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SHEBOYGAN COUNTY

NATURAL AREAS AND CRITICAL RESOURCES PLAN

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INTRODUCTION

Sheboygan County covers an area of 513 square miles. The County has over 26.3 miles of coastal shoreline along Lake Michigan, and contains three major watershed areas that drain into the waters of Lake Michigan. The 2004 population estimate for the County was 115,447 persons.

Sheboygan County is located one hour north of Milwaukee, one hour south of Green Bay, and one hour east of the Fox River Valley. The western portion of the County is dominated by a rolling, glacial terrain (the Kettle Moraine) left by the Pleistocene. The eastern border of Sheboygan County is Lake Michigan. These two very unique and undeniably beautiful landscape features create an exceptional setting for a number of recreational amenities that attract visitors, seasonal residents, and long-term, permanent residents.

Nearly 40% of the County's workforce is currently employed in manufacturing-related industries, demonstrating the significance of manufacturing on the local economy. However, recent downturns and shifts in global production has led to a 10% decline in manufacturing jobs in Sheboygan County in the last 2 years. It will be critical that the County's residents retain jobs.

A number of recent developments in the County are leading to a shift in the economic base and have the potential to shape the County's economic future. Two world-class golf courses owned by Kohler Company, Whistling Straits and Blackwolf Run, and the new Jack Nicklaus course, The Bull, are attracting golf enthusiasts from all over the world. The development of these golf courses has increased the traffic and use of the County's airport and will have an impact on local infrastructure as well as the economy in the future. The redevelopment of the 50-acre former C. Reiss Coal property in the City of Sheboygan to include a 30-acre resort/convention center and a 20-acre mixed-use development will provide additional economic activities centered on tourism in Sheboygan County.

Sheboygan County has not experienced levels of growth such as our neighbor to the south, Ozaukee County. However, given the increasing value of land and housing in the Milwaukee Metropolitan area, including Ozaukee County, and decreased travel times from various locations in Sheboygan County following the upgrade of State Highway 57 from two lanes to four lanes, it is anticipated that growth pressures in Sheboygan County will increase over the course of the next 5-10 years.

In light of the recent developments related to golf and resorts, international exposure of the community as a result of the PGA Championship in 2004, and potential growth pressure from the Milwaukee Metropolitan Area, it is important to plan for resources protection now, rather than react to it when it is too late. Though actual population projections do not indicate that the County will experience high levels of growth in the next 10-20 years, it is difficult to predict whether or not these projections are accurate or what pressures the additional resort/leisure amenities will have on the County's resources.

STATEMENT OF PURPOSE

This plan is intended to provide an inventory of the agricultural, natural, and cultural resource features that may affect local decisions regarding development within Sheboygan County pursuant to Wisc. Stat. §66.1001(2)(c). Once resources are identified in this plan, future planning processes will be implemented to develop strategies for resources protection in Sheboygan County.

The County currently reviews all land divisions in the unincorporated portions of the County. The County also administers the County Shoreland-Floodplain Ordinance and has jurisdiction over land use within 300 feet of all navigable rivers and streams and 1000 feet of all navigable lakes and ponds. The plan will be used for reviewing land divisions and issuing County Shoreland-Floodplain permits.

The County administers the Sheboygan County Stewardship Fund, a grant program available to government entities and non-profit agencies. Eligible projects must be related to natural resources conservation and preservation, and recreation activities including:

- **Project Development.** Examples*: Park or trail development or restoration, creation or restoration of public access to significant water resources.
- **Purchase of Development Rights.** For preserving agricultural, recreational, and natural lands and/or open space.
- **Land Acquisition.** Examples*: Conservation easements, property acquisition of sensitive or significant lands, scenic easement acquisition.
- **Restoration of Wetlands and Natural Habitat.** Examples*: Vegetative buffering along significant surface water resources; wildlife habitat restoration; forest, prairie, and flora restoration, wetland restoration; Lake Michigan bluff protection.
- **Discretionary.** These projects will be funded on a case-by-case basis where the project has significant merit to promote the goals of the Program.

This plan will assist in the administration of the County Stewardship Grant program by providing criteria for scoring grant application projects and setting priorities for funding.

NATURAL RESOURCES STRATEGY

- Preservation of agricultural lands
- Large farm expansions and the potential impacts they may cause to the natural environment
- Preserve rural character
- Preserve natural resources and public lands through good management for multiple uses
- Protect groundwater resources
- Improve air quality
- Protect quality of groundwater

- Preserve, restore, and improve surface water quality (wetlands, lakes, rivers, and streams) through education, erosion control, buffer strips, easements, land use controls, flood controls, and nutrient/sediment reductions
- Preservation of parks and open space. Encourage access and preservation of access to lakes and rivers
- Encourage the preservation of environmental corridors and other sensitive areas, such as waterfronts, streams, and wetlands.
- Continue to promote sustainable forestry
- Maintain beaches and determine sources of beach closings and degraded water quality
- Maintain and enhance coastal wetlands
- Improve access to Lake Michigan and other unique coastal features
- Support cultural activities

GOALS, OBJECTIVES, POLICIES

NATURAL RESOURCES

The vision for natural resources in Sheboygan County through the year 2020 is:

> In 2020, Sheboygan County embraces a climate for natural resources that provides healthy ecosystems, a healthy economy, and a high quality of life for all residents. The County promotes sound land use decisions that minimize negative environmental impacts, considers long-term consequences, is suitable for a location, makes efficient use of existing and future infrastructure and services, accounts for community costs, results from a broad public consensus, and is consistent with the community and regional character.

Goal 1: Promote sound land use in the Milwaukee and Sheboygan River Basins.

Objective 1.1 : Conserve the character of rural areas in the basin including natural areas, prime agricultural lands, and environmental corridors.

Objective 1.2: Protect investments in public lands by encouraging compatible land uses adjacent to public lands.

Objective 1.3: Encourage re-development of brownfields, abandoned and derelict properties in urban areas.

Objective 1.4: Support and encourage Comprehensive Land Use Planning in the basin.

Objective 1.5: Promote measures designed to improve air quality (e.g. mass transit, multi-modal transportation, ozone action incentives, higher density development, multi-use and walkable neighborhoods).

Goal 2: Conserve and restore riparian areas (corridors adjacent to waterways) in the Milwaukee and Sheboygan River Basins.

Objective 2.1: Combine public and private efforts to restore riparian stream buffers for water quality and wildlife.

Objective 2.2: Conserve and restore wetland functions and values in the basin.

Objectives 2.3: Restore environmental integrity and recreation values in the lower Sheboygan River Basin.

Objective 2.4: Remove dams and restore free-flowing waterways, where feasible.

Goal 3: Acquire sufficient public lands and manage for multiple uses.

Objective 3.1: Promote public land acquisitions that protect natural areas and provide recreational opportunities.

Goal 4: Improve water quality.

Objective 4.1: Encourage best management practices in agricultural areas.

Objective 4.2: Promote stormwater management measures that prevent non-point pollution in rural and urban areas.

Objective 4.3: Support measures that prevent the pollution associated with use of bio-solids.

Goal 5: Educate Citizens on the Importance of Natural Resources in the Basin.

Objective 5.1: Improve public outreach for education of land and water issues in the Sheboygan and Milwaukee River Basins.

Objective 5.2: Provide land development information related to wise-use of resources.

Goal 6: Protect the coastal resources of Lake Michigan.

Objective 6.1: Promote wise land use decisions within the "coastal corridor" (between Lake Michigan and Interstate 43).

Objective 6.2: Work toward eliminating invasive species within the "coastal corridor".

Goal 7: Identify, protect, and preserve the County's significant natural scenic and open space areas for enjoyment by its residents and visitors for present and future generations.

Objective 7.1: Maintain and improve the quality of ground water and surface waters within the Milwaukee and Sheboygan River Basins.

Objective 7.2: Identify and Preserve high quality wetlands.

Objective 7.3: Maintain the natural beauty and physical integrity of the Lake Michigan shoreline as seen from the land and the water while providing for public use and access.

Objective 7.4: Preserve and protect the unique geological features that exist in the County.

Objective 7.5: Discourage artificial light pollution, while preserving the safety of the residents of the County.

Objective 7.6: Encourage provision of natural corridors for species exchange between major environmental land holdings.

Objective 7.7: Provide potential sources of infrastructure materials for future development (e.g.- sand, gravel, stone), within the County.

AGRICULTURAL RESOURCES

The vision for agriculture in Sheboygan County through the year 2020 is:

> In 2020, Sheboygan County embraces a climate for agriculture that promotes innovation, new markets, entrepreneurship, diversity, and vitality that coexists with the natural features of the landscape as well as the expanding urban population.

Goal 1: The local units of government in Sheboygan County promote a healthy climate for agriculture.

Objective 1.1 : Identify all regulatory agencies that play a role in local farm operations and land use decisions including federal, state, county, and local to create a more streamlined process.

Objective 1.2: Inventory existing regulations and identify overlaps and inconsistencies.

Goal 2: Minimize the potential for conflicts between rural landowners.

Objective 2.1: Develop an inventory and rating system for local roads to identify those most likely to be traveled by farm operators to create a safe environment for travel between fields and conduct everyday operations.

Objective 2.2: Develop an educational program for realtors to better inform buyers of the processes involved with building/developing in the country and what to expect from the rural landscape.

Objective 2.3: Inventory existing agricultural infrastructure and identify areas best suited for agriculture to create agriculture-only land use districts.

Goal 3: Streamline the regulatory process.

Objective 3.1: Develop a broad, countywide strategy that promotes interagency cooperation.

Objective 3.2: Work with each Town to develop individual information sheets to be given to landowners at the time of permit issuance that includes the process at the local level so landowners know what to expect.

Goal 4: Develop better-informed local governments that can react to changes in agriculture and land use.

Objective 4.1: Develop specific training for all elected officials on current issues related to agriculture and land use law.

Objective 4.2: Support local "forums" for elected officials to provide education on agriculture and land use issues.

Objective 4.3: Develop a "menu" or clearinghouse for educational materials that can be used by local officials.

Goal 5: Sustain the County's agricultural heritage and economy.

Objective 5.1: Protect productive and fallow farmland within the County.

Objective 5.2: Establish standards to protect existing agricultural land uses.

Objective 5.3: Encourage sound agricultural and soil conservation methods to minimize soil erosion and ground water contamination.

Objective 5.4: Encourage sound management and preservation of the County's forested areas.

AGRICULTURAL AND OPEN SPACE DEVELOPMENT/PRESERVATION

Goal 1: To provide an aesthetically pleasing, relaxing, rural atmosphere in the County.

Objective 1.1: Preserve and create environmental corridors that screen developed areas and provide for the integration of natural habitat into the County.

Objective 1.2: Set aside open space in the County to be maintained for the preservation of natural vistas.

Goal 2: To encourage and protect farming while providing for the orderly development of land that is currently or was historically in productive farm use for non-farm development.

Objective 2.1: Retain agricultural and open lands in the County as key components of the rural area and aesthetic character of the community.

Objective 2.2: Prevent the premature development of fringe lands in the County that could be incompatible with the long-term best use of the land.

Objective 2.3: Identify areas recommended for future development.

PARKS AND RECREATIONAL LANDS

Goal 1: To ensure residents have safe recreational sites within the County that provide a number of activities.

Objective 1.1: Increase the number of good, well maintained recreational sites and trails within the County.

Objective 1.2: Develop public access to the waters of Lake Michigan.

Objective 1.3: Acquire, develop and maintain future recreational sites within the County.

METALLIC AND NON METALLIC RESOURCES

Goal 1: To ensure that future mining sites will not negatively impact the County or its residents.

Objective 1.1: Do not harm views, the natural environment and aesthetics through mining operations.

HISTORIC AND CULTURAL RESOURCES

The vision for cultural and historic resources in Sheboygan County through the year 2020 is:

> In 2020, Sheboygan County embraces a climate for cultural and historic resources that promotes a healthy economy and a high quality of life for all residents and visitors. The County promotes sound land use decisions that minimize negative impacts on these resources, considers long-term consequences, is suitable for a location, accounts for community costs, results from a broad public consensus, and is consistent with the community and regional character.

Goal 1: Encourage the preservation of historical, cultural, and archaeological resources that are symbolic of the County and its residents, both past and present.

Objective 1.1 : Encourage the continued use of areas of historical and cultural heritage.

Objective 1.2: Identify and preserve historic districts and farm structures of historical and archaeological value.

Objective 1.3: Identify criteria to be used to inventory buildings and sites with unique historic characteristics of Sheboygan County.

Goal 2: Promote the local artistic culture.

Objective 2.1: Encourage the integration of local art in public spaces.

Objective 2.2: Identify and promote local artistic resources (e.g.-galleries, sculpture gardens, museums).

Goal 3: Preserve the natural and rural characteristics of the County.

Objective 3.1: Establish standards for characteristics for local cultural resources that are historically significant.

Objective 3.2: Promote local land use decisions that are sensitive to the local culture and history.

Goal 4: Identify, protect, and preserve significant natural, historic, scenic, and open spaces for enjoyment by residents and visitors for present and future generations.

Objective 4.1: Encourage and support interested parties and stakeholders in efforts in preserving the County's cultural resources.

Objective 4.2: Preserve and protect the unique geological and natural resources holding significant historic value throughout the County.

Objective 4.3: Encourage the preservation of rural character in the County through guidelines for billboards and signs along roadsides.

Goal 5: Educate Citizens on the Importance of Cultural Resources in the County.

Objective 5.1: Improve public outreach for education of historic sites, ethnic settlement patterns, and the overall history of Sheboygan County.

Goal 6: Sustain and promote dance, music, art, and theater programs in the County that are vital to the local economy and culture.

Objective 6.1: Provide community and financial support, when possible, for the continuation of these programs.

Goal 7: Identify, maintain, and preserve roadways with a historic, scenic, or cultural value to Sheboygan County.

Objective 7.1: Identify local, county, and state roads with unique aesthetic qualities for designation as scenic and historic highways and rustic roads.

BACKGROUND

CLIMATE

Sheboygan County typically experiences continental weather with some modification by Lake Michigan. The cool waters of the lake delay spring, while relatively warm water in fall retards early frost. Summers, on average, are mild due to the region's proximity to water that moderates daily extremes.

About two-thirds of the annual precipitation falls during the growing season. It is normally adequate for vegetation, although drought is occasionally reported. The climate is most favorable for dairy farming; the primary crops are corn, small grains, hay, and vegetables.

The growing season averages 126 to 165 days. The average date of the last spring freeze varies from the first week to the last week of May, with a median date of last frost of May 11. The first autumn freezes occur in early to mid-October, with a median date of first frost of October 6.

The long-term mean annual precipitation ranges from 31 to 32 inches throughout Sheboygan County. Average daily temperatures range from a low of 9.2 $^{\circ}$F in January to a high of 82.2 $^{\circ}$F in July.

The average seasonal snowfall is typically around 48 inches. The mean date of first snowfall of consequence, an inch or more, occurs in early November. The snow cover acts as protective insulation for grasses, autumn seeded grains, and other vegetation.

The approximate humidity conditions for the County in winter ranges from an average nighttime maximum of about 80 percent to a daytime minimum of about 70 percent. Relative humidity in the summer averages 85 percent at night and 60 percent in the daytime.

ECOLOGICAL LANDSCAPES

The Wisconsin DNR has mapped Wisconsin into areas of similar ecological potential and geography into units known as Ecological Landscapes. This classification is based on aggregations of subsections from the National Hierarchical Framework of Ecological Units (NHFEU) (Avers et al. 1994). The NHFEU and the Ecological Landscape systems delineate landscapes of similar ecological pattern and potential across the state in a way that is meaningful and useful to resource administrators, planners, and managers.

Sheboygan County falls into two of these Ecological Landscapes or Eco-Regions. These include:

Central Lake Michigan Coastal

The Central Lake Michigan Coastal Ecological Landscape stretches from southern Door County west across Green Bay to the Wolf River drainage, then southward in a narrowing strip along the Lake Michigan shore to central Milwaukee County. Summers are cooler, winters are warmer, and precipitation levels are greater in the eastern part of this landscape than at locations farther inland,

owing to the influence of Lake Michigan. Dolomites and shales underlie the glacial deposits that blanket virtually all of the Central Lake Michigan Coastal Ecological Landscape.

The dolomite Niagara Escarpment is the major bedrock feature, running across the entire landscape from northeast to southwest. Series of dolomite cliffs provide critical habitat for rare terrestrial snails, bats, and specialized plants. The primary glacial landforms are ground moraine, outwash, and lake plain. The topography is generally rolling where the surface is underlain by ground moraine, variable over areas of outwash, and nearly level where lacustrine deposits are present. Important soils include clays, loams, sands, and gravels. Certain landforms, such as sand spits, clay bluffs, beach and dune complexes, and ridge and swale systems, are associated only with the shorelines of Lake Michigan and Green Bay. Today approximately 84 percent of this Ecological Landscape is non-forested. The remaining forest consists mainly of mesic maple-basswood or maple-beech types, or lowland hardwoods composed of soft maples, ashes, and elms.

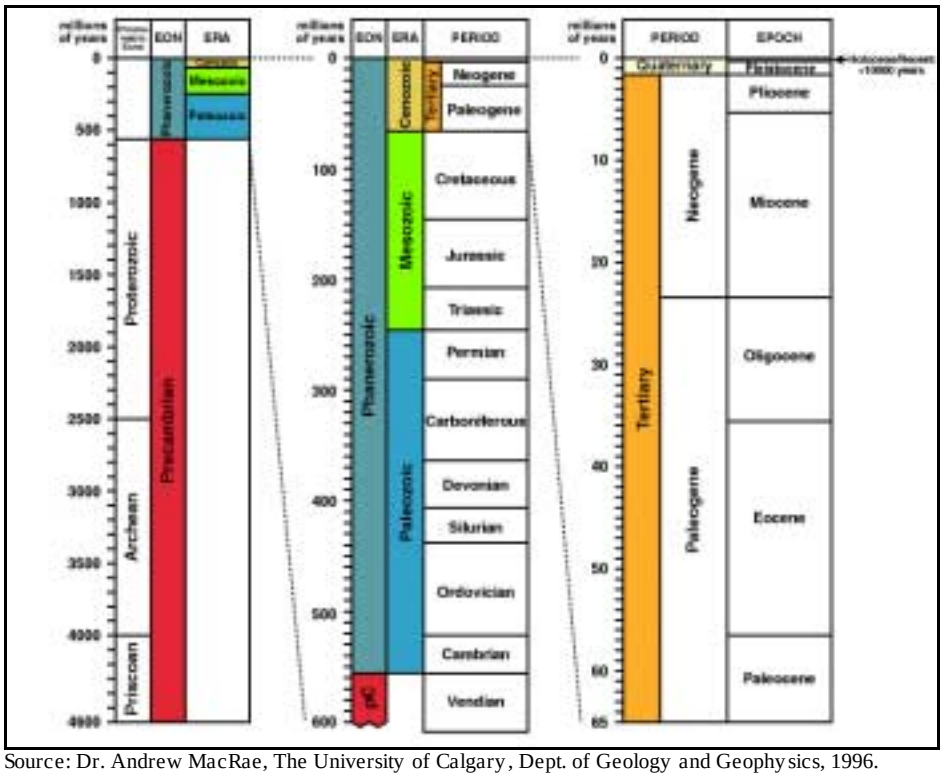
Southeast Glacial Plains

The Southeast Glacial Plains Ecological Landscape makes up the bulk of the non-coastal area in southeast Wisconsin. This landscape is made up of glacial till plains and moraines composed of glacial materials deposited during the Wisconsin Ice Age. Agricultural and residential uses have significantly altered the historic vegetation. (Map 1.10 in Appendix A depicts the Original Vegetation Cover of Wisconsin). Most of the rare natural communities are associated with the Niagara Escarpment or large moraines. Agriculture and urban land uses dominate, with forested areas occupying about 10 percent of the area.

GEOLOGY

Two different types of geologic settings, Quaternary geology and bedrock geology, characterize Sheboygan County. Quaternary geology refers primarily to the effects that continental glaciations have had on the region within the last 20,000 years, and to a lesser extent, the surface effects of more recent erosion and deposition. Bedrock geology refers to the much older, solid rock layers that lie beneath Quaternary sediments. Figure 1.1 and 1.2 illustrate the time span for each of these geologic time periods.

Figure 1.1: Geologic Time Scale



Source: Dr. Andrew MacRae, The University of Calgary, Dept. of Geology and Geophysics, 1996.

Figure 1.2: Geologic Eras

CENOZOIC ERA (Age of Recent Life)	Quaternary Period	The several geologic eras were originally named Primary, Secondary, Tertiary, and Quaternary. The first two names are no longer used. Tertiary and Quaternary have been retained but used as period designations.
	Tertiary Period	
MESOZOIC ERA (Age of Medieval Life)	Cretaceous Period	Derived from Latin word for chalk (creta) and first applied to extensive deposits that form white cliffs along the English Channel.
	Jurassic Period	Named for the Jura Mountains, located between France and Switzerland, where rocks of this age were first studied.
	Triassic Period	Taken from the word "trias" in recognition of the threefold character of these rocks in Europe.
PALEOZOIC ERA (Age of Ancient Life)	Permian Period	Named after the province of Perm, U.S.S.R., where these rocks were first studied.
	Pennsylvanian Period	Named for the State of Pennsylvania where these rocks have produced much coal.
	Mississippian Period	Named for the Mississippi River Valley where these rocks are well exposed.
	Devonian Period	Named after Devonshire, England, where these rocks were first studied.
	Silurian Period	Named after Celtic tribes, the Silures and the Ordovices, that lived in Wales during the Roman Conquest.
	Ordovician Period	
	Cambrian Period	Taken from the Roman name for Wales (Cambria) where rocks containing the earliest evidence of complex forms of life were first studied.
PRECAMBRIAN	----------	The time between the birth of the planet and the appearance of complex forms of life. More than 80 percent of the Earth's estimated 4-1/2 billion years falls within this era.

Source: USGS, *Geologic Time*, 1997.

Bedrock Geology

The bedrock units, which underlie Sheboygan County, range in age from Precambrian at depth, to Silurian at the surface. The oldest are impermeable crystalline rock of Precambrian age at depths that average more than 1,500 feet below the land surface.

Silurian dolomite, often referred to as Niagara, is the uppermost bedrock in Sheboygan County and reaches thicknesses up to 580 feet. Rocks underlying the Niagara dolomite are not visible in the County. Below the Niagara dolomite is a shale formation known as Maquoketa. It reaches a maximum thickness of 450 feet. The Maquoketa Shale overlies a dolomite formation, termed Platteville-Galena, which is approximately 500 feet in thickness. This rock formation, in turn, overlies Cambrian sandstones, which are 450 feet thick. All of these sedimentary rock formations overlie Precambrian igneous rocks. Map 1.1 in Appendix A shows the bedrock geology of Sheboygan County.

Quaternary Geology

The last glacial ice of Quaternary glaciation, which left the planning area approximately 10,000 years ago, modified the bedrock surface by scouring highlands and depositing material in lowlands created by pre-glacial erosion. Four types of Quaternary deposits are recognized within the region, including till, glaciofluvial sediments, shoreline deposits and organic deposits.

Till or unstratified drift is a mixture of unsorted, angular- to round-shaped sediments ranging in size from clay to boulders. Tills are ice-contact deposits originating directly from glacial ice.
Unlike till, glaciofluvial sediments are sorted by particle size that delineates the stratification. Glaciofluvial sediments were deposited in a fluvioglacial environment involving glacial meltwater flow. Each individual layer of glaciofluvial sediments are characterized by a given grain size, ranging from pebbles and cobbles to sand or finer.

Ground and end moraines are two types of topographic landforms found in the region that consist primarily of till. A ground moraine is an irregular surface of till deposited by a receding glacier. The steeper slope points in the direction from which the glacier advanced. An end moraine is an accumulation of earth, stones, and other debris deposited at a glacier's end stage.

At least one type of topographic landform consisting of glaciofluvial sediments occurs in some areas of the planning area. This type of topographic feature is an outwash plain, which is an apron of well sorted, stratified sand and gravel deposited by glacial meltwater. Glaciofluvial deposits, which contained large ice blocks that eventually melted, were pitted with depressions known as kettles. Glaciofluvial deposits of sand and gravel surround many drumlins; but these are often covered with a thin silt cap. Map 1.2 in Appendix A shows the Pleistocene Geology of Sheboygan County.

The most prominent ancient shoreline in the area is that of the Nipissing Great Lakes phase, which usually occurs at an elevation of 600-605 feet above sea level. The highest ancient shoreline in the area is that of the Algonquin phase, which occurs at elevations between 620 and 658 feet above sea level.

SOILS

Soil is composed of varying proportions of sand, gravel, silt, clay, and organic material. The composition of a soil affects the specific properties of that soil. These properties must be evaluated prior to any development.

General Soils Description

The general characteristics of soils are largely the result of various glacial depositional processes. Outwash soils were formed from glacial deposits that were derived from local bedrock formations. Organic soils developed under a forest cover consisting mainly of conifers and hardwoods in the north, in a cool and relatively moist climate. Sandy soils were formed from parent materials derived from sandstone bedrock pulverized by glacial ice.

Soils, in part, determine how much rainfall or snowmelt directly flows into the rivers, lakes, and wetlands, and how much infiltrates the ground. Water that infiltrates the ground replenishes soil moisture and recharges the groundwater system. Soils are grouped into general soil associations that have similar patterns of relief and drainage. These associations typically consist of one or more major soils and some minor soils. The general soil types can be divided into three broad categories: areas dominated by soils formed in glacial till; areas dominated by soils formed in glacial outwash and till; and areas dominated by organic soils.

The soils in Sheboygan County are diverse ranging from sandy loam to loam or shallow silt loam, and from poorly drained to well drained. In some areas, lacustrine sands are found overlying clays or bedrock within only a few feet of the surface. Poorly drained sands are common in the lake plain or in depressions between dunes and beach ridges. Important soils in the County include clays, loams, sands, and gravels. Map 1.3 in Appendix A shows the general soils in Sheboygan County. The dominant associations found in Sheboygan County include the Boots, Casco, Oakville, Theresa, Kewaunee, and Hochheim soils.

The Boots series soils are nearly level, poorly drained soils that were formed in herbaceous organic matter greater than 51 inches thick. These soils are typically found in depressions of old glacial lake areas. The native vegetation of these soils included ground cover of marsh grasses, sedges, and cattails and trees included tamarack, white cedar, and alders. The organic layer of these soils is very thick, measuring 60 inches or greater, with the top 14 inches typically black muck. Permeability of these soils is moderately rapid and available water capacity is very high; natural fertility is very low. The root zone of these soils is limited by the water table, which is frequently at or near the surface in areas that have not been drained by artificial means.

The Casco soils are found in nearly level to very steep areas. Casco soils are well drained and are underlain by stratified sand and gravel outwash. These soils are typically found on outwash plains, stream terraces, and the convex side of slopes of glacial moraines. Areas containing Casco soils have complex slopes. Native vegetation on these soils consisted mainly of oak and hickory trees. Permeability of these soils is moderate until approximately 17-inches below the surface where permeability becomes rapid. Available water capacity is low in Casco soils. Organic-matter content is moderate and natural fertility is low. The root zone of vegetation is limited by underlying sand and gravel. Areas where slopes are not too steep typically support corn, small grain, legumes, and other crops commonly grown in Sheboygan County.

Oakville soils are found along the coast of Lake Michigan, typically in the areas south of the City of Sheboygan. These are very well drained soils located on nearly level to sloping areas of old glacial lake plains, old beach ridges, and stabilized sand dunes. The native vegetation consisted of mixed deciduous and coniferous trees. The surface layer of the Oakville soils is dark brown, loamy fine sand approximately 8 inches thick. Permeability of these soils is very rapid and available water capacity as well as organic-matter content and natural fertility are very low. Most of the acreage consisting of these soils is used for woodlands. Some areas are used for pasturing and crops.

Theresa soils are nearly level to sloping; well-drained soils that are underlain by gravelly sandy loam or gravelly loam glacial till and are typically found on glacial till plains. The native vegetation in the area of these soils included deciduous forest mainly of maple, oak, basswood, beach, and hickory trees. Permeability of these soils is moderate and available water capacity is high. Organic-matter content and fertility is moderate. The majority of acreage consisting of these soils is used for crops. Some of the acreage is used for pasture and woodlands in areas where slopes are steeper.

Kewaunee soils are found on nearly level to moderately steep slopes, are well drained and moderately well drained often formed in silty clay loam glacial till. These soils are found on glacial till plains. The native vegetation on these soils was forest consisting mainly of oak, maple, beech, basswood, and white pine. Permeability of Kewaunee soils is moderately slow and available water capacity is moderate. The organic-matter content of these soils is moderately low and natural fertility is medium. Areas with these soils typically are used for crops and pasture, but frequently remain was woodlands.

Hochheim soils are found on nearly level to steep slopes, are well drained and underlain by gravelly sandy loam or gravelly loam glacial till. These soils are found on glacial till plains and on the sides and tops of drumlins that were formed during the last glaciation process. Permeability and available water capacity are moderate and organic matter content is moderately low; natural fertility is medium. Areas with these soils on slopes less than 15% are typically used for crops; in areas where slopes are steeper are frequently used for pasture and woodlands.

TOPOGRAPHY

The attractiveness of Sheboygan County is due, in part, to a variety of topographic features. The general topography of the County area is characterized by a gently rolling landscape broken by areas of steep slope along various river valleys. Map 1.4 in Appendix A shows the areas with steep slopes in Sheboygan County.

Landforms in the county are glacial in origin, including drumlins, esker-like ridges, and wetlands.

