

NATURAL, AGRICULTURAL, AND CULTURAL RESOURCES

5.1 NATURAL RESOURCES

Importance of the Community Natural Resource Base

The natural resource base of the Town of Madge is directly interconnected to land use. The community's natural resource base impacts activities such as farming and forestry. Quality and quantity of natural resources directly influences the productivity and sustainability of land use activities. Residential development is greatly influenced by the presence of natural attributes such as woodlands, lakes, rivers, and wildlife, which attract both residents and visitors to the community. Furthermore, community economy is linked to revenues generated through tourist expenditures and agricultural productivity, both of which rely on the continued viability of the community natural resource base.

Due to the interconnectedness of land use and community natural resources and the role natural resources play in defining community character, it is important that community planning emphasize resource sustainability and protection of sensitive environmental features.

The maintenance of resource quality in the future is directly related to land use. Impacts to air, land, wildlife, and water are generated by every land use activity; and it is the cumulative effect of these activities, which can create environmental problems.

Background

The Town of Madge, located in the southeastern part of Washburn County, encompasses approximately 21,824 acres. Madge was once part of Bashaw, Spooner, Shell Lake, and Long Lake before it became a town in 1915. Lakeview, Madge, and Rockford Park are located in Madge. James S. Devereaux, a Shell Lake postmaster, may have named the town Madge, after his daughter.

Topography

The Town of Madge is located within the Central Plains geographic province of Wisconsin, a region characterized by low to moderate topographic relief. Surface elevations in Madge range from a maximum of approximately 1,372 feet (derived) in the county forest north of Harmon Lake to minimum of approximately 1,099 feet (derived) at Crystal Brook in the northwestern part of the town. Topography and slope are depicted in Map 5.1.

Slopes

Steeply sloping lands can present challenges or pose barriers to development. Steepness of topography is commonly expressed as percent slope (vertical rise /horizontal run *100). As a general rule, slopes in excess of 20 percent are of greatest concern for any land disturbing activity. Steep slopes do not necessarily preclude all forms of development; although, costly engineering and site preparation/mitigation measures are required in order to minimize potential adverse impacts. Potential problems associated with development of excessively sloping lands include erosion and slope stability.

Slopes in the Town of Madge range from level to nearly 37 percent. The steepest slopes are found in scattered locations throughout the town, primarily associated with water bodies. Steeply sloping lands are also common in the north-central parts of the town, in the vicinity of Glendennon Lake. The principal existing land use in these areas is currently woodlands and residential. Any proposed future development of these lands will require consideration of site-specific topographic constraints.

Soils

An understanding of local soils is a critical component of land use planning. Soil conditions influence productivity of agricultural lands and forests and may pose obstacles to land and infrastructure development. Soil factors such as wetness, drainage capacity, strength, and depth to bedrock all influence soil suitability for land uses. In order to evaluate soil suitability for land uses, soil criteria for each use must be well defined and the suited soil regions must be identified.

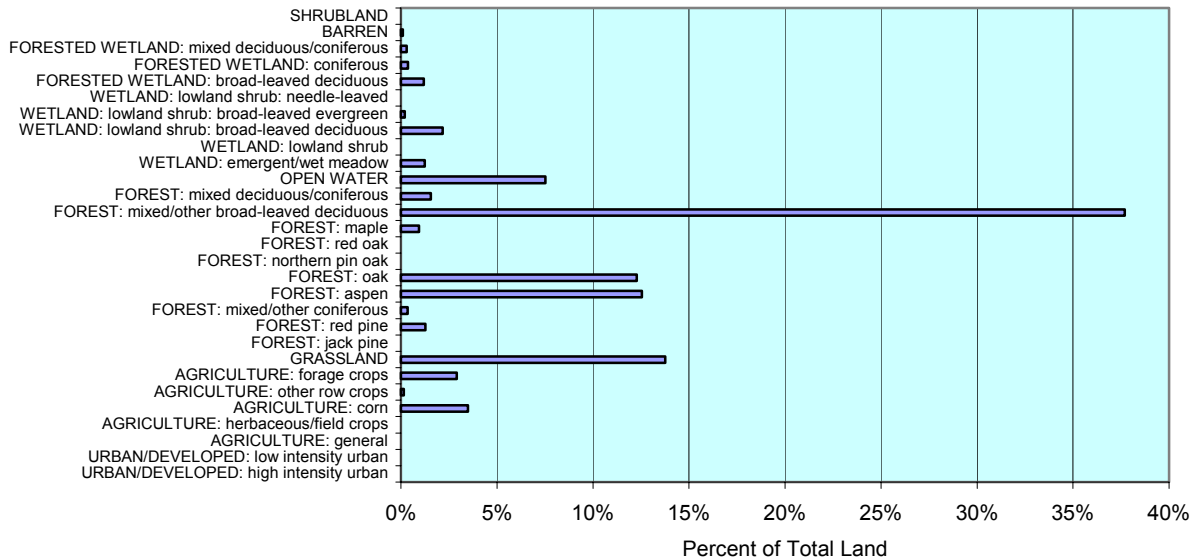
Soil properties which limit land uses or restrict land use activities are referred to as limitations or limiting factors. Different soil types vary widely in terms of their distribution and limitations for specified uses. The spatial distribution of soils in the Town of Madge have been inventoried and mapped by the Natural Resource Conservation Service (NRCS) and soil properties identified. Soil limitations for specified uses are defined as “slight”, “moderate”, or “severe”. Soils rated with severe limitations have one or more properties that are generally considered unfavorable for the specified land use or activity. A “severe” rating implies that substantial cost may be incurred through special designs or construction practices, remediation, or soil maintenance practices in order to overcome the limitation. Soils that exhibit these limitations should therefore generally be avoided, and development should be guided into more appropriate locations.

