Ashland County
Land & Water Resource Management Plan

2020-2029

ASHLAND COUNTY

LWRM PLAN ADVISORY COMMITTEE

Approved on August 6, 2019 by the Wisconsin Land and Water Conservation Board
Approved on October 10, 2019 by the Ashland County Board of Supervisors

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Ashland County
Land & Water Resource Management (LWRM) Plan
2020-2029

PLAN SUMMARY

The Ashland County LWRM Plan contains objectives and activities expected to meet goals established by the Advisory Committee. The plan is drafted for 10 years, with a work plan to be revised in 5 years. This plan guides work of the Land and Water Conservation Department in conserving water resources, reducing non-point source pollution, improving nutrient management, and implementing adaptive conservation while supporting sustainable economic and recreational resource use in Ashland County.

DEPARTMENT MISSION

Promoting sound land and water stewardship through education, technical support and consistent program delivery.

Goals, objectives, and activities established in the plan will help to guide the Department's initiatives through the year 2029. They will also provide the basis for funding those initiatives from various private, local, state, and federal sources. The plan is organized into five sections:

1. Introduction

Details the development process of the plan, and includes LWRM Plan requirements by the state, performance standards and prohibitions, related plans, county ordinances, state-related regulations, and Land and Water Conservation Department activities.

A detailed look at past planning, revised water quality data, and updated land use trends provided the Advisory Committee with information necessary to determine where the department should target time and effort. A good deal of time was spent validating the issues and concerns of the previous plan, identifying progress on previous goals, and determining if any new or emerging issues should be considered. The identified land and water goals of the previous plan (2010-2019) continue to remain today, and the Committee raised concern about increased precipitation and flooding experienced in the County since 2016. Therefore, the LWCD worked closely with the Northern Institute of Applied Climate Science (NIACS) in Houghton, Michigan to include climate science and strategies into its revised LWRM Plan. This is an effort to plan ahead, assess risk, and account for variable future conditions when designing best conservation practices that are adapted to changing conditions.

2. Resource Assessment

Includes assessments and information about soils, geology, ecological landscapes, land cover, climate, groundwater, drinking water, surface waters and watersheds, impaired waters, forest and woodlands, agricultural land, rare or endangered species, invasive species, and population.

3. Plan Goals, Objectives, and Activities and Educational Strategy

Provides a detailed implementation and education strategy for the four plan goals.

4. Plan Implementation

Identifies various departments and partners involved in implementation of the plan. This section also lists potential funding sources. A 2019 Work Plan and Expected Costs is included in Appendix C.

5. Monitoring and Evaluation

Includes methods of water quality monitoring, pollution inventory, and accomplishment tracking.

Plan Development

The LWRM plan was developed through an advisory committee including WDNR and other natural resource partners, the Ashland County Zoning Administrator, county staff, farmers, and elected officials. Natural resource partners contributed extensive data; two public informational meetings and a public hearing were held. Ashland County staff assisted with updating resource assessments, maps and work plans. The Land Conservation Committee held a public hearing on July 8, 2019.

The Ashland County Land and Water Resource Management Plan was approved by the Land and Water Conservation Board on August 6, 2019 and the Ashland County Board on October 10, 2019.

Assessment of water quality, soil erosion, and other nonpoint sources of water pollution

Surface Water Resources

The surface waters of Ashland County include 1,250 square miles of lakes, rivers, streams, intermittent waterways and wetlands. There are 157 named lakes totaling 5,936 acres (9.28 square miles). Ashland County comprises 1.9 percent of Wisconsin's total land area and contains 1 percent of the total inland lakes in Wisconsin. There are also many artificial drainage ways where the natural water flow has been altered by human activity. Sediment, nutrients, and other pollutants are carried in runoff water from watersheds that drain to these surface water features.

Ashland County contains all or parts of five Hydrologic Unit Codes (HUCs) eight sub-basins, 15 HUC 10 watersheds, and 53 HUC 12 sub-watersheds. Nemadji to Fish Creek HUC 8 is located on the southwest shore of Lake Superior in Minnesota and Wisconsin. This regional unit includes the Apostle Islands National Lakeshore, Chequamegon National Forest, and the City of Ashland. The Bad-Montreal HUC 8 extends along the shore east of Ashland to the mouth of the Montreal River in on the Wisconsin-Michigan border. Most of the Bad River Band of Lake Superior Tribe of Chippewa and the majority of Ashland County is located in this regional unit. The 25-mile Penokee-Gogebic Range is located in this area. In each of these hydrologic units, there are numerous perennial and intermittent streams and other surface drainages that carry water only during spring runoff or extreme storm events.

Ashland County has two distinct drainage basins: Lake Superior basin and the Mississippi basin. All of the water that flows to the Mississippi is contained within the Upper Chippewa River sub-basin. Soil conditions, land cover, and land use vary within each basin. The lakes, rivers, and wetlands of the county are impacted by land use practices in the watersheds that drain to them. Most of the pollutants that enter surface water resources are carried in runoff from many diffuse, or nonpoint, sources. The major pollutants of concern are sediment carried from areas with bare soil such as crop fields and construction sites, and phosphorus attached to soil particles or dissolved in runoff water from fertilized fields and lawns and livestock operations.

Urbanization and other human activities disrupt the natural course of water as it moves across a watershed. Removing vegetation and constructing impervious surfaces such as roads, parking lots, driveways, sidewalks, and rooftops greatly increases the amount and rate of stormwater runoff. As a result, water levels fluctuate more in streams. With less infiltration, there is decreased base flow and greater runoff during and after storms. These changes may bring flooding, increased water temperatures, decreased oxygen levels, greater channel erosion, and increased sedimentation. As stormwater runoff crosses the urbanized landscape, it picks up fertilizers, pesticides, debris, salt, oil, grease, other toxic substances, and sediments and carries them to surface waters.

Agricultural Trends

Agricultural lands in Ashland County have not yet experienced the intense pressures of urban sprawl and land use conversion that have occurred on other parts of the state. Industries reliant on natural resources and open space such as agriculture, forestry, recreation and tourism provide a strong foundation to the economy of the county. Despite its importance in the “northwoods”, agriculture faces many challenges: a short growing season, variable heavy clay soils, extensive wetlands, small fields bisected by waterways, long distance to services and markets, and increased precipitation and runoff due to climate change.

Ashland County saw an increase in overall number of farms and acreage from 2012 to 2017 (Table 1). In 2017, there were 263 farms (USDA 2017 Census for Agriculture) and 52,428 acres of farmland in the County, including 96 beef and 15 dairy farms. Some of the remaining farms include small numbers of horses, pigs, chickens, sheep, or goats. Like many other Wisconsin counties, Ashland has suffered a decrease in the number of dairy farms. However, beef farms have increased, and small livestock farms have more than doubled since 2012.

There were three farmland preservation agreements located in the Fields, Waters and Woods Agricultural Enterprise Area (AEA) covering 1386.45 acres and an additional two farmland preservation agreements outside the AEA covering 765.64 acres in 2018. Landowners were eligible for $10,760.45 in tax credits for farmland preservation/exclusive agriculture zoning in 2018.

Changes in climate and extreme weather are increasing the challenges for agriculture nationally and globally, and many of these impacts are predicted to continue. The Northern Institute of Applied Climate Science (NIACS), housed at Michigan Technological University, developed resources to help land managers, producers, and educators in the Midwest integrate climate change considerations and action-oriented decisions into existing conservation and farm plans. The “Adaptation Workbook” (https://forestadaptation.org/) is available for producers and land managers. It provides a structured process to identify and assess climate change impacts, challenges, opportunities, and adaptation tactics. It also provides evaluation and adaptation actions for improving responses to extreme and uncertain conditions. A synthesis of Adaptation Strategies and Approaches for Agricultural Systems, Forested Watersheds, Urban Forests and Non-Forested Wetlands (Appendix A) serves as a “menu” of potential responses for making science-based decisions to minimize future climate risks.

Groundwater Resources

The source of drinking water for the City of Ashland is Lake Superior, and groundwater is the primary source of drinking water for Ashland County residents. As with 70% of the state, the sand and gravel aquifer is the main source of groundwater. The Status of Groundwater Quantity Report (WDNR 1997) states that groundwater is abundant in Ashland County.

SUMMARY OF WORK PLAN

The following goals were developed to address concerns identified in the planning process:

Plan Goals

1. Maintain and enhance the quality of Ashland County's surface and groundwater resources.
2. Conserve and enhance the soil and terrestrial resources of Ashland County.
3. Protect and improve aquatic and terrestrial wildlife habitat in Ashland County.
4. Provide conservation education to private landowners, local officials, non-governmental organizations, and the general public through collaboration with other resource management entities.

The 2019 Annual Work Plan (Appendix C) identifies planned activities and performance measures. It also includes staff hours and expected costs (including cost sharing).

Water quality objectives in consultation with WDNR

The Wisconsin Department of Natural Resources (WDNR) emphasizes development of reports and implementation plans for Total Maximum Daily Load (TMDL) projects. A TMDL is a plan to reduce the amount of specific pollutants reaching an impaired lake or stream to the extent that water quality standards will be met. Ashland County has no TMDLs.

Agricultural performance standards

Agricultural Performance Standards will be addressed through implementation of the priority farm strategy and the Agricultural Performance Standards and Animal Waste Ordinance (Appendix E).

Progress tracking

Progress tracking involves both water quality monitoring and evaluation of progress toward meeting the goals of the land and water resource management plan.

Water quality and habitat monitoring

State and federal agencies conduct many fish and wildlife habitat monitoring activities. The LWCD does not implement habitat monitoring other than for specified invasive species. However, the LWCD will cooperate and assist other partners to conduct monitoring including water quality monitoring (surface, ground, and well water); water and sediment quantity monitoring; and wildlife species and habitat monitoring. The LWCD utilizes monitoring data from partner organizations to gain the information necessary in decision-making, and to implement programs in a cost-effective manner.

HABITAT MONITORING

State and federal agencies that emphasize fish and wildlife habitat restoration and protection have many ongoing efforts to monitor habitats and species. The LWCD does not implement habitat monitoring other than for specified invasive species.

Plan evaluation

Plan evaluation assesses whether the objectives and activities of the plan are being accomplished. Performance measures are listed for plan activities in the 2019 Annual Work Plan (Appendix C). Measures of plan success include resource monitoring, practice completion, assistance provided, compliance with standards, and educational activities completed. The LWCD will report progress against evaluation criteria in the work plan each year.

Chapter 1. Introduction

DEPARTMENT MISSION

Promote sound land and water stewardship through education, technical support and consistent program delivery.

Wisconsin Chapter 92 and Chapter ATCP 50.12 require counties to develop a Land and Water Resource Management Plan. These Plans provide counties, through their Land Conservation Committees, the tools, flexibility and funding strategies to implement statewide goals and local priorities. The Ashland County LWRM Plan contains pragmatic objectives and activities intended to meet the goals established by the Advisory Committee. The Plan is drafted for 10 years (2020-2029), but the Work Plan will be revised after 5 years or less.

The LWRM Plan guides the work of the Ashland County Land and Water Conservation Department in conserving local water resources, reducing non-point source pollution, implementing adaptive conservation practices, and improving nutrient management while supporting sustainable economic and recreational use of these resources. The 2020 Annual Work Plan is found in Appendix C. The work plan identifies planned activities with benchmarks and performance measures. It also includes staff hours and expected costs (including for cost sharing).

PLAN DEVELOPMENT PROCESS

The LWRM plan was developed through a dedicated advisory committee, natural resource partner data contributions, public informational meetings and a public hearing. The advisory committee met twice to review plan goals and to update the implementation strategy. A review of current water quality data, new watershed and comprehensive plans, revised land use trends, and updated county GIS maps provided the workgroup with information necessary to determine where the land and water conservation program should prioritize time and financial resources. Time was spent validating the issues and concerns of the previous plan, identifying progress on the previous plan's goals, and determining if any new or emerging issues should be considered. Ashland County staff assisted with updating resource assessments, maps and work plans. The Land Conservation Committee (LCC) held a public hearing on July 8, 2019 where citizens and agency representatives had a chance to learn more about the land and water resource management plan and to offer comments.

After approval by the Land and Water Conservation Board in August 2019, the LWCD will present the final plan to the Ashland County Board for approval by resolution. Public participation will continue throughout the life of the LWRM plan at annual planning meetings, through annual reports to the county board, other groups, and department newsletters to Ashland County citizens. Groups, organizations and individuals will also be asked by the LCC to participate in project planning and/or implementation as necessary.

PLAN REQUIREMENTS

This land and water resource management plan was developed to meet the requirements of the County Land and Water Resource Management Planning Program. ATCP 50.12 codifies specific standards for the approval of the Land and Water Resources Management Plans. LWRM Plans must contain criteria including, but not limited to, an assessment of water quality and soil erosion conditions and WDNR water quality objectives, applicable nonpoint source performance standards, a plan to identify priority farms in the county, regulations to implement the county plan, a strategy for encouraging voluntary implementation of conservation practices under ATCP 50.04, compliance procedures for NR 151, a multi-year work plan and budget, a plan to monitor and track progress, and an information and education strategy.

In NR151 the Department of Natural Resources (DNR) established agricultural and non-agricultural performance standards and prohibitions to reduce runoff and protect water quality. In ATCP 50, the Department of Agriculture, Trade and Consumer Protection (DATCP) identified conservation practices that farmers must follow to meet the DNR standards. These standards require counties to consult with DNR and identify how they will assist landowners to achieve compliance with performance standards and prohibitions. Appendix A contains the Agricultural Performance Standards Implementation Strategy.

For LWRM Plan development, the County Land and Water Conservation Committee must make a reasonable effort to notify landowners and land users if soil erosion rate determinations are made, and provide an opportunity for these individuals to comment. Erosion rates for individual fields were not assessed in the preparation of this plan. Landowners were notified of the Ashland County Land and Water Resource Management Plan contents in the notice for the public hearing.

The land and water resource management plan must be submitted to the Department of Agriculture, Trade, and Consumer Protection and the Department of Natural Resources for review. It will be submitted to the Wisconsin Land and Water Conservation Board in August 2019. The plan will be brought before the Ashland County Board of Supervisors at the September 2019 meeting.

- Two Advisory Committee and Public Informational Meetings: April 26, 2019 and July 8, 2019
- Public Hearing Date: July 8, 2019
- County Board Approval Date: September 2019

PERFORMANCE STANDARDS & PROHIBITIONS

County land and water resource management plans are the local mechanism to implement the NR151 runoff standards. Ashland County adopted an Agricultural Performance Standards Animal Waste and Concentrated Animal Feeding Operations Ordinances on September 20, 2018.

The Ashland County Farmland Preservation Plan was updated in December 2016. The soil and water conservation standards for Ashland County include NR151 Agricultural Performance Standards and are evident in the new Ordinances and Farmland Preservation Program.

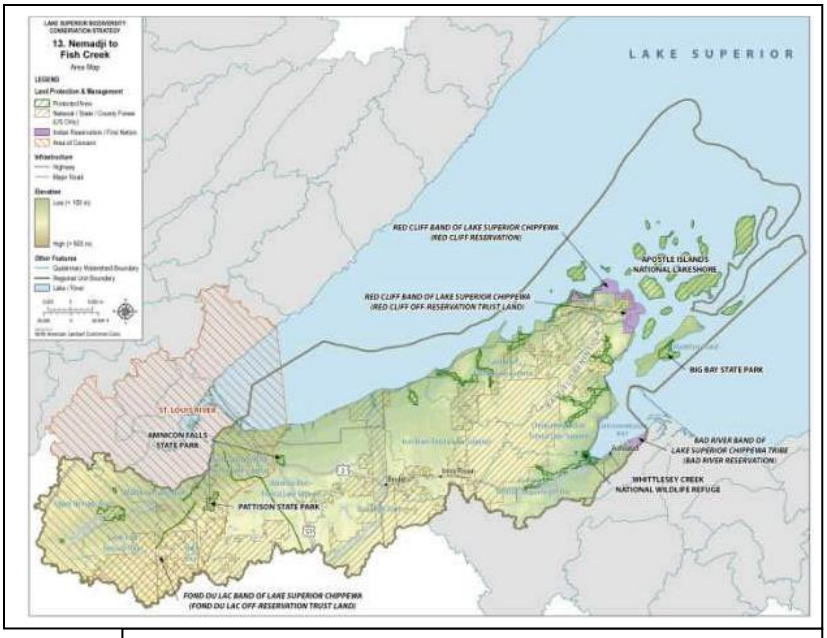
In addition, several county-developed standards are part of the implementation strategy of this plan.

RELATED PLANS

Lake Superior Lake-wide Action and Management Plan

Ashland County is included in two of 20 plans of the Lake Superior Lake-wide Action and Management Plan (LAMP) Biodiversity Conservation Strategies (BCS) (www.natureconservancy.ca/superiorbca). Regional plans respond to local conservation efforts while meeting to lake-wide biodiversity goals.

Lake Superior BCS: Nemadji to Fish Creek – covers the southwest shore of Lake Superior: Apostle Islands National Lakeshore, Chequamegon National Forest, and the Red Cliff Reservation. It includes the Lake Superior clay plain, coastal wetlands and rocky shoreline cliffs. There is little development, with 88% vegetated cover. Two Superfund sites are in located in Chequamegon Bay. One is in Ashland County.

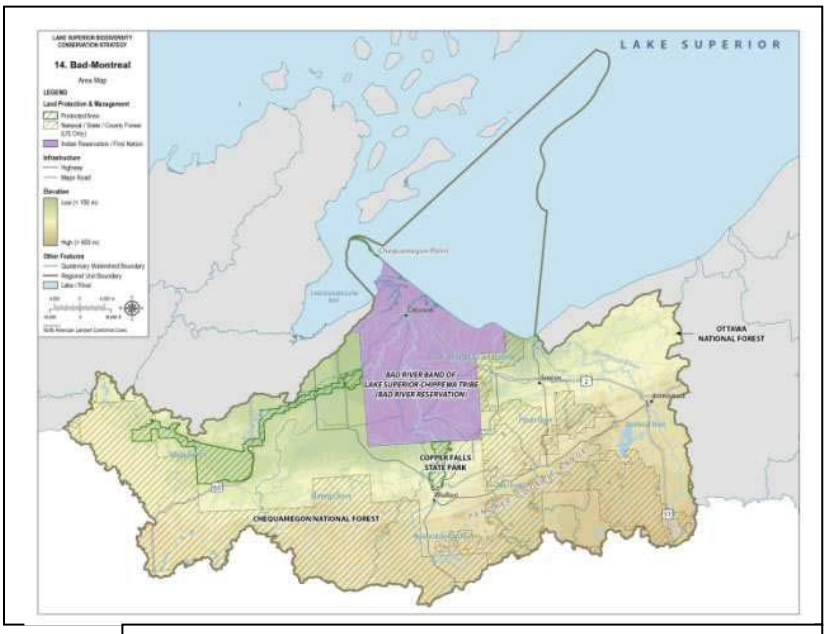


Nemadji to Fish Creek Unit www.natureconservancy.ca/superiorbca

The coastal wetlands provide highly productive habitat for many species including 207 species of concern like the Wood Turtle and Long-eared Owl.

