Lake Michigan Watershed-Based Plan

LAKE COUNTY STORMWATER MANAGEMENT COMMISSION

APRIL 24, 2019

Funding for this project provided, in part, by the Illinois Department of Natural Resources Coastal Management Program and Illinois Environmental Protection Agency through Section 319 of the Clean Water Act.

About This Project

Create an umbrella “watershed-based plan” for the Lake Michigan Watershed

Goals:

- Reduce non-point source pollution
- Reduce flood damages/improve stormwater management
- Restore and enhance the natural drainage system

Process and Timeline

Stakeholder planning group will assist and guide the process

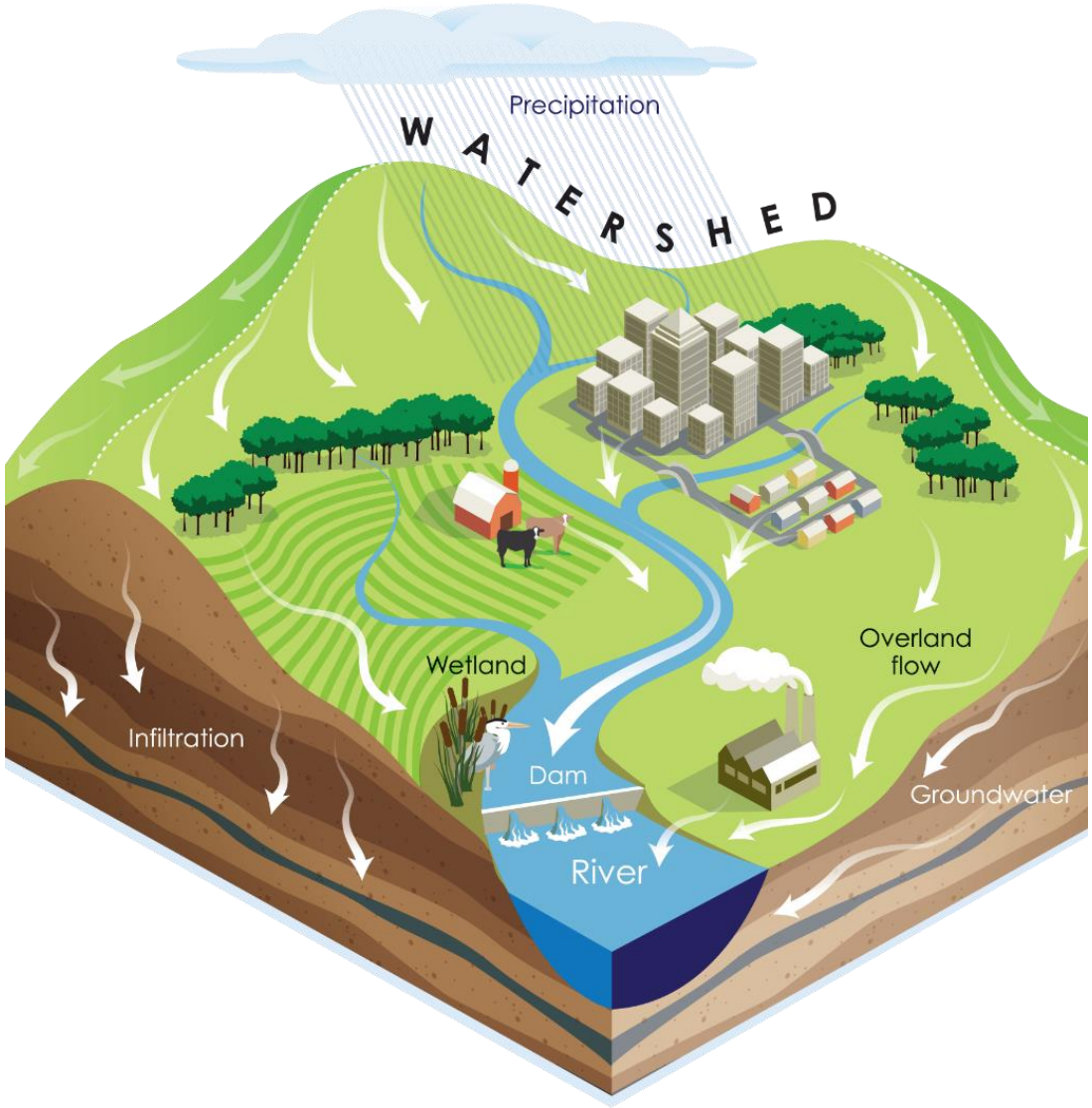
Direct outreach to stakeholders in 2019-early 2020

~12 planning meetings (2019-2020)

Plan completed September 2020

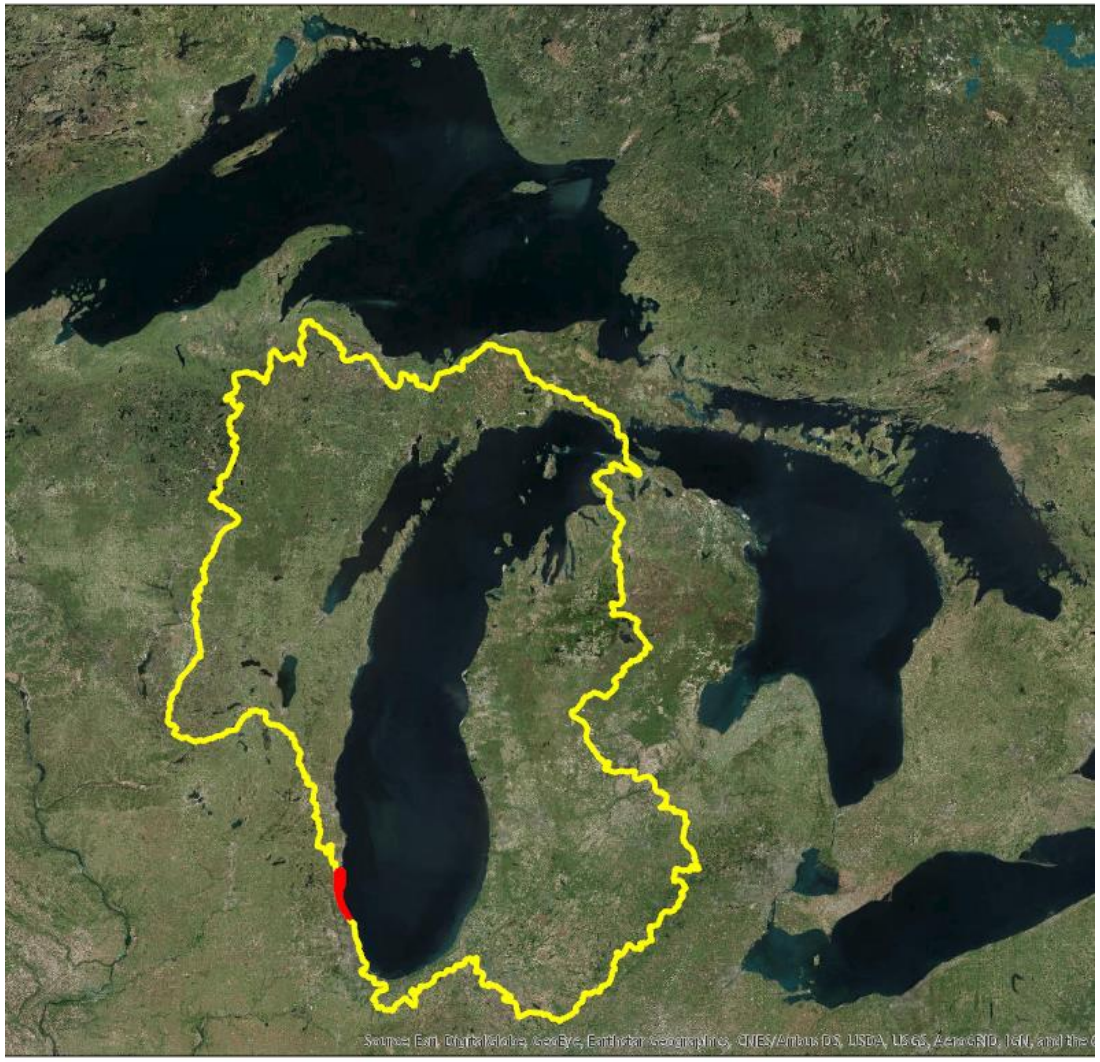
Stakeholders will receive information via email

Meeting materials will be available on the SMC website



What is a Watershed?

- Area of land drained by a river, stream, or other body of water
- Also called "drainage basin" or "catchment"



Lake Michigan Watershed

45,600 square-mile land area

22,300 square-mile lake surface

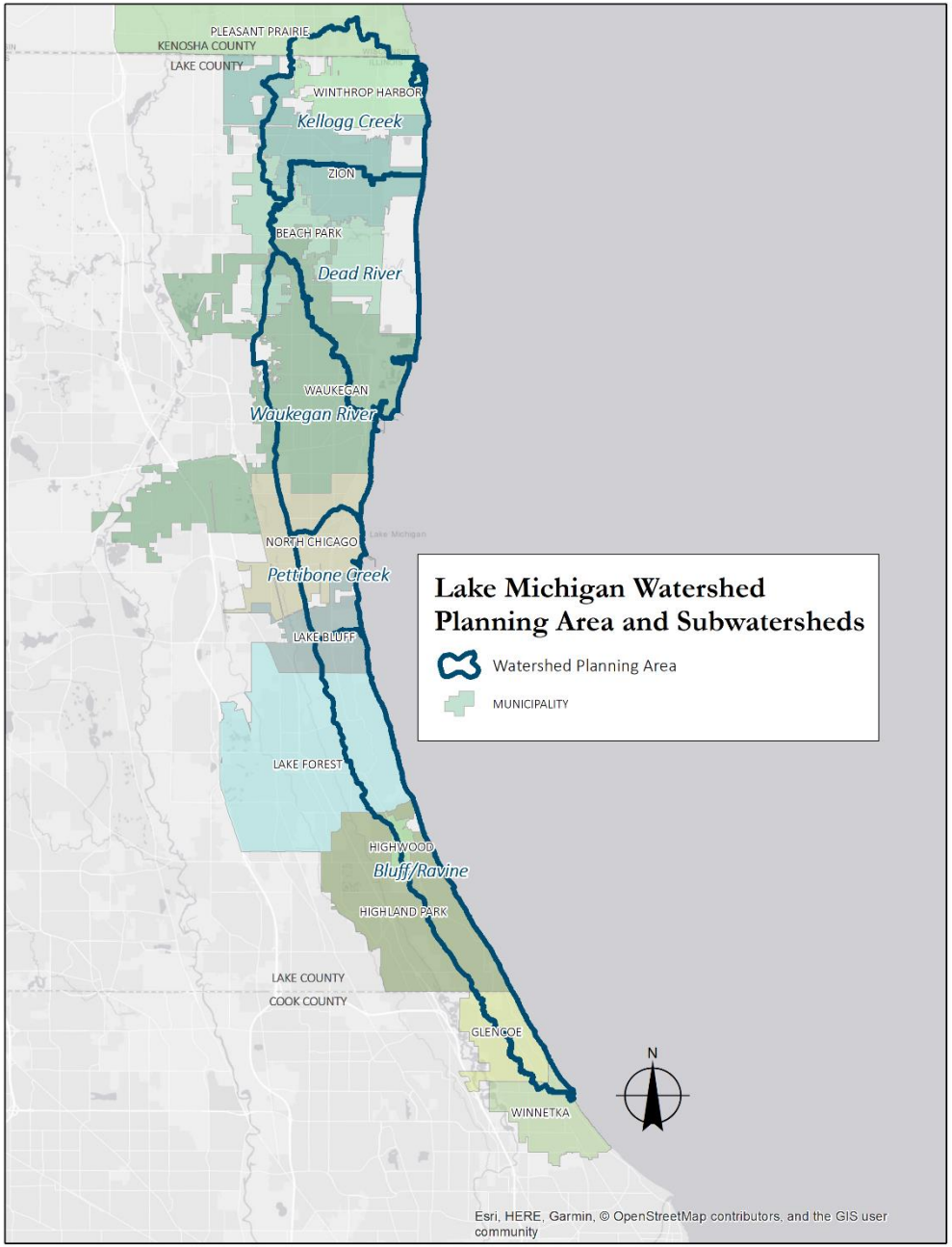
Area in Illinois reduced 673 square miles (Chicago Diversion)

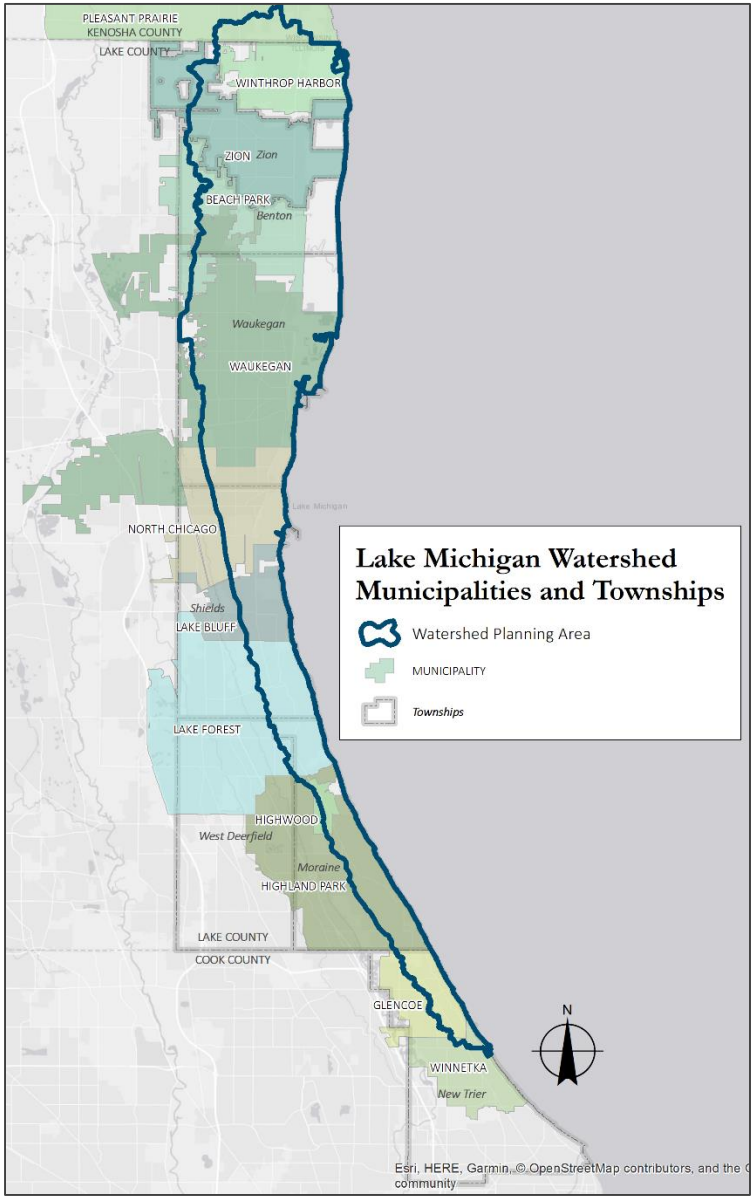
Watershed Planning Area

57 square miles

5 Subwatersheds:

- Kellogg Creek
- Dead River
- Waukegan River
- Pettibone Creek
- Bluff/Ravine





Planning Jurisdictions

Portions of:

