

# A Citizen's Guide to Maintaining Stormwater Best Management Practices For Homeowner's Associations and Property Owners



Types of BMPs • Signs of a Degraded BMP • Who Should Carry Out Maintenance

Inspecting Your BMP • BMP Inspection Schedule • Maintenance Costs

Putting Together Your Own Maintenance Plan



**STORMWATER MANAGEMENT COMMISSION**

# A Citizen's Guide to Maintaining Stormwater Best Management Practices (BMPs) For Homeowners Associations and Property Owners

Do You Have a Stormwater BMP?.....	3
Types of BMP.....	4
A Plan for Maintaining Your BMPs.....	5
Signs of a Degraded BMP.....	7
Who Should Carry Out Maintenance?.....	8
Tips for Working With Lawn Care Companies Involving the Community	
BMP Maintenance Quick Guide.....	10
Inspecting Your BMPs.....	12
Maintenance Costs.....	13
Need a Retrofit?	
What You Can Do To Prevent Pollution.....	14
Benefits of Native Vegetation.....	15
A Few Words About Stormwater and Mitigated Wetlands.....	16
Easements and Easement Maintenance	
Agency Resources, Publications and Websites.....	17
Native Plant /Aquatic Plant Vendors and Installers Prescribed Burn Consultants Basin Plant Control Companies	

**CREDITS:** Lake County Health Department, Lakes Management Unit; Lake County Department of Planning, Building and Development; Lake County Soil and Water Conservation District; Bob Gardiner, Patty Werner, Lake County Stormwater Management Commission; Northern Virginia Planning District Commission; USDA - Natural Resource Conservation Service; Integrated Lakes Management, Inc.; Joy Corona, Bleck Engineering, Inc.; Bob Ward, Bridlewood Homeowners Association.

**COPIES:** Limited copies of this guide are available from the Lake County Stormwater Management Commission. The Guide is also available to download from SMC's website: [www.lakecountyil.gov/stormwater](http://www.lakecountyil.gov/stormwater)

**DATE:** December 2002; Revised October 2004

## Do You Have a Stormwater BMP?

The term "Best Management Practices," or BMP, was introduced and defined by the U.S. Environmental Protection Agency as a practice or combination of practices that is an effective, practicable means of preventing or reducing the amount of pollution generated by non-point sources.

What is non-point source pollution? Sources of non-point pollution include sediment, nutrients, motor oil, and lawn care products that run off hard surfaces and yards into storm drains. Storm drains typically empty into nearby water bodies and wetlands. Fortunately for Lake County that has thousands of acres of water bodies and wetlands, there are BMPs in place. A variety of local, state and federal laws, including the Lake County Watershed Development Ordinance (WDO) and the federal Clean Water Act, encourage or require the control of non-point source pollutants using BMPs.

Do you have a BMP on your property or in your neighborhood? Ponds, ditches and depressions that you see every day may actually be engineered stormwater facilities designed to reduce flooding and improve water quality. As development occurs, land is covered by roads, driveways, rooftops and other hard surfaces that do not allow stormwater to infiltrate (or soak) into the ground. Without BMPs, the end result of development may be flooding and poor water quality in streams and lakes.

The five most common BMPs in Lake County are wet detention basins, dry detention basins, vegetated swales, plant buffers, and stormwater wetlands. The long-term benefits of BMPs only work if they are maintained to sustain their effectiveness. Maintaining your BMP is an important part of Lake County's flood reduction and environmental protection efforts.

## BMP Lingo

**Best Management Practice (BMP)** - A practice or combination of practices that is an effective, practicable means of preventing or reducing the amount of pollution generated by non-point sources. Examples of BMPs include detention ponds, buffers and vegetated swales.

**Bio-Infiltration** - Vegetated depressional areas, such as engineered channels, vegetated swales or rain gardens, that are used to collect and filter urban stormwater.

**Buffer** - An area of vegetated land, preferably non-mowed native vegetation, left open adjacent to drainageways, streams, wetlands, lakes, ponds and other surface waters for the purpose of minimizing the impacts of point and non-point source pollution.

**Deed or Plat Restricted Areas** - Easements, covenants, deed restricted open spaces, reserved plant areas, conservation easements, or public road right-of-ways that contain any part of the stormwater management system of a development.

**Detention Basin** - Temporarily stores water before discharging to river or lake; primarily used to reduce peak discharges, but does not reduce runoff volumes. Can be classified into two groups:

**Dry Detention Basin** - Stores stormwater runoff but dries up following a rainstorm or snow melt. Typically not effective at removing pollutants.

**Wet Detention Basin** - Also stores stormwater runoff, but contains a permanent pool of water that will more effectively remove nutrients in addition to other pollutants than other BMPs like a dry pond.

**Filter Strip** - A vegetated area designed to slow runoff velocities and filter out sediment and other non-point pollution.

**Mitigated Wetland** - Created or restored wetlands are intended to replace the beneficial functions of wetlands lost due to development activities.

**Native Vegetation** - Native vegetation species that provide long root systems that can help stabilize stream banks, and can provide pollutant filtering capabilities.

**Non-Native Vegetation** - Plant species not native to an area that tend to out-compete and crowd out native species and dominate the area. Also called invasive species.

**Non-Point Source Pollution** - Also known as polluted runoff, comes from diffuse or scattered sources in the environment rather than from a defined outlet such as a pipe. As water moves across and through the land it picks up and carries away natural and human-made pollutants, depositing them into lakes, rivers and even underground sources of drinking water.

**Vegetated Swale** - An open channel drainageway used along residential streets and highways to convey stormwater and filter pollutants in lieu of conventional storm sewers.

**Watershed Development Ordinance (WDO)** - Regulations implemented in 1992 to set consistent, countywide standards for new development in Lake County. The WDO includes standards for detention, wetlands, soil erosion and sediment control.

**Stormwater Wetland** - A shallow, constructed pool that captures stormwater and allows wetland vegetation to grow.

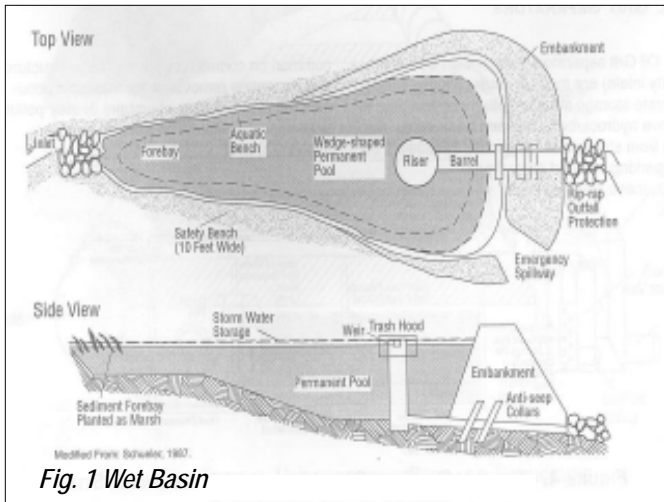


(Photo courtesy of USDA NRCS)

*Meet on-site with members of your homeowner's association to find out where your BMPs are located.*



