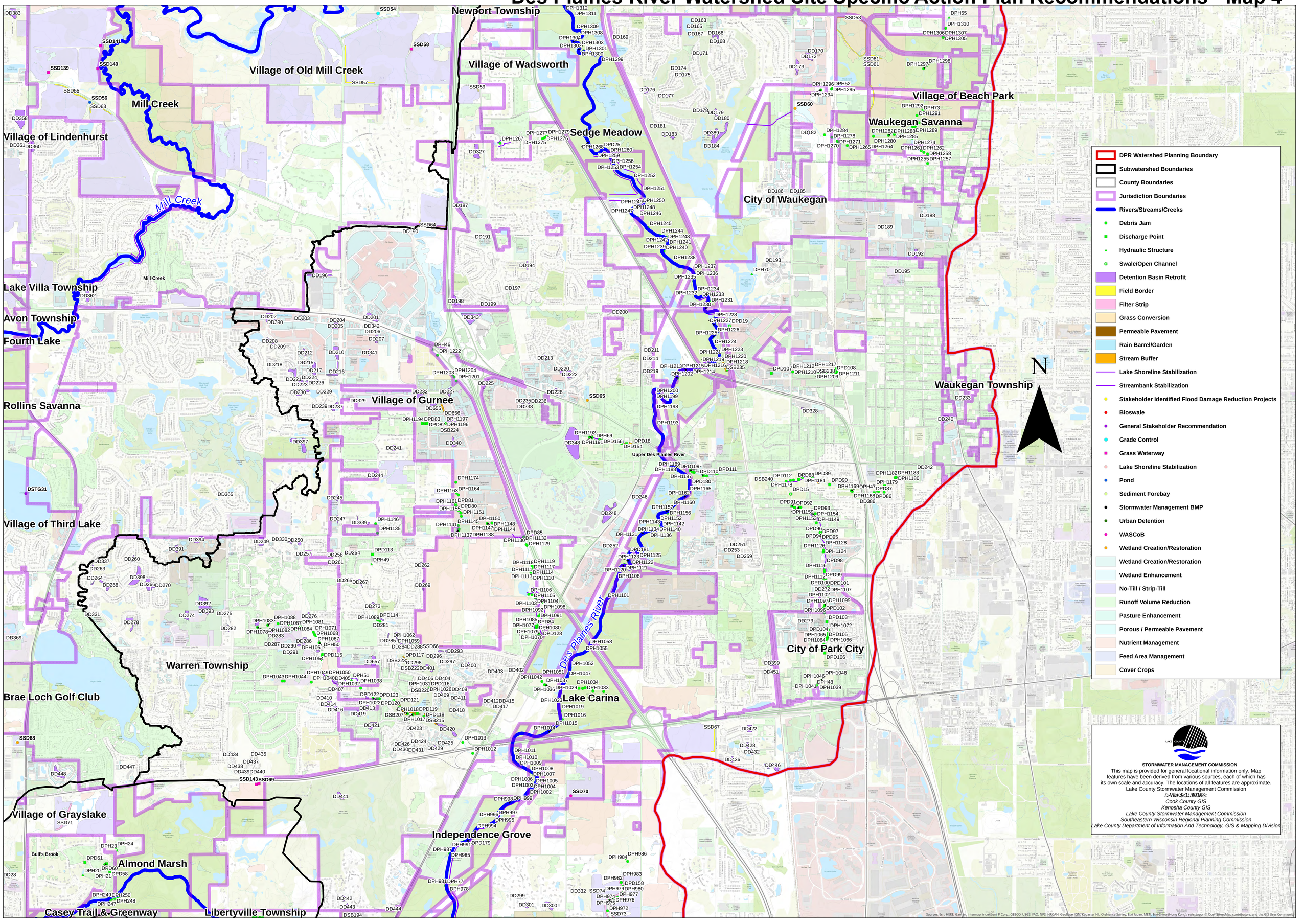
Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 3



Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 4



Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 5

STORMWATER MANAGEMENT COMMISSION

This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate.

Lake County Stormwater Management Commission

DATA SOURCES:

Cook County GIS

Kenosha County GIS

Lake County Stormwater Management Commission

Southeastern Wisconsin Regional Planning Commission

Lake County Department of Information And Technology, GIS & Mapping Division

Map 5 of 5

N

- DPR Watershed Planning Boundary
- Subwatershed Boundaries
- County Boundaries
- Jurisdiction Boundaries
- Rivers/Streams/Creeks
- Debris Jam
- Discharge Point
- Hydraulic Structure
- Swale/Open Channel
- Detention Basin Retrofit
- Field Border
- Filter Strip
- Grass Conversion
- Permeable Pavement
- Rain Barrel/Garden
- Stream Buffer
- Lake Shoreline Stabilization
- Streambank Stabilization
- Stakeholder Identified Flood Damage Reduction Projects
- Bioswale
- General Stakeholder Recommendation
- Grade Control
- Grass Waterway
- Lake Shoreline Stabilization
- Pond
- Sediment Forebay
- Stormwater Management BMP
- Urban Detention
- WASCoB
- Wetland Creation/Restoration
- Wetland Creation/Restoration
- Wetland Enhancement
- No-Till / Strip-Till
- Runoff Volume Reduction
- Pasture Enhancement
- Porous / Permeable Pavement
- Nutrient Management
- Feed Area Management
- Cover Crops

Village of Lindenhurst
Lake Villa Township
Fourth Lake
Village of Round Lake Beach
Warren Township
DD363
Rollins Savanna
Village of Gurnee
DST6
DST6
DST6
DST6
DSTG30DST5
Avon Township
Village of Third Lake
DSTG31
DD366
Mill Creek
DD395
DD367
DD368
Village of Hainesville
Village of Grayslake
DD369
DD396
Brae Loch Golf Club
SSD68
Mill Creek
SSD72
DD450
DD28
DPD57
Bull's Brook
Casey Trail & Greenway
Libertyville Township
Fremont Township
Village of Libertyville
Bull Creek
DD29
DD30
DD449
SSD83

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Miles

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Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 6

STORMWATER MANAGEMENT COMMISSION

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Lake County Stormwater Management Commission

DATA SOURCES:

Cook County GIS

Kenosha County GIS

Lake County Stormwater Management Commission

Southeastern Wisconsin Regional Planning Commission

Lake County Department of Information And Technology, GIS & Mapping Division

N

DPR Watershed Planning Boundary
Subwatershed Boundaries
County Boundaries
Jurisdiction Boundaries
Rivers/Streams/Creeks
Debris Jam
Discharge Point
Hydraulic Structure
Swale/Open Channel
Detention Basin Retrofit
Field Border
Filter Strip
Grass Conversion
Permeable Pavement
Rain Barrel/Garden
Stream Buffer
Lake Shoreline Stabilization
Streambank Stabilization
Stakeholder Identified Flood Damage Reduction Projects
Bioswale
General Stakeholder Recommendation
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Lake Shoreline Stabilization
Pond
Sediment Forebay
Stormwater Management BMP
Urban Detention
WASCoB
Wetland Creation/Restoration
Wetland Creation/Restoration
Wetland Enhancement
No-Till / Strip-Till
Runoff Volume Reduction
Pasture Enhancement
Porous / Permeable Pavement
Nutrient Management
Feed Area Management
Cover Crops

Avon Township
Village of Round Lake Park
Village of Grayslake
Warren Township
Libertyville Township
Village of Libertyville
General Offices
Bull Creek
Village of Mundelein
Countryside Golf Club
Fremont Township
Village of Hawthorn Woods
Village of Long Grove
Vernon Township
Ela Township
Mill Creek
Bull Creek
Indian Creek
Almond Marsh
Casey Trail & Greenway

SSD72 SSD83 SSD87 SSD90 SSD91 SSD89 SSD133 SSD92 SSD86 SSD98 SSD99 SSD100 SSD97 SSD101 SSD103 SSD105 SSD132 SSD131 SSD75 SSD96 SSD106
DD449 DD22 DD5 DD27 DD26 DD23 DD104 DD105 DD111 DD55 DD58 DD48 DD4 DD39 DD40 DD47 DD2 DD42 DD41 DD31 DD30 DD29 DD28 DD33 DD32 DD46 DD44 DD45 DD34 DD35 DD36 DD54 DD57 DD59 DD64 DD106 DD107
DPD61 DPH20 DPD57 DPD54 DPH32 DPH16 DST9 DST9 DSTFP03 DSTFP02 DSTG48 DSTG60 DST3 DST4 DSB251 DSB40 DPH214 DPD62 DPH213 DPH28 DPH210 DPH209 DPH15 DPH14 DPD43 DPH45 DPD72 DPH40 DPH11 DPH182 DPH12 DPH160 DPH278 DPH290 DPH280 DPH288 DPH540 DPH284 DPH287 DPH289 DPH274 DPH285 DPH179 DPH273 DPH176 DPH178 DPH174 DPH177 DPH172 DPH175 DPH173 DPH170 DPH171 DPH169 DPH168 DPH166 DPH167 DPH164 DPH165 DPH163 DPH159 DPH530 DPH531 DPH527 DPH529 DPH528 DPH526 DPH525 DPH517 DPH519 DPH43 DPH513 DPH515 DPH42 DPH505 DPH504 DPH503 DPH402 DPH403

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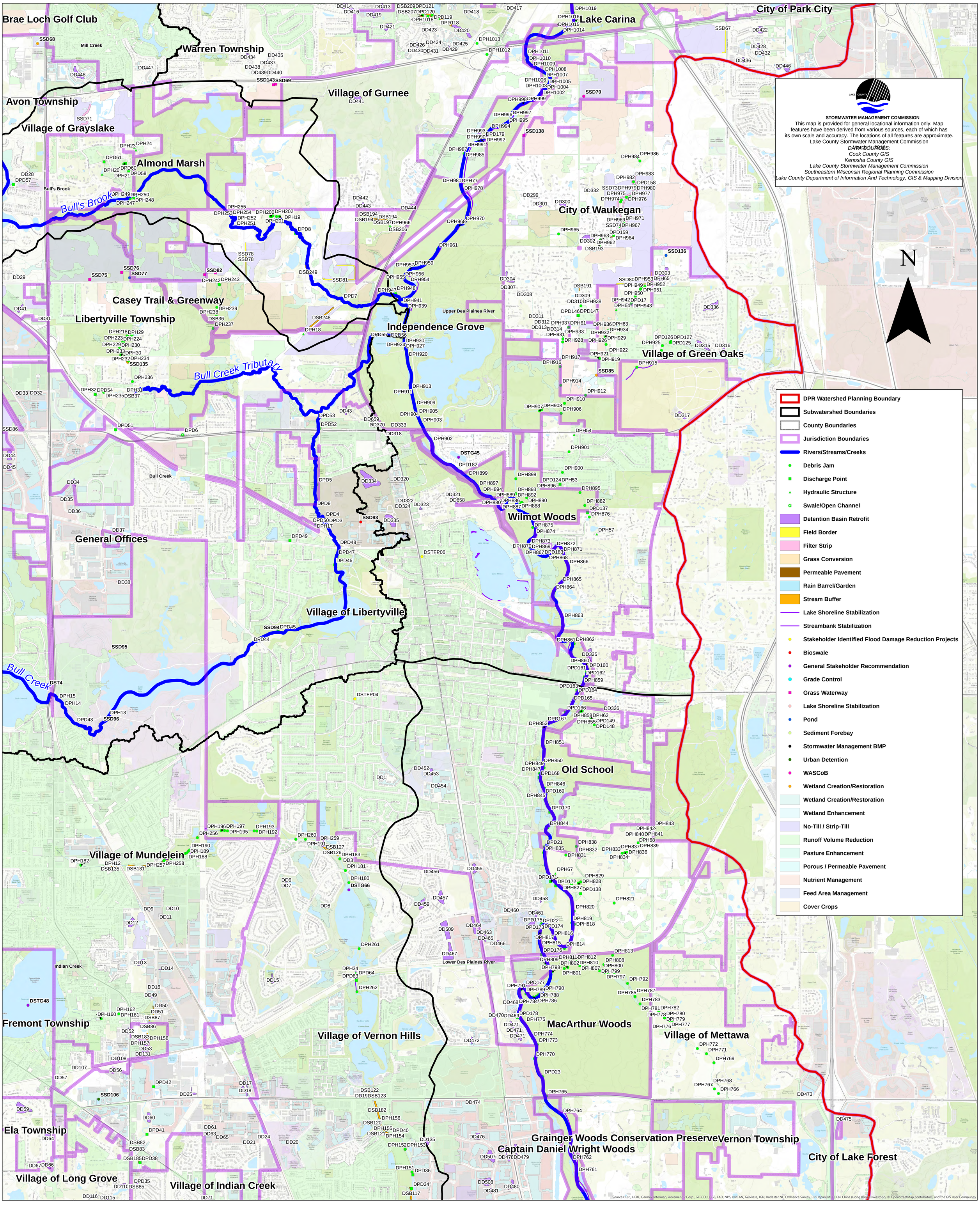
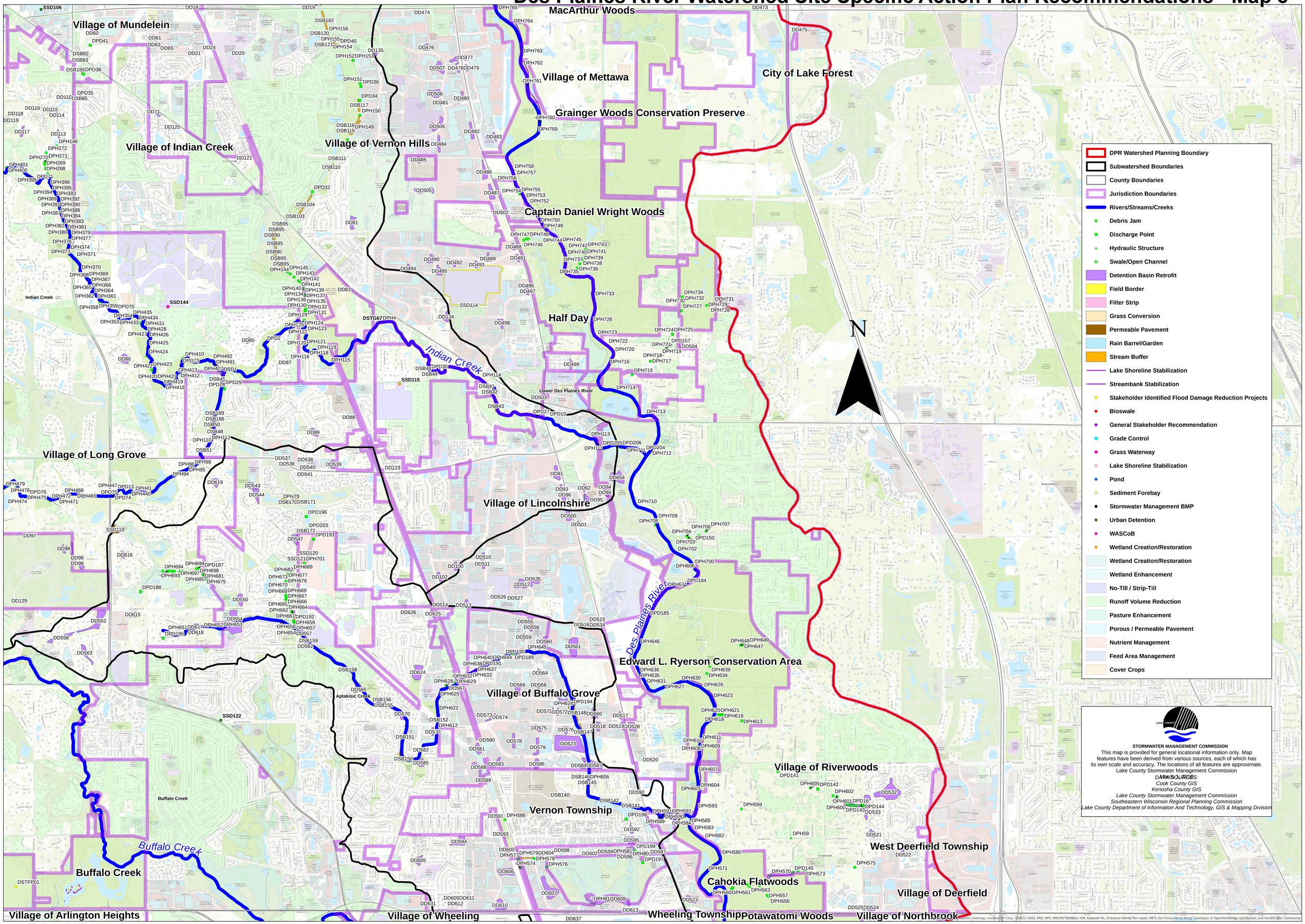
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 7



Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 8



STORMWATER MANAGEMENT COMMISSION

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Lake County Stormwater Management Commission

DATA SOURCES:
Cook County GIS
Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division

Esri Community Maps Contributors, Intermap, increment P Corp., DEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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Des Plaines River Watershed Site Specific Action Plan Recommendations - Map 9

Village of Long Grove
Buffalo Creek
DSTF5
DSTFP01
Ela Township
Palatine Township
DD629
Village of Arlington Heights
Village of Palatine
Buffalo Creek
Village of Buffalo Grove
SSD127
Wheeling Township
Vernon Township
DD593
DD594
DD600
DPH577
DD605
DD606
DPH574
DPH579
DPH578
DD604
DD598
DD602
DD599
DPH581
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DPD197
DPH583
DPH585
DPH584
DPH582
DPH580
DPH571
DPH570
DPD145
DPH573
DPH572
DPH575
DPH59
DD521
West Deerfield Township
DD522
Village of Riverwoods
Cahokia Flatwoods
DPH560
DPH561
DPH563
DPH557
DPH556
Village of Deerfield
DD525
DD524
Aptakisic Creek
DD607
DD609
DD611
DD612
DD631
DD610
DD613
DPH81
DD608
DD523
DD637
DPH555
DSB179
DPH554
DD622
DD621
DD620
DPH553
DD646
DD645
DD644
DD643
DD642
DD641
DSB176
DSB175
DSB173
DSB174
DPH552
DPH551
Potawatomi Woods
DD638
SSD128
SSD129
Buffalo Creek
Lower Des Plaines River
DD640
DD639
Village of Northbrook
DPH550
DPH549
Dam No. 1 Woods
DD633
DD635
DPH548
DD636
DD632
DPH547
DPD186
Northfield Township
City of Prospect Heights
Village of Glenview
Prospect Heights
Forest River
N

DPR Watershed Planning Boundary
Subwatershed Boundaries
County Boundaries
Jurisdiction Boundaries
Rivers/Streams/Creeks
Debris Jam
Discharge Point
Hydraulic Structure
Swale/Open Channel
Detention Basin Retrofit
Field Border
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Wetland Enhancement
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Runoff Volume Reduction
Pasture Enhancement
Porous / Permeable Pavement
Nutrient Management
Feed Area Management
Cover Crops

LAKE COUNTY

STORMWATER MANAGEMENT COMMISSION

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Lake County Stormwater Management Commission

DATA SOURCES:
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Kenosha County GIS
Lake County Stormwater Management Commission
Southeastern Wisconsin Regional Planning Commission
Lake County Department of Information And Technology, GIS & Mapping Division

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

1 0 1 2 Miles

Appendix O : Previously Approved Subwatershed-Based Plans

Subwatershed-Based Plan can be found on SMC's webpage links below:

- **Bull Creek/Bulls Brook Watershed Based Plan (2009)**
  - http://www.lakecountyil.gov/DocumentCenter/View/11017
- **Indian Creek Watershed Based Plan (2009)**
  - http://www.lakecountyil.gov/DocumentCenter/View/11363
- **North Mill Creek-Dutch Gap Canal Watershed-Based Plan (2013)**
  - http://www.lakecountyil.gov/DocumentCenter/View/11231
- **Mill Creek Watershed and Flood Mitigation Plan (2014)**
  - http://www.lakecountyil.gov/DocumentCenter/View/12203
- **Buffalo Creek Watershed-Based Plan (2016)**
  - http://www.lakecountyil.gov/DocumentCenter/View/12897

Subwatershed-based plan executive summaries are attached.

Bull Creek–Bull's Brook Watershed-Based Plan

A Strategy for Protecting and Restoring the Watershed

Executive Summary August 2008

Why this Watershed Plan?

Water is elemental to our lives. Our bodies are largely composed of water—and we need to consume clean water for our survival. Plants and animals also need water—and we in turn depend on these plants and animals for food, medicines, fuel and the everyday products we use. Although elemental to our individual lives, our communities and our planet, we sometimes take water for granted.

This plan is important to you because it specifically addresses water problems (and promises) here in your community within the Bull Creek-Bull's Brook watershed. Because clean and abundant water, healthy lakes and streams, and safety from flooding are important for residents and businesses—and generally the economic and environmental health of our community—it is also important to community leaders.

As a resident, landowner, business or community official your actions make a difference in keeping water in our creeks and lakes clean, reducing flooding, and protecting natural areas that help do both as well as providing habitat and places for people to recreate.

How water flows and collects in streams, wetlands and lakes is based on landform. Because water flow generally does not follow political jurisdiction boundaries, we recognize that most water resource problems need to be addressed at the watershed level, which frequently involves several political jurisdictions. The watershed planning process for Bull Creek & and Bull's Brook brought the municipalities, townships, county and the broader community of homeowner associations, businesses, institutions, non-profit organizations and residents that live or work in the watershed together to plan for managing and improving the land, lakes, streams and wetlands of the watershed.

Clockwise from top: Bull Creek South, Libertyville; Aldo Leopold Lake, Prairie Crossing, Grayslake; St. Mary's Lake, Mundelein

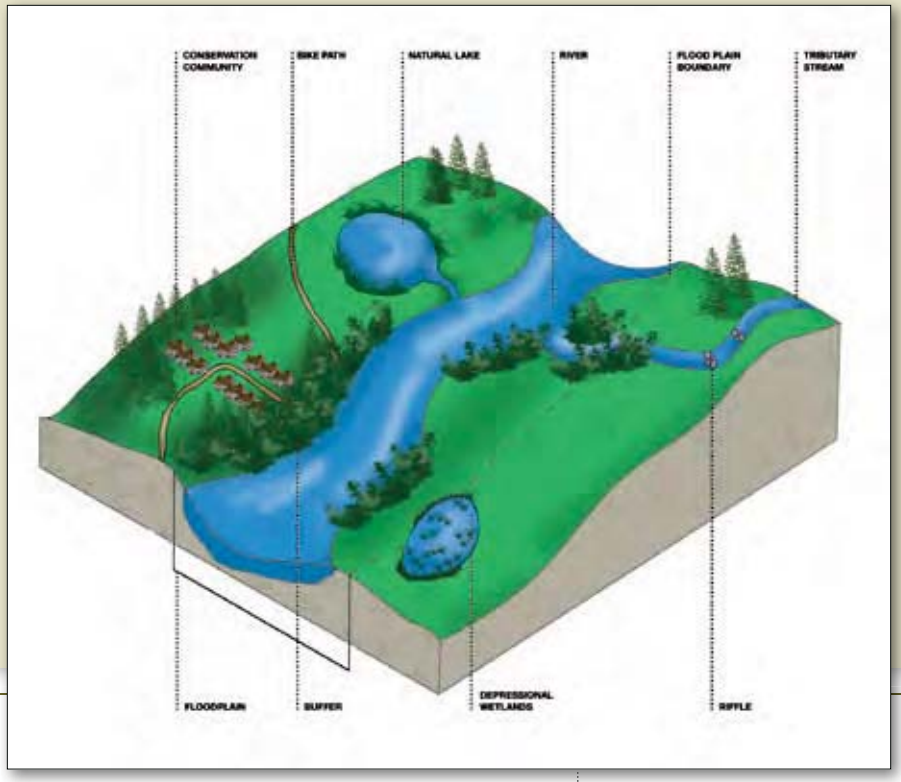
As a resident, landowner, business or community official, your actions make a difference in keeping water in our creeks and lakes clean, reducing flooding, and protecting natural areas that help do both as well as providing habitat and places for people to recreate. The Bull Creek/Bull's Brook Watershed Plan was created to help stakeholders better understand the watershed and to identify what actions need to be taken to prevent and reduce flood damage, improve water quality, and protect and enhance natural resources, greenways, and recreational opportunities. This comprehensive management plan summarizes the overall condition of the watershed (present day and into the future) and recommends actions as best practices that you as a stakeholder, individually or in collaboration with others, can take to protect watershed resources that are still in good shape—and restore those that are degraded.

What is a Watershed?

After a rain drop or snowflake falls on the land, it may infiltrate into the soil or it may run off over the land surface to a low spot in the landscape, which is usually a body of water (lake, stream or river). A watershed is the area of land that drains to a particular stream, river or lake.

The health of a waterbody is a direct reflection of how the land in the watershed is used and managed. Some of the benefits of a healthy watershed are:

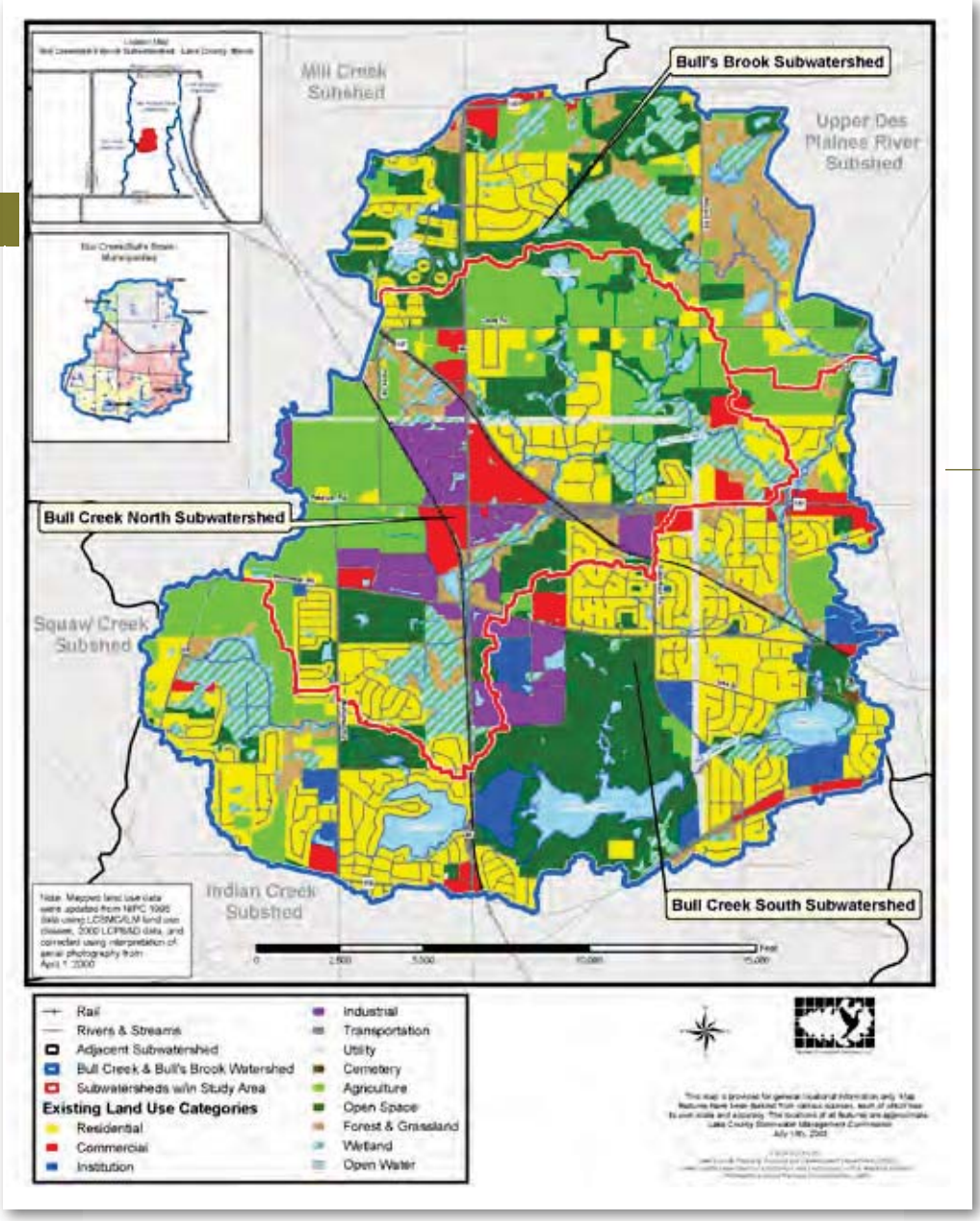
- **improved water quality**
- **fewer flooding problems**
- **enhanced wildlife habitat**
- **provides opportunities for education and recreation**



Do you live or work in Bull Creek-Bull's Brook Watershed?

Bull Creek-Bull's Brook Watershed, located in central Lake County, is part of the Des Plaines River Basin in northeastern Illinois. Three subwatersheds comprise the larger Bull Creek-Bull's Brook watershed and together they drain approximately 14 square miles to three tributaries: Bull's Brook; Bull Creek North; and Bull Creek South. In addition to the stream system, the natural landscape of the watershed is a complex of lakes, wetlands and upland prairies, savannas and woodlands. Interspersed with these natural features are farms, subdivisions of homes, commercial/industrial centers, area schools, St. Mary's University, and recreation facilities (golf courses, soccer and ball fields, playgrounds etc.). The Villages of Libertyville, Mundelein and Grayslake are the predominate watershed jurisdictions along with unincorporated areas of Libertyville and Warren Townships. Approximately 43% of the watershed is in developed land uses.

2004 Land Use Data



What is special about the Bull Creek-Bull's Brook Watershed?

The landscape we see today was created over 10,000 years ago by the last retreat of the Wisconsin Glacier. As the giant ice sheets melted and retreated, they carved out and left behind unique glacial features such as the moraines, ridges, kettle holes (Butler Lake), and the outwash till plains still visible throughout the watershed, but especially in the northern half that is less-developed.

Remnants, some large and some small, of the pre-settlement landscape and plant and animal communities of the watershed remain today. They are the biodiversity of the watershed. These water and natural resources, along with several significant cultural resources are worth protection and restoration. A short list includes:

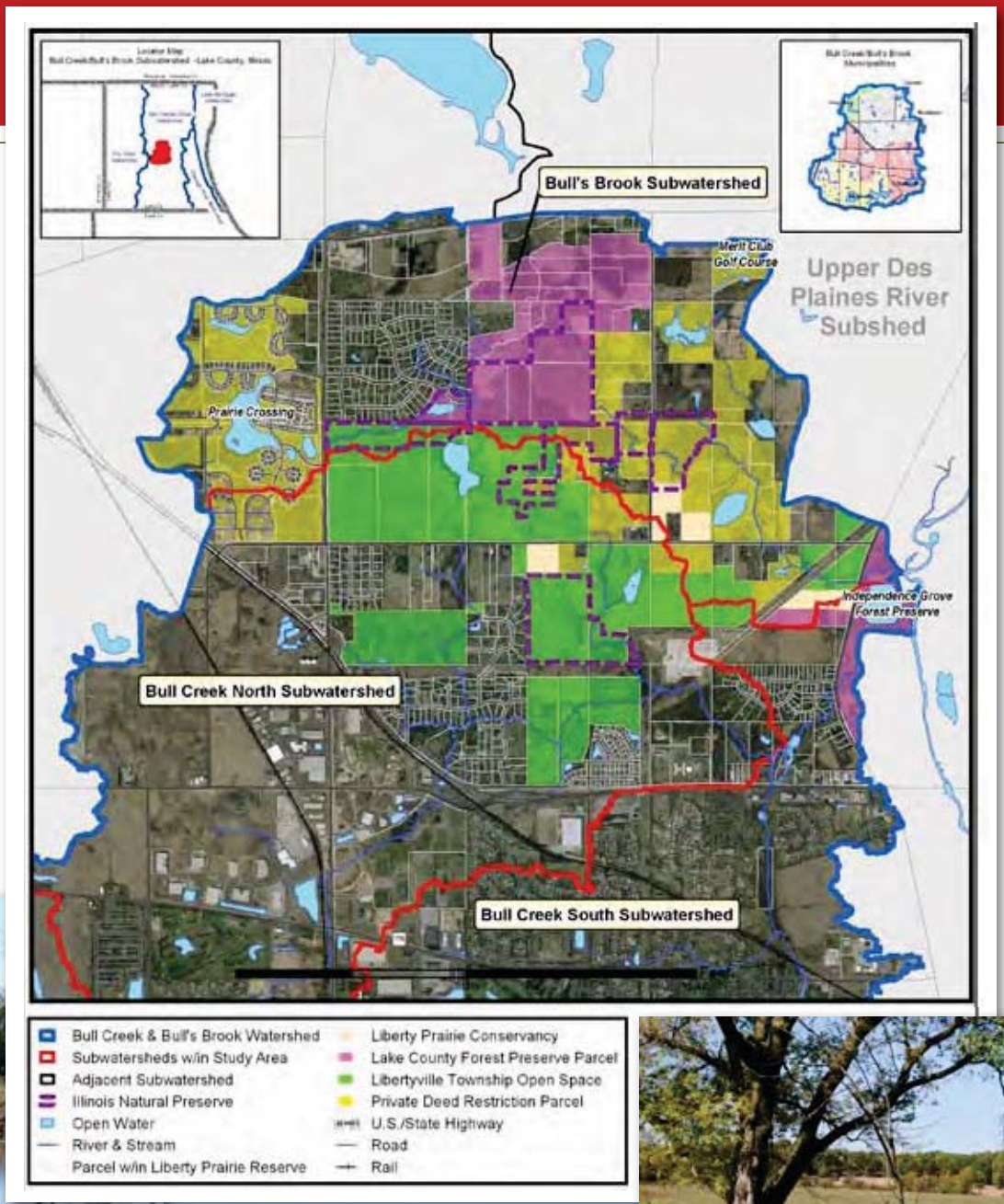
- The South Branch of Bull Creek has a series of lakes: Loch Lomond, St. Mary's and Butler Lakes that are significant features of the communities they are in and the watershed as a whole. St. Mary's University also has one of the largest woodland plant communities in the watershed and central Lake County.
- The North Branch of Bull Creek includes Liberty Prairie, a dedicated nature preserve and one of the remaining few remnant prairies in the state, and extensive high quality wetlands along the creek.
- Bull's Brook includes Sanctuary Pond (a nursery for endangered fish), Leopold Lake, Oak Openings Nature Preserve, and Almond Marsh, which is also a dedicated nature preserve and is home to a number of threatened and endangered species and a significant heron rookery.

Watershed Goals

- **Protect and restore natural resources**
- **Improve water quality**
- **Reduce flood damage**
- **Enhance and restore stream health**
- **Guide new development to benefit watershed goals**
- **Preserve green infrastructure**
- **Enhance education and stewardship**
- **Improve watershed coordination and collaboration**

Left: Almond Marsh; Right: Bull's Brook at Oak Openings Nature Preserve

Unique to the Bull Creek-Bull's Brook watershed is the Liberty Prairie Reserve. The Reserve is a 5,800 acre area in central Lake County, of which 3,200 acres of public and private farmland and natural areas are permanently protected from further development.



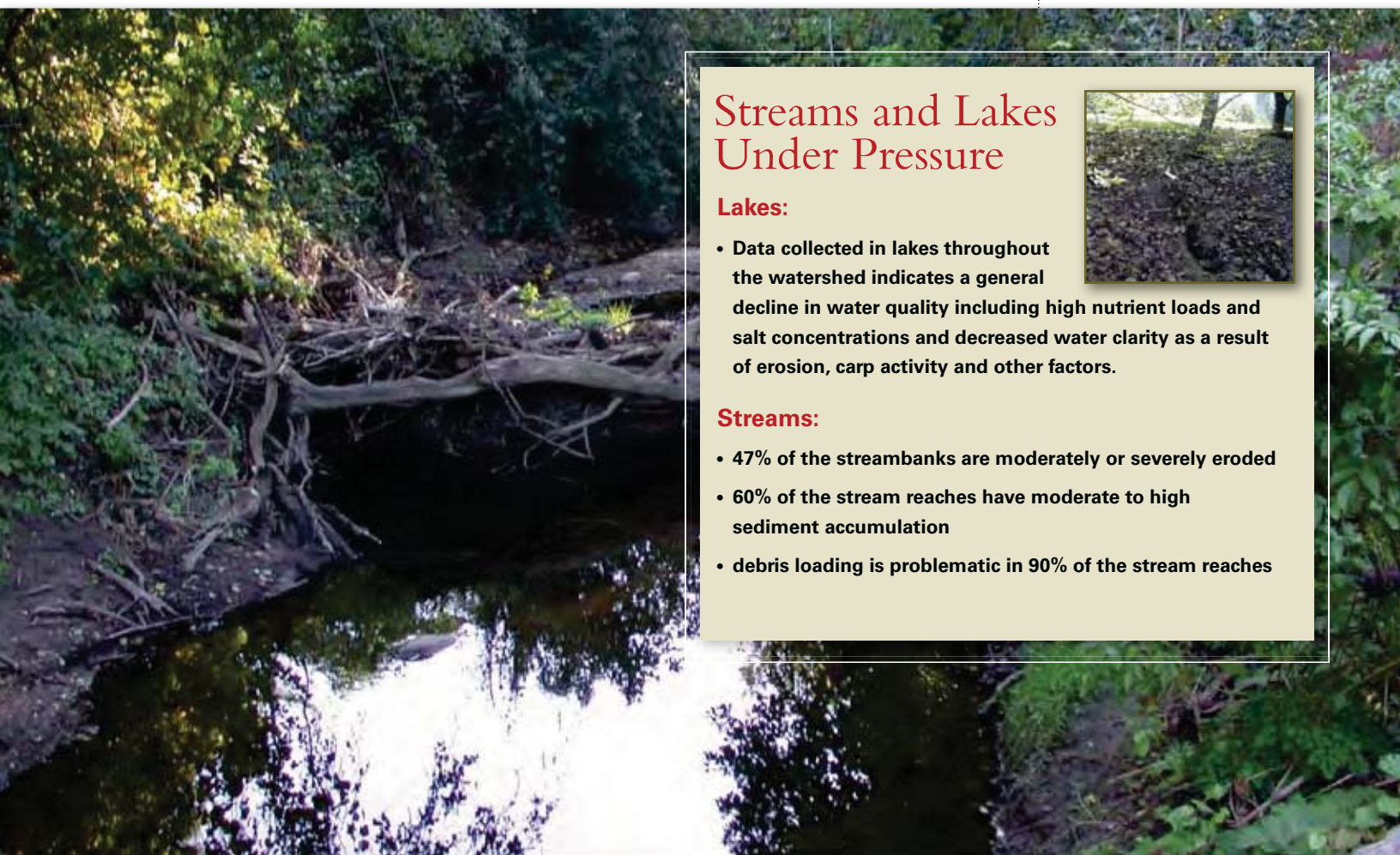
Legally protected private open lands within the Liberty Prairie Reserve

What are the current challenges to watershed health?

Lakes and ponds in the watershed are impaired or becoming impaired by high loads of nutrients in stormwater runoff and high salt concentrations from winter de-icing. Streams are degraded by pollutants in stormwater runoff, erosion caused by the higher volume of runoff to creeks from impervious surfaces such as building rooftops, roads, parking lots etc., and as a consequence of poor riparian or streamside property management and lack of stream maintenance.

More specifically watershed threats include:

- **Erosion, excess nutrients, and road salt are the biggest threats to water quality**
- **Natural resources are threatened by adjacent and upstream development**
- **Stream channels are degrading due to lack of maintenance**
- **Lakes and streams are threatened by greater volumes of stormwater runoff and pollution**
- **Poor development practices negatively impact water and other natural resources**
- **Automobile "habitat" creates disproportionately more runoff and pollution**
- **Watershed stakeholders lack the knowledge, skills and resources that they need to address watershed issues**
- **Lack of communication, coordination and collaboration among watershed stakeholders to maintain/improve watershed health**



Streams and Lakes Under Pressure

Lakes:

- **Data collected in lakes throughout the watershed indicates a general decline in water quality including high nutrient loads and salt concentrations and decreased water clarity as a result of erosion, carp activity and other factors.**

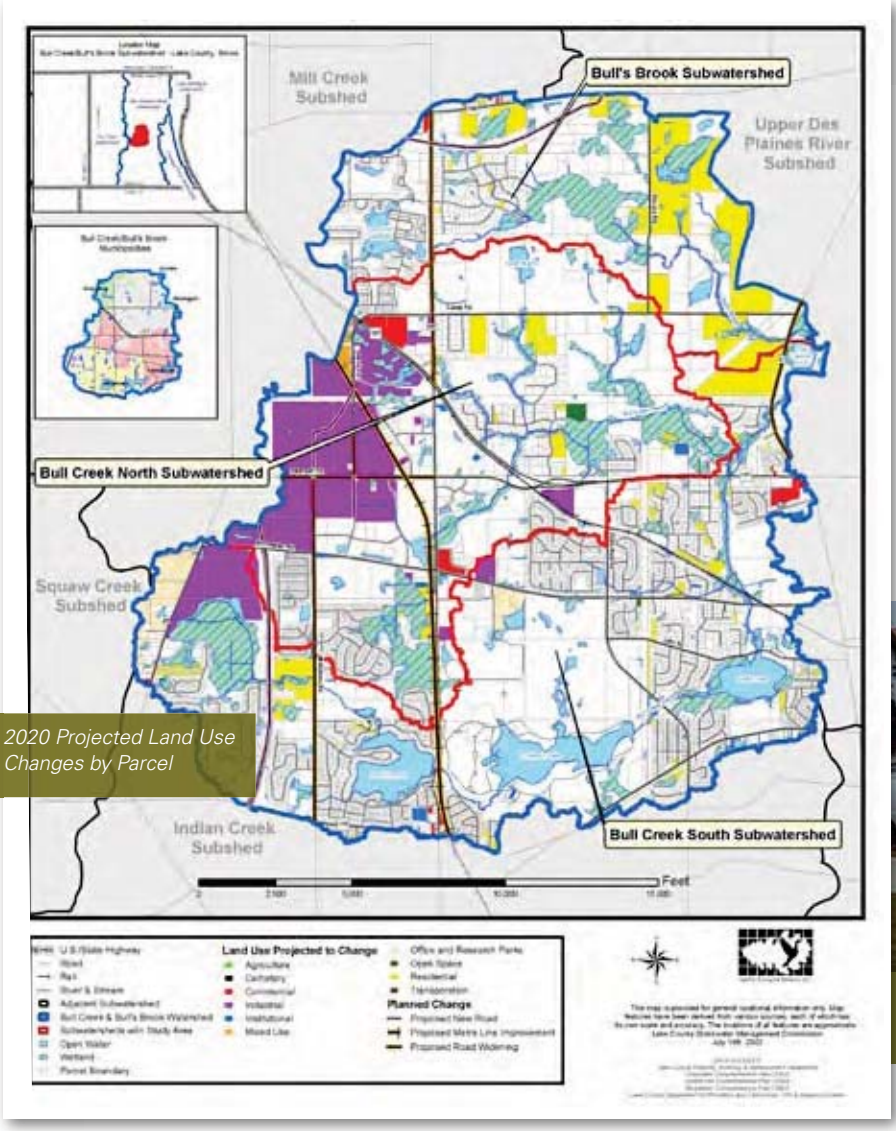
Streams:

- **47% of the streambanks are moderately or severely eroded**
- **60% of the stream reaches have moderate to high sediment accumulation**
- **debris loading is problematic in 90% of the stream reaches**

The Future of the Watershed: What is at Risk?

Impervious Cover Impacts Water Resources

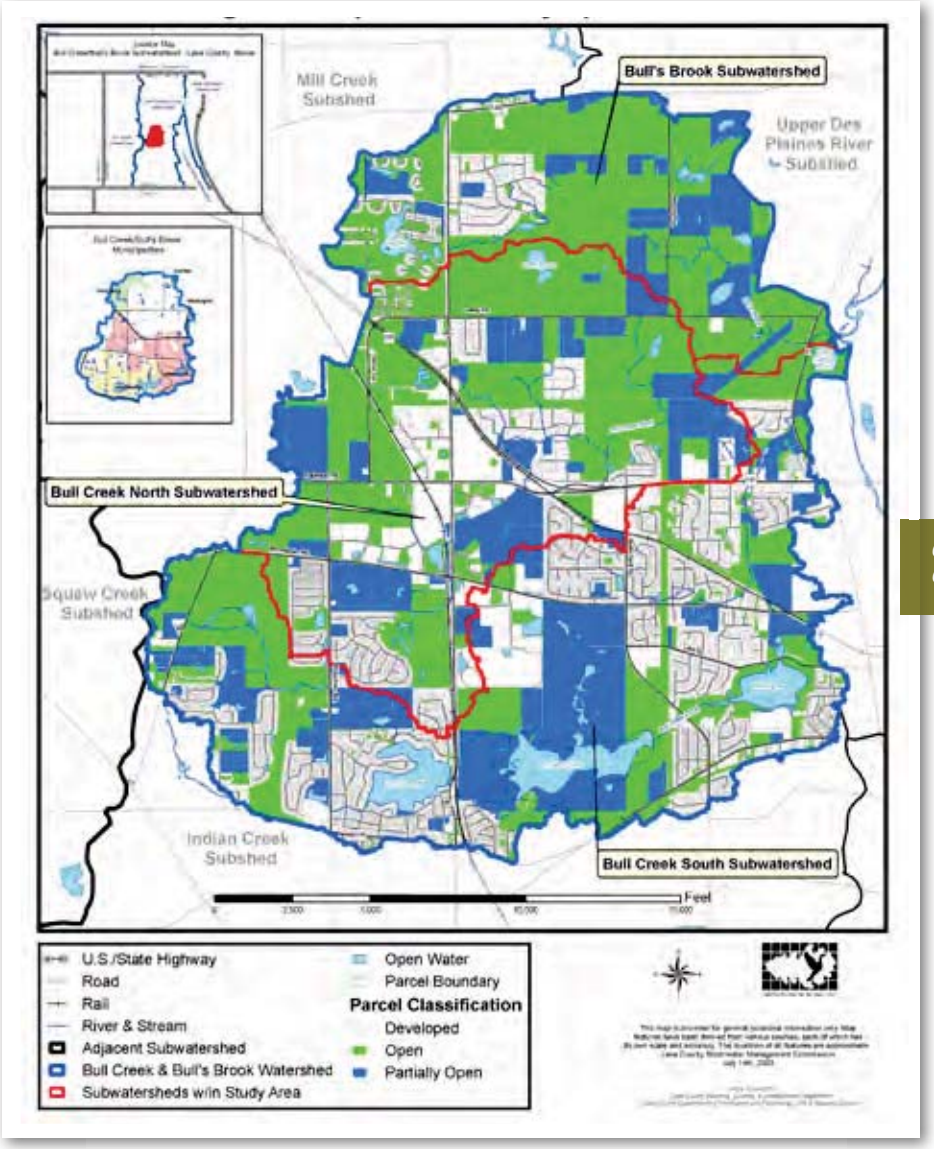
An analysis of the watershed's vulnerability based on the effect of impervious cover on stream and lake quality and flooding was evaluated using the proposed future development in the Bull Creek-Bull's Brook Watershed. Increased impervious cover typically results in more stormwater runoff, which carries pollutants to streams and lakes and causes erosion. Increased volumes of runoff also translate into more frequent flooding and a larger floodplain in some locations. More than 50 homes, businesses and schools are within the mapped 100 year floodplain in the watershed. All of these, and potentially other structures currently outside the floodplain boundary, may be at risk of flood damage in a 100-year flood event. (There is a 26% chance of a 100-year flood damaging your home within the timeframe of a 30-year home mortgage.)



2020 Projected Land Use Changes by Parcel

Looking into the future—the number of households in the watershed is expected to increase by 22% and the number of jobs by 90% between 2000 and 2030. Consequently, impervious cover is expected to increase in the watershed as land continues to be developed for these new homes, businesses and their accompanying transportation and parking needs. To reduce the negative impacts on the environment, the watershed plan recommends converting development practices from the

Traditional residential development in Libertyville.



Green Infrastructure
Open and Partially Open Parcels

traditional stormwater collection and conveyance systems to low impact development practices that reduce and infiltrate stormwater runoff.

Loss of Green Infrastructure

Green infrastructure serves an important function in the Bull Creek-Bull's Brook Watershed. It not only forms an interconnected network of natural areas that absorb and infiltrate precipitation, but also includes the wetlands and streams that make up the natural drainage system of the watershed and the green roofs, detention basins and swales of the built stormwater infrastructure.

A parcel level inventory of the watershed's green infrastructure was conducted, and a total of 5,789 acres of open or partially open land was identified. Future land use projections predict that approximately 1,200 acres of this land will be developed over the next 20-30 years (roughly 21%). The hydrology functions that this open land currently provides to the watershed (absorbing, infiltrating, evapotranspiring and storing precipitation) will have to be replaced within the developed lands using low impact development practices so that increases in runoff and its negative environmental and flood damage impacts on the watershed can be avoided.

Good Things are Beginning to Happen in the Watershed

Watershed partners are taking the lead and moving forward with implementing best management projects and educational activities recommended in the watershed plan. Join the watershed team and take the lead on a project in your neighborhood or community.

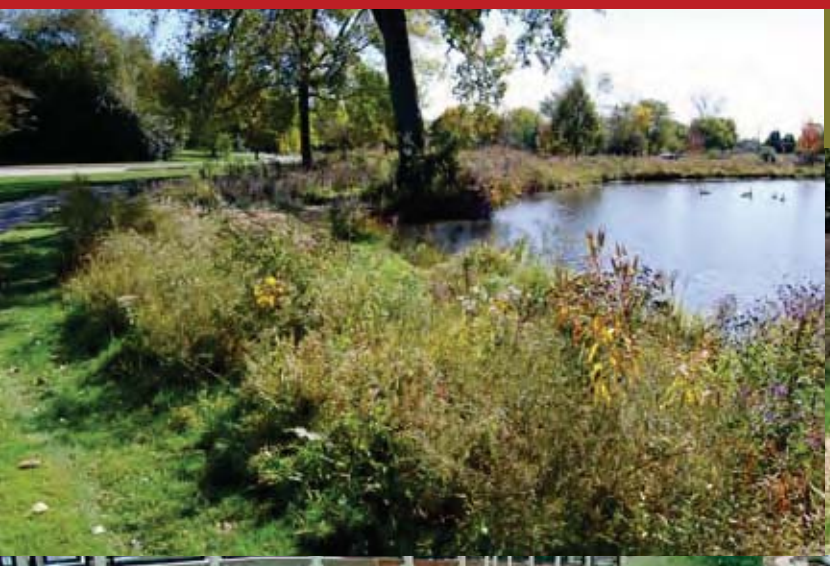
Stream Maintenance ➤
Liberty Prairie Area Homeowners Association: Stream cleanup of Bull Creek North with assistance from Libertyville Township and the youth conservation corps.

Pollutant Filter
Loch Lomond Property Owners Association: Banned phosphorus in fertilizers; conducts lake education days; and planted native shoreline plants as a demonstration project.

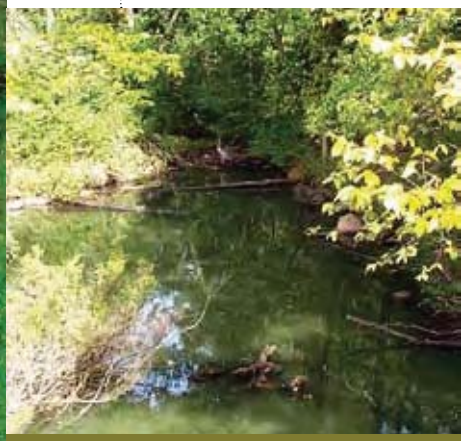
Natural Area Restoration
Liberty Prairie Conservancy and Libertyville Township: Sedge Meadow Wetland restoration at Liberty Prairie.

Low Impact Development

Lake County is constructing a central permit facility in Libertyville that includes a bioswale, vegetated swales, rain gardens, wetland detention and a green roof to capture, filter and infiltrate runoff.



Shoreline Stabilization/Pollutant Filter
Libertyville Parks Department: Regraded and stabilized shoreline with native buffer around Butler Lake



Stream Restoration
St. Mary's University: Has been awarded a grant to restore Bull Creek South Stream reach on their property.

Runoff Reduction
Mundelein Park District: Aquatic center developed with parking lot bioswale and landscaping with deep rooted plants to infiltrate runoff.

What can we do?

...the 10 best things that could happen in the next 10 years.

Watershed council

- Educate and motivate residents, businesses, institutions and communities to reduce the amount of pollutants they contribute.
- Work with communities to develop a collaborative green infrastructure preservation strategy

Communities & county

- Adopt the watershed plan
- Require low impact development standards
- Retrofit stormwater facilities, government properties and transportation corridors to reduce runoff and improve water quality
- Use less road salt and look to use of alternative de-icers
- Ban phosphorus in fertilizers

Residents and businesses

- Convert large areas of yards, commercial and institutional, lawns, and stormwater facilities to native landscaping
- Create rain gardens and disconnect your rooftop runoff from the storm sewer system

Lake and streamside property owners

- Establish/maintain native plant buffers along shorelines and stream channels

Prairie Corridor, Native roadside plantings

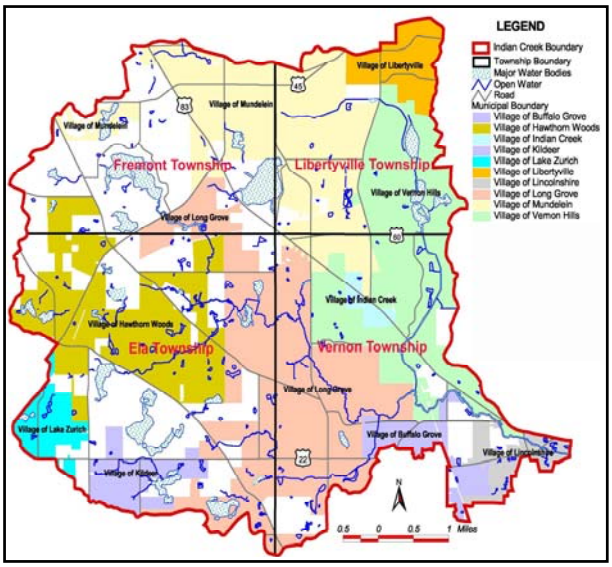
Conservation Development, Prairie Crossing

Education, Watershed tour

Stewardship, Liberty Prairie

INDIAN CREEK WATERSHED PLAN
EXECUTIVE SUMMARY

The Indian Creek Watershed covers a 38 square mile area in southern Lake County, Illinois that drains 24,116 acres before discharging into the Des Plaines River near Lincolnshire, Illinois. It is comprised of many streams, lakes, and land uses within 10 municipalities and unincorporated areas. The watershed includes four major stream branches (Indian Creek mainstem, Kildeer Creek, Diamond Lake Drain, and Seavey Ditch), and 650 acres of lakes.



Historically, the Indian Creek Watershed supported a diverse fauna and flora including prairies, savannas, oak woodlands and wetlands. These natural communities served valuable functions including water quality benefits, wildlife habitat, soil stabilization, and retention and detention of stormwater. These functions became impaired as Europeans settled and altered the landscape by converting natural plant communities to agricultural land, channelizing streams and draining wetlands, and ultimately by constructing roads, houses and cities. Today, more than half (62%) of the watershed is developed in residential, commercial, industrial, institutional, and transportation land uses with only 38% remaining as open space.

Predictably, flooding increased and water quality decreased as development pressure impaired the ability of the landscape to serve these functions. As a result, the Illinois EPA formally listed Indian Creek and two of its major lakes – Big and Little Bear lakes – on its 2002 Section 303(d) impaired waters list.

This natural river swale lies in an undeveloped area. It represents the historic structure of rivers in Illinois.

The Indian Creek Watershed Committee (ICWC) was formed in 1999 to provide stakeholders in the watershed with an opportunity and forum to express their concerns, and to provide direction for watershed restoration through the Watershed Plan process. The Lake County Stormwater Management Commission (LCSMC) and the Watershed Project Team facilitated regular meetings during the 12-month watershed planning process where the ICWC formalized a vision, goals and objectives for the watershed, and attended presentations educating participants on watershed issues.

Goals and Objectives

The vision of the ICWC is:

> *To preserve, protect, restore and enhance the resources, function and values of the Indian Creek Watershed through stewardship, education and partnerships.*

Key goals and objectives identified during the watershed planning process are:

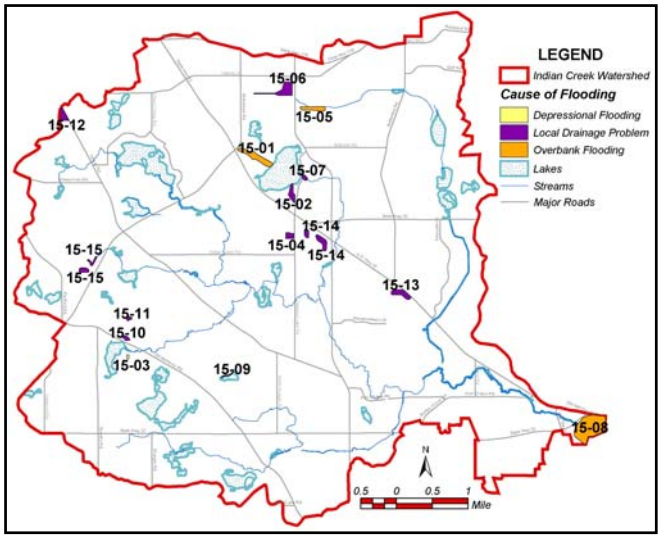
- Protect, Restore, Enhance, or Maintain Channel Function and Conveyance.
- Maintain or Improve Water Quality.
- Reduce Flooding.
- Maintain or Improve Biodiversity.
- Enrich Quality of Life and Develop Cultural Values for a Sustainable Watershed.
- Develop Environmentally Sustainable Recreation Opportunities.
- Demonstrate Economic Benefits and Provide Incentives for Sustainable Land Use Practices.
- Foster Watershed Stewardship and Awareness through Education.
- Utilize Open Space to Achieve Watershed-Wide Goals.
- Develop Stewardship Network for Long-Term Management and Monitoring.
- Develop or Enforce Regulations that Benefit Watershed-Wide Goals.

Assessing the Watershed Condition

The Project Team assessed the Indian Creek Watershed in a variety of ways to understand existing and projected future problems and opportunities. At the watershed scale, the Project Team assessed the topography, soils, wetlands, flooding and drainage, regional storage areas, streams and lakes, water quality, natural resources, land uses, development trends, and open space. The following summarizes some of the key results of the watershed scale assessment:

Flood Damage Reduction

- One third (33.3%) of the watershed contains hydric soils. The remainder is moderately to well-drained soils with moderate runoff potential, infiltration and transmission rates.
- More than half of the pre-settlement wetlands in the watershed have been drained or filled. Of the remaining 2,957 acres of wetland, 15 wetlands consisting of 865 acres are classified as high quality wetlands per Lake County's Advance Identification (ADID) study.



- LCSMC's Flood Problem Areas Inventory of the watershed identified 15 flood problem areas (mostly failed local drainage).
- 3,243 structures were located within the Federal Emergency Management Association (FEMA) 100-year flood mapping area.

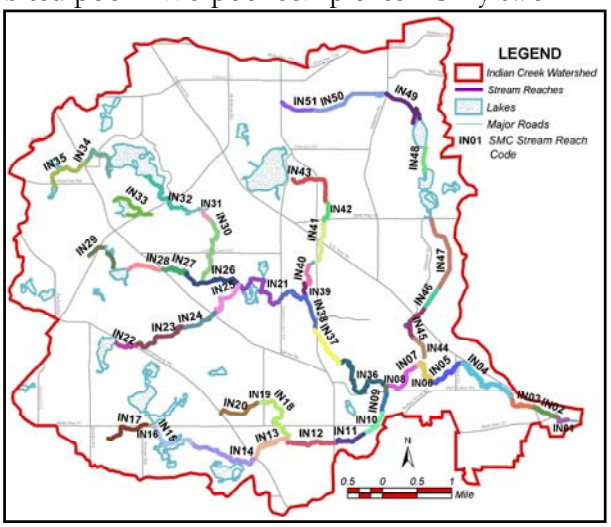
- Forty-six (46) regionally significant storage areas were located and have the potential to store up to 384,582 acre-feet of stormwater runoff.

Water Quality Improvement

- Percent impervious cover within the watershed is expected to increase from 28% to 36% over the next 20 years.
- Indian Creek, Little Bear Lake, and Big Bear Lake are included on the Illinois EPA 2002 Section 303(d) impaired waters list.
- Biological sampling conducted by the IEPA, IDNR and U.S. Army Corps of Engineers (USACE) indicates degraded water quality and habitat conditions in streams and lakes.
- Lake County Health Department-Lakes Management Unit studies indicate that most of the lakes in the watershed are in poor to average condition due to high nutrient levels (especially phosphorus), eroded banks, extensive development and the presence of invasive plant species.

Natural Resource/Open Space Enhancement

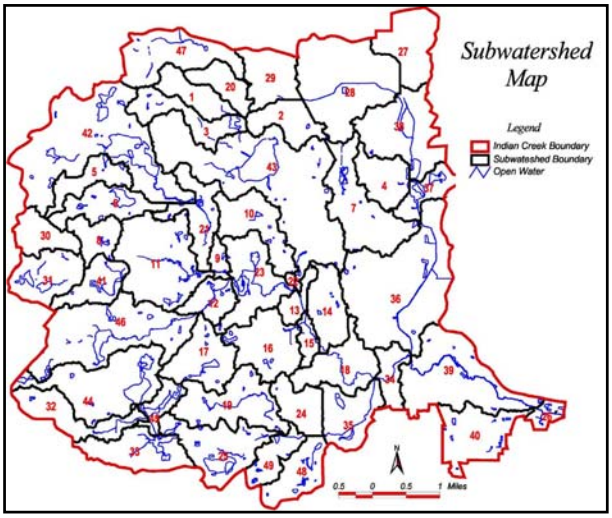
- A LCSMC study found that most of the 51 reaches of inventoried streams were channelized, had eroded banks, heavy debris loads and exhibited poor riffle-pool complexes. Only two stream reaches contained a natural meandering channel.
- Several Illinois state-listed threatened and endangered species persist within the watershed, most of which are associated with wetlands and high-quality natural areas.
- Development covers 62% of the watershed. Residential (37%), agricultural (15%), and transportation (11%) are the largest categories of land use. An additional 3,734 acres of open land is expected to be developed over the next 20 years.
- The study identified 12,664 acres of open or partially open space in over 3,545 parcels within the project area. Another 17% (2,208 acres) of the watershed is protected open space.



Assessing Subwatershed Conditions

After assessing the watershed as a whole, the Project Team used topography to delineate 49 Subwatershed Management Units (SMUs) that ranged in size from 28 acres to 1,839 acres. Because SMUs are relatively small and have fewer political boundaries, they are more easily assessed, measured and analyzed. Watershed issues such as flood damage reduction, water quality improvement and natural resource protection become easily comparable allowing planners to rank SMUs based on immediate needs.

The Project Team assessed and compared each SMU based on runoff, stream flows, pollutant loading and vulnerability to development. Some of the key findings include:



- The hydrology models indicated that the major lakes had sufficient capacity to detain water during 2 and 10-year storm events; however, Bresen Lake, Kemper Lake, Lake Charles and Leo Lake would overtop during a 100-year event.
- Water level fluctuations caused by runoff in Sylvan Lake and Pond-A-Rudy are predicted to decrease with projected development due to more restrictive LCSMC detention requirements.
- Despite an expected increase in imperviousness, peak flows in all streams modeled, except for Seavey Ditch, are predicted to be lower than existing conditions with projected development due to more rigorous LCSMC detention requirements.
- Retrofitting detention basins constructed before 1992 so that they detain water per existing regulations could substantially reduce peak flows in all streams.
- Several SMUs in Indian Creek mainstem, Kildeer Creek branch, and Seavey Ditch had flows exceeding 4 feet per second (considered excessive) during existing and projected development conditions.
- Based on PondPack v7 hydrologic modeling software, 2-year storm flows should stay within the streambanks of all reaches. Reaches within eight SMUs at the downstream end of the watershed are projected to overtop their banks for the 10-year and 100-year storm events during existing and projected development. Five SMUs, generally in the upper reaches of the watershed, are predicted to flood only during a 100-year storm event.
- Using a pollutant loading analysis developed by LCSMC and the Northeastern Illinois Planning Commission (NIPC), 11 SMUs were identified as water quality "hotspots." One SMU (#43) was identified as the worst water quality "hotspot" for existing and projected conditions.
- The Project Team modeled the potential effects various stormwater management strategies would have on water quality within a typical 40-acre development. A dry detention pond, a wet-bottomed pond and a Stormwater Treatment Train™ (STT; sediment basin-prairie filtration-wetland) were compared for single family, multifamily, and commercial land uses. Several pollutants were modeled for all three treatments and land uses. The dry detention pond removed only 26-67% of all pollutants; the wet pond removed 90-95% of all pollutants; and the STT removed 95-99% of all pollutants.
- The Project Team completed a vulnerability assessment of all 49 SMUs based on percent impervious cover and various field criteria. The 4-step assessment is designed to measure how sensitive specific SMUs are to development and associated imperviousness. According to the assessment, the eastern portion of the watershed is largely "Non-Supporting" (highly impervious and degraded) while the western portion is mostly "Impacted" (moderately impervious and somewhat degraded). Following 20-year projected land use conditions, the

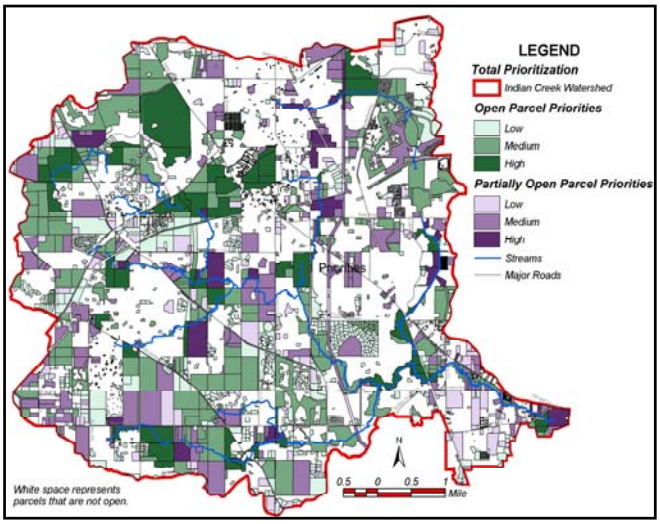
entire watershed is expected to be mostly Non-Supporting, mostly due to an increase in imperviousness as the western portion of the watershed is developed.

"Toolbox" of Watershed Best Management Practices (BMPs)

The report includes a "Toolbox" of BMPs that provides specific types of in-the-ground projects and watershed policies that can be implemented to achieve watershed goals. The watershed restoration and management techniques described in the Toolbox, when applied to the Indian Creek Watershed, can help improve water quality, reduce flood damage, educate watershed residents, and protect, restore, and enhance natural resources and greenways.

Parcel Prioritization

As a first step toward targeting specific watershed improvement opportunities, the Project Team identified and weighted all open and partially open parcels within the watershed based on 15 criteria.



Parcels were ranked independent of watershed goals, and then ranked under the categories of flood damage reduction, water quality improvement, and natural resources/greenways protection and enhancement. Parcels with the highest priority were ranked highest as an open space management priority. This parcel prioritization process was completed independently of the Prioritized Action Plan described later in the report, and it provides an additional and complementary tool for targeting specific open space for implementing BMPs.

Prioritized Action Plan

The Prioritized Action Plan provides stakeholders with action items for watershed-wide improvements. It serves to direct stakeholders toward specific sites for the implementation of BMPs and other action items. Some of these items could include:

- Acquire funding;
- Develop educational programs;
- Organize or participate in data collection;
- Provide regulatory or technical guidance;
- Issue permits;
- Acquire land for restoration or protection purposes;
- Oversee or implement restoration projects; and

- Monitor long-term success of watershed improvement projects.

The Prioritized Action Plan is divided into a Programmatic Action Plan and a Site Specific Action Plan. The Programmatic Action Plan recommends action items with general applicability throughout the watershed. Action items are based on objectives developed by the Project Team and aim to reduce flood damage, improve water quality and protect natural resources/greenways. The Site Specific Action Plan identifies sites where flooding, water quality, or open space protection problems or opportunities have been identified. Only the highest priority sites were considered for inclusion in the plan. The list, which is organized by municipality, serves only as a starting point for watershed improvement projects and should be adjusted as projects are completed and additional sites are targeted.

A priority ranking was assigned to site-specific action recommendations, but not to programmatic action recommendations. Assigning priority to watershed improvement projects is largely dependent on feasibility, which is determined by size of the project, location, land use, ownership, funding, scope of work and other factors. A feasibility study will be an important next step in the process of implementing many of the recommended actions.

The following summarizes key recommendations listed by project goal found in the Site Specific Action Plan:

Flood Damage Reduction

- Detention basins constructed before 1992 were identified and mapped in specific flood problem SMUs as retrofit opportunities to reduce flooding.
- The study identified, mapped, and recommended for additional assessment 14 of 46 potential depressional storage locations.
- Stream reaches exhibiting instream or overbank debris loads as well as sediment deposition were identified and mapped for stream maintenance activities.
- Open and partially open parcels adjacent to Flood Problem Areas (FPAs) were identified and mapped for potential flood reduction measures.
- High priority parcels in the 100-year floodplain were identified, mapped and included in the plan for potential flood damage reduction measures.

Water Quality Improvement

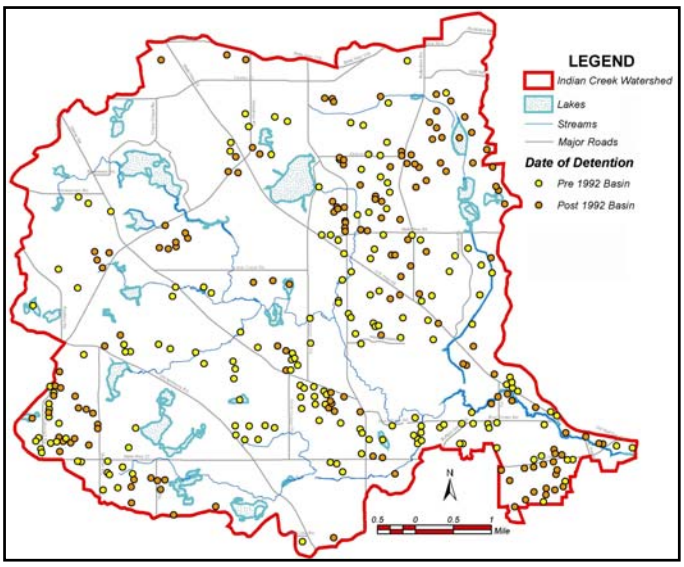
- Streams and lakes with erosion problems were identified and mapped for enhancement or stabilization.
- High priority parcels with drained wetlands and located in the water quality "hotspot" SMUs were identified, mapped and targeted for wetland restoration.
- Problematic discharge pipes and hydraulic structures were identified, mapped and included in the plan for retrofits or repairs.
- Existing dry bottom, concrete lined and riprap lined detention basins were identified, mapped and included in the plan for water quality improvement retrofits.
- Stream reaches with inadequate buffers were identified, mapped and targeted for potential enhancement.
- Lakes with abundant invasive shoreline plant species were identified, mapped and recommended for invasive species removal.

Natural Resources/Greenways Protection and Enhancement

- High priority open and partially open parcels intersecting high quality natural resources were identified, mapped and assessed for potential acquisition.
- All open and partially open parcels intersecting proposed and unknown status trails/greenways were identified and mapped by municipality for potential acquisition and expansion opportunities.
- All additional high priority parcels for natural resource/greenways protection and enhancement were identified, mapped and included in the plan as high priority for protection.
- Stream reaches lacking adequate instream habitat were identified, mapped and targeted for habitat enhancement.

Regulatory Changes

The report proposes several regulatory changes to improve water quality, reduce flooding, improve habitat and provide other watershed benefits.



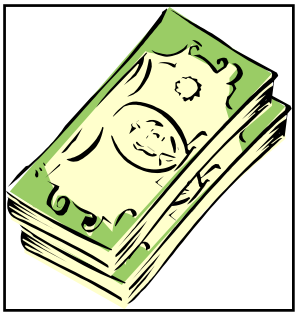
Of particular significance to the Indian Creek Watershed may be a site-specific reduction in the required release rate of detention basins, especially near streams, to prevent erosion and downcutting following storm events. As an example, the required release rate for specific streams and drains in the Squaw Creek Mainstem system is 0.02 cubic feet per second (cfs) for the 2-yr storm compared to the WDO maximum allowable release rate of 0.04 cfs. Specific studies, such as the flood insurance study (FIS) flow rate analysis adopted by the LCSMC for the Squaw Creek Mainstem, could be adopted for Indian Creek Watershed SMUs to reduce in-stream erosion. Flooding upstream of detention basins is a potential risk associated with reducing the release rate of detention basins that already adhere to the WDO maximum allowable rate, and for this reason we encourage detailed site analysis and both upstream and downstream hydraulic and hydrologic modeling for specific sites that may benefit from an additional rate reduction. We expect that in most cases of severe streambank erosion, a release rate reduction for contributing detention basins would create more benefits for the receiving stream than flooding problems for upstream areas.

Streambank erosion is a threat to water quality and flooding in the Indian Creek Watershed, particularly for sections of Indian Creek mainstem, Kildeer Creek, and the Seavey Ditch. These reaches have modeled velocities that exceed 4 feet/second under existing and post-developed conditions and modeled flows that exceed channel depths during the 10 and 100-year storm events.

The current maximum allowable release rates seem sufficient to control flooding and prevent bank erosion for all stream reaches for the 2-year storm event, even under post-developed conditions. However, flooding could be prevented and water quality could be improved in the watershed by reducing release rates for the 100-year storm event.

The three project goals of reduced flooding, improved water quality, and open space/natural resource protection would be best achieved in the Indian Creek Watershed by requiring within-watershed wetland mitigation. Efforts should be made at the regulatory level to preserve remaining wetlands in the watershed for the simple reason that they naturally function in flood control and water quality. A joint agreement between permitting agencies (LCSMC, USACE) and the U.S. Fish and Wildlife Service and the Natural Resources Conservation Service to mitigate for all wetland losses in the watershed should be pursued as the optimal action to achieve a no net loss policy at the watershed level.

Funding Sources



Opportunities to secure funds for restoration projects in the Indian Creek Watershed are widespread due to the scope of BMPs and diversity of actions available to meet the project goals of flood damage reduction, water quality improvement and open space protection. Public and private organizations that administer various conservation and environmental programs are often eager to form partnerships and leverage funds for land acquisition, restoration and environmental education. In this way, funds invested by partners in the Indian Creek Watershed can be doubled or tripled, although actual dollar amounts are difficult to measure.

Funds generally fall into two relatively distinct categories (Conservation Fund et al., 2001). The first category is existing grant programs, funded by a public agency or by other sources. The second, one that can provide greater leverage, might be called "money to be found." The key to this money is to recognize that any given project may have multiple benefits. A specific project to acquire and restore wetlands in the Indian Creek Watershed may be recognized by a partner organization as an opportunity to provide another benefit such as threatened and endangered species protection. It is important to note and explore all of the potential project benefits from the perspective of potential partners and to then engage those partners. Partners may wish to become involved because they believe the project will achieve their objectives, even if they have little interest in the specific objectives of the Indian Creek Watershed Plan.

This report identifies potential partners and funds or cost-share opportunities grouped generally by project goal and organization. The programs identified are the most promising for projects likely to result from the watershed plan. It is anticipated that additional partnering and funding opportunities will be identified as the watershed plan is implemented.

Watershed-Based Plan

A Strategy for Protecting and Restoring the Watershed

North Mill Creek - Dutch Gap Canal

Executive Summary- July 2011

Why this watershed plan?

Water is elemental to our lives. Our bodies are largely composed of water - and we need to consume clean water for our survival. Plants and animals also need water – and we in turn depend on these plants and animals for food, medicines, fuel and the everyday products we use. Although elemental to our individual lives, our communities and our planet, we sometimes take water for granted.

