Protecting Nature in Your Community

A Guidebook for

Preserving and Enhancing Biodiversity

Northeastern Illinois Planning Commission

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March 2000

prepared by

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This report was funded in part by the U.S. Department of Agriculture Forest Service, through a grant administered by the Illinois Conservation Foundation. The findings and recommendations contained herein are not necessarily those of the funding agency.

Acknowledgments

The authors gratefully acknowledge the support and comments provided by the following individuals: Ders Anderson of the Openlands Project, Cal Doughty of the Village of Long Grove, Deborah Fagan of the DuPage County Regional Planning Commission, Kent Fuller and Donna Twickler of the U.S. Environmental Protection Agency, Jim Knudsen of the Village of Carol Stream, Suzanne Malec of the City of Chicago Department of the Environment, Brook McDonald of The Conservation Foundation, Mary Ochsenschlager of the St. Charles Park District, Stephen Packard of the National Audubon Society, Laurel Ross of The Nature Conservancy, Sam Santell and Michael Brown of the Kane County Development Department, Robert Sullivan of the Village of Orland Park, Robin Traubenik of the Village of New Lenox, Diane Trgovcich-Zacok of Chicago Wilderness, Rich Vaupal at the Northern Illinois Cartography Lab, Ann Viger of the Crystal Lake Park District, Patricia Werner of the Lake County Stormwater Management Commission, and Jim Ford, Irene Hogstrom, Lori Heringa, Beth Meier, and Mike Murphy of the Northeastern Illinois Planning Commission. Photographs on pages 1, 69, and 79 courtesy of Chicago Wilderness. Figures on pages 7, 14, 30, 49, 68, 70, 86, and 89 courtesy of the Wisconsin Department of Natural Resources and University of Wisconsin—Extension.

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Imagine a region . . .

filled with life . . .

Where the evening air is rich with bird calls
and the scent of flowers . . .

Where children splash and play in clean creeks,
and peer below the surface of the water at fish
and other aquatic creatures . . .

Where people learn to gently and respectfully
enter back into a positive relationship with
the nature that surrounds them . . .

And where rare plants, animals and natural communities
are nurtured back to health
and offered a permanent home next to our own —
to the benefit of our health and our economy —
in preserves large enough to sustain them forever.

-Chicago Wilderness, Biodiversity Recovery Plan

1 INTRODUCTION

The Natural Landscape of the Region

More than 200,000 acres of protected woodlands, wetlands, prairies, and streams in the greater Chicago region provide refuge to thousands of plants and animal species, many of them rare, threatened, or endangered. Privately owned lands, including our own backyards, provide additional habitat for wildlife, such as migrating birds. This diversity of native plants and animals, or *biodiversity*, reflects the unique blend of landscapes that were formed around the southern end of Lake Michigan by the forces of glaciers, wind, and wildfires. The resultant ecosystems are so rare that they have been labeled "globally significant" by ecologists.

While of clear scientific interest and importance, biodiversity and natural areas are increasingly valued by the region's residents for their aesthetic, recreational, and educational values. Just as residents of other regions appreciate their mountains, seacoasts, and forests, our more subtle and diverse landscapes provide a rich sense of place. Preserved natural areas, in particular, provide a valuable reminder of times when vast prairies, mingled with woodlands and wetlands, spread across the horizon. Early accounts of this landscape attest to its beauty.

> *"In all my life, I never saw or dreamed of so beautiful a sight as the rolling prairies. Nothing can equal the surpassing beauty of the rounded swells and the sunny hollows, the brilliant green of the grass, the numberless varieties and splendid hues of multitudes of flowers. I gazed in admiration too strong for words."*-Ellen Bigelow, 1835.

Ongoing Threats

While 200,000 acres of natural lands have been preserved from destruction by urban or agricultural development, this represents less than ten percent of the total landscape. Further, many of the preserved lands have been substantially degraded due to four principal causes:

- fragmentation of natural areas into smaller, isolated parcels;
- elimination of fire from the landscape;
- introduction of invasive non-native species; and
- disruption of natural water flow, or hydrology.

Certain ecological communities have been particularly damaged. For example, less than one-tenth of one percent of the original Midwestern prairie remains today.

Urban growth further threatens the remaining natural landscape and its diversity of plants and animals. Regionally, population is projected to increase by 25 percent by the year 2020. In the collar counties, where some of the most critical natural areas and habitats remain, population increases of 70 to over 100 percent are forecast.

In response to these threats, an initiative called ***Chicago Wilderness*** has begun. Comprising more than ninety organizations, most of them responsible for natural land management, restoration, public education, and/or research, Chicago Wilderness is dedicated to protecting the Chicago region's natural communities, restoring them to long-term viability, and raising public awareness. To assist in this effort, *Chicago Wilderness* has produced the ***Biodiversity Recovery Plan***, which encourages the types of techniques described in this guidebook. The major findings and

recommendations of the plan are that while the region is very rich in biodiversity, it is being lost to development and other threats, and decisive action is needed.

A Critical Role for Local Governments

While many natural areas are or will be protected through acquisition by forest preserve and conservation districts, federal and state agencies, and the numerous other initiatives of *Chicago Wilderness*, the actions of local governments—counties, municipalities, park districts, and wastewater authorities—will be critical to accomplishing natural preservation objectives. Achievement of the goals of *Chicago Wilderness* will depend, to a large degree, on the actions of local government entities to control and manage growth in a sensitive manner. In particular, there is a need for public policies, strategies, and regulations to protect and enhance biodiversity, such as land use planning, compatible zoning, setbacks and buffers, natural landscaping, local parks acquisition, natural area management, and watershed management.

Local government programs are especially critical to the protection and restoration of streams, lakes, and wetlands that are dependent on water inputs from their surrounding watersheds. Past experience indicates that if the watersheds are not well protected the biodiversity of existing high quality streams, lakes, and wetlands almost surely will be lost. The responsibility to protect these resources appropriately falls largely to local governments.

Purpose and Objectives of this Guidebook

The Chicago Region Biodiversity Council, through its Biodiversity Recovery Plan, has identified an essential role for local governments, including municipalities, counties, park districts, and wastewater authorities, in protecting and enhancing regional biodiversity. Consequently, the goal of this guidebook is to help communities minimize adverse effects of future development on regional biodiversity and areas of high quality habitat, and to accomplish localized restoration of developed landscapes and degraded natural areas. The first objective of the guidebook is to share information with local government entities regarding the relevance and importance of natural areas within and surrounding their communities. The second objective is to identify tools to enable protection and restoration within existing and newly developing urban areas. Appropriate tools span the realm of planning, regulation, acquisition, and educational initiatives.

"To me, survival of world-class biodiversity in the midst of industry and other urban development is the most interesting feature of this whole region . . . My faith is that the destiny of the Chicago region now is to amaze the world with our capacity to restore and preserve our unique natural heritage and our economic capacity into the future."

-Lee Botts, Indiana Dunes Environmental Learning Center.

Why Protect Nature?

Quality of Life, Recreation, and Aesthetics

Natural areas enhance the quality of life for people, and they help define community identity by connecting residents to the natural landscape in which they live. A recent national survey of home buyers found that natural open space, walking and bicycle paths, and gardens with native plants were the three most desirable amenities for residential areas. Hiking, bird-watching, fishing, and photography are some of the more common activities enjoyed by many of the region's residents who utilize natural areas or even just reside near them.

"Natural areas, parks and open space create a high quality of life that attracts tax-paying businesses and residents to communities." -The Trust for Public Land, 1999.

Recreational use is increasing across the nation, as well as in northeastern Illinois. In fact, 40 million visits each year are made to forest preserves in Cook County alone. These areas make the region an attractive place to live and work, and enhance the economic and development value of the region. Healthy, functional natural areas, rather than degraded ones, are what people in the region are seeking for recreation. The Northeastern Illinois Planning Commission (NIPC) recently adopted a regional water trails plan designating 480 miles of the region's waterways as trails, and 174 sites for canoe and kayak access. Clean water, healthy streams, and wildlife can enhance the paddling experience for water trail users.

"What's really important? It's the personal things. A tree, a child, flowers. We need to soften the cities. Neighborhoods need nature." -Chicago Mayor Richard M. Daley.

Public Support

Surveys indicate that the public supports initiatives to protect our land and waters. As noted below, this has been demonstrated recently by the passage of four county referenda and the state allocating public funds for land acquisition and management. A 1998 American Farmland Trust survey found that residents of Kane, McHenry, and DeKalb counties support protecting open space from development to preserve or enhance natural ecosystems and wildlife habitat. Furthermore, a survey by *Chicago Wilderness* indicates a willingness by residents to pay up to $19.67 per household per year in additional property taxes ($59 million per year) for new wilderness restoration and expansion activities.

Recent Local and State Initiatives Supporting Land Preservation

- Kane County residents pass $70 million referendum by 66 percent to buy 5000 acres of open space (1999);
- Will County residents pass $70 million referendum by 57 percent to buy 6500 acres of open space (1999);
- Lake County residents pass $35 million referendum by 66 percent to buy 4000 acres of open space and $20 million for habitat restoration, trails and other improvements (1999);
- DuPage County residents pass $75 million referendum by 57 percent to buy 2000 acres of open space (1997);
- State of Illinois establishes the Open Lands Trust Act providing $160 million for state and local governments to acquire open space (1999).

Economic Value

A number of studies have shown that parks, open space and natural areas enhance the economic value of an area. Not only does the preservation of open land cost less in services than other uses, it has been found that some types of development, especially residential, cost more in community services than they generate in taxes. A pair of 1998 studies by The Trust for Public Land found that while land conservation projects caused a short term rise in local property taxes, over the long term communities that had protected the most land enjoyed the lowest property tax rates. This may be because less development means less public expenditures for roads, schools and infrastructure (The Trust for Public Land, 1999). Furthermore, owing to the increasing desire of people to have access to open space and natural areas, proximity of natural areas to residences may enhance property values. (See also *The Value of Open Space Preservation* in chapter 8.) Recreational opportunities also generate income and economic activity for communities through local businesses that profit from increased recreational traffic and tourism.

- Approximately $85 billion is generated for the U.S. economy each year by people who feed birds or observe and photograph wildlife;
- Wildlife watchers spent $29 billion on trips, equipment, and other expenditures in 1996;
- Sport fishing alone boosted the nation's economy by $108 billion in 1996, supporting 1.2 million jobs and generating household income of $28 billion;
- Across the nation, parks, protected rivers, scenic lands, wildlife habitat, and recreational open space help support a $502-billion tourism industry. At present rates of growth, the tourism industry will soon become a leading U.S. industry.

Source: The Trust for Public Land, 1999.

Environmental Benefits

> *"Estimated value of all economic benefits generated by a single acre of wetland: $150,000 to $200,000."*
>
> -The Trust for Public Land, 1999.

Naturally vegetated landscapes—including prairies, woodlands, and wetlands—provide a number of services that are highly beneficial to humans and ecosystems. They control erosion, help retain stormwater, help clean the air of pollutants, mitigate global warming by absorbing carbon dioxide and other greenhouse gases, and help shelter and cool our homes (The Trust for Public Land, 1999). Most importantly, these services are provided absolutely free. Research has shown that these services depend on properly functioning ecosystems, which in turn depend on the diversity of plants and animals—biodiversity—that make up those ecosystems. The major consequence of losing these ecosystem services and replacing them with human-made substitutes is the enormous cost of designing, building, maintaining and improving our own services. Add to this the likely risk of never attaining the efficiency with which nature provides them. A more complete list of environmental benefits follows.

- A variety of microorganisms break down plant and animal matter to create healthy, nutrient-rich soil.
- Native plants help conserve soil and water by preventing erosion, maintaining air moisture near the earth's surface, and storing water.
- A multitude of insects, birds, bats, and other animals pollinate the majority of crops and other plants on the planet, many of which are pollinated by only one species.

- Natural landscapes moderate climate extremes by absorbing carbon dioxide and other greenhouse gases, trapping heat in the winter, and providing shade in the summer.
- Native plants improve air quality by continually absorbing gases and particles from the atmosphere and producing clean, essential oxygen.
- A diversity of plants and animals preserves genetic diversity, which helps maintain evolutionary processes and store genes with potentially beneficial human uses.
- Native plants help protect water quality by filtering and cleansing water, while microorganisms break down some pollutants and contaminants.
- Native plants and their extensive root systems promote the infiltration of rain and stormwater into the ground where it can help replenish the groundwater table and maintain baseflows into wetlands and streams.
- Natural areas naturally absorb precipitation and thereby reduce flood damage (see below.)

Natural Areas Can Reduce Expensive Flood Damages

Protecting natural areas can have direct positive effects on communities that have suffered economic damages from flooding. Natural areas that provide floodwater detention during high flows, such as wetlands and floodplains, can lower flood stages and thereby prevent floodwaters from impacting property. The Federal Emergency Management Agency estimates that federal, state, and local governments spent a total of $203 million acquiring, elevating or removing damaged properties from floodplains after the 1993 midwestern floods, saving an estimated $304 million in future flood damages. Some towns, such as Soldiers Grove, Wisconsin and Valmeyer, Illinois, have been entirely removed from the floodplain and relocated to avoid future flood damage. Protected floodplains that double as wildlife refuges or recreation areas may generate additional economic benefits by attracting bicyclists, hikers, bird watchers, and other tourists to a community (The Trust for Public Land, 1999).

Date of Event	Region Affected	Rainfall Amounts	Damages
Sept-Oct 1986	Cook, DuPage, Lake, Kane, McHenry	4 to 10.3 inches	$34.6 million
August 1987	Cook, DuPage	3 to 9.4 inches	$77.6 million
July 1996	Cook, DuPage, Kane, Will	8 to 16 inches	$564 million
August 1997	Cook	6.1 inches	$40 million

Source: Resource Coordination Policy Committee

A Unique Opportunity

An initiative to protect biodiversity, such as that being led by Chicago Wilderness, is rare. Indeed, few regions of the country have taken such progressive steps to protect their natural heritage. By implementing some of the ideas mentioned in this guidebook, communities can contribute to this unique opportunity to become one of the first metropolitan regions in the world to undertake such a progressive and historic task. The Chicagoland region is known for being the first and best in many things, and our environmental efforts can be added to that legacy.

While contributing to global biodiversity may seem like a lofty goal to local citizens and governments, preservation at the local level is the most effective means of protecting global biodiversity. Furthermore, communities can contribute to biodiversity protection and the preservation efforts of forest preserve districts and others without adversely affecting the way they normally operate. Slight shifts in a community's focus, minimal modifications of ordinances, and a general commitment to biodiversity protection can achieve critical results.

> *"Chicago Wilderness is a tremendous repository of biodiversity. And while there are other great repositories like this—the Great Smoky Mountains, the Florida Everglades—the fact that this one is in a metropolitan area makes it unique."*
> -John Rogner, U. S. Fish and Wildlife Service.

Spiritual Values

The mere idea of wildlife in our midst, especially when we have contributed to its protection, is valuable to many and improves the quality of life. Many people feel a moral and ethical imperative to protect wildlife and the diversity of life from the impacts of development. Reasons for this include a desire to protect other species from extinction, religious values associated with cherishing the earth and its inhabitants, and the desire to leave for future generations that which we are able to enjoy.

> *"Our native landscape is our home, the little world we live in, where we are born and where we play, where we grow up and finally where we are . . . laid to eternal rest. It speaks of the distant past and carries our life into the tomorrow. To keep this pure and unadulterated is a sacred heritage, a noble task of the highest cultural value."*
> -Jens Jensen.

The Role of Local Governments: Counties and Municipalities, Park Districts, and Wastewater Authorities

> *"Everyone is entitled to a home where the sun, the stars, open fields, giant trees, smiling flowers, are free to teach an undisturbed lesson of Life. Herein lies my task."* -Jens Jensen

It is clear that nature plays an important role in our lives and communities. The Illinois Department of Natural Resources and forest preserve and conservation districts have already done much to protect and restore natural areas in the region. This guidebook is not intended for them but instead is directed to the opportunities available to local governments to complement their previous and ongoing efforts, and to take advantage of the network of preserved areas already in place in the region. Local governments have an opportunity to help preserve and enhance nature using a wide variety of techniques that can be incorporated into their daily activities. Local officials are encouraged to take action to ensure that nature is preserved for current and future generations to enjoy.

> *"What I'm trying to do in the city is to make good habitat for nature and people. We didn't used to allow nature to exist in a small little park. But we can. I want to bring more nature into parks and boulevards so they can be habitat for trees, birds, flowers, and people. The neighborhoods and schools need to be comfortable and green."*
> -Chicago Mayor Richard M. Daley.

The Importance of Local Government Involvement

Local governments are essential partners in the effort to protect nature because:

1. the majority of the land and water resources in the region (approximately 90%) are within the jurisdiction of municipalities, counties, park districts, and wastewater authorities;
2. the majority of land use planning and policy decisions are made at the local level;
3. stormwater and wastewater discharges controlled by local governments can have substantial impact on downstream rivers, lakes and wetlands.

Recommended Actions

The *Biodiversity Recovery Plan* recommends a number of specific actions for local government entities that are included here. Additional recommendations that are not included in the plan are shown in italics. These recommendations are followed by references to the chapters of the guidebook that describe tools and techniques that are appropriate to each type of local government action.

Municipalities and County Governments

As the primary decision makers on land development, municipal and county officials and staffs can have a major impact on the conservation of biodiversity. They can:

1. Amend comprehensive county-wide plans and municipal plans to identify valuable open spaces meriting preservation and specify who should be responsible for protection of the land. (Chapter 2: Comprehensive Land Use Planning; Chapter 8: Open Space Preservation)

2. Amend comprehensive county-wide plans and municipal plans to identify farmlands to be protected, for agricultural land is generally much more compatible with natural habitats than is suburban development. (Chapter 2: Comprehensive Land Use Planning)
3. Amend zoning ordinances, landscape ordinances and other regulations to encourage increased open space and planting of native grasses, trees and flowers on private lands. (Chapter 3: Compatible Zoning and Subdivision Regulations; Chapter 6: Natural Landscaping; Chapter 9: Natural Area Management and Restoration)

Additional Recommendations

4. *Amend subdivision codes and stormwater management regulations to reduce the amount of impervious surface area, and utilize the landscape to naturally filter and infiltrate runoff before it leaves the development site. (Chapter 4: Improved Stormwater Management)*
5. *Amend comprehensive plans and zoning and subdivision regulations to protect existing streams, lakes, wetlands, and other natural areas, and encourage restoration of natural conditions on private lands. (Chapter 5: Stream, Lake and Wetland Protection; Chapter 9: Natural Area Management and Restoration)*
6. *Educate local residents about the means and benefits of natural area preservation and management. (Chapter 10: Education)*

Park Districts

Park districts and municipal parks departments tend to own the lands closest to dense concentrations of human residents. These lands have a critical role to play not only in providing habitat for native plants and animals, but also in offering urban children and adults an immediate opportunity to explore the beauty and magic of nature. Park districts can:

1. Implement specific suggestions for ecosystem management found in the Biodiversity Recovery Plan for any natural communities that may be within their ownership. (Chapter 9: Natural Area Management and Restoration)
2. Increase the amount of land within parks that can provide habitat for native plants and animals, including vegetation that provides food and shelter for migrating birds. (Chapter 6: Natural Landscaping)
3. Acquire or protect natural communities that are not yet protected and that may be too small to meet the acquisition criteria for a county or state conservation agency. (Chapter 8: Open Space Preservation)
4. Restore wetland, prairie, water, and woodland ecosystems on park holdings. (Chapter 5: Stream, Lake and Wetland Protection; Chapter 9: Natural Area Management and Restoration)
5. Educate the public about the importance of biodiversity. (Chapter 10: Education)

Additional Recommendations

6. *Develop and amend master plans to protect and connect natural areas, coordinate with surrounding communities and government entities, and manage park district properties to expand their benefits for wildlife. (Chapter 2: Comprehensive Land Use Planning)*
7. *Coordinate with cities and counties to utilize natural areas for stormwater management, and to design and manage naturalized stormwater detention facilities to better control the quality of runoff. (Chapter 4: Improved Stormwater Management)*

Wastewater Authorities

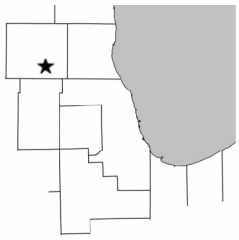
The role of wastewater authorities—including sanitary districts, municipalities, counties, and private utilities—in sewage treatment requires them both to own land and to manage major sources of flow to many waterways. To help conserve nature and biodiversity, wastewater authorities can:

1. Discharge stormwater and treated effluent in locations that will cause the least damage to the ecology of streams, and carefully consider the ecological impacts of new or increased discharges. (Chapter 7: Improved Wastewater Treatment)
2. If a wastewater authority owns land that supports a natural community, it should partner with a forest preserve district, park district, or other appropriate conservation agency to ensure protection of biodiversity. (Chapter 8: Open Space Preservation)

Additional Recommendation

3. *Manage and restore wastewater plant properties to healthy natural conditions and utilize natural landscaping techniques to increase the amount of land that can provide habitat for native plants and animals. (Chapter 5: Stream, Lake and Wetland Protection; Chapter 6: Natural Landscaping; Chapter 9: Natural Area Management and Restoration)*

How a Commitment to Nature Works in One Community



The City of Crystal Lake faces many of the same challenges as other growing municipalities. Traffic congestion and urban sprawl have become hot issues as new homes and businesses continue to be built at a rapid rate.

Through careful planning and concerted land acquisition, however, the Crystal Lake community has managed to protect over a thousand acres of park land. While the park district provides typical amenities such as ball fields for residents, much of the park district's land is left wild. Some of its holdings are Illinois nature preserves, others are landscaped with native plants. These natural lands are highly beneficial to a wide diversity of plants and animals, and residents still have quick access to nature, the reason many people choose to live in Crystal Lake in the first place.

Crystal Lake also protects the lake for which the town is named. The lake is one of the top five lakes in Illinois in terms of water quality and aquatic life. It has 23 different species of native fish, including two that are listed as threatened or endangered in the state of Illinois. The park district is currently taking major steps to protect the lake's watershed, such as purchasing several hundred acres of open space. The City has recently transformed one of the underground storm sewers into a more natural, above-ground stream, a process engineers call "daylighting." This stream meanders through a restored wetland where the natural hydrology has been reestablished. Furthermore, the City has for many years enforced an ordinance that benefits water quality by limiting the amount of impervious surface allowed in developments within the watershed. Only 20 percent of the surface area of a development can be paved surfaces or rooftops, and the remaining 80 percent remains open.

Recommended Tools and Techniques

Recognizing the importance of biodiversity to our well-being, quality of life, and economy, local authorities are encouraged to develop strategies for protecting what remains of our natural heritage. This seemingly difficult task can be eased by knowing how to undertake the process, the variety of options that are available, the community benefits of those options, and how and where these techniques are being locally utilized.