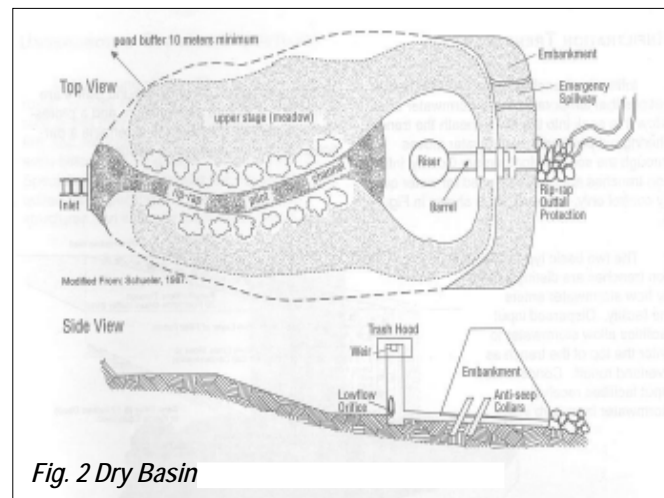
# Type of BMPs



## WET DETENTION - "WET BASINS" (Fig. 1)

Wet basins are man-made with permanent pools of water that function much like natural ponds. Excess runoff is stored above the permanent pool and is discharged at a controlled rate through an outlet. A wet basin can be more effective when native plants are added to the slopes and bottom. Adding wetland plants around a wet basin is also known as a stormwater wetland detention facility.

The advantages of a wet basin over a dry basin include higher pollutant removal and less chance that pollutants will be re-suspended during a storm. Wet basins can also serve as an aesthetic or recreational amenity as well as a habitat for some wildlife and aquatic species. Unmowed native vegetated buffers on the perimeter makes the basin less attractive to geese.



## EXTENDED DRY DETENTION - "DRY BASINS" (Fig. 2)

Dry basins temporarily hold stormwater but are not effective at pollutant filtering because they are typically planted with turf grass. Dry basins can be used for recreational areas like soccer fields. Prior to the mid-1980s, dry basins were the most common type of stormwater management facility. The WDO includes language that encourages the retrofitting of dry basins to improve water quality. For more on retrofitting, see p. 14.

## VEGETATED SWALES (Fig. 3)

Swales are one of the most commonly used stormwater practices. For many years they have been used along highways, parking lots, along residential streets and in between homes to convey water. Today, swales are designed to infiltrate and treat stormwater runoff.



## VEGETATED BUFFERS (Fig. 4)

Buffers are vegetated areas that surround wet basins and wetlands, and run parallel to streams and lakes. Buffers can be effective in filtering out non-point pollution before it reaches a water body. Buffers are required by the WDO and depending on the size of the water body they protect, minimum buffers widths can range from 20 feet to 100 feet wide (for high quality streams and wetlands).

## STORMWATER WETLAND DETENTION (Fig. 5)

A stormwater wetland detention facility typically includes a small permanent pool of water. The bottom and the slopes are planted with



native wetland plants that provide pollutant-filtering capabilities. The WDO encourages stormwater wetland detention. See p. 16 for more on wetlands.



# A Plan for Maintaining Your BMPs

## IF A PLAN ALREADY EXISTS

Since 1992, the Lake County Watershed Development Ordinance (WDO) requires a stormwater facility maintenance plan to address water quality. If your subdivision was permitted in 1992 (those built in 1992-93 were likely grandfathered) or after, a maintenance plan should be available through the permitting agency, usually the community. The plan typically includes:

- A description of inspection intervals and maintenance tasks required for each BMP.
- The party responsible for performing the maintenance tasks.

Before a Homeowner’s Association takes ownership of stormwater facilities:

- If you don’t already have one, get a copy of the site plan and as-built drawings that include all stormwater facility locations and types, easements, deed restrictions, and stormwater facility maintenance plans.
- Meet with the permitting agency (usually your local municipality) and the developer on-site to discuss the stormwater facilities, including the current condition and near-term and long-term maintenance of each facility.

*SAMPLE INSPECTION LOG*

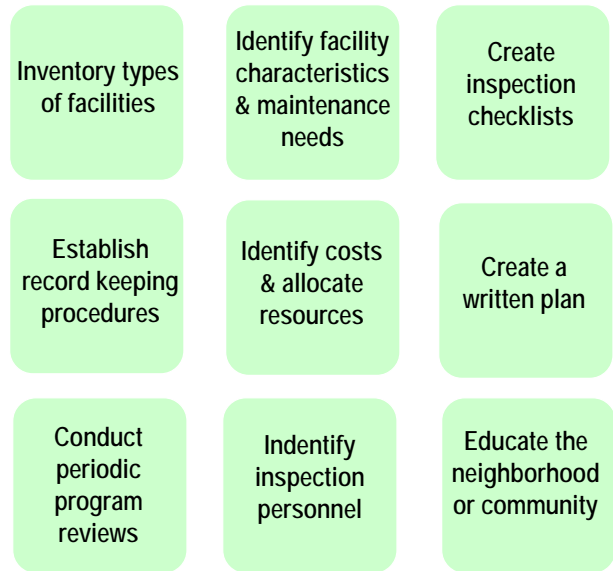
**ROUTINE MAINTENANCE**  
Wet and Dry Basins (with or without stormwater wetlands)  
**TASK:** Remove accumulated debris and litter, especially around the inlet and outlet areas.  
**INLET LOCATION:** Inspect wet basin inlets and outlets at Lincoln and Main Streets.  
**SCHEDULE:** monthly  
**LAST INSPECTION:** 11/03/03  
**CURRENT INSPECTION:** 5/02/04  
**OBSERVATIONS:** Removed litter from inlet/outlets. Some erosion will need to be stabilized.  
**COMMENTS:** Outlets need to be checked after snow melts during the winter. Vegetation around inlet area should be reviewed by landscaping company in the late summer to prevent/improve erosion problem.  
**INSPECTOR INITIALS:** Ima Reed

*It's not important how you set up your inspection log. What is important is that you follow the BMP Maintenance Quick Guide on pp. 10-11.*

## IF A PLAN DOES NOT ALREADY EXIST

You will want to consider creating a maintenance plan if one does not already exist. There are many advantages to having a plan. It provides a historical record of each facility, can be used in policy creation for the next association board, and can include a long-term maintenance budget. While the needs of your neighborhood may differ from those of the next, there are elements of a BMP maintenance plan that are universal.

### Elements of a Maintenance Plan



#### ■ Inventory Types of Facilities

The permitted site plan will show components of the stormwater system including basins, wetlands and swales. Consult with the site designer or permitting agency to identify below-ground features like storm sewers or above ground features like wetland and native vegetated areas.

#### ■ Identify Facility Characteristics and Maintenance Needs

Spend a day with your BMP! With site plan in hand, walk the site with the developer and a representative from the permitting agency. For older BMPs, particularly basins, consider taking along someone from your village engineering department or a consulting engineer. Take note of the physical and design characteristics of each drainage component and drainage easements. From there, some basic maintenance needs should become obvious. For example, vegetation may not have been sufficiently established around the perimeter of a basin or the outlet structure may contain a debris jam.

#### ■ Create Inspection Checklists

Checklists are essential to ensure that all system components are functioning as originally constructed. They are important not only during inspection, but checklists provide a historical status of facility functionality. See maintenance checklists for different BMPs on pp. 10-11. Consider tailoring the checklists to your site and facility types.

