

## 5 STREAM, LAKE, AND WETLAND PROTECTION



### *Background*

Streams, lakes, and wetlands are familiar features in the landscape of the Chicago Wilderness region, present in nearly all communities. They help store and drain the water from our developing landscapes, and they frequently receive our treated and untreated wastewater and stormwater.

Waterbodies and wetlands also provide *aquatic* (occurring in or on the water) habitat for diverse communities of plants and animals, including fish, amphibians, insects, birds and mammals. Streams, lakes, and wetlands also are valued for their aesthetic qualities and their recreational uses, including fishing, swimming, wildlife observation, and boating. As a consequence, water features and associated greenways increasingly are viewed as amenities for residential development and as preferred opportunities for open space acquisition.

*“Amount spent by Americans on the purchase of canoes and kayaks in 1996: \$99.1 million. Protection of our waterbodies can enhance local economies by providing recreational opportunities.”*

*-The Trust for Public Land, 1999.*

Historically, however, conflicts have arisen between the various uses and functions of waterbodies and wetlands. There are two principal causes for these conflicts. The first is the alteration of the watershed that contributes flow to a waterbody or wetland. A common example is the conversion of farmland to subdivisions and shopping centers and the corresponding increase in impervious surfaces. This generally results in adverse changes to both the quantity and quality of runoff water, leading

to channel erosion, damaged habitat, degraded water quality, and increased flooding. These impacts can be addressed through better land use planning and stormwater management, as addressed in other chapters of this guidebook.

The second cause of conflicts is the physical alteration or destruction of waterbodies and wetlands and their adjacent lands, or *riparian zones*. Activities such as channelizing streams and filling wetlands destroy critical habitat features and upset the natural hydrologic balance that has evolved over thousands of years.

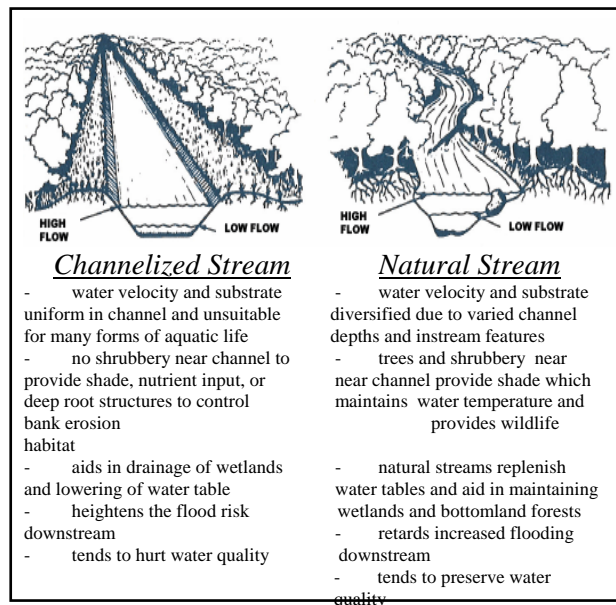
Contrary to common understanding, state and federal regulations do not adequately protect the natural functions and habitats of streams, lakes, and wetlands. For example, federal regulations pertain mostly to the discharge of fill material into wetlands and waterbodies, but do not provide protection from other significant disturbances such as impoundment, vegetation removal, erosion, destruction of riparian buffers, and discharge of stormwater.

In the last several decades, local governments have begun to recognize the importance of waterbodies and wetlands in storing and conveying flood waters. They have instituted local floodplain protection ordinances that in many cases go beyond state and federal requirements. Until recently, however, the habitat value of wetlands, lakes, and streams has not received much attention from local governments. As awareness of the limitations of state and federal protections has increased, a number of local governments have attempted to fill the gap. Motivated by concerns over lost recreational uses, erosion, impaired aesthetics, and degraded habitat, they have implemented ordinances that protect natural shorelines and streambanks, native vegetation, and riparian buffer zones.

## Recommended Approaches

Local governments can use a number of techniques to better protect the natural functions and habitats of streams, lakes, and wetlands. Some of these techniques, such as natural landscaping and open space acquisition, are described elsewhere in this guidebook. The approaches described below embrace several important principles.

- Techniques used for management of waterbodies and wetlands should be *multi-objective*, rather than focusing on a single purpose such as flood control.
- Protection and restoration techniques should be *sustainable*, addressing identified problems in an environmentally friendly manner without the need for excessive or costly future maintenance.
- *Natural* techniques, derived from native plants and materials should be used wherever feasible.
- Recommended management techniques must be *cost-effective*.