3 Counties

12 Municipalities

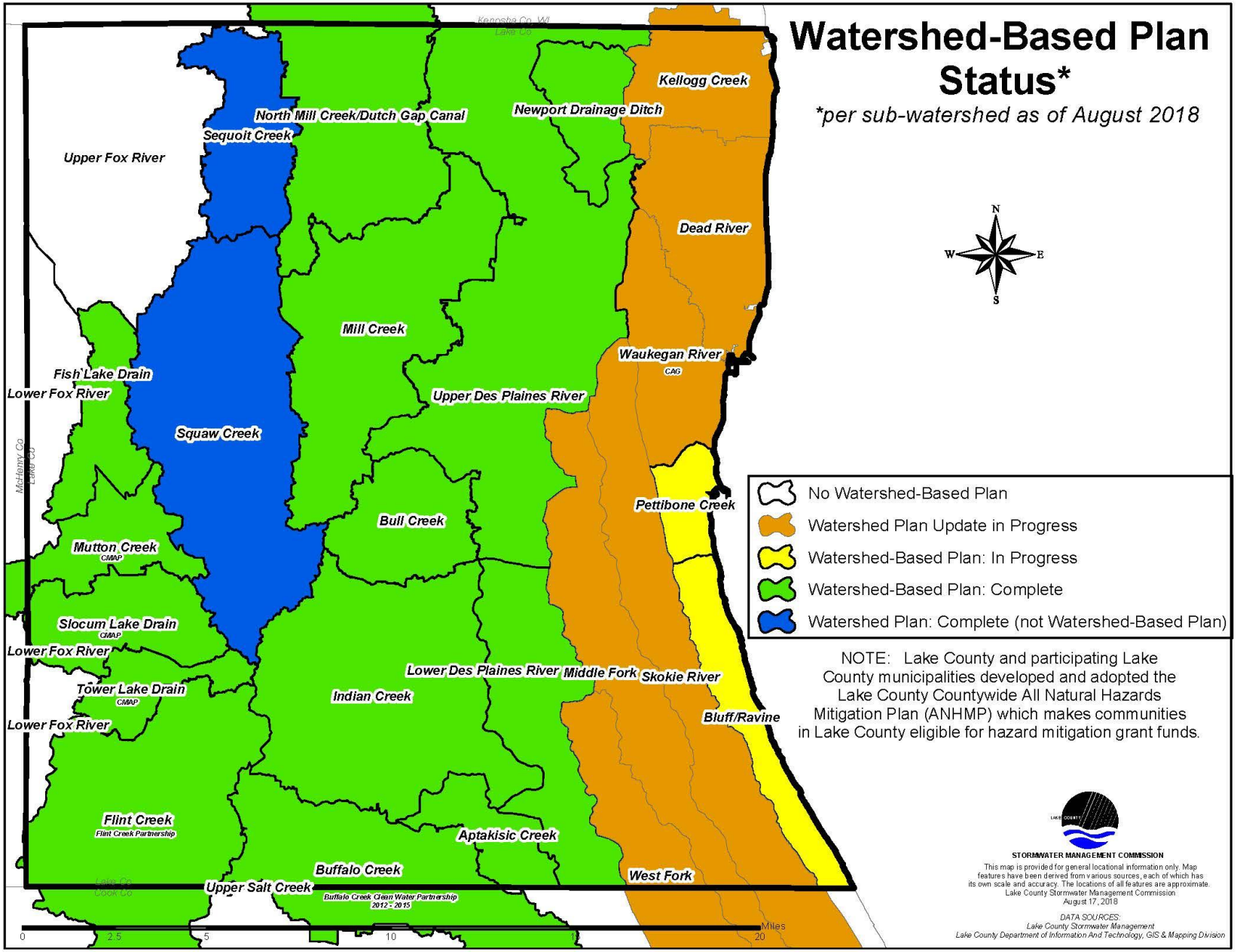
7 Townships

~10% of area unincorporated

Illinois Beach State Park (IDNR)

Forest Preserves

Federal lands (Navy)


Watershed-Based Plan Status*
*per sub-watershed as of August 2018
Kenosha Co, WI
Lake Co
Kellogg Creek
North Mill Creek/Dutch Gap Canal
Newport Drainage Ditch
Sequoit Creek
Upper Fox River
Dead River
N
W
E
S
Mill Creek
Waukegan River
CAG
Fish Lake Drain
Lower Fox River
Upper Des Plaines River
Squaw Creek
McHenry Co
Lake Co
Pettibone Creek
Bull Creek
Mutton Creek
CMAP
Slocum Lake Drain
CMAP
Lower Fox River
Lower Des Plaines River
Middle Fork
Skokie River
Tower Lake Drain
CMAP
Indian Creek
Bluff/Ravine
Lower Fox River
Flint Creek
Flint Creek Partnership
Aptakisic Creek
Buffalo Creek
West Fork
Upper Salt Creek
Buffalo Creek Clean Water Partnership 2012 - 2015
Lake Co
Cook Co
0
2.5
5
10
20
Miles
No Watershed-Based Plan
Watershed Plan Update in Progress
Watershed-Based Plan: In Progress
Watershed-Based Plan: Complete
Watershed Plan: Complete (not Watershed-Based Plan)
NOTE: Lake County and participating Lake County municipalities developed and adopted the Lake County Countywide All Natural Hazards Mitigation Plan (ANHMP) which makes communities in Lake County eligible for hazard mitigation grant funds.
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
August 17, 2018
DATA SOURCES:
Lake County Stormwater Management
Lake County Department of Information And Technology, GIS & Mapping Division

Why a Watershed Plan?

Clean water, healthy lakes and streams, safety from flooding are important for residents & businesses

Existing issues: water quality, ravine erosion, stormwater, etc…

Watersheds do not follow political boundaries, planning improves coordination & cooperation among communities

Provide "roadmap" for stakeholders to accomplish watershed goals

Watershed Plan Purpose and Benefits

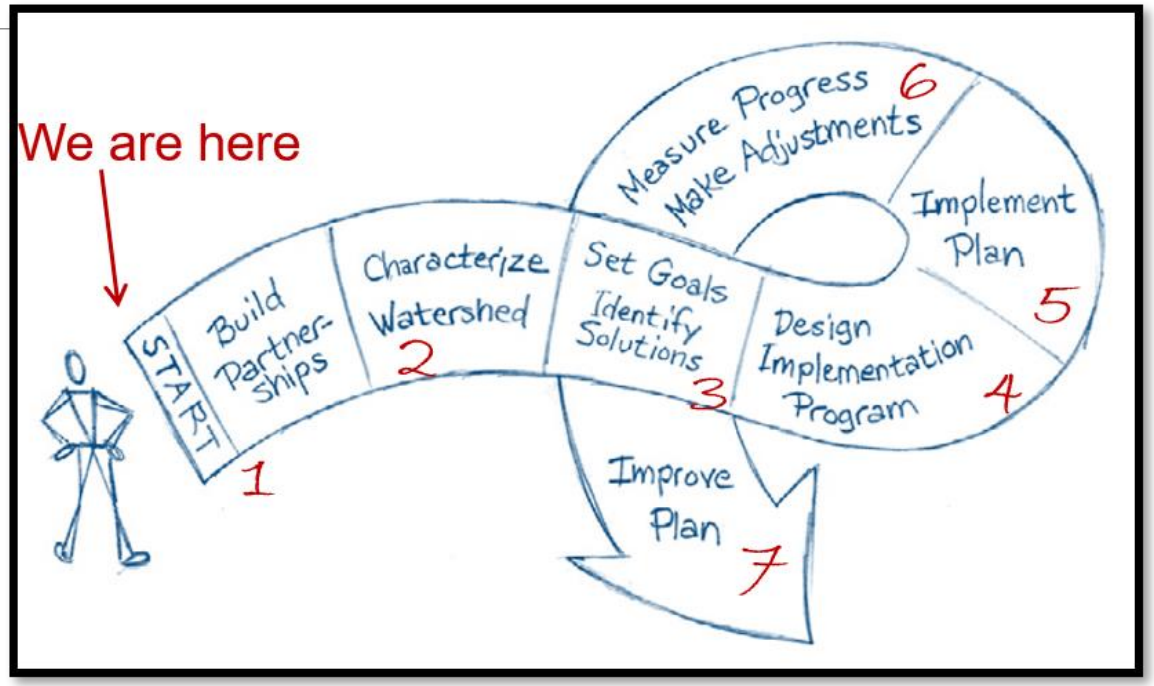
Works to improve management and restoration of the watershed to:

- Improve Water Quality
- Address Stormwater Issues & Flooding
- Restore and Enhance Natural Resources
- Educate, Communicate, and Coordinate

The Planning Process

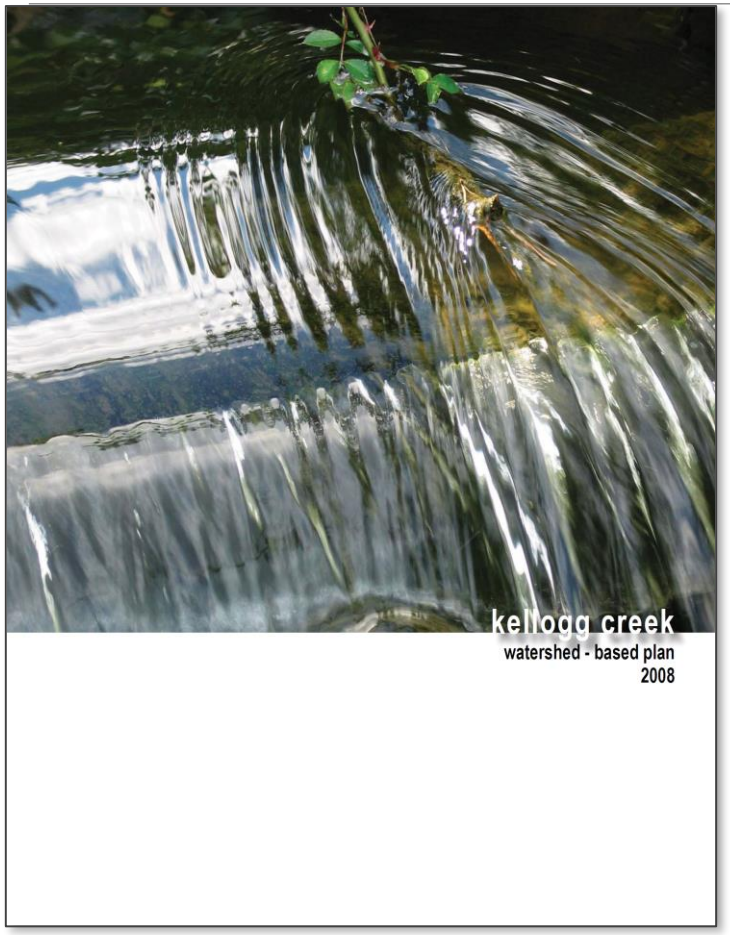
Over the next 18 months…

1. Outreach to stakeholders
2. Identify and collect watershed information/data
3. Develop goals and objectives & explore potential solutions
4. Develop an action plan



Source: Handbook for Developing Watershed Plans to Restore and Protect Our Waters, USEPA

Watershed Plan Components



Goals & Objectives

Watershed Assessment

Action Plan

Education & Outreach Strategy

Implementation Plan

New Planning Initiatives

Environmental Justice

- "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." (USEPA)
- Enhanced EJ mapping resource

Climate Resilience

- New rainfall analysis for Illinois (ISWS Bulletin 70 update)
- Likely impacts on:
  - Existing infrastructure
  - New or Re-development
  - Natural resources

Watershed-Based Planning

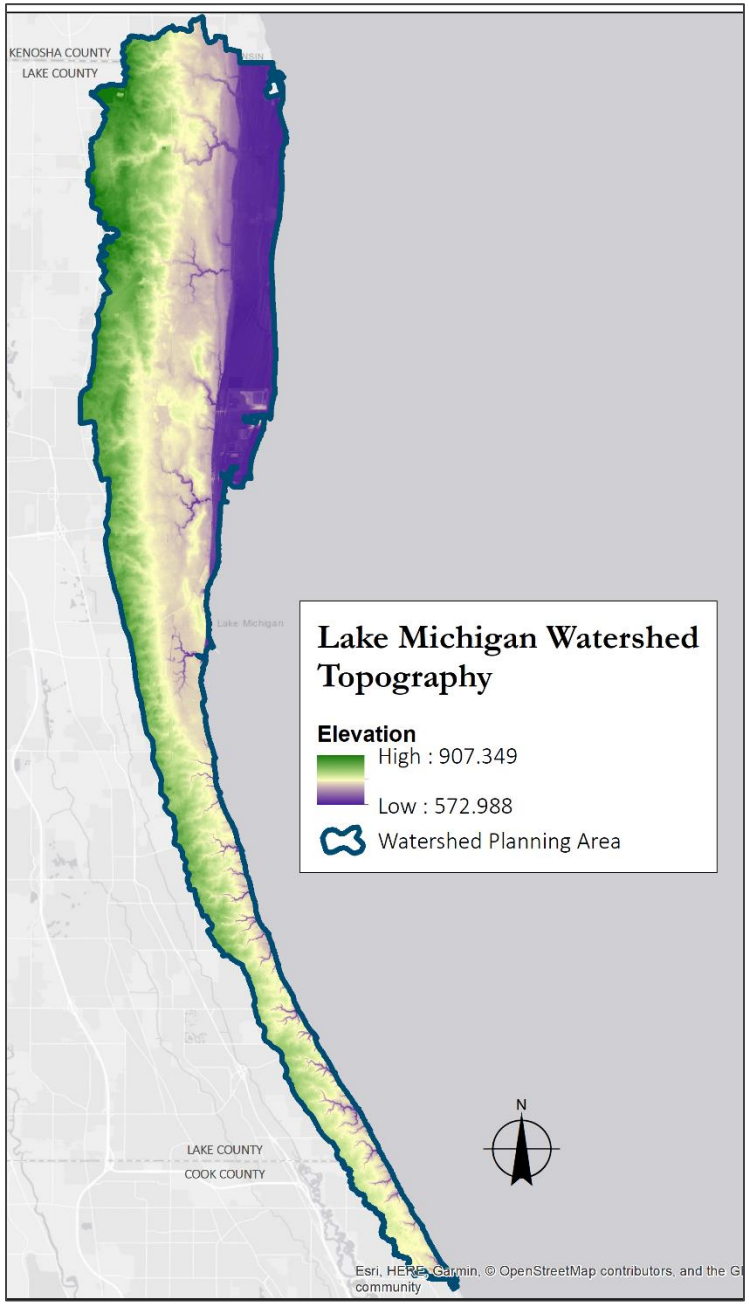
- ID causes & sources of impairment; load reductions needed
- Develop management measures (action plan)
- Schedule, milestones, measures of progress, monitoring plan, information/education plan
- Technical & financial assistance needed
- Plan updates: modify action plan + incorporate TMDL recommendations