■ **Establish Record Keeping Procedures**

Tracking and recording can be logged in a computerized database. This allows homeowner's associations, facility managers or inspectors to schedule inspections, and to check off observations. A database could include identification numbers for each BMP, BMP type and location, data from previous inspections, special maintenance needs and pictures of your facilities.

**RECORD-KEEPING TOOLS**

- Computer
- Map files
- Inspection logs
- Important phone numbers
- Site map/plans



*Get your homeowner's association involved. Educate members on the maintenance plan, and train volunteers to be inspectors.*

■ **Identify Costs and Allocate Resources**

This task is typically the most difficult task for an association or facility manager. A good rule of thumb is to increase a routine maintenance budget by an average of 3-4 percent each year for inflation. For long-term maintenance needs, consult your local government or work with a consulting engineer to estimate the cost of the needed work.

■ **Create a Written Plan**

A written plan should include the following:

- Name, location of site.
- Name, address and phone number of current owner(s) and previous owner(s).
- History of the site including a copy of the permitted site plan and as-built drawings, and maintenance plan (if required at time of permitting), copy of natural resource inventory (if one was conducted), other pertinent information and documentation including wetland permits, mitigated wetland monitoring requirements, professional evaluation of the drainage system prior to handing over ownership to the association, etc.
- Identify regulatory and legal requirements (including legal implications of ownership, with regard to facility maintenance and the legal impacts of neglect).
- Maintenance for both on-going and periodic maintenance requires record-keeping policies, and an equipment inventory.
- Funding mechanism, collection, distribution of funds, yearly budget approval process, evaluation of services and policies.

■ **Conduct Periodic Program Reviews**

On a yearly basis, review your inspection program, checklists, and contracts with landscaping companies and other contractors. Other items to check:

- Is your computerized tracking system working and does it need updating?
- Does your inspection checklist need to be evaluated for more detailed inspection or other information?
- Are you satisfied with professional services currently under contract, and are you getting what you paid for?
- Is the association fee covering maintenance costs or is there a need to increase it?
- Take time to update information such as phone numbers and addresses of inspectors and other support personnel. Update your inventory of equipment, if applicable.

■ **Identify Inspection Personnel**

Your landscaping company can alert you to maintenance needs on occasion. Inspections on the other hand can monitor and identify on a regular schedule. Inspections can be done by anyone interested in the task. Volunteer inspectors should be reliable, detail-oriented and willing to train others. A job description and training session should be written and become part of the maintenance plan.

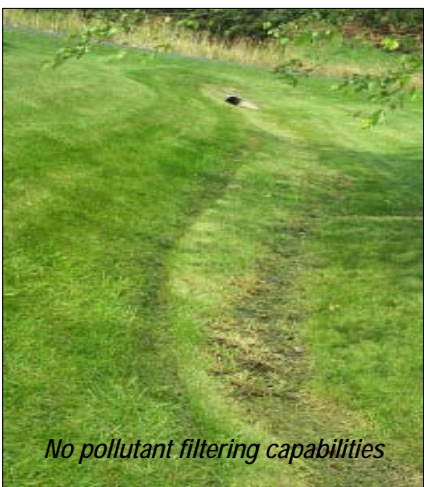
■ **Educate The Neighborhood or Community**

Last, but not least, it is imperative that those who live near a basin or another system component understand the purpose of the facility and the practices that keep the facility operating. For example, a native vegetative buffer is often viewed as a "mosquito haven" and aesthetically unpleasant. The preferred view is a manicured lawn mowed up to the banks of a wet basin with little or no vegetation on the perimeter. Use your newsletter or a neighborhood gathering to talk about and show the merits of native vegetated buffers. For more on educating your community, see p. 8.

<p><b>Sycamore Tree Subdivision Homeowners Association Sycamore, IL</b></p> <p><b>Stormwater Facility Maintenance Plan Adopted 10/01/04</b></p>	<p><b>Table of Contents</b></p> <p>Association Structure Inventory of Facilities Map, pictures of facilities Maintenance Schedule Inspection Log Form and Directions Lawn Care Contract Info Maintenance Budget Equipment Inventory Inspection Schedule</p>
---	---



# Signs of a Degraded BMP





## Who Should Carry Out Maintenance?

Cost, safety and effectiveness are key factors in determining who will carry out your maintenance needs. Some of the more routine maintenance tasks can be done by a BMP facility owner. Those tasks may include landscaping, educating the neighborhood, and litter removal.

It is recommended that a professional landscaping company be hired for the more difficult routine work. Mowing, burning, working around sloping embankments, stabilizing eroded areas, and replanting vegetation are tasks a professional landscaping company might best manage. Trained professionals can also identify problems early on saving expensive repairs later.

### TIPS FOR WORKING WITH LAWN CARE COMPANIES

Your BMP is a water treatment system and requires special attention. Sit down with your landscaping company manager and discuss your BMP maintenance needs. Objectives might include:

- Communicate that the facility is a water quality device.
- Communicate mowing practices; for instance, mowing at a

higher level and perhaps not as frequently, or not at all especially in the buffer areas. You also can request that use of heavy equipment be avoided where possible particularly in vegetated areas.

- Communicate the need to keep the BMP facility clear of grass clippings and leaf piles (convey this to the residents as well).
- Ask whether the company follows an integrated pest management (IPM) plan and minimize the application of pesticides and fertilizers. An IPM plan can include:
  - Use of pesticides only as needed and only in trouble spots
  - Use of alternatives to pest control or no control at all
  - Policy of not applying chemicals when there is a heavy rainfall in the forecast
  - Testing the soil before applying low-phosphorous fertilizer if needed.

**TIP: The key is communication. If the company cannot agree or is not willing to agree to your needs, find another company that will.**

## Involving the Whole Community in Maintenance Responsibilities

Consider starting a public education program for your neighborhood. Even if day-to-day maintenance is left to a professional, involving the community in on-going BMP maintenance activities is a cost-effective way to prolong the life of the BMP and to prevent pollution.

Most of the time people are unaware that their activities contribute to pollution. Through education, people become aware of how their activities impact water quality and flooding, and they become a stakeholder in protecting their environment. Consider the following questions for your education program:

- What are the pollution and flooding problems that need to be addressed?
- What activity or activities are responsible for the pollution or flooding? Encourage residents to change their habits to reduce pollution.



*Educate your neighbors about your BMPs.*

### Join Your Neighbors for a BMP Clean Up Day!

What's a BMP? A BMP, or Best Management Practice, is a facility designed to trap pollutants from our neighborhood before entering Bull Creek.

Sat., October 5, 2003  
9 a.m. at the south pond

Even if you can't make it, there are simple things you can do to protect our community's water quality. Following the suggestions on the attached brochure can help!  
For more information call 555-2233.



*Storm drain stenciling is a good community project to encourage clean water.*



- Who can help implement a community education program? Boy/Girl scouts, environmental group, local school or chamber of commerce?
- How will the message reach the targeted audience? Options could include public meetings, bulletin boards, local newspaper, and signage.
- How can alternatives to pollution be encouraged? Recycling and hazardous waste days are a good start.



