Planning for Natural Resources

A Guide to Including Natural Resources in Local Comprehensive Planning

FOR TABLE OF CONTENTS CLICK **HERE**

. . . OR PAGE DOWN

Department of Urban & Regional Planning, University of Wisconsin–Madison/Extension and Wisconsin Department of Natural Resources

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Project Team

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Contents

Notes to the Reader

Abbreviations used in this publication:

WDNR—Wisconsin Department of Natural Resources
UWEX—University of Wisconsin Extension

Obtaining publications:

WDNR Publications listed in this document may be obtained by contacting the closest WDNR Service Centers listed in Appendix B.

UWEX publications listed in this document may be obtained by contacting University of Wisconsin Extension Cooperative Extension Publications, 630 W. Mifflin St., Rm. 170 Madison, WI 53703 Phone: 608/262-3346 or toll free at 877/947-7827. Home page: *http://www1.uwex.edu/ces/pubs/*.

The Planning Advisory Service publications listed in this document are available from the American Planning Association at: *http://www.planning.org/bookstore/default.asp*.

Foreword

How we use land and the land decisions we make today are perhaps the most important, long-term environmental issues facing Wisconsin. The vast majority of land in Wisconsin is, and will remain, privately owned, and individual landowners, developers, and local governments are the principal land use decision-makers. Whether land is public or private, we are all stewards of the land.

Change is inevitable in Wisconsin. Wisconsin citizens want economic opportunities, attractive places to live, and convenient places to recreate. These things do not need to be mutually exclusive.

However, poorly planned, scattered development across the state poses serious risks to natural resources—habitat, water quality and quantity, air quality, scenic values, and more. The comprehensive planning and "smart growth" law provides a new opportunity to protect the resources we value so that future generations will know the same vistas and resources we treasure today.

Local governments are uniquely positioned to balance the needs of development while maintaining a healthy environment. This guide tries to offer some help for communities to:

- better identify, understand, and protect the natural resources within their boundaries;
- identify potential environmental issues and conflicts in a land use and development context; and
- consider possible strategies to use in preparing a comprehensive plan that promotes land uses that address the natural environment of our communities.

> "All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. . . the land simply enlarges the boundaries of the community to include soils, waters, plants and animals. . . In short, a land ethic changes the role of Homo Sapiens from conqueror of the land to plain member and citizen of it."—Aldo Leopold

Introduction

Wisconsin's comprehensive planning law, signed into law in October 1999, provides local governments with a definition of a comprehensive plan. According to this definition, a local comprehensive plan includes at least the following nine elements: Issues and Opportunities; Housing; Transportation; Utilities and Community Facilities; Agricultural, Natural and Cultural Resources; Economic Development; Intergovernmental Cooperation; Land Use; and Implementation. The comprehensive plan definition is the same for cities, villages, towns, counties, and regional planning commissions.

The definition is intended to provide local governments with a broad policy framework for addressing many of the issues that local governments confront on a daily basis. The definition is important because beginning on January 1, 2010, any program or action of a local government that affects land use must be consistent with that local government's comprehensive plan.

This guidebook was developed to help Wisconsin communities plan for natural resources as part of the comprehensive plan. It provides reference information to the many resources available through federal, state, regional, county, and local programs that can help communities make informed decisions about these environmental topics. It is not intended to constrain or dictate the manner in which local governments prepare their local comprehensive plan.

Natural resources relate to most, if not all, of the comprehensive plan elements. As a result, natural resource issues may arise in numerous places in the comprehensive plan. For example, local governments need to plan for natural resources as part of the Agricultural, Natural and Cultural Resources Element. The Agricultural, Natural and Cultural Resources Element is defined in the law as:

> *A compilation of objectives, policies, goals, maps and programs for the conservation, and promotion of the effective management, of natural resources such as groundwater, forests, productive agricultural areas, environmentally sensitive areas, threatened and endangered species, stream corridors, surface water, floodplains, wetlands, wildlife habitat, metallic and nonmetallic mineral resources, parks, open spaces, historical and cultural resources, community design, recreational resources and other natural resources.* Wis. Stat. § 66.1001(2)(e).

The use of the term "such as" in the law makes this list illustrative of natural resources that may be found in a particular community. Not all communities will have all these resources. Some communities may have natural resources not included in this list for which they will want to plan. The key to this element is identifying those resources (agricultural, natural, and cultural) that the community wants to protect.

Other guidebooks available on elements of the Wisconsin comprehensive planning law:

- *Housing Wisconsin: A Guide to Preparing the Housing Element of a Local Comprehensive Plan*
- *Transportation Planning Resource Guide: A Guide to Preparing the Transportation Element of a Local Comprehensive Plan*

These publications are available from the Office of Land Information Services at *http://www.doa.state.wi.us/olis/complanning.asp* or by calling 608/267–2707.

Additional guidebooks are being prepared on planning for agricultural resources, historic and cultural resources, intergovernmental cooperation, and economic development.

In addition, natural resource issues arise in other elements of the comprehensive plan. For example, the Utilities and Community Facilities Element is defined, in part, as:

> *A compilation of objectives, policies, goals, maps and programs to guide the future development of utilities and community facilities in the local governmental unit such as sanitary sewer service, storm water management, water supply, solid waste disposal, on-site wastewater treatment technologies, recycling facilities, parks. . .*Wis. Stat. § 6.1001(2)(d).

The Utilities and Community Facilities Element focuses on natural resources in the context of local facilities that are necessary to serve existing and new development. Are existing facilities adequately meeting the needs of the community? Some facilities have a direct impact on where new development will occur and at what scale (such as sewer lines). Other facilities address the consequences of development (such as managing for stormwater runoff).

The Economic Development Element requires, in part, that local government: "*evaluate and promote the use of environmentally contaminated sites for commercial or industrial uses."* Wis. Stat. § 66.1001(2)(f). This element encourages local governments to promote the reuse of contaminated land (or brownfields) as an economic development strategy.

The Land Use Element requires, in part, that the local government:

> *. . . include a series of maps that shows current land uses and future land uses that indicate productive agricultural soils, natural limitations for building site development, floodplains, wetlands and other environmentally sensitive lands, the boundaries of areas to which services of public utilities and community facilities . . . will be provided in the future . . . and the general location of future land uses by net density or other classifications.* Wis. Stat. § 66.1001(2)(h).

The Land Use Element is a central part of a local comprehensive plan. Through this element, a comprehensive plan can encourage the protection of natural resources and growth and economic development in areas designated in the Land Use Element.

Natural resources will also arise in some of the other elements of the comprehensive plan. Indeed, that is one reason why comprehensive planning is so important—the policies, goals, and objectives of one element often relate to other elements. Therefore, the elements cannot be viewed in isolation from one another.

Part I

Part I provides an overview of the planning process for natural resources. An important component of that process is for communities to identify and map those resources the community wants to protect. Conducting an inventory of natural resources will help communities identify what and where natural resources—water, wildlife, mineral, etc.—are located in the community. Through this planning process, communities also establish goals, priorities, and policies for protection, restoration and management of their resources.

CHAPTER 1

Planning for Natural Resources—An Overview

Why plan for Natural Resources?

A simple answer is that environmental health, measured by the quality and quantity of natural resources, is a cornerstone to the quality of life.

Natural resources are often a defining feature for local communities throughout the state—the Lake Michigan and Lake Superior lakefronts and coastlines; the Niagara Escarpment; the lakefronts in cities like Milwaukee, Sheboygan, and Manitowoc; the isthmus in Madison; the lakes, wetlands, and forests of the Northwoods; the bluffs along the Mississippi River and the southwestern Driftless Area; the Baraboo Hills in Sauk County; and the glacial drumlins of Dodge County, to name just a few.

We depend on natural resources in many ways: to provide a clean and abundant supply of groundwater and surface water; assure safe air to breathe; and to provide a natural landscape of terrestrial and aquatic habitats, such as forests, prairies and wetlands that are fundamental to a healthy and diverse biological community. Natural resources include the parks, trails, scenic areas, and other outdoor places we rely on for recreation. Also, natural resources are essential to a vibrant economy—measured in tourism revenues, enhanced property values, sustainable agriculture and wood products, low cost raw materials (such as sand, gravel, and stone), available water for manufacturing processes, etc.

Wisconsin's natural resources are facing significant threats due to increasing human demands by a growing state population. Conversely, our natural resources generally do not increase to meet the extra demand. Unplanned or poorly planned development patterns in the last several decades, coinciding with population growth, have increased demand for water, land, and raw materials. Rural landscapes are being transformed by a demand for "healthy country living", sometimes to the detriment of established neighborhoods and communities. This rural migration along with the expansion of the urban fringe, forces local governments to consider expanding their services to meet the demands—sometimes costing more than will be recovered in new tax base revenues.

Land use conflicts are common in Wisconsin communities. Examples of conflicts include annexation battles, loss of farmland and family-owned farm operations, water rights debates, construction of new highways, growing energy demands, private property rights, and government regulation.

Direct impacts of current and projected development patterns include habitat loss and fragmentation. The changing of the landscape from undeveloped to developed areas, adds to the amount of impervious surfaces, such as roads and rooftops. This increase in the amount of impervious surfaces can lead to potentially negative changes in watershed hydrology, water quality, stream flows groundwater recharge areas, and sedimentation of waterbodies. Impervious surfaces also lead to a phenomenon called the "urban heat island effect" where the air temperature in industrial parks and commercial areas can be 5–10 degrees hotter than surrounding areas with green space.

Planning for development patterns that do not provide a connection between various land uses and transportation alternatives indirectly affect air quality by increased reliance on motor vehicles which contributes to reduced air quality. Certain patterns of development encourage increased use of motor vehicles, which is associated with the growth of air pollutant emissions contributing to global climate change.

There are many state and some federal regulations designed to protect Wisconsin's natural resources. Some state laws, including those for floodplains, shorelands and wetlands, establish minimum use and protection standards that must be adopted and administered by local government zoning ordinances. But not all natural resources are protected by state law. Local governments throughout the state have the flexibility to plan for and develop their own local ordinances to deal with the unique land use issues/conflicts in their community and to protect the natural resources that they value most. Examples might include the protection of steep slopes from development, protection of native prairie grasslands, and tree conservation ordinances. Local governments, empowered with land use planning authority are also in a strong position to influence the direct and indirect environmental effects of current and future development patterns and practices.

Agricultural, Natural and Cultural Resources Element Format

As mentioned in the Introduction, natural resources relate to most, if not all, of the comprehensive plan elements. However, the major focus on natural resources is in the Agricultural, National and Cultural Resources Element. While the Wisconsin Statutes define the content of the Agricultural, Natural and Cultural Resources Element, the Statutes do not prescribe a specific format for the plan document. Depending on the unique resources in each community, a community may want to integrate agricultural and cultural resources into this element or create separate elements or "sub-elements" that address these separately. Nonetheless, use of a common format would be helpful to State, regional, and county agency staff, to builders and developers, and to others routinely involved in multiple communities. While communities are free to choose their own format, the following is a possible format for any of the elements:

Executive Summary
A brief overview of the major points of the element is important for people with little time to read the entire element.

Context
This includes an explanation of why the element was developed and acknowledges contributing people and agencies to demonstrate the breadth of participation in the planning process.

Data and Analysis
This section summarizes or includes a description of the existing natural resources in and around a community and trends related to those resources. Maps are an effective tool to describe the type and location of natural resources such as waterways, land cover type, soils, recreation and natural areas, environmental corridors, special wildlife type and use patterns, land in protective ownership, etc.

Goals and Objectives
This section describes your community's goals and objectives for the future of local natural resources. Establishing goals and objectives will direct natural resource policy and decision making in the future. This section should also relate to the overall community goals established in the Issues and Opportunities Element. Maps can be used to help describe desired future conditions.

Policies, Programs, and Actions

This section describes policies and implementation strategies to meet the above goals and objectives. The description of implementation strategies may also appear in the Implementation Element. Strategy implementation schedules can have either short or long time frames.

Who should be involved in planning?

The comprehensive planning process will include the local governing body (who ultimately adopts the comprehensive plan) and the local government's plan commission (who has to recommend approval of the comprehensive plan to the governing body). Section 66.1001(4) of the Wisconsin Statutes also requires public participation throughout the process.

As part of the overall comprehensive planning process, a local community may also decide to create a separate "advisory committee" or "task force" to assist in the preparation of the plan. A wide set of interests should be reflected by such a committee or task force.

For natural resource issues, communities may also want to seek input from natural resource professionals in federal agencies, state agencies (such as the Wisconsin Department of Natural Resources (WDNR)), Regional Planning Commissions, local planning departments, private planning consultants, colleges and universities, the University of Wisconsin Extension, outdoor recreational groups, and environmental organizations. Representatives from special purpose units of government, such as lake districts and metropolitan sewerage districts, should also be included in the planning process.

Broad public involvement is critical throughout the planning process. Business owners, realtors, builders, forest landowners, farmers, and other interests that might be prevalent in a community should all be included some way in the planning process. Be sure to also include other groups such as minorities, low-income persons, elderly, and the disabled.

Questions to ask about who to involve include:

- How well are natural resource interests represented on these various bodies?
- Is there broad public representation? (Is there representation of all or most sectors of the community?)
- Are the ranges of people who will be impacted by this plan represented?
- Is there a need for a subgroup to study certain natural resource issues?
- Should professional assistance, either in the form of a facilitator or a lead consultant to spearhead the process, be used?

ADDITIONAL RESOURCES

A Guide to Planning and Smart Growth Statutes, (Wisconsin) Office of Land Information Services (2000), available at web site: *http://www.doa.state.wi.us/olis/complanning.asp.*

Involving Citizens: A Guide to Conducting Citizen Participation, by Wilbur A. Wiedman, Wisconsin Department of Natural Resources, Bureau of Information and Education (1992).

The Planning Process

Once the community has figured out who needs to be involved, it's time to start the plan development process. The unique character of a community makes the application of a single planning model for preparing a comprehensive plan impractical. The following are steps from a traditional planning process that can help local governments address natural resources in the comprehensive planning process.

Natural Resources Inventory

Knowledge about existing natural resource conditions, trends, and opportunities is fundamental to a successful planning process. An inventory of natural resources is essential when preparing a comprehensive plan since the extent, type, locations, limitations and benefits of natural resources will affect planning and policy judgments. A good way to describe natural resources is with a brief narrative and maps. (Ideally the maps should use geographic information system (GIS) technology for ease in future updating.)

Appendix A identifies sources of information for the natural resources inventory. The level of detail may vary considerably among communities. Some communities have detailed geographic systems from which to assemble background information. Other communities may not have reliable or accessible sources of data, and must rely initially on federal, state, regional, county, and private sources of information.

The information gathered in your inventory will assist the community in making informed decisions relative to the goals of natural resource use, protection, and restoration. Since the physical environment has fixed locations, whereas a community has options regarding siting the footprint of human development, the information collected in the natural resources inventory will also help in preparing the other comprehensive plan elements.

Some examples of natural resource information to inventory include (subject to site-specific variations):

- Parks and recreational areas
- Open space
- Navigable waters, wetlands, ponds, streams, floodplains, and shorelands
- Environmentally sensitive areas, endangered/threatened species, natural areas
- Aquifers and their recharge areas
- Soils, topography, drainage patterns, and stormwater management
- Agricultural lands (prime agricultural soils, unique agricultural lands)
- Forests, woodlands, prairies, and other vegetation cover types
- Historic and archeological sites
- Landfills and brownfields
- Aggregate resources, such as sand and gravel deposits
- Natural geologic features and scenic areas
- Ridgetops, blufflands, and areas with steep slopes
- Air quality
- Local energy resources

Natural Resources Analysis

As the community develops the inventory, the community will need to consider the present condition of local natural resources, and determine whether protection, enhancement, or restoration is needed. Questions to ask when analyzing the inventory might include:

- **Resource quantity questions**

Is there enough open space? Are there adequate water supplies for existing and future residential, commercial, and industrial areas? Where would new water supplies be located?

- **Resource quality questions**

Are there water quality problems present in lakes or groundwater that need to be addressed before development can occur? How will stormwater runoff be addressed?

- **Resource values questions**

Are there particularly beautiful views, wildlife habitat, or other important ecological or environmentally sensitive areas that need protection in order to maintain or create community character?

What limitations to development do natural resources (e.g., wetlands, steep slopes) present?

Communities should consider how natural resources relate to other features in the community such as the location of existing housing, commercial areas, and transportation facilities including transit, bike paths and roads. The community should also consider how natural resources relate to one another. For example, is it possible to preserve and/or create an interconnected open space network (an environmental corridor) connecting certain resources with one another, including those of adjacent municipalities?

Goals, Policies and Objectives for Natural Resources

Next, the community should articulate goals, policies and objectives for the conservation and effective management of natural resources. Goals are the things that a community hopes to accomplish—how the community would like to be in the future. They provide direction for community decisions. In setting goals, the community should answer the following questions: What do the people of your community see as their important natural resources? How should the community balance future development with the natural resource preservation? How will the development of the community affect the surrounding region? What are the community issues related to those resources?

The community then needs to establish policies. Policies are used to guide community decisions in pursuit of a goal. In setting policies, the community should answer the following question: What does the community want to do to meet its goals for natural resources?

The community also needs to establish objectives. The word objective is subject to a range of interpretations. Sometimes "objectives" are defined similar to a goal—the end toward the attainment of which plans and policies are directed. Other times "objectives" are defined as specific, attainable, and measurable statements of the actions the community will take to carry out a plan. Communities need to define how they will use these terms.

Below are examples of some natural resource goals and policies:

Goal: **Improve the quality of surface water.**

Policies:
- Develop and administer non-point source pollution prevention and construction site and erosion control programs designed to improve water quality of the surface waters.
- Identify and protect major drainage corridors through watershed planning in order to aid in the management of stormwater runoff.

Goal: **Preserve sensitive natural resource areas and habitat.**

Policies
- Identify and protect environmental/wildlife corridors, particularly those that link major blocks of protected natural resource areas.
- Encourage the incorporation of environmental/wildlife corridors into development plans.
- Target key areas within the environmental/wildlife corridor for acquisition as part of a local/regional open space plan.
- Target redevelopment of brownfields to take advantage of existing infrastructure.

Goal: **Protect groundwater quality and quantity.**

Policy:
- Identify ways to protect aquifer recharge areas from risk of contamination.

Goal: **Minimize conflicts between existing recreation lands and neighboring land uses.**

Policies:
- Examine and modify zoning regulations so that established recreation uses are not jeopardized by adjacent land development patterns.
- Establish a recreation land set-aside program to meet future recreation needs.
- Require developers to include recreation lands in new subdivisions, or contribute funds for future recreation and open space land acquisition.

In setting goals and policies, communities need to rely on the information gathered in the earlier steps and then explore alternatives. Evaluation of alternative ways to achieve community goals is a critical part of the planning process. The community also needs to establish indicators to measure the community's progress toward achieving its goals.

ADDITIONAL RESOURCES

Building Our Future: A Guide to Community Visioning by Gary P. Green, Anna L. Haines, and Steve Halebsky, University of Wisconsin Extension, Publication #G3708 (2000). Available at: *http://www1.uwex.edu/ces/pubs/pdf/G3708.PDF.*

Implementation Programs and Actions

After developing natural resource goals, policies, and objectives, communities need to develop specific programs and actions to implement the policies. Local governments across the state have numerous options available in planning for natural resources and developing different implementation tools. In some instances, there are state regulatory programs that set minimum standards local governments must follow, such as shoreland setbacks. In evaluating local natural resource issues, communities may decide that they want to do more than these state minimums. For many natural resource issues, the state does not set standards that local communities must follow; in these cases, the responsibility for protecting natural resources lies with landowners and local governments.

The Implementation Element of the comprehensive plan requires that the local community develop strategies to carry out the goals and policies of the plan. Section 66.1001(2)(i) of the Wisconsin Statutes specifically requires that the Implementation Element include:

> *A compilation of programs and specific actions to be completed in stated sequence, including proposed changes to any applicable zoning ordinances, official maps, sign regulations, erosion and storm water control ordinances, historic preservation ordinances, site plan regulations, design review ordinances, building codes, mechanical codes, housing codes, sanitary codes or subdivision ordinances, to implement the objectives, policies, plans and programs contained in [the other elements].*

The programs and actions that a community will take to implement the Agricultural, Natural and Cultural Resources Element can be included as part of that element and restated in the Implementation Element. This may make it easier to integrate the various elements of the comprehensive plan.

The Implementation Element requires that local communities "describe how each of the elements of the comprehensive plan will be integrated and made consistent with the other elements of the comprehensive plan." Wis. Stat. § 66.1001(2)(i). For example, implementing the goals and policies of the Agricultural, Natural and Cultural Resources Element will need to correspond to actions undertaken in other elements such as land use, economic development, and community facilities.

Some examples of how the elements relate to one another include:

Issues and opportunities. Include information on natural resources as part of the background information on the community required to be included in this element. The overall community objectives, goals, and policies should also reflect the important natural resources in the community.

Housing. Natural areas and local natural resources should be a consideration in housing goals and related strategies. Actions that protect natural resources must be considered in concert with goals to enhance housing opportunities or affordability.

Transportation. Transportation corridors can have significant direct and indirect adverse effects on natural areas. Some corridors serve a recreational purpose and are enhanced by preservation of viewsheds, buffers and judicious use of narrower right-of-ways and grading.

Utilities and community facilities. The provision of community facilities and services, such as public sewer and water, has a significant impact on development patterns. The designation of future utility and facility service areas should avoid natural resource areas that the community wants to protect.

Economic development. Natural resources often support local manufacturing industries, including agriculture, mining, and paper and pulp industries. Natural resources also support tourism and recreation. Economic development priorities should be compatible with actions to enhance or protect natural resources in a comprehensive plan.

Intergovernmental cooperation. Many natural resource issues extend beyond the boarders of a community. In the context of planning for natural resources, intergovernmental cooperation might entail working with adjacent units of government, the state and regional governing bodies, the Indian nations, and the federal government. In addition, it may mean working with special purpose units of government that have a direct effect on natural resources. Some of the special units of government that might be within your community include school districts, metropolitan sewerage districts, sanitary districts, lake management districts, and farm drainage districts. Exchange of natural resources databases and coordination in an effort to establish common goals and objectives for natural resources should be encouraged.

Land use. Areas identified for protection in the natural resource element, such as floodways and flood plains, or areas that are natural flowages or wetlands, should be identified in the land use element as unsuitable for development.

Implementation. Identify the actions the community will take to implement the natural resource goals and policies developed in the Agricultural, Natural, and Cultural Resources Element.

Natural resource issues also need to be integrated and made consistent with agricultural and cultural resource issues—the other resources covered in the Agricultural, Natural and Cultural Resources Element.

Although historic, agricultural, and natural resources are enumerated together in statute, it is important to coordinate and balance the preservation of natural resources with that of historic resources and agricultural resources. In some cases the preservation of natural resources will easily coincide with the preservation of historic resources and conservation of agricultural lands. For instance, many local communities have preserved prehistoric mound groups by including them within local public parks. Good examples include the Village of Hancock's Whistler Mounds Park in Waushara County and the City of Sheboygan's Indian Mound Park, both of which preserve and interpret a large grouping of Native Indian Mounds as part of a larger open space.