Protecting a variety of plants and animals is essentially a matter of protecting many different land and water habitats on which they depend. Thus, the tools and techniques presented in this guidebook focus on preserving and protecting natural areas and waterways.

Where Do You Start

Begin to develop a plan for preserving nature and habitat in the community by identifying the vision and values of residents regarding the future of the community. Once a consensus is established, you can begin to build a framework for achieving that future. This guidebook will help you decide which tools and techniques the community should adopt to accomplish its goals.

In many cases, the structure to accomplish biodiversity protection already exists within the community's programs and procedures. Thus, the first, and possibly easiest, step in approaching this task is to examine the community's existing programs and regulations and answer the following questions to determine what needs to be done next.

1. What are my community's natural resources and are they adequately protected?
2. Can my community's existing programs be used in their current form to accomplish biodiversity protection?
3. Can existing programs be amended to accommodate habitat and wildlife concerns?
4. Does my community need new programs and regulations to achieve biodiversity protection?

What Needs to Be Done

Once a community establishes its vision to protect and manage natural areas, it should develop a strategy to coordinate with neighboring jurisdictions, such as forest preserve districts. In particular, the community should look for opportunities to coordinate in a broader regional context, such as with its neighbors in a watershed.

Though this guidebook identifies municipalities and counties, park districts, and wastewater authorities as distinct units of government, in some communities these are departments within the village or city. Coordination among these local government departments is critical if biodiversity goals are to be achieved.

The community also should develop a planning framework for moving forward with more specific actions. In particular, a comprehensive land use plan should be developed, updated, or amended to reflect a general vision and more specific objectives for protecting and managing natural areas. This plan leads logically into the development and enforcement of protective zoning and subdivision regulations. These regulations should refer to more specific tools such as improved stormwater management, natural landscaping, and stream, lake, and wetland protection.

On a parallel track, the comprehensive plan should lead into open space preservation and management and restoration of natural areas. Land use planning also should be coordinated closely with wastewater facility planning, leading to improved wastewater management. And finally, throughout all of these steps, there is a critical need for ongoing education of both local decision-makers and community residents.

Following is a list of the tools and techniques that are described in subsequent chapters of the guidebook, along with suggestions for the most appropriate implementing entities.

Chapter 2: Comprehensive Land Use Planning: counties and municipalities

Chapter 3: Compatible Zoning and Subdivision Regulations: counties and municipalities

Chapter 4: Improved Stormwater Management: counties, municipalities, and park districts

Chapter 5: Stream, Lake and Wetland Protection: counties, municipalities, park districts, and wastewater authorities

Chapter 6: Natural Landscaping: counties, municipalities, park districts, and wastewater authorities

Chapter 7: Improved Wastewater Management: wastewater authorities

Chapter 8: Open Space Preservation: counties, municipalities, and park districts

Chapter 9: Natural Area Management and Restoration: counties, municipalities, park districts, and wastewater authorities

Chapter 10: Education: counties, municipalities, park districts, and wastewater authorities.

Suggested Reading

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Additional Information

Chicago Wilderness Magazine.
www.chicagowildernessmag.org
Subscriptions: $14/year or $24 for two years
PO Box 5054
Skokie, Illinois 60076-5054
847/965-9253

Important Biological and Ecological Principles

Protecting nature requires an appreciation for a number of biological and ecological principles.

Large, intact blocks of natural areas are most effective for protecting a diversity of habitats and wildlife and for protecting large populations of wildlife. While every little bit of preserved habitat contributes to the protection of biodiversity, we should aim for preserving and expanding large patches whenever possible. Where this is not possible, we should endeavor to connect the smaller patches of habitat to larger ones to facilitate the movement of species.

Natural corridors and greenways that link larger patches of habitat are essential. Localities should endeavor to create "greenway" linkages connecting local natural areas and areas in surrounding communities. Rivers, streams, trails, utility rights-of-way and unused railroad rights-of-way provide good linking opportunities. A map of the Chicago Wilderness region illustrates this concept. The protected areas along the Des Plaines River constitute a good corridor of habitat for wildlife to move through. An ideal situation would be to connect the rest of the protected areas into a network. The Northeastern Illinois Regional Greenway Plan provides a framework for the creation of 4300 miles of greenways in the region.

Where connections between larger natural areas are not possible, small patches can act as stepping stones for wildlife movement. Small patches of habitat are very helpful where breaks in the network of habitats occur. This is especially true for mobile animals, such as birds, and plants that are able to disperse over long distances via the wind or animals. For these species, patches of habitat provide refuge while moving between larger natural areas. Examples include small parks and residential lots landscaped with natural vegetation.

Rare landscape elements, significant or unique natural features, and threatened and endangered species and habitats should be prioritized for protection. Communities should examine the natural areas within their jurisdiction, and inventory the plant and animal species found there. Communities in which rare habitats or species exist should endeavor to protect these landscape elements first, and direct development to other areas. This does not mean that common habitats are not important, but that if the choice between the two must be made, then the rare or endangered areas should be prioritized for protection. Common habitat should be second priority, followed by disturbed areas, such as farm fields, that have potential for restoration.

2 COMPREHENSIVE LAND USE PLANNING

Background

Most municipalities and counties have developed comprehensive land use plans. A comprehensive plan establishes a community's goals, objectives and policies, and shows an overall pattern of land use that a community believes will help achieve these goals. An effective plan can guide the type, intensity and quality of land use to achieve balanced and self-sustaining communities that nourish and expand human opportunities, as well as protect and enhance the natural landscape. Municipalities are authorized to plan for a *planning jurisdiction* that includes unincorporated areas up to 1.5 miles from their corporate boundaries.

The comprehensive plan guides future land use decisions of community leaders by providing a framework that can be used to evaluate development proposals and phase public improvements. It also serves as a guide to set aside land to meet future public needs for transportation improvements, wildlife habitat, public open space, parks, schools and flood control.

Comprehensive plans are not legally enforceable documents, yet they provide policy statements that add legal support to zoning and other local ordinances. Comprehensive plans rarely provide enough detail or authority to implement the recommended actions. Therefore, goals outlined in these plans usually must be achieved with subsequent legislation such as *zoning ordinances* and *subdivision regulations*, which are discussed in the following chapter. Controlling capital improvements and infrastructure development is another means of implementing the comprehensive plan. For example, if the plan identifies specific habitat as a priority for conservation, then it should discourage the extension of infrastructure into this area to prevent unwanted development, and should budget funds for acquisition and restoration purposes.

Until recently, most comprehensive plans have not identified biodiversity protection as an explicit goal. Nor have they identified lands to be preserved or restored for their habitat value or diversity of native plants. One reason for this is that local governments traditionally rely on forest preserve and conservation districts to preserve "natural" areas. The fact is that local governments can greatly complement and augment efforts by these other agencies to protect a wide variety of plants and animals. Until recently, there were few good sources of information that communities could use to identify natural areas needing protection. Now, particularly with the ongoing efforts of *Chicago Wilderness* members, natural areas have been mapped in many parts of the region and some digital inventories are available.

Recommended Approaches

Planning should project a desired vision of what the community will look like in the future; it is typically a 20-year outlook. A good plan will achieve the community's objectives regardless of the rate or ultimate extent of growth. A good plan will reflect local conditions, concerns, resources, priorities and opportunities in its proposals and design standards. A good plan will also provide simple, clear, and concise statements and policies that can be understood by the least-informed community members, as well as developers, builders and public officials.

A number of important components that communities should include in their comprehensive plans are described below. More detailed information can be found in the NIPC publication *Environmental Considerations in Comprehensive Planning* (1994).

Identify Basic Principles

From an environmental and biodiversity perspective, the plan should embrace several basic principles:

- protect, enhance and integrate natural resources into the life and future of the community;
- require quality of design that reinforces individual and community identity and character, minimizes maintenance and environmental costs, improves the quality of life, and relates to the natural environment of the site, streetscape and landscape;
- create efficiency, order, and sustainability in the phasing and design of infrastructure and public service systems;
- promote land and water resource preservation and restoration; and
- coordinate with neighboring communities.

Write Specific Policy Statements

In embracing these principles, a comprehensive plan should include explicit statements embracing a land preservation and restoration ethic for protecting nature, as well as specifying *what* it wants to accomplish and *how* it intends to achieve goals. For example, compare the language of the following hypothetical policy statements, and notice how the second provides more concrete goals and actions:

Good: "Wildlife habitat shall be considered in all development plans."

Better: "The county will attempt to ensure viable populations of all native plants and wildlife found in the county by preserving adequate habitat, and preserving natural processes these plants and animals need to survive. The county will also minimize human impacts to wildlife and their habitats."

Identify Specific Actions

The comprehensive plan should refer specifically to a variety of ways in which a community can accomplish natural area protection goals. For example, consider the following action statements regarding stormwater management, which include substantial changes from the prevailing design philosophy that encourages rapid drainage of water from a site:

"It is the policy of the community to control stormwater runoff to minimize downstream environmental impacts. We will accomplish this with the following measures:

1. encourage site planning and drainage measures that minimize runoff rate and volume, and ensure water quality;
2. minimize impervious surfaces;
3. use the landscape to naturally absorb and filter runoff before slowly releasing it downstream; and
4. minimize erosion from construction sites."

Identify Natural Areas

The plan also should identify and map existing natural areas, environmentally sensitive areas, and locations of known threatened and endangered species on an accompanying map.

Such areas should include existing stream corridors, wetland complexes, woodlands, and remnant prairies. Greenways that are important for linking natural areas and providing wildlife movement corridors also should be identified and mapped.

For planning purposes, the identification of natural areas often can be done with existing information. Suggested sources of information are summarized below.

- *Wetlands*: National Wetland Inventory (NWI) maps are available digitally through the Illinois Department of Natural Resources (IDNR) and U.S. Fish and Wildlife Service (USFWS). Paper NWI maps can be obtained through NIPC. More current wetland inventories generally are available through county Natural Resources Conservation Service (NRCS) offices. Some of the NRCS inventories are available digitally. In DuPage, Lake, and McHenry counties, wetland advanced identification (ADID) maps are available. These maps identify wetlands and other waters of the United States and also distinguish high quality sites.
- *Stream Corridors*: Stream locations are identified on U.S. Geological Survey topographic and hydrologic atlas series maps. Topographic maps are available digitally. Paper copies of the hydrologic atlas series maps are available through NIPC.
- *Floodplains*: The Federal Emergency Management Agency (FEMA) produces maps of floodplains for the entire region. These maps can be obtained from NIPC.
- *Illinois Natural Areas*: The Illinois Department of Natural Resources maintains the Natural Areas Inventory, which is available in digital format. This inventory identifies sites that are known to contain threatened or endangered species.
- *Woodlands*: Woodlands can be determined from aerial photos. Both the counties and NIPC are sources of aerial photos.
- *Greenways*: The Northeastern Illinois Regional Greenway Plan (NIPC and Openlands Project, 1992 and 1997) identifies important regional greenway opportunities, and suggests criteria for identifying local greenway linkages.
- *Remnant Prairies*: Relatively few high quality remnant prairies remain on non-public land and most are relatively small. However, a significant number of sites with disturbed but restorable prairie and oak savanna remnants still remain. In some counties, the forest preserve district or conservation district may be helpful in identifying such sites.
- *Threatened and Endangered Species*: Lists of threatened and endangered species and communities are available through the U.S. Fish and Wildlife Service, and the Illinois Natural History Survey in its Natural Heritage Database.

The types of information referenced above are appropriate for preliminary planning and mapping. However, site-specific information should be collected to review actual development proposals.

Coordinate with Park Districts or Departments

The comprehensive plan should reflect an integrated approach between land use and local open space protection and management actions. For example, when identifying important natural areas, the plan should include suggestions for local and regional park ownership and

management. (For additional information see the 1980 NIPC publication *Regional Open Space and Recreation Policy Plan*.) Also, districts should be encouraged to inventory their land holdings to identify natural areas and opportunities to protect and enhance them.

Coordinate with Wastewater Authorities

The land use plan should be closely coordinated with those planning wastewater facilities, including sanitary districts, public works departments, and/or private utilities. In particular, issues such as land use and population projections, treatment plant capacities, and discharge locations should be closely coordinated between the land use plan and wastewater facilities plan to ensure adequate protection of sensitive local waterbodies. Also, wastewater authorities should be encouraged to review their lands to determine biodiversity values and to manage them accordingly.

Coordinate with Surrounding Communities and Districts

In developing the local comprehensive plan, planners should coordinate with comprehensive planning initiatives of neighboring communities, counties, and districts, as well as regional plans. For example, communities should meet with forest preserve district or conservation district officials to review existing and proposed holdings and management plans. Plan recommendations should address compatible land use adjacent to preserves as well as possible local acquisitions to maximize protection of natural areas. Similarly, coordination should occur to ensure land use compatible with adjacent communities. For example, the preservation efforts of one community may be compromised by a neighboring community's plans for high intensity use.

Summary of Benefits

Comprehensive land use planning provides an opportunity for communities to envision their future and to set in motion the policies and actions to realize that vision. Establishing the vision to protect nature in a comprehensive plan is the first step to enacting protective programs and legislation. A plan sets the framework for enacting ordinances, and it directs municipal leaders in making appropriate decisions to accomplish community objectives.

The comprehensive plan also depicts the community's vision in graphic form through its land use maps, which may be the most effective way to convey the plan's vision to residents, elected officials, and potential developers.

> *"Other communities claim that they can't do what Long Grove does in terms of protecting their natural resources, but we don't have any more power over what happens in our community than any other community in the region. The fact is that the residents in our community chose to prioritize protection of our natural resources over other things."*
> -Cal Doughty, Manager, Village of Long Grove, 1999.

Urban Revitalization *(adapted from The Trust for Public Land, 1999.)*

One technique for preserving valuable landscapes while accommodating a growing population is to redevelop previously used urban lands, sometimes known as "brownfields." A similar technique is "infill development" whereby additional development is inserted into unused portions of previously developed areas. A few of the benefits of brownfield and infill development are as follows.

- A recycled parcel is often less expensive to develop than new land, because it is already serviced by roads, utilities, and other infrastructure.
- Brownfields also can be redeveloped into community parks or natural areas.
- Brownfield and infill development limits the pressure to develop agricultural land and other open space, potentially impacting valuable habitat.

> *"Urban parks, gardens, and recreational open space stimulate commercial growth and promote inner-city revitalization."* -The Trust for Public Land, 1999.

Specific techniques for accomplishing redevelopment objectives include special zoning, such as a redevelopment overlay zone, and tax incentives to encourage redevelopment. In some cases, in order to stimulate redevelopment, a municipality may need to relax certain regulations that counter redevelopment efforts.

Redevelopment also should utilize sustainable development techniques such as those covered in this guidebook. This includes using native landscaping (Chapter 6), natural drainage and improved stormwater management techniques (Chapter 4), and preservation or restoration of natural habitat on the site (Chapters 8 and 9).

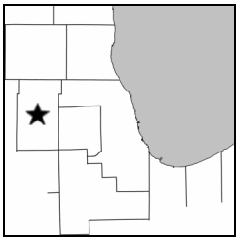
> *"Revitalizing public parks is a phenomenally cost-effective way to generate community economic development."*-Steve Coleman, Washington D.C. open space activist.

An Example: Homan Square Infill Development Project, Chicago

When Sears and Roebuck left the Homan area for the Sears Tower in the late 1980s, their old facility was left vacant. However, through the innovative redevelopment actions of the community, Homan Square will eventually contain a 55-acre mixed-use, mixed-income development with approximately 600 residential units, private businesses, light industry, and public agencies. This type of redevelopment of previously developed land helps prevent the conversion of undeveloped open space and agricultural land into urban uses, and thus helps protect the region's natural areas.

Local Examples

Kane County's Land Resource Management Plan



In 1996, Kane County adopted a comprehensive land use plan entitled "2020 Land Resource Management Plan." This plan refers specifically to protecting and enhancing high quality habitat necessary for the survival of a diversity of plant and animal species. This plan identifies benefits, makes clear policy statements, and lists specific actions that will help the community achieve its preservation goals. According to the plan, preserving open space provides a number of benefits:

- protects the diverse flora and fauna important to the structure and function of ecosystems, as well as habitat necessary for migration and propagation of plant and animal species;
- filters sediments and pollutants, enhances stream and wetland function, and helps accommodate stormwater flows and prevent flood damage; and
- enhances property values and provides community identity and activity areas, alternative transportation routes, educational opportunities, and areas for scientific research.

The plan recommends acquisition and preservation through both public and private efforts, including forest preserve and park district acquisitions, the development approval process (especially Planned Unit Developments), and dedication of conservation easements. Furthermore, private landowners can help the effort by using natural landscaping techniques. These techniques are discussed in later chapters of this guidebook.

Specific open space policy statements in the plan include:

- Protect biodiversity by preserving, regenerating, and restoring natural areas.
- Incorporate environmental design criteria in development controls and county ordinances to protect natural, scenic, historic, archeological, and environmental areas and to minimize adverse impacts.
- Encourage the acquisition and development of greenways for recreation/transportation trails and habitat corridors.
- Encourage the increased use of non-acquisition techniques such as conservation easements, tax adjustments, and dedications for implementing open space plans.

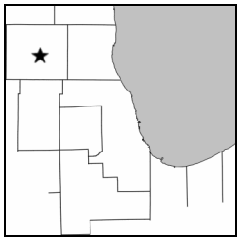
Another section of the Kane County plan addresses water quality and quantity and the protection of fish, shellfish and wildlife. The plan recommends a number of specific actions regarding water resources that directly benefit wildlife and biodiversity:

- Protect/restore all streams and rivers to a B class or better, which indicates a highly valued water resource able to support game species of fish.

- Protect groundwater supplies to maintain hydrology important for wetland function.
- Reduce pollutant and sediment loading in waterways and waterbodies.
- Utilize Best Management Practices, such as buffer strips, to protect river and stream corridors and water quality.
- Protect the floodplain to reduce flood peaks and extend flood discharge times.
- Reduce impervious surfaces.
- Utilize watershed planning to integrate land use, infrastructure and water resource planning.

Contact the Kane County Development Department: 630/232-3480.

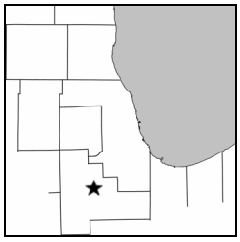
City of Woodstock



As part of their comprehensive planning process, the City of Woodstock has taken a proactive planning step to identify and inventory high quality natural areas in their community before anticipated development pressures force their conversion to other uses. The community hopes to protect the hydrology and natural features in the community by utilizing the natural area inventory as a framework around which future development will be planned. The City is working with a local private land planning firm in this effort.

Contact the City of Woodstock: 815/338-4300.

St. Charles Park District Comprehensive Master Plan



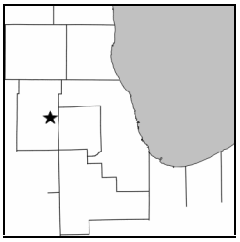
In its 1996 Comprehensive Master Plan, the St. Charles Park District identified a number of goals and objectives related to natural area protection and management. One of the park district goals is land acquisition, for which the following objectives have been identified: acquire additional land utilizing innovative acquisition techniques; acquire land which can protect wildlife and fragile ecosystems and provide a variety of recreational uses; link open space areas; cooperate with other public and private entities.

Another of the park district's goals is to "establish cooperative relationships to expand recreational opportunities, to promote and enhance service delivery, and to preserve open space areas." Objectives of this goal include working with the City of St. Charles, the Forest Preserve District of Kane County, Kane County and its comprehensive plan, school districts, adjacent park districts and other jurisdictions to coordinate activities.

The plan discusses these goals and objectives in greater detail, as well as natural features, greenways, and parks and open space. Numerous detailed maps also are included.

Contact the St. Charles Park District: 630/516-3342.

Village of New Lenox



The Village of New Lenox, with a population of about 13,000, provides a good example of a small but growing community using a comprehensive plan to incorporate natural areas and open space into its vision of the future. New Lenox recognizes that natural areas and open space in the community will promote environmental well being, provide natural corridors for wildlife migration, optimize aesthetic benefits, enhance community form, and provide a sense of community identity. Their plan lays out a development framework for the community through five major steps:

1. identifies the significant natural features of the community including creeks and drainage, floodplains, wetlands, and significant areas of native vegetation;
2. lists development trends, constraints, and opportunities regarding open space and natural features;
3. establishes goals and objectives for the community for natural areas and open space;
4. makes specific recommendations for implementing the plan and accomplishing the goals and objectives; and
5. provides examples of development that can help accomplish open space goals.

Goals and objectives for the open space and natural features of the community include:

- preserve existing natural features;
- establish linear open space corridors to provide environmental protection and linkages among significant open space features;
- consider open space as an integral program element in the planning and development of residential areas;
- utilize a wide variety of public and private acquisition/maintenance techniques for open space ownership and stewardship, including dedication to public entities and conservation easements;
- establish a comprehensive pedestrian / bicycle trail system throughout environmental corridors and utility corridors;
- integrate setbacks and buffer yards along arteries and collector roads into the open space system;
- coordinate development with plans and policies of the park district and forest preserve district; and
- develop landscaping and tree preservation ordinances.

Preserving and linking open space and natural features is a common goal for all development activities. Specific details for accomplishing some of the goals and objectives include:

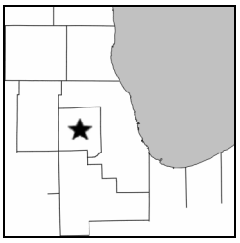
- specific open space percentage requirements for different residential development densities;
- Primary Implementation Tools for accomplishing the plan's goals and objectives;
- minimizing disturbance of natural features;

- grouping residential lots to maximize contiguous project open space;
- providing open space buffers along all peripheral collector roads;
- providing contiguous open space wherever possible rather than small fragments; and
- connecting open space with trails and linear open space corridors.

The plan appendix illustrates a number of development designs that can be used to accomplish open space objectives, and identifies seven different mechanisms for maintaining and protecting open space.

Contact the Village of New Lenox Planning and Development Administration: 815/485-6452.

DuPage County Natural Areas Study



In October of 1996, the DuPage County Regional Planning Commission (DCRPC), responsible for developing and maintaining the county comprehensive plan, adopted the DuPage County Natural Areas Study. The study is intended to provide a resource for municipal and county officials, such as the DuPage County Forest Preserve District, who are interested in open space preservation. An update of earlier, outdated studies, this study (1) identifies remaining open space areas worthy of preservation, (2) ranks these areas based on their natural features, linkages, and cultural and archeological features, and (3) identifies tools available for preserving open space. The study also includes the county's methodology for identifying and prioritizing open space areas so that other communities can use it as a model for their own open space assessment. Finally, the study makes three recommendations for protecting the environmentally sensitive areas identified in the report.