# Inspecting Your BMPs

## Maintenance Program Components

- Regular Inspections
- Vegetation Management
- Embankment and Outlet Stabilization
- Debris and Litter Control
- Mechanical Components/Inlet/Outlet Replacement
- Insect Control
- Maintenance of Access Route to BMP
- Overall Pond Maintenance
- Sediment/Pollutant Removal

## REGULAR INSPECTIONS

This section outlines the maintenance needs for the most common types of BMPs found in Lake County. It is important to understand that while general maintenance tasks can be outlined, actual maintenance needs will vary according to specific site conditions. Many BMP inspections are conducted on an annual or semi-annual inspection schedule. Photos should be taken to add to the file. It also is important to inspect and clear debris following rain events particularly when a BMP's storage capacity has been surpassed.

## VEGETATION MANAGEMENT

Most BMPs heavily rely on vegetation to filter out nonpoint source pollution and to prevent erosion on embankments and slopes. The following is a quick reference on how to keep your vegetation healthy.

- **Mowing.** Short grass (Kentucky blue grass, etc.) may look nice, but doesn't have a deep root system and is ineffective as a pollutant filter. Cut grass no shorter than 6-8 inches, particularly grass near basin embankments and slopes. Never mow down to the water's edge. In fact, replace your grass around wet basins with native vegetated buffers. See p. 15 for the benefits of native vegetation.
- **Weed and Pest Control.** More is not better when it comes to fertilizing and pesticide use, especially near basins, swales, lakes and streams. Excess fertilizer can flow off your lawn and into storm sewers that eventually drain into nearby water bodies.
- **Non-Native Vegetation.** Non-native species like buckthorn and purple loosestrife can impact a BMP's effectiveness by blocking out the more effective long-rooted native vegetation. Short-rooted non-native species can actually destabilize a BMP's embankment or slope, and reduce the

## Factors Affecting Type and Frequency of Maintenance

**Function of the BMP Facility.** Inspections will vary depending on the type of BMP.

**Visibility of the BMP Facility.** The needs and preferences of the surrounding community will determine to a large extent the amount of maintenance for aesthetics and BMP facility effectiveness.

**Landscaping.** Maintenance needs will vary depending on the types of vegetation used in landscaping. Native vegetation needs less care and less mowing than turf grass.

**Upstream Conditions.** The conditions of the watershed upstream from your BMP can significantly impact the amount of sediment and other pollutants entering your BMP facility. Upstream commercial areas or roads may result in an increased need for litter and sediment removal, and other maintenance tasks.

**Safety.** Since BMPs can often involve the impoundment of water, the safety of nearby residents must be considered.

**Need for Professional Judgment.** BMPs are water treatment as well as storage facilities. While some routine maintenance can be undertaken by a non-professional, the judgment of a professional should be consulted regularly.

**Financing.** The costs associated with non-routine BMP maintenance tasks can be considerable. A fund should be established to provide for the costs of long-term needs such as sediment removal. (see *Non-Routine Maintenance*)

*Source: Northern Virginia Planning District, Division of Environmental Services.*

BMP's pollutant filtering capabilities. Monitoring, mowing and prescribed burning can help control unwanted, non-native species.

- **No Mow Zones.** In Lake County, higher quality wetland areas are required to have native vegetated buffers up to 100 feet in accordance with the WDO. At the same time, buffer requirements vary in size along streams, lakes and rivers, and wet basins. It is recommended that any native vegetated buffer remain as "no mow" areas. An alternative to mowing are prescribed burns. For more on prescribed burns, see p. 14.

# BMP MAINTENANCE QUICK GUIDE

## Wet and Dry Basins

### ROUTINE MAINTENANCE

- ✓ Remove accumulated debris and litter, especially around the inlet and outlet areas.
- ✓ Mow routinely, unless there is native vegetation. If native vegetation exists, consider periodic burns on a bi-annual schedule or yearly in early spring or late fall.
- ✓ Remove woody vegetation from all embankment areas.
- ✓ Stabilize/revegetate side and bottom areas.
- ✓ Stabilize/revegetate contributing areas to reduce incoming sediments.
- ✓ Implement a pollution prevention program.

### NON-ROUTINE MAINTENANCE

- ✓ De-thatch grass to remove accumulated sediment and debris
- ✓ Aerate compacted areas to promote infiltration
- ✓ Monitor sediment accumulations, and remove sediment when the pool volume has become reduced significantly (roughly 15-20% of the basin), or when the basin becomes stagnant
- ✓ Replace BMP mechanical components, reconstruct embankments and spillways

### Tips for When Non-Routine Maintenance is Required for Wet Basins

- Visible signs of sediment accumulation.
- Insects and/or odor become problems.
- Algae blooms occur in the summer months or ponded areas become dominated by a single aquatic plant species.
- Visible damage to the embankment or mechanical components.

### Tips for When Non-Routine Maintenance is Required for Dry Basins

- Standing water is visible in inappropriate areas after 48 hrs.
- Insects and/or odor become problems.
- Emergence of non-native wetland vegetation.

### INSPECTION SCHEDULE

- Monthly
- Bi-Annually or Yearly Early Spring or Late Fall
- As Needed
- As Needed
- As Needed
- As Needed
- < Every 2 Yrs.
- Every 2-3 Yrs.
- Semi-Annual Inspection
- 2-10 Yrs. for Dry Basins
- 5-15 Yrs. for Wet Basins
- > 20 Yrs. if Maintained

## & Buffers

### ROUTINE MAINTENANCE OF VEGETATED SWALES, BUFFERS

- ✓ Remove accumulated debris, litter and sediment.
- ✓ Mow routinely unless there is native vegetation. If native vegetation exists, consider periodic burns on a bi-annual schedule or yearly in early spring or late fall.
- ✓ Replace non-native vegetation, like purple loosestrife, with native vegetation.
- ✓ Remove woody vegetation and stabilize and revegetate side and bottom areas with

### INSPECTION SCHEDULE

- As Needed
- Bi-Annually, or Yearly Early Spring or Late Fall
- As Needed
- As Needed

## Vegetated Swales

- native vegetation.
- Replant wetland plants (for wet swale) if not sufficiently established.

As Needed  
As Needed

### NON-ROUTINE MAINTENANCE

- Remove accumulated sediment/pollutants.

Semi-Annual Inspection

### Tips for When Non-Routine Maintenance is Required

- Standing water is visible after 48 hrs.
- Insects and/or odor become problems.
- Wetland vegetation emerges where not intended.
- Visible erosion or undercutting of swale banks is apparent.

## Stormwater Wetland (see also Wet Basins)

### ROUTINE MAINTENANCE

- Remove accumulated debris and litter.
- Supplement wetland plants if not well established.
- Inspect for invasive species and remove where possible.
- Hire a professional for periodic prescribed burns to encourage native plant growth and discourage non-natives.

### INSPECTION SCHEDULE

Monthly  
Annually  
Monthly  
Bi-Annual, or Yearly Early Spring  
or Late Fall

### NON-ROUTINE MAINTENANCE

- Remove accumulated sediment/pollutants.
- Stabilize/replace inlet/outlet structures.