This plan is important to you because it specifically addresses water here in your community within the North Mill Creek-Dutch Gap Canal watershed, and because clean and abundant water, healthy lakes and streams, and safety from flooding are important for residents, agricultural producers, businesses and the economic and environmental health of our communities.

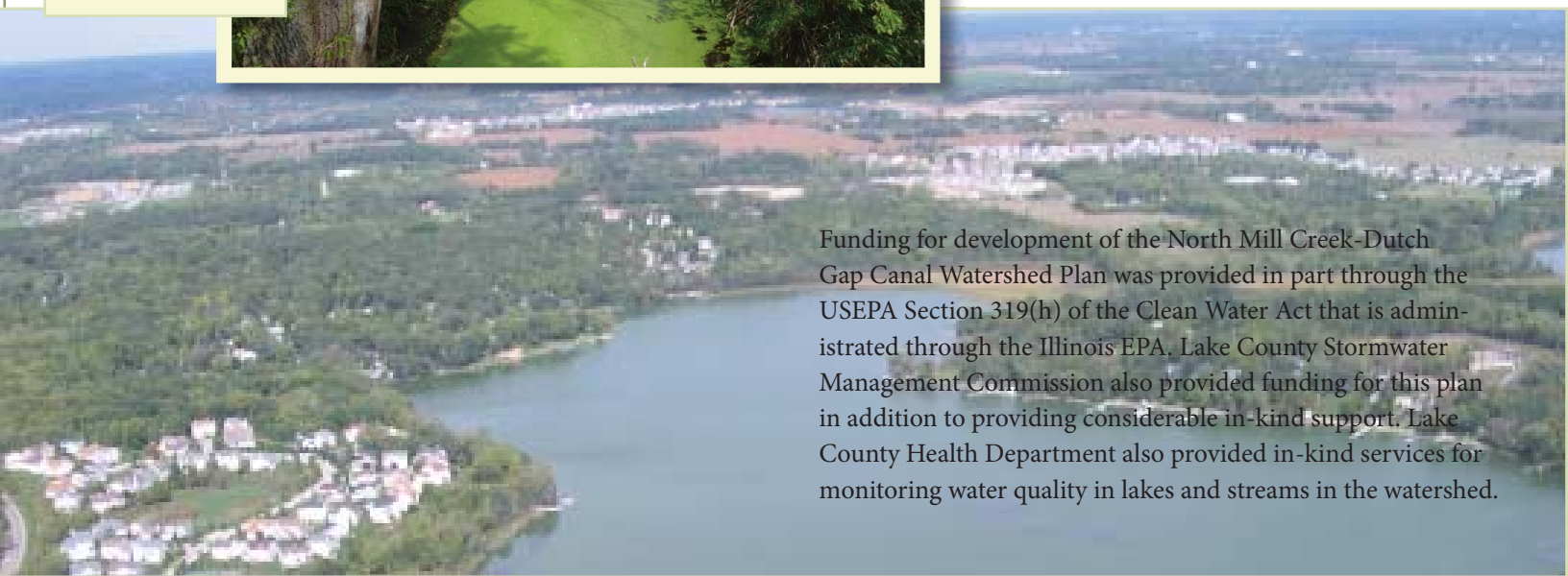
As a resident, landowner, or business or community official your actions make a difference in keeping the water in our creeks and lakes clean, reducing flooding and protecting natural areas that provide habitat and places for people to recreate.

Dutch Gap Canal North of Winfield Rd

Below: Aerial view of Crooked Lake

How water flows and collects in streams, wetlands and lakes is based on landform. Because water flow generally does not follow property lines or political boundaries, we recognize that most water resource problems need to be addressed at the watershed level, which frequently involves multiple landowners and several political jurisdictions.

A watershed plan is stakeholder driven and it is a "living" document that can be modified as deemed necessary by watershed stakeholders. The watershed planning process for the North Mill Creek-Dutch Gap Canal brought the municipalities, townships, counties and the broader community of



Funding for development of the North Mill Creek-Dutch Gap Canal Watershed Plan was provided in part through the USEPA Section 319(h) of the Clean Water Act that is administrated through the Illinois EPA. Lake County Stormwater Management Commission also provided funding for this plan in addition to providing considerable in-kind support. Lake County Health Department also provided in-kind services for monitoring water quality in lakes and streams in the watershed.

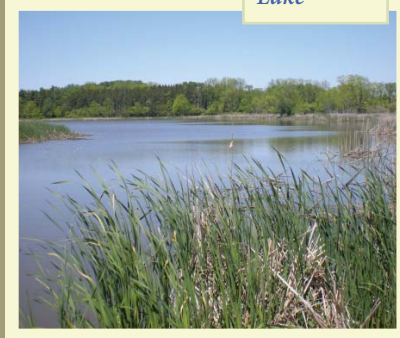
homeowner associations, businesses, institutions, non-profit organizations and residents that live or work in the watershed together to plan for managing and improving the land, lakes, streams and wetlands of the watershed.

Stakeholders at watershed planning kick-off meeting

The North Mill Creek-Dutch Gap Canal Watershed Plan was created to help stakeholders better understand the watershed and to identify what actions need to be taken to prevent and reduce flood damage, improve water quality, and protect and enhance natural resources, greenways, and recreational opportunities. This comprehensive management plan summarizes the overall condition of the watershed (present day and into the future) and recommends actions as best practices that you as a stakeholder, individually or in collaboration with others, can take to protect watershed resources that are still in good shape - and restore those that are degraded.

Plan Purpose

The Lake County Stormwater Management Commission (SMC) took the lead to develop this watershed plan for the North Mill Creek/Dutch Gap Canal watershed. A significant outcome of this planning effort and the implementation of the plan going forward is to return the ten (10) lakes and two (2) streams in the watershed that are presently listed as being "impaired" to conditions that fully support their designated uses as aquatic habitat and for recreation.



McDonald Lake

The purpose of this plan is to:

- **restore watershed lakes, streams and wetlands to a healthy condition**
- **reduce the impacts of water pollution and flood damage on watershed residents, and**
- **provide opportunities for watershed stakeholders to have a significant role in the process.**

Watershed Goals

- **Protect and restore natural resources**
- **Improve water quality**
- **Reduce flood damage**
- **Guide new development to benefit watershed goals**
- **Preserve and enhance green infrastructure**
- **Enhance education and stewardship**
- **Increase sustainable agricultural practices**

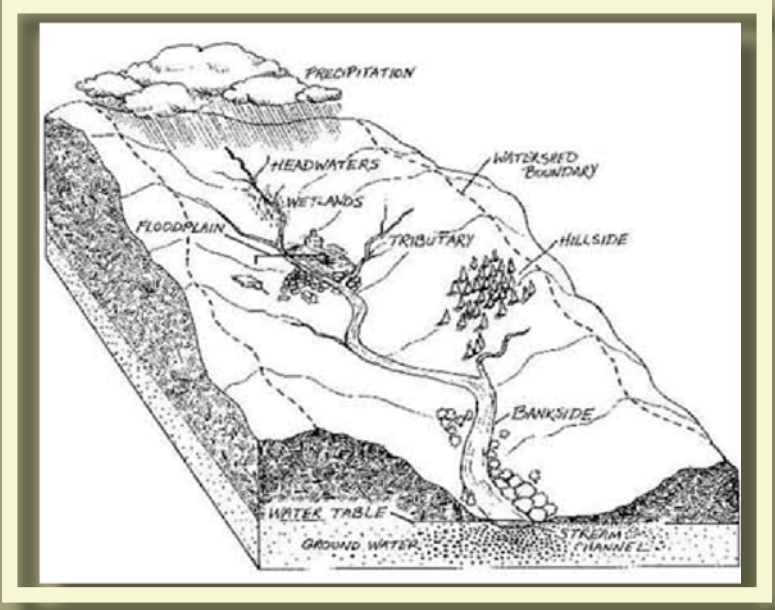
This watershed plan was developed with a broad representation of watershed stakeholders who took part in the planning process. One hundred thirty people representing municipalities, Lake and Kenosha counties, agricultural interests, natural resource agencies, homeowner and lake associations, and private residents participated in watershed planning meetings and the watershed bus tour in 2010-2011. This stakeholder group developed seven goals for this watershed plan.

What is a Watershed?

After a rain drop or snowflake falls on the land, it may infiltrate into the soil or it may run off over the land surface to a low spot in the landscape, which is usually a body of water (lake, stream or river). A watershed is the area of land that drains to a particular stream, river or lake.

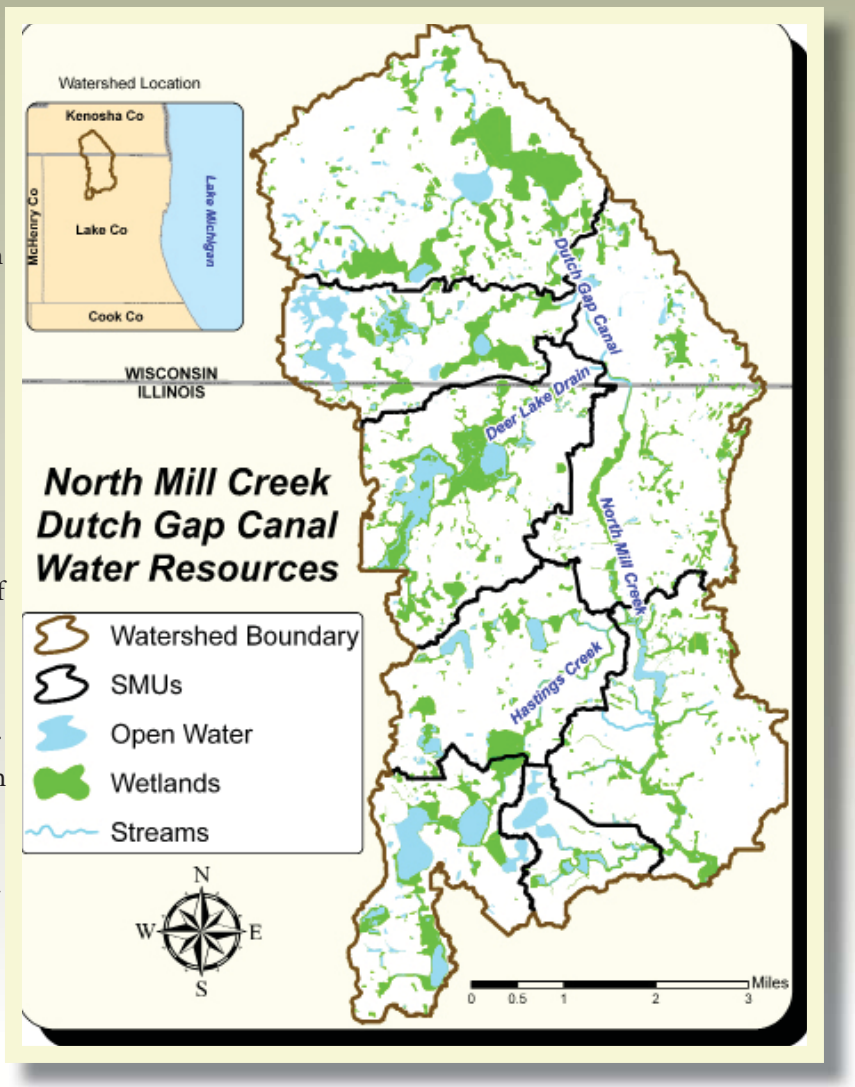
The health of a waterbody is a direct reflection of how the land in the watershed is used and managed. Some of the benefits of a healthy watershed are:

- **improved water quality**
- **fewer flooding problems**
- **enhanced wildlife habitat**
- **opportunities for education and recreation**



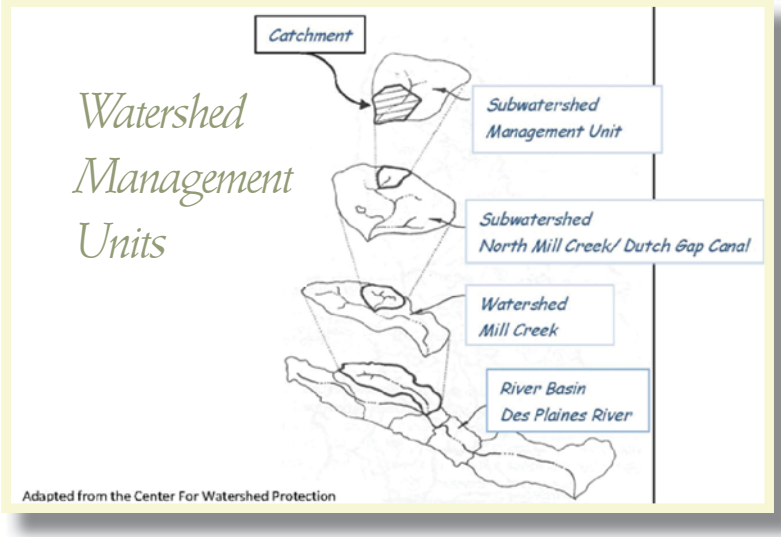
North Mill Creek-Dutch Gap Canal

The North Mill Creek/Dutch Gap Canal watershed is a ***subwatershed*** of the larger Des Plaines River Basin and encompasses approximately 23,532 acres or 37 square miles in north central Lake County, Illinois and south central Kenosha County, Wisconsin. The North Mill–Dutch Gap watershed has abundant water resources including 39 miles of stream, more than 4,164 acres of wetlands, and 24 named lakes encompassing approximately 1,066 acres. Smaller unnamed water bodies add up to another 418 acres of area bringing the total to 1,484 acres of open water across the watershed. The land area of the North Mill Creek-Dutch Gap Canal watershed drains to three tributaries: Hastings Creek, Deer Lake Drain and the mainstem of North Mill Creek-Dutch Gap Canal.

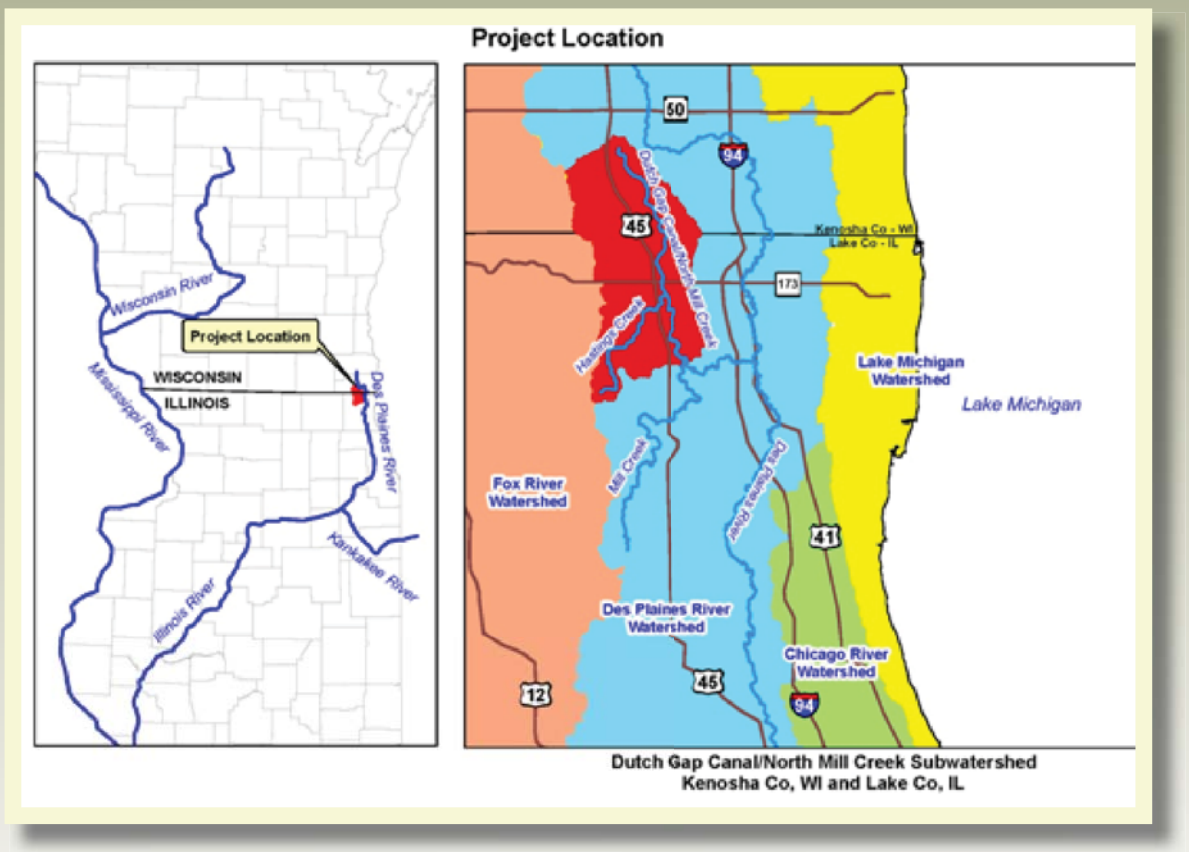


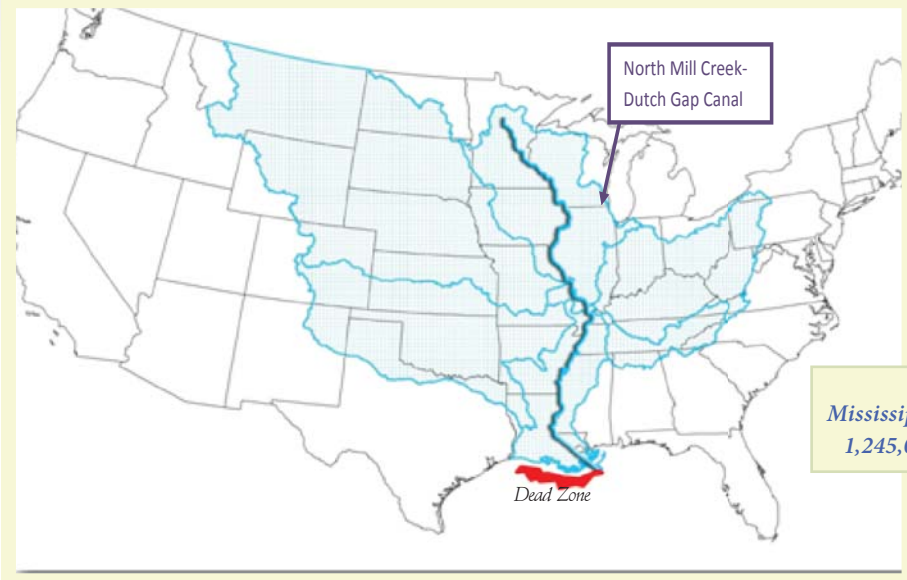
The overall North Mill-Dutch Gap watershed is divided into smaller drainage areas for more detailed study in this watershed plan. These are referred to as "Subwatershed Management Units" (SMUs), and even smaller drainage units are called "Catchments".

North Mill Creek-Dutch Gap Canal is actually a headwater tributary of the Mississippi River Basin, which covers 1,245,000 square miles of the continental U.S.



North Mill Creek flows into Mill Creek, and then into the Des Plaines and Illinois Rivers before reaching the Mississippi River, and eventually the Gulf of Mexico a thousand miles away.



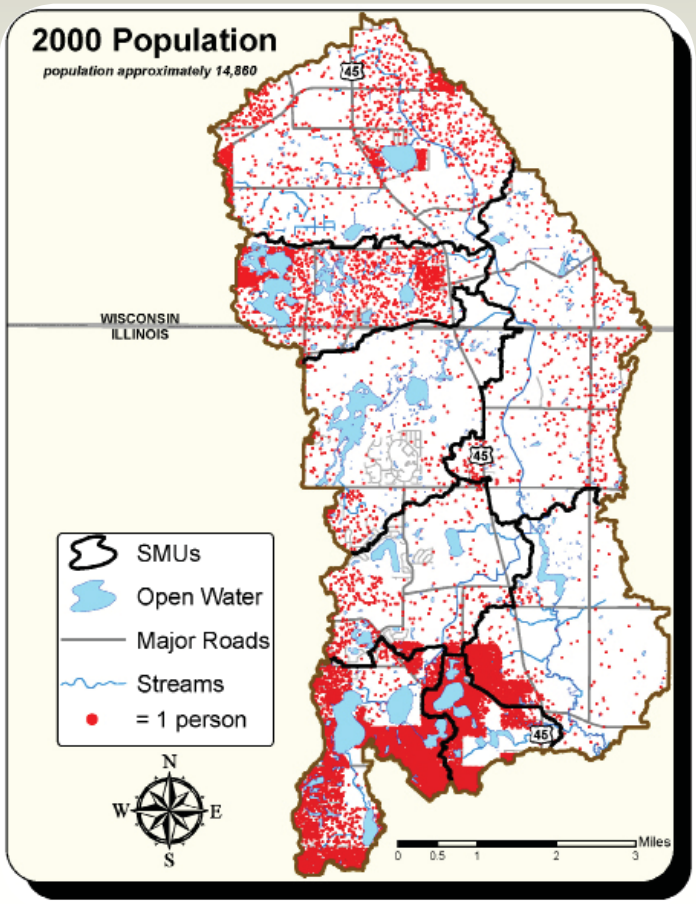


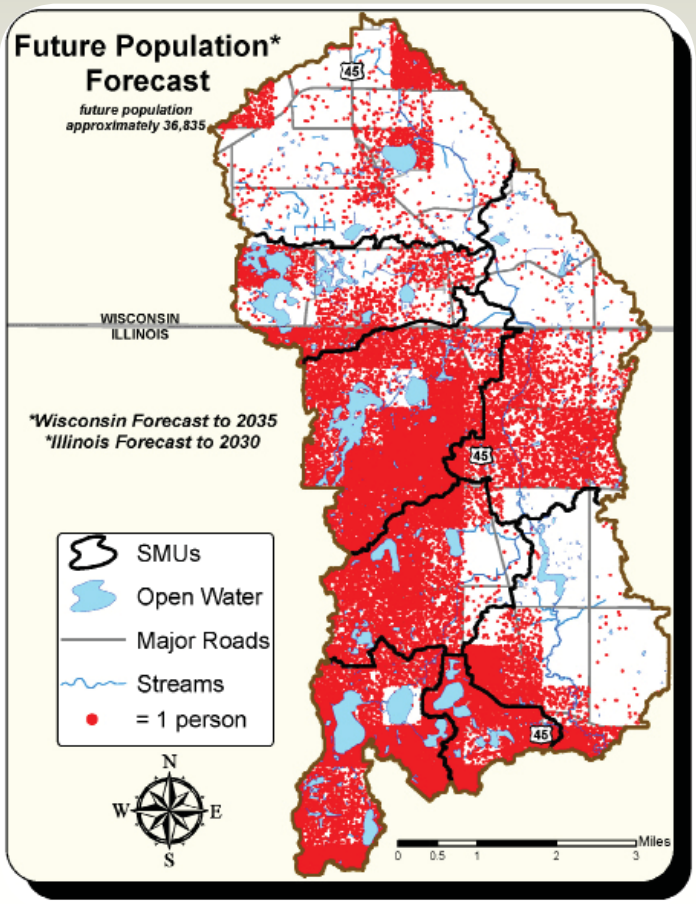
Mississippi River Basin: 1,245,000 sq mi

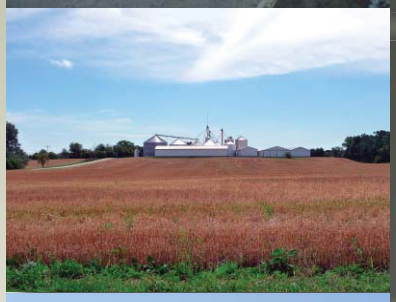
Do you live or work in North Mill Creek-Dutch Gap Canal Watershed?

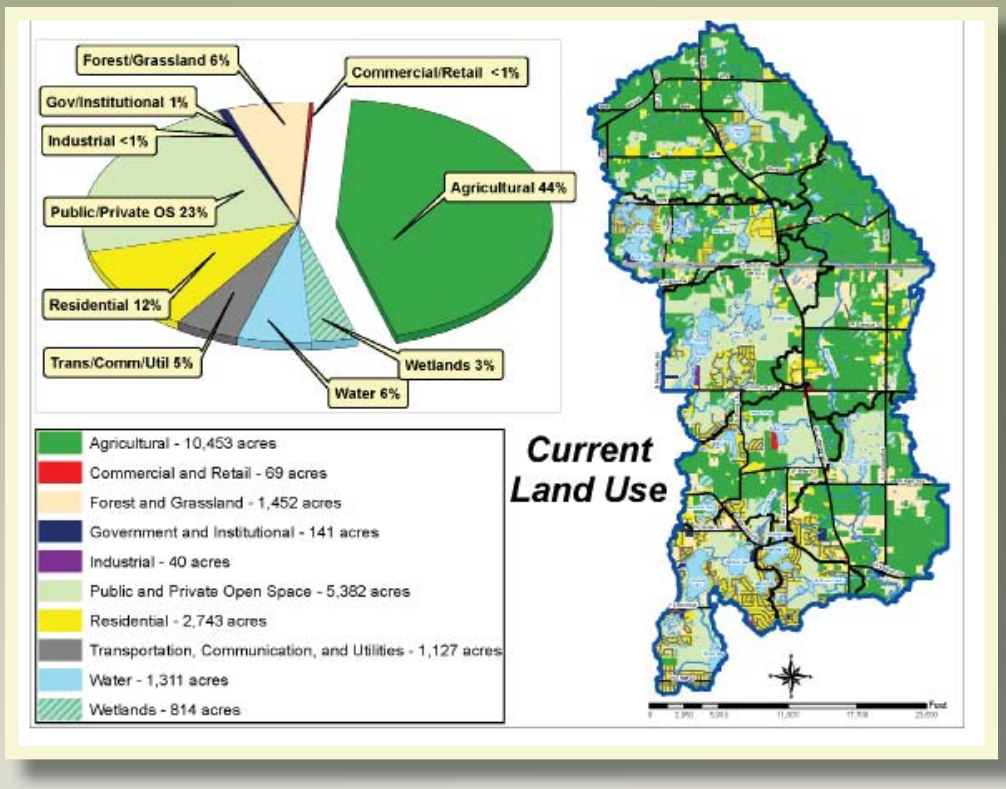
The North Mill Creek-Dutch Gap Canal Watershed is a largely rural watershed. In addition to the Dutch Gap Canal and North Mill Creek stream corridor, the natural landscape of the watershed is a complex of lakes, wetlands, savannas, upland prairies, and woodlands.

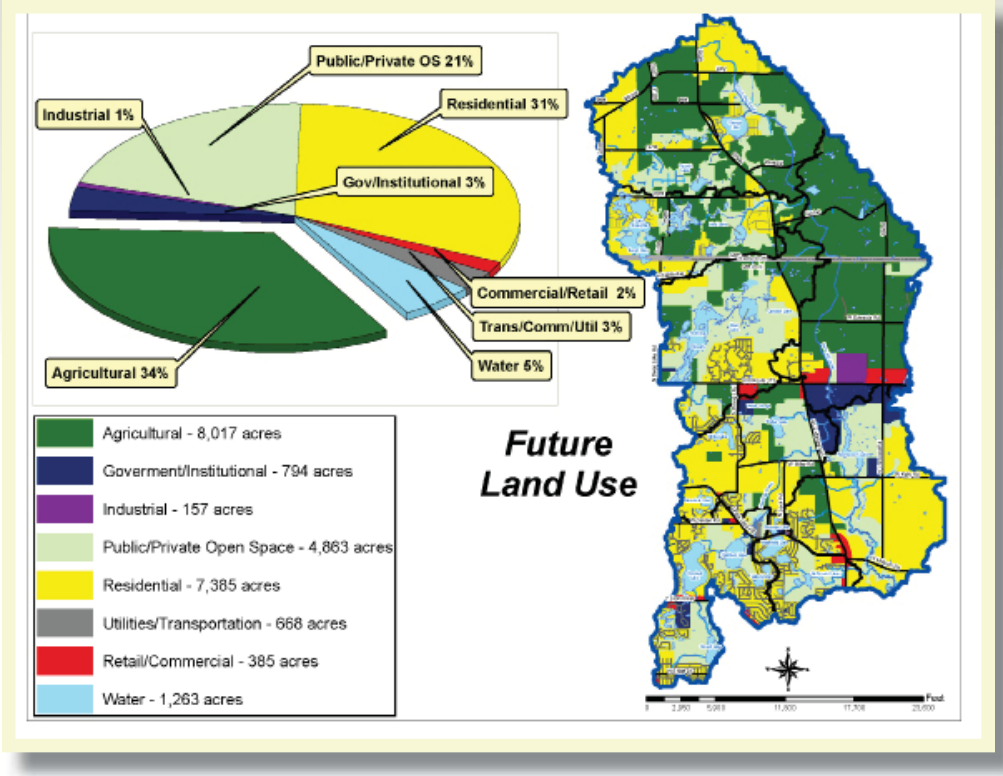
Interspersed with the remaining natural features of the watershed are farms, subdivisions, lake communities, limited commercial areas, a new industrial park and several area schools. The Villages of Bristol, Antioch, Lindenhurst, Old Mill Creek, and Lake Villa are the primary watershed jurisdictions, along with unincorporated areas of Antioch, Newport and Salem Townships. Approximately 15,000 people lived in the watershed and 1,300 people worked here in 2000. A population increase of roughly 148% and a 177% increase in employment are forecasted for the watershed between the years of 2000-2035.







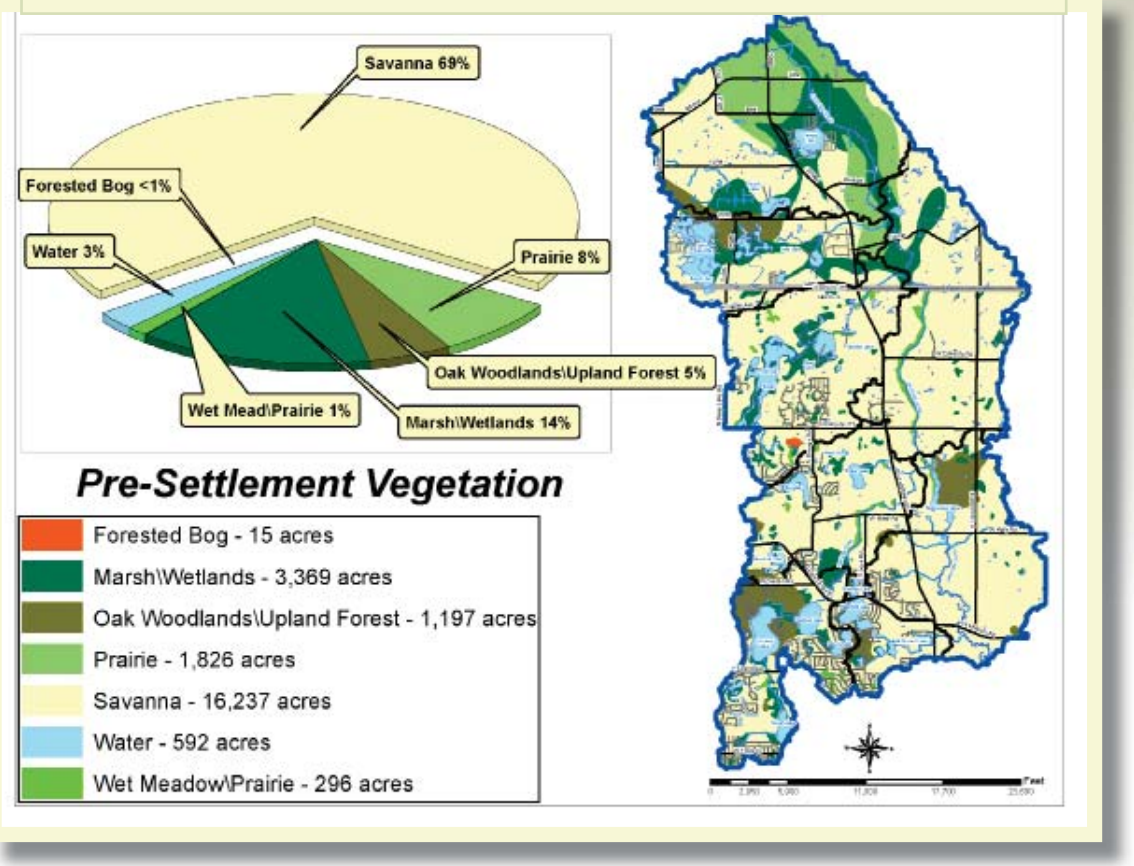

Forest/Grassland 6%
Commercial/Retail <1%
Gov/Institutional 1%
Industrial <1%
Agricultural 44%
Public/Private OS 23%
Residential 12%
Trans/Comm/Util 5%
Wetlands 3%
Water 6%
Agricultural - 10,453 acres
Commercial and Retail - 69 acres
Forest and Grassland - 1,452 acres
Government and Institutional - 141 acres
Industrial - 40 acres
Public and Private Open Space - 5,382 acres
Residential - 2,743 acres
Transportation, Communication, and Utilities - 1,127 acres
Water - 1,311 acres
Wetlands - 814 acres
Current Land Use


Public/Private OS 21%
Industrial 1%
Residential 31%
Gov/Institutional 3%
Commercial/Retail 2%
Trans/Comm/Util 3%
Water 5%
Agricultural 34%
Agricultural - 8,017 acres
Goverment/Institutional - 794 acres
Industrial - 157 acres
Public/Private Open Space - 4,863 acres
Residential - 7,385 acres
Utilities/Transportation - 668 acres
Retail/Commercial - 385 acres
Water - 1,263 acres
Future Land Use

What is special about the North Mill Creek-Dutch Gap Canal watershed?

The watershed landscape of gently rolling fields, grasslands, lakes, wetlands and woodlands that we see today was created over 10,000 years ago by the last retreat of the Wisconsin Glacier. As the giant ice sheets melted and retreated, they carved out and left behind unique glacial features such as the moraines, ridges, kettle holes, and the outwash till plains still visible throughout the watershed.

Plant Communities in the Watershed Prior to European Settlement



Pre-settlement Land Cover

Remnants, some large and some small, of the pre-settlement landscape and plant and animal communities of the watershed remain today. They are the biodiversity of the watershed. These water and natural resources, along with several significant cultural resources that include several sites where mastodon remains were discovered in recent years, are worth protection and restoration.

Special Places

The North Mill Creek-Dutch Gap watershed is identified as a Conservation Opportunity Area by the Illinois State Wildlife Action Plan. Five plants, nine birds and one fish species are listed as threatened or endangered species (T&E). The largest nature preserve in the watershed that is home to several T&E species is the Redwing Slough/Deer Lake Land and Water Reserve totaling over 734 acres. Redwing Slough is considered a Nationally Significant Wetland Area by the U.S. Fish and Wildlife Service.

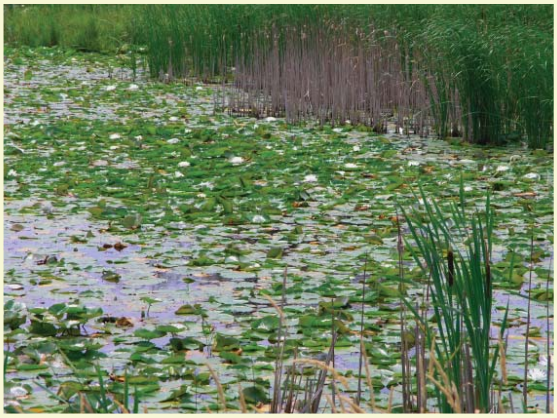
Ethel's Woods Forest Preserve

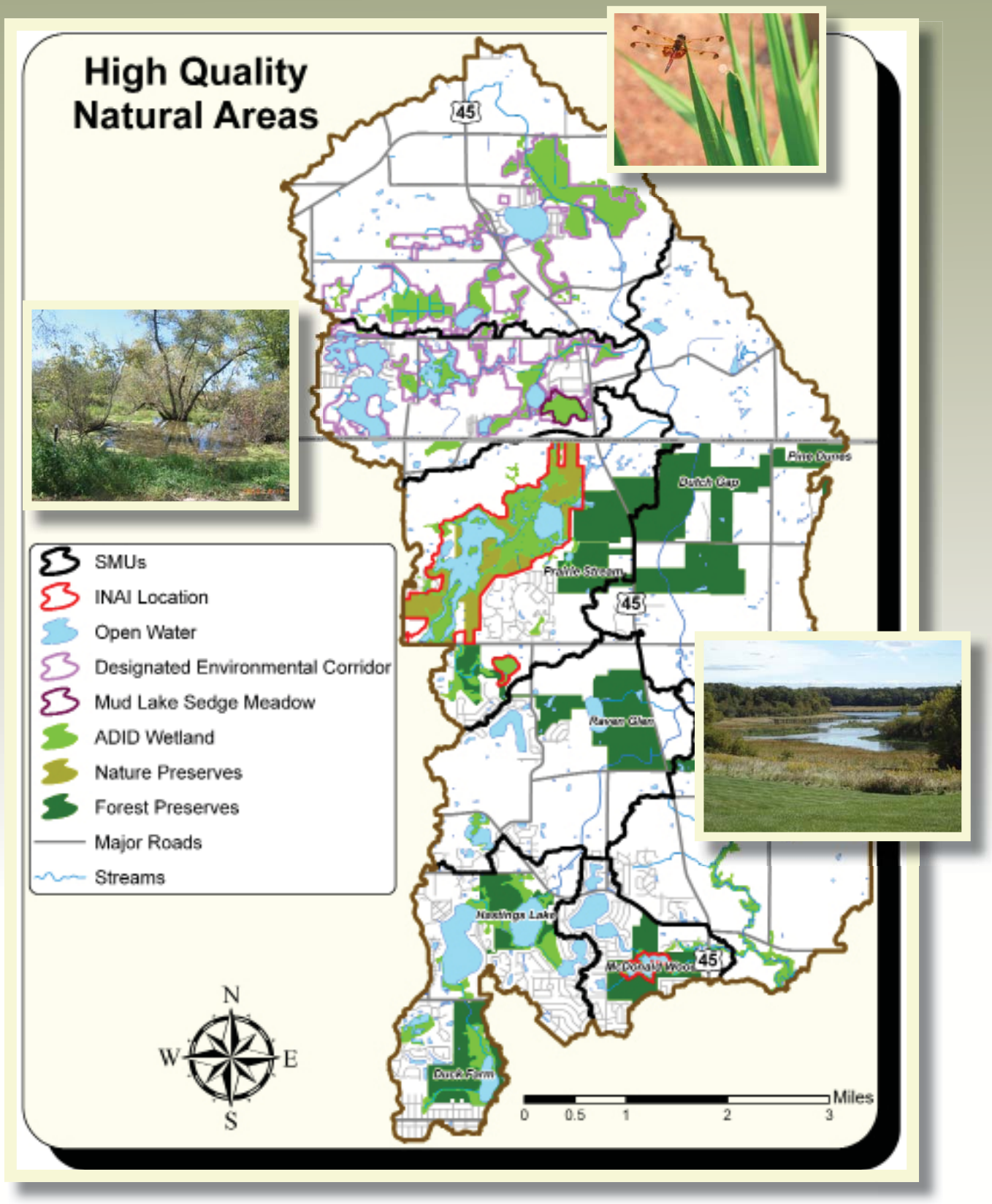
High quality watershed resources include:

- Eighty-two high quality wetlands totaling 1,351 acres.
- Three recorded Illinois Natural Area Inventory sites include Redwing Slough, and McDonalds Woods Marsh totaling 986 acres
- Raven Glen Forest Preserve includes the 33 acre Timber Lake, one of the highest quality lakes in Lake County
- Ethel's Woods Forest Preserve includes two high quality wetlands and numerous old oak-hickory woodlands

Redwing Slough

Below:Marsh at Hendrick Lake




High Quality
Natural Areas
45
Dutch Gap
Prairie Stream
Raven Glen
Hastings Lake
McDonald Woods
Duck Farm
SMUs
INAI Location
Open Water
Designated Environmental Corridor
Mud Lake Sedge Meadow
ADID Wetland
Nature Preserves
Forest Preserves
Major Roads
Streams
N
W
E
S
0
0.5
1
2
3
Miles

What are the current challenges to watershed health?

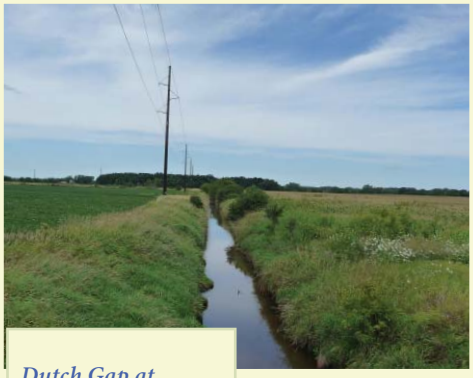
Lakes in the watershed are impaired or becoming impaired by high loads of nutrients and sediment in stormwater runoff and by carp stirring up lake bottoms. Salt from winter de-icing is resulting in an increasing trend in chlorides. Streams are degraded by pollutants in stormwater runoff and runoff from agricultural drain tiles. In-stream erosion is caused by the higher volume of runoff to creeks from impervious surfaces such as building rooftops, roads, parking lots. Poor riparian or streamside property management and lack of stream buffers and maintenance have also contributed to degraded streams.

Streams and Lakes Under Pressure

Lakes:

Data collected in lakes throughout the watershed indicates a general decline in water quality in most lakes including high nutrient loads from farms and lawns, and decreased water clarity as a result of erosion, carp activity and other factors. Ten of twenty-two watershed lakes are impaired. Five lakes have not been evaluated.

Lake Linden



Dutch Gap at Horton Rd

Streams:

- **Channelization is characterized as moderate to high in 64% of stream reaches.**
- **Streambanks of 71% of the stream reaches are moderately or severely eroded.**
- **Sediment accumulation is characterized as moderate to high in 79% of stream reaches.**
- **Excess debris loading is problematic in 50% of the stream reaches.**

Watershed Threats

Gully erosion washes topsoil off land and into creek

More specifically watershed threats include:

- Erosion, excess nutrients, and road salt are the biggest threats to water quality.
- Flooding causes property damage, crop loss and road closures. Sixteen locations that include 199 structures have been reported as flood problem areas, and Wisconsin farmers report increasing crop loss because of flooding.
- Stream channels are degrading due to channelization and lack of maintenance.
- Lakes and streams are being damaged by increasing volumes of storm-water runoff and pollution. Rasmussen Lake is one of the poorest quality lakes in Lake County.
- "Business as usual" development practices create more stormwater runoff increasing pollution, flood damage and loss of high quality natural resources.
- Roads create disproportionately more runoff and pollution in the sub-urbanized areas of the watershed. Major roadway improvements being planned include the Route 45 Millburn By-pass; expanding Route 173 to four lanes; and rebuilding and adding intersection improvements to Route 45 in Wisconsin.

More specifically watershed threats include:

- Watershed stakeholders lack the knowledge, skills and resources that they need to address watershed issues.
- There has been a lack of communication, coordination and collaboration among watershed stakeholders to maintain and improve watershed health.

The future of the North Mill Creek-Dutch Gap Watershed: what is at risk?

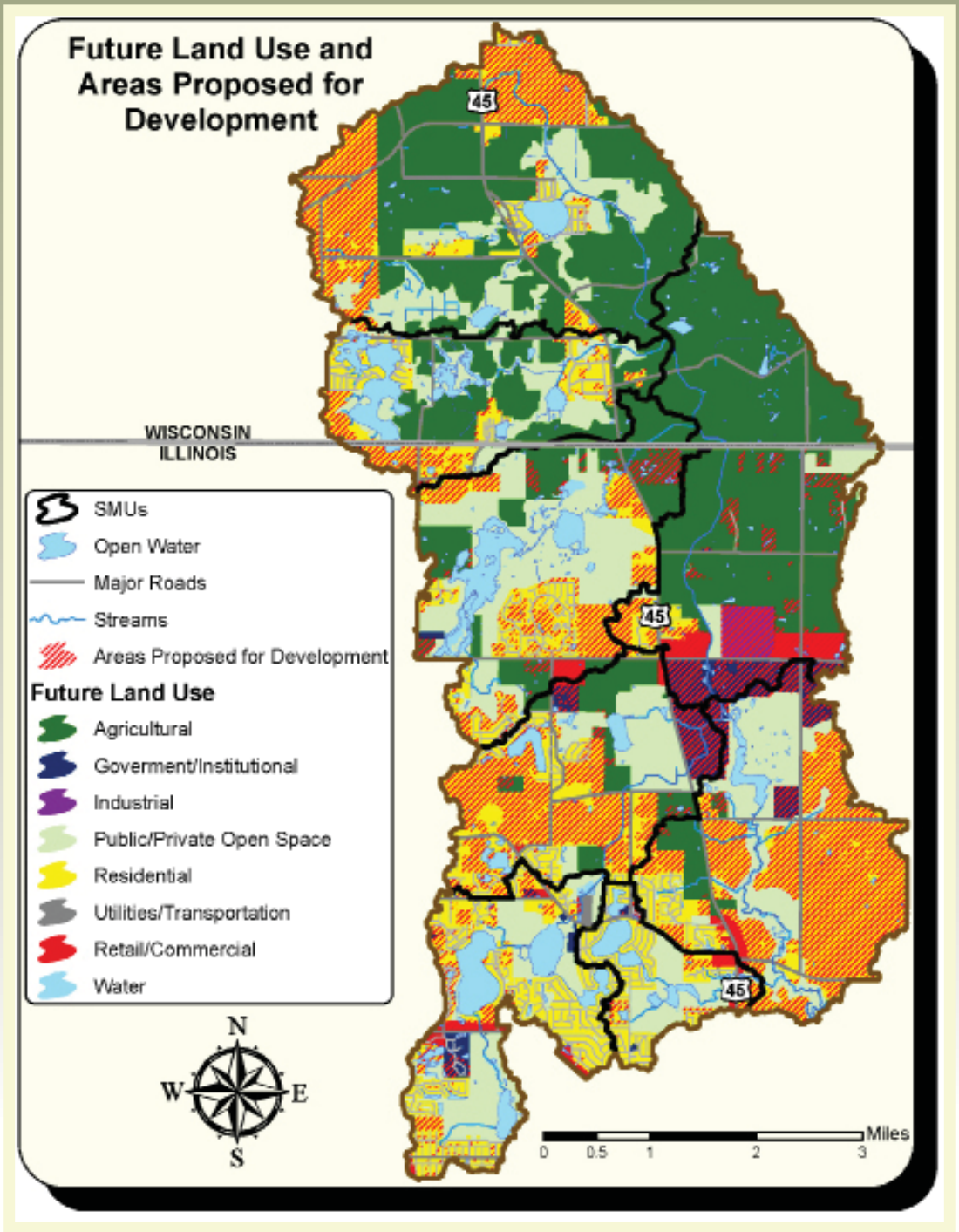
The watershed is changing. Population and jobs are projected to increase dramatically in the watershed over the next 25 years with associated changes in land use to a less rural and more suburban watershed. In 2000, 14,860 people lived in the North Mill Creek-Dutch Gap Canal Watershed and 1,361 had jobs here. By 2035 the watershed is expected to be home for more than 36,000 residents and more than 3,700 jobs. These are significant increases and watershed land use is expected to change accordingly. As of 2005 approximately 74% of the watershed was in rural land uses or open space. By 2035 residential, commercial, institutional and industrial lands are supposed to increase, while rural lands and open space are expected to decrease to 60% of the watershed area. The largest area of change will be conversions from agriculture and open space to residential.

Impervious Cover Impacts Water Resources

As a mostly rural watershed, only 5.6% of the land cover was impervious surface in 2007. Future land use projections indicate that the area covered by impervious surfaces will be two and a half times greater in 2030 covering more than 15% of the land surface. Since watershed development is projected to be significant, an analysis of the watershed's vulnerability based on the effect of impervious cover on stream and lake quality and flooding was evaluated using the future land use forecast for the watershed. Increased impervious cover typically results in more stormwater runoff. This runoff from lawns streets, driveways, rooftops, parking lots and streets carries more water and pollutants from the land to streams and lakes and causes stream channels to erode.

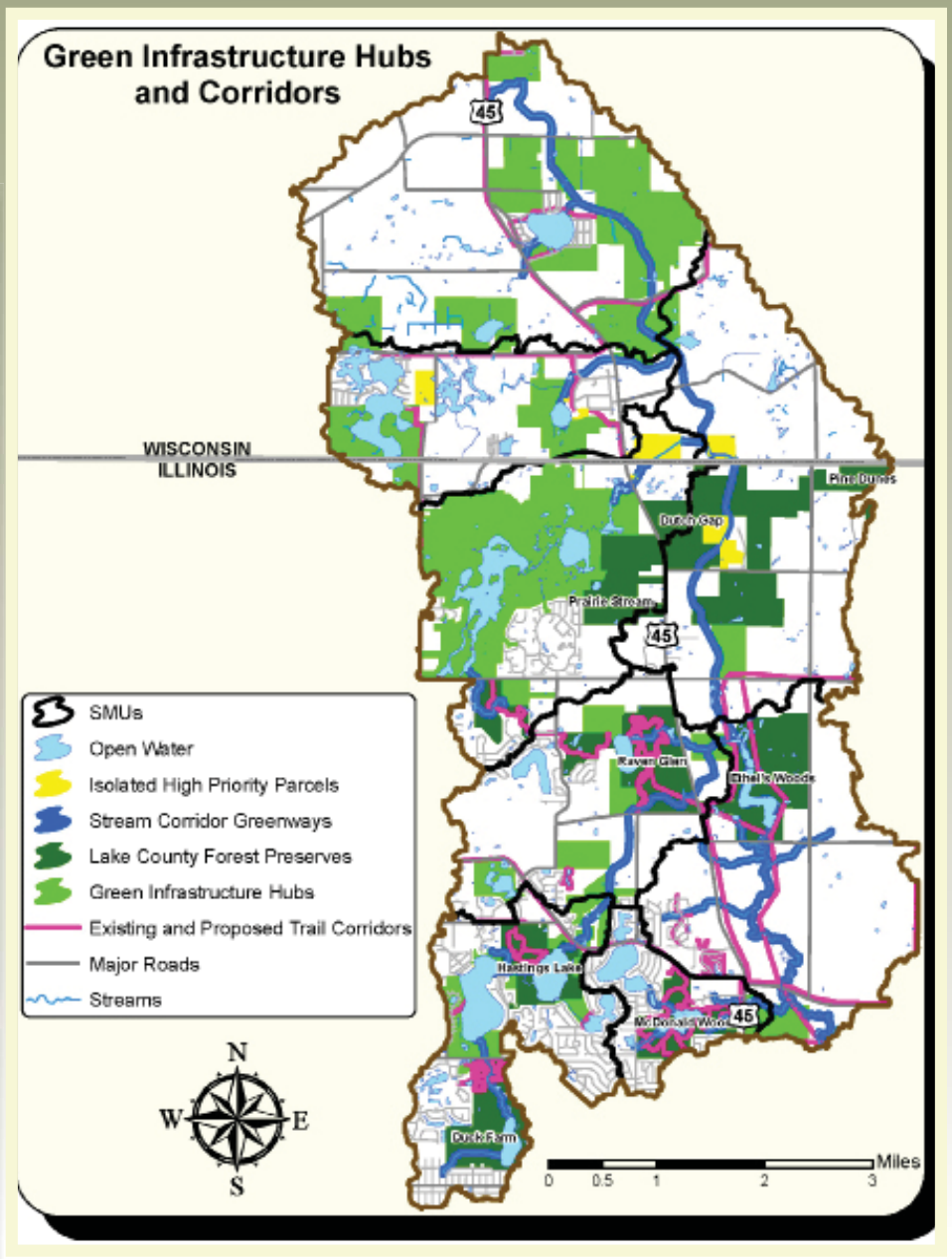
Increased volumes of runoff also translate into more frequent flooding and a larger floodplain in some locations. Thirty-four homes and businesses located in the 100 year floodplain, and other structures outside the floodplain, may be at risk of flood damage in a 100-year flood event. (There is a 29% chance of a 100-year flood occurring within the timeframe of a 30-year home mortgage.)

To reduce the negative impacts of impervious cover on the environment, the watershed plan recommends converting development practices from the traditional stormwater collection and conveyance systems to low impact development practices that reduce and infiltrate stormwater runoff.



Loss of Green Infrastructure

Green infrastructure serves an important function in the North Mill Creek-Dutch Gap Watershed. It not only forms an interconnected network of natural areas that absorb and infiltrate precipitation, but also includes the wetlands and streams that make up the natural drainage system of the watershed. Best management practices that reduce stormwater runoff such as rain gardens, green roofs, naturalized detention basins and swales also contribute to green infrastructure.



An inventory of the watershed's open land (complete undeveloped) and partially open parcels (minimal area devoted to structures) form the basis of the watershed's green infrastructure network. A total of 20,202 acres of open or partially open land was identified. Future land use projections predict that approximately 6,000 acres of this land will be developed over the next 20-30 years (roughly 30%). The hydrology functions that this open land currently provides to the watershed (absorbing, infiltrating, evapotranspiring and storing precipitation) will have to be replaced within the developed lands using low impact development practices so that increases in runoff and its negative environmental and flood damage impacts on the watershed can be avoided.

What can we do?

…the 15 best things that could happen in the next 10 years:

Form a watershed council

- Educate and motivate residents, businesses, institutions and communities to reduce the amount of pollutants they contribute.
- Work with communities to develop a collaborative green infrastructure preservation strategy.
- Provide technical assistance to stakeholders for watershed improvement projects.

Communities & county

- Adopt the watershed plan.
- Require low impact development standards.
- Retrofit stormwater facilities, government properties and transportation corridors to reduce runoff and improve water quality.
- Use less road salt and look to use alternative de-icing products.
- Ban phosphorus in fertilizers.

Residents and businesses

- Convert large areas of yards, lawns, and stormwater facilities to native landscaping.
- Create rain gardens and disconnect rooftop runoff from the stormsewer system.

Lake and streamside property owners

- Establish and maintain native plant buffers along shorelines and stream channels.
- Maintain streams on your property according to American Fisheries Society Standards.

Farmers and equestrian & nursery operators

- Install and properly maintain stream buffers and grassed waterways that include water treatment practices for drain tile discharges.
- Implement nutrient management plans for all operations.
- Stabilize eroding fields and use best farming practices to reduce soil loss.

Good things are beginning to

Watershed partners are taking the lead and moving forward with implementing best management projects and educational activities recommended in the watershed plan. Join the watershed team and take the lead on a project in your neighborhood or community.

Elfering Farm has a nutrient management plan and only applies fertilizer where needed

Below: Native plant buffer at Hendrick Lake helps to keep the water clean

happen in the watershed

Lindenhurst promotes storm-water awareness

Ecological restoration at Ethel's Woods Forest Preserve

Left: Lindenhurst is upgrading it's wastewater treatment plant 2011-2012 to include nutrient removal

Right: Stakeholders are coming together to plan for the future of their watershed

The North Mill Creek – Dutch Gap Watershed Community

Residents
Businesses
Schools

COMMUNITIES

Antioch
Bristol
Lake Villa
Lindenhurst
Old Mill Creek

TOWNSHIPS

Antioch
Bristol
Newport
Salem

AGENCIES/DISTRICTS/ORGANIZATIONS

Lake and Kenosha Counties
Lake County Stormwater Management Commission
Lake County Forest Preserve District
Lindenhurst Park District
Southeastern Wisconsin Regional Planning Commission
Natural Resources Conservation Service
Illinois and Wisconsin Department of Natural Resources
Illinois Environmental Protection Agency
Grubb School Drainage District
Lindenhurst Lakes Commission
Antioch Environmental Commission
Lake and Property Owner Associations
Upper Des Plaines River Ecosystem Partnership
Liberty Prairie Conservancy

Funding for development of the North Mill Creek-Dutch Gap Canal Watershed Plan was provided in part through the USEPA Section 319(h) of the Clean Water Act that is administrated through the Illinois EPA. Lake County Stormwater Management Commission also provided funding for this plan in addition to providing considerable in-kind support. Lake County Health Department provided in-kind services for monitoring water quality in lakes and streams in the watershed.

Mill Creek Watershed Plan

A Strategy for Protecting and Restoring the Watershed

Executive Summary- January 2016

Mill Creek Watershed Community

Residents
Businesses
Schools

COMMUNITIES
Carillon North
Grandwood Park
Grayslake
Gurnee
Hainesville
Libertyville
Lindenhurst
Old Mill Creek
Round Lake Beach
Round Lake Park
Third Lake
Venetian Village
Wadsworth
Wildwood

TOWNSHIPS
Avon-Fremont
Lake Villa
Newport
Warren

AGENCIES/DISTRICTS
Avon-Freemont Drainage District
Lake County Board and Departments
Lake County Stormwater Management Commission
Lake County Forest Preserve District
College of Lake County
Grandwood Park District
Grayslake Park District
University of Illinois Extension Service
Wildwood Park District

ORGANIZATIONS
Lake and Property Owner Associations
Conserve Lake County

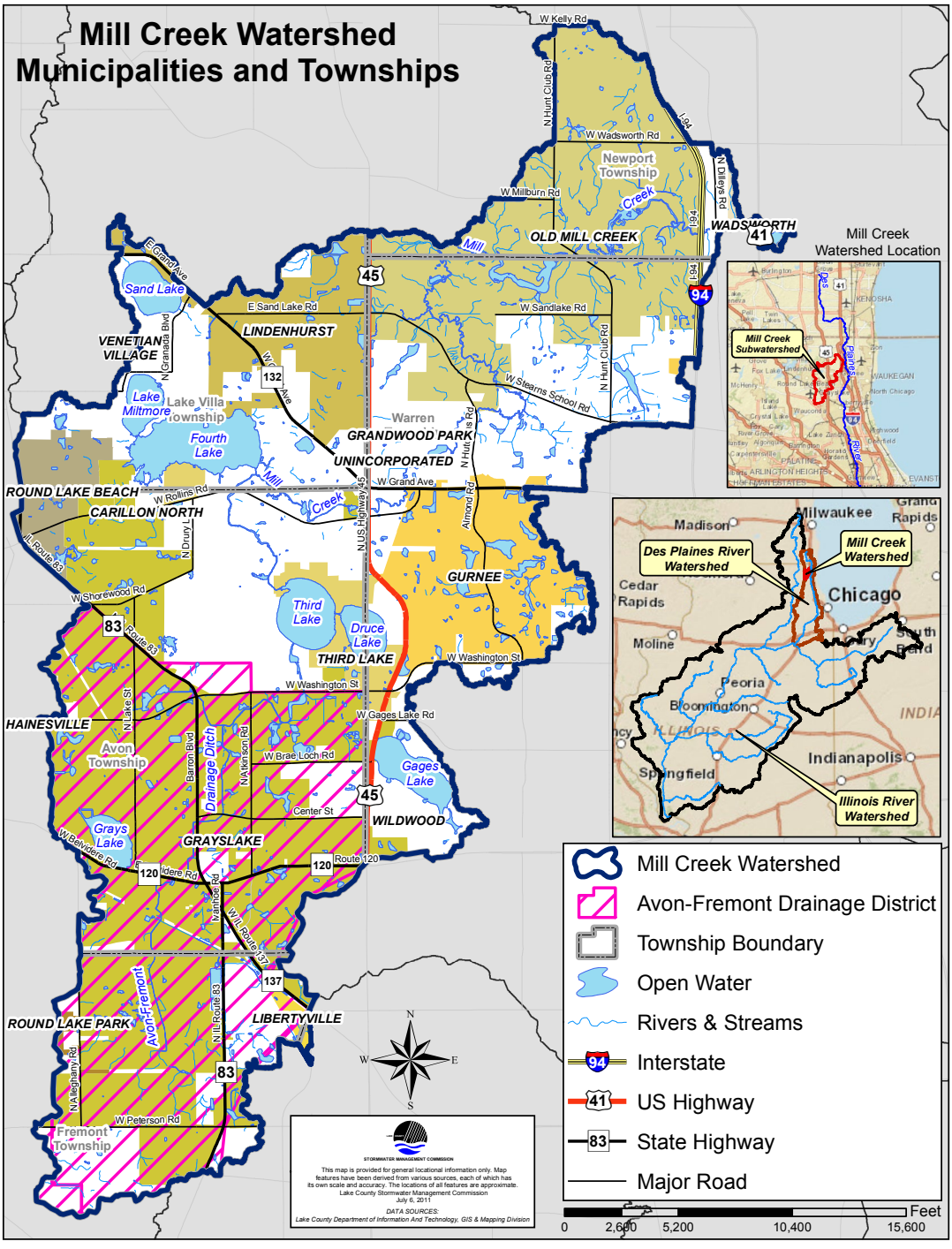
72 Stakeholders participated in the first watershed planning meeting to identify and discuss watershed issues and opportunities.

Volunteer efforts for the Grandwood Park Lake shoreline stabilization project.

Funding for the development of the Mill Creek Watershed and Flood Mitigation Plan was provided in part by the Illinois Department of Commerce and Economic Opportunity (DCEO) through an Illinois "IKE" Disaster Recovery Planning Program grant. Lake County Stormwater Management Commission also provided funding for this plan and considerable in-kind support. Northwater Consultants and Water Resource Solutions provided planning support.

Do you live or work in Mill Creek Watershed?

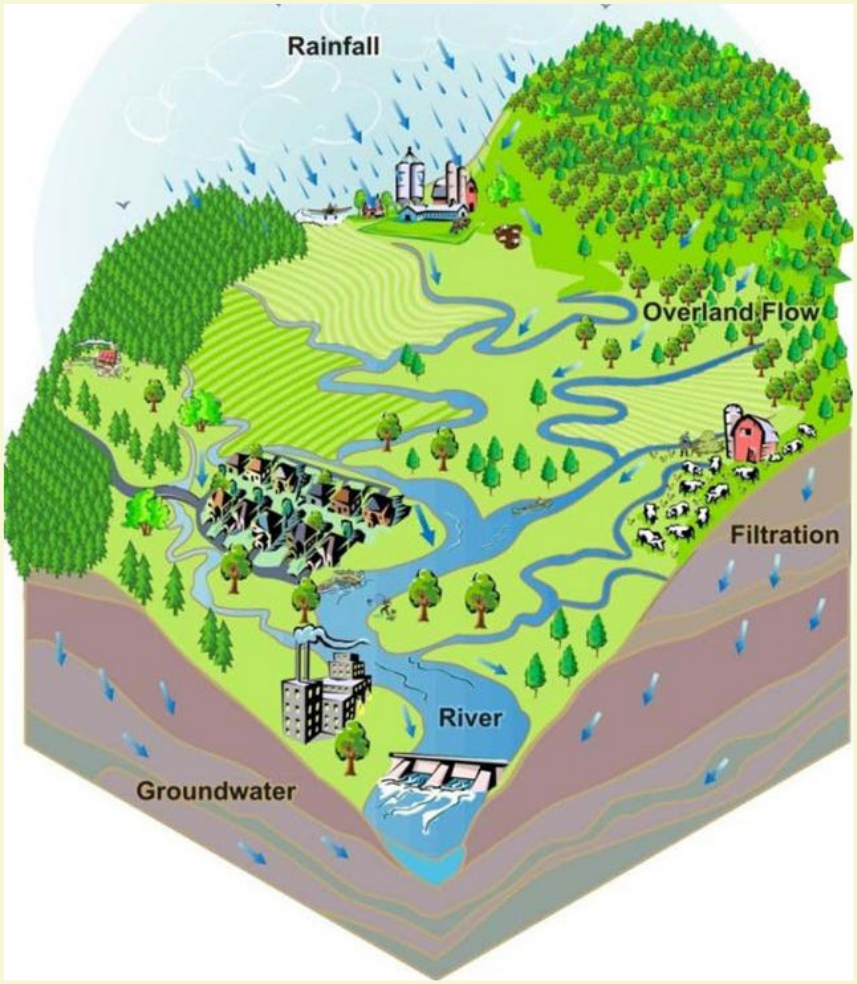
The watershed planning process for Mill Creek brought municipalities, townships, county, broader community of homeowner associations, businesses, institutions, non-profit organizations, and residents that live or work in the watershed together to plan for managing and improving the land, lakes, streams, and wetlands of the watershed.



Mill Creek watershed is a subwatershed within the Des Plaines and Illinois River watersheds that are tributary to the Mississippi River Basin, which covers 1,245,000 square miles of the continental U.S.

What is a Watershed?

After a rain drop or snowflake falls on the land, it may infiltrate into the soil or it may run off over the land surface to a low spot in the landscape, which is usually a body of water (lake, stream or river). A watershed is the area of land that drains to a particular stream, river or lake.



The health of a waterbody is a direct reflection of how the land in the watershed is used and managed. Some of the benefits of a healthy watershed are:

- improved water quality
- fewer flooding problems
- enhanced wildlife habitat
- opportunities for education and recreation

Why this watershed plan?

Water is elemental to our lives. Our bodies are largely composed of water and we need to consume clean water for our survival. Plants and animals also need water and we in turn depend on these plants and animals for food, medicines, fuel and everyday products we use. Although elemental to our individual lives, our communities and our planet, we sometimes take water for granted.

This plan is important to you because it specifically addresses water here in your community within the Mill Creek Watershed. Clean and abundant water, healthy lakes and streams, and safety from flooding are important for residents, agricultural producers, businesses, and the economic and environmental health of our communities.

As a resident, landowner, business or community official your actions make a difference in keeping water in our creeks and lakes clean, reducing flooding, and protecting natural areas that help do both as well as providing habitat and places for people to recreate.

How water flows and collects in streams, wetlands and lakes is based on landform. Water flow generally does not follow property lines or political boundaries; we recognize that most water resource problems need to be addressed at the watershed level, which frequently involves multiple landowners and several political jurisdictions.

This plan was developed with a broad representation of watershed stakeholders who took part in the planning process. Representatives from municipal and county agencies, businesses, homeowner and lake associations, agricultural producers, natural resource agencies and groups, and other interested groups and individuals from throughout the watershed. This stakeholder group developed five goals for this watershed plan.

Watershed Goals

- **Reduce flood damage**
- **Improve water quality**
- **Preserve and enhance green infrastructure**
- **Protect and restore natural resources**
- **Enhance stakeholder education and stewardship**

Mill Creek Watershed stakeholders review potential planning topics and rank each topic based on priority.

Plan Purpose

The ***Lake County Stormwater Management Commission (SMC)*** took the lead to develop this watershed plan for the Mill Creek watershed. A significant outcome of this planning effort and the implementation of the plan going forward is to return the nine (9) watershed lakes that are water quality "impaired" to conditions that fully support their designated uses as aquatic habitat and for recreation.

This plan identifies Best Management Practices (BMPs) to remedy or mitigate water quality degradation, flood damage, and natural resource loss. The plan also makes recommendations for preventative actions to address potential future water quality and flood damage problems.

The purpose of this plan is to:

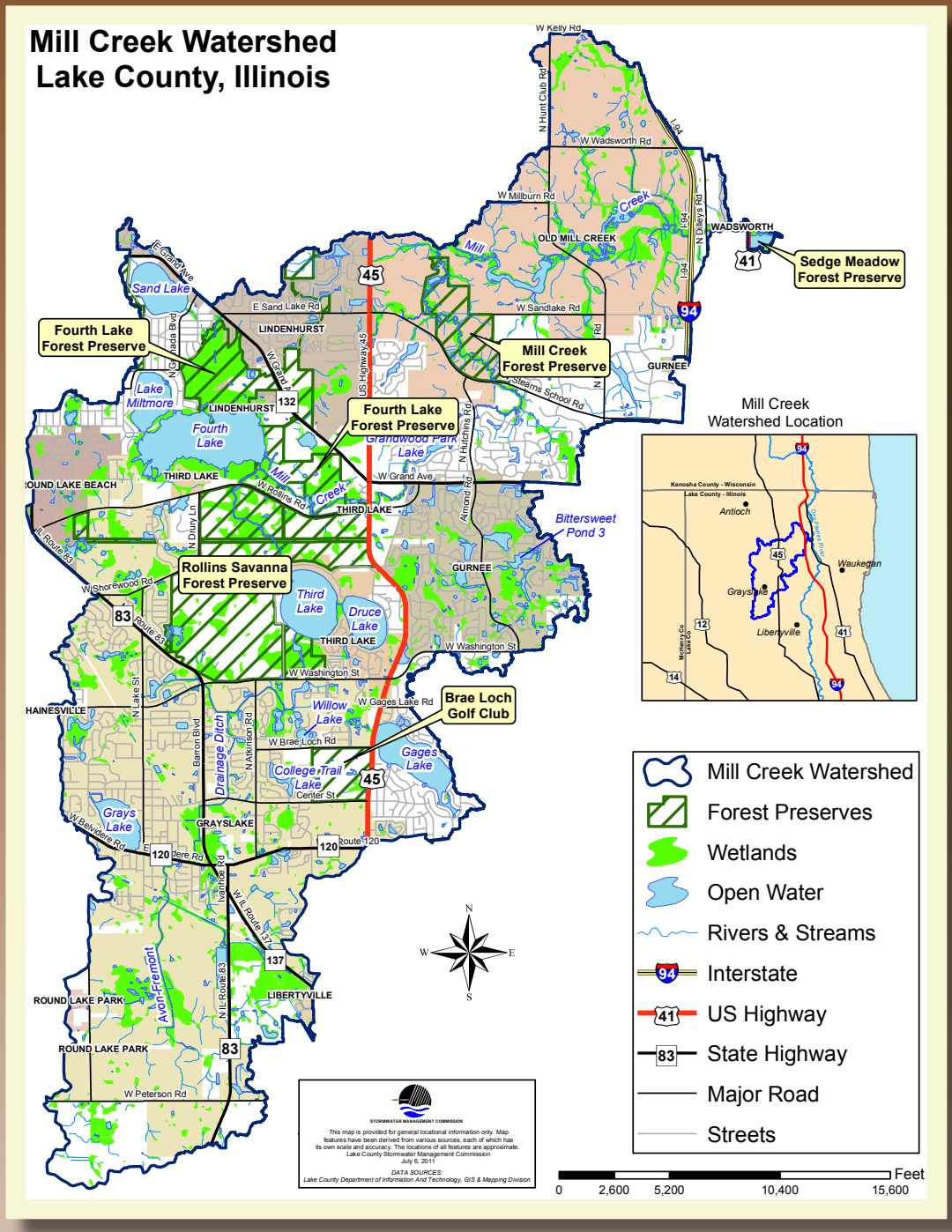
- restore watershed lakes, streams and wetlands to a healthy condition
- reduce the impacts of water pollution and flood damage on watershed residents, and
- provide opportunities for watershed stakeholders to have a significant role in the process.

Rollins Savanna

Mill Creek

About the Mill Creek Watershed

The Mill Creek watershed is a subwatershed of the larger Des Plaines River Basin and encompasses approximately 31 square miles (20,107 acres) in north central Lake County. The natural landscape of the Mill Creek watershed is a complex of lakes, streams, wetlands, savannas, upland prairies, and woodlands. Mill Creek watershed is interspersed with farms, subdivisions, lake communities, commercial areas, area schools, College of Lake County, and recreation facilities.



The Mill Creek watershed includes 38 miles of stream, more than 4,000 acres of wetland, 23 named lakes encompassing over 1,100 acres, and smaller ponds and unnamed water bodies make up another 218.5 acres.

Land use in the Mill Creek Watershed is a combination of rural and suburban, which is typical of Lake County, Illinois. Residential and open space/wetlands land use classes account for the greatest area of the watershed at 21% and 37%, respectively. Another substantial land use is agricultural at 18% of the watershed. The watershed includes 227 miles of roads.

Municipalities cover 12,840 acres, 64% of the watershed, including the Villages of Grayslake, Gurnee, Libertyville, Lindenhurst, Old Mill Creek, Round Lake Beach, Third Lake, and Wadsworth. Unincorporated areas, including Grandwood Park and Wildwood communities, cover 7,270 acres; 36% of the watershed.

The population of the Mill Creek Watershed is approximately 46,207, and approximately 16,500 jobs are located in the watershed (based on the 2010 decennial census).

What is special about Mill Creek Watershed?

Photos by Lake County Forest Preserve District from top to bottom - Rollins Savanna, Fourth Lake, Sedge Meadow

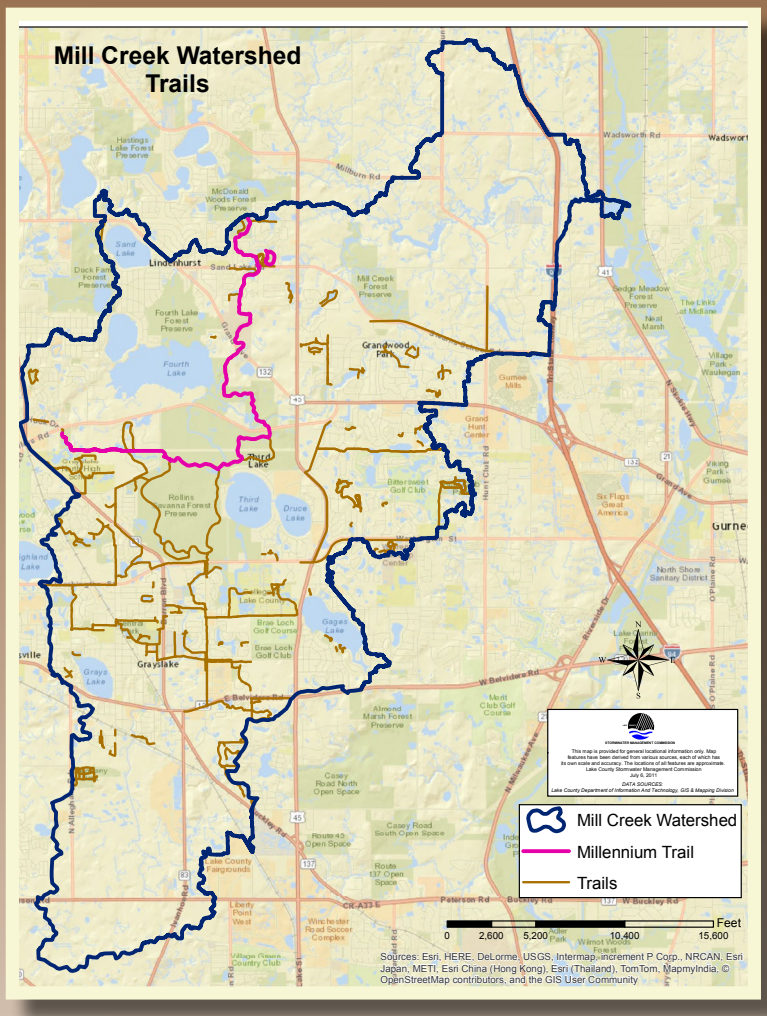
The Mill Creek Watershed is home to ecologically significant and protected areas providing habitat for threatened or endangered species, and features high-quality wetlands and natural areas. As of 2011, there were 22 threatened and endangered species, located in the watershed.

Ecologically significant and protected areas in the watershed include:

- 4,000 acres of wetlands of which 1,380 are high quality wetlands.
- Eight forest preserves totaling 2,721 acres.
- Rollins Savanna, the largest preserve in the watershed totaling 1,220 acres, is identified as an Important Bird Area by the National Audubon Society due to the large number of endangered yellow-headed blackbirds that live there.
- Fourth Lake Forest Preserve and its fen ecosystem are home to a variety of state threatened and endangered plant species. The calcareous floating mat is considered high quality and is one of ten of its kind and quality in the state.

Trails

There are more than 44 miles of trails in the watershed offering recreational and alternative transportation benefits. Trails connect neighborhoods, parks, forest preserves and communities.



A portion of the Millennium Trail and Greenway runs through the Mill Creek Watershed. The Greenway will cover 35 miles when completed and currently covers approximately 25 miles, connecting local communities to forest preserves. The Millennium Trail extends through Rollins Savanna and Fourth Lake Fen Forest Preserves.

What are the current challenges to watershed health?

Watershed Threats

- Sediments from erosion, excess nutrients, and road salt are the biggest threats to water quality.
- Flooding is the number one natural hazard in Lake County. There are 31 known flood problem areas in the Mill Creek Watershed and an estimated 337 structures (residences, churches, businesses) are at risk of flooding due to their location in the 100-year floodplain.
- Stream channels are degrading due to erosion caused by excess stormwater discharges, channelization, and lack of maintenance.
- Lakes and streams are being damaged by increasing volumes of stormwater runoff, invasive aquatic species and pollution.
- Traditional development practices can create more stormwater runoff, increasing pollution, flood damage and loss of high quality natural resources.
- Without the inclusion of runoff reduction practices, conversion of open land and partially open land to impervious surfaces reduces the landscape's ability to absorb and filter stormwater.
- Roads tend to be a collection point for stormwater and generate disproportionately more runoff and pollution in suburbanized areas of the watershed.
- Many watershed stakeholders lack the knowledge, skills, and resources to address watershed issues.
- There isn't adequate communication, coordination, and collaboration among watershed jurisdictions to maintain/improve watershed health.