COASTAL RESOURCES

The Great Lakes were formed during the Wisconsin Glaciation that occurred approximately 75,000-10,000 years before present (B.P.). The Laurentide Ice Sheet entered the Lake Michigan area approximately 26,000 years B.P. This ice sheet reached its maximum extent approximately 16,000 years B.P. During this time, the ice sheet carved its way across the northern portion of North America. When the ice receded, runoff from the melting glacier was captured in the basins that were formed by the gouging ice of the glacier thereby forming the Great Lakes.

Lake Michigan is the second largest Great Lake when measured by volume. Lake Michigan is 307 miles long, 118 miles wide, 925 feet at its maximum depth, with an average depth of 279 feet and consists of approximately 1,660 miles of mostly sand and pebble beaches.

The Lake Michigan basin is the area of land where rivers and streams all drain into Lake Michigan. The lake Michigan drainage basins covers more than 45,000 square miles and drains parts of four states including Wisconsin, Illinois, Indiana, and Michigan. In Sheboygan County, the Milwaukee River and Sheboygan River Basins make up the majority of the land area within the County and both drain into Lake Michigan.

Lake Michigan has unique conditions that can support a wide variety of species, including plants and animals that are not found anywhere else in the world. The sand dunes, coastal marshes, tallgrass prairies, savannas, forests, and fends provide essential habitat for numerous wildlife. Agricultural and industrial products such as iron ore, coal, limestone, metals, petroleum, coke, and chemicals are derived from the resources within the Lake Michigan Basin. The lake area serves the commercial and sport fishing industries. Lake Michigan provides a source of fresh drinking water, cooling water for industries, and water for agricultural practices in the region. Finally, the lake provides a scenic setting for recreation activities such as camping, swimming, fishing, and bird watching.

THREATS TO LAKE MICHIGAN AND ITS COASTAL RESOURCES

The quality of Lake Michigan is a concern to many agencies and organizations that study its health. Pollutants, habitat loss, and shifts in species composition in the lake in the coastal areas are important factors that continue to contribute to the degradation of the quality of the Lake Michigan Ecosystem. Even though reductions have been made in pollutant levels over the past 20 years, data continue to show toxic pollutants continue to create negative impacts on the physical and biological elements of the ecosystem.

In 1972, the United States and Canada signed the Great Lakes Water Quality Agreement (GLWQA) that was subsequently renewed in 1978. This agreement expressed the commitment of both countries to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin Ecosystem. The Agreement was amended in 1987 and aimed at strengthening the programs, practices, and technology that were described in the 1978 renewal; the amended agreement increased accountability for implementing these programs and practices and set specific timetables for these activities.

The GLWAQ creates the International Joint Commission. The Commission monitors and assesses progress under the Agreement and advises Governments on matters related to the quality of the boundary waters of the Great Lakes system. The Agreement also calls upon the Commission to assist the Governments with joint programs under the Agreement, and provides for two binational boards -- the Great Lakes Water Quality Board and the Great Lakes Science Advisory Board -- to advise the Commission.

One outcome of the GLWQA was the development of the Lake Michigan Lakewide Management Plan (LaMP) that addresses 14 warning signs of an impaired ecosystem. These warning signs or symptoms are:

- Restrictions on fish and wildlife consumption.
- Tainted fish and wildlife flavor.
- Degradation of fish and wildlife populations.
- Fish tumors or other deformities.
- Bird or animal deformities or reproduction problems.
- Eutrophication or undesirable algae.
- Restrictions on drinking water consumption or taste or odor problems.
- Beach closings.
- Additional costs to agriculture or industry as a direct result of issues with the ecosystem.
- Loss of fish and wildlife habitat.

In 1994 the United States and Canada held a State of the Lakes Ecosystem Conference (SOLEC) to discuss quality issues with the Great Lakes. The findings for Lake Michigan from this conference include:

- Environmental quality within the basin generally is best in the north and deteriorates in the south.
- The sea lamprey has eliminated all stocks of native Lake trout, and has severely reduced whitefish and other aquatic populations.
- The sport fishery remains productive.
- Habitat loss, particularly wetland areas, is widespread throughout the Lake Michigan Basin, most profoundly in the southern areas of the Lake.
- Bioaccumulative, persistent toxic substance levels in fish are among the highest in the Great Lakes Basin, which has resulted in multiple fish advisories.

Pollutants

To accomplish the goals of the LaMP, a Critical Pollutants Work Group was formed which consisted of technical staff from the US Environmental Protection Agency, the US Fish and Wildlife Service, the US Geological Survey, and experts from the four states adjacent to Lake Michigan. Together, this group developed a process for listing and delisting substances as pollutants of concern and identified pollutants that were currently impacting Lake Michigan. The group categorized pollutants of concern into three levels based on the degree of association with known impairments in the Lake, their distribution and frequency of occurrence.

Critical pollutants are the most harmful to the ecosystem and programs to mitigate their persistence in the environment are a top priority. Pollutants in the category impair beneficial uses due to their presence in open lake waters, their ability to cause or contribute to failures to meet objectives set by the GLWQA, or their ability to bioaccumulate. Critical pollutants for Lake Michigan identified by the Work Group are:

- Total PCBs
- Chlordane
- Dioxin

- Mercury
- Dieldrin
- DDT/DDD/DDE
- Furans

Substances identified as "Pollutants of Concern" are those that cause or contribute to use impairments on a local or regional basis, or for which there is evidence that loads to, or ambient concentrations in, the Lake Michigan Basin are increasing. Pollutants of Concern for Lake Michigan identified by the Work Group are:

- Hexachlorobenzene
- Toxaphene
- Cadmium
- Copper
- Arsenic
- PAHs
- Chromium
- Zinc
- Cyanide

The Work Group identified one last group of substances that need to be controlled as "Emerging Pollutants". These pollutants are toxic substances that do not knowingly contribute to impairments of Lake Michigan at the present time, however are showing increasing loadings or concentrations within the Lake. These pollutants are:

- Atrazine
- PCB substitute compounds
- Selenium

Based on the recommendations of the Work Group, the LaMP will be focusing on addressing these pollutants according to their priority level.

Area of Concern

Another component of the GLWQA is an agreement to develop remedial action plans (RAPs) for the 43 Areas of Concern identified by the International Joint Commission. The Sheboygan River encompasses the lower Sheboygan River downstream from the Sheboygan Falls Dam, including the entire harbor and nearshore waters of Lake Michigan. The Sheboygan River Area of Concern (AOC) serves as a settling area for pollutants transported from three watersheds- the Sheboygan River, Mullet River, and Onion River. Pollutants of concern in the Sheboygan AOC are:

- Suspended Solids
- Fecal Coliform Bacteria
- Phosphorus
- Nitrogen
- PCBs
- PAHs

- Heavy Metals

Other criteria contributing to designation as an Area of Concern are Beneficial Use Impairments. Eight of the Fourteen Beneficial Use Impairments (previously mentioned) have been identified for the Sheboygan Area of Concern. These Use Impairments are:

- **Degradation of Fish and Wildlife Populations:** The lower Sheboygan River currently supports a diverse fish population. Recent surveys show smallmouth bass are abundant in the Sheboygan River system. Populations of trout and salmon are dependent on stocking. However, bioaccumulating contaminants in the food chain and sedimentation are negatively affecting the fish populations and their forage base.

  Populations of mink are well below what normally would be expected for the habitat available. Small mammal trapping in 1993 resulted in no mink found in the AOC. Occasional mink are seen in this area, however they are suspected to be transient individuals that probably are not breeding in the area.

- **Fish Tumors or Other Deformities:** Fish health assessments were conducted by WDNR on white suckers in the AOC in 1994. This research concluded that white suckers residing in the lower Sheboygan River were exposed to and absorbed significant amounts of PCBs and PAH, and exhibited biochemical, histological and hematological alterations, suggesting impaired fish condition.

- **Bird or Animal Deformities or Reproductive Problems:** Reproductive problems are suspected with mink because of their low population levels in relationship to available high quality habitat. A study that examined four species of birds collected along the Sheboygan River concluded that reproductive impairments were suspected because of the PCB tissue concentrations found.

- **Degradation of Benthos (organisms that live on or in the bottom of a body of water)**: Benthic surveys on the Sheboygan River identified the AOC as having degraded populations. The community shows low species diversity and is dominated by pollution tolerant species compared to reference conditions.

- **Restrictions on Dredging Activities:** Dredging in the lower Sheboygan River and Inner Harbor has not been conducted since 1969 because of contaminated sediment disposal concerns. The sediments are contaminated with high concentrations of PCBs, PAHs and heavy metals. Some deposits are considered heavy pollution according to U.S. EPA guidelines and WDNR draft sediment criteria.

- **Eutrophication [the process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life usually**

resulting in the depletion of dissolved oxygen] or Undesirable Algae: Nutrient concentrations in the lower Sheboygan River and Harbor routinely exceed water quality criteria. Blooms of nuisance algae are often seen in summer months. The major cause of eutrophication is nonpoint source pollution from developing urban areas and upstream agricultural areas.

- **Degradation of Phytoplankton & Zooplankton Populations:** The species found in the AOC are indicative of disturbed conditions. The periphyton [organisms (as some algae) that live attached to underwater surfaces] community downstream of the Village of Kohler is highly productive. The community shifts toward greater tolerance of high nutrient conditions. Biomass and density in the AOC are the highest found in the Sheboygan River. High concentrations of nutrients from point and nonpoint sources are considered responsible.

- **Loss of Fish & Wildlife Habitat:** Although historic loss of habitat has occurred through development, the quality of wildlife habitat along the river is good considering its proximity to urban areas. Ongoing loss of instream habitat for fish and wildlife is occurring through sedimentation from streambank, farmland and construction site erosion. Dams on the river also contribute to degraded habitat in several ways. They alter river flow, increase water temperature, cause the loss of important riffle areas, inhibit fish migration and cause sediment build up which buries much of the fish cover and invertebrate habitat.

The GLWQA required Remedial Action Plans (RAPs) for all Ares of Concern. The RAP process is conducted in three phases. Stage I identifies and assesses use impairments in the AOC, and identifies sources of stress from all sources, Stage II identifies proposed remedial action methods for implementation, and Stage III documents progress on implementation.

In 1994, the Wisconsin Department of Natural Resources with the assistance of other local stakeholders outlined activities targeted for implementation and progress toward development of a comprehensive strategy for restoring water quality, fisheries, recreational uses and other benefits of the Sheboygan River Basin. The 1994 RAP was published in October 1995 and distributed for review at 51 libraries statewide, including the Mead Public Library in Sheboygan and the Memorial Library in Sheboygan Falls. Three work groups (Water quality, Biota and Information and Education) were formed to recommend remedial actions for Stage Two RAP development.

The Sheboygan River and Harbor Stage One RAP was completed in 1989 following a two-year cooperative effort of Wisconsin Department of Natural Resources (WDNR), other agencies, researchers and the citizens of the Sheboygan are. All of these groups worked together to identify management goals for the river and harbor for the year 2000 and specific management strategies to control existing sources of pollution, abate environmental contamination and restore beneficial uses. The RAP goals and objectives describe the "desired future state" of the Sheboygan River ecosystem. The Sheboygan County Water Quality Task Force served as the Citizens Advisory Committee (CAC) for Stage One development. The CAC included representatives from industry, government,

fishing and conservation groups and others, and was instrumental in facilitating information exchange between environmental agencies and the public. An intergovernmental Technical Advisory Committee was utilized for review purposes.

To-date progress has been made in implementing the RAP and developing additional recommendations for restoring beneficial uses. Following a Remedial Investigation and Enhanced Screening, an emergency removal of PCB contaminated sediments in the upper portion of the Sheboygan River was completed in 1991. A total of 4,100 m^3 of PCB-contaminated sediments were removed. Sediment was deposited in two Confined Disposal Facilities (one temporary and the other an experimental Confined Disposal Facility at Tecumseh Products Company) and other selected deposits were armored in five areas near Rochester Park. The remaining sediments were to be dealt with in a later action. The US EPA has conducted a feasibility study for further cleanup options in the area.

In 1992, monitoring of soil and groundwater for total PAHs, cyanide, arsenic and nickel at the Coal Gastification Plant site began in spring of 1992. This site is located on the far-south side of the City of Sheboygan on the shores of Lake Michigan. Results of these investigations showed that were exceedances for these substances higher than state enforcement standards.

In 1991, a Remedial Investigation and Feasibility Study was completed at the Kohler Company landfill Superfund site. In 1992, a Record of Decision for landfill closure was issued. And, in 1996, a Record of Decision for groundwater was issued for the site.

These activities are contributing to successful achievement of alleviating the beneficial use impairments. However, to improve the quality of the Sheboygan River Basin ecosystem and achieve the "desired future state" will require a long-term commitment from all levels of government, as well as local interest groups and citizens. Successful implementation of the RAP will require the cooperation of all stakeholders and a willingness of the Basin's citizens to voluntarily change the way they conduct their everyday lives.

Erosion

Coastal erosion occurs throughout all of the Great Lakes and is a concern because of the potential for property loss and damage, loss of infrastructure, public health and safety issues, water quality degradation, and loss of habitat. Coastal erosion is characterized by the landward retreat of the shoreline or the bluff edge and includes the narrowing loss of beaches, dunes, coastal barriers, and associated wetlands and lakebed down cutting in the nearshore area. Coastal erosion rates in Sheboygan County range from 0.20 to .49 meters per year (8-20 inches per year).

There are three types of erosion processes that typically effect coastal areas. These include wave attack, mass wasting, or surface water. Wave attack (or toe erosion) degrades bluff and beach areas through the constant motion of the water. Waves are generated by wind and storms. The impact of wave action is a function of the climate and is dictated by wave direction, magnitude, and frequency.

Waves remove material from the base of the bluff areas, making them unstable. As the bluffs are eroded by wave action, sediment is transported along the shore creating, or destroying, beaches and dunes.

Mass wasting occurs as soil creep, debris flows, or slides and slumps or some other process that will transport materials down a slope; these processes are driven by gravity and frequently occur on steep, unstable slopes. Depending upon whether or not the materials are consolidated or unconsolidated, the rates and types of bluff failure will be different. Groundwater is often a major contributing factor to the mass wasting process.

Frequently, wave attack on a shoreline will lead to a mass-wasting event. As time proceeds, the process begins again and eventually a major mass-wasting event occurs again.

Surface water including that from precipitation and groundwater was well as septic tanks (climate driven) and lawn sprinklers (human driven) washes material away. Sheet and rill erosion often occur on unvegetated slopes. Ravine and gully erosion can also undermine a bluff or dune area. The freeze/thaw cycle also contributes to failures of bluff areas.

The erosion rate in a coastal area is dependent upon the width and elevation of a beach area, the available sediment supply, the slope of the coastline, shoreland protection (natural and artificial), climate, such as storms, precipitation, surface water, groundwater, and lake levels, and vegetation. Other impacts to shoreland areas of the Great Lakes include lakebed down cutting and beach alterations such as barriers including piers and improperly installed erosion protection structures.

Two "regions", the bluff areas north of the City of Sheboygan and the dune areas South of the City of Sheboygan characterize the coastal landscape of Sheboygan County. The bluffs north of the City of Sheboygan average approximately 50-feet in height. This area is composed of cohesive glacial till, lacustrine clays, unconsolidated clays, silts, sands, and outwash deposits. The soils in this area tend to become easily saturated by high groundwater levels. This soil saturation is a major contributor to bluff erosion along the coast in this area. Upon saturation the soils become heavy, weakening the structure of the bluff. Coupled with the dynamic wave action of Lake Michigan at the base of the bluff area, bluff erosion and slumping is an ongoing hazard that must be continually mitigated through shoreline regulation and erosion control projects.

The areas south of the City of Sheboygan are made up of a ridge and swale complex with numerous pockets of coastal wetlands gaining protection from Lake Michigan by a series of dune areas. Quartz sand beaches and dunes are underlain by cohesive clays (glacial till) or bedrock. This area is subjected to impacts from development due to the high value of real estate along the shores of Lake Michigan. Perhaps one of the greatest potential impacts to the quality of Lake Michigan and the dune areas is the placement of septic systems in coastal dunes. Frequently the dune area is sited as the only suitable area for a septic system. Currently, state law does not prohibit placement of septic systems in these areas, nor are County's allowed to restrict placement in these areas.

The US Army Corps of Engineers and the Wisconsin Coastal Management Program have recently completed a comprehensive analysis of erosion along the coastal areas of the Great Lakes. Through a modeling process, the Corps of Engineers calculated potential coastal erosion rates and future hazard areas that may impact the resource and the human population. As information from this study become available, it will be used as the basis for future programs and policies related to land use regulation in the bluff area.

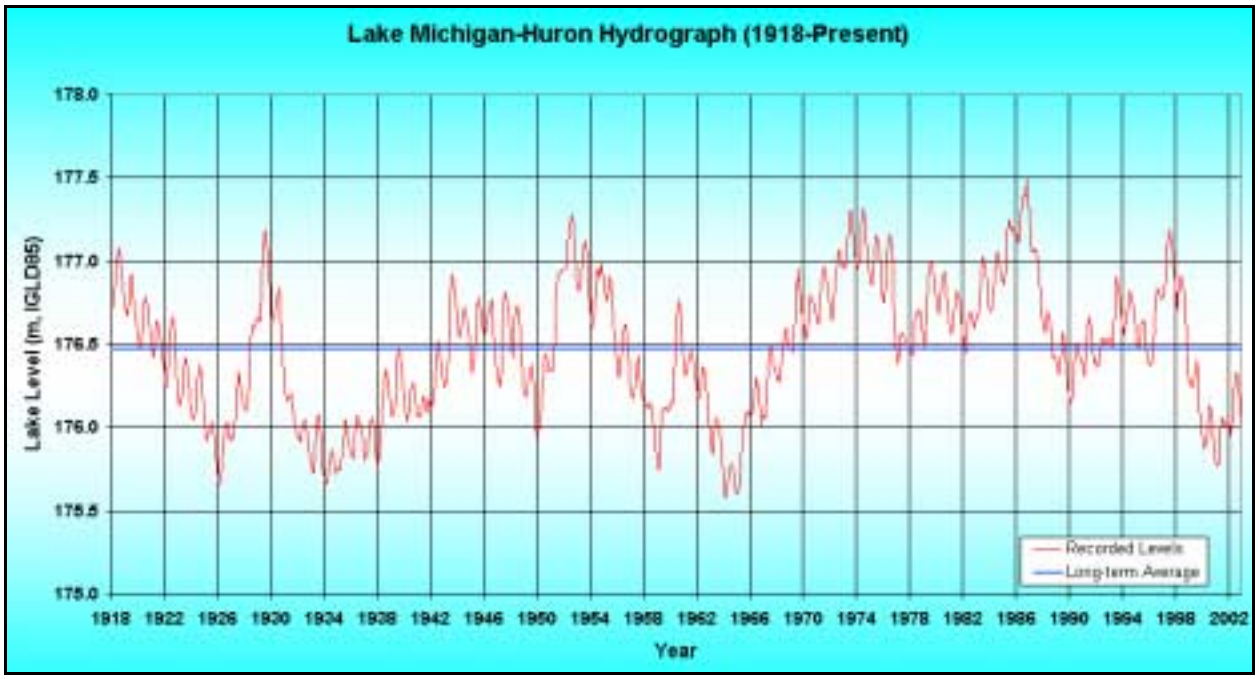
WATER LEVELS

The last several years have seen a dramatic drop in the water levels of Lake Michigan. The drop in water levels has had a significant effect on the use of the bay and rivers feeding to it. With lower water levels, more of the shoreline is exposed and wet areas become dry. In December 1999, the water level of lakes Michigan and Huron continued to decline, passing the Low Water Datum elevation of 577.5 feet above the International Great Lakes Datum of 1985.

According to the US Army Corps of Engineers (Detroit District), evaporation is blamed for much of the drop in lake levels over the past few years. Warmer-than-average water temperatures have occurred in the past few summers, causing greater than average evaporation of lake water when the cold winds of fall arrive. Brisk, dry, cold winds blowing over exposed warmer waters hasten evaporation and lowers water levels. According to the Corps, lakes Michigan and Huron lose about 2.5 centimeters (one inch) of water a week to evaporation in October. If an unusually cold air mass settles over a much warmer lake, the same amount of evaporation, or more, may occur in just a few days. Since lakes Michigan and Huron rise and fall together, a drop of one inch in water level is a loss of about 784 billion gallons of water to the atmosphere. In some Great Lakes harbors and inter-connecting channels during times of low lakes levels, cargo–loading ships are vulnerable to being set down on the bottom of there is a temporary drop in water level caused by an atmospheric pressure change, or a shift in wind direction to strong winds blowing offshore.

On June 6, 2003, the water level was nine inches below the chart datum of 577.5 feet (IGLD 1985). This level is 24 inches below the long-term average lake level for the date, but still slightly more than eight inches above the lowest average water level of this century; a record set in 1964. On average, the minimum seasonal water level of these lakes occurs in February.

Figure 1.3: Lake Michigan/Huron Historic Water Levels, 1918-2002



Source: US Army Corps of Engineers, 2003.

Large declines in lake levels can create large-scale economic concern for the commercial users of the water system. Shipping companies and hydroelectric power companies can suffer economic repercussions, and harbors and marinas are adversely affected. Increased costs and impacts of dredging are an additional concern with low water levels.

NATURAL RESOURCES

WATERSHEDS

A watershed can be defined as an interconnected area of land draining from surrounding ridge tops to a common point such as a lake or stream confluence with a neighboring watershed. All lands and waterways contribute drainage to one watershed or another. Each watershed is comprised of one main-stem of a river. A river basin is made up of a number of watersheds that drain into one larger river. The majority of Sheboygan County lies within the Sheboygan or Milwaukee River Basins.

Sheboygan County encompasses some of the most scenic and critical watersheds within Wisconsin. All the watersheds in Sheboygan County drain into the Lake Michigan Watershed either through major rivers or direct drainage to the lake. These watersheds have been classified as either Priority or Non-Priority watersheds for water quality purposes by the Wisconsin Department of Natural Resources. The Sheboygan River Watershed has been designated as a Great Lakes Area of Concern by the International Joint Commission. These areas have had Remedial Action Plans completed to address contamination concerns. Map 1.5 in Appendix A shows the watersheds in Sheboygan County.

Priority Watersheds

The Wisconsin Nonpoint Source Water Pollution Abatement Program (NPS Program) was created in 1978 by the state legislature. This program selected priority watersheds based on numerous factors including, but not limited to: unique species, potential to respond positively to nonpoint source controls and sensitivity to phosphorus loading. The program has provided financial and technical assistance to landowners and local governements to reduce nonpoint source pollution. Four watersheds within Sheboygan County have been designated as Priority Watersheds through this program.

North, East and West Branch Milwaukee River Priority Watershed was designated in 1984. The Milwaukee River North Watershed is located in portions of Sheboygan, Ozaukee and Washington counties and has a drainage area of 150 square miles. Land cover is primarily rural with agriculture dominant. Sources of nonpoint pollutants included runoff from animal waste, sedimentation from crop fields, urban construction sites, stream bank erosion, and manure.

The Milwaukee River East-West watershed covers 266 square miles and is located in portions of Dodge, Fond du Lac, Ozaukee, Sheboygan, and Washington counties. Land cover is primarily rural with agriculture dominating. Sources of nonpoint pollutants included wetland drainage, urban runoff and agricultural runoff contributing nutrients and sediment.

Onion River Priority Watershed was designated in 1980. The Onion River Watershed was one of the first watersheds targeted under the Nonpoint Source Water Pollution Abatement Program. The watershed covers about 100 square miles and has 124.2 miles of streams. It flows southerly for about half its length before turning northward, entering the Sheboygan River in the city of Sheboygan Falls. Belgium Creek is the only major tributary to the Onion River. Land use in the watershed is primarily agricultural. The entire Village of Waldo, most of the Village of Belgium, and small portions of the Village of Cedar Grove, and the City of Sheboygan Falls comprise the urban areas of the watershed. Sources of nonpoint pollutants included sedimentation, agricultural and urban runoff, pasturing practices, and stream bank erosion.

Pigeon River Priority Watershed was designated in 1995. The Pigeon River is a 30-mile long tributary of Lake Michigan that lies within the Sheboygan River Basin. It forms at the confluence of the Pigeon and Meeme River Branches near the Sheyboygan-Mantitowoc County line. Sources of nonpoint pollutants include sedimentation, stream bank erosion, construction and feedlot runoff.

Sheboygan River Priority Watershed was designated in 1985. The Sheboygan River originates in east-central Wisconsin and drains an area of land situated between Lake Winnebago and Lake Michigan. The watershed is a sub-basin of the larger Sheboygan River drainage basin that includes: the Sheboygan River, the Pigeon River, Mullet River, Onion River, Black River, and direct tributaries to Lake Michigan. The Sheboygan River Watershed drains approximately 245 square miles. The watershed lies in portions of four counties: Sheboygan, having the largest contributing drainage area with 52 percent of the watershed (127 square miles); Fond du Lac, containing 30 percent of the

watershed (74 square miles); Calumet, 7 percent (17 square miles); and Manitowoc, making up 11 percent of the watershed (27 square miles). The majority of the population living in the watershed resides in incorporated areas, primarily concentrated in the metropolitan area of Sheboygan, Sheboygan Falls, Kiel, and the village of Kohler. Land uses in the watershed are primarily rural. Most of the land is used for agricultural purposes, with milk production and dairy products being the predominant industry in all four counties. Sources of rural nonpoint pollutants most commonly found in this watershed include sediment from crop and stream bank erosion, polluted runoff from barnyards and feedlots, and runoff from winter-spread with livestock manure. Sources of urban nonpoint pollutants include construction sites, freeways, industrial areas, commercial areas, and residential areas.

The Sheboygan River Watershed is the most studied watershed in the Sheboygan River Basin. Many researchers have conducted studies to determine the effects of polychlorinated biphenyl (PCB) uptake in fish and wildlife in the lower 14 miles of the Sheboygan River. This section of the river is listed as a Federal Superfund site. The U.S. EPA and others are currently evaluating clean up alternatives for this site.

NON-PRIORITY WATERSHEDS

Black River Watershed is located entirely within Sheboygan County and contains the 11.4-mile Black River. It is characterized primarily as natural lowlands with adjacent agricultural areas. Sources of rural and urban nonpoint source pollutants include channel modification, construction site erosion, and increased imperviousness contributes to flashy flows, increased nutrients, bacteria, and sedimentation.

Mullet River Watershed is about 98 square miles and it originates at the outlet of Mullet Lake in Fond du Lac County, running northeast into Sheboygan County. The river then runs east and drains into the Sheboygan River near Sheboygan Falls. Land use in the Mullet River watershed is primarily agricultural. Sources of rural and urban nonpoint pollutants include runoff from barnyards, eroding agricultural lands, and stream bank erosion.

Sauk and Sucker Creeks Watershed includes a small portion of Sheboygan County, but is predominately in Ozaukee County. Sauk and Sucker Creeks flow southward entering into Lake Michigan in and near Port Washington. Agriculture is the dominant land use in the Sauk and Sucker Creek Watershed; however, it is an urbanizing watershed. Sources of nonpoint pollutants include erosion from construction sites, run off from impervious surfaces, agricultural runoff, stream bank erosion, and sedimentation.

GROUNDWATER

Sheboygan County's groundwater reserves are being held in two principal aquifers: the eastern dolomite aquifer, and the sandstone and dolomite aquifer.

The Eastern Dolomite Aquifer occurs from Door County to the Wisconsin Illinois border. It consists of Niagara dolomite underlain by Maquoketa shale. In areas where fractured dolomite bedrock occurs at or near the land surface, the groundwater in shallow portions of the western dolomite aquifer can easily become contaminated.

The Sandstone and Dolomite Aquifer consists of layers of sandstone and dolomite bedrock that vary greatly in their water-yielding properties. In eastern Wisconsin, this aquifer lies below the eastern dolomite aquifer and the Maquoketa shale layer. These rock types dip slightly to the east, south, and west, away from north central Wisconsin, becoming much thicker and extending to greater depths below the land surface in the southern part of the state. In eastern Wisconsin, most users of substantial quantities of groundwater tap this deep aquifer to obtain a sufficient amount of water.

In Wisconsin, the primary sources of groundwater contamination are agricultural activities, municipal landfills, leaky underground storage tanks, abandoned hazardous waste sites, and hazardous/toxic spills. Septic tanks and land application of wastewater are also sources for possible contamination. The most common groundwater contaminant is nitrate-nitrogen, which comes from fertilizers, animal waste storage sites and feedlots, municipal and industrial wastewater and sludge disposal, refuse disposal areas, and leaking septic systems.

SURFACE WATERS

There are numerous lakes and rivers in Sheboygan County. The most significant surface water feature is Lake Michigan. Map 1.6 in Appendix A shows the surface water features in Sheboygan County.

Lakes (Map 1.6)

- Lake Michigan: Lake Michigan borders on the eastern edge of Sheboygan County. Bottom type consists mainly of bedrock on exposed shores, and sand within the bays and shallow shores. Coho & Chinook salmon, lake trout, northern pike, and yellow perch are the dominant sport fishes, with the occasional smallmouth bass, walleye and rainbow trout. Most sport fishing occurs in the bays. Lake trout numbers are expected to increase with the better control of lampreys. Access of the larger pleasure crafts is restricted to harbor sites because of the rocky and shallow, sandy shores. This area of Lake Michigan averages slightly more that 400-foot deep waters within two miles of shore.
- Sheboygan Lake is a drainage lake located within the Broughton Sheboygan County Marsh. It covers more than 674 acres within the 14,000-acre marsh, but averages no more than 3 feet deep.
- (Big) Elkhart Lake in Sheboygan County has approximately 300 surface acres and a maximum depth of 119 feet. It is the largest kettle moraine in the county and the fourth deepest lake in the state. Increase in fertility is gradual and due mainly to septic tank seepage and some isolated surface water runoff from cropland and farm operations. The fishery of the lake includes walleye, panfish and smallmouth bass. Public access is provided.