This study was followed in May of 1999 by the Natural Areas Study Implementation Summary Report, which documents the major activities undertaken to implement the recommendations of the 1996 study. The report also evaluates the degree to which the recommendations of the 1996 study were achieved, and the particular areas in which significant success can be reported.

Contact DuPage County Development and Stormwater Department: 630/682-7230.

Additional Information

The American Planning Association provides technical assistance for comprehensive planning (312/431-9100).

Suggested Reading

2020 Land Resource Management Plan. Kane County, Illinois. 1996.

DuPage County Natural Areas Study. DuPage County Regional Planning Commission. 1996.

DuPage County Natural Areas Study Implementation Summary Report. DuPage County Regional Planning Commission. 1999.

Environmental Considerations in Comprehensive Planning -- A Manual for Local Officials. Northeastern Illinois Planning Commission. 1994. Chicago.

Habitat Protection Planning: Where the Wild Things Are. Christopher Duerksen, et al. 1997. Planning Advisory Service Report No. 470/1. American Planning Association. Chicago.

Illinois Geographic Information System. CD-ROM. Illinois Department of Natural Resources. 1996. Springfield, Illinois.

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Northeastern Illinois Regional Greenway Plan. Northeastern Illinois Planning Commission and Openlands Project. 1992 and 1997. Chicago.

Regional Open Space and Recreation Policy Plan. Northeastern Illinois Planning Commission. 1980. Chicago.

St. Charles Park District Comprehensive Master Plan. St. Charles Park District. 1996. St. Charles, Illinois.

Village of New Lenox Comprehensive Plan. Village of New Lenox. 1997. New Lenox, Illinois.

3 COMPATIBLE ZONING AND SUBDIVISION REGULATIONS

Background

All communities in the region have zoning and subdivision regulations. Whereas the comprehensive plan identifies land use in a general fashion, zoning and subdivision regulations provide for specific and detailed control of the type and intensity of land use within carefully defined districts or zones and the orderly division of land into smaller lots. Zoning and subdivision regulations are the most common tools that municipalities use to control the use of land after policies have been outlined in the comprehensive plan.

Under zoning, the entire municipality is divided into districts, and the zoning ordinance identifies what kind of land uses are allowed in each district. This should be done in a manner that avoids conflicts between land uses that may not be compatible. For example, certain industrial uses may not be compatible with the preservation of an identified wetland complex, whereas low density residential use may be compatible, particularly if the development is clustered and adequate buffers and setbacks are provided.

Subdivision regulations are used to control the division of land into lots in a way that helps achieve the community's goals. These regulations set standards for public facilities, services, and improvements, including stormwater management, soil erosion control plans, standards for street rights-of-way, pavement width and strength, parkway trees, and provision of public rights-of-way and easements. Many subdivision regulations also require developers to donate cash or a portion of a development property for schools, parks or other community facilities. Specific guidelines can be built into these regulations to protect community amenities, such as natural areas, and to require environmentally sustainable site designs.

Communities should ensure that their staff members are familiar with the requirements outlined in the zoning and subdivision codes. This will help ensure that these regulations are being utilized and enforced on the ground.

Recommended Approaches

Zoning

Effective zoning can provide some of the most valuable and effective tools for environmental protection within a community. Zoning typically controls four characteristics of development: use, height, bulk, and density. Use zones control the types of activity that are allowed in each district, such as residential, industrial and commercial. Height regulations control the height and number of stories of buildings, while bulk ordinances control the size of development lots and the percentage of the lot that may be covered by structures. Density standards regulate how many residences may be built per acre.

Zoning ordinances can be applied or modified to preserve natural areas and to buffer natural areas from incompatible uses. For example, most municipalities already have zoning ordinances that require specified amounts of open space, typically in the form of lot-size requirements, setback requirements, or maximums for building site coverage. Zoning also can be used simply to prohibit incompatible land uses in or near natural areas. Instead, compatible uses such as public or private open space (e.g., golf courses), or low density or clustered residential development would be more appropriate for lands adjacent to natural areas.

Development density zoning also can protect sensitive habitats and open space. One technique is to encourage higher development densities in areas with few natural resources and lower densities in more sensitive areas.

Some more specific techniques are described below. Some controls that could be included in zoning regulations, such as buffers and minimum lot sizes, also can be addressed in subdivision controls, and vice versa.

Planning and Regulatory Techniques

The State of Illinois has given municipalities and other local governments the authority to protect the health, safety, and welfare of their residents through reasonable regulations. In particular, local governments are authorized by Illinois' basic zoning enabling legislation to protect sensitive areas and to enforce development setbacks. Some important considerations in using regulatory techniques:

1. Ensure that goals and objectives are clearly stated and specific, and that they do not conflict with other ordinances.
2. Use existing models that work, and tailor them to local conditions. Consider some of the local examples identified in this guidebook or the model ordinances developed by NIPC and others.
3. Keep in mind the ability of the community to enforce the regulation, and the cost and complexity of doing so. A complex ordinance is useless if the community can not devote adequate staff, time and money to enforce it. A simple, clearly stated ordinance is often as effective as a complex one, and will be easier to implement and enforce.

Restrictive Zoning

Communities may establish new zoning ordinances or amend existing zoning ordinances to restrict certain activities in or near natural areas, wildlife habitat areas, and waterways. For example, zoning regulations can prohibit the use of loud machinery within 1000 feet of migratory bird nesting areas during the breeding season. This helps protect birds that are particularly sensitive to noise.

Performance Zoning

This alternative to traditional zoning regulates development impacts by establishing environmental protection standards that must be met if development is to proceed. Examples of standards that might be required include minimum habitat protection percentages, habitat restoration requirements, limits on tree and vegetation removal, and wetland buffer requirements. Typically, a developer is allowed to use flexibility and innovative design layouts to attain natural preservation goals, as long as performance standards are met.

Density Restrictions

Local governments can control the density of development in and near natural areas to reduce the impact of development on wildlife. For example, areas near protected habitat could have very low densities, and development further from the habitat areas can be more dense. A variation of this technique is the use of cluster development, high density development designed to preserve open space on undeveloped portions of a site. This technique is described in detail below.

Higher density, clustered development at appropriate locations can result in infrastructure cost savings, on a per capita basis, due to shorter roads and utility lines, and savings related to more concentrated service areas for police protection, fire protection, and schools.

Setbacks, Buffers and Open Space Requirements

Building setbacks, sometimes justified to provide for the future widening of streets in residential areas, may be used to protect specific development site features such as floodplains, natural habitats, or steep slopes. Setbacks require new development to be built beyond a specified distance from lot lines as stated in the zoning ordinance. This technique can protect natural areas by establishing buffers between intensive uses and wildlife habitat.

Open space requirements are another form of setback that require developers to leave a specific percentage of a site undeveloped. A local government may require that the undeveloped land be protected via dedication to the government or a local conservation organization, through a conservation easement (see Appendix C), or other means. This undeveloped land can consist of existing natural habitat, or may be restored to natural habitat conditions. Open space requirements also may be designated in subdivision regulations.

Buffers are another important means of separating incompatible land uses. Like setbacks, buffers require a minimum amount of preserved land to protect natural areas from disturbances such as buildings or parking lots. Buffers should remain in a natural state or otherwise conform to specific standards. For example, a community should require a stream buffer to be planted in native, deep-rooted vegetation rather than covered in sod; a woodland buffer may be required to be planted in native trees. Further discussion of buffers is included in chapter 5 dealing with stream, lake, and wetland protection.

Riparian Buffer: An area of trees, shrubs, and herbaceous plants that functions as a vegetative transition zone, separating upland and wetland ecosystems. The vegetative buffer aids water quality by trapping or removing sediment, excess nutrients, pesticides, and other pollutants from surface runoff and shallow ground water.

Special Districts and Overlay Zones

Overlay zones are used to place property simultaneously in two zones, one of which can be a habitat protection zone. This technique overlays criteria for development that are in addition to the standards and criteria of the base zoning district to which it is applied. If a particular development falls within both of the established zones, then it must conform to regulations of both zones. One of the advantages of overlay zones is that they can be added to the existing zoning, and do not require rezoning of the entire community to accomplish preservation objectives.

A common type of overlay zone in northeastern Illinois is used for the identification and protection of a community's floodplains or wetlands. For example, NIPC has identified a "lowland conservancy overlay district" in its *Model Stream and Wetland Protection Ordinance*. This overlay district superimposes criteria for the protection of stream corridors and wetlands, including supplemental standards for buffers, setbacks, landscaping, and avoidance of certain areas. This type of overlay district may establish guidelines for new construction and impose special design review

requirements, as in the Village of Long Grove example at the end of this chapter. Other types of overlay zones protect trees and vegetation, establish percentage requirements for open space preservation, and protect prime nesting grounds. For example, a Village of Glenview ordinance prohibits or limits development in environmentally sensitive zones. Overlays are also used to designate wildlife movement corridors and greenways.

Cluster Development / Conservation Development

Conventional residential zoning calls for *minimum* lot sizes and encourages maximal use of the lot for development. An alternative approach is to encourage *cluster development* which maintains the gross density of the site (i.e., the same number of lots) but clusters the development onto a smaller, buildable portion of the site. (In some cases, such as when the majority of a site is wetlands or floodplain, the gross density of the site may have to be reduced to protect these features from impact.) This technique is particularly useful when the intent is to protect specific features on a development site, such as wetlands, remnant prairies, or groundwater recharge zones, while allowing development.

Cluster development is an integral tool used to achieve the objectives of a *conservation development*. Conservation developments are tailored to the characteristics of a site and are intended to achieve several basic environmental objectives:

- minimize the overall disturbance of the site to prevent soil erosion and compaction during construction;
- facilitate the protection of sensitive habitats, including stream corridors, wetlands, and woodlands;
- allow for the protection of open space and for greenway linkages to adjacent sites; and
- facilitate the use of natural drainage and landscaping approaches, and reduce the effective impervious area of a development, thereby minimizing offsite stormwater impacts.

In establishing zoning requirements for clustering or conservation development, it is important that the community provide clear guidance to developers. This may be accomplished by (1) clearly stating its conservation objectives and priorities in the zoning ordinance so the developer knows which areas are to be preserved, and then (2) establishing specific cluster design guidelines in the subdivision regulations. The community also may provide direction on the amount of open space to be preserved on a site. For example, a community may wish to specify a *maximum*, rather than minimum, lot size within each residential zoning class.

Another approach for enabling conservation development without actually specifying requirements is through *planned unit developments* (PUDs). A properly written PUD ordinance can allow developers the flexibility to utilize cluster developments and other alternative approaches that may otherwise conflict with standard zoning requirements.

In addition to providing obvious environmental benefits, cluster and conservation developments can provide substantial savings to developers on infrastructure costs, thereby improving affordability. According to a recent study in DuPage County (*Home Ownership -- Keeping the Dream Alive*), cluster developments can save 35 percent on the cost of site clearance, street pavement, and storm sewers.

A final consideration of cluster and conservation developments is the need to prepare a resource management plan to ensure long term management and maintenance of sensitive features and common areas. In particular, the developer should identify the entities responsible for management. Possible options include individual property owners (e.g., via conservation easements), homeowners associations, land conservancies, or park or forest preserve districts.

How a Community Might Use its Zoning Ordinances to Protect Biodiversity

The fictitious community of Arborville wants to protect existing native trees in their community for their wildlife habitat values. Options for using zoning to accomplish this goal include:

1. adopt a new subsection of text addressing tree protection and make those requirements applicable to all zones;
2. draft similar protection language but add the new requirements to only specific zone districts through amendments to those chapters of the code;
3. create a new chapter or subsection creating a "habitat protection zone" and then amend the zoning map to apply that zone where it is appropriate; and
4. draft the protections into the text of an overlay zone and then amend the zoning maps to add the overlay district on the existing zoning districts.

Subdivision Regulations and Review

Subdivision regulations are another tool for implementing the policies outlined in the comprehensive plan. These regulations establish a process so that proposals for the subdivision of land for development can be reviewed and recorded, and so that public officials and developers can cooperate to find a subdivision design that satisfies the needs of both the developer and the community. The regulations set guidelines for developers to follow for public infrastructure, services and improvements such as stormwater management, erosion control, and open space protection. Some controls that could be included in zoning regulations, such as buffers and minimum lot sizes, can also be addressed in subdivision controls, and vice versa.

Effective subdivision regulations, however, require that the engineers and planners administering the regulations understand the intent and spirit of the regulations. Encouraging investment in the community's vision by the administrative staff is essential to achieve effective regulation. Some specific techniques are discussed below.

Open Space Set-asides

Like zoning regulations, subdivision ordinances can be used to stipulate requirements for the provision of open space. This is a particularly valuable tool for protecting natural areas, especially if the ordinance includes criteria stating a preference for setting aside natural areas that occur on a development site. As an alternative a community may require a developer to pay a fee to the government (an *impact fee*), which the government then uses to purchase and protect open space or natural areas

elsewhere. For example, if a new development impacts native woodland, impact fees could be used to preserve or restore woodland elsewhere. This option is useful where a community would like to amass enough funds to purchase a large piece of property, or otherwise purchase land that will contribute to an overall network of natural areas.

Biodiversity and Environmental Protection Ordinances

Most environmental protection ordinances are contained in a community's zoning and subdivision regulations. Many local governments throughout the Chicago Wilderness region have adopted model ordinances developed by the Northeastern Illinois Planning Commission for stream and wetland protection, floodplain management, erosion and sediment control, and stormwater drainage and detention. Other communities have developed and adopted their own codes for these purposes. Similar ordinances, such as for stormwater management, that are not part of zoning or subdivision regulations also may be adopted specifically to protect habitat, wildlife migration corridors, and threatened and endangered species. For example, a number of communities have adopted tree protection ordinances that prohibit cutting of certain sizes or types of trees, and vegetation ordinances that protect native vegetation and prohibit the use of noxious, invasive species. The Village of Barrington, for instance, has strict rules regarding trees, requiring developers to hire an arborist to study a site's trees and help the village determine what percentage of the trees should be preserved.

Design Requirements

Local governments may adopt specific design guidelines for subdivision or residential development that require developers to protect natural resources. Design requirements can be used to encourage or require developers to use native vegetation for landscaping and to implement stormwater drainage designs that minimize offsite environmental impacts. For example, a community may want to reduce stormwater runoff to protect wetlands and stream habitats and to prevent flood damages. Specific design requirements to achieve this goal may include minimizing impervious surfaces, such as with the use of permeable paving blocks for driveways or overflow parking areas. They also may require smaller street widths, which reduces the area of impermeable surface by minimizing the paved surface area, and allows for larger yards and, thus, a larger area for water absorption. These topics are discussed in detail in subsequent chapters.

Summary of Benefits

Zoning and subdivision regulations can protect habitat and open space with low initial, administrative and management costs, and may be tailored to a community's needs. The responsibility for adhering to regulations and minimizing environmental impacts lies with the developer and/or landowner, who, in turn, can benefit from enhanced property values.

Another benefit of zoning and subdivision regulation approaches are that they can be utilized to accomplish a number of community objectives at the same time. For example, an overlay to protect a floodplain could be used to protect water quality, minimize damages to residents' property, and provide parks, greenways, and bicycle trails for recreation.

Subdivision design requirements to protect wetlands can provide stormwater detention areas, wildlife habitat, and opportunities for bird watching and educational activities for residents.

Incentives

Some communities are averse to using regulatory measures to control land use decisions, and may be more willing to adopt incentive measures to encourage developers and landowners to voluntarily take specific actions. Some examples of incentives are discussed below.

***Density Bonuses**:* In these programs, local governments allow landowners to construct more development on their land than is allowed by the zoning regulations. In exchange, the developer agrees to set aside open space, protect habitat, buffer streams and wetlands, or otherwise protect environmental amenities. Typical bonuses are on the order of 25 to 50 percent.

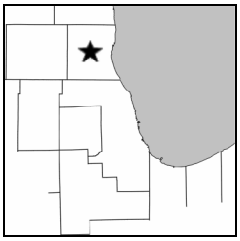
***Transferable Development Rights**:* This technique, which is not legal in Illinois, moves development from an inappropriate or sensitive area to a more appropriate one, and is described in the chapter on open space preservation.

***Preferential Tax Treatment**:* Economic incentives are another important approach to motivating landowner behavior. One technique, *use assessments*, allows land to be taxed for its current use rather than the "highest and best use" potential that is typically used. For example, some golf courses in northeastern Illinois are assessed at a reduced open space rate that applies as long as the land is not converted to some other use (see Open Space Assessment below.) The same result also can be accomplished with a *conservation easement* or *deed restriction*, whereby a landowner voluntarily restricts the use of land in exchange for tax relief. These techniques are discussed further in the chapter on open space preservation. However, a number of other specific property tax incentive programs are discussed briefly below. Contact information is listed in Appendix A.

- *Exemption of Property Leased to a Park District*: Encourages leasing of land to be preserved as open space. Contact the County's Board of Review.
- *Forest Legacy Program (FLP*): Assists in identifying and protecting environmentally important private woodlands at risk of conversion to other uses. Contact State Forester's Office or District Forester, Illinois Department of Natural Resources, Division of Forest Resources.
- *Open Space Assessment*: Encourages preservation of land as open space by taxing the land for its use as open space. Contact the Supervisor of Assessments, County Assessor.
- *Vegetative Filter Strip Assessment*: Encourages vegetative filter strips between farmland and water features in exchange for property tax reduction. Contact the Illinois Department of Agriculture; Bureau of Land and Water Resources; Illinois Department of Revenue, Office of Local Government Services.

Local Examples

Lake County's Unified Development Ordinance

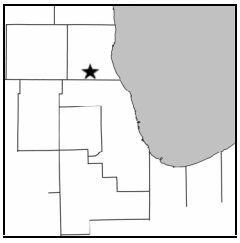


Lake County has developed a Unified Development Ordinance (UDO) that is intended to provide a regulatory environment that permits a realistic level of high-quality development to coexist with an enhanced level of open space and natural resource preservation. The UDO mentions open space and natural area protection throughout the document, and more specific standards include the following:

- identification and protection of natural resources for all development proposals, including woodlands, significant trees, water features, floodplains, shorelines, steep slopes, and wetlands;
- protection of water features through restrictions on floodplain development, protection of natural channels, buffer requirements, and soil erosion and sediment control standards;
- land dedication requirements (or cash contribution in lieu of land dedication) for public park and recreation land;
- provisions for conservation development where developers are given incentives for setting aside open space; and
- limits on the area of land able to be cleared of woodland vegetation.

Contact the Lake County Department of Planning and Development: 847/360-6350.

Village of Long Grove



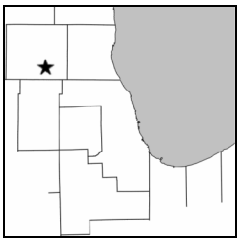
The Village of Long Grove has adopted a number of subdivision and zoning regulations that protect natural areas and water quality. Some of these provisions make specific reference to native flora and fauna and wildlife habitat.

Long Grove's zoning regulations require that development be guided to preserve green areas, open space, and locally endangered species of plants and animals, and to avoid all possible damage to the natural environment and ecology of the village. To accomplish these objectives, the Village has established lowland and upland conservancy districts to protect, among other things, prime wetlands, wildlife areas, woodlands, scenic areas, groundwater recharge areas, areas useful for recreation and education, and areas valuable for flood control. Projects within these districts must not disturb the natural vegetation, forest cover, or natural ecology of the area.

The Village's subdivision regulations also discuss scenic easements in the community, wherein all significant natural vegetation, woodlands, and hedgerows shall be preserved and maintained to provide a refuge for native animal and bird life, as well as undisturbed areas of native plant communities.

Contact the Village of Long Grove: 847/634-9440.

City of Crystal Lake



The water that fills Crystal Lake originates solely within a local watershed as runoff or groundwater flow—it is not fed by streams or rivers originating elsewhere. To protect the quality of the lake, the City of Crystal Lake has enacted a watershed zoning regulation to protect Crystal Lake aquifer recharge areas, to improve the quality of surface and sub-surface discharges to the lake, and reduce accumulated nutrients in the lake. This regulation designates specific requirements for development and other activities within the watershed including:

- maintaining groundwater flows and levels;
- development designs that preserve natural drainage patterns and groundwater recharge; and
- preservation of natural stormwater detention areas through acquisition or dedication.

Contact the City of Crystal Lake Community Development Division: 815/459-2020.

Suggested Reading

The Cluster Subdivision: A Cost-Effective Approach. Welford Sanders. 1980. Planning Advisory Service Report No. 356. Chicago. American Planning Association.

Conservation Designs for Subdivisions: A Practical Guide for Creating Open Space Networks. Randall Arendt. 1996. Island Press.

Environmental Considerations in Comprehensive Planning -- A Manual for Local Officials. Northeastern Illinois Planning Commission. 1994. Chicago.

An Examination of Market Appreciation for Clustered Housing with Permanently-Protected Open Space. J. Lacy. 1990. Center for Rural Massachusetts, University of Massachusetts.

Habitat Protection Planning: Where the Wild Things Are. Christopher Duerksen, et al. 1997. Planning Advisory Service Report No. 470/1. Chicago. American Planning Association.

Home Ownership -- Keeping the Dream Alive. Attainable Housing Task Group and DuPage County Development Department. 1993.

Model Stream and Wetland Protection Ordinance. Northeastern Illinois Planning Commission. 1988. Chicago.

Preparing a Conventional Zoning Ordinance. Charles A. Lerable. 1995. Planning Advisory Service Report No. 460. Chicago: American Planning Association.

Rural by Design. Randall Arendt, et al. 1994. Chicago. Planner's Press.

Subdivision Design in Flood Hazard Areas. Marya Morris. 1997. Planning Advisory Service Report No. 473. Chicago: American Planning Association.

Unified Development Ordinance. Lake County. In progress.

Village of Long Grove Code of Regulations. Village of Long Grove. 1991.

Zoning Handbook for Municipal Officials with Suggested Forms. Illinois Municipal League.

4 IMPROVED STORMWATER MANAGEMENT

"Past philosophy sought maximum convenience at an individual site by the most rapid possible elimination of excess surface water after a rainfall and the containment and disposal of that water as quickly as possible through a closed system. The cumulative effects of such approaches have been a major cause of increased frequency of downstream flooding, often accompanied by diminishing groundwater supplies."

-Urban Land Institute et al.,
Residential Storm Water Management.

Background

Compared to some other techniques, the benefits of stormwater management may be less direct, but they are no less important to protecting the region's biodiversity. While other techniques mostly benefit the diversity of plants and animals living on land, the principal benefits of stormwater management relate to water environments. More specifically, without improved stormwater management, the integrity and quality of the region's aquatic systems—streams, lakes, and wetlands—will continue to be degraded and remaining high quality ecosystems will be destroyed.