Photos from top to bottom - Streambank Erosion, Channelization, and Algae Bloom

What is expected in the future?

Future Conditions

The watershed is changing. As a whole it is expected to experience significant growth in population, households, and employment from 2000-2040. Planned major roadway expansions will add an additional 21 miles of roadway in the watershed. Residential landuse is projected to increase by 3,381 acres, or 77%, ultimately covering 7,453 acres (38%) of the watershed. Population is forecasted to increase an additional 31% and employment by 54% by the year 2040 (Chicago Metropolitan Agency for Planning, CMAP).

Impervious Cover Impacts Water Resources

Future land use projections suggest that the area covered by impervious surfaces may be two and a half times greater in 2040 covering more than 15% of the land surface. Increased impervious cover typically results in more stormwater runoff. This runoff from lawns streets, driveways, rooftops, parking lots and streets carries more storm water and pollutants from the land to streams and lakes, and causes stream channels to erode. Increased volumes of runoff also translate into more frequent flooding and an expanded floodplain in some locations.

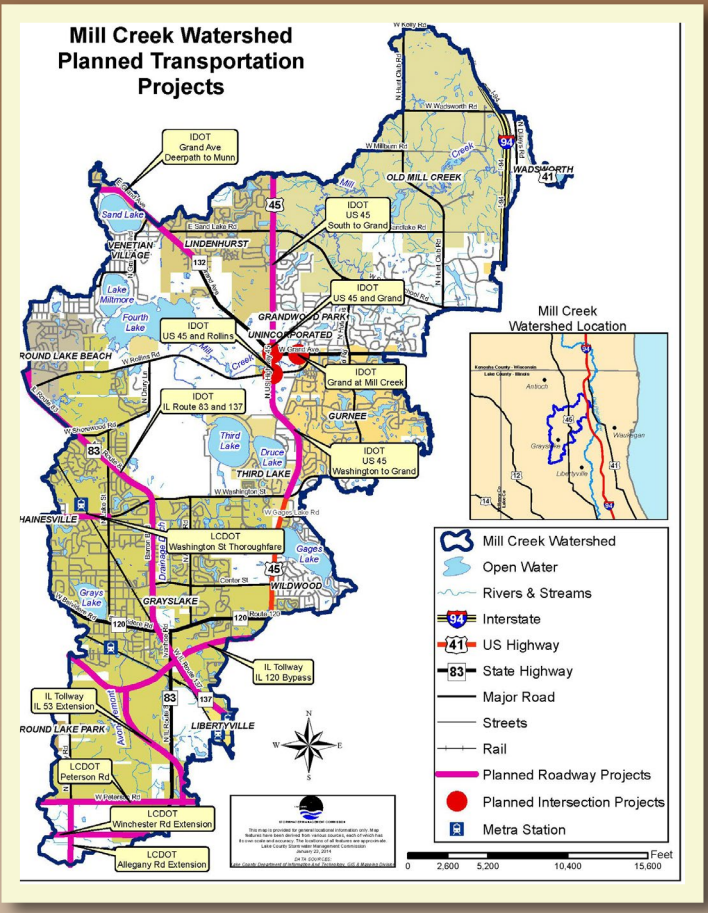
To reduce the negative impacts of impervious cover on the environment, the watershed plan recommends converting development practices from the traditional stormwater collection and conveyance systems to low impact development practices that reduce and infiltrate stormwater runoff.

Loss of Green Infrastructure

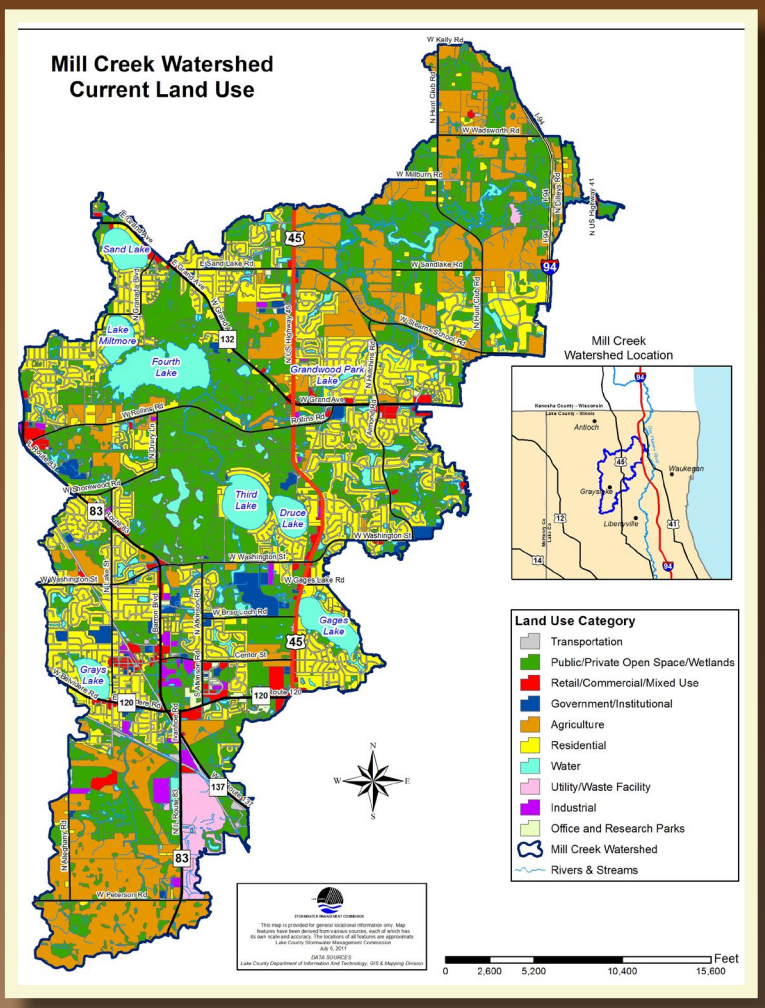
Green infrastructure serves an important function in the Mill Creek Watershed and forms an interconnected network of natural areas that absorb and infiltrate precipitation, which include the wetlands and streams that make up the natural drainage system of the watershed. Green infrastructure in the watershed is expected to decline at the landscape scale. The loss of green infrastructure means the loss of infiltrative, storage, and water flow.

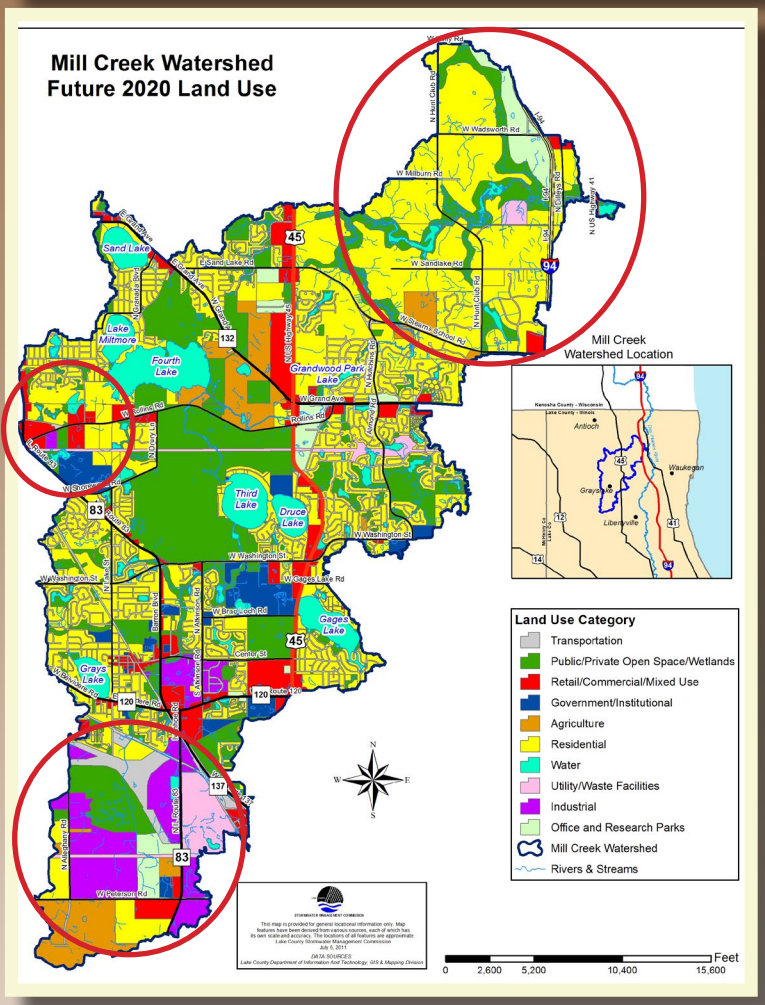
- The area of agricultural land is projected to decrease by 288%, from 3,639 acres to 939 acres.
- The public/private open space and wetlands are projected to decrease by 3,098 acres; a 73% decline.

In the Mill Creek Watershed, data indicates the total change from un-developed land uses - green infrastructure (agriculture, public open space and water) to developed land uses is 5,941 acres (30%). The loss of green infrastructure means the infiltrative and water storage functions that are currently available will also be lost and will have to be replaced to prevent flood damage and water quality impairments.



Planned roadway improvements are estimated to be an additional 101 acres of impervious surface when completed.





Circled areas on the future land use map indicate the most significant land use changes as reflected by community master plans.

More intense storms worsen flood damage

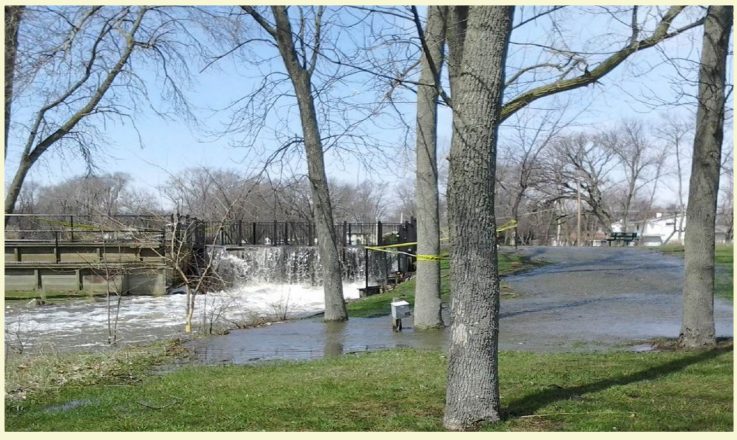
Recent flood events further exacerbated existing flood problem areas in the watershed. The federally-declared April 2013 flood impacted areas included Grandwood Park, Gurnee, Third Lake, Grayslake, Wadsworth, Lindenhurst, Wildwood/Gages Lake, and unincorporated areas of the county. A June 2013 flash flood event caused sanitary and storm sewer backs ups, and depressional and nuisance flooding.

With more frequent and higher intensity storm events, more erosion and flood damages occur on streambanks. The Mill Creek watershed stream inventory results assessed the degree of streambank erosion along the right and left banks (facing upstream) of streams within the Mill Creek Watershed. **The results indicate that nearly all the stream reaches are moderately or severely eroded, suggesting that the stream channel may be adjusting to overall changes in the watershed hydrology.**

Extent of Mill Creek Watershed Erosion:

- 7% of the banks were slightly eroded,
- 55% of the banks were moderately eroded,
- and 38% of the banks were severely eroded.

The severely eroded banks consisted of bare banks with rills and severe overhanging of vegetation, as well as, many exposed tree roots, fallen trees, and slumps or slips.



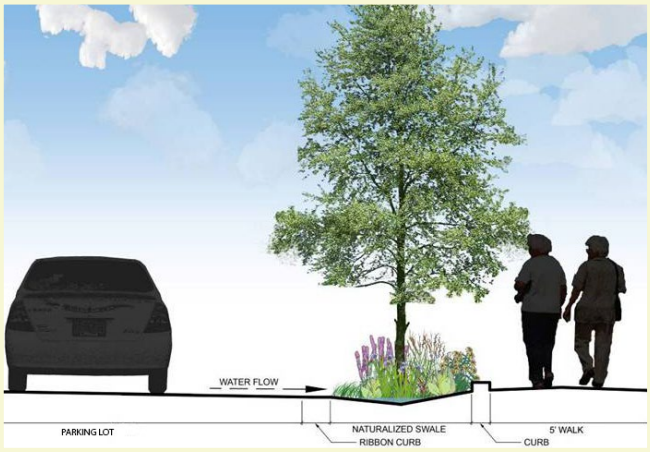
Grandwood Park Lake overflowed its banks and over topped the Grandwood Park Dam as a result of the April 2013 flood event.

This eroded streambank is an example of a stream/creek degradation (Mill Creek).

Good things are beginning to happen in the watershed

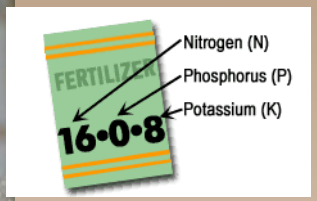
Watershed partners are taking the lead and moving forward with implementing best management projects and educational activities recommended in the watershed plan. Join the watershed team and take the lead on a project in your neighborhood.

The Lake County Department of Public Work's Mill Creek Water Reclamation Facility treated effluent is tributary to Mill Creek. The facility was upgraded in fall of 2011 to include state of the art nutrient reduction technologies.



College of Lake County (CLC) will be installing parking lot bioswales to treat urban runoff (and reduce non-point source pollution) before the water flows into Willow Lake, the Avon-Freemont Ditch, then into Third Lake, before reaching Mill Creek

Phosphorous Bans
Libertyville, Lindenhurst, and Gurnee have banned the use of fertilizer with phosphorous to prevent further negative impacts to watershed lakes, and health issues like Blue Green Algae.



(L-R) Grayslake residents Lori Rieth and Wendy Kotulla work with Lake County Health Department through the Volunteer Lake Monitoring program to monitor the water quality of Druce Lake. (Photo by John Konstantaras~For Sun-Times Media)

Communities helping protect our watershed!

Carillon North Wetland Restoration

The Carillon North wetland subcommittee of the retirement community's homeowner association chopped, hauled and stacked buckthorn encroaching on the community's 14-acre wetland. For many years, Carillon community volunteers, HOA Board members and the property management team have been focused on restoring the high quality 14-acre Drury Wetland and 2.75 acre prairie buffer around it, and improving stormwater management basins.

The community is already eco-friendly with native plant landscaping around the community's three ponds and prairie swale that runs through the community. Carillon North's buffer enhancement project won the 2010 Conservation and Native Landscaping award from Chicago Wilderness and U.S. EPA.

Conservation @ Home - Land Conservation in Grayslake

As home to the 20-year-old nonprofit Conserve Lake County, is it any wonder Grayslake has emerged as an epicenter for the Chicago region's Conservation@ Home program? The award-winning program supports homeowners and property managers who seek to incorporate eco-friendly practices into their landscaping and property management. Since 2011, when Conserve Lake County brought the program to the county, over 700 properties have enrolled, with Grayslake leading the way among municipalities with the highest levels of participation. Learn details at "http://www.conservelakecounty.org.

The program features property appointments in which homeowners and managers receive personalized assessments and recommendations. Qualifying properties are certified. To support conservation in Grayslake, the Village recently began to partially reimburse residents who participate in the program. During appointments, property owners or managers walk their site with a certified sustainable landscape consultant and learn how to make better use of time and budgets while contributing to protection of Lake County's exceptional natural resources. They learn how to retain aesthetics and improve property values while making the landscape healthy for pets, people, songbirds and butterflies. They also learn about ecological treasures or invasive species that might exist on the property, and ways to approach water issues, healthy lawn care and landscaping with native trees, shrubs or other plants.

What communities can take the lead on for their watershed...?

- Consider pervious or permeable pavement as an alternative to impervious surfaces
- Monitor, and maintain stormwater detention facilities
- Remediate aging & failing sanitary sewer lines

Parking lot constructed with pervious pavement reduces stormwater runoff.

- Incorporate naturalized drainage and native landscaping into building and roadway projects
- Preserve open space and wetland areas
- Stabilize eroding lake shorelines and detention basin shorelines
- Maintain, establish and expand native riparian buffers
- Restore stream channels, streambeds and aquatic habitat to a healthy condition
- Use less road salt and use alternative de-icers

Depressed parking lot swales and pervious pavement are low impact development practices.

- Promote watershed education
- Adopt the watershed plan
- Adopt low impact development standards

What residents and businesses can do for their watershed?

- Establish/enhance native plant buffers along streams, wetlands, and lakes
- Consider having a flood insurance policy
- Convert large areas of lawns to native landscaping
- When using chemical treatments in your yard, apply only the recommended amount

Grandwood park residents install a native plant buffer around Grandwood Lake

- Use just enough road salt in the winter to keep high traffic areas free of ice
- Install a rain garden to capture rooftop runoff
- Discharge sump pumps and downspouts into lawns, rain gardens/ barrels, or infiltration basins

Slightly depressed "Rain Gardens" infiltrate runoff from rooftops, lawn and paved areas.

- Incorporating sustainable landscaping and certify your property with Conservation @ Home

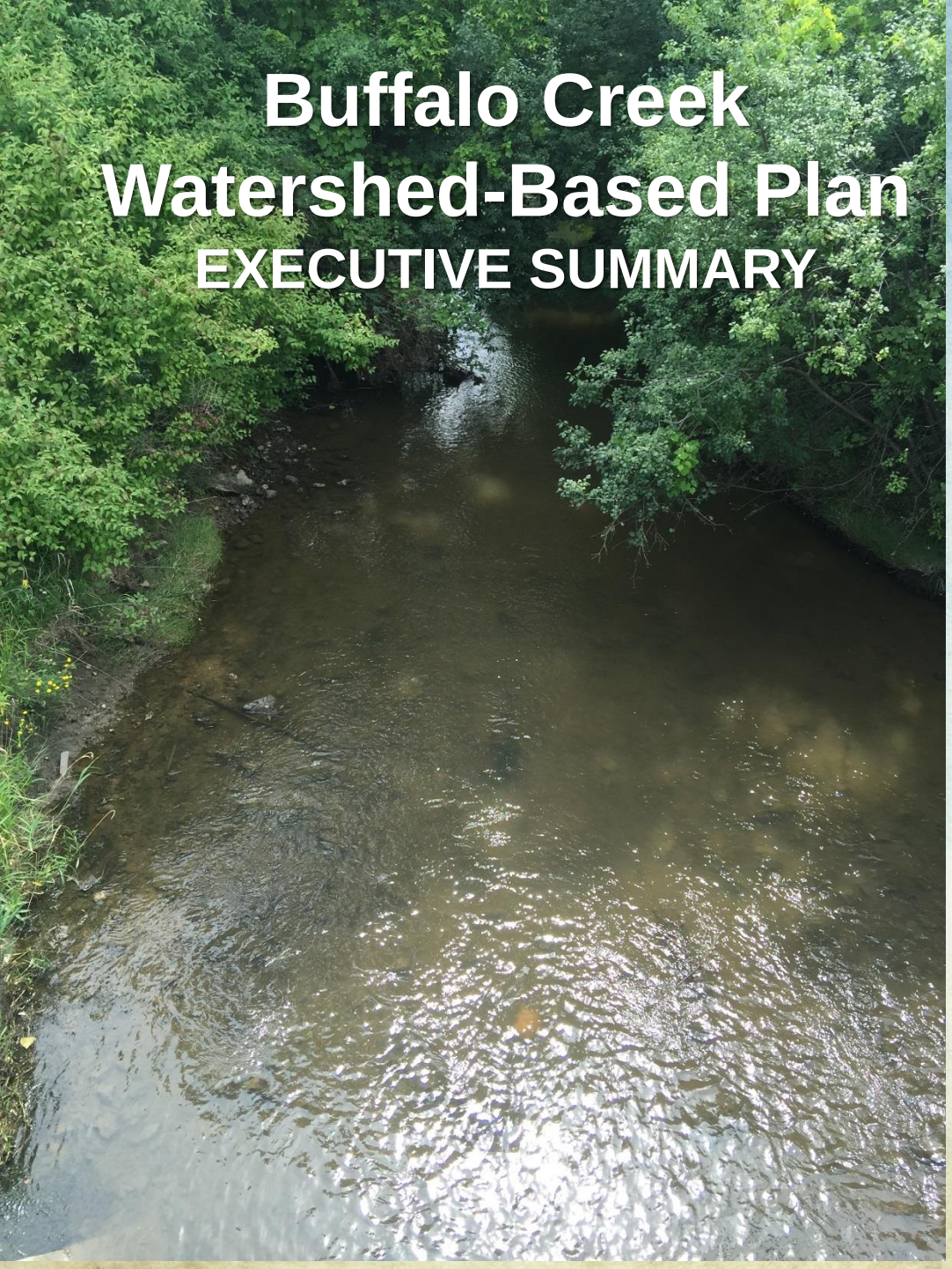
- Keep your storm drain openings clear of debris, snow, and ice to prevent storm sewer backups

To view the 2014 Mill Creek Watershed and Flood Mitigation Plan go to:

http://www.lakecountyil.gov/Stormwater/LakeCountyWatersheds/DesPlainesRiver/Pages/MillCreek.aspx

Buffalo Creek Watershed-Based Plan

EXECUTIVE SUMMARY

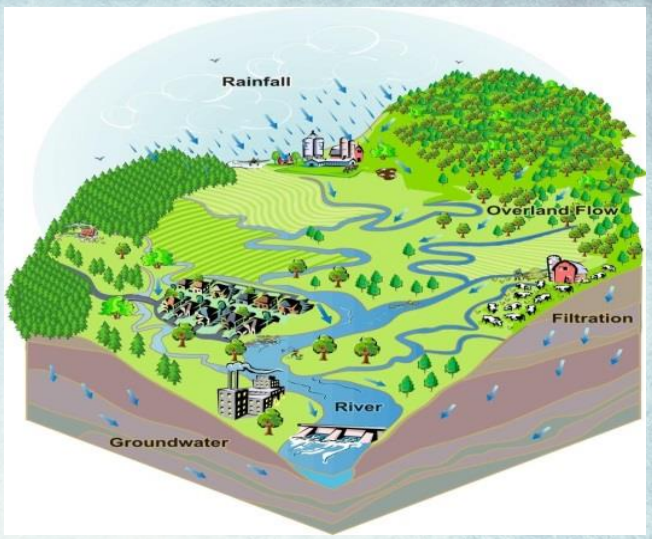


Prepared for:
Buffalo Creek Clean Water Partnership
December 2015

Buffalo Creek Clean Water Partnership

What you will find inside this Executive Summary

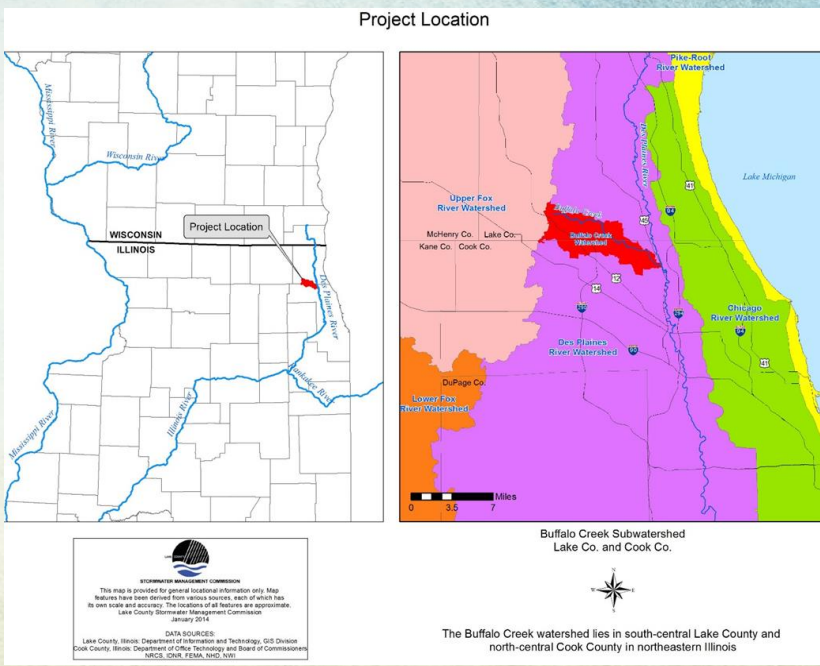
1. Introduction
2. Purpose and Goals
3. Past, Present & Future
4. Challenges & Threats
5. Green Infrastructure
6. Action Recommendations
7. Get Involved



Source: Arkansas Watershed Advisory Group

Introduction

Each of us lives, works, and plays in a watershed. A watershed is the area of land drained by a river/stream system or a body of water. As simple as the definition sounds, a watershed is actually a complex interaction between ground (below and above), climate, water, vegetation and animals. In today's developed watersheds, other elements such as sewage, agricultural drainage, infrastructure, impervious surfaces (such as streets, parking lots, and buildings), stormwater and erosion can have detrimental effects on the health of a watershed. Buffalo Creek is a tributary of the Des Plaines River, located in Lake and Cook counties.



The Buffalo Creek Watershed is approximately 11 miles long and 2.5 miles wide with a total drainage area of 26.8 square miles. The general orientation of the watershed slopes from the northwest to the southeast. Two tributaries, the North Branch and the South Branch, join together downstream of Albert Lake to form the main channel of Buffalo Creek in the northwest portion of the watershed. Buffalo Creek enters the Buffalo Creek Reservoir at the Long Grove/Buffalo Grove border just south of Checker Road. Another tributary named Tributary A originates in the Deer Grove Cook County Forest Preserve and enters the Buffalo Creek Reservoir from the south. Buffalo Creek exits the Buffalo Creek Reservoir via a spillway located at the southwest corner of Arlington Heights Road and Checker Road.

After Buffalo Creek crosses into Cook County, two more tributaries feed the main channel. Farrington Ditch enters from the north while White Pine Ditch joins from the southwest. Buffalo Creek continues through the Village of Buffalo Grove. When Buffalo Creek passes under the Wisconsin Central R.R. in the Village of Wheeling, it becomes the Wheeling Drainage Ditch. The Wheeling Drainage Ditch flows southeast until it reaches Wolf Road. It was rerouted north of Palwaukee Airport in the 1990s and flows to the Des Plaines River.

PURPOSE

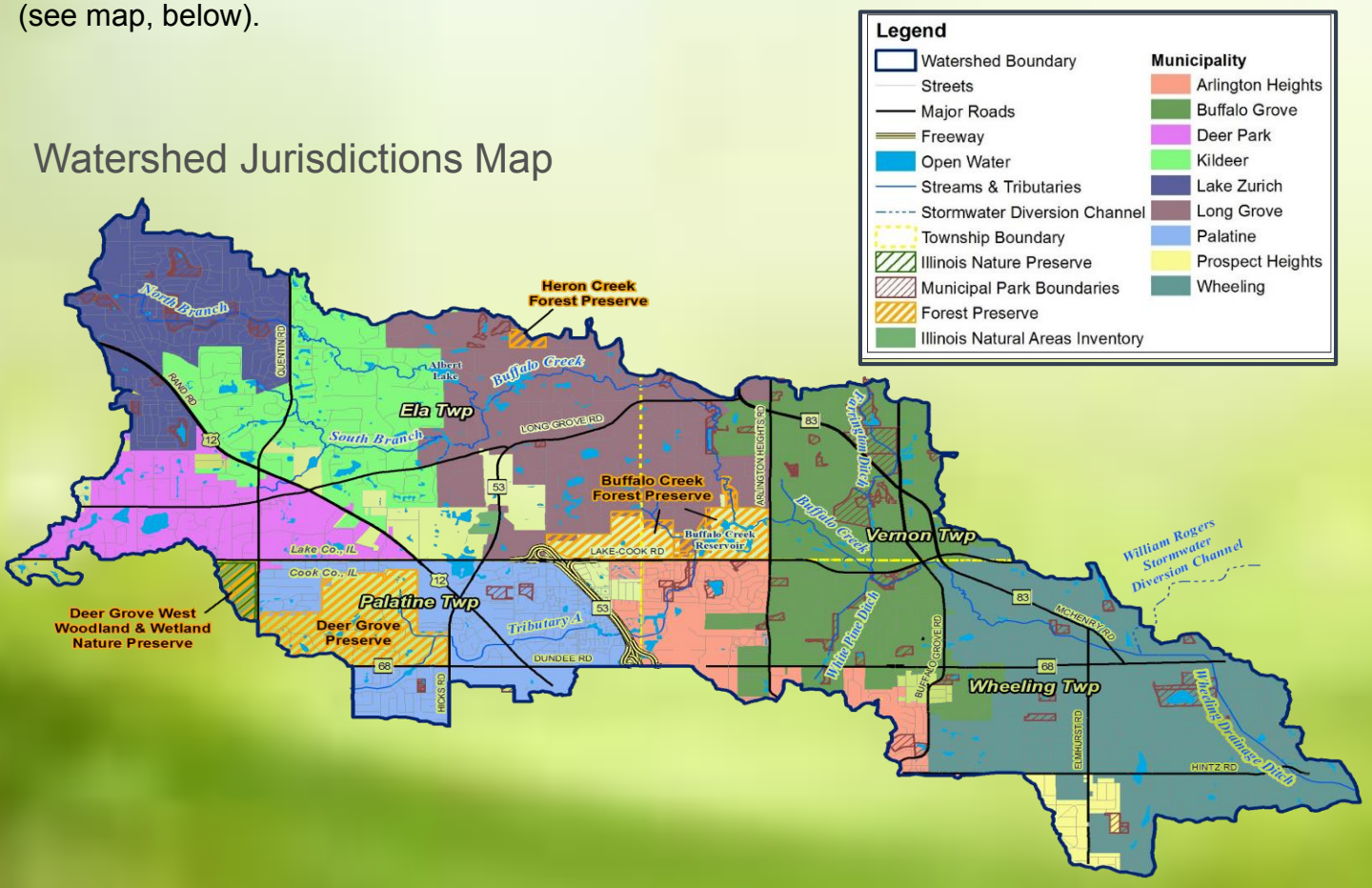
The first step toward improved water quality in the Buffalo Creek Watershed is the development of a Watershed-Based Plan. Watershed planning requires collaboration between local stakeholders to appropriately sustain and manage water resources. Watershed plans are a comprehensive approach to environmental protection that relies on science, policy and public involvement. Rather than focusing on single issues, watershed plans address multiple water quality issues under one program, thus taking a holistic approach of water resource management.

The goal of this effort was to come up with a plan to restore watershed lakes, streams, wetlands, and groundwater to a healthy condition while reducing the impacts of water pollution on watershed residents. This process provided opportunities for watershed stakeholders to have a significant role in the process. A significant outcome of this planning effort and implementation of the plan going forward is to return the waterbodies in the watershed that are presently listed as “impaired” on the Illinois 303(d) list of impaired waters to conditions that fully support their designated uses.

In 2012, the Lake County Stormwater Management Commission applied for and received a 319 of the Clean Water Action – Nonpoint Source Pollution Control Grant administered through the Illinois Environmental Protection Agency (Illinois EPA) for the planning and to produce a comprehensive watershed-based plan for the Buffalo Creek Watershed. With the creation of this plan, identified pollutant can be addressed through various efforts which include improvement projects that may be eligible for state and federal grants. All recommendations in this plan are for guidance only and not required by any federal, state, or local agency.

The primary jurisdictions in the watershed include the municipalities of Wheeling, Buffalo Grove, Long Grove, Kildeer, Palatine, Deer Park, Lake Zurich, Arlington Heights and Prospect Heights (see map, below).

Watershed Jurisdictions Map

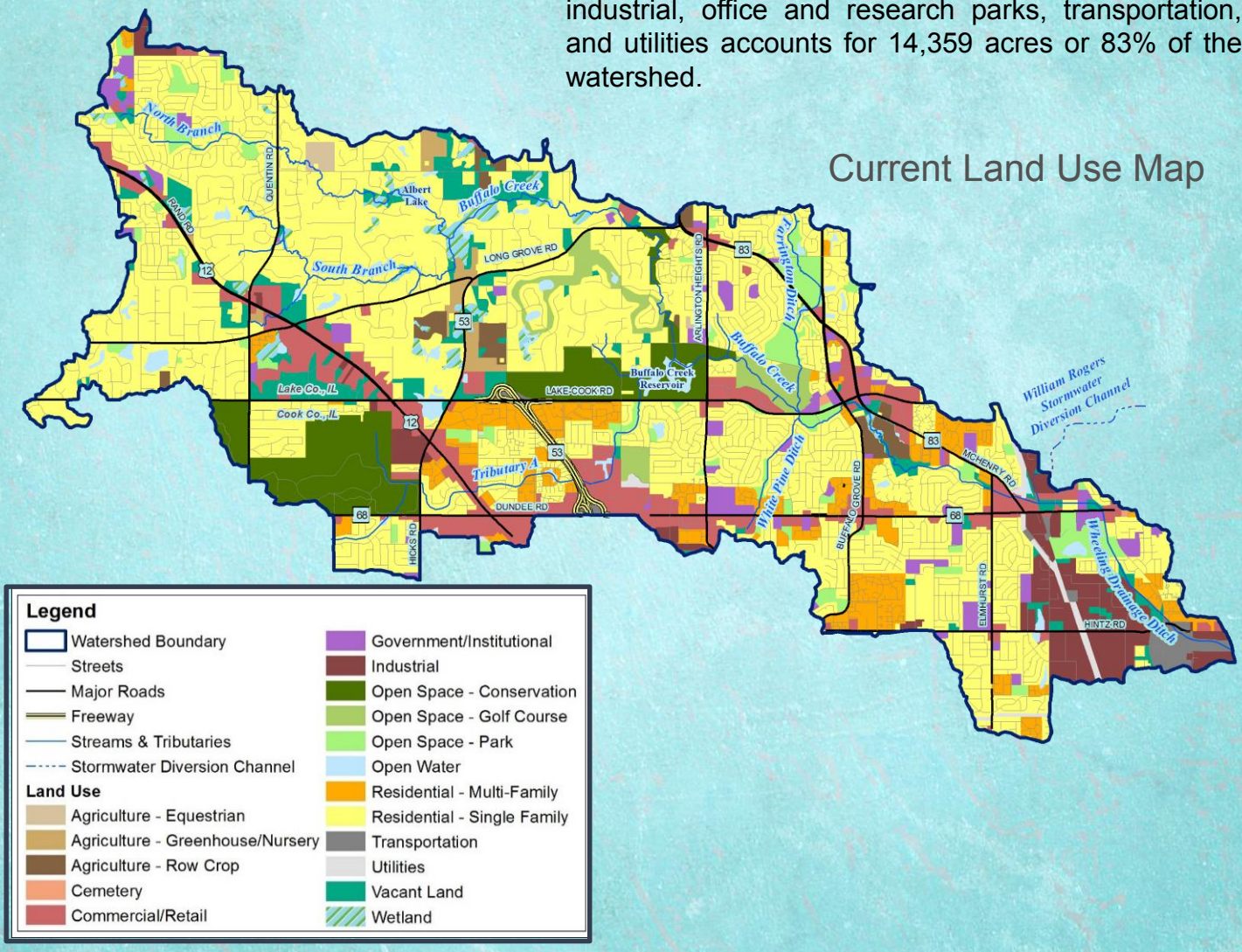


THE PAST

Vegetation prior to European settlement within the Buffalo Creek Watershed was evaluated as part of the planning process. Based on this analysis, pre-settlement vegetation in the watershed consisted of approximately 83% prairie, 11% timber and the remainder wetlands, ponds and lakes. Following settlement, most of this land was converted to agricultural practices, followed by residential and commercial land uses.

THE PRESENT

Existing land use of the Buffalo Creek Watershed was determined using a combination of data from the Chicago Metropolitan Agency for Planning (CMAP) and 2012 aerial photo interpretation (see map below). The residential land use class accounts for the greatest area of the watershed with 9,394 Acres (54%). Total open space, including all open land (agricultural, private/public open space, wetlands, and water) comprises 3,026 acres or 17% of the watershed. Total developed land, including residential, commercial/retail/mixed use, government, institutional, industrial, office and research parks, transportation, and utilities accounts for 14,359 acres or 83% of the watershed.



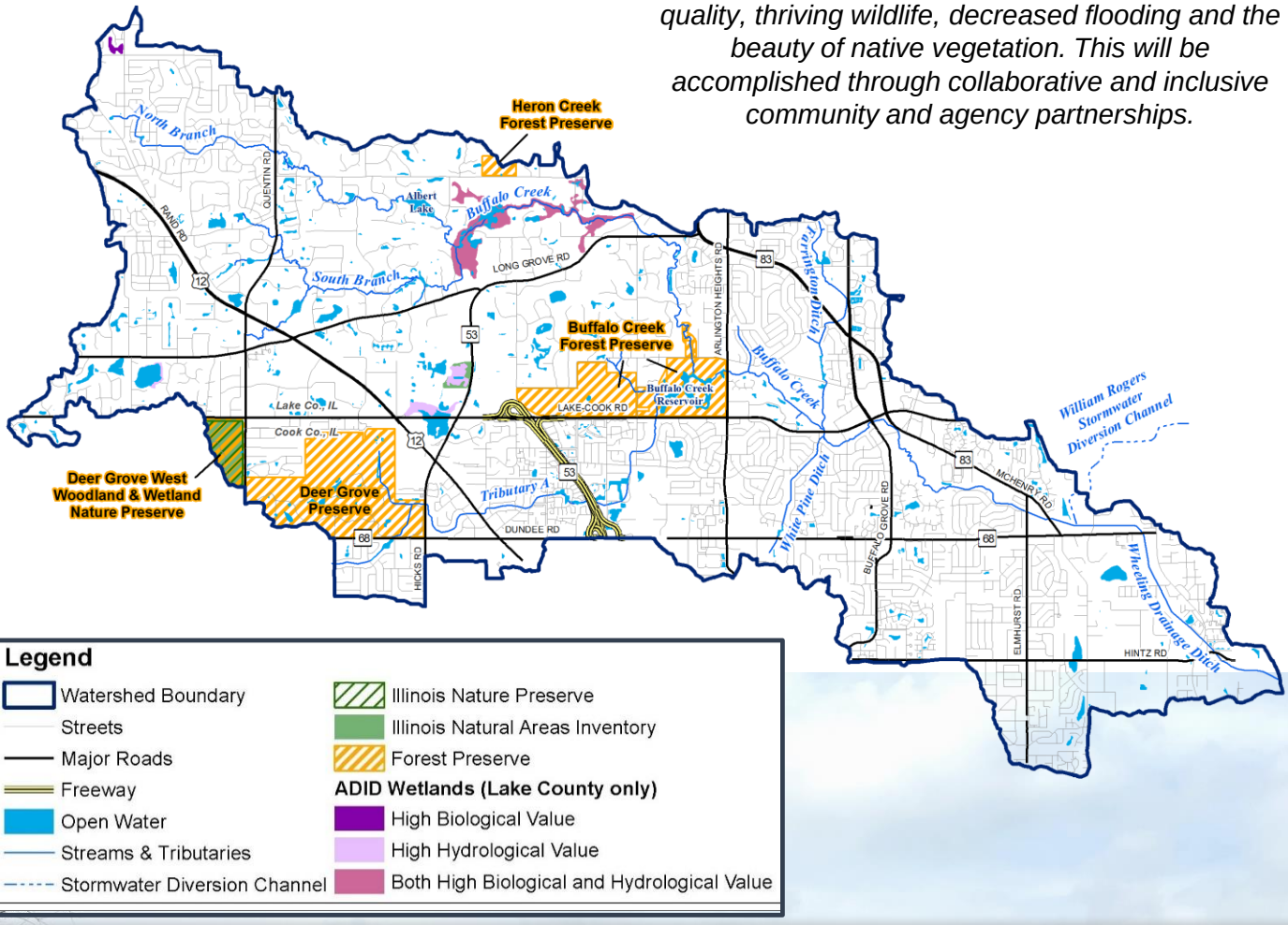
THE FUTURE

Future land use projections were based on a review of municipality future land use maps. Approximately 3.5% of the watershed is expected to change land use; 3.4% of the watershed that is currently considered pervious will be converted to imperious cover. This is primarily a result of the increase in commercial and industrial properties and single family residential land use, which is supported by the expected increase in household and population. Approximately 95% of the expected land use changes are expected to occur on agricultural and vacant land uses. The population density is expected to increase from 7.1 persons per acre to 8.8 persons per acre.

High Quality Natural Areas Map

Vision Statement

Buffalo Creek will be a sustainable watershed success story with reduced erosion, improved water quality, thriving wildlife, decreased flooding and the beauty of native vegetation. This will be accomplished through collaborative and inclusive community and agency partnerships.



WATERSHED PLAN GOALS

GOAL #1 WATER QUALITY: Improve and protect water quality (physical, biological, and chemical health), eliminate impairments and non-point source pollution, and implement land development and management practices to prevent pollution.

GOAL #2 MANAGE STORMWATER VOLUME AND REDUCE FLOODING: Reduce flooding and runoff through increased storage and infiltration of stormwater.

GOAL #3 NATURAL RESOURCES: Protect, enhance & restore natural resources through expanding environmental corridors, maintaining hydrology/buffers for high quality areas, and employing good natural resource management practices.

GOAL #4 GREEN INFRASTRUCTURE: Use a system of both site-level stormwater green infrastructure practices to reduce runoff and pollution, and regional greenways and trails to protect and connect the natural drainage system, natural resource areas and to provide recreational opportunities.

GOAL #5 SMART DEVELOPMENT: Guide new development and redevelopment design and practices to protect or enhance existing water resources, natural resources and open space.

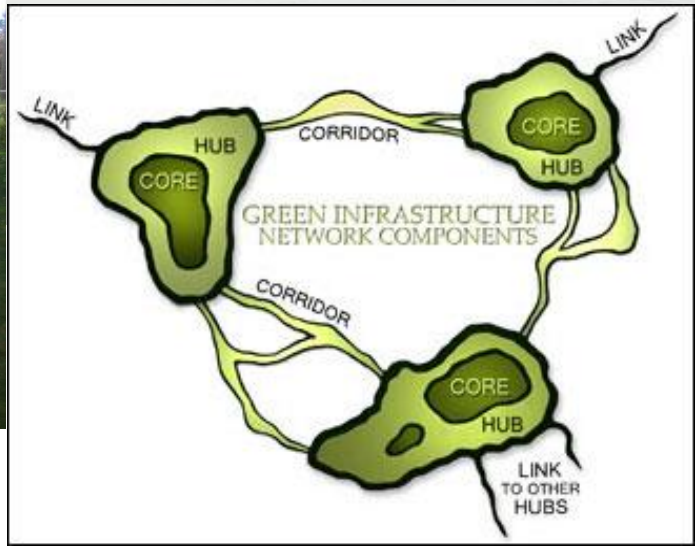
GOAL #6 STAKEHOLDER EDUCATION: Provide watershed stakeholders with the knowledge, skills and motivation needed to implement the watershed plan. Watershed stakeholders include (but are not limited to) residents, property owners, property owner associations, businesses and institutions, government agencies and jurisdictions, and developers.

GREEN INFRASTRUCTURE & YOUR BACKYARD

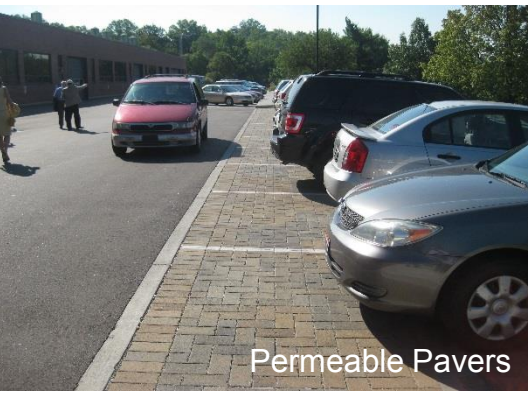
A Green Infrastructure Network is a connected system of natural areas and other open space that conserves natural ecosystem values and functions, sustains clean air and water, retains and infiltrates runoff, and provides a wide array of benefits to wildlife and people. The network is made up of hubs and linking corridors. Hubs generally consist of the largest and least fragmented areas such as Deer Grove Forest Preserve, Buffalo Creek Reservoir, large agricultural areas, and golf courses. Corridors are generally formed by smaller private residential parcels along developed reaches of Buffalo Creek and tributaries.

Corridors are extremely important because they provide biological conduits between hubs. However, most parcels forming corridors are not ideal green infrastructure until residents embrace the idea of managing stream corridors or creating backyard habitats.

Rain Barrel



Source: Chicago Wilderness Green Infrastructure Vision June 2012



Permeable Pavers

Rain Garden

Bioswale

If a portion of a stream runs through your backyard, here are some tips to help property manage your piece of the green infrastructure network:

1. **MANAGER FERTILIZER USE**
   Avoid over fertilizing lawns adjacent to streams and only use phosphorus when soil testing shows that it is necessary.
2. **NO DUMPING**
   Avoid dumping yard waste and clear heavy debris jams.
3. **REMOVE NON-NATIVE SPECIES**
   Identify and remove plants that are not native to the area (see photo guide, right).
4. **PLANT NATIVE VEGETATION**
   Deep rooted, native plants adapted to the Midwest climate can help control erosion by stabilizing banks.
5. **NATURAL STREAMS**
   Work with experts to restore degraded streams.

For more information, check out the Lake County Stormwater Management Commission's booklet, “Riparian Area Management: A Citizen's Guide,” at www.lakecountyil.gov/stormwater.

RAIN BARREL

DISCONNECTED DOWNSPOUT

Any property owner can improve green infrastructure. Create a safe place for wildlife by providing a few simple things such as food, water, cover, and a place for wildlife to raise their young. The National Wildlife Federation’s Certified Wildlife Habitat® and the Conservation Foundation’s Conservation@Home programs can help you get started. Golf courses can become certified through the Audubon Cooperative Sanctuary Program.

Creating a rain garden (see photo, above), or a small vegetated depression, to capture water is another way of promoting infiltration while beautifying your yard and providing additional habitat. Disconnecting your roof downspouts and capturing that runoff in rain barrels (see photo, above)not only reduces the amount of runoff entering streams, but also serves as a great source of water for irrigating your yard.

REMOVE THESE NON-NATIVE AND INVASIVE SPECIES

TEASEL

GARLIC MUSTARD

PURPLE LOOSESTRIFE

REED CNARY GRASS

BUCKTHORN

GET INVOLVED

Watershed planning and implementation is a voluntary effort. Active watershed stakeholders are needed to put this watershed plan into action. Buffalo Creek Clean Water Partnership is in place to support plan implementation and future planning efforts. Contact the Buffalo Creek Clean Water Partnership to learn how you can help. The Buffalo Creek Watershed-Based Plan can be downloaded at: www.buffalocreekcleanwater.org.

How can *YOU* help Buffalo Creek?

Residents & Businesses

- ❑ Reduce fertilizer use on lawns and only use phosphorus based on soil testing results.
- ❑ Use less salt on driveways, parking lots, and sidewalks during winter months.
- ❑ Use native landscaping to decrease watering needs and maintenance.
- ❑ Install rain gardens and use rain barrels to reduce stormwater runoff.
- ❑ Manage your backyard as part of the green infrastructure network.
- ❑ Attend meetings with decision makers to express concerns about the watershed.
- ❑ Build a sense of community in your neighborhood around Buffalo Creek and the watershed.
- ❑ Attend watershed education events.

Municipalities & Townships

- ❑ Adopt the Buffalo Creek Watershed-Based Plan and inform the public that a plan has been developed.
- ❑ Incorporate watershed plan goals and recommended actions into local comprehensive plans, zoning overlays, codes, and ordinances.
- ❑ Build “demonstration projects,” or large-scale water quality & public education projects, near public facilities.
- ❑ Distribute materials to help residents manage streams in their backyards.

Forest Preserve Districts

- ❑ Control non-native/invasive species and replace with native vegetation.
- ❑ Look for opportunities to acquire green infrastructure protection areas.
- ❑ Restore historic surface hydrology and groundwater.

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

Buffalo Creek Clean Water Partnership

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

For more information contact:
Buffalo Creek Clean Water Partnership
www.buffalocreekcleanwater.org
All photos by Cardno unless otherwise noted.

BLECK engineers surveyors

Living Lands Conservation Company

Cardno Shaping the Future

TRC Results you can rely on

This plan was prepared using United States Environmental Protection Agency funds under Section 319 (h) of the Clean Water Act distributed through the Illinois Environmental Protection Agency. The findings and recommendations herein are not necessarily those of the funding agencies.

Appendix P : Small Watershed Assessment & Action Plan (SWAAP)

Final Report

Small Watershed Assessment and Action Plan (SWAAP)

Financial Assistance Agreement: 3191506

May 24, 2018

Prepared for:
Illinois Environmental Protection Agency
Bureau of Water – Watershed Management Section
1021 North Grand Avenue Springfield, IL. 62794-9276
(217) 782-3362

Prepared By:

Ernesto Huaracha
Lake County Stormwater Management Commission
500 West Winchester Road
Libertyville, Illinois 60048
847-377-7715 (Phone)
847-984-5747 (Fax)
ehuaracha@lakecountyil.gov (Email)

STORMWATER MANAGEMENT COMMISSION

Funding for this project provided, in part, by the Illinois Environmental Protection Agency through Section 319 of the Clean Water Act.

Executive Summary

The Small Watershed Assessment and Action Plan Project (SWAAP) report assesses, current on-the-ground conditions and detailed geospatial data assessments that provides recommended watershed protection and restoration projects. This information can be used by local stakeholders to improve existing water quality problems. To realize improvements in water quality, programmatic project recommendations must be transitioned from the planning phase, to an implemented project.

This summary identifies the efforts to transition watershed based programmatic and/or site-specific action plan recommended projects identified in the Bull Creek-Bull's Brook Watershed-Based Plan (2008) and the Buffalo Creek Watershed-Based Plan (2016) to implementation. The SWAAP presents implementable recommendations with conceptual project design, supported with project definition, probable cost and purported water quality improvement benefits for stakeholders to implement or secure future funding for project implementation. Experience confirms that if municipalities, residents, and other watershed stakeholders are left to their own devices to conduct this additional work, few of the ideas and concepts presented in a watershed-based plan will be turned into reality and the potential of the watershed-based planning process to reduce the impacts of nonpoint source pollution will not be fully realized.

Two locations with the Des Plaines River Watershed (HUC 8: 07120004) were assessed as a basis of this report. The locations assessed in detail within this SWAAP report, include areas in and around Loch Lomond (AUID:IL_RGU) in Mundelein, IL and Buffalo Creek (AUID: IL_GST) in Long Grove, IL.

The Loch Lomond SWAAP assessment, targets a study area of 469 acres, within a drainage area of 2.02 square miles for Bull Creek (AUID: IL_GV04). The SWAAP is within the Bull Creek-Des Plaines River HUC 10: 0712000403, and Loch Lomond lake is the largest waterbody in the study area (AUID: IL_RGU). The SWAAP area of Loch Lomond has previously been identified with site-specific project recommendations within the Bull Creek- Bull's Brook Watershed-Based Plan (2008) and will have additional site-specific project recommendations identified within the Des Plaines River Watershed-Based Plan (2018) as part of SMC subwatershed management unit (SMU BC019).

The Buffalo Creek SWAAP assessment, targets a study area of 161 acres, within a drainage area of 9.70 square miles. There are 28.5 stream miles upstream of the Buffalo Creek SWAAP, and it is located within the Willow Creek-Des Plaines River HUC 10: 0712000405. Buffalo Creek is the main stream corridor in the study area (AUID: IL_GST). The SWAAP area of Buffalo Creek site has previously been identified with site-specific project recommendations within the Buffalo Creek Watershed-Based Plan (2016) will have additional site-specific project recommendations identified within the Des Plaines River Watershed-Based Plan (2018) as part of SMC SMU BF025.

The determination to assesses Loch Lomond and Buffalo Creek as recommended Small Watershed Assessment and Action Plan Project study areas transpired from early watershed analyses that sought locations that were within small watersheds less than 10 sq. mi. and currently have established stakeholder groups capable of implementing SWAAP project recommendations. The

SWAAP locations of Loch Lomond and Buffalo Creek have well documented water quality issues (i.e. Bull Creek- Bull's Brook Watershed-Based Plan (2008), Buffalo Creek Watershed-Based Plan (2016), Des Plaines/ Higgens Creek TMDL (2013), Lake County Lake Reports) and passionate and established stakeholder groups that have pursued smaller water quality improvement projects (i.e. native plant installation, rain garden BMP installation, shoreline stabilization) and ongoing educational programmatic outreach to the community (phosphorus reduction/banning, lake water quality educations, lakeshed management plans, project lead for watershed plan adoption).

Recommendations for water quality improvement projects is a multi-step process of office data assessments and then authenticated with field verification. The process begins with desktop geospatial analyses based on the best available data. The field reconnaissance verifies whether the field condition validates the desktop analysis. Validated data ensures accuracy of projects recommendations and data, supplementing stakeholders with the resources to implement projects. The SWAAP assessment includes program and projects to improve the health of the watershed and provide stakeholders with the resources to solicit project and funding partners to continue the protection and restoration of the Des Plaines River Watershed.

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1. Introduction

1.1 Background

The development of a watershed-based plan (WBP) is a key step in efforts to protect and restore rivers and streams from the impacts of nonpoint source pollution. WBPs provide an analysis of existing watershed conditions and water quality problems and outline site improvement and restoration opportunities for addressing those problems, with the goal being the long-term protection and restoration of receiving waters so they can meet state water quality standards.

To realize improvements in water quality, WBP project recommendations must be transitioned from the planning phase, to implemented projects. Project implementation is neither simple nor straightforward, as, at the end of the watershed-based planning process stakeholders are typically left with a variety of project options to promote watershed protection and restoration. Many stakeholders see WBP recommendations as unachievable with little guidance on how to successfully transition the project recommendations into reality.

The Small Watershed Assessment and Action Plan Project (SWAAP) process seeks to reduce the perception that WBP projects are unachievable, by providing recommended project details, decisions, and objectives for stakeholder project implementation programs. For a project to enter implementation stage, stakeholders must be able to transition the ideas and concepts presented in a WBP into a defined action. WBP recommendations can vary on the level of technical input needed to transition a WBP recommendations to an implemented project. Defined actions can help stakeholders decide if projects can be accomplished by volunteers or contracted services. SWAAP recommendations provide a detailed assessment of the conditions in the study area at a more “local” scale to further engage stakeholder groups. The detailed assessments presented in this SWAAP are implementable recommendations.

Resources exist for stakeholders to assess their watersheds, such as the Unified Subwatershed and Site Reconnaissance (USSR) Manual developed by the Center for Watershed Protection (2004). The manual provides direction on determining actions to improve water quality but determining project specific recommendation may not be readily noticeable by inexperienced investigators. This understanding can rarely be attained without experience, including detailed on-the-ground assessment work, investigational tools or resources for drainage analysis, project design capability, and project implementation background that extends beyond the scope of work included in the typical watershed-based planning process. Experience confirms that if municipalities, residents, and other watershed stakeholders are left to their own devices to conduct this additional work, few of the ideas and concepts presented in a WBP will be turned into reality and the potential of the watershed-based planning process to reduce the impacts of nonpoint source pollution will not be fully realized.

1.2 Purpose

The purpose of the Small Watershed Assessment and Action Planning process is to assess, in detail, current on-the-ground conditions as they relate to overall local catchment drainage patterns and the current conditions influence on water quality. The assessments detail,

potential watershed protection and restoration practices that can be used to address existing water quality problems (e.g., surface water impairments) and Total Maximum Daily Load (TMDL) load allocations.

The SWAAP process further expounds upon programmatic actions from the WBP with detailed information that includes site specific projects with a conceptual design and a probable cost estimate. Since this process yields more detailed information than is feasible within the watershed-based planning process, this process can include specific detail on actions that provide significant contributions to water quality problems and/or provide significant opportunities for project implementation with a phased priority of necessary projects implementation.

The primary goal is to provide local stakeholders with a more detailed guide of the tasks needing to be completed and a budgetary target to implement watershed protection and restoration projects. These steps will increase the likelihood for real improvements in water quality.

1.3 Relationship to Watershed-Based Plan

A Small Watershed Assessment and Action Plan provides additional information on existing watershed conditions and potential watershed protection and restoration projects, which will help: (1) address existing goals, objectives, and recommendations outlined in the watershed-based plan based on site specific field verified solutions; (2) further engage municipalities, homeowners, and other watershed stakeholders in the implementation of many of the ideas and concepts presented in the watershed-based plan with succinct project directives; (3) provide watershed stakeholders with critical data and information required to secure further technical assistance and obtain funding to support the implementation of watershed protection and restoration programs and projects; and, (4) further advance local efforts to protect and restore local lakes, streams, and wetlands and address the goals of the Clean Water Act.

1.4 Elements of the Small Watershed Assessment and Action Planning Process

The Small Watershed Assessment and Action Planning process includes: a review of conditions within the selected study area, based on the contents of the associated watershed-based plan and other relevant information (e.g., GIS data), including detailed, on-the-ground assessment work in order to present a detailed characterization of the study area. The detailed assessment presents stakeholders valuable resources and information on their defined small watershed. The SWAAP assessment bolsters stakeholder awareness of water quality impacts and next steps to achieve improvement goals for progressing water quality improvements. Preliminary concept plans for stream and stream corridor restoration practices, lake and lake shoreline restoration practices, and upland protection and restoration practices are presented in following, with detailed guidance on the implementation of watershed protection and restoration projects and strategies that can help meet the watershed management goals established in the WBP.

Small Watershed Assessment and Action Planning actions include the following:

- Define the study area (define and refine boundaries of the study area)

- Review conditions within the study area based on the contents of the existing watershed-based plan and other relevant information (e.g., Lake Co. Lakes Management Unit Lake Reports, GIS data)
- Geospatial desktop assessment
- Define field assessment strategy
- Conduct field assessment work
- Develop inventory of stream and stream corridor restoration opportunities
- Develop inventory of lake and lake shoreline opportunities
- Develop inventory of upland area restoration opportunities
- Engage stakeholders
- Prepare an action plan based on the results of the desktop and field assessments

2. Small Watershed Assessment Loch Lomond Study Area

2.1 Summary of Loch Lomond Study Area Desktop Assessment & Results

The information provided within this section, will characterize the existing conditions within the Loch Lomond study area (SWAAP-LL). The characterization of current and future water quality impacts as connected to physiographic and/or anthropogenic factors will be assessed to aid in developing future water quality improvement projects. The project recommendations aim to reduce or mitigate stormwater runoff rates, volumes, and pollutant loads and/or improve the condition of receiving waters within the SWAAP-LL.

In this section, existing watershed-based plans and other relevant information, including geographic information system (GIS) data will be described on its function and use in determining project recommendations. The defined data analysis will be utilized in conjunction with field observations to identify specific project recommendations for specific locations with the small watershed study areas.

Small Watershed Study Area Delineation

To determine how water enters the receiving waters within the SWAAP-LL, the local drainage pathways must be identified. Understanding the impacts of small watersheds, is a key first step in determining how a SWAAP-LL will benefit overall water quality within the Des Plaines River Watershed. The SWAAP-LL is located within the Bull Creek-Des Plaines River HUC 12: 071200040302. Lake Loch Lomond is the largest waterbody in the study area (Assessment Unit ID: IL_RGU), (Figure 1).

SWAAP-LL boundaries were delineated via the Arc Hydro GIS modeling tools for Esri ArcMap software to define smaller drainage areas within the larger Des Plaines River watershed. Arc Hydro is a set of models and tools that operate within ArcMap to support geospatial and temporal data analyses specifically to delineate and characterize watersheds in raster and vector formats, define and analyze hydro geometric networks, manage time series data, and configure and export data to numerical models[1].

The Arc Hydro GIS tools analyzed areas in groupings of approximately 500-acres. Storm sewer network[2] data was incorporated into the Arc Hydro model to further refine the small watershed boundaries and more accurately reflect how and where stormwater runoff is impacting the SWAAP-LL area. Refining the small watershed drainage area based on all available data more accurately represents the physiographic and/or anthropogenic factors impact the BMPs selected for water quality improvement projects. The SWAAP-LL areas are based on more detailed analyses of the existing topography then what is used to delineate a subwatershed management unit (SMU) in the Des Plaines River Watershed-Based Plan.

[1] Arc Hydro Website, http://resources.arcgis.com/en/communities/hydro/01vn0000000s000000.htm.

[2] Data provided by: Lake County Dept. of Transportation (culvert data); GIS Consortium (stormsewer network data); The Village of Mundelein (stormsewer network data); The Village of Long Grove (stormsewer network data).

The SWAAP-LL study area is 469 acres (Figure 2), within a drainage area of 1289.90 acres (2.02 square miles), which is located within SMC SMU BC019[3].

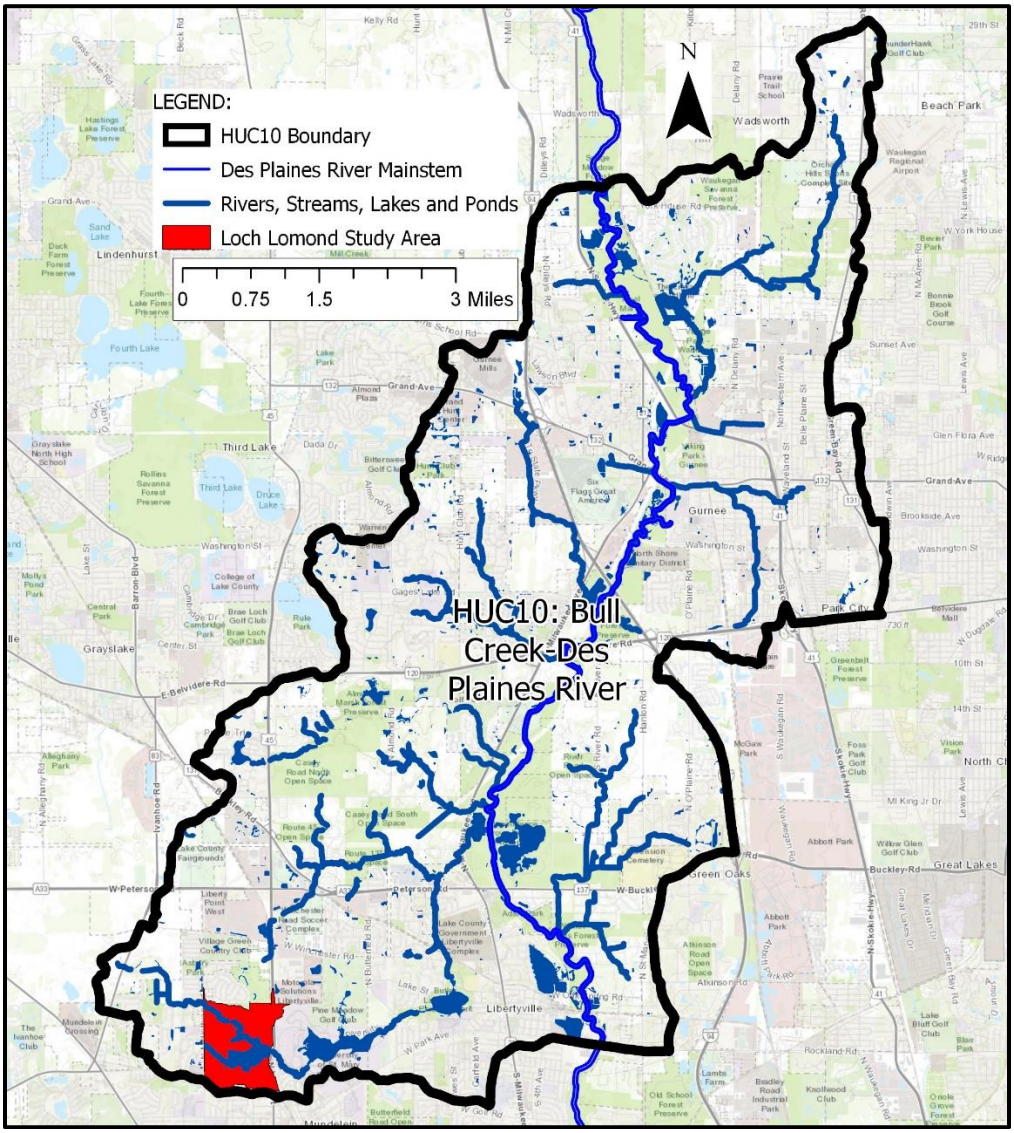


Figure 1:Loch Lomond SWAAP-LL HUC 10 Reference

Small Watershed Drainage Delineation and Hydrology

Delineating the natural surface drainage and engineered subsurface drainage networks within the small watersheds, allows for a better comprehension of how and where water enters a lake/pond or linear waterbody. Understanding the movement of water, including how much land is contributing water runoff, where it flows, and the available storage areas for runoff is essential to determine project opportunities for water quality improvement.

[3] Lake County Stormwater Commission. Des Plaines River Watershed-Based Plan, 2018.

Natural drainage pathways have been impacted by damming, redirection, channelization, culvert headwalls, and urbanization. Loch Lomond was a natural depression prior to the late 1950s. The natural depression was dammed in 1955 but did not become a lake until the 1960s, as the surrounding area converted to urbanized land functions. Future drainage concerns into Loch Lomond (AUID: IL_RGU) include continued conversion of agricultural lands into various urban land uses and a proposed multi-lane highway (IL Route 53 road extension) approximately 1,400 linear (ln.) feet (ft.) West of the SWAAP-LL Eastern boundary (Figure 2).

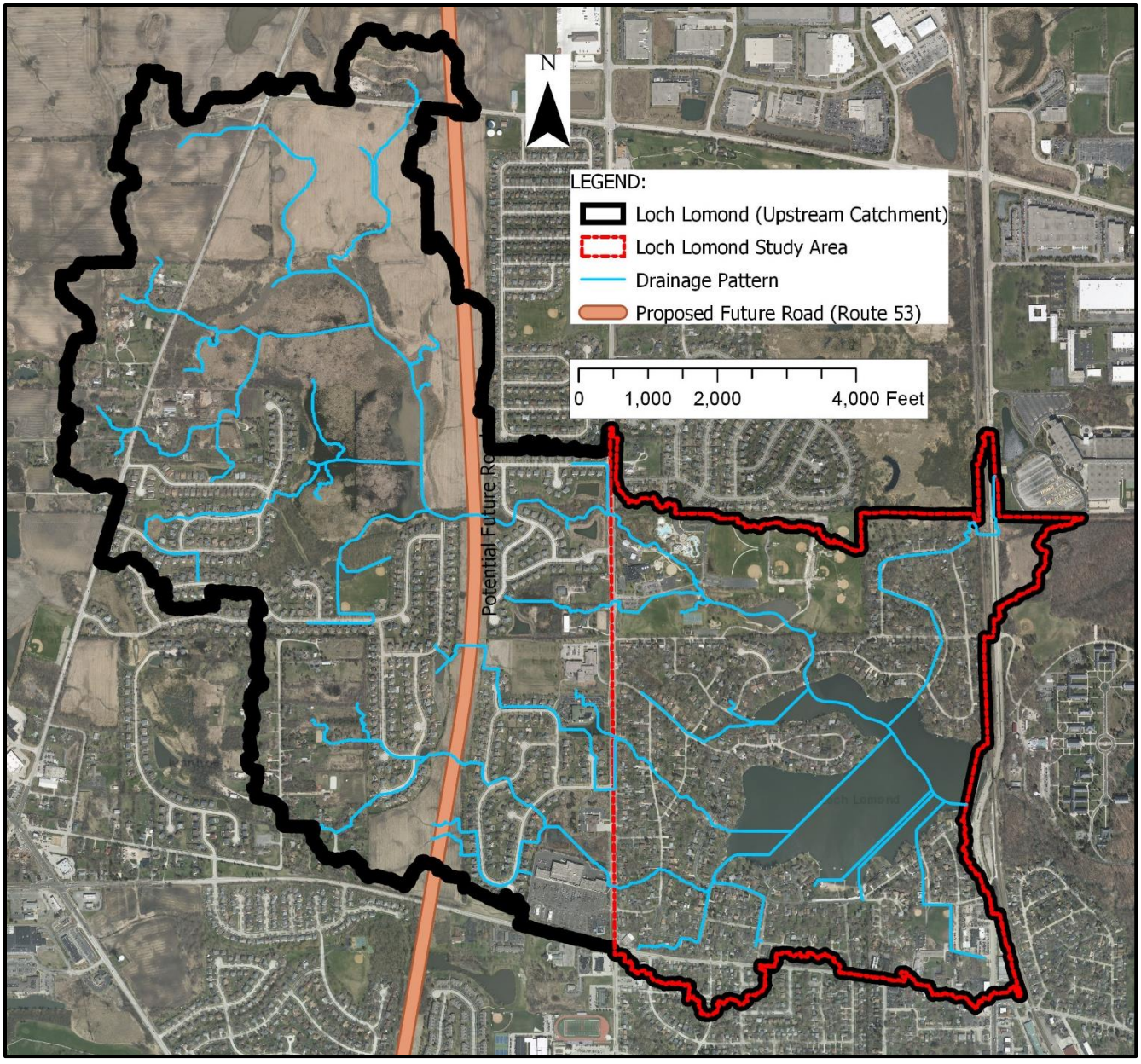
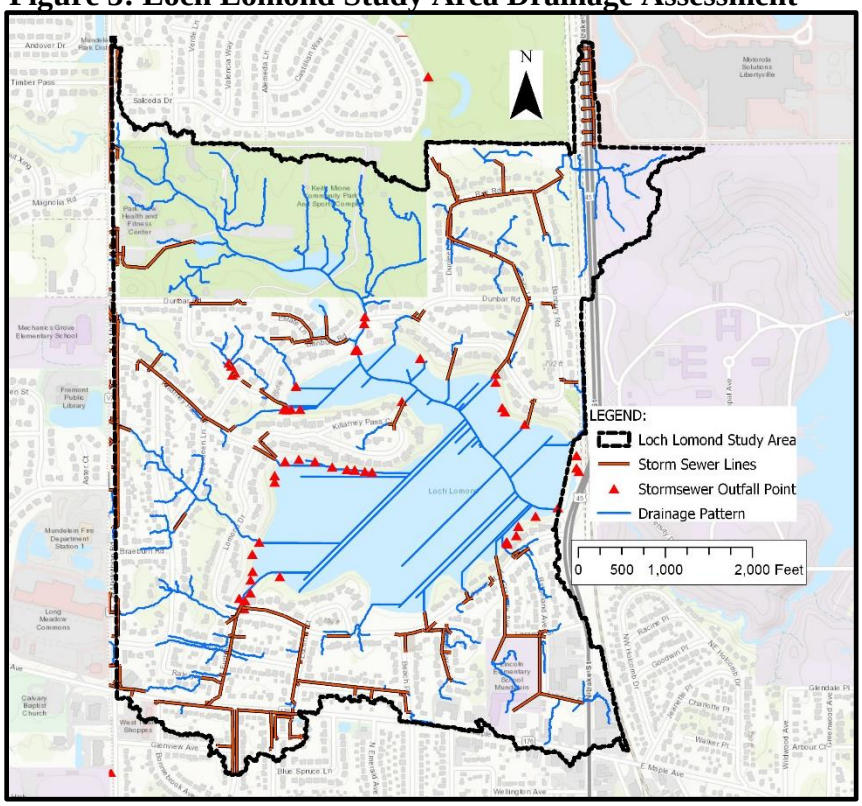


Figure 2: Loch Lomond Drainage Area Assessment

Figure 3: Loch Lomond Study Area Drainage Assessment



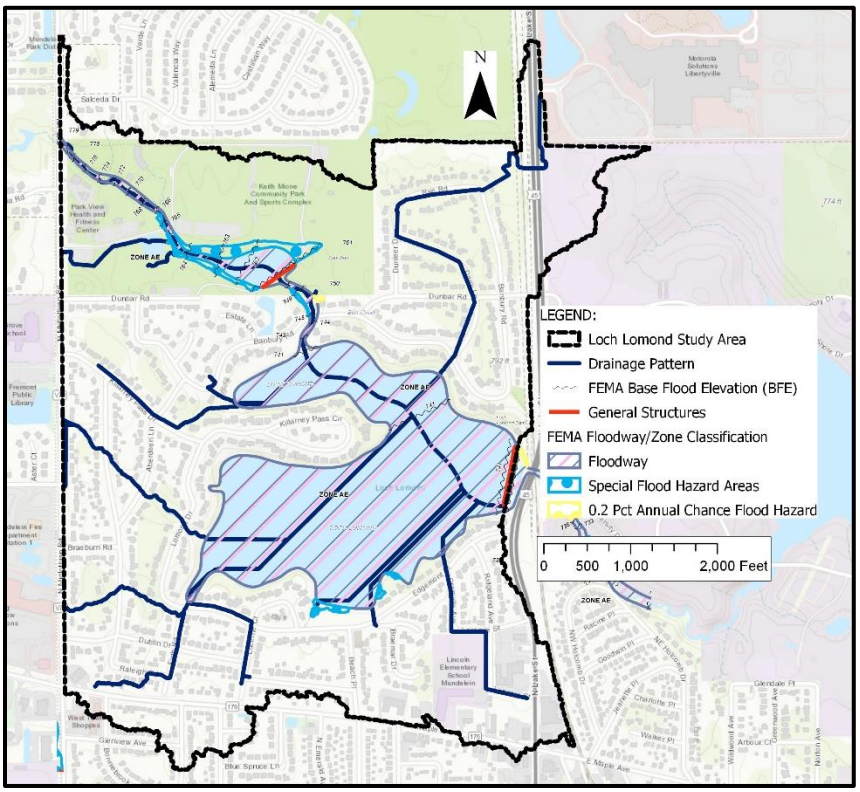
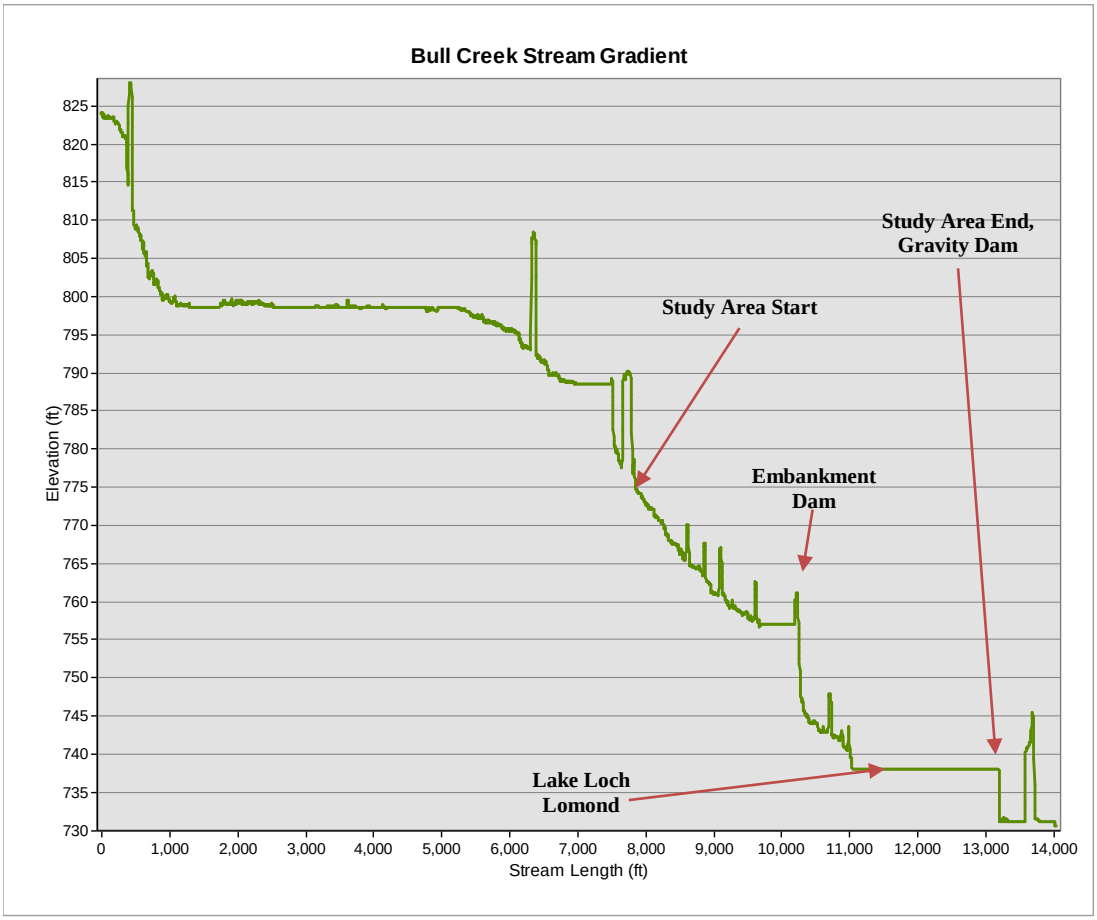


Figure 4: Loch Lomond Flood Hazard Zone Assessment

Figure 5: Bull Creek Gradient and Loch Lomond Study Area Drainage Area



The gradient of Bull Creek from West to East through Loch Lomond indicates that the area does not flood based on FEMA data (Figure 4), therefore there is a low probability of flooding to impact buildings and/or structures. Drainage enters the lake readily through multiple drainage pathways, but primarily through Bull Creek. The observed spikes in the stream gradient are related to road/bridge decks not removed in the development of the Lake County digital terrain model (DTM) dataset, with the exception on two dams identified in Figure 5. Dam structures indicate pooling on the upstream side of the structure as indicated by the location of the floodway and special flood hazard areas (1.0% Flood Zone or 100-yr Floodplain) in the Loch Lomond flood hazard zone assessment (Figure 4).