At times, conflicts between the preservation of natural, agricultural and historic resources may occur. To resolve such a conflict, a careful examination of the alternatives available and the values inherent in the different sets of resources should be conducted. For instance, the retention of a historic boathouse should be considered whenever a lakeshore restoration plan is developed.

Evaluation and Revision

Plans, even after completion, should be flexible documents, and as such need periodic re-evaluation and updating. In fact, the Implementation Element requires that comprehensive plans must be updated, at a minimum, at least once every ten years. The Implementation Element also requires that local governments include a mechanism to measure the local governmental unit's progress toward achieving all aspects of the comprehensive plan. Key questions to ask include: Are the goals being met? If not, why? Does the community need to build different mechanisms to achieve the goals, or, are the goals still appropriate? These are questions that can be revisited in the evaluation and revision process.

CHAPTER 2

An Overview of Some General Implementation Tools

Choosing Tools

There are many 'tools' a community can use to achieve its goals. Some are regulatory in nature, and others are not. Many times a complex problem needs to be approached with a wide variety of tools. This chapter briefly summarizes some of the various natural resource related general tools available to local governments to help implement their comprehensive plans.

There is no one "cook-book" that should be followed to achieve success. Each community's physical setting, landscape, and natural resources will be different. Existing development patterns, community problems, projected growth rates and the natural resources opportunities and concerns will also be unique and will require different approaches and solutions from local governments and its citizens. Some of these tools also require that communities commit sufficient staff and financial resources to properly administer them.

1. Education & Citizen Participation

Just as citizen involvement is an important step required throughout the planning process, it is also an essential implementation tool. Citizens and local officials must be made aware of the natural resource goals of their comprehensive plan when they consider and make decisions such as rezoning a parcel of land for a proposed new development. Citizens need to understand the relationship between natural resources and economic development, land use, community facilities, and transportation. Citizens should also be encouraged to participate in the comprehensive planning process. The more participation, the more ownership of the plan will be achieved. As a result, natural resource goals will receive important consideration in the land use decision-making process.

Education is also an important tool for encouraging private action. For example, educating property owners along lakeshores about natural landscaping techniques can help improve water quality in those lakes.

2. More Detailed Information (e.g., Environmental Assessments)

Education can also take the form of more detailed assessment of the potential impacts that certain development activities may have on natural resources. Some states (Minnesota, for example) require that local governments prepare environmental assessments on new developments of a certain size. Wisconsin does not have a similar requirement for local governments. However, Wisconsin law does require that state agencies prepare environmental assessments or impact statements before they take certain actions (e.g. when the Wisconsin Department of Transportation sites and constructs a new highway or undertakes a major rehabilitation project, WDNR issues regulatory permits, etc.).

Nonetheless, some local governments in Wisconsin have found it helpful to include within zoning and/or subdivision ordinances a requirement for an environmental assessment to be conducted for certain development proposals. The environmental assessment provides the community with detailed information about the project and its potential environmental and socio-economic impacts so the local government can make

informed decisions about the proposed development. In addition, the information could be used to work with the developer to modify the project (design, location, etc.) to minimize impacts on the environment. The City of Middleton, for example, requires an environmental assessment for certain developments as part of its subdivision ordinance.

3. Other Plans

Comprehensive plans establish the general policy framework for local decision-making. As part of the comprehensive planning process, a community may determine that an implementation strategy is to prepare more detailed plans to fully address certain issues. These plans may cover a certain area such as a neighborhood plan, a lake management plan, or a waterfront redevelopment plan. These plans may also more specifically address certain community functions such as wastewater treatment facilities.

4. Regulatory Tools

Regulatory tools stem from local government's responsibility and authority to protect public health, safety, and welfare. Examples of these tools include the following:

a. Zoning. Zoning regulates the use of land, lot size, and the height and bulk of structures. A general zoning ordinance is probably the most commonly used land use implementation tool. Over time, more sophisticated zoning techniques have been developed. Some of these techniques are summarized below. It is important to note that the administration of many of these techniques can be complex. Communities may need to have a professional planner on staff to administer the ordinance.

i. Performance zoning. Performance zoning is a method that permits controlled development while also being sensitive to the landscape. It tries to regulate the impacts of land uses, rather than the uses themselves, by outlining general goals for developers that they can meet in different ways. Landowners are permitted a wide variety of uses, so long as they meet certain numeric standards such as a certain ratio of impervious surfaces, a certain density, a certain amount of open space, or certain noise level standards. Note: Performance zoning can be complex and would likely require a professional planner on staff to administer the ordinance.

ii. Overlay zoning. Overlay zones allow special regulations within all or a portion of a zoning district or several districts. This type of zoning can be helpful if there is one particular resource that needs to be protected a consistent way, regardless of what district it is located in. Shoreland regulations are an example of an overlay. Overlay zones are also common for wellhead protection areas and groundwater recharge areas. For an example of a "Sensitive Natural Environmental Areas" overlay district, see: *http://www.mnplan.state.mn.us/pdf/2000/eqb/ordinances/managing.pdf.*

iii. Incentive zoning. Incentive zoning allows developers to provide additional amenities such as open space in exchange for higher densities, additional floor area, or other property enhancements.

iv. Planned Unit Developments (PUDs). Planned unit developments (also sometimes referred to as "planned development districts") allow developers to vary some of the standards in local zoning ordinances to provide for innovative approaches that may allow for better design and arrangement of open space to protect natural resources. PUDs require flexibility from both the developer and local government.

b. Subdivision regulations. Subdivision regulations allow communities to control the division of land and the quality of development by outlining the subdivider's responsibility for installing on-site facilities, such as roads, and by ensuring the availability of public facilities, such as parks, sewers, and water, to handle development. Often subdivision regulations include dedication requirements for parks. Subdivision regulations can also address land suitability and environmental and design issues.

c. Official maps. Official maps show existing and planned public facilities such as streets and parks. They can also show historic districts and waterways. The maps can be used to restrict the issuance of building permits within the limits of the mapped areas. The maps are an effective means to reserve land for future public use.

d. Density Transfers. Density transfers can take several different forms. Some programs allow the transfer of development rights (TDR) from one parcel that a community wants to protect to another parcel where the community wants development to occur. The person who develops the latter parcel compensates the owner of the burdened property for the limitations on development.

A more common form of density transfer is the transfer of building sites on a single parcel. This form of transfer occurs under some cluster development ordinances or PUDs. Development is directed to one portion of a parcel away from features on the parcel that a community wants to protect. Eau Claire County has a voluntary density transfer ordinance for preserving agricultural areas.

5. Private Action Tools

a. Non-Profit Conservation Organizations. Non-profit conservation organizations such as land trusts are private organizations established to protect land and water resources for the public benefit. Land trusts often protect natural resources by owning the land or by holding a conservation easement which limits the use of the land to the terms specified in the easement. Land trusts and non-profit conservation organizations are eligible to participate in state grant programs that fund land or conservation easement acquisitions.

For further information about land trusts contact Gathering Waters Conservancy which helps coordinate land trust activities throughout the state: http://www.gatheringwaters.org.

6. Acquisition Tools

a. Land acquisition. Communities and non-profit conservation organizations can acquire Land for conservation purposes simply by purchasing it outright. This is recommended when public access to the property is required.

b. Conservation Easements. Conservation easements limit land to specific uses and thus protect it from development. These voluntary legal agreements are created between private landowners (grantors) and qualified land trusts, conservation organizations or government agencies (grantees). Conservation easements may be purchased but are frequently donated by conservation-minded landowners. Grantors can receive federal tax benefits as a result of donating easements. Grantees are responsible for monitoring the land and enforcing the terms of the easements. Easements can be tailored to the unique characteristics of the property and the interests of the landowner. Easements may apply to entire parcels of land or to specific parts of a property. The easement is recorded with the deed to the property to limit the future uses of the land as specified in the easement. Land protected by conservation easements remains on

the tax roll and is privately owned and managed.

c. Purchase of Development Rights (PDR). The purchase of development rights is a land conservation tool that communities can use to protect important natural resources such as farmland, hillsides, and wetlands. Under a PDR program, a unit of government (city, village, town, county, or state) or a nonprofit conservation organization (such as a land trust) purchases a conservation easement that limits the use of the land to accomplish a certain purpose, including protecting the land from development. The rights purchased are recorded in a conservation easement. PDR programs are voluntary and participants retain ownership of their land. They can sell or transfer their property at any time; but, because of the easement, the land is permanently protected from certain types of development.

The Town of Dunn in Dane County established a PDR program to preserve agricultural land and open space. Information about the Town of Dunn's program is available at *http://town.dunn.wi.us*. The Federal Farmland Protection Program within the U.S. Department of Agriculture provides funding for the purchase of agricultural easements. The program has help fund the Town of Dunn program and similar programs in Wisconsin. For information see *http://www.wi.nrcs.usda.gov/soil/prime/fpp.html.*

d. Eminent domain. Eminent domain allows government to take private property for public purposes, even if the owner does not consent, if the government compensates the property owner for their loss. Local governments may use eminent domain to acquire critical natural resource lands.

7. Fiscal Tools

a. Capital Improvement Program (CIP). CIPs help a community plan for the timing and location of capital improvements (facilities such as public sewer and water and parks). CIPs ensure proper local budgeting for capital improvements. The location of capital improvements has a major impact on development patterns.

b. Impact fees. These are financial contributions imposed on new development to pay for capital improvements such as parks and stormwater management facilities needed to serve the development. Impact fees must be carefully crafted to assure that new developments are not paying more than their fair share of the cost of such improvements.

c. State and federal resources. The Wisconsin Department of Natural Resources (WDNR) administers a variety of grant and loan programs designed to help communities assess and meet their needs in areas including recreation, clean water, and the protection of lakes, rivers, environmental corridors and sensitive plant and wildlife communities. Contact the Government Outreach staff at your WDNR regional office for information on these programs, or explore the WDNR Community Financial Assistance web site at: *http://www.dnr.state.wi.us/org/caer/cfa/cfindex.html.* For information on federal funding sources see the *Smart Growth Funding Resource Guide* available at: *http://www.smartgrowth.org/pdf/funding_resources.pdf*.

ADDITIONAL RESOURCES

Sample ordinances are available from a variety of organizations including the Wisconsin League of Municipalities (*http://www.lwm-info.org/*); the National Association of Counties (*http://www.naco.org/*); and the U.S. Environmental Protection Agency (*http://www.epa.gov/owow/nps/ordinance/*). Other useful materials are available from organizations such as the Local Government Environmental Assistance Network (*http://www.lgean.org/*), and the American Farmland Trust (*http://www.farmland.org*).

Guide to Community Planning in Wisconsin, by Brian W. Ohm, University of Wisconsin Extension, Publication # G3697 (1999), available at: *http://www.lic.wisc.edu/shapingdane/resources/planning/library/book/other/title.htm*

Achieving Environmentally Sensitive Design in Growth Areas through Flexible and Innovative Regulations, by Daniel Rosen, Maryland Office of Planning (1995).

Administration of Flexible Zoning Techniques, by Michael J. Meshenberg, Planning Advisory Service Report Number 318, Chicago: American Planning Association (1976).

Incentive Zoning by Marya Morris, Planning Advisory Service Report Number 494, Chicago: American Planning Association (2000).

The Principles of Smart Development, by the Oregon Transportation and Growth Management Program, Planning Advisory Service Report Number 479, Chicago: American Planning Association (1998).

Performance Standards for Growth Management, edited by Douglas Porter, Planning Advisory Service Report Number 461, Chicago: American Planning Association (1996).

Saving American Farmland: What Works, Northampton, Mass.: American Farmland Trust (1997).

Holding Our Ground: Protecting America's Farms and Farmland, by Tom Daniels and Deborah Bowers, Washington, D.C.: Island Press (1997).

Saved By Development: Preserving Environmental Areas, Farmland and Historic Landmarks with Transfer of Development Rights, by Rick Pruetz, Burbank, CA: Arje Press (1997).

Development Approaches

Although well intentioned, some conventional zoning and subdivision regulations can discourage environmentally sensitive design. However, these regulations can be refocused to encourage more environmentally sensitive development patterns and designs. The impacts of development depend not only on how much land is developed, but also the way in which land is developed. Sensitive natural areas such as streams, wetlands, floodplains, groundwater recharge areas, steep slopes, mature forests, critical habitat areas, and shorelines can be safeguarded through the design of local ordinances and programs. The first approach should always be to avoid disturbing sensitive areas. If impacts are unavoidable, then development should be designed to minimize impacts and limit disturbance to points of least sensitivity.

Local regulations need to be flexible to allow people a wide range of choices. Rather than local ordinances that promote uniform lot sizes, communities should explore alternative development approaches such as clustering and traditional neighborhood developments. Within a community, different development forms and densities are a better response to growth demands than one single solution. These approaches can also have less of an adverse impact on natural resources. In addition, communities should explore narrower road widths. Narrower street widths can reduce impervious surfaces that add to storm water runoff, resulting in decreased flooding and degradation of water quality. (Towns need to be mindful of the minimum design standards for town roads under section 86.26 of the Wisconsin Statutes.) Local communities can also reduce the setbacks of structures from the road to decrease the impervious surfaces caused by lengthy driveways. Local ordinances can encourage the use of natural drainage designs, tree protection, and the use of appropriate vegetation for landscaping. Road grades should permit variation when feasible to reduce tree removal.

Communities should explore possible revisions to their ordinances to address these issues. Some examples of different development approaches that can be more sensitive to natural resource issues are discussed below. There are many variations on these development approaches.

Infill Development

Infill development can accommodate new growth in an already developed area rather than using up new land on the periphery of a region. Because infill takes place in a developed area, it is often accessible via transit or walking, and requires shorter trip distances than development on the periphery, thus generating less air pollution than the same development on the periphery.

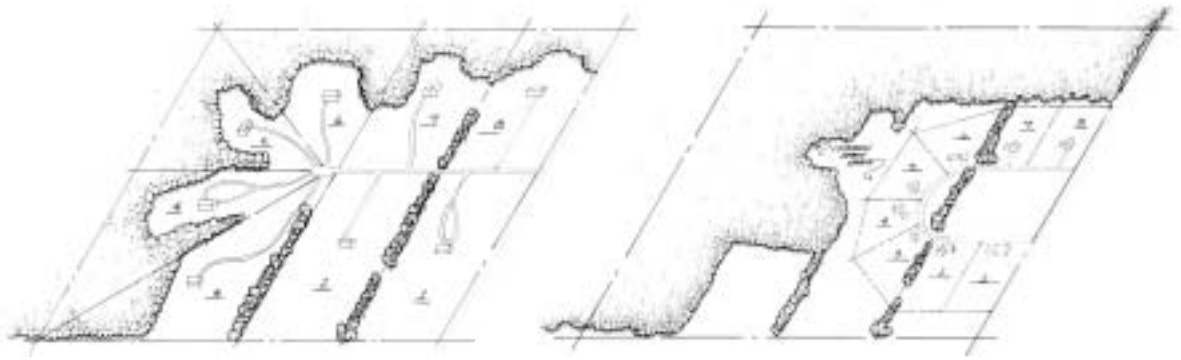
Communities should review their local ordinances and programs to ensure that they do not discourage infill development. The State of Oregon has developed an *Infill and Redevelopment Code Handbook* that is available at: http://www.lcd.state.or.us/tgm/codeassistance.htm. The State of Maryland has also developed models and guidelines for infill development. They are available at *http://www.mdp.state.md.us/planning/M&gs/infill/InfillFinal_1.pdf.*

Cluster Development & Conservation Subdivisions

Cluster development, also known as open space or conservation subdivisions, are an alternative approach to the conventional lot-by-lot division of land in rural areas that spreads development evenly throughout a parcel with little regard to impacts on the natural and cultural features of the area. Cluster development enables a developer to concentrate units on the most buildable portion of a site, preserving natural drainage

systems, open space, and environmentally and culturally sensitive areas. If appropriately planned and designed, cluster development can reduce the disruption and fragmentation of wildlife habitat. The comprehensive planning process should help identify areas where cluster development is appropriate.

Generally, cluster development allows for an adjustment in the location of residential dwelling units on a parcel of land as long as the total number of dwelling units does not exceed the number of units otherwise permitted in the zoning district. The dwelling units are grouped or clustered on only a portion of a parcel of land. The remainder of the site is preserved as open space, farmland, or as an environmentally and culturally sensitive area. This clustering of the dwellings into a small area is made possible by reducing the individual lot sizes. The open space is permanently protected and held in common ownership. Sometimes additional dwelling units may be permitted as a density bonus if certain objectives are achieved.



conventional subdivision **cluster/conservation subdivision**

ADDITIONAL RESOURCES

An ordinance for a conservation subdivision prepared by the University of Wisconsin Extension is available at *http://www.wisc.edu/urpl/facultyf/ohmf/projectf/consub.pdf.*

Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks, by Randall Arendt, Washington, D.C.: Island Press (1996).

Growing Greener: Putting Conservation into Local Plans and Ordinances, by Randall Arendt, Washington, D.C.: Island Press (1999).

Rural Development Guide for East Central Wisconsin Governments and Landowners, East Central Wisconsin Regional Planning Commission (1999).

Rural Cluster Development Guide, Southeastern Wisconsin Regional Planning Commission (1996).

Open Space Design Development: A Guide for Local Governments, Washington County (Minnesota) Planning and Administrative Services, Metropolitan Council, BRW, Inc. (1997).

Department Position on Cluster Development, WDNR (1999).

Traditional Neighborhood Development

Traditional neighborhood development is found in the older parts of Wisconsin's cities and villages—neighborhoods that often developed prior to World War II. A more recent example is Middleton Hills, a new development begun in the 1990s in Middleton, Wisconsin (near Madison). Traditional neighborhood development is one of a variety of planning concepts that share similar themes. These models include neo-traditional development, new urbanism, urban villages, hamlets, compact communities, transit-oriented development, pedestrian pockets, and the revitalization of existing traditional towns.

Traditional neighborhood development is a form of compact development. Compact development can accommodate new growth while minimizing use of undeveloped land. Because compact development uses less land, it can reduce habitat disruption and adverse impacts on wildlife, vegetation, and water quality. Regional travel studies have found that most compact development patterns produce less vehicle travel and fewer emissions of air pollutants than dispersed development patterns do.

Traditional neighborhood developments are designed to include a mixture of uses (e.g., residential, commercial, and public uses). Residential uses are mixed to provide a range of housing types, costs, and sizes. Traditional neighborhoods are also designed to provide for access via an interconnected network of circulation systems that facilitate walking, bicycling, and driving and promote transit use. Finally, traditional neighborhood developments are designed to be responsive to the cultural and environmental features of a site.

It is important that communities establish planning policies and objectives for traditional neighborhood developments. Section 66.1027 of the Wisconsin Statutes requires that cities and villages with a population of at least 12,500 residents enact an ordinance to allow traditional neighborhood development as a development option. The local ordinances must be adopted by January 1, 2002 and must be similar to a model traditional neighborhood development ordinance developed by the University of Wisconsin Extension. The law requiring that cities and villages adopt the ordinance states that the ordinance is not required to be mapped. A copy of the model ordinance is available at *http://www.wisc.edu/urpl/facultyf/ohmf/projectf/tndord.pdf.* Communities with populations of less than 12,500 should also explore the adoption of traditional neighborhood development ordinances.

ADDITIONAL RESOURCES

Ahwahnee Principles for Community Design. Available at: *http://www.lgc.org/community_design/*.

The State of Oregon has developed a *Model Development Code and User's Guide for Small Cities* and a *Commercial and Mixed Use Development Code Handbook* that are available at: *http://www.lcd.state.or.us/tgm/codeassistance.htm.*

Crossroads, Hamlet, Village, Town, by Randall Arendt, Planning Advisory Service Report Number 487/488, Chicago: American Planning Association (1999).

Suburban Nation: The Rise of Sprawl and the Decline of the American Dream by Andres Duany, et.al., New York: North Point Press (2000).

Visions for a New American Dream: Process, Principles and an Ordinance to Plan and Design Small Communities, by Anton Nelessen, Chicago: American Planning Association Planners Press (1994).

Reinventing the Village by Susan Sutro, Planning Advisory Service Report Number 430, Chicago: American Planning Association (1990).

Neighborhood-Based Planning, by Wendelyn Martz, Planning Advisory Service Report Number 455, Chicago: American Planning Association (1995).

Sustainable Development

Sustainable development generally means development that maintains or enhances economic opportunity and community well being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Comprehensive planning is recognized as a critical step towards more sustainable development. Comprehensive planning for sustainability can help achieve more efficient use of land, decrease traffic congestion, conserve important natural resources, engage citizens, and provide for economic prosperity. Planning for sustainability can also address microscale design features, such as promoting "green buildings" that conserve energy and use materials that are environmentally friendly.

Several Wisconsin communities have developed sustainable development planning processes. An example is Sustainable Racine (*http://www.sustainable-racine.com*).

According to research conducted by the Minnesota Round Table on Sustainable Development and based on the experiences of communities around the country, the following general characteristics describe communities that are sustainable places to live and work:

- Promote informed decision-making;
- Maintain natural and cultural assets;
- Promote local and regional economic prosperity;
- Promote a mutually supportive network of businesses;
- Account for the full environmental, social, and economic costs of new development;
- Plan, finance and provide public facilities and services in a timely, orderly, and efficient way;
- Develop a balanced transportation system that offers people choices to meet their diverse needs and energy-efficient, low-cost modes of travel;
- Use natural resources in a way that sustains them over time;
- Foster livable communities;
- Preserve community character.

A sustainable community also asks critical questions about its natural resources, including how it might:

- Use and replenish renewable natural resources;
- Use nonrenewable natural resources and eventually introduce substitutes;
- Provide alternative job opportunities for those displaced by changes in resource use;
- Minimize its overall energy use and maximize energy efficiency;
- Use Wisconsin's renewable energy sources;
- Optimize virgin resource use, reuse existing materials, use recycled and recyclable materials, and use wastes as feedstock or turn them safely back into the soil;
- Reduce reliance on persistent toxic substances;
- Maintain ecological processes and biological diversity;
- Work with its neighbors in tackling these issues.

ADDITIONAL RESOURCES

From Policy to Reality: Model Ordinances for Sustainable Development, Minnesota Planning (2000). Available at *http://www.mnplan.state.mn.us/SDI/ordinances.html*.

Sustainable Development: The Very Idea, Minnesota Planning (1998). Available at *http://www.mnplan.state.mn.us/press/veryidea.htm#View*.

Sustainable Communities Network, *http://www.sustainable.org*.

Center of Excellence for Sustainable Development, *http://www.sustainable.doe.gov*.

Multnomah County, Oregon, Department of Sustainable Community Development Land Use Planning Division, *http://www.multnomah.lib.or.us/lup/index.html*.

Wisconsin Environmental Initiative, Green Built Homes Initiative, *http://www.wi-ei.org*.

Wisconsin Green Building Alliance, *http://www.wgba.org*.

Building Alternatives: Resources to Promote Smart Building, Smart Growth, UW–Extension, Soil and Hazardous Waste Education Center (2000).

Planners Guide to Sustainable Development, by Kevin J. Krizek, Planning Advisory Service Report Number 467, Chicago: American Planning Association (1996).

Part II

Different communities will have different natural resource issues depending on what natural resources are located within a community. The following chapters are organized around specific natural resources. The chapters provide: 1) an overview of specific natural resources and some of the issues and concerns related to those resources; 2) an overview of state and federal laws and programs that apply to some of those resources and can influence local comprehensive planning efforts; and 3) programs and actions to help local communities conserve and promote the effective management of natural resources found in their community.

