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A Citizen's Guide to Maintaining Stormwater Best Management Practices

For Homeowners Associations and Property Owners

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Putting Together Your Own Maintenance Plan

Lake County Stormwater Management Commission
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A Citizen's Guide to Maintaining Stormwater Best Management Practices (BMPs)

For Homeowners Associations and Property Owners

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Lake County Soil and Water Conservation District
Lake County Stormwater Management Commission
Northern Virginia Planning District Commission
USDA - Natural Resource Conservation Service

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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. Prompted by federal, state and local laws and regulations, developers now are required to control non-point source pollution using BMPs.

Do you have a BMP? Ponds, ditches and depressions that you see every day actually may 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.

In addition, pollution from urban development, called nonpoint source pollution, includes sediment, nutrients, motor oil, and lawn care products that can wash from hard surfaces into water bodies during a storm event.

The five most common BMPs in Lake County are wet ponds, dry ponds, vegetated swales, buffers and stormwater wetlands. For more information on each, see page 5.

If you do have a BMP, you are not alone. 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 urban pollutants. As such, maintaining your BMP is an important part of Lake County's flood reduction and environmental protection efforts.

(Photo courtesy of USDA NRCS)

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

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 - Grassed depressional areas, such as engineered channels or vegetated swales, that are used to collect and filter urban storwmater.

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

Deed or Plat Restriction - Covers easements, covenants, deed restricted open spaces and outlots dedicated to a public entity, 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** - Usually dry up following large rainstorms or snow melt events. Typically not effective at removing pollutants.
- **Wet detention basin** - 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.

Invasive Vegetation - Plant species not native to an area that tend to out-compete native species and dominate the area. These plants often have negative aspects such as shallower root systems.

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

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.

Type of BMPs

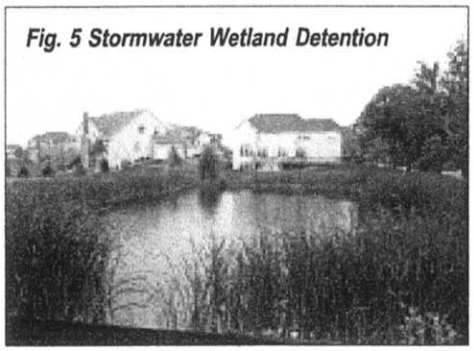
Fig. 1 Wet Pond

Fig. 2 Dry Pond

BUFFERS (Fig. 4)
Buffers are vegetated areas that surround wet ponds 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 a pollutant-filtering capabilities. Wetland detention can offer both pollutant filtering capabilities and habitat. The WDO encourages stormwater wetland detention.

Fig. 5 Stormwater Wetland Detention



WET DETENTION - "WET PONDS" (Fig. 1)
Wet ponds are man-made basins 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 pond can be more effective when native plants are added to the slopes and bottom. Adding native vegetation, which serves as a filter for nonpoint source pollution, is also known as a "stormwater wetland." For more on stormwater wetlands, see page 16.

The advantages of a wet pond over a dry pond are higher pollutant removal and less chance that pollutants will be re-suspended during a storm. Wet ponds also can serve as an aesthetic or recreational amenity as well as providing habitat for some wildlife and aquatic species. Native vegetation also makes the area less attractive to geese.

EXTENDED DRY DETENTION - "DRY PONDS" (Fig. 2)
Dry ponds temporarily hold stormwater but are not effective at pollutant filtering, because they are typically planted with turf grass. Dry basins most commonly are used for recreational areas like soccer fields. Prior to the mid-1980s, dry basins were the most common type of stormwater management facility. The Lake County Stormwater Management Commission suggests retrofitting dry ponds to improve water quality. For more on retrofitting, see page14.

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 and residential streets to convey water. Today, swales also serve to treat stormwater runoff using native vegetation to increase pollutant-filtering capabilities.

Fig. 3 Vegetated Swale

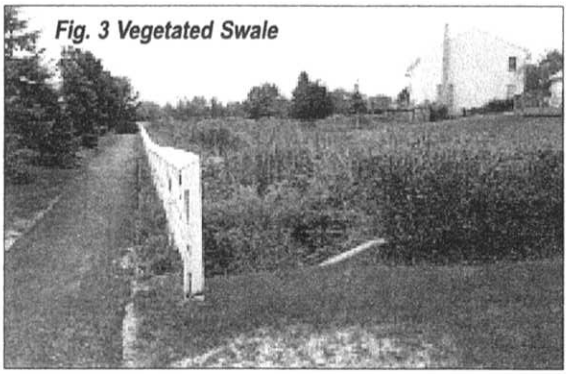
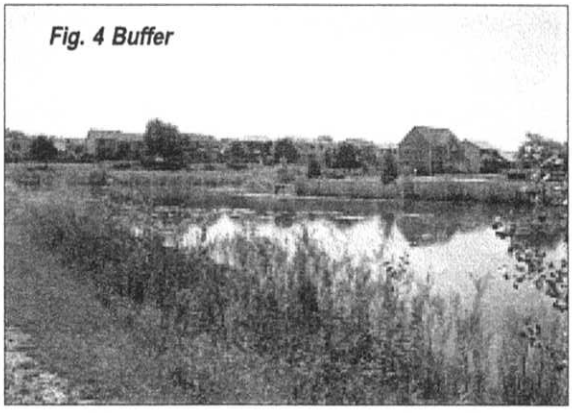


Fig. 4 Buffer



Bottom photos courtesy of Lake County Health Dept., Lakes Management Unit.