Conventional urban development dramatically increases the amount of stormwater runoff generated by the landscape. The principal causes of this effect are impervious surfaces—streets, parking lots, and buildings—and compaction of the soil due to construction activities. Instead of soaking into the ground, rain that falls on an impermeable surface is converted quickly to runoff and is eliminated from the site via sewers and manmade channels.

Some common site development standards may actually worsen stormwater runoff problems. For example, development standards that require wide streets, expansive parking lots, and artificial drainage systems produce even more runoff than similar developments of 40 to 50 years ago.

In recognition of the effect that increased runoff has had on flooding, new development often incorporates stormwater detention to slow the release of stormwater runoff to downstream rivers. While beneficial in controlling flood peak flows, this still leaves several runoff-related problems inadequately addressed.

- Stormwater runoff is contaminated with various water pollutants that are byproducts of urban activities such as automobile use, lawn care, and industrial fallout. If unchecked, these pollutants will damage aquatic life, including fish and other wildlife species that depend on water resources for food and habitat.

- Water that runs off urban landscapes cannot effectively recharge groundwater. As a consequence, wetlands and waterbodies that are naturally dependent on stable groundwater flow are subject to highly variable surface runoff causing long-term degradation. Specific impacts include a loss of sensitive plant species and a subsequent loss of wildlife habitat. Also, communities that depend on locally recharged groundwater aquifers are more likely to suffer water shortages that could limit future development and necessitate sprinkling bans and other restrictions.
- Urban runoff causes instability in the drainage system by increasing the high flows, which can cause streams to rapidly erode and degrade water habitat, and decreasing the low flows (or *baseflows*). Reduced baseflows can cause small streams and lakes to dry up and concentrate pollutants to damaging levels.
- While stormwater detention can effectively reduce runoff *rates*, thereby controlling localized flooding, it does little to control the increased *volume* of runoff caused by urbanization. As a consequence, flooding continues to worsen on larger drainage systems, such as the Des Plaines and Fox Rivers.

Recommended Approaches

Fortunately, there are development options involving alternative stormwater drainage and site design approaches that can substantially reduce the identified impacts. These alternative development techniques, commonly called *best management practices*, or *BMPs*, involve measures that accomplish two basic objectives:

1. reduce the amount of impervious surface area, thereby reducing runoff; and
2. utilize the landscape to naturally filter and absorb runoff before it leaves the development site.

Interestingly, the recommended development designs reflect both old and new design philosophies. For example, natural drainage and narrow street widths mirror a design philosophy that pre-dates the arrival of "modern" subdivision design in the 50's and 60's. Another recommendation, the use of native landscaping materials, emulate presettlement conditions. Cluster development, which reduces impervious area, is a relatively new design approach that has not yet been widely used in this region.

Local governments can ensure that environmentally friendly stormwater designs are implemented in their communities by establishing requirements in zoning and subdivision ordinances. Many communities adopt such ordinances to ensure adequate drainage, to limit offsite flow rates with detention basins, and to limit erosion from sites during construction. Another way to reduce stormwater impacts is to provide flexibility in local subdivision ordinances that allows and encourages natural drainage approaches, such as vegetated swales, to minimize impervious surfaces and soil compaction.

Specific recommendations for improved stormwater drainage and site design follow. It should be acknowledged that not all of these techniques are appropriate on all development sites. Also, while it can be demonstrated that nearly all of these techniques are less expensive to implement than conventional development designs, there may be other tradeoffs such as aesthetic perceptions and maintenance needs

that should be considered. Detailed discussion of these approaches is provided in a number of NIPC publications, particularly *Reducing the Impacts of Urban Runoff: The Advantages of Alternative Site Design Approaches* (1997).

Natural Detention Basin Design, Management, and Maintenance

Natural detention basin designs incorporate features of natural wetland and lake systems, such as gradual shoreline slopes, a border of wetland and prairie vegetation, and areas of open water. In contrast, conventional designs feature dry bottoms or riprap-edged wet basins. Natural designs remove more stormwater pollutants than conventional wet and dry bottom basins, reduce nuisance goose populations, and can provide habitat for waterfowl, water insects, and amphibians.

To maximize the benefits of natural basin design, local officials should develop and adopt practices to manage and maintain the basins for optimal function. Maintenance and management guidelines have been developed by NIPC and the Butterfield Creek Steering Committee.

Natural Drainage Measures

Use of drainage swales, vegetated filter strips, and other natural drainage approaches—in contrast to storm sewers, lined channels, and curbs and gutters—will reduce runoff volumes and greatly enhance the removal of damaging pollutants from runoff water. Communities should strive to maintain the natural drainage system, including natural stream channels, wetlands, and floodplains.

Infiltration Practices

Infiltration practices encourage stormwater to seep into the ground rather than travel over the surface of the soil, and to recharge groundwater supplies that are essential to the health of many streams and wetlands. Where soils are sufficiently permeable, infiltration trenches and basins dramatically reduce surface runoff volumes and naturally recharge groundwater supplies. Mass site grading, which strips water permeable topsoil and compacts underlying soils, also should be minimized.

Permeable Paving

The use of permeable paving blocks is a recommended alternative for low traffic parking areas, emergency access roads, and driveways to increase infiltration and reduce runoff volumes and pollutant loads.

Permeable paving blocks (*Virginia Soil and Water Conservation Commission*.)

Natural Landscaping

Natural landscaping approaches utilize native plants, particularly wildflowers, prairie grasses, and wetland species, as an alternative to conventional turf grass and ornamental plants. Natural landscaping,

particularly appropriate in drainage swales and filter strips at the edges of roads and parking lots, can significantly reduce stormwater runoff by improving soil permeability, and reduce the maintenance needs of conventional turf grass landscaping such as mowing and irrigation. Natural landscaping also provides important localized habitats for birds and butterflies. This technique is discussed in greater detail in chapter 6.

Reduced Imperviousness via Alternative Residential and Parking Lot Designs

The area of impervious surfaces in a residential development can be reduced in several ways: utilizing narrower streets; reducing setbacks between streets and homes thereby reducing the length of driveways; and by reducing sidewalk widths. Impervious surfaces also can be reduced in parking lots by downsizing individual parking stalls, installing planting medians, sharing parking between adjacent users, adjusting peak demand assumptions, and banking raw land until parking demand builds.

Cluster Development/PUDs

Cluster development, described in chapter 3 of the guidebook, increases development density on portions of a development site to preserve natural features, sensitive habitats, and open space. This technique results in substantially less overall impervious area. Planned unit developments provide for greater flexibility in the site planning process, allowing the inclusion of many of the site design alternatives described above.

Maintenance Practices

In addition to these site design techniques, local governments can implement other programs to reduce the damaging effects of stormwater on aquatic ecosystems. For example, regular street sweeping in high traffic areas, particularly commercial districts, can substantially reduce runoff pollutants. Also, reducing the use of road salt, or substituting with less damaging chemicals, can reduce winter runoff impacts on sensitive wetlands, streams, and native prairies and woodlands. See the NIPC brochure, *Pavement Deicing: Minimizing the Environmental Impacts*, for more information.

Summary of Benefits

When used in combination on a development site, these techniques can substantially reduce both stormwater-related impacts and construction costs. Based on assessments of case studies in northeastern Illinois and other parts of the country, it is estimated that alternative stormwater drainage and site design approaches can:

- reduce stormwater runoff volumes by 20 to 70 percent (in comparison to conventional development);
- reduce runoff pollutant loads by 60 to 90 percent;
- reduce site development costs by $1,000 to over $4,000 per lot for residential developments, and by $4,000 to $10,000 per acre for commercial and industrial developments.

Other documented benefits of these approaches include reduced infrastructure maintenance and replacement costs, enhanced site aesthetics, improved property values, and greater flexibility of site design. These techniques also will lead to improved protection and enhancement of sensitive natural areas and the region's waterbodies for supporting a diversity of wildlife.

Keeping water clean is almost always cheaper than cleaning it up later.

Local Examples

Progressive Ordinances

Natural drainage has been the standard practice for most low density residential communities, such as the villages of Long Grove and Barrington Hills, as well as most of the unincorporated areas in northeastern Illinois. More recently, the concept of reducing runoff at the source has been explicitly incorporated into some local ordinances. For example, the Lake County Watershed Development Ordinance, which applies to all of the communities in Lake County, recommends a runoff reduction hierarchy to minimize impervious surfaces and soil compaction, and to maximize infiltration of runoff on the development site. The Ordinance also regulates floodplain development, and protects water quality by requiring buffers for streams, lakes, ponds and wetlands.

Innovative Site Designs

While conventional storm sewer drainage is still used in most developments, natural drainage has been successfully utilized on some higher density cluster developments, such as Prairie Crossing in the Village of Grayslake, the Fields in the Village of Long Grove, and Mill Creek in Kane County. At Prairie Crossing, roadside swales convey runoff to restored prairies which run between housing clusters. Filtered runoff is then discharged into polishing wetlands before it reaches a large detention basin, which doubles as a recreational lake.

Natural detention basin designs are becoming more common throughout the region. Some notable examples are projects recently constructed in the Butterfield Creek watershed in south Cook County. These projects include several wet bottom basins in the Southgate Commerce Center in the Village of Matteson; a detention lake and adjacent wetland "biofilter" at the Prairie Lakes commercial and office development in the Village of Homewood; and a retrofitted wetland basin in the Heather Hill residential subdivision in the Village of Flossmoor.

Suggested Reading

Best Management Practice Guidebook for Urban Development. D. W. Dreher and T. H. Price. 1992. Northeastern Illinois Planning Commission. Chicago.

Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. T.R. Schueler. 1987. Metropolitan Washington Council of Governments. Washington, D.C.

Draft Technical Policy Directive for Maintenance and Monitoring of Naturalized Stormwater Management Facilities Vegetated with Wetland and Prairie Plantings. Northeastern Illinois Planning Commission and the Butterfield Creek Steering Committee. 1999. Chicago.

Lake County Watershed Development Ordinance. Lake County Stormwater Management Commission. 1999. Lake County, Illinois.

Model Stormwater Drainage and Detention Ordinance. Northeastern Illinois Planning Commission. 1994. Chicago.

Nonpoint Source Pollution: A Handbook for Local Governments. J. Jeer, M. Lewis, S. Meck, and J. Witten. 1997. Planning Advisory Service Report Number 476. American Planning Association.

Pavement Deicing: Minimizing the Environmental Impacts. Northeastern Illinois Planning Commission. 1998. Chicago.

Reducing the Impacts of Urban Runoff: The Advantages of Alternative Site Design Approaches. D. W. Dreher and T. Price. 1997. Northeastern Illinois Planning Commission. Chicago.

Residential Stormwater Management. Urban Land Institute, American Society of Civil Engineers, and National Association of Home Builders. 1975.

Site Planning for Urban Stream Protection. T. R. Schueler. 1995. Metropolitan Washington Council of Governments. Washington, D.C.

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. It is estimated that over 90 percent of Illinois' original wetlands have been lost, and over 40 percent of the stream miles in northeastern Illinois have been degraded by channelization. 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. Except for large "public" waterways, the State of Illinois does not protect

streams and rivers from channelization and other destructive modifications, focusing instead only on flooding concerns.

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.

A 1993 study by the Illinois State Water Survey concluded that for every 1 percent increase in protected wetlands along a stream corridor, peak stream flows decreased by 3.7 percent.

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. Other recommended techniques are described in greater depth in other publications, notably the Chicago Wilderness publication *Restoring and Managing Stream Greenways: A Landowner's Handbook* (NIPC, 1998). 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*.

A number of NIPC publications, listed at the end of this chapter, provide additional useful information.

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 (see below);
- require *setbacks* for buildings and pavement; and
- prohibit direct discharges of untreated stormwater into existing wetlands.

If wetlands are not a significant resource in a community, stream protection can be addressed independently through the *Model Floodplain Ordinance*, developed jointly by the Illinois Department of Natural Resources and NIPC. This ordinance prohibits inappropriate uses in floodways, prohibits unnecessary modification of stream channels, requires mitigation for unavoidable activities, and requires a 25-foot buffer along all channels.

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.

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. A thorough discussion of appropriate buffer species is provided in the *Native Plant Guide for Streams and Stormwater Facilities in Northeastern Illinois* (NRCS et al, 1997). This reference provides detailed information on individual plant characteristics as well as plant suitability under various hydrologic and water quality regimes.

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 Illinois. These techniques are commonly labeled "bio-engineering" methods because they incorporate living plant material with structural practices, resulting in a living erosion control system.

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.

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, as evidenced in the recent development of the *Northeastern Illinois Regional Water Trails Plan*. Similarly, improving water quality in many streams and rivers has increased fishing activity. Other water-based recreational activities include nature study and hiking.

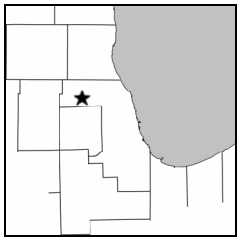
Aquatic habitat
Regionally, some of the most important species of flora and fauna are associated with streams, lakes, and wetlands. Furthermore, some upland fauna spend at least part of their life cycles using water systems, or depend on other organisms that do.

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

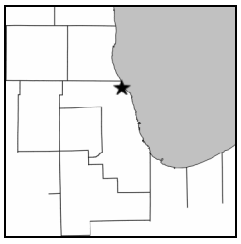
Village of Schaumburg



The Village of Schaumburg enacted a wetland protection overlay district as part of their zoning ordinance. The ordinance requires a special use permit for construction within the overlay district and establishes the conditions under which a permit may be granted if impacts on wetlands are minimized. The ordinance establishes development standards for construction proposed in, or within 100 feet of, a wetland, and requires a series of reports dealing with soil characteristics, site grading and excavation, hydrological controls, and vegetation.

Contact the Village of Schaumburg Department of Planning: 847/895-4500.

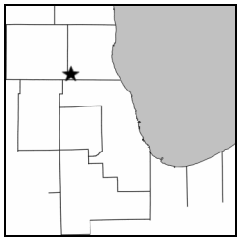
The Chicago Botanic Garden



The Chicago Botanic Garden in Glencoe recently created a twelve-acre buffer along a nearly one mile stretch of the Skokie River. The created buffer averages about 50 feet in width on both sides of the channel and consists of several "oxbow" wetlands and an evolving prairie community. Although the buffer is new, it has clearly transformed the landscape of the river corridor and greatly enhanced wildlife, water quality functions, and bank stability. The site is easily viewed from trails and internal roadways along the west side of the Garden property.

Contact the Chicago Botanical Garden: 847/835-5440

The Flint Creek Restoration Project



This project involved the stabilization of eroded streambanks in several communities in southwestern Lake County. Projects were implemented by four entities: the Villages of Barrington and Lake Zurich, the Lake County Forest Preserve District, and Citizens for Conservation (a local land conservation group). The restoration objectives were to stabilize eroding channel banks and to remove excessive debris and non-native trees and shrubs that were shading out understory vegetation and blocking flows. After clearing undesirable woody vegetation, a combination of "soil bio-engineering" techniques were installed to stabilize the streambanks. Treatments ranged from vegetative stabilization in the least severe erosion zones, to the installation of evolving techniques ("A-Jacks", "coconut fiber rolls", and "lunker" structures,) in combination with native vegetation and erosion blankets on more severely eroded banks. Installation was implemented by outside contractors, municipal staff, Forest Preserve District staff, and volunteers. All of the stabilized sites have successfully withstood severe flooding conditions.

Contact Northeastern Illinois Planning Commission, Natural Resources Department: 312/454-0400.

Additional Information

Federal and Illinois Clean Lakes Programs (FCLP, ICLP): Assists in pollution source identification and control, and restoration and protection of inland lakes. Illinois Environmental Protection Agency, Bureau of Water (217/782-3362).

Nonpoint Source Management Program: Assists in control of nonpoint source pollution, water quality improvement, and public education. Illinois Environmental Protection Agency, Bureau of Water (217/782-3362).

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).

Soil and Water Conservation: Assists and educates public for soil conservation, water resource conservation, and erosion control. County Soil and Water Conservation Districts or Illinois Department of Agriculture (see Appendix A for district office contact information).

Streambank Stabilization and Restoration Program (SSRP): Demonstrates vegetative and other low-cost bioengineering techniques for stabilizing streambanks. Illinois Department of Agriculture or County Soil and Water Conservation District Offices (see Appendix A for district office contact information).

Wetland Reserve Program (WRP): Assists in wetland restoration and protection. U. S. Department of Agriculture, Natural Resources Conservation Service county office (see Appendix A for contact information).

Wetland Weed Management: Illinois Department of Natural Resources provides logistical and biological support to local governments and agencies seeking to control purple loosestrife, an invasive wetland species. Illinois Department of Natural Resources, Natural History Survey (217/333-6830).

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.

6 NATURAL LANDSCAPING

Background

The predominant landscaping material of the Chicago region is the turf grass lawn. The lawn is borrowed from the heavily grazed, short grass pastures and formal gardens of Europe, and provide not only aesthetic appeal but recreational space as well.

Despite the popularity of today's heavily manicured landscapes, ecologists have described them as virtual deserts with respect to biodiversity. A monoculture of turf grass precludes native plant species. It also offers little habitat for indigenous birds and butterflies that are desired by many urban residents. Introduced grasses, such as Kentucky bluegrass, also do not thrive as well-kept lawns without considerable effort, because they prefer the cool, damp climate of their origin. Turf grass requires irrigation, frequent mowing, fertilizer, pesticides, and herbicides. This maintenance is not only expensive but also contributes to adverse environmental impacts, including air and water pollution.

This modern landscape contrasts sharply with the predominant landscape prior to European settlement. Then, prairies were interspersed with woodland, savannas, and wetlands. Hundreds of species of plants could be found on every acre of land.

Now there is a growing interest in the use of native plants in landscaping. Known as *natural landscaping*, this movement is fueled in part by concerns over the high costs and environmental impacts of the modern landscape. Natural landscaping offers particular benefits in protecting and restoring biodiversity, because it attracts native animals, including colorful butterflies and moths and an array of songbirds. It also can serve as a buffer for sensitive natural areas and can be used to connect adjacent habitat areas via vegetated greenways.

> *"If suburbia were landscaped with meadows, prairies, thickets or forest, or with combinations of these, then the water would sparkle, fish would be good to eat again, birds would sing and human spirits would soar."*-Lorrie Otto, Wild Ones Natural Landscapers, Ltd.

Another value of natural landscaping is the protection of downstream wetlands and waterbodies. This is accomplished, in part, by the deep, extensive root systems of native plants that (1) improve the infiltration and filtering of precipitation and stormwater runoff, and (2) hold soil in place, thus greatly reducing erosion and siltation of waterbodies. Stands of native vegetation also require relatively low inputs of chemical control agents—no fertilizers or pesticides, and minimal herbicide once established. Thus natural landscaping leads to improved water quality and the stabilization of runoff in comparison to conventional landscapes.

Recommended Approaches

Local governments can do a number of things to promote natural landscaping. Potential local actions range from encouraging the use of native plants for landscaping private properties and new development, to protecting existing native vegetation and trees, to utilizing natural landscapes on public properties. The actions, summarized below, are described in much greater detail in NIPC's *Natural Landscaping for Public Officials: A Sourcebook* (1997).

Encourage the Use of Native Plants for Private Landscaping

In many communities, the conventional turf grass landscape has been virtually mandated by local weed and landscaping ordinances. Even where residents desire to implement more natural landscapes, they are discouraged or prohibited. In these circumstances, the first step is to revise the community's weed ordinance to allow natural landscaping. NIPC's *Natural Landscaping Sourcebook* provides guidance on revising weed ordinances to encourage compatible natural landscaping, including model ordinance language. This guidance encourages property owners to communicate their landscaping plans with neighbors, to manage natural areas to avoid "weedy" conditions, and to provide setbacks between natural landscapes and property lines.

Natural landscaping also can be encouraged or required for certain components of new development or redevelopment. In particular, natural landscaping should be required in drainage swales, around detention basins, and along the edges of streams, lakes, and wetlands.

Other potentially important sites for the establishment of natural landscapes and habitats are institutional sites (such as hospital grounds), commercial and industrial sites (especially industrial and office parks), houses of worship, and senior housing complexes. Privately owned golf courses and parks also should be encouraged to use natural landscaping. Agricultural land also can benefit from natural landscaping for windbreaks, swales and other uses.

Protect Existing Native Trees and Other Native Vegetation

A number of communities have instituted tree protection ordinances that require certain species of trees and/or trees larger than a specified size to be protected by property owners and developers. Such ordinances could be further tailored to biodiversity protection purposes by specifying native trees for preservation. They also can provide for the control of invasive tree species in the restoration and management of natural oak woodland, wetland, and prairie habitats.

Some communities require broad protection of other native plant communities for their habitat and biodiversity values. Such requirements stipulate that native prairies, wetlands, and woodlands must be preserved and managed to retain their plant diversity. Additional discussion of this approach is presented in the chapter on stream and wetland protection.

Utilize Natural Landscapes on Public Properties

Local governments can effectively promote the use of natural landscaping by using it on public properties. This can be done by municipalities, school districts, park districts, and highway departments.

Municipalities can use native vegetation around buildings and parking lots to enhance aesthetics, reduce maintenance costs, and reduce stormwater runoff. Municipalities also can use native vegetation to remediate landscaping and erosion problems along stream channels and detention basins, as well as along highway and road parkways, ditches, medians, and vacant meadows and open areas. The various types of rights-of-way, such as utility corridors, provide good locations for the use of native landscapes. Using natural landscaping in these corridors can help provide habitat continuity and linkages important for species propagation and survival.

School districts and park districts are increasingly incorporating natural landscaping into their properties. In addition to aesthetic and maintenance benefits, establishing prairies and wetlands provides a unique educational vehicle to convey ecological and natural history concepts. Maintenance of natural landscapes also provides a hands-on opportunity for students and volunteers to interact with natural processes.

Provide for Maintenance

Natural landscapes require much less maintenance than conventional lawns. Once established, natural landscapes do not require regular mowing, watering, fertilizer, or pesticides. Prairie or wetland landscapes are best managed by prescribed burning, typically every one to three years, which controls most invasive weeds and stimulates native plant diversity. The services of a qualified professional should be sought for burning and an Illinois EPA permit is needed as well. Fire-breaks and setbacks from buildings are important to ensure safety. With these precautions, prescribed burning is now a commonly applied technique throughout the region. Where natural landscaping is applied on very small sites, such as residential lawns, burning may not be appropriate. In these settings, infrequent mowing and hand weeding are recommended.

Provide Public Education

Local governments should provide information about natural landscaping to citizens, business owners, developers, and civic organizations. Important topics include environmental benefits, landscape setbacks at property lines, and prescribed burning. The educational effort also can include demonstration projects. NIPC's *Natural Landscaping Toolkit* (1997) was developed with this purpose in mind.