Semi-Annual Inspection  
Annual Inspection  
20 Yrs. if Maintained

## SPRING

- Non-native vegetation removal/control
- Vegetation planting
- Rain garden installation
- Debris removal
- Post-winter inspection of structures, embankments and outlets
- Embankment stabilization
- Prescribed burning
- Structural component replacement
- Clear storm grates of leaves, debris

## SUMMER

- Non-native vegetation removal/control
- Vegetation planting
- Rain garden installation
- Debris removal
- Non-native vegetation removal/control
- Embankment stabilization
- Monitor/remove sediment
- Check for odors, standing water
- Structural component replacement
- Clear storm grates of leaves, debris

## FALL

- Non-native vegetation removal/control
- Debris removal
- Non-native vegetation removal/control
- Check for odors, standing water
- Structural component replacement
- Prescribed burning
- Clear storm grates of leaves

## WINTER

- Debris removal
- Clear storm grates of leaves, snow, debris
- Monitor structures and outlets



# Inspecting Your BMPs

## EMBANKMENT AND OUTLET STABILIZATION

Finding the source of erosion and stabilizing it can improve the effectiveness of a wet basin or swale. Left unchecked, an erosion problem can necessitate dredging, replacement of an entire embankment or slope, or even an inlet structure.

A prime cause of erosion is a lack of deep-rooted vegetation that holds soil in place. There are several techniques to stabilize banks including the combination of environmentally-favorable structural products, like lunkers and A-Jacks, that are combined with deep-rooted plants. The combination of structural and natural is known as bio-engineering.

In addition to erosion, problems like sink holes, a rusty, broken or crushed pipe, odor, or algae blooms are all clear indications to call a consulting engineer.

Animal burrows also will deteriorate embankment integrity. Take steps to control animal burrowing by quickly filling existing holes.



(Photo courtesy of Integrated Lakes Management, Inc.)

*Native vegetation was used on this wet basin bank stabilization project in Lake County.*

## DEBRIS AND LITTER CONTROL

Regularly check for litter, debris and floating debris. Floating debris can clog basin inlets and outlets and swales. If dumping is a problem, outreach to the neighborhood can help.

## MECHANICAL COMPONENT, INLET/OUTLET REPLACEMENT

Erosion, corrosion, improper design, and lack of maintenance can all contribute to component loss of function. Valves, sluice gates, pumps, locks and access hatches are some of the mechanical components of wet and dry basins that may eventually need replacing. Call a consulting engineer for an inspection and replacement cost estimates.

## INSECT CONTROL

Mosquitoes and other insect breeding grounds can be created in shallow ponds of standing water. The development of a mosquito problem, particularly in dry ponds, is usually an early indication of a maintenance problem. It is likely the infiltration capacity of the BMP needs to be increased or sediment needs to be removed. It takes only 72 hours for larvae to hatch in standing water.

SEDIMENT REMOVAL FREQUENCY	
<u>BMP</u>	<u>Sediment Removal Frequency</u>
Wet Basin	5-15 years
Dry Basin	2-10 years
Vegetated Swale	2 years

Other insect control options include larger wet basins that maintain a stock of fish to feed on mosquito larvae. In addition, natural vegetated buffers can provide shelter for mosquito predators.

## MAINTENANCE OF ACCESS ROUTE TO BMP

Access to BMPs for routine and non-routine maintenance is critical. For more on easements, see p. 16.

## OVERALL WET BASIN MAINTENANCE

A healthy aquatic ecosystem has many benefits that are often overlooked. A healthy wet basin should require little maintenance. However, a good indicator of an unhealthy ecosystem is excessive algae growth. This could be caused by nutrients from fertilization practices by a landscape company or surrounding neighbors, upstream activities or by excess sediment.

Steps should be taken to reduce nutrients at their source and to encourage the growth of more desirable aquatic and emergent vegetation in a wet basin.

## SEDIMENT/POLLUTION REMOVAL

Since the primary purpose of a BMP is to remove sediment and other pollutants from stormwater runoff, sediment will eventually accumulate in a BMP and needs to be removed. There are no specific rules governing the timing of sediment removal because facility maintenance varies. However some general guidelines on sediment removal frequency are listed above.

Note that your wet basin may have been designed with stilling basins to collect settled sediment. Stilling basins are designed for sediment removal access, and sediment may need to be removed sooner than a BMP without a settling basin.

**BMP COMPONENT REPLACEMENT**

Eventually, like most infrastructure, some BMP components may need replacing and should be part of a BMP replacement fund. Components may include:

- inflow, outflow devices
- trash racks
- valves, orifices
- pumps and switches
- earthwork such as embankments and side slope stabilization
- mulches and vegetation.

# Maintenance Costs

## ROUTINE MAINTENANCE COST CONSIDERATIONS

Routine maintenance costs can vary based on the type of BMPs you have. Costs for mowing, weed control, fertilization and debris removal are typically calculated per acre, per year. Cost estimates can be obtained from lawn care companies and a general rule of thumb is to increase your yearly maintenance budget by 3-4 percent for these activities.

**TIP: The non-routine maintenance needs of a BMP, while infrequent, can be a major undertaking in terms of funding and logistics, and should always be performed by a consulting engineer.**

## NON-ROUTINE MAINTENANCE COST CONSIDERATIONS

Non-routine costs are often the most expensive and usually are not budgeted. It is advised that a BMP maintenance fund, with annual contributions, be established. You may want to consider hiring a consulting engineer to conduct a replacement fund study. When a fund is started, the primary non-routine maintenance cost is typically related to wet basin pollutant and sediment removal, or dredging.

### Wet Basin Dredging

Associations should have a copy of the "as built" drawings of their wet basin(s) depth contours. It is recommended that depth contours be checked about every two years unless there is a significant change in the basin's functions. Seek a consulting engineer or basin management company to determine if the depths of the basin have changed to the point that they no longer resemble what was designed and built.

A major cause of depth reduction includes high sediments loads from upstream construction site erosion, shoreline erosion, agricultural runoff and decaying aquatic plants. Ideally, you would want to correct these types of problems prior to dredging.

If dredging is the last option, a dredging feasibility study would be performed to determine areas to be dredged and to estimate dredging costs. The cost depends on the volume of sediment removed based on cubic yards, and sediment disposal. Don't forget that permits may be needed from local, state and federal agencies.

Your cost considerations should include:

**Mobilization and Demobilization.** Depending on the size of the basin, equipment will either be waterborne or on the perimeter of the basin. Additional costs for the construction of access roads and heavy equipment may be required if not already provided in the cost.

**Disposal.** The primary determinant of disposal costs is whether on-site disposal is an option. If on-site disposal is not available, landfill and transportation costs can be high.

Source: Integrated Lakes Management, Inc.

**Benefits of Dredging.** Dredging restores the BMP to its original intent and will likely improve it by:

- Removing excessive sediments
- Removing nutrient rich or toxic sediments
- Removing rooted aquatic plants
- Preventing fish kills
- Creating better habitat for fish



(Photo courtesy of Integrated Lakes Management, Inc.)

*Dredging is an eventual cost. Plan ahead and set funds aside.*

## Need a Retrofit?

Retrofits are stormwater treatment practices put into place after development has occurred to improve water quality, protect downstream BMPs and water resources, reduce flooding, or meet other watershed restoration goals. Several types of retrofit opportunities exist including:

**Create a wet or stormwater wetland basin:** Dry basins can be converted to wetland basins by excavating portions of the basin bottom to create wetland pockets and/or redesigning the outlet to allow for some water retention. Wetland and native prairie vegetation is then planted on the bottom and on banks.