Putting Together Your Own Maintenance Plan

IF A PLAN ALREADY EXISTS

Under Lake County's WDO, a stormwater facility maintenance plan to address water quality is required of all new development since October 1992. 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:

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

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

- If you don't already have one, get a copy of the site plan that includes all stormwater facility locations and types, easements, 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 maintenance of each facility.

SAMPLE INSPECTION LOG

ROUTINE MAINTENANCE
Wet and Dry Ponds (with or without strormwater wetlands)
TASK: Remove accumulated debris and litter, especially around the inlet and outlet areas.
INLET LOCATION: Wet pond inlets and outlets at Lincoln and Main Streets.
SCHEDULE: monthly
LAST INSPECTION: 11/0302
CURRENT INSPECTION: 12/0202
OBSERVATIONS: Removed litter from inlet/outlets.
COMMENTS: Needs to be checked after snow melts during the winter, vegetation around inlet area should be reviewed by landscaping company in the spring
INSPECTOR INITIALS: MR

It's not important how you set up your inspection log. What is important is that you follow the BMP Maintenance Guide on p. 10 and the BMP Inspection Schedule on p. 13.

IF A PLAN DOES NOT ALREADY EXIST

You will want to consider creating your own maintenance plan if one does not already exist. There are many advantages to having one including a historical record of the facilities, policy creation for the next association board, and a long-term maintenance budget. And while the needs of your neighborhood may differ from those of the next, there are elements of a maintenance plan that are universal.

Inventory types of facilities	**Identify facility characteristics & maintenance needs**	**Create inspection checklists**
Establish record keeping procedures	**Identify costs & allocate resources**	**Create a written plan**
Conduct periodic program reviews	**Indentify inspection personnel**	**Educate the neighborhood or community**

- **Inventory Types of Facilities**

Get to know your facilities. The permitted site plan will show components of the drainage system including basins, wetlands and swales. Consult with the site designer to identify below-ground features like a storm sewers or to identify vegetation.

- **Identify Facility Characteristics and Maintenance Needs**

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

- **Create Inspection Checklists**

Checklists are essential to ensure that all system components are functioning as originally constructed. They are important not only during inspection, they provide an historical record for the facility and a current status of its functions. See maintenance checklists for different BMPs on page 10. You may want to tailor the checklists to your site.

Putting Together Your Own Maintenance Plan

■ Establish Record Keeping Procedures

Tracking and recording can be logged in a computerized database if it is feasible for your plans. This allows facility managers or inspectors to schedule inspections and to check off completed maintenance needs. A database could include identification numbers for each facility, facility 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

■ 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 no less than 3 percent each year for inflation. For long-term maintenance needs, consult your local government or work with a professional 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 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 record-keeping policies, equipment inventory.
- Funding mechanism, collection, distribution of funds, yearly budget approval process, evaluation of services and policies.

Sycamore Tree Subdivision
Homeowners Association
Sycamore, IL

Stormwater Facility
Maintenance Plan

Adopted 12/01/02

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

■ Conduct Periodic Program Reviews

On a yearly basis, review your inspection program and checklists, and contracts with licensed professionals. Other items include:

- Is your computerized tracking system working?
- 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.

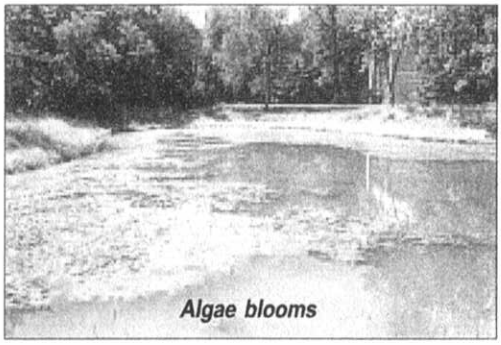
■ Identify Inspection Personnel

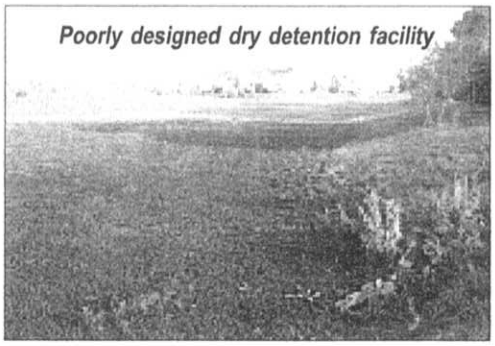
Most routine maintenance activities, like mowing, are contracted services. Routine inspection can be done by anyone interested in the task. The person should be reliable, detail-oriented and willing to train others. A job description should be written and become part of the maintenance plan.