Establish a Sense of Place

Many municipalities in the region are named after specific natural features that either used to exist or still exist in the landscape of northeastern Illinois. For example, Long Grove, Oak Park, and Hawthorne Woods presumably were named for landscape features with which early residents identified. These place names provided an identity and a sense of place for the towns and villages that grew up near these

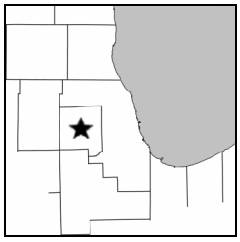
features, an identity that today is probably less evident. Such names could be used as the impetus to reestablish the native landscape as a unique amenity for the community.

Summary of Benefits

- *Low maintenance cost.* Natural landscapes require much less time, money and effort to maintain once they are established. Long term needs for irrigation, fertilizers, pesticides and herbicides are virtually eliminated. Instead, controlled burning or mowing may be needed every one to three years.
- *Wildlife habitat and biodiversity protection and restoration.* Natural landscaping protects and restores habitats for wildlife. The introduction of native plants can enhance the populations of birds, insects, and animals which are essential components of healthy ecosystems.
- *Conservation education and scientific study.* Natural landscaping puts people in touch with nature close to home, work, and other nearby locations. Municipalities, school districts, park districts, and forest preserve and conservation districts can use natural landscaping as an educational and environmental monitoring tool.
- *Beautification and property enhancement.* Natural landscaping provides aesthetic richness with seasonally changing color and texture that significantly contributes to the beauty of sites and communities.
- *Creation of a distinctive community image.* High quality natural features such as river corridors and woodlands strengthen the identity of a community or neighborhood. Distinctive natural landscaping that preserves the unique characteristics of a community is a unique community asset.
- *Reduced cost of stormwater management*. Natural landscaping slows and reduces the amount of stormwater runoff and enhances infiltration. This helps reduce infrastructure costs and downstream flooding, and replenishes groundwater. Stormwater conveyance and detention facilities that replicate natural systems are generally less expensive to build and almost always more economical to maintain.
- *Reduced soil erosion.* Native plants appropriately used on sloped sites, stream banks, drainageways, and shorelines can effectively hold the soil and reduce erosion due to their deep and fibrous root systems. The initial cost and long term maintenance costs are less expensive than traditional hard engineered structures such as rip rap.
- *Improved water quality.* Native vegetation in drainageways enhances the infiltration of contaminated stormwater. Vegetated buffers along streambanks and shorelines intercept surface runoff and subsurface water pollutants. The reduced use of fertilizers and other chemicals is also an important factor in protecting water quality and public health.
- *Passive recreation.* Natural landscapes are ideal locations for bird watching, photography, walking and hiking, and simply enjoying the quiet and beauty of nature.
- *Other environmental benefits.* Due to greatly reduced reliance on lawn mowers for maintenance, natural landscapes can reduce noise pollution and air pollution, including greenhouse gases.

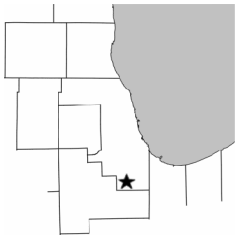
Local Examples

DuPage County Government Center



DuPage County has begun a natural landscaping project on 10 acres of the 57-acre DuPage County Government Center. The site contains most of the county offices in a traditional landscape containing an artificial pond as a detention facility. More than 50 species of native grasses and wildflowers were planted on the existing berms along Manchester Road and on about three acres east of the county courthouse. The riprap-lined detention basin also has been retrofitted with a naturalized shoreline. The county plans to consider extending the natural landscaping to a substantial portion of the 57-acre site. Contact DuPage County Facilities Management Department: 630/682-7363.

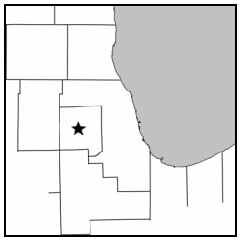
Matteson Village Hall and Green



The Village of Matteson has built a new Village Hall and Green, a six-acre, multi-use site that will eventually include residential, office, and retail space. The new development is sensitive to the environment, utilizing a planning concept called sustainable design. This concept combines landscape and building design that is more conscientious of the natural environment. Landscaping on the green will be reminiscent of the midwestern prairie landscape including native prairie grasses and wildflowers that require less maintenance and are more resilient to weather changes than other types of landscaping. The new Village Green also will incorporate expansive parkland, ponds, walkways, benches, natural areas to buffer street traffic, and an amphitheater, plaza, and gathering place for concerts and public events.

Contact the Village of Matteson: 708/748-1559

Wheaton Warrenville South High School



Addressing many issues simultaneously, Wheaton Warrenville South High School began incorporating native landscape treatments into their school grounds in 1995. The school had several goals: to reduce maintenance on unused lawn areas and time demands on limited staff; improve overall aesthetics; restore native habitats; and more importantly, create a living laboratory for hands-on environmental education. The project consultant developed a master plan which identified appropriate zones for the re-introduction of various prairie community types and incorporated requested outdoor classroom elements.

During Earth Day week in April 1995, students successfully installed the first phase of the master plan, approximately 2.5 acres of upland mesic and wet prairie plantings. Students and staff are the stewards responsible for establishing and managing the emerging natural plant communities, including the restoration of an adjacent emergent wetland system. The campus' first burn occurred in the spring of

1996. Given the positive feedback from students, staff, parents, and the surrounding community, subsequent phases are being considered for installation.

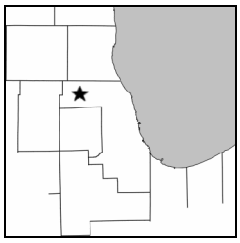
Contact Wheaton/Warrenville South High School: 630/682-2120.

Natural Landscaping in the Right-of-Way

Both the Illinois Department of Transportation and Commonwealth Edison have used native plants along their rights-of-way. Prairie plants are used in a number of locations in the Chicago area. Commonwealth Edison also has a voluntary stewardship program that encourages their employees, families, and friends to participate in prairie restoration efforts.

Contact the Commonwealth Edison Department of Environmental Services (312/394-4447) or the Illinois Department of Transportation (847/705-4000).

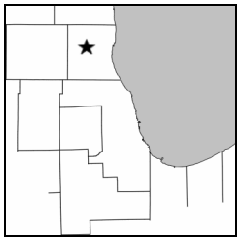
Sears Corporate Headquarters, Village of Hoffman Estates



An initiative by the Sears Corporation at their Prairie Stone Business Park has incorporated native plants into the landscape in ornamental as well as functional ways. Natural landscaping is used in key entrances and highly visible common areas. It also is a critical element of the stormwater management plan, which uses native plants in detention basins and swales to filter and reduce the amount of stormwater that runs off the property. Following this initiative, the Village of Hoffman Estates adopted a landscape ordinance allowing native landscape installations under certain circumstances. This is a modification of the earlier municipal code that restricted landscape groundcovers to a maximum of 12 inches.

Contact the Prairie Stone Business Park: 847/645-1900.

Prairie Crossing, Village of Grayslake



Prairie Crossing is an innovative, large scale, clustered residential development in which natural landscaping is a major design component. Nearly 175 acres of native prairies and wetlands are being restored through and around the residential areas of the development. These areas, in addition to their habitat and aesthetic benefits, serve as part of an alternative stormwater management system that uses the natural functions of these systems to cleanse stormwater.

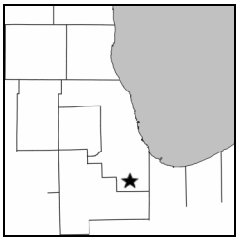
The Prairie Crossing project demonstrates its commitment to public education by providing a handbook, "Living with Nature," and numerous educational opportunities for residents throughout the year. Homeowners are educated regarding the environmentally progressive aspects of the development and are encouraged to minimize use of chemicals, landscape with native plants, and minimize lawn area. A community supported garden program provides additional opportunities to involve homeowners with natural resources and develop a greater understanding and appreciation for natural landscaping.

The environmentally friendly development design has provided other important benefits including infrastructure savings of several million dollars, lower maintenance costs, resident involvement, local and national media attention, and wildlife use of the open spaces and restored landscapes.

Zoning and regulatory approval for the project was greatly expedited by the overall conservation focus. Although many construction details and plans required long and arduous negotiations, including the stormwater management scheme, the local community and public officials were ultimately supportive of alternative strategies for landscaping and stormwater management.

Contact Prairie Crossing Environmental Team: 847/548-4062.

Olympia Fields Country Club, Village of Olympia Fields



Golf courses are a major land use in metropolitan areas, and one where conversion from traditional to natural landscaping can have very positive and highly visible impacts. Olympia Fields Country Club has taken a number of significant actions to incorporate natural landscaping into their plans. These include:

- controlling erosion of streambanks and pond edges with native vegetation;
- re-establishing prairie and savanna vegetation;
- planting native trees and woody understory from locally collected seed;
- removing invasive non-native species including honeysuckle, buckthorn, burdock, and garlic mustard; and
- using prescribed burning for prairie and savanna areas.

The club also has established an environmentally-sensitive fertilizer and pesticide program, and has been certified by the National Audubon Society as a cooperative wildlife sanctuary.

Contact Olympia Fields County Club Grounds Department: 708/748-0580.

Suggested Reading

Native Plant Guide for Streams and Stormwater Facilities in Northeastern Illinois. U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers. 1997.

Natural Landscaping for Public Officials: A Sourcebook. Richard Mariner, et al. 1997. Northeastern Illinois Planning Commission.

Tallgrass Restoration Handbook. S. Packard. and C.F. Mutel, eds. 1997. Island Press, Washington, D.C.

Tool Kit on Natural Landscaping. Northeastern Illinois Planning Commission. Chicago. (The *Tool Kit* contains a poster brochure and slide collection, in addition to the *Sourcebook* listed above.)

United States Environmental Protection Agency Website: www.epa.gov/greenacres.

Wild Ones Handbook. Wild Ones—Natural Landscapers, Ltd. 1998. Appleton, Wisconsin.

Wild Ones New Member Handbook. Wild Ones—Natural Landscapers, Ltd. 1999. Appleton, Wisconsin.

Wild Ones—Natural Landscapers, Ltd. Website: www.for-wild.org.

7 IMPROVED WASTEWATER MANAGEMENT

Background

Historically, inadequately treated municipal and industrial wastewater was a major contributor to the degradation in the region's streams and rivers. Many of our waterways were unable to support healthy ecosystems or recreational uses such as fishing and swimming. Even non-contact uses such as boating and streamside hiking were limited by objectionable debris, sediment, and odors.

As a result of the federal Clean Water Act, tougher regulations in the 1970s and 1980s dramatically reduced wastewater pollution. These improvements have led to the revival of some fish communities and the return of canoeists to rivers like the Fox, Des Plaines, and Chicago.

Despite these improvements, however, most of our suburban and urban streams and rivers still do not meet the goals of the Clean Water Act to provide "fishable and swimmable" conditions.

More specifically, our urban streams and rivers do not have the ecological health and vitality of their rural counterparts. Some of the reported problems include fewer species and numbers of fish; lack of game fish that are sensitive to pollution, such as smallmouth bass; and contamination of fish flesh with pollutants like heavy metals that make them unsafe for consumption.

Currently, much of our water pollution comes from sources such as stormwater runoff. Yet, wastewater discharges still contribute to water quality problems according to assessments conducted by the Illinois EPA and others. These continuing wastewater-related problems are linked to several factors. Some of our more urban waterways are unable to dilute even highly treated discharges, resulting in problems like low dissolved oxygen levels that are damaging to aquatic life. Some treatment plants do not reliably produce a high quality effluent, either because they are overloaded with new sanitary connections or because their designs are inherently less reliable. This problem is common for small treatment plants (e.g., "package plants"), and its impacts are particularly damaging in low flow, high quality streams. Also, during wet weather, some "leaky" sewer systems become overloaded with stormwater resulting in sewage overflow into waterways. Another problem is the weakness (or absence) of water quality regulations for some pollutants such as phosphorus, which contributes to undesirable algae growth in many of our lakes and slow moving rivers and streams.

Some of the solutions to these problems will involve improved regulation at the state and federal level, which are beyond the scope of this guidebook. However, some actions can be taken locally, often at little or no cost, to protect and improve the aquatic life of the region's streams and lakes. The responsible parties for these actions may include one or a combination of municipalities, counties, sanitary districts, and private utilities.

Recommended Approaches

There are several strategies that wastewater treatment authorities should consider to both reduce the adverse effects of existing discharges and to minimize the impacts of new or expanded facilities. The philosophy behind the recommended approach is based on the following criteria.

- New or expanded discharges to low-flow or high-quality waterbodies generally should be avoided.
- Treatment facilities should be designed to ensure consistent, high quality effluent, and effluent should be diverted away from high quality stream segments to less sensitive receiving waters.
- Treatment plant effluent should be utilized as a resource and not simply viewed as a waste product.

Effective Wastewater Facility Planning

Before recommending any new facilities or expansions, wastewater authorities commonly develop facility plans to evaluate cost-effective options. A primary consideration in developing a wastewater facility plan is to coordinate its development with county and municipal comprehensive plans. As discussed in the comprehensive land use planning chapter, effective planning should be proactive in anticipating future development, not reactive in responding to immediate development pressures.

Facility plans also should fully evaluate water quality impacts on receiving waterbodies. This is particularly important for discharges to low-flow and high-quality waterbodies, because even minor or short-term disruptions in effluent quality can have severe effects on fish and other aquatic organisms. Alternative approaches are warranted in such circumstances.

Where practical, new or expanded discharges should be avoided. The first alternative to be considered in the facility plan is service by an existing treatment facility. For example, if wastewater can be routed to a facility that discharges to a large receiving stream instead of creating a new discharge to a small stream, then the existing facility should be given preference. A related alternative is to route the new or expanded discharge to a waterbody that can assimilate a greater volume of effluent without damage. Generally, a large stream or river is preferred to a small stream, pond, or lake.

If a new or expanded discharge to a low-flow/high-quality waterbody can not practically be avoided, then special facility designs should be implemented to ensure effluent reliability. For example, redundancy (e.g. two or more treatment units side by side) should be built into critical process designs to ensure the availability of at least one operational unit if another malfunctions. Also, designs with proven reliability, such as oxidation ditches, should be selected over less reliable designs, such as mechanical package plants. Operationally, it may be reasonable to require that a certified operator is present at all times even for a small facility that would normally require only part-time operation.

Other alternatives that should be evaluated are discussed below. In evaluating these alternatives, cost-effectiveness should be weighed against predicted water quality and stream use benefits.

Regional Treatment

Regional treatment involves the construction of one facility in a circumstance where two or more facilities might otherwise have been constructed. Regional approaches can result from coordination of two or more local governments, or from merging multiple facilities within a single governmental jurisdiction.

The regional approach to wastewater treatment yields a number of advantages.

1. Larger, regional facilities operate more effectively and produce a more reliable, high-quality effluent. This benefits aquatic life and water quality.
2. Regional facilities serve larger drainage areas. This can allow more flexibility in locating the facility and discharging to a location that can more effectively assimilate the effluent.
3. Due to economies of scale, constructing and operating a larger facility can lead to cost savings.
4. A regional approach allows wastewater service areas to follow watershed boundaries rather than arbitrary political boundaries. This enables more efficient, less costly conveyance of wastewater.

Northeastern Illinois has a long history of regional treatment approaches. Some of the most successful examples are the sanitary districts that serve multiple communities, particularly in Cook, DuPage, Kane, and Lake counties. County public works departments also have provided regional treatment, notably in DuPage and Lake counties. Examples of individual communities that have joined together to cooperatively operate regional facilities are the arrangements between Naperville and Warrenville, Lombard and Glen Ellyn, and Frankfort and Tinley Park.

Wetland Polishing

A potentially inexpensive technique to improve the performance and reliability of wastewater treatment plants is to route the treated discharge through a "constructed" wetland before it reaches the stream. The benefits of wetlands in filtering and transforming pollutants are well documented, and wetlands have been effectively utilized throughout the country in treating, or *polishing*, wastewater. A properly designed wetland can improve effluent quality and can treat certain pollutants, like phosphorus, that are not effectively removed by conventional treatment plants.

The feasibility of utilizing this technique depends on the type and amount of available land at or near the treatment plant site. The simplest application of this approach is to eliminate the underground discharge pipe that conveys effluent to the receiving stream and direct the flow across the floodplain. Some minor grading will be necessary to establish a shallow, meandering flow path to the stream. The wetland treatment zone should be vegetated with native plants. This approach might actually save money for new discharges since it eliminates the need for a discharge pipe across the floodplain.

Where adequate resources and land are available, a more formal wetland design is recommended. The design should be based on factors such as the rate of wastewater discharge and the necessary flow-through time in the constructed wetland to meet treatment objectives. Several design options are possible including a broad, meandered wetland swale, and spreading the effluent across the width of a wetland. Alternately, the discharge flow could be routed to an existing low habitat quality wetland or a restored wetland offsite. The U.S. Environmental Protection Agency is a good source of information on the design of treatment wetlands. (See *Constructed Wetlands for Wastewater Treatment and Wildlife Habitat* (USEPA, 1993), located at its website: www.epa.gov/owow/wetlands/construc/.)

Since the principal objective of this technique is to protect aquatic habitat, the use of existing high quality wetlands for treatment should be avoided. Also, a permit must be sought from the U.S. Army Corps of Engineers if any construction in a wetland is planned. Ideal sites for wetland treatment include highly degraded or drained wetlands in the floodplain that can be inexpensively modified. In these

situations, the introduction of treated wastewater and the long-term management of the plant community in the wetland should both protect downstream water quality and enhance the functions of the treatment wetland.

"*The Village is proud of our regional plant and believe polishing wetlands should be considered with any new plant*."
-Howard Sloan, Assistant Village Administrator, Village of Frankfort.

Wastewater Reuse

Another potentially inexpensive technique to reduce the impacts of treated wastewater is to reuse it before it is discharged to a waterbody. At least two options are possible. One is to divert the treated wastewater and associated pollutants for use in landscape irrigation (see also *Land Application* below). Irrigation may be feasible if there are open spaces near the treatment plant that need irrigation water, such as golf courses, parks, or office campuses. Aquatic life is protected because diversion for irrigation will occur mostly during hot and dry weather conditions when the receiving stream or lake is most susceptible to pollutant loadings. A portion of the irrigation water will return to the waterbody after being cleansed by the soil, some will recharge groundwater supplies, and some will be absorbed and used by vegetation.

The other option is to reuse treated wastewater for "gray water" purposes, such as flushing toilets. While this option has been more widely employed internationally and in arid regions of the U.S., it is not yet widely utilized in this region. The benefits of this reuse option are that it reduces both the effective wastewater discharge and the demand for potable water.

Land Application

Except for employing conventional secondary wastewater treatment components, land application of wastewater is radically different from conventional treatment and discharge. While conventional approaches employ tertiary treatment techniques and discharge the effluent to a surface waterbody, land treatment utilizes the soil as a tertiary treatment device and eliminates any direct discharge to surface water. Land-applied wastewater percolates into the ground where it can either replenish deeper groundwater aquifers or slowly return to the surface drainage system as baseflow. The treated wastewater that eventually reaches streams or lakes is largely cleansed of residual pollutants.

Land treatment alternatives require fairly large tracts of open space to accommodate seasonal storage basins and irrigation plots. However, the open space necessary for land application can accomplish additional objectives, such as recreation, habitat, and stormwater management. Land treatment is potentially an ideal complement to clustered residential development or office campuses that have large green spaces. The amount of area needed for land treatment systems is largely a function of soil permeability and slope.

Summary of Benefits

Water quality: Alternative wastewater management techniques benefit water quality in several important ways. Improved planning and regionalization can eliminate potentially damaging discharges to sensitive waterbodies. Innovative treatment technologies such as wetland polishing or land application can improve the reliability of treatment and reduce the pollutant loading of components like phosphorus that are not well-controlled with conventional technologies.

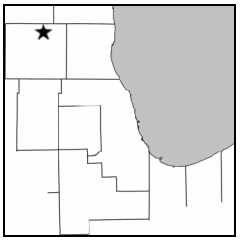
Hydrology: Conventional wastewater discharges can radically alter the natural flow rates and water temperatures of waterbodies, particularly small streams and rivers. Some biologists have argued that these changes (e.g., the fact that urban streams and lakes rarely freeze in the winter) can seriously upset the aquatic ecology. Techniques such as land application and wetland polishing can reduce these effects by "naturalizing" both flow rates and water temperatures.

Groundwater recharge: Land application and irrigation of treated wastewater replenishes groundwater aquifers with cleansed water. Using wastewater as a resource is preferable to treating effluent as a waste product, as in conventional surface disposal methods.

Cost savings: Effective wastewater facility planning and construction of regional facilities can lead to substantial savings, both in construction and long-term operating costs. Similarly, innovative techniques such as land application and wastewater reuse can result in significant savings in infrastructure costs in many circumstances.

Local Examples

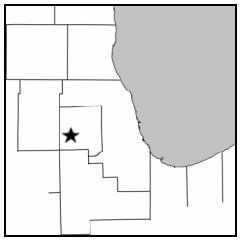
Richmond Wastewater Facility Planning Study



The Village of Richmond in northern McHenry County straddles Nippersink Creek, one of a handful of class A streams in the region and home to two threatened species of mussels. The existing treatment facility is an old package-style mechanical plant that is difficult to operate and prone to upset. Recognizing the need to upgrade and expand this plant, the Village hired a multi-disciplinary team of consultants to prepare a wastewater facility plan. Also, at the urging of local conservation groups, the Village assembled an advisory committee of local and regional environmental experts to recommend alternative approaches and assess the plan's effectiveness in protecting the unique high quality habitat of Nippersink Creek. The resulting plan calls for a new tertiary treatment facility utilizing the highly reliable oxidation ditch technology. The plan also evaluated land treatment, wetland polishing, and reuse options to better ensure protection of the stream. It concluded that reuse of effluent for gray water and irrigation was the most feasible and effective approach. In addition to wastewater considerations, the Village adopted a number of NIPC model ordinances for improved stormwater and floodplain management, erosion control, and stream and wetland protection. Its comprehensive plan also calls for cluster development and setting aside the entire stream corridor as public open space.

Contact the Village of Richmond: 815/678-4040.