This unit is prone to erosion and is a major source of sediment to Lake Superior. Accelerated runoff and non-point source pollution are major threats to biodiversity, and climate change presents significant threats, in particular northern forests and species at the southern end of their range, and to Chequamegon Bay.

Lake Superior BCS: Bad River-Montreal - extends east from Ashland to the Wisconsin/Michigan boundary, and includes the Bad River reservation and the Penokee-Gogebic Range. The Penokee Range has extensive forests, headwater streams, open bedrock, and a substantial iron ore deposit. Over 45% of the coast is wetlands, Kakagon and Bad River Slough is a Ramsar Wetland of International Importance. It is the largest freshwater estuary on Lake Superior, an important spawning region, and holds the largest wild rice bed on the lake. At least 145 species of concern have been documented, including Piping Plover and Northern Flying Squirrel.



Bad River-Montreal Unit www.natureconservancy.ca/superiorbca

The Bad River is estimated to be one of the largest contributors of suspended sediment to Lake Superior, and accelerated runoff and non-point source pollution are major threats to biodiversity.

Lake Superior Collaborative Action Plan

Lake Superior Collaborative Charter - May 2019
In 2018, a collaborative was formed to coordinate protection and restoration efforts in the Lake Superior Basin of Wisconsin. The Lake Superior Collaborative (LSC) is composed of governmental agencies, academic institutions, and non-governmental organizations in or near the Lake Superior Basin. Governmental agencies include federal, state, tribal, and local governments.

The Lake Superior Collaborative has evolved from historical partnership efforts conducted by the Lake Superior Basin Partner Team (1998-2012), the Chequamegon Bay Area Partnership (2009-2017), and the Lake Superior Landscape Restoration Partnership (2014-2017).

The Collaborative developed a draft action plan in April 2019 to identify priorities and actions as listed in the Lake Superior LAMP. These priorities will guide the work of the Collaborative. Several of Ashland County Land and Water Conservation Department's objectives and activities compliment specific actions of the Lake Superior Collaborative action plan. They are identified with a symbol on the LWRM 2020-2024 Work Plan (Appendix C).

Farmland Preservation Plan

The Ashland County Board adopted the Ashland County Farmland Preservation Plan in 2016 as an element of the County's Comprehensive Plan. The plan identified policies related to four goals: Preservation of Agricultural Lands, Urban Growth, Environmental and Cultural Resources, and Public Facilities. It also provides data on the general characteristics of the county including demography, agriculture, and forestry, and outlined recommended mapping districts.

The Farmland Preservation Area (FPA) for Ashland County (Figure 1) was identified and mapped at the tax parcel level and includes 284,031 total acres. The FPA includes the following:

- All soils listed as prime agricultural not otherwise excluded.
- Existing private land use of agriculture, farmstead, open land, and woodlands.
- Lands within the Fields, Waters and Woods Agricultural Enterprise Area (AEA) not otherwise excluded if the tax parcel is five acres or greater in size or part of 40 contiguous agricultural acres.
- Privately-owned environmental areas along ravines, intermittent and perennial streams, lakes, and wetlands not otherwise excluded.

Excluded from the FPA: lands planned for nonagricultural development through 2030, municipal or sanitary districts unless the tax parcel is five acres or greater or part of 40 contiguous agricultural acres, tax exempt private or public land in the Bad River Reservation, and land zoned other than agriculture.

Agriculture Goals

Goal 1: Ashland County will work to preserve and protect lands most suitable for agricultural use and production, and to ensure that farmers qualify for farmland preservation tax credits.

Goal 2: Ashland County will help guide physical growth and development in a manner that does not jeopardize existing and potential agricultural lands.

Goal 3: Preserve the County's designated cultural, scenic, and environmental resources.

Goal 4: Provide public facilities that most efficiently and effectively meet the overall goals of the Farmland Preservation Plan and other plans and programs adopted by the county.

Farmland Preservation Income Tax Credits
An active Farmland Preservation Plan provides participating landowners an opportunity to claim an income tax credit. Landowners must be Wisconsin residents and meet other eligibility criteria to claim the credit, including compliance with state soil and water conservation standards.

In order for landowners to participate in the program, the county must adopt an agricultural or farmland preservation plan and a farmland preservation/exclusive agriculture zoning ordinance which is certified by the State of Wisconsin Department of Agriculture, Trade and Consumer Protection.

Agricultural Enterprise Areas (AEAs)
The Fields, Waters and Woods Agricultural Enterprise Area in Ashland and Bayfield Counties was created in 2014. It covers parts of the Towns of Ashland, Marengo, White River, and Kelly. The AEA also includes lands within the Bad River Reservation. Qualified landowners in the AEA can enroll in the Farmland Preservation Program. Four Farmland Preservation Agreements have been approved in Ashland County with 765.64 acres enrolled in 2018 and an additional 1386.45 acres enrolled in Farmland Preservation in Agricultural Enterprise Areas. Landowners received $10,760.45 in tax credits for farmland preservation/exclusive agriculture in 2018.

In 2015, the Fields, Waters and Woods petitioners requested a boundary modification to correct mapping errors made during the original designation request. In 2016, Ashland County certified a comprehensive revision to their farmland preservation plan pursuant to s. 91.84, 2009 Stats.

Farmland Preservation Zoning
Farmland Preservation Zoning allows limited residential development and can restrict the density of the residential structures. Discouraging non-agricultural development in areas zoned for Farmland Preservation may reduce the likelihood of conflicts between farmers and their non-farming neighbors.

Tax Credits for Land under Farmland Preservation

- $10.00/acre if land is zoned and located in an Agricultural Enterprise Area
- $7.50/acre if land is zoned exclusive agriculture
- $5.00/acre with a Farmland Preservation Program agreement after 2009

Other Implementation Tools

- Wisconsin Purchase of Agricultural Conservation Easement (PACE)
- Other Conservation Easements
- Purchase or Transfer of Development Rights
- Mitigation Ordinances
- Comprehensive Land Use Planning

Land Use Planning

The Ashland County Comprehensive Plan was approved in December 2016 and is intended to create a comprehensive set of resources and policy to assist the county and local units of government to manage development. The plan explores the county's physical and economic conditions, identifies development issues, and provides a policy for local governments to manage development issues.

Total Maximum Daily Load Reports & Implementation Plans

The U.S. Clean Water Act requires that states develop Total Maximum Daily Loads (TMDLs) for those water bodies deemed impaired, meaning they are not meeting water quality standards. Once a TMDL is established, an implementation plan needs to be developed for the water body of concern to address the water quality impairment issues. Ashland County does not have any TMDLs.

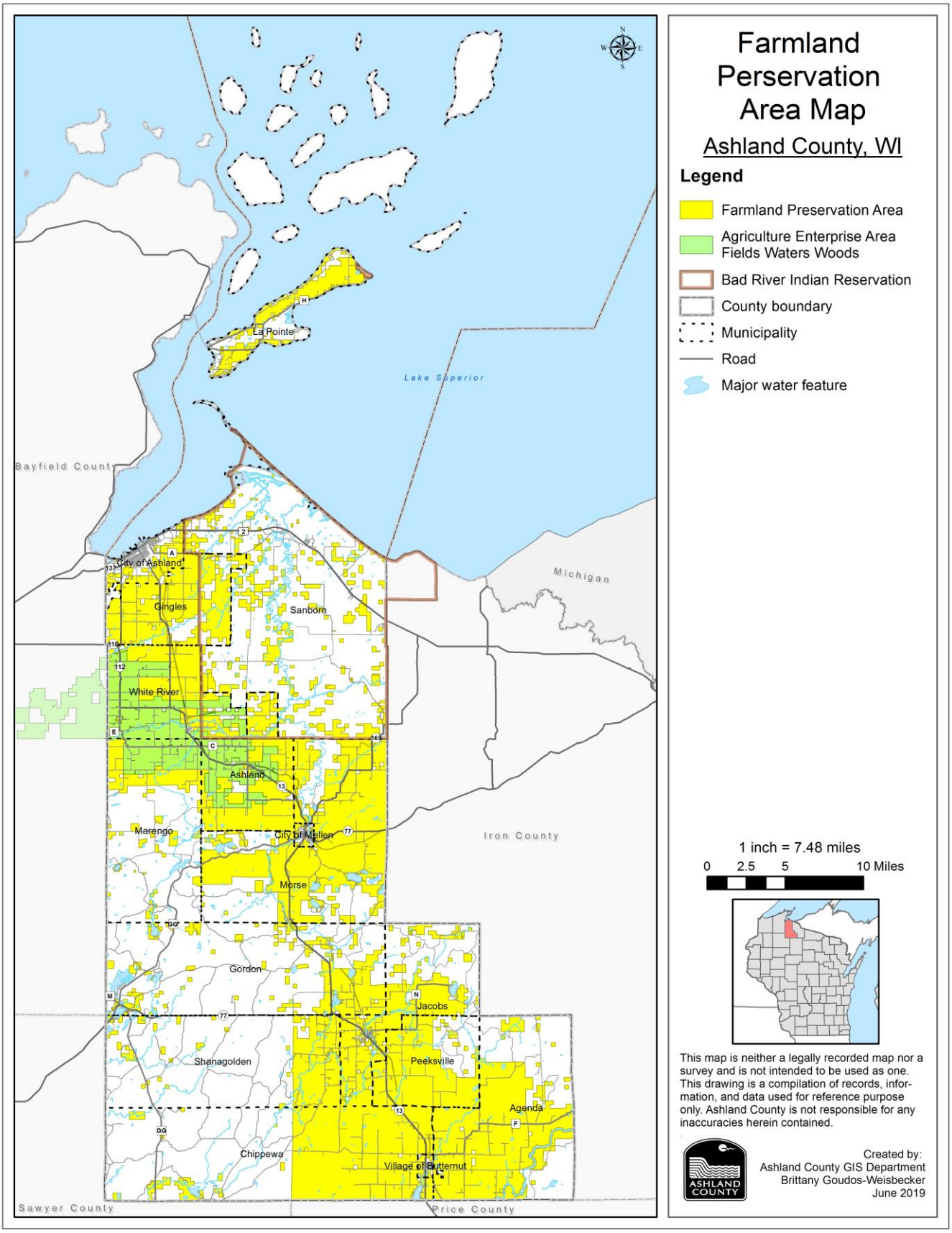


Figure 1. Farmland Preservation and Agricultural Enterprise Areas

Marengo River Watershed (9 Key Element) Action Plan

The Marengo River Watershed experienced extensive logging and farming activities around the turn of the 20th Century, and the effects of this land cover conversion had tremendous impacts on streams and rivers that are still felt today. The Marengo River Watershed Partnership was formed as a way for residents, local government, and natural resource professionals to identify actions needed to improve watershed health.

A Marengo River Watershed Action Plan (MRWAP) was developed in 2010. It recommended nearly 100 action items necessary to prevent future impairments and to maintain the watershed's high quality features. The action steps were designed to reduce or prevent nonpoint source pollution and to build knowledge about the watershed to allow future management efforts to adapt to changes in the watershed and changes in human needs. For each action item, the partner organization(s) best suited to implement the task was identified, along with an estimated cost and potential funding source(s). A measure of success was also identified for each action item to assist in evaluation of plan progress. A timeframe of 10 years was used to determine the scope of activities.

The Superior Rivers Watershed Association (formerly Bad River Watershed Association) (BRWA) worked with WDNR and Bad River Natural Resources Department (BRNRD) on a water quality assessment to ensure MRWAP recommendations would be consistent with water quality standards in both jurisdictions. A process used by WDNR to assess conditions of Wisconsin's watersheds was used to develop the recommendations.

The Marengo River Watershed Water Quality Management Plan

Each year, Wisconsin selects one watershed (roughly equivalent to USGS level-5 or 10-digit HUC codes) in each of its 24 basins for water quality management planning (CWA section 208). The water quality management plans are considered updates to the State's Area-wide Water Quality Management Plans under Wisconsin Administrative Rule NR121. These plans provide the following key pieces of information:

- General assessments of lakes, streams, wetlands, Great Lakes shoreline, and beaches.
- Specific details for determining impaired waterbodies for the state's 303(d) Impaired Waters List.
- Watershed updates: land use change, population growth, resource issues, management projects in place or planned, and narrative summaries of waters and watersheds.

The efforts to develop this nine-element plan led the WDNR to select the Marengo River Watershed for completion of its 2011 water quality management plan for the Lake Superior Basin. The plan serves as an assessment of current conditions and designated use attainment of the Marengo River Watershed outside the Bad River Tribe's Reservation. It provided for recommendations in the nine-element Watershed Action Plan to encompass both on and off-reservation portions of the watershed. A working draft of the WDNR Marengo River Watershed Water Quality Management Plan was completed with input from BRWA, BRNRD, and the United States Forest Service (USFS) and integrates most of the Marengo River Watershed Action Plan (WDNR 2011a). The recommendations form a collective vision for maintaining and improving the health of the Marengo River Watershed.

Bad River Band of Lake Superior Tribe of Chippewa Indians Integrated Resource Management Plan

Federal government regulations require tribes with forested reservation land to develop an Integrated Resource Management Plan (IRMP). The Bad River Natural Resources Department (BRNRD) is responsible for enforcing the environmental codes and ordinances passed by the Tribal Council that protect the natural resources of the Reservation for the next seven generations. In 2013, the Tribe formally adopted its first Ma'iingan (Wolf) Management Plan, and it is currently revising that plan to include climate change adaptations. One of the key water quality standards components of the management plan is the Antidegradation Policy which protects Outstanding Resource Waters (ORWs) and Exceptional Resource Waters (ERWs) from being unnecessarily degraded.

Water Quality Monitoring
The BRNRD suggests that very little water quality data exists due to lack of funding and monitoring activities. However, water quality monitoring has been initiated for 22-25 sites within and just outside the Reservation to establish a baseline of water quality data. Bad River Natural Resources Department, in a report of Nov 4, 2004, strongly suggests that a cooperative effort be established to continue monitoring, identify priority sites, and share information as it becomes available.

Sporadic water quality monitoring has taken place since 1997. The highest incidence of exceeding the monitored water quality parameters were found for the Marengo River and Beartrap Creek. As a result, Bad River's Water Quality program established nonpoint source and storm event monitoring for several sites suspected to be experiencing impacts of nonpoint source pollution. Nonpoint source impacts were identified for fecal coliform, E. coli bacteria, phosphate, and less often for nitrate. In addition, damage to streambanks and the riparian zone was documented for at least one site on Beartrap Creek. Aerial analysis was also conducted which indicated a likelihood of impacts due to failing septic systems, outdated or improperly maintained wastewater treatment plants, nutrient loading and/or sedimentation due to farm feedlots, fields, road ditches, crossings, logging operations, or improperly sized or poorly maintained road culverts.

Clean Water Act Authority
On July 2, 2009, the Environmental Protection Agency (EPA) granted authority to the Bad River Band of Lake Superior Chippewa Indians to run its own water quality standards program on its reservation. This authority is for the standards programs only. The Tribe will have to submit the actual water quality standards they develop to EPA for another round of review and approval. The Tribe's application and the decision documents will be posted on EPA's Web site:
http://www.epa.gov/region5/water/wqs5/wqstribes.htm

Basin Water Quality Management Plans

Lake Superior Basin Water Quality Management Plan (WDNR PUBL-WT- 278-99-REV)
Water quality management plans (WQMs) are required under Section 208 of the Federal Clean Water Act. The first Lake Superior Basin WQM was updated in 1991 and again for the 1999 publication. The Lake Superior Basin WQM 1999 identifies the following issues and recommendations:

Issues
- Point source pollution management
- Toxic pollution management
- Non-point source pollution management
- Surface water monitoring and assessment needs

Recommendations
- Water quality monitoring
- Evaluate and protect wetlands
- Assist county and municipal administrators in enforcement of shoreland and wetland zoning
- Protect existing water quality in Class I lakes
- Assist local authorities to develop standards for Lake Superior shoreline aesthetic and buffer zones
- Develop shoreline management education materials to prevent impacts to water resources

Upper Chippewa River Basin (WDNR PUBL-WR-345-96-REV)
The Upper Chippewa River Basin WQM was first published in 1980 and subsequently updated in 1996. This document was intended for revision every five years, but lack of DNR staffing has made this impossible. The 1996 WQM Plan for the Upper Chippewa River Basin identifies the following issues and recommendations:

Issues:

- Polluted runoff
- Contaminated biota (plant and animal life)
- Sediment quality
- Loss of shoreline habitat due to development
- Aquatic habitat in streams, impoundments and wetlands
- Endangered resources

Recommendations

- Setbacks
- Shoreline erosion control
- Riparian habitat protection
- Identify foam in the Upper Chippewa Basin
- Purple loosestrife control
- Protect wetland habitat along Chippewa and Flambeau
- Develop shoreline management education materials to prevent impacts to water resources

Superior Rivers Watershed Association Strategic Plan

The strategic plan includes a series of long term, overarching goals that SRWA will seek to achieve by the year 2025. Each goal is tied to achieving the vision by adhering to their mission statement. The goals were created by a Board of Directors with input from a Technical Committee on the most pressing environmental concerns for the area. The home page for the organization contains links to more information: http://www.superiorrivers.org/

Northwoods Cooperative Weed Management Area Plan

The Northwoods Cooperative Weed Management Area (NCWMA) is a multi-agency and community relationship created to effectively coordinate and implement management and eradication of invasive terrestrial and aquatic plants. Participation in the NCWMA is voluntary.
http://www.northwoodscwma.org/assets/pdf/Final_NCWMA_Aug%209%202007.pdf

White River Watershed Management Plan

In 2003, the Friends of the White River took steps to preserve the river's quality for generations to come. Aided by the Superior Rivers Watershed Association and the Wild Rivers Chapter of Trout Unlimited they secured funding to prepare the management plan. The plan focuses on investigation of conservation options and management actions along the middle stretch of the White River in Bayfield County.

The objectives of the plan include:
Research and maintain or improve water quality

- Establishing water quality guidelines and testing schedules to improve or maintain water quality.
  Research and maintain or improve fishery
- Seek funding to research the health of the fishery and to gather information from longtime residents and landowners.

Provide walk-in public access to the river

- To establish a walk-in public access trail to the White River through donation or purchase and to establish a primitive campsite accessible to river users.

Encourage ecological preservation to protect the scenic beauty and ecological health of the river corridor.

- Pursue opportunities to purchase easements along the White River and to work with conservation organizations to educate White River watershed land owners.