CHAPTER 3

Water Resources

Wisconsin's groundwater, lakes, rivers, streams, and wetlands are among the state's greatest natural resources. Fish, wildlife, and plants depend on water to give them life. People depend on water for many uses, including drinking, waste assimilation, and recreation. Water is also vital to industry and agriculture.

The state has significant responsibilities for protecting water resources under what is known as the "Public Trust Doctrine." The Public Trust Doctrine embodies the notion that the waters in Wisconsin are held in trust by the state for the benefit of all. There can be no private interests in waterways that adversely affect this public interest. In fulfilling its responsibilities under the Public Trust Doctrine, the Wisconsin Legislature has enacted laws and charged WDNR to protect water resources. Several of these laws directly affect local planning activities and need to be considered in the inventory and analysis that is part of the Agricultural, Natural and Cultural Resources Element and other elements such as Land Use. Local plans need to reflect the framework provided by these laws and, at a minimum, must be consistent with them.

The following sections provide an overview of many of the state and federal requirements related to water resources. In many cases, these are only minimum requirements. Communities may find that they need to adopt more restrictive requirements in order to meet the vision, goals, objectives, and policies articulated in their comprehensive plan. In other cases, the state may not have the authority to protect certain resources. Again, communities may find that they need to adopt local requirements to fill this "gap."

Navigable Waters

State requirements

In order to protect public rights in navigable waters, the WDNR has been given authority in Chapters 30 and 31 of the Wisconsin Statutes to issue permits affecting all navigable waters of the state. Navigable waters are waterways that have a *defined* bed and bank (i.e., a bottom or channel) and enough water to regularly support the smallest recreational watercraft on an annual recurring basis, including periods of high runoff.

Public navigable waters are distinguished by the "ordinary high water mark," which distinguishes lands held in trust by the public from private lands. For some activities, the ordinary high water mark delineates the waterward limits of local zoning authority and the landward limits of WDNR water regulation permit authority.

Any construction activity such as dredging and building bridges, dam construction, or breakwaters in lakes, rivers and streams requires state permits. This is also true for ponds and some streams that may be dry in parts of the year. For more information about the state permit process for construction activity see: *http://www.dnr.state.wi.us/org/water/fhp/waterway/rights.htm*. Local and/or federal permits may be required in addition to state permits for a single project. Local governments are not exempt from state permit requirements, although a different process authorizes certain state and municipal highway projects. Chapter TRANS 207 of the Wisconsin

The following are some of the activities that require permits from WDNR:

- Wharves, Piers, Swimming Rafts—Wis. Stat. § 30.13(1)
- Structures, including piers and boat shelters—Wis. Stat. § 30.12
- Boathouses and houseboats—Wis. Stat. § 30.121
- Bridges—Wis. Stat. § 30.123
- Grading on the bank, ponds—Wis. Stat. § 30.19
- Channel Changes —Wis. Stat. § 30.195
- Enclosures—Wis. Stat. § 30.196
- Dredging—Wis. Stat. § 30.20 (gives WDNR some authority over non-navigable streams)

Administrative Code governs this process.

Chapter 31 of the Wisconsin Statutes covers dam construction, dam safety, operation and maintenance, alteration or repair of dams, dam transfer and dam removal, and water level and flow control. Chapter NR 33 of the Wisconsin Administrative Code provides design and construction standards for large dams. For further information see the WDNR web page at: *http://www.dnr.state.wi.us/org/water/wm/dsfm/index.htm*.

Wisconsin also has several laws that affect development around certain water bodies. Check with your local WDNR office to see if there are other restricted water bodies in your area. Two examples are the St. Croix National Scenic Riverway and the Lower Wisconsin Riverway.

The lower St. Croix River between the dam near St. Croix Falls and its confluence with the Mississippi River in northwestern Wisconsin constitutes a relatively undeveloped scenic and recreational asset. The St. Croix National Scenic Riverway, includes its major tributary the Namekagon, was established in 1968 as one of the original eight rivers under the Wild and Scenic Rivers Act. The lower 52 miles were added to the system in 1972. The National Park Service administers the Riverway. Information is available at: *http://www.nps.gov/sacn/*.

The Wisconsin Legislature determined that preservation of this unique resource is in the public interest and directed the WDNR to develop guidelines for the protection and management of the riverway corridor. According to sections 30.27(2) and (3) of the Wisconsin Statutes, and NR 118 of the Wisconsin Administrative Code, counties, cities, villages, and towns within the area affected by guidelines are required to adopt ordinances that conform to WDNR standards.

Lands within the Lower Wisconsin Riverway District are to be maintained and protected to promote the physical and aesthetic characteristics of the riverway through permitting and purchase of riverway lands. Development restrictions are administered by an independent state agency, the Lower Wisconsin State Riverway Board (made up of local officials and recreation user group representatives). Additional information is available at: *lwr.state.wi.us*.

Local programs and actions

- **Educate about water resources**. Contact your local WDNR office or any of the references listed below for water resources educational materials.

- **Develop a lake or river protection plan.** Grants are available through the WDNR. They provide up to 75% of the funding for planning and carrying out protection and restoration projects on Wisconsin waters. More information is available at *http://www.dnr.state.wi.us/org/water/fhp/lakes/lakeplan.htm*.

- **Dam Maintenance and Removal.** Dams are an important part of many Wisconsin communities. Many have outlived their useful life, but some continue to be significant features of community identity as well. It is wise to consider their long-term status while planning for natural resources. Communities across Wisconsin may be faced with issues related to the repair or removal of an old dam within the long-term planning horizon. They can be very expensive to maintain and cause safety problems or damage to downstream property if they fail. Several communities in Wisconsin have chosen to remove old dams, releasing and restoring the natural stream. Removal of a dam typically costs two to five times less than its repair.

Where it is determined that a dam remains viable and serves a useful purpose, proper maintenance and water quality related measures should be implemented by

the appropriate organization.

The WDNR has a grant program to assist communities with financing repair, reconstruction, or removal of old dams. Chapter NR 335 of the Wisconsin Administrative Code covers the administration of the Municipal Dam Repair and Removal Grant Program to help communities with the decision making process associated with dams. The Wisconsin River Alliance, a statewide non-profit, non-partisan citizen advocacy organization for river protection and restoration, is also a valuable resource. Information can be found at: *http://www.wisconsinrivers.org/index.html*. The Wisconsin River Alliance also has a Dam Removal Toolkit (a guide and companion video) available for interested communities.

- **Work with Lake Districts.** Inland lake protection and rehabilitation districts (lake districts) are special purpose units of government administered by a local board of commissioners. They can be an important partner in local planning efforts. Lake districts have the authority to levy taxes, make special assessments, or charge user fees to finance lake management activities. A lake district can assume responsibilities for ownership, repair, maintenance and operations of a dam. Several of the WDNR financial assistance programs (lake planning grants and lake protection grants) are available to lake districts and local governments to support land use planning efforts as a means of protecting lake water quality.

ADDITIONAL RESOURCES

University of Wisconsin–Extension Water Resources Program provides information about water quality and natural resources education programs in Wisconsin at: *http://clean-water.uwex.edu/*.

The Water Resources Institute at the University of Wisconsin–Madison (*http://wri.wisc.edu/*) coordinates research programs applicable to the solution of present and emerging water resource problems.

A Model Local Ordinance to Regulate Piers, Wharves and Berths in Wisconsin: A Guide for Land Management Organizations, by William P. O'Connor, Wisconsin Association of Lakes (1996).

Law of the Land: A Citizens Guide to Influencing Local Land Use Decisions that Affect Water Quality, by Michael D. Dresen and Rita M. Kozak, UW–Extension and WDNR (1994).

Wisconsin Water Law: A Guide to Water Rights and Regulations, by Paul G. Kent and Tamara Dudiak, UW–Extension (Second Edition, 2001). Available at: *http://www1.uwex.edu/ces/pubs/pdf/G3622.PDF*.

Floodplains

Floodplains serve many important functions related to flood and erosion control. For example, floodplains provide areas where floodwaters are stored, reduce flood velocities (giving us more time to react to floods), reduce flood peaks, and reduce sedimentation. Floodplains also provide important functions related to ground water recharge, fish and wildlife habitat, and water quality (filter nutrients and impurities from runoff, process organic wastes, and help to moderate temperature fluctuations).

Floodplains are natural extensions of waterways and flooding is a natural physical event. When buildings are constructed in the floodplain, the floodplain's storage capacity is reduced. This causes the next flood of equal intensity to crest even higher than the last and often inundate areas outside the historic floodplain. The other functions of floodplains can also be lost.

FACT

▶ According to the Wisconsin Emergency Management Division, Wisconsin communities experienced significant flooding each year from 1990–2001, except 1994. A Federal Disaster Declaration was granted for nine of those years. Total damages to public and private property (including agricultural damages) during that time period totaled more than one billion dollars.

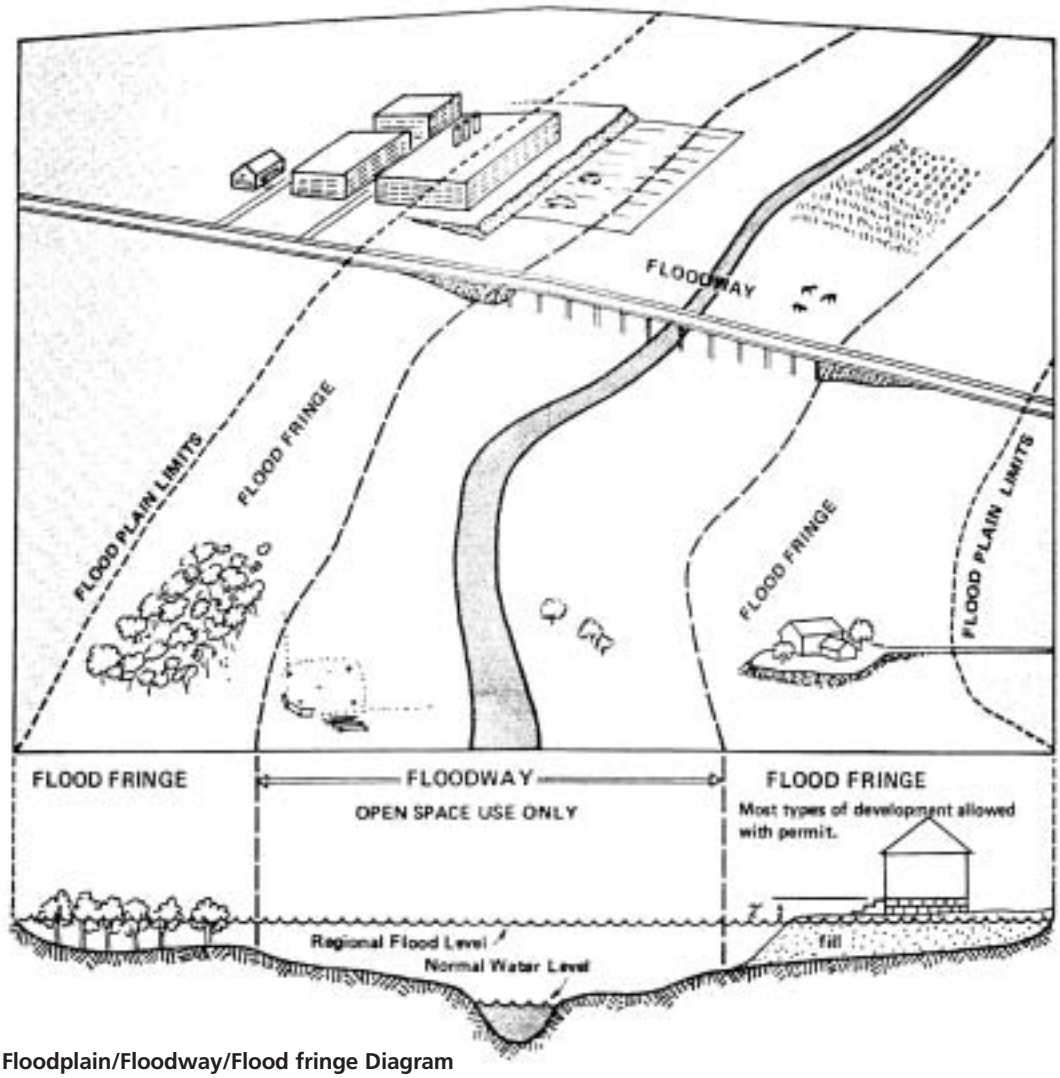
State and federal requirements

Counties, cities, and villages are required to adopt reasonable and effective floodplain zoning ordinances. The requirement is found in section 87.30 of the Wisconsin Statutes and Chapter NR 116 of the Wisconsin Administrative Code. Floodplain zoning is designed to protect individuals, private property and public investments from flood damage.

Floodplain zoning maps identify areas where major floods occur. Regulations prohibit development in the floodway, the most dangerous flood area. In other flood areas, the flood fringe, development that is built above flood levels and otherwise flood-protected is allowed if it is in accordance with local ordinances. For regulatory purposes, a floodplain is generally defined as land where there is a one percent chance of flooding in any year (also known as the 100-year floodplain).

In order to participate in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program, more than 480 Wisconsin cities and villages have enacted floodplain zoning ordinances that also comply with applicable federal standards. A few other municipalities have adopted floodplain zoning ordinances, but do not participate in the national insurance program.

Natural Hazards Mitigation Plans. Floods are one type of natural hazard eligible for the state's Hazard Mitigation Grant Program, which funds long-term mitigation measures. Grant recipients are required to develop a hazard mitigation plan that identifies natural hazards in the community, their potential impacts, and recommendations to mitigate potential damages from those hazards. As communities prepare comprehensive plans, they should consider planning for natural hazards and coordinate their comprehensive plans with this program. Further information is available from the following websites: *http://www.fema.gov/MIT/* and *http://badger.state.wi.us/agencies/dma/wem/programs.htm.*



Floodplain/Floodway/Flood fringe Diagram

Local programs and actions

State and federal regulations provide minimum standards for development in floodplains aimed at preventing increases in flood damages. These programs do not address many local situations or environmental concerns. Some local planning strategies include the following:

♦ **Educate residents about flood risks.** Educational information is available from WDNR and FEMA.

♦ **Accurately identify the floodplain.** Local governments can use flood insurance rate maps (FIRMs) to determine where new structures can be built. Mortgage companies also use the maps to determine whether homeowners will be required to purchase flood insurance. The maps are available from the National Flood Insurance Map Service Center, P.O. Box 1038, Jessup, MD 20794–1038 (1–800–358–9616). Older FIRMs might not be accurate because they were drawn at a more generalized scale. They also might not be accurate because of increased flooding due to changes in flood patterns in upstream watersheds and because of outdated technical assumptions. In the mid–1990s, Winnebago County, for example, developed more accurate floodplain maps

drawn to a more detailed scale. The revised mapping showed that many homes had been inappropriately identified in relation to various flood zones.

Communities should strive to update floodplain analysis and accurately map floodplains on large-scale topographic maps, using digital technology, if available. It is critical that new floodplain delineations be coordinated with WDNR and FEMA. Zoning maps and FIRMs should be updated to reflect the most current and accurate floodplain delineations.

♦ **Identify open space opportunities.** Local communities may want to target open space acquisitions to protect floodplains.

♦ **Implement effective floodplain ordinances.** A model floodplain zoning ordinance is available from the WDNR's local water management specialist or call 608/ 266–3093. Good administration and enforcement is critical to implementing the ordinance.

ADDITIONAL RESOURCES

WDNR's floodplain webpage:
http://www.dnr.state.wi.us/org/water/wm/dsfm/flood/title.htm.

Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability, Federal Emergency Management Agency. To order call 1–800–480–2520 and request FEMA 364.

Addressing Your Community's Flood Problems: A Guide for Elected Officials, Association of State Floodplain Managers, Inc., and the Federal Interagency Floodplain Management Task Force (1996). Copies are available from ASFPM Executive Office, 4233 West Beltline Highway, Madison, WI 53711, or call 608/274–0123.

Shorelands

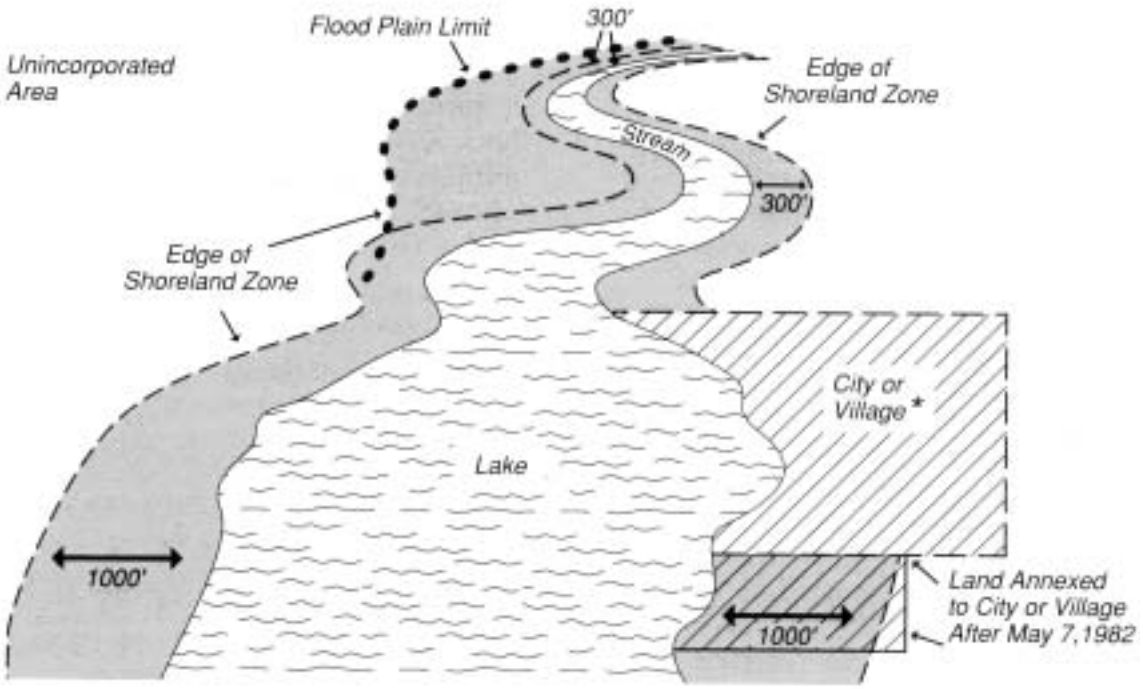
FACT

A 1997 study by WDNR, entitled *Shoreland Zoning Regulations do not Adequately Protect Wildlife Habitat in Northern Wisconsin,* revealed that undeveloped lakes averaged one frog per 126 feet of lakeshore, compared to one frog per 220 feet for developed lakes and one frog per 470 feet on very densely developed lakes.

In their natural state, Wisconsin's waters are protected by diverse vegetation along their shores. As development occurs, the fish, wildlife, water quality, and scenery begin to change. The very things that drew people to the water begin to disappear as well. Many homeowners and visitors seek out lakes and rivers as places to enjoy natural beauty in a quiet setting, yet the sheer number of users and riparian landowners can create use conflicts and put pressure on limited resources.

State requirements

Each county is required to zone by ordinance all shorelands in its unincorporated areas. This requirement is found in section 59.692 of the Wisconsin Statutes and Chapter NR 115 of the Wisconsin Administrative Code. Cities and villages are not required to adopt these general development standards. However, many municipalities choose to adopt similar regulations related to shoreline setbacks, lot size, construction site activities, and removal of shoreline vegetation. Shorelands include areas within 1,000 feet of a lake (including ponds and flowages) or 300 feet of a navigable stream or to the landward extent of the floodplain (whichever is greater). Development is restricted in the shoreland zone as summarized below.



General Shoreland Development Minimum Standards (county ordinances may be more restrictive)

Minimum lot sizes	100 feet minimum average width and 20,000 square feet for *unsewered* lots. 65 feet minimum average width and 10,000 square feet for *sewered* lots.
Setbacks	75 feet from ordinary high water mark for *all* structures except piers, boat hoists, and boathouses. Decks, screen porches, and other accessory structures must be set back. Certain unwalled or screened structures (gazebos, etc.) may be allowed closer than 75 feet.
Shoreline vegetation	removal of vegetation limited in the 35-foot strip area adjacent to the ordinary high water mark; no more than 30 feet in any 100 feet may be clear-cut.
Filling and grading	permits required to avoid erosion and adverse effects on habitat and water quality.
Sanitary codes	permits and standards for sewage systems and wastewater disposal are required.
Subdivision review	review of plans for public roads, utilities, storm water drainage, erosion control, etc. to manage the environmental effects of residential development.

*Section 59.692(7) requires that county shoreland zoning ordinances remain in effect after land is annexed to a city or village after May 7, 1982, until the city or village adopts its own ordinance that is at least as restrictive as the county ordinance.

Local programs and actions

♦ **Lake Classification Systems.** A growing number of counties have voluntarily adopted lake classification strategies to provide additional resource protection. These strategies go beyond the minimum standards required by the state under the shoreland zoning program discussed above. While each lake is unique, it is impractical and unrealistic to strive to manage all lakes individually. Lake classification suggests that it makes sense to place lakes into categories with management strategies best suited to them.

Lakes can be grouped based on hydrology, average depth, surface area, shoreline configuration, and sensitivity to pollutants and recreational use. This is a rational approach that allows lakes to be managed in a manner that considers the lake's capacity to support growth and development. The idea is that some categories of lakes are more vulnerable to problems associated with over use or are better suited to some uses than others. In recognizing these differences, a county or other unit of government is in a better position to implement appropriate management. For a summary of some of the ordinance standards adopted by counties, some of which are more stringent than the state minimum requirements, see *http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/countyordinancemap.htm.*

An example of the lake and river classification planning efforts from Burnett County is available at *http://www.mwd.com/burnett/landuse/scroll.html*.

For additional information on lake classification see *http://www.dnr.state.wi.us/org/water/fhp/lakes/lakeprot.htm*. The Wisconsin Lake Partnership also has a Shoreland Management and Lake Classification Fact Sheet Series, available at *http://www.uwsp.edu/cnr/uwexlakes/FactSheetList.htm*.

As an incentive for counties to develop lake classification plans, the WDNR has a grant program to help fund the associated costs. Information about the grants is available at *http://www.dnr.state.wi.us/org/caer/cfa/Ef/forms/lakeguidance.pdf.*

- **Other programs.** The Coastal Management Program in the Wisconsin Department of Administration also has grants available to fund similar planning activities in communities along the Great Lakes, and it can provide other planning resources for Great Lakes coastal communities. Information about the grant program is available at *http://www.doa.state.wi.us/dhir/boir/coastal/grants/*. The Wisconsin Department of Agriculture, Trade and Consumer Protection has resources about agricultural shoreland management ordinances. Information is available at *http://datcp.state.wi.us/static/arm/landwater/shore.htm.*

- **Education.** Education of private landowners along shorelines can also be an important implementation tool. A variety of educational resources are available from the University of Wisconsin Extension (*http://www1.uwex.edu/*) and the WDNR.

ADDITIONAL RESOURCES

WDNR shoreland web site:
http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/title.htm.

Shoreland Stewardship Fact Sheets, UW–Extension. Available at:
http://clean-water.uwex.edu/pubs/shore/index.html.