Naperville/Warrenville Wastewater Regionalization



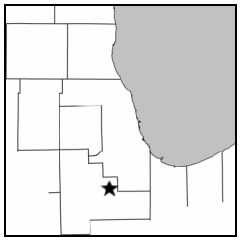
In the 1970s, the City of Naperville operated three treatment plants and the City of Warrenville operated one plant, all of which discharged into the West Branch of the DuPage River. Naperville initiated engineering assessments demonstrating that constructing a new regional treatment facility downstream of town would be much less expensive than upgrading existing facilities and would provide adequate land for future expansion. Naperville purchased the Warrenville facility and its service area and constructed an interceptor sewer connection to its new Springbrook Water Reclamation Center. Approximately 25 years later, the Naperville Springbrook Water Reclamation Center consistently discharges a high quality effluent to the DuPage River. As a result, the intervening stretch of the West Branch of the DuPage has improved from a C class stream to a B class stream, and it even supports a growing population of smallmouth bass. The renowned Naperville Riverwalk has benefited from improved water quality, drawing hundreds of thousands of visitors annually.

The City of Naperville Department of Public Utilities currently is planning to construct an approximately 20-acre designed wetland at its Springbrook facility. The wetland facility would consist of a one-half mile long series of shallow and deep interconnecting ponds that would receive the treated effluent from the 30 million gallons per day treatment facility before eventual discharge to the DuPage River. The designed wetland would be planted with appropriate vegetation, creating a wildlife, waterfowl, and bird sanctuary. A planned city-wide bicycle trail system would pass between and through the wetland and the river, providing opportunities for nature viewing including an observation mound and wooden walkways.

Besides the public recreational and educational benefits, the designed wetland will provide for some nutrient removal from the Springbrook effluent as well as stormwater storage.

Contact the City of Naperville: 630/420-6131.

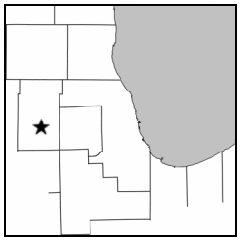
Frankfort Wetland Polishing System



The Village of Frankfort applied for a wastewater facility planning amendment in 1994 to construct a regional treatment facility and upgrade its west treatment plant. Because this facility would ultimately discharge 3 million gallons per day to Hickory Creek, one of the higher quality aquatic ecosystems in the region, NIPC recommended that the Village evaluate the construction of a wetland polishing system to ensure a consistent, high quality effluent. After concluding that this option was feasible, the Village constructed an 8-acre wetland area adjoining their regional plant. This constructed wetland conveys the treated effluent from the regional plant via a series of shallow wetland ponds and swales. The wetland site is partially owned by the Forest Preserve District of Will County and managed by the Village. The restored wetland and adjacent trail system routinely attract local residents, including local high school students who are proposing to incorporate wetland monitoring into their environmental science curriculum.

Contact the Village of Frankfort: 815/469-2177.

Mill Creek Land Treatment System



The more than 1500-acre Mill Creek development in south-central Kane County incorporates many elements of conservation design recommended in the Kane County *2020 Land Resource Management Plan*. Design elements include clustering, a 40 percent open space set-aside, greenway dedication to the Kane County Forest Preserve District, and naturalized stormwater management practices. These were recommended because the Mill Creek development is located in the County's "critical growth" area and straddles Mill Creek, a relatively high quality tributary of the Fox River. Consistent with the conservation design theme, the development incorporates a land application system for wastewater disposal, thus avoiding the need for a conventional treatment plant with a surface discharge to Mill Creek. When the development is complete, approximately 650,000 gallons per day of wastewater will be applied to 167 acres of the local golf course.

Contact the Kane County Development Department: 630/232-3484.

Suggested Reading

Constructed Wetlands for Wastewater Treatment and Wildlife Habitat. U.S. Environmental Protection Agency. 1993. Washington, D.C. (located at website: www.epa.gov/owow/wetlands/construc/.

Guiding Principles for Constructed Treatment Wetlands: Providing Water Quality and Wildlife Habitat (Final Draft). U.S. Environmental Protection Agency. 1999. Washington, D.C. (located at website: www.epa.gov/owow/wetlands/constructed.html.)

Water Quality Management Plan Amendment Process and Procedures. Northeastern Illinois Planning Commission. Updated June 1996. Chicago.

8 OPEN SPACE PRESERVATION

"The need for breathing spaces and recreation grounds is being forced upon the attention of practical men, who are learning to appreciate the fact that a city, in order to be a good labor-market, must provide for the health and pleasure of the great body of workers." -Daniel Burnham, *Plan of Chicago*, 1909.

Background

The rapid loss of plant and animal species can be largely attributed to the loss of habitat due to the conversion of natural areas to other uses such as agriculture or homes. Thus, one important technique for protecting biodiversity is to prevent the conversion of remaining habitat. One of the most direct and effective means of protecting the land and water necessary for the survival of a wide diversity of species is for public entities and conservation organizations to acquire large tracts of property or development rights to property. Across the nation, publicly-owned land is by far the greatest repository of valuable habitat and species diversity. Land owned by private conservation organizations is growing daily.

The rationale for increased open space preservation is simple: as the area of protected land and water increases, the variety of habitats that are protected increases as well. Protection of a greater variety of habitats results in the protection of a greater variety of wildlife species that depend on those habitats. While this relationship will generally hold true when many small natural areas are protected, large contiguous natural areas are more beneficial to wildlife than many small ones, as discussed in the section on biological and ecological principles.

Thanks to the efforts of forest preserve districts and conservation district in our region, over 142,000 acres of land have been preserved as public open space by these entities alone. Also, these entities are continuing to acquire natural areas in response to strong public demand for additional preserves.

Park districts also have acquired a significant amount of land, typically for active recreational uses such as ball fields and picnic areas. While they provide a tremendous public amenity for a great number of people, parks that are largely covered with turf grass do not contribute a great deal to biodiversity and habitat protection. Park districts can contribute to the biodiversity protection effort by complementing their traditional acquisitions with more natural areas and by converting some of their manicured landscapes to native vegetation.

A shift in the direction of acquiring and managing more natural areas can provide important benefits to park districts. First, the goal of providing recreational space can be met because natural areas are destinations for many passive recreational activities such as hiking, bird watching, and photography, as well as for active recreation such as canoeing and fishing. Furthermore, these recreational activities require less maintenance and management of properties, thereby saving the park districts money. Natural areas also provide aesthetic benefits and a sense of identity for a community, enhance property values of surrounding residences, and can benefit the community by providing areas for stormwater retention and flood control.

Although public land acquisition techniques are stressed here, the importance of the actions of private property owners in protecting biodiversity should not be overlooked, and should be encouraged by local governments. Local land conservation organizations are another very useful source of assistance and information. Additional information is provided in the sections below on *Funding Preservation Programs* and the appendices. Excepting eminent domain, all of the techniques can be applied or amended for use by private property owners.

"By preserving open space we fashion a richer, greener, more complex infrastructure that makes cities more appealing places to live. This, in turn, will reduce the pressure to bulldoze economically valuable farmland and natural areas on the urban fringe."
-William Moorish, Director of the Design Center for American Urban Landscape at the University of Minnesota.

Recommended Approaches

Generally, preservation techniques fall into two categories. The first is fee simple ownership, in which the land itself is purchased or donated, along with all of the rights that are normally associated with land ownership. Once a government entity assumes ownership, it controls development, redevelopment, preservation and access, and can manage the land in accordance with its biodiversity protection goals. The second type of acquisition allows certain rights, usually the right to develop, to be removed from a parcel of land and retired. Ownership of the land itself does not change under this type of program.

Local governments in Illinois wield a great deal of power and control in protecting open space and associated wildlife and natural area values. This section first describes a simple process for an acquisition program, and follows with specific techniques for acquiring land and property rights, as well as ideas for funding these acquisitions.

1. **Identify** non-protected areas within the community that present opportunities for preserving natural areas, habitats of threatened and endangered species, or areas with potential to be restored to a previous natural condition. Preliminary identification should be made in the community's or park district's comprehensive plan. Also consider the importance of greenways and connecting open spaces, and the utility of small but optimally-located patches.
2. **Prioritize** these areas using criteria that maximize biodiversity and community benefits. Valuable assistance can be provided by the U. S. Fish and Wildlife Service, Illinois Department of Natural Resources, or the county forest preserves or

conservation districts. Criteria for prioritization should include lands and waters that harbor significant habitat and threatened and endangered species, critically situated lands with important restoration potential, and lands that adjoin high-quality habitat. Areas that contribute to natural area networks and connect with forest preserve and conservation district lands also should be considered high priority. Sites that meet multiple objectives, such as biodiversity protection, restoration and passive recreation should be prioritized as well.

3. **Preserve** the highest priority areas using available resources and techniques that are described below. Realizing that acquisition programs are often expensive, governments may choose to encourage landowners to cooperate with private or non-profit organizations to achieve conservation objectives. Rapidly developing communities should acquire open space while land is still readily available.

Dedications/Donations

One common acquisition technique is requiring developers to dedicate a specific amount or percentage of the development site as a condition of development permit approval. Alternately, cash in lieu of land may be required, to be used to purchase land elsewhere. In the 1960's, the Illinois Supreme Court upheld a Naperville ordinance requiring such a dedication, thereby setting a legal precedent for other municipalities to do the same (*Naperville v Krughoff*).

Governments and park districts also can accept voluntary property donations or dedications from landowners. This can be accomplished in a number of ways and arrangements can be made to accommodate the needs of the property owner. For example, the landowner can designate that the land be dedicated after he or she passes away, and live on the land until then. Donations and dedications often include tax relief for the party donating the property.

Development Rights Acquisition

Rather than purchase the land outright, local agencies may choose instead to pay the landowner to restrict the land from certain activities. Commonly known as purchase of development rights, and also as conservation easements, this technique typically removes or limits a landowner's right to develop his or her property, and may provide them with a tax benefit. The landowner is compensated for the difference between the fair market value of the land and its potential development value, and retains ownership of the property. Though the land is restricted from development, it may be used for other purposes such as recreation or farming.

Illinois Nature Preserves: Illinois Nature Preserves can be established on properties that hold threatened or endangered species or especially high quality habitats. Local governments can encourage private landowners to apply for such designation through the Illinois Department of Natural Resources Division of Natural Heritage (217/785-8774). Property tax on preserved land is reduced to the assessed value of $1 per acre per year in perpetuity. Over one hundred Illinois Nature Preserves, eleven of them privately-owned, have been established in the Chicago Wilderness area, including the Parker Fen and the Bystricky Prairie in McHenry County.

Purchase

A public entity also may choose to purchase property from a landowner. The landowner may sell the land outright at fair market value to an agency, or it may be sold at a bargain price, which lowers capital-gains tax. As mentioned above, flexible agreements are possible with this technique as well. Funding options are discussed briefly later in this chapter.

In *sellback and leaseback* programs, a local government purchases property, imposes easements, deed restrictions or development agreements on the property, and then sells or leases the property to a third party. The restrictions might state that the owner or lessor may not develop the property, disturb vegetation, or use the property in any way that would harm the species residing there. Sellbacks and leasebacks can be effective site-level tools to reduce the costs of habitat acquisition programs.

Other techniques for purchasing land provide still more flexibility to buyers and sellers, such as purchase options and rights of first refusal. These programs are typically used when buyers want to have first option to purchase property. For example, park and forest preserve districts could be given the right of first refusal on all golf courses before they are sold to other parties. This would allow these entities to purchase golf courses and restore them to a more natural state.

If it is impossible for the government agency to negotiate the acquisition of either the development rights or full ownership of a property, then more drastic measures might be considered as a last resort for highest priority properties. Eminent domain (also known as condemnation) is an inherent power of government. It is the compulsory purchase of land from a private owner in exchange for just compensation as established by a court of law. It is a right of government as long as the purpose (a public purpose) and value paid are appropriate. Public purpose can include the protection of the environment for the benefit of the residents of a community. It should be noted, however, that this technique is generally unpopular and may only be acceptable in extreme cases.

Conservation Easements

Conservation easements are a fairly common and very useful technique for removing development potential from a property in order to protect it. A conservation easement is a documented agreement whereby private landowners may voluntarily restrict their land from specific activities, either in exchange for money or by donation. Easements are highly flexible and designed to meet the particular needs of the landowner and the receiver of the easement. Restricted activities may include building of structures, removal of native flora and fauna, and grading or disruption of soils. Other less disruptive uses may be allowed within the easement, such as certain types of structures or recreational activities, but these must be specified in the easement document. Landowners can elect to manage the easement themselves, ensuring that the conditions of the easement agreement are being met, or they may convey rights of management to an organization devoted to such activities. Easement donors may qualify for tax deductions or benefits under certain circumstances and conditions. This technique is described in greater detail in Appendix C.

"Open space conservation is a one-time investment that can boost property values and swell tax coffers long after the land is

paid for. And in survey after survey home buyers identify nearby open space and trails as among the top features in choosing a home."-The Trust for Public Land, 1999.

Land Trades

Local governments might consider trading land that is no longer needed for its original purpose (or land acquired through tax reversions or other means) for land that is valuable as wildlife habitat.

Summary of Benefits

Acquiring land or development rights is beneficial to the protection of biodiversity for a number of reasons.

- Open space, public lands and parks are amenities highly valued by residents, are attractive to families and businesses looking to relocate, and can increase property values of the community.
- Protected areas and parks can add to the community's economy by providing destinations for active and passive recreation and other tourist activities.
- Open space preservation can help avoid expensive legal battles associated with regulatory protection measures while reimbursing landowners for the economic and other benefits the open space will bring the community.
- Most acquisition measures protect land in perpetuity, while regulatory measures, such as zoning, can be changed.
- Acquisition programs can be used with other preservation programs to link existing or future natural areas into a network of habitats useful for wildlife.

The Value of Open Space Preservation

√ A 1999 National Association of Home Builders survey found that respondents favor development that leaves or plants as many trees as possible (87 percent), protects environmentally sensitive areas such as wetlands (87 percent), and preserves wildlife habitat (59 percent). Access to park areas was one of the top two amenities that would seriously influence the respondents to move to a new community. It was followed by walking/jogging trails (48 percent), and lakes (38 percent).

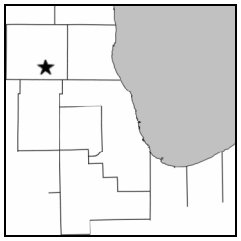
√ A 1997 study found that small company owners ranked recreation, parks, and open space as high priorities in choosing a new location for their businesses (The Trust for Public Land, 1999).

√ A 1996 northeastern Illinois study sponsored by the Illinois Prairie Trail Authority found that, in some cases, a developer can attach up to a $10,000 premium to the sales price of lots adjacent to trails. Realtors use proximity to trails as an asset in marketing properties, and those lots tend to sell quickly (NIPC and Openlands Project, 1997).

- √ In Salem, Oregon, land adjacent to a greenway was worth approximately $1,200 an acre more than land only 1,000 feet away (The Trust for Public Land, 1999).
- √ In Oakland, California, a greenway around Lake Merritt added $41 million to surrounding property values (The Trust for Public Land, 1999).
- √ In Dayton, Ohio, five percent of the selling price of homes near the Cox Arboretum and park was attributable to that open space (The Trust for Public Land, 1999).
- √ In San Francisco, California, Golden Gate Park increased surrounding property values by $500 million to $1 billion, and generated $5 to $10 million in annual property taxes (The Trust for Public Land, 1999).

Local Examples

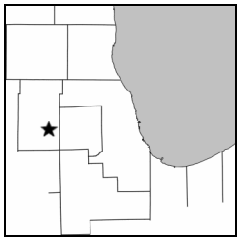
Crystal Lake Park District



Through careful planning and land acquisition, Crystal Lake Park District has protected 25 acres of park land for every 1,000 residents, 15 acres more than the national average. The park district, which typically provides ball fields and other active recreational facilities, has left 59 percent (674 acres) of their land wild. Other lands have been planted with native species and are used mainly for hiking and biking trails. The community also contains 70 acres of Illinois Nature Preserve land.

Contact the Crystal Lake Park District: 815/459-0680.

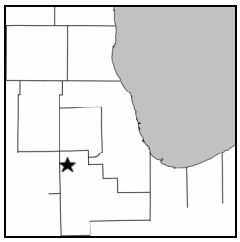
City of Geneva



The City of Geneva has initiated a project called Prairie Green to purchase 440 acres of agricultural land on its western border to be restored to natural conditions for passive recreation and habitat. A $10 million referendum to fund the purchase was passed by 82 percent of Geneva residents in 1997. After all of the land has been assembled, the City intends to restore it to natural prairies, wetlands, and open water, and to enhance the quality of Mill Creek, which runs through the area. It is hoped that through cooperation with the City of St. Charles, the St. Charles Park District, and the Kane County Department of Corrections, the restored lands and waters also will be utilized for stormwater management for the city. This plan dovetails with Kane County's stormwater management plan and ordinances.

Contact City of Geneva Planning Department: 630/232-0818.

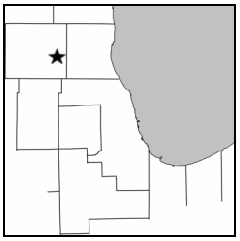
Village of Plainfield



The Village of Plainfield has designated specific open space preservation requirements within its comprehensive plan. Depending on the type and density of development being sought for a parcel of land, the Village requires a percentage of the parcel be set aside as open space. For single-family residential development, 10 percent of the site must be set aside; for clustered development, 25 percent set aside; and for planned development (PUD), 35 percent of the site must be set aside as open space. Furthermore, through the development review process, the Village prioritizes natural features on the parcel for protection based on (1) the importance and sensitivity of natural features of the parcel, and (2) contribution of the natural areas to the regional trail and greenway network.

Contact the Village of Plainfield Planning Department: 815/439-2824.

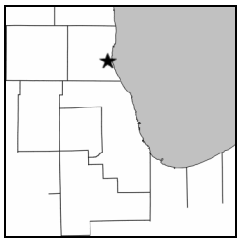
Nunda Township



Nunda Township accepted title to 30 acres of drained hydric soils from the developer of adjoining land. The Township converted a portion to a prairie restoration site, created several soccer fields, and left the remainder as passive open space.

Contact Nunda Township: 815/459-4011.

Middlefork Farm



Through a creative application of planned-development agreements, annexation agreements, and other development agreements, 120 acres of a 191-acre, 74-lot development were dedicated and preserved as open space through an agreement among seven different parties, including the Lake Forest Open Lands Association, Lake County Forest Preserve District, and City of Lake Forest. The majority of the preserved land is in the floodplain of the Middle Fork of the North Branch of the Chicago River, and will be restored to savannas, wetlands, and wet prairie. Several historic barns also will be preserved on a portion of the site owned by the City of Lake Forest.

Contact the Lake Forest Open Lands Association: 847/234-3880.

Additional Information

Funding Preservation Programs

As mentioned in the *Recent Local and State Initiatives Supporting Land Preservation* box in the introduction, public support for land acquisition is high. While purchasing land and development rights can be expensive, a number of funding mechanisms and sources are available to governments. Private and non-profit conservation agencies, such as The Nature Conservancy, The Conservation Foundation, and Corlands (a division of the Openlands Project), also can provide technical assistance or acquire land and easements on an interim basis if an ultimate public owner can be identified. A number of land conservancies and other conservation organizations in the region also own and manage open space resources. A brief list of funding and acquisition mechanisms is included below.

Open Space Lands Acquisition and Development Program (OSLAD): Administered by the Illinois Department of Natural Resources, Division of Grant Administration (217/782-7481), this program helps local government agencies acquire and develop land for public parks and open space. Funded by the Illinois real estate transfer tax, OSLAD is budgeted statewide at $17, 715,000 for fiscal year 1999. Since its inception in 1986, OSLAD has provided almost $28 million to Cook County, and nearly $32 million to the collar counties. Approved projects are eligible for a 50% reimbursement.

Natural Areas Acquisition and Development Program (NAAF): The Illinois Department of Natural Resources, Division of Natural Heritage (217/785-8774) administers this fund for acquisition and

stewardship of natural areas, including habitat for endangered and threatened species, high-quality natural communities, wetlands, and other areas with unique or unusual qualities of natural heritage. Lands acquired remain in state ownership. Approximately $2 million is spent statewide each year.

Open Land Trust (OLT): This new initiative dedicates $160 million over four years to acquire natural areas and open space and to provide recreational opportunities for Illinois citizens. Illinois Department of Natural Resources, Division of Grant Administration (217/782-7481).

Register of Land and Water Reserves: Illinois Department of Natural Resources, Division of Natural Heritage (217/785-8774) provides protection for natural areas, significant wildlife habitat, and high quality restorations that are not conducive for dedication as a nature preserve. Registered areas are eligible for property tax reduction. May be used on private or public land.

Land and Water Conservation Program (LAWCON): This program funds acquisition and management of land and water outdoor recreation areas and facilities including areas for bicycle, water, and walking trails, as well as nature study, and natural resource preservation. Approved projects are eligible for a 50% reimbursement. Contact Illinois Department of Natural Resources, Division of Grant Administration (217/782-7481).

TEA-21 (formerly ISTEA): This is a federal grant program administered by states, Metropolitan Planning Organizations (MPO's), and local councils of governments that can be used to fund bicycle and trail facilities, greenway projects, landscaping and scenic beautification projects, acquisition of scenic easements, and mitigation of water pollution due to highway runoff. Selected projects receive up to 80 percent of project cost. Among the TEA-21 programs are Enhancements, Congestion Mitigation and Air Quality, and the Surface Transportation Program. Contact Illinois Department of Transportation Enhancements Manager (217/785-2908).

Bicycle Path Grants Program: This program can be used to acquire linear corridors that contribute to bicycle paths, such as greenways, and to fund construction and rehabilitation of non-motorized bicycle paths and support facilities. Program funds up to 50 percent of project costs. No maximum exists for acquisition projects. Contact Illinois Department of Natural Resources, Division of Grant Administration (217/782-7481).

Boat Access Area Development Program**:** This program provides financial assistance (up to 90 percent) for land acquisition for canoe access on lakes and rivers. This can coordinate with stewardship, protection, and educational goals. Illinois Department of Natural Resources, Division of Grant Administration (217/782-7481).

Land conservancies: Land conservancies are usually local non-profit organizations dedicated to managing and preserving land for conservation, growth control, or other purposes. Land conservancies can often provide technical and financial assistance to local communities to help achieve conservation goals. A list of local land conservancies can be found in Appendix B.

Tax revenues, bond measures, and referenda**:** A community can allocate tax revenues for the protection or acquisition of land. They also can raise money with bond measures, in which a government issues a certificate of debt guaranteeing payment of the original investment plus interest by a specified future

date. Another technique is a referendum, the submission of a proposed public measure or actual statute to a direct popular vote. Referenda can be used to pass a tax increase or bond measure to raise funds for land acquisition programs.

***Taxing, assessment and special conservancy districts*:** A local government can establish special districts in which landholders are taxed to provide amenities such as parks and natural areas.

***Excess lands*:** Surplus highway rights-of-way and abandoned railways, mines, and quarries could be selectively transferred to public entities through land exchange, purchase, or long term, no fee leases.