Ashland County Ordinances[1]

Floodplain

This ordinance regulates all areas that would be covered by the regional flood or base flood. Note: Base flood elevations are derived from the flood profiles in the Flood Insurance Study. Regional flood elevations may be derived from other studies. This ordinance is intended to regulate floodplain development to: (1) Protect life, health and property; (2) Minimize expenditures of public funds for flood control projects; (3) Minimize rescue and relief efforts undertaken at the expense of the taxpayers; (4) Minimize business interruptions and other economic disruptions; (5) Minimize damage to public facilities in the floodplain; (6) Minimize the occurrence of future flood blight areas in the floodplain; (7) Discourage the victimization of unwary land and homebuyers; (8) Prevent increases in flood heights that could increase flood damage and result in conflicts between property owners; and (9) Discourage development in a floodplain if there is any practicable alternative to locate the activity, use or structure outside of the floodplain.

General Zoning

All thirteen townships fall under general zoning. Land disturbance, storm water management, and erosion and sediment control plans and standards are in the ordinance. One township has comprehensive zoning.

Shoreland Protection

The Wisconsin legislature delegated responsibility to counties under Wisconsin Statutes 59.692 and 281.31, and NR 115 Wisconsin Administrative Code to: maintain safe and healthy conditions and prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; and preserve and restore shoreland vegetation and natural scenic beauty. NR 115 applies to land 1) Within 1,000 feet of the Ordinary High Water Mark (OHWM) of navigable lakes, ponds or flowages, and 2) Within three hundred (300) feet of the OHWM of navigable rivers or streams, or to the landward side of the floodplain boundary. Statutes 61.351 and 62.231, and NR 117 require cities and villages to regulate activities in wetlands located in the shoreland zone.

NR 151 Agricultural Performance Standards and Prohibitions

The LWCD regulates NR 151 agricultural performance standards in Ashland County. A permit is required for new animal waste storage structures and closure of old storage (Figure 2) in order to prevent surface and groundwater pollution to protect public health, environment, safety, and general welfare. Structures must be constructed according to Natural Resource Conservation Service standards and include an updated 590 Nutrient Management Plan. Operators must comply with NR 151. The ordinance was adopted September 20, 2018.

Metallic Mineral and Nonmetallic Mining

The Zoning Department regulates the following Ashland County ordinances related to mineral mining:

- Ashland County Metallic Mineral Mining Impact Ordinance
- Ashland County Zoning Ordinance Regarding Metallic Mineral Mining and Reclamation
- Ashland County Bulk Sampling and Non-Ferrous Metallic Mineral Prospecting Ordinance

The LWCD will assist the zoning department as requested with review of metallic and non-metallic mining operation plans, and review of and recommendations for reclamation plans in accordance with NR 135.

Sanitary

The City of Ashland, City of Mellen, Village of Butternut, Glidden and Town of La Pointe have sanitary sewers. Most residents and businesses in rural areas rely on private septic systems and wells. The County regulates proper siting, design, installation, inspection, and management of all private onsite wastewater treatment systems (POWTS) and non-sanitation systems to protect the environment and public health.

1 Ashland County Ordinances: https://co.ashland.wi.us/zoning_ordinance

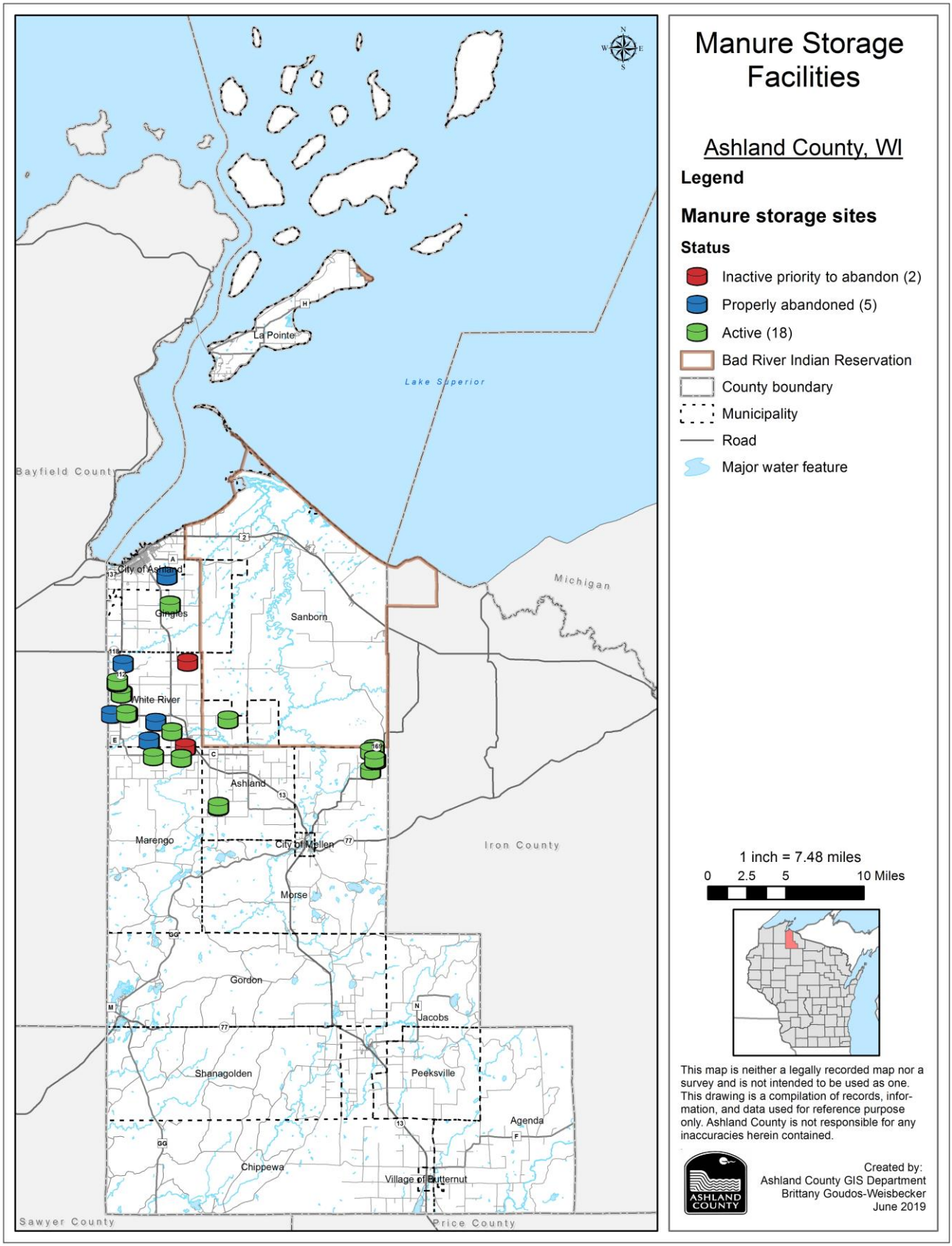


Figure 2. Manure Storage Facilities

RELATED STATE REGULATIONS

NR 151

Implementation and enforcement of agricultural performance standards and prohibitions are covered under NR 151. Ashland County's implementation plan for NR151 is included in Chapter 3: Goal 2.

ATCP 50

Conservation practices that farmers must follow to meet the WDNR standards of NR151 are in the ATCP 50 regulation. It also guides appropriate practices and cost share procedures for implementation of additional conservation practices.

ATCP 50 also codified specific standards for the approval of the Land and Water Resource Management plans and requires counties to consult with DNR and identify how they will assist landowners to achieve compliance with performance standards and prohibitions.

ATCP 51

Wisconsin Statutes 93.90 provides uniform regulation of the siting livestock facilities across the state. Variations that exceed state requirements are allowed but only if necessary to protect public health or safety. Local government must adopt requirements by ordinance prior to a siting application being filed.

Counties may enact regulations of livestock operations that are consistent with and do not exceed the performance standards, prohibitions, conservation and technical standards of state law without DNR and DATCP approval.

Chapter 30

State permits are often required for activities taking place near waterways. Chapter 30 of Wisconsin Statutes regulates activities in navigable waterways. The following Administrative Codes are applicable:

- NR 320: Bridges and Culverts in or over Navigable Waters
- NR 328: Shoreline Erosion Control Structures in Navigable Waterways
- NR 329: Miscellaneous Structures in Navigable Waterways
- NR 343: Ponds and Artificial Waterways
- NR 345: Dredging in Navigable Waterways

The WDNR also regulates construction site erosion control, wastewater discharge permits, and agricultural runoff.

NR 243

The City of Ashland, City of Mellen, Village of Butternut, unincorporated Glidden and the Town of LaPointe are not large enough to require storm water management plans by the WDNR. All of these communities, if working in an area of 1 acre or more, are subject to Wisconsin's storm water rules under the Pollution Discharge Elimination System (WPDES) Program.

NR 243 defines regulations governing discharge of pollutants to navigable waters of the state. In addition, it defines and governs standards associated with Confined Animal Feeding Operations (CAFOs- operations larger than 1000 animal units) and establishes permit requirements for these large-scale producers under Wisconsin Pollution Discharge Elimination System (WPDES) Permits. These permits address the following activities: Manure storage, Runoff control systems, Compost facilities, Groundwater monitoring, and Nutrient management with spray irrigation.

Land and Water Conservation Department Activities

Land & Water Conservation Responsibilities

Prepare, maintain, and implement the Land and Water Resources Management Plan under the authority of Chapter 92, Wisconsin Statutes; promote conservation of long-term soil productivity; protect the quality of natural resources; enhance water quality; and focus on correction of severe soil erosion problems through programs including watershed management of targeted lakes and rivers, support of the Working Lands and Farmer Led Council Initiatives; and promote natural resource management programs.

Financial and Technical Assistance

A variety of federal, state, and local programs encourage the installation of conservation practices such as vegetative buffers near water, wetland restoration, prairie plantings, and sedimentation basins. The program encourages participation, provides administration, and designs and inspects practices. Management plans for cropland rotations, best management practices, and fertilizer and manure applications are also prepared. Progress toward meeting program objectives is tracked.

Technical Review for State and Local Regulatory Programs

Staff review and recommend approval of plans for erosion control and stormwater management. This review occurs before land division, land use, and Board of Adjustment special exception permits can be issued. Staff members review animal waste facility operations before a facility is permitted, when an animal waste storage facility is proposed, or when a complaint is received. Plans are also reviewed for the operation and reclamation of nonmetallic mines.

Educational Activities

Educational activities are offered that emphasize protection of natural resources. Conservation field days are offered throughout the county to grades K-12. Classroom presentations are given to various grade levels upon request. The department is involved with farm city day and the county fair, and has displays at sport shows and lake fairs. Staff members also assist with a statewide conservation camp each year.

Local Cooperation

Ashland County has a great number of natural resource professionals that live and work in the area as well dedicated residents who participate in county programs and have a deep concern for natural resources. Local efforts to balance protection, restoration and multiple-use are made clear in the goals, objectives and activities outlined in this plan. Resource agencies and local groups will build on their history of cooperation by sharing data, staff, expertise, and financial resources to implement many of the activities outlined in the LWRMP.

Governmental agencies such as the Wisconsin Department of Natural Resources (WDNR), Bad River Band of Lake Superior Chippewa Indians, Red Cliff Band of Lake Superior Chippewa, United States Forest Service (USFS), United States Fish and Wildlife Service (FWS), United States Geological Survey (USGS), Natural Resources Conservation Service (NRCS), Farm Service Agency (FSA), and Apostle Islands National Lakeshore (AINL) continually cooperate to develop plans and strategies intended to benefit the resources of the region. The LWCD also nourishes partnerships with educational organizations such as UW-Extension, the Sigurd Olson Environmental Institute (SOEI) at Northland College, and local schools; and non-governmental organizations including the Bad River Watershed Association, the Northwood Cooperative Weed Management Area, Inland Sea Society, The Nature Conservancy (TNC), Friends of the White River, Alliance for Sustainability, Trout Unlimited, Ducks Unlimited and others to share information, implement projects, and distribute environmental education messages.

Chapter 2. Resource Assessment

Ashland County is located in northwestern Wisconsin and covers 2,294 square miles of which 1,044 square miles (46%) is land and 1,250 square miles (54%) is water. The 2016 United States Census population was 16,511. It is bordered by Bayfield County to the west, Price and Sawyer Counties to the south, Iron County to the east, and Lake Superior to the north. The county includes 17 of the 21 islands collectively known as the Apostle Islands, located in Lake Superior off the north shore of Ashland County and the east shore of Bayfield County. Devil's Island in Ashland County is the northernmost point of the state. The southern one third of the county drains to the Upper Chippewa Basin, and the remainder drains to Lake Superior.

Ashland County is 1,468,160 acres in size. More than half is open water, primarily Chequamegon Bay and Lake Superior. Of the 647,235 acres of land and open space in the county, approximately 52,428 acres, or 8.1%, was reported as farmland in 2017 (Table 1). Woodlands and forests make up nearly 88% of the remaining land base, including wooded lands found on farms. The County had an overall increase in number of farms and acreage from 2012 to 2017[2]. There were 263 farms reported in 2017. Like many other Wisconsin counties, there was a decrease in dairy farms. However, beef farms have increased, and small livestock farms have more than doubled since 2012.

2 USDA 2007, 2012 and 2017 Census of Agriculture: www.nass.usda.gov/Statistics_by_State/Wisconsin/index.php

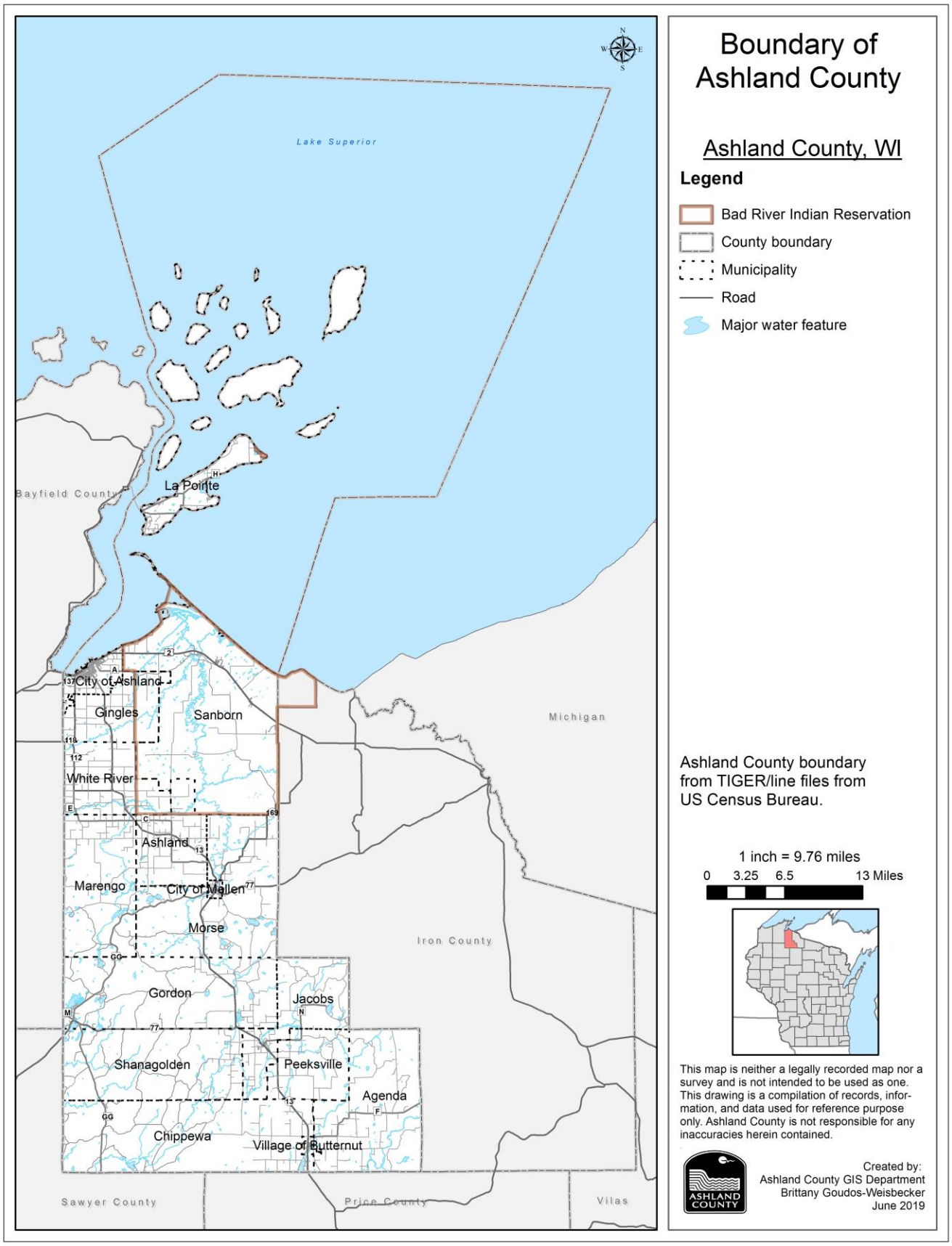


Figure 3. Ashland County Boundary

GEOLOGY & SOILS

The County's physiography is largely due to the glaciers that originated in northern Canada. There are two distinct drainage basins. The Bad River and its tributaries drain northern Ashland County to Lake Superior, and the Chippewa River watershed drains the southern half to the Mississippi.

The Lake Superior lowlands contain glacial red clays or clay till (mixed glacial material of clay, sand, gravel, and boulders). The clays cover the historic glacial Lake Duluth adjoining present day Lake Superior. They were laid down under a previous glacial lake that occupied the Lake Superior Basin and surrounding area. This red clay till soil is finely textured, resulting in very poor drainage. Streams cut very deep v-shaped valleys into it; some ranging anywhere from 40 to 100 feet deep. The Apostle Islands were once covered by glacial lake waters. The ice sheet re-advanced over the islands after the clay was laid down, and in many places covered the clay with low ridges of red sand and silt.

Just south of the Lake Superior Lowland, the land surface is hilly and rough. Some of the hills are ridge- like accumulations of glacial sand, gravel, boulders, clay and silt, known as moraines. They were deposited by the ice sheet as it paused for a while or as it changed position slightly. Kettle shaped depressions can be found along the hills and ridges. Some of the hills are comprised of trap rock (hardened lava flows) and are narrow ridges with very steep rock walls. Waterfalls can occur where streams leave the lava formations and enter the clay plains. Copper Falls is a good example.

The Penokee Range extends 80 miles from Ashland County through Iron County and into Michigan where it is known as the Gogebic Iron Range. The Range is about one-half to one-mile wide and rises to 1,872 feet above sea level at Mt. Whittlesey near Mellen. The elevation at the City of Ashland is 671 feet above sea level, while Lake Superior sits at 602 feet. Extending south of the Range is rolling low relief with glacial deposits. Glacial outwash soils, well sorted sand or sand and gravel deposited by water melting from the glacier exist in the area and loose rock is common.

Soils

The Web Soil Survey provides detailed information about specific soils in a defined area of interest. The generalized soil characteristics provide an overview of the distribution of soil types across Ashland County. This information assists in land use decision making as it helps to identify the development potential or limits of a site. Detailed mapping information is online: http://websoilsurvey.nrcs.usda.gov The generalized soil types (Figure 4) were classified by professional soil scientists. A brief description of the generalized soil types follows.