- Crystal Lake is located in the town of Rhine near the Village of Elkhart Lake. The lake is 113 acres and is heavily used for fishing and boating.
- Little Elkhart Lake is adjacent to Big Elkhart Lake and is known for fishing. The size of motors allowed on the lake is limited. The lake covers 47 acres and has a maximum depth of 21 feet.
- Gerber Lake consists of two contiguous basins covering approximately 22 acres in the town of Rhine. The basins are spring-fed and are known for largemouth bass and bluegill fishing. No motorboats are allowed on the lake.
- Jetzers Lake is a small lake located in the town of Herman covering around 14 acres. The lake is spring-fed and has an outlet to the Pigeon River.
- Random Lake is the second largest lake in Sheboygan County with 213 acres in area. It is the first large lake north of Milwaukee and has a public fishing pier, boat landing and docking piers, public beach, picnic area and swimming at Lakeview Park.

Other Sheboygan County lakes in the southern part of the county include:

- Plymouth Mill Pond
- Lake Ellen
- Waldo Mill Pond
- Crooked Lake
- Lake Seven

Rivers, Streams and Creeks

Nichols Creek is the only stream or river to have been designated as outstanding resource water while Ben Nutt Creek is designated an exceptional resource waters by the state of Wisconsin. This designation under Wisconsin Administrative Code NR 102 establishes water quality standards for different classes of surface waters in the state.

Sheboygan County is characterized by a number of major river systems that flow from west to east across the County. Major rivers in the County include:

- The *Mullet River* originates at the outlet of Mullet Lake in Fond du Lac County and runs generally east before joining the Sheboygan River in the City of Sheboygan Falls. The two named tributaries to the Mullet River are La Budde Creek and Jackson Creek. The watershed contains nearly 2 miles of Class I trout water, 10 miles of Class II trout water and nearly 35 miles of streams supporting a warm water sport fish community.
- The *Sheboygan River* originates in east-central Fond du Lac County and flows generally southeastward into the City of Sheboygan where it enters Lake Michigan. The major tributaries to the Sheboygan River are the Onion and Mullet Rivers. Other named warm water tributaries to the Sheboygan River are Otter and Weedens Creeks. Millhome, Schuett and Feldner's Creeks are trout streams located in the Sheboygan River Basin. There are also nine dams in the Watershed: Sheboygan Marsh, Kiel, Rockville, Millhome, Johnsonville,

Sheboygan Falls, Waelderhaus, Riverbend and Mischo's. The Franklin dam was removed in 2001, restoring this river reach to a free-flowing condition. The positive change in flow, temperature, and oxygen levels will result in habitat suitable for game fish species such as smallmouth bass, northern pike, and rock bass.

- The *Onion River* flows southerly for about half its length before turning northward, entering the Sheboygan River in Rochester Park in the City of Sheboygan Falls. Belgium Creek is the only major tributary to the Onion River. There are two dams on the Onion River, which form the Waldo and Hingham impoundments.

Trout Streams

Since 1990, a category system has been used to manage a variety of fishing opportunities that anglers desire. Size and limits on the number of fish vary by category to match the productivity of the stream, the fishing pressure, and the local fishing community. Class I trout streams are high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near the limits of the waterway. Class I streams tend to be small and may contain small or slow-growing trout, especially in the headwaters areas. Class 2 trout streams may have some natural, in-stream reproduction, but not enough to use all of the available food and habitat in the stream. As a result, stocking is required to maintain a strong sport-fishing population in these streams. Class 2 streams have a good survival rate and often produce some fish larger than average. In Sheboygan County there are 37 miles of trout streams, of which 8.9 miles are Class 1 and 28.1 miles are Class 2. Table 1 shows the trout streams in Sheboygan County.

Table 1: Trout Streams in Sheboygan County

STREAM	CLASS TYPE	FISH TYPE	MILES
Ben Nutt Creek- to Junction with Mill Creek	Class 2	Brown Trout	6.0
Glenbeulah Springs	Class 2	Brook Trout	0.5
Gooseville Creek- North branch and below junction to Milwaukee River	Class 1	Brown Trout	1.0
Gooseville Creek- South branch only	Class 2	Brook Trout, Brown Trout	0.9
Jackson Creek	Class 2	Brook Trout, Brown Trout	1.8
LaBudde Creek- Upstream from Badger Road	Class 1	Brook Trout	1.7
LaBudde Creek- Downstream from Badger Road to Mullet River	Class 2	Brook Trout	2.7
Melius Creek	Class 2	Brown Trout	3.3
Road	Class 2	Brown Trout	1.6

STREAM	CLASS TYPE	FISH TYPE	MILES
Mullet River from Glenbeulah Pond Dam to State Highway 67	Class 2	Brown Trout	2.0
Nichols Creek to State Highway 28 in Cascade	Class 1	Brook Trout, Brown Trout	3.8
Onion River to County Road N	Class 2	Brown Trout	4.0
Watercress Creek- All	Class 2	Brown Trout	3.3
Chambers Creek to County Road W	Class 2	Brook Trout	2.0
Schuett Creek- All	Class 1	Brown Trout	0.4

Shoreland Corridors

Shorelands are often viewed as valuable recreational and environmental resources both in urbanized and rural areas. As a result, the State of Wisconsin requires that counties adopt shoreline/floodplain-zoning ordinances to address the problems associated with development in floodplain areas. Development in shoreland areas is generally permitted, but specific design techniques must be considered. Development in these areas is strictly regulated and in some instances, is not permitted. For planning and regulatory purposes, the floodplain is normally defined as those areas, excluding the stream channel, that are subject to inundation by the 100-year recurrence interval flood event. This event has a one percent chance of occurring in any given year. Because of this chance of flooding, development in the floodplain should be discouraged, and the development of park and open space in these areas should be encouraged.

The authority to enact and enforce floodplain and other zoning provisions in counties is set forth in Chapter 59.97 of the Wisconsin Statutes and Wisconsin Administrative Code NR 115, 116, 117. This same authority is also vested to cities and villages in Chapter 62.23 of the Wisconsin Statutes.

Floodplains

Floodplains are often viewed as valuable recreational and environmental resources. These areas provide for stormwater retention, groundwater recharge, and habitat for various kinds of wildlife unique to the water.

Development permitted to take place in these areas is susceptible to storm damage and can have an adverse effect on water quality and wildlife habitat. In addition, it can also result in increased development and maintenance costs such as providing flood proofing, repairing damage associated with flooding and high water, increased flood insurance premiums, extensive site preparation, and repairing water-related damage to roads, sewers, and water mains. Some communities have special ordinances for buildings within the floodplain for remodeling and expanding. New expansions may have to be compliant to the rules of floodplain construction.

As a result, the State of Wisconsin requires that counties, cities and villages adopt shoreland/floodplain-zoning ordinances to address the problems associated with development in floodplain areas. Development in shoreland areas is generally permitted, but specific design techniques must be considered. Development in floodplain areas is strictly regulated and in some instances is not permitted. Map 1.7 in Appendix A shows the floodplain areas as mapped by the Federal Emergency Management Agency (FEMA). The original paper copy maps produced by FEMA were re-created in digital format for mapping purposes. An on-site review of the floodplain elevation is necessary to determine the most accurate location of the floodplain boundary.

WETLANDS

According to the Wisconsin Department of Natural Resources, wetlands are areas where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophilic vegetation. Other common names for wetlands are swamps, bogs, or marshes. Wetlands serve as a valuable natural resource. They provide scenic open spaces in both urban and rural areas. Map 1.8 in Appendix A shows wetlands as mapped on the Wisconsin Wetland Inventory.

Wetlands also act as natural pollution filters, makings many lakes and streams cleaner and drinking water safer. They act as groundwater discharge areas and retain floodwaters. Filling or draining of wetlands is costly, destroys the productive capacity of the ecosystem and can adversely affect surface water quality and drainage. Finally they provide valuable and irreplaceable habitat for many plants and animals.

Because of their importance, there are strict regulations regarding wetlands. Wisconsin Administrative Codes NR 115 and NR 117 fall under the jurisdiction of the Wisconsin Department of Natural Resources, and mandate that shoreland wetlands be protected in both the rural and urban areas of the State. In the unincorporated areas, NR 115 provides the legislation to protect wetlands of five acres or more that are within the jurisdiction of county shoreland zoning ordinances. Wetlands not in the shoreland zone are protected from development by the federal government and the WDNR through Section 404 of the Clean Water Act, and NR 103, respectively. It should be noted that all wetlands, no matter how small, are subject to WDNR, and possibly federal regulations, if they meet the State definition.

Sheboygan Marsh

The *Broughton Sheboygan Marsh Park & Wildlife Area* lies in northwestern Sheboygan County, just west and north of Elkhart Lake; it encompasses over half of the Towns of Russell and Greenbush (North). It includes about 14,000 acres of land and surface water; 8,166 acres are publicly owned, of which 7,414 acres are owned by Sheboygan County and 752 acres by the State of Wisconsin. The remainder is privately owned, some of which is publicly accessible. The Sheboygan River flows easterly through the Marsh. Map 1.9 shows the Sheboygan Marsh area.

The *Wildlife Area* is an ecologically diverse system comprised of expansive cedar and tamarack swamps, shrub marshes, lowland hardwoods, and large areas of marshes and open water. The Marsh is bisected by the Sheboygan River, which is impounded by a dam at the northeast corner of the property. The open waters and adjoining wetlands are a restored flowage of the Sheboygan River. *Sheboygan Marsh* lies in a 133 square mile watershed.

Sheboygan Marsh is particularly popular during the hunting and fishing seasons. Prime habitat exists for migratory waterfowl, small and big game animals, fish, furbearers, and various species of non-game animals. As such, it is especially attractive to hunters, fishers, and nature observers alike, for all seasons. The Marsh adjoins the Ice Age National Scientific Reserve.
A major County Park, located on approximately 30 acres at the northeast corner of the property at the site of the Sheboygan River dam, has been developed by Sheboygan County. This popular facility offers the following:

- Marsh Lodge (full service rustic restaurant and tavern)
- Broughton Lodge (multipurpose facility)
- State Wildlife Viewing Area
- 64 developed campsites
- Large picnic area with contemporary shelter
- Playground
- Canoe and boat rentals
- Launching ramps
- Fishing piers
- Public snowmobile trails (part of 199 mile county system)
- Large open areas

Management activities on Sheboygan Marsh are primarily directed at habitat improvements for migratory waterfowl, small and big game animals, fish, and development of facilities for other compatible outdoor recreational pursuits. Wisconsin Department of Natural Resources professional staff, in accordance with a formal Management Agreement re-executed with Sheboygan County in 2002 following the adoption of the Marsh Management Plan, provides wildlife, fish, and forestry management.

Archaeological investigations have classified "Sheboygan Marsh" as an "archaeological treasure" of national significance; it remains a candidate for nomination to the National Register of Historic Places.

Kiel Marsh

The Kiel Marsh Wildlife Area is located in north central Sheboygan County, north of the Sheboygan Marsh on the Sheboygan River in portions of the Town of Rhine and Town of Russell in Sheboygan

County. Portions of the Kiel Marsh lie in southwest Manitowoc County. And southeast Calumet County. The property borders on the City of Kiel in Manitowoc County.

The Kiel Marsh was formed during the Ice Age. Early inhabitants of the area include the Fox, Sac, and Menominee Tribes of Native Americans. In 1963, the Conservation Commission approved the State acquisition of the property.

The Kiel Marsh consists of 822 acres of land. Future expansion, to include a total of 1072 acres of land, is the goal of the Department of Natural Resources. Carp, yellow perch, northern pike, black crappie, and bullhead species dominate the fish population in the Kiel Marsh. Species such as pumpkinseed, bluegill, and largemouth bass are less common and do not contribute significantly to the fishery. Muskrats, mink, and beaver are the principal fur-bearing mammals on the marsh. While wood duck is the most abundant waterfowl, the marsh also has sizable populations of mallard, blue-winged teal, Canada geese, black terns, sora rails, green herons, great blue herons, great horned owls, barred owls, marsh wrens, red-winged black birds, tree swallows, and a variety of other song birds and small mammals. Deer and ruffed grouse are common residents of the wooded and brush area; pheasants are found on the upland fringe. Ospreys, which are an endangered or threatened species, successfully nest on the Sheboygan Marsh and hunt on the Kiel Marsh. Blandings turtles, another endangered or threatened species have been noted on the Sheboygan River in this area.

FORESTS AND WOODLANDS

Woodlands throughout Sheboygan County are comprised primarily of sugar maple, yellow birch, American beach, basswood, red oak and red pine, hemlock, sugar maple, paper birch, aspen and white cedar, and small stands of the northern hardwood species. Also seen in the County are balsam firs, white spruce, black spruce and tamarack. These woodlands provide an aesthetic and natural purpose, providing habitat to many animals. One state forest is located in the County. Maps 1.10 and 1.11 show the original vegetative cover and the wooded areas of Sheboygan County.

Kettle Moraine State Forest – Northern Unit

The northern unit of the Kettle Moraine State Forest contains approximately 30,000 acres of forestlands. Outdoor recreation is an important use of this forest, however, it is also the largest block of contiguous forest in Wisconsin, east of the Baraboo range. The State Forest is important for sensitive wildlife in the area such as Neotropical migrants, several endangered and threatened species, and red-shouldered hawks.. Special interest areas include Dundee Mountain, the Henry S. Ruess Ice Age Visitor Center, Parnell Tower and Esker just to name a few. Spruce Lake Bog and Jersey Flats Prairie are also areas that are excellent for viewing wildlife. Wildlife species found throughout the forest include whitetail deer, turkeys, Cooper's hawks, red squirrels, meadowlarks, bluebirds and red-winged blackbirds.

MAJOR PARKS, RECREATION AREAS AND OPEN SPACES

Sheboygan County has a number of state and local trail facilities including the Old Plank Road Trail. A portion of the Ice Age National Scenic Trail heads south from the village of Glenbeulah. The

following inventory provides a description of the state parks and the major county parks throughout the County.

State Parks

Kohler-Andrae State Park

Kohler-Andrae State Park is one of the last natural preserves along the Lake Michigan shore, and is open for everyone to explore and enjoy, such as campgrounds, picnic areas, a bath house, nature center, trails and roads. This 1,000-acre scenic spot on the shore of Lake Michigan offers a peaceful setting year round. There are campsites, approximately two miles of beach, a nature center and two nature trails.

Wade House State Historic Site

The Wade House State Historic Site, situated in Greenbush at the entrance of the Kettle Moraine State Forest, once served as an inn and stopping point for stage coaches traveling on the Fond du Lac-Sheboygan Plank Road. Guides in Civil War era costumes, and period furniture and furnishings give guests a firsthand glimpse of a time gone by. The Wesley Jung Carriage Museum, located on the grounds, holds one of the world's outstanding authentic collections of hand- and horse-drawn vehicles.

Other State Parks and Lands

Kettle Moraine Springs Fish Hatchery- Town of Scott
LaBudde Creek State Fishery Area- Town of Rhine
Nichols Creek State Wildlife Area- Town of Lyndon, Town of Mitchell
Rhine Center Bog- Town of Rhine
Schuett Creek State Fishery Area- Town of Rhine

Recreation Trails

Ice Age National Scenic Trail

One of only eight national scenic trails in the United States, the Ice Age Trail will eventually be a thousand-mile walking/hiking trail located in and unique to Wisconsin. About 600 miles of the Trail are now available for use. The route of the Trail approximates the last stopping point or terminal edge of the most recent continental glaciation. The Trail varies to include other features of the glacial landscape, portions of the "Driftless Area", and communities. Congress recognized the national significance of the Trail by designating it a National Scenic Trail (NST) in 1980. The State of Wisconsin designated the Trail a State Scenic Trail in 1987.

Old Plank Road Recreation Trail

This popular, 17-mile, trail accommodates bicyclists, runners, walkers, in-line skaters, horseback riders, moped users, Nordic skiers, and snowmobiles on 10 feet of asphalt and 8 feet of turf. The trail parallels State Highway 23 from Sheboygan, past Kohler, Sheboygan Falls, Plymouth, and onto historic Greenbush, linking with the Ice Age Trail in the northern unit of the Kettle Moraine State Forest.

Snowmobile Trails

Sheboygan County has 228 miles of State funded snowmobile trails. Fifteen area clubs maintain these trails throughout the county. Private land owners provide the majority of the land used for the public trail system.

County Parks

Broughton Sheboygan Marsh Park

This 30 acre developed year round park includes the "Marsh Lodge" (full service restaurant and tavern), and "Broughton Lodge", a multi-purpose facility. The 64 fully developed campsites include showers, playground, picnic areas, canoe and boat rentals, launch ramp, and fishing piers. County snowmobile trails traverse the Marsh and connect with the Countywide 199 mile trail system. The Sheboygan Marsh Wildlife Area includes over 13,000 acres and attracts hunters, fishers, and wildlife/natural observers. Map 1.12 of Appendix A shows the extent of Broughton Sheboygan Marsh Park.

Gerber Lakes Public Fish & Wildlife Area

Sheboygan County's newest public lands, this Fish & Wildlife Area is open to the public for multiple outdoor recreation uses. Map 1.13 of Appendix A shows the Gerber Lakes Public Fish and Wildlife

Area. The Wildlife Area is located in Section 35, Town of Rhine, 3 miles east of Elkhart Lake and is open to public hunting and fishing during these seasons.

The property includes 3 lakes, 2 of which are among the most popular fishing and canoeing lakes in the area. Big Gerber Lake is 15 acres and has a maximum depth of 37 feet, Little Gerber Lake is 8 acres with a maximum depth of 21 feet, and Bullet Lake, which is approximately one acre in size. Big Gerber and Little Gerber Lake are connected by a short, navigable channel; both lakes have restrictions on motorized watercraft.

The land cover on the property is diverse, consisting of tillable uplands, deciduous trees (principally maple, beech, oak, ash, birch, and aspen), coniferous forest (principally pine, spruce, and tamarack), meadow, and wetland. The topography of the property ranges from rugged steep slopes greater than 25% on the western and southern portions of the property, and gently rolling along the areas adjacent to the lakes. The southern portion of the property is in the process of being restored to a native prairie. This restoration project should be complete following the planting of prairie vegetation in Spring 2005.

The lakes on this property are within the headwaters of the Otter Creek tributary. The lakes include one of the region's most productive warm water fisheries, with the prinicipal species being largemouth bass, bluegill, and black crappie. Game and non-game animal species commonly found on the property include whitetail deer, red and grey fox, raccoon, skunk, cottontail rabbit, squirrels, various mice, voles, and moles, wild turkeys, herons, red tailed hawks, barred and great horned owls, migratory waterfowl (such as mallard, wood duck, greenwing and bluewing teal, Canada geese), songbirds, pheasant, and Hungarian partridge.

Other Parks and Environmental Areas

Ellwood H. May Environmental Park

This 120-acre public park is commonly known as Maywood. Maywood offers natural history, environmental programs and activities, community events, recreational outings, summer camps, field trips, self-guided walks, cross country skiing and hiking trails, wildlife viewing, and a meeting place for environmental groups. The park is a popular destination for school groups, families, and individuals who love nature and the outdoors.

Diverse habitats at Maywood provide a haven for wildlife throughout the restored prairie, Pigeon River corridor, spring-fed ponds, wetlands, and coniferous and deciduous forests. The Maple forest is tapped every March for its sweet maple syrup, which is bottled and sold at the Ecology Center.

This land was donated to the City of Sheboygan on October 31, 1974 by Ellwood H. May. Mr. May owned and operated the Mayline Office Furniture Company of Sheboygan. After a careful and extensive study of the existing environmental conditions, it was determined that an environmental park would be the best suited use of the new facility.

The park is supported by the City of Sheboygan, public grants and The Environmental Park Trust of Sheboygan County through voluntary donations, bequests, and annual fund drives. The Ecology Center, and extensive trail network, and a beautiful setting make Maywood a natural focal point for our environmental programs within Sheboygan County.

Recreational Marinas

The Bay-Lake Regional Planning Commission conducted a survey of all recreational marinas operating within the area in the fall of 2002. There are two marinas in Sheboygan County providing access to Lake Michigan. The results of the survey are found in Table 2.

Table 2: Recreational Marinas, Permanent and Transient Slips

Marina Name	Community	Permanent Slips	Transient Slips	Max Boat Size (ft)	Water Depth (ft)
Harbor Centre Marina	Sheboygan	250	yes/varies	50	10
Sheboygan Yacht Club	Sheboygan	60	yes/varies	60	10

Source: Bay-Lake Regional Planning Commission, Survey of Marinas, 2002

AIR QUALITY ISSUES

The U.S. Environment Protection Agency (EPA) uses six "criteria pollutants" as indicators of air quality: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter and lead. For each of these, the EPA has established "primary" standards to protect public health, and "secondary" standards to protect other aspects of public welfare, such as preventing materials damage, preventing crop and vegetation damage, or assuring visibility. These standards are called the National Ambient Air Quality Standards (NAAQS). Areas of the country where air pollution levels persistently exceed these standards may be designated "non-attainment."

Sheboygan County is considered a nonattainment area for the “8 hour” ozone standard (NAAQS). Sheboygan County was in attainment of the “1 hour” ozone standard, but the new standard has gone into effect. The Governor OF THE State of Wisconsin recommended nonattainment designation for Sheboygan County under the 8 hour standard in 2003 and the US Environmental Protection Agency designated Sheboygan County as nonattainment on April 15, 2004, with an effective date of June 15, 2004.

WILDLIFE HABITAT

Fish and wildlife habitat areas have been delineated according to their level of quality and importance in many of the coastal areas of Sheboygan County as part of a 1976 Fish and Wildlife Habitat Study that was prepared by the WDNR. In this study, habitat areas were identified as having top, medium or low quality that measures the capability of supporting various types of wildlife habitat.

A majority of the large remaining wooded and wetland areas within the County were designated as Class 1 (most desirable) wildlife habitats by the Wisconsin Department of Natural Resources.

Major wildlife species using these habitats include songbirds, deer, ruffed grouse and squirrels. Other common species include snowshoe hare, coyote, gray fox, raccoon, skunk and porcupine. Muskrat, mink, beaver and otter have been identified in the wetland areas. Several species of gulls, terns, geese, and ducks inhabit the area. Some of the old fields provide habitat for pheasants. Wolf, woodchuck, meadow vole, American toad, snapping turtle, and Canada goose can be found throughout the County.

Sheboygan County lies within an important migratory corridor for songbirds, shorebirds, waterfowl, and raptors. These birds, possibly including some threatened or endangered species, use wooded and wetland areas for food and shelter during migration.

The Wisconsin Department of Natural Resources has also designated the waters of Lake Michigan as Class 2 (desirable habitat) fish habitat. Fish species that may be found include small mouth bass, yellow perch, northern pike, rock bass, rainbow trout, lake trout, and brown trout.

ENDANGERED RESOURCES

Both federal and state identification efforts for threatened and endangered resources were conducted as part of a WDNR review of the Ice Age Trail project area in Sheboygan County which showed many occurrences of rare species and natural communities recorded in the WI Natural Heritage Inventory (NHI).

Rare species and natural communities are identified in Table 3 according to the respective county in which they were observed.

Table 3: Sheboygan County Rare and Natural Communities

Scientific Name	Common Name
Alasmidonta viridis	Sippershell Mussel
Anemone multifida var hudsoniana	Early Anemone
Arethusa bulbosa	Swamp-pink
Artemisia dracunculus	Dragon Wormwood
Aster furcatus	Forked Aster
Bog Relict	Bog Relict
Buteo lineatus	Red-shouldered Hawk
Calylophus serrulatus	Yellow Evening Primrose
Cardamine pratensis	Cuckooflower
Carex richardsonii	Richardson Sedge
Carex sychnocephala	Many-headed Sedge
Coregonus artedi	Lake Herring
Crangonyx gracilis	A Side-swimmer
Crangonyx richmondensis	A Side-swimmer
Cypripedium arietinum	Ram's-head Lady's-slipper

Scientific Name	Common Name
Cypripedium parviflorum	Small Yellow Lady's-slipper
Cypripedium reginae	Showy Lady's-slipper
Elymus lanceolatus ssp psammophilus	Thickspike
Emydoidea blandingii	Blanding's Turtle
Etheostoma microperca	Least Darter
Gentiana alba	Yellow Gentian
Lithospermum latifolium	American Gromwell
Luxilus chrysocephalus	Striped Shiner
Malaxis brachypoda	White Adder's-mouth
Orconectes propinquus	Northern Clearwater Crayfish
Platanthera Dilatata	Leafy White Orchis
Platanthera hookeri	Hooker Orchis
Platanthera orbiculata	Large Roundleaf Orchid
Regina septemvittata	Queen Snake
Shrub-Carr	Shrub-Carr
Thalictrum revolutum	Waxleaf Meadowtrue
Thamnophis sauritus	Northern Ribbon Snake
Triglochin maritima	Common Bog Arrow-grass
Triglochin palustris	Slender Bog Arrow-grass
Trillium nivale	Snow Trillium
Trisetum melicoides	Purple False Oats
Valeriana sitchensis ssp uliginosa	Marsh Valerian
Venustaconcha ellipsiformis	Ellipse
Viola rostrata	Long-spur Violet

Source: WDNR, BER, 2003.

SCIENTIFIC AND NATURAL AREAS

The Wisconsin State Natural Area program was established to formally designate sites in natural or near natural condition for scientific research, the teaching of conservation biology, and most of all, preservation of their natural values and genetic diversity for the future. These areas are not intended for intensive recreation use, but rather to serve the mission of the Natural Areas Program, to locate and preserve a system of State Natural Areas harboring all types of biotic communities, rare species, and other significant natural features native to Wisconsin.

Kohler Park Dunes in Sheboygan County has three uncommon Great Lakes shore habitats present in this area: Lake Michigan dunes consisting of large, active portions surrounded by stabilizing dunes; one quarter mile of beach community; and two small remnants of white pine forest. The area is rich in coastal plant species and there are numerous critical plant species present. A 10-acre buffer zone as been established on the west edge of the scientific area.

Nichols Creek is located in the Towns of Sherman and Lyndon, and has been designated as a State Exceptional Water Resource. Wisconsin's Outstanding and Exceptional Resource Waters Program is designed to maintain the water quality in Wisconsin's cleanest waters. An exceptional resource water is defined as a stream that exhibits the same high quality resource values as outstanding waters, but which may be impacted by point source pollution or has the potential for future discharge from a small sewer community. The Nichols Creek State Wildlife Area, which makes up the headwaters of Nichols Creek which drains into the North Branch of the Milwaukee River, is located in the Towns of Lyndon and Mitchell**.**

North Branch Milwaukee River Wildlife and Farming Heritage Area includes portions of Sheboygan, Ozaukee, and Washington Counties and encompasses a total of 19,487 acres of land. The core area is made up of 16,549 acres of land and an additional 2,938 acres made of corridors along the five tributary streams in the Area. The project areas includes river and stream corridors, large wetland complexes, three lakes, and rural/agricultural lands and is one of the largest blocks of open space remaining in southeastern Wisconsin where agriculture is the dominant land use. The purpose of the project is to:

- Maintain the rural character of the area.
- Maintain and enhance existing natural resources.
- Restore plant communities and wetlands to improve wildlife habitat and water quality.
- Provide nature-based outdoor recreation and education opportunities.

Nearly 9,100 acres of cropland and pasture areas, 5,900 acres of wetlands, and 700 acres of forest occur within the boundary area. In an effort to achieve the goal of agricultural land preservation, the Wisconsin Department of Natural Resources is committed to working with local farmers and landowners to participate in Purchase of Development Rights (PDR) projects within the boundary area. Purchase of Development rights programs pay landowners the difference between the market price and the use price (e.g.- agricultural use value). In return, the landowner relinquishes his/her right to develop their land.

Sheboygan County Memorial Arboretum in Sheboygan County is a wet lacustrine swamp that is made up primarily of black ash and American elm with alder in the under story. The tree canopy is somewhat open and there many plant species throughout the swamp and there is little local relief. Trails run along the east and west fringes of the swamp.

ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL AREAS

Environmental corridors serve many purposes. They protect local water quality and wildlife habitat through identification and preservation of environmentally sensitive areas. They can be used as a means of controlling, moderating, and storing floodwaters while providing nutrient and sediment filtration. Environmental corridors can provide fish and wildlife habitat, recreational opportunities, and serve as buffers between land uses while improving the aesthetics of the community. The environmental corridor process is also used as part of the planning process for making planning and zoning decisions at the local level.

The concept of a corridor is based on the delineation of environmental features adjacent to waterways and water-related resources. The Bay-Lake Regional Planning Commission has defined environmental corridors to include the following set of uniformly available information: Wisconsin Department of Natural Resources wetlands; Federal Emergency Management Agency's 100-year floodplains; areas with slopes greater than or equal to 12 percent; lakes, rivers, streams and ponds; a 75-foot lake and river setback; and, a 25-foot buffer of wetlands. Many of the Commission's planning activities require delineation of environmental corridors (comprehensive plans, watershed plans, sewer service area plans, etc.).

Other features that are considered as part of the environmental corridor definition on an area-by-area basis include: designated scientific and natural areas; unique and isolated woodland areas; scenic viewsheds; historic and archaeological sites; unique geology; wetland mitigation sites; isolated wooded areas; unique wildlife habitats; parks and recreation areas; and other locally identified features. The Commission has defined environmental corridors for Sheboygan County to help in identifying areas that have the greatest need for protection. These corridors were delineated using of the Commission's Geographic Information System (GIS) to overlay a variety of features. Map 1.14 in Appendix A shows these environmental corridors.