Creating an Effective Shoreland Zoning Ordinance: A Summary of Wisconsin Shoreland Zoning Ordinances, Bureau of Watershed Management, WDNR, Publication #WT–542–00 (2000).

Shoreland Zoning Resource Guide: An Annotated Model Shoreland Zoning Ordinance, by Brian Standing, Thomas Bernthal, and Susan Jones, WDNR, PUBL-WT–508–97 (1997).

Floodplain and Shoreland Management Guidebook, WDNR, PUBL-WZ–210-REB88 (1988).

Shoreland Plants and Landscaping, by Dan Wilson and Gary Korb, UW–Extension (1999). Available at: *http://www1.uwex.edu/ces/pubs/pdf/GWQ014.PDF*.

Wetlands

Wetlands are a critical natural resource that function in several ways that are beneficial to both people and wildlife. They often provide excellent fish and wildlife habitat. In addition, they function as a water filtration system, recycling nutrients and purifying the water. They also act as water storage devices in the event of high water. Like sponges, wetlands are able to absorb excess water and release it back into the watershed slowly, preventing flooding and minimizing flood damage. As more impermeable surfaces dominate our developed environment, this excess capacity for water runoff storage becomes increasingly important. Wisconsin wetlands also provide recreation for boaters, hunters, canoeists, wildlife watchers and environmental education purposes.

"... wetlands serve a vital role in nature, are part of the balance of nature and are essential to the purity of the water in our lakes and streams. Swamps and wetlands are a necessary part of the ecological creation and now, even to the uninitiated, possess their own beauty in nature."

—The Wisconsin Supreme Court in *Just v. Marinette County* (1972).

FACTS

- A 1995 report by WDNR entitled, *Wisconsin's Biodiversity as a Management Issue,* indicates that most of Wisconsin's wildlife species use wetlands during some stage of their life cycle.
- The same report found that one-third of the plants and animals on Wisconsin's state endangered and threatened list depend on wetlands.
- According to WDNR's *Wisconsin Wetland Acreage Facts* (1998), nearly 50% of Wisconsin's original 10 million acres of wetlands have been converted for agricultural, commercial, industrial, and residential uses.

State and federal requirements

Cities and villages are required to protect *at least* all unfilled wetlands that:

- Are within their borders;
- Are five acres or larger;
- Are shown on WDNR's final wetland inventory maps; and
- Are located within shorelands.

This requirement is in sections 61.351 and 62.231 of the Wisconsin Statutes and Chapter NR 117 of the Wisconsin Administrative Code. Ordinances adopted under a city or village's general zoning authorities may be more restrictive than wetland protection ordinances, but may not be less restrictive. For example, an ordinance might cover all wetlands, or all wetlands over one acre in size. A "Model Shoreland-Wetland Zoning Ordinance for Cities and Villages" is available from the WDNR's Bureau of Watershed Management. For a copy, contact the WDNR's local water management specialist or call (608) 266–0161. County shoreland zoning ordinances must also include wetland protection provisions for wetlands within shoreland areas.

In addition to the required local shoreland/wetland zoning ordinances, a variety of federal and state regulations apply to wetlands both within and outside of the shoreland zone. For example, the discharge of dredged or fill material in low areas or wetlands may require a permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. A Corps permit usually requires "Water quality certification" from the Department of Natural Resources. Chapter NR 299 of the Wisconsin Administrative Code explains the procedures and criteria for application and review of permits. The U.S. Army Corps of Engineers Wetland may require compensatory mitigation (e.g., restoring other wetlands). Chapter NR 103 of the Wisconsin Administrative Code defines the state's wetland water quality standards.

Isolated, nonnavigable wetlands are not protected by the U.S. Army Corps of Engineers. However, under section 281.36 of the Wisconsin Statutes, WDNR has the authority to protect isolated wetlands in Wisconsin. No person can fill or dredge in such a wetland unless the state certifies that the project meets Wisconsin's water quality standards for wetlands.

Local programs and actions

♦ **Identify and map wetlands.** Accurate identification and mapping of wetlands is important.

♦ **Establish protection, restoration and management goals, objectives, and policies for wetland communities.**

♦ **Education.** Refer to any of the references below for wetlands educational materials.

♦ **Implement effective ordinances.** Communities have the option to protect wetland resources beyond the minimum standards required under state law, such as protecting buffers around wetland areas. Dane County, for example, applies its shoreland/wetland zoning regulations to all wetlands, including inland wetlands located beyond the shoreland areas. Small scattered wetlands can help improve water quality and provide wildlife habitat. For a copy of the Dane County ordinance see http://www.co.dane.wi.us/ord/ord011.pdf.

♦ **Identify open space opportunities.** Communities may want to target open space acquisitions to protect important wetlands, or provide buffers around them.

♦ **Promote wetland restoration.**

ADDITIONAL RESOURCES

WDNR wetlands web site: *http://www.dnr.state.wi.us/org/water/fhp/wetlands/index.htm.*

Wisconsin Wetlands Association web site: *http://www.wiscwetlands.org*.

Guide to Wetland Protection Laws: A Directory of Regulations, Regulators and Related Programs. Available at: *http://www.dnr.state.wi.us/org/water/fhp/wetlands/guide.htm*.

Protecting Wetlands Through Local Zoning. Available at: *http://www.dnr.state.wi.us/org/water/fhp/wetlands/protect.htm*.

Wetland Functional Values. Available at: *http://www.dnr.state.wi.us/org/water/fhp/wetlands/function.htm*

Basic Guide to Wisconsin's Wetlands and Their Boundaries, Wisconsin Coastal Management Program, Wisconsin Department of Administration, PUBL-WZ–029–94 (1995). For ordering information see: *http://www.doa.state.wi.us/dhir/boir/coastal/publications/guide.asp*.

A Manual for County Enforcement of Wetlands Regulations, Coastal Management Program, Wisconsin Department of Administration. Available at: *http://www.doa.state.wi.us/dhir/boir/coastal/publications/wetland_enforce_man.pdf.*

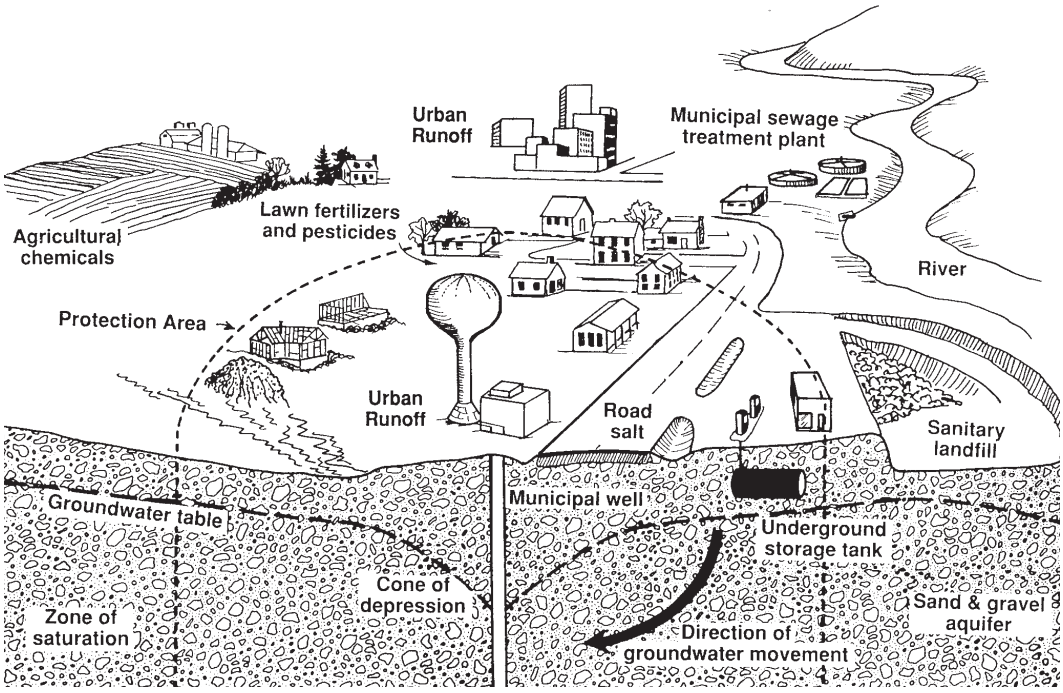
Wetland Restoration Handbook for Wisconsin Landowners, by Alice L. Thompson and Charles S. Luthin of the Wisconsin Wetlands Association, WDNR (2000).

A Guide To Conservation Programs For Wisconsin Landowners. Information pamphlet. U.S.D.A. Natural Resource Conservation Service, Madison, Wisconsin (1996).

Groundwater

Groundwater is an important natural resource in Wisconsin. Fifteen to thirty percent of the precipitation we get in Wisconsin each year seeps into the ground and recharges our aquifers. The daily recharge is calculated at 14 billion gallons per day. It is estimated that there is enough groundwater underground to cover Wisconsin to a depth of 30 feet!

Despite this seemingly inexhaustible supply, there are growing concerns about both the quality and quantity of groundwater. For example, groundwater quality may be impacted by any of a variety of activities, including leaking underground storage tanks, landfills, septic systems, over-application of pesticides and fertilizers, and spills of hazardous chemicals (see figure below). The most common contaminants found in Wisconsin groundwater are nitrate-nitrogen, volatile organic compounds (VOCs) and pesticides. Nitrate comes from a multitude of sources including nitrogen-based fertilizers, septic systems, animal waste storage, feedlots, municipal and industrial wastewater discharges and sludge disposal. Some examples of VOCs are gasoline and industrial solvents, paints, paint thinners, stain removers and drain cleaners. Pesticides reach groundwater from land application, spills, misuse or improper storage and disposal.



Groundwater quantity is also a concern in certain parts of the state. Groundwater is used for a variety of residential, agricultural and industrial uses. Areas including southeast Wisconsin, the Lower Fox River Valley and Dane County, have seen groundwater levels drop due to heavy pumping of the aquifers. As these and other areas become developed, there is an increasing demand for water as well as a reduction in groundwater recharge as the area is paved. In some cases, shallow wells have gone dry. Groundwater withdrawals can also affect surface water. Groundwater, as part of the hydrologic cycle, moves through the aquifers underlying our state and discharges to Wisconsin's lakes, rivers, and wetlands. A loss of or decrease in groundwater recharge to surface waters can reduce the flow in these water bodies. In addition to modifying the use of these surface waters, it may harm fisheries or aquatic habitat. Groundwater

FACTS

- According to a 1993 report entitled *Water Use in Wisconsin* by the U.S. Geological Survey, groundwater withdrawals in 1985 were estimated at 570 million gallons per day. Today, approximately 759 million gallons of groundwater are withdrawn from subsurface aquifers.
- A 1998 report by the U.S. Geological Survey found that groundwater elevations in northeastern Wisconsin have declined as much as 150 feet in the last 50 years.

pumping has already caused a reduction in streamflow, loss of springs and changes in vegetative wetland communities in parts of Wisconsin.

State and federal requirements

Common law and statutory provisions govern groundwater. In 1974, the Wisconsin Supreme Court overturned existing law and created the current law – the doctrine of reasonable use. A property owner's use of groundwater is not absolute, but has to be reasonable, considering impacts on the water table and other uses. Groundwater is also protected as waters of the state.

The WDNR, in consultation with the Wisconsin Department of Health and Family Services, has established groundwater quality standards that apply to facilities or activities regulated by several state agencies including the Department of Agriculture, Trade and Consumer Protection, WDNR and the Department of Transportation. These facilities or activities include a variety of potential threat to groundwater including landfills, underground storage tanks, pesticide storage and use, road salt storage, etc.

There are no federal requirements related to groundwater quantity. The WDNR requires a permit for high capacity wells (wells that have the capacity to pump more than 100,000 gallons per day).

Local programs and actions

- **Gather existing information on groundwater resources.** It is important to understand the geologic and groundwater setting of the community. This information is critical to planning for a safe drinking water supply. Appendix A contains a listing of resources for various types of natural resources information. This would be a good place to start. Understanding where water comes from and what quality and quantity issues need to be addressed are valuable components in planning for wise use of the groundwater resource. Computer groundwater models have been and are being developed for certain areas of the state as tools available to help communities understand this resource and to plan for long-term water supply needs.
- **Identify the recharge area for wells.** There may be existing information to identify the recharge area for wells, that is, the area that contributes water to wells through precipitation. This gives an idea of the area that needs to be protected to ensure a safe drinking water supply.
- **Inventory potential contaminant sources within the recharge area for wells.** This tells about the threats to water supply. Then develop long-term plans to address these potential sources.

Water Supply

Approximately 75% of Wisconsin residents rely on groundwater as a source of drinking water. There are about 1100 community systems that supply groundwater to their residents and nearly 11,000 non-community systems (like schools, businesses, gas stations, restaurants, roadside rest areas and churches) that also serve the public. There are also approximately 750,000 private wells in the state providing groundwater to homeowners primarily in rural areas. Groundwater used by industry and irrigated agriculture is equally as significant as residential use.

The remaining 25% of the population are served by surface water systems. There are only 20 surface water drinking water systems that serve many of the larger cities in the state including Milwaukee, Racine, Kenosha, Ashland, Appleton and Oshkosh. With one exception, they take water from Lakes Michigan, Superior or Winnebago. Typically, more treatment is required of surface water before it is supplied to homeowners than groundwater.

State and federal requirements

The federal government, through the Safe Drinking Water Act of 1974, has established drinking water standards for public water supply systems. The WDNR enforces those standards through chapter NR 809 of the Wisconsin Administrative Code.

The WDNR also regulates the design, construction, and operation of public water supply systems. As noted above, a permit is required by the WDNR for high capacity wells (wells that have the capacity to pump more than 100,000 gallons per day). Private wells do not require permits but must be constructed by a licensed contractor.

As a result of the 1996 amendments to the Safe Drinking Water Act, the WDNR implements a number of programs to assist municipal water utilities. A capacity development program has been established to help public water systems strengthen their ability to consistently supply safe drinking water to their customers. The program focuses on assisting system owners and operators, particularly small water systems, with improving their technical abilities, managerial skills, and financial resources to comply with the Safe Drinking Water Act requirements.

The WDNR also manages a state revolving loan fund that provides low interest loans to communities to improve their drinking water system. The federal government provides 80% and the state 20% of the funds.

For nearly 10 years, the WDNR has been implementing the federally mandated wellhead protection program. The program is based on the premise that it is much cheaper to protect water supply than to have to address groundwater contamination after the fact. Under the requirements of section NR 811.16(5) of the Wisconsin Administrative Code, all new municipal wells installed after May 1, 1992 must have a WDNR approved wellhead protection plan prior to placing the well into service. For wells already in service on May 1, 1992, municipalities are encouraged, but not required, to develop wellhead protection plans. Wellhead protection planning involves delineating the area contributing water to wells, inventorying the potential contaminant sources within that area, and implementing a plan to address the potential contaminant sources to protect water supply. A template for preparing wellhead protection plans for municipal wells is available at *http://www.dnr.state.wi.us/org/water/dwg/gw/WHPtplat.pdf*.

Another requirement of the 1996 Safe Drinking Water Act amendments was that states, including Wisconsin, complete source water assessments for all public water supplies by May of 2003. This includes both groundwater and surface water systems. The assessment by the WDNR will include a source water delineation of the area contributing water to a system's wells or surface water intake, an inventory of potential contaminant sources within that area, and a determination of each public water system's susceptibility to contamination. These assessments will be made public and will provide valuable information to communities in deciding how best to protect water supply, whether the community relies on surface water or groundwater.

Local programs and actions

♦ **Wellhead Protection or Source Water Protection Plans.** The source water assessments will provide most of the information needed for a community to complete a Wellhead Protection or a Source Water Protection Plan. The goal of both programs is to prevent contaminants from entering public water supplies and insure that communities have a long-term source of clean drinking water. Wellhead protection will focus on groundwater supplies. Source water protection will focus on surface water supplies. The only remaining step, but one that is critical for a local community, is its decision on management of the wellhead protection or source water protection area.

Management ideas include installing monitoring wells to detect contamination before it reaches your wells, using Clean Sweep or other programs to reduce waste products, working with farmers to use best management practices, promoting water conservation, setting aside park land or open space within the wellhead protection area to protect groundwater recharge, developing a contingency plan in case one or more wells becomes contaminated, establishing design standards for facilities within the wellhead protection area and using capacity development to strengthen system capacity for the long term.

Information collected when preparing a wellhead protection plan may fit with the Agricultural, Natural and Cultural Resources Element, the Utilities and Community Facilities Element, and the Land Use Element.

♦ **Adopt Wellhead Protection Ordinances.** Example wellhead protection ordinance language is available at
http://www.dnr.state.wi.us/org/water/dwg/gw/EXORDWHP.HTM.

♦ **Work with other jurisdictions.** Several communities have wellhead protection areas that extend beyond their municipal boundary into adjacent jurisdictions. In these circumstances, it is important to work together with those jurisdictions to help protect that area outside the municipal boundary. For example, Portage and Chippewa Counties worked with local governments to adopt countywide ordinances that provide for wellhead protection outside municipal boundaries.

ADDITIONAL RESOURCES

Wisconsin Groundwater Coordinating Council website: *http://www.dnr.state.wi.us/org/water/dwg/gcc/.*

WDNR wellhead protection and source water protection website: *http://www.dnr.state.wi.us/org/water/dwg/gw/whp.htm.*

A Guide to Groundwater Quality Planning and Management for Verona, by Stephen Born, et al., Wisconsin Geological and Natural History Survey (WGNHS) Special Report 9 (1987).

Wellhead Protection Districts in Wisconsin: An Analysis and Test Applications, by Stephen Born, et al., WGNHS Special Report 10 (1988).

Groundwater Protection Through Land-Use Controls, by Douglas Yanggen, et.al., WGNHS Special Report 11 (1991).

Groundwater Quality Regulation: Existing Governmental Authority and Recommended Roles, by Douglas Yanggen, et al., WGNHS Special Report 12 (1989).

A Template for Preparing Wellhead Protection Plans for Municipal Wells, WDNR, PUBL-DG–053–00 (2000).

Status of Groundwater Quantity in Wisconsin, WDNR, PUBL-DG–043–97 (1997).

State of Wisconsin Program Plan for Public Water Supplies, WDNR (1993).

Wisconsin's Source Water Assessment Program Plan, WDNR (1999).

A Guide for Conducting Potential Contaminant Source Inventories for Wellhead Protection, WDNR, PUBL DG–052 99 (1999).

Groundwater: Protecting Wisconsin's Buried Treasure, WDNR, PUBL-DG–055–99 (1999).

Determining Wellhead Protection Area Boundaries – An Introduction, WDNR, PUBL WR312–92 (1993).

A Guide to Wellhead Protection, by Jon Witten and S. Horsley, Planning Advisory Service Report Numbers 457/458, Chicago: American Planning Association (1995).

Stormwater Runoff, Erosion, & Nonpoint Source Pollution

As more land is covered with pavement and buildings, an increasing volume of water enters creeks, streams, and storm sewers instead of soaking into the soil to replenish groundwater. Pollutants carried by stormwater enter the State's waterbodies as well. As more impervious surfaces are created, decreasing the amount of land available for infiltration, many local governments are faced with the need to construct costly stormwater diversion and storage facilities.

Soil erosion continues to be one of the leading causes of water pollution in Wisconsin. While generally thought of as an agricultural or rural concern, polluted runoff can also be a significant problem in urban or urbanizing areas.

State and federal requirements

> **FACT**
>
> ▶ Polluted runoff is the primary reason that 30% of 552 waterbodies are included on the Impaired Waters List maintained by WDNR's Bureau of Watershed Management. These waterbodies do not support the fish communities, recreation, or other uses they should support.

Several federal and state regulations help address stormwater management issues. Under the 1987 amendments to the Clean Water Act, the U.S. Environmental Protection Agency requires municipalities with populations of 100,000 or more to obtain a municipal stormwater discharge permit. Beginning in 2003, federal stormwater regulations will require municipal stormwater discharge permits for certain municipalities with populations of less than 100,000. Wisconsin has been authorized to administer the federal program. To meet federal requirements, the state has developed a state storm water management and permitting program.

The Wisconsin Legislature also directed the WDNR to develop performance standards to:

- control polluted runoff from non-agricultural activities;
- develop performance standards and prohibitions for agricultural activities in cooperation with the Department of Agriculture, Trade and Consumer Protection (DATCP); and
- make other changes to address polluted runoff problems from rural and urban sources.

In response to these directives, the WDNR and DATCP redesigned their nonpoint source programs. WDNR created five new administrative rules and revised or recreated three existing rules, while DATCP revised its applicable rule. The Wisconsin Departments of Commerce and Transportation worked with the WDNR to develop non-agricultural and transportation performance standards. The focus of the revision involves three basic areas: statewide performance standards; local implementation and enforcement; and expanded financial assistance (see p. 41).

These proposed rules, expected to go into effect in 2002, will have a direct impact on private actions and on local government activities. The rules will require that certain local governments take specific actions to control storm water. Local governments will need to incorporate these requirements into their local planning activities.

The County Land and Water Resource Management Plans referenced in proposed rule ATCP 50 are required under section 92.10 of the Wisconsin Statutes. County land conservation committees prepare the plans to conserve long-term soil productivity, protect the quality of related natural resources, enhance water quality, and focus on severe soil erosion problems. The plans must be submitted to the Land and Water Conservation Board for review. The data collected for these plans will be helpful to preparing the Agricultural, Natural and Cultural Resources and Land Use Elements.

Local programs and actions

- **Coordinate stormwater management goals, policies, and objectives.** The Agricultural, Natural, and Cultural Resources Element should establish the policy basis for the community's stormwater management program. Stormwater management facilities and other programs such as the establishment of a stormwater utility should be addressed as part of the Utilities and Community Facilities Element.

- **Identify and protect major drainage corridors to aid in the management of stormwater runoff.** Floodplain surveys and maps should be used where available to identify the location of floodplains (floodways and flood fringe areas) for establishing protected riparian/drainage corridors. The waterbody's floodplain should be maintained for filtering coarse and fine particulate matter as well as nutrients and

contaminants for perennial streams. The more natural the state of the vegetation, the better the filtering capabilities. If floodplain maps and surveys are not available, USGS or larger-scale topographic maps can be used to identify waterways and delineate corridors around those waterways.

Opportunities for connecting linear corridors should be identified to promote habitat enhancement as well to maximize areas for stormwater infiltration and pollutant filtering. Communities should develop stormwater management plans to address stormwater quality issues. Stormwater management facilities should be located outside existing floodways to avoid pollutant capture failure and sediment/nutrient release during high flow events.

♦ **Best management practices.** Best management practices (BMPs) are actions that residents or agencies can take to reduce the impact of human activity on natural settings, and thus they are dependent on both the setting and the type of impact that needs to be reduced. Some BMPs are multifunctional, serving to address numerous concerns with unified efforts through legislation, education, and land-use management. Others are simpler, more localized, and more direct, such as construction site runoff control measures. Proposed rule NR 154 identifies best management practices for a wide range of activities.

♦ **Educate residents about natural drainage approaches.** WDNR has a model stormwater ordinance and a construction site best management practice handbook. UW Extension and WDNR also have a series of workshops for construction site Best Management Practices (BMPs) and stormwater management that may be helpful.