Bedrock-dominated Soils: These soils are relatively shallow, and excavation required for roads, foundations and utilities is limited. Shallow soil depths limit filtering capabilities of drainage fields.

Transition Soils (Sand over Clay): Very deep, moderately well to somewhat poorly drained soils that formed in sandy sediments. Often referred to as the "transition area", these soils separate the clay plain from the higher elevation area that is dominated by sand. These soils have a sand cap over clay or stratified loamy material. Seeps often are prevalent in these areas, especially in spring, and the headwaters of many streams originate here. Excavations in these soils are subject to cave-ins in spring. With seasonally high water tables, these areas require alternative sanitary systems such as mounds. Roads in these areas are subject to break-up and often contain unstable wet zones. Some groundwater recharging of aquifers can also occur in these areas.

Sandy Soils: Sandy soils often are groundwater recharge areas. These areas are droughty because of low available water capacity and rapid permeability. The rapid permeability of these soils aid in ground water recharge but also provides a poor filter for contaminants. Sandy soils are subject to rutting because of their low soil strength. A gravel base often is necessary to provide adequate strength for roads and driveways. Sandy soils may also present a corrosion hazard for concrete structures.

Ravine and Floodplain Soils: Steep, well drained to excessively drained soils on ravines. Some areas are freshly undercut by streams and are slumped. Typically these soils are stratified loamy, sandy, and clayey materials with water seeps exiting some strata. These areas are prone to slumping and instability and disturbances often result in excessive sedimentation of waterways. Ravine bottoms include alluvial deposits that are subject to flooding. Ravines and floodplains are subject to erosion problems and are generally unsuited for development. Mass soil wasting and severe gully erosion can occur unless proper safeguards are in place. Upstream watershed changes (i.e., housing, roads, and other impervious surfaces) can cause stable channels in these areas to degrade. The best practice for these areas is to maintain a permanent forest cover.

Wetland Soils: These areas are wet for part to most of the year and are typically capable of supporting wetland vegetation. Many areas do not freeze in the winter making winter logging difficult. They occur either where the groundwater table meets to surface of the land or in perched conditions where a confining layer in the soil retards downward flow through the soil. These soils present severe limitations for construction of buildings and roads because they are frequently wet. Due to close contact with the water table, contamination in these areas can readily spread to groundwater.

Clay Soils: These areas include very deep, nearly level to steep soils that formed in clayey glacial till and/or clayey lacustrine deposits modified by wave action and in the underlying stratified loamy and/or sandy lacustrine deposits. The high clay content of these soils makes them susceptible to surface erosion, especially in areas where native vegetation has been removed. Because they have low soil strength when wet, a layer of cobble stone may be required under well graded, crushed rock to reduce rutting of driveways and to support heavy vehicles such as fire trucks and snow plows. Because clay soils shrink and swell dramatically with varying moisture levels, special construction of foundations is necessary to prevent damage to buildings. The high water-holding capacity of clays encourages the use of level areas for agriculture, but clay soils also limit the availability of water to plant roots more than till soils do.

Till Soils: Till soils have a higher available water capacity, slower permeability, and higher nutrient holding capacity compared to sandy soils. Tills are best suited to growing trees and other plants. The moderate permeability of these soils aids in ground water recharge. Except in areas with steep slopes, these areas often are better suited for development because the silt and sand mixture provides soil strength for roads and foundations and filtering capability for drainage fields.

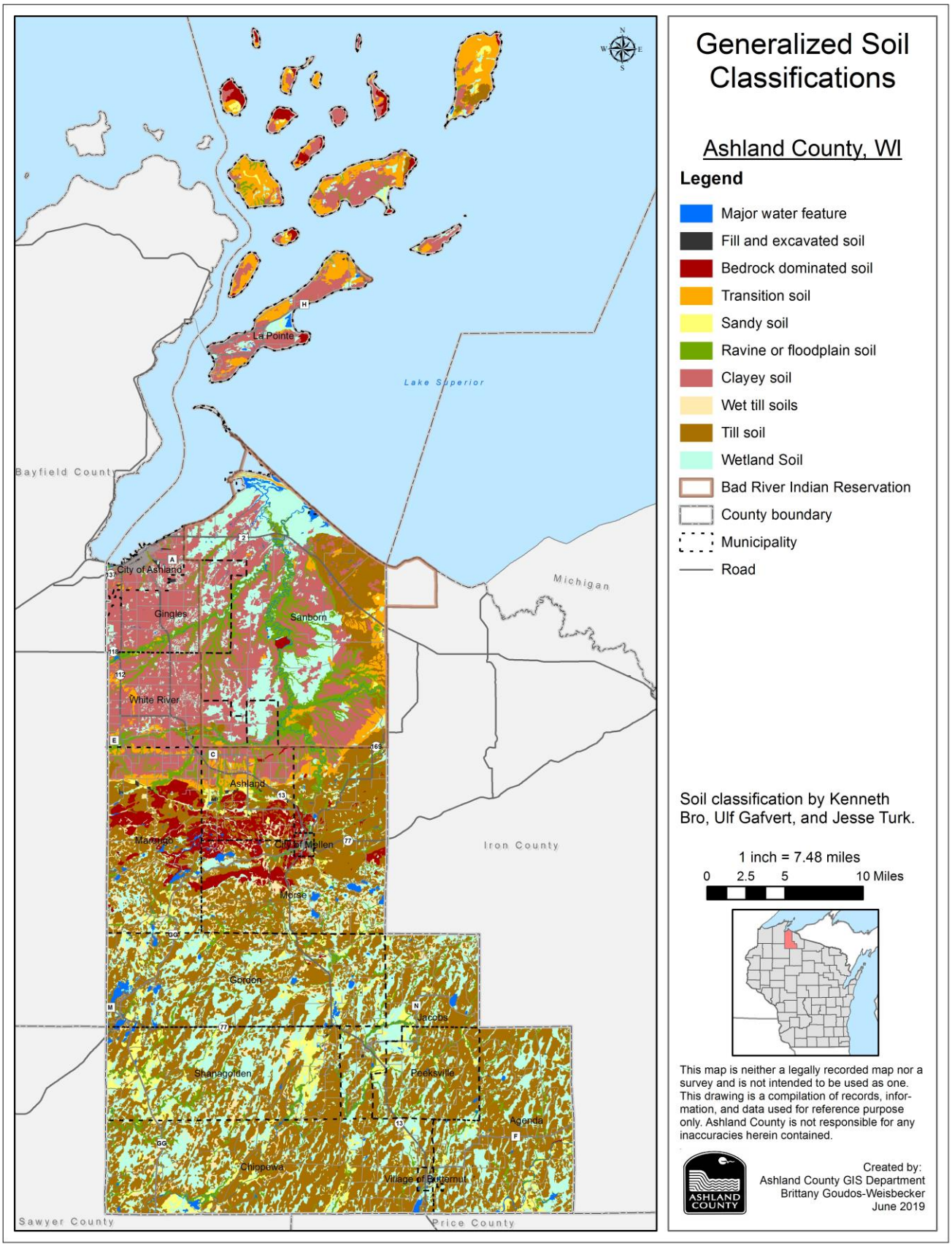


Figure 4. Soil Classifications

ECOLOGICAL LANDSCAPES & LANDCOVER

Ecological landscapes are areas that differ from each other in ecological attributes and management opportunities. They have unique physical and biological characteristics such as climate, geology, soils, water, or vegetation. There are 16 Ecological Landscapes in Wisconsin and they differ in biological productivity, wildlife habitat suitability, rare species, and other ways that affect land use. Ashland County includes two landscapes the Superior Coastal Plain, and the North Central Forest (Figure 5).

The Superior Coastal Plain is composed of a lacustrine clay plain that slopes toward Lake Superior. Historically, it was forested with white pine, white spruce, balsam fir, paper birch, balsam poplar, aspen, and white cedar. Northern hardwood and hemlock-hardwood forests cover the Apostle Islands and include old-growth remnants. The coastal wetlands cover thousands of acres and are composed of a mosaic of vegetation including forests, shrub lands, wet meadows and marsh. The North Central Forest is 75% forested and the remaining is open lands and fields. The dominant forest type is mesic northern hardwoods, composed of sugar maple, basswood, and red maple, with some stands of hemlock, yellow birch, and/or white pine. Aspen-birch forest is also abundant, followed by spruce-fir. Forested and non-forested wetland communities are common and widespread.

More information about these landscapes can be found at: https://dnr.wi.gov/topic/landscapes/

Historical Land Cover

The landscape of northern Wisconsin and Ashland County underwent significant change following European settlement in the late 1800s and early 1900s. Much of Ashland County was 100% forested, consisting of mixed coniferous/deciduous forest, boreal forest, and wetland areas. Forests played a key role in slowing the rate of runoff to watershed streams from rain and snowmelt events, particularly in the northern, clay portion of the watershed where soil infiltration rates are naturally slower.

A comprehensive analysis of land cover changes and the effects on erosion and sedimentation in the North Fish Creek Watershed was conducted by the United States Geological Survey (USGS) (Fitzpatrick *et al*. 1999). Similar land cover changes to those in North Fish Creek occurred throughout the Lake Superior Basin of Wisconsin, including the Marengo River Watershed. Removal of the forests began in the late 1800s and continued through early 1900. Along with forest removal, fires burned much of the organic layer that acted as a sponge, particularly on the clay soils. Streams were used to transport logs to area mills, which widened stream channels, scoured banks, and removed most of the healthy woody aquatic habitat. After logging declined, major agricultural development occurred and peaked in mid-1920 to mid-1930, with much of the upland areas consisting of cropland and pasture for dairy cattle (Fitzpatrick *et al*. 1999).

The combination of forest removal and agricultural development had a tremendous impact on the land and stream channels of the Lake Superior Basin that is still being felt today. However, the Lake Superior Basin watersheds still retain many high quality habitats and areas of habitat potential.

Vegetation

The Wisconsin Initiative for Statewide Cooperation on Landscape Analysis and Data (WISCLAND) developed land cover data across the state. The University of Wisconsin-Madison and WDNR partnered to update the current land cover of Wisconsin, and completed Wiscland 2.0 in August 2016. Land cover data identifies the types of land cover present over large areas (i.e., agricultural lands, forests, grassland, urban areas, wetlands, and water bodies), and is used in research and management plans. The Land Cover Classifications[3] for Ashland County are shown on Figure 6.

3 Ecological Landscapes of Wisconsin: https://dnr.wi.gov/topic/landscapes/

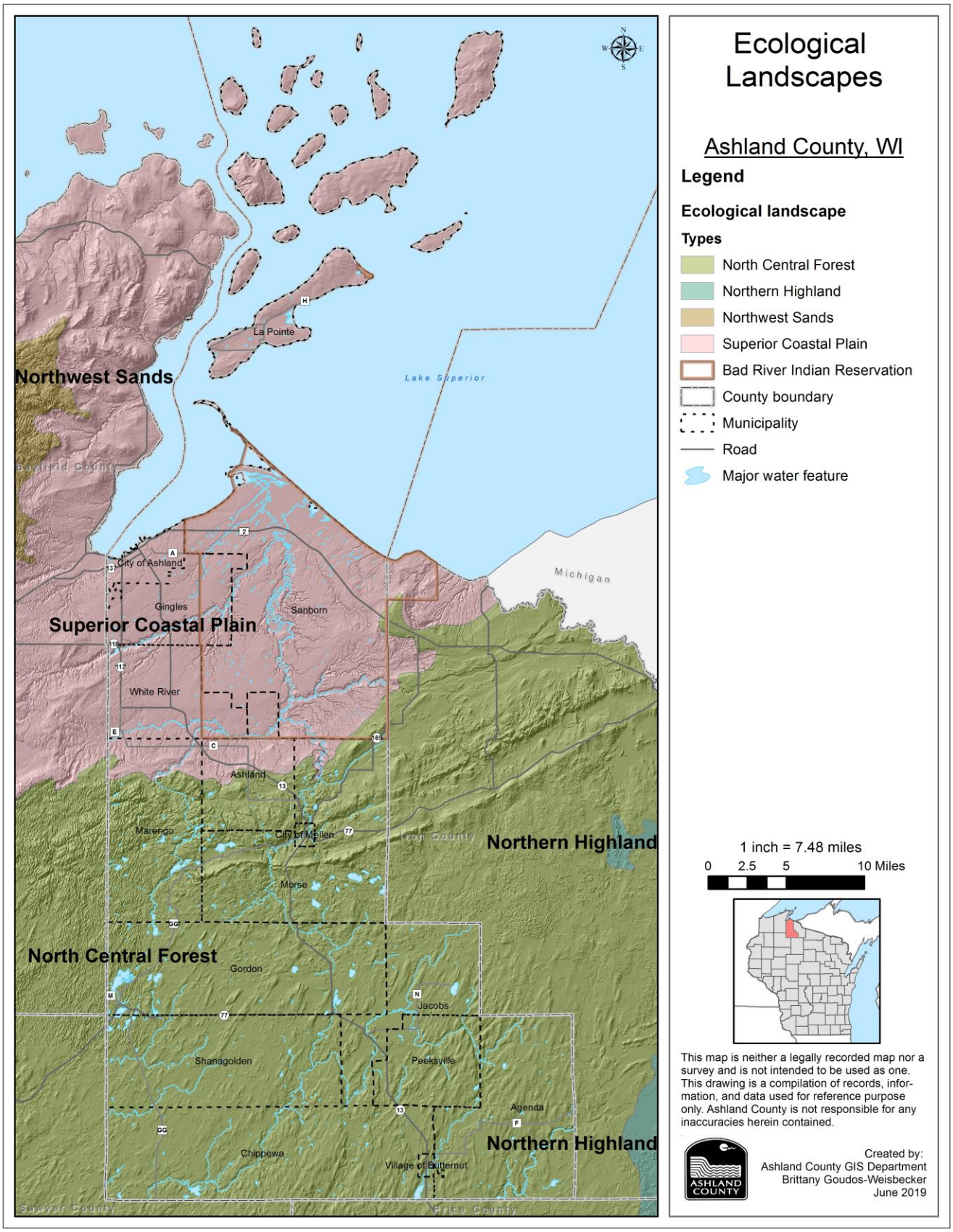


Figure 5. Ecological Landscapes

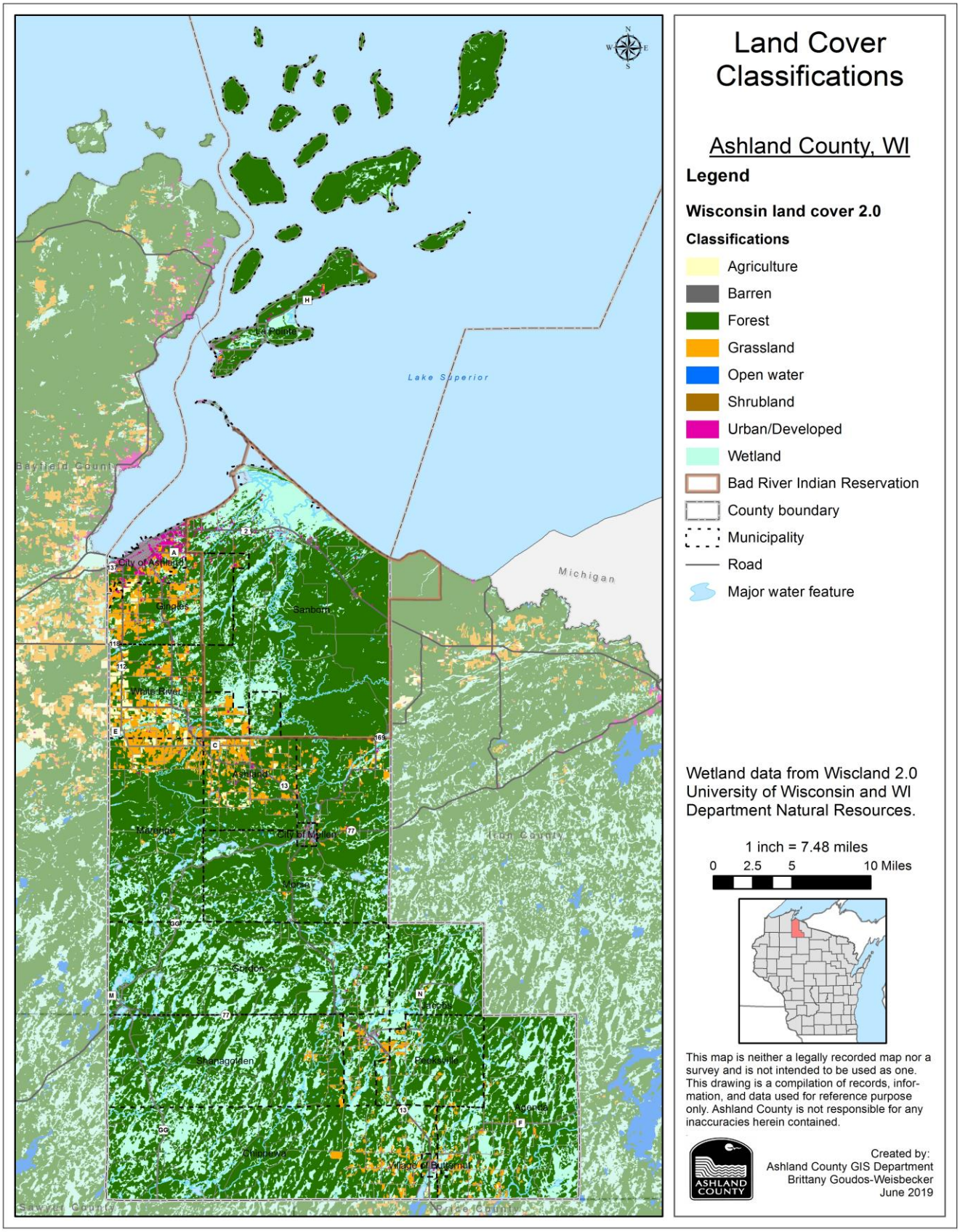


Figure 6. Land Cover Classifications

Climate

Climate change is already having substantial effects on natural systems and the benefits they provide, and it is important for resource managers to understand and consider how climate change may intensify through this century in order to plan for future variable conditions.

The Wisconsin Initiative on Climate Change Impacts (WICCI) released a comprehensive report detailing the science behind climate change, the anticipated impacts, adaptation strategies, and educational resources on the subject. The project convened working groups to assess potential climate change impacts on specific regions in Wisconsin. These working groups focused on several subjects of particular interest in Ashland County including agriculture, coastal resilience, cold-water fisheries, forestry, human health, plant communities, soil conservation, water resources, stormwater, and wildlife. Some of the anticipated impacts may severely affect Ashland County, like the extreme flooding and infrastructure damages experienced in 2016 (photo at right), and other impacts may be less.