Open Space Land Assessments and Property Ownership Delineation

Evaluating and assessing the size and proximity of open undeveloped or partially development urbanized landscapes is critical to determine potential BMP locations. Significant land holdings are in private ownership (Figure 6) and have undergone urbanization at varying degrees of land impact. The available open space in the SWAAP-LL includes Homeowner Association Open Space (Loch Lomond, Hickory Hills Estate and Hampton Reserve), The Chicago Archdiocese, and the Mundelein Park District (Figure 7).

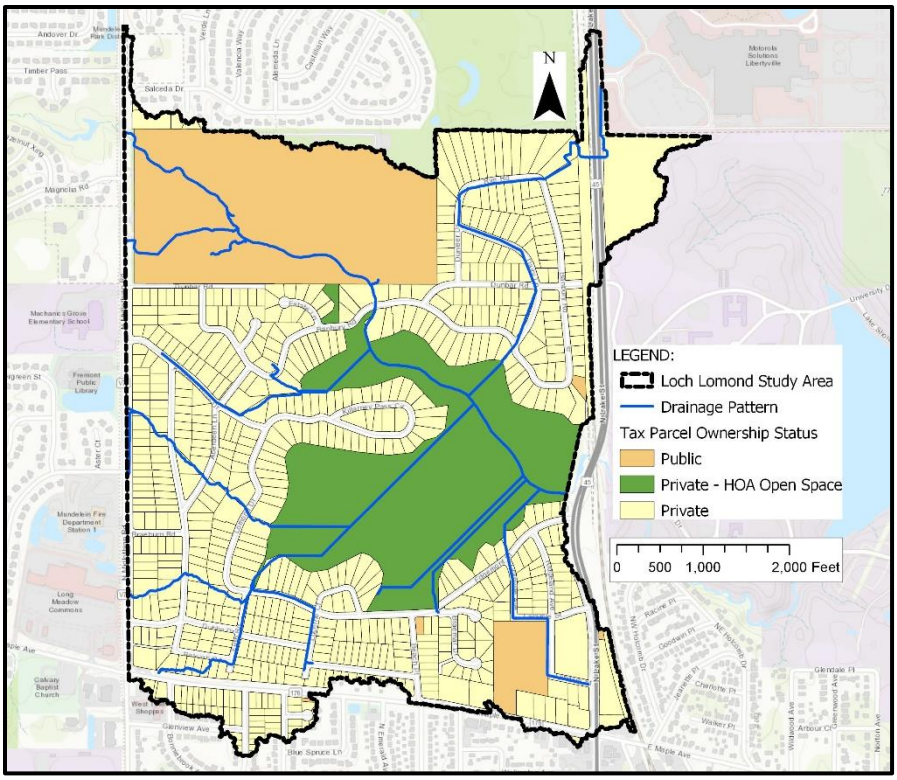


Figure 6: Loch Lomond Property Ownership Assessment

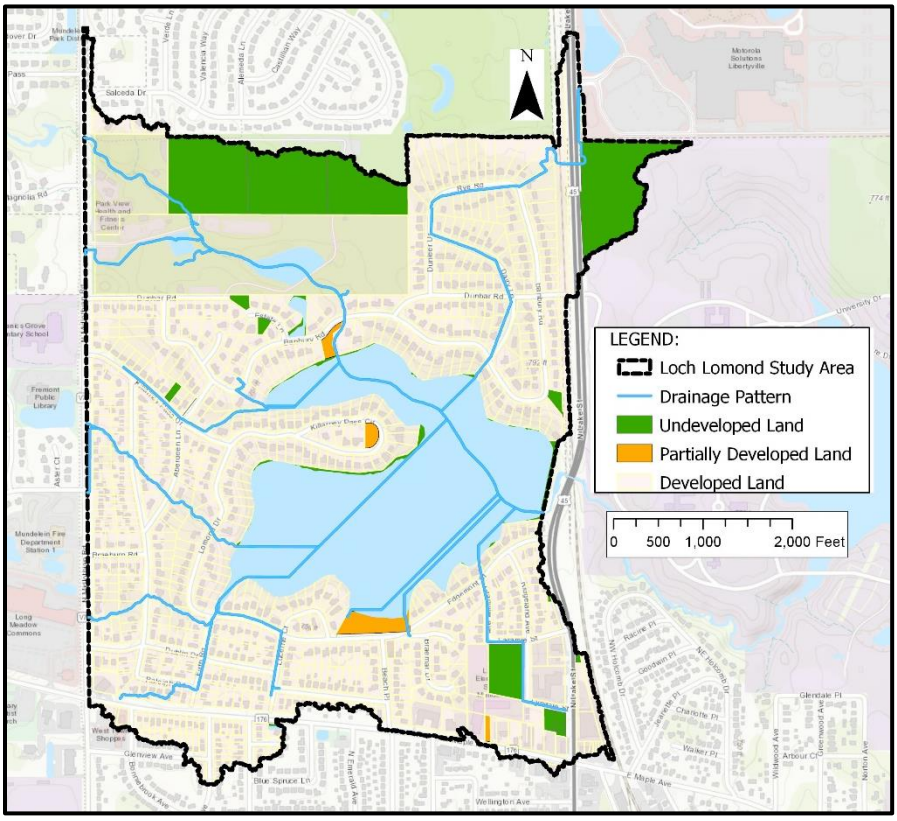


Figure 7: Loch Lomond Open Space Assessment

Topographical Assessment

A topographical assessment of the existing topography supports our field reconnaissance in identifying areas with possibly eroding streambanks or shorelines based on the severity of the slope steepness near ponds, lakes or linear waterbodies. The slope analysis is completed within the Esri ArcMap software, utilizing a LiDAR derived digital terrain model (DTM)[4]. LIDAR, which stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth[5] and a DTM is a data interpretation of the distance data derived from the remote sensing. Areas that have been determined to be exhibiting potential erosion based on a GIS analysis were reviewed in the field, and recommendations for stabilization have been included in the conceptual drawings.

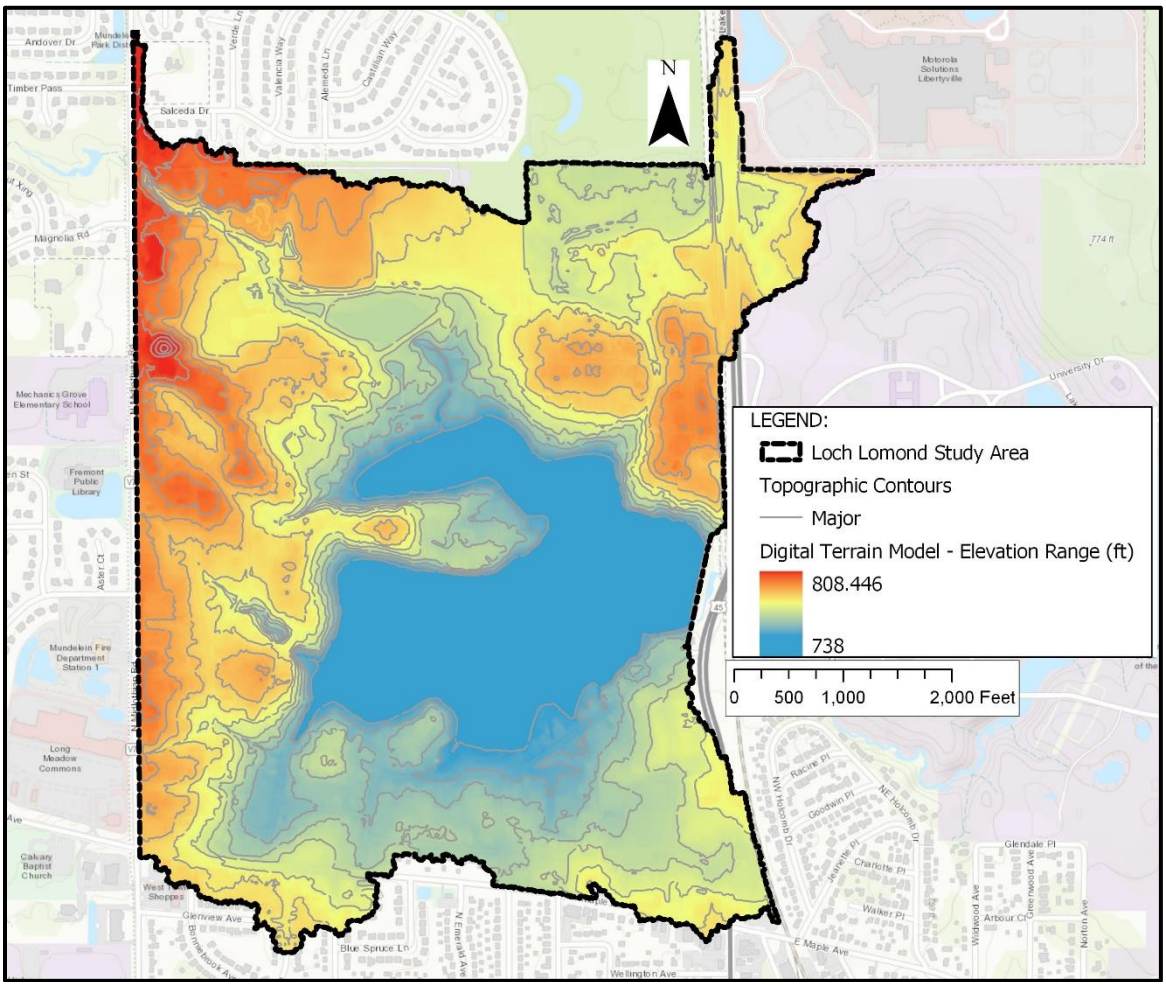


Figure 8: Loch Lomond Topographical Assessment

[4] Lake County GIS. DTM Data, 2007. (https://s3.amazonaws.com/lakecountygis-public/topography.html).
[5] National Oceanic and Atmospheric Administration. LiDAR Description & Function. (https://oceanservice.noaa.gov/facts/lidar.html).

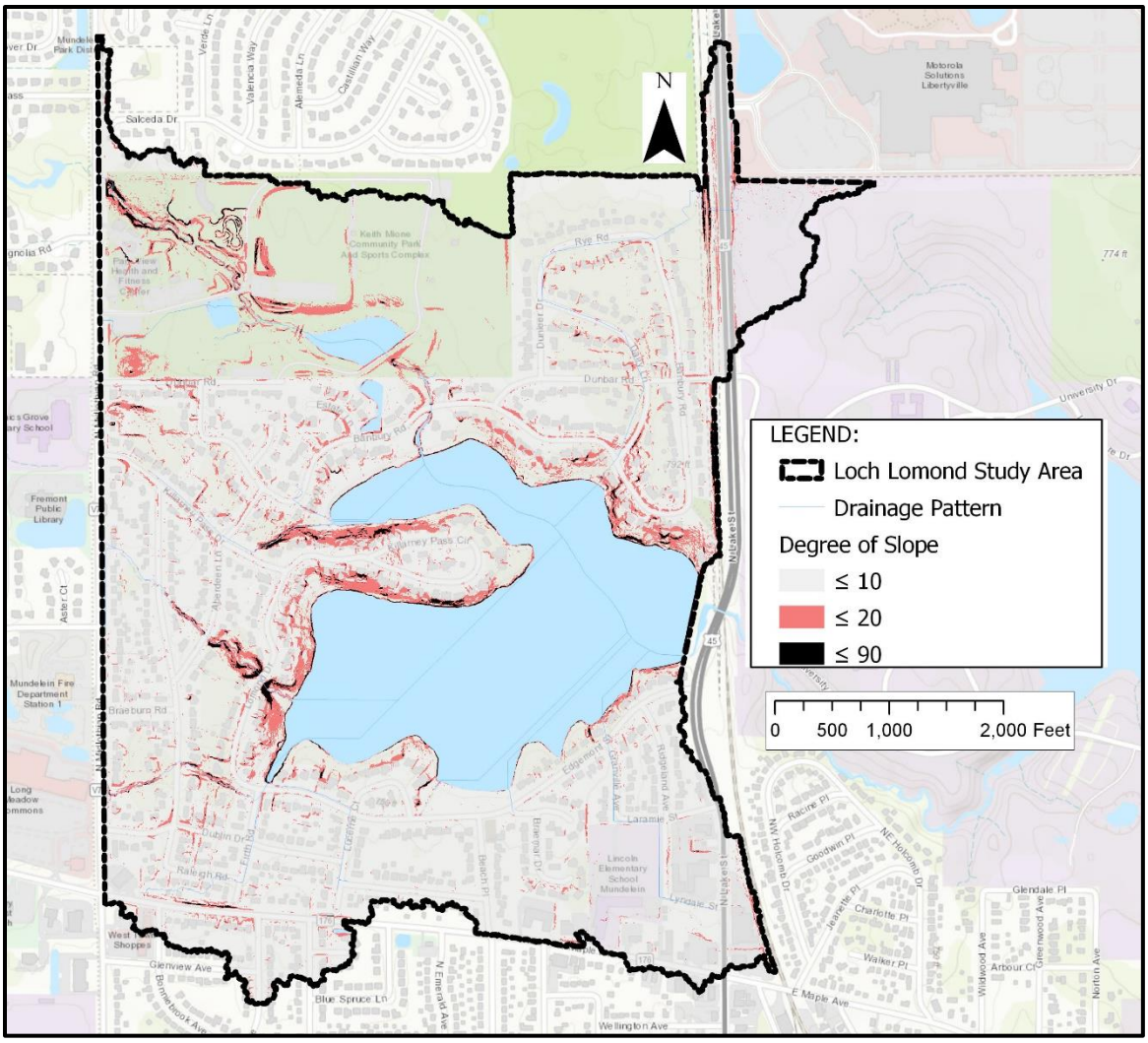


Figure 9: Loch Lomond Steep Slope Assessment

Using the results of the desktop GIS assessments, key areas were identified within the SWAAP-LL to facilitate field assessment work. The opportunities will be presented as preliminary concept designs projects for future development, funding, and implementation. This initial desktop assessment work is critical in forming a comprehensive understanding of the selected sites prior to conducting a more detailed on-the-ground assessment of watershed conditions and potential watershed protection and restoration opportunities.

The GIS analyses identified areas of concern within the SWAAP-LL, particularly along streambanks and shorelines which is an anticipated result of urbanization impacts of natural waterways. Lake County Health Department Lake Assessments have consistently noted that Loch Lomond's water quality is poor with low water clarity, high total suspended solids (TSS) concentrations, chloride concentrations and total phosphorous (TP) concentrations, and few established aquatic plants[6].

[6] Lake County Health Department, Lakes Management Unit. Loch Lomond Summary Report - Lake County, IL, 2015. (https://www.lakecountyil.gov/DocumentCenter/Home/View/14163).

2.2 Summary of Loch Lomond Study Area Field Assessments & Results

Field assessment data collection determines the validity and accuracy of GIS desktop assessments. Field results benefit the calibration of the models for watershed protection and restoration opportunities. Esri software offers multiple tools for accomplishing desktop and field assessments and field inventorying. GIS derived desktop analyses data was imported into ArcGIS online for real-time data access while in the field and accessible via a tablet connected to the cellular network. Field verification of open space, drainage pathways, riparian habitat and slope inventory data, were observed and noted for comparison to desktop data. Observations noted that may impact BMP siting includes: street modernization from rural ditch drainage to curb and gutter drainage systems (Loch Lomond), previously implemented slope stabilization practices by homeowners, storm sewer network functionality, condition, and ownership.

2.2.1 Stream & Stream Corridor Assessment

Introduction

The Lake County Stormwater Management Commission (SMC) conducted an on-the-ground assessment of stream characteristics to evaluate conditions within the corridor of the stream network within the SWAAP-LL. Though not specifically assessed, the stream assessment also made note of observed aquatic and riparian life. The stream assessment inventoried approximately 4,500 ln. ft. of stream channel within the SWAPP-LL in September 2017 (Figure 10). Supplemental stream assessment data was also used from previous SMC stream inventories conducted in Bull Creek in 2015.

Methods

Inventory methodology included walking the entire reach, measuring channel dimensions, noting streambank and riparian conditions, and documenting hydraulic structures and discharge points using a standardized database. A digital camera with an integrated Global Positioning System (GPS), was used to take geolocated photographs during the stream assessment. The major stream characteristics evaluated included:

- Channel conditions (physical dimensions, degree of bank erosion, degree of channel erosion, sediment accumulation, debris load, pool/riffle development)
- Hydraulic structures (bridges, culverts, dams and weirs)
- Discharge points (pipes, drain tiles, stormsewers, tributary streams and swales)
- Riparian corridor (floodplain and streambank land use and cover)
- Aquatic habitat (substrate composition and in-stream cover)

Although some quantitative data was collected such as channel width, discharge point sizes and hydraulic structure measurements, the condition of the creek was largely assessed using a qualitative method that involved visually inspecting and rating each stream reach as low, moderate, or high for the characteristic being evaluated. A more detailed description of the stream assessment can be observed here: http://arcg.is/1Ne1lgm.

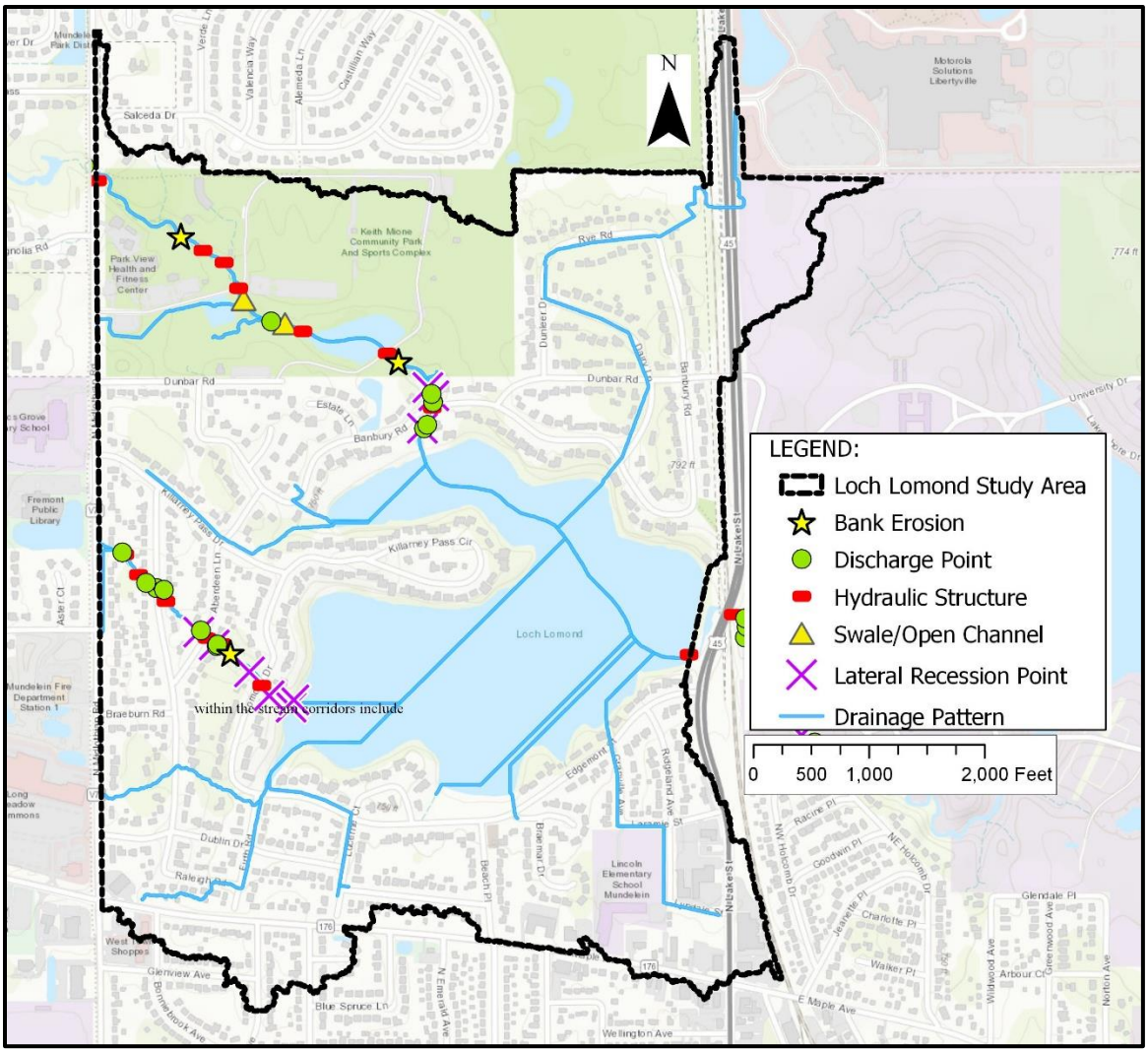


Figure 10: Loch Lomond Stream Assessment

Results and Discussion

The stream assessment identified an extensive amount of vegetative species that are not native nor conducive for effective slope stabilization along the stream channels. Much of the stream channels are dominated by a dense canopy and understory of ornamental and/or non-native invasive species (Buckthorn, European Mulberry, Eastern Cottonwood, Norway, Boxelder and Silver Maple, and Multiflora Rose). The dense canopy prevents native riparian grasses and forbs from establishing in populations significant enough to prevent soil loss. Trees are losing the soil mass around their roots and falling into the stream channels, developing debris jams and redirecting the normal stream thalweg, promoting new sources of slope instability and streambank erosion. Native plant vegetation in stream corridors, have evolved to thrive, stabilize and mitigate soil loss with deep root systems. The volume and velocity of water moving through the Bull Creek channel combined with the lack of suitable vegetation has impacted streambanks.

The water quality data presented in section 2.2.2, implies that soil loss due to streambank erosion and agricultural land runoff, is continuing to contribute to the turbidity and pollutant loads within the lake. Upstream development of the SWAAP-LL is regulated by the Lake County, IL

watershed development ordinance (WDO), https://www.lakecountyil.gov/2358/Watershed-Development-Ordinance. Per the WDO, site impact must comply with construction sediment and erosion control site protections to maximize water quality. Compliance is completed by self-reporting, community and inspector reporting to ensure compliance. Soil erosion contributes phosphorus and nitrogen as the soil particles are released into the water column by erosive forces.

The section of Bull Creek located within the study area and upstream of Loch Lomond is not identified as impaired in either the 2016 303(d) or 305(b) programs[7].

Bull Creek's biological integrity[8] is rated as relatively poor to non-existent for fish and macroinvertebrate diversity and establishment. Bull Creek has been impacted by culvert headwalls, damming, redirection, channelization, and urbanization, and no upstream hydraulic connectivity exists for aquatic species to move upstream within the Bull Creek stream corridor.

BMPs will benefit the long-term stability within the stream corridors. BMP recommendations will include thinning the vegetative canopy, runoff reduction surfaces, stone armoring on stream channel slopes where appropriate, in stream stone riffles, stone stabilization of upstream tributaries, and incorporation of naturalized detention basins for offsite runoff into the natural drainage pathways.

2.2.2 Lake Shoreline Assessment

Introduction

The Lake County Stormwater Management Commission (SMC) conducted an on-the-ground assessment of lake and pond characteristics. Though not specifically assessed, the lake/pond assessment also made note of observed aquatic and aquatic life. The shoreline assessment inventoried approximately 2,000 of the 12,000 ln. ft. of shoreline for Loch Lomond in September 2017 (Figure 11). Supplemental shoreline data was also used from Loch Lomond Lake Report prepared by the Lake County Health Department in 2015[9].

Methods

Inventory methodology included walking the shoreline where accessible, noting shoreline conditions, and documenting hydraulic structures and discharge points if there are probable impacts to water quality. The major shoreline characteristics evaluated included:

- Conditions (degree of bank erosion, sediment accumulation, debris load)
- Hydraulic structures (bridges, culverts, dams and weirs)
- Discharge points (pipes, drain tiles, and stormsewers)
- Corridor (floodplain, land use and cover)
- Aquatic habitat (substrate composition and lake cover)

[7] Illinois Environmental Protection Agency. Illinois Integrated Water Quality Report and Section 303(d) List - Volume I: Surface Water, 2016. (http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/index).

[8] Des Plaines River Watershed Workgroup (DRWW), Water Quality Data, 2016.

[9] Lake County Health Department, Lakes Management Unit. Loch Lomond Summary Report - Lake County, IL, 2015. (https://www.lakecountyil.gov/DocumentCenter/Home/View/14163).

The shoreline assessment was largely assessed using a qualitative method that involved visually inspecting and identifying whether the shoreline was impacting water quality.

2.2.2.1 Lakes Water Quality

Lake Reports

The 2015 Loch Lomond Summary Report reported that total phosphorus in Loch Lomond averaged 0.196 mg/L. This represents a 33.5% decrease from the 2005 concentration of 0.295 mg/L, this is still higher than the Illinois Environmental Protection Agency impairment rate of 0.050 mg/L. Sources of phosphorus include inputs from the watershed, local sources (i.e., lawn fertilizers and agricultural runoff) and internal loading from sediment caused by wind and wave action and carp. Nitrogen is the other nutrient critical for algal growth. The average Total Kjeldahl nitrogen (TKN) concentration for Loch Lomond was 1.54 mg/L, which was higher than the county median of 1.20 mg/L. A total nitrogen to total phosphorus (TN:TP) ratio of 8:1 indicates that nitrogen was the nutrient limiting aquatic plant and algae growth in Loch Lomond. By using phosphorous as an indicator, the trophic state index (TSIp) ranked Loch Lomond as hypereutrophic with a TSIp value of 80.2. This means that the lake has high nutrients which can result in excess plant and algae growth. The 2015 average total suspended solids (TSS) concentration for Loch Lomond was 11.0 mg/L, which was higher than the county median of 8.2 mg/L and a 16.7% decrease from the 2005 average of 13.1 mg/L. Water clarity was measured by Secchi depth, with the lowest reading in August (1.60 ft.) and the deepest was in May (6.90 ft). The average Secchi depth for the season was 2.94 ft, which was near the county median (2.96 ft). The average conductivity of Loch Lomond was 0.7736 mS/cm which is higher than the county median (0.7920 mS/cm). This was a 7.8% increase from the 2005 average (1.3298 mS/cm). The average chloride concentration for Loch Lomond in 2015 was 134 mg/L which was slightly lower than the county median of 139 mg/L. Although Loch Lomond is at the top of the watershed, it has lower water quality than the lakes it flows into. This is in part due to the lack of aquatic plants to stabilize sediments and take up excess nutrients and continually internal loading of phosphorus from disturbed lakebed sediment. Loch Lomond experiences minimal stratification because it is relatively shallow (avg. water depth 5 ft and a maximum depth of 8 ft). The inability to stratify increases suspension of nutrients in the water column and water surface, instead of trapping nutrients in the lower profile of the lake.

HOA Water Sampling

The Loch Lomond HOA is in the process of developing and implementing a lake management plan for Loch Lomond. As part of their management plan they collected water chemistry data (2016-2017) from four (4) inlet sampling points entering lake Loch Lomond. Total phosphorus entering Loch Lomond averaged 0.098 mg/L, higher than the Illinois Environmental Protection Agency (IEPA) impairment rate of 0.050 mg/L. The main tributary to Loch Lomond, Bull Creek contributes 0.164 mg/L of phosphorus. Sources of phosphorus include inputs from the watershed, local sources (i.e., lawn fertilizers and agricultural runoff) and loading from the sediment of streambank erosion. The average total suspended solids (TSS) concentration entering Loch Lomond was 11.42 mg/L. The average chloride concentration entering Loch Lomond was 136.88 mg/L.

IEPA 2016 Integrated Water Quality Report

Loch Lomond (AUID: IL_RGU) has been identified as impaired for Fecal Coliform, Phosphorus (Total), and Total Suspended Solids (TSS) in the 303(d) Program[10].

Loch Lomond (AUID: IL_RGU) has been identified for the following impairments, potential pollutant sources, and designated use classification in the 305(b) Program[11].

- Potential Pollutant Causes: Fecal Coliform, Total Suspended Solids (TSS), Phosphorus (Total).
- Potential Pollutant Sources: Source Unknown, Littoral/shore Area Modifications, Other Recreational Pollution Sources, Streambank Modifications/destabilization, Agriculture, Rural (Residential Areas), Urban Runoff/Storm Sewers, Waterfowl.
- Designated Uses: Fully Supporting Aquatic Life, Not Assessed Fish Consumption, Not Supporting Primary Contact, Not Assessed Secondary Contact, Not Supporting Aesthetic Quality.

2.2.2.2 Lake Shoreline Assessments

A full shoreline erosion assessment was completed for Loch Lomond in 2015. One hundred percent of the shoreline was developed with the major shoreline types being riprap, seawall, and lawn. The shoreline was divided into 11 reaches, and evaluated for none, slight, moderate and severe erosion based on exposed soil and tree/plant roots, failing infrastructure, undercut banks, and other signs of erosion. Based on the 2015 data[12], 23.4% of Loch Lomond's shoreline has some erosion, with 1.2% of the shoreline classified as moderate erosion and 2.6% of the shoreline classified as severely eroded, Figure 11.

Lakes Reports and Lake Shoreline Assessments Discussion
The inlet sampling data and in-lake water quality sampling data indicate that phosphorus reduction and sediment reduction are needed to improve water quality. Due to the shallow nature of lake Loch Lomond, mitigating pollutants prior to discharging into the lake will benefit the overall health of the lake. As with any impounded system, dredging will be a short-term water quality improvement. Dredging select areas of the lakes will increase water depth and may improve water quality and inversion, but it is a costly service and does not mitigate continued input of pollutant into the lake. The Loch Lomond HOA's current aquatic maintenance practices for water quality issues, includes a pesticide program of herbicides and algicides (control primarily of algae and invasive vegetation), which only serves as a temporary solution to improve water quality issues.

BMPs that target permanent and long-term reductions in sediment and nutrient movement into Loch Lomond will benefit the water quality within Loch Lomond the most. Stabilizing stream

[10] Illinois Environmental Protection Agency. Illinois Integrated Water Quality Report and Section 303(d) List Volume I: Surface Water, 2016. (http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/index).

[11] Illinois Environmental Protection Agency. Illinois Integrated Water Quality Report and Section 303(d) List - Volume I: Surface Water, 2016. (http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/index).

[12] Lake County Health Department, Lakes Management Unit. Loch Lomond Summary Report - Lake County, IL, 2015. (https://www.lakecountyil.gov/DocumentCenter/Home/View/14163).

channels entering Loch Lomond would be the most effective BMP as well as stabilizing areas with moderate to severe shoreline erosion. The shallow nature of the lake and internal loading of nutrients will continue to be a problem as native emergent and submergent vegetation remain non-existent. Planting buffer strips and emergent vegetation to stabilize the water's edge may be feasible pending the existence of a transitional shoreline profile below the waterline conducive to plant establishment.

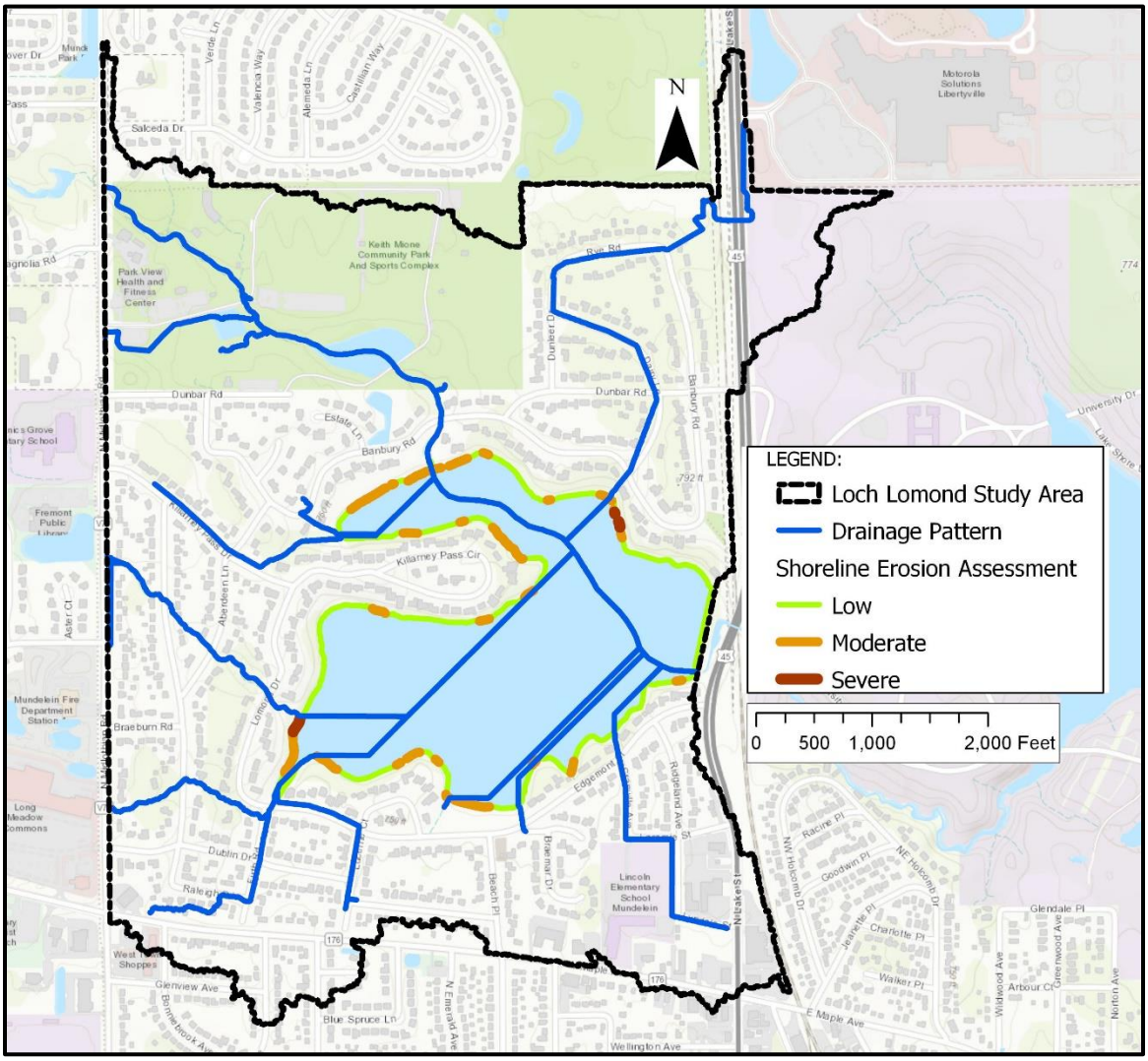


Figure 11: Loch Lomond Shoreline Assessment

Floating treatment wetlands (FTWs) serve as an alternative BMP to shoreline stabilization, vegetated FTWs mimic the function of naturalized shorelines with nutrient and sediment uptake. FTWs support aquatic vegetation on an anchored self-buoyant system, the root system of the native plants grow into the water oxygenating the water, absorbing nutrients and binding suspended sediment. The root systems also provide protection, habitat and food sources to aquatic species. FTWs are also proposed as isolated islands within the lake; they were presented as near-term implementable projects to stakeholders. The majority of the lake shoreline is located on private property, easement/site access will need to be negotiated, whereas the lake itself is the

property of the Loch Lomond HOA and thereby a near-term implementable project. Research has indicated significant reduction of in lake pollutants is achievable (TSS, TN, P) from FTWs[13]. An additional benefit of FTWs specific to native plant establishment and longevity is that the buoyancy of the FTW system abates the effects of water level variability, urban hydrology in a small watershed increases the probability of plant failure due to variability in water levels.

2.2.3 Upland Assessments

Upland assessments were conducted by a windshield survey of the adjoining community within the SWAAP-LL, in addition to aerial imagery interpretation and Google street view assessment of areas outside the SWAAP-LL.

Upland areas were assessed based on observation techniques presented in the Unified Subwatershed and Site Reconnaissance (USSR) Manual developed by CWP (2004) to identify potential pollution sources influencing water quality and to evaluate restoration project opportunities. The manual provides detailed guidance regarding survey techniques to help watershed groups, municipal staff, and consultants unfamiliar with identifying stormwater pollution sources. The manual also offers guidance to assess subwatershed restoration potential for source controls, pervious area management, and improved municipal maintenance such as education, retrofits, street sweeping, inlet cleaning, and open space management.

The potential actions that were considered during the assessment to address observed sources of stormwater pollution were:

- Improved management of common areas
- Storm drain stenciling/marking program
- Tree planting
- Improved landscaping/native landscaping
- Stormwater management practice maintenance
- Stormwater retrofit opportunity

2.2.3.1 Neighborhood Source Assessment (NSA)

NSAs describe pollution source areas, stewardship behaviors, and restoration opportunities within individual neighborhoods. Each neighborhood has unique characteristics which determine the ability to implement restoration projects, source controls, and stewardship practices.

Methods

Potential stormwater pollutant sources are observed within the adjoining communities as pollutants can be introduced from yards and lawns, rooftops and downspouts, driveways and sidewalks, and common areas. Specific watershed protection and restoration practices can be recommended based on the results of the neighborhood assessment. Assessments can identify programs and projects that allows municipalities, homeowners, and other watershed stakeholders to identify resource allocation toward achieving the goals of the watershed-based plan.

[13] T. R. Headley and C.C. Tanner. Floating Treatment Wetlands: An Innovative Option for Stormwater Quality Applications, 2008. 11th International Conference on Wetland Systems for Water Pollution Control.

Results and Discussion

The community is predominately residential consisting of 45% of the SWAAP-LL (Table 1) with an average lot size of 4.73 acres.

Table 1: Loch Lomond Study Area Land Use Data

Loch Lomond Land Use Assessment[14]		
Land Use	Acres	Percent of SWAAP-LL
Commercial/Retail	5.42	1.15
Disturbed Land	0.20	0.04
Forest/Grassland/Beach	9.69	2.05
Government/Institutional	7.77	1.65
Industrial	0.32	0.07
Office/Research	0.55	0.12
Public/Private Open Space	76.34	16.18
Rail	5.93	1.26
Residential-Multi Family	1.36	0.29
Residential-Single Family	212.27	45.00
Transportation	68.55	14.53
Utility/Waste Facility	0.23	0.05
Water	77.73	16.48
Wetlands	8.01	1.14
Total	469	100

Improved management of common areas

Street sweeping helps remove trash, sediment and other organic matter such as leaves and grass clippings from the curb and gutter system and prevents them from entering the storm drains and nearby streams. Street sweeping also reduces sediment and other pollutant loads such as oil and metals to the stream system. Excessive organic matter, sediment, and trash can clog streams and the storm drain system resulting in costly maintenance and stream health impairment. Also, the decay of an unbalanced amount of organic matter in a stream depletes the supply of dissolved oxygen, depriving other aquatic life including fish of their oxygen demand. As the SWAAP-LL area moves to curb and gutter systems, a street sweeping initiative must be implemented to ease the effects of a curb and gutter storm drain system on receiving streams and Loch Lomond. The assessed areas had minimal trash, but the presence of sediment, and/or organic matter (leaves and grass clippings) was identified.

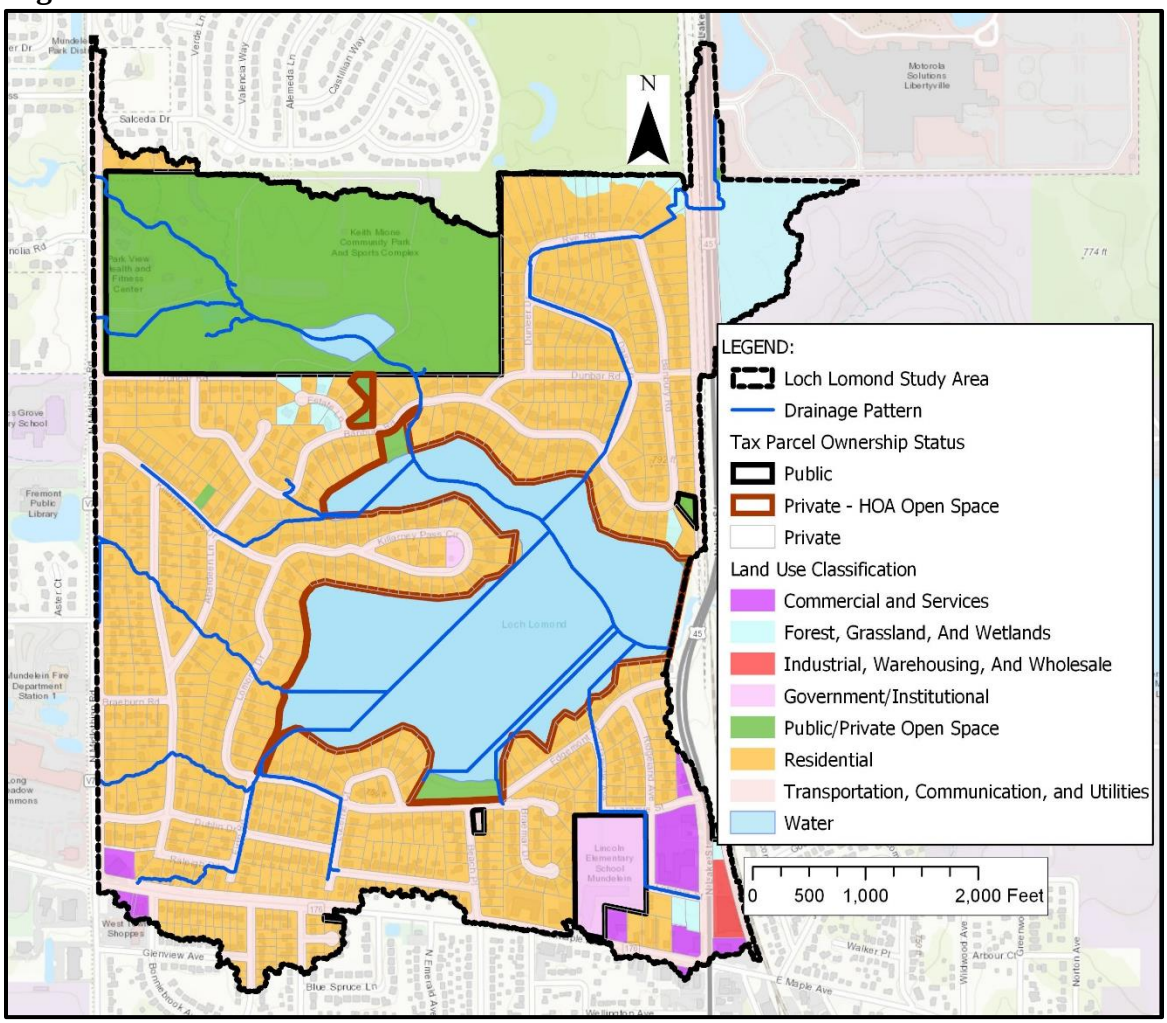
Storm Drain Marking

Most of the road infrastructure in the SWAAP-LL consist of a mix of natural ditch drainage (90%) and modern curb and gutter systems (10%) with storm drain inlets that convey stormwater runoff quickly and directly to the stream system and ultimately to Loch Lomond. At the time of field reconnaissance, the Village of Mundelein was in the process of converting portions of the natural ditch drainage system to curb and gutter systems and filling in the ditch depressions. Since there is little or no infiltration of stormwater in a curb and gutter system, the future potential for more pollutants to be carried to the lake is feasible. The new installed storm drains do not have markings or indicators that the inlets eventually drain to Loch Lomond. New

[14] Lake County GIS. Land Use GIS Data, 2010.

and existing inlets should be identified with markings or indicators to educate residents that any trash, lawn clippings (potential for nutrient pollution), or other debris accumulating along the curbs and gutters will be washed away during a storm event and end up in Loch Lomond.

Figure 12: Loch Lomond Land Use Assessment

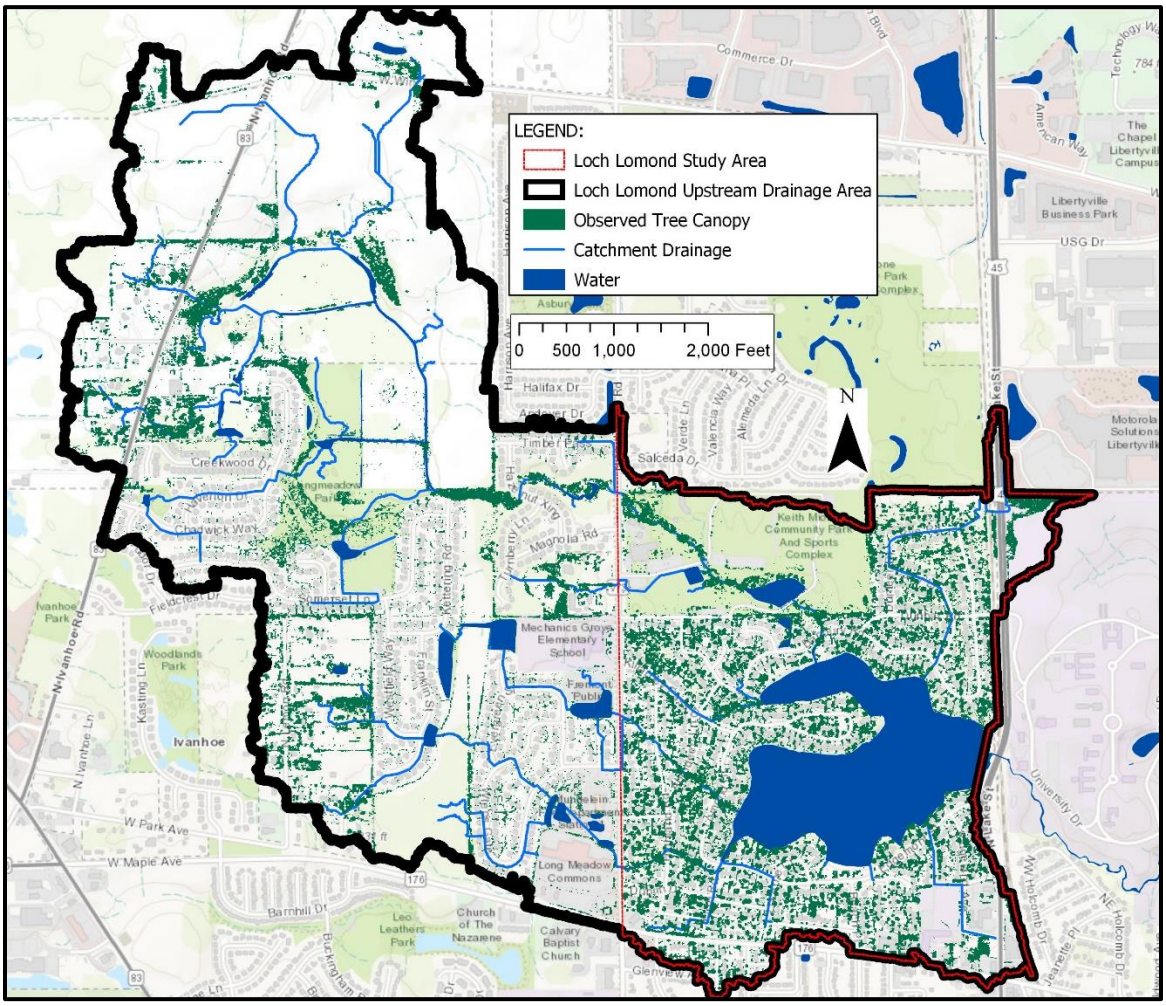


Street and Shade Trees

Street and shade trees are an aesthetic asset to the community, but also provide air and water quality improvements since they intercept precipitation with their leaves and absorb precipitation and nutrients through their root systems. This infiltration of precipitation through leaves or the root systems reduces runoff and provides some treatment before stormwater runoff reaches the stream or waterbody system. Street trees are recommended for neighborhoods with a minimum of 6 feet of green space between the sidewalk and curb and less than 20% of these areas had trees planted (Figure 13). Approximately 100 trees are needed in the SWAAP-LL, based on a spacing of one tree per 30 feet. A spacing of 30 feet presumes a mature tree canopy and the dripline as the extent of tree root system. The tree canopy establishment within the upstream drainage area of Loch Lomond outside of the SWAAP-LL is relatively poor. The canopy establishment is limited due to the age of the tree population (18-22 years old, development impact within the years 1996-1999). Mature trees are an effective stormwater BMP

tool, the uptake of stormwater for a mature tree (ex. 36-inch Bur oak will intercept 6,365 gallons of stormwater runoff per year) is more significant than a newly planted 3" caliper tree (ex. 3-inch Bur oak will intercept 95 gallons of stormwater runoff per year)[15]. The association of canopy coverage tends to correlate with tree maturity and size. The inclusion of the tree canopy coverage upstream of the SWAAP-LL, highlights the need for preservation/installation of trees to intercept stormwater.

Figure 13: Loch Lomond Tree Canopy Assessment



Improved landscaping/native landscaping

The vegetative inventory assessment in the SWAAP-LL concluded that little native vegetation exists outside of the vegetated stream buffers. The Loch Lomond HOA has implemented rain gardens planted with native grasses and forbs. The stream buffers have mature trees that are mix of native and non-native species, with an understory of invasive species. The residential landscape vegetation is predominately turf with non-native ornamental plant species existing as shrubs and flowers. Trees within the SWAAP-LL are a mix of native and non-native

[15] National Tree Benefit Calculator, (http://www.treebenefits.com/calculator/).

species. As mentioned in the lake assessment the lake has no substantial shoreline or emergent plant habitat established in the lake.

Long term improvements will include thinning the canopy of the stream corridors and removing and replacing invasive and aggressive plant species to improve soil stability. Converting turf depressions and/or detention basins with native plant species can improve water quality. Determining the types of fertilizer or turf maintenance in practice on each parcel was not completed as part of this report, but educational support will be offered to stakeholders to educate the community on reduced chemical inputs into lawn maintenance.

2.2.3.2 Impervious Area Assessment

Introduction

Assessing the locations and extent of impervious surface area in proximity to drainage patterns will aid in identification and evaluation of potential BMP project locations for impervious pavement reduction, vegetation enhancement, or stormwater retrofitting.

Methods

Impervious cover assessments were conducted by a windshield survey of the adjoining community within the study area, in addition to aerial imagery interpretation, and GIS data analyses[16,17,18].

Project recommendations are determined by existing conditions at the sites and potential level of community support for BMP implementation. Parcel size, ownership, value of existing vegetation, neighbor proximity and adjacency considerations have been assessed to identify sites with good potential as a stormwater retrofit location.

Results and Discussion

The SWAAP-LL study area of 469 acres has approximately 75% of available land in some form of imperviousness that continues to impact water quality, stormwater runoff volume and velocity (Table 2). The primary considerations for impervious cover tend to be attributed to artificial structures such as buildings, roads, driveways, or parking lots. Impervious cover can also be attributed to open spaces and properties with compacted soils in the landscape or areas with limited vegetation establishment that do not support sufficient water infiltration. In the SWAAP-LL 45.48 acres are attributed to impervious street pavement and 1,120 building structures constitute 50.66 acres of impervious cover, which comprises a significant component of High Impervious Cover.

The impervious cover assessment in combination with the drainage analysis assessment seeks to characterize parcels with the best opportunity to be retrofitted with BMPs for improved rain and runoff infiltration where paved surfaces are present. Potential opportunities for retrofitting existing land use with BMP projects have been identified in the conceptual designs for the SWAAP-LL. Specific recommendations will include reductions in upland drainage directly to

[16] National Land Cover Database (NLCD). Percent Developed Imperviousness Database, 2011. (https://www.mrlc.gov/nlcd2011.php).
[17] Lake County GIS. Planimetric GIS data: Buildings, Edge of Pavement, and Parking Lots.
[18] Lake County SMC. Des Plaines River Watershed-Based Plan- impervious cover assessment data, 2018.

water bodies, reductions of impervious pavements, or redirection of runoff through naturalized basins or buffers before reaching receiving waters of a creek or lake. Ongoing programmatic education with communities and municipalities will continue to promote and highlight projects and opportunities for increased infiltration and absorption of runoff. Permeable pavement projects will continue to be long term education effort to ensure stakeholder support of the benefits and long-term cost benefits of permeable pavements as a substitute for impervious pavement. Currently off-road parking and parking lots are being proposed for retrofits from asphalt parking to a permeable pavement system. Recommendations will be for public properties such as school districts and park districts for parking lot retrofits but will be contingent on funding opportunities and ongoing education for support.

Figure 14: Loch Lomond Percent Impervious Cover Assessment

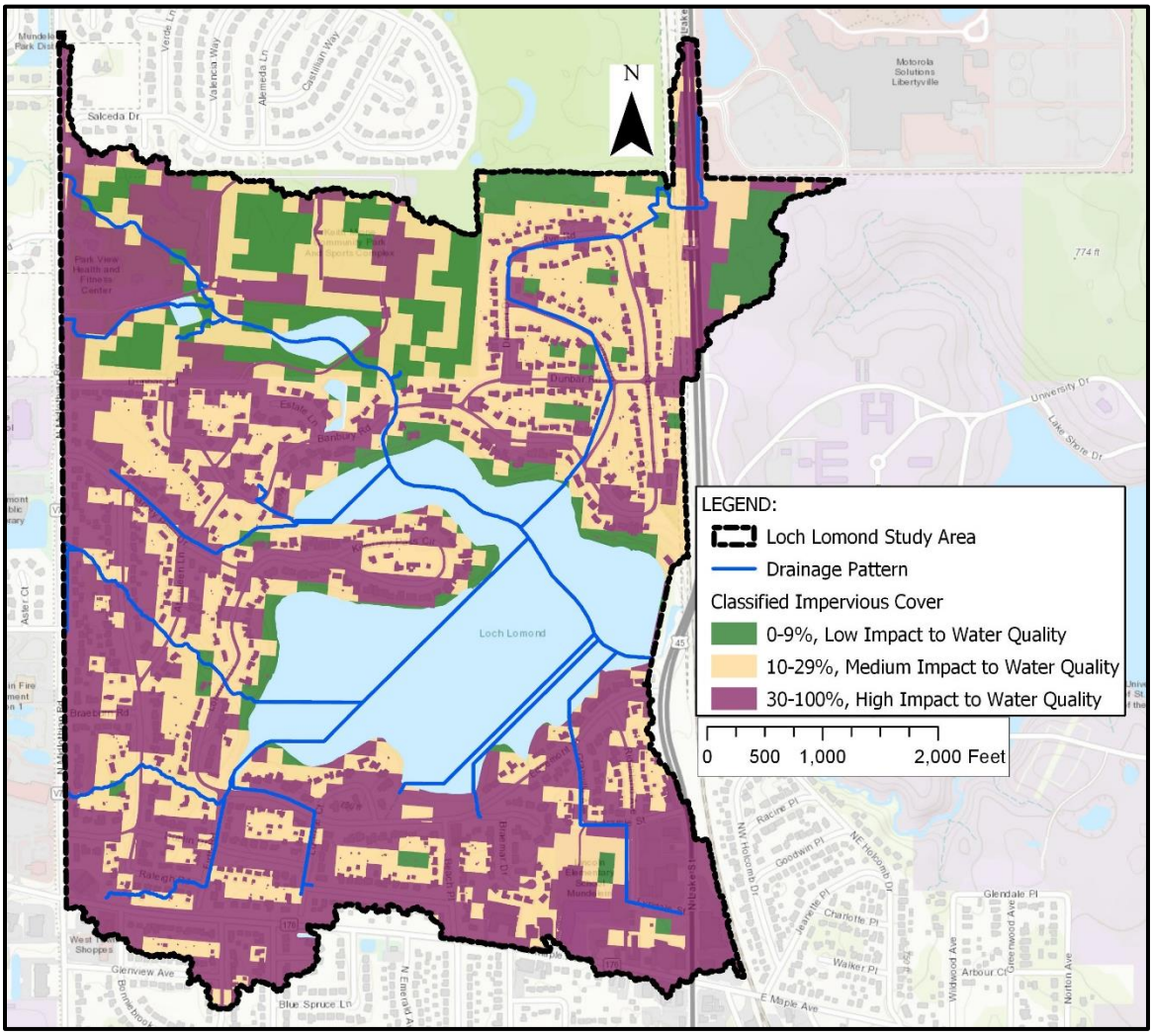


Table 2: Loch Lomond Impervious Cover Data

ITEM	ACRES	% AREA
Low Impervious Cover, 0-9%	44.59	10%
Medium Impervious Cover, 10-29%	135.65	29%
High Impervious Cover, 30-100%	208.90	45%
Water	79.87	17%
Total	469	100%

2.2.4 Stormwater Retrofit Inventory

Introduction

Stormwater retrofits are a valuable tool to improve water quality in areas where the natural soil, vegetation or drainage has been altered and/or impacted. Stormwater retrofit opportunities included treating runoff from parking lots, inlet retrofits, and conversion/inspection of existing stormwater management detention and retention facilities. Retrofit locations will seek to ensure sufficient pervious area is available to treat a portion of stormwater runoff from impervious surfaces. Retrofit opportunities promote infiltration or filtration of stormwater runoff with BMPs. BMPs such as infiltration trenches, naturalized basins, or bio-retention solutions incorporate native vegetation and filter media through which stormwater passes. This reduces the volume and velocity of water, pollutants, and water temperature of the runoff prior to groundwater recharge or entering the stream/lake system.

Methods

Stormwater retrofit opportunities are effective in areas of medium and high impervious cover. Areas of high and medium impervious cover (30-100%) are presumed to have been altered from their natural state to include some form of development. The development thereby reduces the available green space to a range of 0-70% of land cover while also impacting and potentially impeding natural drainage pathways. Field investigations were conducted by a windshield survey of the adjoining community within the study area, in addition to aerial imagery interpretation, and GIS data analysis[19,20,21]. The feasibility of implementing a stormwater retrofit project at each site was evaluated by investigating drainage patterns, drainage boundaries, impervious cover, available space, and other site constraints (e.g., conflicts with existing utilities and land uses, site access and potential impacts to natural areas). As discussed in section 2.2.3.2, impervious cover can also be attributed to open spaces and properties with compacted soils in the landscape or areas with limited vegetation establishment that do not support sufficient water infiltration. Project recommendations are determined by existing conditions at the sites and potential level of community support for BMP implementation and maintenance. Parcel size, ownership, value of existing vegetation, neighbor proximity and adjacency considerations have been assessed to identify sites with good potential as a stormwater retrofit location were also noted during the assessment.

Results and Discussion

[19] National Land Cover Database (NLCD). Percent developed imperviousness database, 2011.
[20] Lake County GIS. Planimetric GIS data: Buildings, Edge of Pavement, and Parking Lots.
[21] Lake County SMC, Des Plaines River Watershed-Based Plan- impervious cover assessment data, 2018.

Many viable stormwater retrofit opportunities existing in the SWAAP-LL, but the immediate project recommendations seek immediate benefits for water quality improvement. Key project recommendations seek to rehabilitate, enhance and/or naturalize existing stormwater management detention and retention facilities to increase infiltration, and reduce pollutant reduction loads from overland runoff. Additional project recommendations seek to convert open turf patches into mixed use vegetative landscapes for passive recreational use.

2.3 Small Watershed Assessment Summary of Loch Lomond Study Area

In sections 2.1 and 2.3, the overall results of the desktop and field assessments indicate that the natural habitat of the SWAAP-LL has been substantially impacted by land use and land function. The impact of development has contributed to increased volume and velocity of runoff via roofs, roads, and stormwater pipes based on the assessed erosion issues in the field and validated via GIS analysis. The available open space needed for runoff infiltration/filtration has been severely impacted by current land uses and has increased the sediment and pollutant load of Loch Lomond over the last six (6) decades. Water chemistry issues observed in Loch Lomond will continue to be observed until appropriate programmatic and field actions are pursued to mitigate and reduce the impacts of upstream runoff into Loch Lomond.

Water quality impacts include the following:

- Nonpoint water quality impacts from urbanization contribute to increased soil erosion, turbidity, nutrient introduction, and upland habitat loss to Loch Lomond.
- Aquatic life is inconsistent due to the lack of upstream stream continuity, channelization, elevated/perched stormsewer structures and damming.
- Streambank stability and streambank function are a foreseeable concern until appropriate stabilization practices are completed.

Programmatic and field project recommendations for stakeholders to incorporate in their community include:

- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Downspout disconnect information for riparian land owners and upland land owners.
    - Rain water harvesting opportunities.
    - Retrofitting of natural depression or drainage paths with rain gardens or bio-swales.
    - Native vegetation inclusion/incorporation with landscaped areas.
    - Tree preservation/tree planting for stormwater runoff reductions.
- Stormwater runoff education
    - Storm drain stenciling/marking.
    - Street Cleaning.
    - Permeable pavement surfaces.
    - Reduced vegetative debris storing on slopes or drainage paths.
    - Proper trash disposal or use of hazardous household collection or recycling facilities for disposal.

3. Inventory of Watershed Restoration Opportunities in the Loch Lomond Study Area

3.1 Stream & Stream Corridor Restoration Opportunities in the Loch Lomond Study Area

Stream and stream corridor restoration practices have been selected to enhance the appearance, stability, and function of the stream corridors. Applicable practices range from vegetative bank stabilization and localized grade control, to comprehensive restoration projects, such as full channel redesign and re-alignment. Stream and stream corridor restoration practices are often combined with stormwater retrofits and upland restoration programs and practices to meet subwatershed restoration objectives. Based on the results of the stream assessment, recommendations will include examples of: stream restoration, streambank/shoreline stabilization, vegetative buffer enhancement, and stream cleanups.

3.1.2 Potential Stream & Stream Corridor Restoration Programs

This section of the plan will provide a summary of the program-type opportunities (i.e., non-site specific or watershed-wide opportunities) identified during the field assessment work or developed to address issues identified during the field assessment work. Individual program opportunities may be further developed through the identification of the next steps toward program implementation.

In following are identified stakeholder support and outreach program recommendations to continue ongoing awareness, education, or housekeeping activities. SMC offers an array of educational stormwater best practice resources for the Lake County Community (https://lakecountyil.gov/2261/Stormwater-Best-Practices).

- Stakeholders to offer native vegetation management reference resources.
- Stakeholders to offer invasive species identification reference resources (terrestrial, aquatic, plants, animals, insects).
- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Downspout disconnect information for riparian land owners and upland land owners.
    - Rain water harvesting opportunities.
    - Top of streambank buffer enhancement, maintenance, or preservation.
    - Stream clean-up includes removing trash, tires and other debris from waterways.
- Stormwater runoff education
    - Eliminate the storage of vegetative debris on slopes or in drainage paths (i.e. grass clippings, wood piles).
    - Removal of instream vegetative debris obstructions.

- Proper trash disposal or use of hazardous household collection or recycling facilities for disposal.

3.1.3 Potential Stream & Stream Corridor Restoration Projects

This section of the plan will provide a summary of the project-type opportunities (i.e., site- or reach-specific opportunities) identified during the field assessment work or developed to address issues identified during the field assessment work. Individual projects for which preliminary concept designs were not developed may be further developed through the identification of the next steps toward project implementation.

Table 3: Loch Lomond Proposed Vegetation Management Projects

Proposed Vegetation Management										
PROJECT ID	**PROJECT DESCRIPTION**	**ACRE**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
LLVM01	Vegetation management: clearing of invasive/aggressive woody species diameter at breast height (DBH) <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.62	$20,000.00	$12,400.00	Mundelein Park District, Private Property	High	N/A	N/A	N/A	N/A
LLVM02	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.98	$20,000.00	$19,600.00	Mundelein Park District	High	N/A	N/A	N/A	N/A
LLVM03	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.90	$20,000.00	$18,000.00	Private Property	High	N/A	N/A	N/A	N/A

LLVM04	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.44	$20,000.00	$8,800.00	Private Property	High	N/A	N/A	N/A	N/A
LLVM05	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.18	$20,000.00	$3,600.00	Private Property	High	N/A	N/A	N/A	N/A
LLVM06	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.22	$20,000.00	$4,400.00	Private Property	High	N/A	N/A	N/A	N/A
LLVM07	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.45	$20,000.00	$9,000.00	Private Property	High	N/A	N/A	N/A	N/A
LLVM08	Vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.21	$20,000.00	$4,200.00	Private Property	High	N/A	N/A	N/A	N/A

Table 4: Loch Lomond Proposed Streambank Stabilization Projects

Proposed Streambank Stabilization[22]										
PROJECT ID	**PROJECT TYPE**	**LN FT**	**UNIT COST**	**TOTAL COST**	**PROJECT SUPPORT**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
LLSBS01	Stabilize the streambanks from previous stabilization activities to the retention pond of Bull Creek. Clear invasive and aggressive vegetation and plant low profile native species. Stabilization should include stone toe stabilization practices.	873.10	$50.00	$43,655.14	Multiple Private Resident Parcels	High	2.98	1.15	5.97	2.20
LLSBS02	Stabilize the streambanks of Bull Creek from retention pond into Loch Lomond. Clear invasive and aggressive vegetation. Stabilization should include stone toe stabilization practices.	1,028.15	$70.00	$71,970.63	Multiple Private Resident Parcels and Mundelein Park District.	High	18.22	1.36	7.03	2.59
LLSBS03	Stabilize the streambanks of tributary to Loch Lomond lake. Clear invasive and aggressive vegetation and plant low profile native species. Stabilization should include stone toe stabilization practices.	697.84	$50.00	$34,892.24	Multiple Private Resident Parcels	Medium	9.05	0.92	4.77	1.76

[22] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

LLSBS04	Stabilize the streambanks of tributary to Loch Lomond lake. Clear invasive and aggressive vegetation and plant low profile native species. Stabilization should include stone toe stabilization practices.	626.02	$60.00	$37,561.34	Multiple Private Resident Parcels	Medium	6.54	0.83	4.28	1.58
LLSBS05	Stabilize the streambanks of tributary to Loch Lomond lake. Clear invasive and aggressive vegetation and plant low profile native species. Stabilization should include stone toe stabilization practices. A 40-ln ft (both banks) section of the stream needs a retaining wall replacement.	850.33	$150.00	$127,549.70	Multiple Private Resident Parcels	High	7.03	1.12	5.81	2.14
LLSBS06	Stabilize the streambanks of tributary to Loch Lomond lake. Clear invasive and aggressive vegetation and plant low profile native species. Stabilization should include stone toe stabilization practices.	1,026.65	$50.00	$51,332.71	Multiple Private Resident Parcels	Medium	6.78	1.35	7.02	2.58

Table 5: Loch Lomond Proposed In-Stream Stabilization Projects

Proposed In-Stream Stabilization										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**

LLSS01	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	149.08	$33.00	$4,919.64	Mundelein Park District	Medium	N/A	N/A	N/A	N/A
LLSS02	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	275.09	$33.00	$9,077.97	Mundelein Park District	Medium	N/A	N/A	N/A	N/A
LLSS03	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	363.85	$33.00	$12,007.05	Mundelein Park District	High	N/A	N/A	N/A	N/A
LLSS04	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	69.12	$33.00	$2,280.96	Private Residence	Low	N/A	N/A	N/A	N/A
LLSS05	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	147.03	$33.00	$4,851.99	Private Residence	High	N/A	N/A	N/A	N/A

General Notes:

1. The Probable Cost Estimates do not include field surveys, permitting costs and engineering services if needed.
2. Cost will vary pending the phasing and scope of work implemented. Probable additional cost dependent on project owner, consultant, contracting team: Permitting/Engineering +30%, Mobilization +10%, Maintenance/Restoration +5%.
3. Pending the project/s and prior to finalizing a scope of work a professional field survey may be needed.
4. Pending the scope of project/s being implemented, soliciting a permit from the municipality, county, state and/or federal government of jurisdiction may be needed.
5. The probable cost does not include costs for bidding services, mobilization, or temporary construction access costs if needed.
6. The probable cost does make an estimated cost based on the presumed material and labor to implement a project.
7. Pending the funding sources and the requirements of the funding sources, permanent drainage and/or conservation easements may be needed if they do not currently exist to implement public funds on private land holdings. Costs for implementing easements are not addressed in the probable cost.

3.2 Lake & Lake Shoreline Restoration Opportunities in Loch Lomond Study Area

This section of the plan will provide an overview of lake and lake shoreline restoration practices and programs recommended for lake and lake shoreline restoration opportunities identified during the field assessment work or developed to address issues identified during the field assessment work. It will include conceptual designs, complete with planning level cost-estimates and preliminary pollutant load reduction estimates for the potential restoration opportunities.

3.2.1 Potential Lake & Lake Shoreline Restoration Programs

This section of the plan will provide a summary of the project-type opportunities (i.e., site-specific opportunities) identified during the field assessment work developed, to address issues identified during the field assessment work. Individual program opportunities may be further developed through the identification of the next steps toward program implementation.

In following are identified stakeholder support and outreach program recommendations to continue ongoing awareness, education, or housekeeping activities. SMC offers an array of educational stormwater best practice resources for the Lake County Community (https://lakecountyil.gov/2261/Stormwater-Best-Practices).

- Stakeholders to offer native vegetation management reference resources.
- Stakeholders to offer invasive species identification reference resources (terrestrial, aquatic, plants, animals, insects).
- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Rain water harvesting opportunities.
    - Shoreline buffer enhancement, maintenance, or preservation.
    - Cleaning of boats or other aquatic recreation items to minimize the transfer of invasive species.
- Stormwater runoff education
    - Eliminate the long-term or temporary storage of vegetative debris in streets, catch basins, or in drainage paths.
    - Proper trash disposal or use of SWALCO hazardous household collection or recycling facilities for disposal.

3.2.2 Potential Lake & Lake Shoreline Restoration Projects

This section of the plan will provide a summary of the project-type opportunities (i.e., site- or reach-specific opportunities) – identified during the field assessment work or developed to address issues identified during the field assessment work. Individual projects for which preliminary concept designs were not developed may be further developed through the identification of the next steps toward project implementation.

Table 6: Loch Lomond Proposed In-Lake Habitat Enhancement Projects

Proposed In-Lake Habitat Enhancement[23]										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (lb./year)**
LLFTW01	Installation of a floating treatment wetland.	1,149.33	$20.00	$22,986.60	Loch Lomond HOA, Shoreline placement in open water of Loch Lomond Lake.	High	50.52	6.43	9.19	360.82
LLFTW02	Installation of a floating treatment wetland.	988.71	$25.00	$24,717.75	Private Residence and Loch Lomond HOA, Shoreline placement in open water of Loch Lomond Lake.	High	43.47	5.53	7.91	310.49
LLFTW03	Installation of a floating treatment wetland.	656.79	$20.00	$13,135.80	Private Residence and Loch Lomond HOA, Shoreline placement in open water of Loch Lomond Lake.	High	50.52	6.43	9.19	360.82
LLFTW04	Installation of a floating treatment wetland.	1,673.26	$20.00	$33,465.20	Loch Lomond HOA, Shoreline placement in open water of Loch Lomond Lake.	High	43.47	5.53	7.91	310.49
LLFTW05	Installation of a floating treatment wetland.	23,660.94	$20.00	$473,218.80	Loch Lomond HOA, Shoreline placement in open water of Loch Lomond Lake	Medium	28.88	3.68	5.25	206.25
LLFTW07	Installation of a floating	11,333.41	$25.00	$283,335.25	Loch Lomond HOA, Island in open water of	Medium	73.56	9.36	13.39	525.46

[23] Preliminary Pollutant Load Reductions from vendor water quality monitoring research, (http://www.floatingislandinternational.com/research/research-papers/).

	treatment wetland.				Loch Lomond Lake.					
LLFTW08	Installation of a floating treatment wetland.	14,444.20	$25.00	$361,105.00	Loch Lomond HOA, Placement in open water of Loch Lomond Lake	Low	1040.24	132.39	189.29	7430.28
LLFTW09	Installation of a floating treatment wetland.	11,334.64	$25.00	$283,366.00	Loch Lomond HOA, Island in open water of Loch Lomond Lake	Medium	498.27	63.42	90.67	3559.05
LLFTW10	Installation of a floating treatment wetland.	11,334.64	$25.00	$283,366.00	Loch Lomond HOA, Island in open water of Loch Lomond Lake	Low	635.03	80.82	115.55	4535.93

General Notes:

1. The Probable Cost Estimates do not include field surveys, permitting costs and engineering services if needed.
2. Cost will vary pending the phasing and scope of work implemented. Probable additional cost dependent on project owner, consultant, contracting team: Permitting/Engineering +30%, Mobilization +10%, Maintenance/Restoration +5%.
3. Pending the project/s and prior to finalizing a scope of work a professional field survey may be needed.
4. Pending the scope of project/s being implemented, soliciting a permit from the municipality, county, state and/or federal government of jurisdiction may be needed.
5. The probable cost does not include costs for bidding services, mobilization, or temporary construction access costs if needed.
6. The probable cost does make an estimated cost based on the presumed material and labor to implement a project.
7. Pending the funding sources and the requirements of the funding sources, permanent drainage and/or conservation easements may be needed if they do not currently exist to implement public funds on private land holdings. Costs for implementing easements are not addressed in the probable cost.

3.3 Upland Area Restoration Opportunities in Loch Lomond Study Area

This section of the plan will provide an overview of upland restoration practices and will present the upland restoration opportunities identified during the field assessment work or developed to address issues identified during the field assessment work. It will include – as applicable – tables and maps, complete with planning level cost-estimates and preliminary pollutant load reduction estimates for the potential restoration opportunities.

3.3.1 Potential Upland Area Restoration Programs

This section of the plan will provide a summary of the project-type opportunities (i.e., site-specific opportunities) identified during the field assessment work or developed to address issues identified during the field assessment work. Individual program opportunities may be further developed through the identification of the next steps toward program implementation.

In following are identified stakeholder support and outreach program recommendations to continue ongoing awareness, education, or housekeeping activities. SMC offers an array of educational stormwater best practice resources for the Lake County Community (https://lakecountyil.gov/2261/Stormwater-Best-Practices).

- Stakeholders to offer native vegetation management reference resources.
- Stakeholders to offer invasive species identification reference resources (terrestrial, aquatic, plants, animals, insects).
- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Rain water harvesting opportunities.
    - Shorelines of water bodies located outside of FEMA floodplains require buffer enhancement, maintenance, or preservation.
    - Naturalization of turf drainage ditches with low-profile native plant species.
    - Tree Planting installation program in right of ways and private property where suitable.
- Stormwater runoff education
    - Eliminate the storage of vegetative debris in streets, catch basins, or in drainage paths.
    - Proper trash disposal or use of SWALCO hazardous household collection or recycling facilities for disposal.
    - Proper siting of housekeeping activities (i.e. pool cleaning, car washes, equipment storage as examples).
    - Storm drain stenciling/marking program for all inlets.

3.3.2 Potential Upland Area Restoration Projects

This section of the plan will provide a summary of the project opportunities, including stormwater retrofits – identified during the field assessment work to address identified issues. Individual projects for which preliminary concept designs were not developed may be further developed through the identification of the next steps toward project implementation.