Effects of stream modification.

## *Protect Waterbodies and Wetlands from Development Impacts*

To supplement federal and state regulations, local governments are encouraged to implement their own ordinances to protect the natural functions, habitats, and beneficial uses of streams, lakes, and wetlands. These ordinances should be designed to complement federal and state regulations, but not duplicate them.

Some of the recommended elements of a waterbody and wetland protection ordinance include:

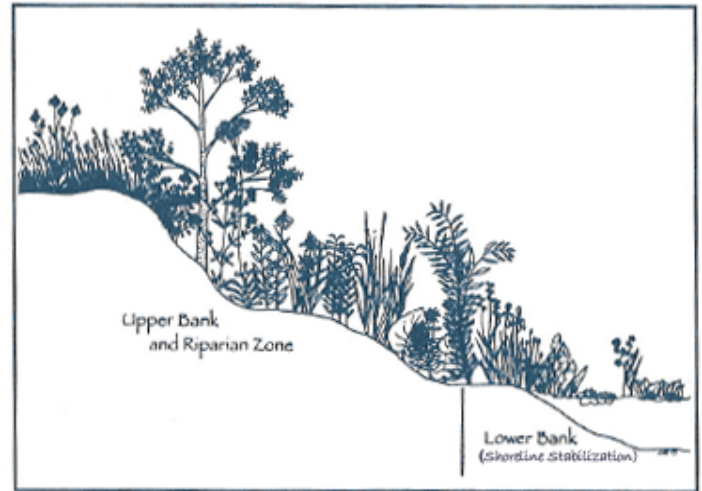
- *prohibit damaging modifications* such as channelization, straightening, filling, impoundment, draining, and armoring;
- require *mitigation* for unavoidable disturbances;
- protect natural *buffer zones* along the edge of waterbodies and wetlands;
- require *setbacks* for buildings and pavement; and
- prohibit direct discharges of untreated stormwater into existing wetlands.

## *Restore and Protect Natural Buffers along the Edges of Streams, Lakes, and Wetlands*

The concept of a riparian buffer is fairly simple: a continuous vegetated strip of land planted with the types of native plants which naturally exist in an undisturbed riparian setting. In contrast, a turf grass lawn down to the water's edge is not a buffer strip.

Ecologists, water quality specialists, and land planners agree that a naturally vegetated buffer strip is critical to the health and quality of waterbodies and wetlands. A stable buffer is the last line of defense for impacts that may seriously threaten a healthy, stable ecosystem.

Buffers are known to enhance fish and wildlife habitat, filter pollutants from runoff water, stabilize streambanks and shorelines, provide shade, screen noise, serve as greenways, and enhance aesthetics.



*Planting zones within a buffer.*

Buffer strip characteristics can vary depending on local circumstances, such as the size and quality of the waterbody or wetland. However, there are several basic components of any buffer.

**Width:** Any width of native vegetation along the edge of a waterbody or wetland will provide some benefits. However, it is recommended that a buffer extend a minimum distance of 25 feet from the edge of the waterbody or wetland. Wider buffers—50 to 100 feet, or more—should be protected for larger and more ecologically-sensitive rivers, lakes, and wetlands. A recent national survey of local and state guidance for stream buffers observed a median width of 100 feet, with a range of 20 to 200 feet. Wider buffers also allow space for the lateral movement of streams and re-establishment of natural meandering patterns. The buffer also should cover the entire streambank or shoreline slope to provide maximum bank stabilization.

*Intrusions:* While a continuous, uninterrupted buffer is preferable for protection of water quality and habitat, some flexibility may be desirable to provide access to a waterbody for recreational uses, particularly in parks and other public lands. Access typically would be provided via a mown footpath or a stepping stone trail. Paving through a buffer is discouraged, although limited intrusions may be acceptable to accommodate trail access.

*Vegetation:* Buffers should be planted with native species which are indigenous to a particular locale. The Federal Land Survey, conducted in the mid-1800s, provides a good general indication of the vegetation communities that existed prior to European settlement. It may surprise many landowners to know that most of the smaller stream and river corridors in the region were historically vegetated with wetland and prairie grasses and flowers, not trees.