Plan Focus

- Lake Michigan issues differ from other watersheds
- Focus on shoreline and "inland" issues
- Address nearshore as appropriate

Photo Credit: Illinois Department of Natural Resources

Watershed Characteristics



Topography

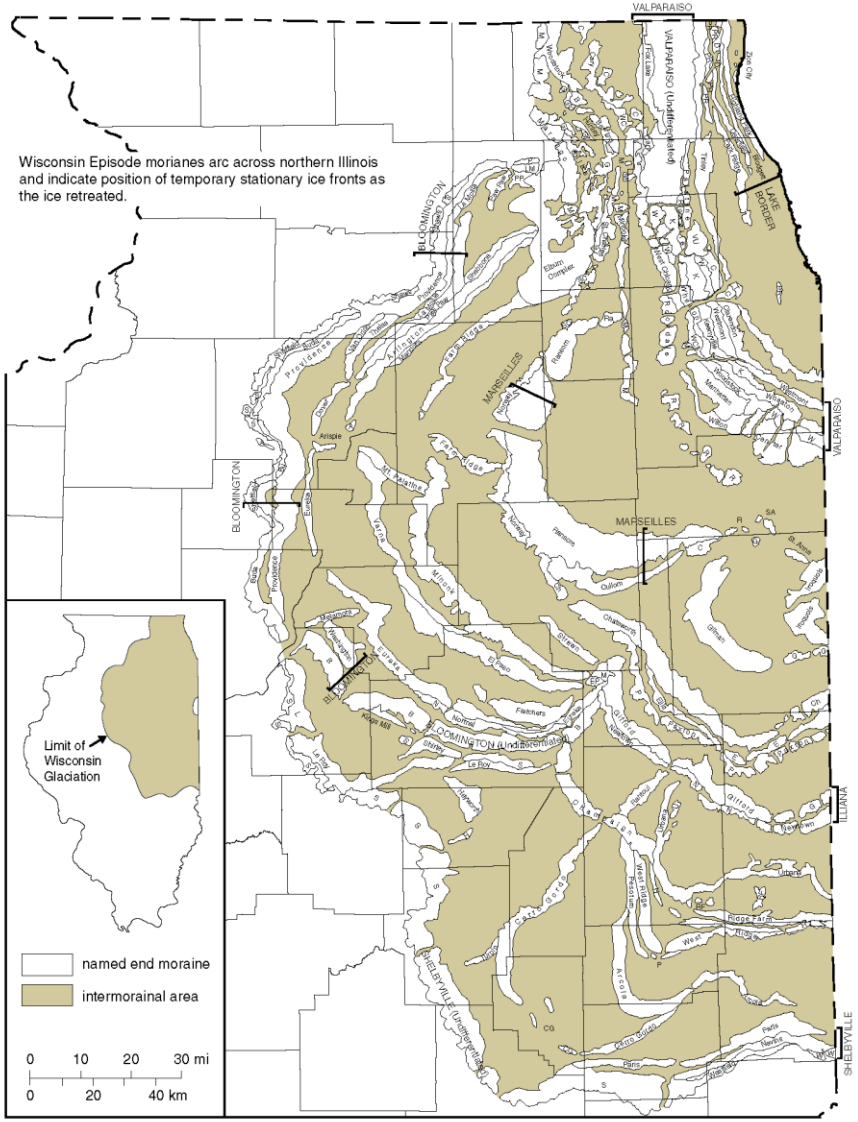
Foundation for watershed hydrology

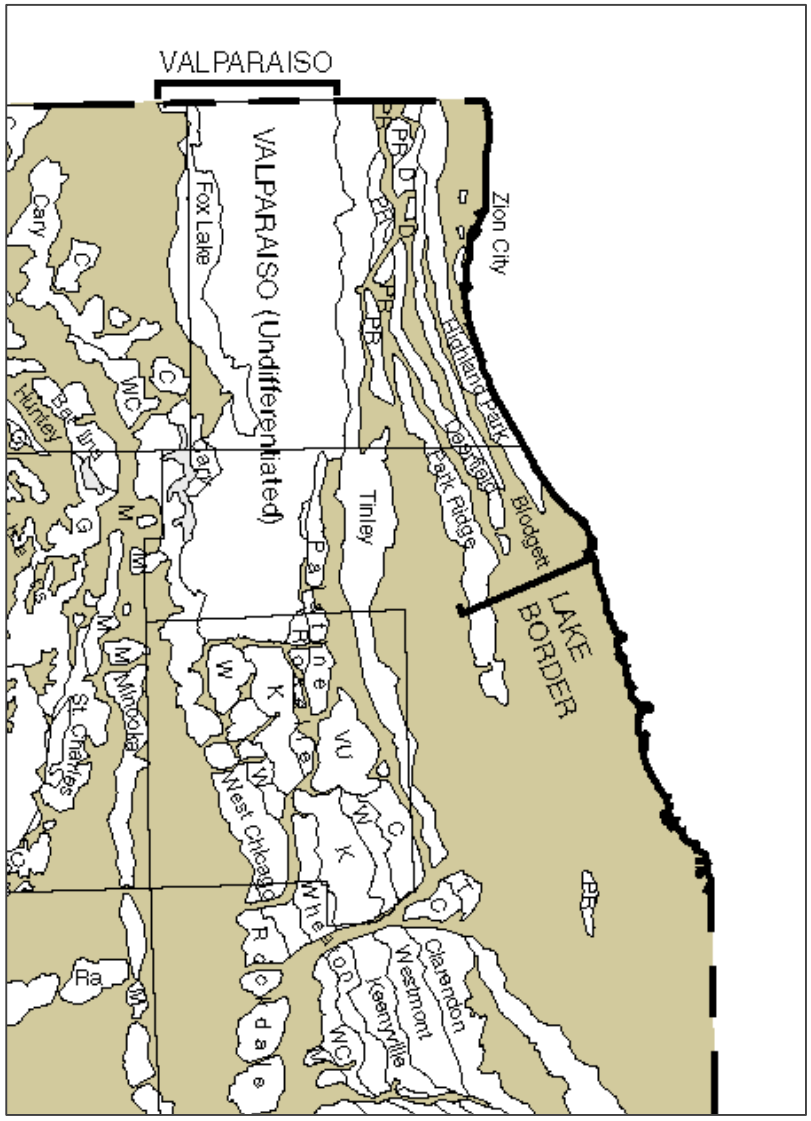
Flow is generally west to east

Highest point along northeastern boundary

Among the youngest topographic features in Illinois

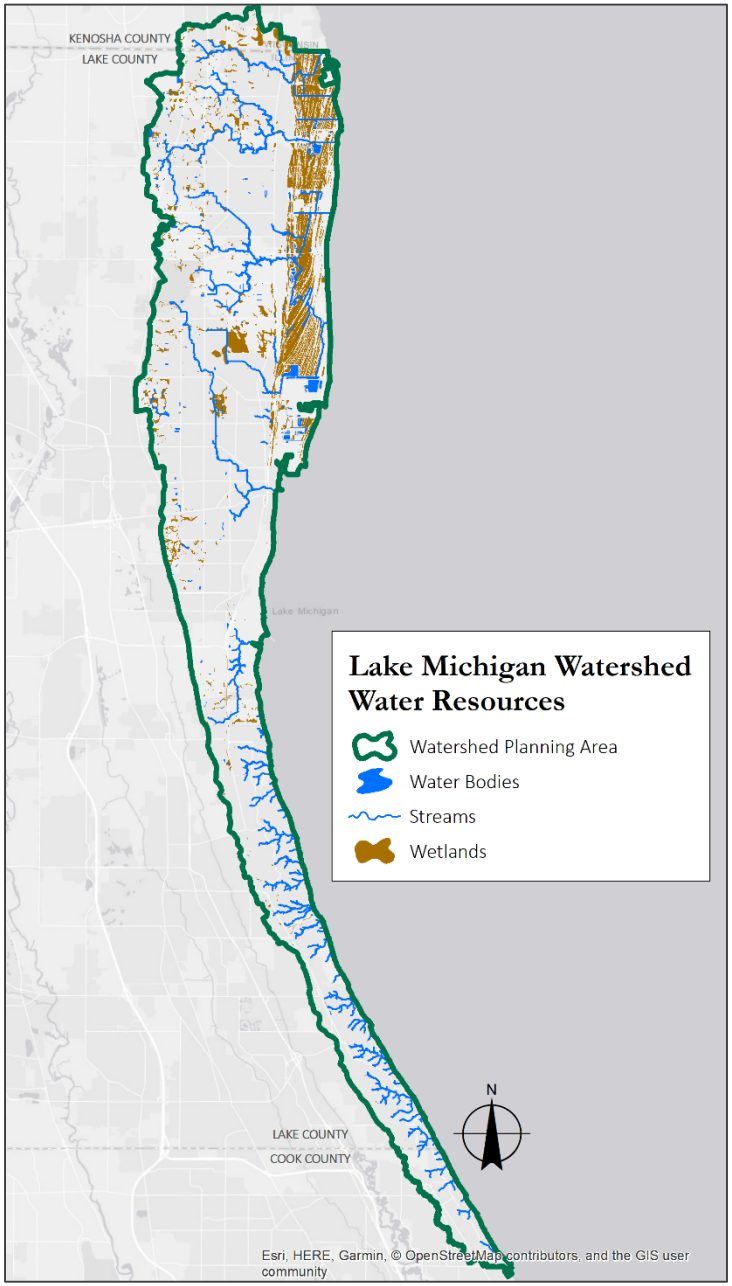
End Moraines Of The Wisconsin Glacial Episode





Source: Illinois State Geological Survey

ISGS 8.5x11 map series



Water Resources

Streams: 81 miles (50 miles of ravines)

Wetlands: 3,600 acres

RAMSAR wetland of international importance (3,290 acre site in IL, includes uplands)