AGRICULTURAL RESOURCES

Agriculture creates jobs, provides a product for sale, and pays taxes. Farmland can also provide other substantial benefits to the environment, including floodplain protection, groundwater recharge areas, and wildlife habitat. There are also social benefits, including bucolic views and open space.

In evaluating the value of farmland, there must be a basic assumption that farmland is worth saving. Therefore, the basis for farmland protection centers around farming as an economically productive activity that merits protection based on a variety of factors, but especially the quality of the resources available, proximity to conflicts, and the economic value of farms and related businesses.

GENERAL SOIL ASSOCIATIONS

About two-thirds of Sheboygan County is covered with moderately well drained, heavy soils of high agricultural quality, which occur in the central and eastern portions of the County. Soils of this type tend to retain water and have poor infiltration and percolation characteristics. The majority of these heavy soils consist of clay loams or silty clay loams of the Kewaunee Series.

In the highland areas of the County, particularly in the Kettle Moraine region, excessively drained gravely loams of the Rodman Series are prevalent. Soils adjacent to the Moraine on the East are generally well-drained and rolling silt-loams.

Poorly drained soils comprise approximately 20% of the County's area. The largest occurrence is in the Town of Russell within the Sheboygan County Marsh. Sand dunes along Lake Michigan are found adjacent to red clay soils in the southern half of the County.

Prime Agricultural Soils[1]

The USDA, Natural Resources Conservation Service defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops, with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. Prime farmland includes land that is being used currently to produce livestock and timber. It does not include land already committed to urban development or water storage.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land must also be available for these uses (cropland, pastureland, forestland, or other land, but not water or urban built-up land).

Prime farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

In general, prime farmland in Wisconsin:

- Has an adequate and dependable water supply from precipitation or irrigation
- Has a favorable temperature and growing season
- Has acceptable acidity or alkalinity
- Has few or no rocks
- Is permeable to air and water
- Is not excessively erodible
- Is not saturated with water for long periods of time
- Does not flood frequently, or is protected from flooding

Map 1.16 in Appendix A provides a representation of areas designated as farmland in Sheboygan County.

Land Capability

Land capability subclasses place soils into groups with similar suitability and limitations for agricultural use. The risks of soil damage or limitations in use become progressively greater from class 1 to class 8. Class 1 and 2 soils have the best capability for agricultural production and the capability diminishes as the classes advance. The subclass letter indicates the major soil related hazard for agricultural use:

E = hazard of erosion
W = wetness limitations from water table or flooding

[1] ftp://ftp-fc.sc.egov.usda.gov/WI/Soil/prime/prinotes.html , U.S. Department of Agricutlure

S = surface stones, or low available water capacity, or other root zone limitation

The improved land capability class has been mapped by soil type (see Map 1.17). This classification was chosen because it represents the capability subclass after limitations like wetness or surface stones have been removed to make the soil more suitable for agricultural use. The assumption was made that existing productive agricultural lands in Sheboygan County have already had improvements made (i.e. tiling, clearing large rocks, etc.)

Soil Productivity

Soil productivity measures the average yield for selected crops by soil type. Maps were generated for Alfalfa, Corn, and Soybeans and the expected average yield for each soil type. (See maps 1.18, 1.19, & 1.20) It is important to note that these yields are long-term averages.

Agricultural Economy[2]

Sheboygan County agriculture is a large contributor to the local economy. Agriculture accounts for $1.67 billion in economic activity, almost 20% of the County's total economic activity. The agricultural portion of Sheboygan County's economy contributes $478.2 million in take-home income annually, 12.2% of the total income for Sheboygan County. There are almost 9,179 jobs tied to agriculture, nearly 12% of the total County workforce.

Farmland Preservation

The preservation of farmland is a controversial issue. Many rural, non-farm residents want to preserve farmland while many farmers also want to preserve the land while retaining the option to sell. However, as development increases and agricultural commodity prices decline, the challenges to preserving the farmland resources become greater.

Farmland preservation creates a contentious issue between private property rights and the social responsibility of a community to protect and preserve farmland resources for the future. The public has an interest in the right to decide what land will be developed, preserved, or utilized and has kept many communities from taking aggressive measures to protect farmland from development.

The changes in the structure of Wisconsin's property taxation, implementing a use-value assessment, have been generally favorable to agricultural preservation. Agricultural lands are now assessed for their value in agriculture and not other potential uses. However, in many instances additional tax burden has been shifted to parcels with improvements, such as barns, houses, etc. The net effect on farmland preservation is less substantial when the farmer has higher taxes on buildings.

The effect of rural residential development in productive agricultural areas creates many issues. New development can make daily farming activities difficult and sometimes dangerous. New residents in farming areas may not understand basic farming practices, such as manure handling or harvesting. As a result, farmers are forced to contend with conflicts such as; increased traffic and nuisance

[2] Sheboygan County UW-Extension; *Agriculture A Powerful Economic Force in Sheboygan County;* July, 2004.

complaints by new neighbors related to slow moving vehicles on roadways, noise, dust, odors, and late hours of operation. As development pressures increase, so will conflicts with agricultural practices.

Farmland does not require the services that residential, commercial, industrial, and other intensive uses do. Farm fields do not send ears of corn to school, require an extensive transportation network, request utilities like public water and sewer, or demand services like police and fire protection.

HISTORIC/CULTURAL AND ARCHEOLOGICAL RESOURCES

HISTORY OF THE COUNTY

Native American people, following their trail from Milwaukee to Green Bay, could always tell where they were when they reached the mouth of the Sheboygan River. They called this spot Schwab-we-way-kum, Native American terminology for "great noise underground." The theory is that the rushing sounds of the falls upstream prompted this description and this is a more generally accepted version of how Sheboygan got its name.

When the first European settlers came to the area, there were approximately 1000 Native Americans living in the county, composed mainly of the Pottawatomi, Chippewa, Ottowa, Winnebago and Menominee tribes. Their villages and camps were clustered on the bank or shore of practically every lake or stream, with the largest villages situated along the shore of Lake Michigan. After this territory began to interest the European settlers, treaties were made with the Native Americans. On September 26, 1833, in a treaty made at Chicago, the Native American tribes relinquished all claim to the land on the west shore of Lake Michigan, including what is now Sheboygan County, though many Native Americans remained there for many years.

On December 7, 1836, an act of the territorial legislature detached the area from Brown County. This was less than a year after Wisconsin became a territory and nearly twelve years before it became a state. It was not until two years later, December 17, 1838, that the legislature passed a law organizing the county government and providing for the first election of officers, which was held March 4, 1839.

Sheboygan County's boundaries have never changed from its original organization. The Town of Sheboygan was the first to organize, March 8, 1839, with its boundaries extending to those of the county. As new towns were formed, they were set off from the Town of Sheboygan.

A study of names of the first European settlers established them to have been of English ancestry from New England. First came trappers, then surveyors, followed by businessmen. They were followed in the 1840's and 50's by large migrations of Germans, Dutch, and Irish who came directly from Europe.

The Settlers started clearing the land and raising crops. With the increased interest in agriculture, dairying emerged as a principal industry in the county. Cheese making moved from the farmhouse

and dairy barn in 1887 with the first cheese factory being located on the Fond du Lac Plank Road, two miles west of Sheboygan Falls. By 1875 there were 45 factories producing over 2,000,000 pounds of cheese. At one time there were 116 factories in the county. Today the number of operating factories has dwindled and the bulk of the dairy products are produced in cooperative and corporate dairies. A large concentration of dairying continues in Sheboygan County. While the number of dairy farms is decreasing, herd sizes are becoming larger.

Many factories contributed in making Sheboygan County a prosperous manufacturing center almost from the beginning. A wealth of natural waterpower from lakes and streams flowing generally southeasterly into Lake Michigan attracted numerous sawmills and flourmills. Many of the immigrants were artisans with skilled trades and with the abundant supply of raw materials; it was natural that early manufacturing utilized the abundant forest resources. In the 1850's implements and engines were being made in the City of Sheboygan and a tannery prospered. Up to the Civil War, the City of Sheboygan Falls out-ranked the City of Sheboygan as a manufacturing center.

Two outstanding developments characterized the era between 1880 and 1890. One was a phenomenal growth in population, and the other was a development of large-scale industry. In 1875, Sheboygan County had a population of less than 7,000 that mushroomed to 16,300 by 1890. Currently, Sheboygan County has a population of over 110,000.

Woodworking continued to dominate the economy, producing such products as lathes, windmills, spokes, sashes, doors and window blinds, clothes, reels, rakes, carriages, wagons and barrels. The manufacturing of enamelware emerged as an industry of great importance in the 1880's in the form of small kitchen cooking utensils and large kitchen and bathroom fixtures. The latter industry has become the largest employer of labor in the county with outlets throughout the world.

Various immigrants had their cultural and economic effect on the community. Thrifty and industrious, they earned and saved money with which to build homes and communities of which they can justly be proud. Great music lovers, they also formed singing societies and these groups still conduct festivals and dances. Slavonic Catholics and Lithuanians arrived on the Sheboygan scene early in the twentieth century, and these ethnic groups have added to the heritage of the county.

HISTORICAL SITES

Portions of Sheboygan County have been settled since the 1700s. Subsequently, there are many buildings of historical importance within the region. For this plan, historic districts on the state and/or national registry have been listed (Appendix D). The Sheboygan County Cultural Resources Committee identified the following as important cultural resources in the County:

- Archaeological Sites
- Arts (e.g.-galleries/museums, murals, Tellen carvings)
- Barns
- Bridges

- Cemeteries
- Century Farms
- Churches (old)
- Ethnic Events (e.g.-Holland Fest, Greek Fest)
- Feed Mills
- Forests (e.g.- kettle/forest in Elkhart Lake)/geographic features (kettles)
- Government Buildings
- Historical Event/People (e.g. Sexton, Broughton)
- Ice Industry
- Industry/Industrial Sites
- Inter-Urban Rail Line (resort-town culture, influence on the communities)
- Libraries
- Lighthouses
- Meat Markets ("old fashioned")
- Native Sites
- Old Hotels
- Railroad
- Railroad Depots
- Restaurants
- Road America
- Roads
- Settlement Patterns
- Schools, education, parks (e.g.-Marsh)
- Streets (brick)
- Stores (e.g. corner stress, Evans in the Falls, Daane Hardware, Doegnitz Hardware)
- Wade House

An inventory of these Cultural Resources can be found in Appendix B.

Care should be taken when excavation is done within Sheboygan County, since there is the possibility of disturbing a historical or archeological site. The State of Wisconsin requires any findings of human bones to be reported enabling the State Historical Society to investigate (Wisconsin Statute §157.70). Land developers trying to obtain state permits from the Wisconsin Department of Natural Resources on any development involving federal monies are required to be in compliance with Section 106 of the National Historic Preservation Act and 36 CFR Part 800: Protection of Historic Properties.

HISTORIC DISTRICTS

Cole Historic District, City of Sheboygan Falls was listed in the State and National Register on December 1, 1988. It is situated on 10 acres and consists of 5 commercial and domestic dwellings in Greek Revival and other styles from the period between 1837 and 1867.

Downtown Historic District, City of Sheboygan Falls was listed in the State and National Register on December 27, 1984. It is situated on 65 acres consists of over 30 buildings in late Victorian, 19th and 20th Century Revivals and other styles from the period between 1835 and 1928.

Mission House Historic District, Lakeland College, Town of Herman was listed in the State and National Register on December 20, 1984. It is situated on 100 acres and consists of 5 buildings in Colonial Revival, Classical Revival and late Gothic Revival from the period between 1879 and 1934.

The *City of Sheboygan, Wisconsin Architectural and Historical Intensive Survey Report*, prepared in 2002 by LJM Architects for the City of Sheboygan is a valuable resource for identifying potential historic resources in the City of Sheboygan.

METALLIC AND NON METALLIC MINING RESOURCES

Metallic mining in Wisconsin has occurred since the time of early settlement. Metals mined in the state include copper, lead, iron, and zinc. Mining has economic value to multi-regional areas, but also has the ability to degrade natural resources. Any new mines need to have a permit granted by the WDNR, which includes a reclamation plan. Wisconsin State Administrative Code NR135 gave this authority to the counties; Sheboygan County has enacted a non-metallic mining program. The reclamation plan is a detailed technical document designed to meet the goals that will lead to successful reclamation and will help reduce the negative effects to the environment once the mine is abandoned. The plan has minimum standards that must be met before acceptance. The WDNR defines successful reclamation as "the restoration of all areas disturbed by mining activities including aspects of the mine itself, waste disposal areas, buildings, roads and utility corridors". Restoration is defined as "returning of the site to a condition that minimizes erosion and sedimentation, supports productive and diverse plants and animal communities and allows for the desired post-mining land use". Currently there is no metallic mining occurring in Sheboygan County. However, sand, gravel, and crushed stone (nonmetallic resources) are nonrenewable resources mined in the region. Map 1.15 in Appendix A shows the potential gravel source areas in Sheboygan County.

Sand, gravel, and crushed stone are needed for sub-base materials for road construction as well as a major component in concrete for foundations, basement walls, sidewalks, etc. As the region undergoes further growth and development, there will be greater demands for sand, gravel, and crushed stone. Even though sand, gravel, and crushed stone are ubiquitous, some deposits are of far better quality than other deposits. Gravel and crushed stone deposits with low chert content are best suited for concrete. Gravel deposits with low percentages of foliated metamorphic rock, gabbro, and basalt fragments are best suited for sub-base material and concrete. Outwash plains, kames, eskers, dunes, point bars, and stream channels are the best sources for better quality sand and gravel.

Sand, gravel, and crushed stone have low "intrinsic value", but high "place value". Intrinsic value refers to cash value of a given unit (weight or volume) of the product, while place value refers to the cost of transporting a given unit of the product. Construction costs increase significantly as the

distance from the source of sand, gravel, and crushed stone increases, to the point that transportation costs may exceed production costs.

PLANNING PROCESS

PUBLIC PARTICIPATION

Public Input-Survey

On March 19, 2004, the Sheboygan County Planning & Resources Department in conjunction with UW-Extension sent out a comprehensive planning survey to 5,000 randomly selected households. Those receiving a survey were given until April 5, 2004 to return their completed survey to UW-Extension. The County paid for return postage. Surveys that were received during that week were accepted; those received after were not.

Purpose

The purpose of the *Sheboygan County Comprehensive Planning Survey* was to gather public input on issues related to the nine elements of the State Comprehensive Planning Law (Ch. 66.1001, Wis. States). All of the information gathered and developed will be used for the completion the County's Comprehensive Plan in accordance with State Statutes, the *Sheboygan County Natural Areas and Critical Resources Plan*, *Sheboygan County Outdoor Recreation and Open Space Plan*, and the *Farmland Preservation Plan*. Data collected through this process will be analyzed and shared with each community in the County.

Method

Five thousand (5,000) surveys were sent to randomly selected households by a consulting firm named, "The Complete Package." Addresses were selected from each zip code within the County proportionate to the population of the County. We are not sure why the Waldo zip code received no surveys. Results from this selection are below:

Municipality	Zip Code	Actual Number Of Surveys Sent	Actual Population In Zip Code*	Actual Percent Of The County Population	Percent Receiving Surveys
Adell	53001	121	1947	1.90	2.42
Cascade	53011	133	1894	1.85	2.66
Cedar Grove	53013	181	3056	2.98	3.62
Elkhart Lake	53020	229	3730	3.64	4.58
Glenbeulah	53023	107	1968	1.92	2.14
Kohler	53044	107	1968	1.92	2.14
Oostburg	53070	227	4637	4.52	4.54
Plymouth	53073	662	14,903	14.54	13.24

Municipality	Zip Code	Actual Number Of Surveys Sent	Actual Population In Zip Code*	Actual Percent Of The County Population	Percent Receiving Surveys
Random Lake	53075	182	4180	4.08	3.64
Sheboygan-Town of Wilson	53081	2107	43,928	42.85	42.14
Sheboygan-Howards Grove-Town of Mosel	53083	419	10,370	10.11	8.38
Sheboygan Falls	53085	568	10,370	10.11	11.36
TOTAL		5000	102525	100	100
Missing:					
Waldo	53093	0	2650	0	2.9

*2000 US Census

University of Wisconsin-Extension staff entered the survey responses into a Microsoft Access Database that was developed by County Planning & Resources staff. The database allowed the users to select an answer from a menu for each question; this option minimized data entry errors and ensured that the format for each question was uniform. Following data entry, the information was exported from the Access database into a Microsoft Excel spreadsheet for tabulation. Two UW-Extension employees completed the initial data entry. To allow the data to be tabulated and analyzed in a meaningful way, the two databases were merged and a new ID# was assigned to each record; this eliminated the likelihood that data duplicates would occur.

Several opportunities were used to generate participation in the survey process. A press release was sent to the local media outlets. This press release resulted in articles in local newspapers including the *Sheboygan Press*, the *Sounder*, the *Plymouth Review*, and *The Beacon*. The item in the Sheboygan Press also included an editorial on the importance of completing the survey. Short radio spots were aired on local radio stations.

Analysis

Respondents

Of the 5,000 surveys that were sent out, 981 surveys were returned resulting in just under a 20% response rate. The standard error of the sample is +/-3%. The majority of the respondents are long-time residents of the County, with those living in the County for more than 20 years making up 65% of the responses (Table 4).

Table 4: Length Of Residency

Table 4: Length Of Residency		
	%	Number
Less than 1 Year	0.4	4
1-5 Years	7.7	76
6-10 Years	7.9	77
11-20 Years	14.6	143
Over 20 Years	65.2	640
No Answer	4.2	41

The response rate from communities for the survey was nearly parallel with the corresponding population rate for a community (Table 5). There are two exceptions, the City of Sheboygan and the Village of Waldo. The City of Sheboygan's population makes up 45.1% of the County's total population. However, the response rate for City of Sheboygan residents was 22.12%. There are a number of factors that could have contributed to the response rate, some of which may include language barriers, owner-occupancy, and/or other socio-economic factors that may have played a role in an individual's likelihood to participate.

Another possibility is that some respondents did not indicate which city, village, or town they lived in; they simply marked one of the three "city", "village", or "town". Some of the people that indicated that they lived in the "city" may be City of Sheboygan residents. However, if all of the respondents choosing "city" (13.05%) were residents of the City of Sheboygan only (not City of Plymouth or City of Sheboygan Falls), the City of Sheboygan response rate would still be lower than its relative population.

The other community that did not have a response was the Village of Waldo. Due to an error by the company that was used to generate the mailing list, no surveys were sent to people living in the Waldo zip code. Surveys were sent to residents based on their community's population. For example, City of Sheboygan Residents received 45.1% of the surveys that were sent out.

Table 5: Place of Residence			
Community	**Responses**	**Percent Of Responses**	**Percent Of County Population (2000 Us Census)**
City of Plymouth	61	6.22%	6.9
City of Sheboygan	217	22.12%	45.1
City of Sheboygan Falls	55	5.61%	6
Adell	9	0.92%	0.5
Cascade	8	0.82%	0.6
Cedar Grove	12	1.22%	1.7
Glenbeulah	4	0.41%	0.3
Elkhart Lake	13	1.33%	0.9
Howards Grove	17	1.73%	2.5
Kohler	14	1.43%	1.7
Oostburg	16	1.63%	2.4
Random Lake	19	1.94%	1.4
Waldo	0	0.00%	0.4
Greenbush	22	2.24%	2.5
Herman	18	1.83%	1.8
Holland	36	3.67%	2.1
Lyndon	12	1.22%	1.3
Lima	26	2.65%	2.6
Mitchell	15	1.53%	1
Mosel	7	0.71%	0.7
Plymouth	39	3.98%	2.8
Rhine	27	2.75%	2
Russell	3	0.31%	0.4
Scott	22	2.24%	1.6
Sheboygan (Town)	41	4.18%	5.2
Sheboygan Falls (Town)	33	3.36%	1.5
Sherman	19	1.94%	1.3
Wilson	39	3.98%	2.9
No Answer	41	4.18%	
City	128	13.05%	

Table 5: Place of Residence			
Community	**Responses**	**Percent Of Responses**	**Percent Of County Population (2000 Us Census)**
Village	7	0.71%	
Town	2	0.20%	
Total	982	100.10%	100.1

To get an idea if any of the respondents were seasonal residents or part-time residents, survey respondents were given the option to write in the name of the Community in which they owned land if they lived outside of the County (Table 6). It appears that some of the respondents completed this section if they lived outside of a village or city (in a town) but lived in a postal area that had the name of an incorporated village or city. For example, if an individual lived in the Town of Rhine, but used an Elkhart Lake address they might have written "Town of Rhine" as a response to this question.

Table 6: Own Land in the County, Live Outside of the County	
Community	**Responses**
Cedar Grove	1
"City"	1
Cleveland	1
Greenbush	1
Herman	1
Holland	3
Mosel	1
Rhine	2
"Village"	1

Though all residents' responses are important, a picture of whether or not the respondents owned their homes or rented their homes was desired (Table 7). Respondents most frequently stated that they owned their homes (88.0%) versus rented their homes (8.2%). Home ownership rates of survey respondents were quite different from that of the general population of the County. According to the last US Census, 67.7% of the County's population owned their home versus 27.1% renting.

Table 7: Own/Rent			
Survey			**Us Census (2000)**
	%	Number	%

Table 7: Own/Rent			
	Survey		Us Census (2000)
Own	88.0	863	67.7
Rent	8.2	80	27.1
No Answer	3.8	38	-
Total	100	981	94.8*

*This number does not account for vacant housing and seasonal housing

Most of the respondents were men (Table 8), aged 35-65 (Table 9). In general, 47% of the population is male and 53% are female. According to the 2000 US Census, 33.4% of the population is between the ages of 35 and 65 in Sheboygan County.

Table 8: Gender		
	%	Number
Male	59.3	582
Female	35.9	352
No Answer	4.8	47
	100	981

Table 9: Age			
	Survey		US Census
	Number	%	%
Under 18	0	0	29.2
18-24	12	1.2	6.3
25-34	86	8.8	16.6
35-44	154	15.7	14.9
45-54	246	25.1	9.9
55-64	195	19.8	8.6
65-74	143	14.6	7.9
75 and Older	107	10.9	6.7
No Answer	38	3.9	-
Total	981	100	100.1

Household sizes are shrinking as more people are choosing to have fewer children and "baby boomers" grow older. As families get older, the children leave the house and develop their own families and households. The survey respondents' household size was most likely 2 people (Table 10). The highest percentage of people had no children (people in household under 18 years old- Table 11), representing 77% of respondents.

Table 10: People In Household		
	Number	%
9	1	0.1
7	4	0.4
6	14	1.4
5	55	5.6
4	110	11.2
3	116	11.8
2	425	43.3
1	181	18.5
0	7	0.7

Table 10: People In Household		
No Answer	68	6.9
Total	981	100

Table 11: People In Household Under 18 Years Old		
	%	Number
7	0.1	1
5	0.3	3
4	0.9	9
3	4.1	40

Table 11: People In Household Under 18 Years Old		
2	9.3	91
1	8.3	81
0	35.1	345

Table 11: People In Household Under 18 Years Old		
NA	41.9	411
Total	100	981

Respondents were mostly employed or retired (Table 12). Those that were working were most likely to be employed in the "services" field (Table 13). Many of the survey respondents choose not to answer this question.

Table 12: Employment Status		
	%	Number
Employed	54.3	533
Unemployed	2.3	23
Self-Employed	8.0	78
	0.1	1
Retired	27.8	273
Do Not Work	2.7	26
No Answer	4.8	47
	100	981

Table 13: Field of employment		
	%	Number
	4.1	40
Wholesale Trade	6.8	67
Government	5.5	54
Retail Trade	6.1	60
Services	36.6	359
Construction/Mining	5.6	55
No Answer	35.3	346
Total	100	981

Education attainment of survey respondents was not very consistent with data from the 2000 US population census for the county (Table 14). High School education attainment by survey respondents was about equal to that reported on the 2000 US Census for Sheboygan County residents. However, the rate of college, graduate, and technical college education attainment among the survey respondents was significantly higher than education attainment for Sheboygan County residents reported on the last US Census.

Table 14: Education Attainment			
	Survey		US Census (2000)
	Number	%	%
8th Grade	1	0.1	5.8
Some High School	35	3.6	9.8
High School	352	35.8	39.9
Junior College	23	2.3	19.7
College	247	25.2	12.8

Post Graduate	130	13.3	5.1
Technical College	133	13.6	6.9
No Answer	60	6.1	-
Total	981	100	100

The salary of survey respondents was slightly lower than the county population as reported in the 2000 US Census in the $15,000 to $49,999 category (38.7% for survey respondents and 44.8% for county residents) (Table 15). The response rate for individuals earning under $15,000 per year was significantly lower for survey respondents (4.3%) than the actual population earning this income in the County according to the 2000 US Census (10.1%).

Table 15: Annual Gross Income			
	Survey		US census (2000)
	Number	%	%
Under $15,000	42	4.3	10.1
$15,000-$49,999	379	38.7	44.8
$50,000-$99,999	343	34.9	37.4
$100,000 or More	92	9.4	7.7
No Answer	125	12.7	-
Total	981	100	100

Overall, survey respondents were more likely to be older men with a higher level of education earning a little bit more than the average person in Sheboygan County. The average survey respondent has lived in the County for more than twenty years, owns his/her own home, with four or less people, most likely with him or herself and one other person and is currently employed or retired.

The survey did not capture the opinion of newer residents, residents that are more likely to be living in poverty, renters, and those with a lower level of education. Additional efforts should be made in the planning process to involve individuals most likely to fit into this demographic group in the input process.

County Trends and Land Use

Growth in Sheboygan County over the ten years between the last US Census has been at a rate of approximately 10%, growing from a population of 103,877 in 1990 to 112,646 in 2000. County growth projections for the next 10 years (2000-2010) are projected to be about 11%. Survey respondents said they would prefer growth to be at the same rate or slower than projected, with 738 or 75.2% of respondents choosing this response.

In the past, Sheboygan County has relied heavily on manufacturing and industry to sustain its economy, with nearly 40% of residents employed in the manufacturing sector. With recent declines in manufacturing jobs (nearly 10% in the past 3 years in the community), respondents were asked what their vision for the County's economy is for the next 20 years. Thirty-five percent of respondents said that they would like to see the community continue as a manufacturing center, twenty-three percent said they would like to see the community become stronger in the business/service sector, and eighteen percent said they would like to see the community become a tourism destination (Table 16).

Table 16: What rate would you like to see growth occur? (Question 1)	
Growth Rate	Percent Of Responses
Faster than projected	8.3
Present projected rate of growth	43.5

Table 16: What rate would you like to see growth occur? (Question 1)	
Slower than projected	31.7
No Growth	5.7
Don't Know	6.0
No Answer	4.8

Based on these results, economic development efforts should be focused on promoting and protecting the manufacturing base of the community and education efforts should focus on providing workers with the skills they need for higher-paying jobs that do not specifically require a four-year or two-year degree.

Agriculture was also identified as an important sector of the economy, with 12.7% of respondents indicating that they would prefer the community to rely on agriculture to support its economy (Table 17). The response rate is similar to the rate of employment in agriculture in Sheboygan County, which is 20%. Agriculture accounts for 20% of the County's economy.

Table 17: What identity would you like Sheboygan County to have in 20 years? (Question 2)	
Economic Base	**Percent Of Responses**
Tourism	18.4
Manufacturing	34.5
Retail	7.2
Business/Service	23.1
Agriculture	12.7

Respondents were asked about their opinions regarding types of growth in the County for a twenty-year planning period. Single-family residential development, family farms, small businesses, and light industry accounted for the responses getting the most favorable ratings (Table 18). Selections receiving the least support (lowest percentage with a "strongly agree" answer) were multi-family residential and large corporate farms.

Table 18: The following types of growth should be encouraged within Sheboygan county: (Question 3)			
Type	**Strongly Agree/Agree**	**Neutral**	**Disagree/ Strongly Disagree**
Single family residential	43.7%	13.5%	4.3%
Multi-family residential	27.5%	33.0%	27.3%
Rural residential	41.7%	25.2%	20.3%
Hobby farms	37.0%	35.2%	14.0%
Family farms	67.6%	18.1%	4.4%
Large corporate farms	14.7%	21.4%	50.2%
Small businesses	79.1%	9.0%	2.5%

Table 18: The following types of growth should be encouraged within Sheboygan county: (Question 3)			
Type	**Strongly Agree/Agree**	**Neutral**	**Disagree/ Strongly Disagree**
Large retail	33.2%	26.4%	28.8%
Light industry	76.6%	11.8%	3.9%
Heavy industry	54.3%	21.5%	15.3%

The City of Sheboygan, City of Sheboygan Falls, Village of Kohler, Town of Wilson and Town of Sheboygan are required to comply with Phase I of the Clean Water Act Amendments of 1987. Sheboygan County, Town of Mosel, Town of Sheboygan Falls, Town of Lima, and Village of Howards Grove are required to comply with Phase II of these amendments. The amendments regulate stormwater discharge to waterways and set specific requirements for reduction of pollutants in these discharges. To gauge resident's understanding of stormwater issues and the related infrastructure requirements, the survey included specific questions about stormwater issues.

Twenty percent of respondents stated that they "agree" that stormwater is a problem in their community, where twenty-five percent of respondents disagree (Table 19). Nearly an equal number of respondents remained neutral on the issue.

Table 19: Stormwater runoff is a problem in my community. (Question 12)			
	Agree Or Strongly Agree	**Neutral**	**Disagree Or Strongly Disagree**
Runoff Is a Problem	30%	22.6%	34.5%

To address stormwater quantity issues, respondents were most likely to favor detention/retention basins and conservation design measures (Table 20). Ditching or channelization was also frequently chosen as an option for stormwater quantity mitigation. However, this method of stormwater management is no longer a widely accepted best management practice as it has been found to increase downstream flooding and stream "flashiness". Impact fees were not highly favored to help pay for stormwater mitigation.