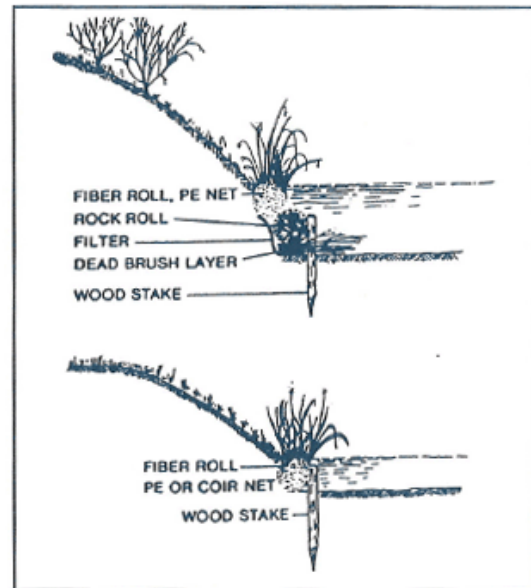
Buffer vegetation should begin at or below the normal water elevation with wetland species, and should proceed up the bank with water tolerant and upland species.

### *Stabilize Streambanks and Lake Shores using Environmentally-Sensitive Techniques*

While erosion of streambanks and shorelines is a natural phenomenon, the degree of erosion along many of the region's streams and lakes far exceeds natural rates due to excessive water velocities, rapidly fluctuating water levels, loss of stabilizing vegetation, and past modification. The consequences of erosion are loss of property, habitat destruction, water quality impairment, and threats to infrastructure.

The conventional solution to erosion has been to armor channels and shorelines with a hard

surface such as concrete, steel, or rock. While such approaches may be effective locally, they typically are quite expensive and destructive of water habitat, and may actually lead to increased flooding and erosion in other locations along the stream. In recent years, several types of alternative natural bank stabilization techniques have been successfully installed in the area. These techniques are commonly labeled "bio-engineering" methods because they incorporate living plant material with structural practices, resulting in a living erosion control system.



Bioengineering: fiber rolls at the toe of a streambank (*Bestman Green Systems, Inc.*)

By using native plant species, bank stabilization becomes self-sustaining and, to an extent, self-repairing since the plants are adapted to grow and reproduce in stream channel and lake environments. The use of native vegetation also restores some of the look and feel of the original channel or shoreline, including enhanced habitat for both land and water animals. The added benefit of bio-engineering stabilization is that it can be substantially less expensive than conventional techniques to install and maintain.

## *Perform Environmentally-Sensitive Maintenance and Protection of Stream Channels*

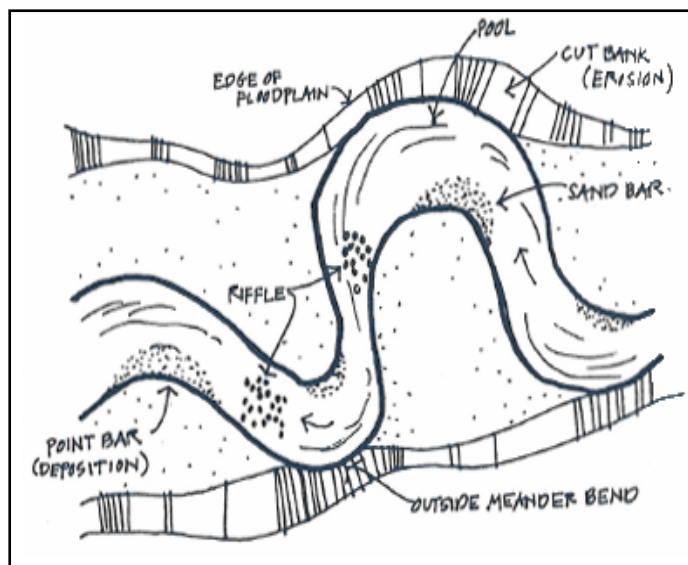
Maintenance is commonly needed to preserve the capacity of stream channels to convey runoff, particularly during times of flooding, as well as to maintain a desired aesthetic character. Unfortunately, most channel maintenance programs historically have focused solely on drainage and have ignored the multiple functions of a stream channel. In particular, conventional maintenance has resulted in the virtual elimination of desirable riparian vegetation and instream habitat features, particularly in headwater streams.

Accepting that continued maintenance is necessary and inevitable, the challenge is to identify a better approach that recognizes both the natural functions and desired uses of streams. A preferred stream maintenance approach should include several basic elements:

- avoid storage or disposal of materials in riparian areas, including grass clippings and other yard waste (this may be accomplished with an ordinance prohibiting such activity);
- maintain effective channel conveyance;
- avoid channel modifications;
- perform regular monitoring and maintenance;
- preserve and/or restore native riparian vegetation; and
- preserve instream habitat features.