■ Educate The Neighborhood or Community

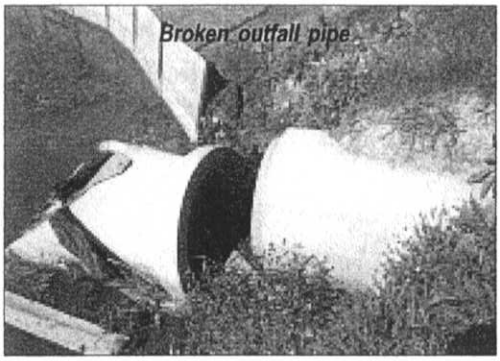
Last, but not least, it is imperative that those who live near a basin or another system component understand the purpose of the facility and the practices that keep the facility operating. For example, a native vegetative buffer is often viewed as a "mosquito haven" and aesthetically unpleasant. The preferred view is a manicured lawn up the banks with little or no vegetation. Use your newsletter or a neighborhood gatherings to talk about and show the merits of native vegetation. For more on educating your community, see page 9.

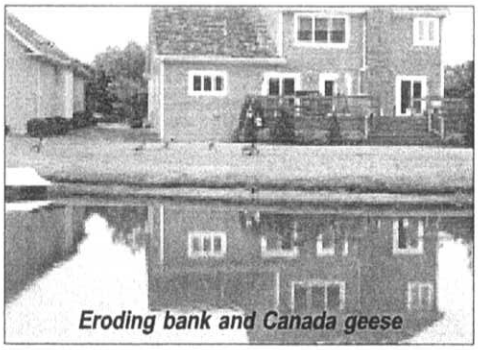
Signs of a Degraded BMP


Algae blooms

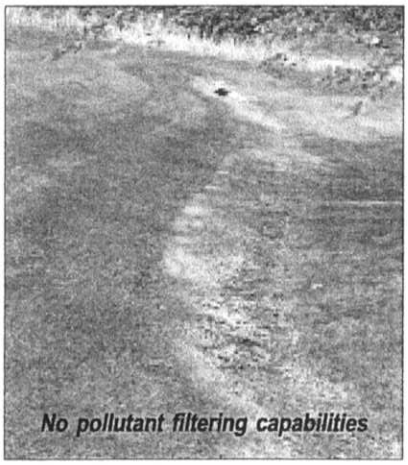

Poorly designed dry detention facility


No pollutant filtering capabilities

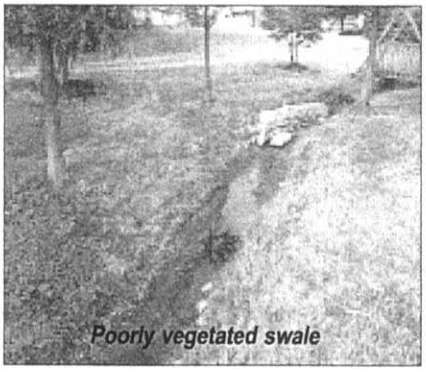

Broken outfall pipe

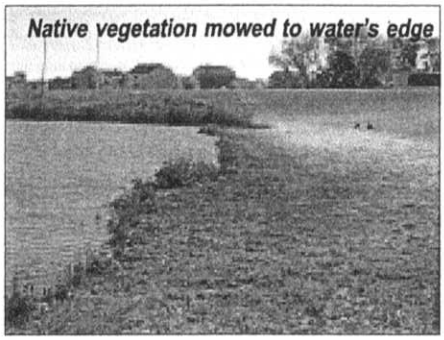

Eroding bank and Canada geese

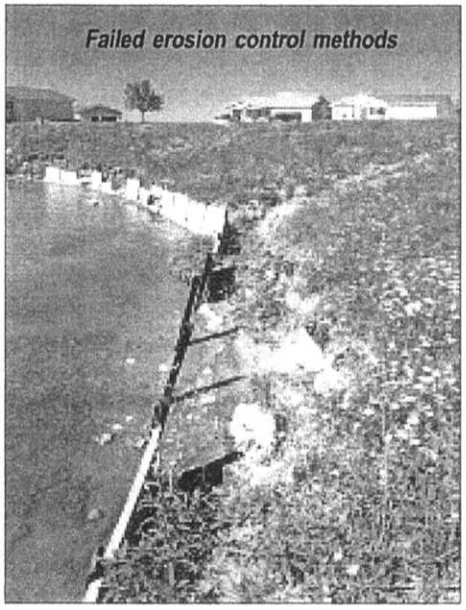

Bank failure

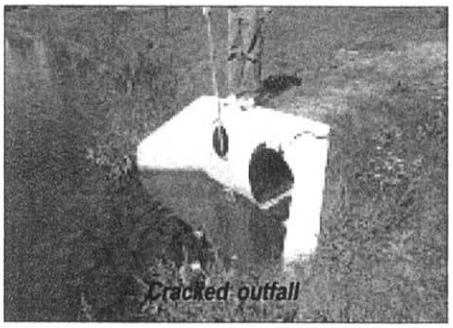

No pollutant filtering capabilities


Clogged trash rack


Poorly vegetated swale


Native vegetation mowed to water's edge


Failed erosion control methods


Cracked outfall


Purple Loosestrife

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 facility owner. Those tasks may include landscaping, education of the neighborhood and litter removal.