St. Mary's Church on the Bad River Reservation in Odanah, WI
Bureau of Indian Affairs, July 13, 2016

Climate Change – Summarized by the Northern Institute of Applied Climate Science (NIACS)
The earth's climate has changed over the past century, and these changes are expected to continue. The following pages include the observed and projected climate change impacts across northern Wisconsin and Upper Michigan[4]. Recent observed changes in Wisconsin include:

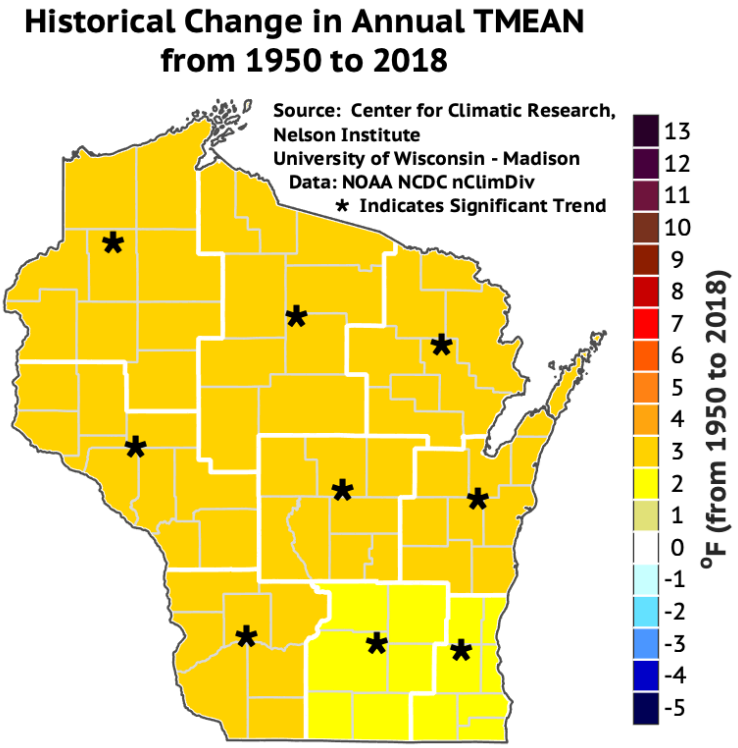
- Annual temperature has increased 1.4 °F; winter has increased by 2 °F in the past century.
- Annual precipitation has increased by more than 2 inches, particularly in the spring and fall.
- Heavy rainfall events (3+ inches) have become much more frequent
- Lake ice break-up, leaf-out, and bird migration dates are shifting earlier into the spring

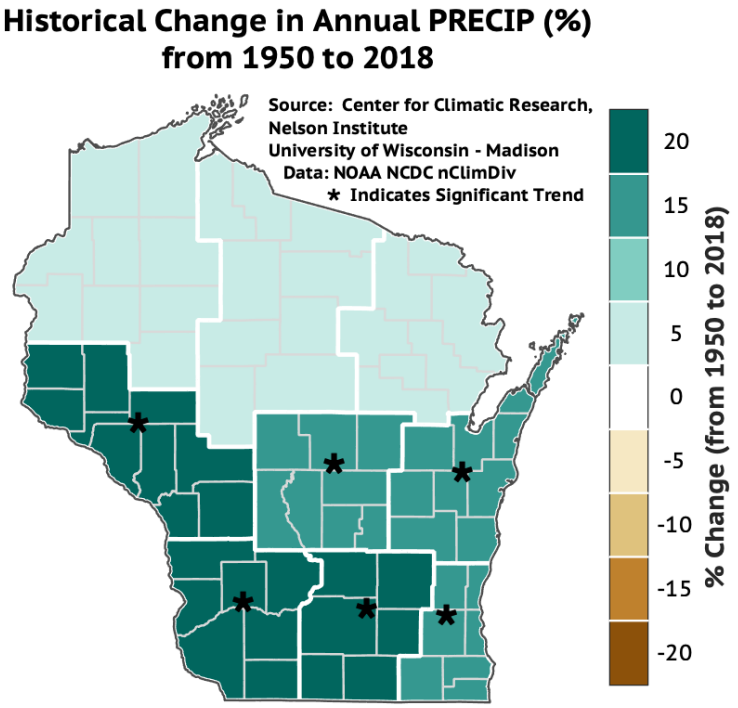
There is uncertainty in long-term climate projections, yet the best available science supports temperature increase across all seasons in northern Wisconsin and western Upper Michigan over the next century. Projected change is 2 to 9 °F by 2100, with winters likely to continue warming faster than other seasons. Precipitation is projected to increase up to 1 inch during winter and about 1 to 3 inches in spring by 2100. The greatest uncertainty exists for summer precipitation, with slight increases or large decreases possible. There may be greater moisture stress in summer and fall because higher temperatures and longer growing seasons will lead to more evaporation and transpiration.

Future stress will increase threats to forests, such as insect pests and diseases. Boreal tree species are expected to decline and temperate species are expected to be favored (see Appendix A for tree species).

4 Janowiak et al. 2014. **Forest Adaptation Resources.** www.forestadaptation.org

Maps: Observed changes in average temperature, and precipitation (1950-2018):

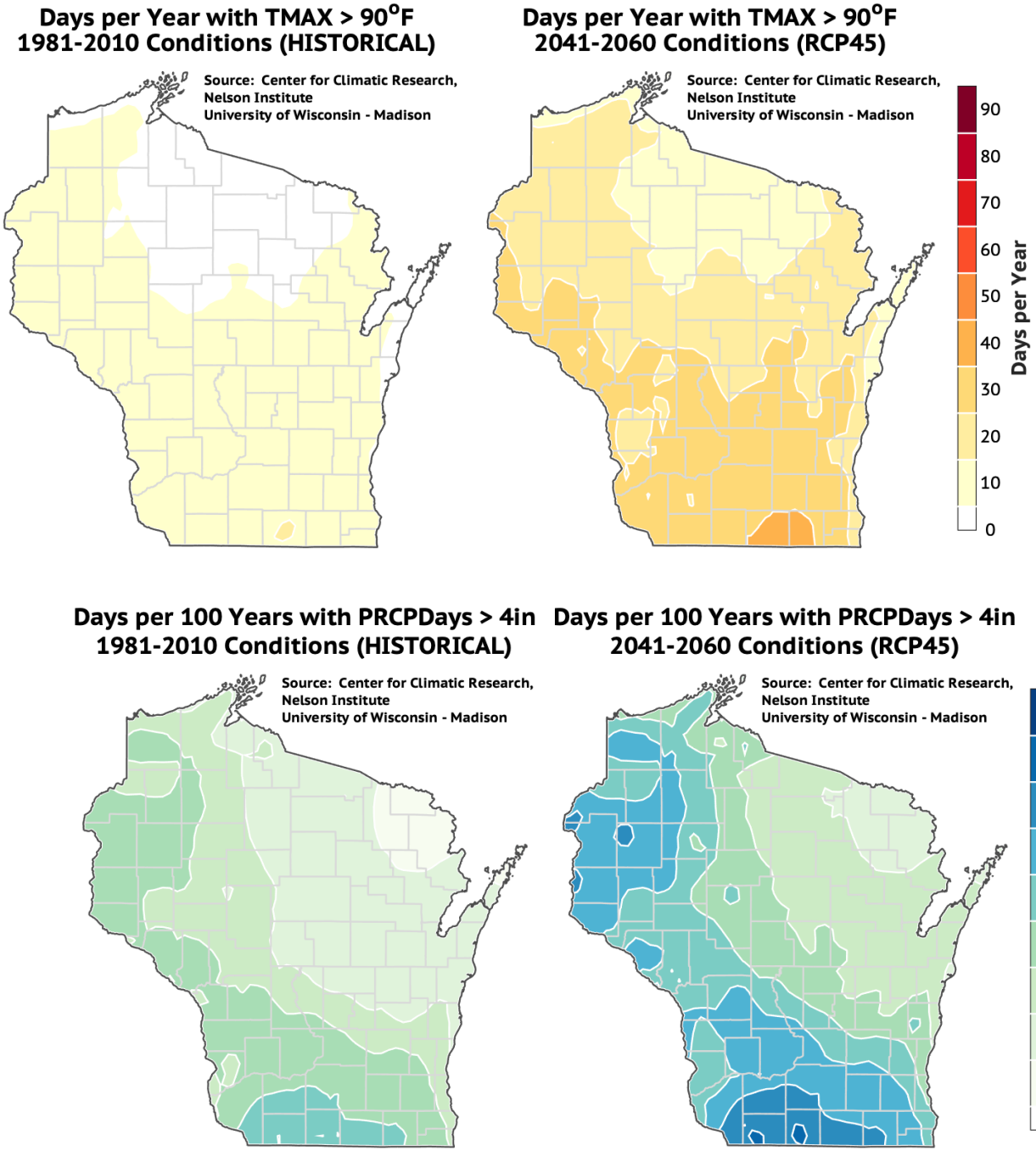




Observed changes in climate from 1950-2018. Maps provided by the Wisconsin Initiative for Climate Change Impacts (WICCI), University of Wisconsin-Madison Center for Climatic Research, Nelson Institute (2019).

Figure 7. Climate: Historical Change in Annual Temperature & Precipitation

Maps: Future changes in climate modeled using a low emission scenario (RCP 4.5) for the time period 2041-2060. The maps below compare anticipated future climate to present climate conditions for maximum temperatures (greater than 90 degrees Fahrenheit); and the frequency of very heavy precipitation events.



Anticipated changes in climate by 2041-2060. Maps provided by the WI Initiative for Climate Change Impacts, University of WI-Madison Center for Climatic Research, Nelson Institute (2019). Note: "RCP" or Representative Concentration Pathways are scenarios used to describe long term concentrations of carbon dioxide based on possible future global climate change policy. More information on climate change and future emissions scenarios can be found in Chapter 2 of the National Climate Assessment.

Figure 8. Climate Projections – Temperature and Precipitation

Adaptation

Changes in climate and extreme weather are increasing the challenges for agriculture nationally and globally, and many of these impacts are predicted to continue. The Northern Institute of Applied Climate Science (NIACS), housed at Michigan Technological University, has developed information and tools to help agricultural producers, land managers, and educators in the Midwest integrate climate change considerations and action-oriented decisions into existing farm and conservation plans. The Adaptation Workbook (https://forestadaptation.org/) provides producers and land managers a flexible, structured process to identify and assess climate change impacts, challenges, opportunities, and adaptation tactics. It also provides evaluation and adaptation actions for improving responses to extreme and uncertain conditions. A synthesis of Adaptation Strategies and Approaches serves as a “menu” of potential responses organized to provide a clear rationale for making decisions by connecting planned actions to broad adaptation concepts. Responses address both short- and long-range timeframes and extend from incremental adjustments of existing practices to major alterations that transform the entire farm operation. Example adaptation tactics include prescriptive actions for agricultural production systems common in the region to guide producers, service providers, and educators in developing appropriate responses for their farms and location. In addition, NIACS published Adaptation Strategies and Approaches Developed for Agricultural Systems, Forested Watersheds, Urban Forests and Non-Forested Wetlands to aide managers in measures which account for future variability (Appendix A).

Variables that effect plant species vulnerability

Climate Change will influence plant growth and survival affecting growing degree days, plant hardiness zones, and heat zones. This information may assist in planning restoration and conservation projects.

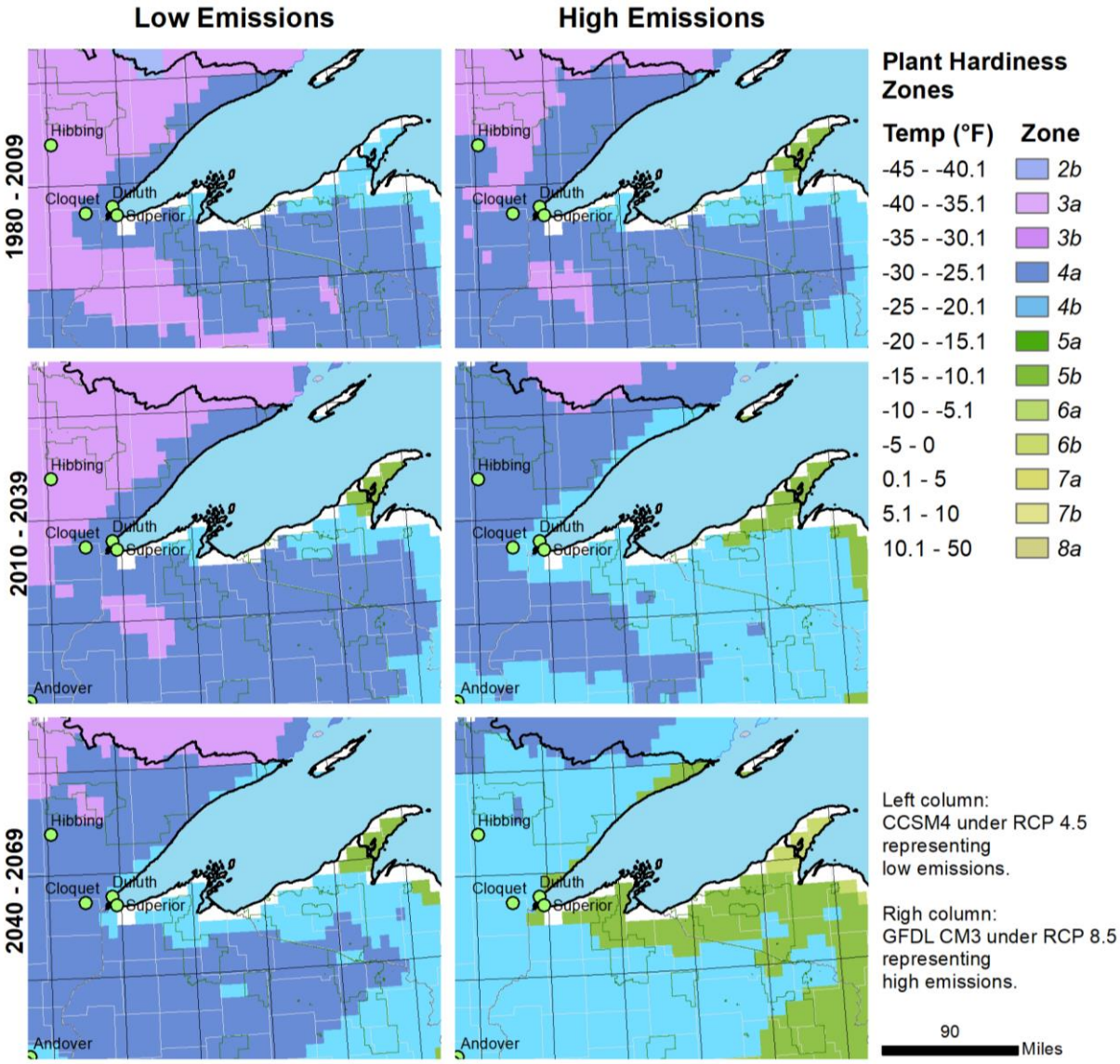


Figure 9. Climate Projections – Plant Hardiness Zones

Plant Hardiness Zones

Plant hardiness zones (PHZs) can indicate the extent of winter stress that plants experience due to cold temperatures. These zones are based on the average annual extreme minimum temperatures. The zones displayed in the map below, are based on the 30-year averages of the absolute minimum temperature in each year, which are categorized into 2.8 °C (5 °F) increments. Winter temperatures have been rising in recent years and the trend is expected to continue. Minimum winter temperatures could rise at 2.3–10.9 °C (4.1-6.0 °F) across much of upper Wisconsin under low to high emissions scenarios (Janowiak et al., 2015).

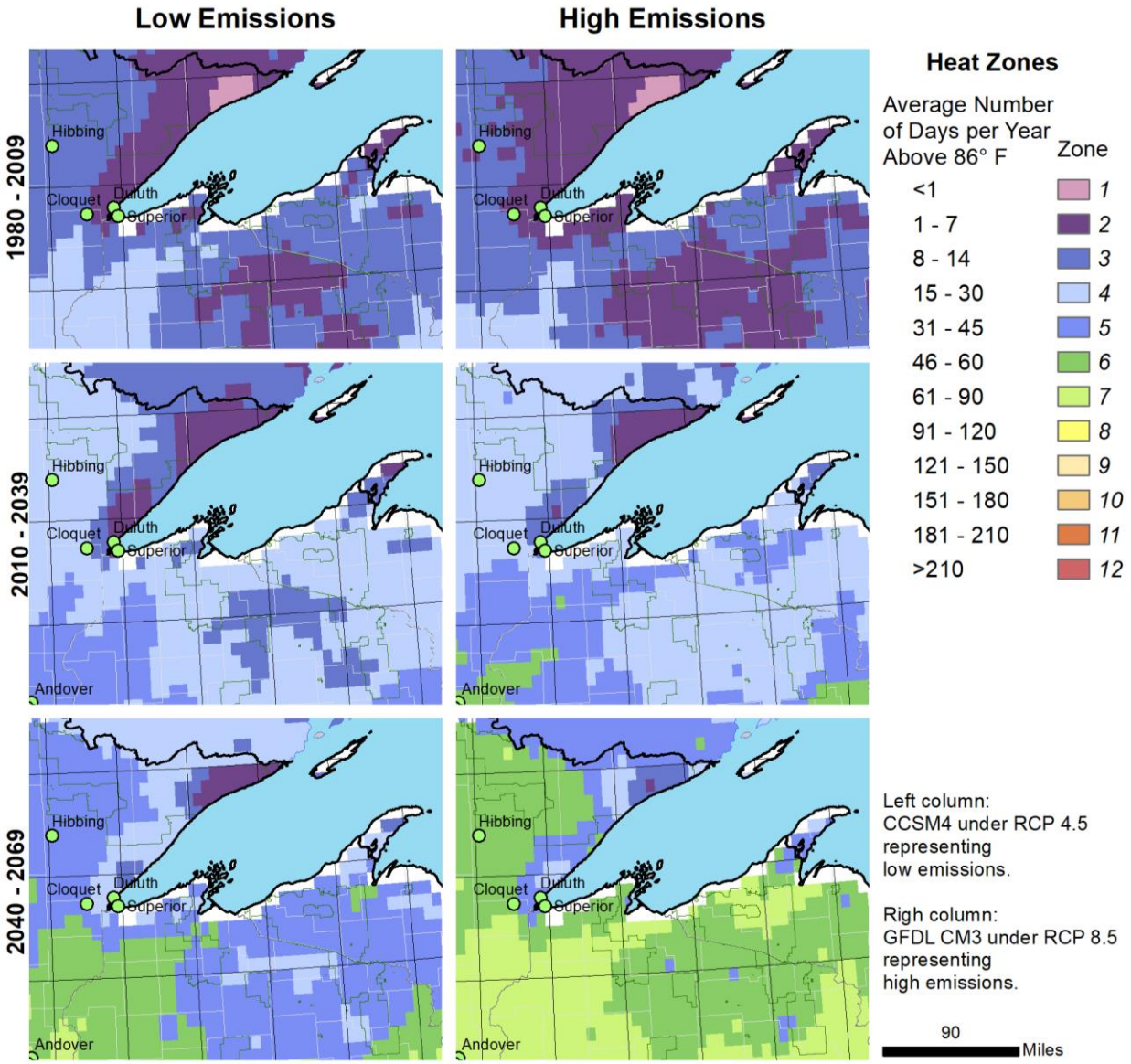


Figure 10. Climate Projections – Heat Zones

Heat Zones

Heat zones map areas of potential heat stress for plants and animals, including humans. These heat zones, map the number of days per year with a maximum daily temperature ≥30 °C (86 °F). This metric is used to indicate a change in 'hot' conditions, recognizing that individual species have unique adaptations and abilities to tolerate a wide variety of conditions.