♦ **Support agricultural and erosion control programs that are targeted to assist private landowners.** Encourage landowners to sign up for cost-share funds under the Priority Watershed Program where available throughout the state, as well as the use of the Targeted Runoff Management Grant Program and Urban Stormwater Management Grant Program. Other agencies with helpful programs include the Natural Resources Conservation Service and DATCP.

♦ **Work cooperatively with other programs related to these issues.** Drainage districts, for example, are one such program. Chapter 88 of the Wisconsin Statutes governs the drainage district program that oversees the systematic drainage of lands for

Highlights of proposed changes to the Wisconsin Administrative Code

- ATCP 50: Implements agricultural performance standards, creates a nutrient management program, and establishes technical standards and updates standards for county land and water resource management plans.
- NR 120: Priority Watershed and Priority Lake Program. Revisions primarily cover agricultural nonpoint source grant activities in current priority watershed projects.
- NR 151: Runoff Management. A new rule that creates:

  Agricultural Performance Standards and Prohibitions: Covers erosion from croplands and pollutants from animal feeding operations, and includes manure management prohibitions.

  Non-Agricultural Performance Standards: Covers performance standards for construction sites, post-construction development, and developed urban areas.

  Transportation Facility Performance Standards: Describes criteria, applicability, and enforcement for transportation facilities.

  Technical Standards Process for Non-Agricultural Performance Standards: Describes the process to be used for developing and disseminating non-agricultural technical standards.
- NR 152: Model Ordinances for Construction Site Erosion Control and Storm Water Management. A new rule that includes model ordinances for construction site erosion control and storm water management for voluntary adoption by municipalities.
- NR 153: Targeted Runoff Management Grant Program. A new rule that describes criteria and procedures for both rural and urban projects.
- NR 155: Urban Nonpoint Source Water Pollution Abatement and Storm Water Management Grant Program. A new rule that describes the criteria and procedures for urban nonpoint source projects.
- NR 154: Best Management Practices and Cost-Share Conditions. A new rule that lists acceptable Best Management Practices and cost-share conditions to meet the performance standards and prohibitions eligible for funding through grants under NR 153, NR 155 and NR 243.
- NR 216: Storm Water Discharge Permits. A revised rule that adds the non-agricultural performance standards as requirements for storm water permits issued to municipalities, industries, and construction sites.
- NR 243 Animal Feeding Operations. Proposed rule changes add the agricultural performance standards and prohibitions in NR 151 to the Animal Waste Management Program authorized by this rule.

agricultural practices. Primary responsibility for planning for and administering drainage districts resides with the county drainage board. The board also resolves drainage disputes among landowners. Local communities should coordinate their comprehensive planning efforts with drainage districts.

- **Conduct watershed-based stormwater management studies.** Conducting watershed-based studies can help coordinate stormwater management issues with other governmental units located in the watershed.

- **Implement effective stormwater management and erosion control ordinances.** Adoption and effective implementation of local stormwater management ordinances can help reduce the amount of pollutants entering waterways from runoff. Proposed rule NR 152 includes model ordinances for both storm water management and for construction site erosion control. Adoption of the ordinances by local governments is voluntary. Additional examples of stormwater management and erosion control ordinances include those adopted by the City of Madison, the City of Middleton, and Dane County. Other examples are available at the U.S. Environmental Protection Agency's website: *http://www.epa.gov/owow/nps/ordinance/*.

  Under sections 59.693 and 281.33 of the Wisconsin Statutes, counties are authorized to enact ordinances to control construction site erosion at sites in unincorporated areas, if the sites are not for building construction or stormwater management. Similarly, under sections 61.354, 62.234, and 144.266, of the Wisconsin Statutes, cities and villages are authorized to enact construction site erosion control ordinances for their incorporated areas.

- **Support conservation development designs.** Encourage developers to design developments that result in less runoff. The design of development should minimize impervious surfaces and maximize on-site infiltration of stormwater (where appropriate), which will help reduce the discharge of pollutants to ground and surface water. Natural topography and existing land cover should be maintained and protected to the maximum extent practicable.

- **Apply for grants to address runoff management.** The DNR offers financial assistance for local efforts to control nonpoint source pollution. These grants support both the implementation of source-area controls to prevent runoff contamination and the installation of treatment systems to remove pollutants from runoff. The main goal of these nonpoint grants is to improve the quality of Wisconsin's water resources by decreasing the impacts of nonpoint pollution. Information is available at: *http://www.dnr.state.wi.us/org/water/wm/nps/npsprogram.html*.

ADDITIONAL RESOURCES

WDNR's Runoff Management Section website:
http://www.dnr.state.wi.us/org/water/wm/nps/index.htm.

U.S. Environmental Protection Agency Phase 2 website:
http://cfpub1.epa.gov/npdes/stormwater/swphase2.cfm?program_id=6.

Nonpoint Education for Municipal Officials Project, an educational program for local land use officials that addresses the relationship of land use to natural resource protection. *http://nemo.uconn.edu/*.

Wisconsin Construction Site Best Management Practice Handbook (November 1993) (Call 1–800–362–7253 to obtain a copy).

The Wisconsin Stormwater Manual, by Jeffrey Prey, et al., WDNR (1994).

Nonpoint Source Pollution: A Handbook for Local Government, by Sanjay Jeer, et al., Planning Advisory Service Report Number 476, Chicago: American Planning Association (1997).

Can buffers boost your bottom line? U.S.D.A., Natural Resources Conservation Service and UW–Extension (2001).

CHAPTER 4

Wildlife Resources

Biodiversity

Biodiversity, the full spectrum of life forms and the ecological processes that support them, depends on the sustainability of diverse ecosystems, such as the mosaic of forests, agricultural lands, grasslands, bluffs, coastal zones and aquatic communities present in Wisconsin. Wisconsin has five major upland biological communities—northern forests, southern forests, oak and pine barrens, oak savannas and grasslands (prairies). Each supports a general vegetation cover type, which provides habitat—food, shelter, etc.—for a distinct group of wildlife species. Though not a native land cover, cultivated agricultural lands may also support extensive wildlife populations. Some wildlife species, such as whitetail deer, have adapted so they can survive in virtually any habitat. Other wildlife species require a very select ecological niche, or even a single "host" plant species. For example, the Karner blue butterfly, a federally listed endangered species, is found only in dry prairies that have abundant patches of wild lupine. The rarest habitat types often harbor remaining populations of many of the state's endangered and threatened species.

Vegetative communities change naturally over time, but human influence can have a more dramatic role in succession. For example, grasslands were historically affected by fires, which kept shrubs and trees from invading and becoming woodlands. However, in combination with development and intensive agricultural practices, modern-day fire suppression activities, established to protect human life and property, have strongly accelerated declines in grassland habitat. In an effort to maintain what little native grassland communities remain, managed burns, mowing and brushing are used to prevent woody species invasion.

Ironically, as development increases in rural areas, the ability to strategically control wildfires often becomes more challenging. Human evacuation is more complicated and can jam access routes for fire fighting equipment. Allocation priorities for manpower and suppression equipment are more difficult due to the sheer number and scattered location of home sites.

Another key factor influencing the types of wildlife and populations is habitat diversity. The more different types of habitat present, the greater number of species present (i.e. the more species diversity). In fact, habitat loss has been identified as the single greatest threat to biodiversity in the United States. Aside from the obvious role in supporting Wisconsin's wildlife, land cover vegetation has many other values—watershed protection (erosion control, reduced runoff, etc.), recreation opportunities, raw materials, climate control, release of oxygen to the air, and aesthetics- to name just a few.

Development patterns can greatly affect habitat quantity and quality and, therefore, wildlife diversity and populations. An obvious impact is the loss of habitat due to conversion of woodlands, prairies and cropland to other uses. Infrastructure to service new uses—roads, power lines, sewer and water, telecommunications towers/lines, etc.—can also cause serious wildlife impacts by the loss or fragmentation of habitats, obstructing migration routes and increased human activity which disrupts normal wildlife behavior patterns. The transition area between developed landscapes and natural habitats can be the source of a range of detrimental environmental impacts that may limit native biodiversity. Such detrimental impacts include light, noise, and invasion by non-native

plants and animals. Invasive plants and animals is the second major threat to biodiversity in the United States.

In 1995, WDNR published a report entitled *Wisconsin's Biodiversity as a Management Issue*, which provides a detailed account of Wisconsin's ecotypes, abundance, and functional values. The report recognizes that since slightly less than 16% of Wisconsin's 35.7 million acres are held in public ownership, a cooperative effort is needed if Wisconsin's ecotypes, and the values they provide, are to be protected for future generations. A key focus in the *Biodiversity* report is to develop partnerships with local units of government and private landowners in order to reach a balance between human development and the maintenance of Wisconsin's diverse habitats and values.

The Southeastern Wisconsin Regional Planning Commission adopted a regional natural areas and critical species habitat protection and management plan in 1997. The plan recommends ownership and management strategies to protect habitat areas. The plan also recommends relatively large areas where forest interior and grassland habitats could and should be restored.

Threatened and endangered species

Wisconsin law prohibits the "taking" of any plant or animal listed as endangered or threatened, regardless of where it occurs. Taking is defined as the act of killing, harming, collecting, capturing, or harassing a member of a protected species. For plants, taking is prohibited only on public property. However, even on public lands taking of listed plants is not prohibited if it occurs in the course of forestry, agriculture, or utility practices.

WDNR is available to provide information on endangered and threatened species. See the website for the Bureau of Endangered Resources at: *http://www.dnr.state.wi.us/org/land/er/* or contact the Bureau at 608/266–7012. The Bureau also maintains Wisconsin's Natural Heritage Inventory (NHI). Established in 1985 by the Wisconsin Legislature, the NHI program is responsible for maintaining data on the locations and status of rare species, natural communities, and natural features in Wisconsin. Further information is available at: *http://www.dnr.state.wi.us/org/land/er/nhi/nhimain.htm*.

Wisconsin is home to one species listed on the Federal Endangered Species list—the Karner blue butterfly. A copy of the *Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement* is available at: *http://www.dnr.state.wi.us/org/land/er/publications/karner/karner.htm*.

FACT

▶ According to the Southeastern Wisconsin Regional Planning Commission, the four-County metro Milwaukee area population grew 2 percent from 1970 to 1990, but the amount of developed land increased by 27 percent.

Local programs and actions

♦ **Identify natural resource areas in the community.** Natural resource areas do not have to be large to harbor a variety of animals and plants. Parks, land adjacent to water bodies, and even empty lots can be areas that are worth protecting for their value to wildlife.

♦ **Adopt ecosystem management principles.** Key concepts to consider include:

- ▶ Maintaining large, intact areas of native vegetation.
- ▶ Establishing program priorities for species and habitat protection.
- ▶ Protecting rare landscapes.
- ▶ Maintaining connections among wildlife habitat areas.
- ▶ Maintaining significant ecological processes.
- ▶ Contributing to the regional persistence of rare species.

- Balancing public needs with habitat needs.
- Developing within constraints of existing natural features.
- Maintaining and developing buffers between public lands and human development.

♦ **Seek funding for habitat protection.** Identify financial incentives that may be available to help defray costs of acquiring or to protect target habitats. There are many grant programs available to local governments and private landowners to promote conservation practices. Summary information on state grant programs is available at a number of websites including: *http://www.dnr.state.wi.us/org/caer/cfa/bureau/programs.html* and *http://www.doa.state.wi.us/dhir/boir/wcca/index.asp*. These sites include a basic description of specific programs available for habitat protection of rural ecotypes and urban areas (such as WDNR's Urban Forestry program). The Stewardship Program also has grants for habitat restoration.

♦ **Incorporate natural resource areas in plans for parks and open space.**

♦ **Build partnerships.** Habitat conservation is important for other interests, such as hunting and fishing. It is a major focus of the WDNR and private organizations, such as Ducks Unlimited, Trout Unlimited, the National Wild Turkey Federation, Whitetails Unlimited, Prairie Enthusiasts, the Nature Conservancy, and many local land trusts. Local governments should consider establishing partnerships with local chapters of these organizations or sportsmen's and rod and gun clubs to help with wildlife habitat protection. There are also incentive programs for private landowners available through the federal government, including the Conservation Reserve Program, the Wildlife Habitat Incentive Program, and the Wetlands Reserve Program. Information about these programs is available from the Natural Resources Conservation Services at: *http://www.wi.nvcs.usda.gov*.

ADDITIONAL RESOURCES

The Biodiversity Project, 214 N. Henry St., Suite 201, Madison, WI 53703. Website: *http://www.biodiversityproject.org*.

Managing Change in Rural Communities: The Role of Planning and Design, Natural Resource Conservation Service (1995). For copies call the Soil and Water Conservation Society at 1–800-THE-SOIL.

Wisconsin's Biodiversity as a Management Issue: A Report to Department of Natural Resource Managers, WDNR (1995).

Working Trees for Wildlife, Natural Agroforestry Center, available at: *http://www.unl.edu/nac/brochures/wtw/wtw.pdf*.

Unique Habitats: Hillsides and Bluffs

Wisconsin's geologic history has left a striking legacy of bluffs throughout the state. The Driftless Area, covering the southwestern one-quarter of Wisconsin from the Mississippi River to Wausau to just west of Madison, contains some the state's most outstanding scenic vistas along the Mississippi and Wisconsin River valleys. Another major bluff feature is the Niagara Escarpment, a significant landscape feature in the eastern part of the state extending above ground from Door County south to the Horicon Marsh area. The Lake Michigan shoreline is also dominated by unique bluffs, which form popular vistas and recreation areas.

When southern Wisconsin was cleared and plowed for agriculture, the steepest slopes were often unsuitable for cultivation. These undeveloped hillsides and bluffs feature a diverse mosaic of woody hillsides, rocky precipices, south-facing dry prairies and shady north-facing slopes. Bluffs and hillsides often represent some of the largest blocks of undisturbed wildlife habitat, and also serve as primary animal migration corridors, helping to assure mobility and exchange of genetic material and thus the long-term viability of wildlife populations.

Hillsides and bluffs are unique and often desired sites for possible development. They are considered desirable places to live as they often have attractive views and are often found in more natural settings. Bluffs and hillsides are attractive visual resources for everyone and development on them can be seen as having a negative effect on the landscape. However, they also pose possible engineering and construction problems as hillsides are prone to natural hazards and constrain development design. Slopes are extremely vulnerable to erosion, and are difficult to stabilize once disturbed by construction. The result is lost remnants of rare habitat communities and the species they contain.

State requirements

There are no state laws that prohibit development on steep faced hillsides or bluffs. Some regulatory programs require set backs from steep slopes before certain permits are issued. Sewer service to areas having steep slopes is discouraged in the Sewer Service Area planning process. The Lower Wisconsin Riverway, discussed earlier, has special regulations that may affect development on steep slopes along that riverway.

Local programs and actions

♦ **Adopt effective local ordinances.** Local regulation for steep slopes may be needed for some of the following public purposes: protection from natural hazards such as landslides; protection of natural resources such as water quality; and protection of environmental features like bluffs, native vegetation, and wildlife habitat. Regulations should be designed to meet local conditions and characteristics such as geology, available building space, watershed characteristics, and habitat concerns.

The Village of Bayside in Milwaukee County has long had an ordinance regulating building on ravines and Lake Michigan bluffs. The Village of Cross Plains in Dane County also has an ordinance regulating building on the hills surrounding the village. Pepin County has adopted a Mississippi River Bluffland Ordinance. Copies are available from the Pepin County Zoning Administrator at (715) 672–8897.

♦ **Seek funding to protect bluff lands.** The Stewardship Program provides grants for bluff protection. For information see: *http://www.dnr.state.wi.us/org/caer/cfa/lr/stewardship/*stewardship.html#local.

ADDITIONAL RESOURCES

Planning for Hillside Development by Robert B. Olshansky, Planning Advisory Service Report Number 466, Chicago: American Planning Association (1996).

The Land User's Handbook for the Ridge and Valley Lands of Southwest Wisconsin, by W. Thomas Lamm and Brian Vandewalle, Environmental Awareness Center and UW–Extension (1979).

Unique Habitats: Grasslands

Grasslands are an important habitat for plants and animals that are often overlooked in planning. Grasslands can be fragmented by forest plantings and by development. Grassland birds have declined significantly in recent decades, more so than bird species dependent on any other habitat type. Some bird species adapted well to agricultural land use in the early to mid–1900s, but since the late 1950s large acreages of pasture and small grain crops have been converted to row crops, decreasing useable agricultural habitat for grassland bird species. Also, much late-harvested grass hay has been converted to alfalfa, which is harvested early and frequently, causing a significant mortality in grassland birds like meadowlarks and bobolinks.

FACTS

- According to the *State Natural Heritage Inventory*, only 0.5% (13,000 acres) of Wisconsin's original grassland ecosystems remain in a relatively intact condition.
- According to a 1997 WDNR publication entitled *Managing Habitat for Grassland Birds: A Guide for Wisconsin*, 40 species of birds require grasslands during their breeding cycle.

Local programs and actions

- **Seek funding for grassland protection.** Grasslands are one of many resources that can be funded through the Conservation Reserve Enhancement Program and some of the hunting stamp programs (Turkey, Pheasant, etc.) administered by the WDNR.
- **Establish effective ordinances.** Grasslands can be protected through land use control techniques such as zoning and private-sector initiatives like land trusts. There are also incentive programs available through the federal government, including the Conservation Reserve Program and the Wetlands Reserve Program. Communities should identify whether there are other unique habitats that they would like to protect.
- **Encourage restoration of grasslands.**

ADDITIONAL RESOURCES

For information on specific plants and animals see *http://www.natureserve.org/*.

Managing Habitat for Grassland Birds: A Guide for Wisconsin, WDNR (1997)

Habitat Protection Planning: Where the Wild Things Are, by Christopher J. Duerksen, et al., Planning Advisory Service Report Number 470/471, Chicago: American Planning Association (1997).

Preparing a Sensitive Areas Element for the Comprehensive Plan, Maryland Office of Planning and Maryland Department of Natural Resources (1993).

Wetland Reserve Program. U.S.D.A. Natural Resource Conservation Service. Washington, D.C.

Improving Wisconsin Grasslands, Conservation Reserve Enhancement Program fact sheet. U.S.D.A. Natural Resources Conservation Service (2001).

Exotic and Invasive Species

Non-native aquatic and terrestrial plants and animals, commonly referred to as exotic species, have been recognized in recent years as a major threat to the integrity of native habitats and the species that utilize those habitats.

In some cases these species are intentionally introduced for public benefits. The ring-necked pheasant was intentionally introduced in Wisconsin and other states as a desirable upland game bird, without any disruption to natural biological communities. In other cases a species, intentionally or unintentionally introduced, can flourish due to the absence of natural predators, faster growth rates, etc., to the point that the ecological balance of habitats is so disrupted that native plants and animals are excluded. European immigrant purple loosestrife was introduced into the U.S. as a showy landscape plant. Seed dispersal from runoff, earthmoving, and other mechanisms has caused loosestrife to become so pervasive in some wetlands that native plant diversity and populations, and the wildlife communities they support, are lost. The zebra mussel, an exotic from Asia, was inadvertently introduced from ocean vessel ballast tanks that entered the Great Lakes. Zebra mussels have spread extensively throughout inland river systems, as well as to many isolated lakes, by hitchhiking on recreation boats moving from a contaminated water body to one that is not infested. Other known inadvertent transport mechanisms for zebra mussels are construction equipment (barges, dredges, etc.), bait buckets, and SCUBA equipment.

Native species with limited population size or ecological range can be particularly susceptible to displacement by aggressive exotics or invaders. According to a 1996 report by the Nature Conservancy, invasive species have contributed to the decline of 42% of the endangered and threatened species in the U.S.

In addition to biological risks, exotic and invading species may also present considerable economical and social problems. Zebra mussels attach themselves, often in many layers, to underwater structures on lake or river beds, boat hulls and motors, docks, water intake pipes, native mussel beds, etc. Industries and municipalities annually spend millions of dollars to clean water supply pipes. Boat motors can be damaged by zebra mussel colonies blocking water circulation in engines, docks require cleaning.

Communities should be aware of species that may pose potential problems and minimize risks of introducing or translocating them. Awareness starts with education and carries through to public facilities construction/management and to decisions on new development within community boundaries.

State requirements

No person may bring into the state any non-native fish or any wild animals for introduction without first obtaining a permit from WDNR as required by sections 29.736 and 29.745 of the Wisconsin Statutes.

WDNR and the University of Wisconsin Sea Grant Institute have education and outreach programs on aquatic exotic species and can provide technical information on exotic or invasive species and control methods. For information see:
http://www.dnr.state.wis.us/org/water/wm/glwsp/exotics;
http://www.seagrant.wisc.edu/outreach/nis/index.html; and
http://www.dnr.state.wis.us/org/land/er/invasive/nonnative.htm.

Local programs and actions

♦ **Local government awareness and education.** Local governments should be aware of invasive species that may present environmental, economic or social risks in their communities.

♦ **Native landscaping.** Encourage the use of native plants in landscaping, where appropriate. A community could also consider adopting a landscaping ordinance that would discourage landscaping with ecologically invasive species.

♦ **Develop new public/private construction and public facility maintenance guidelines to prevent introduction or translocation of exotic and invasive species.** Public employees and new construction contractors and developers who are required to obtain local permits could follow such guidelines. The guidelines could also relate to exotic plant control strategies on locally owned public properties such as local parks. Examples of restrictions might include decontaminating construction equipment that operated within zebra mussel infested waters before use in or near uncontaminated waters and caution with respect to transporting soil, fill material, and rock from a site that may contain invasive animals, eggs, plants, and seeds.

ADDITIONAL RESOURCES

Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants, WDNR (1997).

Protecting Wisconsin Waters from Exotic Invaders, WDNR and UW Sea Grant Institute (1994).

Biological Invasions, Great Lakes Panel on Aquatic Nuisance Species (1996).

Landscaping for Wildlife, by Carrol L. Henderson, Nongame Wildlife Program, Section of Wildlife, Minnesota Dept. of Natural Resources, St. Paul, MN (1987).

Landscaping with Native Trees: The Northeast, Midwest, Midsouth & Southeast Edition, by Guy Sternberg and Jim Wilson, Shelburne, Vt.: Chapters Pub. (1995).

Preparing a Landscape Ordinance, by Wendelyn A. Martz with Marya Morris, Planning Advisory Service Report Number 431, Chicago: American Planning Association (1990).

Native Plants: Warm Season Grasses, Flowers and Legumes, U.S.D.A., Natural Resources Conservation Service (2000).

CHAPTER 5

Forest Resources

Trees and forests can play an important role in shaping a community's identity. Forests have long been important to the economy of many communities in Wisconsin. Each year forest-based recreationists spend $2.5 billion in Wisconsin communities. Timber production provides a partial basis for wood products manufacturing activity that accounts for $15 billion annually. Large blocks of public and working forests for logging, recreation, and ecological functions are important to the continued success of forestry in Wisconsin.

Differing views over the use of forest resources have led to conflicts over the proper uses of forests. Increased recreational land ownership in parts of the state has caused the fragmentation of forests resulting in reduced wildlife habitat and ecosystem integrity. Planning can help strike a balance between competing forest use issues.