Table 20: Stormwater runoff problems (quantity) should be addressed with: (Question 13)			
Stormwater Management Practice (Quantity)	**Agree Or Strongly Agree**	**Neutral**	**Disagree Or Strongly Disagree**
Impact Fees	15.1%	23.0%	38.8%
Detention/Retention Basins (dry)	40.7%	26.7%	11.7%
Conservation Design	56.8%	17.8%	7.4%
Ditching/Channelization	43.3%	23.4%	12.5%

In regard to stormwater quality issues, twenty seven percent of respondents stated that they "agree" that wet-detention ponds with standing water were a solution (Table 21). New State of Wisconsin stormwater rules will require wet-detention ponds for water quality improvement in many new developments, but are frequently controversial due to the issue of standing water as a health and safety concern. However, wet detention basins are frequently designed to eliminate issues related to mosquito spawning through increased depth and safety issues can be mitigated with design measures such as a safety shelf or fencing.

Conservation design measures that promote infiltration of stormwater where possible was the most highly favored. Polymer, or chemical treatment, which is an emerging technology for improving stormwater quality, was not highly favored. Again, ditching and channelization was chosen as an option for stormwater quality improvement.

Table 21: Stormwater runoff problems (quality/nonpoint pollution) should be addressed with: (Question 14)			
Stormwater Management practice (quality)	**Agree Or Strongly Agree**	**Neutral**	**Disagree Or Strongly Disagree**
Impact Fees	18.5%	21.9%	32.2%
Detention/Retention Basins (wet)	33.3%	24.9%	17.0%
Conservation Design	57.0%	16.0%	5.9%
Polymer (chemical) Treatment	11.8%	25.3%	35.4%
Ditching/Channelization	40.2%	25.4%	11.7%

Though it appears that respondents have a solid, basic understanding of stormwater issues, responses indicate that government will need to be more proactive in providing education on issues related to stormwater quantity and quality; Clean Water Act Amendments require public outreach and education as part of the permitting process.

As the nation and the state's energy needs continue to increase and traditional methods of generating energy continue to change, new methods of electricity generation will continue to be explored. Sheboygan County has been identified as an area that would be highly conducive to wind turbines for electricity generation. Respondents were asked to identify where wind turbines would be most appropriate if they were to be located in Sheboygan County (Table 22). Three areas received the most responses, nearly in an equal manner, off of the shore of Lake Michigan (which has been identified as a possibility), rural Sheboygan County, and in industrial parks.

Table 22: If wind turbines were located in Sheboygan county they should be located (check one that you agree with): (Question 15)	
Wind turbine location	**Responses**
Lake Michigan	25.7%
Kettle Moraine	8.9%
Rural County	27.3%
No Where	27.6%
No Answer	3.8%

In regard to the distance that people would prefer wind turbines to be located from residences, respondents stated that ¼ to ½ mile, ½ to 1 mile or 1 mile or more would be the most appropriate (Table 23). A distance of more than 5 miles was also chosen as an option 17% of the time. Approximately 6 percent of respondents said that wind turbines should not be located in Sheboygan County. Given the development pattern of Sheboygan County, there are very few places where a residence would be greater than 1 mile from a wind turbine, except off the shore of Lake Michigan.

Table 23: If a wind turbine project would be located in Sheboygan County, how far from a residence should the nearest turbine be? (Question 16)	
Distance of wind turbine from a residence	**Responses**
¼ to ½ mile	22.7%
½ to 1 mile	23.8%
1 mile or more	25.1%
5 miles or more	17.6%
Anywhere is too close	5.7%
No Answer	5.1%

The survey asked respondents specific questions about preserving farmland in Sheboygan County. The respondents overwhelming stated that they would like to see productive farmland preserved. Only 16.8% of respondents stated that they "disagree" that farmland should be preserved at all costs. Nearly 72% of respondents stated that they "strongly agreed" or "agreed" with protecting productive farmland, but allowing growth in areas not suitable for agricultural use. The difficult issue related to this question is how to identify areas that are not suitable for agricultural use.

Respondents agreed to some level to the "purchase of development rights" or PDR as a method of preserving farmland (Table 24). This approach to farmland preservation pays farmers the difference between the agricultural value and the market value of their land in return for the sale of their right to develop their land for purposes other than agriculture. These programs are frequently funded through taxes or private efforts such as land conservancy groups.

Table 24: Local government should address the issue of development in productive agricultural regions by: (rate each) (Question 18)			
Preserve farmland	**Agree or strongly agree**	**Neutral**	**Disagree or strongly disagree**
At All Costs	49.8%	21.5%	21.0%
Protect Productive, Allow Development in Non-Ag. Areas	71.6%	11.6%	9.6%
Purchase of Development Rights	31.0%	29.5%	26.1%
No Protection	12.2%	14.8%	62.5%

Sixty percent of respondents supported protecting the agricultural economy of the County by directing growth into areas near existing developed areas (Table 25).

Table 25: The agricultural economy of Sheboygan County should be protected by having growth directed into and around existing developed areas. (Question 19)			
	Agree Or Strongly Agree	**Neutral**	**Disagree Or Strongly Disagree**

Growth in existing areas	60.3%	19.3%	8.0%

Respondents were asked to rate their level of agreement to the idea that government should identify and protect natural resources (Table 26). Respondents overwhelmingly supported the idea of government protecting woodlands, wetlands and floodplains, open spaces, lakes, rivers, and streams, endangered species, parkland, and historic and cultural sites.

Table 26: My city/village/township should make an effort to identify and protect the following: (Question 20)

Resource	Agree Or Strongly Agree	Neutral	Disagree Or Strongly Disagree
Woodlands	77.4%	11.1%	3.7%
Wetlands & Floodplains	72.5%	13.4%	7.1%
Open Space	58.5%	25.1%	8.0%
Lakes, Rivers, Streams	86.3%	5.4%	2.0%
Endangered Species Habitat	62.9%	20.2%	8.9%
Parkland	76.9%	12.4%	3.8%
Historic and Cultural Sites	73.7%	15.9%	3.8%

Respondents were asked to rate their level of agreement to sources that could represent a threat to groundwater contamination (Table 27). Generally, respondents seem to have a clear understanding of sources of groundwater pollution.

Table 27: The following represent a threat to the quality of Sheboygan County's groundwater: (rate each one) (Question 21)

Pollution Source	Agree Or Strongly Agree	Neutral	Disagree Or Strongly Disagree
Residential Runoff	51.4%	23.3%	13.7%
Construction Runoff	51.4%	23.3%	13.7%
Agriculture Pesticides & Fertilizers	49.5%	26.5%	13.3%
Manure and Liquid Waste Land Application	69.8%	14.9%	4.9%
Commercial/Industrial Stormwater	65.3%	15.2%	7.9%
Failing Septic Systems	61.0%	18.1%	7.3%
Sewage Holding Tanks Land Spreading	48.8%	24.1%	11.0%
Improperly Abandoned Wells	43.5%	28.7%	11.4%
Industrial Waste Land Spreading	66.4%	14.9%	5.8%
Municipal Waste and Sludge Land Spreading	58.7%	20.0%	8.2%

Slightly lower responses to sources such as residential runoff, construction site runoff, agricultural and pesticide runoff, and land spreading indicate a need for further education on this issue. However, the overall responses indicate that people have a good, general understanding of potential sources of groundwater contamination.

Respondents seemed to feel strongly that government should be proactive in protecting groundwater and drinking water quality and quantity (Table 28).

Table 28: Local government should be involved with the protection of groundwater quality and drinking water supplies in the following ways: (Question 22)

Government Involvement With Groundwater Protection	Agree Or Strongly Agree	Neutral	Disagree Or Strongly Disagree
Land Use Regulation	76.9%	10.1%	5.8%
Provide Information Only	21.8%	22.7%	40.9%
No Involvement	6.5%	15.4%	62.4%

Recent beach closings along Lake Michigan and the dumping of untreated sewage by the Milwaukee Metropolitan Sewerage District have brought the quality of Lake Michigan water to the forefront. The survey asked respondents to rate their level of agreement to sources of pollution to Lake Michigan (Table 29). Overall, respondents had a good understanding of threats to the quality of Lake Michigan and its coastal resources Storm Sewer Discharge, 61.3%

Table 29: The following represent a threat to the quality of Lake Michigan and the coastal features adjacent to the lake: (Question 23)

Threat To Lake Michigan	Agree Or Strongly Agree	Neutral	Disagree Or Strongly Disagree
Storm Sewer Discharge	61.3%	10.1%	5.8%
Residential Runoff	52.7%	21.9%	12.4%
Coastal Bluff Erosion	50.1%	21.5%	13.5%
Coastal Dune Alteration	48.1%	24.8%	10.4%
Development in the "Coastal Corridor"	40.0%	37.2%	29.1%
Development in the Sheboygan River Basin	23.7%	37.2%	29.1%
Invasive/Exotic Species	59.7%	17.5%	5.4%

Respondents also had a good understanding of threats to the quality of surface waters in the County (Table 30).

Table 30: I have concerns about the following as they affect surface water quality in the County and Lake Michigan: (Question 24)

Pollutant Source	Agree Or Strongly Agree	Neutral	Disagree Or Strongly Disagree
Draining/Filling Wetlands	62.1%	24.8%	10.4%
Construction Erosion	45.4%	26.5%	13.7%
Failing Septic Systems	64.8%	14.9%	5.6%
Increased Runoff/Flash Flooding	51.1%	26.2%	7.8%
Road Salts	57.2%	20.6%	8.4%
Automobile Runoff	52.9%	23.1%	9.4%
Pet Wastes	29.6%	32.6%	23.9%
Dumping Down Storm Sewers	70.1%	12.5%	4.2%
Farming too Close to Streams	54.6%	21.1%	9.9%
Land Application of Septic/Sewage Sludge	50.5%	22.9%	9.5%
Manure Runoff	51.7%	21.6%	12.8%
Over Application of Fertilizer/Manure	62.2%	16.5%	7.6%

Respondents were most likely to state that land along river and stream corridors should remain in its natural state; recreational uses received the next highest frequency of response (Table 31). Residential, commercial, and agricultural uses were not entirely opposed to, but did not receive the same level of agreement as leaving it natural and recreational uses did.

Table 31: The best use of land along the river and stream corridors within rural areas of the county should be: (Question 25)

Best Use Of Land Along River Corridors	Agree Or Strongly Agree	Neutral	Disagree Or Strongly Disagree
Residential	23.0%	21.6%	14.6%
Agriculture	23.2%	27.7%	35.2%
Recreation	63.3%	14.8%	9.5%
Commercial	6.1%	15.2%	64.6%
Leave it in its Natural State	71.3%	14.0%	5.4%

ISSUES IDENTIFICATION

Bay-Lake Regional Planning Commission Nominal Group Session

On Wednesday, April 30, 2003 54 citizens of Sheboygan County were involved in a Nominal Group Process in order to produce a list of issues and concerns regarding future development in the Sheboygan

County and the Bay-Lake Region. The following is an explanation of the process and the final list of issues and concerns as they were ranked and voted on by the group.

The list is important to the planning process as it will be used in formulating goals and objectives for the Regional Comprehensive Plan and will provide input into the development of Sheboygan County's Development Plan. In addition, the issues identified will be used as a checklist to ensure that they are addressed within the plan, and discussed by the Planning Committee during the planning and research phase.

The participants were divided into six groups and asked to write down as many ideas as possible regarding existing and future development within the Bay-Lake Region and Sheboygan County. The ideas of each member of the group were recorded on a flip chart in a round-robin discussion. Group members were then asked to identify their Top Five Issues from all the issues written down for their group. The scores were then totaled to identify the five major issues facing the Sheboygan County and the Bay-Lake Region, as well as several other issues that need to be addressed in the plan. Each groups top five were then *combined and voted on by the entire group* to identify the five major issues or concerns facing Sheboygan County and the Bay-Lake Region.

Results are as follows in Table 32:

Table 32: Bay-Lake Regional Planning Commission Nominal Group, April 30, 2004, Combined Results

Rank	Score	Issue/Concern Regarding Future Development in Sheboygan County and the Bay-Lake Region	Issue Type
1	18	Planned development - residential, commercial, industrial	Economic Development
2	15	Preserve prime agricultural lands/limit residential development in agricultural lands	Agriculture
3	14	Prevent urban sprawl-encourage cluster development	Land Use
3	14	Protect clean water and air and limit light and noise pollution	Natural Resources
4	10	Have government units work together	Intergov't Cooperation
5	9	Protect resources (air, water, soil)	Natural Resources
5	9	Conserve wildlife and environment corridors	Natural Resources
6	8	Local land use control	Government
7	7	Preserve rural character	Agriculture
7	7	Combine community services (police, fire, garbage, etc.)	Intergov't Cooperation
7	7	Stormwater/sewer management plan that affects towns and villages together	Government
7	7	Preserve the quality of life issues	Land Use
8	6	Better development and upgrading of highways	Transportation
8	6	Keep industries in compact industrial parks	Economic Development
8	6	Downsize the 35 acre minimum lot size in ag. land	Agriculture
9	5	Residential development in rural areas	Land Use
9	5	Preservation of lakes and wetlands	Natural Resources

Rank	Score	Issue/Concern Regarding Future Development in Sheboygan County and the Bay-Lake Region	Issue Type
9	5	Towns should have more input/clout in annexation decisions	Government
9	5	Designate areas for industrial and commercial development	Economic Development
10	4	High tech job development	Economic Development
10	4	Lake Michigan and other unique features need public access	Natural Resources
10	4	Rural development should be around existing villages	Land Use
10	4	Continue to maintain open space we have	Natural Resources
10	4	Issues after implementation of plan-ability to alter it	Land Use
10	4	How much prime farmland to preserve?	Agriculture
11	3	Bring in more industry	Economic Development
11	3	Preserve farm industry	Agriculture
11	3	Protect water of Lake Michigan	Natural Resources
11	3	Impacts of farm consolidations (res./ag. Conflicts, roads, etc.)	Agriculture
11	3	Effects of consolidation of local govt. (city and town)	Intergov't Cooperation
12	2	Encourage tourism and recreational areas	Economic Development
13	1	Minimize land use conflicts	Land Use

Sheboygan County Smart Growth-Stewardship Technical and Advisory Committees

On July 10, 2003, members of the Sheboygan County Smart Growth-Stewardship Technical and Advisory Committees participated in a joint meeting/input session to identify issues related to each of the elements of Smart Growth as outlined in Ch. 66.1001, Wis. Stats.

The Smart Growth-Stewardship Technical Committee and the Smart Growth-Stewardship Advisory Committee has been meeting, most often jointly, since September 19, 2002. The Committee was formed to assist Sheboygan County with the development of the administration and distribution of County Stewardship Grants and the development of the *Sheboygan County Comprehensive Plan*. The Committees have been asked to assist with other planning efforts on an ongoing basis.

Membership on the Advisory Committee consists of elected officials from local communities. The Sheboygan County Board of Supervisors' Resources Committee for each of the following selected one representative:

- Urban Town
- Rural Town
- Urban Village
- Rural Village
- One Each from Each of the Three Cities

Membership on the Technical Committee consists of individuals to represent each of the 9 elements of Comprehensive Planning. On July 10, 2003 the group participated in a "round robin" input session where each member was given the opportunity to speak. The "round robin" continued until the group had exhausted their list. The issues were not ranked for their importance.

Results from this process follow:

- Cultural resources – community events/organizations – add to the quality of life.
- Deer management/urban wildlife
- Development of upland forest areas – need for preservation.
- Groundwater pollution
- Habitat fragmentation
- Impacts of ATV use – erosion, environmental impacts, noise, etc.
- Need for housing sites that are sensitive to the environment/wildlife habitat
- Need to inventory and work to preserve local historical landmarks.

Information obtained from this process was used to develop goals, objectives, and policy strategies.

Agriculture Planning Committee

On November 19, 2003, members of the Sheboygan County Agriculture Planning Committee participated in an input session to identify issues related to the agricultural resources of Sheboygan County.

The Agriculture Planning Committee has been meeting since June 2003. The Committee was formed to assist Sheboygan County with the development of the *Natural Areas and Critical Resources Plan,* the County's Comprehensive Plan, and the *Farmland Preservation Plan* update.

Membership on the Committee includes appointees from each Town in the County except the Town of Sheboygan; the Town of Sheboygan does not have any farmers participating in the Farmland Preservation Program and is nearly entirely urbanized. The Town of Mitchell does not participate in the Farmland Preservation Program, however much of the Town is largely agricultural and therefore has an appointee. The Village of Glenbeulah has at least one individual participating in the Farmland Preservation Program and therefore has an appointee. No other villages participate in the program. A representative from the Farm Bureau as well as a representative from the Glacial Lakes Conservancy sit on the Committee. The Committee has 17 members.

On November 19, 2003, the group was asked to specifically address 3 issues:

- Characteristics of Viable Farmland
- Challenges to the Ability to Farm
- Future Challenges to Farm Success- 5 to 10 Years

The group participated in a "round robin" input session where each member was given the opportunity to speak at least once. The "round robin" continued until the group had exhausted their list. When a list of issues was complete for each of the three topics, the group was asked to cast their vote for the top three on each list. The issues were ranked by the number of votes. Fourteen members of the Committee attended this meeting. The results from this process follow in Tables 33, 34 and 35.

Table 33: Sheboygan County Agricultural Planning Committee Issues Identification Session, November 19, 2003, Results- Characteristics of Viable Farmland

Number of Votes					*Total Votes*	*Characteristics of Viable Farmland*
1	**2**	**3**	**4**	**5**		
5	1	2		1	9	Able to grow produce at a value above the cost of production
3	1	2	1	2	9	Soils dictate the level of production – class I and II are best – most important to preserve
1	5		1	1	8	Well drained (natural or tiled)
2	1	1	1	2	7	Management practices can guide productivity of farmland
1	1	1	2		5	Definition of viable farmland is subject to the type and intensity of farming practices
		1	3		4	Located in an area that does not have conflicts with the intensity of the agricultural practice
	1	1		1	3	Profitable farms drive the demand for agricultural land
	1	1		1	3	Well drained, less than 3% slope, with 10" of topsoil
	1	2			3	Able to support the operator
		1	2		3	Capable of producing grass for grazing or rotational crops
			1	2	3	Able to be tilled – worked with machinery
				1	1	50 % of gross income generated from the farm to be considered viable
			1		1	Land supply is limited in areas with expanding agricultural businesses
					0	Soils that are stony or gravely are farmable
					0	Small parcels near urbanizing areas are more difficult to farm
					0	Field size of 3 to 6 acres are more difficult to farm row crops
					0	Precipitation of the region

Table 34: Sheboygan County Agricultural Planning Committee Issues Identification Session, November 19, 2003, Results- Challenges to the Ability to Farm

Number of Votes					*Total Votes*	*Challenges to the Ability to Farm*
1	**2**	**3**	**4**	**5**		
	3	5	2	1	11	Government regulation – complication of farming activities
4	1		1	4	10	Natural conflicts – streams, waterways, etc. – additional regulation from DNR
1	3	2		3	9	Adjusting farm practices to accommodate neighboring uses (dust, noise, manure)

Number of Votes 1	2	3	4	5	*Total Votes*	*Challenges to the Ability to Farm*
3	2		2		7	Can't set market price for products grown
2		3	1	1	7	Increasing traffic – auto/truck traffic vs. farm equipment
2	1		2	1	6	Importance of "good neighbor" policies in farm operations – more development in an area doesn't have to add conflicts
	2		1	1	4	Conflicts within the agricultural community between industrial and smaller farms
			2		2	Limited time of day to use County Roads and Highways for farm equipment (More commuters from the rural area; Increased gravel truck use; Poor accesses and driveways)
			1		1	Conflicts with neighbors
				1	1	Roads and bridges are too narrow to accommodate large equipment
		1			1	Farm fields located on major highways need to be worked late at night to avoid traffic
		1			1	Conflicts with tourists drawn to other rural activities (golf courses)
					0	Hunting activities
					0	Need for wider medians on 4-lane highways to accommodate crossing with long implements

Table 35: Sheboygan County Agricultural Planning Committee Issues Identification Session, November 19, 2003, Results- Future Challenges to Farm Success – 5 to 10 years

Number of Votes					*Total Votes*	*Future Challenges to Farm Success – 5 to 10 years*
1	**2**	**3**	**4**	**5**	*****	
1	2	2	3	1	10	Manure storage – regulations – cost of hauling – use to generate power (methane digestion)
3	2	2	1		9	Higher land prices will limit future expansions
1	3	1	2	2	9	More regulation
3	1	2	1		7	Economics driving land value for other uses
1	3	1		1	6	Urbanization – competition with fellow farmers to survive
1		2	2		6	Social demand for preserving open space and farmland vs. farmer's individual interests
1		1			2	Land is more valuable to rent to other farms than to grow crops on
				1	2	New technology – greenhouse farming
				1	1	Sites for wind generation of power
				1	1	Larger farms wanting to expand into developing areas
				1	1	Possibility of more grazing operations – benefit of low-cost inputs
				1	1	Expanding markets – organic farming
					0	Large farms that already exist in developing areas will be able to relocate with the sale of assets if development pressure grows
					0	Asset being located near markets

** Includes votes fromone member that were not ranked.*

Information obtained from this process was used to develop goals, objectives, and policy strategies for agricultural resources in Sheboygan County.

Sheboygan River Basin Partnership

On Monday, February 23, 2004, members of the Sheboygan River Basin Partnership participated in an issues identification session to identify issues related to the natural resources of Sheboygan County. Members of the group that participated in the process include representatives from:

- Sierra Club
- Glacial Lakes Conservancy
- Sheboygan County Audubon Society
- Elkhart Lake Improvement District
- Ice Age Trail Foundation
- Interested Citizens

Ten people with natural resources interests participated in this process. Bay-Lake Regional Planning Commission staff and Planning & Resources Department staff broke the group into two smaller groups. The Basin Educator from the University of Wisconsin-Extension also assisted with the process. Each group had five people. Each participant was asked to take 3-5 minutes to write down issues related to natural resources that they see throughout Sheboygan County.

After the participants finished writing they submitted the results to the facilitator who read the issues to the group and wrote them onto a large flip chart. After all of the issues were read, the facilitator asked for further clarification on issues if they were not clear. The group then went through the list and combined issues that were similar. Once the final list was compiled, the group was asked to choose the 3 issues that they viewed to be the most important to Sheboygan County through the next 20 years. Results from this process follow in Table 36 and 37.

Table 36: Sheboygan River Basin Partnership Issues Identification Session, February 23, 2004, Results, Group 1

GROUP #1		*PROGRAM PRIORITIZATION*	
Total Votes:	**20**		
# of Votes Received		**Item Description**	**Position on list**
TOP FIVE CHOICES	3	Protect/Expand Public Recreational Areas (passive/active)	#14
	3	Encourage Development Around Cities	#27
	2	Preserve Wetlands	#05
	2	Encourage Protection Of Wildlife & Environmental Corridors	#21
	2	Protect Historic Natural Areas	#22
	2	Protect Viewsheds	#25
	1	Control Invasive Species	#03
	1	Preserve Existing Farms	#18
	1	Preserve Open Space	#20
	1	Preserve Woodlots & Woodlands	#26
	1	Protect Kettle Moraine From Development	#28
	1	Rare, Threatened Or Endangered Species & Habitat Should Be Identified & Protected	#29
		~~Loss Of Wooded Areas~~ (see #26)	#01
		~~Publicly Owned Wooded Areas Should Be Preserved For Recreation~~ (see #26 & #14)	#02
		Preserve Habitat -- Small Game/Birds	#04
		Inland Shorelands	#06
		Stream Setbacks	#07
		Prevent Large Cattle Operations	#08
		~~Preserve Corridors For Wildlife~~ (see #21)	#09
		Residential Planning	#10
		Protect Surface Water Sources	#11
		Protect Groundwater, Including Recharge Areas	#12

		~~Protect Groundwater Recharge Areas~~ (see #12)	#13
		Maintain Transportation Routes To Maintain Manufacturing Jobs	#15
		Protect Great Lakes Water	#16
		Participate In International Treaties	#17
		No Development On Sloping Land	#19
		Encourage Farm Marketing	#23
		Encourage PDR Programs	#24

Table 37: Sheboygan River Basin Partnership Issues Identification Session, February 23, 2004, Results, Group 2

GROUP #2		*PROGRAM PRIORITIZATION*	
Total Votes:	**25**		
# of Votes Received		**Item Description**	**Position on list**
TOP SIX CHOICES	3	(Ground Surface) Source Water Protection (Quantity & Quality)	#01
	3	Preservation Of Natural Areas, Habitats, Stream Buffers	#12
	2	Need More Bio-Reserves Connected With Corridors	#06
	2	"Nature First!"	#16
	2	Restoration Of Wetlands & Highly Disturbed Areas Back To Historical Status	#22
	2	Get All Government Authorities To Work Together To Preserve Environmentally Sensitive Areas	#24
	2	"Seattle-Style" Development -- Urban Growth Boundaries	#26
	1	Fragmentation & Degradation of Forests & Natural Habitat	#02
	1	Preserve Viewsheds	#04
	1	Identification & Preservation Of Archeological & Historical Sites	#08
	1	Invasive Species Control Programs	#13
	1	Improve Grade School/High School Education For Natural Resources Programs	#18
	1	Coastal Buffers	#20
	1	Need More County Ownership	#30
	1	"How Many People Are Too Many In Sheboygan County?"	#34
	1	Need Massive PDR For Farmlands	#36
		Water Quality (Rivers & Watersheds)	#03
		Preserve & Maintain Natural Shorelines To Stop Erosion	#05
		Rapid Development Of Historically Agricultural Lands	#07
		Inconsistent Zoning Practices Because Of "Grassroots Gov't" Leading To Development Of Env. Sensitive Areas	#09
		Better Identification Of Unique Landscape Resources (karst, fens, etc.)	#10
		Remove Unwanted Structures That Fragment Habitat	#11
		State Funds Need To Be Designated Towards Natural Resource Preservation/Monitoring	#14
		Pharmaceutical/Chemical Water Pollution (measuring impacts)	#15
		Mandatory Community Park Space	#17

GROUP #2		*PROGRAM PRIORITIZATION*	
Total Votes:	**25**		
# of Votes Received		**Item Description**	**Position on list**
		Public Education To Develop Understanding On Natural Resources & Protection Of Natural Resources	#19
		Take Marginal Farmlands (e.g., cons. reserves) & Put Them Under Public Ownership Or PDR (willing sellers)	#21
		Additional Mulit-Use Trails In County With Focus On Natural Resources	#23
		A Better Understanding Of High Capacity Wells	#25
		Point/Nonpoint Pollution Prevention	#27
		Answer First To Natural & Scenic Beauty/Assets Before Dev. $$ -- Don't Let Dev. $$ Direct Decisions	#28
		Identification Of Airsheds	#29
		Tighten City Boundaries -- Make Cities More Desirable	#31
		Remove Billboards	#32
		Designate State/County $$ For Groundwater Management	#33
		Lake Michigan Coastal Protection	#35
		Need Public Ownership Of Upper Milwaukee River Basin	#37

Cultural Resources Committee

On September 2, 2004 members of the Sheboygan County Cultural Resources Planning Committee participated in an input session to identify issues related to the cultural resources of Sheboygan County.

The Cultural Resources Planning Committee has been meeting since July 2004. The Committee was formed to assist Sheboygan County with the development of the *Natural Areas and Critical Resources Plan*, the County's Comprehensive Plan, and the *Farmland Preservation Plan* update.

Membership on the Committee includes appointees from a variety of communities across the County and include Chip Beckford, Town of Mitchell Board Chairman; Ione Heinen, Village of Oostburg resident; Glen Laubenstein, Village of Random Lake resident; Jennifer Lehrke, LJM Architects; Jeannae Moersch, Village of Elkhart Lake resident; Marge Pearce, Town of Wilson resident; Betty Potter, City of Sheboygan Falls resident; Jim Thiel, Village of Random Lake resident; and Bill Wangemann, City of Sheboygan resident. All of the Committee members were chosen for their previous contributions to historic preservation-related activities in the county and/or a current interest in issues related to historic preservation. The Committee has nine members.

The group participated in an input session where each member was given the opportunity to speak at least once until the group had exhausted their list. Six members of the Committee attended this meeting. Results from this process are below and include both issues *and* opportunities for cultural resources in Sheboygan County:

Opportunities

- Many "historical-minded" people in the County; a lot of interest by individuals throughout the County.
  - Organized Groups
  - Data Rich
- The Sheboygan County Historical Research Center in Sheboygan Falls.
- Should be some kind of language in the State Statutes regarding Historic Preservation.

Issues

- Documentation of existing resources (e.g.- pictures) is lacking.
- Education of private property owners so they do not feel threatened if their property is deemed to have historical value.
- No central source/clearinghouse for historical information of all types; each agency/group has their own information.
- Need more public awareness and outreach.

POLICY & PROGRAM RECOMMENDATIONS

Natural Resources

Goal 1: **Promote sound land use in the Milwaukee and Sheboygan River Basins.**

Objective 1.1 **: Conserve the character of rural areas in the basin including natural areas, prime agricultural lands, and environmental corridors.**

Existing Programs & Policies

- Sheboygan County Stewardship Program
- Farmland Preservation Program

Recommendations for Future Programs & Policies

- Identify and classify Environmental Corridors by their ecological value.
- Inventory natural areas in the County.
- Develop a viable conservation subdivision or low-impact development ordinance and identify areas most conducive to this type of development.
- Facilitate community vision sessions to develop important aspects of a community's character.
- Explore the development of a Stewardship Lot Program in Sheboygan County.