While soil inventory and interpretation does provide an accurate representation of soil characteristics at the local level, this data should not supplant the evaluation of individual site soil characteristics; therefore, the following soil information should be used as a general guide for local officials, planners, citizens, and developers. Soil types are portrayed in Map 5.2 and soil limitations are depicted in Map 5.3.

Land Cover

Land cover information for the Town of Madge was obtained from the WISCLAND (Wisconsin Initiative for Statewide Cooperation on Land Cover Analysis and Data) data set. This data represents surface vegetation, open water, and urban area delineation based on interpretation of dual year satellite imagery. The data presents a generalized view of community land cover and should not replace individual site examination. WISCLAND land cover is depicted in Map 5.4.

Figure 5.1: Town of Madge Land Cover Class by Percent of Total Area



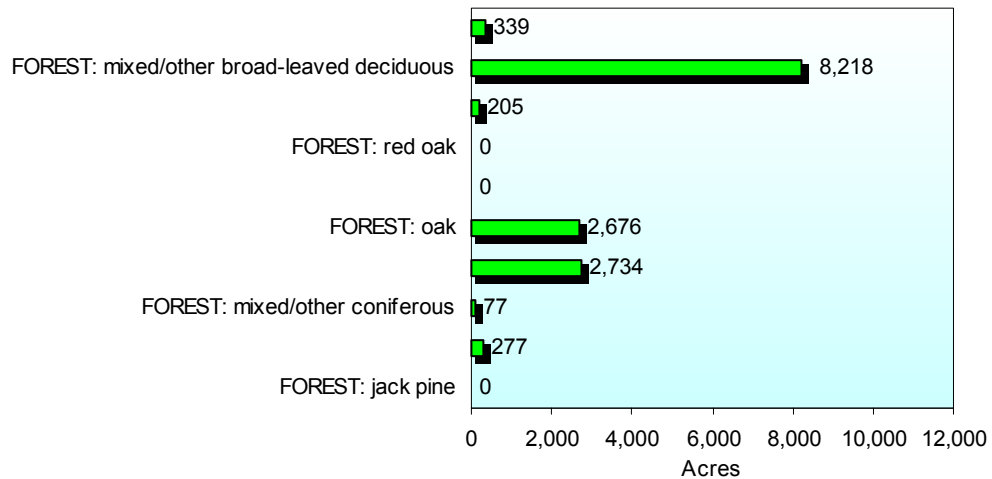
Source: WISCLAND Satellite Imagery

Forest Resources

Forests are one of the most defining characteristics of northern Wisconsin. The forest resource represents significant cultural, social, environmental, and economic assets to the area. Forests provide a range of benefits including wildlife habitat, forest products, recreational opportunities, and aesthetics. They are also very important in protecting and enhancing local water quality.

The dominant forest cover type in the Town of Madge is mixed/other broad-leaved deciduous, which comprises over 8,000 acres. Aspen, oak, and mixed deciduous/coniferous forest land account for the bulk of remaining forestlands in the Town of Madge.

Figure 5.2: Forest Cover Types, Approximate Area, Town of Madge



Source: Information obtained through GIS analysis using WISCLAND data set

The majority of forests in the Town of Madge are currently under private ownership, with approximately 65 acres of forestland owned by industrial forest companies.

County Owned Forest Lands

There are approximately 3,228 acres of county-owned forestlands in the Town of Madge. The Washburn County Forestry Department manages these forests following their forest management plan.

Town-Owned Forest Lands

The Town of Madge owns several parcel of land and manages the property for timber harvesting. For example, the 40-acre area once used as the town landfill is now managed for timber harvesting.

State-Owned Forest Lands

There are approximately 102 acres of state managed land in the Town of Madge. The National Audubon Society owns the majority of the 102 acres, with an agreement with the Wisconsin DNR to manage these lands. The remainder of the 102 acres is state-owned land representing islands.

Federally Owned Lands

There is no federally owned land in the Town of Madge.

Surface Water Resources

Water resources in the Town of Madge are environmentally, socially, and economically significant. These resources represent unique and complex environments supporting a wide range of biological diversity. The aquatic influence extends beyond the confines of the lake or stream and impacts the diversity of surrounding terrestrial communities.

Surface water resources represent central components of natural environmental corridors, serving as a natural organizational framework for Washburn County, linking communities to each other and to the environment. The corridors are centered on the water bodies, wetlands, and woodlands and contain some of the most critical plant and animal habitat in the county.

Water resources represent one of the most significant factors in defining the “northwoods” character of northern Wisconsin. Results of the comprehensive planning survey indicate that water resources are important recreational assets. Lakes, rivers, and streams provide residents and visitors with recreational opportunities and provide economic benefits through tourism and development.

Over the past 30 years, nearly two-thirds of all lakes ten acres and larger were developed in northern Wisconsin. Continuing pressure is being placed on water resources and the number of people using these resources continues to grow annually.

The quality and quantity of surface water resources is correlated to land use activities. Land use change is a primary factor causing water quality and habitat degradation in northern Wisconsin’s surface waters. The intensity of activity is also a vital land use characteristic related to water

quality as issues such as livestock density, septic system density, traffic density, or proportion of impervious surfaces can influence the quality of surface water resources. In 1987, Wisconsin initiated a surface water protection policy after a federal judge ordered the state to comply with the revised federal Clean Water Act, which instructed states to protect their most outstanding lakes, flowages, and streams from the dumping of polluted wastewaters.

Water Quality

The water quality in the lakes found in the Town of Madge is generally excellent. Much of the town’s land is a headwaters region for either the Red Cedar or Namekagon Rivers. The area receives about 30 inches of precipitation annually, and rain and snowmelt replenish groundwater that, in turn, replenishes the numerous lakes, ponds, wetlands, and streams. The large amount of forestland in the town limits the amount of surface runoff helping to keep water quality high. Only a small number of the town’s lakes have been monitored and analyzed to establish detailed measurements of water quality and identify major threats. At the county and state level, the WDNR has conducted broad surveys of surface waters in an attempt to identify unique and valuable lake, stream, and river resources.