Trees and forests are important to local communities throughout the state. The trees and other vegetation in and around a town, village or city form an important ecosystem. Urban forests include tree-lined streets, trees in home landscapes, school yards, parks, riverbanks, cemeteries, vacant lots, utility rights-of-way, adjacent woodlands and anywhere else trees can grow in and around a community. Shrubs, flowers, vines, ground covers, grass, and a variety of wild plants and animals also are part of the urban forest. Streets, sidewalks, buildings, utilities, soil, topography, and, most importantly, people are an integral part of the urban forest.

State Requirements

Twenty-nine northern Wisconsin counties own and manage nearly 2.34 million acres of county forest lands. The County Forest Law, found in section 28.11(5)(a) of the Wisconsin Statutes, requires counties to develop comprehensive county forest land use plans for a 10-year period. Current plans cover 1996–2005. All county forests will be updating their plans for the next planning period of 2006–2015.

COUNTIES WITH COUNTY FOREST LANDS

Ashland	Barron	Bayfield	Burnett
Chippewa	Clark	Douglas	Eau Claire
Florence	Forest	Iron	Jackson
Juneau	Langlade	Lincoln	Marathon
Marinette	Monroe	Oconto	Oneida
Polk	Price	Rusk	Sawyer
Taylor	Vernon	Vilas	Washburn
Wood			

Management goals on each county forest are aimed at providing multiple uses and public benefits such as economic revenues to towns and counties, optimum production of forest products, provision of recreational use opportunities, management of wildlife and its habitat, and protection of watersheds. Management of the county forest must adhere to the county forest plan. In addition to the statutes and state administrative codes, most county forests have applicable county ordinances that are listed in the appendix of the plan. Copies of the plan are available from the local county forest administrator.

Local programs and actions

- **Establish a Local Forestry Program**. The WDNR has an Urban and Community Forestry Assistance Program that provides education and technical assistance to communities for managing their tree resource. The Program also offers grants to assist with a variety of urban forestry related projects. Information about the Urban and Community Forestry program is available at: *http://www.dnr.state.wi.us/org/land/forestry/UF/INDEX.HTM.*

♦ **Adopt a Local Tree Protection Ordinance.** The City of Kenosha is an example of one community that has a comprehensive forestry program. A copy of the City's tree ordinance can be found at: *http://www.kenosha.org/departments/court/ordinances/chapter34.pdf*. Software to help local communities establish tree ordinances is available at: *http://www.treetrust.org/*. WDNR Urban Forestry Assistance grants are available for developing tree ordinances, forming tree boards/committees and developing urban forestry plans (including tree emergency response plans in the wake of flood, storm, and tornado damage).

♦ **Implement County Forest Plans.** Local governments with county forest lands should consider forest plans when preparing comprehensive plans. Forest plans could be reflected in several different comprehensive plan elements, including the Agricultural, Natural and Cultural Resources Element, the Utilities and Community Facilities Element, and the Land Use Element.

♦ **Consider school forests.** Many school districts own school forests, which may be shared among several districts. These forests should be considered in the same ways that county forests and other resource lands are treated in a community's comprehensive plan.

♦ **Work with private landowners.** Fifty-seven percent of forest land is in private ownership. In an effort to promote sustainable forestry practices, the state provides a property tax incentive for private forest landowners under the Managed Forest Law (MFL). Voluntary participation in the program requires that private landowners follow "sound forestry practices" as prescribed in a formal management plan or, as in the case of industrially owned lands, a management commitment. Information on which lands are included in MFL is available from the WDNR Bureau of Forestry. Encouraging enrollment under the MFL is one step communities can take to help implement its comprehensive plan. Information about the MFL program is available at: *http://www.dnr.state.wi.us/org/land/forestry/ftax/INDEX.HTM*.

Forestry assistance is also available for woodland owners through WDNR foresters and private consulting foresters. If a privately owned woodland is being managed for sustainable forestry, it will provide many benefits to the community.

♦ **Calculate the benefits of urban forests.** CITYgreen is a software program developed by American Forests, a conservation organization that specializes in urban forestry. The program enables the user to analyze the environmental and economic benefits of urban forests and trees. Information about the program is available at: *http://www.americanforests.org/trees_cities_sprawl/citygreen/index.html*.

ADDITIONAL RESOURCES

WDNR forestry website: *http://www.dnr.state.wi.us/org/land/forestry/*.

Wisconsin County Forest Association website: *http://www.wisconsincountyforests.com/index.html.*

Urban Forestry Newsletter, available at: *http://www.dnr.state.wi.us/org/land/forestry/UF/INDEX.HTM.*

Forestry Facts (Series), publication of the Department of Forest Ecology & Management, University of Wisconsin–Madison/Extension, available at *http://forest.wisc.edu/extension/forfact.htm.*

Tree City USA materials available from the National Arbor Day Foundation at: *http://arborday.org*.

The Forest Where We Live: Caring for Trees in Towns and Cities, WDNR, PUBL FR–108–96 (1996).

Tree Conservation Ordinances: Land-Use Regulations Go Green by Christopher J. Duerksen and Suzanne Richman, Planning Advisory Service Report Number 446, Chicago: American Planning Association (1993).

Guidelines for Developing and Evaluating Tree Ordinances, California Department of Forestry and Fire Protection, available at: *http://www.isa-arbor.com/tree-ord/ordintro.htm*

Conserving Wooded Areas in Developing Communities: Best Management Practices in Minnesota, St. Paul, MN: Minnesota Department of Natural Resources, et al., (2001).

Public Lands and Property Taxes, WI Dept of Revenue by Daniel P. Huegel, Wisconsin Department of Revenue (Pub-FR–166 2001). Copies available from the WI Dept of Revenue, Division of Research & Analysis, Bureau of Local Fiscal Policy, PO Box 8933, Madison, WI 53708–8933. Tel.: 608/266–2700.

CHAPTER 6

Parks, Open Space, & Recreational Resources

Parks and Recreational Resources

Public open space lands such as parks and parkways are important determinants of the quality of life within a community. These lands serve multiple functions including outdoor recreation, outdoor education, buffers, flood and stormwater management, habitat preservation, air and surface water quality improvement, protection of groundwater recharge areas, aesthetics, and providing community focal points. They also enhance the value of nearby properties.

Planning for parks and open space often takes an integrated "systems" approach. The system should consist of a complementary set of parks and open spaces that, considered together, meet a full range of community needs. The state has a system of parks serving certain statewide functions. Counties also often have park systems serving regional park and open space needs. Cities, villages, and towns often have local park systems that may include neighborhood playgrounds, town squares, mini-parks, community playfields, and community parks. Planning for parks and open space therefore needs to consider inter-community and regional relationships and interdependencies. Coordination with other jurisdictions and organizations is important.

One helpful resource is the Statewide Comprehensive Outdoor Recreation Plan (SCORP), developed by WDNR every five years. The purpose of SCORP is to offer a research base and overall guidance for all providers of outdoor recreation throughout Wisconsin—federal, state, county, city, village, and town governments; resorts and other businesses; and a variety of other public and private organizations. Ideally, the SCORP will be used in conjunction with other planning documents.

The SCORP identifies several major, statewide issues facing outdoor recreation in Wisconsin and suggests strategies for addressing those issues. By identifying issues of statewide significance, outdoor recreation providers from local recreation departments to federal agencies can better identify individual roles for providing high quality recreation resources, and for continually improving the recreational opportunities offered to citizens, now and into the future. In addition to the SCORP, the WDNR has also prepared a State Trails Network Plan that will be useful to local governments.

Planning for local public parks and recreational resources

The process of planning for public parks and recreational resources should proceed like any planning process. Because of the fundamental importance of planning for these resources, a planning process for public parks and open space is briefly summarized below:

Identify public park and recreational needs. Determining how much land is needed for parks and recreational activities is complex. The amount necessary is usually determined through an analysis of neighborhood and community-wide needs for outdoor recreation areas, for natural and cultural resource protection and management, and for other open space uses such as aesthetics and buffers. However, communities are extremely varied in their population characteristics, the opportunities for providing open space, and the needs for natural resource management. Therefore, local examination of needs is very important and requires understanding the physical and social resources of the community and the community's goals for parks and open space.

There are also distinctions between planning for public areas for intensive recreational development such as ball fields, tennis courts, swimming pools, etc., and needing to preserve open space. The need for parks is dependent on the size and distribution of a community's population. Several organizations have developed standards to help communities determine how much open space is necessary. Many communities also follow standards developed by the National Recreation and Park Association (*http://www.nrpa.org*). The Association recommends a minimum of 10 acres of local parkland and 20 acres of regional open space for every 1,000 persons. The need for open space preservation often depends on the location of natural resources.

Inventory existing and potential park and recreational resources. The inventory should examine existing and planned local and non-local (e.g., federal, state, county, private) park, open space, and recreational resources, facilities, and programs. The inventory of recreational resources should identify features such as sports fields, trails, public fishing and hunting areas, and public access points.

Park and recreational resource analysis. Compare public park and recreational resource needs with existing and potential resources. How will the community meet the needs of projected future growth in the community? The analysis should help the community establish meaningful goals, policies, and objectives for parks and recreational resources. Determine what resources, facilities, and programs are needed, when they should be available, and where they should be placed in accordance with these goals and policies. Recommend changes in existing park and recreation systems or create a local system based on the analysis.

Identification of parks, open space, and environmental corridors should occur as part of the Agricultural, Natural and Cultural Resources Element. The identification of these areas also needs to occur as part of the Land Use Element. The Utility and Community Facilities Element also requires that a community's parks be described and any future additions and expansions outlined.

Implementation. Implementing actions may include:

- **Acquisition.** Prioritize and schedule capital expenditures for land acquisition, development, and annual maintenance of parks and open space. This schedule should be coordinated with the Utilities and Community Facilities Element. Funding resources for park and open space acquisition are summarized below.
- **Partnerships with nonprofit conservation organizations.** There are several private organizations that focus their efforts on parks and open space. In urban areas, organizations include land trusts, gardening groups, community garden groups, neighborhood associations, and local park foundations. In rural areas of the state, organizations include local land trusts and hunting and fishing groups. Working with these groups to define the local resource base and future goals will allow for more informed decision making on these issues. Often these organizations have access to resources that can supplement the work of local governments.

ADDITIONAL RESOURCES

The Conservation Fund: *http://www.conservationfund.org*

Trails and Greenways Clearinghouse: *http://www.trailsandgreenways.org*

National Parks Service, Rivers, Trails and Conservation Assistance Program: *nps.gov/rtca* or call 414–297–3617/3605.

State Trails Network Plan, Bureau of Parks and Recreation, WDNR (2001). For further information call 608/266–2181.

The Economic Benefit of Parks and Open Space: How Land Conservation Helps Communities Grow Smart and Protect the Bottom Line by Steve Lerner and William Poole, The Trust for Public Land (1999). Information also available at: *http://www.tpl.org*.

Assuring Your Community's Well-Being: A Parks, Recreation, and Open Space Planning Guide, State of Washington, Department of Community Development, Growth Management Division (1993).

Parks, Recreation, and Open Space: A Twenty-First Century Agenda by Alexander Garvin, Planning Advisory Service Report Numbers 497/498, Chicago: American Planning Association (2000).

Park, Recreation, Open Space and Greenway Guidelines, by James D. Mertes and James R. Hall, Arlington, Va.: National Recreation and Park Association (1995).

Park Maintenance Standards. Alexandria, Va.: National Recreation and Park Association (1986).

Environmental Corridors

Environmental corridors are continuous systems of open space that are often located in urban or urbanizing areas. These corridors include environmentally sensitive lands including woodlands, wetlands, and habitat areas, natural and cultural resources requiring protection from disturbance and development, and lands needed for open space and recreational use. Environmental corridors serve multiple functions. Protection and preservation of environmental corridors contribute to water quality through reduction of nonpoint source pollution and protection of natural drainage systems. Environmental corridors can also protect and preserve sensitive natural resource areas, such as wetlands, floodplains, woodlands, steep slopes, native grasslands, prairies, prairie savannas, groundwater recharge areas and other areas that would impair habitat and surface or groundwater quality if disturbed or developed. These valuable environmental services are often difficult and very costly to replicate or mitigate (e.g., cleaning the air, filtering and storing drinking water, keeping excess nutrients out of streams and rivers, and providing critical habitat and pathways for wildlife).

Environmental corridors can be a major part of the needed open space for a community or region. In addition, the continuous and typically linear nature of environmental corridors is suited to increasingly popular recreational activities requiring trail development, such as hiking, biking, and cross-country skiing. By helping to meet various public policy objectives, environmental corridors can contribute to citizens' quality of life.

Environmental corridors are mapped using geographic information systems and other mapping techniques. Many of the Regional Planning Commissions and several counties have delineated environmental corridors. Contact your Regional Planning

Commission and/or county for a description of the process used to identify the corridors.

Identification of environmental corridors should occur as part of the Agricultural, Natural and Cultural Resources Element. The identification of these areas also needs to occur as part of the Land Use Element.

Unlike parkland that is acquired for public use, environmental corridors may consist of a combination of lands acquired for public use and privately owned lands that are usually not open to the public. Where public access is required for recreation or for provision of structures such as stormwater detention basins, acquisition of the lands through purchase or dedication is necessary. Financial resources for acquiring land within an environmental corridor are discussed below. Conservation easements may also be acquired where fee-simple title is not needed.

Environmental corridors can also be protected through a variety of means, including limits on the extension of public sanitary sewers, and zoning of floodplains, shorelands, wetlands, and conservancy areas. Site planning that incorporates the natural features of a parcel should also be encouraged. Public acquisition may be required if the natural resources are not adequately protected through regulation.

Generally, resource features that can be mapped and used as background information for developing environmental corridors include:

- All waterways and water bodies, including lakes, ponds, intermittent and perennial streams, and drainageways;
- Vegetated buffer strips along drainageways, streams, lakes, and wetlands;
- 100-year floodplains;
- Wetlands;
- Groundwater recharge and wellhead protection areas;
- Steep slopes (12% or greater);
- Woodlands;
- Areas of unique vegetation or geology;
- Historic and archeological sites; and
- Existing and proposed parks, greenways, conservancy areas, and stormwater management areas.

ADDITIONAL RESOURCES

Tomorrow by Design: A Regional Design Process for Sustainability, by Philip J. Lewis, New York: John Wiley & Sons, Inc., (1996).

Design with Nature, by Ian L. McHarg, Garden City, New York: Natural History Press (1969), reprinted by New York: John Wiley & Sons, Inc. (1992).

Environmental Corridors: Land Use Planning Guide, Technical Paper No. 1, Land Information & Computer Graphics Facility, University of Wisconsin–Madison (Fall 1998) also available at: *http://www.lic.wisc.edu*.

Environmental Corridors: Lifelines of the Natural Resource Base, fact sheet prepared by the University of Wisconsin Extension and the Southeastern Wisconsin Regional Planning Commission.

Financing Park and Open Space Land Acquisitions

Local sources

Locally generated sources of revenue available to local units of government include the establishment of impact fees (as provided for in section 66.0617 of the Wisconsin Statutes), subdivision dedication requirements (as provided for under chapter 236 of the Wisconsin Statutes), special fees, and use of general tax revenues. Local governments can also accept gifts and donations of land or rights to the land.

State and federal sources

The state and federal governments have several financial resources available to assist local communities in the acquisition of land for parks and open space. Federal sources of funding include the Land and Water Conservation Fund (LWCF) and the Recreational Trails Act. In addition, the WDNR administers a number of grant programs that focus on the acquisition of land or rights in land, restoration, or development of land for conservation and public outdoor recreation purposes.

The Knowles-Nelson Stewardship Fund includes several key local assistance programs. These programs provide aids for the acquisition and development of local parks, urban green space grants, urban rivers grants, and grants to fund the acquisition of development rights. Chapter NR 51 of the Wisconsin Administrative Code governs administration of the different grant programs under the Stewardship Fund. A Comprehensive Outdoor Recreation Plan is required if the community wishes to apply for certain funding under the Stewardship Program. Guidelines for these plans are available from WDNR.

WDNR Lake Management Protection Grants also include a land acquisition component. Federal funding programs include the Land and Water Conservation Fund and the Recreation Trails Program administered by WDNR. A key component of these programs is cooperation and partnership between the WDNR, the federal government, local units of government, and nonprofit conservation organizations. To foster this partnership, the programs provide matching grants (usually 50%) to eligible sponsors, including local units of government and nonprofit conservation organizations.

Guidelines, application forms, and other information about these programs is available by contacting a WDNR regional office community services specialist or through the WDNR Bureau of Community Financial Assistance's website: *http://www.dnr.state.wi.us/org/caer/cfa/.html*.

Private sources

Community nonprofit conservation organizations (e.g., local land trust organizations) can play an important role in meeting the conservation and recreation needs of local communities and Wisconsin residents. Additional grants for acquisition of land and rights in land and habitat restoration are available to these organizations through the Stewardship Land Acquisition subprogram. These funds can be used for projects including natural areas, habitat areas, fisheries, streambank protection, wildlife areas, state riverways, bluff protection, preservation of endangered and threatened species, and habitat restoration.

ADDITIONAL RESOURCES

Information for local governments interested in applying for funds from the Stewardship Program is available at:
http://www.dnr.state.wi.us/org/caer/cfa/lr/stewardship/stewardship.html#local

Information for nonprofit organizations interested in applying for funds from the Stewardship Program is available at:
http://www.dnr.state.wi.us/org/caer/cfa/lr/stewardship/stewardship.html#nonprofit

Guidelines for the Development of Local Comprehensive Outdoor Recreation Plans. Bureau of Community Assistance, WDNR.

CHAPTER 7

Scenic Resources

There is much to be said for the saying "beauty is in the eye of the beholder". Visual quality is a subjective, personal taste based on feeling and emotion. Most people enjoy scenic vistas of unspoiled nature—blue skies, green hills, coastlines, lakes, etc. Some might prefer the appearance of a manicured park or golf course to a pastoral setting of small family farms in rural areas.

Views are often considered attractive if they provide something that engages our interest. Distraction can occur when something in the view looks out-of-place and diverts attention, maybe a flashing light or a strongly contrasting color.

Development can disrupt a viewshed, one of the key qualities that makes the countryside attractive in the first place. Some feel that homes built in woodlots or at the edge of a cornfield look out of place and generally weaken the aesthetic value in a rural countryside. Others feel similarly about cabins in the northern forests, along lake shorelines and atop bluffs.

The design, lot location(s), set backs, color, height, landscaping, etc., of home sites in rural areas can minimize aesthetic impacts. Overhead power lines, telephone and fiber optic lines can be buried. Home sites can be landscaped so the public's view from roads, waysides, trails and navigable waters is effectively screened. Earth tone colors and non-reflective roofs can help prevent a strong, out-of-place appearance.

Billboards can sometimes interfere with scenic views along roads. Night lighting from street lights, commercial and industrial sites, public buildings and even home yard lights can cause a glare that imposes on the property of others or blocks night sky views. Recent technology has brought a tremendous increase in the siting of wireless telecommunications towers, which can also intrude on viewsheds.

State and federal regulations

There are state regulations specifically targeted at aesthetic or viewshed protection, as in the case of the regulations that apply in the Lower Wisconsin Riverway discussed earlier. There are also a number of programs in place to help minimize or promote protection of visual quality. Certain business, like landfills and salvage yards, are subject to view screening regulations by WDNR. WDNR also has an urban forestry program that offers technical assistance and grants to local governments encouraging green space and vegetative protection. The Wisconsin Department of Transportation (WisDOT) has a Scenic Easement acquisition and Scenic Byways enhancement program which aims to protect scenic travel routes and recreation amenities (i.e. overlooks, interpretive signs, etc.). Much of the viewshed along the highways following the Mississippi River (the "Great River Road") are protected by scenic easements. WisDOT also regulates certain billboards along state and federal highways.

The Ice Age Trail is another example. It is part of a unique family of national scenic trails whose members include the Appalachian Trail and Pacific Crest Trail. When completed, the Trail will wind approximately 1,200 miles through 31 of Wisconsin's 72 counties extending from Potowatomi State Park in Door County to Interstate State Park in Polk County. The Trail is intended to preserve some of the world's finest examples of landscapes and landscape features that were created by continental glaciation 15,000 years ago. The Trail is also a Wisconsin State Scenic Trail.

The Ice Age Trail is administered by a partnership of the National Park Service, WDNR, and the Ice Age Park and Trail Foundation, Inc. (*http://www.iceagetrail.org*). Currently, about 550 miles of the trail are open for public use. Local communities are encouraged to preserve rights-of-way for future trail segments. Local communities should contact the Ice Age National Scenic Trail manager at the National Park Service Office in Madison for information about including the Ice Age Trail in their planning efforts.

Local programs and actions

- **Develop means to assess visual impact from new developments.** This also means identifying unique visual resources, such as "rural roads." In addition to assessing the visual impact, local communities can develop design guidelines for new structures. The policy basis for the design guidelines should be established in the community's comprehensive plan.
- **Develop and implement local ordinances to protect valued viewsheds.** Examples of local ordinances which protect valued viewsheds include the City of Madison's "Capitol View Preservation" provision in its zoning code (the City of Madison ordinances are available at *http://www.ci.madison.wi.us/*), and the City of Cumberland, Maryland's "Viewshed Protection Overlay District" (available at: *http://www.ci.cumberland.md.us/citygovt/commdev/zoningtoc/section10/section10*).
- **Incorporate scenic resources in plans for parks and open space.**
- **Develop and implement an outdoor lighting ordinance.** Increasingly, light pollution caused by poor exterior lighting is becoming a source of conflict for communities. Communities can address the problem by educating residents and others about more efficient exterior lighting practices. Communities can also adopt an outdoor lighting ordinance to regulate the type, placement, and brightness of residential and commercial light fixtures in the community. For example, the Town of Koshkonong in Jefferson County recently adopted an outdoor lighting ordinance that requires most new exterior lighting fixtures to be fully shielded to prevent glare, light trespass and sky glow.

  For more information, the Illuminating Engineering Society of North America provides recommended design standards for the lighting profession. The Website for the Society is: *http://www.iesna.org*. The International Dark-Sky Association has a great deal of information on exterior lighting and sample exterior lighting ordinances from around the country available on its web site at: *http://www.darksky.org*.
- **Develop and implement a wireless telecommunications tower ordinance.** While the Federal Telecommunications Act of 1996 places certain limitations on the authority of local governments to regulate wireless telecommunication towers, local governments can regulate the appearance of the towers. Communities who have adopted such ordinances require the co-location of antennas on the same tower or on existing tall structures such as water towers and electric towers. Communities can also require the camouflaging of tower structures to limit the visual impact.

  The U.S. Fish and Wildlife Service has established interim guidelines promoting tower sharing, tower design concepts to give a natural appearance and recommending height, lighting and anchor wire limits to reduce the risk of towers as a bird flight hazard. See: *http://migratorybirds.fws.gov/issues/tblcont.html*. The Minnesota - Wisconsin Boundary Area Commission developed a model wireless communications overlay ordinance to regulate the siting of wireless facilities within two miles of the St. Croix River in order to protect the scenic setting of the River. A copy of the ordinance is available from the Commission's Hudson Office at (715) 386–9444.

- **Develop and implement a landscaping ordinance.**
- **Develop and implement a sign ordinance.** A sign ordinance can regulate the appearance of on-premise signs and off-premise signs such as billboards.

ADDITIONAL RESOURCES

Aesthetic Objectivity: A Valid Basis for Visual Impact Assessment, by Dennis W. Hudacsko, American Planning Association 1999 National Planning Conference. Available at: *http://www.asu.edu/caed/publications/proceedings99/HUDAC/HUDAC.HTM*.