Objective 1.2: **Protect investments in public lands by encouraging compatible land uses adjacent to public lands.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with local communities to identify land uses compatible with public land and incorporate this information into the Comprehensive Plan.

Objective 1.3: **Encourage re-development of brownfields, abandoned and derelict properties in urban areas.**

Existing Programs & Policies

- State of Wisconsin Brownfields-Redevelopment Program

Recommendations for Future Programs & Policies

- Work to build community identity by revitalizing main streets.
- Develop an informational forum to educate local leaders on the various programs associated with brownfield redevelopment.

Objective 1.4: **Support and encourage Comprehensive Land Use Planning in the basin.**

Existing Programs & Policies

- Sheboygan County Comprehensive Multi-Jurisdictional Planning Process

Recommendations for Future Programs & Policies

- Continue to move forward with compliance with Ch. 66.1001, Wis. Stats.

Objective 1.5: **Promote measures designed to improve air quality (e.g. mass transit, multi-modal transportation, ozone action incentives, higher density development, multi-use and walkable neighborhoods).**

Existing Programs & Policies

- Sheboygan Metropolitan Planning Organization and the associated planning process.

Recommendations for Future Programs & Policies

- Identify neighborhood designs and make land use recommendations, such as conservation subdivisions, redevelopment projects, and traditional neighborhood design that promote alternative transportation choices and allow for the creation of a network of interconnected trails and pathways.
- Develop a comprehensive planning process that considers a full range of transportation alternatives and choices in order to provide safe, convenient and efficient access to land, goods, and services for all community residents and all modes of transportation.
- Identify existing contiguous development that can take advantage of existing transportation options.
- Examine the potential for designating local pedestrian and bicycle routes and identify off-street paths throughout the County.
- Identify networks that link destinations such as residential areas, schools, parks, and commercial areas.

Goal 2: **Conserve and restore riparian areas (corridors adjacent to waterways) in the Milwaukee and Sheboygan River Basins.**

Objective 2.1: **Combine public and private efforts to restore riparian stream buffers for water quality and wildlife.**

Existing Programs & Policies

- Voluntary buffer programs in agricultural areas (County & Federal)
- Trout Unlimited 2003 County Stewardship Project
- Sheboygan County Stewardship Program

Recommendations for Future Programs & Policies

- Encourage the Sheboygan River Basin Partnership to work on projects that restore riparian stream buffers.
- Work with the Glacial Lakes Land Conservancy to restore lands that act as a buffer.

Objective 2.2: Conserve and restore wetland functions and values in the basin.

Existing Programs & Policies

- Sheboygan County Land & Water Conservation wetland restoration program.
- USDA Natural Resources Conservation Service wetland restoration program.
- US Fish & Wildlife Service wetland restoration program.
- Milwaukee River Basin Wetland Assessment Tool US EPA Pilot program.
- Sheboygan County Land & Water Conservation Department 2004 Coastal Management Program project to evaluate quality of past wetland restoration projects.
- County Shoreland-Floodplain Zoning

Recommendations for Future Programs & Policies

- Inventory and classify wetlands based on their quality and function.
- Develop new setback to wetlands requirements in the Shoreland Zone based on wetland quality.

Objectives 2.3: Restore environmental integrity and recreation values in the lower Sheboygan River Basin.

Existing Programs & Policies

- South Pier Development- City of Sheboygan
- City of Sheboygan Falls Lagoon Dredging and Shoreline Restoration/Access Project
- City of Plymouth dam removal and restoration project.

Recommendations for Future Programs & Policies

- Continue to support redevelopment projects in the Basin.

Objective 2.4: **Remove dams and restore free-flowing waterways, where feasible.**

Existing Programs & Policies

- City of Plymouth dam removal and restoration project.
- Franklin Dam- Town of Herman- Removal
- Wisconsin Department of Natural Resources Small and Abandoned Dam Removal Grant Program

Recommendations for Future Programs & Policies

- Develop an inventory of existing dams including their age, quality, and owner to identify potential removal sites *if* the owner is interested.

Goal 3: **Acquire sufficient public lands and manage for multiple uses.**

Objective 3.1: **Promote public land acquisitions that protect natural areas and provide recreational opportunities.**

Existing Programs & Policies

- County Stewardship Program
- State Stewardship Program

Recommendations for Future Programs & Policies

- Develop a County acquisition plan that is consistent with existing County public lands and does not contradict other existing (federal, state, private) acquisition plans.

Goal 4: **Improve water quality.**

Objective 4.1: **Encourage best management practices in agricultural areas.**

Existing Programs & Policies

- Priority Watersheds Program
- Farmland Preservation
- Various USDA Programs

Recommendations for Future Programs & Policies

- Check with Pat Miles

Objective 4.2: **Promote stormwater management measures that prevent non-point pollution in rural and urban areas.**

Existing Programs & Policies

- Subdivision Ordinance
- Federal Clean Water Act Phase I Compliance (City Sheboygan, City of Sheboygan Falls, Village of Kohler, Town of Wilson, Town of Sheboygan)
- State of Wisconsin Stormwater Rules

Recommendations for Future Programs & Policies

- Develop and adopt a county stormwater and erosion control ordinance.
- Comply with Federal Clean Water Act Phase II requirements.

Objective 4.3: **Support measures that prevent the pollution associated with use of bio-solids.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- State of Wisconsin Land Spreading Rules
- State of Wisconsin Manure Storage Rules
- County Manure Storage Rules
- Nutrient management planning for agriculture – Priority Watersheds Program.
- Continue to enforce County ordinances.
- Continue involvement with Priority Watersheds Program.

Goal 5: Educate Citizens on the Importance of Natural Resources in the Basin.

Objective 5.1: Improve public outreach for education of land and water issues in the Basin.

Existing Programs & Policies

- Sheboygan River Basin Partnership informational forums.
- UW-Extension Basin Education program.
- Sheboygan County YMCA Outdoor Skills Center Education Program

Recommendations for Future Programs & Policies

- Develop information forums and workshops centered on current land use and water quality issues.

Objective 5.2: Provide land development information related to wise-use of resources.

Existing Programs & Policies

- UW-Extension Growth-Management Educator

Recommendations for Future Programs & Policies

- Develop a county conservation subdivision ordinance and workshop to present the ordinance to local officials, residents, and other stakeholders.
- Develop a county low impact development ordinance and workshop to present the ordinance to local officials, residents, and other stakeholders.

Goal 6: Protect the coastal resources of Lake Michigan.

Objective 6.1: Promote wise land use decisions within the "coastal corridor" (between Lake Michigan and Interstate 43).

Existing Programs & Policies

Recommendations for Future Programs & Policies

- County Shoreland-Floodplain Zoning
- Local Zoning

- Inventory and identify parcels that meet current minimum standards within the County Shoreland Zone to determine how many new lots could be developed.
- Inventory critical habitat areas that may be deserving of protection.
- Encourage growth and development away from the coastal corridor where possible, and in areas with existing infrastructure and services.
- Develop programs that address agricultural runoff, farming practices, and shoreland development as it relates to water quality impacts to Lake Michigan
- Provide educational opportunities for the public to gain a better understanding of their role in protecting Lake Michigan and measures to mitigate human impacts on the resource.
- Inventory and preserve environmental corridors in the "coastal corridor."
- Inventory and protect coastal areas at risk.
- Inventory and prioritize environmental corridors in Sheboygan County.
- Identify, protect, and preserve the County's significant natural scenic and open space areas for enjoyment by its residents and visitors for present and future generations.

Objective 6.2: Work toward eliminating invasive species within the "coastal corridor."

Existing Programs & Policies

- DNR Aquatic Invasive Species Program

Recommendations for Future Programs & Policies

- Identify and inventory areas with invasive species.
- Develop a public-information program on invasive species including prevention of establishment and removal.

Goal 7: Identify, protect, and preserve the County's significant natural scenic and open space areas for enjoyment by its residents and visitors for present and future generations.

Objective 7.1: Maintain and improve the quality of ground water and surface waters within the Milwaukee and Sheboygan River Basins.

Existing Programs & Policies

- State of Wisconsin Wellhead protection program for municipal water supplies.
- State of Wisconsin Well abandonment program.
- Sheboygan County Sanitary Ordinance
- UW-Extension water testing program.
- Elkhart Lake Improvement Association's groundwater assessment study.

Recommendations for Future Programs & Policies

- Promote land use decisions that are cognizant of groundwater resources.
- Identify potential groundwater contamination sites and develop a countywide mitigation strategy.
- Identify potential groundwater recharge areas and develop a model protection district.

Objective 7.2: Identify and preserve high quality wetlands.

Existing Programs & Policies

- Sheboygan County Shoreland-Floodplain Ordinance
- Chapter 30, Wisconsin State Statutes
- Wisconsin Wetland Inventory

Recommendations for Future Programs & Policies

- Inventory and classify wetlands based on their quality and function.
- Develop new setback to wetlands requirements in the Shoreland Zone based on wetland quality.

Objective 7.3: **Maintain the natural beauty and physical integrity of the Lake Michigan shoreline as seen from the land and the water while providing for public use and access.**

Existing Programs & Policies

- Sheboygan County Shoreland-Floodplain Ordinance
- Chapter 30, Wisconsin State Statutes
- Chapter 236, Wisconsin State Statutes governing land divisions
- Sheboygan County Stewardship Program

Recommendations for Future Programs & Policies

- Inventory existing public access sites such as road-right-of-way to the water and previously dedicate public parks.
- Encourage projects that provide access to Lake Michigan through the County's Stewardship Program.

Objective 7.4: **Preserve and protect the unique geological features that exist in the County.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Inventory and map existing features such as karst geology, glacial features, dunes, etc.
- Education and information program on these features.
- Evaluate the feasibility of developing a program to protect these features.

Objective 7.5: **Discourage artificial light pollution, while preserving the safety of the residents of the County.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Provide education and encourage adoption of light pollution reducing ordinances at the local level.

Objective 7.6: **Encourage provision of natural corridors for species exchange between major environmental land holdings.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Conduct an inventory of areas that would support a natural corridor between major land holdings.
- Encourage conservation easements in natural corridors between major land holdings.

Objective 7.7: **Provide potential sources of infrastructure materials for future development (e.g.- sand, gravel, stone), within the County.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Sheboygan County Non-Metallic Mining Ordinance for site reclamation post extraction.
- Inventory existing infrastructure resources within the County.

Agricultural Resources

Goal 1: **The local units of government in Sheboygan County promote a healthy climate for agriculture.**

Objective 1.1 **: Identify all regulatory agencies that play a role in local farm operations and land use decisions including federal, state, county, and local to create a more streamlined process.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Develop a matrix for government agencies to see what programs are currently being implemented at all levels.
- Develop an intergovernmental clearinghouse of information for landowners.

Objective 1.2: **Inventory existing regulations and identify overlaps and inconsistencies.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Act as an educational resource to local communities and other agencies on where overlaps and inconsistencies exist with recommendations on how to mitigate these conflicts.

Goal 2: **Minimize the potential for conflicts between rural landowners.**

Objective 2.1: **Develop an inventory and rating system for local roads to identify those most likely to be traveled by farm operators to create a safe environment for travel between fields and conduct everyday operations.**

Existing Programs & Policies

- Countywide functional classification of roads
- State of Wisconsin Pavement Rating Program (PASAR)
- State of Wisconsin traffic counts.
- State of Wisconsin/County bridge inventory.

Recommendations for Future Programs & Policies

- Update countywide functional classification of roads.
- Provide educational opportunities for local units of government on the importance of adequate infrastructure for agriculture and existing infrastructure resources in the County.

Objective 2.2: **Develop an educational program for realtors to better inform buyers of the processes involved with building/developing in the country and what to expect from the rural landscape.**

Existing Programs & Policies

- Farm Bureau informational piece on rural living.

Recommendations for Future Programs & Policies

- Work with local technical college to develop a curriculum for realtors.
- Host workshops for landowners regarding these issues.
- Develop an informational piece that can be handed out with the issuance of a sanitary or assignment of a driveway.

Objective 2.3: **Inventory existing agricultural infrastructure and identify areas best suited for agriculture to create agriculture-only land use districts.**

Existing Programs & Policies

- Farmland Preservation Plan- Local exclusive agricultural zoning.

Recommendations for Future Programs & Policies

- Update countywide functional classification of roads.
- Provide educational opportunities for local units of government on existing infrastructure resources in the County.
- Act as a resource to local units of government interested in developing agriculture-only land use districts.

Goal 3: **Streamline the regulatory process.**

Objective 3.1: **Develop a broad, countywide strategy that promotes interagency cooperation.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Identify potential opportunities for possible coordination efforts.
- Host annual conferences with all agencies that work with agriculture-related regulation to open dialog between agencies.

Objective 3.2: **Work with each Town to develop individual information sheets to be given to landowners at the time of permit issuance that includes the process at the local level so landowners know what to expect.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Develop a matrix or decision-tree that can be handed out to landowners either by the County or the Town to ensure that landowners know all of the steps with the process.

Goal 4: **Develop a better-informed local government that can react to changes in agriculture and land use.**

Objective 4.1: **Develop specific training for all elected officials on current issues related to agriculture and land use law.**

Existing Programs & Policies

- UW-Extension certification for plan commission members and local elected officials.
- UW-Extension Natural Resources and Community Development agent

Recommendations for Future Programs & Policies

- Host one annual workshop on emerging land use issues and practices, recent court decisions, and general land use law.

Objective 4.2: Support local "forums" for elected officials to provide education on agriculture and land use issues.

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Host one annual workshop on emerging land use issues and practices, recent court decisions, and general land use law.
- Develop specific forums on issues as they arise (example: Wind Forum, Smart Growth Workshops).

Objective 4.3: Develop a "menu" or clearinghouse for educational materials that can be used by local officials.

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with UW-Extension to coordinate resources related to education materials and act as a lead agency for material collection, cataloging, and distribution.

Goal 5: Sustain the County's agricultural heritage and economy.

Objective 5.1: Protect productive and fallow farmland within the County.

Existing Programs & Policies

- Farmland Preservation Program
- Local Zoning Ordinance

Recommendations for Future Programs & Policies

- Identify productive and fallow agricultural in the County.
- Develop a prioritization process for these lands.
- Communicate this with local units of government through information sessions and local meetings.
- Incorporate this information into the Comprehensive Planning process.

Objective 5.2: Establish standards to protect existing agricultural land uses.

Existing Programs & Policies

- Farmland Preservation Program

Recommendations for Future Programs & Policies

- Work toward completing the County's Land Evaluation-Site Assessment (LESA) tool.

Objective 5.3: Encourage sound agricultural and soil conservation methods to minimize soil erosion and ground water contamination

Existing Programs & Policies

- Federal- Farm Service Agency, Natural Resources Conservation Service
- State- Farmland Preservation Program, Well-Abandonment Program
- County- Priority Watershed Programs/Best Management Practice Cost-Sharing, UW-Extension Education Programs

Recommendations for Future Programs & Policies

- Conduct a groundwater resource evaluation.

Objective 5.4: **Encourage sound management and preservation of the County's forested areas.**

Existing Programs & Policies
- Managed Forest Law
- DNR Acquisition Program
- Kettle Moraine State Forest
- Local Zoning Ordinances

Recommendations for Future Programs & Policies
- Use environmental corridors mapping to identify wooded areas in the County.
- Identify parcels currently enrolled in the Woodland Tax Credit program.
- Identify additional parcels that may qualify for the program.

Agricultural and Open Space Development/Preservation

Goal 1: **To provide an aesthetically pleasing, relaxing, rural atmosphere in the County.**
Objective 1.1: **Preserve and create environmental corridors that screen developed areas and provide for the integration of natural habitat into the County.**

Existing Programs & Policies
- Sheboygan County Shoreland-Floodplain Zoning
- Local Town zoning that incorporates environmental corridors or conservation districts.
- Sheboygan County Stewardship Program

Recommendations for Future Programs & Policies
- Identify and classify Environmental Corridors by their ecological value.
- Inventory natural areas in the County.
- Develop a viable conservation subdivision or low-impact development ordinance and identify areas most conducive to this type of development.
- Facilitate community vision sessions to develop important aspects of a community's character.

Objective 1.2: **Set aside open space in the County to be maintained for the preservation of natural vistas.**

Existing Programs & Policies

Recommendations for Future Programs & Policies
- Explore the use of overlay districts in the Shoreland Zone with setbacks for lakes, streams, and wetlands requiring additional care and proof that development will not have a negative effect on these resources.

Goal 2: **To encourage and protect farming while providing for the orderly development of land that is currently or was historically in productive farm use for non-farm development.**
Objective 2.1: ***Retain agricultural and open lands in the County as key components of the rural area and aesthetic character of the community.***

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Promote the development of large tracts of farmland in a planned and orderly method as opposed to a piece-by-piece method over a long period of time.
- Explore the option of establishing a buffer strip between businesses and adjacent housing developments to minimize conflicts and to create natural sight shields from construction, lights, and noise that compromise aesthetic goals.

Objective 2.2: **Prevent the premature development of fringe lands in the County that could be incompatible with the long-term best use of the land.**

Existing Programs & Policies
- Farmland Preservation Plan
- Local Planning Efforts
- County Smart Growth-Stewardship Grant Program

Recommendations for Future Programs & Policies
- Provide resources for local planning efforts.

Objective 2.3: **Identify areas recommended for future development.**

Existing Programs & Policies

Recommendations for Future Programs & Policies
- Identify existing infrastructure and services that would be best suited for future growth and development through the Comprehensive Planning process.

Parks and Recreational Lands

Goal 1: **To ensure residents have safe recreational sites within the County that provide a number of activities.**

Objective 1.1: **Increase the number of good, well maintained recreational sites and trails within the County.**

Existing Programs & Policies
- Chapter 236, Wisconsin State Statutes governing land divisions
- Sheboygan County Stewardship Program
- State Stewardship Program
- County Outdoor Recreation and Open Space Plan

Recommendations for Future Programs & Policies
- Inventory existing public access sites such as road-right-of-way to the water and previously dedicate public parks.
- Encourage projects that provide access to Lake Michigan through the County's Stewardship Program.

Objective 1.2: **Acquire, develop and maintain future recreational sites within the County.**

Existing Programs & Policies
- County Stewardship Program
- State Stewardship Program

Recommendations for Future Programs & Policies
- Develop a County acquisition plan that is consistent with existing County public lands and does not contradict other existing (federal, state, private) acquisition plans.
- Develop access to the waters of Lake Michigan.

Metallic and Non Metallic Resources

Goal 1: **To ensure that future mining sites will not negatively impact the County or its residents.**

Objective 1: **Do not harm views, the natural environment and aesthetics through mining operations**

Existing Programs & Policies

- Local Zoning Ordinance- Conditional Use Permitting Process
- County Non-Metallic Mining Program

Recommendations for Future Programs & Policies

- Inventory existing infrastructure resources within the County.

Historic and Cultural Resources

Goal 1: **Encourage the preservation of historical, cultural, and archaeological resources that are symbolic of the County and its residents, both past and present.**

Objective 1.1 **: Encourage the continued use of areas of historical and cultural heritage.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with the Sheboygan County Cultural Resources Committee to provide information and education to local communities on the historical and cultural resources within their boundaries.

Objective 1.2: **Identify and preserve historic districts and farm structures of historical and archaeological value.**

Existing Programs & Policies

- Century Farms Program
- City of Sheboygan Historic Building Survey
- State of Wisconsin Historic Sites Database

National Register of Historic Places

Recommendations for Future Programs & Policies

- Work with the Sheboygan County Cultural Resources Committee and local communities to examine the desire/feasibility of local preservation regulations.

Objective 1.3: **Identify criteria to be used to inventory buildings and sites with unique historic characteristics of Sheboygan County.**

Existing Programs & Policies

- National Register of Historic Places

Recommendations for Future Programs & Policies

- Work with Sheboygan County Cultural Resources Committee to develop criteria for local buildings and sites with unique characteristics.

Goal 2: **Promote the local artistic culture.**

Objective 2.1: **Encourage the integration of local art in public spaces.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with the Sheboygan County Cultural Resources Committee to develop a model ordinance and/or guidelines for integrating local art in public spaces.

Objective 2.2: **Identify and promote local artistic resources (e.g.-galleries, sculpture gardens, museums).**

Existing Programs & Policies

- John Michael Kohler Arts Center
- Weill Center for Performing Arts
- University Theatre
- Community Theater
- Chambers of Commerce

Recommendations for Future Programs & Policies

- Continue to provide support for local programs and policies related to local art in public areas.

Goal 3: **Preserve the natural and rural characteristics of the County.**

Objective 3.1: **Establish standards for characteristics for local cultural resources that are historically significant.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with Sheboygan County Cultural Resources Committee to develop criteria for local cultural resources.

Objective 3.2: **Promote local land use decisions that are sensitive to the local culture and history.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with Sheboygan County Cultural Resources Committee to develop a workshop for local communities and historic preservation groups to discuss preservation strategies, techniques, and potential land use conflicts.

Goal 4: **Identify, protect, and preserve significant natural, historic, scenic, and open spaces for enjoyment by residents and visitors for present and future generations.**

Objective 4.1: **Encourage and support interested parties and stakeholders in efforts related to preserving the County's cultural resources.**

Existing Programs & Policies

- Sheboygan County Cultural Resources Committee
- Local Historic Preservation Groups

Recommendations for Future Programs & Policies

- Include interested parties and stakeholders in the cultural resources component of the County's multijurisdictional comprehensive planning process.

Objective 4.2: **Preserve and protect the unique geological and natural resources holding significant historic value throughout the County.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Inventory and map existing features such as Karst geology, glacial features, dunes, etc. with significant historic value throughout the County.
- Evaluate the feasibility of developing a program to protect these features.

Objective 4.3: **Encourage the preservation of rural character in the County through guidelines for billboards and signs along roadsides.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Encourage local communities to control and reduce the size, frequency, and location of billboards along road corridors.

Goal 5: **Educate Citizens on the Importance of Cultural Resources in the County.**

Objective 5.1: **Improve public outreach for education of historic sites, ethnic settlement patterns, and the overall history of Sheboygan County.**

Existing Programs & Policies

Recommendations for Future Programs & Policies

- Work with Sheboygan County Cultural Resources Committee to develop a workshop for the public to discuss preservation strategies, techniques, and potential land use conflicts.

Goal 6: **Identify roadways with a historic, scenic, or cultural value to Sheboygan County.**

Objective 6.1: **Identify local, county, and state roads with unique qualities for designation as "scenic highways," "historic highways," and "rustic highways."**

Existing Programs & Policies

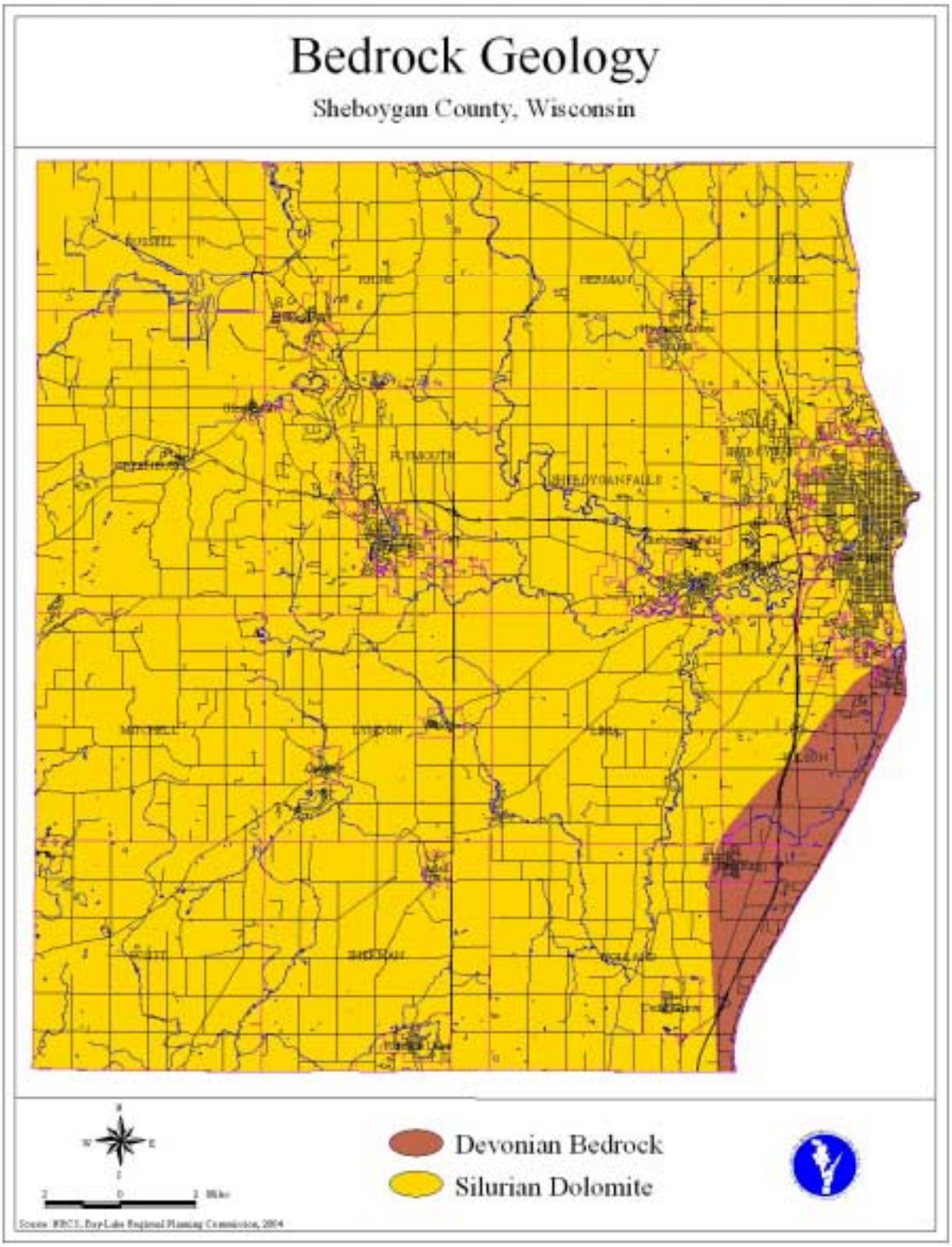
- Federal & State scenic, historic, and rustic roads

Recommendations for Future Programs & Policies

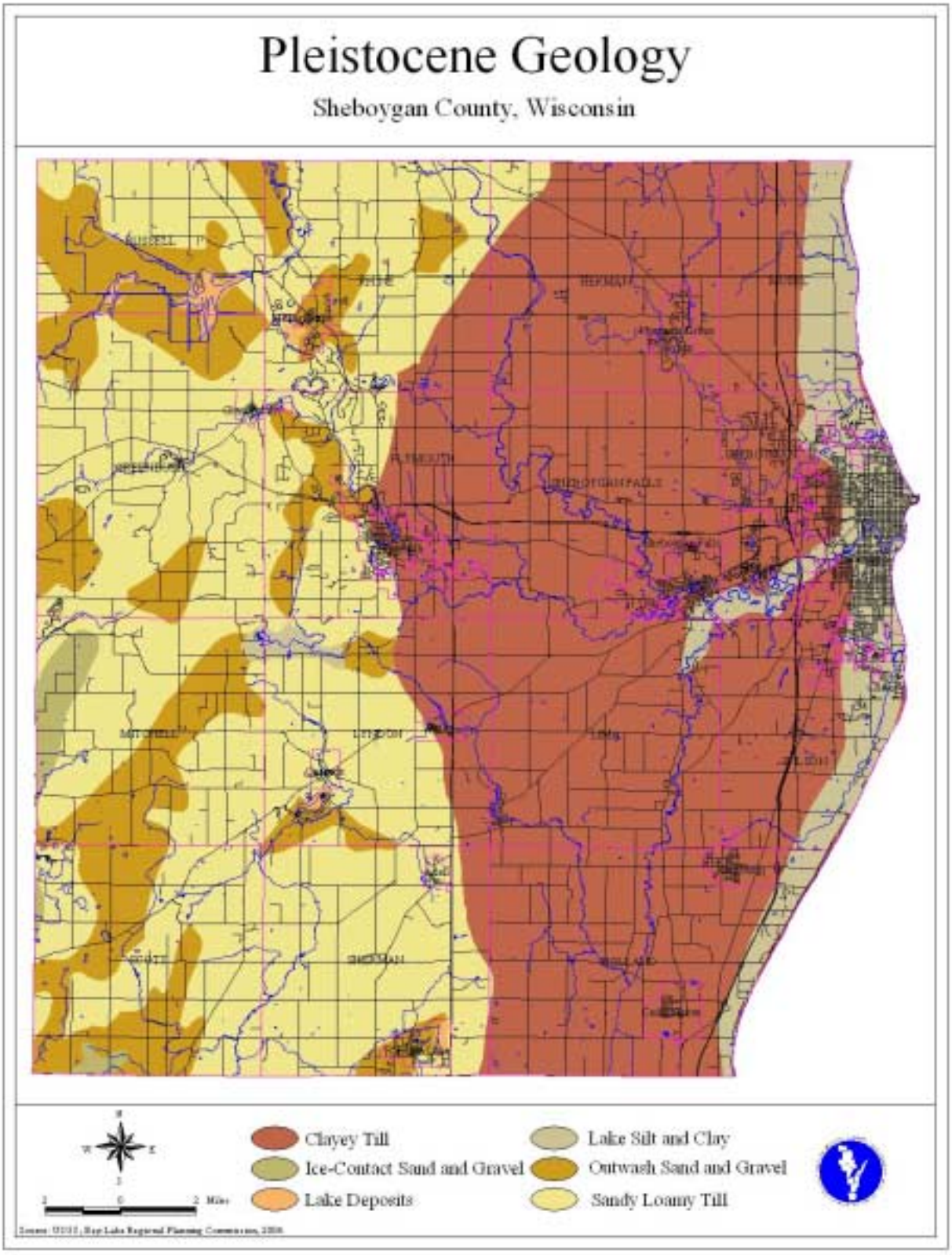
- Work with the Sheboygan County Cultural Resources Committee to identify criteria for local/county scenic and historic highways, and rustic roads.