Profound changes are expected under the high emissions (RCP8.5) scenario. Under this scenario, all regions would have very large increases in the number of hot days per year. Many parts of the country could experience a 100-day increase in such days. Locations associated with high elevation (such as the Rocky Mountains) may have the least change, while areas in the Midwest and Appalachians may undergo the greatest changes.

Growing Degree Days

The maps below describe projections of change throughout the century for Ashland County. Each pair of maps presented here compares recent conditions (1980-2009) to future (2010-2039; and 2040-2069) conditions under a scenario of high greenhouse gas emissions (**RCP 8.5**; high level of emissions, RCP 4.5; lower level of emissions and less warming). Note: Representative Concentration Pathways are scenarios which describe long term concentrations of carbon dioxide based on possible future climate change policy. More information can be found in National Climate Assessment (nca2018.globalchange.gov/chapter/2/)

Growing degree days (GDD) describe the season for plants to grow and mature. GDD is calculated by:

1) Finding the average temperature for each day in the year.

2) The average number of degrees above 41 °F (5 °C) daily is calculated and then summed for the year.

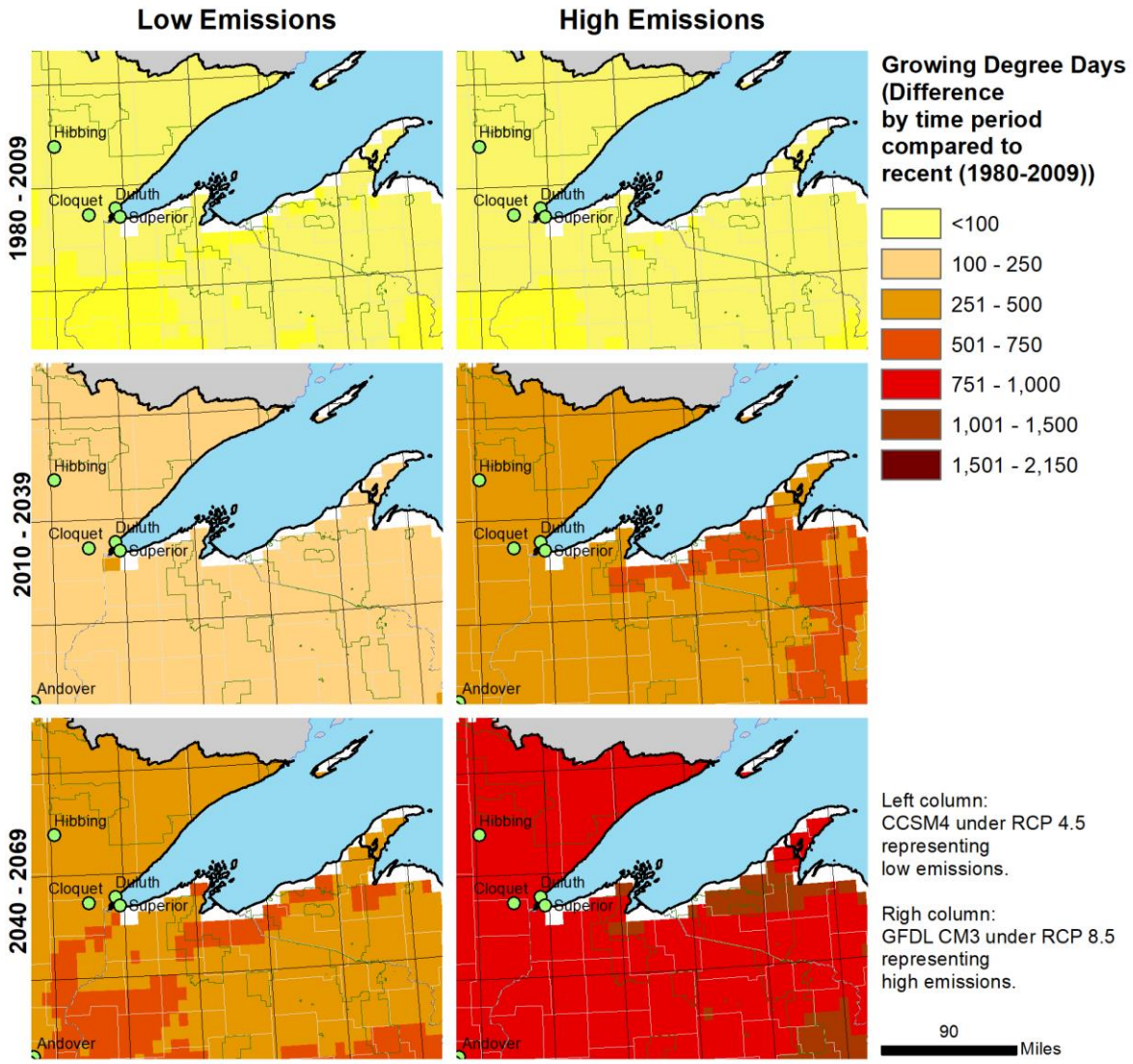


Figure 11. Climate Projections – Growing Degree Days

GDD data helps provide an indication of the annual growing potential, regardless of seasonality. Although the number of growing degree days varies widely across the United States, the projections suggest that the growing season will increase substantially in all areas, especially under the high emissions. Though some plants may have improved growth with an increases in GDD, this measure does not incorporate estimates of precipitation. Many models suggest precipitation will occur in more frequent and extreme events. Higher temperatures and greater moisture stress can increase stress on plants and contribute to greater mortality.

AGRICULTURAL LAND

Of the 673,680[5] acres of woodlands or open space in Ashland County, 32% is the Chequamegon Nicolet National Forest, 15% is within the Bad River Indian Reservation, 40,000 acres is County forest land, 4,000 acres lies in two state parks, and 52,428 acres is farmland. The County has not experienced development pressure and agriculture land conversion common in other parts of the state. Agriculture, forestry, recreation and tourism provide a strong economic foundation. However, agriculture faces challenges including a short growing season, heavy clay soils, extensive waterways, distant markets, and unprecedented precipitation.

Farms in Wisconsin must follow environmental requirements to control runoff from fields, pastures and livestock facilities. Wisconsin's NR 151 Runoff Rules set statewide standards for all farmers, including to annually develop and follow a Nutrient Management Plan (NMP) designed to keep nutrients and sediment from entering lakes, streams, wetlands and groundwater. In Ashland County, 18 farmers have developed NMPs on 8,376 acres and four Farmland Preservation Agreements have been approved on 2,152 acres.

Ashland County had an increase in overall number of farms and acreage from 2012 to 2017. There were 263 farms reported in 2017. Like many other Wisconsin counties, there was a decrease in dairy farms. However, beef farms have increased, and small livestock farms have more than doubled since 2012.

Measure	2007	2012	2017
Land in Farms (ac.)	55,370	45,815	52,428
Number of Farms	203	187	263
Average Farm Size (ac.)	273	245	199
Number of Beef Farms	91	82	96
Number of Dairy Farms	20	15	15
Number of Hog Farms	7	5	18
Number of Sheep Farms	4	4	9
Number of Chicken (Layers)	24	24	56
Market Value of Products/Livestock/ Poultry	$58,855	$64,363	$66,806
# of Milk Cows	2,087	1,994	3,019
# of All Cattle & Calves	7,574	7,522	9,357
Corn for Grain (# farms)	6	12	8
Corn for Grain (acres)	520	1,308	1,667
Corn for Grain (bu.)	46,800	137,553	130,487
Corn for Silage (# farms)	17	13	15
Corn for Silage (acres)	1,301	1,063	1,959
Corn for Silage (tons)	13,655	15,927	28,179
Hay (# farms)	154	131	194
Hay (# acres)	19,614	16,442	17,864
Hay (tons)	28,999	31,154	40,108

Table 1. Ashland County Number of Farms 2007-2017*

5 USDA 2007, 2012 and 2017 Census of Agriculture: www.nass.usda.gov/Statistics_by_State/Wisconsin/index.php

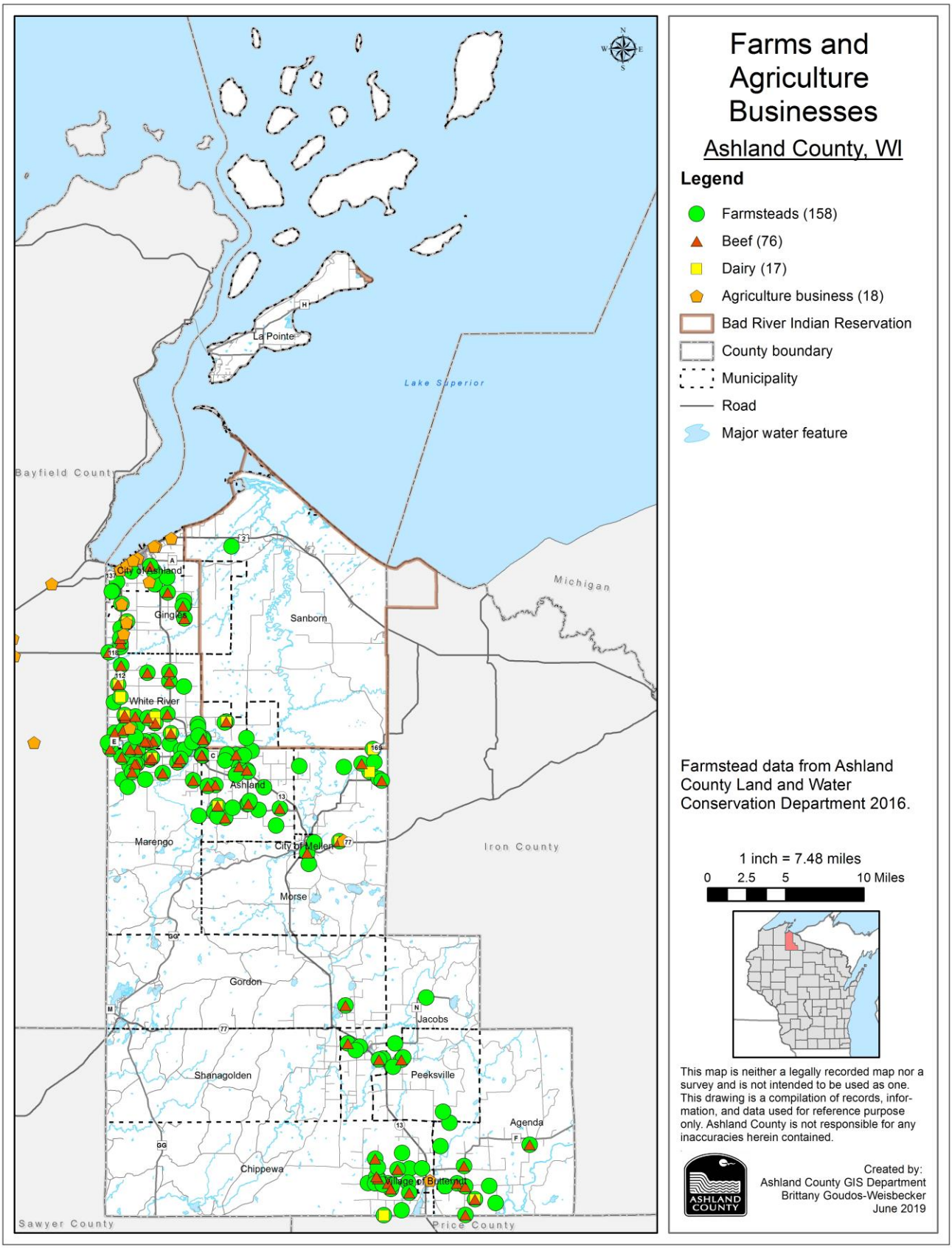
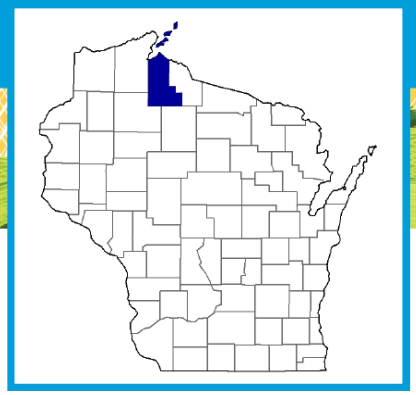


Figure 12. Farms and Agricultural Businesses

2017 CENSUS OF AGRICULTURE *County Profile*



Ashland County
Wisconsin

Total and Per Farm Overview, 2017 and change since 2012

	2017	% change since 2012
Number of farms	263	+41
Land in farms (acres)	52,428	+14
Average size of farm (acres)	199	-19
Total	($)	
Market value of products sold	17,570,000	+46
Government payments	273,000	+28
Farm-related income	341,000	-7
Total farm production expenses	14,899,000	+50
Net cash farm income	3,285,000	+22
Per farm average	($)	
Market value of products sold	66,806	+4
Government payments (average per farm receiving)	8,266	+31
Farm-related income	4,060	-24
Total farm production expenses	56,650	+7
Net cash farm income	12,490	-13

(Z) Percent of state agriculture sales

Share of Sales by Type (%)

Crops	15
Livestock, poultry, and products	85

Land in Farms by Use (%) [a]

Cropland	47
Pastureland	16
Woodland	29
Other	7

Acres irrigated: 360

1% of land in farms

Land Use Practices (% of farms)

No till	3
Reduced till	3
Intensive till	13
Cover crop	6

Farms by Value of Sales

	Number	Percent of Total [a]
Less than $2,500	118	45
$2,500 to $4,999	32	12
$5,000 to $9,999	35	13
$10,000 to $24,999	26	10
$25,000 to $49,999	25	10
$50,000 to $99,999	9	3
$100,000 or more	18	7

Farms by Size

	Number	Percent of Total [a]
1 to 9 acres	20	8
10 to 49 acres	71	27
50 to 179 acres	97	37
180 to 499 acres	47	18
500 to 999 acres	20	8
1,000 + acres	8	3

USDA
United States Department of Agriculture
National Agricultural Statistics Service
www.nass.usda.gov/AgCensus

Table 2. Census of Agriculture 2017 County Profile

2017 CENSUS OF AGRICULTURE *County Profile*

Market Value of Agricultural Products Sold

	Sales ($1,000)	Rank in State [b]	Counties Producing Item	Rank in U.S. [b]	Counties Producing Item
Total	**17,570**	**63**	**72**	**2,448**	**3,077**
Crops	**2,640**	**69**	**72**	**2,601**	**3,073**
Grains, oilseeds, dry beans, dry peas	431	68	72	2,290	2,916
Tobacco	-	-	6	-	323
Cotton and cottonseed	-	-	-	-	647
Vegetables, melons, potatoes, sweet potatoes	(D)	60	72	(D)	2,821
Fruits, tree nuts, berries	91	62	71	1,329	2,748
Nursery, greenhouse, floriculture, sod	150	64	71	1,339	2,601
Cultivated Christmas trees, short rotation woody crops	(D)	(D)	64	(D)	1,384
Other crops and hay	1,732	55	72	1,355	3,040
Livestock, poultry, and products	**14,930**	**60**	**72**	**1,860**	**3,073**
Poultry and eggs	50	48	72	1,249	3,007
Cattle and calves	2,627	63	72	2,036	3,055
Milk from cows	12,149	61	68	414	1,892
Hogs and pigs	44	52	71	1,153	2,856
Sheep, goats, wool, mohair, milk	10	62	70	2,362	2,984
Horses, ponies, mules, burros, donkeys	(D)	(D)	69	(D)	2,970
Aquaculture	(D)	25	52	(D)	1,251
Other animals and animal products	(D)	62	70	1,785	2,878

Total Producers [c]	**461**
Sex	
Male	259
Female	202
Age	
<35	33
35 – 64	271
65 and older	157
Race	
American Indian/Alaska Native	2
Asian	-
Black or African American	-
Native Hawaiian/Pacific Islander	-
White	459
More than one race	-
Other characteristics	
Hispanic, Latino, Spanish origin	4
With military service	56
New and beginning farmers	140

Percent of farms that:

Have internet access	**75**
Farm organically	**1**
Sell directly to consumers	**14**
Hire farm labor	**14**
Are family farms	**97**

Top Crops in Acres [d]

Forage (hay/haylage), all	17,864
Corn for silage or greenchop	1,959
Corn for grain	1,667
Soybeans for beans	856
Cultivated Christmas trees	209

Livestock Inventory (Dec 31, 2017)

Broilers and other meat-type chickens	(D)
Cattle and calves	9,357
Goats	94
Hogs and pigs	280
Horses and ponies	183
Layers	1,118
Pullets	50
Sheep and lambs	171
Turkeys	(D)

See 2017 Census of Agriculture, U.S. Summary and State Data, for complete footnotes, explanations, definitions, commodity descriptions, and methodology.
[a] May not add to 100% due to rounding. [b] Among counties whose rank can be displayed. [c] Data collected for a maximum of four producers per farm.
[d] Crop commodity names may be shortened; see full names at www.nass.usda.gov/go/cropnames.pdf. [e] Position below the line does not indicate rank.
(D) Withheld to avoid disclosing data for individual operations. (NA) Not available. (Z) Less than half of the unit shown. (-) Represents zero.

USDA is an equal opportunity provider, employer, and lender.

Table 2. Census of Agriculture 2017 County Profile

LAND SPREADING

The WDNR Wastewater Program regulates land spreading activities for wastewater and wastewater generated solids[6] from different sources, including:

- Municipal – Wastewater Treatment Plant (WWTP) sewage sludge (NR 204)
- Septage – servicing of private sewage systems (NR 113)
- Industrial – land treatment of industrial liquid wastes and by-product solids and sludge (NR 214)

In general, WDNR determines the suitability of a requested land application site based upon land owner agreement to accept, soil type/characteristics and description, permeability, depth to groundwater/bedrock, slope, proximity to waterways and other landscape features (ie ditches, sinkholes, etc.). Wastewater characterization varies by waste type/source. Septage, holding tank or septic tank characteristics values are established using historic default values for nitrogen at a rate not to exceed the agronomic need for the crop grown.