Aesthetics and Land-Use Controls, by Christopher J. Duerksen, Planning Advisory Service Report Number 399, Chicago: American Planning Association (1986).

Aesthetics of Parking, by Thomas P. Smith, Planning Advisory Service Report Number 411, Chicago: American Planning Association (1988).

Aesthetics, Community Character, and the Law, by Christopher J. Duerksen, and R. Matthew Goebel, Planning Advisory Service Report Numbers 489/490, Chicago: American Planning Association (1999).

Appearance Codes for Small Communities, by Peggy Glassford, Planning Advisory Service Report Number 379, Chicago: American Planning Association (1983).

Preparing a Landscape Ordinance, by Wendelyn A. Martz with Marya Morris, Planning Advisory Service Report Number 431, Chicago: American Planning Association (1990).

Sign Regulation for Small and Midsize Communities, by Eric Damian Kelly and Gary J. Raso, Planning Advisory Service Report Number 419, Chicago: American Planning Association (1989).

CHAPTER 8

Mineral Resources

Nonmetallic Mineral Resources

"Nonmetallic" minerals include all mined materials other than those mined as a source of metals (such as lead, copper, gold, etc.). Economically important nonmetallic minerals include building stone, lime, sand, gravel, and crushed stone used in construction of buildings and roads. Mineral resources, like other natural resources, occur where nature put them, which is not always convenient or locally desirable. Some areas of the state have limited nonmetallic resources that are rapidly being eliminated from future development by competing land uses, specifically residential development. If an abundant supply of inexpensive aggregate is desired for the future, wise management of this resource is important.

State requirements

All counties in Wisconsin were required to adopt an ordinance by June 1, 2001, that establishes a nonmetallic mine reclamation program to promote compliance with state reclamation standards contained in Chapter NR 135 of the Wisconsin Administrative Code. (The reclamation of nonmetallic mining sites located in or adjacent to navigable waters is regulated by permits under Chapter 30 of the Wisconsin Statutes and NR 340 of the Wisconsin Administrative Code.) Cities, villages, and towns may also choose to adopt an ordinance and administer the program within their jurisdiction. The WDNR is required to review local ordinances for compliance with the statewide standards. Local governments have the option of adopting other ordinances, such as issuing conditional use permits, with additional provisions related to nonmetallic mining, such as regulating hours of operation or timing of blasting.

NR 135 of the Wisconsin Administrative Code also allows landowners to register marketable nonmetallic mineral deposits to prevent future uses that would interfere with mining of the deposit. Registered sites are protected from any local zoning or other decisions that permanently interfere with nonmetallic mining at the site for at least 20 years.

Local programs and actions

♦ **Establish effective planning policies and ordinances.** Communities need to consider non-metallic mineral resources as they plan for the future. Communities with nonmetallic mines should incorporate, to the extent practicable, the information related to nonmetallic mines and undeveloped resources, along with reclamation possibilities in their comprehensive plans. Depleted mining sites can be reclaimed as parkland, wildlife habitat, recreational land, or other uses.

ADDITIONAL RESOURCES

Information about non-metallic mineral resources and mining industry is available from the Wisconsin Geological and Natural History Survey at: *http://www.uwex.edu/wgnhs*.

Information about the nonmetallic mining reclamation program is available at: *http://www.dnr.state.wi.us/org/aw/wm/mining/nonmet.htm*. Model ordinances to assist communities in meeting the requirements of NR 135 are available at: *http://www.dnr.state.wi.us/org/aw/wm/mining/modordin.htm*.

Metallic Mineral Resources

Metallic mineral mining refers to mining of mineral deposits that contain recoverable quantities of metals, such as copper, zinc, lead, iron, gold and silver. Examples of such mining activity that has historically occurred in Wisconsin include the lead and zinc mines in southwest Wisconsin and iron mines in various parts of the state. More recently, interest has primarily been focused on Northern Wisconsin where several copper-zinc deposits have been discovered. The Flambeau deposit in Rusk County has been mined and the site reclaimed. The owners of the Crandon deposit in Forest County are currently involved in the state's permitting process. Other areas of mineralization have been identified in several northern counties, but are not currently being considered for development.

State requirements

Metallic mining activities including exploration (drilling) for minerals, prospecting (large quantity sampling for bench-scale and pilot plant scale tests), mining and reclamation are regulated by the WDNR. Mining operations are subject to a comprehensive array of regulations consisting of mining-specific laws and rules as well as other environmental protection regulations that pertain to specific aspects of the mining operation. A typical mining operation will need to obtain between ten and twenty permits, licenses or approvals from the WDNR in order to develop the mine.

Local programs and actions

Local municipalities in northern Wisconsin have important decisions in regard to potential mining projects. Extensive land ownership enables many municipalities to decide whether or not to lease lands for metallic mineral exploration and mining. After an ore body is discovered, municipalities have substantial authority in determining whether a proposed project receives necessary approvals to proceed with development. Thus, local communities will need to consider how potential metallic mineral resource development will fit into their comprehensive plan and also will need to understand its role in decisions regarding such development.

Northern Wisconsin counties own and manage several million acres of county forest land in the region where metallic mineral resources are most likely to occur. On these lands, counties have the authority to enter into exploration and mining leases with mining companies. The decision to enter into such an agreement rests with the county board and is largely a local decision, although the WDNR reviews draft agreements to assure protection of sensitive natural resources and must ultimately approve the agreements. A county may also decide to withdraw lands from its county forest for mining or

other purposes. The law states that if mineral extraction cannot be accomplished without permanently affecting the surface of the land, the land must be withdrawn as county forest land before mining can begin. A resolution to withdraw county forest land requires a two-thirds majority vote by the county board.

Wisconsin's mining law mandates that the local municipality (town, city, village, county or tribal government) where the proposed mine would be located must have granted the necessary permits or approvals under its applicable zoning or land use ordinance before state permits for mining can be granted. In addition the law also authorizes local municipalities to negotiate a "local agreement" or contract with a mine operator to address restrictions, safeguards and other requirements that the municipality believes necessary for protecting the public health, safety or welfare of its residents. The provisions in a local agreement could substitute for existing municipal zoning or land use controls, although this is not a requirement of a local agreement. The law still provides for local municipality approval of a mining proposal, either through its zoning or land use authority or by means of a local agreement, or both, whichever the local municipality chooses.

ADDITIONAL RESOURCES

For more information about metallic mineral deposits in the state refer to the Information Sheet prepared by WDNR entitled *Potential Mining Development in Northern Wisconsin.* This information sheet is available at: *http://www.dnr.state.wi.us/org/es/science/mining/infosheets/pot-dev/pot-dev.htm*.

Information about metallic mineral resources and mining history is available from the Wisconsin Geological and Natural History Survey at: *http://www.uwex.edu/wgnhs*.

CHAPTER 9

Solid & Hazardous Waste

Many communities throughout the state have or will need to site landfills, incinerators, hazardous waste processing facilities, and other solid and hazardous waste facilities. Limitations on the use of these facilities, including the potential stigma created by these facilities related to future land uses in the surrounding areas, can be an important planning factor.

State and federal requirements

The state and federal government have numerous laws that regulate solid and hazardous waste facilities. Information about these programs is available from the WDNR at: *http://www.dnr.state.wi.us/org/aw/wm/*.

The WDNR has approval authority for design and location of landfills and other solid and hazardous waste facilities under Chapter 144, subch. IV of the Wisconsin Statutes. Location of these facilities should be consistent with a community's comprehensive plan.

Local programs and actions

- **Solid waste management/recycling plans.** Local comprehensive plans should coordinate with existing solid waste management or recycling plans. These plans could be excellent sources of natural resources and/or land use information. These plans should also be considered when developing the Utilities and Community Facilities Element.
- **Reuse of solid waste sites.** A community's comprehensive plan should also consider the future use of solid waste sites. Can they fit within a community's plans for open space? Are there other uses?

CHAPTER 10

Brownfields

Brownfields are a special type of infill development. Brownfields are abandoned or underutilized properties where expansion or redevelopment is hindered by real or perceived contamination. Redeveloping brownfields can provide the following important public benefits:

- Provide jobs close to where workers are concentrated;
- Put tax delinquent properties back on the tax rolls;
- Improve a community's image and appeal to tourists;
- Provide new development space in targeted areas;
- Utilize existing infrastructure;
- Reduce health risks to communities by cleaning up contaminated sites.

Brownfields have the potential to supply land to meet the demand for a significant amount of development. A 1996 study found that brownfields in Detroit, Chicago, Milwaukee, and Cleveland could absorb 1 to 5 years of residential development, 10 to 20 years of industrial development, or 200 to 400 years of office space. Brownfields should also be addressed in the Economic Development Element.

State and federal requirements

The WDNR has a brownfield program in their Bureau for Remediation and Redevelopment section that can assist communities in identifying and remediating brownfields. (*http://www.dnr.state.wi.us/org/aw/rr/index.htm, http://www.dnr.state.wi.us/org/aw/rr/rbrownfields/beap.html).*

Local programs and actions

- **Identify brownfields.** The WDNR has developed the Bureau for Remediation and Redevelopment Tracking System (BRRTS) and the Geographic Information System (GIS) Registry. These are on-line databases that can connect to state-wide information about contaminated sites, spills, cleanups and other data. They can be accessed at *http://www.dnr.state.wi.us/org/aw/rr/brrts/find_sites.htm*.

- **Promote redevelopment of key properties.** Local governments and developers have a number of tools to assist with the clean-up and redevelopment of brownfield sites. Some of these tools include:
  - Tax tools dealing with delinquent property taxes;
  - Liability exemptions for local governments, lenders, and voluntary parties;
  - Municipalities have a cause of action to recover clean-up costs from responsible parties;
  - Grants and loan programs to encourage investigation, clean-up and redevelopment of contaminated properties;
  - General liability clarification letters to help persons interested in brownfields.

ADDITIONAL RESOURCES

Financial Resource Guide for Cleanup and Redevelopment, WDNR and Wisconsin Department of Commerce, PUB-RR–539 (March 2000). Describes local, state, and federal financial resources and incentives available to help businesses and communities cleanup and redevelop brownfields. Available at: *http://www.dnr.state.wi.us/org/aw/rr/archives/pubs/RR539.pdf.*

Transforming Brownfields Industrial Eyesores into Recreational and Open Space Attractions, U.S. EPA. (2000). Information available at *http://www.epa.gov/brownfields/*.

Redeveloping Brownfields with Transportation Funds, U.S. EPA. (2001). Available at *http://www.smartgrowth.org* or by calling (202) 260–7154.

CHAPTER 11

Wastewater Facilities

The location and design of wastewater treatment facilities and their collection systems both reflect and impact local development patterns. Planning for these facilities is essential for determining if and how a community retains the fundamental elements that make up its character and design.

State and federal requirements

Wastewater treatment facilities are regulated by either WDNR or the Wisconsin Department of Commerce. The type, size and location of the facility determines which agency regulates it. The Department of Commerce regulates small privately owned wastewater treatment systems. The WDNR regulates all other facilities, including "package treatment plants" or larger onsite facilities.

Small Privately Owned Wastewater Treatment Facilities (Small Onsite Systems) Small privately owned onsite wastewater treatment facilities are regulated under chapter COM83 of the Wisconsin Administrative Code. COM 83 includes performance-based provisions that provide flexibility in design (although the designs must be on approved lists or an exception or variance must be obtained). Changes in COM83 adopted February 4, 2000, removed existing soil depth requirements, prohibitions on placement of systems in floodplains, and various provisions pertaining to ownership and management. With this change, land that was 'undevelopable' under the old regulations is no longer prohibited from development under the new regulations.

Larger Onsite Systems and Municipal Treatment Plants Larger wastewater treatment systems are regulated by WDNR. Facilities discharging wastewater to surface waters or groundwater are permitted through the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit Program. During the initial design or planned upgrade of wastewater treatment plants, the facility plans and specifications must be reviewed and approved by the DNR. This review process is conducted under Chapter NR110 of the Wisconsin Administrative Code. Included in the NR110 review is a cost-effectiveness analysis of proposed wastewater alternatives to evaluate potential options for future treatment.

All plants regulated under NR110 and all WPDES permits are required to be in conformance with the state's Areawide Water Quality Management Plan developed under chapter NR121 of the Wisconsin Administrative Code. This means that the facility plan should be designed to address any special water quality concerns or issues (e.g., an outstanding resource water designation or a waterbody identified as impaired) in the appropriate "integrated basin plan" for that area.

Every community with sanitary sewer service within designated water quality planning areas (Southeastern Wisconsin, Dane County, and the Fox Valley) and other communities with populations larger than 10,000, are required to prepare Sewer Service Area (SSA) Plans. SSA planning is a water pollution control planning process required by the Federal Clean Water Act and administered by the WDNR under Chapter NR 121 of the Wisconsin Administrative Code. The plans are prepared by a Regional Planning Commission or a local planning authority. The WDNR approves the final plan. These plans provide the basis against which conformance reviews of sewer extensions occur in these specified areas and help communities better plan their growth and development in light of this major infrastructure cost to the community.

SSA planning is a process designed to anticipate a community's future needs for wastewater treatment. This planning helps protect communities from adverse water quality impacts through development of cost-effective and environmentally sound 20-year sewerage system growth plans. A SSA plan identifies existing sewered areas as well as adjacent land most suitable for new sewered development. This planning also identifies areas where sewers should not go such as steep slopes and environmentally sensitive areas where development would have an adverse impact upon water quality. Local governments with sanitary sewer service who are not required to prepare sewer service area plans may find the SSA planning process helpful as they prepare comprehensive plans.

SSA Plans have specific procedural and substantive requirements. A community, when required to develop a SSA plan under NR121, cannot replace its SSA plan with the Utilities and Community Facilities Element of the comprehensive plan. However, the SSA plan can be incorporated into several different comprehensive plan elements. The SSA plan relates most directly to the Utilities and Community Facilities Element. This Element calls for a description of:

> *the location, use, and capacity of existing public utilities and community facilities that serve the local governmental unit, shall include an approximate timetable that forecasts the need in the local governmental unit to expand or rehabilitate existing utilities and facilities or the create new utilities and facilities" and an assessment of the "future needs for governmental services in the local governmental unit that are related to such utilities and facilities.* Wis. Stat. § 66.1001(2)(d).

SSA plans also touch upon the Land Use Element. SSA Plans must identify where sewer service will occur over the following 20- year-time horizon. The Land Use Element requires, among other things, a series of maps that identify "the boundaries of areas to which services of public utilities and community facilities will be provided consistent with the timetable described in" the Utilities and Community Facilities Element and the 20 year time horizon of the comprehensive plan.

SSA plans also have certain requirements regarding the use of population projections (Department of Administration (DOA) or DOA approved projections), local density standards, and persons per household to identify needed residential acreage. Population projections and other demographic data are required in the Issues and Opportunities Element of a comprehensive plan.

SSA Plans also need locally produced data related to commercial and industrial land needs. Similar data is needed for the Economic Development Element.

The projections used in SSA plans should be consistent with the community's demographic projections used in its comprehensive plan. However, because the two plans may be developed over differing time horizons and on different schedules, it is possible that there may be differences in projected demographics and growth patterns in the two plans. Where differences exist, the community should strive to resolve those differences as soon as possible. One way to do this is to update or amend the SSA plan to reflect updated information and to promote consistency between the two plans.

The Agricultural, Natural and Cultural Resources Element can help identify those resources that the community seeks to protect. SSA plans require that local governments identify environmentally sensitive areas. These areas should include: "major areas unsuitable for the installation of waste treatment systems because of physical or environmental constraints are to be excluded from the service area. According to section NR 121.05(1)(g)2.c. of the Wisconsin Administrative Code, areas to be considered for exclusion from the sewer service area because of the potential for adverse impacts on the quality of the waters of the state from both point and nonpoint sources of pollution include, but are not limited to, wetlands, shorelands, floodways and floodplains,

steep slopes, highly erodible soils and other limiting soil types, groundwater recharge areas, and other such physical constraints."

Many communities, when developing their SSA Plans, identify buffers around wetlands and other waterways - both perennial and intermittent streams - and lakes. These areas are included in the environmentally sensitive areas and are prohibited from sewered development. Also included are lands having slopes greater than 12 percent. Some communities choose to identify special resources other than water-based sensitive areas in their SSA Plan.

Provisions regarding the identification of environmentally sensitive areas in NR121, and implemented locally through SSA plans, apply to all sewer systems. However, private onsite systems regulated by the Department of Commerce are primarily located outside of "sewer service areas" and are thus not subject to the same corridor protection provisions as sewered areas that fall under the requirements of NR121. However, the extension of private laterals, regulated under the Department of Commerce's Uniform Plumbing Code, are subject to the same regulatory provisions as public collection systems, including requirements excluding development of sewer systems in environmentally sensitive areas or corridors identified in approved SSA plans.

Because some sewer service areas extend beyond the boundaries of one jurisdiction, there may be issues that need to be addressed as part of the Intergovernmental Cooperation Element. In some communities, special purpose units of governments (such as sanitary districts or metropolitan sewerage districts) operate wastewater treatment facilities. These districts are separate from the local unit of government preparing a comprehensive plan. Local governments need to coordinate their planning efforts with these entities. Such coordination can be reflected in the Intergovernmental Cooperation Element as well as the Utilities and Community Facilities Element and the Land Use Element.

Local programs and actions

- **Coordination.** It is important that comprehensive plans and Sewer Service Area Plans are consistent. Local governments should be able to incorporate information from existing SSA Plans into the relevant elements of the comprehensive plan. SSA Plans provide a great deal of important background information that will not need to be duplicated but may require updating within a comprehensive planning process. Local governments may also determine that they need to amend their SSA Plan. In areas where a Regional Planning Commission acts as the designated management agency for water quality planning, the local government should work with the Regional Planning Commission to amend the plan.

- **Develop ordinances restricting placement of onsite systems.** To overcome the limitations on development that were removed with COM83's revisions, some counties have adopted ordinances prohibiting the siting of onsite systems in the floodplain. Communities should also consider developing restrictions for placement of onsite systems (both small and large) in designated environmental corridors or sensitive areas identified in the comprehensive plan, particularly in those areas identified as source water protection or well-head protection areas. Likewise, local governments concerned with issues of operation and maintenance have adopted requirements that affect the county government's long-term liability associated with the system.

ADDITIONAL RESOURCES

For more information about the SSA Planning Program see:
http://www.dnr.state.wi.us/org/water/wm/glwsp/ssaplan/index.htm. An example of a SSA Plan is available at:
http://www.dnr.state.wi.us/org/water/wm/glwsp/ssaplan/janesville.pdf.

CHAPTER 12

Land Use & Air Quality

Air quality, especially good air quality, is often taken for granted. The eastern portion of Wisconsin experiences high concentrations of ground-level ozone. Ground-level ozone, or smog, forms when pollutants emitted from vehicle exhaust, power plants, factories, and other combustion sources combine in the hot summer sun. In addition, warm weather causes an increase in air conditioner usage, which can increase harmful emissions from these sources.

Sound local and regional planning can minimize negative impacts to the air. Air quality is affected by land use decisions in several ways. Development patterns can impact automobile use, which in turn impacts air quality. The emissions from certain industries can also impact air quality. Finally, as more rural residential development occurs, there are increased conflicts between non-farm residents and certain agricultural operations that emit odors. Noise can also be a factor impacting environmental quality.

Transportation and Scattered Development

Vehicle travel including the number and length of trips has increased dramatically in recent decades. Evidence suggests that the increase is in part, the result of changing development patterns. As development patterns become more dispersed and the location of jobs and housing are increasing segregated and distant from one another, alternative modes of transportation are less viable so people make more trips by automobile. Lifestyle choices are also a major factor as, for example, two income families live in locations to "split the difference" between the two employers' locations. Vehicle travel generates air pollutant emissions, greenhouse gas emissions, and noise. Local decisions about what types, where and how new development occurs can have a substantial impact on air quality.

FACTS

- The US Census Bureau estimates that 2.6 million commuters drive alone in Wisconsin and have 1.1 million more vehicles than licensed motorists.
- In Wisconsin, from 1990 to 2000, vehicle miles traveled increased by 23.9%, based on figures from the Wisconsin Department of Transportation, compared to a population increase of 8.8%.

Local programs and actions

- **Promote compact and mixed use development that reduces automobile dependence and travel distances.** Plan for and adopt ordinances that allow for mixed uses and for more compact development such as traditional neighborhood developments.
- **Promote ride-share programs to reduce single occupant vehicle use.** Identify current and future Park and Ride lots. Van pools to major employment centers are available through a program with the Wisconsin Department of Transportation Rideshare Program (1–800–455-POOL) to learn more about the program for application in you community.
- **Promote a multi-modal transportation system.** Offering alternative modes of transportation such as bike lanes, sidewalks, multi-purpose trails and transit systems will help reduce air emissions and improve community livability. Chapter six of *Transportation Planning Resource Guide- A guide to preparing the transportation element of a local comprehensive plan* discusses the relationship between community development and environmental considerations when making transportation planning decisions.

♦ **Link jobs, housing, and transportations systems.** For example, when developing the different comprehensive plan elements, consider the types and locations of business and industry that your region is seeking to develop; the availability of housing for the people who will fill those jobs, and a transportation system so people can get to their jobs in the most environmentally friendly way.

ADDITIONAL RESOURCES

WDNR health, global issues, biomonitoring, ozone, education, technical assistance: *http://www.dnr.state.wi.us/org/aw/air/*.

U.S. Environmental Protection Agency Air Quality Information: *http://www.epa.gov/ARD-R5/naaqs/naaqs.htm*; Sustainable Urban Environments Initiative: *http://www.epa.gov/region5/air/sue*; and Transportation Air Quality Center: *http://www.epa.gov/otaq/traq*

Our Built and Natural Environments: A Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality, U.S. Environmental Protection Agency (2001). Available at: *http://www.smartgrowth.org/* or by calling EPA's National Center for Environmental Publications at (513) 891–6561 and asking for publication number: EPA–231-R–01–002.

Improving Air Quality Through Land Use Activities, U.S. Environmental Protection Agency, Transportation Air Quality Center, EPA Doc. 420-F–00–047 (2001).

Great Lakes Information Network: *http://www.great-lakes.net/envt/air-land/airqual.html*

Transportation Planning Resource Guide- A guide to preparing the transportation element of a local comprehensive plan, Wisconsin Department of Transportation (2001). Available at: *http://www.dot.state.wi.us/dtim/bop/pdf/transportation-guide.pdf*.

Farm Emissions

Wisconsin has a "right-to-farm" law protecting farmers from nuisance suits relating to farm noise and odors. As non-farm residential development expands into rural areas, it is inevitable that odor issues develop. Often the issues relate to manure storage and land spreading. People who move to rural farming areas sometimes are not aware of possible negative impacts such as odors from nearby farms. With more people moving to rural areas and farm operations getting bigger and producing stronger odors, conflicts are likely to become more common.

More livestock means more manure and more odors. To reduce the risk of manure run-off and associated water quality problems, large animal feedlot operations (over 1000 animal units) are now typically required to develop and comply with nutrient management plans. To comply with nutrient management plans, more feedlot operations are storing manure in higher volume storage pits making odors stronger. Plans generally call for manure to be 1) incorporated into the soil within 72 hours of being land spread and 2) applied to farm fields at restricted rates based on soil type and phosphorus usage by crop type. As a result, more feedlots operators are storing manure in large, million gallon pits for several months and hiring contractors with special equipment to spread a few times a year.