Surface water resources were evaluated and numerically rated for water quality, fish, wildlife, and aesthetic values by the Wisconsin Department of Natural Resources. Some water bodies were proposed for designation in Chapter 102, Wisconsin Administrative Code, (*Water Quality Standards for Wisconsin Surface Waters*), as Outstanding Resource Waters (ORW). Such a designation allows for special protection under NR 102. ORW resources were rated as having high quality values associated with water quality, fish, wildlife, and aesthetic characteristics. Exceptional Resource Waters (ERW) are similar to ORW in characteristics but did not score as high in the ranking system and are not included in NR 102 revisions. ORW get the highest protection possible under Wisconsin law with no water degradation allowed in the future. Any discharges into ORW must be as clean as the background water quality. Table 5.1 lists all designated ORW and ERW located in Washburn County. Surface water resources for the Town of Madge are depicted in Map 5.5.

Table 5.1: ORW & ERW Waters Located in Washburn County

| Water Resource | Status | Municipality |
|--|--------|------------------------------------|
| Bass Lake (T40N-R10W-Sec. 17) | ORW | Bass Lake |
| Beaver Brook | ORW | Beaver Brook |
| Long Lake | ORW | Long Lake, Madge, Birchwood |
| Middle McKenzie Lake | ORW | Casey |
| Namekagon River | ORW | Bass Lake-Chicog-Springbrook-Trego |
| S. Fork Bean Brook | ORW | Stone Lake |
| Sawyer Creek | ORW | Bashaw |
| Dago Creek | ERW | Evergreen |
| Shell Lake | ORW | City of Shell Lake |
| Stone Lake (T39N-R10W-Sec. 24) | ORW | Stone Lake |
| Chippanazie Creek Tributary (T41N-R10W-Sec. 9 to 16) | ERW | Stinnett |
| Chippanazie Creek | ERW | Stinnett |
| Crystal Brook | ERW | Madge |

Table 5.1: ORW & ERW Waters Located in Washburn County

| Water Resource | Status | Municipality |
|---|--------|---------------------------|
| Dahlstrom Brook | ERW | Bashaw |
| Godfrey Creek | ERW | Stone Lake |
| Gull Creek | ERW | Springbrook |
| Little Bean Brook | ERW | Bass Lake |
| McKenzie Creek | ERW | Casey & Chicog |
| Namekagon River Tributary (T41N-R13W-Sec. 18) | ERW | Casey, Chicog, & Brooklyn |
| Shell Creek | ERW | Minong |
| Spring Brook | ERW | Springbrook |
| Whalen Creek | ERW | Trego |
| Yellow River Tributary (T38N-R13W-Sec. 4) | ERW | Bashaw |
| Yellow River Tributary (T39N-R12W-Sec. 31) | ERW | City of Spooner |

Source: Wisconsin Department of Natural Resources

At 3,200 acres, Long Lake is the largest Outstanding Resource Water found in Washburn County. The lake is a major recreational resource both locally and regionally. Water quality in Long Lake is currently good but recent trends indicate that this quality is declining.

One common measure of lake quality is the amount of phosphorous in the water. Phosphorous is the nutrient responsible for algae blooms; and lakes with more phosphorous are generally more green in color, less clear, and have lower levels of oxygen available for fish. The 1997 Long Lake Management Plan included specific goals for water quality stated in terms of phosphorous concentrations in different portions of the lake. Figure 5.3 shows the location of basin monitoring sites in Long Lake). Table 5.2 shows these goals as well as the results of recent water quality testing. The results show that Long Lake is not meeting its water quality goals; the DNR recently categorized Long Lake as a eutrophic lake based on its declining water quality.

Figure 5.3: Approximate Locations of Water Quality Monitoring Sites on Long Lake

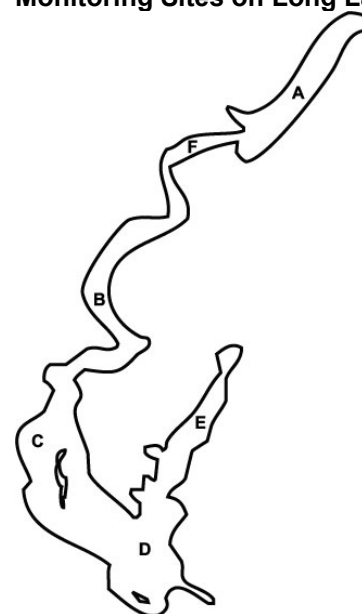


Table 5.2: Water Quality Goals and Actual Measurements in Long Lake

| Basin | Goal | 1994 summer average | 1998-2001 summer average | 2002-2003 summer average |
|---------------------|---------|---------------------|--------------------------|--------------------------|
| A | 16 ug/L | 16 ug/L | 22 ug/L | 21.5 ug/L |
| B | 17 ug/L | 17 ug/L | 20 ug/L | NA |
| C | 19 ug/L | 19 ug/L | 19 ug/L | NA |
| D | 18 ug/L | 18 ug/L | 20 ug/L | NA |
| E | 17 ug/L | 17 ug/L | 19 ug/L | NA |
| F (between A and B) | NA | NA | 20 ug/L | 25 ug/L |

The 1997 Long Lake Management Plan provides an analysis of the sources of phosphorous in Long Lake. Table 5.3 lists these sources. Surface runoff includes snowmelt and storm water that drains into Long Lake or its watershed. Internal loading results from annual lake turnover and the mixing of organic sediments from the lake bottom. Atmospheric deposition of phosphorous results from rain and snow falling directly into the lake and dust settling on the lake. Groundwater contributions come from underwater springs in the lake. Septic systems contribute phosphorous both from functional systems where the soil is saturated with phosphorous and failing systems that deliver waste to the lake. Of these sources of phosphorous, surface water runoff and septic system contributions are the only components that can be readily managed by human intervention. As the area becomes more built up, the amount of phosphorous contributed by runoff is likely to increase and lake water quality goals will be more difficult to reach.