**Stabilize shorelines and improve buffers:** Shorelines of wet basins with erosion problems could be stabilized using native vegetation. Native vegetation buffers should be established around the perimeter of all basins where possible to stabilize shorelines, filter pollutants and to discourage nuisance geese.

**Replace turf grass with native vegetation:** Turf grass is relatively intolerant of water level fluctuations and is maintenance-intensive. It also is not as effective as native vegetation for filtering pollutants. Turf grass should be replaced with native vegetation.

*Seek a consulting engineer to retrofit your BMP.*

Source: Watershed Management Institute.

## What You Can Do To Prevent Pollution

Whether you live in the city or the country...whether your home is large or small, there is something you can do to improve water quality.

- Collect oil and other automotive products preferably for recycling, or tightly seal and wrap them for proper disposal through the Solid Waste Agency of Lake County.
- Wash cars on the lawn, where soapy water can't quickly run toward the nearest storm sewer, picking up other pollutants as it goes. Wash your car with non-toxic, low phosphate soap and use water sparingly. Ideally, take your car to a car wash where water goes to a wastewater treatment plant.
- Keep cars tuned up and in good operating condition. Check for drips and repair leaks immediately to keep nuisance oils off pavement. Better yet, walk, bike or take the bus.
- Monitor fuel use from any underground gas and oil tanks to make sure they are not leaking.
- Clean up pet wastes from which nutrients and bacteria could be washed into BMPS, lakes and streams.
- Direct downspouts away from foundations to planting beds and lawns where water can safely soak into the ground. Install a rain garden.
- Conservatively use salt in winter. Substitute with sand, or chip ice away.
- Sweep your walks and driveways instead of hosing them down.
- Buy no-phosphate cleaners and detergents. Phosphates act as a fertilizer and increases algae and aquatic weeds in wet basins. When these plants die, they rob the water of oxygen and fish may die.

Source: Washington State Department of Ecology, and University of Wisconsin Extension.

### Prescribed Burns

Prescribed burns are an effective way to "fertilize" native vegetation and keep non-native species in check in buffer areas and in stormwater and natural wetlands. Prescribed burns should only be done by trained burn professionals.

Permits will likely be required from the Illinois Environmental Protection Agency, and possibly from your local municipality or fire department. Don't forget to notify all affected neighbors. See "Prescribed Burn Consultants" on p. 18.

### MOSQUITOS AND WATER

#### Prevent Mosquito Breeding

Wet and dry basins traditionally are not mosquito breeding grounds. In fact, mosquito larvae or "wigglers" must live in still water for five or more days to complete their growth cycle before becoming adult mosquitos capable of transmitting disease. Often the number of mosquitoes in an area can be reduced by removing sources of standing water.

- Discard old tires, buckets, drums and any water holding containers.
- Keep roof gutters and downspouts clear of debris.
- Keep trash containers covered.
- Empty plastic wading pools at least once a week and store indoors when not in use.
- Drain unused swimming pools.
- Fill in tree rot holes and hollow stumps that hold water
- Change the water in the bird baths and plant urns at least once a week.
- Store boats upside down or drain rainwater weekly.
- Try bat houses, or "mosquito magnets" that run on propane for your backyard and open areas.

Source: Lake County Health Department and Community Health Center

### CONSIDER A RAIN GARDEN

Rain gardens are just what they sound like... gardens that soak up rain water, mainly from your roof, but also from your driveway and lawn. They are landscaped areas planted with wildflowers and other native vegetation to replace areas of lawn. The gardens fill with a few inches of water and allow the water to slowly filter into the ground rather than running off to storm sewers. Compared to a patch of

conventional lawn, a rain garden allows about 30 percent more water to soak into the ground.

Holding back the runoff helps prevent pollutants such as fertilizers from washing off your yard, into storm sewers and eventually into nearby streams and lakes. By reducing the amount of water



that enters the local storm drain systems, rain gardens also can reduce the chances for local flooding, as well as bank and shoreline damage where storm drains empty into streams and lakes.

For a brochure on rain gardens, see p. 17, for the University of Wisconsin-Extension Service and Wisconsin Department of Natural Resources. Also check out the Illinois Lt. Governor's rain garden initiative at <http://raingarden.il.gov>.





## A Few Words About Stormwater and Mitigated Wetlands

In recent years there has been a national movement towards introducing wetlands where none currently exist, and replacing wetlands that have been impacted, to improve water quality, reduce flooding and to retain natural habitat.

### STORMWATER WETLANDS

Stormwater wetlands, or constructed wetlands, are incorporated into the shallow pools of wet basins. These “naturalized basins” are designed primarily to treat stormwater runoff. They also provide a natural method of shoreline protection against wave action compared to the placement of rock riprap.

While stormwater wetlands usually have less biodiversity than natural wetlands in terms of plant and animal life, they do offer water quality benefits and natural habitat, and can support macro- and micro- invertebrates.

Stormwater wetlands are not required under the Lake County Watershed Development Ordinance (WDO), but are highly recommended as a BMP to meet the water quality provisions of the WDO. Stormwater wetlands also offer aesthetic value and require less maintenance than mitigated wetlands.

It is well worth the time to include stormwater wetlands in your routine maintenance schedule. Watch for invasive plant species and sediment accumulation.

### MITIGATED WETLANDS

Mitigated wetlands are created on a site to replace lost wetland functions due to fill or other negative impacts. Mitigated wetlands are usually placed on a site independent of a wet basin.

The WDO requires that wetlands be replaced at certain ratios depending on the quality of the impacted wetland. The mitigated wetlands can either be replaced on site or in a



*A typical stormwater wetland at the edge of a wet basin.*

wetland bank within the same watershed in Lake County. The goal is ensure that more wetlands are replaced rather than destroyed.

Since mitigated wetlands are designed to replace the inherent features of a natural wetland, mitigated wetlands are required to meet strict performance standards established by the U.S. Army Corps of Engineers and adopted by SMC. Those standards require mitigated wetlands to be monitored for at least 5 years. The developer is responsible for developing and implementing the monitoring and management plan until the performance standards are met. SMC follows up with inspections on a regular basis to ensure plan implementation.

Once SMC determines the developer has met the 5-year monitoring and maintenance standards in the plan, the homeowner's association takes “ownership” of the wetlands. The association should then monitor the wetlands for invasive species and other negative impacts, and implement an annual maintenance program to keep the wetland thriving.

## Easements on Your Property

If you have a BMP in your subdivision or on your property, a deed restriction or easement is required. These legally binding agreements noted on the plat and in your purchasing agreement for your home allows access to stormwater facilities, and requires the property owner to maintain the access point.

BMPs that typically need a dedicated easement include detention basins, overland flow paths, swales, wetlands and buffers.

Here are some common sense guidelines for easement maintenance.

*Source: Charlotte-Mecklenburg County, NC Stormwater Services*

## EASEMENT DO'S AND DON'TS

### Recommended

- Plant trees and shrubs at the top of the embankments or berms to avoid blocking the flow of water. Native, water tolerant grasses and wetlands plants however can be planted at the base of a basin or swale.
- Plant non-woody trees, shrubs and flowers away from outlets and inlets to avoid root blockages.