No natural inland lakes

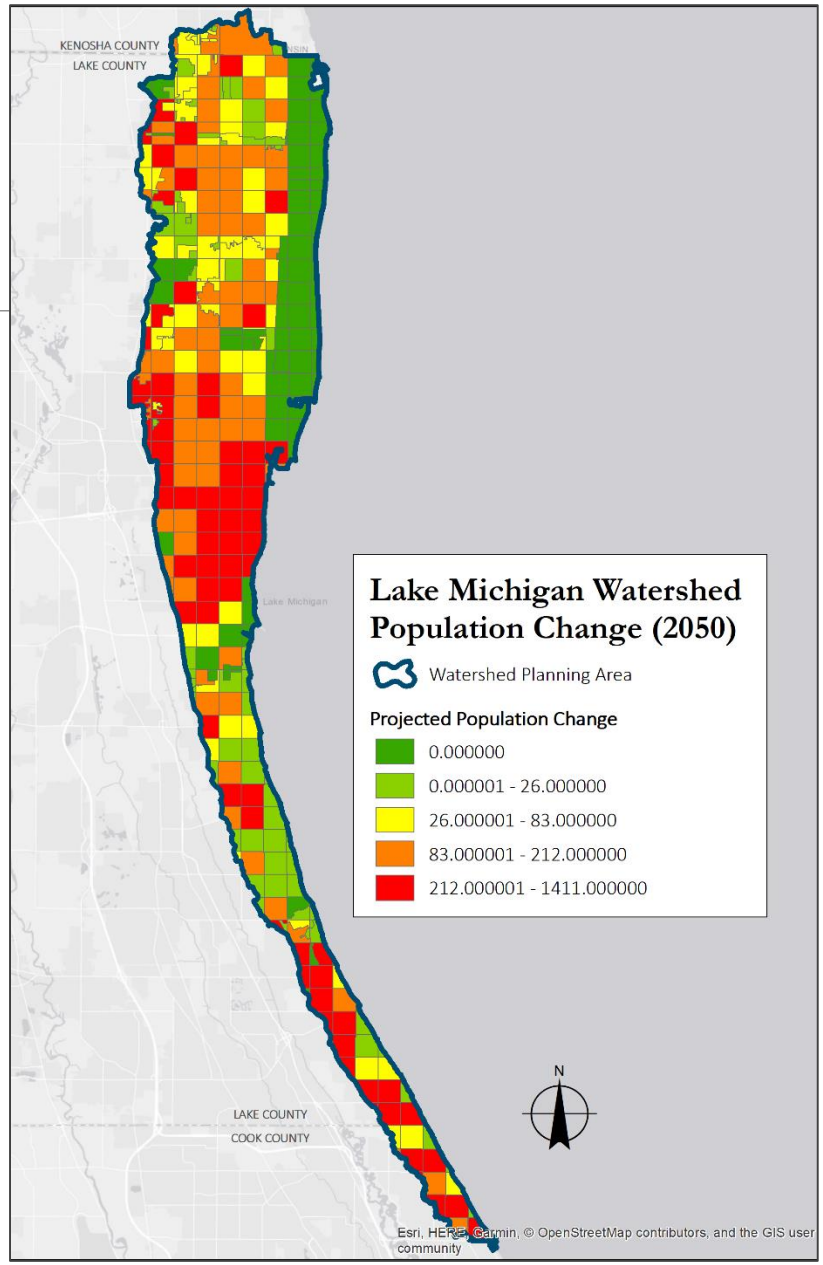
6 water bodies >5 acres

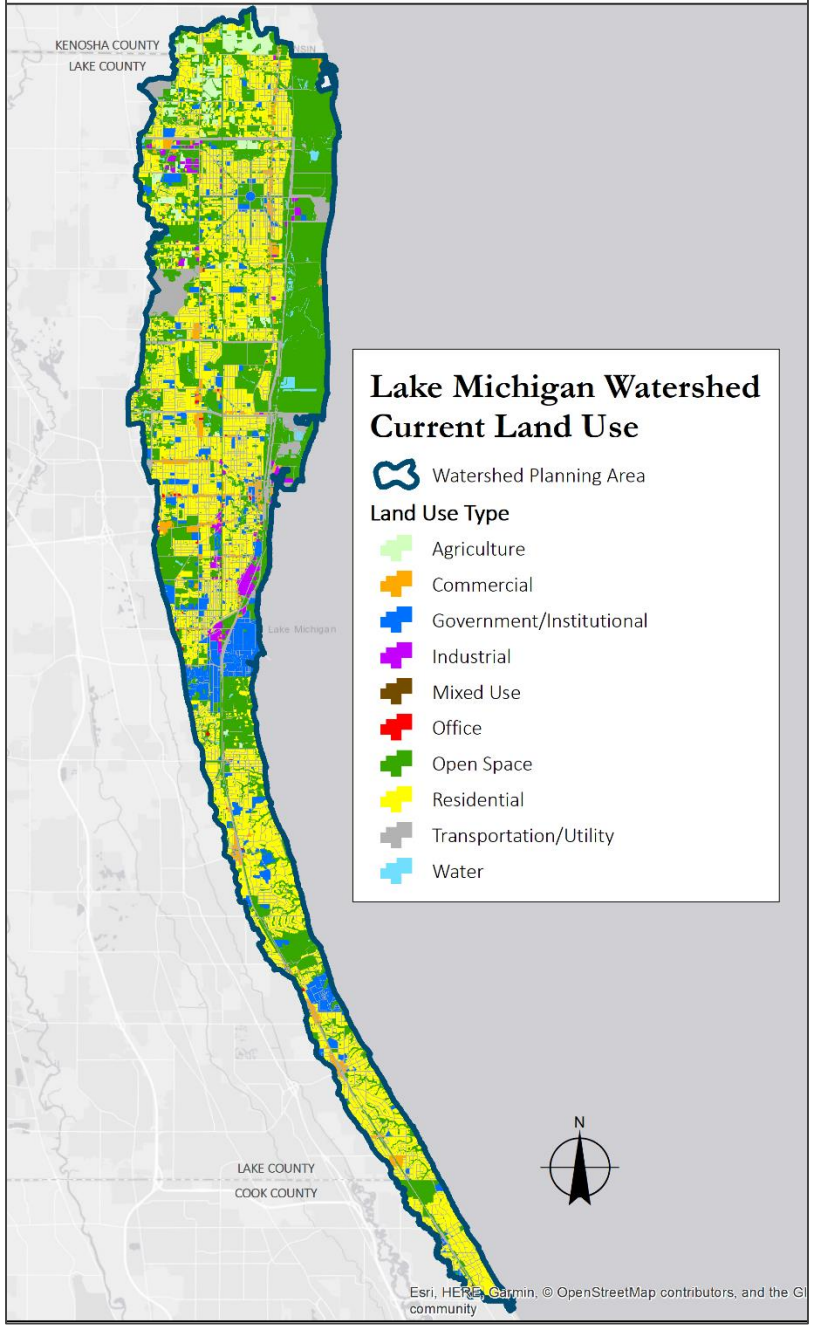
1 Great Lake

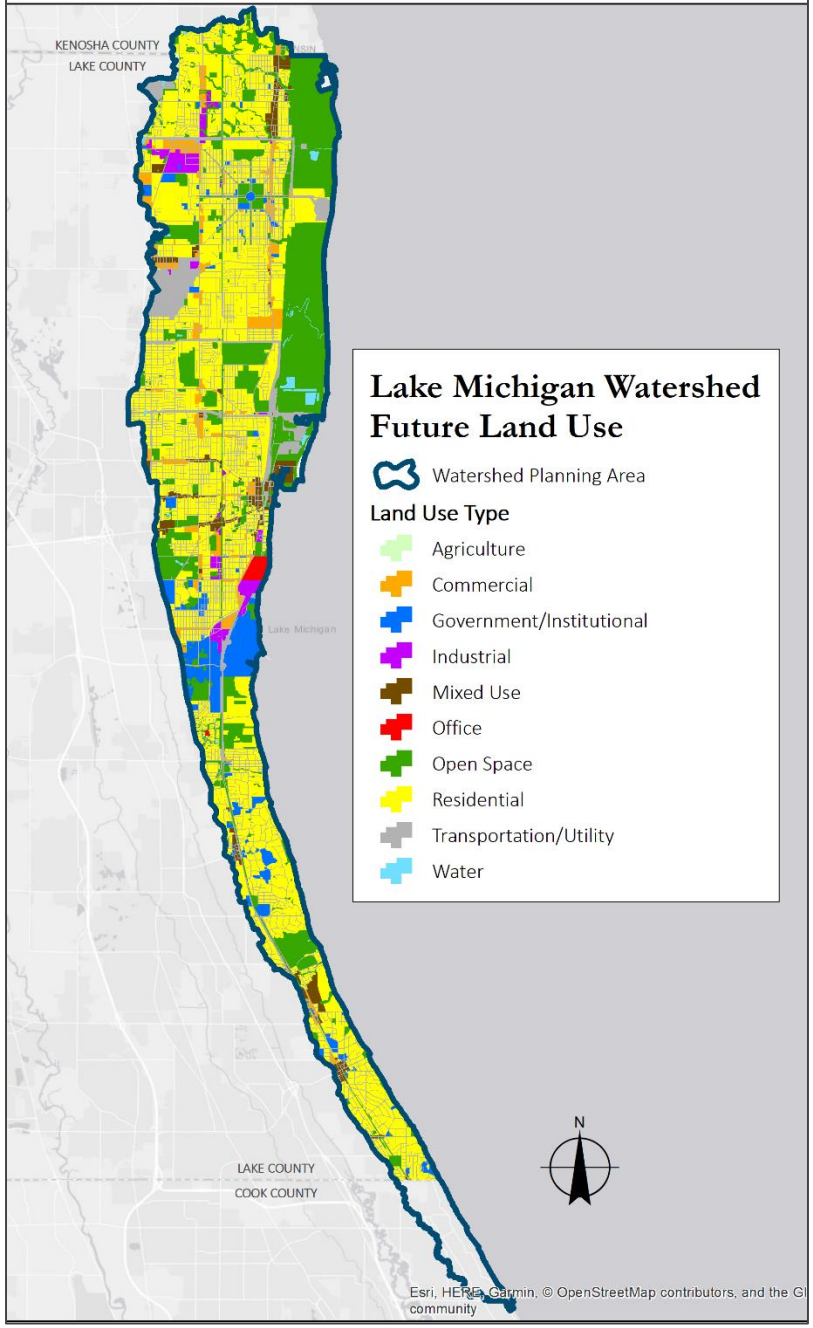
Demographics

	2015	2050
Population	**162,627**	**202,353**
Households	**55,735**	**73,396**
Employment (IL)	**64,353**	**77,671**

Source: CMAP, Southeastern Wisconsin Regional Planning Commission




KENOSHA COUNTY
LAKE COUNTY
Lake Michigan
LAKE COUNTY
COOK COUNTY
N
Lake Michigan Watershed
Current Land Use
Watershed Planning Area
Land Use Type
Agriculture
Commercial
Government/Institutional
Industrial
Mixed Use
Office
Open Space
Residential
Transportation/Utility
Water
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GI
community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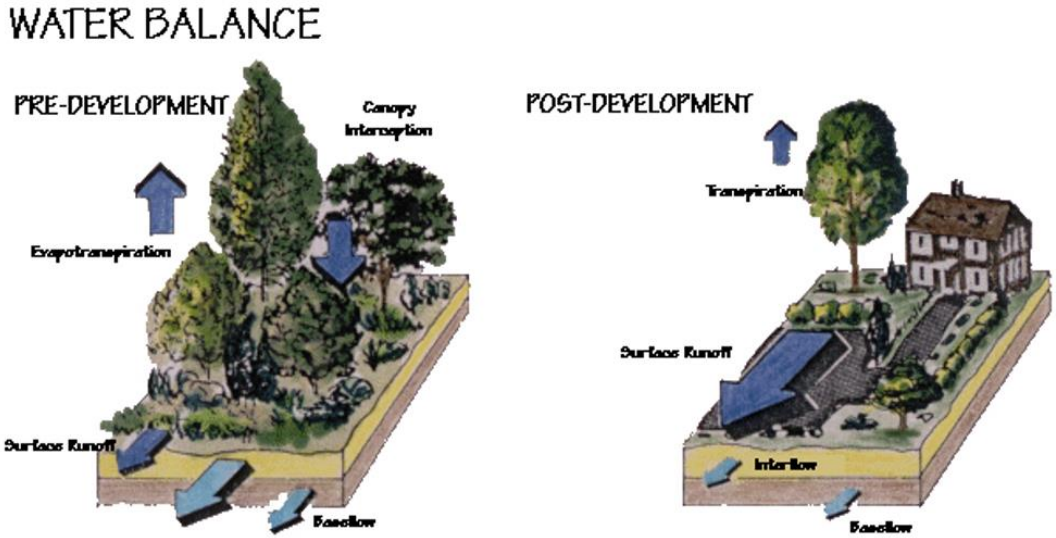
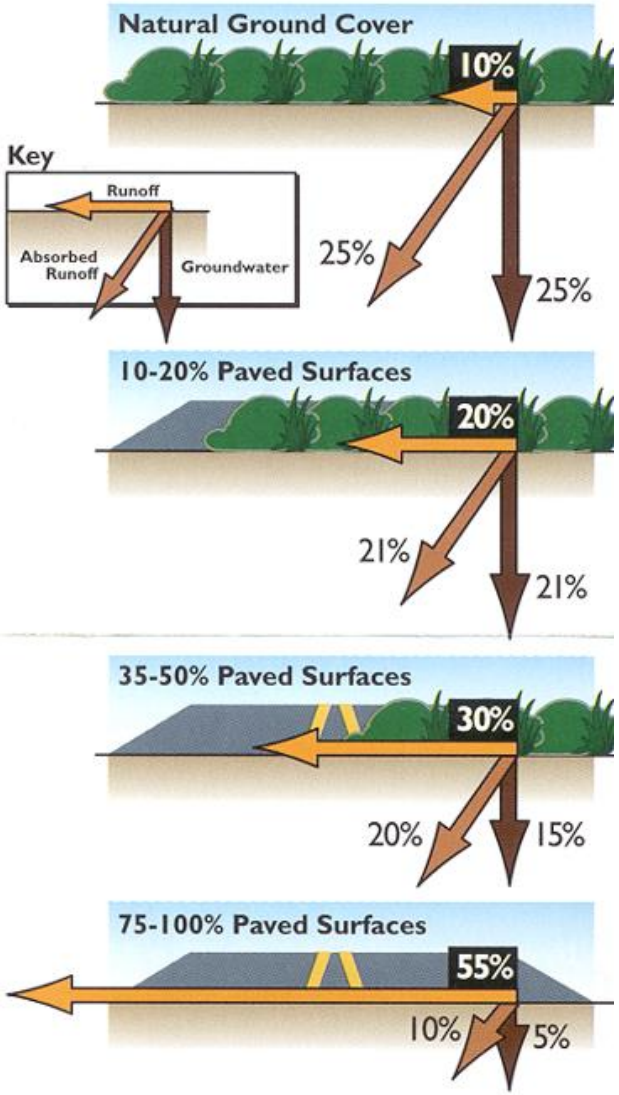
Urbanization and Hydrology

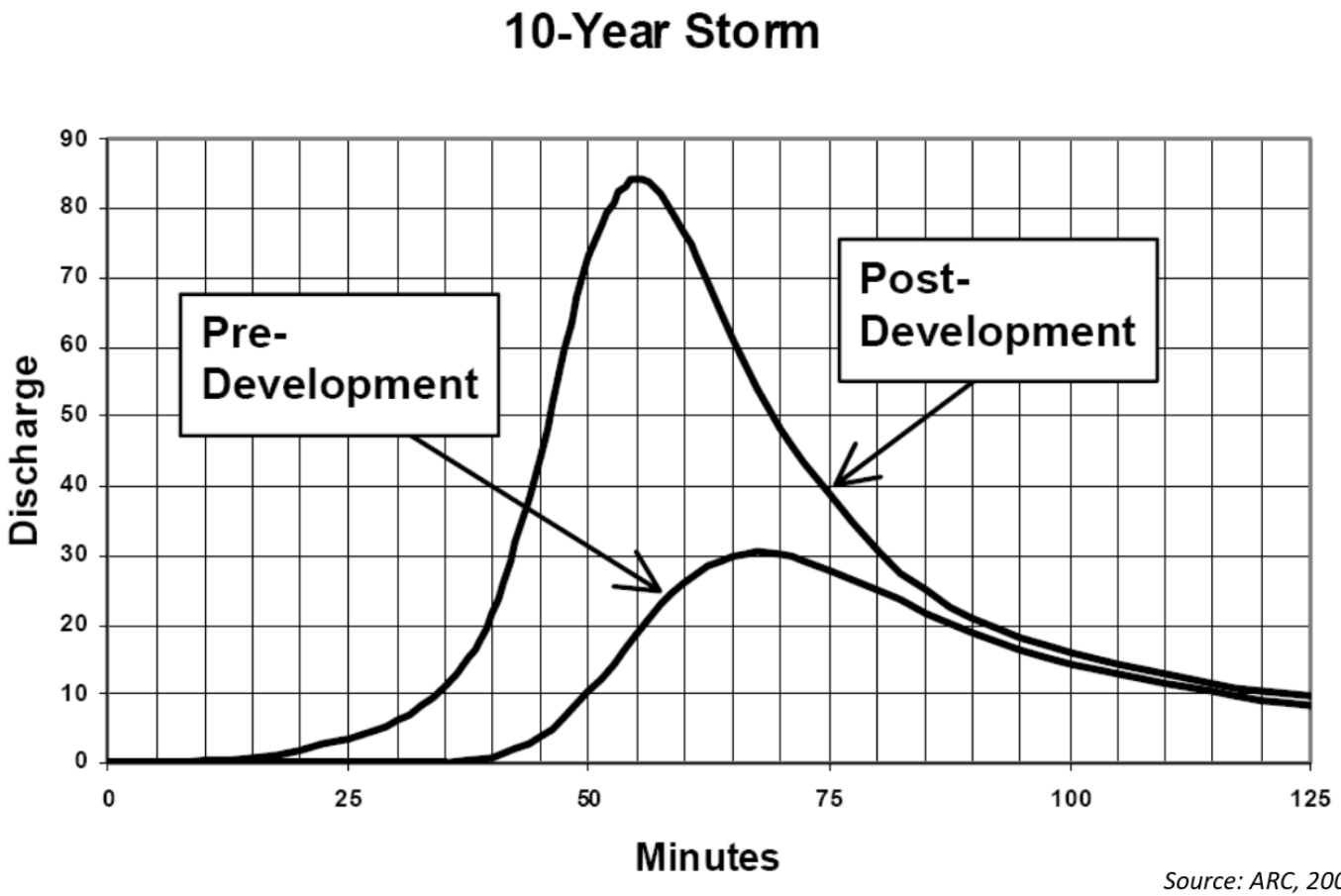




Note: Percentage of evapotranspiration not shown.