Table 5.3: Annual Phosphorous Budget for Long Lake

| Phosphorous Source | Amount (pounds per year) | Portion of Total |
|--------------------|--------------------------|------------------|
| Surface Runoff | 2,322 | 40% |
| Internal Loading | 1,409 | 24% |
| Atmospheric | 928 | 16% |
| Groundwater | 877 | 15% |
| Septic Systems | 233 | 4% |
| Total | 5,779 | |

Section 303(d) of the federal **Clean Water Act** requires the State of Wisconsin to periodically prepare a list of all surface waters in the state for which beneficial uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality limited lakes, rivers, and streams that do not meet surface water quality standards and are not expected to improve within the next two years.

Waters placed on the 303(d) list require the preparation of **Total Maximum Daily Loads** (TMDLs), a key tool in the work to clean up polluted waters. TMDLs identify the maximum amount of a pollutant allowed to be released into a water body so as not to impair uses of the water and allocate that amount among a variety of sources.

Currently, five lakes in Washburn County are classified as 303(d) water bodies, based on elevated levels of mercury (2002 approved list and 2004 proposed list). In the future, as additional testing of area lakes is performed, more lakes may be added to the 303(d) water bodies if found to exceed minimum thresholds.

Harmon Lake in the Town of Madge has been identified as being a 303(d) water body. Each of these water bodies has a low priority ranking under the State of Wisconsin Priority Watershed Program, which provides grants to local governmental units in both urban and rural watersheds selected for priority watershed projects.

- Gilmore Lake (Minong Twp.)
- Harmon Lake (Madge Twp.)
- Minong Flowage (Minong Twp.)
- Silver Lake (Brooklyn Twp.)
- Spring Lake T40 R11W S25 (Springbrook Twp.)

Watersheds

A watershed can be defined as interconnected area of land draining from surrounding ridge tops to a common point such as a lake or stream confluence with a neighboring watershed. The Wisconsin Department of Natural Resources has transitioned its resource management approach to utilize watershed boundaries rather than political or social boundaries.

Both the Brill and Red Cedar River and Shell Lake and Upper Yellow River watersheds are in the Town of Madge. The Brill and Red Cedar River watershed is part of the Lower Chippewa River Basin. Washburn County watersheds are depicted on Map 5.6.

When considering water quality in Madge's lakes, streams, and wetlands, it is important to include the entire watershed of a given water body. This is because the chemical composition of surface water is largely the product of land uses in the area where storm water and snow melt that it drains from. For example, agricultural areas yield higher amounts of nutrients and sediment in runoff than do forested areas.

Most of the lake watersheds in Madge are surrounded by forestland, though some are more heavily impacted by nearby agricultural uses. The total Long Lake watershed, for example, is about 90 percent forested. Besides the type of plant cover, watersheds can be impacted by the amount and connectivity of impervious surfaces located within their borders. It does not take a large amount of impervious surface to impact a stream or lake; as little as 5 percent impervious surface can degrade water quality and lead to a decline in fish population and diversity. Managing storm water at the watershed scale is an important strategy for protecting the long-term condition of surface waters.

In addition to storm water and nutrients, invasive species in lakes, wetlands, and streams present another natural resource issue best managed at the watershed scale. For example, an upstream lake that becomes infested with Eurasian water milfoil is likely to spread this invasive plant to downstream lakes. A lake that is infested with rusty crayfish can spread this invasive arthropod both upstream and downstream because the crayfish is capable of moving in both directions. Currently, these or other invasive species do not impact the watersheds in the Town of Madge, but should they enter one part of a watershed they will likely spread to other parts.

Surface waters such as lakes and streams that are not physically connected can still impact one another through groundwater transport. A wetland or lake polluted from a landfill, for example, can contribute pollution to other lakes through groundwater. The groundwater-shed is more difficult to delineate and operates on a time scale that is difficult to measure and predict. This is because groundwater movement is largely determined by the makeup of subsurface soils and bedrock, which are not easily studied.

Town of Madge Lake Characteristics

Seventeen named and 60 unnamed lakes representing over 63 miles of shoreline are within the Town of Madge. Named lakes in the town are relatively deep, with the deepest being Big Devil Lake at 75 feet and Long Lake at 74 feet. The smaller unnamed lakes are generally shallower, with an average maximum depth of less than 10 feet.

Table 5.4: Named Lakes

| Name | Location Sec. T-N R-W | Surface Acres** | Maximum Depth | Miles of Shoreline** | Miles of Public Shoreline | Percent of Private Shoreline |
|-------------------|-----------------------|-----------------|---------------|----------------------|---------------------------|------------------------------|
| Alder Lake | 8-38-11 | 11.3 | 32 | 0.54 | 0 | 100 |
| Baker Lake | 10-38-11 | 113.7 | 21 | 4.30 | 1.21 | 72 |
| Big Devil Lake | 33-38-11 | 162.2 | 75 | 3.30 | 0 | 100 |
| Chinty Lake | 28-38-11 | 16.2 | 25 | 0.79 | 0 | 100 |
| Crystal Lake | 2-38-11 | 28.5 | 29 | 1.33 | 0.09 | 93 |
| Deep Lake | 18-38-11 | 42.7 | 29 | 1.77 | 0.01 | 99 |
| Glendennon Lake | 4-38-11 | 10.9 | 7 | 0.57 | 0 | 100 |
| Harmon Lake | 13-38-11 | 95.8 | 33 | 3.80 | 2.55 | 33 |
| Leesome Lake | 16-38-11 | 146.1 | 53 | 4.56 | 0.32 | 93 |
| Little Devil Lake | 29-38-11 | 55.6 | 34 | 2.16 | 0.01 | 100 |
| Long Lake | 15-37-10 | 3289.7 | 74 | 38.00 | 0.29 | 99 |
| Moody Lake | 20-38-11 | 49.3 | 30 | 2.57 | 0 | 100 |
| Oak Lake | 7-38-11 | 33.1 | 50 | 1.08 | 0 | 100 |
| Ripley Lake | 19-38-11 | 42.4 | 25 | 1.69 | 0 | 100 |
| Seymour Lake | 15-38-11 | 69.2 | 15 | 1.91 | 0 | 100 |
| Stauffer Lake | 13-38-11 | 42.0 | 10 | 1.88 | 1.88 | 0 |
| Stone Lake | 31-38-11 | 38.5 | 9 | 1.16 | 0 | 100 |