### Not Recommended

- Do not erect any permanent structures like buildings, walls or fences made of blocks or bricks.
- Do not install tennis courts, swimming pools, dams or anything that might block the flow of water.

## UPDATED RESOURCE LIST (4/14) FOR "A CITIZEN'S GUIDE FOR MAINTAINING STORMWATER BMPS"

### Agency Resources

Lake County Stormwater Management Commission (SMC)  
Tel: (847) 377-7700  
[www.lakecountyil.gov/stormwater](http://www.lakecountyil.gov/stormwater)

U.S. Environmental Protection Agency - Nonpoint Source Pollution -  
Best Management Practices (USEPA)  
[www.epa.gov/owow/nps/prevent.html](http://www.epa.gov/owow/nps/prevent.html)

Lake County Health Department  
Tel: (847) 377-8020  
<http://health.lakecountyil.gov/Population/Pages/Lakes-Management.aspx>

### Publications and Websites

Native Plant Guide. USDA-Natural Resource Conservation Service  
The guide provides scientific and common names for plants native to the Northeastern Illinois region.  
<http://plants.usda.gov/>

Chicago Botanic Garden  
1000 Lake Cook Road, Glencoe, IL 60022  
Inventory/search of plants appropriate for northern Illinois.  
<http://bestplants.org/>

Living With Wetlands: A Handbook for Homeowners in Northeastern Illinois. The Wetlands Initiative  
Excellent guide for understanding and managing wetlands on or near your property. Other topics include managing wildlife.  
[www.wetlands-initiative.org/why-wetlands/publications.html](http://www.wetlands-initiative.org/why-wetlands/publications.html)

International Stormwater BMP Database  
[www.bmpdatabase.org/](http://www.bmpdatabase.org/)

Riparian Area Management: A Citizen's Guide  
Lake County Stormwater Management Commission  
The guide includes easy homeowner tips for protecting riparian areas and water quality.  
[www.lakecountyil.gov/Stormwater/Publications/Pages/BestManagementPractices.aspx](http://www.lakecountyil.gov/Stormwater/Publications/Pages/BestManagementPractices.aspx)

Morton Arboretum  
Retrofitting Large Landscapes for Sustainability  
[www.mortonarb.org/trees-plants/community-trees-program/community-tree-resources/sustainable-large-landscapes](http://www.mortonarb.org/trees-plants/community-trees-program/community-tree-resources/sustainable-large-landscapes)

Rain Gardens: A Household Way to Improve Water Quality in Your Community. University of Wisconsin Extension Service and Wisconsin Department of Natural Resources  
[www.lakecountyil.gov/stormwater/publications/Pages/bestmanagementpractices.aspx](http://www.lakecountyil.gov/stormwater/publications/Pages/bestmanagementpractices.aspx)

Solid Waste Agency of Lake County  
1311 N. Estes Street  
Gurnee, IL 60031  
Tel: (847) 336-9340  
Local household chemical waste days are scheduled to protect local natural resources.  
<http://www.swalco.org/Pages/default.aspx>

Streambank and Shoreline Protection Manual  
Includes bioengineering and structural erosion control, streambank stabilization techniques.  
[www.lakecountyil.gov/stormwater/publications/Pages/bestmanagementpractices.aspx](http://www.lakecountyil.gov/stormwater/publications/Pages/bestmanagementpractices.aspx)

Stormwater Manager's Resource Center  
Link to various fact sheets on stormwater, BMPs and other useful information.  
[www.stormwatercenter.net/](http://www.stormwatercenter.net/)

Stormdrain Stenciling Information  
There are several on-line resources for community stormdrain stenciling projects but here is one:  
[www.lakecountyil.gov/stormwater/publications/Pages/bestmanagementpractices.aspx](http://www.lakecountyil.gov/stormwater/publications/Pages/bestmanagementpractices.aspx)

U.S. Environmental Protection Agency  
USEPA has a number of on-line resources to reduce the impacts of nonpoint source pollution by homeowner and business owners.  
<http://water.epa.gov/polwaste/>

University of Illinois Extension Service  
100 South US Highway 45  
Grayslake, IL 60030  
Tel: 847-223-8627  
Extensive publications list on yard care, appropriate plants, pest management. Check out the Master Gardener program.  
<http://web.extension.illinois.edu/lm/>



## Native Plant/Aquatic Plant Vendors/Installers

Applied Ecological Services, Inc.  
120 West Main Street, West Dundee, Illinois 60118  
Tel: (847) 844-9385  
[www.appliedeco.com/](http://www.appliedeco.com/)

Cardno JFNew Native Plant Nursery  
128 Sunset Drive  
Walkerton, Indiana 46574  
Tel: (574) 586-2412  
[www.cardnojfnew.com/Nursery.aspx](http://www.cardnojfnew.com/Nursery.aspx)

ENCAP, Inc.  
Native landscape specifications and drawings for stormwater detention facilities, rain gardens, bio-swailes and other types of projects.  
2585 Wagner Court, DeKalb, IL 60115  
Tel: (815) 748-4500  
<http://encapinc.net/>

McGinty Bros., Inc.  
Tree care, hydroseeding, wildflowers, vegetation control.  
3744 RFD Cuba Road, Long Grove, IL 60047-7958  
Tel: (847) 438-5161  
[www.mcgintybros.com](http://www.mcgintybros.com)

Marshland Transplant Aquatic Nursery  
J & J Transplant Aquatic Nursery, LLC  
PO Box 227, Wild Rose, WI 54984-0227  
Tel: (800) 622-5055  
<http://marshlandtransplant.com/index.html>

Natural Garden Natives  
[www.naturalgardennatives.com/index.cfm/fuseaction/wheretobuy/find](http://www.naturalgardennatives.com/index.cfm/fuseaction/wheretobuy/find)

Pizzo & Associates, Ltd.  
Nursery, restoration, prescribed burns, plantings, invasive plant removal, erosion control.  
136 Railroad St., PO BOX 98, Leland, IL 60531  
Tel: (815) 495-2300  
<http://pizzo.info/>

Possibility Place Nursery  
Offers trees, shrubs, grasses and forbes native to northern Illinois.  
7548 W. Monee-Manhattan Rd., Monee, Illinois 60449  
Tel: (708) 534-3988  
[www.possibilityplace.com/](http://www.possibilityplace.com/)

Prairie Nursery, Inc.  
Wide variety of native wildflowers and grasses in both seeds and plants.  
P.O. Box 306, Westfield, WI 53964  
Tel: (800) 476-9453  
[www.prairienursery.com/](http://www.prairienursery.com/)

Taylor Creek Restoration Nurseries  
More than 30 years of experience in native plants; hundreds of prairie, emergent, wetland, woodland and savanna species in seed, plants, shrubs and trees.  
17921 W Smith Rd., P.O. Box 256, Brodhead, WI 53520  
Tel: (608) 897-8641  
[www.restorationnurseries.com/index.cfm](http://www.restorationnurseries.com/index.cfm)

Tallgrass Restoration, LLC  
2221 Hammond Drive  
Schaumburg, IL 60173-3813  
Tel: (847) 925-9830  
[www.tallgrassrestoration.com/](http://www.tallgrassrestoration.com/)

## Basin/Lake Dredging

U.S. Aqua Vac  
Specializing in lake and pond cleaning.  
P.O. Box 220, Crete, IL 60417 (Chicago Office)  
Tel: Toll Free (866) 989-MUCK (6825)  
[www.usaquavac.com/Home.html](http://www.usaquavac.com/Home.html)