APPENDIX A: MAPS

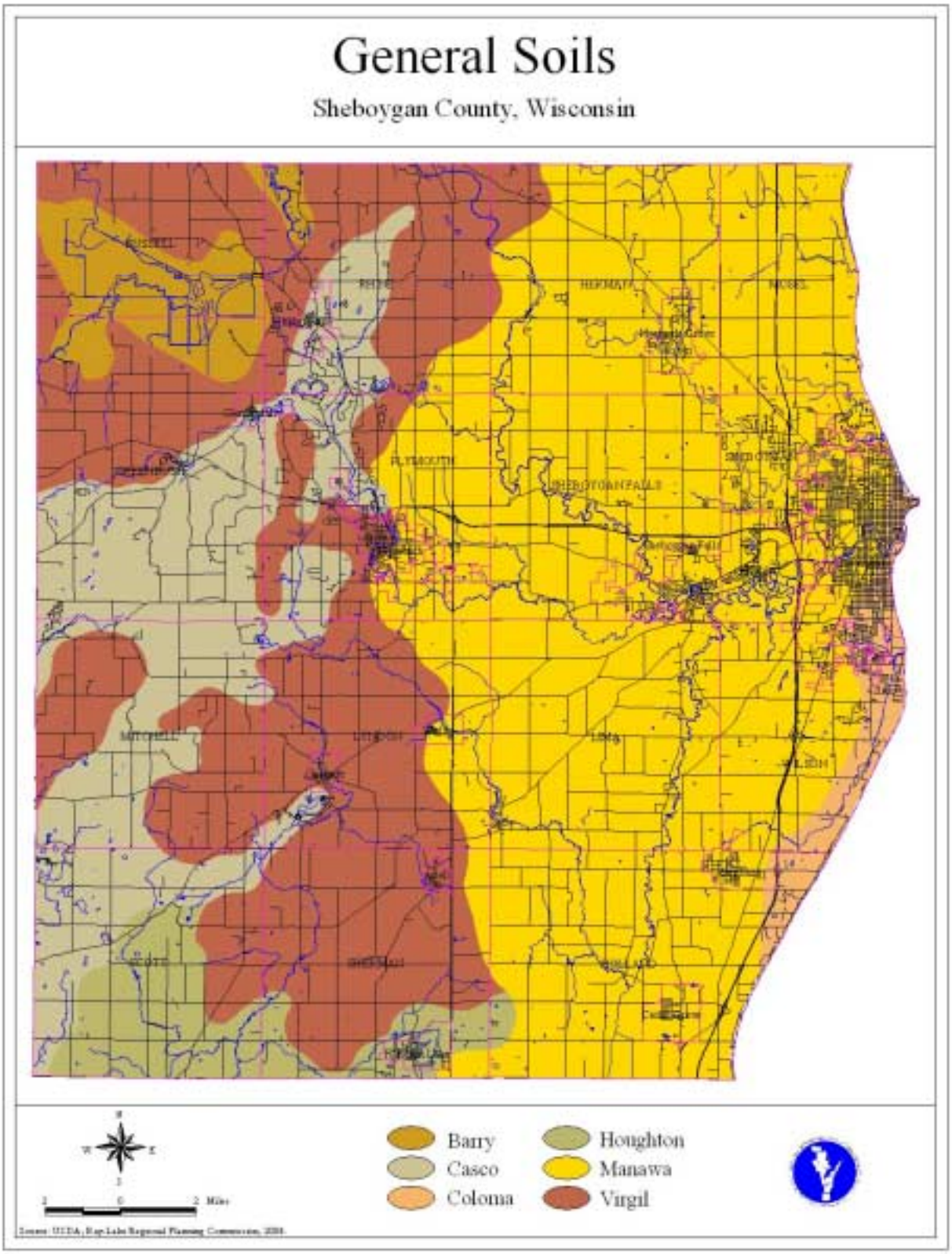
Map 1.1- Bedrock Geology



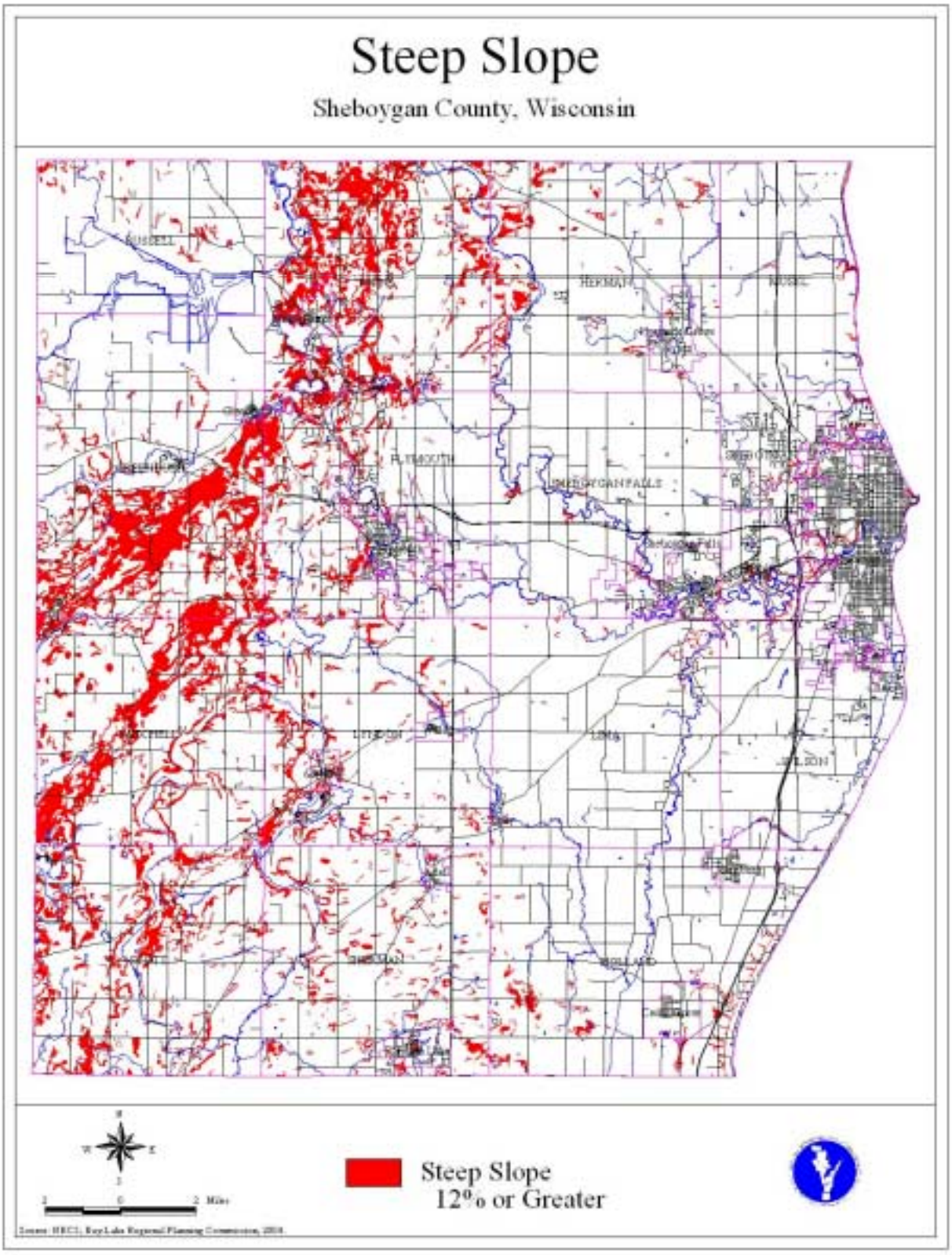
Map 1.2- Pleistocene Geology



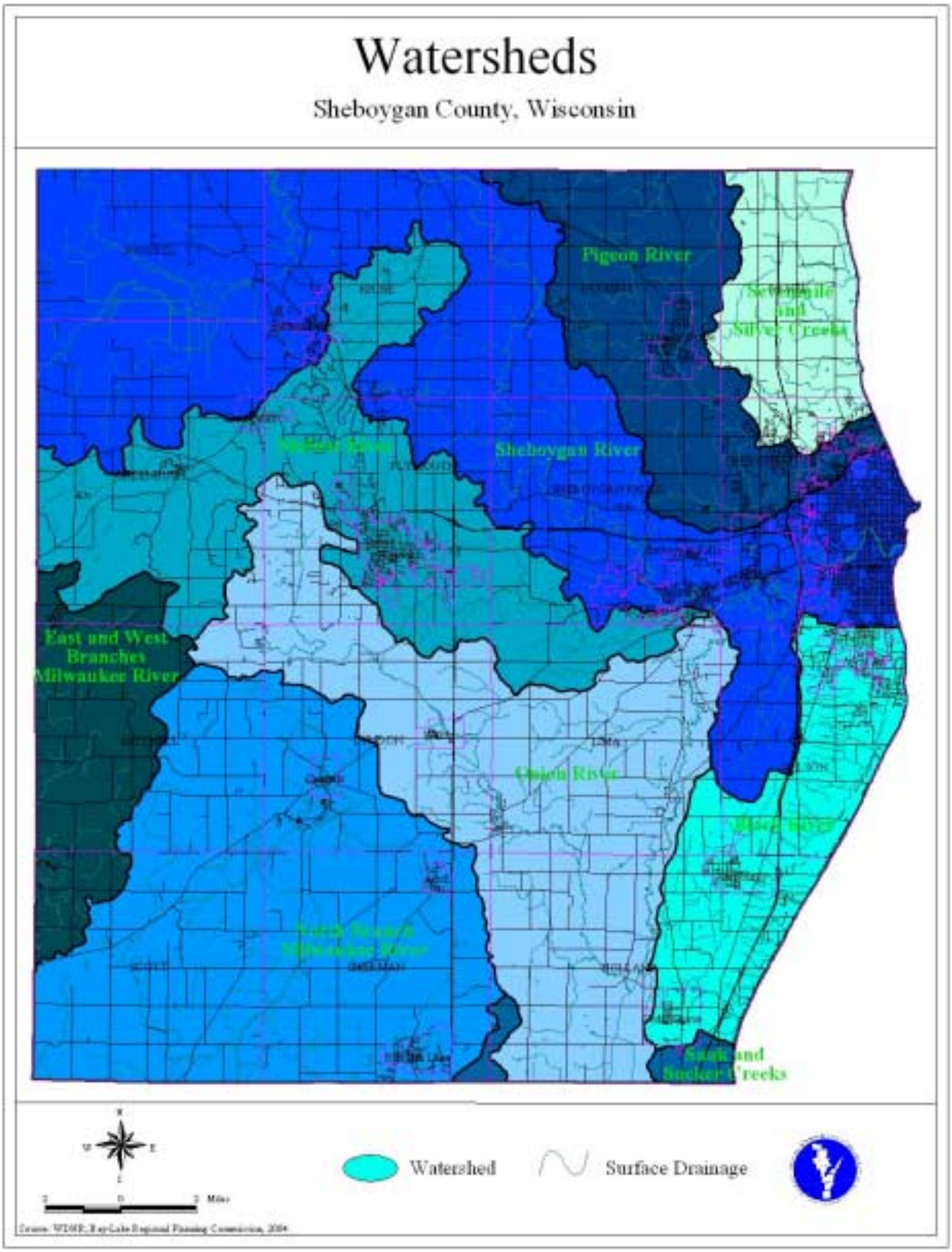
Map 1.3- General Soils



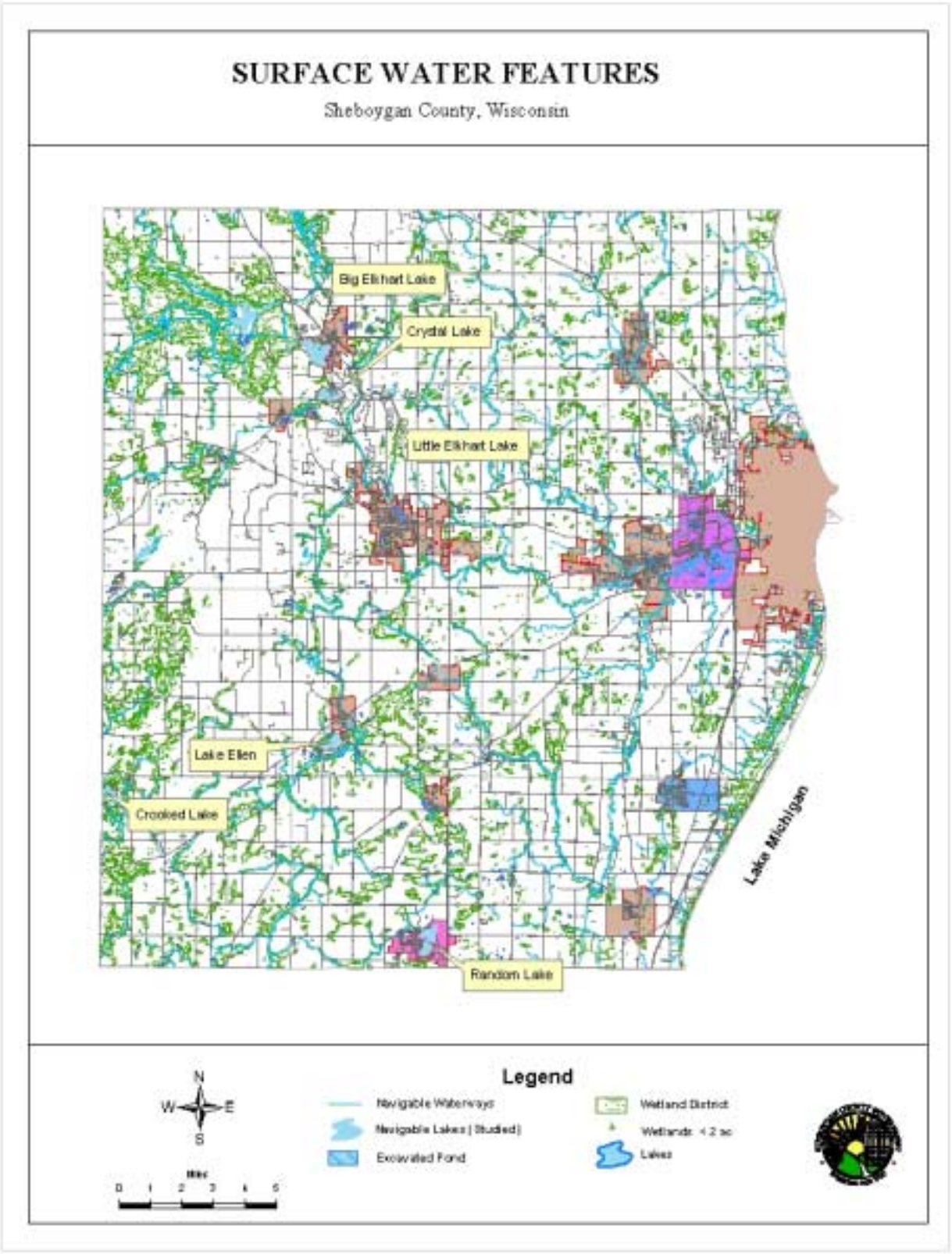
Map 1.4- Steep Slopes



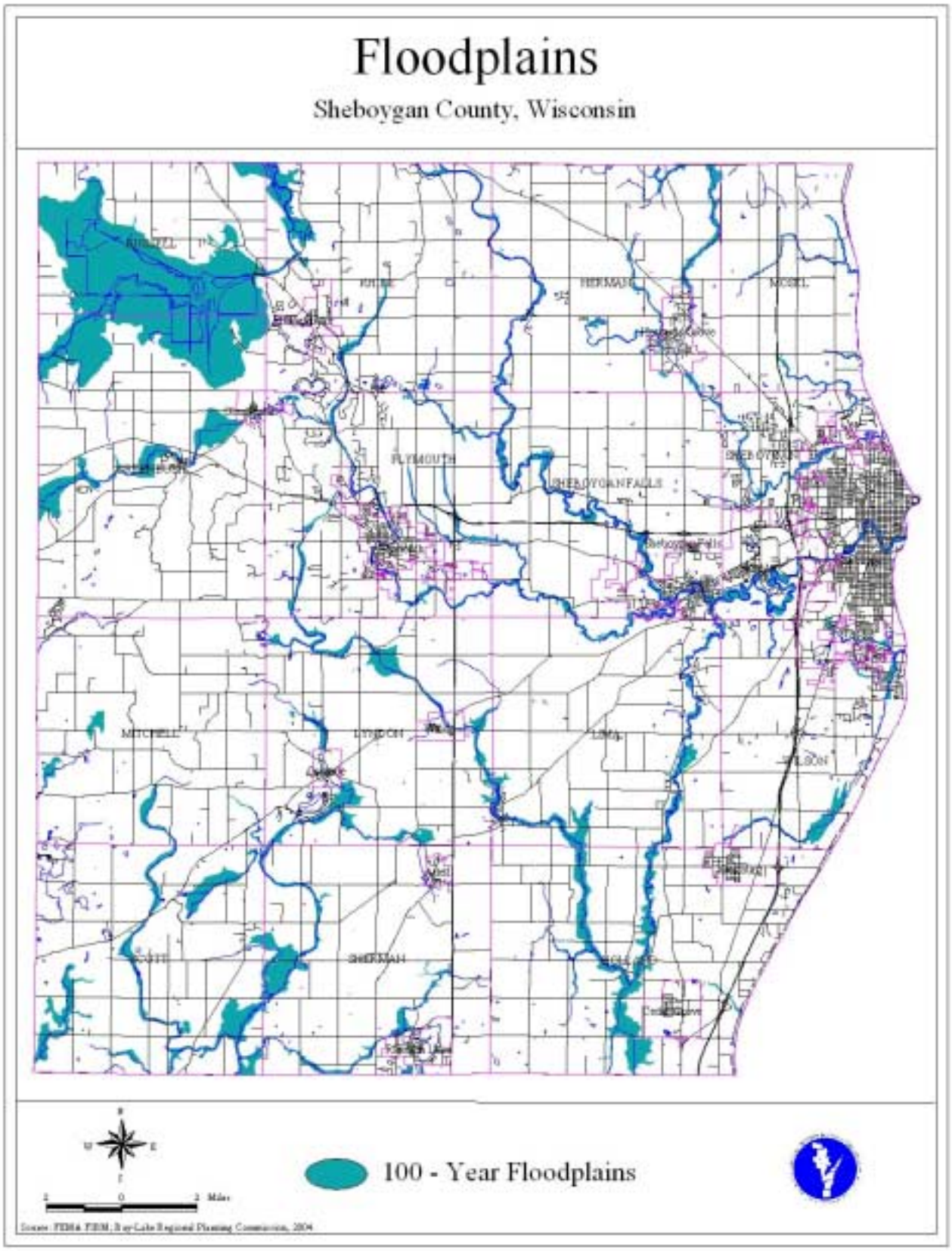
Map 1.5- Watersheds



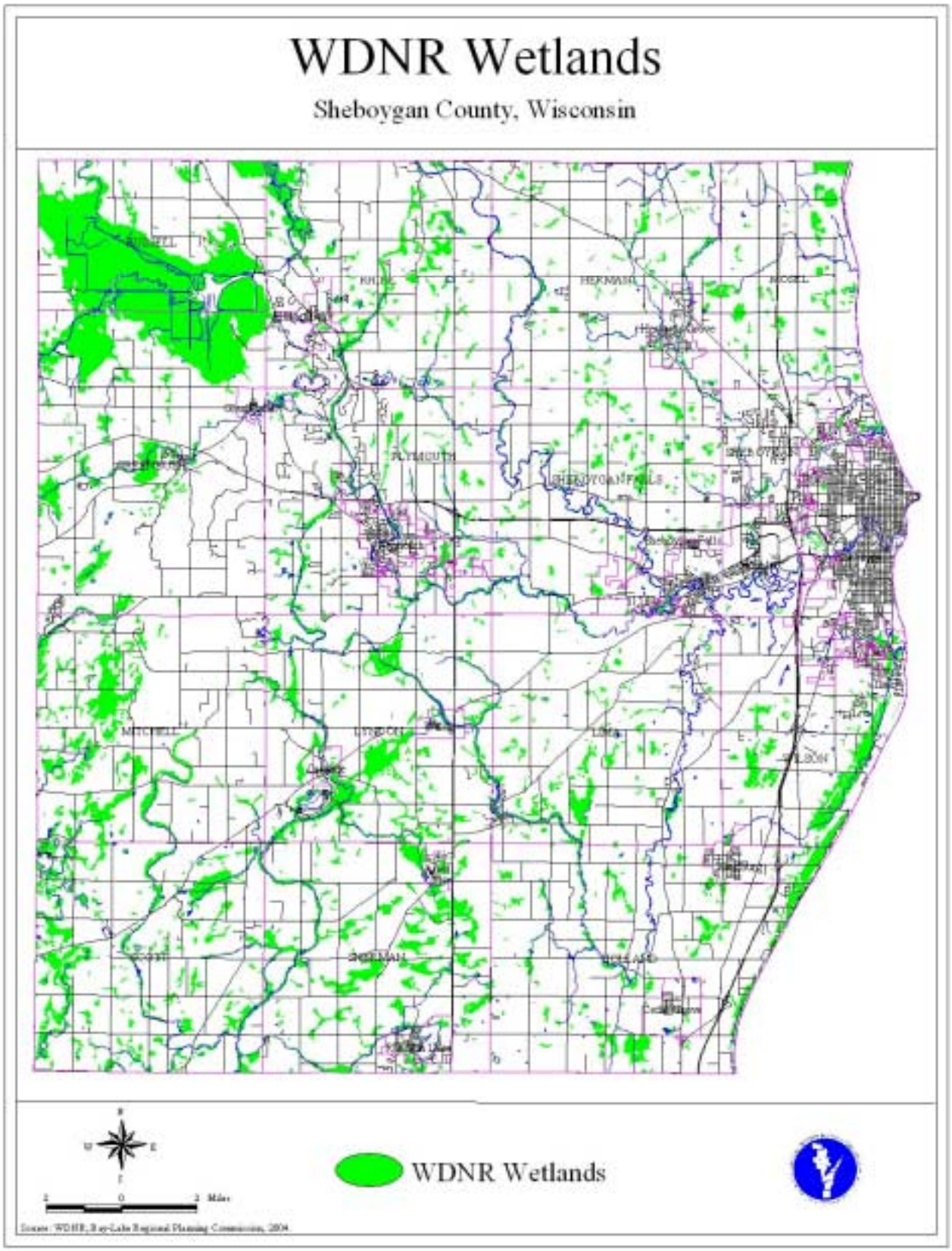
Map 1.6- Surface Waters



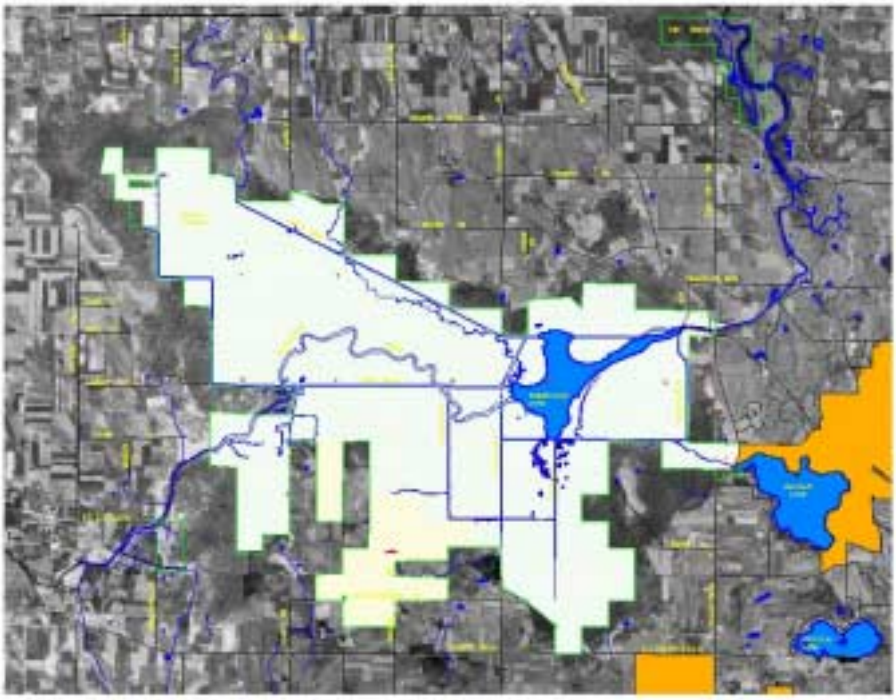
Map 1.7- Floodplains



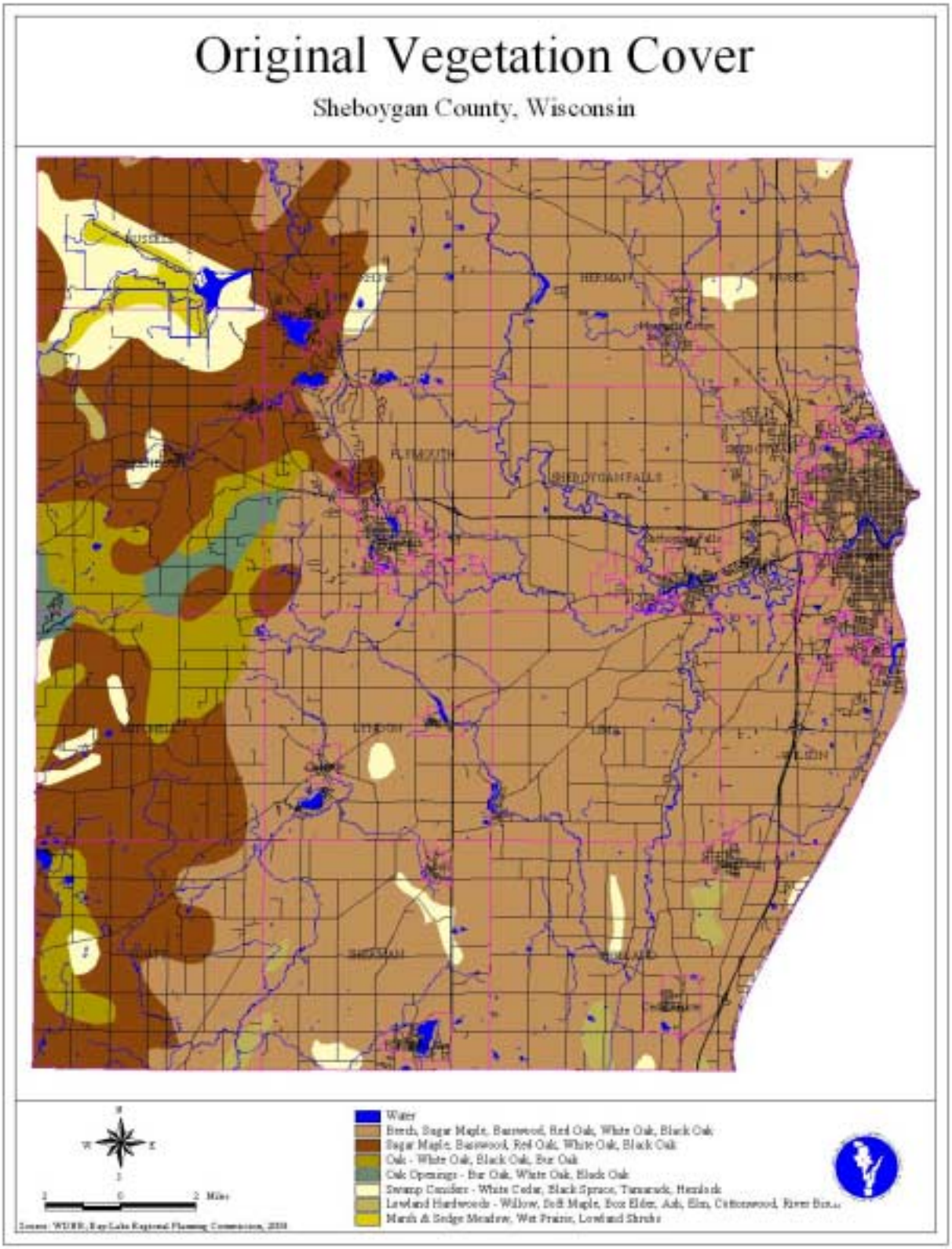
Map 1.8- Wisconsin Department of Natural Resources Wetlands