However, it is recommended that a professional landscaping company be hired for the more difficult work. However, mowing, working around sloping embankments, filling eroded areas, and resodding and replanting vegetation also are tasks that a professional landscaping company might best manage. Trained professionals can, too, 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 a 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 heavy equipment be avoided where possible, particularly in vegetated areas.
- Communicate the need to keep the BMP facility clear of grass clippings (by the company and the residents).
- Ask whether the company follows an integrated pest management (IPM) plan and ask to 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
  - Use of phosphorous-free fertilizer

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 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 they become a stakeholders in protecting their environment. Consider the following questions for your education program:

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

Organize a BMP tour.

Join Your Neighors 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 3, 2002
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. Follow the suggestions on the attached brochure can help!
For more information call 555-2233.

Storm drain stenciling.

- 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? 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.

BMP MAINTENANCE QUICK GUIDE

Wet and Dry Ponds

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, do not mow. Use burning as an alternative if possible.
- ☑ 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.

TIPS FOR WHEN NON-ROUTINE MAINTENANCE IS REQUIRED

Dry Ponds

- Standing water is visible in inappropriate areas after 48 hrs.
- Insects and/or odor become problems.
- Wetland vegetation emerges (unless the facility is specifically designed with marsh or wetland area).
- Visible damage to the embankment (such as sinkholes) or mechanical components.

Wet Ponds

- 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.

NON-ROUTINE MAINTENANCE

- ☑ De-thatch grass to remove accumulated sediment (less than every 2 years) or debris.
- ☑ Aerate compacted areas to promote infiltration (less than every 2 to 3 years).
- ☑ Monitor sediment accumulations. Remove sediment when the pool volume has become reduced significantly (roughly 15%-20% of the pond), or when the pond becomes stagnant.
- ☑ Replace BMP components, reconstruct embankments and spillways (greater than 20 years if properly maintained).

Vegetated Swales Buffers

ROUTINE MAINTENANCE

- ☑ Remove accumulated debris, litter and sediment.
- ☑ Mow routinely unless there is native vegetation. If native vegetion exists, do not mow. Use burning as an alternative if possible.
- ☑ Replace non-native vegetation, like purple loosestrife, with native vegetation.
- ☑ Remove woody vegetation and stabilize and revegetate side and bottom areas with native vegetation.
- ☑ Replant wetland plants (for wet swale) if not sufficiently established.
- ☑ Hire a professional for prescribed burns which encourages native plant growth and discourages non-natives.

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.

NON-ROUTINE MAINTENANCE

- ☑ Remove accumulated sediment/pollutants (as needed).

Stormwater Wetland (see also Wet Ponds)

ROUTINE MAINTENANCE

- ☑ Remove accumulated debris, litter and sediment.
- ☑ Supplement wetland plants if a signficant portion have not established (at least 50% of the surface area).
- ☑ Inspect for invasive species and remove where possible.
- ☑ Hire a professional for prescribed burns which encourages native plant growth and discourages non-natives.

NON-ROUTINE MAINTENANCE

- ☑ Remove accumulated sediment/pollutants as needed.

Inspecting Your BMPs

Maintenance Program Components

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

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 semiannual inspection schedule. Photos should be taken to add to the file. It also is important to conduct regular inspections and clean-up following rain events particularly when the BMP's capacity has been surpassed.

VEGETATION MANAGEMENT

Most BMPs heavily rely on vegetation to filter sediment from stormwater before it reaches the BMP and to prevent erosion of the banks and the bottom of the facility. While turf grass is the most common groundcover, successful BMPs use native vegetation (buffers, swales), and wetland plants (wet ponds) and stormwater wetlands to increase pollutant removal. The following is a quick reference on how to keep your vegetation healthy.

■ **Mowing.** Short grass 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 on pond embankments. Never mow down to the water's edge. Native vegetation should never be mowed, but annual burning is an alternative.

■ **Weed and Pest Control.** More is not better when it comes to fertilizing and pesticide use, especially near ponds, 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. Roots can actually destabilize a structure's bottom areas and side slopes. Monitoring and mowing will help control unwanted, non-native species.

■ **No Mow Zones.** Higher quality areas like wetlands have buffers up to 100 feet, which is in accordance with the WDO. Buffers can also vary in size along streams and ponds. However, it is recommended that these areas remain as "no mow" areas. Mowing is appropriate 1-2 times a year and could be an alternative to burning. For more on prescribed burns, see page 15.

Factors Affecting Type and Frequency of Maintenance

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

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

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

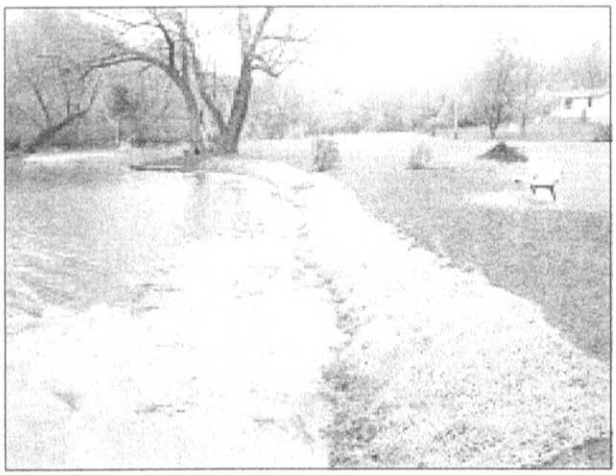
Upstream Conditions. The conditions of the watershed upstream from your BMP can impact significantly the amount of sediment and other pollutants entering your facility. Upstream commercial areas or roads may result in an increased need for litter removal and other maintenance tasks.