Source: Washburn County Lakes Classification

**These figures represent acres, miles of shoreline and miles of public shoreline of entire water body, which may cross jurisdictional boundaries

Lake Types

The named lakes of the Town of Madge are classified in three categories.

Spring Lakes – These lakes have both an inlet and outlet where the main water source is stream drainage.

Seepage Lakes – These lakes do not have an inlet or an outlet and only occasionally overflow. As landlocked water bodies, the principal source of water is precipitation or runoff, supplemented by groundwater from the immediate drainage area.

Drainage Lakes – These lakes have no inlet, but like spring lakes, have a continuously flowing outlet. Their primary source of water is from precipitation and direct drainage from the surrounding land.

Lakes Classification System

The Washburn County Lakes Classification System was developed as a way to assess county surface water resources based on the characteristics of individual water bodies. Lakes in Washburn County were evaluated based on the following criteria:

- | | |
|-------------------|------------------------------------|
| Lake surface area | Size of the watershed |
| Maximum depth | Shoreline Development Factor (SDF) |
| Lake Type | Development density |

Each one of the evaluation criteria for each lake received a score from 0 to 3 based on the lake characteristics. The total sum of all scores is referred to as the *vulnerability ranking*, which ranges from 0 to a possible score of 24. These rankings are used to then define the lake classification assigned.

| <u>Overall Vulnerability Ranking</u> | <u>Lake Classification</u> | <u>Protection Level</u> |
|--------------------------------------|----------------------------|-------------------------|
| Score of 13 and greater | 1 | Minimum |
| Score of 10 to 12 | 2 | Moderate |
| Score of 9 or less | 3 | Maximum |

The Washburn County shoreland zoning ordinance regulates development on all county waterways, including surface waters in the Town of Madge.

Table 5.5: Lakes Class & Development Standards

| Name | Score | Class | Lot Frontage per Single Family Unit | Minimum Lot Area | Minimum Shoreline Setback¹ | Vegetation Removal² | Minimum Side Yard Setback³ | Minimum Rear Setback |
|-------------------|--------------|--------------|--|-------------------------|--|---------------------------------------|--|-----------------------------|
| Alder Lake | 9 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Baker Lake | 9 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Big Devil Lake | 14 | 1 | 150' | 30,000 ft ² | 75' | 30'/50' | 10'/30' | 40' |
| Chinty Lake | 9 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Crystal Lake | 9 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Deep Lake | 11 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Glendennon Lake | 7 | 3 | 300' | 3 Acres | 100' / 125' | 30'/75' | 30'/90' | 40' |
| Harmon Lake | 9 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Leesome Lake | 10 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Little Devil Lake | 10 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Long Lake | 16 | 1 | 150' | 30,000 ft ² | 75' | 30'/50' | 10'/30' | 40' |
| Moody Lake | 7 | 3 | 300' | 3 Acres | 100' / 125' | 30'/75' | 30'/90' | 40' |
| Oak Lake | 11 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Ripley Lake | 10 | 2 | 200' | 80,000 ft ² | 100' | 30'/75' | 20'/60' | 40' |
| Seymour Lake | 8 | 3 | 300' | 3 Acres | 100' / 125' | 30'/75' | 30'/90' | 40' |
| Stauffer Lake | 5 | 3 | 300' | 3 Acres | 100' / 125' | 30'/75' | 30'/90' | 40' |
| Stone Lake | 8 | 3 | 300' | 3 Acres | 100' / 125' | 30'/75' | 30'/90' | 40' |

Source: Washburn County Zoning Ordinance

Perennial and Intermittent Rivers, Creeks, and Streams

Riparian surface features such as rivers, creeks, and streams represent unique and diverse natural systems. The quality and quantity of these resources is linked to land use and human activities.

There are two kinds of streams, perennial and intermittent. Perennial streams flow throughout most (>50%) of the year. Intermittent streams usually flow only after rainstorms or snowmelt and are, therefore, dry most of the year. Intermittent streams must be protected because they

¹ Minimum Shoreline Setbacks Class I –100' lakes, 125' rivers. Setback averaging per section 271(1) Washburn County Zoning Ordinance applies to Class I and II.

² Vegetation Removal = Removal Corridor/feet from Ordinary High Water Mark (OHWM)

³ Minimum Side Yard Setback = Feet Off One Side/ Feet Total Both Sides

channel runoff into perennial streams and lakes and may become part of the aquatic ecosystem when water flows in them.

There are approximately four miles of rivers, creeks, and streams in the Town of Madge. Crystal Brook is the only stream classified as a Class I trout stream. Class I trout streams are high quality trout waters, which have sufficient natural reproduction to sustain populations of wild trout at or near carrying capacity.

Floodplains

Floodplains are lands adjacent to rivers or streams, which are subject to periodic, recurring inundation by water. Due to the flood-prone nature of these lands, development and other land use activities within this zone are strongly discouraged. Appropriate land uses for these areas would consist of resource protection and wildlife habitat uses.