Table 7: Loch Lomond Proposed Wetland Restoration Projects

Proposed Wetland Restoration[24]										
PROJECT ID	**PROJECT DESCRIPTION**	**ACRE**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
LLWR01	Existing wetland captures parking lot runoff. Proposed increase of wetland size to capture additional stormwater runoff prior to entering Bull Creek.	0.54	$30,000.00	$16,200.00	Mundelein Park District	High	N/A	N/A	N/A	N/A
LLWR02	Existing wetland receives stormwater runoff from residential properties, local streets and Route 45. Proposed increase of wetland storage capacity by deepening portions of the wetland for increased filtration and reduction of pollutant loads from entering Loch Lomond lake.	5.47	$40,000.00	$218,800.00	Mundelein Park District and Private Residence's	Medium	N/A	N/A	N/A	N/A
LLWR03	Existing wetland receives stormwater runoff from Route 45, which has hydraulic connectivity to Loch Lomond lake via culverts and underground stormsewer lines. Proposed increase of wetland storage capacity by deepening portions of the wetland for increased filtration and reduction of pollutant loads from entering Loch Lomond lake.	2.18	$20,000.00	$43,600.00	Archdiocese of Chicago	Medium	N/A	N/A	N/A	N/A

[24] Wetland modification recommendations are intended to increase collection and first flush filtration of runoff pollutants during small rain events.

LLWR04	Existing wetland receives stormwater runoff from residential properties, local streets, and actively used agricultural lands which discharges into Bull Creek. Proposed stabilization of streambanks and outfall area with stone practices to minimize soil erosion.	0.84	$40,000.00	$33,600.00	Hampton Reserve HOA	Medium	N/A	N/A	N/A	N/A

Table 8: Loch Lomond Proposed Drainage Basin Enhancement Projects

Proposed Drainage Basin Enhancements[25]										
PROJECT ID	**PROJECT DESCRIPTION**	**LN FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
LLDB01	Create a dry detention basin to capture runoff from fields, stabilize the inlet and outlet drainage paths with stone, and replace turf slopes with native low-profile plant species.	20,534.67	$5.00	$102,673.35	Mundelein Park District	High	1.32	0.24	-	61.61
LLDB02	Dry detention basin, meander the drainage path within the basin, stabilize the drainage path with stone, and replace turf slopes with native low-profile plant species.	26,068.44	$5.00	$130,342.20	Mundelein Park District	High	1.68	0.30	-	78.21
LLDB03	Dry detention basin, stabilize the drainage path with stone and replaced turf slopes with native low-profile plant species.	10,189.40	$4.00	$40,757.60	Mundelein Park District	Low	0.66	0.12	-	30.57
LLDB04	Create a rain garden to capture runoff from road and	24,682.59	$8.00	$197,460.72	Hickory Hills Estates HOA	Medium	1.59	0.29	-	74.06

[25] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

	residential properties and replace turf slopes with native low-profile plant species.									
LLDB05	Create a right of way rain garden for road runoff, stabilize the bottom with stone and the outfall with stone, and replace turf slopes with native low-profile plant species.	4,027.46	$8.00	$32,219.68	Loch Lomond HOA	High	0.26	0.05	-	12.08
LLDB06	Create a rain garden to capture runoff from road and residential properties and replace turf slopes with native low-profile plant species.	5,040.74	$8.00	$40,325.92	Mundelein Park District	Low	0.33	0.06	-	15.12
LLDB07	Expand the drainage basin to capture runoff from parking lot, and residential properties, stabilize inlet and outlet with stone, and replace turf slopes with native low-profile plant species.	7,636.02	$7.00	$53,452.14	Mundelein School District	High	0.49	0.09	-	22.91
LLDB08	Create a rain garden basin to capture runoff from parking lot and replace turf slopes with native low-profile plant species.	2,854.36	$6.00	$17,126.16	Mundelein School District	Low	0.18	0.03	-	8.56
LLDB09	Create a pocket park and rain garden to capture runoff from road and residential properties and replace turf slopes with native low-profile plant species.	8,984.01	$9.00	$80,856.09	Loch Lomond HOA	High	0.58	0.10	-	26.96

Table 9: Loch Lomond Proposed Permeable Pavement Projects

Proposed Permeable Pavement[26]										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
LLPP01	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond.	14,067.87	$10.00	$140,678.70	Village of Mundelein and Loch Lomond HOA	Medium	1.29	0.16	-	50.72
LLPP02	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond from a smaller catchment with direct discharge into Loch Lomond.	8,864.14	$10.00	$88,641.40	Mundelein School District	High	0.81	0.10	-	31.96
LLPP03	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond from a smaller catchment with direct discharge into Loch Lomond.	13,998.39	$10.00	$139,983.90	Mundelein School District	High	1.28	0.16	-	50.47
LLPP04	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond from a smaller	23,750.40	$10.00	$237,504.00	Mundelein School District	High	2.17	0.27	-	85.63

[26] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

	catchment with direct discharge into Loch Lomond.									
LLPP05	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond.	14,710.01	$10.00	$147,100.10	Mundelein Park District	Low	1.35	0.17	-	53.04
LLPP06	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond.	35,748.56	$10.00	$357,485.60	Mundelein Park District	Medium	3.27	0.40	-	128.89
LLPP07	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond.	4,165.28	$10.00	$41,652.80	Mundelein Park District	Low	0.38	0.05	-	15.02
LLPP08	Conversion of traditional pavement surfaces to a permeable pavement. Expectations are decreased stormwater runoff into Loch Lomond.	2,409.37	$10.00	$24,093.70	Mundelein Park District	Low	0.22	0.03	-	8.69

General Notes:

1. The Probable Cost Estimates do not include field surveys, permitting costs and engineering services if needed.
2. Cost will vary pending the phasing and scope of work implemented. Probable additional cost dependent on project owner, consultant, contracting team: Permitting/Engineering +30%, Disposal +10%, Mobilization +10%, Maintenance/Restoration +5%.
3. Pending the project/s and prior to finalizing a scope of work a professional field survey may be needed.
4. Pending the scope of project/s being implemented, soliciting a permit from the municipality, county, state and/or federal government of jurisdiction may be needed.
5. The probable cost does not include costs for bidding services, mobilization, or temporary construction access costs if needed.
6. The probable cost does make an estimated cost based on the presumed material and labor to implement a project.
7. Pending the funding sources and the requirements of the funding sources, permanent drainage and/or conservation easements may be needed if they do not currently exist to implement public funds on private land holdings. Costs for implementing easements are not addressed in the probable cost.

4. Loch Lomond Study Area Small Watershed Action Plan – Implementation Strategy

The watershed restoration opportunities and goals, recommended in this plan are based on the results of the desktop & field assessment work. The intent of this report is to empower stakeholder support in maintaining an implementation strategy for watershed restoration programs and projects in the small watershed study area. The SWAAP-LL report focused on high priority practices – where prioritization is based on evaluation and prioritization criteria goals.

Although there are a significant number of stormwater-related issues found within the SWAAP-LL area, promising opportunities exist to address these issues through a sustainable approach to stormwater management. As reflected in the summary of potential solutions and recommendations presented in Section 3.0, Inventory of Watershed Restoration Opportunities in the Loch Lomond Study Area, stormwater-related damage to structures and infrastructure can be reduced and stormwater-related maintenance problems can be fixed through the implementation of projects that achieve the community's stormwater management goals.

In addition to the technical information presented in both Section 2 and 3 and Appendix A regarding the actions and/or projects that could be used to address each of the problem areas found within the community, SMC staff has developed additional information to assist the SWAAP-LL stakeholders in budgeting for, funding, and implementing projects that will resolve the community's stormwater-related issues. This information is presented below.

Preliminary Cost Estimates

SMC staff has developed a preliminary cost estimate for each of the potential solutions and recommendations presented in Section 3. The preliminary cost estimates provide SWAAP-LL stakeholders a budget target. Stakeholders can use the detailed information to solicit and/or secure funding to implement projects that will resolve the community's stormwater-related issues. It should be noted that the preliminary cost estimates provided in Section 3 tables are based on the potential solutions and recommendations presented in the preliminary concept designs presented in Appendix A.

Such solutions, recommendations, and preliminary concept designs were developed based on a preliminary assessment of site conditions and preliminary engineering analyses performed in accordance with acceptable engineering practices. They are provided for planning purposes only. Actual construction costs may vary depending on the results of additional engineering analyses, further assessment of site conditions, timing of construction, availability of materials, construction methods, and other related factors.

Phased Implementation

SMC staff recognizes that the implementation of the potential solutions and recommendations presented in Section 3 will be limited by the amount of funding available. For that reason, the SWAAP-LL stakeholders should take a phased, multi-year approach to resolving the stormwater-related issues found within the community. Each table in section 3, ranks the

community's stormwater-related. This may be used by the SWAAP-LL stakeholders to prioritize future actions to addressing the community's stormwater-related issues (i.e., project selection, funding, and implementation).

Additionally, it should be noted that each of the detailed preliminary concept designs presented in Appendix A includes several individual elements that, when implemented as part of a single, comprehensive project, are expected to fully resolve the stormwater-related issue found within the associated problem area. SMC staff recognizes that the implementation of the individual preliminary concept designs may be limited by the amount of funding available and that, for this reason, the individual elements described in the preliminary concept designs may not be implemented as part of single, comprehensive projects. For this reason, the SWAAP-LL stakeholders may take a phased approach to implementation of the individual preliminary concept designs, selecting the individual elements that will address the community's most immediate and pressing needs for early implementation and delaying implementation of the remainder of the individual elements until additional funding has been compiled.

Potential Funding Sources

Several grants may be available to assist the SWAAP-LL stakeholders with the implementation of projects that follow this plan's guiding principle and achieve the community's comprehensive stormwater management goals. Some potential funding sources are outlined below.

- SMC Watershed Management Board Grant Program: SMC's Watershed Management Board grant program helps fund the planning, design, and implementation of stormwater management projects. Nine project prioritization criteria are considered by SMC staff in the evaluation of grant applications, with the highest priority placed on flood damage prevention/mitigation projects. However, water quality improvement, natural resource preservation and restoration, and green infrastructure projects are also considered. There is a 50% local match requirement, which can be in the form of cash, in-kind services, or both. Applications for Watershed Management Board grant funds are accepted on an annual basis, typically in early October, and approximately $67,620/year of grant funding is typically awarded to projects located in the Des Plaines River Watershed through the program. More information about SMC's Watershed Management Board grant program can be found online: https://lakecountyil.gov/3635/Watershed-Management-Board-WMB.
- Illinois EPA Section 319(h) Grant Program: The Illinois EPA makes grants available to local units of government and other organizations for projects that address nonpoint source pollution through its Section 319(h) grant program. Projects funded under the Section 319(h) grant program must address water quality issues relating directly to nonpoint source pollution. Grant funds can be used for the implementation of Illinois EPA-approved watershed-based plans, including the development of information/education programs and the implementation of best management practices. Illinois EPA receives these grant funds through Section 319(h) of the Clean Water Act and administers the program within Illinois. The maximum federal funding available is 60%, meaning that there is a minimum 40% local match requirement. Applications for Section 319(h) grant funds are accepted on an annual basis, between June 1 and August 1, and between $3,000,000/year and $4,000,000/year have been awarded to projects

around the state through the program in recent years. More information about Illinois EPA's Section 319(h) grant program can be found online: http://www.epa.illinois.gov/topics/water-quality/watershed-management/nonpoint-sources/faqs/index.

Potential Project Partners

Generally, the stormwater stormsewer infrastructure serving the SWAAP-LL area is owned and operated by the Village of Mundelein. However, some of the community's natural stormwater infrastructure is located on land owned by public and private entities and several of the problem areas identified during the field assessment work are located, at least in part, upon land owned by multiple landowners. The stormwater-related issues found within these problem areas are negatively impacting water quality, as well as adjacent land owners property. SMC staff recommends that the SWAAP-LL stakeholders develop a partnership with their respective municipality to implement projects that will resolve the community's stormwater-related issues located in the study area. The resolution of such issues will benefit all stakeholders of the SWAAP-LL study area and downstream communities.

Assistance with Final Design, Permitting, & Construction

Stakeholders pursing recommended projects should consult with SMC or their local municipality on whether a professional engineering firm is required to assist with the implementation of actions and/or projects requiring additional design, permitting, and/or land description revisions. Stakeholders should review experience and body of work when evaluating and selecting, consultants, contractors, and/or construction oversight. Stakeholder's may use the conceptual designs in Appendix A as needed to support the completion of the additional tasks (e.g., additional site investigation, final design, general and technical specification development, permit acquisition, bidding and contract document preparation, contract award, construction observation, construction management) in order to implement any portion of the recommendations projects. While the implementation of many of the solutions and recommendations presented in this plan may not require the completion of additional design or permitting tasks, SMC staff recommends that the stakeholders review its planned actions and/or projects with the relevant local municipality and/or its selected consultant to identify any additional necessary or beneficial design or permitting tasks, such as permit acquisition and bidding and contract document preparation.

5. Buffalo Creek Study Area Small Watershed Assessment

5.1 Summary of Buffalo Creek Study Area Desktop Assessment & Results

The information provided within this section, will characterize the existing conditions within the Buffalo Creek study area (SWAAP-BC). The characterization on current and future water quality impacts as connected to physiographic and/or anthropogenic factors will be assessed to aid in developing future water quality improvement projects. The project recommendations aim to reduce or mitigate stormwater runoff rates, volumes, and pollutant loads and/or improve the condition of receiving waters within the SWAAP-BC.

In this section, existing watershed-based plans and other relevant information, including geographic information system (GIS) data will be described on its function and use in determining project recommendations. The defined data analysis will be utilized in conjunction with field observations to identify specific project recommendations for specific locations with the small watershed study areas.

Small Watershed Study Area Delineation

To determine how water enters the receiving waters within the SWAAP-BC, the local drainage pathways must be identified. Understanding the impacts of small watersheds, is a key first step in determining how a SWAAP-BC will benefit overall water quality within the Des Plaines River Watershed. The SWAAP-BC is within the Willow Creek-Des Plaines River HUC 12: 071200040502 (Figure 15). Buffalo Creek is the main stream corridor in the study area (Assessment Unit ID: IL_GST), (Figure 16).

The boundaries of the SWAAP-BC were delineated using the Arc Hydro GIS modeling tools for Esri ArcMap software to define smaller drainage areas within the larger the Des Plaines River watershed. Arc Hydro is a set of data models and tools that operates within ArcGIS to support geospatial and temporal data analyses specifically to delineate and characterize watersheds in raster and vector formats, define and analyze hydro geometric networks, manage time series data, and configure and export data to numerical models[27].

The Arc Hydro GIS tools analyzed areas in groupings of approximately 500-acres. Storm sewer network[28] data was incorporated into the Arc Hydro model to further refine the small watershed boundaries and more accurately reflect how and where stormwater runoff is impacting the SWAAP-BC area. Refining the small watershed drainage area based on all available data more accurately represents the physiographic and/or anthropogenic factors impact the BMPs selected for water quality improvement projects. The SWAAP-BC areas are based on more detailed analyses of the existing topography then what is used to delineate subwatershed management unit (SMU) in the Des Plaines River Watershed-Based Plan.

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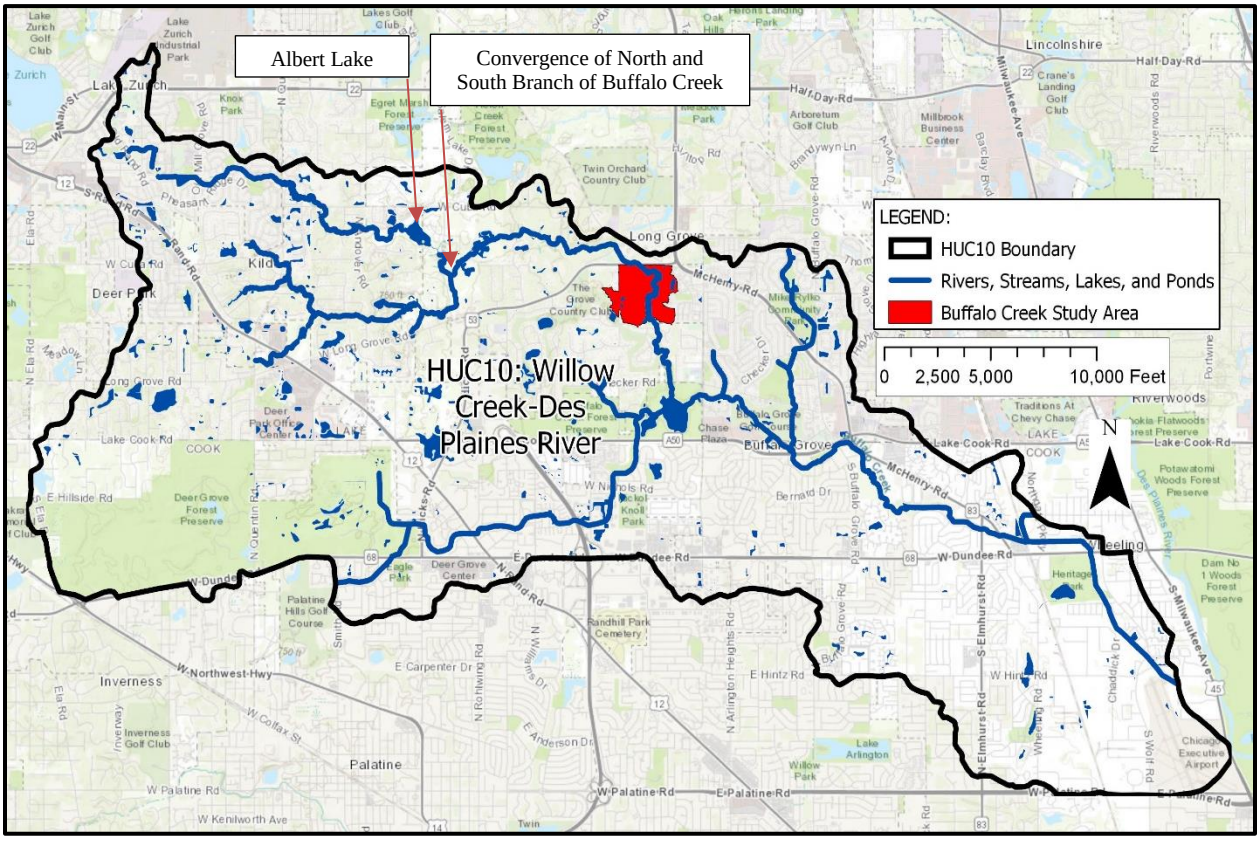
[27] Arc Hydro Website, http://resources.arcgis.com/en/communities/hydro/01vn0000000s000000.htm.

[28] Data provided by: Lake County Dept. of Transportation (culvert data); GIS Consortium (stormsewer network data); The Village of Buffalo Grove (stormsewer network data); The Village of Long Grove (stormsewer network data).

The SWAAP-BC study area is 161 acres (Figure 16, within a drainage area of 6,208 acres (9.70 square miles), which is located within SMC subwatershed management unit (SMU) BC025[29]. There are 28.5 stream miles upstream of the SWAAP-BC, Figure 15.

Figure 15: Buffalo Creek SWAAP-BC HUC 10 Reference



Small Watershed Drainage Delineation and Hydrology

Delineating the natural surface drainage and engineered subsurface drainage networks within the small watersheds, allows for a better comprehension of how and where water enters a lake/pond or linear waterbody. Understanding the movement of water, including how much land is contributing water runoff, where it flows, and the available storage areas for runoff is essential to determine mitigation opportunities for water quality impacts.

The natural drainage pathways of Buffalo Creek have been impacted by damming, redirection, channelization, and urbanization. Buffalo Creek was redirected and channelized within the study area in the early 1970s to accommodate a subdivision in the Village of Buffalo Grove. Buffalo Creek is a heavily developed and densely urbanized subwatershed[30,31], future drainage concerns into Buffalo Creek (AUID: IL_GST) include continued conversion of open space into various

[29] Lake County Stormwater Commission. Des Plaines River Watershed-Based Plan, 2018.
[30] Buffalo Creek Clean Water Partnership and Lake County Stormwater Commission. Buffalo Creek Watershed-Based Plan, 2015.
[31] Lake County Stormwater Commission. Des Plaines River Watershed-Based Plan, 2018.

urban land uses increasing in the ratio of building footprints to open space per parcel of land, with a large footprint of impervious surfaces (Figure 16 and Figure 17).

Figure 16: Buffalo Creek Drainage Area Assessment

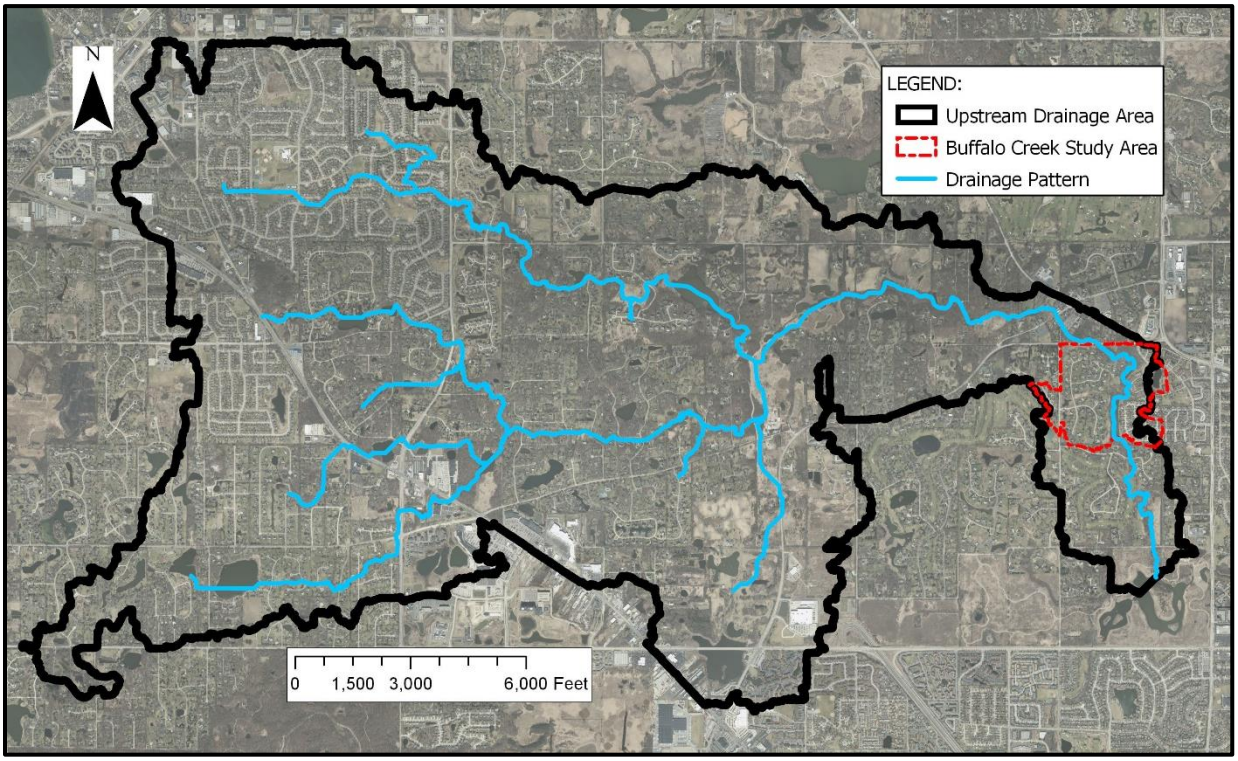


Figure 17: Buffalo Creek Study Area Drainage Assessment

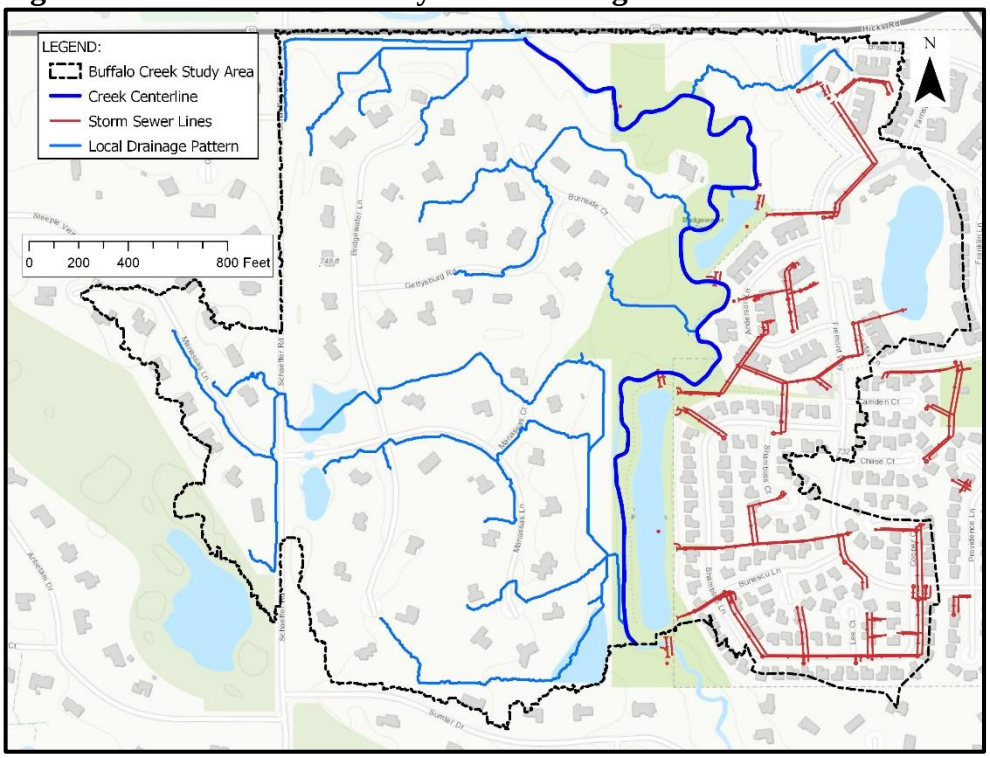
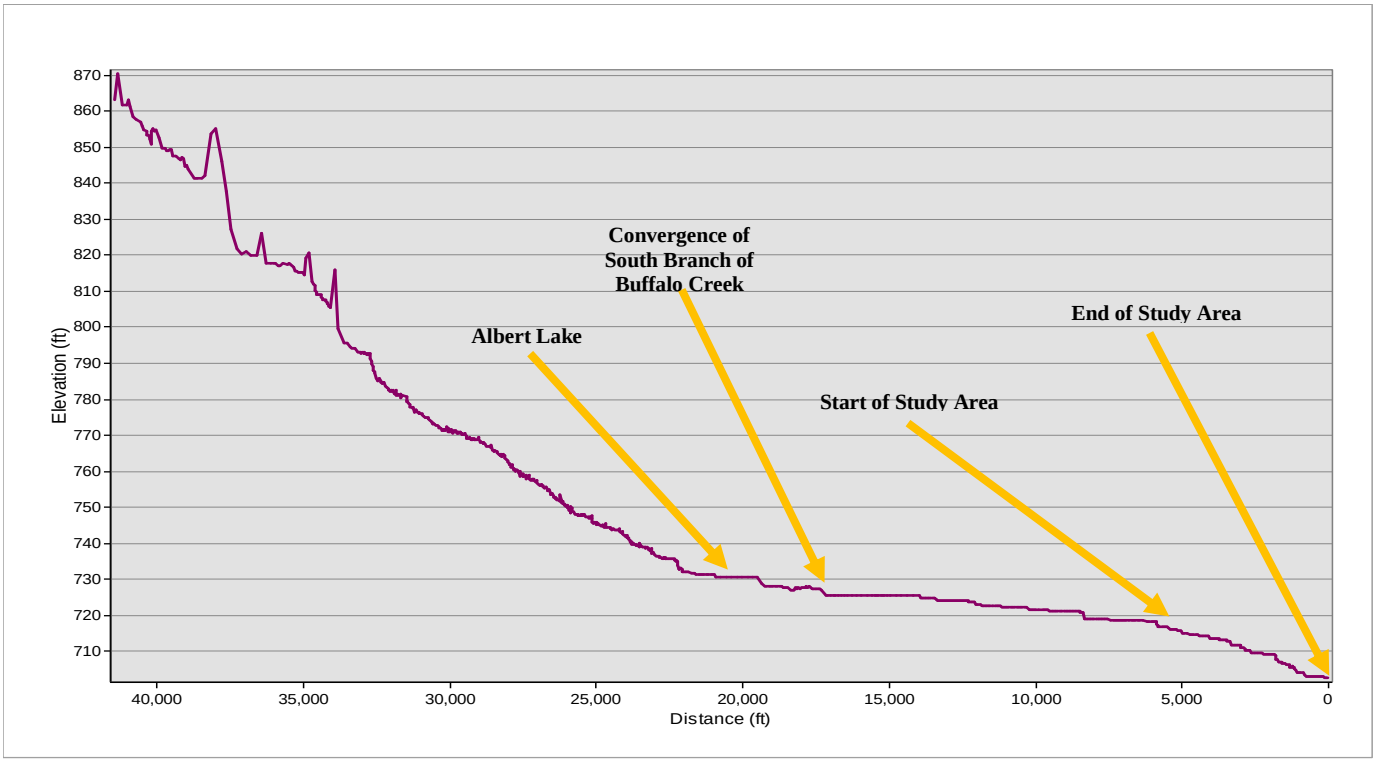


Figure 18: Buffalo Creek Gradient and Study Area Drainage Area

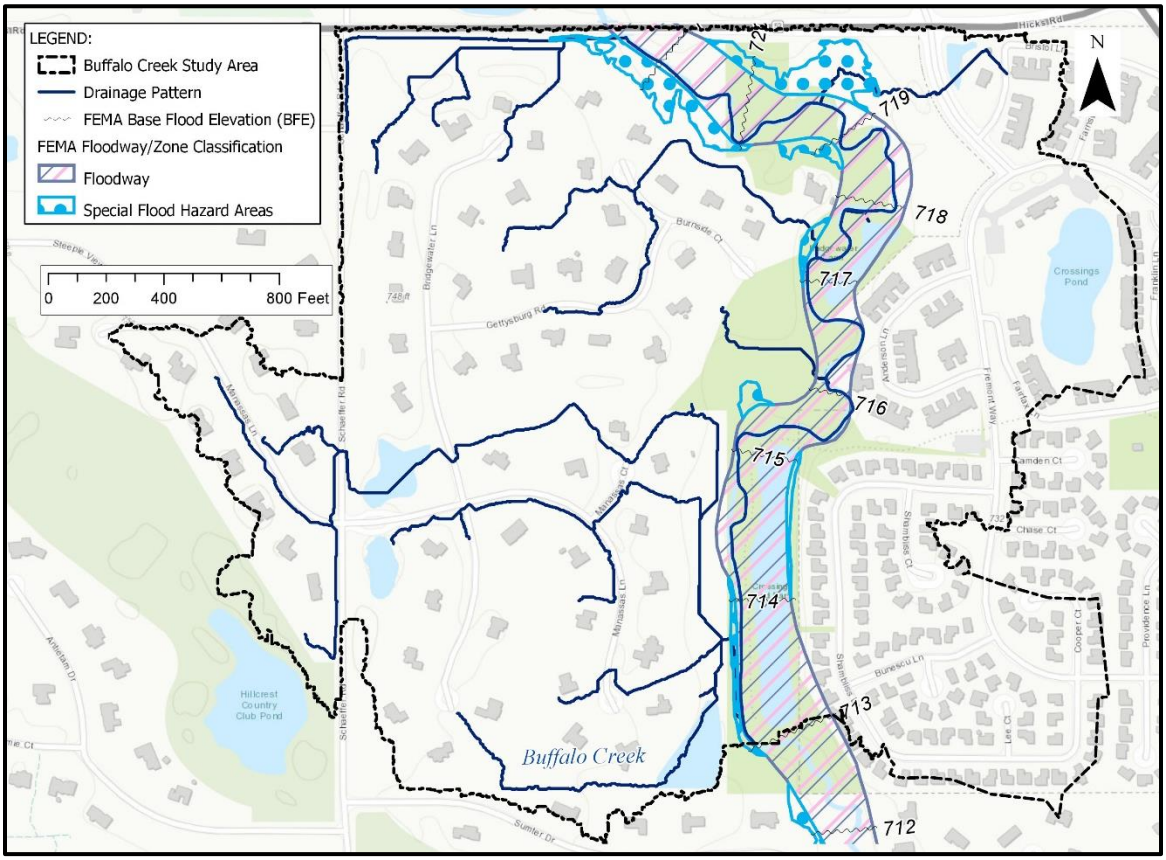


The stream gradient of Buffalo Creek from West to East indicates an elevation drop of 168' over 42,000 ln. ft. along the stream centerline for the main stem of Buffalo Creek (Figure 15 and Figure 18), a relatively flat gradient. The observed spikes in the stream gradient are related to road/bridge decks not removed in the development of the Lake County digital terrain model (DTM) dataset. Observing the stream gradient as it enters the SWAAP-BC study area helps determine how the overall drainage area of 9.70 square miles impacts the SWAAP-BC. The gradient upstream of Lake Albert is six times the observed gradient downstream of Lake Albert. Lake Albert is an observed pooling area for Buffalo Creek, which dissipates creek energy and flow. The convergence of the South Branch of Buffalo Creek 12,000 ln. ft. upstream of the study area adds additional water volume (Figure 16), which enters a pool area that dissipates some of the energy of the intersecting North and South branches of Buffalo Creek.

The flood hazard analysis of Figure 19, indicates some pooling on the northern section of the study area in the FEMA floodway and special flood hazard areas (1.0% Flood Zone or 100-yr Floodplain)[32].

[32] Federal Emergency Management Agency (FEMA). National Flood Hazard Layer (NFHL). (https://hazards.fema.gov/gis/nfhl/rest/services/public/NFHL/MapServer)

Figure 19: Buffalo Creek Flood Hazard Zone Assessment



Open Space Land Assessments and Property Ownership Delineation

Evaluating and assessing the size and proximity of open undeveloped or partially development urbanized landscapes is critical to determine potential BMP locations. Significant land holdings are in private ownership (Figure 20) and have undergone urbanization at varying degrees of land impact. The available open space in the SWAAP-BC includes the Long Grove Park District, the Buffalo Grove Park District, the Bridgewater Farms HOA and the Grove Country Club Golf Course (Grove Acquisitions LLC).

Figure 20: Buffalo Creek Property Ownership Assessment

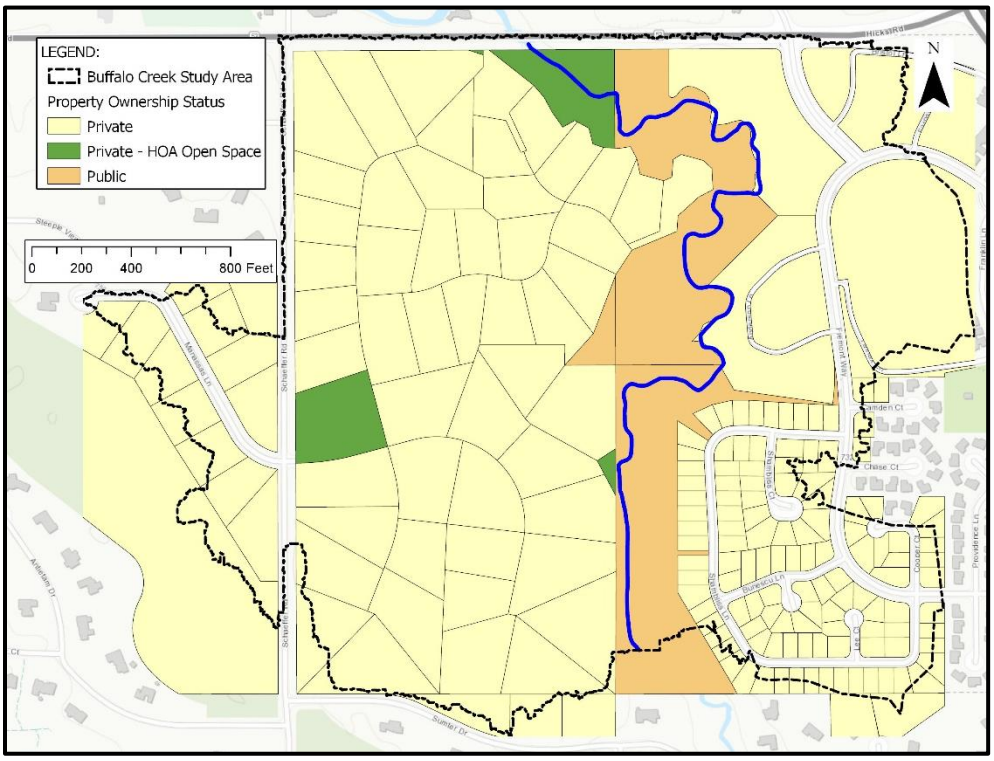
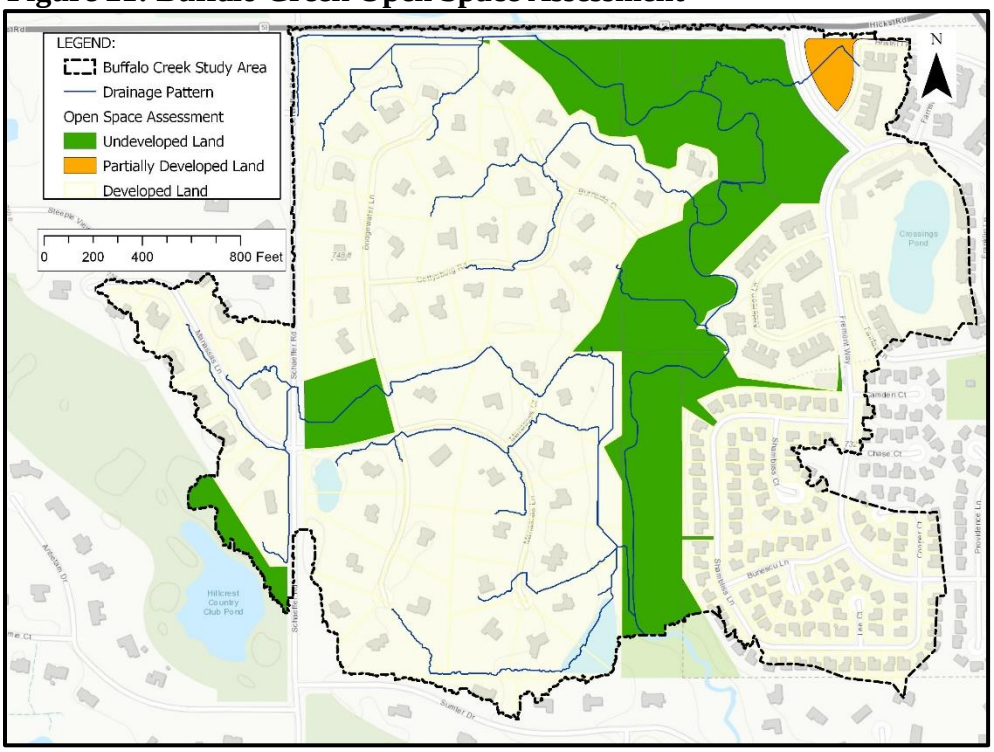


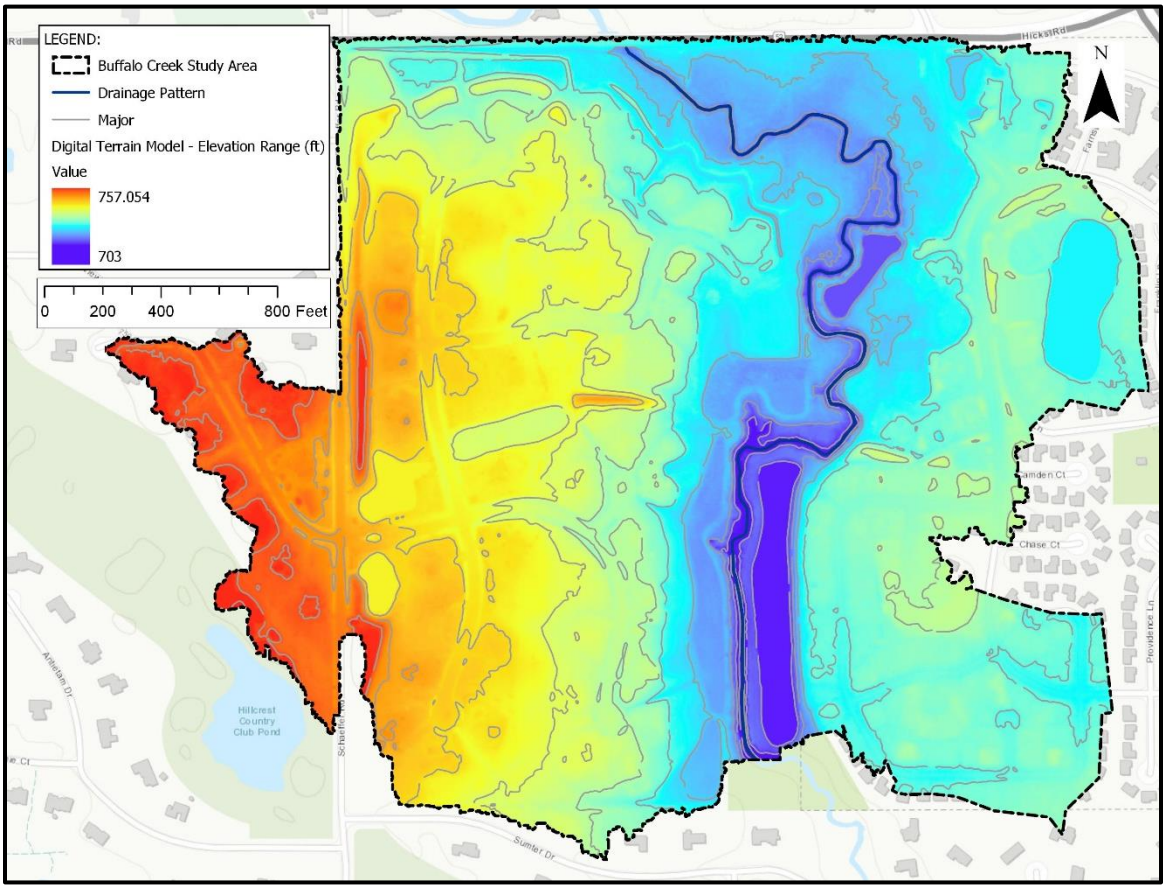
Figure 21: Buffalo Creek Open Space Assessment



Topographical Assessment

A topographical assessment of the existing topography supports our field reconnaissance in identifying areas with possibly eroding streambanks or shorelines based on the severity of the slope steepness near ponds, lakes or linear waterbodies. The slope analysis is completed within the Esri ArcMap software, utilizing a LiDAR derived digital terrain model (DTM)[33]. LIDAR, which stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth[34] and a DTM is a data interpretation of the distance data derived from the remote sensing. Areas that have been determined to be exhibiting potential erosion based on a GIS analysis were reviewed in the field, and recommendations for stabilization have been included in the conceptual drawings.

Figure 22: Buffalo Creek Topographical Assessment

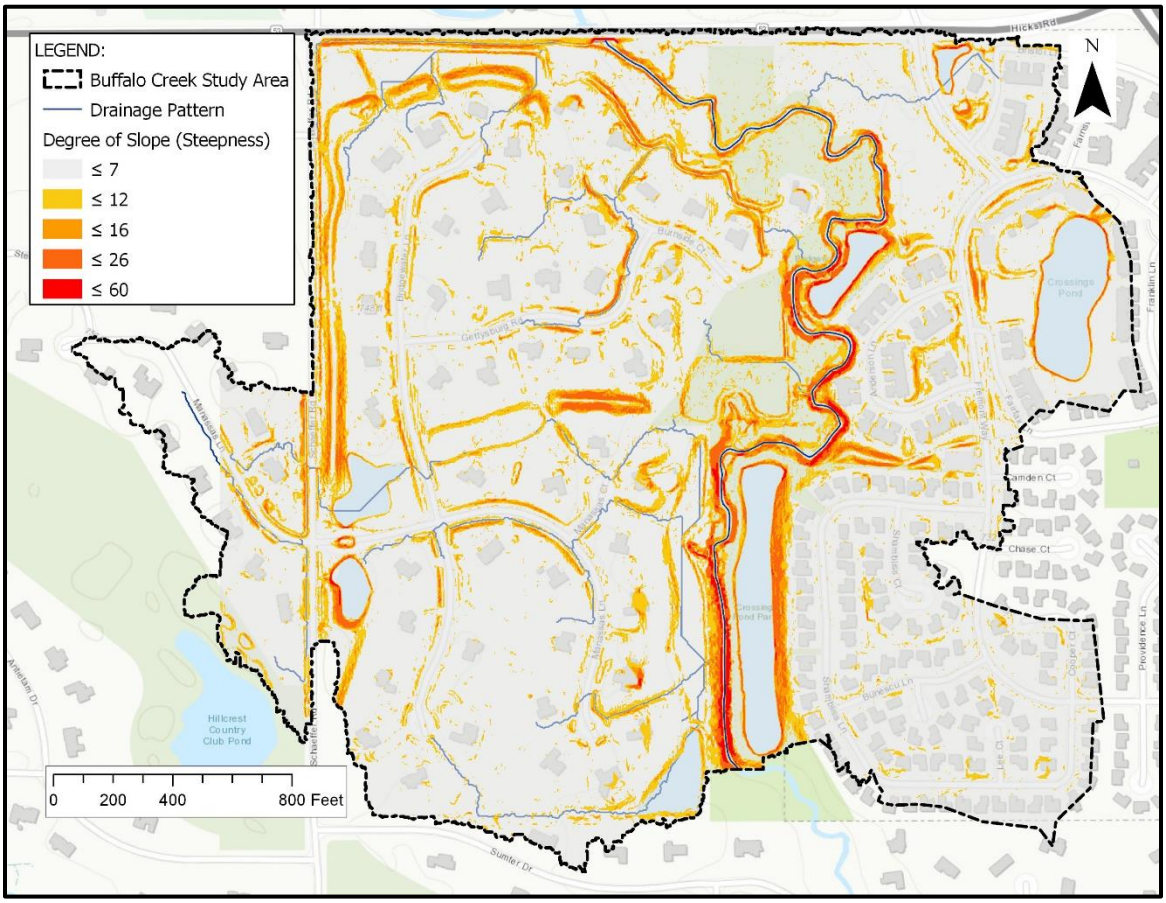


Using the results of the desktop geographic information system (GIS) assessments, key areas were identified within the SWAAP-BC to facilitate field assessment work. The opportunities will be presented as preliminary concept designs projects for future development, funding, and implementation. This initial desktop assessment work is critical in forming a comprehensive understanding of the selected sites prior to conducting a more detailed on-the-ground assessment of watershed conditions and potential watershed protection and restoration opportunities.

[33] Lake County GIS. DTM Data, 2007. (https://s3.amazonaws.com/lakecountygis-public/topography.html).
[34] LiDAR Description & Function, https://oceanservice.noaa.gov/facts/lidar.html

The GIS analysis identified areas of concern within the SWAAP-BC, particularly along streambanks, retention pond shorelines, and steep roadside drainage swales which is an anticipated result of urbanization impacts of natural waterways.

Figure 23: Buffalo Creek Steep Slope Assessment



5.2 Summary of Buffalo Creek Study Area Field Assessments & Results

Field assessment data collection determines the validity and accuracy of GIS desktop assessments. Field results benefit the calibration of the models for watershed protection and restoration opportunities. Esri software offers multiple tools for accomplishing desktop and field assessments and field inventorying. GIS derived desktop analyses data was imported into ArcGIS online for real-time data access while in the field and accessible via a tablet connected to the cellular network. Field verification of open space, drainage pathways, riparian habitat and slope inventory data, were observed and noted for comparison to desktop data. Observations noted that may impact BMP siting includes: implementation of previously implemented slope stabilization practices by homeowners, and coordination of storm sewer network (functionality, condition, and ownership).

5.2.1 Stream & Stream Corridor Assessment

Introduction

The Lake County Stormwater Management Commission (SMC) conducted an on-the-ground assessment of stream characteristics to evaluate conditions within the corridor of the SWAAP-BC stream network. Though not specifically assessed, observed aquatic and riparian life were recorded. The stream assessment inventoried 4,433 ln. ft. of stream channel within the SWAAP-BC in September 2017 (Figure 24). Supplemental stream assessment data was also used from the 2015 Buffalo Creek stream inventory.

Methods

Inventory methodology included walking the entire reach, measuring channel dimensions, noting streambank and riparian conditions, and documenting hydraulic structures and discharge points using a standardized database. A digital camera with an integrated Global Positioning System (GPS), was used to take geolocated photographs during the stream assessment. The major stream characteristics evaluated included:

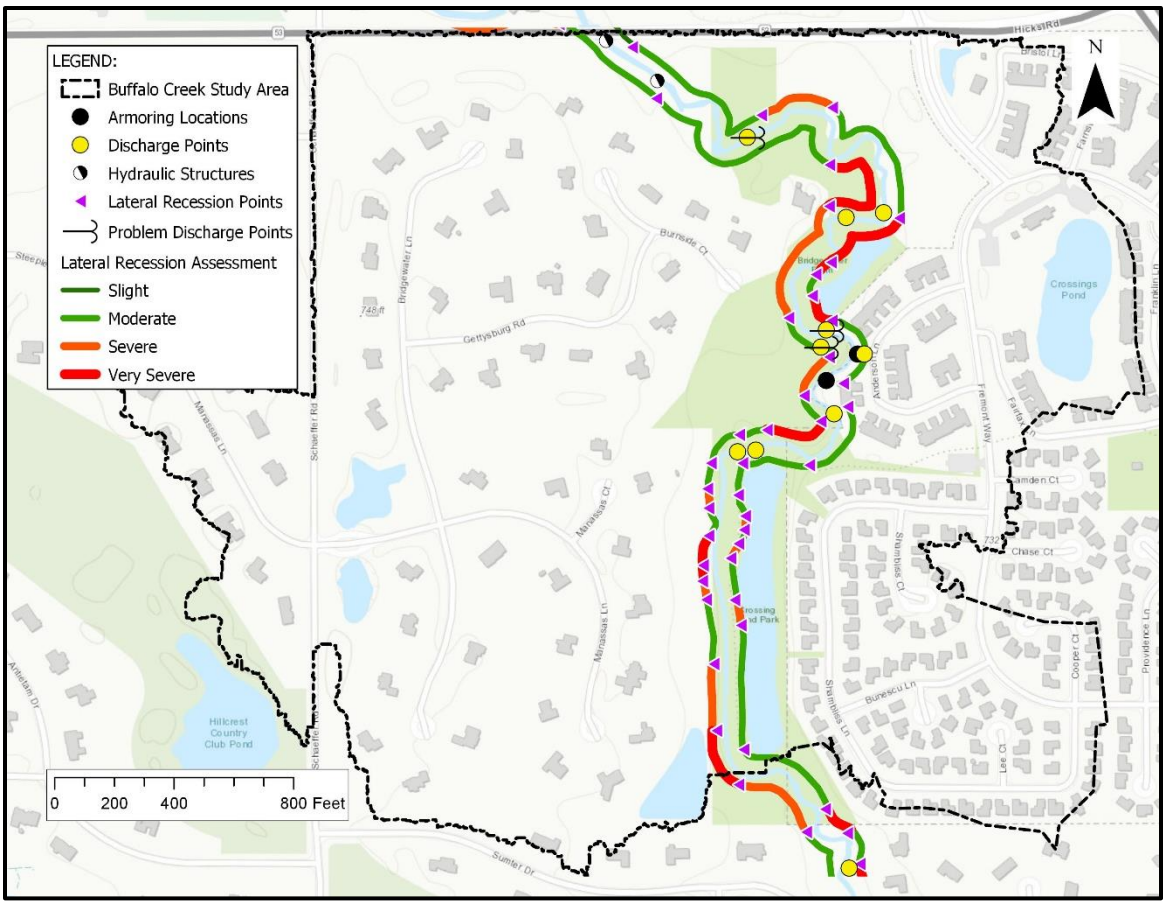
- Channel conditions (physical dimensions, degree of bank erosion, degree of channel erosion, sediment accumulation, debris load, pool/riffle development);
- Hydraulic structures (bridges, culverts, dams and weirs);
- Discharge points (pipes, drain tiles, stormsewers, tributary streams and swales);
- Riparian corridor (floodplain and streambank land use and cover); and,
- Aquatic habitat (substrate composition and in-stream cover).

Although some quantitative data was collected such as channel width, discharge point sizes and hydraulic structure measurements, the condition of the creek was largely assessed using a qualitative method that involved visually inspecting and rating each stream reach as low, moderate, or high for the characteristic being evaluated. A more detailed description of the stream assessment can be observed here: https://lakecountyil.maps.arcgis.com/home/webmap/viewer.html?webmap=c6beeb2a08d149b1a35e89eab50538cc.

Results and Discussion

The stream assessment identified an extensive amount of vegetative species that are not native nor conducive for effective slope stabilization along the stream channels. Much of the stream channels are dominated by a dense canopy and understory of ornamental and/or non-native invasive species (Buckthorn, European Mulberry, Eastern Cottonwood, Norway Maple, Boxelder and Silver Maple, and Multiflora Rose). The dense canopy prevents native riparian grasses and forbs from establishing in populations significant enough to prevent soil loss. Trees are losing the soil mass around their roots and falling into the stream channels, eventually developing debris jams or a redirection of the normal stream thalweg, promoting new sources of slope instability and streambank erosion. Native plant vegetation has evolved to thrive, stabilize and mitigate soil loss with deep root systems within these types of stream corridors. The assessed section of Buffalo Creek has 33 debris jams from trees undercut by streambank failure, with 22 of the debris jams substantially altering the creek flow and increasing slope erosion as a new thawleg develops along the newly eroded streambanks. The volume and velocity of water moving through Buffalo Creek channel combined with the lack of suitable vegetation has impacted streambanks and overland drainage paths.

Figure 24: Buffalo Creek Stream Assessment



Upstream development of the SWAAP-BC, is regulated by the Lake County, IL watershed development ordinance (WDO), https://www.lakecountyil.gov/2358/Watershed-Development-Ordinance. Per the WDO, site impact must comply with construction sediment and erosion control site protections to maximize water quality. Compliance is completed by self-reporting, community and inspector reporting to ensure compliance. Soil erosion contributes phosphorus and nitrogen as the soil particles are released into the water column by erosive forces. Ongoing land use concerns related to stormwater runoff is a problem from land development prior to the WDO establishment in 1992, where many communities installed non-existent, inadequate or undersized stormwater management systems to mitigate runoff before entering a natural drainage system. The runoff volume and velocity from areas of high impervious cover negatively affects the conditions within the stream corridor.

IEPA 2016 Integrated Water Quality Report

- Buffalo Creek (AUID: IL_GST) has been identified as impaired for TSS for the in the 303(d) Program[35].

[35] Illinois Environmental Protection Agency. Illinois Integrated Water Quality Report and Section 303(d) List Volume I: Surface Water, 2016. (http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/index).

- Buffalo Creek (AUID: IL_GST)) has been identified for the following impairments, potential pollutant sources, and designated use classification in the 305(b) Program[36].
    - Potential Pollutant Causes: Chloride, Oxygen Dissolved, TSS, Fecal Coliform
    - Potential Pollutant Sources: Urban Runoff/Storm Sewers, Source Unknown
    - Designated Uses: Not Supporting Aquatic Life, Not Assessed Fish Consumption, Not Supporting Primary Contact, Not Assessed Secondary Contact, Not Assessed Aesthetic Quality

IEPA 2013 Stream Approved TMDL[37]

- Watershed: Des Plaines/ Higgens Creek
- Segment Name: Buffalo Creek
- Impairment: Ammonia, CBOD, Chloride, DO, Fecal Coliform
- Status: TMDL Approved, Approval Date: August 25, 2013

Buffalo Creek's biological integrity[38] has been determined to be relatively poor to non-existent for fish and macroinvertebrate diversity and establishment within Buffalo Creek. Buffalo Creek has been impacted by damming, redirection, channelization and urbanization. No upstream hydraulic connectivity exists for aquatic species within the Buffalo Creek stream corridor North of the Buffalo Creek reservoir (AUID: IL_SGC).

BMPs will benefit the long-term stability within the stream corridors. BMP recommendations will include thinning the vegetative canopy, stone armoring on stream channel slopes where appropriate, in stream stone riffles, stone stabilization of upstream tributaries, and incorporation of naturalized detention basins for offsite runoff into the natural drainage pathways.

5.2.2 Pond Shoreline Assessment

Introduction

The Lake County Stormwater Management Commission (SMC) conducted an on-the-ground assessment of the pond characteristics. Though not specifically assessed, the lake/pond assessment also recorded observed aquatic and aquatic life. The SWAAP-BC shoreline assessment inventoried approximately 4,338 ln. ft. of shoreline of the three retention ponds in September 2017.

Methods

Inventory methodology included walking the shoreline where accessible, noting shoreline conditions, and documenting hydraulic structures and discharge points if there are probable impacts to water quality. The major shoreline characteristics evaluated include:

- Conditions (degree of bank erosion, sediment accumulation, debris load)
- Hydraulic structures (bridges, culverts, dams and weirs)
- Discharge points (pipes, drain tiles, and stormsewers)

[36] Illinois Environmental Protection Agency. Illinois Integrated Water Quality Report and Section 303(d) List Volume I: Surface Water, 2016. (http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/index).

[37] United States Environmental Protection Agency. Clean Water Act Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs). (https://www.epa.gov/tmdl).

[38] Des Plaines River Watershed Workgroup's (DRWW). Bioassessment Report, In development.

- Corridor (floodplain, land use and cover)
- Aquatic habitat (substrate composition and lake cover)

The shoreline assessment was largely assessed using a qualitative method that involved visually inspecting and identifying whether the shoreline was impacting water quality.

5.2.2.1 Pond Water Quality

Lake Reports

The Lake County Health Department does not monitor the water quality of the retention ponds in the study area. No active water quality monitoring program exists for these retention ponds.

5.2.2.2 Pond Shoreline Assessments

A full shoreline erosion assessment was completed for Crossings Pond 1 (2.138 acres), Crossings Park Pond (2.38 acres), and the Bridgewater Farm Park Pond (0.579 acres). One hundred percent of the shorelines are eroding with the major shoreline type being turfgrass lawn. The shoreline was evaluated for none, slight, moderate and severe erosion based on exposed soil and tree/plant roots, failing infrastructure, undercut banks, and other signs of erosion. Based on the assessment 100% of the shoreline had moderate to severe erosion. There is no aquatic shoreline vegetation present in the water.

Current practices to improve water quality, includes mechanical and pesticide programs. The pesticide program of herbicides and algicides (control primarily of algae and invasive vegetation), which only serves as a temporary solution to improve water quality issues. The mechanical program maintains aerators in each of the retention ponds. BMPs that target permanent and long-term reductions in sediment and nutrient movement into Buffalo Creek will benefit the water quality within Buffalo Creek the most. Stabilizing pond shorelines would be the most effective BMP as well as stabilizing areas with moderate to severe shoreline erosion. Sections rated as severe in erosion will require a combination of structural and vegetative improvements. All retention ponds can support an increased footprint of native plant buffers above the waterline.

5.2.3 Upland Assessments

Upland assessments were conducted by a windshield survey of the adjoining community within the SWAAP-BC, in addition to aerial imagery interpretation and Google street view assessment of the study area.

Upland areas were assessed based on observation techniques presented in the Unified Subwatershed and Site Reconnaissance (USSR) Manual developed by CWP (2004) to identify potential pollution sources influencing water quality and to evaluate restoration project opportunities. The manual provides detailed guidance regarding survey techniques to help watershed groups, municipal staff, and consultants unfamiliar with identifying stormwater pollution sources. The manual also offers guidance to assess subwatershed restoration potential for source controls, pervious area management, and improved municipal maintenance such as education, retrofits, street sweeping, inlet cleaning, and open space management.

The following is a list of the potential actions that were considered during the assessment to address observed sources of stormwater pollution.

- Improved management of common areas
- Storm drain stenciling/marking program
- Tree planting
- Improved landscaping/native landscaping
- Stormwater management practice maintenance
- Stormwater retrofit opportunity

5.2.3.1 Neighborhood Source Assessment (NSA)

NSAs describe pollution source areas, stewardship behaviors, and restoration opportunities within individual neighborhoods. Each neighborhood has unique characteristics which determine the ability to implement restoration projects, source controls, and stewardship practices.

Methods

Potential stormwater pollutant sources are observed within the adjoining communities as pollutants can be introduced from yards and lawns, rooftops and downspouts, driveways and sidewalks, and common areas. Specific watershed protection and restoration practices can be recommended based on the results of the neighborhood assessment. Assessments can identify programs and projects that allows municipalities, homeowners, and other watershed stakeholders to identify resource allocation toward achieving the goals of the watershed-based plan.

Results and Discussion

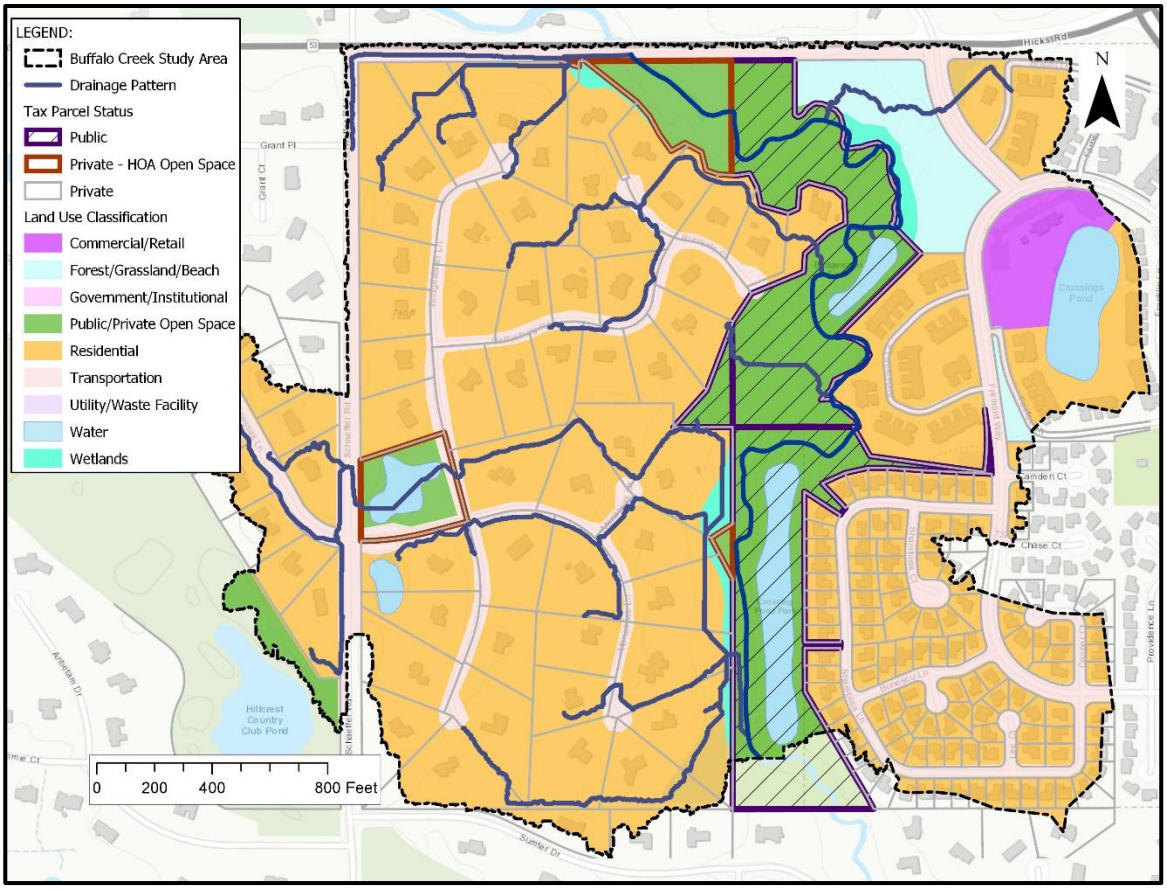
The community is predominately residential consisting of 62% of the SWAAP-BC (Table 10) with an average lot size of 5.08 acres.

Table 10: Buffalo Creek Study Area Land Use Data

Buffalo Creek Land Use Analysis[39]		
Land Use	**Acres**	**Percent of study area**
Commercial/Retail	3.09	1.92
Forest/Grassland/Beach	4.78	2.97
Public/Private Open Space	21.79	13.53
Residential-Single Family	100.23	62.24
Transportation	23.15	14.38
Water	5.96	4.10
Wetlands	2.05	2.13
Total	161.05	100

[39] Lake County GIS. Land Use GIS Data, 2010.

Figure 25: Buffalo Creek Land Use Assessment



Improved management of common areas

The Crossings Pond community (east of Buffalo Creek), is predominately a curb and gutter drainage system. The assessed areas had minimal trash, but the presence of sediment, and/or organic matter (leaves and grass clippings) were identified. Removal of this material is recommended as part of a street sweeping program. The curb and gutter drainage system can collect pollutants, nutrients and other materials from the surface of the street. Education should emphasize minimizing the introduction of grass clippings, turf fertilizer, trash, leaves, automotive liquids or other materials from the street surface to mitigate movement of these items into the retention ponds and creek. Excessive organic matter, sediment, and trash can clog streams and the storm drain system resulting in costly maintenance and stream health impairment. Also, the decay of an unbalanced amount of organic matter in a stream depletes the supply of dissolved oxygen, depriving other aquatic life including fish of their oxygen demand. Street sweeping and catch basin cleaning area essential to minimize the surface movement and collection of street pollutants into the waterways. Street sweeping helps remove trash, sediment and other organic matter such as leaves and grass clippings from the curb and gutter system and prevents them from entering the storm drains and nearby streams. Street sweeping also reduces sediment and other pollutant loads such as oil and metals to the stream system.

The Bridgewater Farm community (west of Buffalo Creek), is predominately right-of-way turf drainage swales. The assessed areas exhibited minimal trash, but the presence of organic matter

(leaves and grass clippings) was identified. Natural overland drainage systems carry less organic matter, sediment, and/or trash versus the direct discharge of runoff via a curb and gutter system as vegetation will filter runoff and/or breakdown organic matter before entering the creek. Excessive organic matter, sediment, and trash can clog streams and the storm drain system resulting in costly maintenance and stream health impairment. Overall education should promote the naturalization of the ditches with native vegetation to enhance the function of natural drainage system into Buffalo Creek.

Based on the visual assessment, most of the Bridgewater Farm landscapes consist of non-native shrubs and trees and expansive lawns of turf, and turf ditches. The condition of the turf during the assessment indicates active turf maintenance programs are in place based on key visual characteristics: fertilization (deep green hue to grass), irrigation (non-dormancy in drier months) and pesticide use (lack of undesirable turf grasses and flowers). The concern is that synthetic fertilizers and pesticides are easily transported through runoff and irrigation and may be entering the natural waterways. Additional educational outreach to stakeholders will include resources in Section 6, highlighting sustainable lawn management.

Storm Drain Marking

The road infrastructure in the SWAAP-BC consist of a mix of natural ditch drainage and modern curb and gutter systems with storm drain inlets that convey stormwater runoff quickly and directly to retention ponds and ultimately to Buffalo Creek. Existing inlets in the Crossings Pond community should be identified with markings or indicators to educate residents that any trash, lawn clippings (potential for nutrient pollution), or other debris accumulating along the curbs and gutters will be washed away during a storm event and end up in Buffalo Creek.

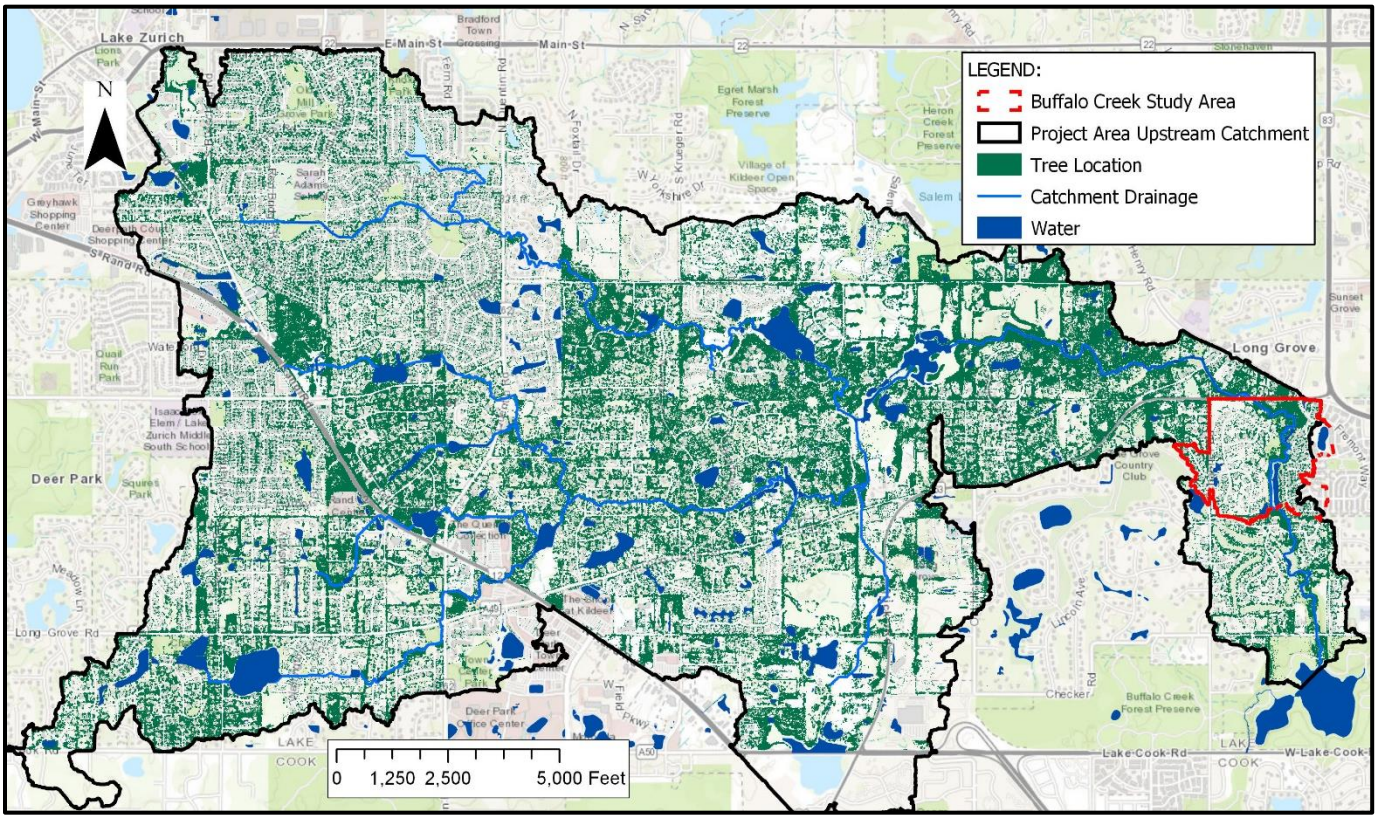
Street and Shade Trees

Street and shade trees are an aesthetic asset to the community, but also provide air and water quality improvements by intercepting precipitation with their leaves and absorbing precipitation and nutrients through their root systems. This slows runoff and can provide treatment of runoff before reaching Buffalo Creek or other waterbodies. Street trees are recommended for neighborhoods with a minimum of 6 feet of green space between the sidewalk and curb and less than 20% of these areas had trees planted (Figure 26). Approximately, 120 trees are needed in the SWAAP-BC, based on a spacing of one tree per 30 feet. A spacing of 30 feet presumes a mature tree canopy and the dripline as the extent of tree root system.

Tree canopy coverage tends to correlate with tree maturity. Figure 26 highlights the need for preservation of mature trees upstream of the SWAAP-BC. The quantity of trees within the upstream drainage area of Buffalo Creek outside of the SWAAP-BC appears sufficient; however, the canopy establishment upstream is limited due to the variable age of the tree population (1-30 years old) based on the age of the development impacts. Mature trees are an effective stormwater BMP tool, the uptake of stormwater for a mature tree (ex., 36-inch Bur oak will intercept 6,365 gallons of stormwater runoff per year) is more significant than a newly planted 3" caliper tree (ex., 3-inch Bur oak will intercept 95 gallons of stormwater runoff per year)[40].

[40] National Tree Benefit Calculator, (http://www.treebenefits.com/calculator/).

Figure 26: Buffalo Creek Tree Canopy Assessment



Improved landscaping/native landscaping

The vegetative inventory assessment in the SWAAP-BC concluded that little native vegetation exists outside of the vegetated stream buffers. The stream buffers have mature trees that are mix of native and non-native species, with an understory of invasive species. The residential landscape vegetation is predominately turf with non-native ornamental plant species existing as shrubs and flowers. Trees within the SWAAP-BC are a mix of native and non-native species. As mentioned in the pond assessment there is no shoreline or emergent plant habitat established in the ponds. Long term improvements will include thinning the canopy of the stream corridors and removing and replacing invasive and aggressive plant species to improve soil stability and converting turf depressions and/or detention basins with native plant species to improve water quality. Determining the types of fertilizer or turf maintenance in practice on each parcel was not completed as part of this report, but educational support will be offered to stakeholders to educate the community on reduced chemical inputs into lawn maintenance.

5.2.3.2 Impervious Area Assessment

Introduction

Assessing the locations and extent of impervious surface area in proximity to drainage patterns aided in identification and evaluation of potential BMP project locations for impervious pavement reduction, vegetation enhancement, or stormwater retrofitting.

Methods

Impervious cover assessments were conducted by a windshield survey of the adjoining community within the study area, in addition to aerial imagery interpretation, and GIS data analysis[41,42,43].

Project recommendations are determined by existing conditions at the sites and potential level of community support for BMP implementation. Parcel size, ownership, value of existing vegetation, neighbor proximity and adjacency considerations have been assessed to identify sites with good potential as a stormwater retrofit location were also noted during the assessment.

Results and Discussion

The SWAAP-BC study area of 161 acres has approximately 77% of available land in some form of imperviousness that impacts water quality and stormwater runoff volume and velocity. Impervious cover tends to be attributed to artificial structures such as buildings, roads, driveways, or parking lots. Impervious cover can also be attributed to open spaces and properties with compacted soils in the landscape or areas with limited vegetation establishment that do not support sufficient water infiltration. In the SWAAP-BC 11.76 acres are attributed to impervious street pavement and 211 building structures constitute 13.59 acres of impervious cover.