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

Need for Professional Judgment. BMPs are water treatment facilities. While some 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.



(Photo courtesy of Lake County Health Dept., Lakes Management Unit)

Native vegetation is used on this pond bank stabilization project.

EMBANKMENT AND OUTLET STABILIZATION

Erosion should be remediated as soon as possible as unstable banks on ponds and outlet structures can reduce the effectiveness of the BMP storage capacity and decrease water quality. Left unchecked, an erosion problem can necessitate replacement of the entire structure.

Lack of vegetation is a prime cause of erosion. There are several techniques to stabilize banks including bioengineering and more traditional environmentally-favorable structural techniques like lunkers and A-Jacks. Consult a professional engineer or erosion control specialist.

If other problems like sink holes, cracking, wet areas around the outlet, a rusty pipe, odor, or algae blooms are observed, call a consultant engineer or pond management company.

Animal burrows also will deteriorate the structural integrity of a bank. Efforts should be made to control animal burrowing. Existing holes should be filled quickly.

DEBRIS AND LITTER CONTROL

Regular debris and litter removal should be conducted to remove floating debris which can clog pond inlets and outlets, swales, and storm sewers. If dumping is a problem, outreach to the neighborhood can help.

MECHANICAL COMPONENTS

Valves, sluice gates, pumps, locks and access hatches are some of the mechanical components on certain BMPs. Call a consultant engineer for annual inspections.

INSECT CONTROL

Mosquitoes and other insect breeding grounds can be created through standing water. The development of a mosquito problem, particularly in dry ponds and rain gardens, is usually an early indication of a maintenance problem. It's likely the infiltration capacity of the BMP needs to be increased or sediments needs to be removed. It also may be possible in larger wet ponds to maintain a stock of fish that feed on mosquito larvae.

ACCESS MAINTENANCE

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

OVERALL POND MAINTENANCE

A healthy aquatic ecosystem has many benefits that are often overlooked. A healthy pond 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, 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 around the permanent pool.

SEDIMENT/POLLUTION REMOVAL

Since the primary purpose of a BMP is to remove sediment and other pollutants from stormwater runoff, sediment eventually will accumulate in a BMP and need to be removed. However there are no specific rules guiding removal requirements because facilities vary. For smaller BMPs like swales, maintenance should be performed every couple of years while a detention pond could go for 10-20 years before sediment should be removed. Dredging would be required to remove sediment from a pond.

Costs also will vary. Pond sediment removal could cost several thousands of dollars while a swale may be a fraction of the cost. Call a consultant engineer to determine sediment removal needs and for cost estimates and logistics. For more on maintenance costs, see page 14.

OUTLET STRUCTURE /MECHANICAL COMPONENT REPLACEMENT

Erosion, corrosion, improper design and lack of maintenance can all contribute to component replacement. Again, call a consultant engineer for an inspection and estimates on repairs.

BMP COMPONENT REPLACEMENT

Eventually, like most infrastructure, BMP components will need to be replaced. Components may include:

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

These items should be considered in a BMP maintenance fund. See page 14 for cost considerations.

BMP INSPECTION SCHEDULE

ROUTINE MAINTENANCE Wet and Dry Ponds (with or without strormwater wetlands)	Inspection Schedule
☑ Remove accumulated debris and litter, especially around the inlet areas.	monthly
☑ Mow routinely unless there is native vegetation.	as needed
☑ If native vegetation exists, do not mow. Consider burning as an alternative.	annually
☑ Remove woody vegetation from all embankment areas.	as needed
☑ Stabilize/revegetate side and bottom areas.	as needed

NON-ROUTINE MAINTENANCE	
☑ De-thatch grass to remove accumulated sediment and debris	< every 2 years
☑ Aerate compacted areas to promote infiltration	< every 2-3 years
☑ Monitor sediment accumulations, and remove sediment when the pool volume has become reduced significantly (roughly 15-20% of the pond), or when the pond becomes eutrophic; 2-10 years for dry ponds; 5-15 for wet ponds	semi-annual inspection
☑ Replace BMP components, reconstruct embankments and spillways	> 20 years if maintained

ROUTINE MAINTENANCE Vegetated Swales, Buffers	
☑ Remove accumulated debris, litter and sediment.	monthly
☑ Mow routinely unless there is native vegetation.	as needed
☑ If native plants exist, do not mow. Use burning as an alternative.	annually
☑ Remove woody vegetation and stabilize and revegetate side and bottom areas.	annually
☑ Stabilize and revegetate contributing areas to reduce incoming sediments.	annually