Flood Hazard Assessment

The Federal Emergency Management Agency (FEMA) has defined areas of flood susceptibility in the Town of Madge. Flood prone areas were determined by statistical analyses of records of river flow and rainfall, information obtained through consultation with the community, floodplain topographic surveys, and hydrologic and hydraulic analyses.

Washburn County has adopted flood plain regulations that apply to all bodies of water in the county. Determination as to whether a building site is located in a flood plain must be made through zoning office review of flood plain maps or through field verification of flood boundary. Flood plains in the Town of Madge are depicted in the Map 5.7.

Groundwater

Groundwater Quantity

Under natural conditions, a balance exists between the volume of water entering an aquifer and the volume of water discharged from an aquifer. With the development of wells, the natural balance between recharge rates and discharge rates has been disrupted. In Wisconsin, the overall groundwater supply has diminished due to increased discharge. Natural fluctuations in groundwater supply can occur due to droughts or natural seasonal precipitation fluctuations.

Groundwater Quality

The quality of natural groundwater varies by location. As groundwater passes through natural sediments, naturally occurring chemicals may become deposited in the water. While naturally occurring groundwater contamination is generally mild, human-induced contaminants can make groundwater supplies unusable. The quality of groundwater is directly related to land use activities. The application of fertilizers, chemical spills, urban runoff, and non-point pollution can contribute to decreased quality of groundwater reserves.

Groundwater Depth and Contamination Susceptibility

Groundwater depths (see Map 5.8) in the Town of Madge range from 0-20 feet around Long Lake in the southeastern portion of the town to 50 feet or greater in the western third of the town. Groundwater contamination susceptibility corresponds to groundwater depth, with shallow groundwater depths being the most vulnerable areas for potential contamination. These areas are of significant concern in relation to the installation of conventional septic systems. The eastern

two-thirds of the Town of Madge are generally considered to be highly susceptible to groundwater contamination (Map 5.9).

Non-point Source Pollution

Non-point source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include:

- excess fertilizers, herbicides, and insecticides from agricultural, commercial, and residential areas;
- oil, grease, and toxic chemicals from urban runoff and energy production;
- sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- bacteria and nutrients from livestock, pet wastes, and faulty septic systems; and
- atmospheric deposition and hydro modification.

With few if any point sources of water pollution (factories, water treatment plants, etc.), NPS is the most pressing threat to water quality in the Town of Madge.

Environmental Corridors

Environmental Corridors are defined by the Wisconsin Department of Natural Resources as:

“Linear areas of natural resources that are critical to maintaining water quality and quantity and to providing habitat linkages that ensure biological diversity. Environmental corridors are often associated with rivers and streams.”

Natural benefits provided by environmental corridors include air filtration, erosion control, and improved water quality. In addition, these natural features benefit the overall quality of life in the area and reduce the need for more expensive man-made solutions to water quality issues.

Many areas within these corridors provide important habitats for land and aquatic plants and animals. Connected habitats are superior to disjointed habitats, and larger habitats are better for ensuring the survival of a species than smaller areas. Ensuring these corridors can continue to work as a system and the relationships between plants, insects, animals, land, and water continue to function properly are critical to environmental health and continued biological diversity.

The impacts and benefits of these corridors are not limited to one community or the responsibility of one jurisdiction. These areas follow natural boundaries and do not stop at political boundaries. Coordination among communities/jurisdictions is necessary in order to achieve the environmental, economic, cultural, community building, and health benefits, which can be attributed to these natural features. Development corridors are depicted in Map 5.10.

Wetlands

Wetlands represent one of the most unique and diverse elements of the natural community. Defined by the presence of water and water-loving vegetation, these communities support a

range of plants and animals adapted to survive and thrive in this wet environment, including many threatened and endangered species. These environments provide additional benefits through the services they provide.

- Wetlands act as natural filters removing nutrients and chemicals from the water and are often constructed as bio-engineered water filtration devices used to treat and cleanse municipal wastewater or urban runoff.
- Wetlands serve as natural flood control devices by intercepting and holding water, a service that reduces flood risk to local communities.
- Wetlands also serve as groundwater recharge supplies for Washburn County communities.
- Wetland vegetation serves to stabilize stream banks and watercourses. This action reduces overall soil erosion and protects water quality by reducing siltation and sediment loads.

The United States Army Corps of Engineers, the Wisconsin Department of Natural Resources, and local zoning codes regulate wetlands. Section 404 of the Clean Water Act establishes programs to regulate the discharge of dredged and fill material into waters of the state including wetlands and is the primary federal regulatory program for wetlands.

Article 27 (Shoreland Regulations) of the Washburn County Zoning Ordinance regulates the use/alterations of wetlands in the county. The regulations contained within this document apply to all lands within 1,000 feet of the ordinary high-water mark of any navigable lake, pond, or flowage and those lands within 300 feet of the ordinary high-water mark of any navigable river or stream.

Wetlands have been delineated by the Wisconsin Department of Natural Resources. The Wisconsin Wetland Inventory (WWI) displays all wetland areas within Washburn County, which are greater than five acres in size. Washburn County has 518,236 surface acres, of which 79,140 acres are wetlands. Based on the WWI data, the Town of Madge has approximately 1,264 acres of wetlands (wetlands five acres and larger).