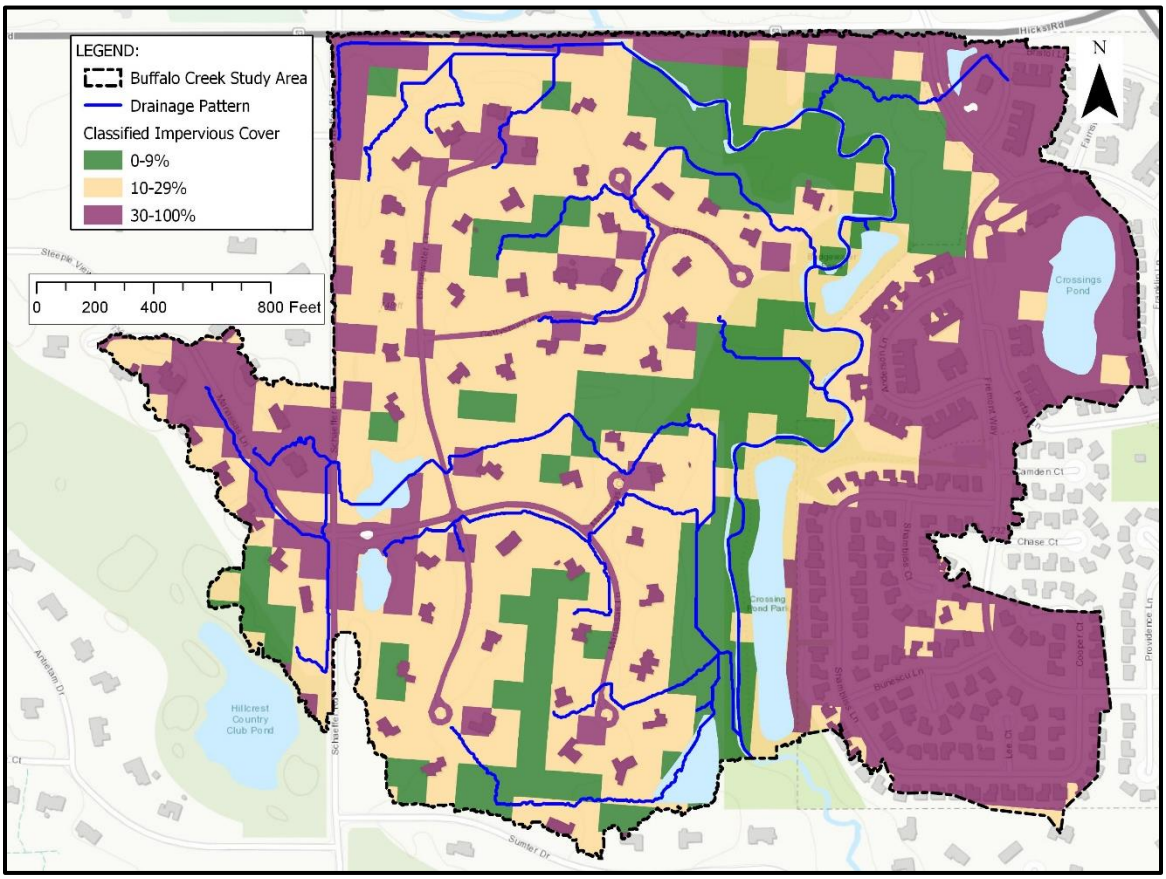
Table 11: Buffalo Creek Impervious Cover Data

ITEM	ACRES	% AREA
Low Impervious Cover, 0-9%	28.47	18%
Medium Impervious Cover, 10-29%	63.38	39%
High Impervious Cover, 30-100%	60.41	38%
Water	8.74	5%
Total	161	100%

The impervious cover assessment in combination with the drainage analysis assessment seeks to characterize parcels with the best opportunity to be retrofitted with BMPs for improved rain and runoff infiltration where paved surfaces are present. Potential opportunities for retrofitting existing land use with BMP projects have been identified in the conceptual designs for the SWAAP-BC. Specific recommendations include reductions in upland drainage directly to water bodies, reductions of impervious pavements, and redirection of runoff through naturalized basins or buffers before reaching receiving waters of a creek or lake. Ongoing programmatic education with communities and municipalities will continue to promote and highlight projects and opportunities for increased infiltration and absorption of runoff. Permeable pavement projects will continue to be a long-term education effort to ensure stakeholder support of the benefits and long-term cost benefits of permeable pavements. Currently off-road parking and parking lots are being proposed for retrofits from asphalt parking to a permeable pavement system. Recommendations will be for public properties such as park districts for parking lot retrofits but will be contingent on funding opportunities and ongoing education for support.

[41] National Land Cover Database (NLCD). Percent Developed Imperviousness Database, 2011. (https://www.mrlc.gov/nlcd2011.php).
[42] Lake County GIS. Planimetric GIS data: Buildings, Edge of Pavement, and Parking Lots.
[43] Lake County SMC. Des Plaines River Watershed-Based Plan- impervious cover assessment data, 2018.

Figure 27: Buffalo Creek Percent Impervious Cover Assessment



5.2.4 Stormwater Retrofit Inventory

Introduction

Stormwater retrofits are a valuable tool to improve water quality in areas where the natural soil, vegetation or drainage has been altered and/or impacted. Stormwater retrofit opportunities included treating runoff from parking lots, inlet retrofits, and conversion/inspection of existing stormwater management detention and retention facilities. Retrofit locations will seek to ensure sufficient pervious area is available to treat a portion of stormwater runoff from impervious surfaces. Retrofit opportunities promote infiltration or filtration of stormwater runoff with BMPs. BMPs such as infiltration trenches, naturalized basins, or bio-retention solutions incorporate native vegetation and filter media through which stormwater passes. This reduces the volume and velocity of water, pollutants, and water temperature of the runoff prior to groundwater recharge or entering the stream/lake system.

Methods

Stormwater retrofit opportunities are effective in areas of medium and high impervious cover. Areas of high and medium impervious cover (30-100%) are presumed to have been altered from their natural state to include some form of development. The development thereby reduces the available green space to a range of 0-70% of land cover while also impacting and potentially impeding natural drainage pathways. Field investigations were conducted by a

windshield survey of the adjoining community within the study area, in addition to aerial imagery interpretation, and GIS data analysis[44,45,46]. The feasibility of implementing a stormwater retrofit project at each site was evaluated by investigating drainage patterns, drainage boundaries, impervious cover, available space, and other site constraints (e.g., conflicts with existing utilities and land uses, site access and potential impacts to natural areas). As discussed in section 5.2.3.2, impervious cover can also be attributed to open spaces and properties with compacted soils in the landscape or areas with limited vegetation establishment that do not support sufficient water infiltration. Project recommendations are determined by existing conditions at the sites and potential level of community support for BMP implementation and maintenance. Parcel size, ownership, value of existing vegetation, neighbor proximity and adjacency considerations have been assessed to identify sites with good potential as a stormwater retrofit location were also noted during the assessment.

Results and Discussion

Many viable stormwater retrofit opportunities existing in the SWAAP-BC, but the immediate project recommendations seek immediate benefits for water quality improvement. Key project recommendations seek to rehabilitate, enhance and/or naturalize existing stormwater management detention and retention facilities to increase infiltration, filtration and pollutant reduction of overland runoff through identified drainage pathways. Additional project recommendations seek to convert open turf patches into mixed use vegetative landscapes for passive recreational use.

5.3 Buffalo Creek Study Area Small Watershed Assessment Summary

In sections 5.1 and 5.2, results of the desktop and field assessments indicate that the natural habitat of the SWAAP-BC has been impacted significantly by land use and land function. The impact of development has contributed to increased volume and velocity of runoff via roofs, roads, and stormwater pipes based on the assessed erosion issues in the field and validated via GIS analyses. The available open space needed for runoff to infiltrate or be filtered has been severely impacted by current land uses and has increased the sediment and pollutant load of Buffalo Creek. Water chemistry issues observed in Buffalo Creek will continue to be observed until appropriate programmatic and field actions are pursued to mitigate and reduce the impacts of upstream runoff into Buffalo Creek.

Water quality impacts include the following:

- Nonpoint water quality impacts from urbanization, runoff volumes and velocity contribute and increase soil erosion, turbidity, nutrient introduction, and upland habitat loss to Buffalo Creek.
- Aquatic life is inconsistent due to the lack of upstream stream continuity, channelization, and elevated/perched stormsewer structures under bridge decks or roadways.
- Streambank stability and streambank function are a foreseeable concern until appropriate stabilization practices are completed.

[44] National Land Cover Database (NLCD). Percent developed imperviousness database, 2011.
[45] Lake County GIS. Planimetric GIS data: Buildings, Edge of Pavement, and Parking Lots.
[46] Lake County SMC, Des Plaines River Watershed-Based Plan- impervious cover assessment data, 2018.

Programmatic and field project recommendations for stakeholders to incorporate in their community will include:

- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Downspout disconnect information for riparian land owners and upland land owners.
    - Rain water harvesting opportunities.
    - Retrofitting of natural depression or drainage paths with rain gardens or bio-swales.
    - Native vegetation inclusion/incorporation with landscaped areas.
    - Tree preservation/tree planting for stormwater runoff reductions.
- Stormwater runoff education
    - Storm drain stenciling/marking.
    - Street Cleaning.
    - Permeable pavement surfaces.
    - Reduced vegetative debris storing on slopes or drainage paths.
    - Proper trash disposal or use of hazardous household collection or recycling facilities for disposal.

6. Inventory of Watershed Restoration Opportunities in Buffalo Creek Study Area

6.1 Stream & Stream Corridor Restoration Opportunities in Buffalo Creek Study Area

Stream and stream corridor restoration practices have been selected to enhance the appearance, stability, and function of the stream corridors. Applicable practices range from vegetative bank stabilization and localized grade control, to comprehensive restoration projects, such as full channel redesign and re-alignment. Stream and stream corridor restoration practices are often combined with stormwater retrofits and upland restoration programs and practices to meet subwatershed restoration objectives. Based on the results of the stream assessment, recommendations will include examples of: stream restoration, streambank/shoreline stabilization, vegetative buffer enhancement, and stream cleanups.

6.1.2 Potential Stream & Stream Corridor Restoration Programs

This section of the plan will provide a summary of the program-type opportunities (i.e., non-site specific or watershed-wide opportunities) identified during the field assessment work or developed to address issues identified during the field assessment work. Individual program opportunities may be further developed through the identification of the next steps toward program implementation.

In following are identified stakeholder support and outreach program recommendations to continue ongoing awareness, education, or housekeeping activities. SMC offers an array of educational stormwater best practice resources for the Lake County Community (https://lakecountyil.gov/2261/Stormwater-Best-Practices).

- Stakeholders to offer native vegetation management reference resources.
- Stakeholders to offer invasive species identification reference resources (terrestrial, aquatic, plants, animals, insects).
- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Downspout disconnect information for riparian land owners and upland land owners.
    - Rain water harvesting opportunities.
    - Top of streambank buffer enhancement, maintenance, or preservation.
- Stream clean-up includes removing trash, tires and other debris from waterways.
- Stormwater runoff education
    - Eliminate the storage of vegetative debris on slopes or in drainage paths (i.e. grass clippings, wood piles).
    - Removal of instream vegetative debris obstructions.
    - Proper trash disposal or use of hazardous household collection or recycling facilities for disposal.

6.1.3 Potential Stream & Stream Corridor Restoration Projects

This section of the plan will provide a summary of the project-type opportunities (i.e., site- or reach-specific opportunities) identified during the field assessment work or developed to address issues identified during the field assessment work. Individual projects for which preliminary concept designs were not developed may be further developed through the identification of the next steps toward project implementation.

Table 12: Buffalo Creek Vegetation Management Projects

Vegetation Management[47]										
PROJECT ID	**PROJECT DESCRIPTION**	**ACRES**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCVM01	Primary vegetation management: clearing of invasive/aggressive woody species diameter at breast height (DBH) <6" and stump treatment herbicides. Clearing of select trees >6" DBH. Salvaging intact trees and root systems for root revetments. Follow up spot herbiciding of grass/forbs.	6.34	$27,000.00	$171,180.00	Bridgewater Farms HOA, Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCVM02	Secondary vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive and/or aggressive trees. Follow up spot herbiciding of grass/forbs.	1.73	$20,000.00	$34,600.00	Long Grove Park District	Medium	N/A	N/A	N/A	N/A

[47] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

BCVM03	Secondary vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive and/or aggressive trees. Follow up spot herbiciding of grass/forbs.	1.16	$20,000.00	$23,200.00	Long Grove Park District	Medium	N/A	N/A	N/A	N/A
BCVM04	Secondary vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	2.72	$20,000.00	$54,400.00	Village of Long Grove, Buffalo Grove Park District	Medium	N/A	N/A	N/A	N/A
BCVM05	Secondary vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	0.47	$20,000.00	$9,400.00	Buffalo Grove Park District	Medium	N/A	N/A	N/A	N/A
BCVM06	Secondary vegetation management: clearing of invasive/aggressive woody species DBH <6" and stump treatment herbicides. Clearing of invasive/aggressive trees. Follow up spot herbiciding of grass/forbs.	1.01	$20,000.00	$20,200.00	Buffalo Grove Park District	Medium	N/A	N/A	N/A	N/A

Table 13: Buffalo Creek Gabion Basket Streambank Stabilization Projects

Gabion Basket Streambank Stabilization[48]										
PROJECT ID	**PROJECT DESCRIPTION**	**FACE FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCGW01	Proposed stabilization of highly eroded left streambank with gabion basket wall.	2250.00	$40.00	$90,000.00	Private Property, Buffalo Grove Park District	High	4.13	1.59	8.26	2.24

Table 14: Buffalo Creek Streambank Stone Toe & Tree Root Revetment Projects

Streambank Stone Toe & Tree Root Revetments[49]										
PROJECT ID	**PROJECT DESCRIPTION**	**LN FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCTRR01	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	183.00	$300.00	$54,900.00	Long Grove Park District	High	2.35	0.91	4.70	1.28
BCTRR02	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	194.00	$300.00	$58,200.00	Private Property, Long Grove Park District	High	2.49	0.96	4.98	1.35

[48] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions
[49] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

BCTRR03	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	179.00	$300.00	$53,700.00	Long Grove Park District	High	2.30	0.89	4.60	1.25
BCTRR04	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	156.00	$200.00	$31,200.00	Buffalo Grove Park District	High	2.00	0.77	4.01	1.09

Table 15: Buffalo Creek Streambank Stone Toe Stabilization - Left Bank Projects

Stone Toe Stabilization - Left Bank[50]										
PROJECT ID	**PROJECT DESCRIPTION**	**LN FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCSSLT01	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	35.00	$150.00	$5,250.00	Bridgewater Farms HOA	Low	0.34	0.13	0.69	0.19
BCSSLT02	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	48.00	$150.00	$7,200.00	Bridgewater Farms HOA	Low	0.47	0.18	0.94	0.26
BCSSLT03	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	59.00	$300.00	$17,700.00	Bridgewater Farms HOA, Long Grove Park District	High	0.58	0.22	1.16	0.32

[50] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

BCSSLT04	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	117.00	$200.00	$23,400.00	Long Grove Park District	Medium	1.15	0.44	2.30	0.63
BCSSLT05	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	71.00	$200.00	$14,200.00	Long Grove Park District	Medium	0.70	0.27	1.40	0.38
BCSSLT06	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	40.00	$300.00	$12,000.00	Private Property, Long Grove Park District	High	0.39	0.15	0.79	0.21
BCSSLT07	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	169.00	$200.00	$33,800.00	Long Grove Park District	Medium	1.66	0.64	3.33	0.90
BCSSLT08	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	124.00	$300.00	$37,200.00	Private Property	High	1.22	0.47	2.44	0.66
BCSSLT09	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	34.00	$200.00	$6,800.00	Long Grove Park District	Medium	0.33	0.13	0.67	0.18
BCSSLT10	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	32.00	$300.00	$9,600.00	Long Grove Park District	High	0.31	0.12	0.63	0.17
BCSSLT11	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	38.00	$150.00	$5,700.00	Long Grove Park District	Low	0.37	0.14	0.75	0.20

BCSSLT12	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	37.00	$300.00	$11,100.00	Private Property, Long Grove Park District	High	0.36	0.14	0.73	0.20
BCSSLT13	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	18.00	$200.00	$3,600.00	Private Property	Medium	0.18	0.07	0.35	0.10
BCSSLT14	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	41.00	$150.00	$6,150.00	Private Property	Low	0.40	0.16	0.81	0.22
BCSSLT15	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	59.00	$300.00	$17,700.00	Buffalo Grove Park District	High	0.58	0.22	1.16	0.32
BCSSLT16	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	68.00	$200.00	$13,600.00	Buffalo Grove Park District	Medium	0.67	0.26	1.34	0.36
BCSSLT17	Identified section of left streambank requiring stone toe stabilization to minimize bank loss.	365.00	$300.00	$109,500.00	Buffalo Grove Park District	High	3.59	1.38	7.18	1.95

Table 16: Buffalo Creek Streambank Stone Toe Stabilization - Right Bank Projects

Streambank Stone Toe Stabilization - Right Bank[51]										
PROJECT ID	**PROJECT DESCRIPTION**	**LN FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCSSRT01	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	39.00	$300.00	$11,700.00	Bridgewater Farms HOA	High	0.42	0.16	0.84	0.23

[51] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

BCSSRT02	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	45.00	$150.00	$6,750.00	Bridgewater Farms HOA	Low	0.49	0.19	0.97	0.26
BCSSRT03	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	36.00	$200.00	$7,200.00	Bridgewater Farms HOA, Long Grove Park District	Medium	0.39	0.15	0.78	0.21
BCSSRT04	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	22.00	$200.00	$4,400.00	Long Grove Park District	Medium	0.24	0.09	0.48	0.13
BCSSRT05	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	50.00	$150.00	$7,500.00	Long Grove Park District	Low	0.54	0.21	1.08	0.29
BCSSRT06	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	242.00	$300.00	$72,600.00	Private Property, Long Grove Park District	High	2.62	1.01	5.23	1.42
BCSSRT07	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	242.00	$300.00	$72,600.00	Private Property, Long Grove Park District	High	2.62	1.01	5.23	1.42
BCSSRT08	Proposed streambank stabilization with onsite tree trunk and root systems removed as part of the canopy thinning and vegetation management program.	163.00	$200.00	$32,600.00	Long Grove Park District	Medium	1.77	0.68	3.52	0.95
BCSSRT09	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	95.00	$300.00	$28,500.00	Long Grove Park District	High	1.03	0.40	2.05	0.56
BCSSRT10	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	17.00	$150.00	$2,550.00	Long Grove Park District	Low	0.18	0.07	0.37	0.10

BCSSRT11	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	40.00	$150.00	$6,000.00	Private Property, Long Grove Park District	Low	0.43	0.17	0.86	0.23
BCSSRT12	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	36.00	$200.00	$7,200.00	Private Property, Long Grove Park District	Medium	0.39	0.15	0.78	0.21
BCSSRT13	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	28.00	$150.00	$4,200.00	Buffalo Grove Park District	Low	0.30	0.12	0.61	0.16
BCSSRT14	Identified section of right streambank requiring stone toe stabilization to minimize bank loss.	448.00	$300.00	$134,400.00	Buffalo Grove Park District	High	4.86	1.88	9.69	2.62

Table 17: Buffalo Creek Proposed In-stream Stabilization Projects

Proposed In-stream Stabilization[52]										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCSR01	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	821.12	$33.00	$27,096.96	IL DOT, Bridgewater Farms HOA	High	N/A	N/A	N/A	N/A
BCSR02	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	450.42	$33.00	$14,863.86	Bridgewater Farms HOA	High	N/A	N/A	N/A	N/A
BCSR03	In stream riffle to filter out sediment and nutrients, dissipate stream energy and	597.49	$33.00	$19,717.17	Long Grove Park District	High	N/A	N/A	N/A	N/A

[52] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

	improve dissolved oxygen levels.									
BCSR04	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	417.38	$33.00	$13,773.54	Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR05	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	433.87	$33.00	$14,317.71	Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR06	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	437.58	$33.00	$14,440.14	Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR07	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	511.65	$33.00	$16,884.45	Private Property	High	N/A	N/A	N/A	N/A
BCSR08	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	405.47	$33.00	$13,380.51	Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR09	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	328.28	$33.00	$10,833.24	Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR10	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	463.93	$33.00	$15,309.69	Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR11	In stream riffle to filter out sediment and nutrients, dissipate stream energy and	454.73	$33.00	$15,006.09	Long Grove Park District	High	N/A	N/A	N/A	N/A

	improve dissolved oxygen levels.									
BCSR12	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	521.62	$33.00	$17,213.46	Private Property	High	N/A	N/A	N/A	N/A
BCSR13	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	383.85	$33.00	$12,667.05	Private Property	High	N/A	N/A	N/A	N/A
BCSR14	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	476.89	$33.00	$15,737.37	Private Property, Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR15	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	476.35	$33.00	$15,719.55	Private Property, Long Grove Park District	High	N/A	N/A	N/A	N/A
BCSR16	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	449.39	$33.00	$14,829.87	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCSR17	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	529.98	$33.00	$17,489.34	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCSR18	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	468.96	$33.00	$15,475.68	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCSR19	In stream riffle to filter out sediment and nutrients, dissipate stream energy and	479.34	$33.00	$15,818.22	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A

	improve dissolved oxygen levels.									
BCSR20	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	294.53	$33.00	$9,719.49	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCSR21	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	298.09	$33.00	$9,836.97	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCSR22	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	304.65	$33.00	$10,053.45	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A
BCSR23	In stream riffle to filter out sediment and nutrients, dissipate stream energy and improve dissolved oxygen levels.	332.23	$33.00	$10,963.59	Buffalo Grove Park District	High	N/A	N/A	N/A	N/A

General Notes:

1. The Probable Cost Estimates do not include field surveys, permitting costs and engineering services if needed.
2. Cost will vary pending the phasing and scope of work implemented. Probable additional cost dependent on project owner, consultant, contracting team: Permitting/Engineering +30%, Mobilization +10%, Maintenance/Restoration +5%.
3. Pending the project/s and prior to finalizing a scope of work a professional field survey may be needed.
4. Pending the scope of project/s being implemented, soliciting a permit from the municipality, county, state and/or federal government of jurisdiction may be needed.
5. The probable cost does not include costs for bidding services, mobilization, or temporary construction access costs if needed.
6. The probable cost does make an estimated cost based on the presumed material and labor to implement a project.
7. Pending the funding sources and the requirements of the funding sources, permanent drainage and/or conservation easements may be needed if they do not currently exist to implement public funds on private land holdings. Costs for implementing easements are not addressed in the probable cost.

6.2 Pond & Pond Shoreline Restoration Opportunities in Buffalo Creek Study Area

This section of the plan will provide an overview of pond and pond shoreline restoration practices and programs recommended for pond and pond shoreline restoration opportunities identified during the field assessment work or developed to address issues identified during the field assessment work. It will include conceptual designs, complete with planning level cost-estimates and preliminary pollutant load reduction estimates for the potential restoration opportunities.

6.2.1 Potential Pond & Pond Shoreline Restoration Programs

This section of the plan will provide a summary of the project-type opportunities (i.e., site-specific opportunities) identified during the field assessment work developed, to address issues identified during the field assessment work. Individual program opportunities may be further developed through the identification of the next steps toward program implementation.

In following are identified stakeholder support and outreach program recommendations to continue ongoing awareness, education, or housekeeping activities. SMC offers an array of educational stormwater best practice resources for the Lake County Community (https://lakecountyil.gov/2261/Stormwater-Best-Practices).

- Stakeholders to offer native vegetation management reference resources.
- Stakeholders to offer invasive species identification reference resources (terrestrial, aquatic, plants, animals, insects).
- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Rain water harvesting opportunities.
    - Shoreline buffer enhancement, maintenance, or preservation.
    - Cleaning of boats or other aquatic recreation items to minimize the transfer of invasive species.
- Stormwater runoff education
    - Eliminate the long-term or temporary storage of vegetative debris in streets, catch basins, or in drainage paths.
    - Proper trash disposal or use of SWALCO hazardous household collection or recycling facilities for disposal.

6.2.2 Potential Pond & Pond Shoreline Restoration Projects

This section of the plan will provide a summary of the project-type opportunities (i.e., site- or reach-specific opportunities) – including stormwater retrofits – identified during the field assessment work or developed to address issues identified during the field assessment work. Individual projects for which preliminary concept designs were not developed may be further developed through the identification of the next steps toward project implementation.

Table 18: Buffalo Creek Pond Shoreline Stabilization Projects

Pond Shoreline Stabilization[53]										
PROJECT ID	**PROJECT DESCRIPTION**	**LN FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCPS01	Stabilize the shoreline of the retention ponds with stone, soil lifts and native vegetation.	849.33	$50.00	$42,466.50	Long Grove Park District	High	1.56	0.60	3.12	0.85
BCPS02	Stabilize the shoreline of the retention ponds with stone, soil lifts and native vegetation.	1375.47	$50.00	$68,773.50	The Crossings Condo Assoc.	High	2.52	0.97	5.05	1.37
BCPS03	Stabilize the shoreline of the retention ponds with stone, soil lifts and native vegetation.	736.26	$50.00	$36,813.00	Buffalo Grove Park District	High	1.35	0.52	2.70	0.73

General Notes:

1. The Probable Cost Estimates do not include field surveys, permitting costs and engineering services if needed.
2. Cost will vary pending the phasing and scope of work implemented. Probable additional cost dependent on project owner, consultant, contracting team: Permitting/Engineering +30%, Mobilization +10%, Maintenance/Restoration +5%.
3. Pending the project/s and prior to finalizing a scope of work a professional field survey may be needed.
4. Pending the scope of project/s being implemented, soliciting a permit from the municipality, county, state and/or federal government of jurisdiction may be needed.
5. The probable cost does not include costs for bidding services, mobilization, or temporary construction access costs if needed.
6. The probable cost does make an estimated cost based on the presumed material and labor to implement a project.
7. Pending the funding sources and the requirements of the funding sources, permanent drainage and/or conservation easements may be needed if they do not currently exist to implement public funds on private land holdings. Costs for implementing easements are not addressed in the probable cost.

6.3 Upland Area Restoration Opportunities in Buffalo Creek Study Area

This section of the plan will provide an overview of upland restoration practices and will present the upland restoration opportunities identified during the field assessment work or developed to address issues identified during the field assessment work. It will include – as applicable – tables and maps, complete with planning level cost-estimates and preliminary pollutant load reduction estimates for the potential restoration opportunities.

[53] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

6.3.1 Potential Upland Area Restoration Programs

This section of the plan will provide a summary of the project-type opportunities (i.e., site-specific opportunities) identified during the field assessment work or developed to address issues identified during the field assessment work. Individual program opportunities may be further developed through the identification of the next steps toward program implementation.

In following are identified stakeholder support and outreach program recommendations to continue ongoing awareness, education, or housekeeping activities.

- Native vegetation management references.
- Invasive species identification references.
- Pesticide awareness on property management.
- Fertilizer awareness on property management.
- Site specific water infiltration/reuse awareness
    - Rain water harvesting opportunities.
    - Shoreline buffer enhancement, maintenance, or preservation.
    - Naturalization of turfed drainage ditches with low-profile native plants.
    - Tree Planting installation program in right of ways and private property where suitable.
- Stormwater runoff education
    - Eliminate vegetative debris storage in street, catch basins, or in drainage paths.
    - Proper trash disposal or use of hazardous household collection or recycling facilities for disposal.
    - Proper siting of housekeeping activities (i.e. pool cleaning, car washes, equipment storage as examples).
    - Storm drain stenciling/marking program for all inlets.

6.3.2 Potential Upland Area Restoration Projects

This section of the plan will provide a summary of the project opportunities, including stormwater retrofits – identified during the field assessment work to address identified issues. Individual projects for which preliminary concept designs were not developed may be further developed through the identification of the next steps toward project implementation.

Table 19: Buffalo Creek Buffer Enhancement/Restoration Projects

Buffer Enhancement/Restoration[54]										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCPR01	Buffer enhancement of retention ponds with native low-profile grass/forb vegetation.	8092.17	$1.00	$8,092.17	Long Grove Park District	High	0.14	0.03	0.85	0.01
BCPR02	Buffer enhancement of retention ponds with native low-profile grass/forb vegetation.	11211.53	$1.00	$11,211.53	Buffalo Grove Park District	Medium	0.20	0.04	1.18	0.01
BCPR03	Conversion of turfgrass field with native low-profile grass/forb vegetation.	49562.24	$0.75	$37,171.68	Long Grove Park District	High	0.86	0.16	5.23	0.04

Table 20: Buffalo Creek Outfall Repair Projects

Outfall Repair[55]										
PROJECT ID	**PROJECT DESCRIPTION**	**UNIT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCOR01	Currently overflow pipe connects pond with creek. Both end of overflow pipe should be stabilized to minimize sediment into the water.	1.00	$10,000.00	$10,000.00	Long Grove Park District	Medium	N/A	N/A	N/A	N/A
BCOR02	Currently creek side invert of overflow pipe sits ~2' above N.W.L. Pipe should be stabilized with stone at streambank. Outfall invert should be	1.00	$5,000.00	$5,000.00	Buffalo Grove Park District	Medium	N/A	N/A	N/A	N/A

[54] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions
[55] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

	reconfigured for downstream flow direction.									

Table 21: Buffalo Creek Bioretention BMP Projects

Bioretention BMP[56]										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCBR01	Proposed conversion of drainage swales into a vegetated bioswale with stone stabilization and native vegetation.	3459.00	$4.00	$13,836.00	Private Property	Medium	0.20	0.03	0.00	0.00
BCBR02	Proposed conversion of drainage swales into a vegetated bioswale with stone stabilization and native vegetation.	6525.00	$4.00	$26,100.00	Private Property	Medium	0.37	0.05	0.00	0.01

Table 22: Buffalo Creek Natural Drainage Stabilization Projects

Natural Drainage Stabilization[57]										
PROJECT ID	**PROJECT DESCRIPTION**	**CU YD**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCDS01	Stabilize drainage path inlet into Buffalo Creek with stone.	172.00	$122.00	$20,984.00	Private Property, Bridgewater Farms HOA	High	0.14	0.02	0.00	0.00
BCDS02	Proposed rock check berm to stabilize drainage	155.00	$122.00	$18,910.00	Long Grove Park District	Medium	0.12	0.02	0.00	0.00

[56] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions
[57] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions

	path inlet into Buffalo Creek.									
BCDS03	Stabilize drainage path inlet into Buffalo Creek with stone.	223.00	$122.00	$27,206.00	Long Grove Park District, Buffalo Grove Park District	High	0.18	0.02	0.00	0.00
BCDS04	Stabilize drainage path inlet into Buffalo Creek with stone.	87.00	$122.00	$10,614.00	Private Property, Buffalo Grove Park District	High	0.07	0.01	0.00	0.00
BCDS05	Stabilize drainage path inlet into Buffalo Creek with stone.	24.00	$122.00	$2,928.00	Long Grove Park District	Medium	0.02	0.00	0.00	0.00
BCDS06	Stabilize drainage path inlet into Buffalo Creek with stone.	62.00	$122.00	$7,564.00	Bridgewater Farms HOA	Medium	0.05	0.01	0.00	0.00
BCDS07	Stabilize drainage path inlet into Buffalo Creek with stone.	1.00	$122.00	$122.00	<Null>	Low	0.00	0.00	0.00	0.00

Table 23: Buffalo Creek Proposed Permeable Pavement Projects

Proposed Permeable Pavement[58]										
PROJECT ID	**PROJECT DESCRIPTION**	**SQ FT**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCPP01	Replace existing impervious parking lot with a permeable pavement parking lot. The current parking lot condition is poor.	6365.00	$12.00	$76,380.00	Private Property, Buffalo Grove Park District	Medium	0.57	0.07	0.00	0.01

[58] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions.

Table 24: Buffalo Creek Proposed Flood Storage Area Projects

Proposed Flood Storage Areas[59]										
PROJECT ID	**PROJECT DESCRIPTION**	**ACRE**	**UNIT COST**	**TOTAL COST**	**PROJECT LOCATION**	**PROJECT PRIORITY**	**N Reduction (lb./year)**	**P Reduction (lb./year)**	**BOD Reduction (lb./year)**	**Sediment Reduction (ton/year)**
BCFS02	Proposed flood reduction location for creek high water events with wetland and upland habitat and to infiltrate residential stormwater runoff.	1.06	$60,000.00	$63,897.23	Long Grove Park District	Low	0.52	0.52	0.52	0.52
BCFS01	Proposed flood reduction location for creek high water events with wetland and upland habitat. Portions of this project require land acquisition.	5.11	$60,000.00	$306,395.30	Private Property, Long Grove Park District	Low	2.50	2.50	2.50	2.50
BCFS01	The flood storage area encompasses public and private ownership. The land is currently undeveloped and land acquisition of the privately held land would be needed to develop the flood storage area.	5.23	$191,204.59	$1,000,000.00	Private Property	Low	2.55	2.55	2.55	2.55

General Notes:

1. The Probable Cost Estimates do not include field surveys, permitting costs and engineering services if needed.
2. Cost will vary pending the phasing and scope of work implemented. Probable additional cost dependent on project owner, consultant, contracting team: Permitting/Engineering +30%, Disposal +10%, Mobilization +10%, Maintenance/Restoration +5%.
3. Pending the project/s and prior to finalizing a scope of work a professional field survey may be needed.
4. Pending the scope of project/s being implemented, soliciting a permit from the municipality, county, state and/or federal government of jurisdiction may be needed.
5. The probable cost does not include costs for bidding services, mobilization, or temporary construction access costs if needed.
6. The probable cost does make an estimated cost based on the presumed material and labor to implement a project.
7. Pending the funding sources and the requirements of the funding sources, permanent drainage and/or conservation easements may be needed if they do not currently exist to implement public funds on private land holdings. Costs for implementing easements are not addressed in the probable cost.

[59] Spreadsheet Tool for Estimating Pollutant Load – STEPL, Preliminary Pollutant Load Reductions.

7. Buffalo Creek Study Area Small Watershed Action Plan – Implementation Strategy

The watershed restoration opportunities and goals recommended in this plan are based on the results of the desktop & field assessment work. The intent of this report is to empower stakeholder support in maintaining an implementation strategy for watershed restoration programs and projects in the small watershed study area. The SWAAP-BC report focused on high priority practices – where prioritization is based on evaluation and prioritization criteria goals.

Although there are a significant number of stormwater-related issues found within the SWAAP-BC area, promising opportunities exist to address these issues through a sustainable approach to stormwater management. As reflected in the summary of potential solutions and recommendations presented in Section 6.0, Inventory of Watershed Restoration Opportunities in Buffalo Creek Study Area, stormwater-related damage to structures and infrastructure can be reduced and stormwater-related maintenance problems can be fixed through the implementation of projects that achieve the community's stormwater management goals.

In addition to the technical information presented in both Section 5 and 6 and Appendix B regarding the actions and/or projects that could be used to address each of the problem areas found within the community, SMC staff has developed additional information to assist the SWAAP-BC stakeholders in budgeting for, funding, and implementing projects that will resolve the community's stormwater-related issues. This information is presented below.

Preliminary Cost Estimates

SMC staff has developed a preliminary cost estimate for each of the potential solutions and recommendations presented in Section 6. The preliminary cost estimates provide SWAAP-BC stakeholders a budget target. Stakeholders can use the detailed information to solicit and/or secure funding to implement projects that will resolve the community's stormwater-related issues. It should be noted that the preliminary cost estimates provided in Section 6 tables are based on the potential solutions and recommendations presented in the preliminary concept designs presented in Appendix B.

Such solutions, recommendations, and preliminary concept designs were developed based on a preliminary assessment of site conditions and preliminary engineering analyses performed in accordance with acceptable engineering practices. They are provided for planning purposes only. Actual construction costs may vary depending on the results of additional engineering analyses, further assessment of site conditions, timing of construction, availability of materials, construction methods, and other related factors.

Phased Implementation

SMC staff recognizes that the implementation of the potential solutions and recommendations presented in Section 6 will be limited by the amount of funding available. For that reason, the SWAAP-BC stakeholders should take a phased, multi-year approach to resolving the stormwater-related issues found within the community. Each table in section 6, ranks the

community's stormwater-related. This may be used by the SWAAP-BC stakeholders to prioritize future actions to addressing the community's stormwater-related issues (i.e., project selection, funding, and implementation).

Additionally, it should be noted that each of the detailed preliminary concept designs presented in Appendix B includes several individual elements that, when implemented as part of a single, comprehensive project, are expected to fully resolve the stormwater-related issue found within the associated problem area. SMC staff recognizes that the implementation of the individual preliminary concept designs may be limited by the amount of funding available and that, for this reason, the individual elements described in the preliminary concept designs may not be implemented as part of single, comprehensive projects. For this reason, the SWAAP-BC stakeholders may take a phased approach to implementation of the individual preliminary concept designs, selecting the individual elements that will address the community's most immediate and pressing needs for early implementation and delaying implementation of the remainder of the individual elements until additional funding has been compiled

Potential Funding Sources

Several grants may be available to assist the SWAAP-BC stakeholders with the implementation of projects that follow this plan's guiding principle and achieve the community's comprehensive stormwater management goals. Some potential funding sources are outlined below.

- SMC Watershed Management Board Grant Program: SMC's Watershed Management Board grant program helps fund the planning, design, and implementation of stormwater management projects. Nine project prioritization criteria are considered by SMC staff in the evaluation of grant applications, with the highest priority placed on flood damage prevention/mitigation projects. However, water quality improvement, natural resource preservation and restoration, and green infrastructure projects are also considered. There is a 50% local match requirement, which can be in the form of cash, in-kind services, or both. Applications for Watershed Management Board grant funds are accepted on an annual basis, typically in early October, and approximately $67,620/year of grant funding is typically awarded to projects located in the Des Plaines River Watershed through the program. More information about SMC's Watershed Management Board grant program can be found online: https://lakecountyil.gov/3635/Watershed-Management-Board-WMB.
- Illinois EPA Section 319(h) Grant Program: The Illinois EPA makes grants available to local units of government and other organizations for projects that address nonpoint source pollution through its Section 319(h) grant program. Projects funded under the Section 319(h) grant program must address water quality issues relating directly to nonpoint source pollution. Grant funds can be used for the implementation of Illinois EPA-approved watershed-based plans, including the development of information/education programs and the implementation of best management practices. Illinois EPA receives these grant funds through Section 319(h) of the Clean Water Act and administers the program within Illinois. The maximum federal funding available is 60%, meaning that there is a minimum 40% local match requirement. Applications for Section 319(h) grant funds are accepted on an annual basis, between June 1 and August 1, and between $3,000,000/year and $4,000,000/year have been awarded to projects

around the state through the program in recent years. More information about Illinois EPA's Section 319(h) grant program can be found online: http://www.epa.illinois.gov/topics/water-quality/watershed-management/nonpoint-sources/faqs/index.

Potential Project Partners

Generally, the stormwater stormsewer infrastructure serving the SWAAP-BC area is owned and operated by the Village of Buffalo Creek or the Village of Long Grove. However, some of the community's natural stormwater infrastructure is located on land owned by public and private entities and several of the problem areas identified during the field assessment work are located, at least in part, upon land owned by multiple landowners. The stormwater-related issues found within these problem areas are negatively impacting water quality, as well as adjacent land owners property. SMC staff recommends that the SWAAP-BC stakeholders develop a partnership with their respective municipality to implement projects that will resolve the community's stormwater-related issues located in the study area. The resolution of such issues will benefit all stakeholders of the SWAAP-BC study area and downstream communities.

Assistance with Final Design, Permitting, & Construction

Stakeholders pursing recommended projects should consult with SMC or their local municipality on whether a professional engineering firm is required to assist with the implementation of actions and/or projects requiring additional design, permitting, and/or land description revisions. Stakeholders should review experience and body of work when evaluating and selecting, consultants, contractors, and/or construction oversight. Stakeholder's may use the conceptual designs in Appendix B as needed to support the completion of the additional tasks (e.g., additional site investigation, final design, general and technical specification development, permit acquisition, bidding and contract document preparation, contract award, construction observation, construction management) to implement any portion of the recommendations projects. While the implementation of many of the solutions and recommendations presented in this plan may not require the completion of additional design or permitting tasks, SMC staff recommends that the stakeholders review its planned actions and/or projects with the relevant local municipality and/or its selected consultant to identify any additional necessary or beneficial design or permitting tasks, such as permit acquisition and bidding and contract document preparation.

Acknowledgements:

Watershed Stakeholders involved in development of the SWAAP report:

- United States Environmental Protection Agency
- Illinois Environmental Protection Agency
- Lake County Geographic Information System (GIS) Division
- Michael Novotney
- Patricia Werner
- Jacob Jozefowski, Lake County Stormwater Management Commission
- Mike Prusila, Lake County Stormwater Management Commission
- Loch Lomond Homeowners Association
- Loch Lomond Homeowners Association, Lakes Committee
- Buffalo Grove Park District
- Long Grove Park District
- Village of Buffalo Grove
- Village of Mundelein
- Buffalo Creek Clean Watershed Partnership

Appendix A –

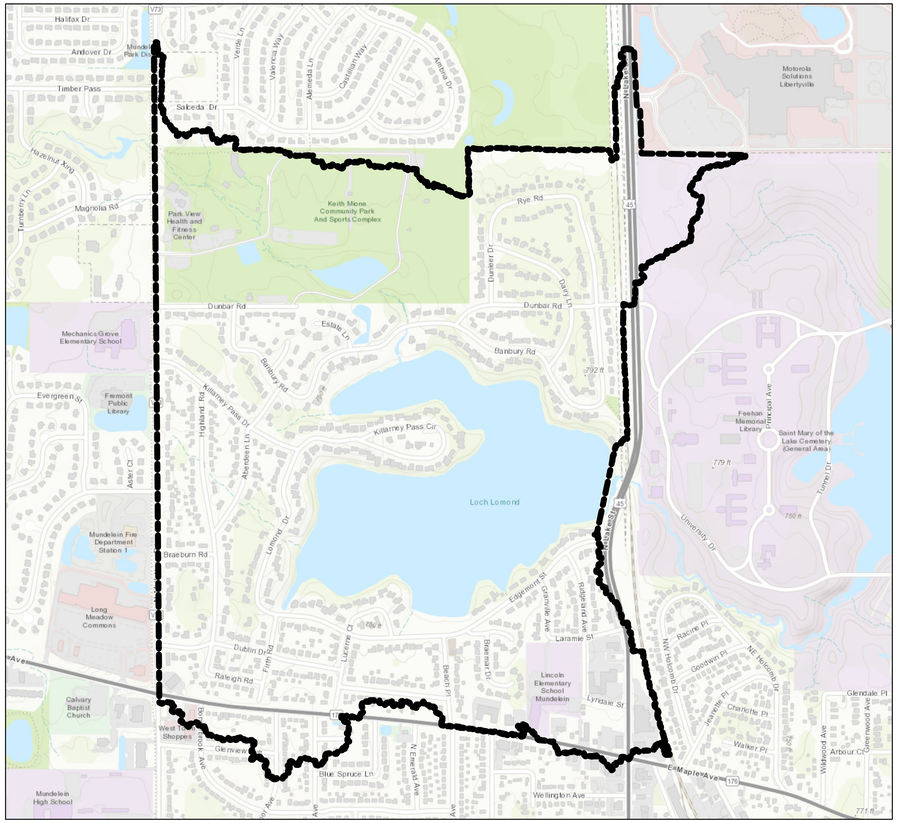
Loch Lomond Stormwater Improvement Projects

Preliminary Concept Designs

SMALL WATERSHED ASSESSMENT AND ACTION PLAN (SWAAP) - Water Quality Improvement Projects Conceptual Design

Conceptual Design Documents - March 3, 2018

PROJECT LOCATION MAP



FOR UNDERGROUND UTILITY LOCATIONS, CALLJ.U.L.I.E.
TOLL FREE TEL. 1-800-892-0123
24 HOURS/DAY
CALL 48 HOURS PRIOR TO DIGGING
JULIE SUBURBS AND DIGG CHICAGO

YELLOW _____GAS
RED_____ELECTRICAL
ORANGE_____PHONE / TV COMMUNICATION
BLUE_____WATER
GREEN_____SEWERS
WHITE_____SAFE TO DIG

Sheet Index

SHEET C 0.0 - COVER SHEET

SHEET C 1.0 - LOCH LOMOND PLANNING AREA OVERVIEW
SHEET C 1.1 - LOCH LOMOND SHEET REFERENCE

SHEET C 2.1 - LOCH LOMOND PROPOSED PROJECTS
SHEET C 2.2 - LOCH LOMOND PROPOSED PROJECTS
SHEET C 2.3 - LOCH LOMOND PROPOSED PROJECTS
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SHEET C 2.11 - LOCH LOMOND PROPOSED PROJECTS
SHEET C 2.12 - LOCH LOMOND PROPOSED PROJECTS
SHEET C 2.13 - LOCH LOMOND PROPOSED PROJECTS

SHEET C 3.0 - LOCH LOMOND DETAILS
SHEET C 3.1 - LOCH LOMOND DETAILS
SHEET C 3.2 - LOCH LOMOND DETAILS

Benchmarks

The topography and elevation data utilized for this project is based on LiDAR derived data points taken in 2007 and made available by Lake County Illinois GIS department.

Field survey by a certified professional land surveyor wiill be needed in future project permitting, bidding, and construction activities.

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STORMWATER MANAGEMENT COMMISSION
LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN
02/01/2018 CONCEPTUAL DESIGN REVISIONS
10/30/2017 DRAFT CONCEPTUAL DESIGN
DATE: DESCRIPTION OF REVISION

PROJECT:
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

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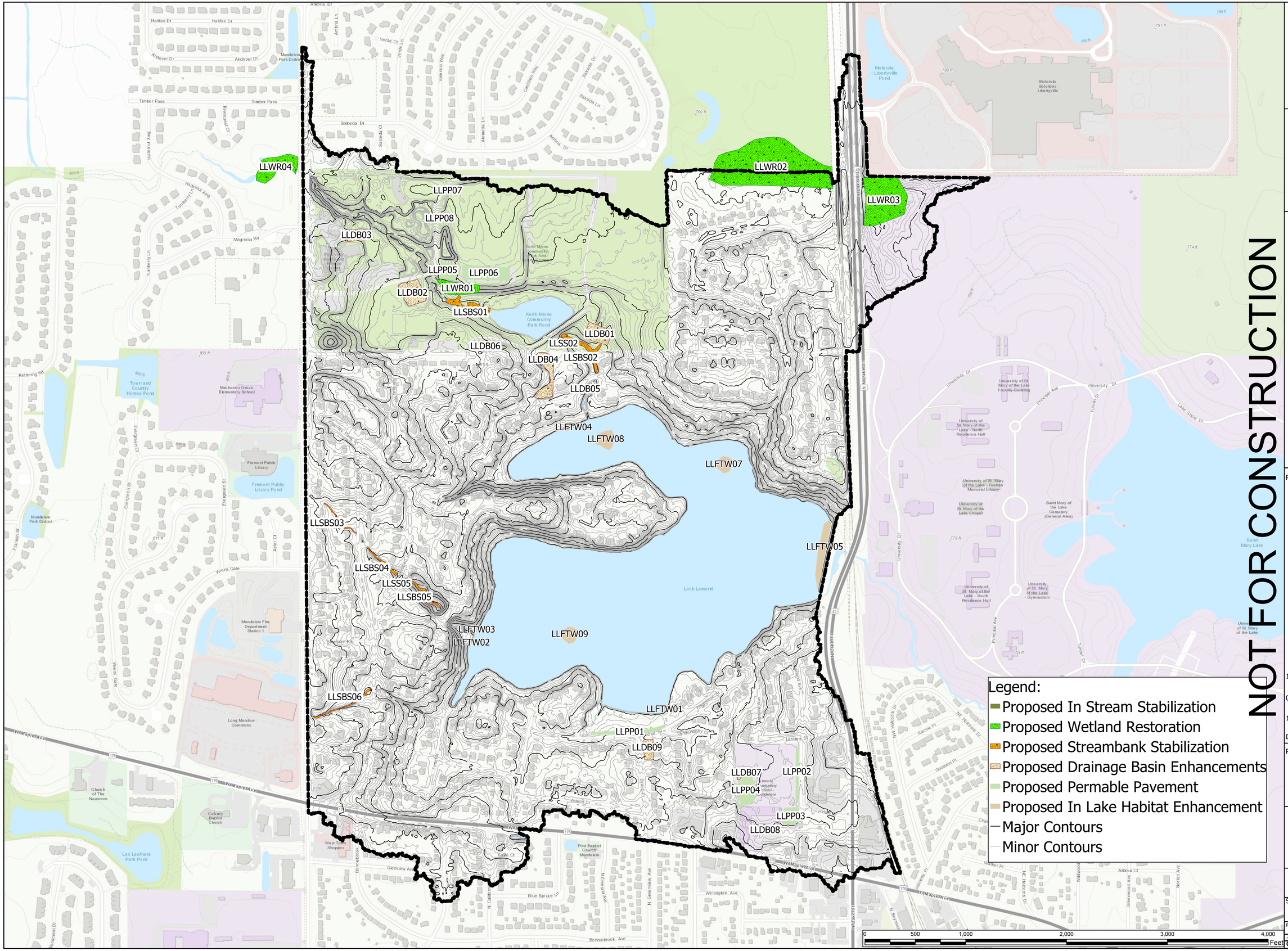

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SHEET C 1.0
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PLANNING AREA OVERVIEW

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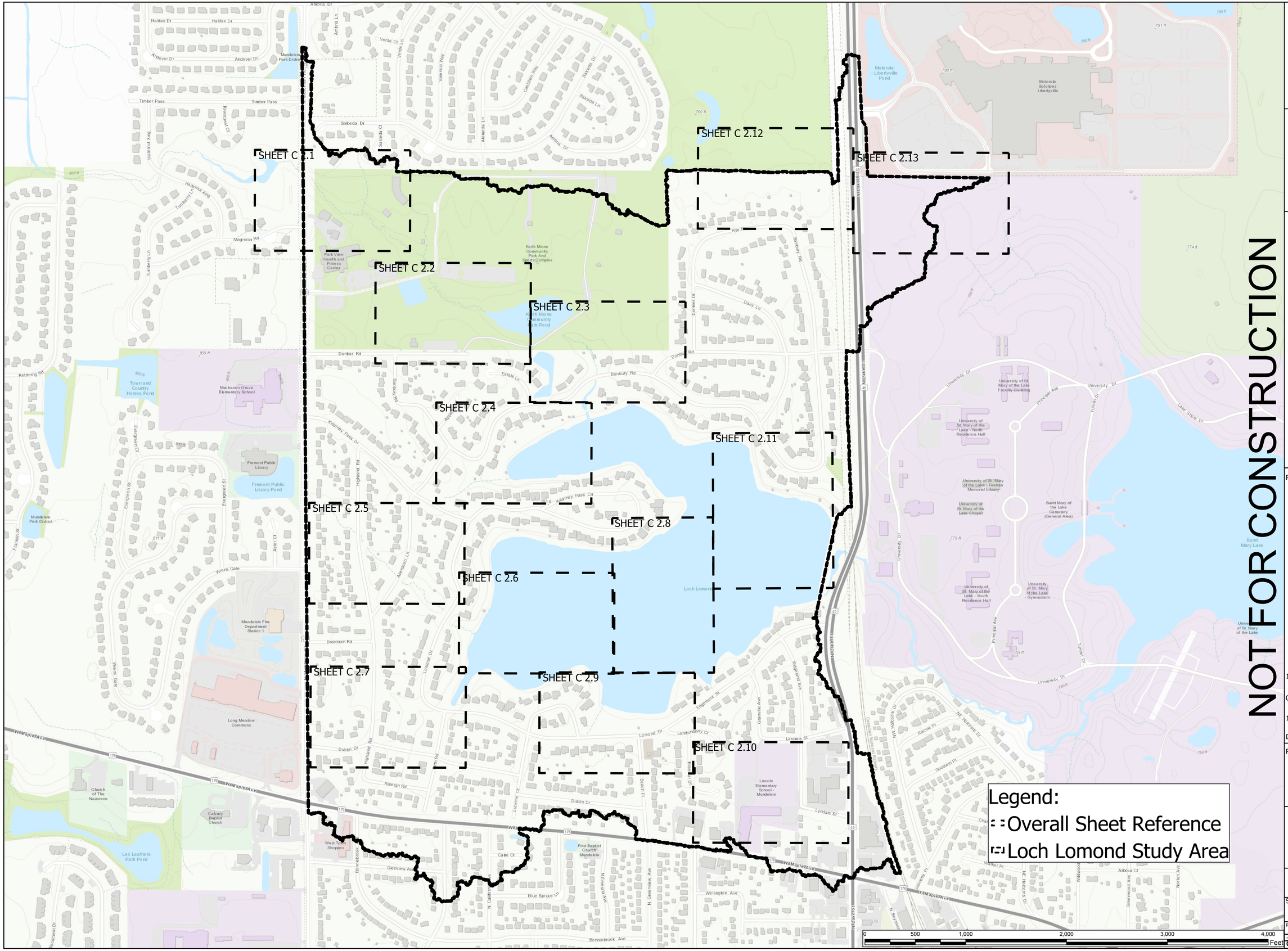

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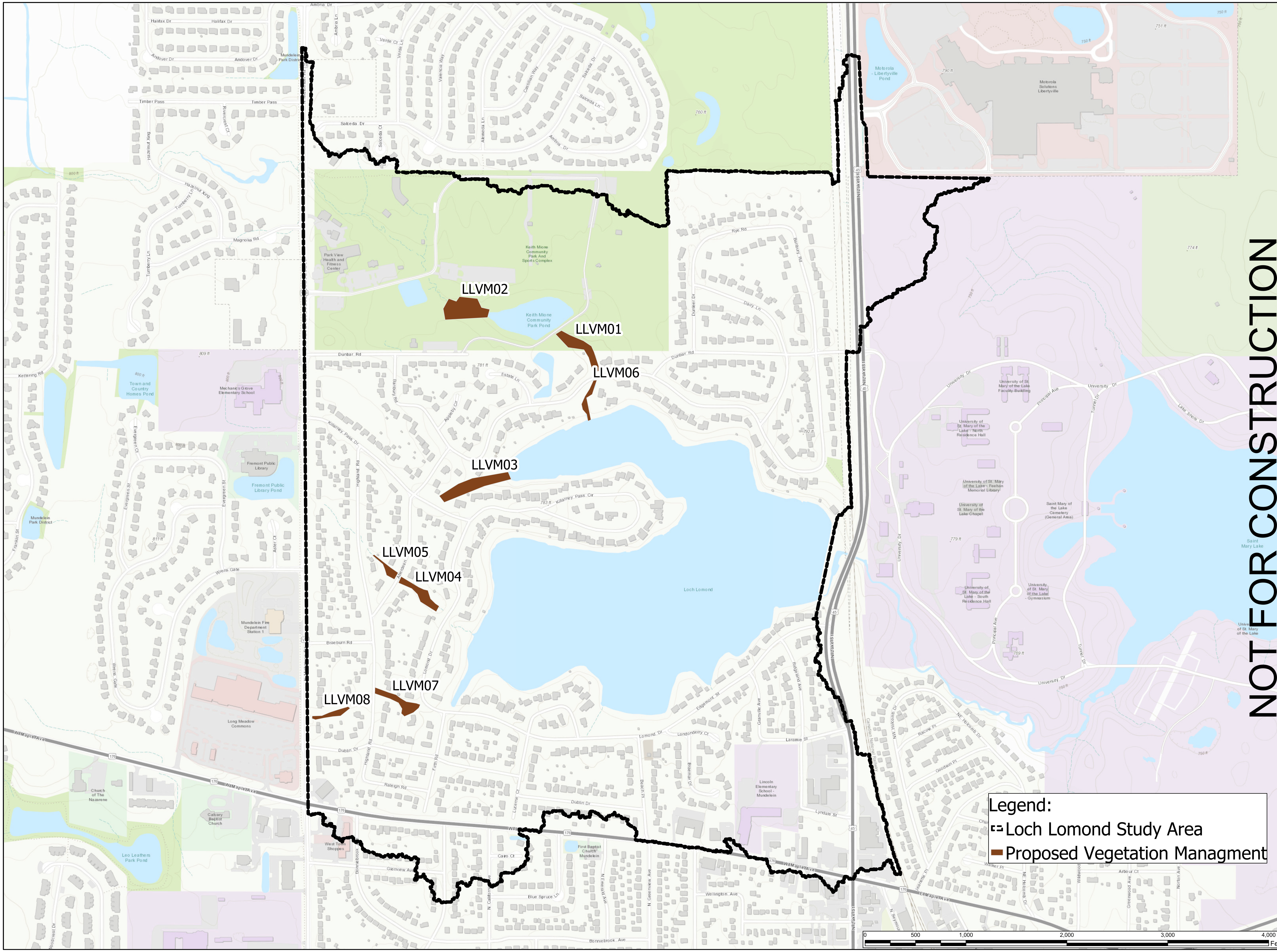

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SHEET C 2.1

LLWR04

N MIDLOTHIAN RD

V73

MAGNOLIA RD

MAGNOLIA RD

V73

N MIDLOTHIAN RD

Barefoot Bay Family Aquatic Center

LLDB03

Park View Health and

Legend:
- Loch Lomond Study Area
- Public Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed Wetland Restoration
- Proposed Drainage Basin Enhancements
- Major Contours
- Minor Contours
- Overall Sheet Reference

0 87.5 175 350 525 700 Feet

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SHEET C 2.2

LLPP05

LLPP06

LLDB02

LLWR01

LLSS03

LLSBS01

LLDB06

Keith Mickie Community Park And Sports Complex

DUNBAR RD

DUNBAR RD

760 ft

781 ft

Legend:
- Loch Lomond Study Area
- Public Land Ownership Holdings
- Private - HOA Open Space Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed In Stream Stabilization
- Proposed Wetland Restoration
- Proposed Streambank Stabilization
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- Proposed Permable Pavement
- Proposed In Lake Habitat Enhancement
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- Minor Contours
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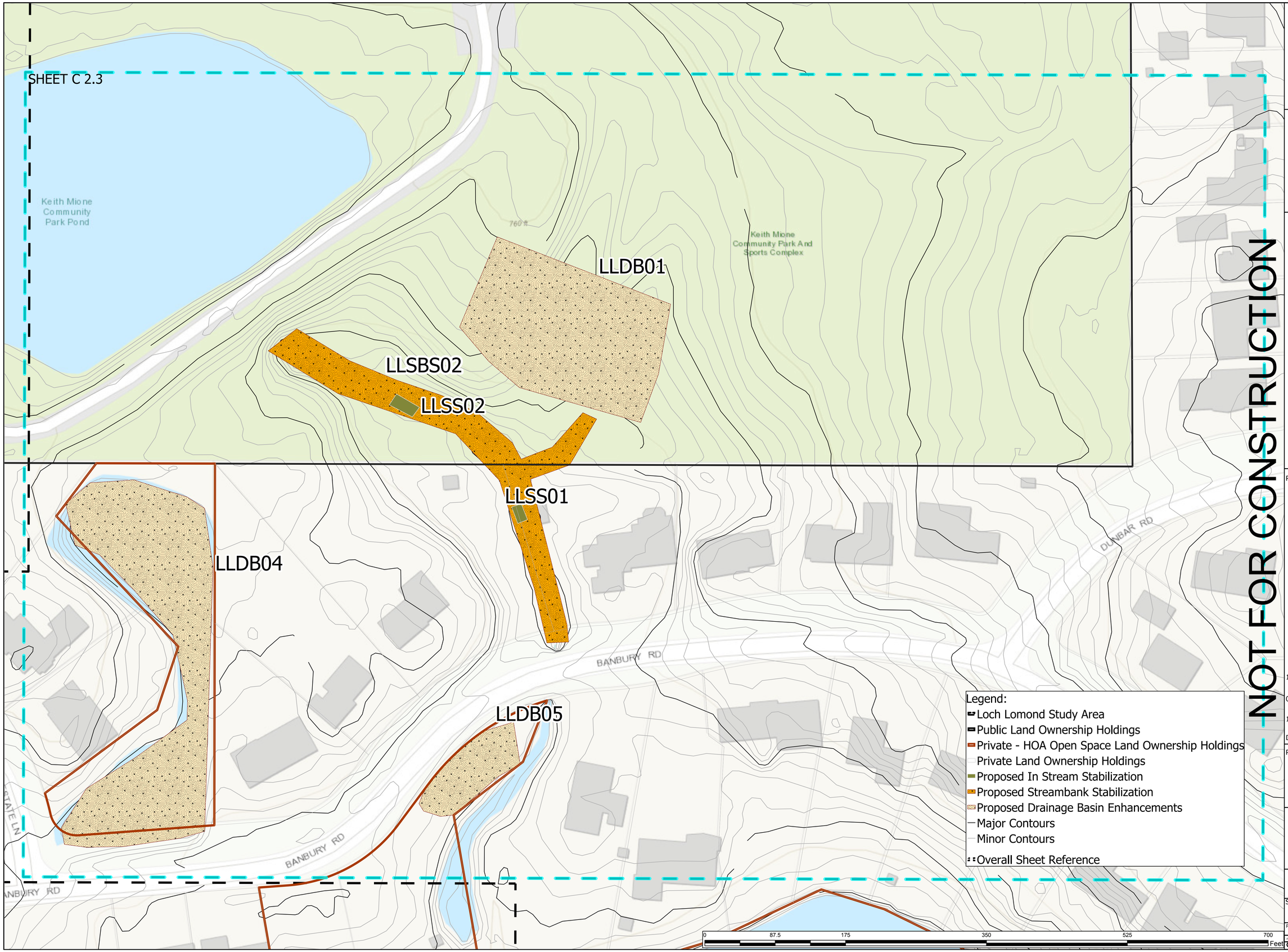

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PROPOSED PROJECTS

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FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:600

SHEET C 2.4

LLDB04

LLDB05

LLFTW04

BANBURY RD

APPLEBY CIR

ABERDEEN LN

KILLARNEY PASS CIR

NOT FOR CONSTRUCTION

N

Legend:
- Loch Lomond Study Area
- Private - HOA Open Space Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed Drainage Basin Enhancements
- Proposed In Lake Habitat Enhancement
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- Minor Contours
- Overall Sheet Reference

0 87.5 175 350 525 700 Feet

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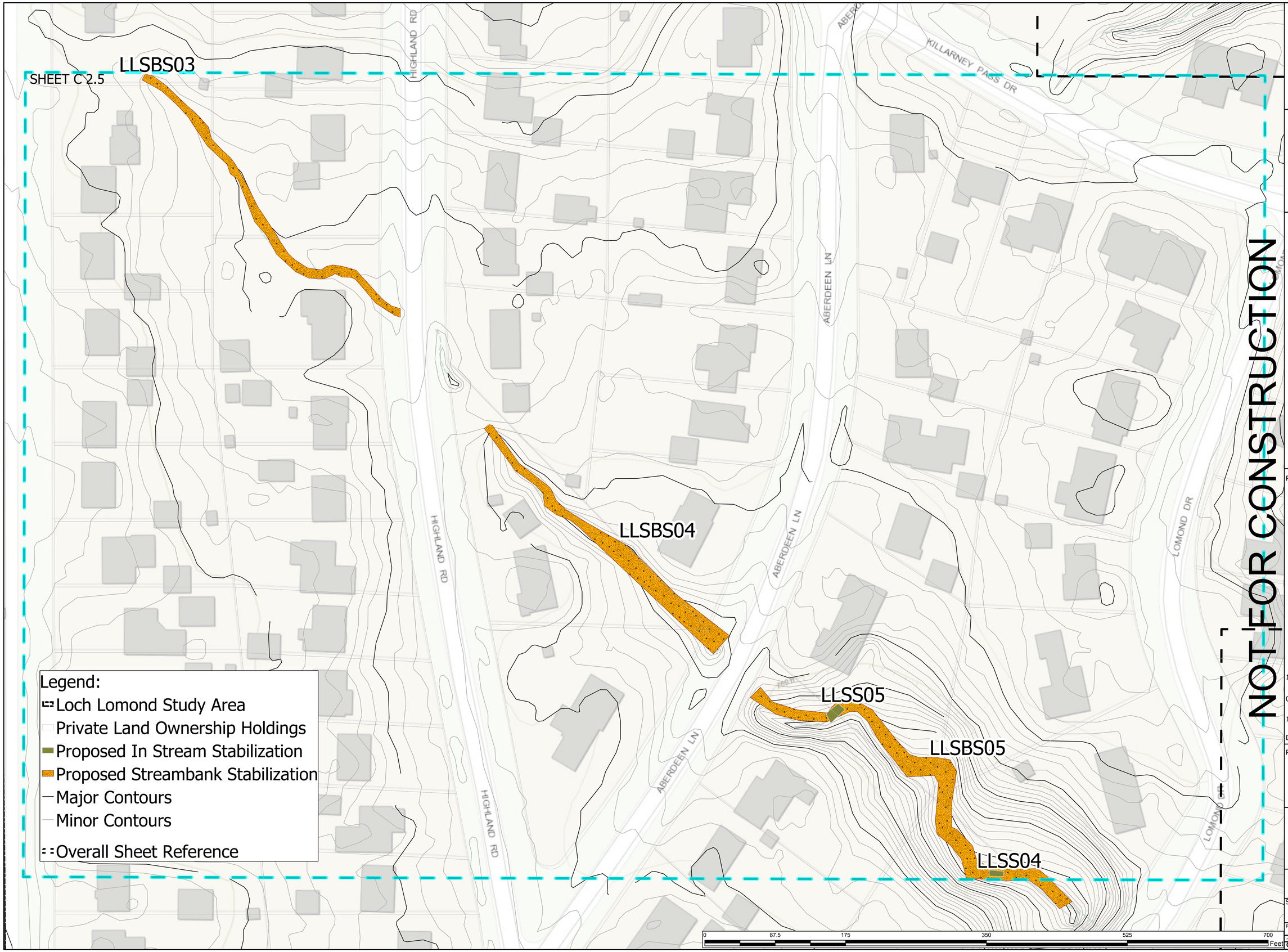

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LOCH LOMOND
PROPOSED PROJECTS

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PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
LAKE COUNTY STORMWATER COMMISSION	SCALE	1:600

SHEET C 2.6

LLFTW03

LLFTW02

LLFTW09

Loch Lomond

SHEET C 2.9

Legend:
- Loch Lomond Study Area
- Private - HOA Open Space Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed In Lake Habitat Enhancement
- Major Contours
- Minor Contours
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0 87.5 175 350 525 700 Feet

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500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

N

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10/30/2017 DRAFT CONCEPTUAL DESIGN

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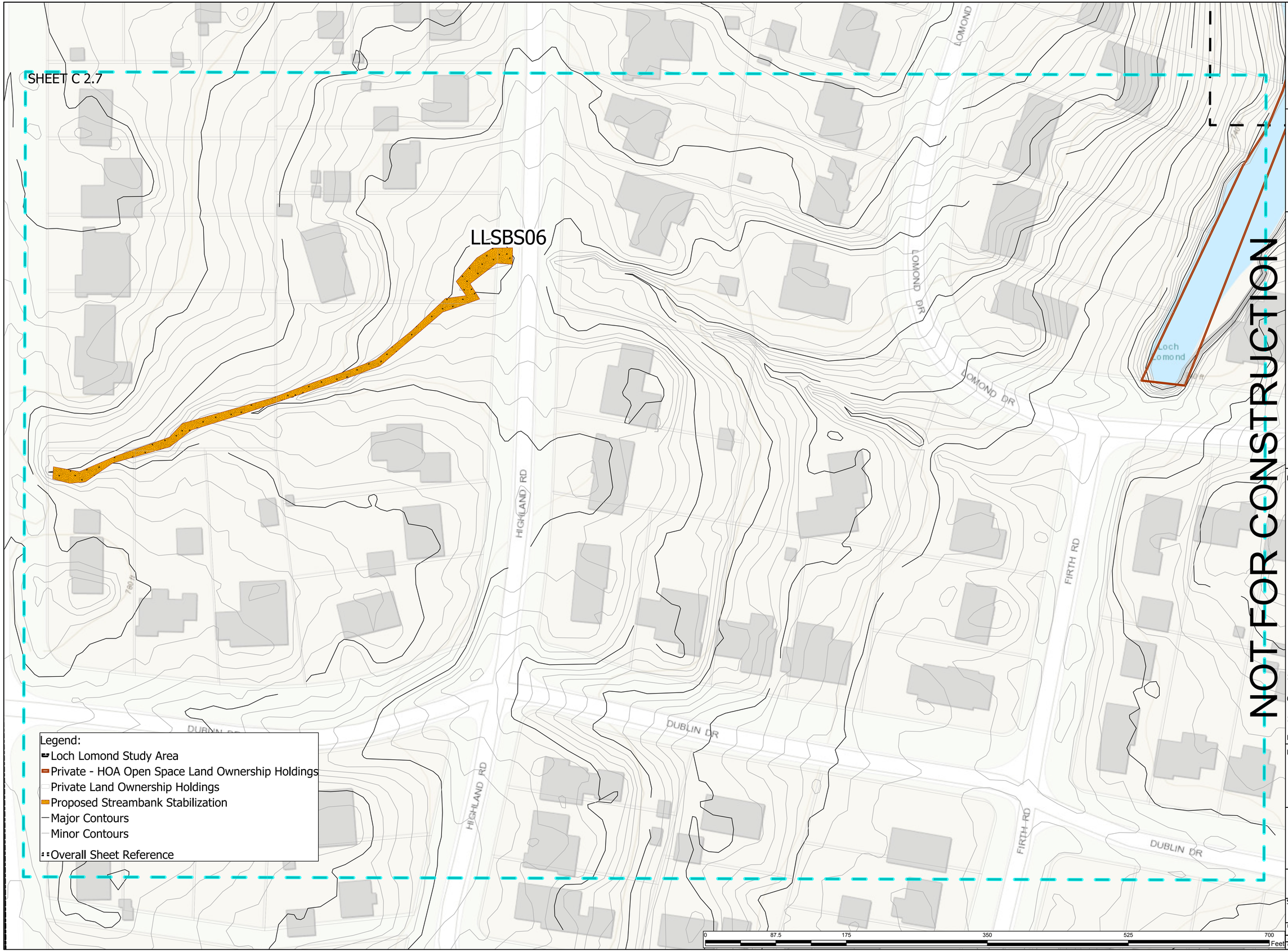
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.6
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
LAKE COUNTY STORMWATER COMMISSION	SCALE	1:600



NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

N

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.7
LOCH LOMOND
PROPOSED PROJECTS

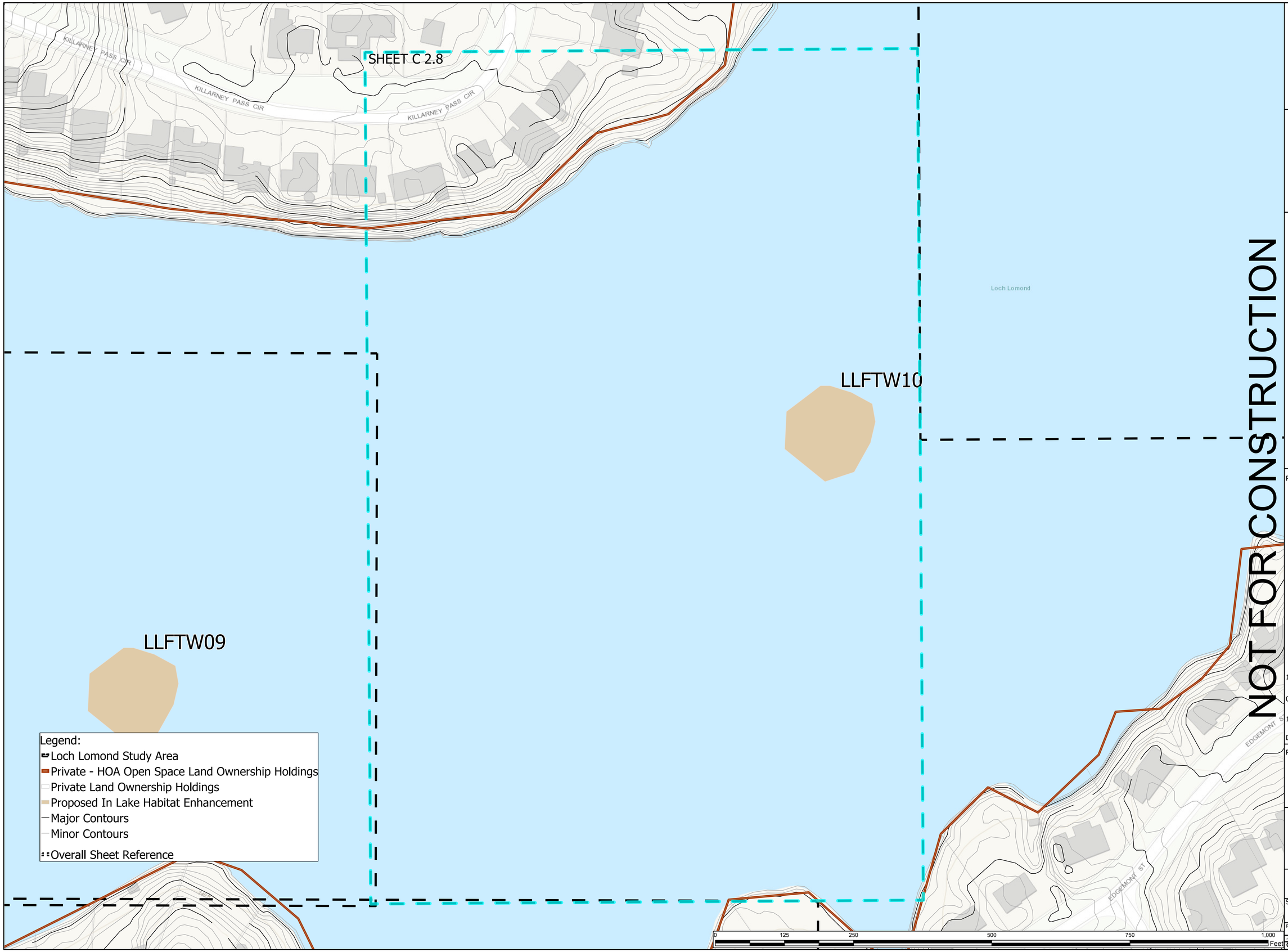
SHEET NO.

DESIGNED	EH
DRAWN	EH
APPROVED	N/A
DATE	10/30/2017
SCALE	1:600

PROJECT NUMBER:
17.dpr.swapp

FILE:

LAKE COUNTY STORMWATER COMMISSION



NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

N

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.8
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.