***Tax reversions, loan foreclosures and collapses*:** Local governments can capitalize on land that reverts to government control when landowners fail to pay their taxes. They also can create agreements with local banks to purchase properties seized by banks and loan companies. While certainly not all of these lands will be valuable for habitat protection, some may remain in a natural state or be restored to natural habitat.

***Limited conservation development*:** With this technique, a local government can recoup costs of purchasing sensitive land by allowing a limited amount of environmentally friendly development on the parcel. Strict standards and monitoring are necessary however.

Suggested Reading

Biodiversity Recovery Plan. Chicago Wilderness. 1999.

Conservation Easements: An Analysis of Donated Development Rights. John B. Wright. 1993. Journal of the American Planning Association. 487-93.

Habitat Protection Planning: Where the Wild Things Are. Christopher Duerksen, et al.. 1997. Planning Advisory Service Report no. 470/1. American Planning Association. Chicago.

Northeastern Illinois Regional Greenway Plan. Northeastern Illinois Planning Commission and Openlands Project. 1992 and 1997. Chicago.

Regional Open Space and Recreation Policy Plan. Northeastern Illinois Planning Commission. 1980. Chicago.

Techniques for Acquiring Open Space at Less-than-fee: A Guide for Local Officials. Northeastern Illinois Planning Commission. 1982. Chicago.

9 NATURAL AREA MANAGEMENT AND RESTORATION

"It is probably not an exaggeration to say that much of the planet is occupied by partially or badly damaged ecosystems. Restoring them is probably the best means of increasing diversity." -John Cairns, Jr., *Increasing Diversity by Restoring Damaged Ecosystems*, in Biodiversity.

Background

Human alteration of the landscape since the arrival of European settlers has led not only to some permanent loss of habitat, but also to the degradation of the remaining habitat and the ecological processes that maintain ecosystem health. As previously mentioned, ecologists have identified four principal causes of habitat degradation in our region:

- fragmentation of natural areas into smaller, isolated parcels;
- elimination of fire, which previously was caused by natural events such as lightning and also used by Native Americans;
- introduction of invasive non-native species such as common buckthorn and purple loosestrife; and
- disruption of natural water flow, or hydrology, due to draining of wetlands and installation of field tiles.

As a consequence, protecting and restoring structure, function, and health of these natural systems will require active management to maintain them in a condition that supports a natural richness of species. Some would argue that we should "let nature take its course." Unfortunately, because we have so disrupted natural processes, some ongoing human effort is necessary to maintain healthy natural communities.

Ecosystem restoration began nearly 60 years ago with a restored tallgrass prairie at the University of Wisconsin. Subsequent efforts by the Morton Arboretum in Lisle and the Fermi National Accelerator Laboratory in Batavia were soon followed by hundreds of projects in forest preserves, park districts, and on private lands. In recent decades great strides also have been made in the restoration of oak woodlands, savannas, and wetlands.

While restoration is generally thought to be the responsibility of large landowners such as the state and forest preserve districts, much can be done and encouraged by local governments. Park districts, in particular, can participate in small-scale restoration of prairies, woodlands and wetlands, while educating residents about the importance of ecosystem restoration. Municipalities and counties can encourage ecosystem restoration in new developments, particularly where sites contain degraded wetlands or stream corridors. Local governments also can encourage, or at least allow, important natural landscape management practices such as removing invasive species and prescribed burning.

Recommended Approaches

Local governments can assist in natural area management and restoration in a number of ways. As mentioned in the chapter on comprehensive planning, identifying natural areas and locations of threatened and endangered species is an important initial step to prioritizing areas for management and restoration. Local governments can restore lands under their ownership or assist in the restoration of other lands by enacting policies and ordinances that allow and encourage restoration efforts. This can include one or more of the following techniques.

> *"Restoration involves all manner of work with the land . . . Much of this work, although conceived by professionals—ecologists and land-use managers—is performed (and informed) by volunteers. Restoration skills can be developed by anyone, and wielding them can produce psychic benefits at least as great as their beneficial effects on the land."*
>
> -Stephanie Mills, *In Service of the Wild* (Beacon Press, 1995.)

Restore Habitat on Public Land

Publicly owned land, particularly suitable park property, presents a great opportunity for local governments to enhance habitat and biodiversity, to develop demonstration projects for public education, and to demonstrate their commitment to habitat protection. Two important management and restoration targets follow:

Restoring Hydrology

A number of ecosystems, such as ponds, wetlands, streams, and rivers, depend on the natural fluctuation of water levels and flows. This natural water movement, or hydrology, has been seriously altered by agricultural and urban drainage. Management techniques to reestablish hydrology include removing or blocking drain tiles, removing drainage ditches from wetlands, removing water-level control structures, reducing the flow of stormwater to stream systems, and promoting stormwater infiltration into the soil where it can help recharge wetlands and groundwater-fed stream systems.

Restoring and Managing Native Plant Communities

Some plant species introduced into this country from Europe or Asia can become very aggressive and replace our native species in the landscape. Some common invasive species include common buckthorn (*Rhamnus cathartica*) and garlic mustard (*Alliaria petiolata*) in woodlands, purple loosestrife (*Lythrum salicaria*) in wetlands, and native ash (*Fraxinus sp.*) and box elder (*Acer negundo*) in prairies. As the diversity of native plant species declines, the native wildlife that depend on them disappears as well.

Thus, the preservation of plants and animals depends on maintaining these natural communities in a healthy state.

Because native plant communities and their seed banks are often depleted on disturbed sites, it commonly will be necessary to reintroduce native species. To maintain ecological integrity, seeds should be obtained from local sources or nurseries. Once the initial restoration is complete, the preferred method for maintaining native prairie, savanna, and wetland communities is reintroducing fire through prescribed burning. Fire removes exotic species not adapted to fire, and allows native, fire-adapted species to thrive. Fire also returns essential nutrients to the soil where plants can use them. Local governments should work with local fire departments to educate them about the necessity of fire in managing these landscapes. In more urbanized settings, where prescribed burning is not feasible, weeding and annual or biennial mowing may be effective. As discussed below, volunteers can effectively accomplish many of these restoration tasks with appropriate supervision.

Troublesome Wildlife Populations

The presence of wildlife in the metropolitan setting is highly valued by many people. But in the absence of natural predators, it is common for some species of wildlife to achieve numbers that conflict with their human neighbors or degrade the health of natural ecosystems. After careful study, some communities adopt measures to control the numbers of such species as white-tailed deer, Canada geese, raccoon, beaver and others. Such action should be a matter of public discussion and consensus. The friction that often accompanies the early stages of nuisance animal control efforts should be seen as an opportunity for public evaluation of ethical questions and education about the interaction between humans and nature. The most successful programs demonstrate a respect for the animals and their human supporters while relying on sound science for decision-making once a public consensus on goals has been achieved. Good information about wildlife control is available from the Illinois Department of Natural Resources, which issues permits for such programs.
Courtesy of Steve Packard, National Audubon Society.

Support Private Landowner Restoration Initiatives

As mentioned above, private landowners play an important role in achieving habitat protection due to the dominance of this land ownership category. Fortunately, interest in establishing or enhancing natural habitats on private land is increasing. Local governments can encourage and provide technical assistance to these parties to help accomplish the community's biodiversity goals. Most importantly, governments can demonstrate a commitment to habitat protection by providing flexibility in local ordinances to allow a broader range of ecological restoration and natural landscaping activities.

Restore Land Used for Other Purposes to Important Habitat

Land used for other purposes can sometimes be reclaimed and restored to important wildlife habitat. Stormwater detention basins retrofitted with wetland prairie plants present good opportunities to provide the community with the multiple benefits of flood control, wildlife habitat, water quality benefits, and recreation areas.

Recruit and Train Volunteers for Management and Restoration Work

Volunteer participation in restoration work not only saves money but fosters an ecological restoration ethic in residents as well. Consider establishing programs through which conservation groups, students, scout troops, or other community groups can fulfill requirements and community obligations through restoration activities.

A community might also consider creating a separate local government committee made up of residents to develop guidelines for protecting and restoring local natural areas. Volunteers often pursue training at all levels and can become the community's natural area leaders and "experts" for natural area management. Involving residents will not only empower residents to take action, but also will help educate and build public support for management and restoration activities. An example is Long Grove's Conservancy and Scenic Easement Corridor Committee.

Summary of Benefits

Communities choosing to manage and restore their natural areas to healthy, functional habitats stand to gain a number of benefits.

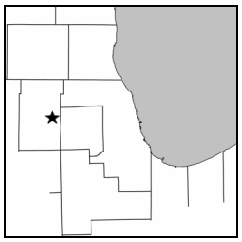
- Public education: involving the public in management and restoration activities will help educate them about the benefits of natural areas to wildlife and the community.
- Re-establishment of habitat and an amenity for the public: the public will benefit from healthy natural areas supporting a diversity of wildlife and recreational opportunities.
- Community service opportunities: restoration and management activities can fulfill community service requirements for schools or legal obligations.
- Improved water quality and stormwater management: restored natural areas help cleanse water and reduce flood damage.

- Increased property values: restored natural areas in proximity to residential areas can increase the value of those residential properties.

Local Examples

St. Charles Park District

The St. Charles Park
increase their stability
generations. The park
approximately 500 acres.
communities including
and prairies. Two of
Fen, are dedicated Illinois



District is committed to managing its natural areas to
and biodiversity and to preserve them for future
district owns and manages five natural areas totaling
These natural areas include many different natural
fens, marshes, upland swamps, woodlands, grasslands,
these natural areas, Norris Woods and Ferson Creek
State Nature Preserves.

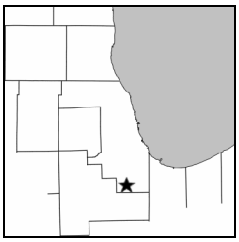
The park district actively manages all of these natural areas with both staff and volunteer labor. Management activities include restoring natural hydrology by removing or otherwise disabling underground drain tiles, removing non-native or other invasive plant species and replacing them with appropriate native species, prescribed burning, and regular monitoring. The park district also is involved with stream restoration and naturalization.

Natural area management must be understood and supported by the community, so education is important. To this end the park district provides regular nature walks and other events in its natural areas. In addition, several of these areas have interpretive signs that explain the site and management activities for visitors. The park district holds regular work days in their natural areas as well as other special events such as for Earth Day. Often special flyers or newsletters are sent to neighbors of the natural areas to inform them of management activities or to make them aware of the importance and uniqueness of the natural area. Neighbors are also encouraged to maintain a naturalized buffer between their turf lawn and the natural area.

Contact the St. Charles Park District: 630/516-3342.

Village of Park Forest Central Park Wetland Restoration Project

This 46-acre open space demonstration project of the South Suburban Stormwater Strategy program is a remarkable, large-scale wetland restoration in a downtown park setting. This collaborative project has the following goals:

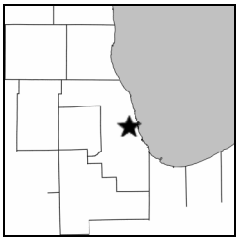


1. To restore a historic wetland area in the Calumet River watershed to natural conditions which will sustain native wetland communities.

2. To make a positive contribution to the long-term ecological functioning of the watershed of the Calumet River providing flood reduction, erosion control, and water quality benefits.
3. To provide wildlife habitat for native fauna, particularly permanent resident and migrating species of birds, reptiles, amphibians, and butterflies.
4. To enhance environmental education, public recreation, and cultural appreciation in Central Park.

Contact the Park Forest Recreation and Parks Department: 708/503-8561.

Chicago Park District



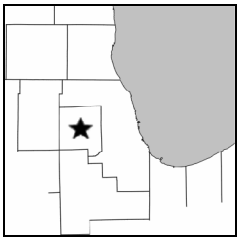
The Chicago Park District has restored wetlands in the floodplain of the Chicago River at Gompers Park by removing two feet of fill, regrading the site, and planting native plants. The park district hopes to achieve a number of objectives with this project:

1. Provide community-based education and training in wetland ecology, restoration, monitoring and management.
2. Restore the wetland using local residents.
3. Establish a model of government, community, and non-profit cooperation for ecological restoration.
4. Eliminate flooding of recreational facilities.
5. Provide a resource for education, scientific study, and community stewardship.

The park district also is restoring the 16-acre Wooded Island in Jackson Park, also known as the Paul Douglas Nature Sanctuary. This glacial sand ridge is covered with woodlands and a remnant savanna. Specific tasks include documentation of historical and existing conditions, removal of alien and invasive plant species, thinning of the severely overgrown understory, and the reintroduction of native woody and herbaceous plant species.

Contact the Chicago Park District: 312/747-7429.

Forest Preserve District of DuPage County



The Forest Preserve District of DuPage County has established the Habitat Improvement Program to restore the District's highest-quality prairie, wetland, stream, and woodland environments. The program is intended to restore degraded habitat by recreating the natural functions and processes through which native ecosystems evolved, and to reintroduce the plants and animals characteristic of the region. Methods used in the program include: widespread planting of native species; removing exotic species; reestablishing native plants on the shorelines of waterbodies; using prescribed burning to restore prairies; reintroducing species of special concern; educating the public about the variety of activities; and involving the public in a volunteer program called Mother Nature's Helpers.

The program also encourages community participation and education through a number of programs. The "Adopt-An-Acre" program offers companies the chance to sponsor one of the restoration sites close to their place of business. Contributions directly support wildlife conservation, habitat improvement, and environmental education. Another program, "Parent-A-Tree," invites individuals, families, schools and youth groups to plant trees in back yards or school grounds and thereby support reforestation efforts. The District also provides environmental education programming for teachers and students.

Contact the Forest Preserve District of DuPage County: 630/933-7200.

Additional Information

***Chicago Wilderness**:* This organization provides a forum for communication and coordination among organizations that are committed to protection and restoration of biodiversity. Funding is provided for activities such as ecological inventory and monitoring and ecological restoration. 68 projects were funded with over $1 million between April 1996 and February 1998.

***Conservation 2000 Ecosystem Program**:* This program funds watershed- and ecosystem-based local partnerships that seek to maintain and enhance natural areas and coordinate conservation efforts with local interests. Land and conservation easement acquisition for habitat protection or restoration are two projects eligible for these funds. Total grants for this program average $3 million per year. Local partnerships include the Fox River, Kishwaukee River, Upper Des Plaines River, Chicago Wilderness, Prairie Parklands, Kankakee River, Upper DuPage River, Thorn Creek, and Lake Calumet. Contact the Illinois Department of Natural Resources, Ecosystem Program, Office of Realty and Environmental Planning (217/782-7940).

***Forest Management Assistance Program**:* Technical assistance to help manage, protect, develop, and enhance private and public forest resources to improve forest quality, wildlife habitat, soil and water conservation, and Illinois residents' quality of life. Illinois Department of Natural Resources, Division of Forest Resources (217/782-2361).

***Forest Stewardship**:* Assists in management and enhancement of Illinois' forests for environmental, social, and economic benefits. Contact the county district forester or biologist, or the Illinois Department of Natural Resources, Divisions of Forest Resources (217/782-2361), Natural Heritage (217/785-8774), Wildlife (217/782-6384), or Fish (217/782-6424).

***Lake Quality Restoration**:* These programs provide funds and technical assistance for restoration projects. Contact Illinois Department of Natural Resources, State Water Survey (309/671-3196), or Illinois Environmental Protection Agency, Illinois Clean Lakes Program (217/782-3362).

***Partners for Fish and Wildlife (PFW)**:* This U.S. Fish and Wildlife program assists landowners with restoring important fish and wildlife habitats (847/381-2253).

***Partners for Wildlife**:* Assists in wetland restoration for habitat, transient waterfowl, and other wildlife; water quality improvement; flood protection; and groundwater recharge. U.S. Fish and Wildlife Service (847/381-2253) or Illinois Department of Natural Resources, Division of Wildlife (217/782-6384).

Private Land Wildlife Habitat Program: Assistance in protecting, enhancing, and developing wildlife habitat to improve wildlife populations, soil and water conservation, and Illinois residents' quality of life. Illinois Department of Natural Resources, Division of Wildlife Resources (217/782-6384).

Species Identification: This technical assistance program assists counties and municipalities in identifying plant and animal specimens, native and present distributions of identified species, habitat requirements, ecological and economic value, and potential pest problems. Contact Illinois Department of Natural Resources, Illinois Natural History Survey, Center for Biodiversity (217/333-6846).

Trees, Shrubs and Seedlings at No Cost: Encourages landowners to reforest land, increase wildlife habitat and control erosion. Illinois Department of Natural Resources, Division of Forest Resources (217/782-2361), Division of Natural Heritage (217/785-8774), or Division of Wildlife (217/782-6384).

Wildlife Habitat Incentives Program (WHIP): Assists landowners in improving wildlife habitat on private lands. Contact United States Department of Agriculture, Natural Resources Conservation Service (see Appendix A for district offices and contact information).

Suggested Reading

Biodiversity Recovery Plan. Chicago Wilderness. 1999.

Illinois Wetland Restoration and Creation Guide. Illinois Natural History Survey. 1997.

The Lake and Reservoir Restoration Guidance Manual, 2nd ed. United States Environmental Protection Agency. 1990.

Tallgrass Restoration Handbook. S. Packard and C. Mutel, eds. Island Press. 1997.

Using Ecological Restoration to Meet Clean Water Act Goals: Proceedings of a National Symposium. 1995.

10 EDUCATION

> *"Every child should have mud pies, grasshoppers, waterbugs, tadpoles, frogs and turtles, elderberries, wild strawberries, acorns, hickory nuts, trees to climb, animals to pet, hayfields, pine cones, rocks to roll, sand, snakes, huckleberries and hornets -- and any child who has been deprived of these has been deprived of the best part of his education."* Luther Burbank, 1849-1926

Background

While there is growing public support for protecting and restoring natural areas and biodiversity, there also are some questions and uncertainty about how to accomplish this goal. As indicated throughout this guidebook, improved public education will be essential to expanding the use and effectiveness of recommended techniques. Counties, municipalities, park districts, and wastewater authorities have a crucial role in this effort.

Residents not only influence larger community decisions with their votes but also make daily decisions affecting the health of natural ecosystems. These decisions range from the plants they choose to landscape around their homes to whether they support local initiatives to acquire open space and habitat. The future of our native landscapes depends upon the support and involvement of our citizenry, which in turn depends upon the degree to which they are educated about those landscapes.

Some schools have already incorporated environmental education into their curricula, and local governments should encourage them to continue these efforts. It is important to understand, however, that people get the information that forms their attitudes and behaviors from a wide range of sources beyond just the education programs of schools. Conservation organizations, the media, and community leaders contribute in important ways to the knowledge and values held by the public, and they help interpret conservation issues. Outreach and education is crucial to developing public support for activities such as ecological restoration. Thus, marketing and use of the media are important strategies for promoting ecological literacy and an appreciation of nature, and for demonstrating the community's commitment to its long-term vision, including biodiversity protection.

Local governments also can play a significant direct role in the educational effort. The purpose of this chapter is to identify opportunities where local governments can most effectively utilize education to implement biodiversity programs and to identify some resources and organizations that can assist them.

Recommended Approaches

Techniques that counties, municipalities and park districts can use to better educate their constituents include the following.

- Foster neighborhood-based programs aimed at improving the environment and biodiversity locally. Natural landscaping, natural area management, and restoration are appropriate for all ages and provide good opportunities for neighborhoods to become involved with the preservation effort.
- Develop links between school-based programs and community projects. Many

schools are incorporating nature and ecology into science and other subject curricula. Local projects (e.g., restoration of a detention basin with native plants) may be used to satisfy community service requirements that many students must fulfill in order to graduate.

- Identify and support community leaders who can lead the educational effort to protect biodiversity. Successful preservation efforts are often the result of one or a few dedicated individuals who encourage and inspire communities to get involved.
- Inform the public about restoration efforts. Some common restoration techniques, such as prescribed burns or removing invasive brush, may initially seem destructive to some residents. However, these activities ultimately lead to more healthy, functioning ecosystems. It is essential to clarify potential misconceptions about nature and the management needed to preserve it. Chicago Wilderness, through its *Biodiversity Recovery Plan* and various brochures, provides excellent information on restoration topics.
- Sponsor and promote an annual event that promotes biodiversity and natural areas.
- Use the media and other communication efforts (interpretive signs, brochures, newsletters) to get the word out on restoration and other land management activities.
- Involve residents in monitoring, restoration, and land management efforts. Target local garden clubs, but also include groups that may not normally be involved in these activities, such as church groups or book clubs. Activities that bring people together help build strong bonds and foster greater public involvement in efforts to enhance the community's image and quality of life.
- Restore public facilities such as parks and stormwater ponds to conditions that support natural habitat. This demonstrates the local government's commitment to preserving nature, and sets a good example for the rest of the community to follow. Specific techniques are covered in previous chapters.
- Encourage organizations to offer a variety of hands-on educational and volunteer experiences to a wide diversity of people including seniors, pre-schoolers, special needs residents, and stay-at-home mothers.

A number of resources, described below, are available through Chicago Wilderness to improve both the scope and methods of communication efforts. Other resources are described in the *Suggested Reading* section at the end of this chapter.

Summary of Benefits

The ultimate goal of environmental education is to help develop environmentally literate citizens and elected officials, capable of making well-informed decisions about protecting local natural resources. Benefits of these educational efforts include the following:

- Increased public support for measures to protect natural areas and habitats initiated by public agencies.
- Improved public understanding of how nature and wildlife contribute to our sense of community, our sense of place, and to sustainable, livable communities.
- Improved understanding of the public's capability to act to conserve nature and to motivate them to take action.
- Improved awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas.

- Improved skills for identifying, participating in, and solving environmental problems.

"When I was at Oakhurst, I felt like I was someone helpful collecting prairie plant seeds so they could plant more next spring. And you know what? I was." -5th grade student recounting a class field trip to Oakhurst Forest Preserve in Kane County

Chicago Wilderness: Tools for Communication and Education Efforts

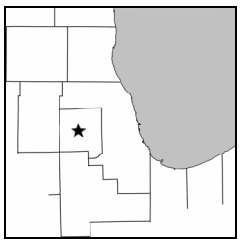
(Adapted from the Chicago Wilderness *Biodiversity Recovery Plan*.
Contact Chicago Wilderness at 312/346-2540 ext. 30, or visit the website at www.chiwild.org.)