NON-ROUTINE MAINTENANCE	
☑ Remove accumulated sediment/pollutants.	as needed

ROUTINE MAINTENANCE Stormwater Wetland	
☑ Remove accumulated debris and litter.	monthly
☑ Supplement wetland plants if a signficant portion have not established (at least 50% of the surface area).	annually
☑ Inspect for invasive species and remove where possible.	monthly
☑ Hire a professional for prescribed burns to encourage native plant growth and discourage non-natives.	annually

NON-ROUTINE MAINTENANCE	
☑ Remove accumulated sediment/pollutants.	as needed

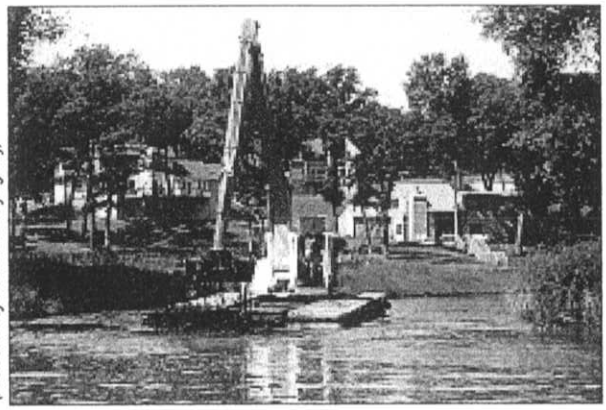
Maintenance Costs

Routine maintenance costs can vary based on the type of stormwater facility you have. A rule of thumb is that annual maintenance will cost a minimum of $3000 per acre, per year, for mowing, weed control, fertilization and debris removal. Cost estimates can be obtained from lawn care companies, but a 3-4 percent increase in a yearly maintenance budget is a good start.

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 professional consultant. Typically non-routine maintenance includes sediment/pollutant removal.

NON-ROUTINE COSTS

BMP	Sediment Removal Frequency
Wet Pond	5-15 years
Dry Pond	2-10 years
Grassed Swale	2 years



(Photo courtesy of Fox Waterway Agency)

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

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 professional to conduct a replacement fund study. When a fund is started, consider that the primary non-routine costs are related to wet and dry pond pollutant and sediment removal.

WET AND DRY POND DREDGING

Associations should always have a copy of the "as built" drawings of their pond(s) depth contours. These depth contours should be checked occasionally (every two years). Once it is noted that the pond depths no longer resemble what was designed and built, maintenance dredging should occur as the pond is no longer fuctioning properly. By dredging in smaller chunks, this will also reduce costs over time as dredging only gets more expensive as the years pass. The cost of dredging a pond depends on the volume of sediment removed. The cost (estimated by cubic yards removed) largely depends on the depth of the water and the distance between the excavation site and the "staging area" where sediment is transferred to trucks for removal. An additional consideration in the cost is how easily the equipment can access the pond bottom. Seek a professional consultant to determine if the depths of the pond have changed.

Mobilization and Demobilization. Depending on the size of the pond, equipment will either be waterborne or on the perimeter of the pond. 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.

By adding these three components together for a dredging project, a range can be established. The owner can expect to pay for sediment/pollutant removal.

Need a Retrofit?

You may want to budget for a retrofit. Stormwater retrofits are stormwater treatment practices put into place after development has occurred to improve water quality, protect downstream channels, 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 prairie vegetation are 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 in detention basins.

Seek a professional consultant to help you retrofit your BMP.

Source: Watershed Management Institute.

What You Can Do To Hold Down BMP Maintenance Costs

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.
- 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. Better yet, 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 lakes and streams.
- Direct downspouts away from foundations to planting beds and lawns where water can safely soak into the ground. Use a rain barrel where practical.
- 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 waterways. When these plants die, they rob the water of oxygen and fish may die.
- When hand-watering or washing your car, use a hose with a shutoff valve or nozzle.

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 stormwater and natural wetlands. Prescribed burns should be done only by professionals. Permits may be required from the Illinois Environmental Protection Agency, and possibly from your local municipality or fire department. You should always notify all affected neighbors.

MOSQUITOES AND WATER

Prevent Mosquito Breeding

Detention ponds traditionally are not mosquito breeding grounds. In fact, mosquito larvae or "wrigglers" must live in still water for five or more days to complete their growth cycle before becoming adult mosquitoes 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 and "mosquito magnets" that run on propane.

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 page 17, for the University of Wisconsin-Extension Service and Wisconsin Department of Natural Resources.

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 retain natural habitat.

STORMWATER WETLANDS

Stormwater wetlands, or constructed wetlands, are incorporated into the shallow pools and along the edges of wet ponds. These "naturalized ponds" 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, 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 then mitigated wetlands.

It is well worth the time to include stormwater wetlands in your regular inspection log. Invasive plant species and sediment accumulation can impact a wetland's benefits to water quality and habitat.

MITIGATED WETLANDS

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

The WDO requires that wetlands be replaced at a 5:1 to 6:1 ratio depending on the quality of the impacted wetland, and can either be replaced on site or in a wetland bank within the same watershed in Lake County. This requirement ensures more weltands are replaced than destroyed.

(Photo courtesy of Applied Ecological Services, Inc.)

A typical stormwater wetland at the edge of a wet pond.

Since they 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.