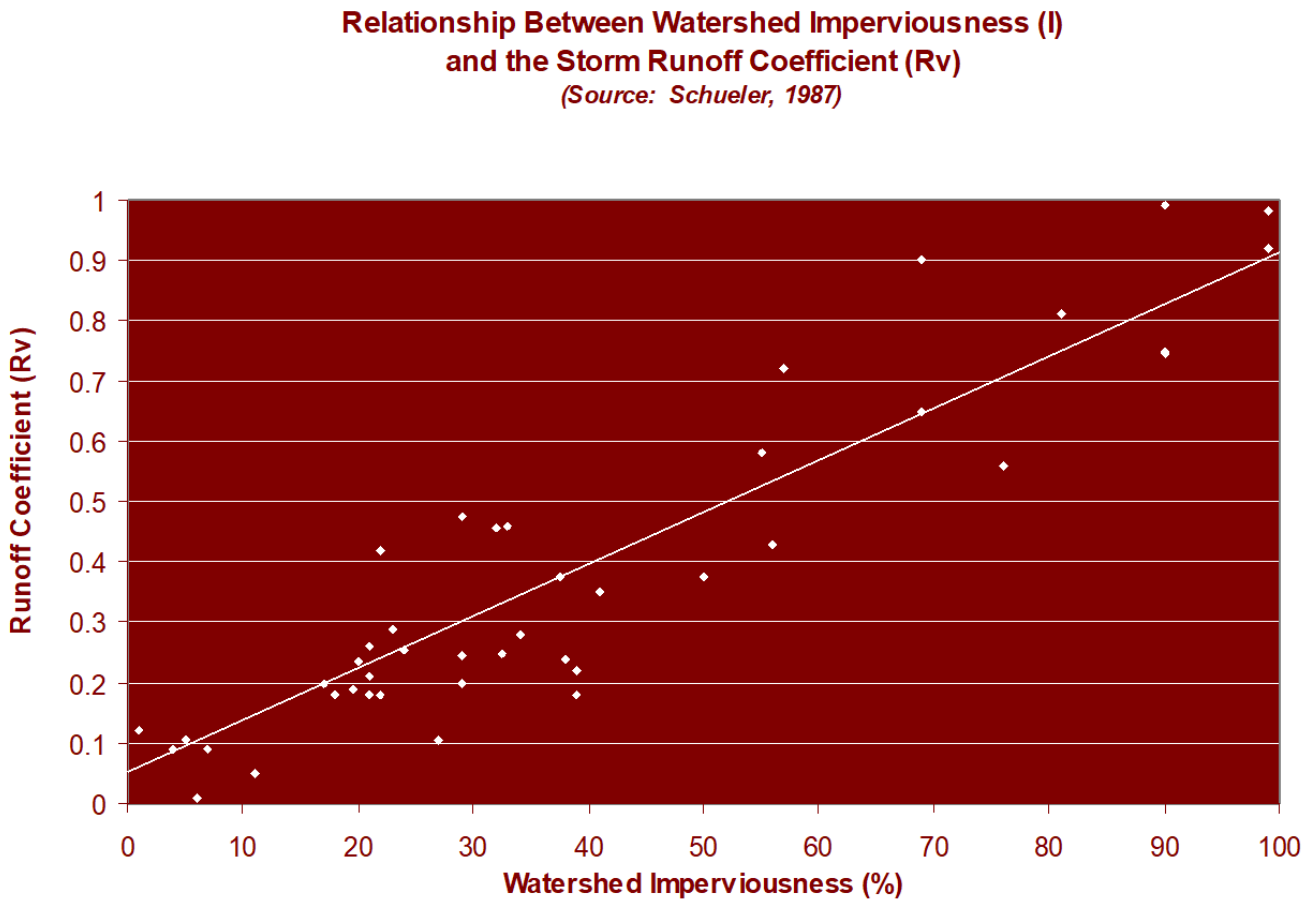
Source: *Water Resources Protection Technology: A Handbook of Measures to Protect Water Resources in Land Development*, by Toby Tourbier and Richard Westmacott, The Urban Land Institute, Washington, D.C., 1981

Stormwater Runoff Rates



Source: ARC, 2001

Stormwater Runoff Volumes

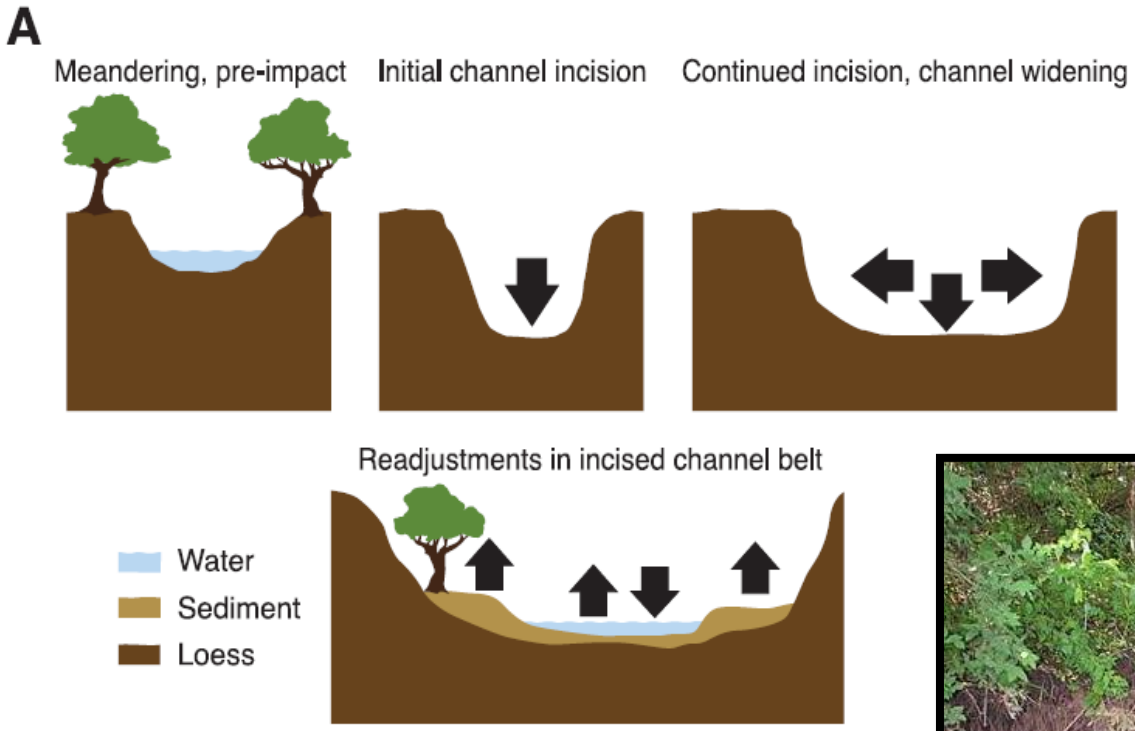


- Altered baseflow regime
- Increased water level fluctuations
- Increased frequency of channel forming events
- Increased ponding and flooding
- Stream channel enlargement (e.g., widening, downcutting)
- Loss of riparian vegetation
- Degradation of water quality
- Eutrophication (i.e., nutrient enrichment)
- Degradation of habitat
- Decline in wildlife abundance and diversity
- Reduced recreational value (e.g., fishing, birding)

Sources: CWP, 2003; Wright et al., 2006; Cruse et al., 2012

Impacts on Water Resources

Impacts on Streams



Source: Cruse et al., 2012

Example from a Local Ravine

Stream Inventory

SMC stream inventories used to objectively assess stream reaches (segments)

Characteristics Inventoried:

- Channel Conditions
- Hydraulic Structures
- Discharge Points
- Riparian Corridor
- Aquatic Habitat

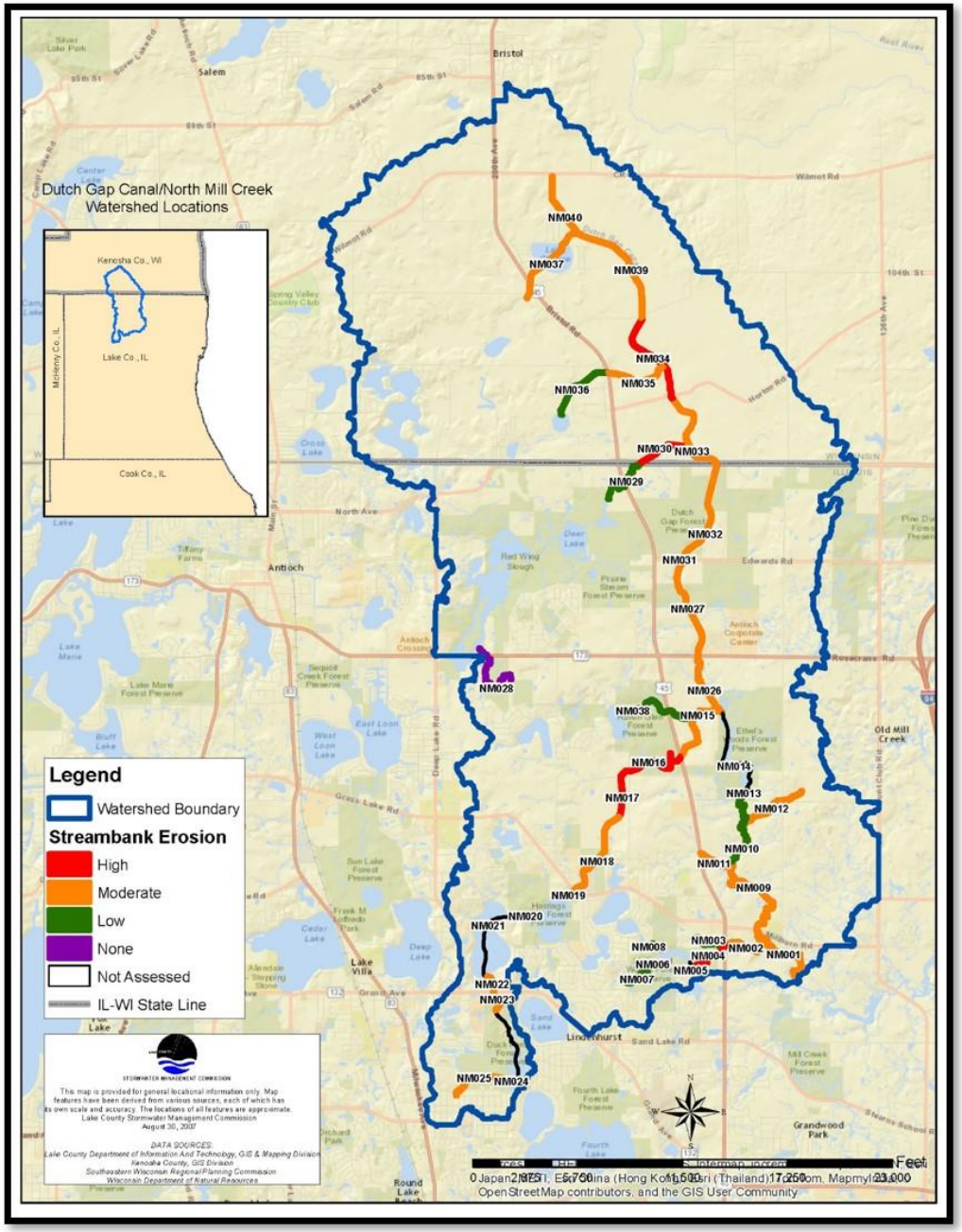
"Snapshot" assessment of overall stream condition

Channel Conditions & Hydraulic Structures

Dimensions, erosion & sediment, and channelization

Measure all in-stream (hydraulic) structures such as dams, culverts, and bridges, & note any <u>obvious</u> issues

Discharge Points
Riparian & Aquatic Conditions



Output & Results

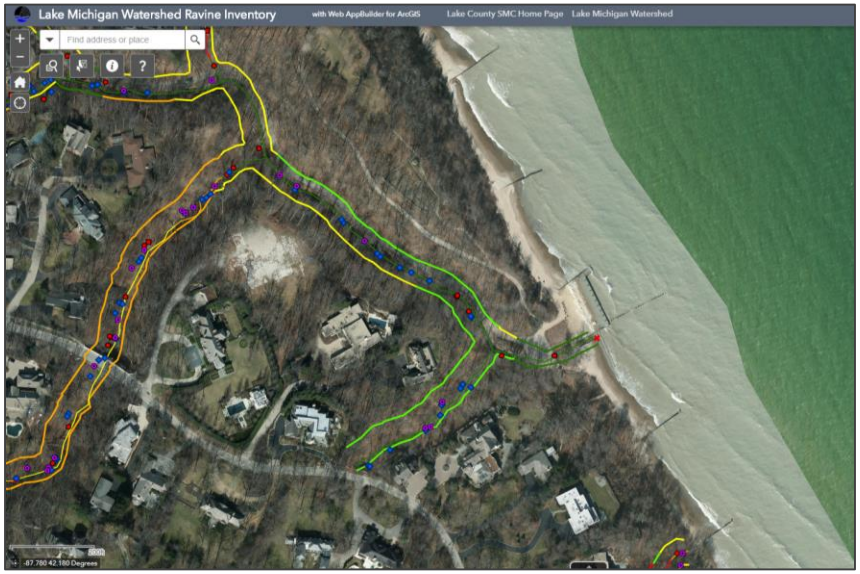
- Compile a summary report & mapping app
- Create maps and tables to compare conditions across the watershed
- Recommendations for watershed planning

Detention Basin Inventory

- Identify/map basins (~250); conduct site visit (2019)
- Document existing conditions
- Identify potential management or retrofit opportunities
- Formulate watershed plan recommendations