## *Restore Habitat in Degraded Waterbodies and Wetlands*

Aquatic habitat includes features of natural streams, lakes, and wetlands—aquatic vegetation, bottom substrate, pools, riffles, and meanders—that are important to healthy and diverse communities of aquatic organisms. Due to historic degradation of many waterbodies and wetlands, significant opportunities for restoration of aquatic habitat will exist in most communities. In streams, restoration can include removal of dams, improvement of stream bottoms, reestablishment of pools and riffles, and restoring meanders. Restoration of streambanks and lake shorelines can include removing invasive species, thinning trees and shrubs to provide sunlight to support ground level plants, or modifying steep banks created by dredging.



Aquatic habitat: pools, riffles, and meanders.  
(A *Citizen's Streambank Restoration Handbook*.)

Wetland restoration commonly involves removing artificial drainage ditches or underground tiles, removing accumulated sediments, and eliminating invasive plants, such as purple loosestrife.

Local governments should encourage and, where appropriate, initiate and participate in restoration activities. In some cases, habitat restoration measures can be designed into stabilization and maintenance projects.

New development or redevelopment activities often present outstanding opportunities for restoration of degraded water ecosystems. A highly-degraded natural system is not only low in functional habitat value but also may be unaesthetic. Hence, a developer may see an opportunity to enhance the aesthetics of the property while improving water quality and habitat functions. In this situation, the cost of restoration may be offset by enhanced property values.

Habitat restoration projects can range from simple measures that can be readily implemented by landowners, to more extensive projects that require considerable design expertise and financial resources. In general, landowners should seek the advice of recognized experts before embarking on restoration. An improperly designed restoration could cause more harm than good, despite sound intentions.



### *Acquire Ownership or Conservation Easements of Waterbodies, Wetlands, and Riparian Areas*

Ownership or easements are the most effective ways to fully protect water systems. Such open space protection measures are discussed elsewhere in the guidebook.

Local governments should place high priority on acquiring streams, lakes, and wetlands for several reasons. As recreational amenities, waterbodies and wetlands offer untapped opportunities for boating, fishing, nature study, and passive recreation. Water features, particularly streams, also are amenable to the development of linear greenways that can support the creation of both land- and water-based trail networks as well as providing habitat corridors for wildlife movement.

Riparian open space also provides benefits such as flood storage, water cleansing, and wildlife habitat. Due to flooding and soils limitations, development of these areas is often difficult. Consequently, the cost of these riparian property is often much lower than upland property, and may be more easily purchased by local government entities. Furthermore, maintenance of naturally vegetated water systems is much less expensive than upland turf grass areas that require routine mowing. (See discussion in chapter 6.)



## *Summary of Benefits*

Protection of streams, lakes, and wetlands provides substantial benefits to local governments.

### *Recreation*

The public demand for water-based recreation is growing. The region's streams and lakes increasingly are being valued for their boating opportunities. Similarly, improving water quality in many streams and rivers has increased fishing activity. Other water-based recreational activities include nature study and hiking.

### *Aquatic habitat*

Regionally, some of the most important species of flora and fauna are associated with streams, lakes, and wetlands. Furthermore, some upland fauna spend at least part of their life cycles using water systems, or depend on other organisms that do.

### *Flood damage prevention*

Streams, lakes, and wetlands naturally convey and store water that runs off our landscape. Thus, protection of these areas and adjacent riparian zones prevents the type of unwise development that has historically caused expensive flood damage.

### *Water quality*

Streams, lakes, and wetlands provide filtering mechanisms that help to cleanse and transform some of the water pollutants generated by surrounding landscapes. Wetlands and riparian buffer strips, in particular, are known to filter contaminants that might otherwise damage the water quality and recreational uses of downstream lakes and rivers.

## *Local Examples*

### ❖ *Dunes Creek Restoration*



*The east parking lot at the Indiana Dunes State Park was removed as part of the Dunes Creek Restoration project. (Tribune photo by Margaret L. Willis)*

After decades of being buried, Dunes Creek, which is part of the Indiana Dunes State Park, has undergone a restoration after the removal of a parking lot which had previously sat atop it. Using drawings from the 1930s – before the creek went underground – and a grant through the Lake Michigan Coastal Program, officials have attempted to bring the creek back to its natural state.

As of January 2006, State Park Assistant Manager Doug Stuke said the creek restoration is 90 percent complete, with more than 20,000 natural grass plantings placed on its banks. An observation area was also installed to give the public a view of the creek. The second phase of the project will place a handicap-accessible trail and boardwalk next to the creek.