The goal of a monitoring and management plan is to make certain that the beneficial functions of impacted wetlands are replaced and are thriving. After SMC signs off on the mitigated wetland, based on the performance standards being met, the homeowners association should monitor the wetland 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 stormwater facility in your subdivision or on your property, an 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 that access point.

Facilities that need dedicated easements include detention basins, overland flow paths, channels and streams, wetlands, buffers, swales, and ditches.

There are some restrictions on what you can and cannot do on that easement.

EASEMENT DO'S AND DON'TS

Recommended

- trees, shrubs, flowers - Planting near pipes should be avoided since roots may eventually block the pipe.
- trees and shrubs should be planted at the top of the stream bank, to avoid blocking the flow of water, but native, water tolerant grasses and wetlands plants can be planted at the base of a ditch.

Not Recommended

- erect any permanent structures like buildings or walls made of blocks or bricks
- tennis courts, swimming pools, dams or anything that might block the flow of water

Source: Charlotte-Mecklenburg County, NC Stormwater Services

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. 1996.

Lake County Stormwater Management Commission. *North Branch of the Chicago River Watershed Managment 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. *Urban Nonpoint Sources/Stormwater Management Fact Sheet: Degraded Urban Detention Ponds - Recognizing Problems and Finding Solutions.*

AGENCY RESOURCES & GUIDES

Government Agencies

Lake County Stormwater Management Commission (SMC)
(847) 918-5260
www.co.lake.il.us/smc

Lake County Health Department and Community Health Center
Lakes Management Unit
(847) 360-6747
www.co.lake.il.us/health

Lake Soil and Water Conservation District (LCSWCD)
(847) 223-1056
www.lcswcd.org

Northeastern Illinois Planning Commission (NIPC)
(312) 454-0400
www.nipc.cog.il.us

USDA - Natural Resource Conservation Service (NRCS)
(847) 223-1056 (same as LCSWCD)
/www.il.nrcs.usda.gov/

U.S. Environmental Protection Agency - Nonpoint Source Pollution - Best Management Practices (USEPA)
www.epa.gov/owow/nps/bestnpsdocs.html

Additional Publications & Web Sites

Native Plant Guide. Northeastern Illinois Planning Commission. (312) 454-0400.
www.nipc.cog.il.us
The guide provides scientific and common names for native plants in the Northeastern Illinois region.

Living With Wetlands: A Handbook for Homeowners in Northeastern Illinois. The Wetlands Initiative. (312) 922-0777
www.wetlands-initiative.org
Excellent guide for understanding and managing wetlands on and near your property. Topics include managing wildlife.

Riparian Area Management: A Citizen's Guide. Lake County Stormwater Management Commission. (847) 918-5260
www.co.lake.il.us/smc/publications
Just updated in 2002, the guide includes easy tips for protecting riparian areas and improving water quality.

Rain Gardens: A Household Way to Improve Water Quality in Your Community. University of Wisconsin Extension Service and Wisconsin Department of Natural Resources
(608) 262-3346

Streambank and Shoreline Protection Manual. A county/federal agency publication available at: www.co.lake.il.us/smc/publications. Includes bioengineering and structural techniques.

Native Plant Material Vendors and Installers

Environmental Concepts
P.O. Box 969, Twin Lakes, WI 53181
Tel: (262) 877-8760

Genesis Nursery
23200 Hurd Road, Tampico, IL 61283
Tel: (815) 438-2220
Offers prairie, wetland, and savanna seeds and plants.

McGinty Bros., Inc.
3744 RFD Cuba Road, Long Grove, IL 60047-7958
(847) 438-5161
Tree care, hydroseeding, wildflowers, vegetation control

The Natural Garden
38 W 443 Highway 64, St. Charles, IL 60174
Tel: (630) 584-0595
Offers seeds of prairie grasses and forbs, perennials, and woodland wildflowers.

Possibility Place Nursery
7548 W. Monee-Manhatten Road, Monee, IL 60449
Tel: (708) 534-3988
Fax: (708) 534-6272
info@possibililtyplace.com
Offers trees, shrubs, grasses and forbs native to northern Illinois.

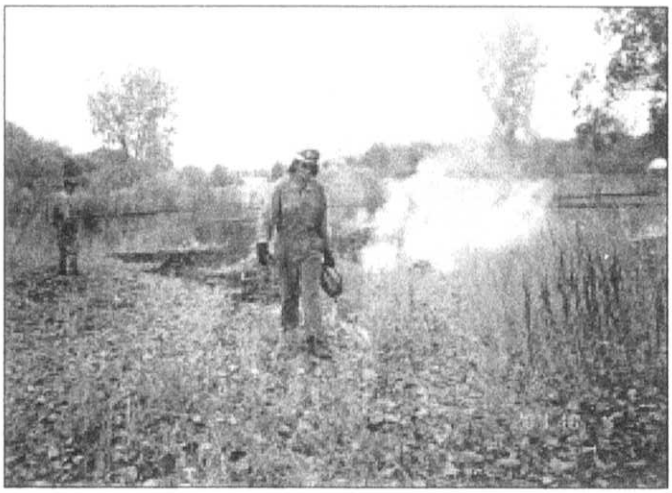
Taylor Creek Nursery
Route 3, Smith Road, P.O. Box 256, Brodhead, WI 53520
Tel: (608) 897-8641
Offers prairie, woodland, and wetland plants.