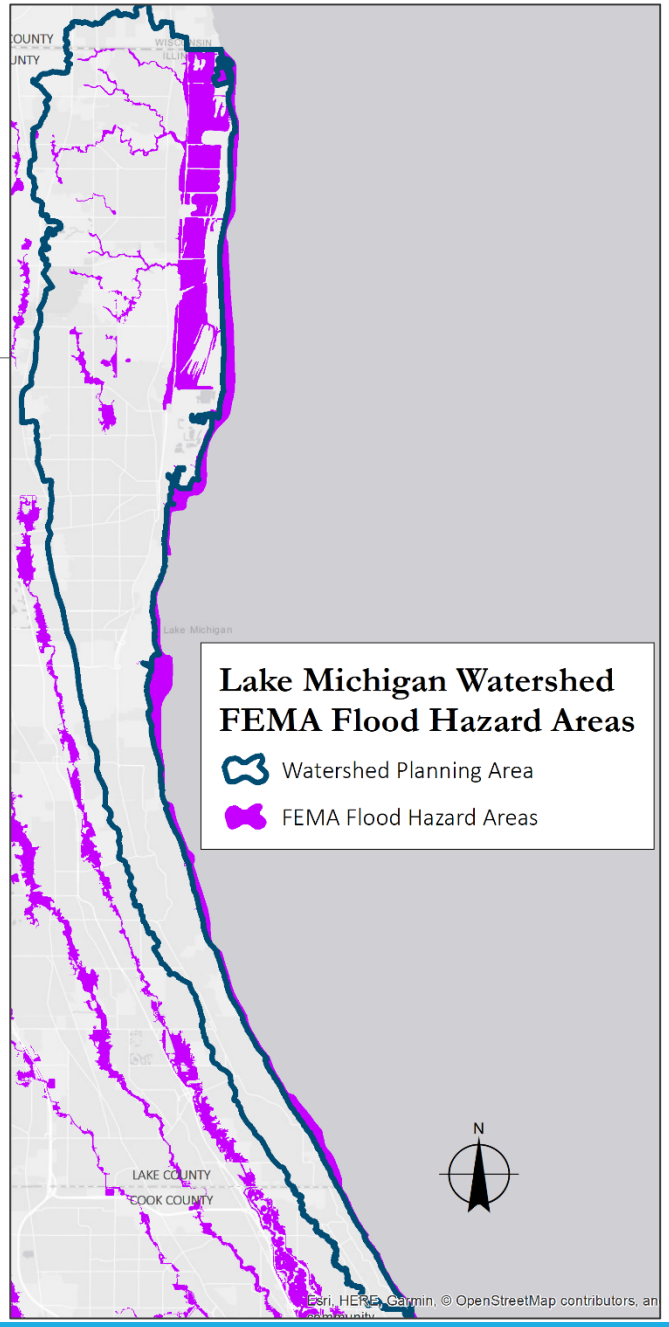
Ravine Inventory

- Repeat 2009/2011 Assessments
- Qualitative assessment of bed and bank stability
- Identify existing structures and points of discharge
- Completed 2017 (Lake Forest) and 2019 (SMC)
- Results posted on SMC Lake Michigan Watershed webpage
- Report and mapping application



Floodplains and Flooding

- Mapped FEMA Flood Zones along Lake Michigan and northern streams
- 48 reported flood problem areas
- Will update Flood Problem Areas with local governments
- Supplement with 2017 flood data



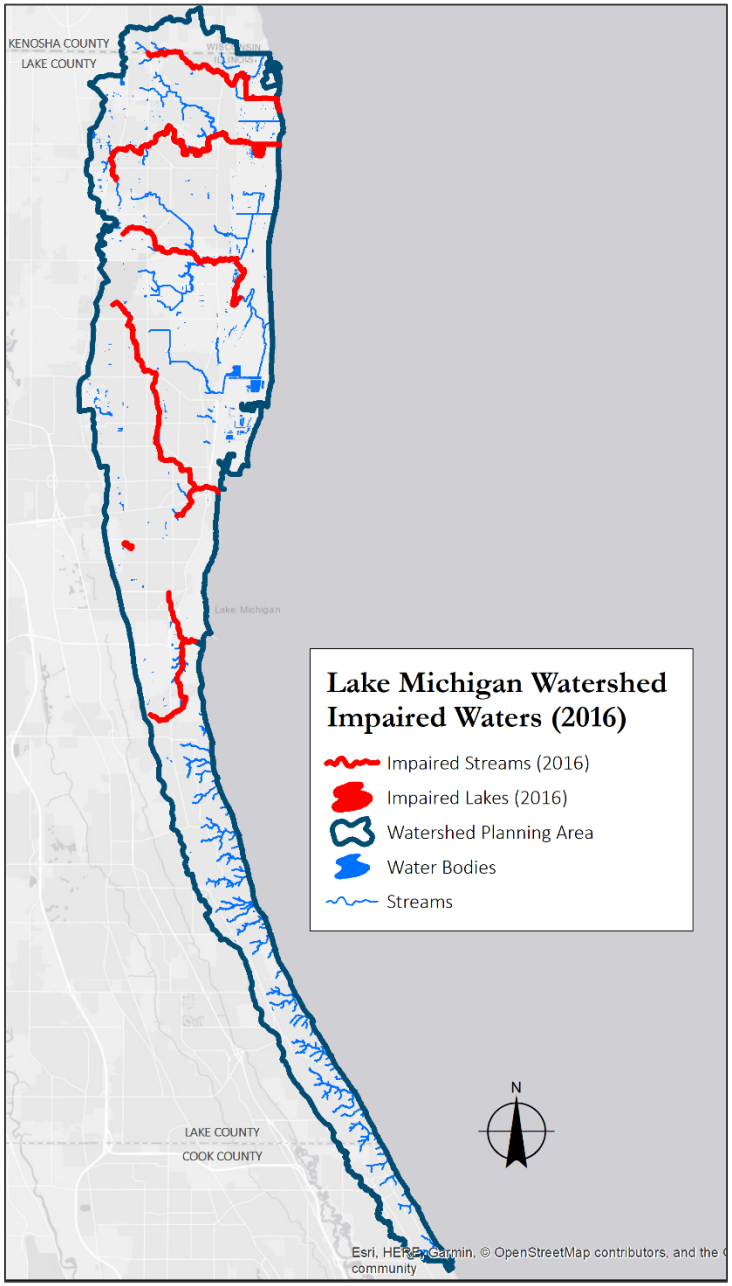
Water Quality Assessments

Illinois EPA Designated Uses:

- Aquatic Life
- Fish Consumption (Lake Michigan)
- Public Water Supply (Lake Michigan)
- Primary Contact (Beaches)
- Aesthetic Quality

Non-support of Use = "Impairment"

Physical, Chemical, Biological Factors



Assessed Units 2016 - Inland

- 8 impaired stream segments
- 1 "not assessed" (Dead River)
- All impaired for "Aquatic Life"
- Common causes include Dissolved Oxygen, Metals, Pesticides, & PCBs

- 2 impaired lakes (Sand Pond & Dugdale)
- Both impaired for "Aesthetic Quality"
- Causes listed as "unknown"

Impaired Beaches and Nearshore Waters

Beaches (E. coli)

9 in Lake County portion

3 in Cook County portion

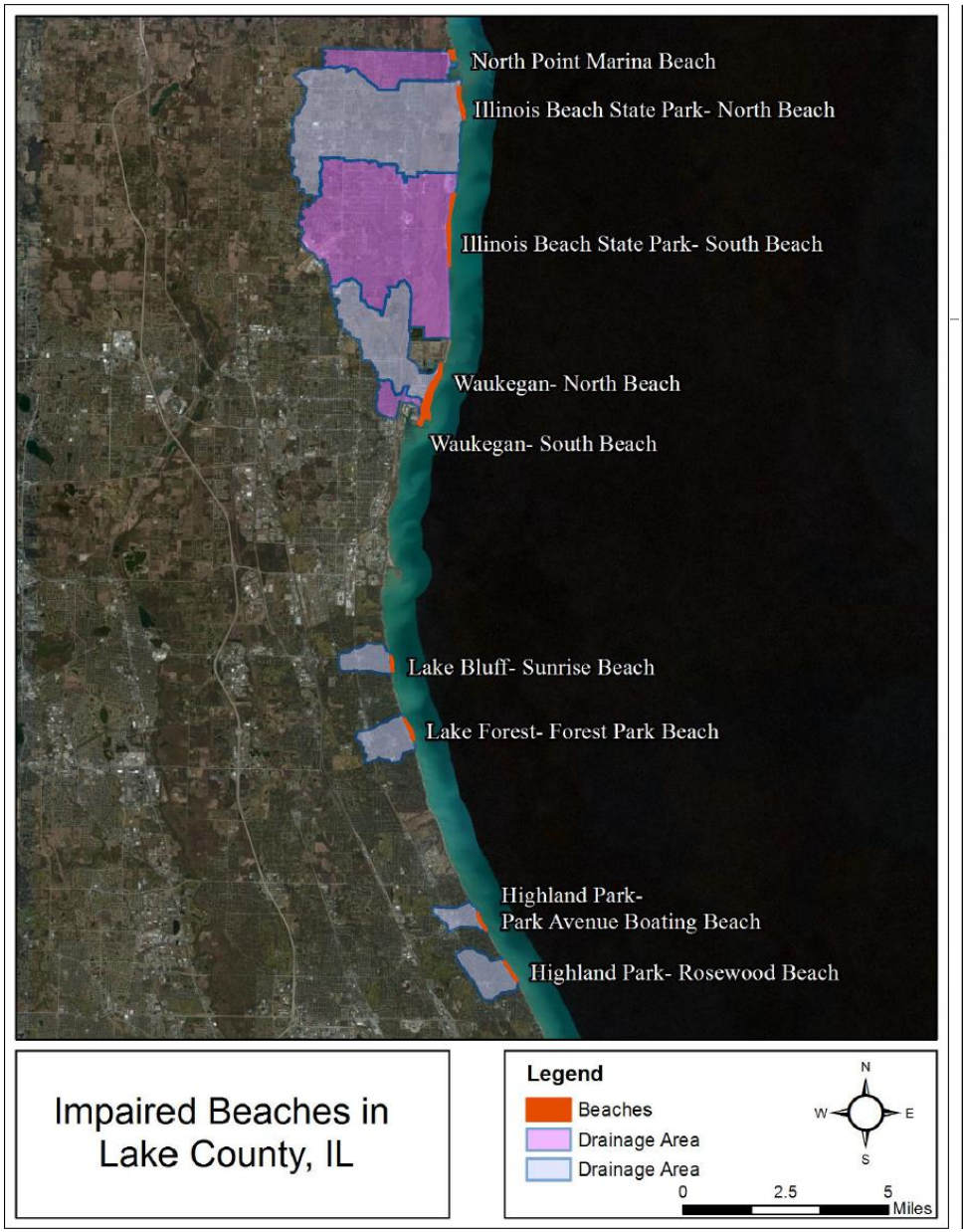
2013 Total Maximum Daily Load - Final

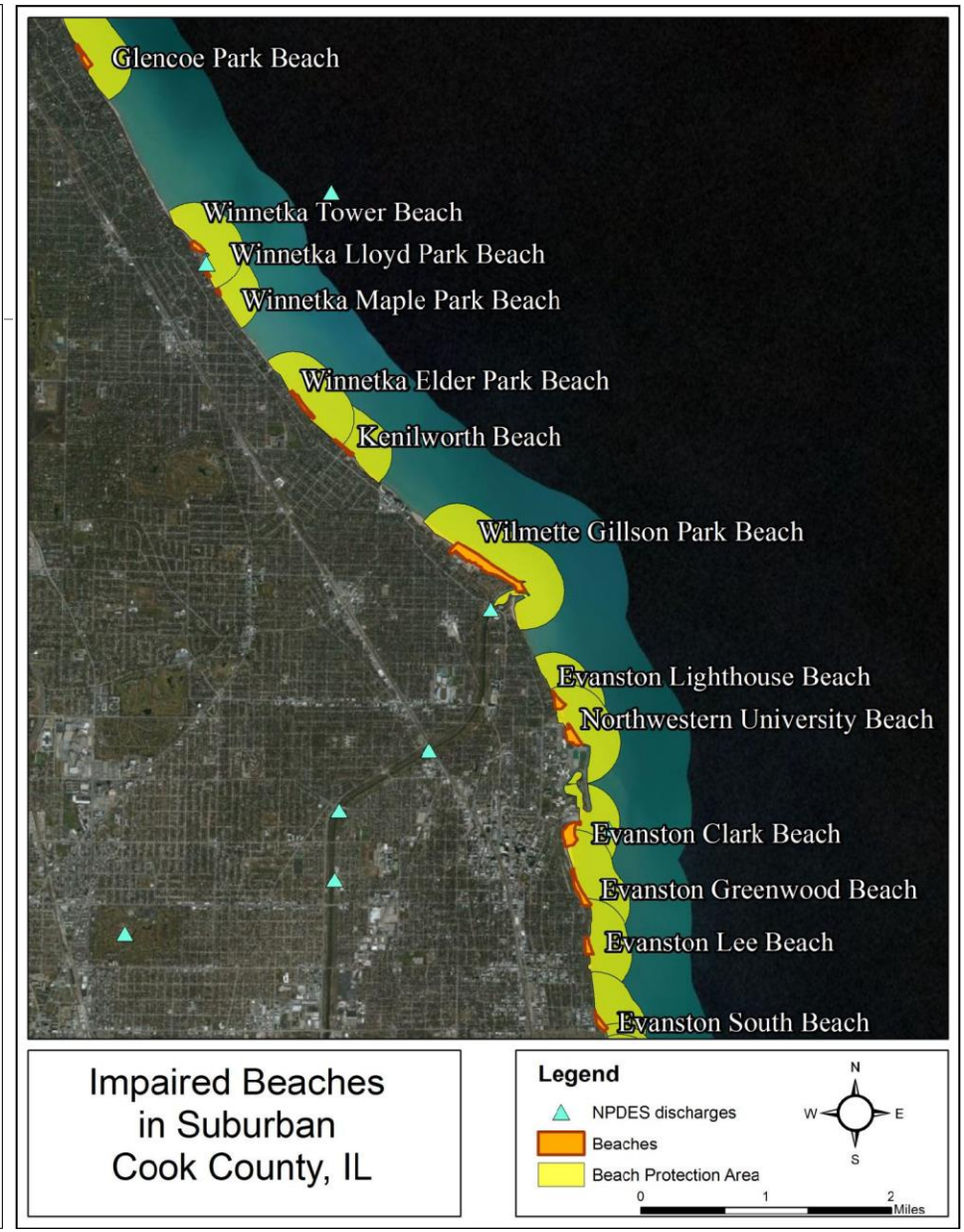
Nearshore Waters-Mercury & PCBs

2 harbors (North Point & Waukegan)