Tools for Individuals, Agencies and Organizations	**Description**	**Purpose/Audience**
Chicago Wilderness: An Atlas of Biodiversity	Full-color, 64-page book describing the natural communities of the region.	For the general public, educators, media, elected officials, corporate and community leaders.
Chicago WILDERNESS Magazine	Quarterly magazine celebrating the rich natural heritage of the region (see *Additional Information* in the introduction for subscription information.).	To convey the messages of local biodiversity protection in a popular format; for all general audiences.
Chicago Wilderness "Portable Resources"	Fifteen-minute video called "This is Chicago Wilderness"; colorful and informative tabletop display; slide show presentation.	To give organizations the means for both internal and external communication about Chicago Wilderness.
Chicagoland Environmental Network (CEN)	Public point-of-contact for volunteer opportunities and events, managed by Brookfield Zoo.	To provide means for public to become informed about and involved in local conservation activities.
Chicago Wilderness Web Site at www.chiwild.org	Comprehensive resource for news and issues related to biodiversity protection, managed by Chicago Academy of Sciences.	To increase public awareness and provide forum for scientists, educators and land managers to share information.

Local Examples

Numerous organizations and agencies around the region contribute to the environmental education effort, including zoos, botanic gardens, museums, and nature centers. Local governments also have been effective in this movement, as demonstrated in the following examples.

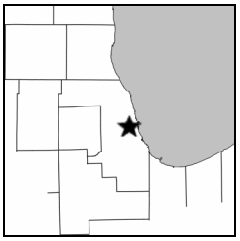
Wheaton Park District



In 1991, the Wheaton Park District, in cooperation with local school districts, developed an educational program for local schools using their Lincoln Marsh property as a living laboratory. The program educates students about the values of wetlands for flood control, water quality, recreation, and wildlife habitat. The program also includes a pre- and post-program activity book, teacher resource manual, and a website that students and teachers can access as a supplement to the other materials. This program has been popular with students, and the park district has traveled throughout the country promoting the program and making it available for other organizations to use as a model. The district also provides programs for all ages of the general public that highlight topics such as reptiles and amphibians, birds, wildflowers, and constructing bird and bat boxes to attract wildlife. Passive education is provided by interpretive signs around the park that explain the values of wetlands to humans.

Contact the Wheaton Park District: 630/871-2810.

City of Chicago



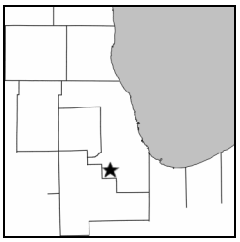
The City of Chicago Department of Environment has numerous programs aimed at educating the public and involving them in nature. Some of these programs are listed below.

- The North Park Village Nature Center is a 46-acre nature preserve and educational facility. The Center's mission is to provide urban citizens with an opportunity to interact with wildlife, plants, and other natural resources through environmental education and access to restored native landscapes.
- The City encourages public involvement in nature walks, star gazing, storytelling, family fun days, school programs, teacher enhancement opportunities, volunteer stewardship activities, ecosystem restoration, and other programs for children, adults, and seniors.
- The Nature Chicago program includes nature trails, trail guides for self-guided tours, and interpretative signs showing the plant and animal species to be found in Chicago's natural areas.
- The Chicago Public Libraries' Nature Connections program presents children with natural history and science materials and brings the resources of Chicago's museums and nature institutions into neighborhoods through the branch and school libraries.

- Festivals, after-school park programs, and volunteer opportunities pertaining to nature and the natural environment occur regularly across Chicago, including a natural art show, bike tours, canoe outings, a river cruise, a nature festival in Daley Plaza, a harvest festival at North Park Village Nature Center, bird and nature walks, after-school activities, summer camp, a seminar series, and the Peggy Notebaert Nature Museum.

Contact the City of Chicago Department of the Environment: 312-744-5472.

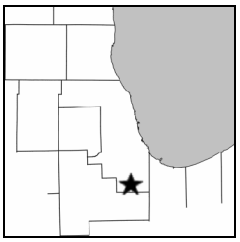
Village of Orland Park



The Village of Orland Park uses naturalized detention ponds as part of their stormwater management plans. In order to help educate the public, the Village posts signs along detention facilities with natural plantings to let the public know why native plants have been used instead of a turf lawn. An example is shown below.

Contact the Village of Orland Park Community Development Department: 708/403-6115.

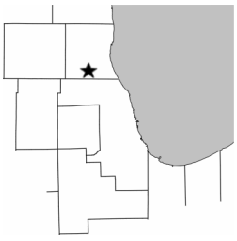
The Butterfield Creek Watershed



A cooperative effort between Richton Park, Matteson, Olympia Fields, Chicago Heights, Flossmoor, Homewood, Glenwood, and Cook County produced a plan for the Butterfield Creek watershed to manage the land and water resources of the area. The group produced a highly attractive and informative poster brochure highlighting the vision for the Butterfield Creek watershed and educating landowners and citizens about sustainable land and water management practices. One side of this full-color brochure shows a map of the watershed, and highlights areas where restoration and natural area enhancement activities are envisioned or underway. The reverse of the brochure describes techniques for land and water management in four areas: managing upland areas, enhancing floodwater storage areas, enhancing and restoring stream channels, and developing recreational opportunities.

Contact the Village of Flossmoor: 708/798-2300.

Village of Long Grove



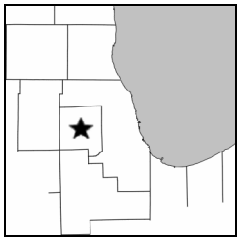
The Village of Long Grove has produced a document entitled "The Village of Long Grove Footprints: A Reference to Environmental Practices." This document for Long Grove residents is an ecology primer that educates readers about ecological principles and the variety of ecosystems that are found in Long Grove. It also encourages citizens to undertake a variety of activities to enhance the natural characteristics, biodiversity, and ecological function of the ecosystems in the community. These activities include the following:

- Grow a natural prairie of mixed grasses and wildflowers instead of the traditional lawn.

- Plant more native trees and shrubs, especially around water features.
- Minimize the use of water-polluting fertilizers and pesticides.

Contact the Village of Long Grove: 847/634-9440.

DuPage County



DuPage County has distributed environmentally- oriented brochures—*Living on a Stream* and *Stream Corridor Landscaping*—to residents and landowners to educate them about the impacts of living on a stream and how to minimize those impacts and enhance the stream corridor. Specific topics in these brochures include:

- Keeping debris and yard waste out of streams.
- Streambank stabilization and erosion management techniques.
- Tips for buffering streams with native vegetation, including lists of desirable and undesirable plant species.
- Living with stream wildlife, such as beaver.

The brochures also publicize actions that the county has taken to protect streams, such as the stream maintenance program and the Adopt-A-Stream program. Contact information for specific questions and information also is provided.

Contact DuPage County Development and Stormwater Department: 708/682-7130.

Additional Information

***Biodiversity Education Network*:** A network of biodiversity educators and leaders in the education, science, and museum fields. Contact World Wildlife Fund, Education Department (202/778-9549).

***The Biodiversity Project*:** Missions are: to assess public opinion on biodiversity; to develop collaborative strategies to increase public awareness and engagement; and to lay the groundwork to implement those strategies. Contact The Biodiversity Project in Madison, Wisconsin (608/250-9876, www.biodiversityproject.org).

***Center for Biodiversity and Conservation*:** Dedicated to the study and conservation of biodiversity, and disseminating information to the public. Contact the American Museum of Natural History (212/769-5742).

Lake Education Assistance Program (LEAP): Assists teachers, youth, non-profit organizations and others to carry out inland lake and lake watershed information and education programs and activities. Illinois Environmental Protection Agency, Bureau of Water (217/782-3362).

National Audubon Society: Trains teams of volunteers and professionals to monitor the health of wild species populations and habitats. Has a variety of educational programs for adults and children (847/965-1150).

The Trust for Public Land's Public Finance Program: This program works with citizen groups, elected officials, and public agencies to help craft, pass, and implement public finance measures for conservation. They can assist in assessing the feasibility and public support for new parks and open space funding; identifying the most appropriate sources of funding; designing a measure appropriate to the community; and assisting with the campaign. Contact The Trust for Public Land (312/427-1979).

***U.S. Fish and Wildlife Service*:** Provides training and program support on topics related to ecosystem and natural resource management, including biodiversity and wetlands ecology. Contact U.S. Fish and Wildlife Service, Division of Educational Outreach (304/876-7319).

***World Wildlife Fund*:** Provides "Windows on the Wild," a biodiversity education initiative that educates the public through traveling exhibitions, formal and informal educator training workshops, and public speaker events. Contact World Wildlife Fund, Education Department (202/778-9549).

Suggested Reading

Animal Tracks Action Packs. National Wildlife Federation. 1996. (A K-8 classroom resource containing information and hands-on projects on wetlands.)

Biodiversity Basics: An Educator's Guide to Exploring the Web of Life. World Wildlife Fund. 1999. Tustin, California.

Engaging the Public on Biodiversity: A Road Map for Education and Communication Strategies. The Biodiversity Project. 1988. Madison, Wisconsin.

Living with Wetlands: A Handbook for Homeowners in Northeastern Illinois. The Wetlands Initiative. 1998. Chicago.

The Rich Diversity of Biodiversity Issues. Norman Myers. 1997. Washington, D.C.

Wetland Discovery Trunk. U.S. Fish and Wildlife Service. The Wetland Discovery Trunk is designed to assist educators in preparing activities for exploring and learning about wetland habitats. Contains lessons, props, videos, pamphlets, publications, and posters.

Wonders of Wetlands Workshop. U.S. Fish and Wildlife Service. (A workshop for educators.)

Appendix A: Technical Assistance

A variety of sources of financial and technical assistance exists for both local governments and landowners. This section of the guidebook is intended to provide a starting point for governments seeking assistance.

American Museum of Natural History
Central Park West at 79th Street
New York, New York 10024
212/769-5742

American Planning Association
122 South Michigan Avenue, Suite 1600
Chicago, Illinois 60603
312/431-9100

American Society of Landscape Architects
Illinois Chapter
P.O. Box 4566
Oakbrook, Illinois 60522
630/833-4516

The Biodiversity Project
214 North Henry Street, Suite 203
Madison, Wisconsin 53703
608/250-9876

Campaign for Sensible Growth
220 South State Street, Suite 1800
Chicago, Illinois 60604
312/922-5616

Chicago Audubon Society
5801-C North Pulaski Road
Chicago, Illinois 60646
773/539-6793

Chicago Botanic Garden
1000 Lake Cook Road
P.O. Box 400
Glencoe, Illinois 60022-0400
847/835-5440

Chicago Wilderness
8 South Michigan Avenue, Suite 900
Chicago, Illinois 60603
312/346-2540 ext. 30
www.chiwild.org

The Conservation Foundation
10 S 404 Knoch Knolls Road
Naperville, Illinois 60565
630/428-4500

The Conservation Fund
53 West Jackson Boulevard, Suite 1332
Chicago, Illinois 60604-3606
312/913-9065

Cook County Tax Assessor
312/603-5306

DuPage County Tax Assessor
630/682-7023

Forest Preserve District of Cook County
536 North Harlem
River Forest, Illinois 60305
630/257-2045

Forest Preserve District of DuPage County
P. O. Box 2339
Glen Ellyn, Illinois 60138
630/933-7200

Forest Preserve District of Kane County
719 South Batavia Avenue, Building G
Geneva, Illinois 60134
630/232-5980

Forest Preserve District of Will County
22606 South Cherry Hill Road
P. O. Box 1069
Joliet, Illinois 60434-1069
815/727-8700

Illinois Department of Agriculture
State Fairgrounds, P.O. Box 19281
Springfield, Illinois 62794-9281
(217) 782-2172

Illinois Department of Natural Resources
524 South Second Street
Springfield, Illinois 62701-1787
600 North Grand Avenue West

P.O. Box 19225
Springfield, Illinois 62794-9225

IDNR Division of Grant Administration
217/782-7481
IDNR Division of Natural Heritage
217/785-8774
IDNR Division of Forest Resources
217/782-2361
IDNR Division of Wildlife
217/782-6384
IDNR Division of Fish
217/782-6424

IDNR Ecosystem Program
Office of Realty and Environmental Planning
524 South Second Street, Lincoln Tower Plaza
Springfield, Illinois 62701-1787
217/782-7940

IDNR State Water Survey
1320 South West Monarch
P.O. Box 697
Peoria, Illinois 61652
309/671-3196

IDNR Natural History Survey
607 East Peabody Drive
Champaign, Illinois 61820
217/333-6830
Center for Biodiversity
217/333-6846

IDNR State Geologic Survey
615 East Peabody Drive
Champaign, Illinois 61820
217/333-4747

Illinois Department of Revenue
Office of Local Government Services
217/782-3627

Illinois Department of Transportation
Enhancements Manager
Enhancements Programming
Room 307, Transportation Adm. Bldg.
2300 South Dirksen Parkway
Springfield, Illinois 62764
217/785-2908

Illinois Environmental Protection Agency
Bureau of Water
P.O. Box 19276
Springfield, Illinois 62794-9276
217/782-3362

Illinois Native Plant Society
Forest Glen Preserve
20301 East 900 North Road
Westville, Illinois 61883
217/662-2142

Illinois Nature Preserves Commission
914 South River Road
McHenry, Illinois 60050
815/385-9074

Kane County Tax Assessor
630/208-3818

Lake County Forest Preserves
2000 North Milwaukee Avenue
Libertyville, Illinois 60048
847/367-6640

Lake County Tax Assessor
847/360-6378

McHenry County Conservation District
6152 Harts Road
Ringwood, Illinois 60072
815/678-4421

McHenry County Tax Assessor
815/334-4290

Metropolitan Planning Council
220 South State Street, Suite 1800
Chicago, Illinois 60604
312/922-5616

The Morton Arboretum
Route 53
Lisle, Illinois 60532
630/719-2427

National Audubon Society
5225 Old Orchard Road
Skokie, Illinois 60077

847/965-1150

The Nature Conservancy
8 South Michigan Avenue, Suite 900
Chicago, Illinois 60603
312/346-8166

Northeastern Illinois Planning Commission
222 South Riverside Plaza, Suite 1800
Chicago, Illinois 60606
312/454-0400

Openlands Project / Corlands
25 East Washington Street, Suite 1650
Chicago, Illinois 60602
312/427-4256

Rails-to-Trails Conservancy, Illinois Chapter
313 West Cook Street
Springfield, Illinois 62704
(217/789-4782)

Sierra Club, Illinois Chapter
1 North LaSalle Street, Suite 4242
Chicago, Illinois 60202
312/251-1680

Soil and Water Conservation Districts
Kane / DuPage Counties
545 South Randall Road
St. Charles, Illinois 60174
630/584-7961

Lake County
100 North Atkinson, Suite 102A
Grayslake, Illinois 60030
847/223-1056

North Cook County
675 North Court, Suite 120
Palatine, Illinois 60067-8106
847/468-0071

McHenry County
1143 North Seminary Avenue
Box 168
Woodstock, Illinois 60098
815/338-0099

Will / South Cook Counties
1201 South Gougar Road
New Lenox, Illinois 60451
815/462-3106

The Trust for Public Land
Chicago Field Office
53 West Jackson, Suite 1663
Chicago, Illinois 60604
312/427-1979

U.S. Army Corps of Engineers, Chicago District
111 North Canal Street, Suite 600
Chicago, Illinois 60606
312/353-6400

U. S. Department of Agriculture
P. O. Box 19273
Springfield, Illinois 62974-9273
217/492-4180

U. S. Department of Agriculture
Consolidated Farm Service Agency
P. O. Box 19273
Springfield, Illinois 62794
217/492-4670

U. S. Department of Agriculture
Forest Service
845 Chicago Avenue #225
Evanston, Illinois 60202
847/866-9311

U.S. Department of Agriculture
Natural Resources Conservation Service
For NRCS district offices see Soil and Water Conservation District office contacts.

Chicago Metro Urban and Community Assistance Office
603 East Diehl Road
Naperville, Illinois 60563
708/505-7808

U. S. Department of the Interior
Fish and Wildlife Service
Chicago Metro Office
1000 Hart Road, Suite 180
Barrington, Illinois 60010
847/381-2253

Division of Education Outreach
National Conservation Training Center
Route 1, Box 166
Sheperdstown, West Virginia 25443
304/876-7319

U. S. Department of the Interior
National Park Service
Center for Conservation, Recreation, and Resources
310 West Wisconsin Avenue, Suite 100 East
Milwaukee, Wisconsin 53203
414/297-3617

Recreation Resources Assistance Division
Rivers, Trails and Conservation Assistance Program
P.O. Box 37127
Washington, D.C. 20013
202/343-3780

U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604
312/353-2000

The Wetlands Initiative
53 West Jackson Boulevard, Suite 1015
Chicago, Illinois 60604
312/922-0777

Wild Ones Natural Landscapers, Ltd.
P. O. Box 1274
Appleton, Wisconsin 54912-1274
920/730-3986; Toll-free 877/FYI-WILD

Wild Ones Information
612 Staunton Road
Naperville, Illinois 60565
630/983-8404

Greater DuPage Chapter
630/415-IDIG

Lake-To-Prairie Chapter
(Northeast Illinois / Southeast Wisconsin)
847/548-1650

North Park Village Nature Center Chapter
(Chicago area)
312/744-5472

Will County Tax Assessor
815/740-4658

World Wildlife Fund
Education Department
1250 24th Street, NW
Washington, D.C. 20037
202/778-9549

Appendix B: Land Conservancies

Citizens for Conservation
PO Box 435
Barrington, Illinois 60011
847/328-7283

The Conservation Foundation
10 S 404 Knoch Knolls Road
Naperville, Illinois 60565
630/428-4500

The Conservation Fund
1800 North Kent Street, Suite 1120
Arlington, Virginia 22209-2156
703/525-6300
703/525-4610

Corlands (a land acquisition affiliate of Openlands Project)
25 East Washington Street, Suite 1650
Chicago, Illinois 60602-1708
312/427-4256

Fox Valley Land Foundation
PO Box 585
South Elgin, Illinois 60177-0585
847/697-5503

Lake Forest Open Lands Association
272 Market Square, Suite 2725
Lake Forest, Illinois 60045
847/234-3963

Land Conservancy of Lake County
PO Box 293
Lake Villa, Illinois 60046
847/265-2145

Land Foundation of McHenry County
Box 352
Woodstock, Illinois 60098

Liberty Prairie Conservancy
32400 North Harris Road
Grayslake, Illinois 60030
847/548-5989

The Nature Conservancy, Illinois Chapter
8 South Michigan Aveenue #900
Chicago, Ilinois 60603
312/346-8166

Nature Foundation
4433 West Touhy, #315
Lincolnwood, Illinois 60646

NeighborSpace
220 South Street, Suite 1880
Chicago, Illinois 60604
312/431-9406

Prairie Lakes Land Trust
32400 North Harris Road
Grayslake, Illinois 60030
847/548-4062

Save the Prairie Society
10327 Elizabeth
Westchester, Illinois 60154
708/865-8736

The Trust for Public Land
Chicago Field Office
53 West Jackson Boulevard, Suite 1663
Chicago, Ilinois 60604
312/427-1979

Appendix C: Conservation Easements

(also called scenic easements, open space easements, and conservation restrictions)

Background

A conservation easement is a documented agreement through which private landowners may voluntarily restrict their land from specific activities. Easements are highly flexible and designed to meet the particular needs of the landowner and the receiver of the easement. Restricted activities may include building of structures, removal of native flora and fauna, and grading or disruption of soils. Other less disruptive uses may be allowed within the easement, such as certain types of structures or recreational activities, but these must be specified in the easement document. Landowners can elect to manage the easement themselves, ensuring that the conditions of the easement agreement are being met, or they may convey rights of management to an organization devoted to such activities.

In many jurisdictions, easements are donated by landowners in exchange for tax benefits, but this requires that the easement be granted in perpetuity. Easements donated for a limited term are not tax deductible. Easements to protect specific amenities on private property, such as wetlands or significant natural areas, may also be purchased by entities such as The Nature Conservancy, local land conservancies, or local governments. The value of the easement is equal to the difference in the value of the land before and after the easement has been applied. For example, a parcel of land that is available for residential development might be worth $250,000. A conservation easement restricting the land from development may reduce the property's value to $50,000. The value of the easement is the difference between the two values, or $200,000. It is important to note, however, that the restricted land is taxable only at its use value, not its value for residential development. Property taxes may be reduced if certain criteria are met. Other potential tax benefits include federal and state income taxes, capital gains taxes, and estate taxes.

Recommended Approaches

Local governments are encouraged to engage in purchasing and receiving donated easements from private landowners. Due to limited staff training and experience and the lack of available funds, however, land conservancies and other conservation organizations have been more successful than local governments in achieving conservation objectives through easements. Yet the success of bond measures and referenda in the region suggest that the public is willing to pay for land and water protection. These public funds may be used to purchase easements, a cheaper alternative to purchasing full title to land parcels. Local governments also should consider encouraging landowners to participate in easement programs, and should provide information and contacts for local conservation organizations and land conservancies. A list of land conservation organizations is provided prior to this appendix. Educating the public and providing assistance are essential to the success of this technique in helping to preserve natural habitats for wildlife.

Local governments may not only purchase conservation easements on land, but also may require that easements be donated for certain development types or locations. For example,

the Village of Long Grove established easements to protect specific resources immediately after land was subdivided, and prior to ownership by residents. Residents were required to accept the terms of the easement when purchasing lots. More on the Village of Long Grove is provided below.

Summary of Benefits

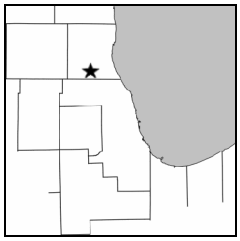
- This non-regulatory protection measure is flexible and able to be implemented quickly.
- Landowner maintains ownership of the land.
- Easement donor may qualify for income, estate and capital gains tax deductions, and/or reduction of property taxes.
- Highly flexible in their terms and restrictions to meet the needs of the landowner.
- Restrictions are registered with the land title and are maintained through transfers of ownership.
- May be voluntary or mandatory, depending on how they are used.
- Low risk of legal challenges.

Local Examples

Conservation Organizations

Non-profit organizations in the region have protected over 2000 acres of private land in the region through conservation easements. The key non-profit organizations that hold conservation easements include: Corlands (1400 acres), The Conservation Foundation (300 acres), the Land Foundation of McHenry County (150 acres), Lake Forest Open Lands (300 acres), the Fox Valley Land Foundation, and The Nature Conservancy.

The Village of Long Grove



The Village of Long Grove has enacted easement programs to protect wetlands, open space, wildlife, water recharge areas, and scenic views. These easement programs pertain to conservancy districts and scenic corridors designated by the Village. These easement programs are not voluntary; those buying lots within the established conservancy districts and scenic corridors accept the conditions of the easements as part of the purchase agreement. The Village holds the easements, and the Village Board is responsible for ensuring that the terms of the easements are met. Land under easement must be maintained in its natural state, and ecological restoration measures generally are encouraged. Use of non-native, invasive species is prohibited.

Contact the Village of Long Grove: 847/634-9440.