Agrecol
1984 Berlin Road
Sun Prairie, WI 53590
Tel: (608) 897-8547
Offers prairie, wetlands seeds and plants.

J & J Tranzplant Aquatic Nursery
P.O. Box 227, Wild Rose, WI 54984-0227
Tel: (715) 256-0059
Fax: (715) 256-0039
Offers woodland wetland and prairie plants and seeds local to Wisconsin and Illinois.

Prairie Nursery
P. O. Box 306, Westfield, WI 53964
Tel: (800) 476-9453
Fax. (608) 296-2741
Offers plants and seeds, landscaping local to the Midwest region.

Source: Liberty Prairie Conservancy, www.libertyprairie.org



(Photo courtesy of Applied Ecological Services, Inc.)

Prescribed Burn Consultants

Applied Ecological Services, Inc.
120 West Main Street, West Dundee, Illinois 60118
847.844.9385
Fax 847.844.8759
www.appliedeco.com/

Christopher B. Burke Engineering Ltd.
9575 W. Higgins Road, Suite 600, Rosemont, IL 60018
(847) 823-0500

Conservation Design Forum
324 N. York Road, Elmhurst, IL 60126
(630) 758-1621

ENCAP, Inc.
12950 State Road 38, Suite 3, DeKalb, IL 60015
(815) 758-1621

Genesis Nursery, Inc.
23200 Hurd Road, Tampico, IL 61283
(815) 438-2220

Glass Landscaping Co.
170 N. Garden Avenue, Roselle, IL 60172
(630) 307-0700

Eubanks & Associates, Inc.
10350 Dearlove Road, Glenview, IL 60025
(847) 824-8325

LaFayette Home Nursery, Inc.
RR1, Box 1A, LaFayette, IL 61449
(309) 995-3311

Prescribed Fire Consulting, Inc.
219 Repulic Avenue, Batavia, IL 60510
(630) 761-0700

Pond Plant Control Companies

Aquamarine
1444 S. West Ave., Waukesha, WI 53189
(242) 547-0211
Plant harvesters and aquatic plant removal equipment

Aquarius Systems, Division of D & D Products
200 N Harrison St., N. Prairie, WI 53153
(262) 392-2162
Manufacturer of: Plant Harvesters, Dredges, Float dredges, Aquatic trash hunters

Aquatic EcoSystems Management, Inc.
PO Box 82, Golf, IL 60029-0082
(847) 724-0646
Herbicide and Algicide treatments, aeration, pond consulting mainly

Aquatic Weed Control
P.O. Box 325, Syracuse, IN 46567
(574) 533-2597

Aquatic Weed Technology
P.O. Box 72197, Roselle, IL 60172
(800) 323-5727

Cygnet Enterprises, Inc.
1860 Bagwell St., Flint, MI 48503-4406
(810) 744-0540
Aquatic and plant/algae supplies

Environmental Aquatic Management
P.O. Box 7239
Algonquin, IL 60102
(847) 960-7252
Lakes management services, herbicide/algicide applicator

Hockney Weed Cutter Co.
P.O. Box 414, Delevan, WI 53115
(262) 215-6037

Inland Lake Harvesters, Inc.
3011 Knollcrest Drive, Burlington, WI 53105
(262) 763-3620
Two separate units to the Company, Dredging Contractors and a Supply company. Supply of Harvesters and Contractors of Harvesting

Integrated Lakes Management
83 Ambrogio Dr., Suite K, Gurnee, IL 60031
(847) 244-6662
Lakes Management, water quality testing, dredging feasabilties, Herbicides, and Hydrological Budgets

Source: Lake County Health Department and Community Health Center, Lakes Management Unit. www.co.lake.il.us/health/ehs/lakes.htm

MB Marine Biochemists
604 E. North St., Suite B, Elburn, IL 60119
(630) 365-1720
Lakes management services, herbicide applicator

McCloud: Pest Control and Specialists
1011A W. Lunt Ave., Schaumburg, IL 60193
(847) 891-6260

Midwest Marine Industries
546 N. Main St., Milford, MI 48381
(248) 685-0222
Company sells dredges and harvesting equipment as well as aeration systems. Also does harvesting, dredging and installs aeration and isopressure systems.

Outdoor Enterprise Ltd.
101 Garden St. SE, Grand Rapids, MI 49507
(616) 791-7740
Sell waterweed cutters and waterweed rakes

Professional Lake Management
P.O. Box 672, Brainerd, MN 56401
(218) 825-3773
Herbicide application, EWM weevil, lake and pond management

Richmond Fisheries
8609 N. Clark, Richmond, IL 60071
(815) 675-6545
Electrofishing Surveys and Fisheries Consultations, Fish dealers and transporters, fisheries assessments, electro shocking. Biological Aquatic Weed Control

Scientific Aquatic Weed Control
16525 Orchard Valley, Gurnee, IL 60031
(847) 662-5370
Herbicide and algaecide applications

NOTE: The following lists of consultants and vendors is 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 judgement in evaluating the credentials of any consultants and vendors appearing on these lists.