Besides serving an aesthetic purpose, the creek also provides additional surface area for sunlight to destroy *E. Coli* bacteria. This should create a safer beach for people and help preserve animal and plant life from an ever-prevalent danger.

*(Source: <http://chestertontribune.com>)*

## ❖ *Wolf Lake Aquatic Ecosystem Restoration Project*



*Channel clearing at Wolf Lake*

Wolf Lake is located on the northwest edge of Hammond, Indiana and the far southeast edge of Chicago, Illinois. The Illinois-Indiana state line very nearly bisects the lake system. The lake covers more than 450 acres in Indiana and has a maximum depth of 18 feet. It is separated into pools by dikes constructed during sand and gravel dredging for the Tollway that crosses the lake.

The ecosystem degradation problem in Wolf Lake includes proliferation of exotic plant species, low diversity of plant and fish species, lack of adequate water depths, poor aquatic habitat, negative impacts from contaminants, and shoreline erosion.

Proposed project features include creating approximately 25 acres of new aquatic and wetland habitat plantings, which will consolidate and expand to provide additional habitat; restoring approximately 5,000 feet of shoreline; creating holes to locally diversify the lake bottom; controlling aquatic and shoreline exotic and undesirable plant species using herbicidal and biological controls; clearing channels; creating openings in dikes and

causeways to restore natural water levels in the project area; and stabilizing shoreline.

A meeting with state, local, and community representatives was held in March 2003 to address concerns about sediment disturbance, access restrictions, shoreline substrate, and effects on fish and other wildlife. Construction was begun in April 2006 with an estimated project cost at \$6.5 million.

(Source: [www.lrc.usace.army.mil](http://www.lrc.usace.army.mil))



## *Additional Information*

### ***Rivers, Trails and Conservation Programs:***

Assists citizens and local governments in conserving rivers and establishing trails on lands outside national parks and forests. National Park Service (414/297-3617).

***Wetlands Reserve Program (WRP):*** Assists in wetland restoration and protection. U. S. Department of Agriculture.



## ***Suggested Reading***

*Best Management Practices Guidebook for Urban Development.* Northeastern Illinois Planning Commission. 1992. Chicago.

*Blackberry Creek Watershed Management Plan.* Blackberry Creek Watershed Resource Planning Committee, Kane-DuPage Soil and Water Conservation District, Northeastern Illinois Planning Commission, and USDA Natural Resource Conservation Service. 1999. St. Charles, Illinois.

*A Guide to Illinois Lake Management.* Northeastern Illinois Planning Commission. 1991. Chicago.

*Lake Notes.* Northeastern Illinois Planning Commission. A series of 4-page publications on topics such as shoreline buffer strips, fertilizers and pesticides, septic systems, and home and yard practices.

*Landscaping Techniques and Materials for Urban Illinois Stream Corridors and Wetland Edges.* Northeastern Illinois Planning Commission. 1991. Chicago.

*Living With Wetlands. A Handbook for Homeowners in Northeastern Illinois.* The Wetlands Initiative. 1998. Chicago.

*Model Floodplain Ordinance.* Illinois Department of Natural Resources and Northeastern Illinois Planning Commission. 1996.

*Model Stream and Wetland Protection Ordinance for the Creation of a Lowland Conservancy Overlay District.* Northeastern Illinois Planning Commission. 1988. Chicago.

*Native Plant Guide for Stream and Stormwater Facilities.* Natural Resource Conservation Service, et al. 1997.

*Northeastern Illinois Regional Water Trails Plan.* Northeastern Illinois Planning Commission. 1999. Chicago.

*Protecting Nontidal Wetlands.* Planning Advisory Service Report No. 412/13. American Planning Association. 1988. Chicago.

*Restoring and Managing Stream Greenways: A Landowner's Handbook.* Northeastern Illinois Planning Commission. 1998. Chicago.

*Stream Obstruction Removal Guidelines.* The Wildlife Society, American Fisheries Society, and International Association of Fish and Wildlife Agencies. 1983. Bethesda, MD.

*Streams and Wetlands: A Resource Worth Preserving.* Northeastern Illinois Planning Commission. 1987. Chicago.

*The Upper DuPage River Watershed Implementation Plan.* The Conservation Foundation and The DuPage River Coalition. 1999. Naperville, Illinois.

*A Vision for Butterfield Creek.* Butterfield Creek Steering Committee, Illinois Department of Conservation, Northeastern Illinois Planning Commission, Johnson, Johnson and Roy, Inc. 1995.