The majority of wetlands in the Town of Madge are classified as *Scrub/Shrub* wetlands; these communities include bogs and alder thicket and are characterized by woody shrubs and small trees such as tag alder, bog birch, willow, and dogwoods. *Emergent/wet meadow* wetlands are the second most dominant type found in the town. These wetlands may have saturated soils rather than standing water. Sedges, grasses, and reeds are dominant species in *Emergent/wet meadow* wetlands. Species such as blue flag iris, marsh milkweed, sneezeweed, mint, and several species of goldenrod and aster may also be present. *Forested wetlands* comprise the next largest wetland type in the Town of Madge and include bogs and forested floodplain complexes

| Name | Approximate Acres |
|--------------------------|--------------------------|
| Scrub/Shrub | 343 |
| Emergent/Wet Meadow | 329 |
| Forested | 325 |
| Aquatic Bed | 267 |
| APPROXIMATE TOTAL | 1,264 |

Source: NWRPC

⁴ Based on Wisconsin Wetland Inventory data, 5-acre minimum mapping unit.

and are characterized by trees 20 feet or more in height such as tamarack, white cedar, black spruce, elm, black ash, green ash, and silver maple. The least common type of wetland in the town is *Aquatic Bed*, which is comprised of plants growing entirely on or in a water body no deeper than 6 feet. Plant species present may include pondweed, duckweed, lotus, and water lilies. Wetlands are depicted in Map 5.7.

Resources of Concern

The Town of Madge provides habitat for many species of wildlife, including rare, threatened, or endangered species of plants and animals. These critical resources have been documented by the Wisconsin Department of Natural Resources as part of the Natural Heritage Inventory Program. The specific location of endangered resources is confidential.

Plants and animals threatened with extinction are protected under federal and state endangered species legislation. Protection is not limited to only the individual species but includes protection of habitat critical to the species' survival. Natural Heritage Inventory List for the Town of Madge includes the following plants and animals.

| Birds | Scientific Name | Status |
|----------------------------|---------------------------------|------------------------|
| <i>Osprey</i> | <i>Pandion Haliaetus</i> | <i>Threatened</i> |
| <i>Bald Eagle</i> | <i>Haliaeetus Leucocephalus</i> | <i>Special Concern</i> |
| Plants | | |
| <i>Arrow-Headed Rattle</i> | <i>Boxcrotalaria Sagittalis</i> | <i>Special Concern</i> |
| <i>Adder's Tongue</i> | <i>Ophioglossum Pusillum</i> | <i>Special Concern</i> |

Other endangered, threatened, or rare species or communities may also occur within the Town of Madge. Locations of these critical resources are mapped to the section level in order to protect the security of these resources. Dory's Bog at Hunt Hill in the southeast end of the town is also a significant resource to the town and surrounding area.

Mineral Resources

Development of metallic mineral resource in the Town of Madge is not expected to occur within the town. To date, no mineral deposits are known to exist within the town. There are no non-metallic mining operations, generally that of gravel and sand, within the town.

To minimize adjacent land use conflicts, it is important that operations relating to non-metallic mining and metallic mining operations if ever developed are conducted in a way that minimizes the effects of noise, air, and water quality to the adjacent area.

5.2 AGRICULTURAL RESOURCES

Productive Agricultural Lands

Agricultural lands play an important role in defining the character of many Wisconsin communities. While not a considerable land use in each Washburn County community, agriculture is an economically and culturally significant activity in some portions of the county.

Wisconsin's Comprehensive Planning legislation requires communities to review and analyze their agricultural land base and to formulate goals, objectives, and policies for preserving prime agricultural lands. Prime farmlands are depicted in Map 5.11.

County Agricultural History

Early agricultural activities in Washburn County were primarily focused on providing food supplies to lumber camps; and by 1935, there were 1,754 farms producing on 215,316 acres of cropland. Low yields due to poor soil conditions caused many of these operations to fail; and by 1978, nearly 50 percent of the county's farm acreage had been sold for other uses. The greatest losses occurred between 1949 and 1969 when nearly 95,000 acres of agricultural lands were converted to other uses. Agricultural land use trends have continued a downward slide as reflected by the Agriculture Census for Washburn County, which indicates an additional 2.9 percent decrease in farmland between 1987 and 1997. Agricultural uses have declined countywide, especially in the marginal lands on the sand barrens of the northern and western parts of the county but remain a viable activity on the more productive lands of the southern parts of the county.

The decrease in overall farmland acreage coincides with an increase in the average farm size. Between the years of 1935 and 1997, the average farm size in Washburn County increased from 122.8 acres to 276 acres, a net increase of nearly 125 percent. This trend mirrors statewide trends towards farmland consolidation and reflects the combining of many smaller family farms into larger, more economical units.

Agricultural Trends in the Town of Madge

The Town of Madge has experienced a net decline in overall farmland acreage from 1967 to 2001. Between the period 1967 and 1976, the town lost 3,118 acres of farmland. During the same period, the town also lost 15 farms. From 1977 through 2001, the town lost an additional 1,784 acres of lands assessed as farmland. Further information on this topic can be found in the Land Use section of the Town of Madge Comprehensive Plan.

As of 2003, it is estimated there remain only five livestock producers: two dairy, two beef, and one sheep/buffalo. What farmland is remaining in productive use is primarily rented out to area farmers versus local town residents farming the property.

Prime Farmland (Washburn County Farmland Preservation Plan)

The Washburn County Farmland Preservation Plan (1982), drafted under the 1977 Wisconsin Farmland Preservation Act, provides detailed statistics, background information, maps, goals, objectives, and policies for farmland preservation. Prime farmland has been delineated from the Washburn County Soil Survey and is depicted in Map 5.11.

5.3 CULTURAL RESOURCES

Introduction

Community cultural resources are a significant element in defining local character. The cultural heritage of the community may consist of many things such as historic buildings, festivals,

cultural groups, entertainment, and viewsheds. This element proposes to identify a number of cultural attributes in the Town of Madge and proposes meaningful objectives to the enhancement and protection of town cultural resources. According to the Architecture and Historic Inventory (AHI), provided by the Wisconsin Historical Society, there are two sites identified in the Town of Madge. These sites are listed below in Table 5.7.