Industrial and Municipal wastewater is regulated under the Wisconsin Pollutant Discharge Elimination System (WPDES). Permit sampling is required to monitor compliance. Site management plans outline the timing and volume of material that can be spread to meet the conditions of the appropriate code. The type of crop and crop year for any approved fields is a consideration in site management plants. Planning application must also be coordinated to meet the needs and operational considerations of the landowner or farmer to compliment a farms nutrient management plan or other logistical needs. Reporting of all WDNR regulated land application activity is required annually. Specific department forms are generated for the facility or hauler to complete and submit per the conditions of the appropriate regulating code. Examples of data recorded on these forms include fields used, number of acres used, and gallons applied by waste type on each field.

Winter spreading is permissible for septage (NR 113) and industrial (NR 214). However, application is conditionally site specific to slopes between 0 – 2%. Other site considerations are evaluated during approval, such as the potential for runoff to surface water. Site conditions are typically addressed within the approved management plan as application on saturated soil conditions is environmentally detrimental and will likely result in loss of use of the field by the farmer.

From 1996 to 2016, a total of 4,931.5 acres have been permitted for land spreading in the Primary and Secondary Source Water Protection Area (SWPA) in Ashland County (Figure 13). In 2016, the number of permitted sites actively utilized for land spreading was much smaller than the amount permitted over the 20-year time period from 1996-2000. The WDNR provided WPDES data from the 2016 calendar year on the distribution and volume of land spreading in the source water protection area. In 2016, a total of 412.3 acres were approved for land spreading of waste in the Primary and Secondary SWPA area. Waste spreading occurred on 366.2 acres, totaling 1,975,678 gallons. Septage was the only type of waste applied in the Primary Source Water Area, and was the most common type of waste applied throughout the both Primary and Secondary Source Water Protection Areas overall at 77% of the total acreage and over 90% by volume. Industrial waste from the Flambeau River Paper mill was spread on one site near Mellen. The only municipal waste spread was from the Village of Mason. The watersheds with the highest amounts of land spreading are the Headwaters North Fish Creek, Whittlesey Creek-Frontal Chequamegon Bay, Troutmere Creek-Marengo River, and Fish Creek-Frontal Chequamegon Bay.

6 WDNR WPDES Permitting: https://dnr.wi.gov/topic/wastewater/DischargeTypes.html

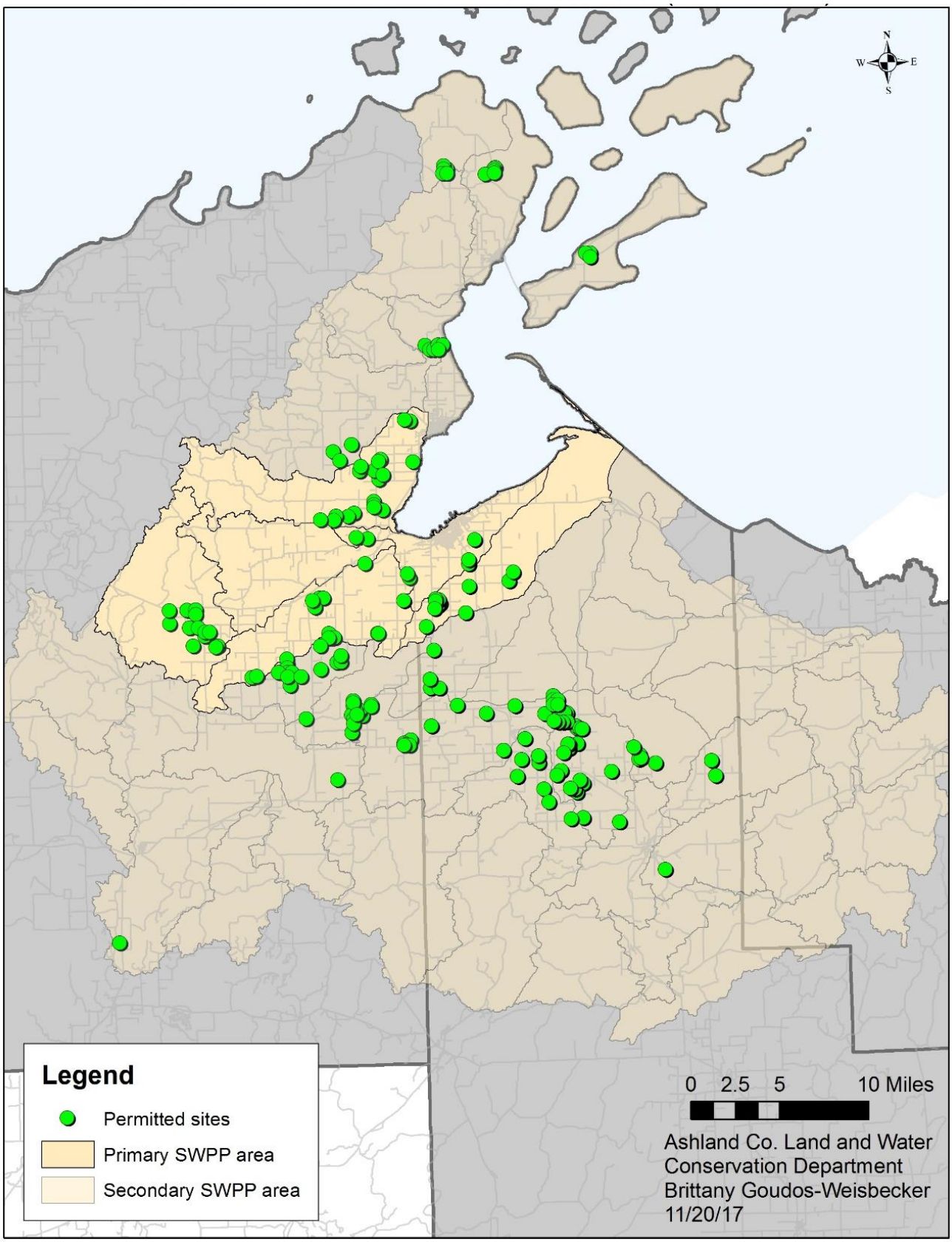


Figure 13. Fields with WPDES Land Spreading Permits (1996-2016)

GROUNDWATER

Lake Superior supplies potable water to the City of Ashland residents, and groundwater is the primary supply of drinking water for most of Ashland County. As with 70% of the state, the sand and gravel aquifer is the main source of groundwater. This aquifer includes primarily glacial deposits of unconsolidated sand and gravel. It is not a continuous layer, but layers of sand and gravel interspersed with other fine-grained, low permeable, deposits. Well yields vary and depend primarily on the permeability and thickness of the sand and gravel at a particular location. Groundwater in general is abundant in Ashland County, but very little is known about the quality. A county-wide groundwater well testing and education program is necessary for more information.

Groundwater contamination susceptibility is low in the northern part of the county and moderately-high in the southern part, along the Lake Superior shoreline, and portions of the Apostle Islands (Figure 14).

The City of Ashland, City of Mellen, Glidden Sanitary District, and the Village of Butternut have municipal water systems. None of these systems have wellhead protection ordinances, and only Butternut Waterworks has a protection plan for their wells. The City of Ashland is developing a Source Water Protection Plan.

Much of the county is served by private wells and septic systems. Protection and maintenance of private wells is largely the responsibility of homeowners. The entire community needs to work together to develop a protection plan that safeguards everyone's water supply. Good construction and proper location are critical in ensuring a safe drinking water supply. Care needs to be taken to locate the well far from potential pollution sources. NR 812, Wis. Adm. Code requires new wells to be located:

- 25 feet from septic tanks
- 25 feet from the high water mark of a lake, pond, or stream
- 50 feet from livestock yards, silos, and septic drainfields
- 100 feet from petroleum tanks
- 250 feet from a sludge disposal area or an absorption, storage, retention or treatment pond
- 1,200 feet from any existing, proposed, or abandoned landfill site

The UW-Extension Center for Land Use Education and the USGS Wisconsin Water Science Center compiled extensive groundwater information which can be found at https://wi.water.usgs.gov/gwcomp/. The purpose of the web site is to make Wisconsin groundwater data accessible and usable to encourage planners to incorporate it into their comprehensive plans.

Nitrate-Nitrogen

Land use affects nitrate concentrations in groundwater. Across Wisconsin, samples found that drinking water from private wells was three times more likely to be unsafe to drink due to high nitrate in agricultural areas than in forested areas. High nitrate levels were also more common in sandy areas where the soil is more permeable (Figure 15).

100% of 56 private well samples collected in Ashland County from 1990-2006 met the health-based drinking water limit for nitrate-nitrogen. Of the 56 samples that have been collected in the county, no samples were above 2 mg/L (milligrams per liter, or parts per million) and no samples exceeded the health-based drinking water limit of 10 mg/L as nitrate-nitrogen.

Ashland County adopted an Agricultural Performance Standards Ordinance in September 2018 to help protect the groundwater and surface water resources.

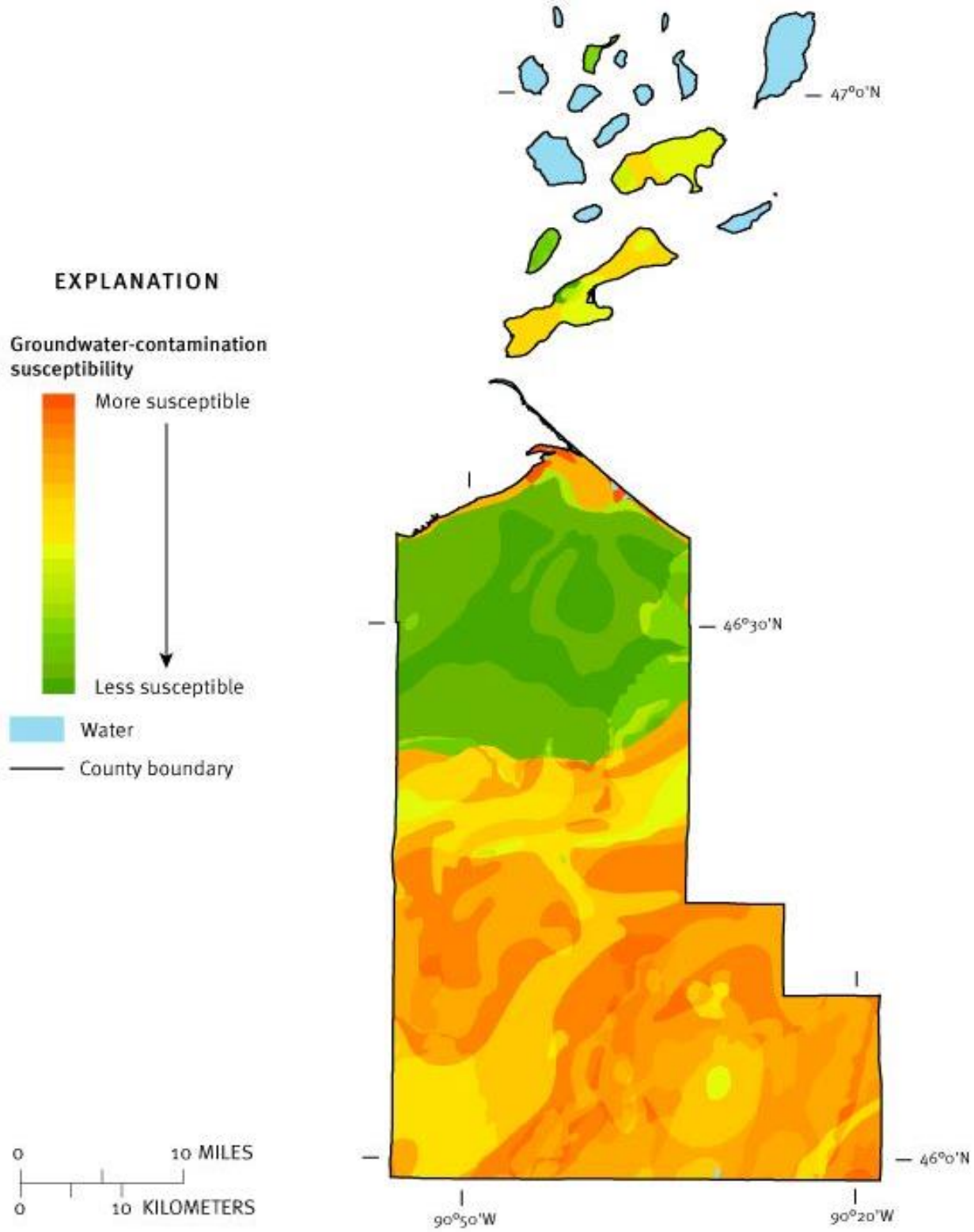


Figure 14. Groundwater Contamination Susceptibility[7]

7 WDNR, Wisconsin's Groundwater Management Plan: https://wi.water.usgs.gov/gwcomp/find/ashland/index_full.html

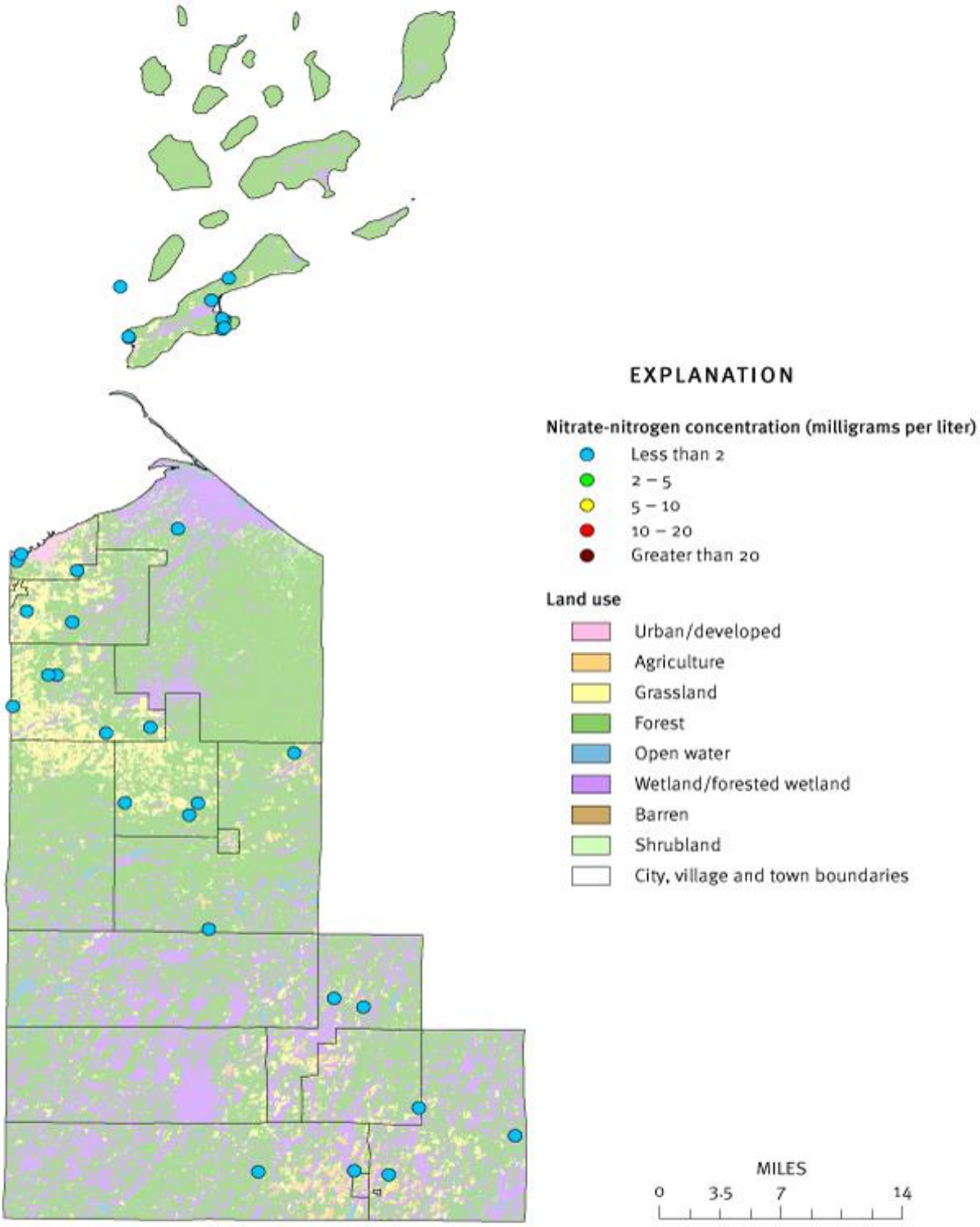


Figure 15. Nitrate-Nitrogen Concentration[8]

Private well nitrate-nitrogen data presented on this map is not comprehensive. Data was from 1985-2004 sampling as reported by the WDNR, WI DATCP, and the Central Wisconsin Groundwater Center.

8 Map source: UWSP, Center for Land Use Education: http://wi.water.usgs.gov/gwcomp/find/ashland/index_full.html

As part of the National Water-Use Information Program, the USGS stores water-use data in standardized format for different categories of water use. Water use in Wisconsin in these summary reports is reported in the following categories: domestic, livestock, aquaculture, industrial, commercial, public use and losses, thermoelectric, or mining.

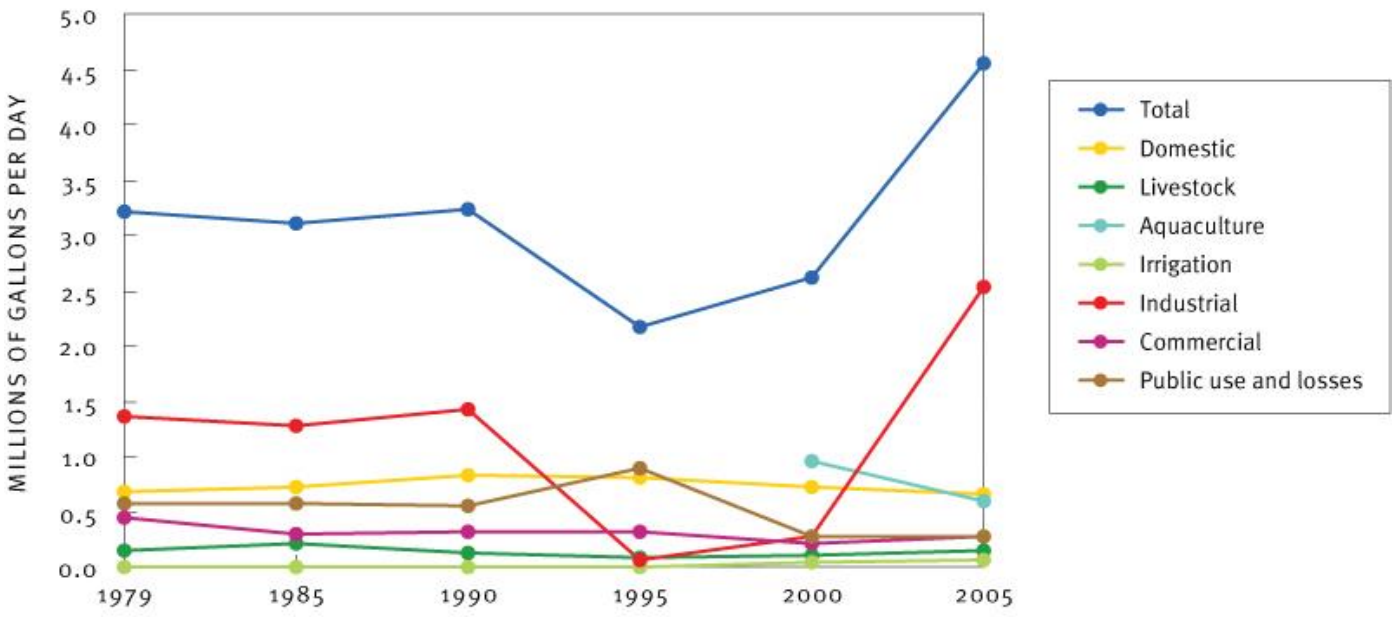


Figure 16. Water Use by Category[9]

Water-use data from U.S. Geological Service *Water Use in Wisconsin* reports for 1979, 1985, 1990, 1995, 2000 and 2005. Figure created for the "Protecting Wisconsin's Groundwater through Comprehensive Planning" web site. 2007.