FACT

▶ According to WDNR Confined Animal Feedlot Operation permit records, the number of large animal feeding operations in Wisconsin has increased from 1 in 1985 to 87 in 2000.

State and federal requirements

State law directs WDNR to regulate air quality by requiring permits from dischargers, and emissions must meet health related standards (limiting the concentration) of certain compounds. Odors released from manure are in the form of ammonia and hydrogen sulfide gas. Both are regulated contaminants. In the past WDNR has typically considered manure gas emissions to be low-level and non-persistent, posing no health risk. In recent years, coincident with rural home site development patterns and changes in manure management practices, a substantial increase in public complaints have been received. In response WDNR has developed interim guidance calling for air engineering staff to investigate complaints and, if necessary, conduct monitoring to determine if a health risk exists. Best management practices are typically recommended to decrease odor emissions. If there is a health problem and it persists, WDNR can refer the issue to the Wisconsin Department of Health and Family Services for resolution of the problem.

If no health risks are expected but there is nonetheless a nuisance odor problem, WDNR has limited authority under Malodorous Emissions regulations in section NR 429.03 of the Wisconsin Administrative Code to address odor complaints.

Local programs and actions

♦ **Education.** Educate prospective new landowners about potential conflicts. Develop brochures or other informational materials, and require developers to inform prospective home buyers of right-to-farm and other laws. Educate farm operators about ways to minimize odor impacts, such as considering prevailing winds when siting manure storage facilities and land spreading, notifying neighbors of land spreading dates, and using additives to reduce odors.

♦ **Avoid incompatible land uses.** Examples of incompatible uses would be allowing new residential development next to an existing farm animal feeding operation thus inviting odor or other conflicts/problems. A local animal waste and/or feedlot ordinance could be developed that requires local approval of large size feedlots, separation distances from existing residences, reverse setbacks so new home sites can't be built near existing feedlots, etc. Trempealeau County has developed Animal Waste Management and Feed Lot Performance Standards Ordinances. Copies are available by contacting the Trempealeau County UW Extension Office at (715) 538–2311, extension 259.

ADDITIONAL RESOURCES

Planning and Zoning for Concentrated Animal Feeding Operations, by Jim Schwab, Planning Advisory Service Report Number 482, Chicago: American Planning Association (1998).

Siting Emissions Sources

When planning for industrial areas, communities should consider the potential impact of air pollution emission sources on air quality.

In some communities in Wisconsin, the use of burn barrels to dispose of waste can be a problem. Smoke from burning garbage, released directly into the air, often contains acid gases, heavy metal vapors, carbon monoxide, and other toxins.

State and federal requirements

In Wisconsin, stationary source air emissions - primarily those from industrial sources through smoke stacks - require state permits to assure compliance with air quality standards designed to protect public health. Other regulated direct source air discharges are fixed or mobile asphalt "batch" plants and large (over 1,000 metro/1,500 non-metro space) parking lots.

Wisconsin law also prohibits burning most household waste, including plastic materials, petroleum-based items like asphalt shingles, tires, kitchen wastes, dirty or wet paper wastes, treated or painted wood, furniture, and demolition material. However, implementation of this law is difficult considering the number of individual incinerators in Wisconsin. Local governments are often the best source of assistance and often regulate residential burn barrels.

FACT

▶ According to an estimate by WDNR staff, more than a half-million individual incinerators are operating in Wisconsin back yards.

Local programs and actions

♦ **Promote environmentally responsible industry.** Encourage already existing local industry to develop sustainable practices. The WDNR has several programs that seek to address air quality issues of industry and can help develop strategies for businesses to reduce their emissions and promote cleaner air. For example, Environmental Management Systems (EMS) are environmental performance measures that industry can adopt voluntarily. Benefits to companies that adopt EMS can include improved public image, reduced expenditures resulting from increased efficiencies, competitive advantage, and measurable reductions in environmental pollution. See: *http://www.epa.gov/ems/links.htm*.

♦ **Enact an ordinance against burning or require burning permits.**

Noise

Noise is defined as unwanted sound. It can vary in frequency, duration and intensity. It is the combination of the frequencies, durations and intensities that can turn a sound into a nuisance or noise.

Loud noises can cause hearing loss (both short term and long term effects are possible) depending on how loud the sound is and how long it lasts. Noise can also cause startling and nervous system responses that have been associated with heart attacks and high blood pressure. There is also the issue of sleep loss and nuisance associated with noise, which some people consider health related effects.

Sound intensity levels are measured in decibels. The most common measurement device available is called an A-weighted Sound Meter. The higher the number of decibels, the louder the sound. Since decibels are expressed in logarithmic units (powers of 10), a sound that is twice as loud as another sound, is only about 3 decibels louder.

State and federal requirements

There are no state regulations or laws concerning community based noise level standards in Wisconsin. There are currently no Wisconsin agencies solely responsible for establishing noise regulations for a community. There are many statutes that address noise in one way or another, but usually there is no quantification of how much noise is too much. There are some noise laws for particular types of motor vehicles, all-terrain vehicles, boats, snowmobiles and recreational equipment, but with the exception of motor boats, which must have sound levels below 86 decibels, usually the only requirement is to have a muffler. There are some state statutory limits to local authority for regulating noise from firing ranges (see section 895.527(2), of the Wisconsin Statutes) and there may be limits on what communities can do about aircraft noise (due to the fact that aircraft engine noise standards are federally established).

There are some established national occupational standards and guidance for the workplace. The Federal Occupational Safety and Health Administration (OSHA) requires employers to institute a hearing conservation plan above a maximum level of 85 decibels over an 8-hour average work shift. OSHA also has established noise standards for 8-hour exposures. The World Health Organization recommends that children's exposure be kept below 120 decibels at all times.

Local programs and actions

♦ **Develop a noise ordinance.** Such an ordinance would govern noise levels in the community. Ideally, a community-based noise standard that will protect hearing loss would be at or below 85 decibels, because community members might be exposed for longer than 8 hours a day and there may be sensitive individuals within the community. In addition, community based standards might also address the nuisance aspects of noise as well. For example, loud (100 decibels) outdoor sounds at night, even of short duration, will wake up a significant percent of the population. An example of a local noise ordinance is from the city of Berkeley, California. (Under California law, a "noise element" is a required element of a local comprehensive plan.) The ordinance is available at: *http://www.ci.berkeley.ca.us/bmc/berkeley_municipal_code/Title_13/40/index.html*.

♦ **Limit incompatible uses.** Develop ordinances to reduce likelihood of two incompatible land uses next to each other.

♦ **Noise barriers.** Creating noise barriers through vegetation, landscaping, or building sound barriers or walls.

ADDITIONAL RESOURCES

The World Health Organization has Guidelines for Community Noise. The guidelines are available at: *http://who.int/peh/noise/noiseindex.html*.

Appendices

Appendix A

Sources of Natural Resources Data

Local governments in Wisconsin have a number of sources of information to help them inventory natural resources. An important starting point is the collection and review of previous plans prepared by the community, Regional Planning Commissions, or the state. Examples include local master plans, parks and open space plans, county farmland preservation plans, county land and water plans, priority watershed plans, and the WDNR's Land Legacy Study and State of the Basin reports.

WDNR's State of the Basin reports, for example, are snapshots of ecological conditions, management needs, and priorities. By the end of 2001, they will be completed for each watershed, or basin, in the state, and will be updated on a six-year rotation. The data these reports contain will be helpful to communities developing comprehensive plans. Find the report for your basin on this website: *http://www.dnr.state.wi.us/org/gmu/index.html.*

After collecting and reviewing these other plans, you should find out what information is available from your county land information office or regional planning commission. The county land information office is responsible for overseeing the development of computerized geographic information systems ("GIS") in each county. A list of county land information officers is available from the Office of Land Information Services in the Wisconsin Department of Administration at: *http://www.doa.state.wi.us/olis/wlip/lio_officers.asp.* The amount of information available on these systems varies by county.

Communities should use the best available data when preparing their comprehensive plan. Some areas of the state will have more detailed information available than other areas. A survey summarizing the status of county GIS programs is available at: *http://www.lic.wisc.edu/wlip/*. County and state agency land information modernization and integration plans for the continued development of land information systems are available at *http://www.doa.state.wi.us/olis/wlip/land_info_mod.asp.* Some cities, villages, and towns have also created customized land information systems for their jurisdiction.

Regional Planning Commissions and Metropolitan Planning Organizations are another primary source of data for planning. The Regional Planning Commissions are clearinghouses for data from state agencies, such as the WDNR, and have worked with counties, towns, villages, and cities to develop custom data sets. Appendix B contains information about where to contact the Regional Planning Commissions. Communities may need to pay a fee to access computerized land information.

Two other important sources of natural resources data that Wisconsin communities would likely find

What is "GIS"?

Geographic information systems ("GIS") are a way to analyze data spatially. GIS can help to explore and recognize land use patterns by linking non-geographic data with geographic locations (like land uses or owner names to parcel maps). Data layers might include topography, soils information, floodplains, trees, etc. GIS can assist communities in data organization and storage, and help the planning process, including such tools as identifying particular zones based on criteria that the user selects. They can also provide an avenue for public participation. All GIS planning applications require a certain level of expertise in GIS programs, computers, and digital data. They also require some up-front costs, and long-term maintenance to keep the data updated and useful.

The Wisconsin State Cartographer's Office gathers, maintains, and disseminates information about mapping and spatial data collection in the state. It provides information about available maps and related data such as what the data is, who collected it, who maintains it, where it is kept and how to obtain it. For more information about GIS see the Office's website at: *feature.geography.wisc.edu/sco/home.html.*

The Environmental Systems Research Institute—ESRI—has free software called "ArcExplorer" available at *http://www.esri.com/company/free.html.* This software allows users to view spatial data sets and make maps.

The Aquatic and Terrestrial Resources Inventory Program ("ATRI") at WDNR facilitates the identification, inventory, storage and distribution of data relating to the aquatic and terrestrial resources of Wisconsin. Central to this objective is the development of an online system that provides metadata, on-line access, downloading and integration of data from the many datasets identified in the inventory. (Metadata is the information about the dataset itself, i.e. how the information was collected, how it is maintained and how it should be used.) ATRI includes both internal and external datasets in any of the following formats: databases and tables, GIS data layers, images, video or audio clips, summary documents and links to other useful websites. Initially, access to ATRI will only be available to WDNR employees.

helpful are the Wisconsin Geological and Natural History Survey and the Wisconsin Department of Natural Resources.

The Wisconsin Geological and Natural History Survey conducts earth-science surveys, field studies, and research. It provides objective scientific information about the geology, mineral resources, water resources, soil, and biology of Wisconsin.The Survey's website is: *http://www.uwex.edu/wgnhs/*.

The WDNR is the state agency responsible for resource management and environmental conservation in Wisconsin. The Department's general web site is *http://www.dnr.state.wi.us/*. Many of the WDNR offices have professional staff that are willing to help local communities understand and address natural resource issues as part of the comprehensive planning process. For example, the WDNR has "Basin Teams." These are WDNR specialists who work within specific watersheds or "basins" that, together, encompass every community in the state. Contact the nearest WDNR office for information regarding the basins and to ask for assistance from the Basin Lands or Water Team Leader. Contact information for WDNR offices is included in Appendix B.

The WDNR also has a GIS program whose mission is to develop and maintain the GIS technology, tools, databases and applications that provide spatial data management, analysis, and mapping capabilities to support WDNR policy evaluation, decision-making, and program operations. The GIS program website is: *http://www.dnr.state.wi.us/org/at/et/geo/*. Information about a variety of mapping sources is available at: *http://www.dnr.state.wi.us/org/land/forestry/airphoto/overview/othsrces.htm.*

A word about scale and other issues . . .

There are several important things to keep in mind when working with spatial data. For example, it is important to understand the scale in which the data was compiled. The "scale" of a map is the ratio between distances measured on a map and the corresponding real-world distances. This relates to the accuracy of the data. Some GIS data was compiled at the very coarse scale of 1 inch = 1 mile. Other data is more detailed and generated directly from the legal descriptions of property at scales such as 1 inch = 100 feet or 1 inch = 400 feet. The more detailed the data, the more accurate the maps. Many of the data sets developed at the regional, county, city, village, and town level are more detailed than some of the data developed by state agencies. Successful data integration also depends on reconciling data from different sources to a common referencing system using GIS tools.

Since most of the data sources contain information from statewide inventories, there is a good chance that certain natural resources in or around your community have never been surveyed or surveys have not been documented in a GIS data bank. As a result, you may want to consult with natural resource professionals from WDNR, universities, UW–Extension, regional planning commissions, or the county to help identify sensitive resources in your community and potential protection strategies.

The following table summarizes some of the types and sources of natural resources related data and where to find that information. Some of the data is available in digital formats, some of it is not. The availability of information will vary by community.

Type of Information	Potential Information Sources	Providers
Floodplains	FEMA floodplain maps; floodplain insurance rate maps; local floodplain data and mitigation plans	Municipal/County land information offices; RPCs; Federal Emergency Management Administration (FEMA); WDNR; WisLINC (*http://wisclinc.state.wi.us/*).
Climate	Climatological records	Wisconsin State Climatology Office (*http://www.aos.wisc.edu/~sco/*); universities; radio and television stations; RPCs
Topography	United States Geological Survey (USGS) maps	Municipal/County land information offices; RPCs; USGS; WisLINC (*http://wisclinc.state.wi.us/*); WGNHS (*http://www.uwex.edu/wgnhs/*).
Surface water	Watershed maps	Municipal/County land information offices; RPCs; WDNR; United States Geological Survey (*http://wwwdwimdn.er.usgs.gov/*).
Wetlands	Wetland inventory maps	WDNR (*http://www.dnr.state.wi.us/org/water/fhp/wetlands/invent.htm*); United States Geological Survey (*national wetlands research center, http://www.nwrc.nbs.gov/index.html*); RPCs.
Groundwater	Groundwater maps and reports	Municipal/County land information offices; RPCs; WDNR; Central Wisconsin Groundwater Center (*http://www.uwsp.edu/cnr/gndwater/*); USGS.
Geology	Geologic maps and reports	WGNHS (*http://www.uwex.edu/wgnhs/*); USGS; WisLINC (*http://wisclinc.state.wi.us/*); *Mineralogy of Wisconsin*, a data base on the minerals of Wisconsin cross-referenced by county and mineral (*http://www.uwrf.edu/~wc01/WiscMin.html*); RPCs.
Soils	Soils survey and other soil maps	WisLINC (*http://wisclinc.state.wi.us/*); County land information offices; RPCs; WGNHS (*http://www.uwex.edu/wgnhs/*); Natural Resources Conservation Service, U.S. Department of Agriculture (*http://www.wi.nrcs.usda.gov/soil/soil.html*).
Vegetation	Land use/land cover maps	WisLINC (*http://wisclinc.state.wi.us/*), State cartographers office, County land information offices; RPCs; Wisconsin Vascular Plants (*wiscinfo.doit.wisc.edu/herbarium/*).
Forestry, woodlands	Statewide Forestry Aerial Photography Project; local forest inventory	WDNR *(http://www.dnr.state.wi.us/org/land/forestry/airphoto/index.htm;)* RPCs.
Threatened and endangered species	Inventories	WDNR, Bureau of Endangered Resources "Rare Species and Natural Communities Information" *(http://www.dnr.state.wi.us/org/land/er/rare.htm)*; Milwaukee Public Museum, amphibians and reptiles (*http://www.mpm.edu/collect/vertzo/herp/atlas/welcome.html*); RPCs.
Waste and contaminated sites	"Lists of Waste Sites and Contaminated Sites", publication number RR–644	WDNR, Bureau for Remediation and Redevelopment (*http://www.dnr.state.wi.us/org/aw/rr/brrts/index.htm*.)
Historical/ archeological resources	Publications, maps, inventories	Wisconsin Historical Society, Historic Preservation Division (*http://www.shsw.wisc.edu/*).

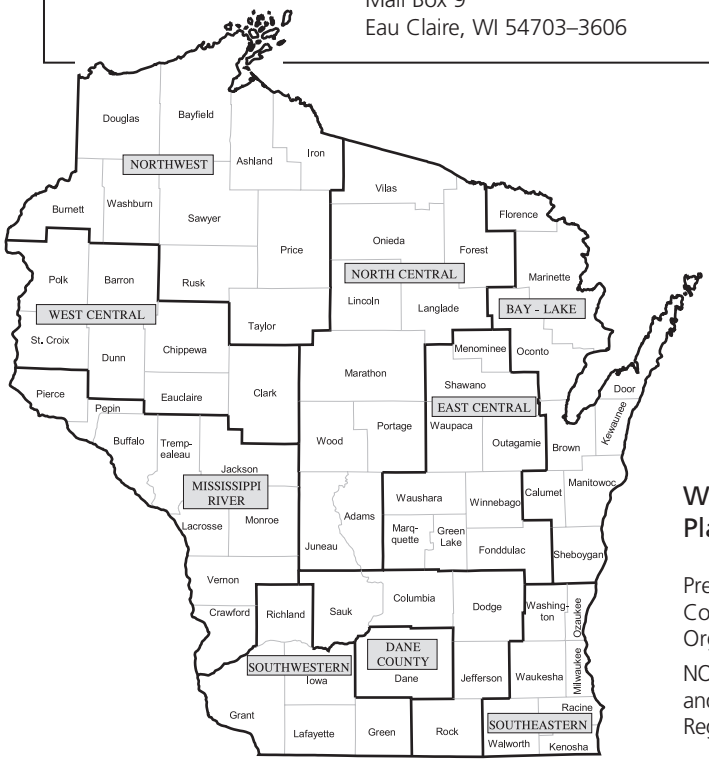
Note: "WisLINC" stands for The Wisconsin Land Information Clearinghouse. The site is a gateway to geospatial data and metadata, related land and reference information, and many of the above referenced agencies that produce or maintain these items. Regional Planning Commissions throughout the state are also a potential source of planning data.

Appendix B

Contact Information

Regional Planning Commissions

Bay Lake	Suite 211, Old Fort Square 211 North Broadway Green Bay, WI 54303–2757	920/448–2820 http://www.baylakerpc.org
Dane County	217 S. Hamilton, Suite 403 Madison, WI 53703–3238	608/266–4137 http://www.co.dane.wi.us/rpc.htm
East Central Wisconsin	132 Main Street Menasha, WI 54952–3100	920/751–4770 http://www.eastcentralrpc.org
Mississippi River	1707 Main Street, Suite 240 La Crosse, WI 54601–4133	608/785–9396 http://www.centurytel.net/mrrpc
North Central Wisconsin	210 McClellan St., Suite 210 Wausau, WI 54403	715/849–5510 http://www.ncwrpc.org
Northwest	1400 S. River Street Spooner, WI 54801–1323	715/635–4801 http://www.nwrpc.com
Southeastern Wisconsin	916 North East Ave. P.O. Box 1607 Waukesha, WI 53817–1607	262/547–6721 http://www.sewrpc.org
Southwestern Wisconsin	426 Karrman Library UW—Platteville Platteville, WI 53818	608/342–1214 http://www.swwrpc.org
West Central Wisconsin	800 Wisconsin Street Mail Box 9 Eau Claire, WI 54703–3606	715/836–2918 http://webpages.charter.net/wcwrpc/



Wisconsin Regional Planning Commissions

Prepared February 2000 bythe Wisconsin Council of Regional Planning Organizations (CORPO).

NOTE: Sauk, Columbia, Dodge, Jefferson and Rock Counties are not covered by a Regional Planning Commission.

Wisconsin Department of Natural Resources

Central Office	101 South Webster St. 6th Floor Madison, WI 53707	608/266–8852 http://www.dnr.state.wi.us/
Regional Offices (and contact names for comprehensive planning)		
Northeast	1125 N. Military Ave., Box 10448 Green Bay, WI 54307–0448	Shelly Schaetz 920/492–5819
Northern	810 W. Maple St Spooner, WI 54801	Chuck McCullough (in Park Falls) 715/762–4684 (ext.106)
Southeast	2300 N. Dr. Martin Luther King, Jr. Dr. Milwaukee, WI 53212	Mike Thompson 414/263–8677
South Central	3911 Fish Hatchery Road Fitchburg, WI 53711	Russ Anderson 608/275–3467
West Central	1300 West Clairmont Ave Eau Claire, WI 54702	Tom Lovejoy 715/839–3747
Service Centers		
Antigo	223 E Steinfest Rd Antigo, WI 54409	715/627–4317
Baldwin	990 Hillcrest Ste 104 Baldwin, WI 54002	715/684–2914
Black River Falls	910 HWY 54 E Black River Falls, WI 54615	715/284–1400
Dodgeville	1500 N. Johns St. Dodgeville, WI 53533	608/935–3368
Eau Claire	1300 W. Clairemont Box 4001 Eau Claire, WI 54702–4001	715/839–3700
Fitchburg	3911 Fish Hatchery Rd. Fitchburg, WI 53711	608/275–3266
Green Bay	1125 N. Military Box 10448 Green Bay, WI 54307–0448	920/492–5800
Hartford	3554 Kettle Moraine Rd. Hartford, WI 53027	262/670–3400
Hayward	10220 N. ST HWY 27 Box 2003 Hayward, WI 54843	715/634–2688
Horicon	N 7725 Highway 28 Horicon, WI 53032–1060	920/387–7860
Janesville	2514 Morse St. Janesville, WI 53545	608/743–4800
La Crosse	3550 Mormon Coulee Rd. La Crosse, WI 54601	608/785–9000
Ladysmith	N4103 HWY 27 Ladysmith, WI 54848	715/532–3911

Service Centers continued		
Madison	101 S. Webster St. Madison, WI 53703	608/266–2621
Milwaukee	2300 N. Dr. Martin Luther King Jr. Dr. Milwaukee, WI 53212	414/263–8500
Oshkosh	625 E. County Rd. Y, STE 700 Oshkosh, WI 54901–9731	920/424–3050
Park Falls	875 S. 4th Ave. Box 220 Park Falls, WI 54552	715/762–3204
Peshtigo	101 N. Ogden Rd., PO Box 208 Peshtigo, WI 54157	715/582–5000
Poynette	W7303 CO HWY CS Poynette, WI 53955	608/635–8110
Rhinelander	107 Sutliff Ave. Rhinelander, WI 54501	715/365–8900
Spooner	810 W. Maple St. Spooner, WI 54801	715/635–2101
Sturgeon Bay	110 S. Neenah Ave. Sturgeon Bay, WI 54235–2718	920/746–2860
Sturtevant	9531 Rayne Rd., Ste 4 Sturtevant, WI 53177	262/884–2300
Superior	1401 Tower Ave. Superior, WI 54880	715/392–7988
Wausau	5301 Rib Mountain Rd. Wausau, WI 54401	715/359–4522
Wautoma	427 E. Tower Dr., Suite 100 Wautoma, WI 54982	920/787–4686
Wisconsin Rapids	473 Griffith St. Wisconsin Rapids, WI 54494	715/421–7800
Woodruff	8770 HWY J Woodruff, WI 54568	715/356–5211

WDNR Geographic Management Units

Produced by WDNR, GIS Analysis & Mapping Services 06/2001