DESIGNED	EH
DRAWN	EH
APPROVED	N/A
DATE	10/30/2017
SCALE	1:874

PROJECT NUMBER:
17.dpr.swapp

FILE:

LAKE COUNTY STORMWATER COMMISSION

SHEET C 2.9

LLFTW01

LLPP01

LLDB09

Loch Lomond

LUCERNE CT

LUCERNE CT

LOMOND DR

LOMOND DR

LOMOND DR

LOMOND DR

EDGEMONT ST

LONDONDERRY CT

BRAEMAR DR

BRAEMAR DR

BEACH PL

755 ft

740 ft

Legend:
- Loch Lomond Study Area
- Public Land Ownership Holdings
- Private - HOA Open Space Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed Drainage Basin Enhancements
- Proposed Permable Pavement
- Proposed In Lake Habitat Enhancement
- Major Contours
- Minor Contours
- Overall Sheet Reference

0 87.5 175 350 525 700 Feet

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

N

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

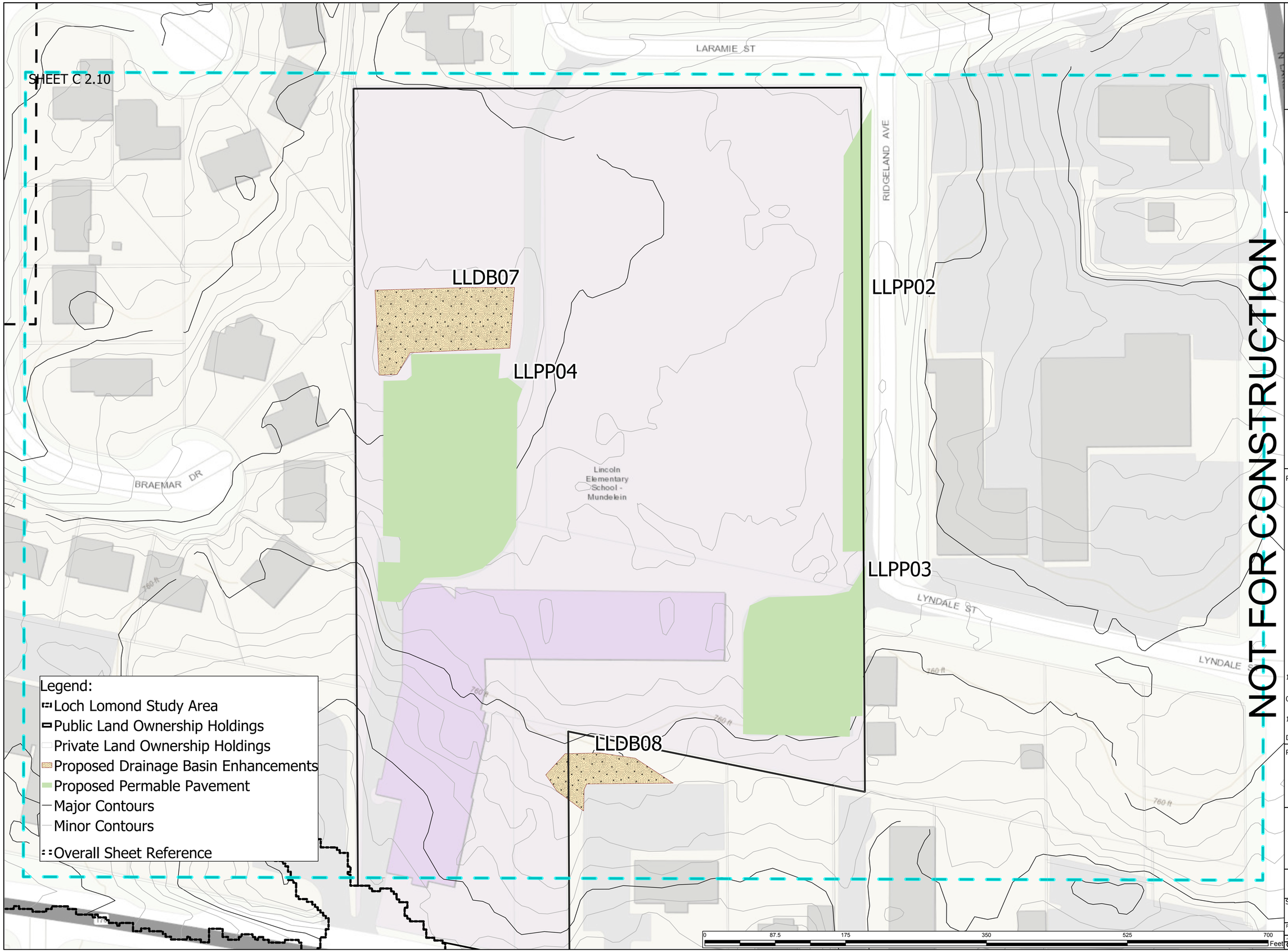
DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.9
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
LAKE COUNTY STORMWATER COMMISSION	SCALE	1:600



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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

N

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

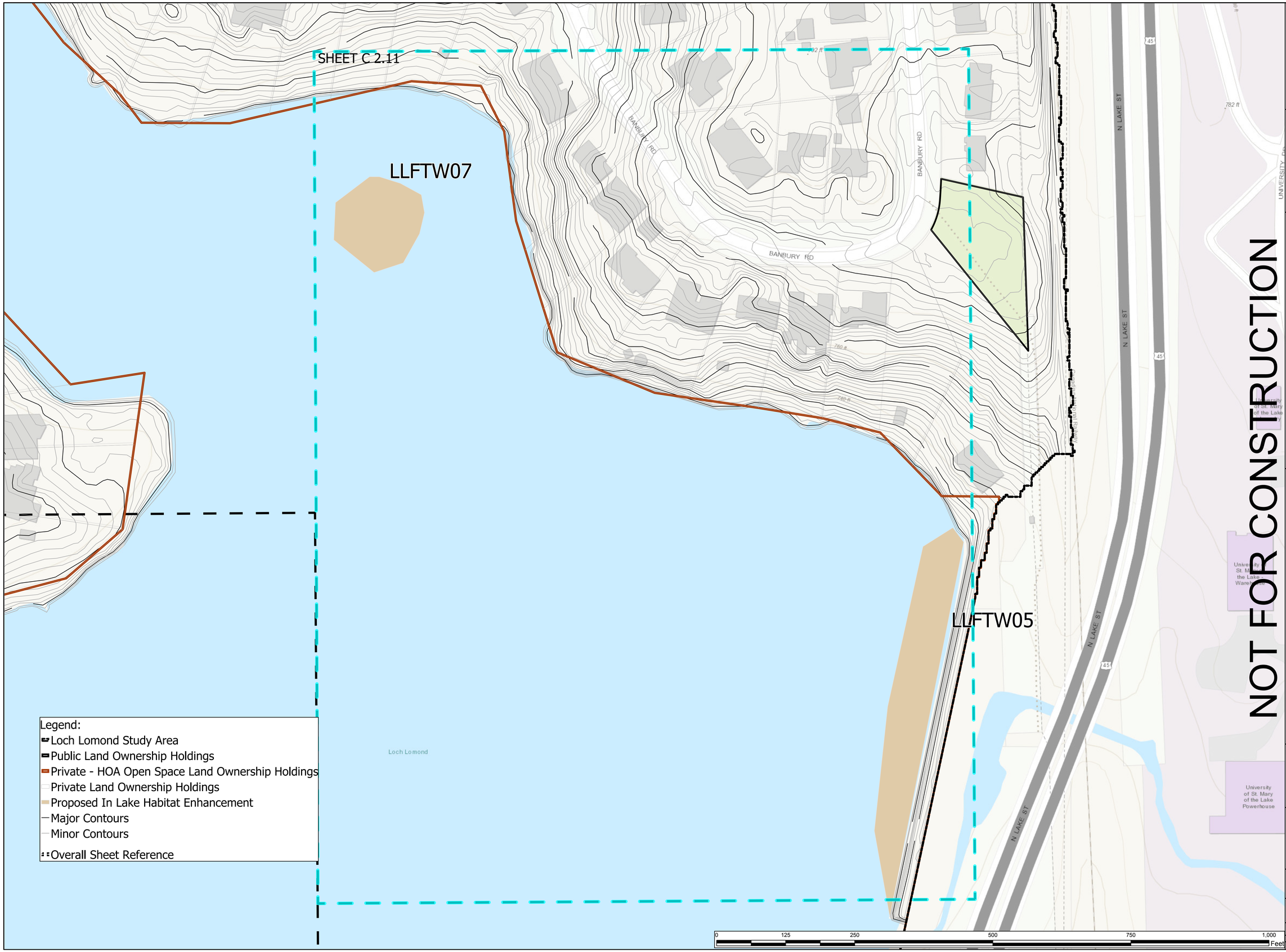
DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.10
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:600



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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

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REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

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10/30/2017 DRAFT CONCEPTUAL DESIGN

DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.11
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:875

SHEET C 2.12

LLWR02

RYE RD

RYE RD

RYE RD

760 ft

760 ft

760 ft

N LAKE ST

45

NOT FOR CONSTRUCTION

Legend:

- Loch Lomond Study Area
- Public Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed Wetland Restoration
- Major Contours
- Minor Contours
- Overall Sheet Reference

0 87.5 175 350 525 700 Feet

N

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

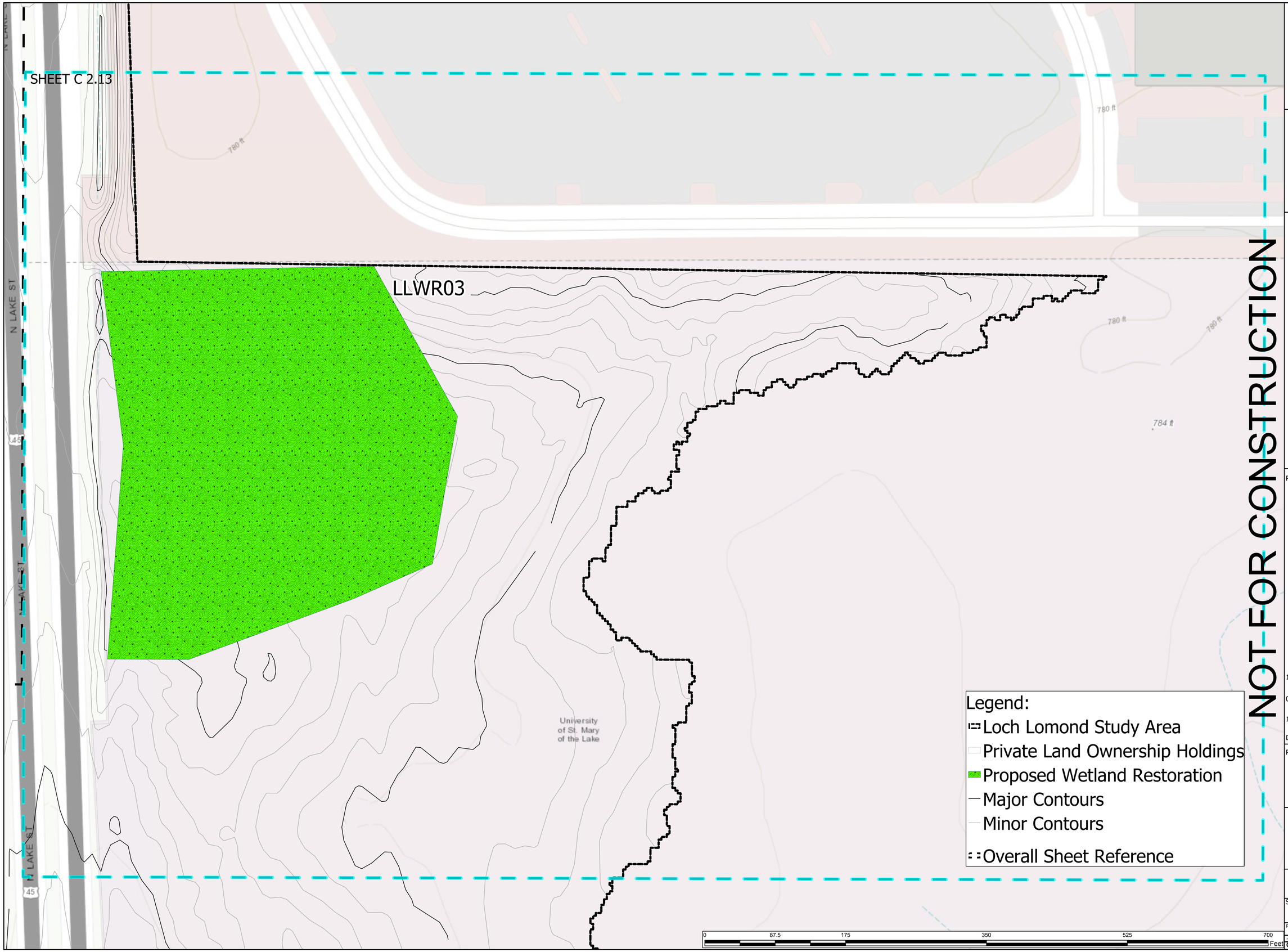
DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.12
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:600



NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

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REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

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10/30/2017 DRAFT CONCEPTUAL DESIGN

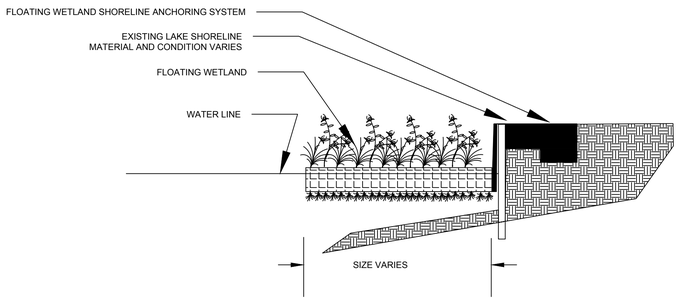
DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

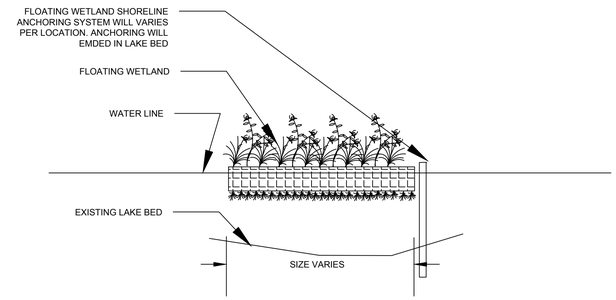
SHEET C 2.13
LOCH LOMOND
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE: LAKE COUNTY STORMWATER COMMISSION	DATE	10/30/2017
	SCALE	1:600



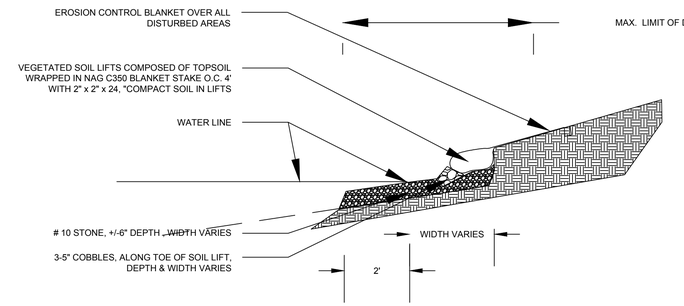
SHORELINE STABILIZATION FLOATING TREATMENT WETLAND

Scale: ###" = ###"



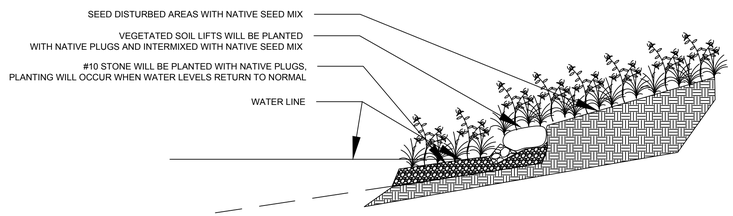
OPEN WATER FLOATING TREATMENT WETLAND

Scale: ###" = ###"



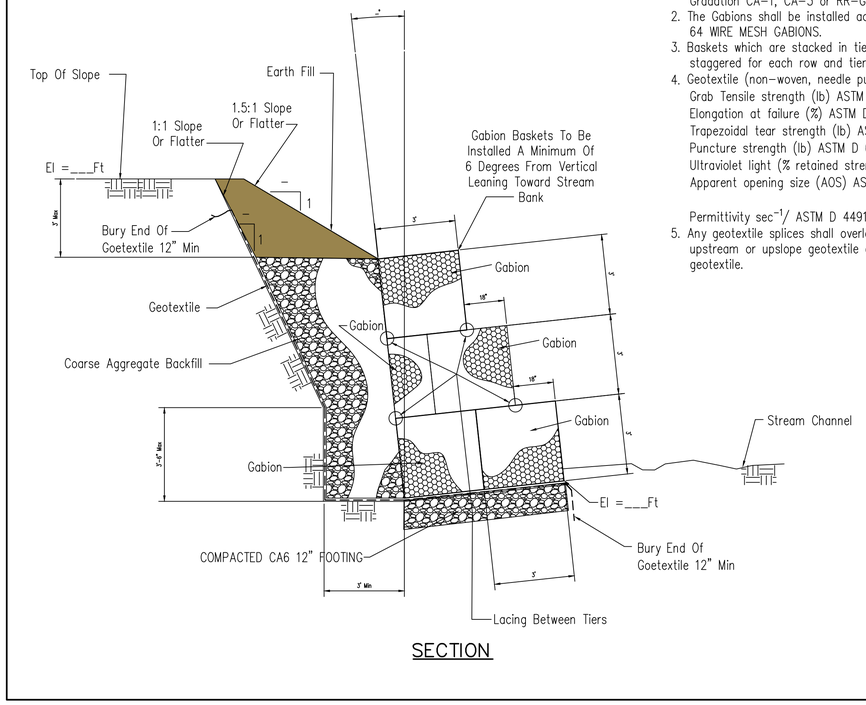
SHORELINE STABILIZATION HARDSCAPE SECTION

Scale: ###" = ###"



SHORELINE STABILIZATION PLANTING SECTION

Scale: ###" = ###"



SECTION

NOTES:
1. The coarse aggregate backfill shall meet the IDOT requirement for Gradation CA-1, CA-3 or RR-Gradation 1 Riprap.
2. The Gabions shall be installed according to construction specification 64 WIRE MESH GABIONS.
3. Baskets which are stacked in tiers shall have vertical seams staggered for each row and tier.
4. Geotextile (non-woven, needle punched) min. criteria:
   - Grab Tensile strength (lb) ASTM D 4632_____202
   - Elongation at failure (%) ASTM D 4632_____≥50
   - Trapezoidal tear strength (lb) ASTM D 4533_____79
   - Puncture strength (lb) ASTM D 6241 _____433
   - Ultraviolet light (% retained strength) ASTM 4355_____min 50
   - Apparent opening size (AOS) ASTM D 4751____ max 0.22 mm (US sieve size 70)
   - Permittivity sec^{-1}/ ASTM D 4491_____min 0.70
5. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the abutting downslope geotextile.

Date 10/2/13
Designed M. QUINONES
Drawn
Checked

STRUCTURAL STREAMBANK STABILIZATION W/O MAT
GABIONS & BASKETS HIGH

United States Department of Agriculture
Natural Resources Conservation Service

File No. IL-ENG-54
Drawing No.
Page 1 of 1
Sheet of

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

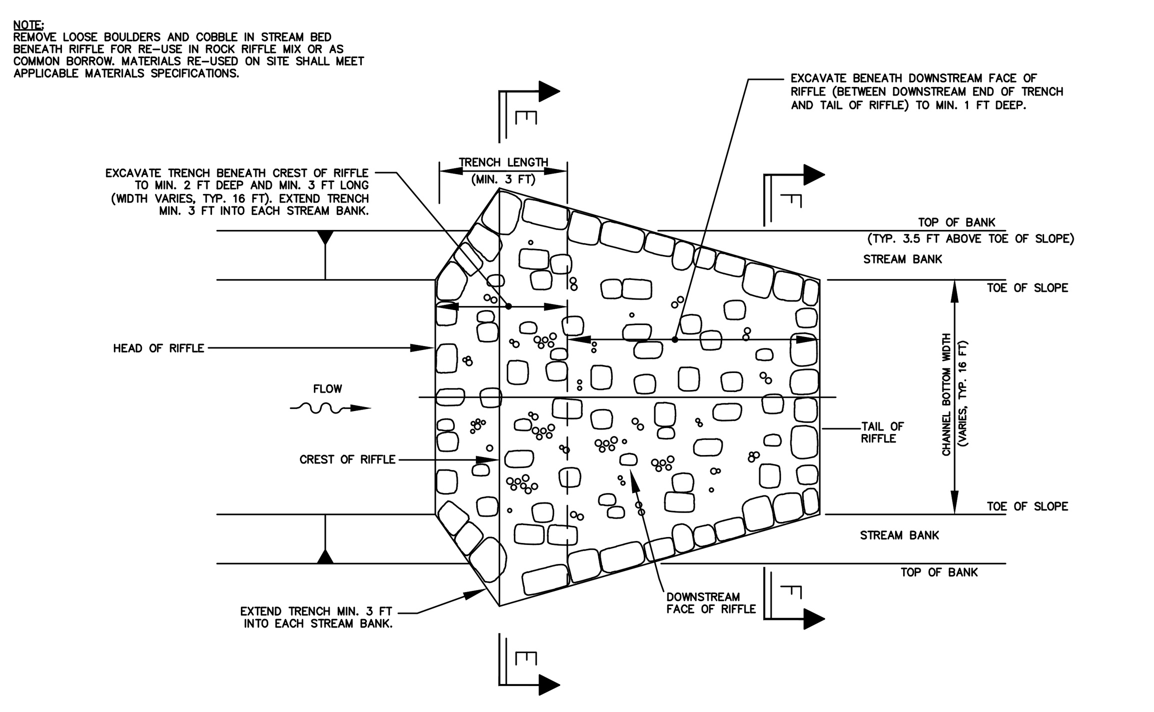
DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

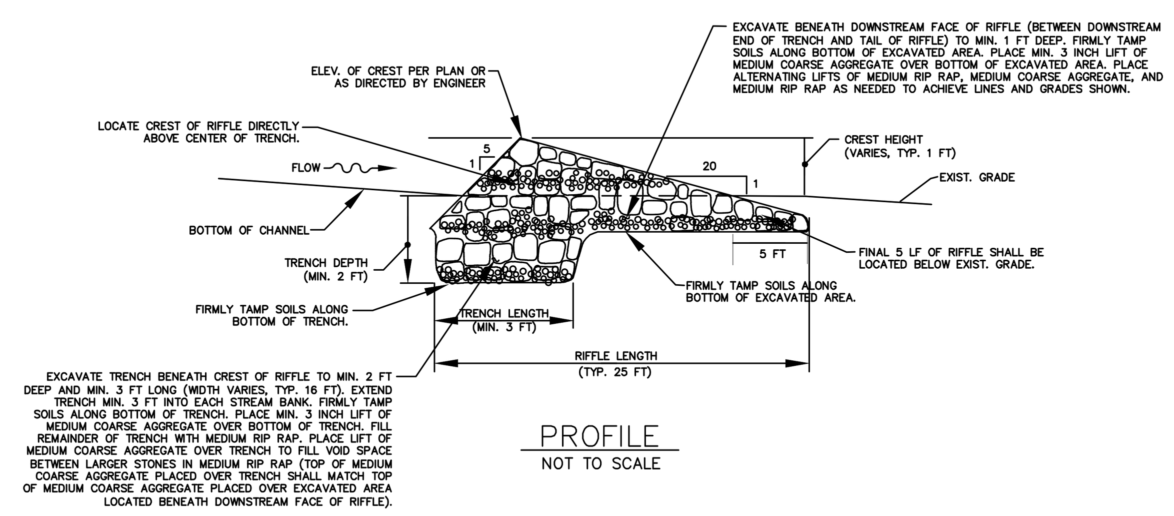
SHEET C 3.0
LOCH LOMOND
SHEET REFERENCE

SHEET N0.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE: LAKE COUNTY STORMWATER COMMISSION.	DATE	10/30/2017
	SCALE	



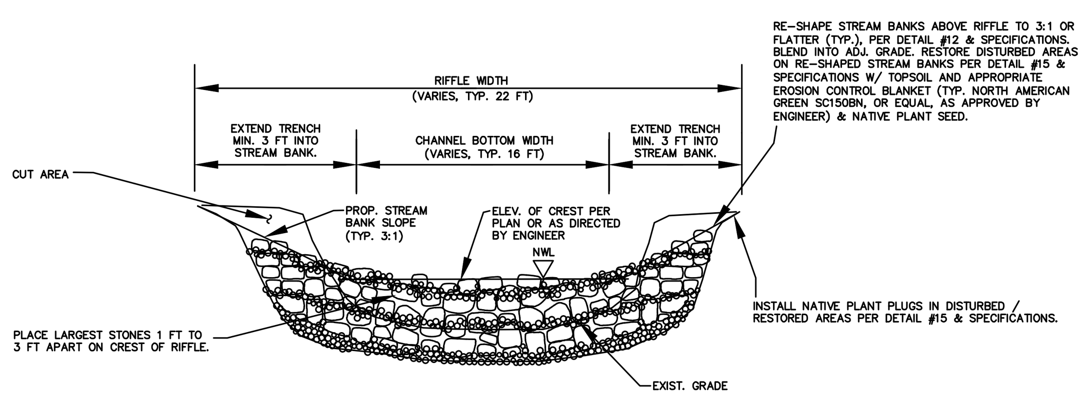
PLAN VIEW

NOT TO SCALE



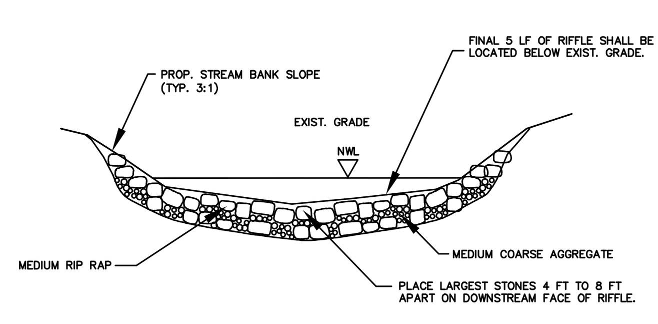
PROFILE

NOT TO SCALE



ELEVATION AT CREST (E SECTION)

NOT TO SCALE



ELEVATION ON DOWNSTREAM FACE (F SECTION)

NOT TO SCALE

INSTALLATION

1. REMOVE LOOSE BOULDERS AND COBBLE IN STREAM BED BENEATH RIFFLE FOR RE-USE IN ROCK RIFFLE MIX OR AS COMMON BORROW. MATERIALS RE-USED ON SITE SHALL MEET APPLICABLE MATERIALS SPECIFICATIONS.
2. EXCAVATE TRENCH BENEATH CREST OF RIFFLE TO MIN. 2 FT DEEP AND MIN. 3 FT LONG (WIDTH VARIES, TYP. 16 FT). EXTEND TRENCH MIN. 3 FT INTO EACH STREAM BANK.
3. EXCAVATE BENEATH DOWNSTREAM FACE OF RIFFLE, BETWEEN DOWNSTREAM END OF TRENCH AND TAIL OF RIFFLE, TO MIN. 1 FT DEEP.
4. FIRMLY TAMP SOILS ALONG BOTTOM OF TRENCH AND ALONG BOTTOM OF EXCAVATED AREA LOCATED BENEATH DOWNSTREAM FACE OF RIFFLE.
5. PLACE MIN. 3 INCH LIFT OF MEDIUM COARSE AGGREGATE OVER BOTTOM OF TRENCH AND OVER BOTTOM OF EXCAVATED AREA LOCATED BENEATH DOWNSTREAM FACE OF RIFFLE.
6. FILL REMAINDER OF TRENCH WITH MEDIUM RIP RAP.
7. PLACE LIFT OF MEDIUM COARSE AGGREGATE OVER TRENCH TO FILL VOID SPACE BETWEEN LARGER STONES IN MEDIUM RIP RAP (TOP OF MEDIUM COARSE AGGREGATE PLACED OVER TRENCH SHALL MATCH TOP OF MEDIUM COARSE AGGREGATE PLACED OVER BOTTOM OF EXCAVATED AREA LOCATED BENEATH DOWNSTREAM FACE OF RIFFLE).
8. PLACE ALTERNATING LIFTS OF MEDIUM RIP RAP, MEDIUM COARSE AGGREGATE, AND MEDIUM RIP RAP AS NEEDED TO ACHIEVE LINES AND GRADES SHOWN. MEDIUM COARSE AGGREGATE SHALL FILL VOID SPACE BETWEEN LARGER STONES IN MEDIUM RIP RAP.
9. ON CREST OF RIFFLE, LARGEST STONES SHALL BE PLACED 1 FT TO 3 FT APART.
10. ON DOWNSTREAM FACE OF RIFFLE, LARGEST STONES SHALL BE PLACED 4 FT TO 8 FT APART.
11. PLACE FINAL LIFT OF MEDIUM COARSE AGGREGATE OVER RIFFLE. SURFACE OF RIFFLE SHALL BE ROUGH AND NATURAL IN APPEARANCE AND SHALL NOT BE SMOOTHED.
12. RE-SHAPE STREAM BANKS ABOVE RIFFLE TO 3:1 OR FLATTER (TYP.), PER DETAIL #12 & SPECIFICATIONS. BLEND INTO ADJ. GRADE.
13. RESTORE DISTURBED AREAS ON RE-SHAPED STREAM BANKS PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
14. RESTORE DISTURBED AREAS ABOVE RE-SHAPED STREAM BANKS PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
15. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

ROCK RIFFLE MIX

67% OF ROCK RIFFLE MIX = MEDIUM RIP RAP:
D100 = 18 INCH (~ 300 LB)
D75 = 12 INCH (~ 90 LB)
D50 = 9 INCH (~ 40 LB)
D10 = 3 INCH (~ 1 LB)

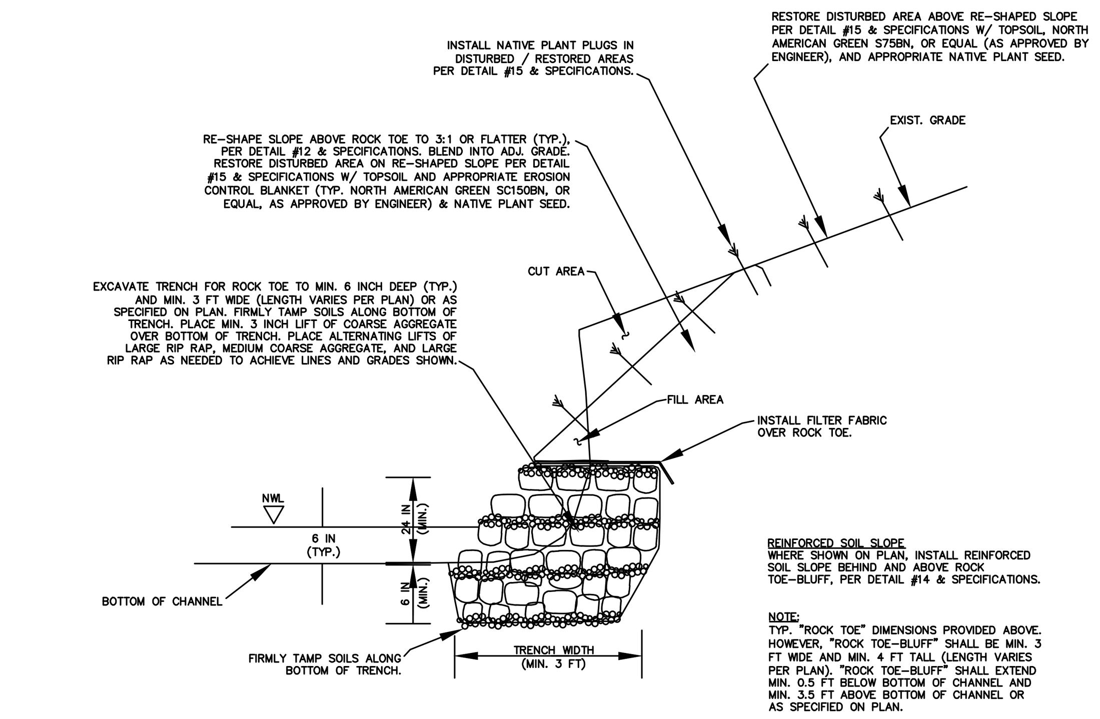
33% OF ROCK RIFFLE MIX = MEDIUM COARSE AGGREGATE:
D100 = 1 INCH
D50 = 0.50 INCH
D10 = 0.1875 INCH

ROCK TYPE:
RIP RAP SHALL BE STONE, QUARRIED FROM UNDISTURBED, CONSOLIDATED DEPOSITS (LEDGES) OF ROCK REASONABLY FREE OF SHALE AND SHALY STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

COARSE AGGREGATE SHALL BE GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

ROCK RIFFLE

NOT TO SCALE



PROFILE

NOT TO SCALE

INSTALLATION

1. EXCAVATE TRENCH FOR ROCK TOE TO MIN. 6 INCH DEEP (TYP.) AND MIN. 3 FT WIDE (LENGTH VARIES PER PLAN) OR AS SPECIFIED ON PLAN.
2. FIRMLY TAMP SOILS ALONG BOTTOM OF TRENCH.
3. PLACE MIN. 3 INCH LIFT OF MEDIUM COARSE AGGREGATE OVER BOTTOM OF TRENCH.
4. PLACE ALTERNATING LIFTS OF LARGE RIP RAP, MEDIUM COARSE AGGREGATE, AND LARGE RIP RAP AS NEEDED TO ACHIEVE LINES AND GRADES SHOWN. MEDIUM COARSE AGGREGATE SHALL FILL VOID SPACE BETWEEN LARGER STONES IN LARGE RIP RAP. ROCK TOE SHALL EXTEND MIN. 6 INCH BELOW BOTTOM OF CHANNEL AND MIN. 2 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.
5. INSTALL FILTER FABRIC OVER ROCK TOE, AS SHOWN AND PER SPECIFICATIONS.
6. RE-SHAPE SLOPE ABOVE ROCK TOE TO 3:1 OR FLATTER (TYP.), PER DETAIL #12 & SPECIFICATIONS. BLEND INTO ADJ. GRADE.
7. TRIM FILTER FABRIC EXTENDING BEYOND TOE OF RE-SHAPED SLOPE. FILTER FABRIC SHALL NOT EXTEND MORE THAN 3 INCH BEYOND TOE OF RE-SHAPED SLOPE.
8. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
9. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
10. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

ROCK TOE / ROCK POINT MIX

67% OF ROCK TOE / ROCK POINT MIX = LARGE RIP RAP:
D100 = 21 INCH (~ 400 LB)
D75 = 15 INCH (~ 170 LB)
D50 = 12 INCH (~ 90 LB)
D10 = 4 INCH (~ 3 LB)

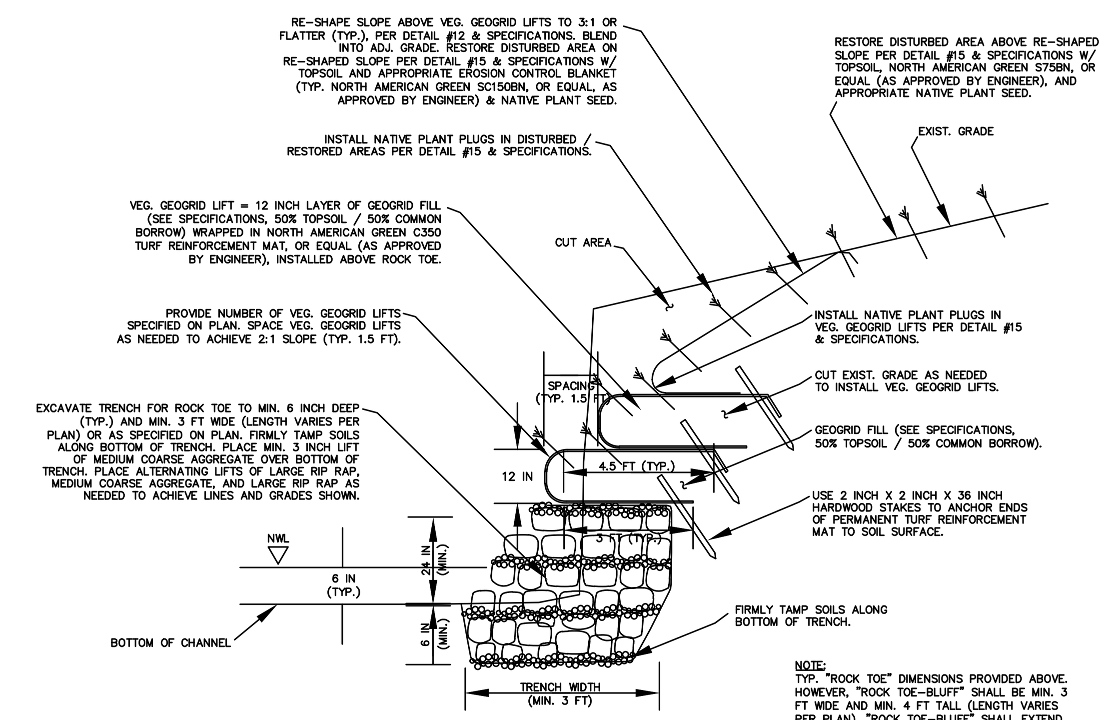
33% OF ROCK TOE / ROCK POINT MIX = MEDIUM COARSE AGGREGATE:
D100 = 1 INCH
D50 = 0.50 INCH
D10 = 0.1875 INCH

ROCK TYPE:
RIP RAP SHALL BE STONE, QUARRIED FROM UNDISTURBED, CONSOLIDATED DEPOSITS (LEDGES) OF ROCK REASONABLY FREE OF SHALE AND SHALY STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

COARSE AGGREGATE SHALL BE GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

6 ROCK TOE / RE-SHAPE SLOPE

NOT TO SCALE



PROFILE

NOT TO SCALE

NOTE:
TYP. "ROCK TOE" DIMENSIONS PROVIDED ABOVE. HOWEVER, "ROCK TOE-BLUFF" SHALL BE MIN. 3 FT WIDE AND MIN. 4 FT TALL (LENGTH VARIES PER PLAN). "ROCK TOE-BLUFF" SHALL EXTEND MIN. 0.5 FT BELOW BOTTOM OF CHANNEL AND MIN. 3.5 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.

INSTALLATION

1. EXCAVATE TRENCH FOR ROCK TOE TO MIN. 6 INCH DEEP (TYP.) AND MIN. 3 FT WIDE (LENGTH VARIES PER PLAN), OR AS SPECIFIED ON PLAN.
2. FIRMLY TAMP SOILS ALONG BOTTOM OF TRENCH.
3. PLACE MIN. 3 INCH LIFT OF MEDIUM COARSE AGGREGATE OVER BOTTOM OF TRENCH.
4. PLACE ALTERNATING LIFTS OF LARGE RIP RAP, MEDIUM COARSE AGGREGATE, AND LARGE RIP RAP AS NEEDED TO ACHIEVE LINES AND GRADES SHOWN. MEDIUM COARSE AGGREGATE SHALL FILL VOID SPACE BETWEEN LARGER STONES IN LARGE RIP RAP. ROCK TOE SHALL EXTEND MIN. 6 INCH BELOW BOTTOM OF CHANNEL AND MIN. 2 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.
5. CUT EXIST. GRADE ABOVE ROCK TOE AS NEEDED TO INSTALL VEG. GEOGRID LIFTS.
6. INSTALL VEG. GEOGRID LIFTS ABOVE ROCK TOE. ROLL OUT TURF REINFORCEMENT MAT (NORTH AMERICAN GREEN C350, OR EQUAL, AS APPROVED BY ENGINEER) TO MIN. WIDTH OF 3 FT (TYP.), AS MEASURED FROM FACE OF SLOPE. ANCHOR END OF TURF REINFORCEMENT MAT TO SOIL SURFACE W/ 2 INCH X 2 INCH X 36 INCH HARDWOOD STAKES INSTALLED AT MAX. 4 FT O.C.
7. PLACE AND COMPACT MAX. 6 INCH LIFTS OF GEOGRID FILL (SEE SPECIFICATIONS, 50% TOPSOIL / 50% COMMON BORROW) OVER TURF REINFORCEMENT MAT AS NEEDED TO ACHIEVE 12 INCH LAYER OF COMPACTED GEOGRID FILL OVER TURF REINFORCEMENT MAT. FOLLOWING COMPACTION, THE DRY DENSITY OF THE COMPACTED GEOGRID FILL SHALL BE AT LEAST 85% OF THE LABORATORY STANDARD (STANDARD PROCTOR) DRY DENSITY.
8. INSTALL APPROPRIATE NATIVE PLANT SEED INTO GEOGRID FILL, PER DETAIL #15 & SPECIFICATIONS.
9. WRAP TURF REINFORCEMENT MAT AROUND AND OVER GEOGRID FILL AND ROLL OUT TO MIN. WIDTH OF 4.5 FT (TYP.) ON TOP OF GEOGRID FILL, AS MEASURED FROM FACE OF SLOPE. FASTEN TURF REINFORCEMENT MAT TO UNDERLYING GEOGRID FILL, PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDED STAPLE PATTERN, W/ MIN. 12 INCH STAPLES AND ANCHOR END OF TURF REINFORCEMENT MAT TO SOIL SURFACE W/ 2 INCH X 2 INCH X 36 INCH HARDWOOD STAKES INSTALLED AT MAX. 4 FT O.C.
10. PROVIDE NUMBER OF VEG. GEOGRID LIFTS SPECIFIED ON PLAN. SPACE VEG. GEOGRID LIFTS AS NEEDED TO ACHIEVE 2:1 SLOPE (TYP. 1.5 FT).
11. RE-SHAPE SLOPE ABOVE VEG. GEOGRID LIFTS TO 3:1 OR FLATTER (TYP.), PER DETAIL #12 & SPECIFICATIONS. BLEND INTO ADJ. GRADE.
12. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
13. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
14. INSTALL NATIVE PLANT PLUGS IN VEG. GEOGRID LIFTS AND DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

ROCK TOE / ROCK POINT MIX

67% OF ROCK TOE / ROCK POINT MIX = LARGE RIP RAP:
D100 = 21 INCH (~ 400 LB)
D75 = 15 INCH (~ 170 LB)
D50 = 12 INCH (~ 90 LB)
D10 = 4 INCH (~ 3 LB)

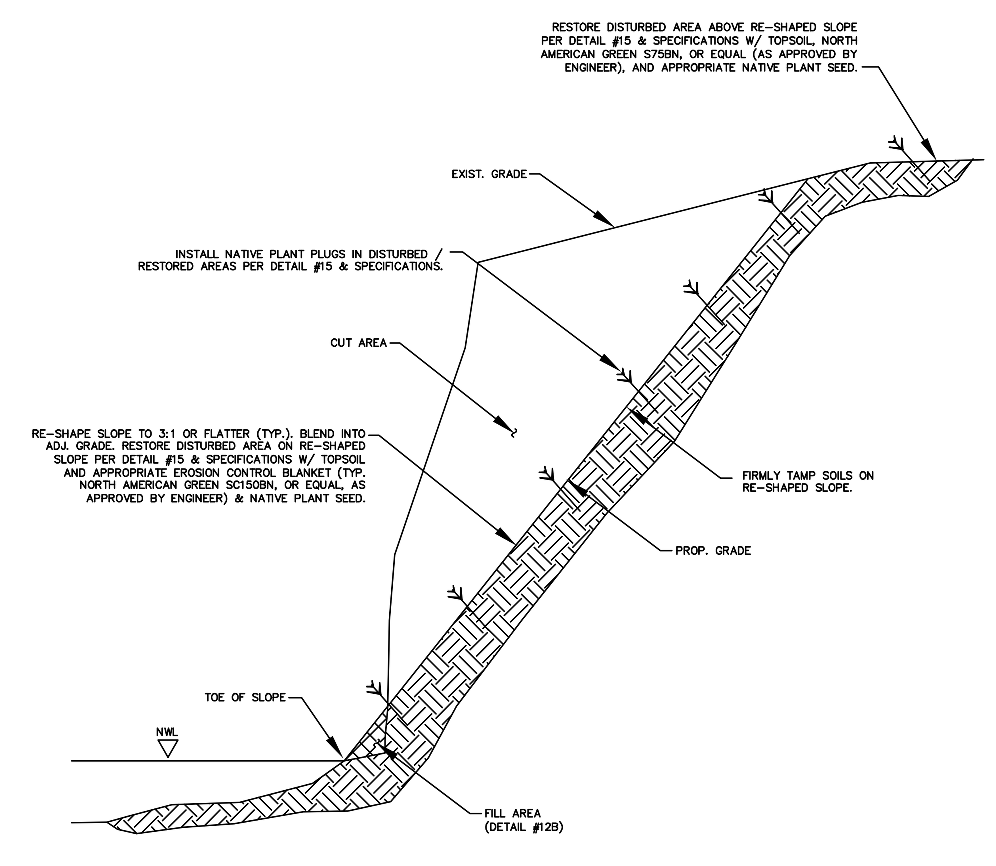
33% OF ROCK TOE / ROCK POINT MIX = MEDIUM COARSE AGGREGATE:
D100 = 1 INCH
D50 = 0.50 INCH
D10 = 0.1875 INCH

ROCK TYPE:
RIP RAP SHALL BE STONE, QUARRIED FROM UNDISTURBED, CONSOLIDATED DEPOSITS (LEDGES) OF ROCK REASONABLY FREE OF SHALE AND SHALY STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

COARSE AGGREGATE SHALL BE GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

ROCK TOE / VEG. GEOGRID LIFTS / RE-SHAPE SLOPE

NOT TO SCALE



PROFILE

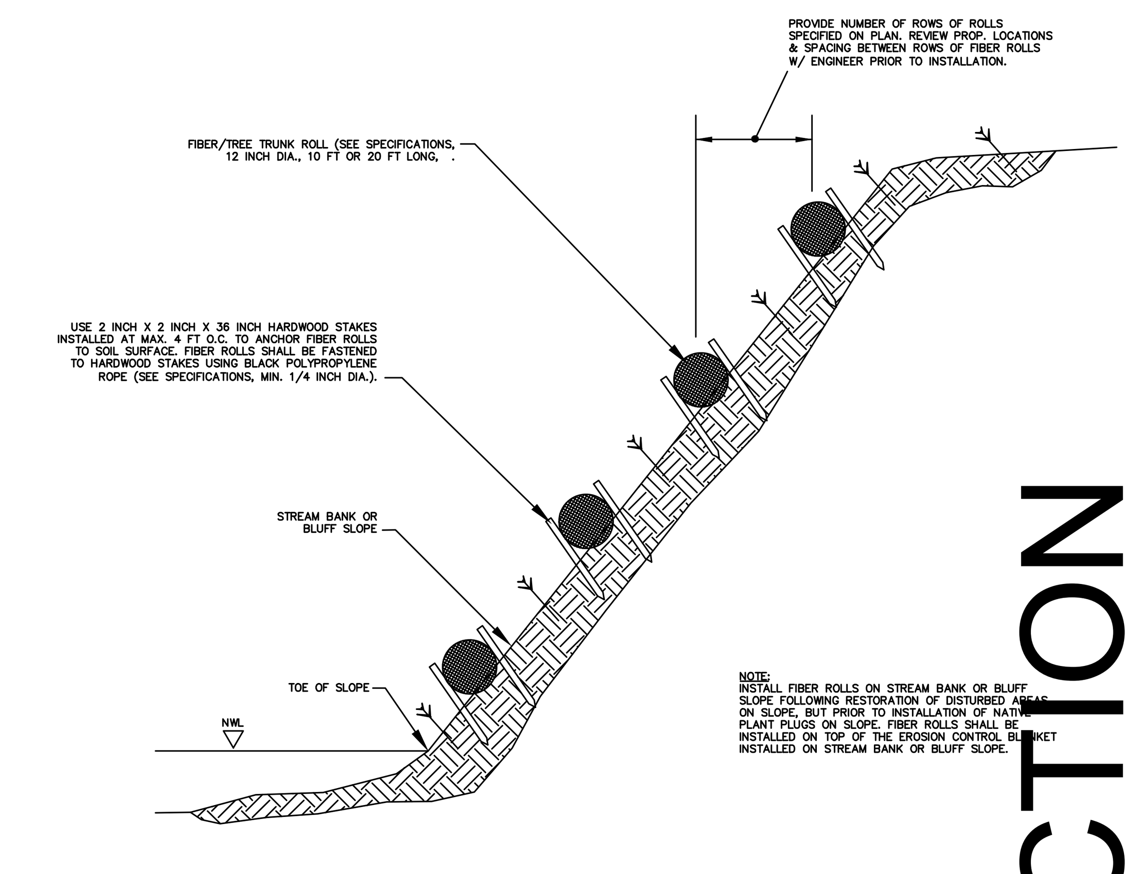
NOT TO SCALE

INSTALLATION

1. CUT EXIST. GRADE AS NEEDED TO RE-SHAPE SLOPE TO 3:1 OR FLATTER (TYP.). SHAPE, TRIM, & FINISH RE-SHAPED SLOPE AND BLEND INTO ADJ. GRADE. FIRMLY TAMP SOILS ON RE-SHAPED SLOPE.
2. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
3. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
4. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

RE-SHAPE SLOPE (CUT)

NOT TO SCALE



PROFILE

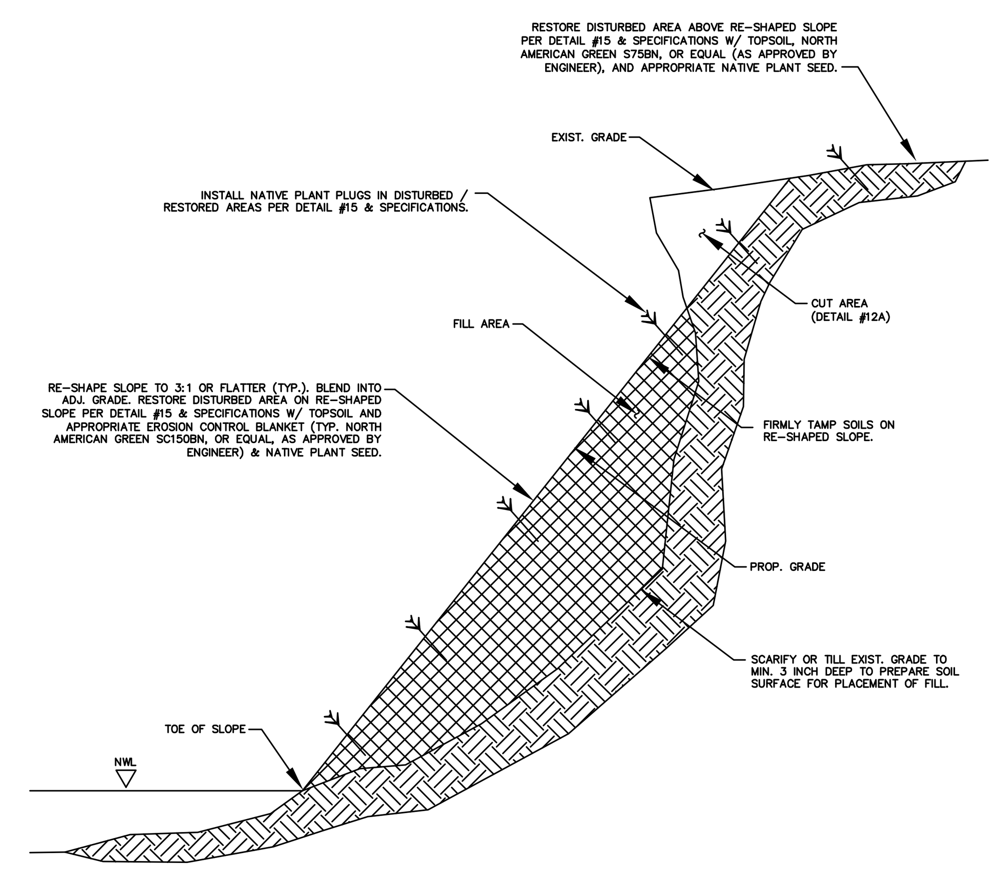
NOT TO SCALE

INSTALLATION

1. INSTALL FIBER ROLLS ON STREAM BANK OR BLUFF SLOPE FOLLOWING RESTORATION OF DISTURBED AREAS ON SLOPE, BUT PRIOR TO INSTALLATION OF NATIVE PLANT PLUGS ON SLOPE. FIBER ROLLS SHALL BE INSTALLED ON TOP OF THE EROSION CONTROL BLANKET INSTALLED ON STREAM BANK OR BLUFF SLOPE. PROVIDE NUMBER OF ROWS OF FIBER ROLLS SPECIFIED ON PLAN. REVIEW PROP. LOCATIONS & SPACING BETWEEN ROWS OF FIBER ROLLS W/ ENGINEER PRIOR TO INSTALLATION.
2. USE 2 INCH X 2 INCH X 36 INCH HARDWOOD STAKES INSTALLED AT MAX. 4 FT O.C. TO ANCHOR FIBER ROLLS TO SOIL SURFACE.
3. FASTEN FIBER ROLLS TO WOOD STAKES USING BLACK POLYPROPYLENE ROPE (SEE SPECIFICATIONS, MIN. 1/4 INCH DIA.).

TERRACE ROLL

NOT TO SCALE



PROFILE

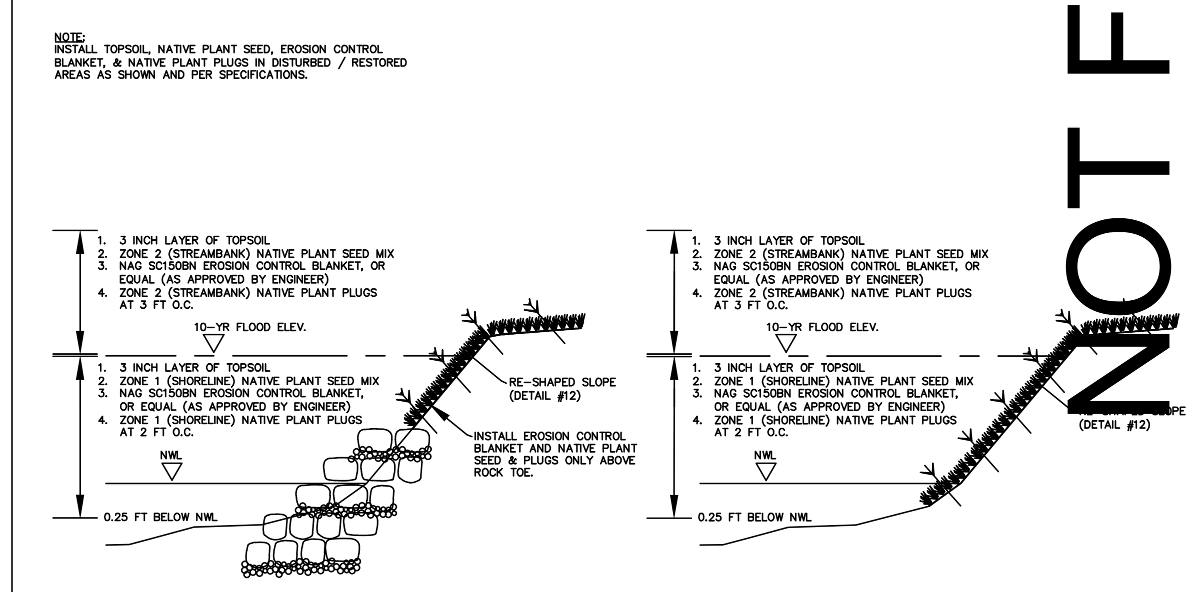
NOT TO SCALE

INSTALLATION

1. SCARIFY OR TILL EXIST. GRADE TO MIN. 3 INCH DEEP TO PREPARE SOIL SURFACE FOR PLACEMENT OF FILL.
2. FILL (USING COMMON BORROW) ABOVE TOE OF SLOPE AS NEEDED TO RE-SHAPE SLOPE TO 3:1 OR FLATTER (TYP.). SHAPE, TRIM, & FINISH RE-SHAPED SLOPE AND BLEND INTO ADJ. GRADE. FIRMLY TAMP SOILS ON RE-SHAPED SLOPE.
3. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
4. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
5. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

RE-SHAPE SLOPE (FILL)

NOT TO SCALE



ROCK TOE / RE-SHAPE SLOPE

RE-SHAPE SLOPE

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

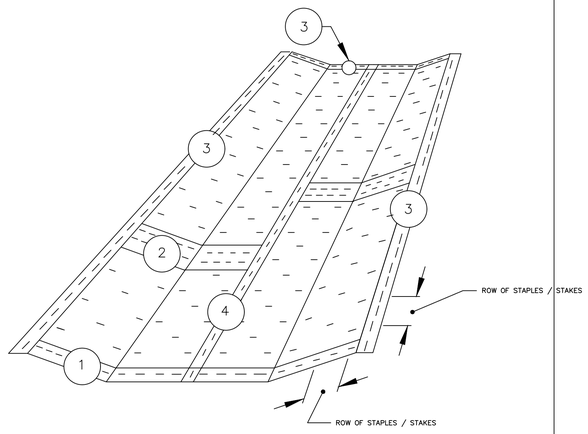
SHEET C 3.1
LOCH LOMOND
SHEET REFERENCE

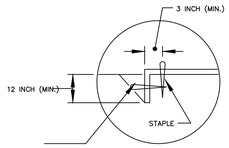
SHEET NO.

PROJECT NUMBER: 17.dpr.swapp

DESIGNED	EH
DRAWN	EH
APPROVED	N/A
DATE	10/30/2017
SCALE	

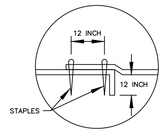
SEE ALSO IL URBAN MANUAL IL-530A / IL-530B





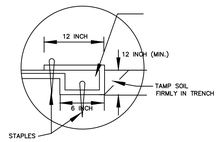
TERMINAL FOLD

DETAIL 1



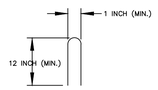
JUNCTION SLOT

DETAIL 2



ANCHOR SLOT

DETAIL 3



STAPLE DETAIL

DETAIL 4

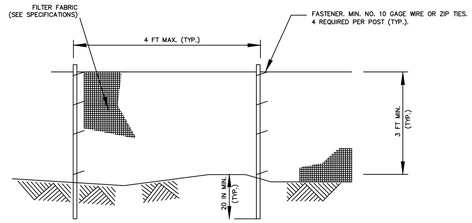
NOTES:

1. IF HEIGHT OF SLOPE TO BE RESTORED IS GREATER THAN 4 FT, EROSION CONTROL BLANKET SHALL BE INSTALLED VERTICALLY UP THE SLOPE, PERPENDICULAR TO THE STREAM BANK. IF HEIGHT OF SLOPE TO BE RESTORED IS 4 FT OR LESS, EROSION CONTROL BLANKET SHALL BE INSTALLED HORIZONTALLY ALONG THE SLOPE, PARALLEL TO THE STREAM BANK.
2. EROSION CONTROL BLANKET SHALL BE PLACED FIRMLY IN CONTACT WITH SOIL SURFACE. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES, PER MANUFACTURER'S RECOMMENDED STAPLE PATTERN.
3. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS. EACH EDGE OF BLANKET SHALL BE SECURED USING ANCHOR SLOT OR TERMINAL FOLD, PER MANUFACTURER'S INSTRUCTIONS. DO NOT USE LAP JOINTS BETWEEN SECTIONS OF EROSION CONTROL BLANKET.
4. PER MANUFACTURER'S RECOMMENDED STAPLE PATTERN, APPROXIMATELY 1.15 STAPLES REQUIRED PER SQ. YD. OF EROSION CONTROL BLANKET INSTALLED IN AREAS RE-SHAPED TO A SLOPE OF 3:1 OR FLATTER, APPROXIMATELY 1.7 STAPLES REQUIRED PER SQ. YD OF EROSION CONTROL BLANKET INSTALLED IN AREAS RE-SHAPED TO A SLOPE OF 2:1 OR FLATTER, AND APPROXIMATELY 3.4 STAPLES REQUIRED PER SQ. YD OF EROSION CONTROL BLANKET INSTALLED IN AREAS RE-SHAPED TO 1:1 OR FLATTER.

EROSION CONTROL BLANKET

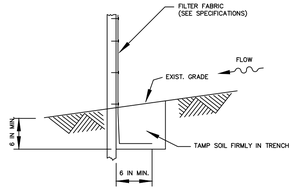
NOT TO SCALE

SEE ALSO IL URBAN MANUAL IL-620A



ELEVATION

NOT TO SCALE



ANCHOR DETAIL

NOT TO SCALE

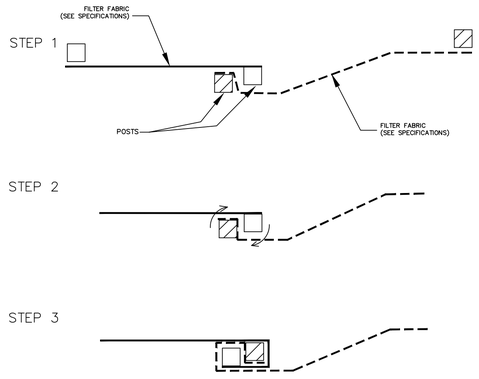
NOTES:

1. SEE SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL PLAN. IF INCLUDED AS PART OF SOIL EROSION AND SEDIMENT CONTROL PLAN, SILT FENCE SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES, AS INDICATED ON PLAN. SILT FENCE SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND REMOVED IN CONJUNCTION WITH FINAL SITE AND SITE STABILIZATION.
2. SILT FENCE SHALL MEET THE PROVISIONS OF AASHTO M288 AND IL URBAN MANUAL IL-620, WHICHEVER STANDARD IS MORE RESTRICTIVE SHALL PREVAIL.
3. FILTER FABRIC USED ON SILT FENCES SHALL BE CLASSIFIED AS SUPPORTED (WITH A WIRE OR POLYMERIC MESH BACKING) OR UNSUPPORTED (NO BACKING).
4. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF AASHTO M288 WITH MIN. AVG. ROLL VALUES (MARV) OF AT LEAST 90-LB FORCE (BEFORE THE FABRIC TEARS) FOR SUPPORTED SILT FENCE, OR 124-LB FORCE PARALLEL TO THE MACHINE DIRECTION & 100-LB FORCE PERPENDICULAR TO THE MACHINE DIRECTION FOR UNSUPPORTED SILT FENCE. PERMITTIVITY SHALL BE TESTED IN ACCORDANCE WITH ASTM D4491 AND MARV PERMITTIVITY SHALL BE 0.05 / SEC OR GREATER. APPARENT OPENING SIZE SHALL BE TESTED IN ACCORDANCE WITH ASTM D4751 AND MARV APPARENT OPENING SIZE SHALL BE 0.024 INCHES OR LESS. UV STABILITY SHALL BE TESTED IN ACCORDANCE WITH ASTM D4355 AND MARV UV STABILITY SHALL BE 70% RETAINED STRENGTH AFTER 500 HOURS OF EXPOSURE OR GREATER.
5. POST SPACING SHALL BE MAX. 4 FT O.C. FOR SUPPORTED FILTER FABRIC OR UNSUPPORTED FILTER FABRIC ELONGATED TO $\geq$ 50%, AS MEASURED IN ACCORDANCE WITH ASTM D4632. POST SPACING SHALL BE MAX 6 FT O.C. FOR UNSUPPORTED FILTER FABRIC ELONGATED < 50%, AS MEASURED IN ACCORDANCE WITH ASTM D4632.
6. POSTS SHALL BE COMPOSED OF HARDWOOD, STEEL, OR SYNTHETIC MATERIAL. POSTS SHALL BE A MIN. OF 56 IN LONG (3 FT ABOVE GRADE, 20 IN BELOW GRADE). HARDWOOD POSTS SHALL BE A MIN. OF 1.2 INCH X 1.2 INCH. STEEL POSTS MAY BE U, T, L, OR C SHAPE, WEIGHING 1.3 LBS PER FT (MIN.).

18 SILT FENCE

NOT TO SCALE

SEE ALSO IL URBAN MANUAL IL-620B



ATTACHING TWO SILT FENCES

NOTES:

1. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE.
2. ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL.
3. DRIVE BOTH POSTS A MINIMUM OF 20 INCHES INTO THE GROUND AND BURY THE FLAP.

SILT FENCE FASTENING

NOT TO SCALE

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
LOCH LOMOND IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 3.2
LOCH LOMOND
SHEET REFERENCE

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE:	DATE	10/30/2017
LCSMC LAKE COUNTY STORMWATER COMMISSION	SCALE	

Appendix B –

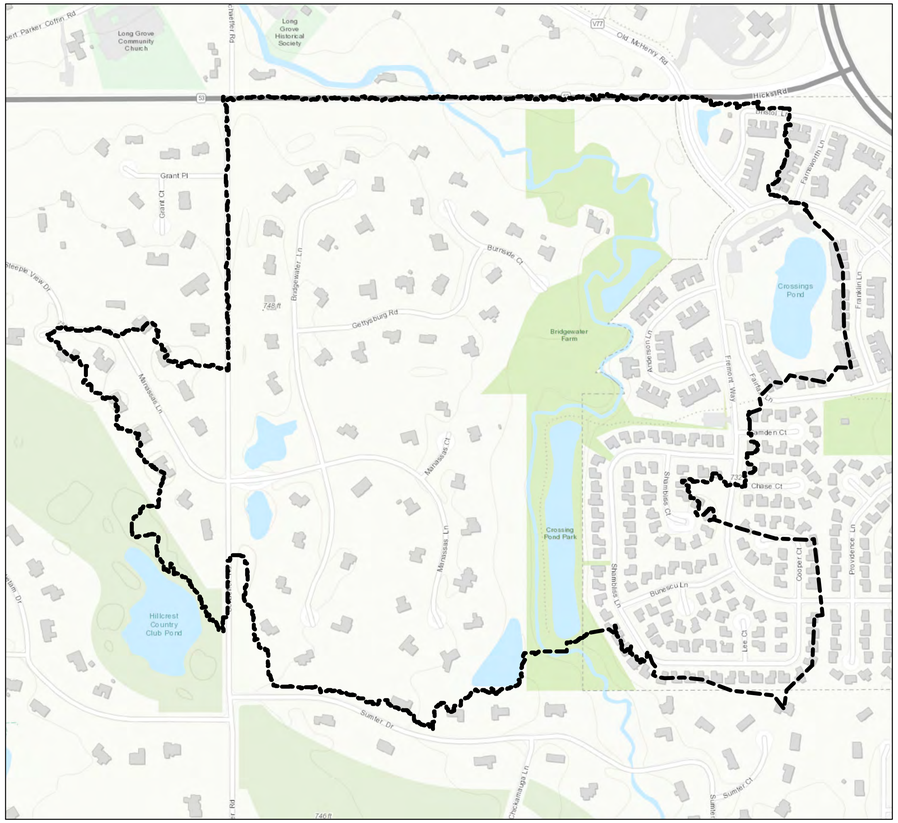
Buffalo Creek Stormwater Improvement Projects

Preliminary Concept Designs

SMALL WATERSHED ASSESSMENT AND ACTION PLAN (SWAAP) - Water Quality Improvement Projects Conceptual Design

Conceptual Design Documents - March 3, 2018

PROJECT LOCATION MAP



FOR UNDERGROUND UTILITY LOCATIONS, CALLJ.U.L.I.E.
TOLL FREE TEL. 1-800-892-0123
24 HOURS/DAY
CALL 48 HOURS PRIOR TO DIGGING
JULIE SUBURBS AND DIGG CHICAGO

YELLOW _____GAS
RED_____ELECTRICAL
ORANGE_____PHONE / TV COMMUNICATION
BLUE_____WATER
GREEN_____SEWERS
WHITE_____SAFE TO DIG

Sheet Index

SHEET C 0.0 - COVER SHEET

SHEET C 1.0 - BUFFALO CREEK PLANNING AREA OVERVIEW
SHEET C 1.1 - BUFFALO CREEK SHEET REFERENCE

SHEET C 2.1 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.2 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.3 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.4 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.5 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.6 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.7 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.8 - BUFFALO CREEK PROPOSED PROJECTS
SHEET C 2.9 - BUFFALO CREEK PROPOSED PROJECTS

SHEET C 3.0 - BUFFALO CREEK DETAILS
SHEET C 3.1 - BUFFALO CREEK DETAILS
SHEET C 3.2 - BUFFALO CREEK DETAILS

Benchmarks

The topography and elevation data utilized for this project is based on LiDAR derived data points taken in 2007 and made available by Lake County Illinois GIS department.

Field survey by a certified professional land surveyor wiill be needed in future project permitting, bidding, and construction activities.