## Prescribed Burn Consultants

Applied Ecological Services, Inc.  
120 West Main Street, West Dundee, Illinois 60118  
Tel: (847) 844-9385  
[www.appliedeco.com](http://www.appliedeco.com)

Cardno JFNew Native Plant Nursery  
128 Sunset Drive  
Walkerton, Indiana 46574  
Tel: (574) 586-2412  
[www.cardnojfnew.com/Nursery.aspx](http://www.cardnojfnew.com/Nursery.aspx)

Christopher B. Burke Engineering Ltd.  
9575 W. Higgins Road, Suite 600, Rosemont, IL 60018  
Tel: (847) 823-0500  
<http://cbbel.com/>

Conservation Design Forum  
375 W. First Street, Elmhurst, IL 60126  
Tel: (630) 559-2000  
[www.cdfinc.com/](http://www.cdfinc.com/)

ENCAP, Inc.  
2585 Wagner Court, DeKalb, IL 60115  
Tel: (815) 748-4500  
<http://encapinc.net/>

Integrated Lakes Management, Inc.  
120 LeBaron, Waukegan, IL 60085  
Tel: (847) 244-6662  
[www.lakesmanagement.com/index.cfm](http://www.lakesmanagement.com/index.cfm)

McGinty Bros., Inc.  
3744 RFD Cuba Road, Long Grove, IL 60047-7958  
Tel: (847) 438-5161  
[www.mcgintybros.com](http://www.mcgintybros.com)

Pizzo & Associates, Ltd.  
136 Railroad St., PO BOX 98, Leland, IL 60531  
Tel: (815) 495-2300  
<http://pizzo.info/>

Tallgrass Restoration, LLC  
2221 Hammond Drive  
Schaumburg, IL 60173-3813  
Tel: (847) 925-9830  
[www.tallgrassrestoration.com/](http://www.tallgrassrestoration.com/)

## Basin Plant Control Companies

Aquamarine  
Plant harvesters and aquatic plant removal equipment.  
1444 S. West Ave., Waukesha, WI 53189  
Tel: (262) 547-0211  
[www.aquamarine.ca/](http://www.aquamarine.ca/)

Aquatic Ecosystems Management, Inc.  
Herbicide and Algaecide treatments, aeration, pond consulting mainly.  
P.O. Box 82, Golf, IL 60029  
Tel: (847) 724-0646  
<http://aquaticecosystemsmanagement.com/>

Aquatic Weed Control  
P.O. Box 325, Syracuse, IN 46567  
Tel: (574) 533-2597  
[www.aquaticweedcontrol.com/](http://www.aquaticweedcontrol.com/)

Clarke Aquatic Services  
P.O. Box 72197, Roselle, IL 60172  
Tel: (630) 839-0810  
[www.clarke.com/](http://www.clarke.com/)

Environmental Aquatic Management  
P.O. Box 7239, Algonquin, IL 60102  
Tel: (847) 960-7252  
<http://environmental-aquatic.com/index.html>

Hockney Weed Cutter Co.  
P.O. Box 414, Delevan, WI 53115  
Tel: (262) 215-6037  
[www.weedcutter.com/](http://www.weedcutter.com/)

Inland Lake Harvesters, Inc.  
P.O. Box 225, Burlington, WI 53105  
Tel: (262) 763-3620  
<http://inlandlakeharvester.com/>

Integrated Lakes Management, Inc.  
120 LeBaron, Waukegan, IL 60085  
Tel: (847) 244-6662  
[www.lakesmanagement.com/index.cfm](http://www.lakesmanagement.com/index.cfm)

Marine Biochemists of Illinois  
809 Hicks Dr., Ste. A, Elburn, IL 60119  
Tel: (630) 365-1720  
[www.marinebiochemists.com/](http://www.marinebiochemists.com/)

McCloud Aquatic Services  
1011A W. Lunt Ave., Schaumburg, IL 60193  
Tel: (847) 891-6260  
[www.mccloudaquatic.com/](http://www.mccloudaquatic.com/)

Mud Cat Division  
1750 Madison Ave., New Richmond, IL 54017  
Tel: (715) 246-2888  
<http://mudcat.com/index.html>

Richmond Fisheries  
8609 N. Clark Rd., Richmond, IL 60071  
Tel: (815) 675-6545

Rollins Aquatic Solutions  
P.O. Box 57, Bloomingdale, IL 60108  
Tel: (630) 893-4595  
<http://rollinsaquatic.com/>

Scientific Aquatic Weed Control  
16525 Orchard Valley, Gurnee, IL 60031  
Tel: (847) 662-5370

Source: Lake County Health Department

NOTE: All lists of consultants and vendors are provided as a public service and does not constitute a recommendation, endorsement or certification of their qualifications or performance record, nor does the absence of a consultant or vendor from the list constitute a negative endorsement. While an effort has been made to provide a complete and accurate listing, omissions, or other errors may occur and, therefore, other available sources of information should be consulted. Those seeking professional services are advised to use independent judgment in evaluating the credentials of any consultants and vendors appearing on these lists.

## REFERENCES

Florida Department of Environmental Protection, Stormwater/Nonpoint Source Management Section. Save the Swales. Tallahassee, FL. 2000.

Kubillus, Sandy. Integrated Lakes Management. Dredging Primer, An Introduction to Dredging Needs, Methods, and Permit Requirements. Gurnee, IL. 2004.

Lake County Stormwater Management Commission. North Branch of the Chicago River Watershed Management Plan for Lake County. 2000.

Lake County Stormwater Management Commission. Lake County Watershed Development Ordinance. 2001.

Livingston, Eric H., Earl Shaver, and Joseph J. Skupien. Operation, Maintenance & Management of Stormwater Management. Watershed Management Institute, Inc. 1997.

Mecklenburg County Storm Water Services. Engineering and Property Management: Repairing Storm Drains on Your Property, Dealing With Drainage In Your Own Backyard, Pipe Outlets and Grates. City of Charlotte and Mecklenburg County. 2000.

Montgomery County Department of Environmental Protection. Maintaining Urban Stormwater Facilities: A Guidebook for Common Ownership Communities. Rockville, MD.

The Nature Conservancy, Illinois Chapter. Steward's Handbook. 1991.

Northern Virginia Planning District Commission, Division of Environmental Services. Maintaining Your BMP: A Guidebook for Private Owners and Operators in Northern Virginia. 2000.

Schueler, T.R. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMP's. Department of Environmental Program, Metropolitan Washington Council of Governments. Washington, DC. 1987.

The Stormwater Center. Stormwater Management Fact Sheets: Wet Pond, Stormwater Wetland, Grass Channel.

University of Illinois Extension. Local Government Topics: Stormwater Best Management Practices Start at Home, Conservation Easements. Urbana, IL. 2000.

USEPA. Landscaping With Native Plants. 2002.

USEPA. Urban Nonpoint Sources/Stormwater Management Fact Sheet: Degraded Urban Detention Ponds - Recognizing Problems and Finding Solutions.

**A Citizen's Guide to Maintaining  
Stormwater Best Management Practices (BMPs)**  
For Homeowner's Associations and Property Owners