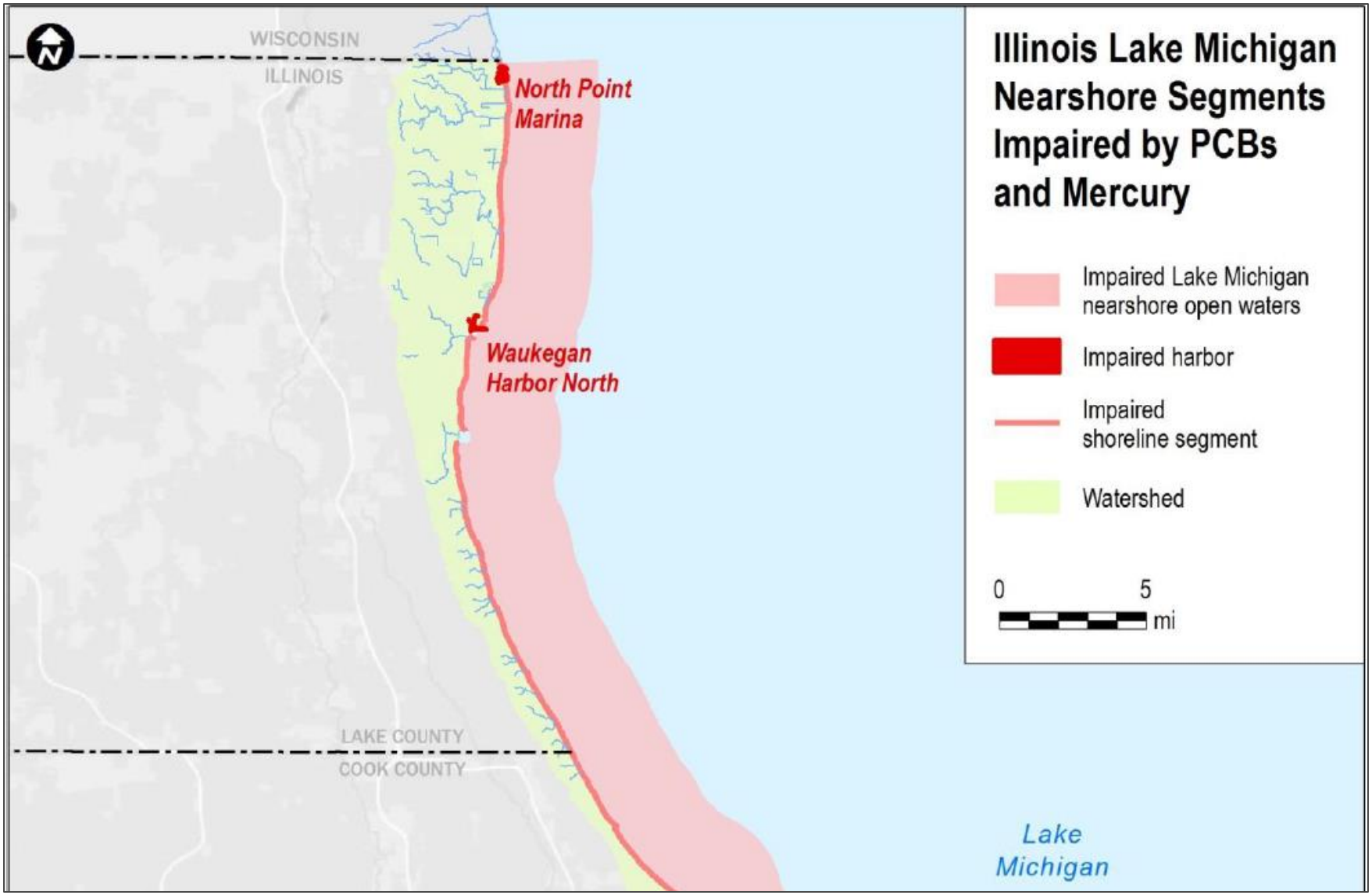
Same shoreline segments as beach impairments

2015 Total Maximum Daily Load - Draft





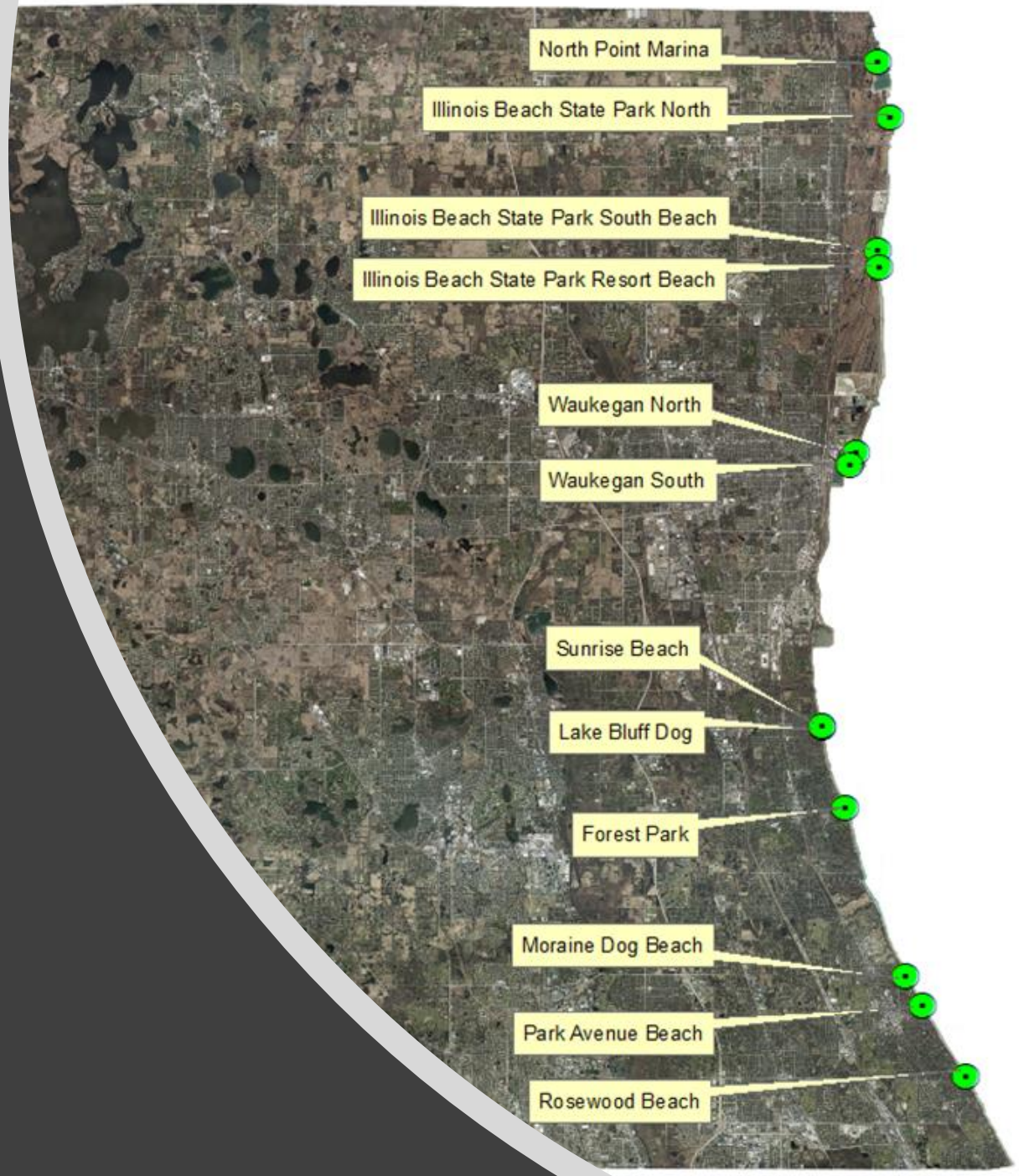
Source: Illinois EPA

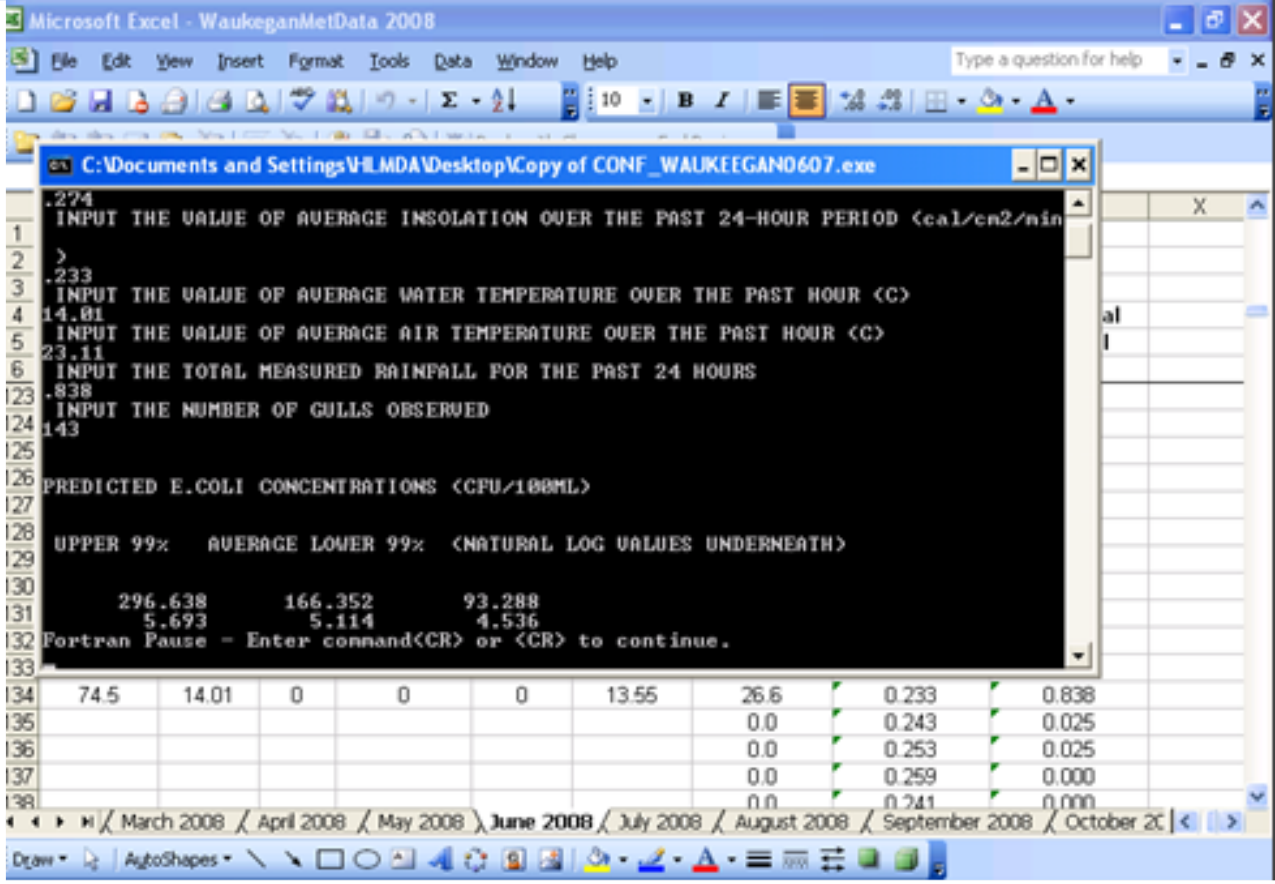


Source: Illinois EPA

Beach Sampling

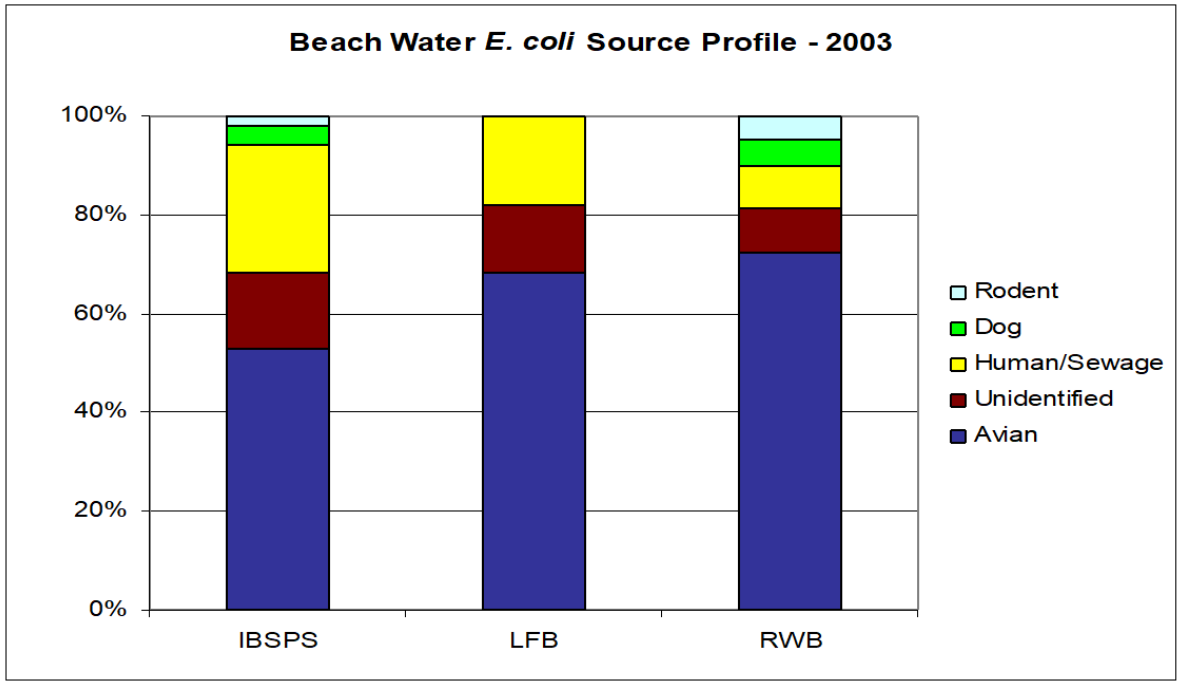
- Beach sampling season Memorial Day to Labor Day.
- The Lake County Health Department samples Lake Michigan Beaches from Monday to Thursday to determine that bacterial levels in the water are within limits established in the Swimming Facility Code (77 Ill. Admin. Code 820).
- Dog Swimming Beaches are sampled every Wednesday.
- The maximum E. coli level allowed – **235** colony-forming units per 100 milliliters (cfu/100mL) – is based on guidelines established by the U.S. Environmental Protection Agency for recreational waters.