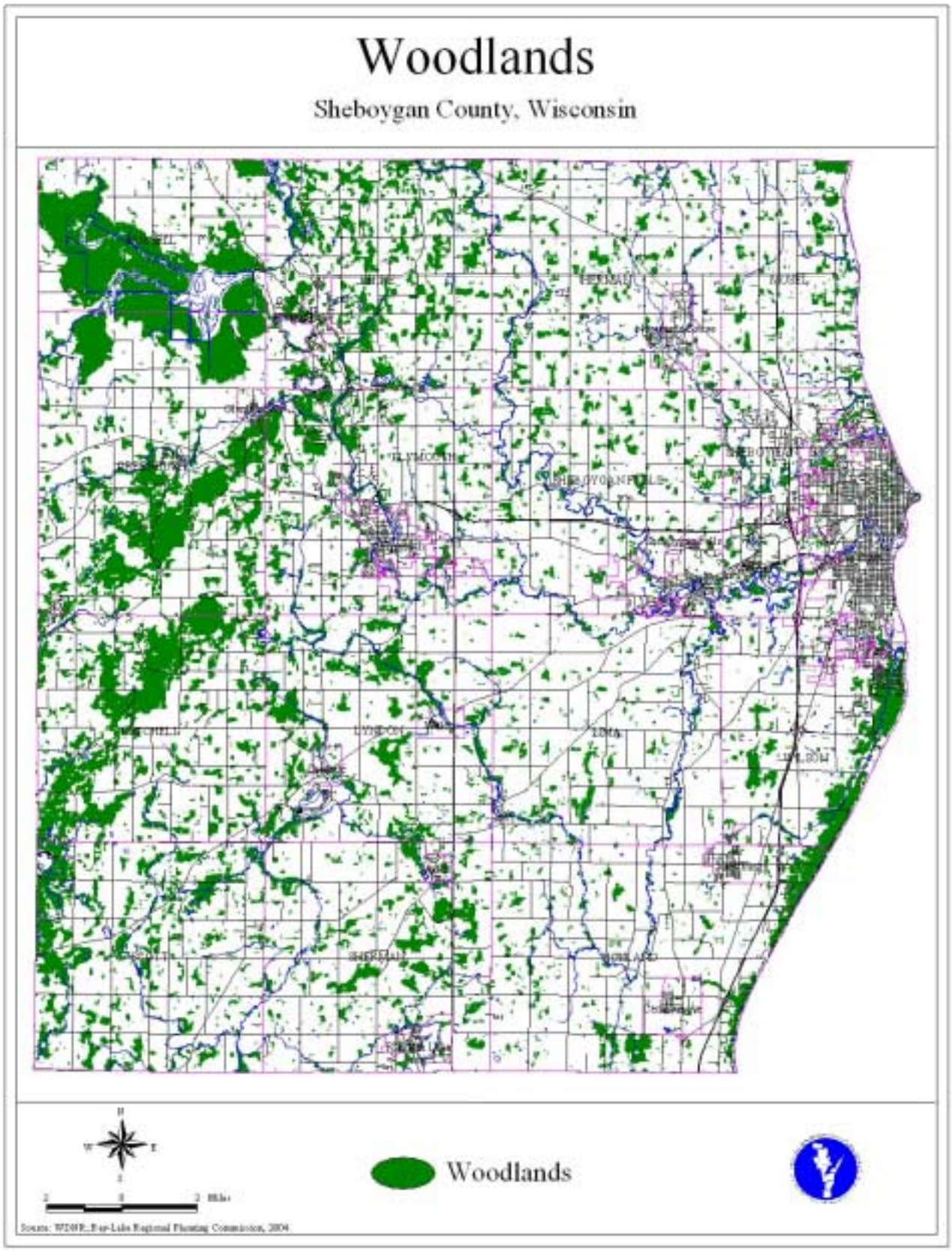
Map 1.9- Sheboygan Marsh



Map 1.10- Original Vegetation Cover

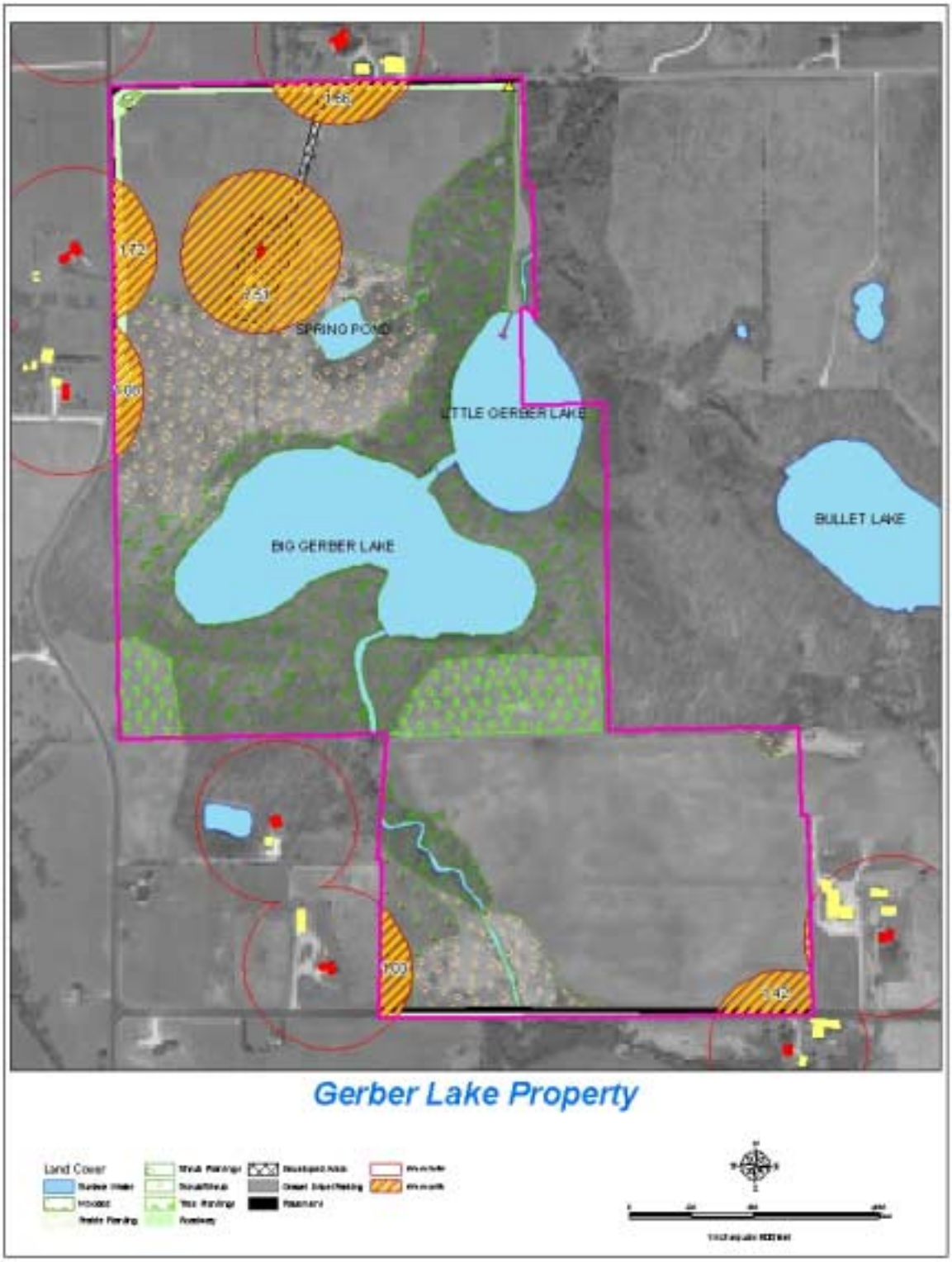


Map 1.11- Woodlands

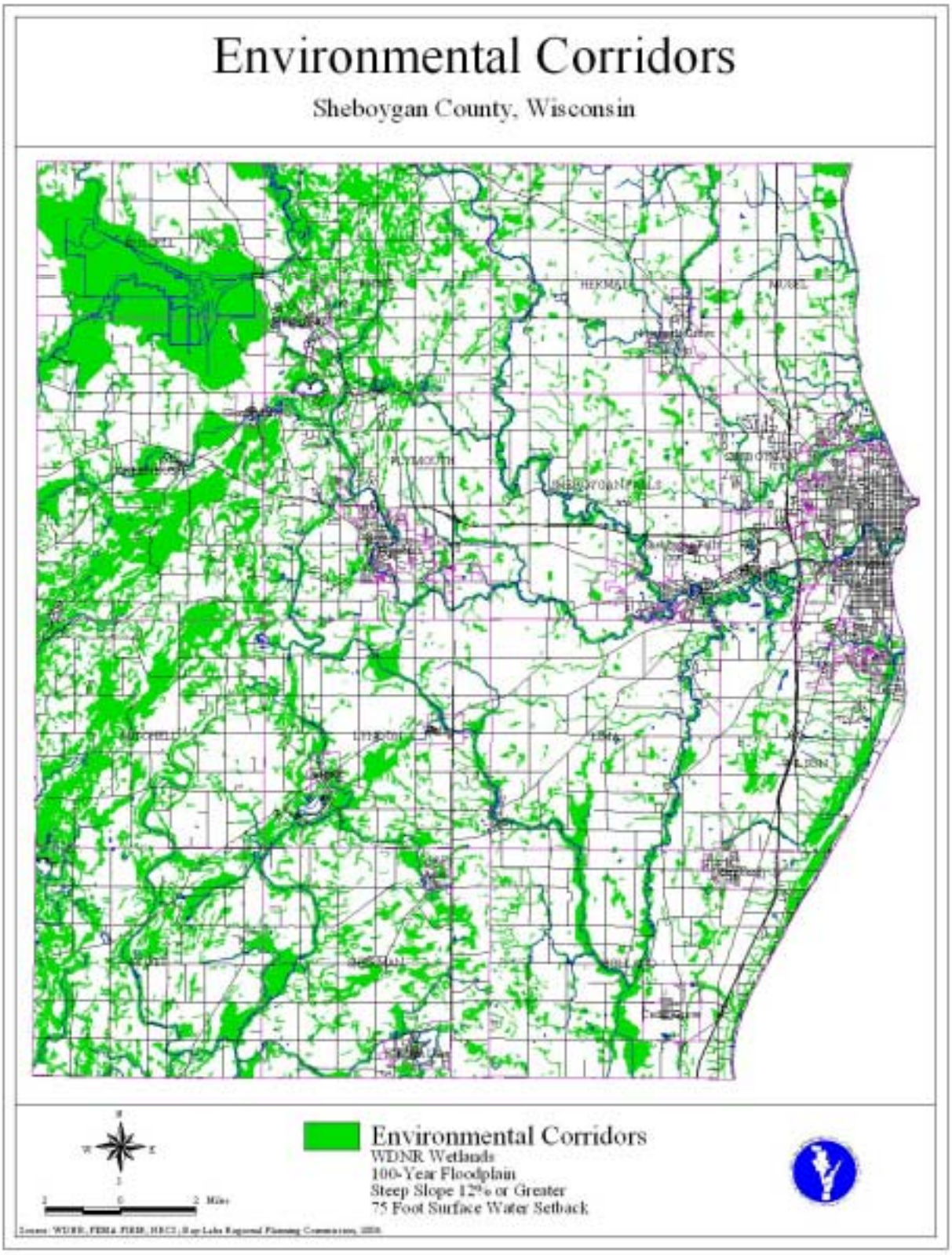


Map 1.12- Marsh Park

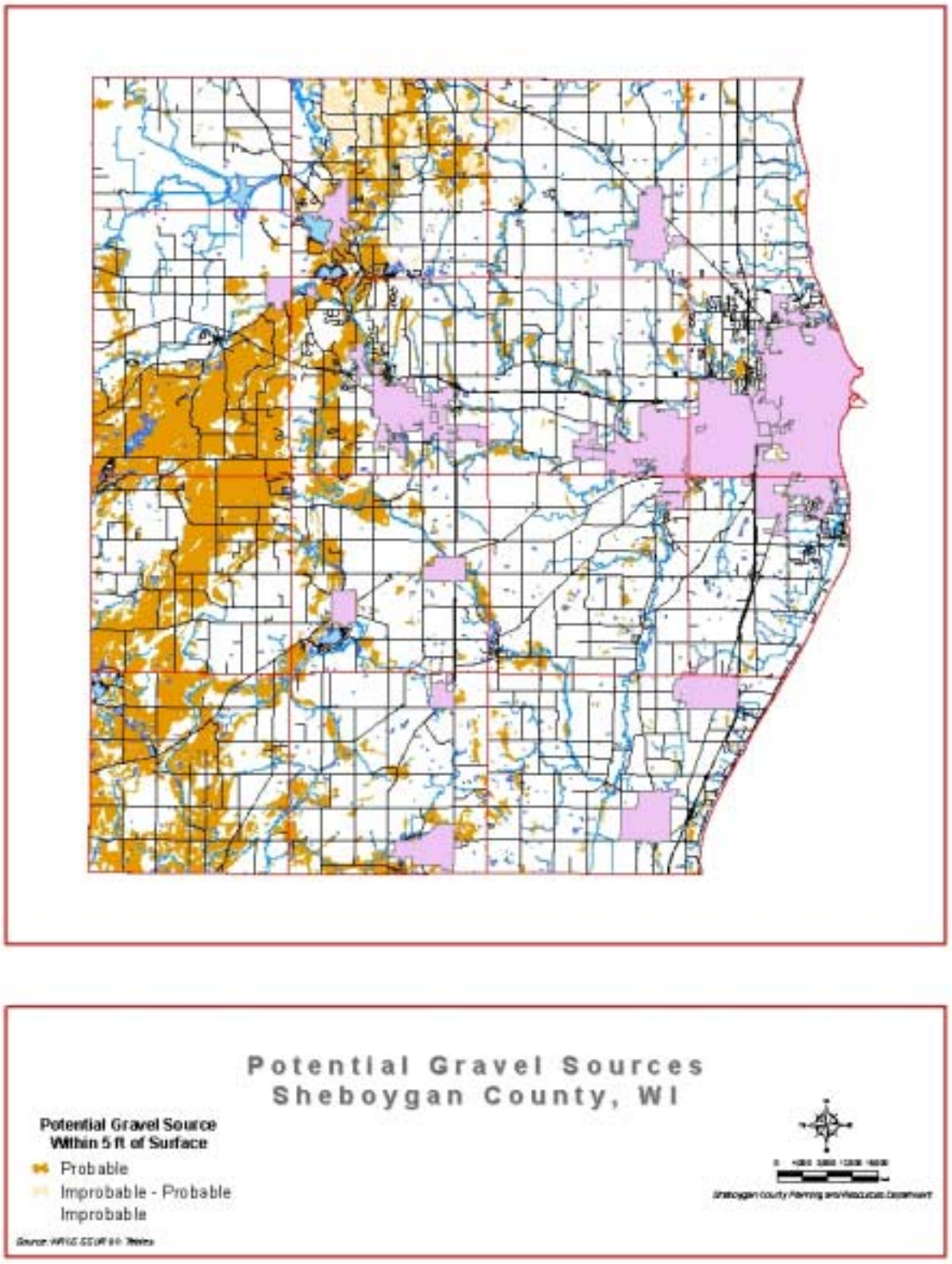
Map 1.13- Gerber Lake Wildlife Area



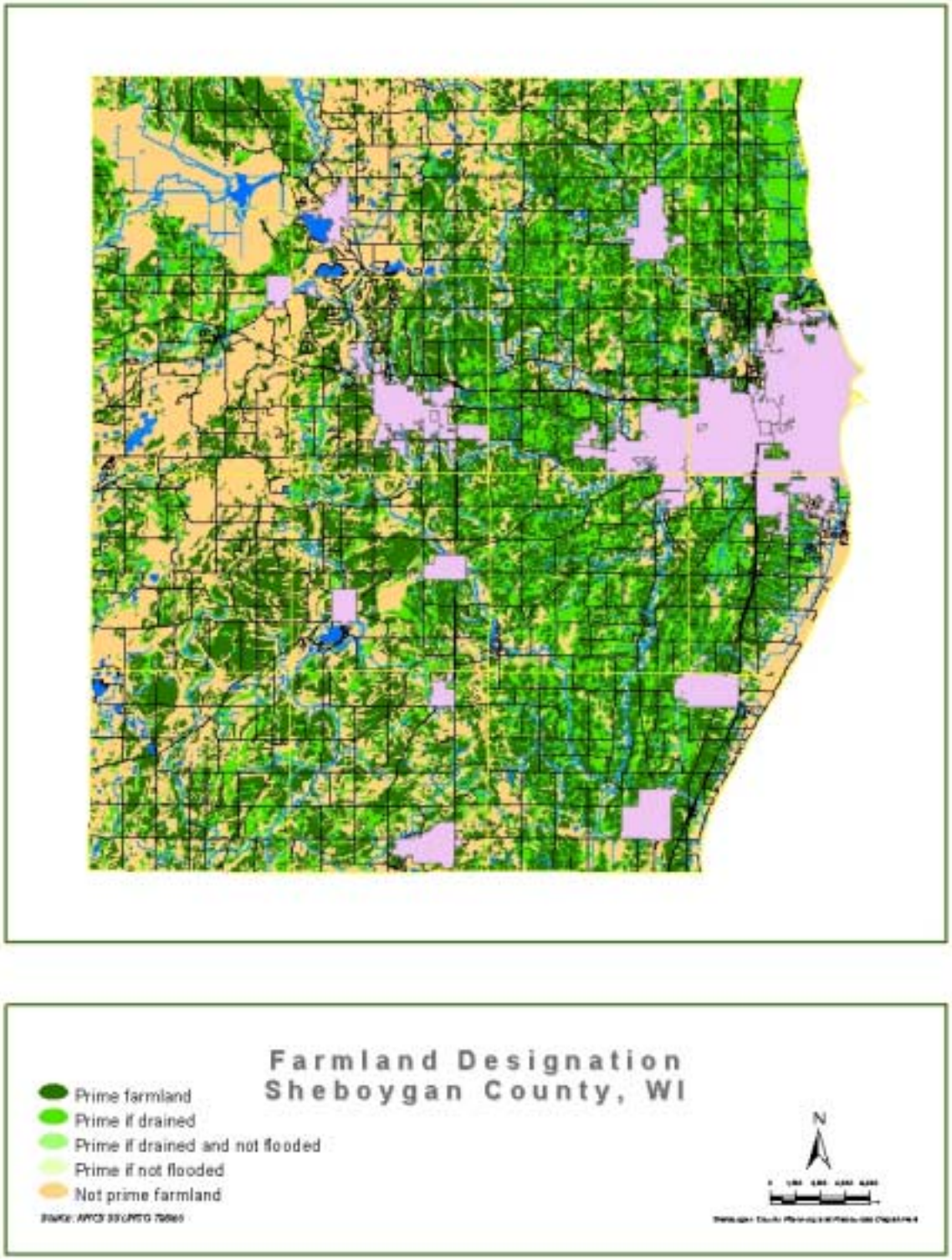
Map 1.14- Environmental Corridors



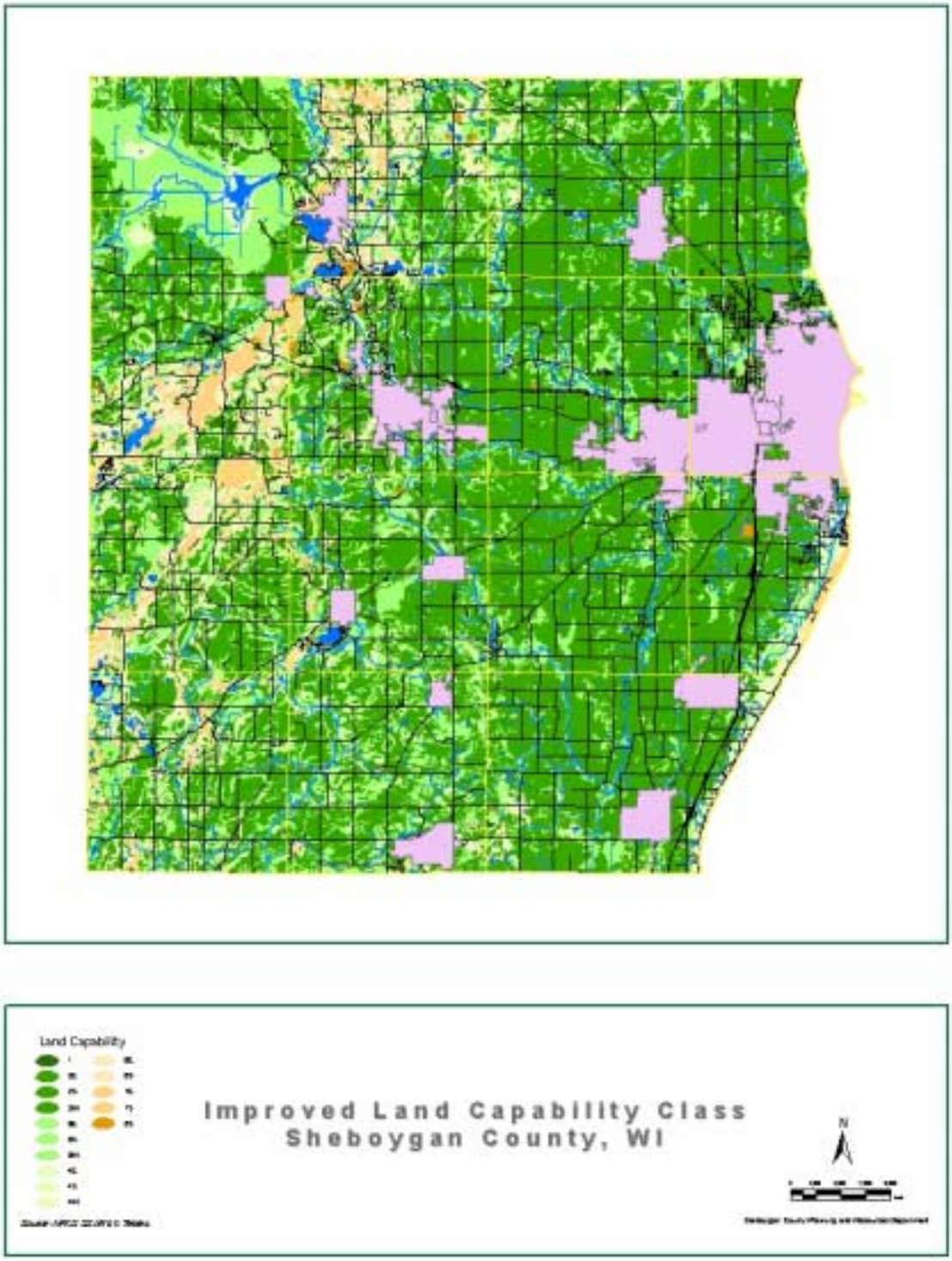
Map 1.15- Potential Gravel Sources



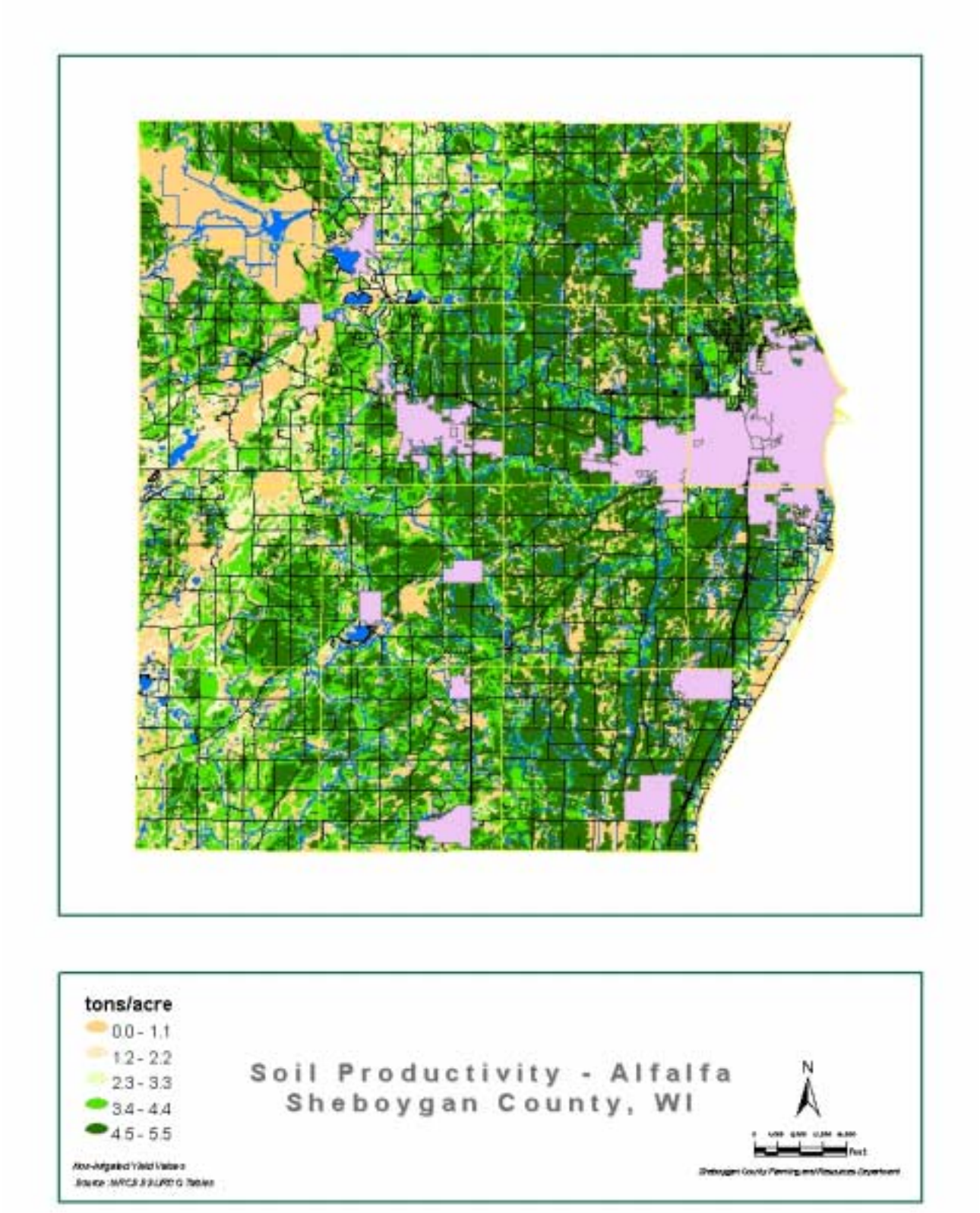
Map 1.16 Farmland Designation



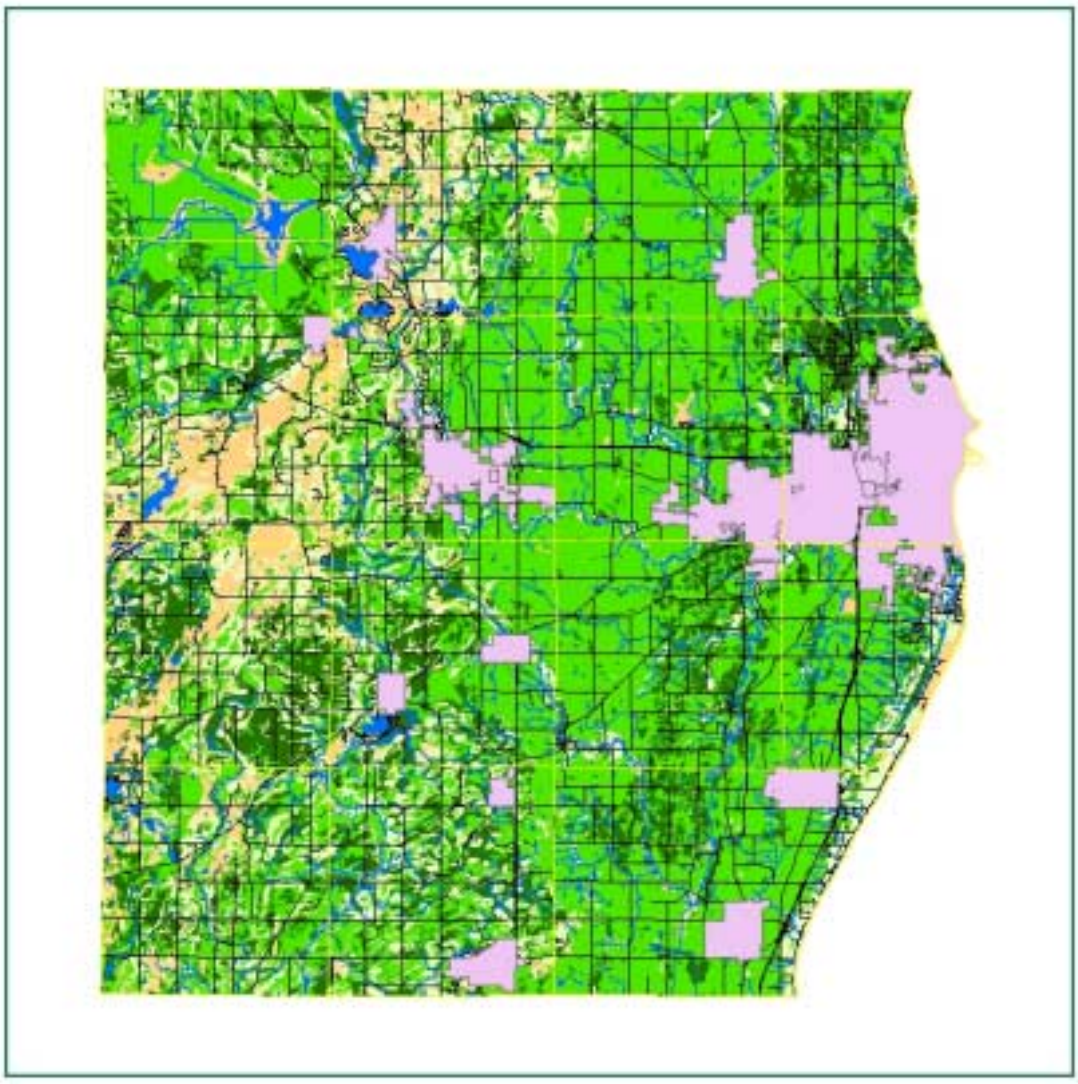
Map 1.17- Improved Capability Class



Map 1.18- Soil Productivity: Alfalfa



Map 1.19- Soil Productivity: Corn



Map 1.20- Soil Productivity: Soybeans