Table 5.7: Historic Sites Inventory

| Township/Range | PLS | Common Name | Historical Name | Date |
|------------------------------------|-------|--------------------|-----------------|------|
| 38-11-24 | SE/SW | New Rockford Hotel | Rockford Hotel | 1902 |
| 38-11-29 | NW/SE | The White House | | |
| Corner of Rockford Road and CTH B* | NW/SE | Duffy's Tavern | Duffy's Tavern | |
| Corner of Baker and Todd Roads | | Todd House | | 1910 |

Source: Wisconsin Architecture and History Inventory, Wisconsin Historical Society and *Town of Madge

Archaeological Sites Inventory

The Wisconsin Historical Society maintains a list of archaeological sites and cemeteries known as the Archaeological Site Inventory Database (ASI). As of May 2003, 173 archaeological sites and cemeteries have been reported to the Wisconsin Historical Society for Washburn County. These sites cover an extended period of time, which include campsites/villages/communities, cabins/homesteads, sugar mapling sites, kilns cemetery/burial/mounds, trading/fur posts, and mill/sawmills. Of the 173 sites in the county, four are reported for the Town of Madge.

Table 5.8: Archaeological Sites & Cemeteries, Town of Madge

| Site Name | Site Type | Cultural Study Unit |
|------------------------------------|------------------|------------------------|
| Tater Lake | Campsite/village | Late Woodland |
| Evergreen/Baptist Mission Cemetery | Cemetery/burial | Historic Euro-American |
| Madge Evergreen Cemetery | Cemetery/burial | Historic Euro-American |
| Harmon Lake Lumber Camp | Logging Camp | Historic Euro-American |

Source: Archaeological Site Inventory Database, Wisconsin Historical Society

There are a number of older homes that may be eligible for listing in the National Register. Because Madge has not been comprehensively surveyed for cultural resources, it may be advisable to do so. That is one of the best ways to evaluate the extent of and need for preserving Madge's cultural resources.

Viewsheds and Scenic Resources

Qualities that characterize the Town of Madge are the picturesque views common throughout the general vicinity of the town. Accessibility to the views may over time be limited or denied due to private development of land. It should be a planning policy to try and ensure that the characteristic natural landscape features are protected and that views remain accessible to the public. Land use design should consider the natural scenic views during the development review process. Planning committee members, during the planning process identified some scenic views in the town. Some of these views included the views from:

- State Highway 70 (east of CTH M) –valley to the south
- State Highway 70 overlooking Crystal Brook

5.4 NATURAL, AGRICULTURAL, AND CULTURAL RESOURCES GOALS, OBJECTIVES, ACTIONS, AND POLICIES

A set of recommended goals, objectives, and actions have been developed to assist the town in the conservation and promotion of effective management of the local natural, agricultural, and cultural resources.

NATURAL RESOURCES

GOAL: Conserve, protect, manage, and enhance the town's natural resources for the highest quality of life for town residents.

Objective 1: To protect lakeshore, streams, groundwater, and wetlands from harmful land use practices.

- a. *Educate the public on chemical runoff, importance of ground cover, the need for functioning private sanitary systems, and identification of exotic species and how to prevent their introduction.*
- b. *Insist the county provide the town with regular reports on septic pumping according to state law.*
- c. *Allow mineral extraction only under controlled conditions and where appropriate.*

Objective 2: To protect and preserve wildlife habitat.

- a. *Prohibit all wetland drainage and filling in accordance with county and state standards.*
- b. *Restore drained wetlands.*
- c. *Identify rare species and habitats.*

Objective 3: Encourage and support the Long Lake watershed project and encourage protection of the Yellow River watershed, St. Croix basin and Namekagon watershed.

- a. *Participate in joint meetings of the groups.*

Objective 4: Preserve large forested areas and review forestry practices on a regular basis to preserve the environment.

- a. *Work with county and private landowners holding large tracts of forest land on forest management practices.*
- b. *Prevent forest fragmentation.*
- c. *Request that all logging operations leave a corridor of uncut vegetation next to lakes, roads, parks, and residential areas.*
- d. *Work with the county forestry department to explore uses of waste wood.*
- e. *Work with willing landowners to create a list of land available for lease or open hunting and landowner contact information.*

- Objective 5: Maintain dark night sky.
- a. *Encourage environmentally friendly outdoor lighting.*

AGRICULTURAL

GOAL: Preservation and support existing and future agricultural activity with Town of Madge.

- Objective 1: Encourage farming practices that minimize environmental damage to surface and groundwater as well as protection of land from erosion by wind and water.
- a. *Continue to make use of programs such as EQIP (Environmental Quality Incentives Program) so as to better monitor farming practices.*
 - b. *Promote organic farming as a viable source of income in the future in the Town of Madge.*
 - c. *Encourage farmers to work with the county land conservation department on nutrient management practices.*
- Objective 2: Minimize factory farms by limiting the number of livestock per acre.
- a. *Utilize soil type and productivity of land to calculate animal capacity by working with the Washburn County Planning, Land and Resource Management Department.*
 - b. *Review development proposals as it may impact air quality.*
- Objective 3: Support continuation of state tax breaks for farmland.
- a. *Determine acres in “use value” classification and track trends over time.*
- Objective 4: Establish cooperation and communication between the town and local agricultural operators and owners.
- a. *Sponsor special annual farmers meeting with town plan commission.*
 - b. *Make conservation options available to land owners, either through the town or land trusts.*

CULTURAL

GOAL: Preservation and enhancement of cultural heritage resources, including historical structures, sites, and landscapes.

- Objection 1: Identify places of cultural and historical value.
- a. *Develop criteria to identify culturally important recreational, logging, and farming cultures.*
 - b. *Map places throughout town.*

c. Explore avenues to encourage preservation of cultural and historical resources.

Objective 2: Establish an archive of historical and cultural memorabilia.

a. Collect from current and past residents information of historical and cultural significance.

b. Develop oral histories on the area

c. Identify a location to store and share collected information.