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION
LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
BUFFALO CREEK IDENTIFIED STUDY AREA

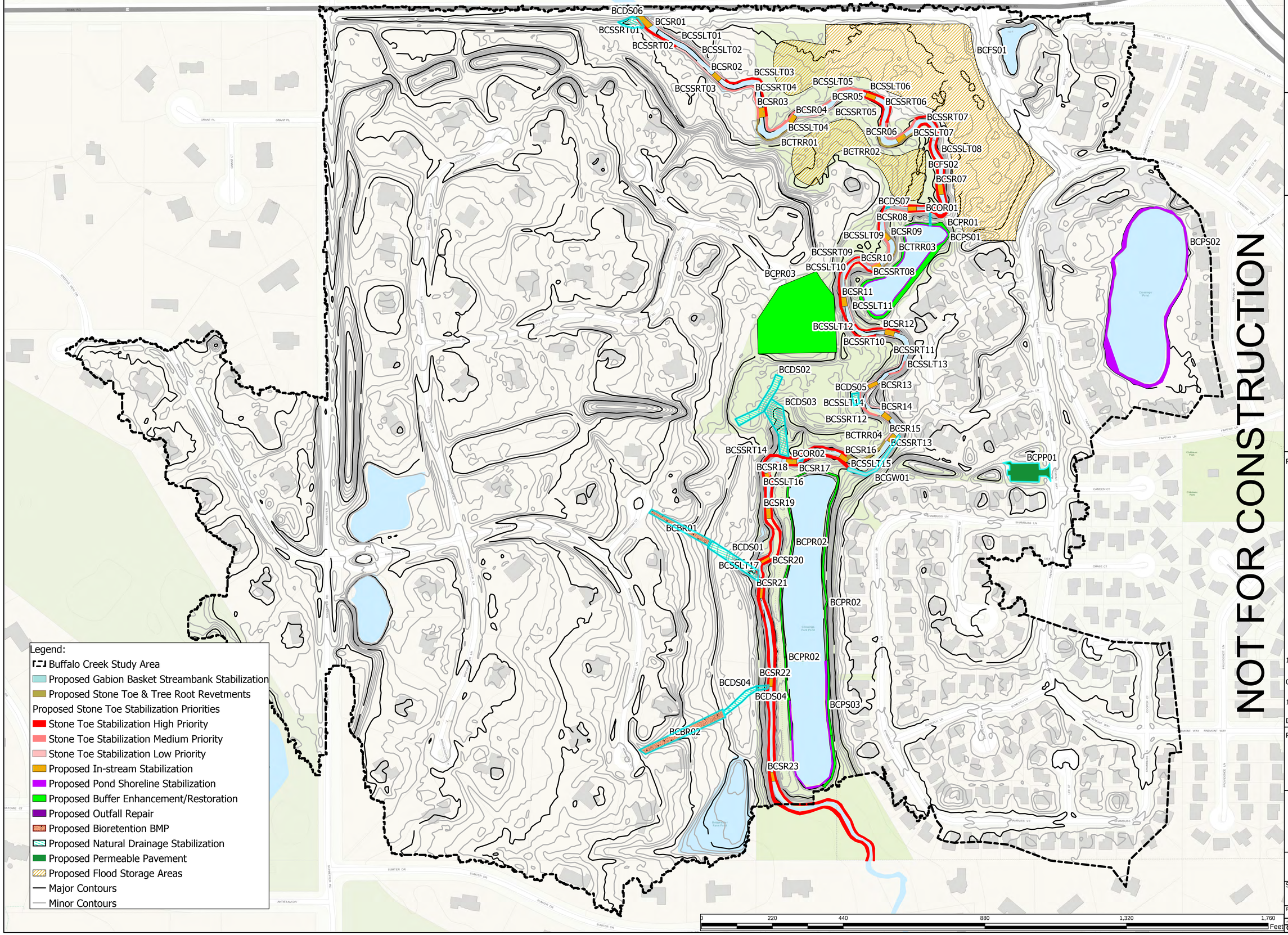
REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN
02/01/2018 CONCEPTUAL DESIGN REVISIONS
10/30/2017 DRAFT CONCEPTUAL DESIGN
DATE: DESCRIPTION OF REVISION

PROJECT:
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

C0.0 COVER SHEET

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
PM: LAKE COUNTY STORMWATER COMMISSION	SCALE	Text



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
BUFFALO CREEK CROSSINGS PARK IDENTIFIED STUDY AREA

N

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

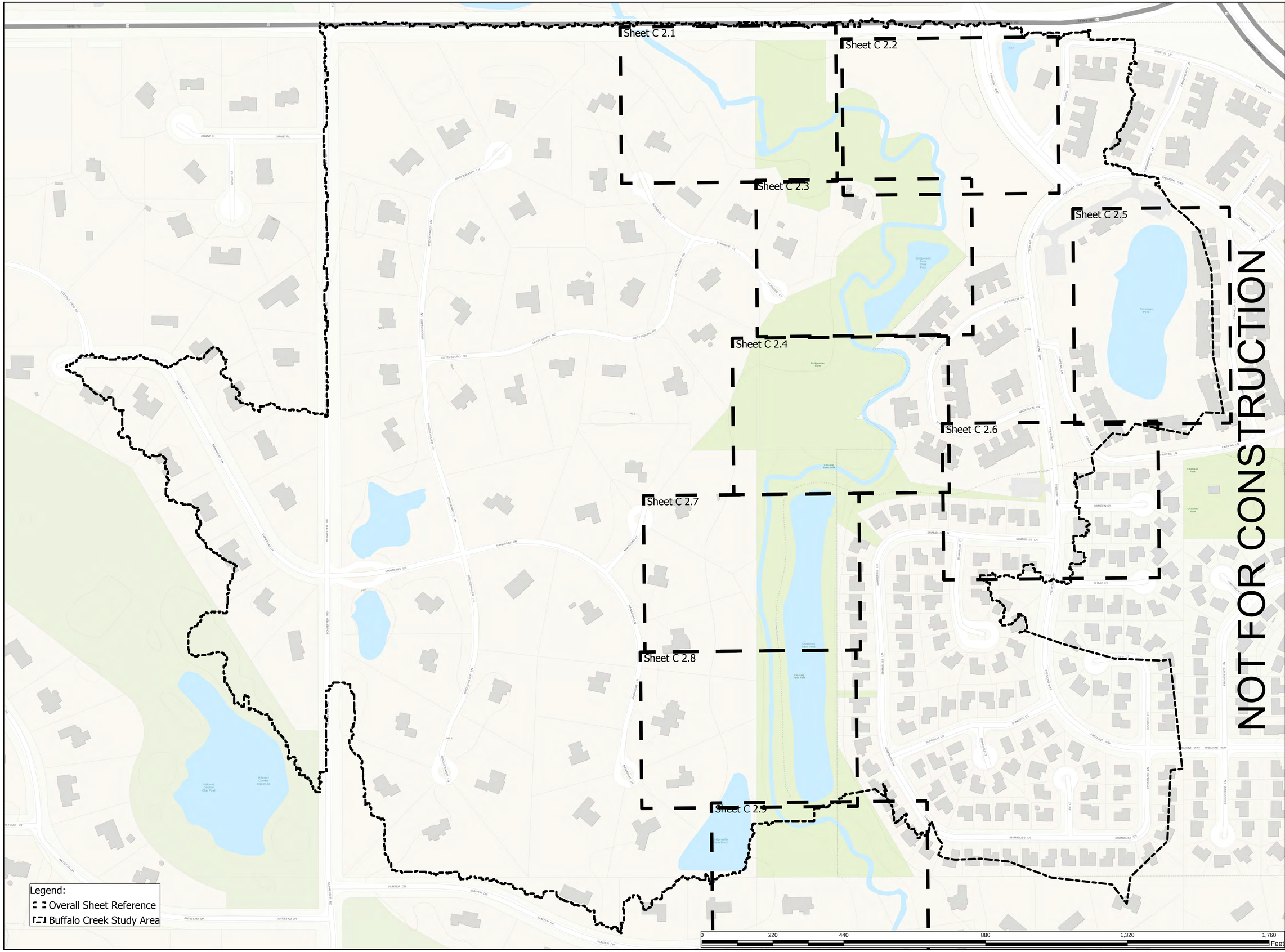
DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 1.0
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
REV.	DATE	10/30/2017
LAKE COUNTY STORMWATER COMMISSION	SCALE	1:1,500



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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
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SHEET C 1.1
BUFFALO CREEK
SHEET REFERENCE

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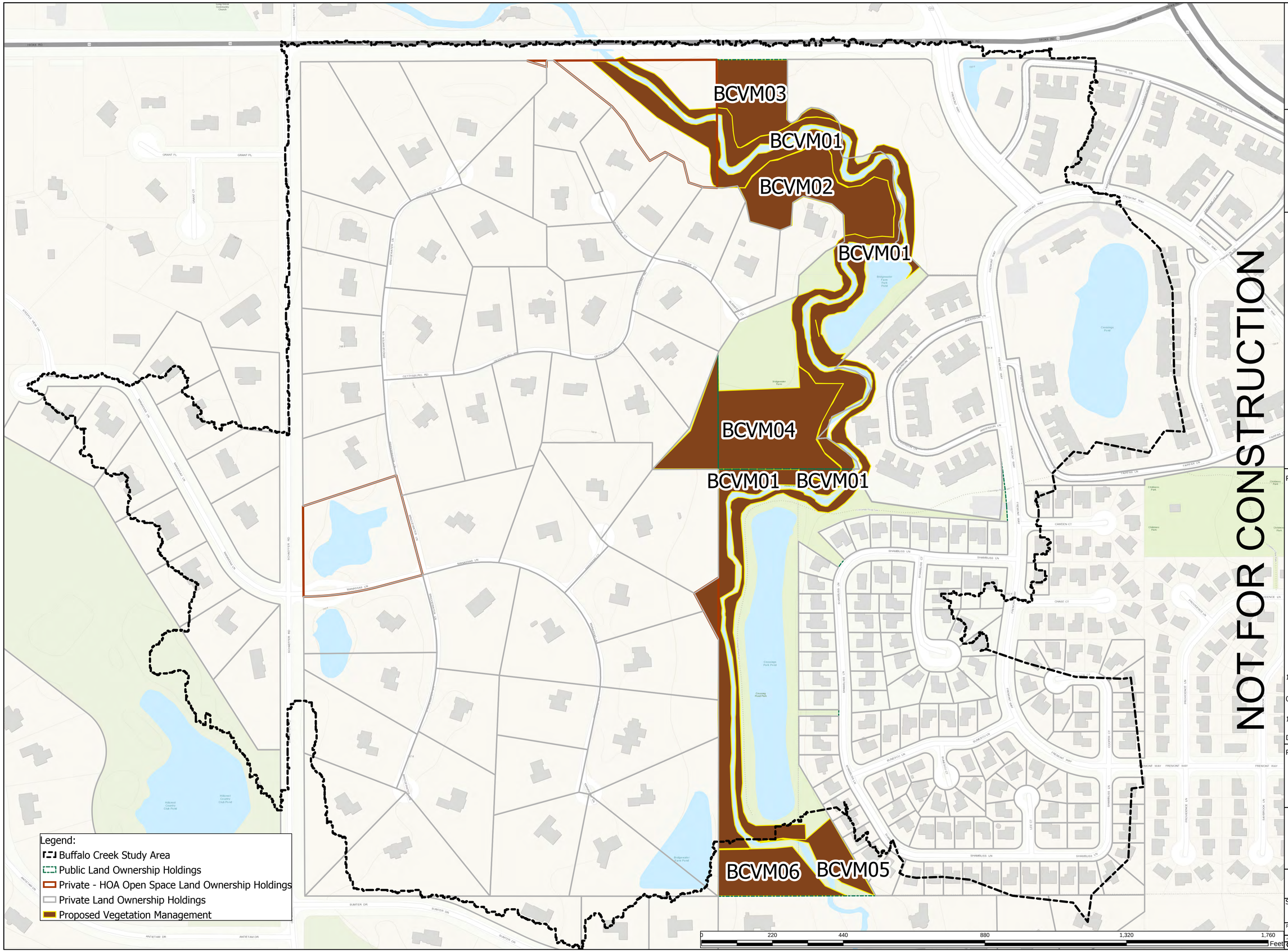
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE: LAKE COUNTY STORMWATER COMMISSION	DATE	10/30/2017
	SCALE	1:1,500



Legend:
- Buffalo Creek Study Area
- Public Land Ownership Holdings
- Private - HOA Open Space Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed Vegetation Management

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.0
BUFFALO CREEK
PROPOSED PROJECTS

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PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE: LAKE COUNTY STORMWATER COMMISSION	DATE	10/30/2017
	SCALE	1:1,500

Sheet C 2.1

BCDS06
BCSR01
BCSSLT01
BCSSRT01
BCSSLT02
BCSSRT02
BCSR02
BCSSLT03
BCSSRT03
BCSSRT04
BCSR03
BCSSLT05
BCSSRT05
BCSR04
BCSSLT04
BCTRR01
BCFS01
BCFS02

Sheet C 2.3

NOT FOR CONSTRUCTION

Legend:
- Overall Sheet Reference
- Buffalo Creek Study Area
- Proposed Stone Toe & Tree Root Revetments

Proposed Stone Toe Stabilization Priorities
- Stone Toe Stabilization High Priority
- Stone Toe Stabilization Medium Priority
- Stone Toe Stabilization Low Priority
- Proposed In-stream Stabilization
- Proposed Natural Drainage Stabilization
- Proposed Flood Storage Areas

0 37.5 75 150 225 300 Feet

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.1
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
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PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
GIS LAKE COUNTY STORMWATER COMMISSION	SCALE	1:260

Sheet C 2.2

Legend:
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- Buffalo Creek Study Area
- Public Land Ownership Holdings
- Private - HOA Open Space Land Ownership Holdings
- Private Land Ownership Holdings
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- Stone Toe Stabilization Low Priority
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- Proposed Flood Storage Areas

BCSSLT05
BCSSRT06
BCSR05
BCSSLT06
BCFS01
BCSSLT08
BCSSRT07
BCSSLT07
BCSR06
BCTRR02
BCFS02
FREMONT WAY

NOT FOR CONSTRUCTION

0 37.5 75 150 225 300 Feet

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

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BUFFALO CREEK CROSSINGS PARK IDENTIFIED STUDY AREA

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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.2
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
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PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE :	DATE	10/30/2017
LAKE COUNTY STORMWATER COMMISSION	SCALE	1:260

Sheet C 2.3

BCFS02

BCFS02

BCFS01

BCSR07

BCDS07

BCSR08

BCSSRT07

BCSSLT09

BCSSLT08

BCOR01

BCSR09

Bridgewater Farm Park Pond

BCSSRT08

BCTRR03

BCSSLT10

BCSR10

BCPS01

BURNSIDE CT

BCSSRT09

BCSR11

BCSSLT11

BCPR03

BCPR01

NOT FOR CONSTRUCTION

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- Stone Toe Stabilization Medium Priority
- Stone Toe Stabilization Low Priority
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- Proposed Pond Shoreline Stabilization
- Proposed Buffer Enhancement/Restoration
- Proposed Outfall Repair
- Proposed Natural Drainage Stabilization
- Proposed Flood Storage Areas

0 37.5 75 150 225 300 Feet

N

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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LIBERTYVILLE, IL 60048

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IDENTIFIED STUDY AREA

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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.3
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
	SCALE	1:260

Sheet C 2.4

BCPR01

BCSSLT11

BCSSLT12

BCSR12

BCSSRT09

BCSSRT10

BCPR03

ANDERSON LN

BCSSLT13

BCSSRT11

BCSR13

BCSSRT12

BCDS05

BCSSLT14

BCSR14

BCDS02

BCDS03

BCSSRT13

BCSR15

Pond Park

BCSSRT14

BCSSLT15

BCSR16

BCSR17

BCOR02

BCTRR04

BCSSLT16

BCPR02

BCSSLT17

BCSR18

BCPR02

BCGW01

Crossings Pond Trail

Legend:
- Overall Sheet Reference
- Buffalo Creek Study Area
- Public Land Ownership Holdings
- Private Land Ownership Holdings
- Proposed Gabion Basket Streambank Stabilization
- Proposed Stone Toe & Tree Root Revetments

Proposed Stone Toe Stabilization Priorities
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- Stone Toe Stabilization Low Priority
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- Proposed Outfall Repair
- Proposed Natural Drainage Stabilization

0 37.5 75 150 225 300 Feet

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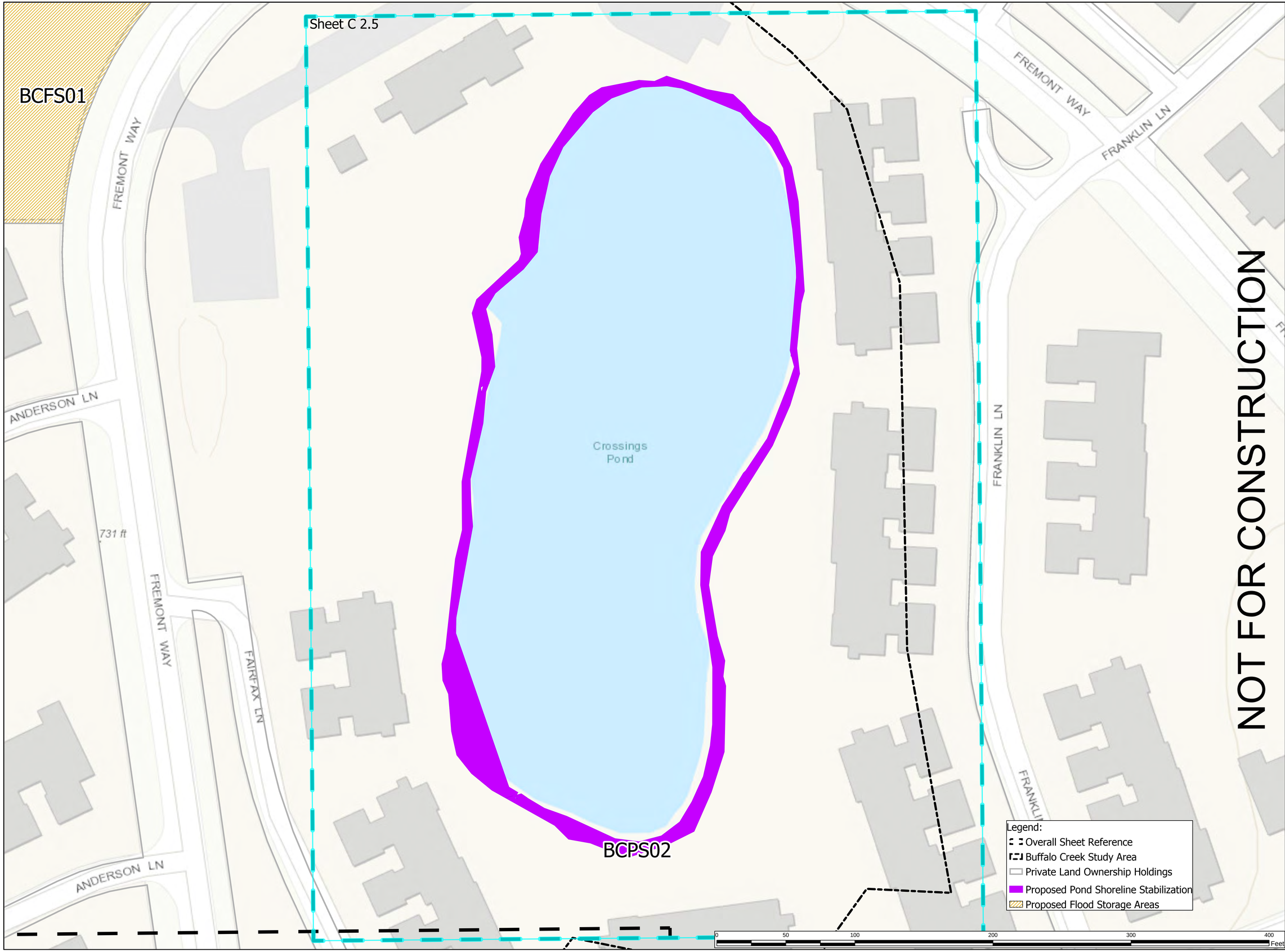
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.4
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
	SCALE	1:260



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500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
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IDENTIFIED STUDY AREA

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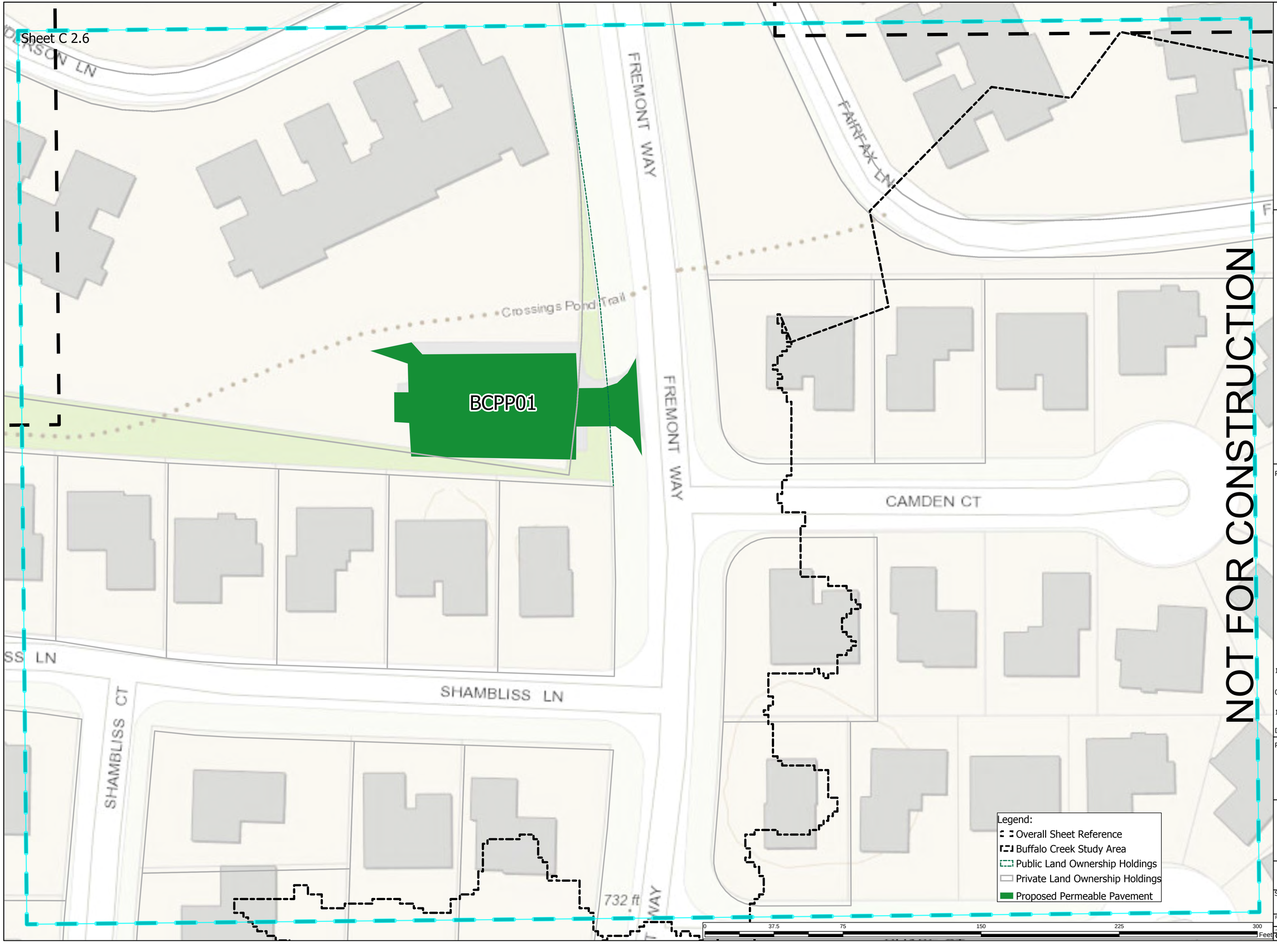
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.5
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:350

Sheet C 2.6



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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.6
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE:	DATE	10/30/2017
LAKE COUNTY STORMWATER COMMISSION	SCALE	1:260

Sheet C 2.7

BCSSLT16

BCPR02

BCGW01

BCSR18

BCSR19

BCBR01

BCSSRT14

BCDS01

BCSR20

BCPR02

BCPR02

BCSSLT17

BCSR21

Crossings Pond Trail

Crossings Park Pond

NOT FOR CONSTRUCTION

Legend:
- Overall Sheet Reference
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- Private - HOA Open Space Land Ownership Holdings
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Proposed Stone Toe Stabilization Priorities
- Stone Toe Stabilization High Priority
- Stone Toe Stabilization Medium Priority
- Proposed In-stream Stabilization
- Proposed Buffer Enhancement/Restoration
- Proposed Bioretention BMP
- Proposed Natural Drainage Stabilization

0 37.5 75 150 225 300 Feet

N

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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LIBERTYVILLE, IL 60048

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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.7
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:260

Sheet C 2.8

BCPR02

Crossing
Pond Park

BCSR22

BCDS04

BCDS04

BCSSLT17

BCPR02

BCSSRT14

BCPR02

BCBR02

BCSR23

BCPS03

Sheet C 2.9

Legend:
- Overall Sheet Reference
- Buffalo Creek Study Area
- Public Land Ownership Holdings
- Private Land Ownership Holdings

Proposed Stone Toe Stabilization Priorities
- Stone Toe Stabilization High Priority
- Proposed In-stream Stabilization
- Proposed Pond Shoreline Stabilization
- Proposed Buffer Enhancement/Restoration
- Proposed Bioretention BMP
- Proposed Natural Drainage Stabilization

0 37.5 75 150 225 300 Feet

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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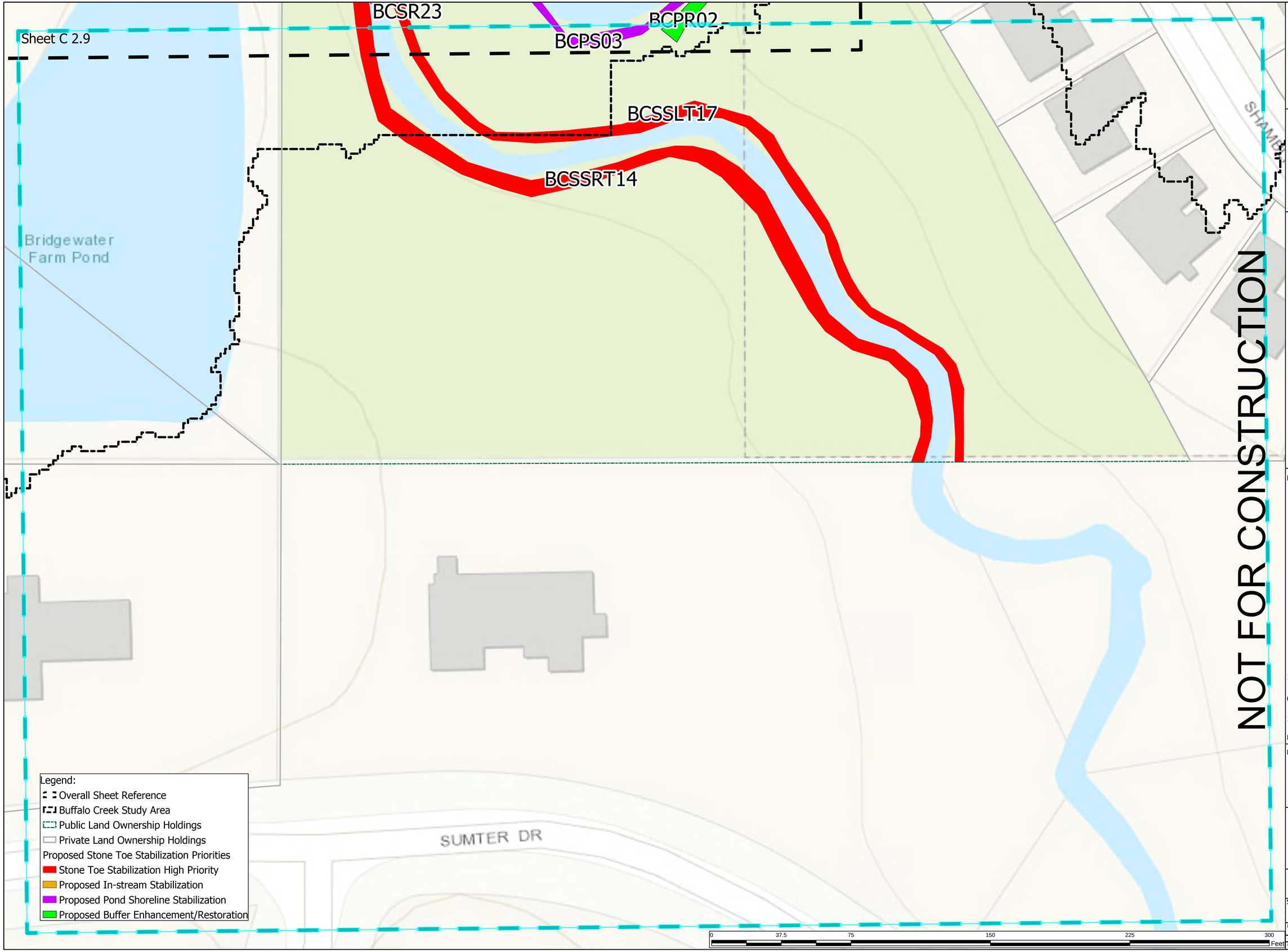
SHEET C 2.8
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
	DATE	10/30/2017
FILE: LAKE COUNTY STORMWATER COMMISSION	SCALE	1:260



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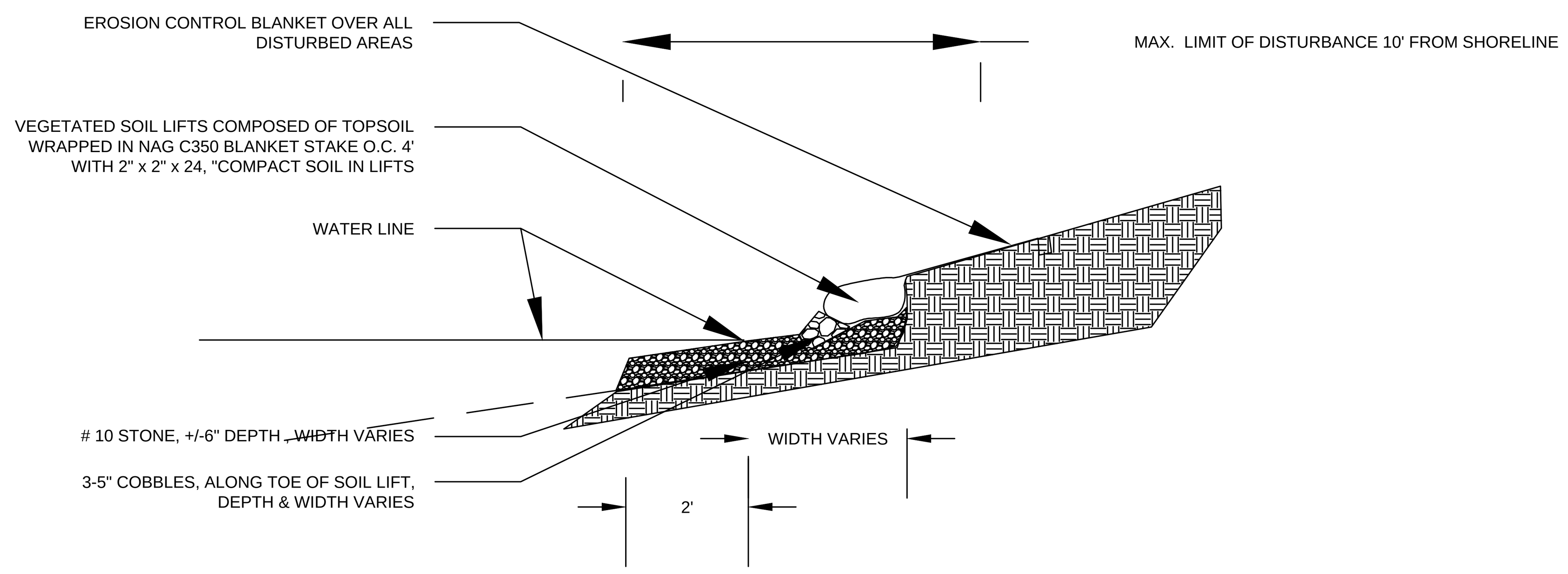
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 2.9
BUFFALO CREEK
PROPOSED PROJECTS

SHEET NO.

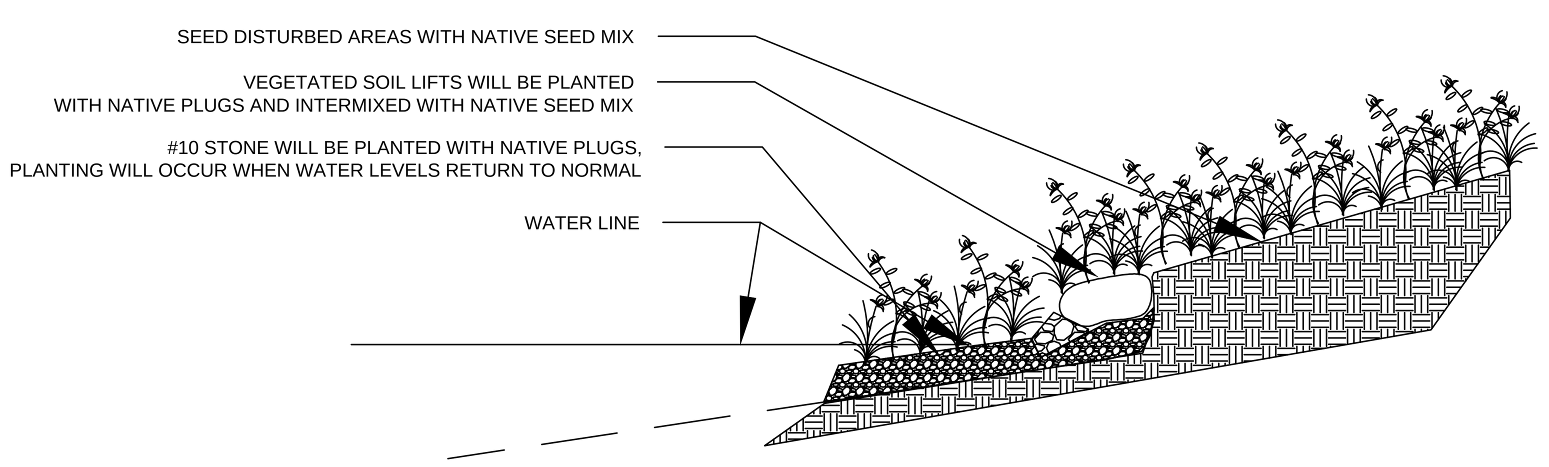
PROJECT NUMBER: 17.dpr.swapp

DESIGNED	EH
DRAWN	EH
APPROVED	N/A
DATE	10/30/2017
SCALE	1:260



SHORELINE STABILIZATION HARDSCAPE SECTION

Scale: ###" = ###"



SHORELINE STABILIZATION PLANTING SECTION

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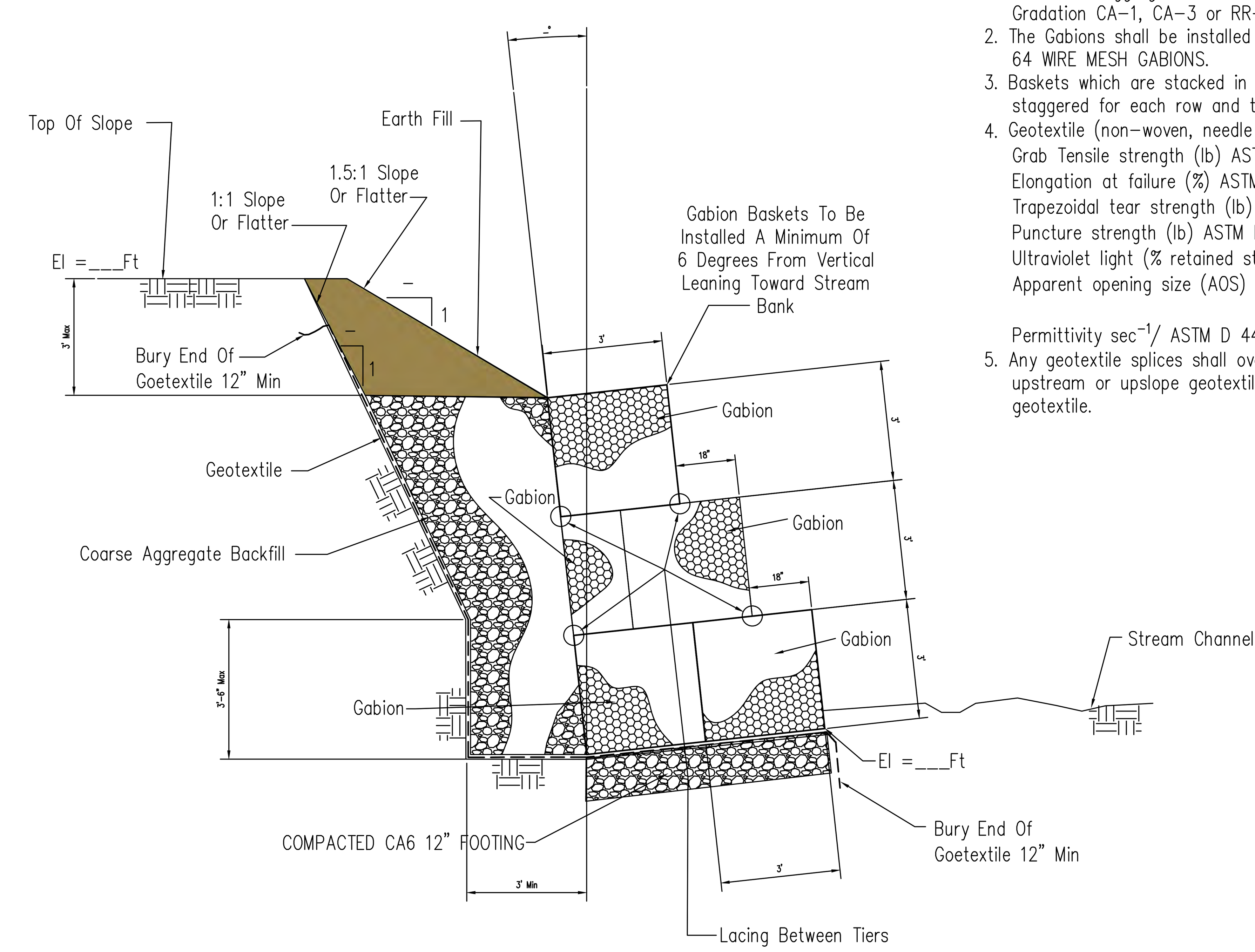

SECTION

NOTES:

1. The coarse aggregate backfill shall meet the IDOT requirement for Gradation CA–1, CA–3 or RR–Gradation 1 Riprap.
2. The Gabions shall be installed according to construction specification 64 WIRE MESH GABIONS.
3. Baskets which are stacked in tiers shall have vertical seams staggered for each row and tier.
4. Geotextile (non–woven, needle punched) min. criteria:
   Grab Tensile strength (lb) ASTM D 4632______________________202
   Elongation at failure (%) ASTM D 4632______________________≥50
   Trapezoidal tear strength (lb) ASTM D 4533__________________79
   Puncture strength (lb) ASTM D 6241 ______________________433
   Ultraviolet light (% retained strength) ASTM 4355__________min 50
   Apparent opening size (AOS) ASTM D 4751____ max 0.22 mm (US sieve size 70)
   Permittivity sec^{-1}/ ASTM D 4491______________________min 0.70
5. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the abutting downslope geotextile.

Designed M. QUINONES Date 10/1/13
Drawn
Checked
Approved

STRUCTURAL STREAMBANK STABILIZATION
GABIONS 3 BASKETS HIGH W/O MAT

United States Department of Agriculture
USDA
Natural Resources Conservation Service

File No.
IL–ENG–54
Drawing No.
Page 1 of 1
Sheet of

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
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SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

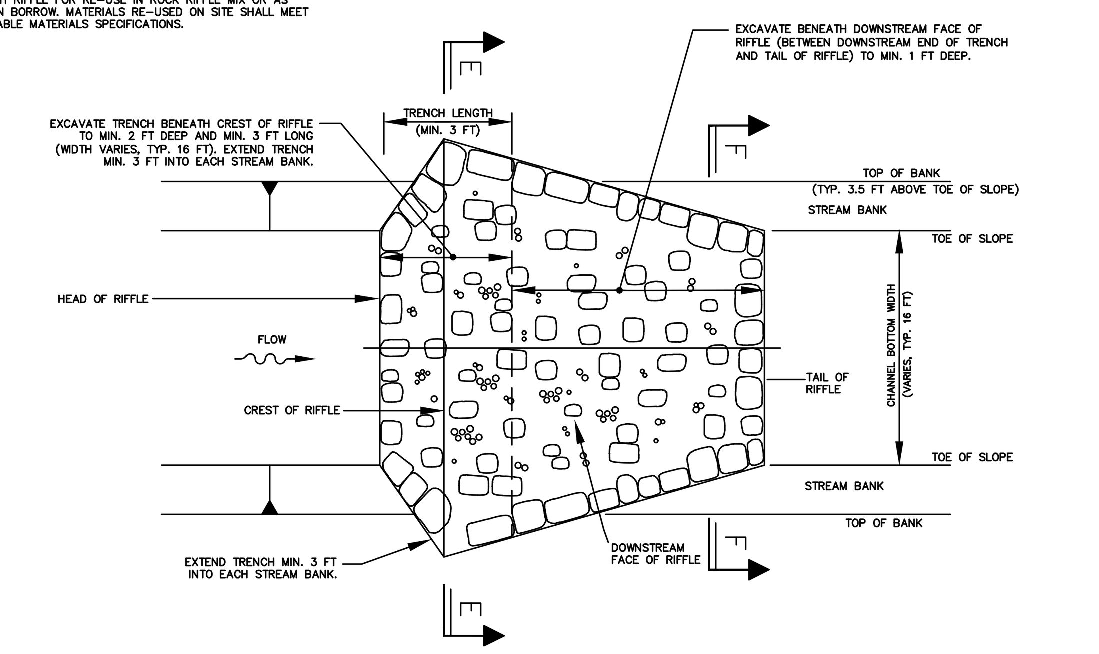
SHEET C 3.0
BUFFALO CREEK
SHEET REFERENCE

SHEET NO.

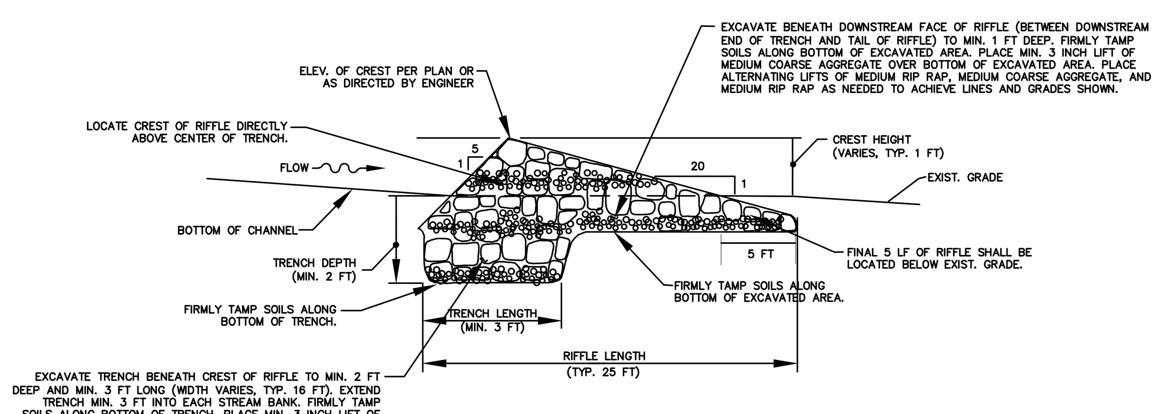
DESIGNED	EH
DRAWN	EH
APPROVED	N/A
DATE	10/30/2017
SCALE	

PROJECT NUMBER:
17.dpr.swapp

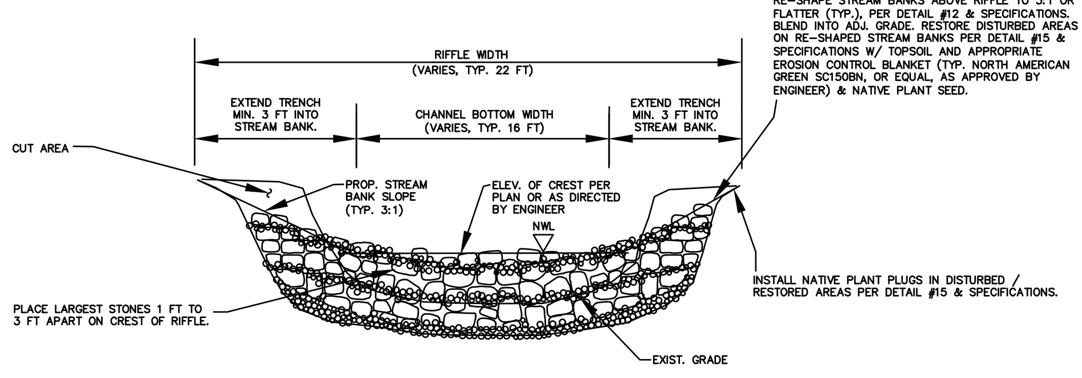
NOTE:
REMOVE LOOSE BOULDERS AND COBBLE IN STREAM BED BENEATH RIFFLE FOR RE-USE IN ROCK RIFFLE MIX OR AS COMMON BORROW. MATERIALS RE-USED ON SITE SHALL MEET APPLICABLE MATERIALS SPECIFICATIONS.



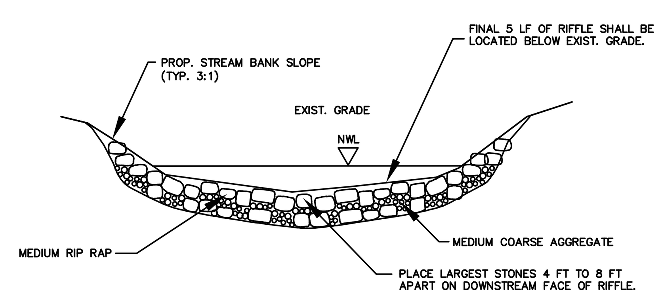
PLAN VIEW
NOT TO SCALE



PROFILE
NOT TO SCALE



ELEVATION AT CREST (E SECTION)
NOT TO SCALE



ELEVATION ON DOWNSTREAM FACE (F SECTION)
NOT TO SCALE

INSTALLATION

1. REMOVE LOOSE BOULDERS AND COBBLE IN STREAM BED BENEATH RIFFLE FOR RE-USE IN ROCK RIFFLE MIX OR AS COMMON BORROW. MATERIALS RE-USED ON SITE SHALL MEET APPLICABLE MATERIALS SPECIFICATIONS.
2. EXCAVATE TRENCH BENEATH CREST OF RIFFLE TO MIN. 2 FT DEEP AND MIN. 3 FT LONG (WIDTH VARIES, TYP. 16 FT). EXTEND TRENCH MIN. 3 FT INTO EACH STREAM BANK.
3. EXCAVATE BENEATH DOWNSTREAM FACE OF RIFFLE, BETWEEN DOWNSTREAM END OF TRENCH AND TAIL OF RIFFLE, TO MIN. 1 FT DEEP.
4. FIRMLY TAMP SOILS ALONG BOTTOM OF TRENCH AND ALONG BOTTOM OF EXCAVATED AREA LOCATED BENEATH DOWNSTREAM FACE OF RIFFLE.
5. PLACE MIN. 3 INCH LIFT OF MEDIUM COARSE AGGREGATE OVER BOTTOM OF TRENCH AND OVER BOTTOM OF EXCAVATED AREA LOCATED BENEATH DOWNSTREAM FACE OF RIFFLE.
6. FILL REMAINDER OF TRENCH WITH MEDIUM RIP RAP.
7. PLACE LIFT OF MEDIUM COARSE AGGREGATE OVER TRENCH TO FILL VOID SPACE BETWEEN LARGER STONES IN MEDIUM RIP RAP (TOP OF MEDIUM COARSE AGGREGATE PLACED OVER TRENCH SHALL MATCH TOP OF MEDIUM COARSE AGGREGATE PLACED OVER BOTTOM OF EXCAVATED AREA LOCATED BENEATH DOWNSTREAM FACE OF RIFFLE).
8. PLACE ALTERNATING LIFTS OF MEDIUM RIP RAP, MEDIUM COARSE AGGREGATE, AND MEDIUM RIP RAP AS NEEDED TO ACHIEVE LINES AND GRADES SHOWN. MEDIUM COARSE AGGREGATE SHALL FILL VOID SPACE BETWEEN LARGER STONES IN MEDIUM RIP RAP.
9. ON CREST OF RIFFLE, LARGEST STONES SHALL BE PLACED 1 FT TO 3 FT APART.
10. ON DOWNSTREAM FACE OF RIFFLE, LARGEST STONES SHALL BE PLACED 4 FT TO 8 FT APART.
11. PLACE FINAL LIFT OF MEDIUM COARSE AGGREGATE OVER RIFFLE. SURFACE OF RIFFLE SHALL BE ROUGH AND NATURAL IN APPEARANCE AND SHALL NOT BE SMOOTHED.
12. RE-SHAPE STREAM BANKS ABOVE RIFFLE TO 3:1 OR FLATTER (TYP.), PER DETAIL #12 & SPECIFICATIONS. BLEND INTO ADJ. GRADE.
13. RESTORE DISTURBED AREAS ON RE-SHAPED STREAM BANKS PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
14. RESTORE DISTURBED AREAS ABOVE RE-SHAPED STREAM BANKS PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
15. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

ROCK RIFFLE MIX

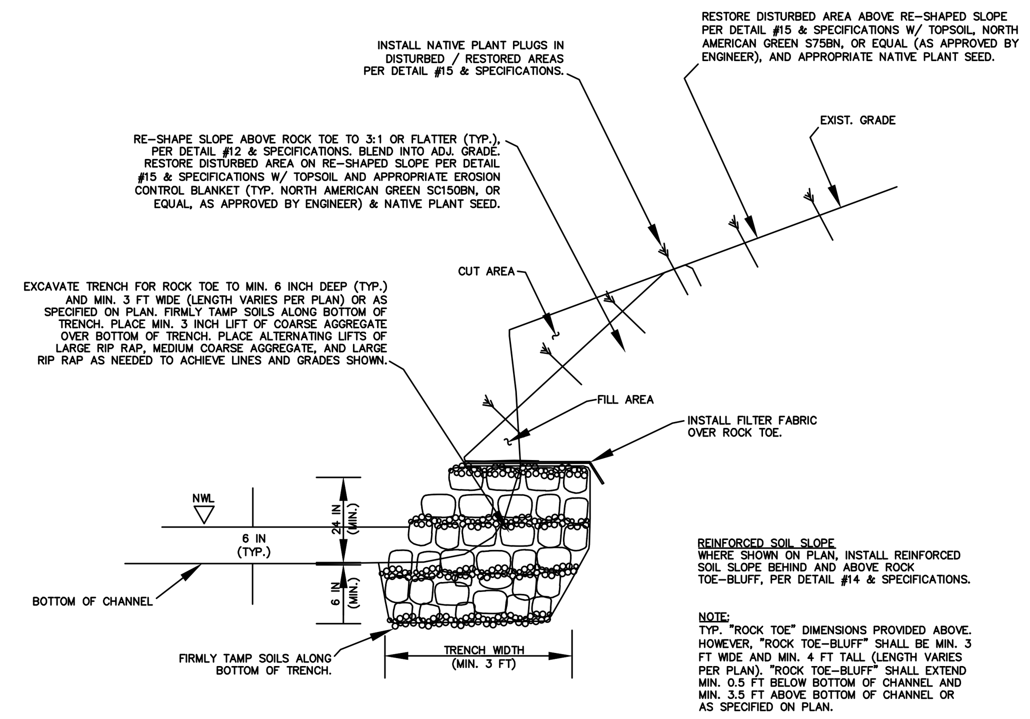
67% OF ROCK RIFFLE MIX = MEDIUM RIP RAP:
D100 = 18 INCH (~ 300 LB)
D75 = 12 INCH (~ 90 LB)
D50 = 9 INCH (~ 40 LB)
D10 = 3 INCH (~ 1 LB)

33% OF ROCK RIFFLE MIX = MEDIUM COARSE AGGREGATE:
D100 = 1 INCH
D50 = 0.50 INCH
D10 = 0.1875 INCH

ROCK TYPE:
RIP RAP SHALL BE STONE, QUARRIED FROM UNDISTURBED, CONSOLIDATED DEPOSITS (LEDGES) OF ROCK REASONABLY FREE OF SHALE AND SHALY STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

COARSE AGGREGATE SHALL BE GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

ROCK RIFFLE
NOT TO SCALE



PROFILE
NOT TO SCALE

NOTE:
TYP. "ROCK TOE" DIMENSIONS PROVIDED ABOVE. HOWEVER, "ROCK TOE-BLUFF" SHALL BE MIN. 3 FT WIDE AND MIN. 4 FT TALL (LENGTH VARIES PER PLAN). "ROCK TOE-BLUFF" SHALL EXTEND MIN. 0.5 FT BELOW BOTTOM OF CHANNEL AND MIN. 3.5 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.

INSTALLATION

1. EXCAVATE TRENCH FOR ROCK TOE TO MIN. 6 INCH DEEP (TYP.) AND MIN. 3 FT WIDE (LENGTH VARIES PER PLAN) OR AS SPECIFIED ON PLAN.
2. FIRMLY TAMP SOILS ALONG BOTTOM OF TRENCH.
3. PLACE MIN. 3 INCH LIFT OF MEDIUM COARSE AGGREGATE OVER BOTTOM OF TRENCH.
4. PLACE ALTERNATING LIFTS OF LARGE RIP RAP, MEDIUM COARSE AGGREGATE, AND LARGE RIP RAP AS NEEDED TO ACHIEVE LINES AND GRADES SHOWN. MEDIUM COARSE AGGREGATE SHALL FILL VOID SPACE BETWEEN LARGER STONES IN LARGE RIP RAP. ROCK TOE SHALL EXTEND MIN. 6 INCH BELOW BOTTOM OF CHANNEL AND MIN. 2 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.
5. INSTALL FILTER FABRIC OVER ROCK TOE, AS SHOWN AND PER SPECIFICATIONS.
6. RE-SHAPE SLOPE ABOVE ROCK TOE TO 3:1 OR FLATTER (TYP.), PER DETAIL #12 & SPECIFICATIONS. BLEND INTO ADJ. GRADE.
7. TRIM FILTER FABRIC EXTENDING BEYOND TOE OF RE-SHAPED SLOPE. FILTER FABRIC SHALL NOT EXTEND MORE THAN 3 INCH BEYOND TOE OF RE-SHAPED SLOPE.
8. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
9. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
10. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

ROCK TOE / ROCK POINT MIX

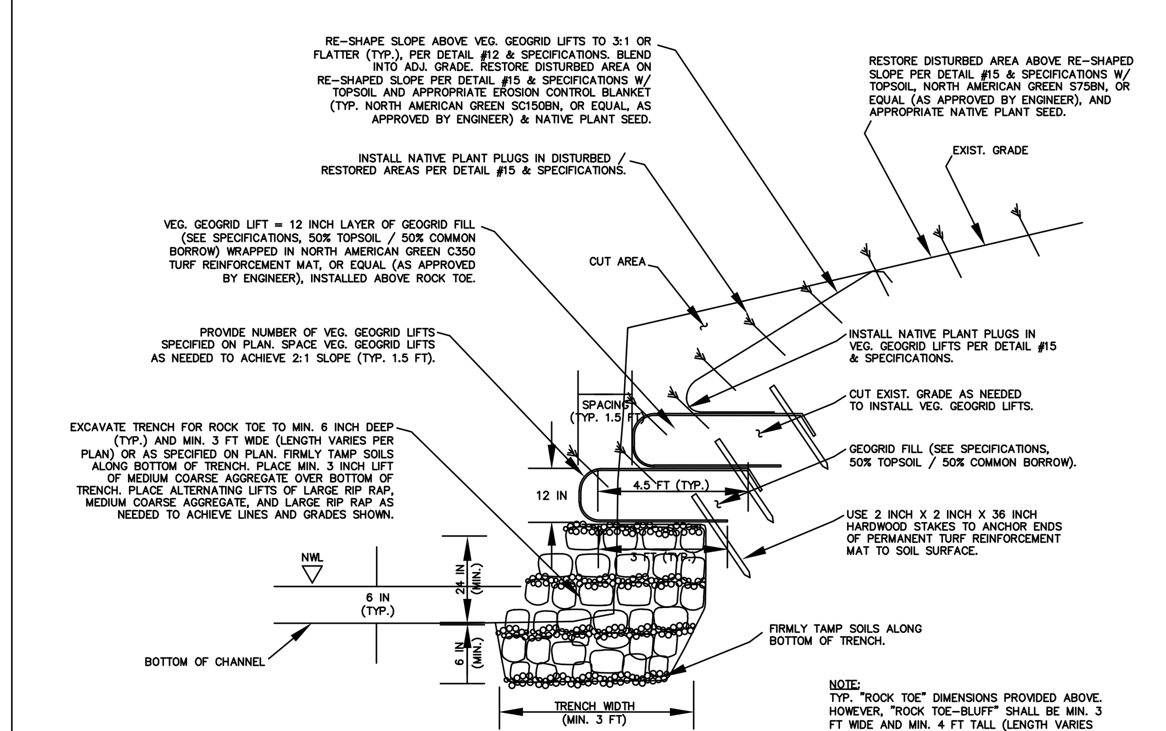
67% OF ROCK TOE / ROCK POINT MIX = LARGE RIP RAP:
D100 = 21 INCH (~ 400 LB)
D75 = 15 INCH (~ 170 LB)
D50 = 12 INCH (~ 90 LB)
D10 = 4 INCH (~ 3 LB)

33% OF ROCK TOE / ROCK POINT MIX = MEDIUM COARSE AGGREGATE:
D100 = 1 INCH
D50 = 0.50 INCH
D10 = 0.1875 INCH

ROCK TYPE:
RIP RAP SHALL BE STONE, QUARRIED FROM UNDISTURBED, CONSOLIDATED DEPOSITS (LEDGES) OF ROCK REASONABLY FREE OF SHALE AND SHALY STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

COARSE AGGREGATE SHALL BE GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

ROCK TOE / RE-SHAPE SLOPE
NOT TO SCALE



PROFILE
NOT TO SCALE

NOTE:
TYP. "ROCK TOE" DIMENSIONS PROVIDED ABOVE. HOWEVER, "ROCK TOE-BLUFF" SHALL BE MIN. 3 FT WIDE AND MIN. 4 FT TALL (LENGTH VARIES PER PLAN). "ROCK TOE-BLUFF" SHALL EXTEND MIN. 0.5 FT BELOW BOTTOM OF CHANNEL AND MIN. 3.5 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.

INSTALLATION

1. EXCAVATE TRENCH FOR ROCK TOE TO MIN. 6 INCH DEEP (TYP.) AND MIN. 3 FT WIDE (LENGTH VARIES PER PLAN), OR AS SPECIFIED ON PLAN.
2. FIRMLY TAMP SOILS ALONG BOTTOM OF TRENCH.
3. PLACE MIN. 3 INCH LIFT OF MEDIUM COARSE AGGREGATE OVER BOTTOM OF TRENCH.
4. PLACE ALTERNATING LIFTS OF LARGE RIP RAP, MEDIUM COARSE AGGREGATE, AND LARGE RIP RAP AS NEEDED TO ACHIEVE LINES AND GRADES SHOWN. MEDIUM COARSE AGGREGATE SHALL FILL VOID SPACE BETWEEN LARGER STONES IN LARGE RIP RAP. ROCK TOE SHALL EXTEND MIN. 6 INCH BELOW BOTTOM OF CHANNEL AND MIN. 2 FT ABOVE BOTTOM OF CHANNEL OR AS SPECIFIED ON PLAN.
5. CUT EXIST. GRADE ABOVE ROCK TOE AS NEEDED TO INSTALL VEG. GEOGRID LIFTS.
6. INSTALL VEG. GEOGRID LIFTS ABOVE ROCK TOE. ROLL OUT TURF REINFORCEMENT MAT (NORTH AMERICAN GREEN C350, OR EQUAL, AS APPROVED BY ENGINEER) TO MIN. WIDTH OF 3 FT (TYP.), AS MEASURED FROM FACE OF SLOPE. ANCHOR END OF TURF REINFORCEMENT MAT TO SOIL SURFACE W/ 2 INCH X 2 INCH X 36 INCH HARDWOOD STAKES INSTALLED AT MAX. 4 FT O.C.
7. PLACE AND COMPACT MAX. 6 INCH LIFTS OF GEOGRID FILL (SEE SPECIFICATIONS, 50% TOPSOIL / 50% COMMON BORROW) OVER TURF REINFORCEMENT MAT AS NEEDED TO ACHIEVE 12 INCH LAYER OF COMPACTED GEOGRID FILL OVER TURF REINFORCEMENT MAT. FOLLOWING COMPACTION, THE DRY DENSITY OF THE COMPACTED GEOGRID FILL SHALL BE AT LEAST 85% OF THE LABORATORY STANDARD (STANDARD PROCTOR) DRY DENSITY.
8. INSTALL APPROPRIATE NATIVE PLANT SEED INTO GEOGRID FILL, PER DETAIL #15 & SPECIFICATIONS.
9. WRAP TURF REINFORCEMENT MAT AROUND AND OVER GEOGRID FILL AND ROLL OUT TO MIN. WIDTH OF 4.5 FT (TYP.) ON TOP OF GEOGRID FILL, AS MEASURED FROM FACE OF SLOPE. FASTEN TURF REINFORCEMENT MAT TO UNDERLYING GEOGRID FILL, PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDED STAPLE PATTERN, W/ MIN. 12 INCH STAPLES AND ANCHOR END OF TURF REINFORCEMENT MAT TO SOIL SURFACE W/ 2 INCH X 2 INCH X 36 INCH HARDWOOD STAKES INSTALLED AT MAX. 4 FT O.C.
10. PROVIDE NUMBER OF VEG. GEOGRID LIFTS SPECIFIED ON PLAN. SPACE VEG. GEOGRID LIFTS AS NEEDED TO ACHIEVE 2:1 SLOPE (TYP. 1.5 FT).
11. RE-SHAPE SLOPE ABOVE VEG. GEOGRID LIFTS TO 3:1 OR FLATTER (TYP.), PER DETAIL #12 & SPECIFICATIONS. BLEND INTO ADJ. GRADE.
12. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
13. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
14. INSTALL NATIVE PLANT PLUGS IN VEG. GEOGRID LIFTS AND DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

ROCK TOE / ROCK POINT MIX

67% OF ROCK TOE / ROCK POINT MIX = LARGE RIP RAP:
D100 = 21 INCH (~ 400 LB)
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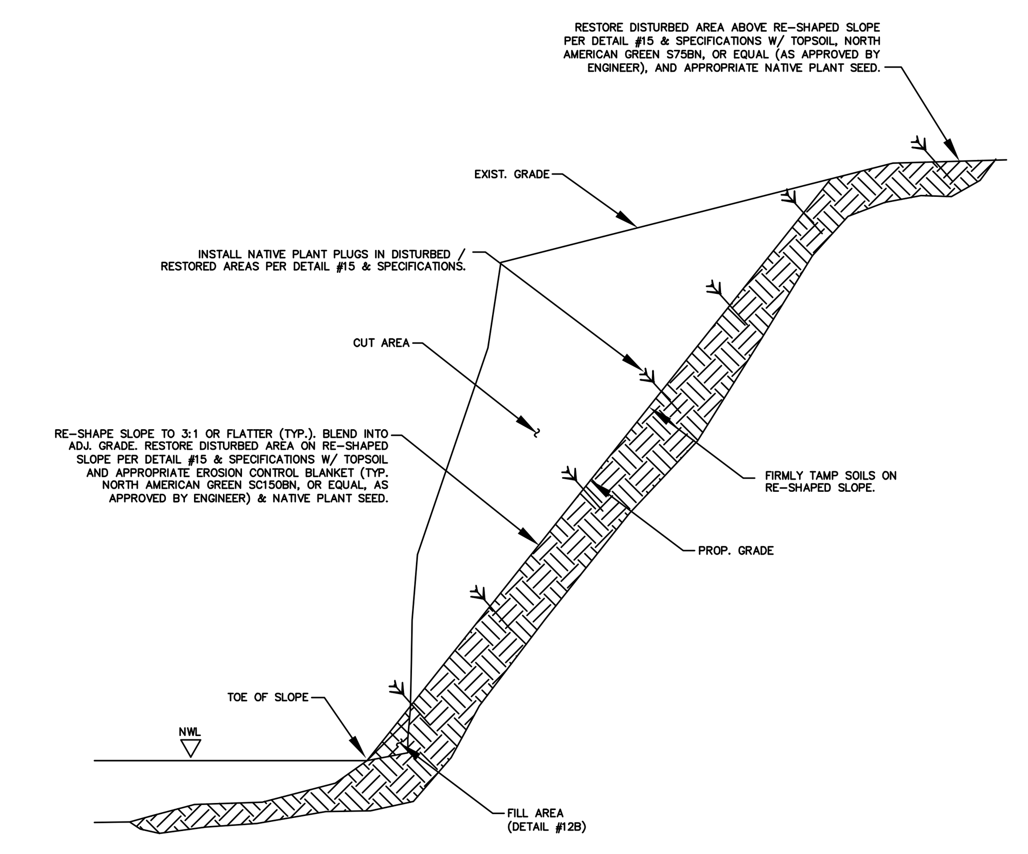
ROCK TYPE:
RIP RAP SHALL BE STONE, QUARRIED FROM UNDISTURBED, CONSOLIDATED DEPOSITS (LEDGES) OF ROCK REASONABLY FREE OF SHALE AND SHALY STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

COARSE AGGREGATE SHALL BE GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE, ANGULAR TO SUB-ROUNDED IN SHAPE, DENSE, SOUND, AND REASONABLY FREE OF LAMINATIONS, CRACKS, SEAMS, AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEATHER. RE-USE OF ON-SITE MATERIALS WITHIN THE SPECIFIED GRADATIONS IS ACCEPTABLE.

ROCK TOE / VEG. GEOGRID LIFTS / RE-SHAPE SLOPE
NOT TO SCALE

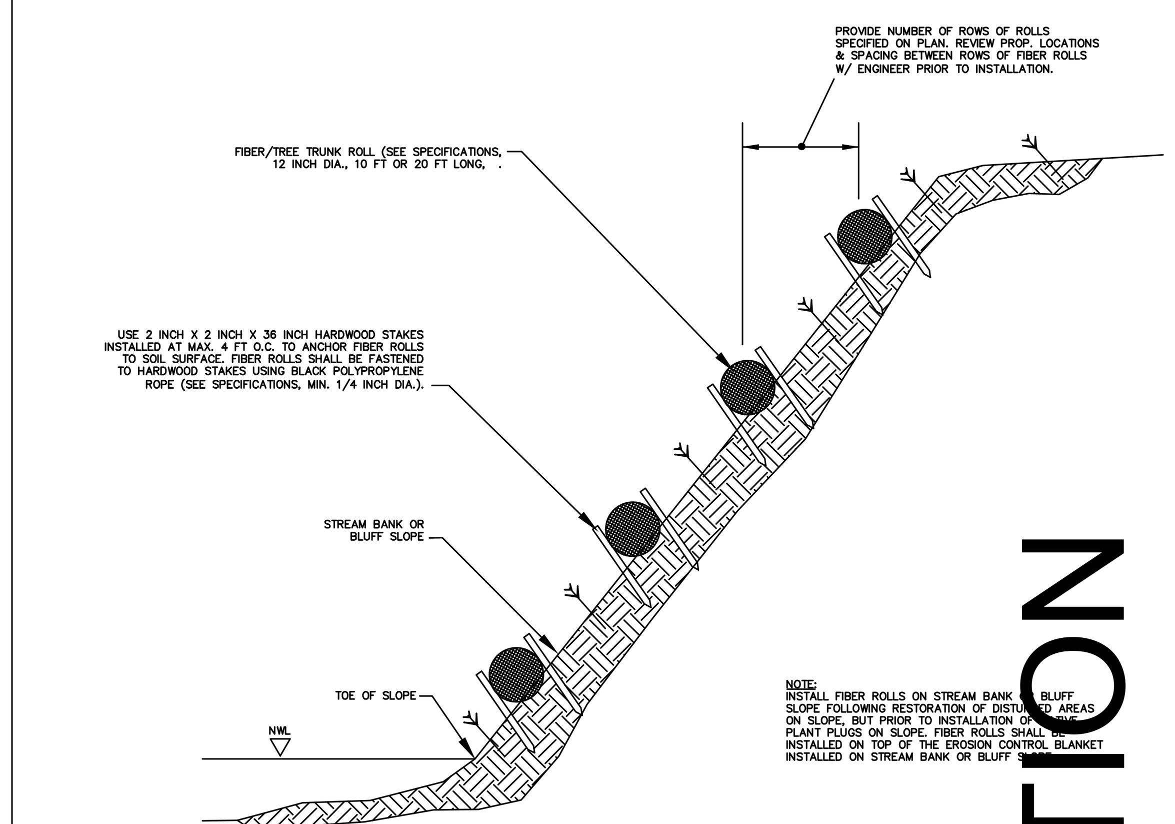


PROFILE
NOT TO SCALE

INSTALLATION

1. CUT EXIST. GRADE AS NEEDED TO RE-SHAPE SLOPE TO 3:1 OR FLATTER (TYP.). SHAPE, TRIM, & FINISH RE-SHAPED SLOPE AND BLEND INTO ADJ. GRADE. FIRMLY TAMP SOILS ON RE-SHAPED SLOPE.
2. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
3. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
4. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

RE-SHAPE SLOPE (CUT)
NOT TO SCALE

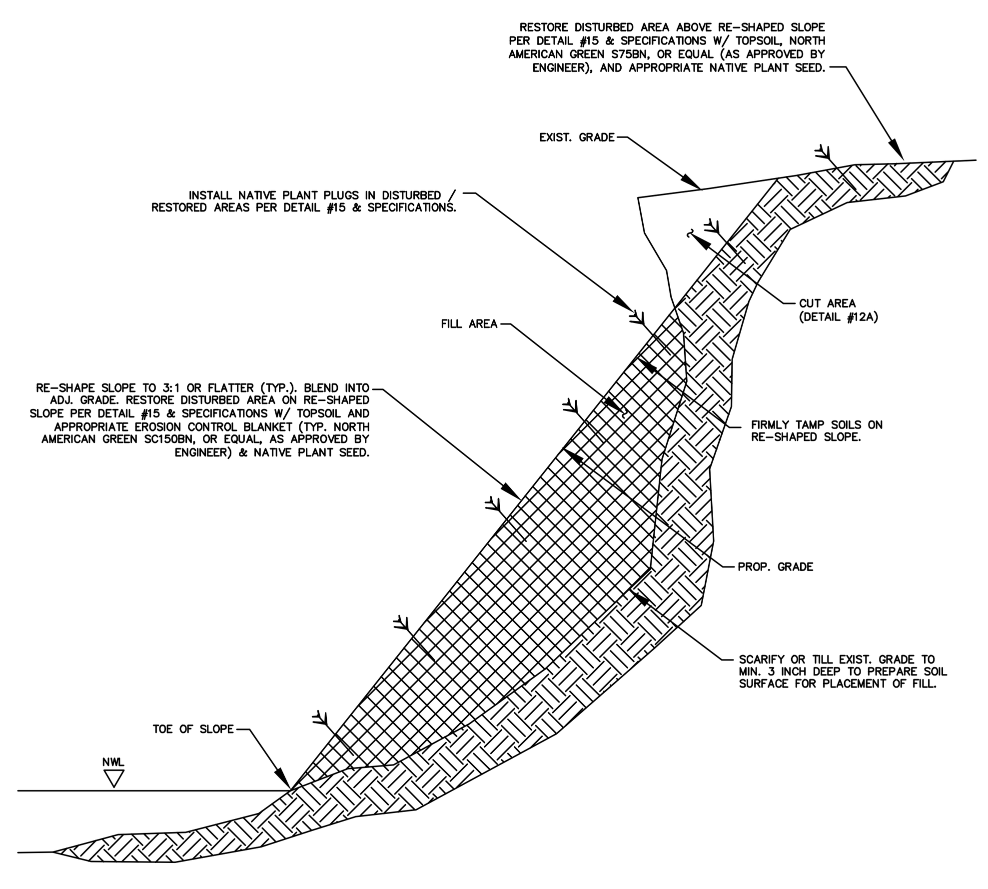


PROFILE
NOT TO SCALE

INSTALLATION

1. INSTALL FIBER ROLLS ON STREAM BANK OR BLUFF SLOPE FOLLOWING RESTORATION OF DISTURBED AREAS ON SLOPE, BUT PRIOR TO INSTALLATION OF NATIVE PLANT PLUGS ON SLOPE. FIBER ROLLS SHALL BE INSTALLED ON TOP OF THE EROSION CONTROL BLANKET INSTALLED ON STREAM BANK OR BLUFF SLOPE. PROVIDE NUMBER OF ROWS OF FIBER ROLLS SPECIFIED ON PLAN. REVIEW PROP. LOCATIONS & SPACING BETWEEN ROWS OF FIBER ROLLS W/ ENGINEER PRIOR TO INSTALLATION.
2. USE 2 INCH X 2 INCH X 36 INCH HARDWOOD STAKES INSTALLED AT MAX. 4 FT O.C. TO ANCHOR FIBER ROLLS TO SOIL SURFACE.
3. FASTEN FIBER ROLLS TO WOOD STAKES USING BLACK POLYPROPYLENE ROPE (SEE SPECIFICATIONS, MIN. 1/4 INCH DIA.).

TERRACE ROLL
NOT TO SCALE



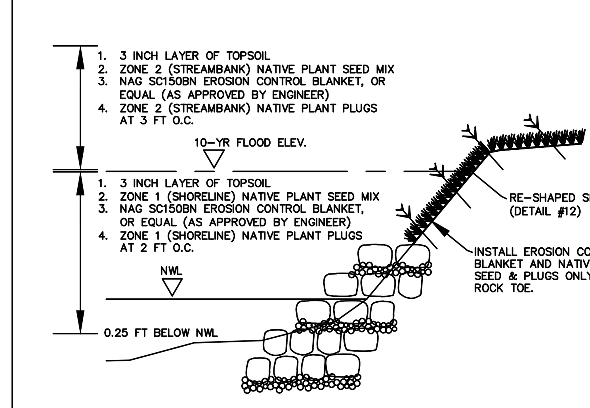
PROFILE
NOT TO SCALE

INSTALLATION

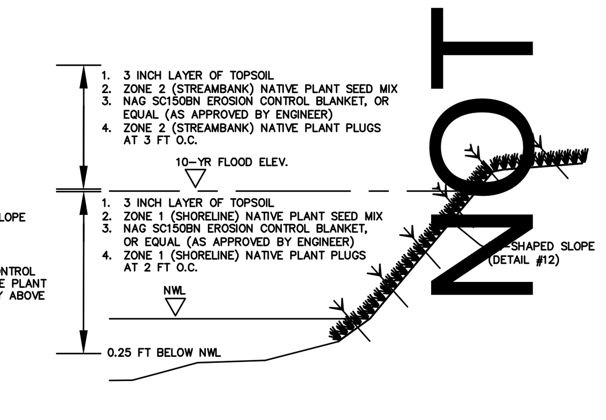
1. SCARIFY OR TILL EXIST. GRADE TO MIN. 3 INCH DEEP TO PREPARE SOIL SURFACE FOR PLACEMENT OF FILL.
2. FILL (USING COMMON BORROW) ABOVE TOE OF SLOPE AS NEEDED TO RE-SHAPE SLOPE TO 3:1 OR FLATTER (TYP.). SHAPE, TRIM, & FINISH RE-SHAPED SLOPE AND BLEND INTO ADJ. GRADE. FIRMLY TAMP SOILS ON RE-SHAPED SLOPE.
3. RESTORE DISTURBED AREA ON RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL AND APPROPRIATE EROSION CONTROL BLANKET (TYP. NORTH AMERICAN GREEN SC150BN, OR EQUAL, AS APPROVED BY ENGINEER) & NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
4. RESTORE DISTURBED AREA ABOVE RE-SHAPED SLOPE PER DETAIL #15 & SPECIFICATIONS W/ TOPSOIL, NORTH AMERICAN GREEN S75BN, OR EQUAL (AS APPROVED BY ENGINEER), AND APPROPRIATE NATIVE PLANT SEED. INSTALL EROSION CONTROL BLANKET PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDED STAPLE PATTERN. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS.
5. INSTALL NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS PER DETAIL #15 & SPECIFICATIONS.

RE-SHAPE SLOPE (FILL)
NOT TO SCALE

NOTE:
INSTALL TOPSOIL, NATIVE PLANT SEED, EROSION CONTROL BLANKET, & NATIVE PLANT PLUGS IN DISTURBED / RESTORED AREAS AS SHOWN AND PER SPECIFICATIONS.



ROCK TOE / RE-SHAPE SLOPE



RE-SHAPE SLOPE

RE-SHAPE SLOPE
NOT TO SCALE

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
BUFFALO CREEK IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN
02/01/2018 CONCEPTUAL DESIGN REVISIONS
10/30/2017 DRAFT CONCEPTUAL DESIGN
DATE: DESCRIPTION OF REVISION

PROJECT:
SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

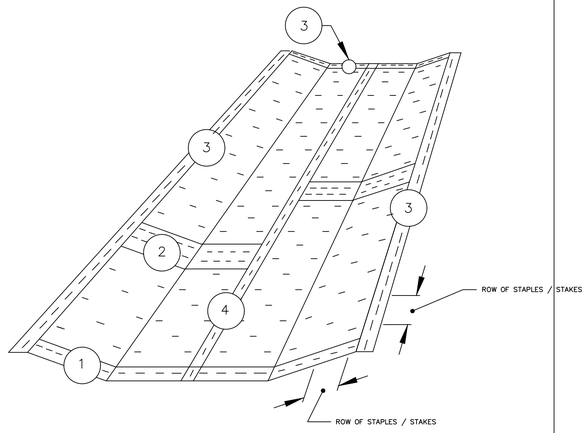
SHEET C 3.1
BUFFALO CREEK
SHEET REFERENCE

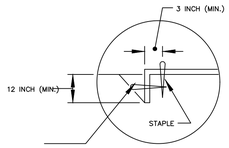
SHEET NO.

DESIGNED	EH
DRAWN	EH
APPROVED	N/A
DATE	10/30/2017
SCALE	

PROJECT NUMBER:
17.dpr.swapp
FILE:
LAKE COUNTY STORMWATER COMMISSION

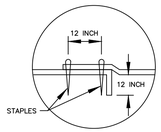
SEE ALSO IL URBAN MANUAL IL-530A / IL-530B





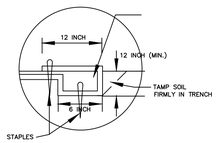
TERMINAL FOLD

DETAIL 1



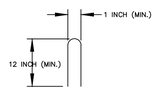
JUNCTION SLOT

DETAIL 2



ANCHOR SLOT

DETAIL 3



STAPLE DETAIL

DETAIL 4

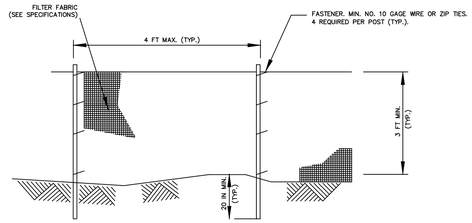
NOTES:

1. IF HEIGHT OF SLOPE TO BE RESTORED IS GREATER THAN 4 FT, EROSION CONTROL BLANKET SHALL BE INSTALLED VERTICALLY UP THE SLOPE, PERPENDICULAR TO THE STREAM BANK. IF HEIGHT OF SLOPE TO BE RESTORED IS 4 FT OR LESS, EROSION CONTROL BLANKET SHALL BE INSTALLED HORIZONTALLY ALONG THE SLOPE, PARALLEL TO THE STREAM BANK.
2. EROSION CONTROL BLANKET SHALL BE PLACED FIRMLY IN CONTACT WITH SOIL SURFACE. FASTEN EROSION CONTROL BLANKET TO SOIL SURFACE W/ MIN. 12 INCH LONG STAPLES, PER MANUFACTURER'S RECOMMENDED STAPLE PATTERN.
3. ANCHOR EACH END OF EROSION CONTROL BLANKET IN MIN. 12 INCH DEEP BY MIN. 6 INCH WIDE TRENCH, PER MANUFACTURER'S INSTRUCTIONS. EACH EDGE OF BLANKET SHALL BE SECURED USING ANCHOR SLOT OR TERMINAL FOLD, PER MANUFACTURER'S INSTRUCTIONS. DO NOT USE LAP JOINTS BETWEEN SECTIONS OF EROSION CONTROL BLANKET.
4. PER MANUFACTURER'S RECOMMENDED STAPLE PATTERN, APPROXIMATELY 1.15 STAPLES REQUIRED PER SQ. YD. OF EROSION CONTROL BLANKET INSTALLED IN AREAS RE-SHAPED TO A SLOPE OF 3:1 OR FLATTER, APPROXIMATELY 1.7 STAPLES REQUIRED PER SQ. YD OF EROSION CONTROL BLANKET INSTALLED IN AREAS RE-SHAPED TO A SLOPE OF 2:1 OR FLATTER, AND APPROXIMATELY 3.4 STAPLES REQUIRED PER SQ. YD OF EROSION CONTROL BLANKET INSTALLED IN AREAS RE-SHAPED TO 1:1 OR FLATTER.

EROSION CONTROL BLANKET

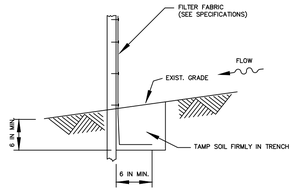
NOT TO SCALE

SEE ALSO IL URBAN MANUAL IL-620A



ELEVATION

NOT TO SCALE



ANCHOR DETAIL

NOT TO SCALE

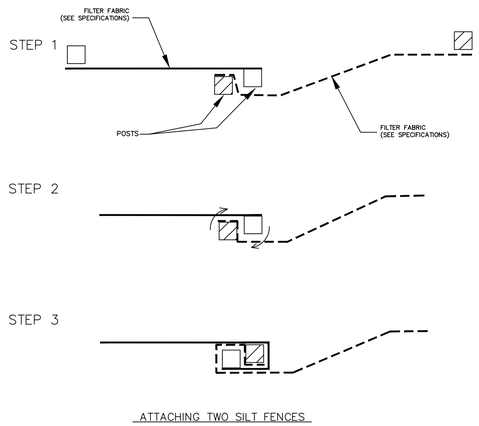
NOTES:

1. SEE SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL PLAN. IF INCLUDED AS PART OF SOIL EROSION AND SEDIMENT CONTROL PLAN, SILT FENCE SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES, AS INDICATED ON PLAN. SILT FENCE SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND REMOVED IN CONJUNCTION WITH FINAL SITE AND SITE STABILIZATION.
2. SILT FENCE SHALL MEET THE PROVISIONS OF AASHTO M288 AND IL URBAN MANUAL IL-620, WHICHEVER STANDARD IS MORE RESTRICTIVE SHALL PREVAIL.
3. FILTER FABRIC USED ON SILT FENCES SHALL BE CLASSIFIED AS SUPPORTED (WITH A WIRE OR POLYMERIC MESH BACKING) OR UNSUPPORTED (NO BACKING).
4. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF AASHTO M288 WITH MIN. AVG. ROLL VALUES (MARV) OF AT LEAST 90-LB FORCE (BEFORE THE FABRIC TEARS) FOR SUPPORTED SILT FENCE, OR 124-LB FORCE PARALLEL TO THE MACHINE DIRECTION & 100-LB FORCE PERPENDICULAR TO THE MACHINE DIRECTION FOR UNSUPPORTED SILT FENCE. PERMITTIVITY SHALL BE TESTED IN ACCORDANCE WITH ASTM D4491 AND MARV PERMITTIVITY SHALL BE 0.05 / SEC OR GREATER. APPARENT OPENING SIZE SHALL BE TESTED IN ACCORDANCE WITH ASTM D4751 AND MARV APPARENT OPENING SIZE SHALL BE 0.024 INCHES OR LESS. UV STABILITY SHALL BE TESTED IN ACCORDANCE WITH ASTM D4355 AND MARV UV STABILITY SHALL BE 70% RETAINED STRENGTH AFTER 500 HOURS OF EXPOSURE OR GREATER.
5. POST SPACING SHALL BE MAX. 4 FT O.C. FOR SUPPORTED FILTER FABRIC OR UNSUPPORTED FILTER FABRIC ELONGATED TO ≥ 50% AS MEASURED IN ACCORDANCE WITH ASTM D4632. POST SPACING SHALL BE MAX 6 FT O.C. FOR UNSUPPORTED FILTER FABRIC ELONGATED < 50% AS MEASURED IN ACCORDANCE WITH ASTM D4632.
6. POSTS SHALL BE COMPOSED OF HARDWOOD, STEEL, OR SYNTHETIC MATERIAL. POSTS SHALL BE A MIN. OF 56 IN LONG (3 FT ABOVE GRADE, 20 IN BELOW GRADE). HARDWOOD POSTS SHALL BE A MIN. OF 1.2 INCH X 1.2 INCH. STEEL POSTS MAY BE U, T, L, OR C SHAPE, WEIGHING 1.3 LBS PER FT (MIN.).

18 SILT FENCE

NOT TO SCALE

SEE ALSO IL URBAN MANUAL IL-620B



ATTACHING TWO SILT FENCES

NOTES:

1. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE.
2. ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL.
3. DRIVE BOTH POSTS A MINIMUM OF 20 INCHES INTO THE GROUND AND BURY THE FLAP.

SILT FENCE FASTENING

NOT TO SCALE

NOT FOR CONSTRUCTION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

STORMWATER MANAGEMENT COMMISSION

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION
500 W. WINCHESTER RD., STE. 201
LIBERTYVILLE, IL 60048

PROJECT LOCATION:
BUFFALO CREEK IDENTIFIED STUDY AREA

REVISIONS:

10/30/2017 DRAFT CONCEPTUAL DESIGN

02/01/2018 CONCEPTUAL DESIGN REVISIONS

10/30/2017 DRAFT CONCEPTUAL DESIGN

DATE: DESCRIPTION OF REVISION

PROJECT:

SMALL WATERSHED ASSESSMENT AND ACTION PLAN IMPROVEMENT PROJECTS

SHEET C 3.2
BUFFALO CREEK
SHEET REFERENCE

SHEET NO.	DESIGNED	EH
	DRAWN	EH
PROJECT NUMBER: 17.dpr.swapp	APPROVED	N/A
FILE: LAKE COUNTY STORMWATER COMMISSION	DATE	10/30/2017
	SCALE	