SwimCast

1. All numbers are <235 = No SwimBan, Beach Open
2. Upper is >235 but Average and Lower are <235 = No SwimBan, Beach is Open
3. Upper and Average >235 = SwimBan, Beach is Closed

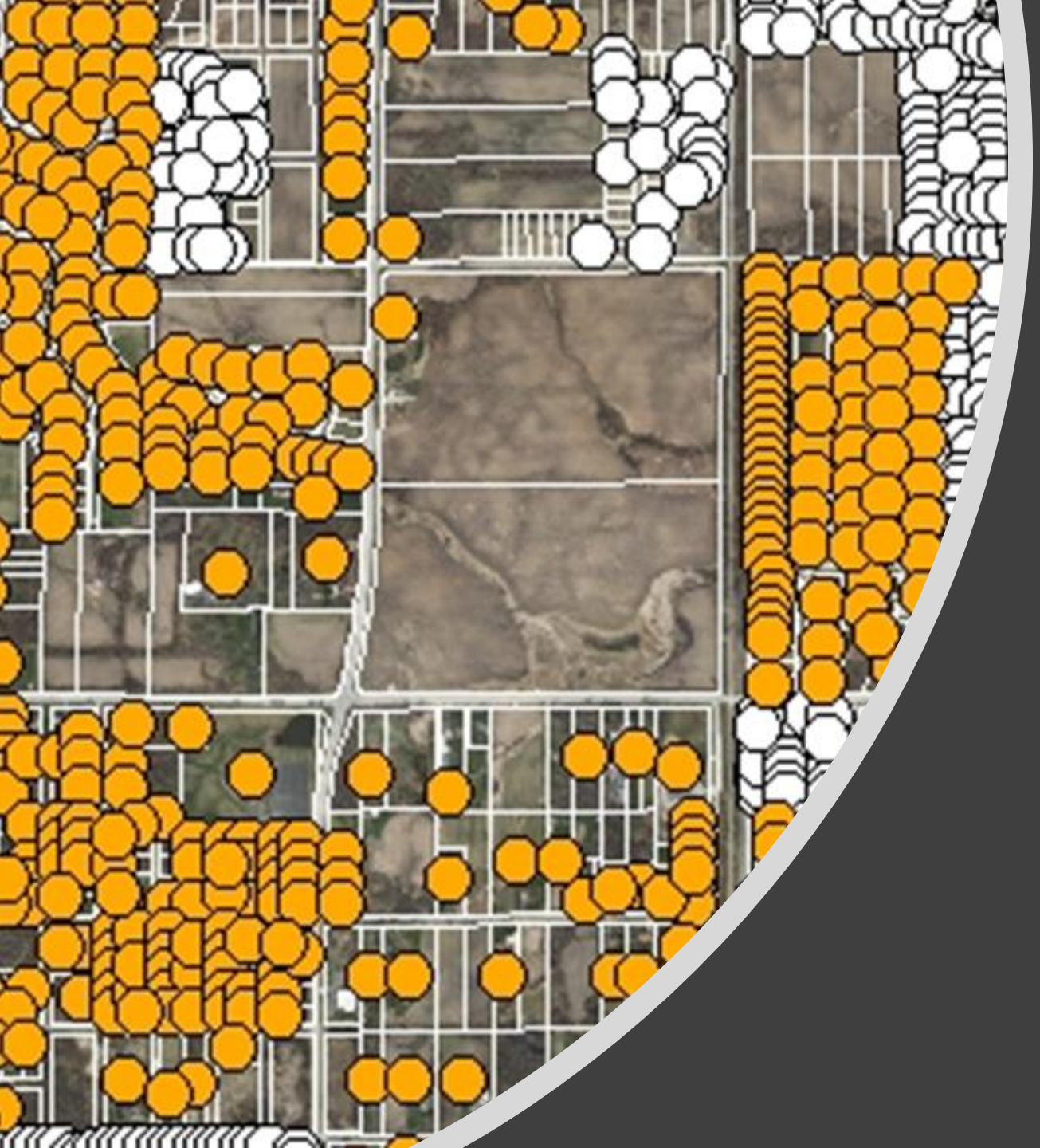


2003 Lake County Ribotyping Bacterial Source ID Study Results

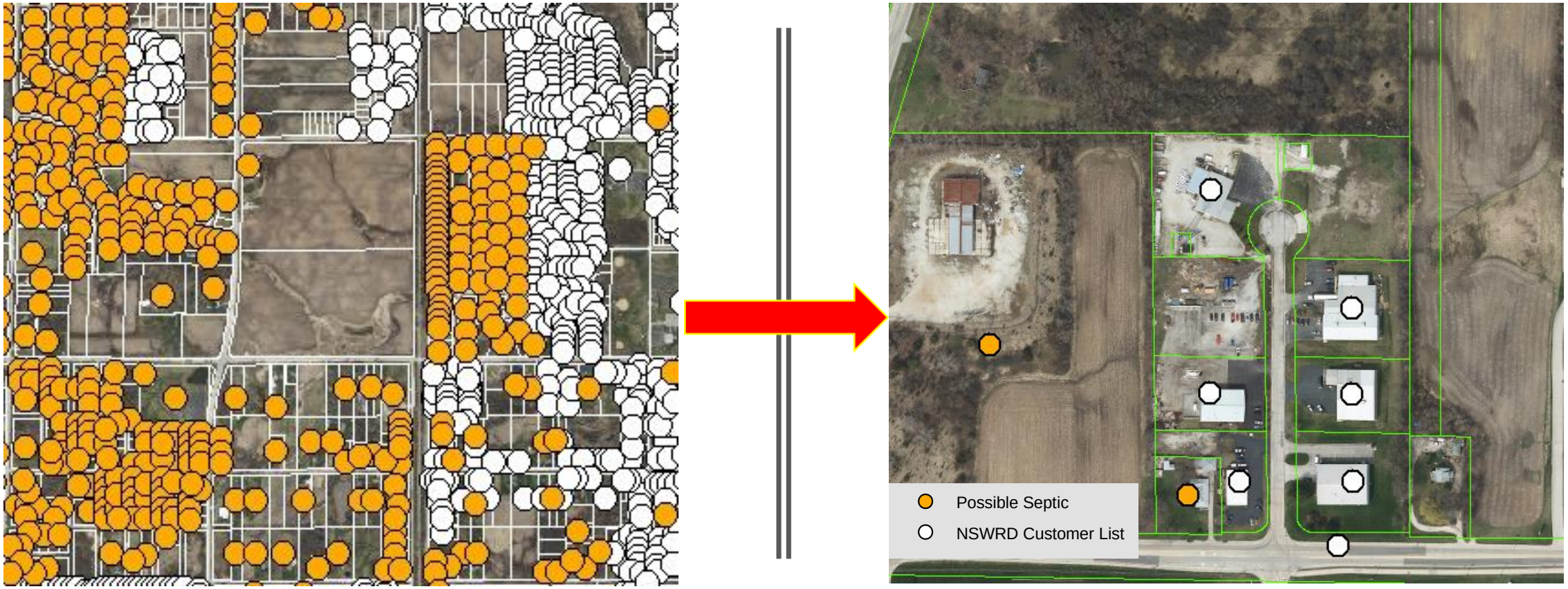
Beach Safety & Sanitary Survey

To prevent illnesses associated with swimming at Illinois beaches, each licensed beach is inspected annually to determine that required safety features are in place and there are no sources of possible pollution such as sewage discharges.

Illicit Discharge to the Waukegan River



Septic Identification Project – Funded by IL DNR



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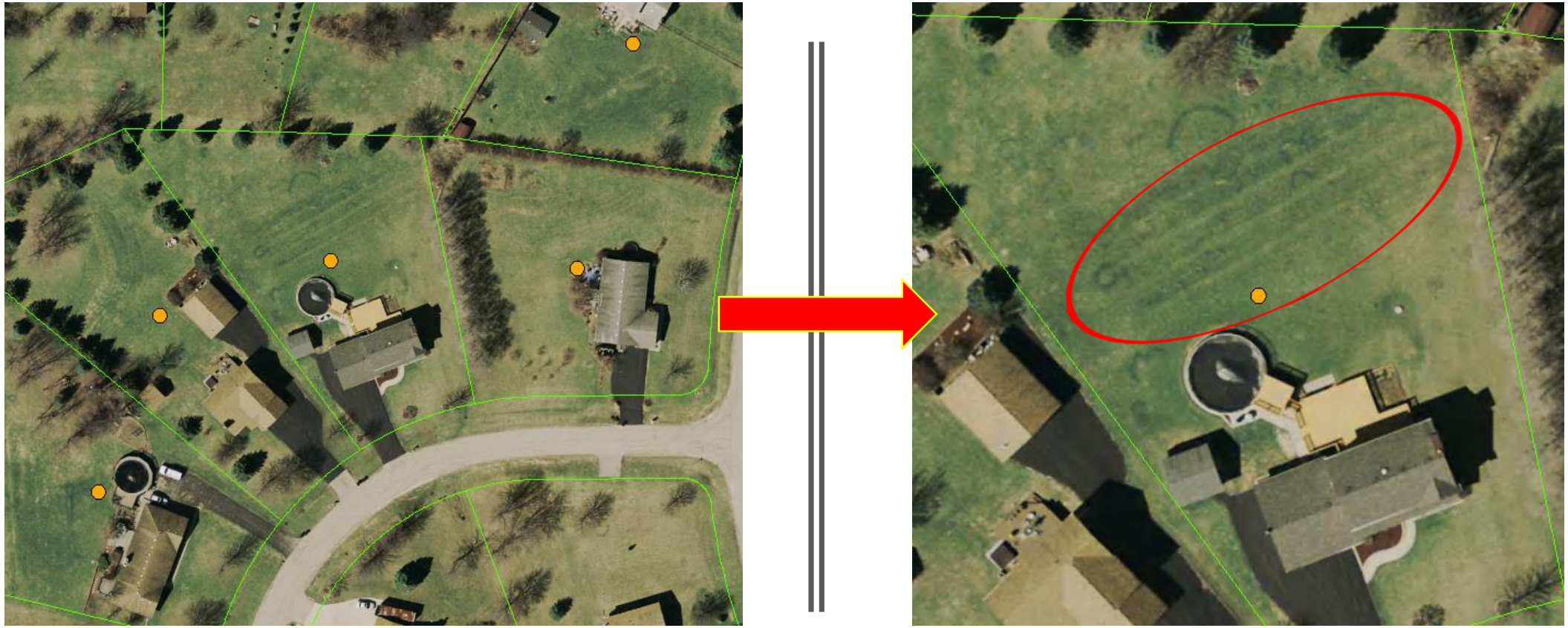

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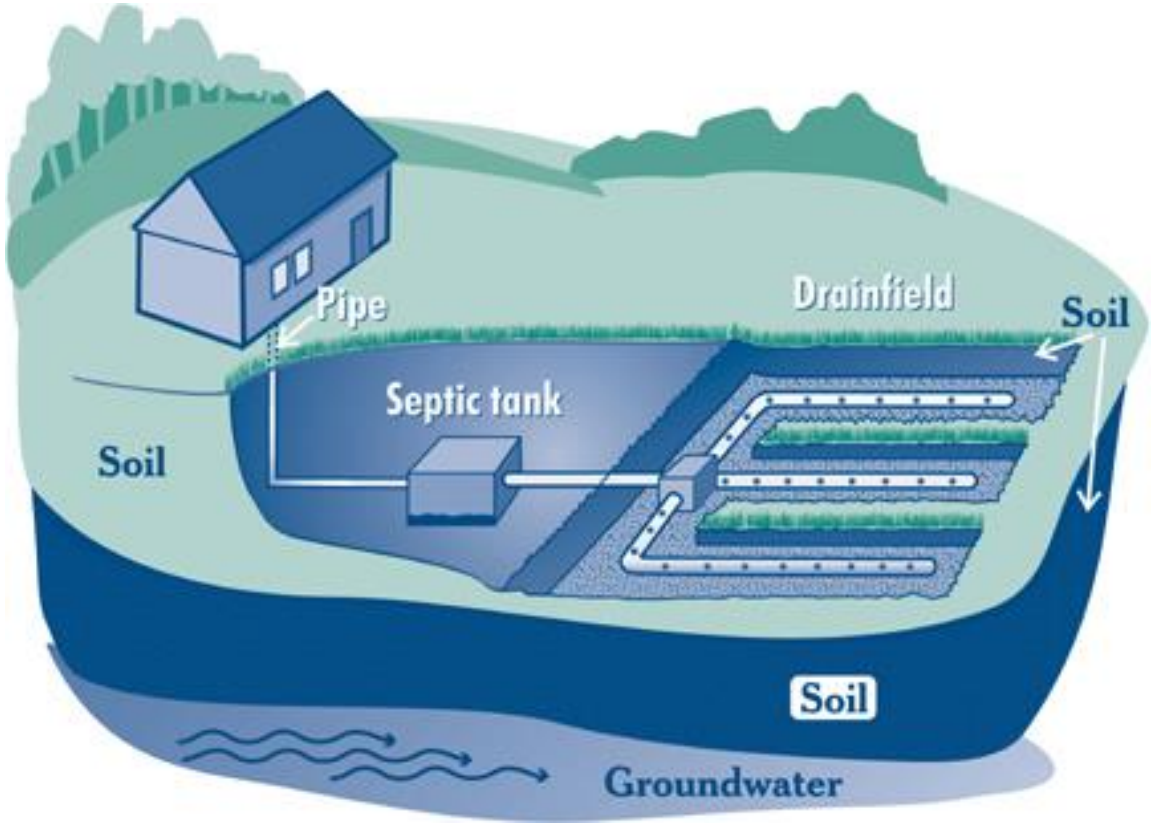

Septic Identification Project – Funded by IL DNR

Stakeholder Role & Responsibilty

1

Provide feedback during watershed planning meetings

2

Action Plan

- New Projects
- Updates (to previous projects)

3

Flood Problem Area Inventory

4

First task starts today!

Watershed Issues and Opportunities

Watershed Issues and Opportunities

Issues: usually related to a real or perceived problem

Opportunities: aspect of the watershed to be preserved or resolution of a watershed issue

50+ **Issues and Opportunities** identified for Kellogg Creek and Dead River watersheds

Goals, Objectives, Indicators, & Milestones

Goals: "Mini" vision statements, desired change/outcome

Objectives: Specific, measurable steps to attain goals

Indicators: Measure or statistic indicative of objective

Milestones: Value set for indicator to assess plan performance

Discussion Today

Issues and opportunities

- Watershed scale (not single location or global)
- Not individual projects or programs
- Previous examples from Dead River & Kellogg Creek plans—update or delete?
- New or emerging issues/opportunities?

For More Information

You can follow the planning process and view meeting documents at:

http://www.lakecountyil.gov/2418/Lake-Michigan-Watershed

Project Contacts:

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Jacob Jozefowski jjozefowski@lakecountyil.gov

847-377-7700