From 1979 to 2004, total water use in Ashland County increased from 3.2 million gallons per day to 4.5 million gallons per day. The increase in total water use over this period is due largely to an increase in industrial use. Commercial usage has decreased by 50%. The proportion of county water use supplied by groundwater increased from 22.4% in 1979 to almost 42% in 2000 and decreased to 17.6% in 2005. No recent data since 2005 has been updated for Ashland County.

9 Water-use data from U.S. Geological Service: http://wi.water.usgs.gov/gwcomp/find/ashland/index_full.html

SURFACE WATERS

Ashland County's total land area covers 668,045 acres. The county has 1,250 square miles of surface water in the form of lakes, rivers, streams, and wetlands. There are 157 named lakes totaling 9.28 square miles (5936 acres). The county has two distinct drainage basins: Lake Superior basin and the Upper Chippewa River sub-basin (Figure 17). All of the water in the Upper Chippewa River sub-basin flows to the Mississippi. Soil conditions, land cover, and land use vary within each basin.

The Lake Superior drainage basin in Wisconsin covers about 3,069 square miles in parts of Ashland, Bayfield, Douglas and Iron Counties. Ashland County contains nearly one-third of the total Lake Superior basin in Wisconsin. The 17 Apostle Islands within Ashland County have a total shoreline length of 153 miles. The Apostle Islands are considered to be part of the Bayfield Peninsula Southeast watershed.

The Upper Chippewa sub-basin is located in the southern third of the county and is mostly wetland and forest land. There is some agriculture scattered throughout the watershed. Part of the watershed is located in the Chequamegon National Forest in southwestern Ashland County. Butternut Creek flows through Butternut Lake and enters the North Fork of the Flambeau River. Butternut Lake, a eutrophic lake, is part of the statewide Long-Term Trend Monitoring program.

Ashland County contains all or parts of five HUC 8 sub-basins and fifteen HUC 10 watersheds, and 53 HUC 12 sub-watersheds. The HUC 10 watersheds in the Lake Superior basin include Chequamegon Bay, Fish Creek, Bad River, Tyler Forks, White River, Marengo River, and Potato River. The HUC 10 watersheds contributing to the Mississippi River include West Fork Chippewa River, East Fork Chippewa River, Butternut Creek, Upper Flambeau River, Middle Flambeau River, and Headwaters South Fork Flambeau River.

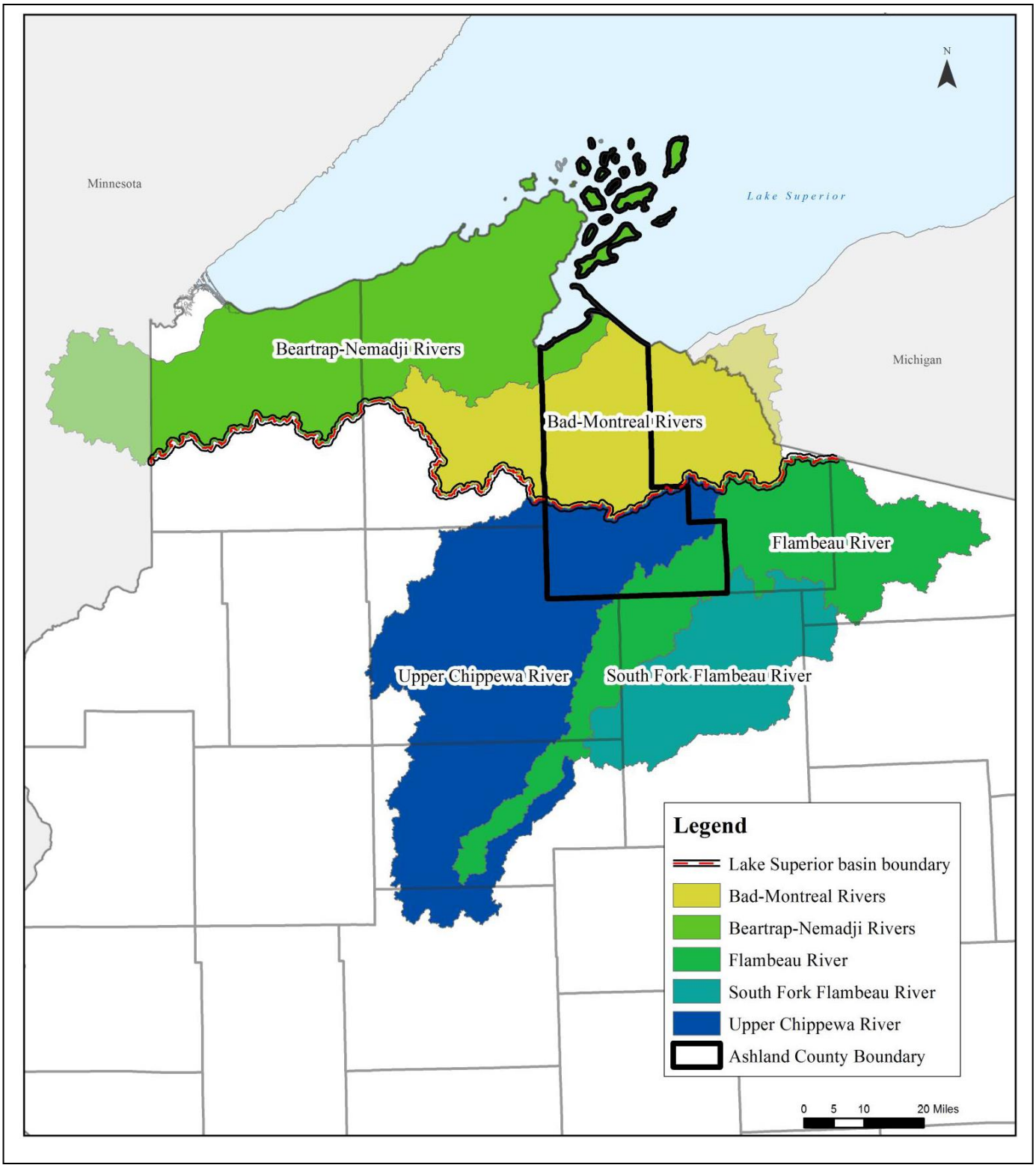
Water quality is generally good, however lakes, rivers, and wetlands of the county are impacted by land use practices in the watersheds that drain to them. Most of the pollutants that enter surface water resources are carried in runoff from many nonpoint sources. The major pollutants of concern are sediment from agricultural fields and construction sites, and nutrients from fertilized fields and livestock operations. Point source pollution from municipal and industrial wastewater discharges have had a negative effect. Additional nonpoint pollution occurs from erosion of stream banks, ditches, and lakeshores as a result of fast runoff from rain and snow events. Human changes to the landscape that increase the amount of impervious surface and alter drainage patterns intensify erosion problems.

Within the City of Ashland, most of the water quality issues are attributable to past and present urban and industrial impacts:

- Current WPDES permitted discharges
- Current stormwater discharges from the City of Ashland and surrounding area
- Historic contamination of Lake Superior sediments (EPA superfund site)
- Historic and current dumping in Bay City Creek and ravines
- Increasing stormwater discharges resulting from residential, commercial, and industrial development
- Occurrence of the pathogens *Cryptosporidium* and *Giardia* in outfall samples
- Increased levels of fecal coliform bacteria in Bay City Creek following rainfall events

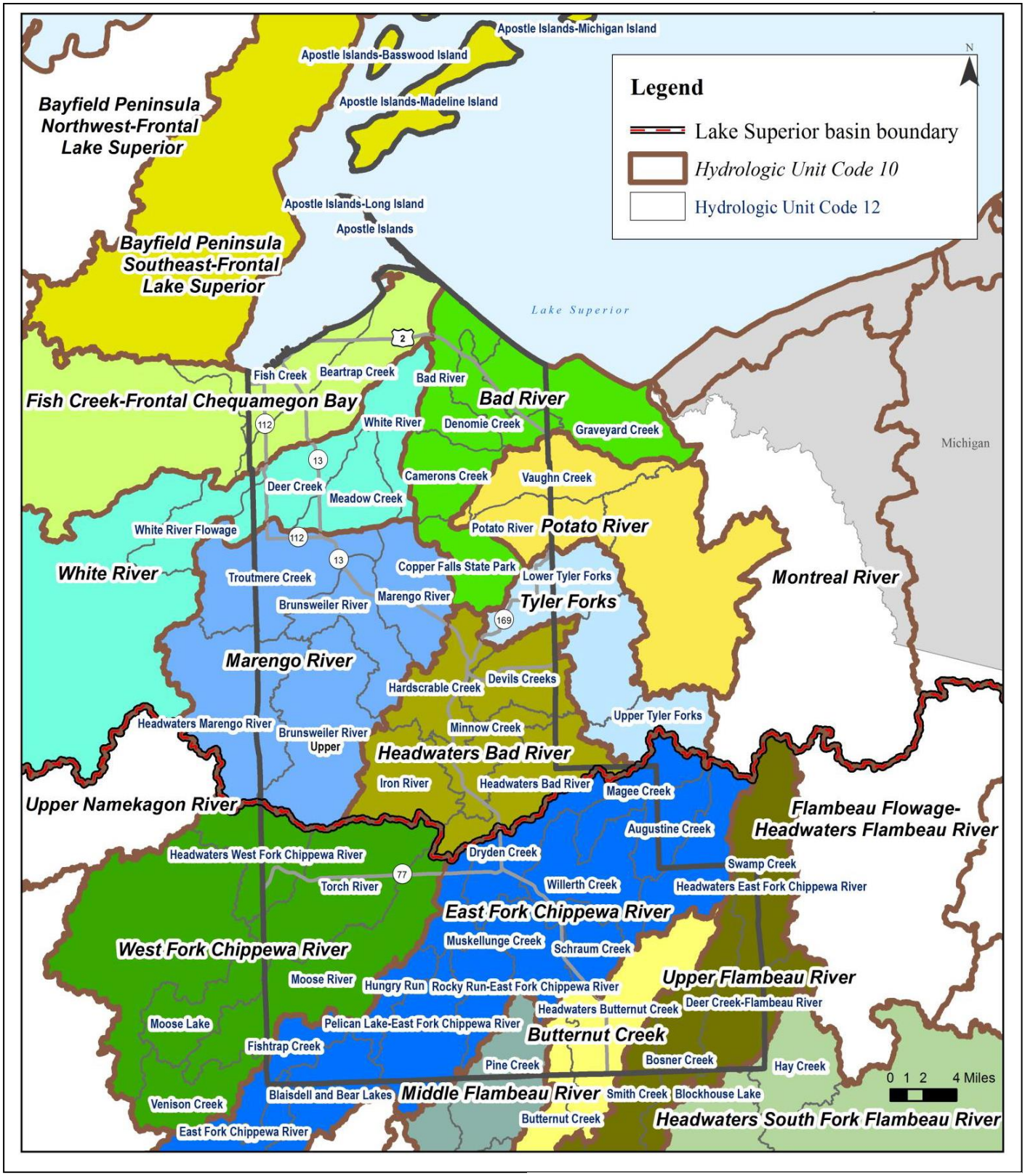
Rivers, Streams, Lakes and Ponds

Ashland County has an extensive network of rivers, streams, creeks, and intermittent waterways. Estimated from GIS using data from the WDNR, there are over 1000 miles of perennial streams and another 712 miles of intermittent waterways. The WDNR lists 479 miles of trout waters in 94 stream segments. The rivers and streams (and many wetlands, lakes, and ponds) are connected to each other and to the uplands through ravines, swales, ditches, diversions, and other waterways.
There are 6,804 acres of lakes, ponds, reservoirs, sloughs, and springs in the county. The WDNR lists 184 waterbodies, of which 95 are named.



Map Credit: Brittany Goudos-Weisbecker, Ashland County GIS Coordinator & Land Information Officer. 2017.

Figure 17. Ashland County HUC 8 watersheds



Map Credit: Brittany Goudos-Weisbecker, Ashland County GIS Coordinator & Land Information Officer. 2017.

Figure 18. Ashland County HUC 10 and 12 Level Watersheds

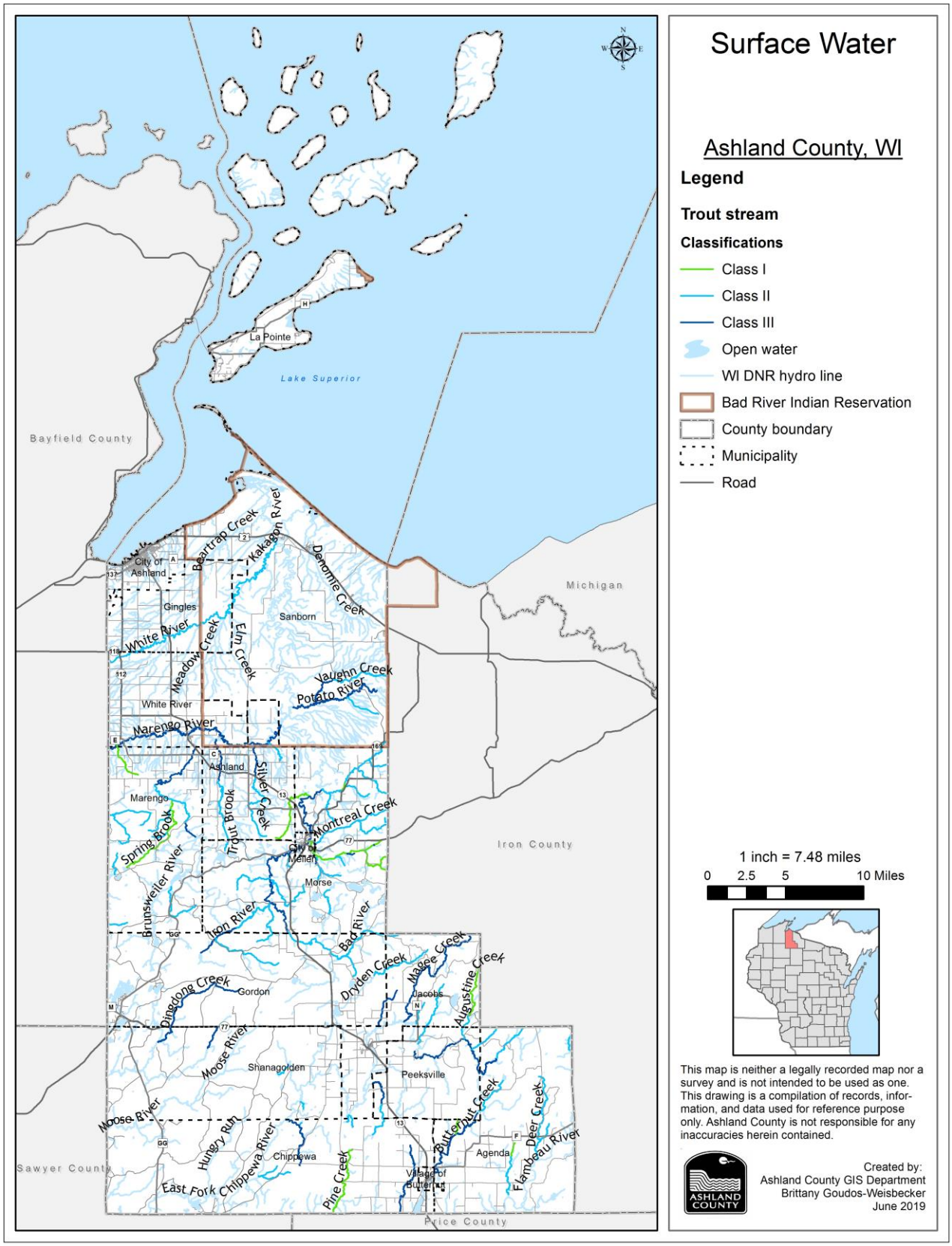


Figure 19. Surface Water Resources

WATERSHED WATER QUALITY CONDITIONS

Wisconsin Statutes provide WDNR with the authority to regulate and manage how waters are used to ensure the protection of water quality and the general public interest in Wisconsin's waters. Water quality standards, including narrative and numeric criteria for surface waters, are described in Chapters NR 102, 104, and 105 of the Wisconsin Administrative Code. In Wisconsin, waterbodies fall into the following designated uses:

- **Fish and Aquatic Life:** All surface waters are considered appropriate for the protection of fish and other aquatic life.
- **Recreational Use:** All surface waters are considered appropriate for recreational use unless a sanitary survey has been completed to show that humans are unlikely to participate in activities requiring full body immersion.
- **Public Health and Welfare:** All surface waters are considered appropriate to protect for incidental contact and ingestion by humans.
- **Wildlife:** All surface waters are considered appropriate for the protection of wildlife that rely directly on the water to exist or rely on it to provide food for existence.

The WDNR establishes water quality standards for individual surface waters based on the potential or attainable uses of the water. This mandate also clearly applies to all waters of the State. In addition, WDNR is required by the Federal Clean Water Act to "provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water."

Outstanding and Exceptional Resource Waters

An additional component of the impaired waters listing and water quality assessment process are anti-degradation classifications, intended to protect existing high-quality waters. Anti-degradation determinations are another important component of resource protection in the county because preventing surface water pollution is more economical than restoring already degraded waters.

In response to requirements of the Clean Water Act, Wisconsin adopted a new anti-degradation policy in 1989. Since that time, Wisconsin has identified outstanding and exceptional resource waters in NR 102 of the Wisconsin Administrative Code. In 2006 the Wisconsin legislature approved additions to the list of ORW and ERW classifications. In Ashland County, 327 miles of stream segments retain these classifications (Table 3). ORWs receive the state's highest protection standards, with ERWs a close second. ORWs and ERWs share many of the same environmental and ecological characteristics. They differ in the types of discharges each receives, and the level of protection established for the waterway after it is designated. ORWs typically do not have any point sources discharging pollutants directly to the water (for instance, no industrial sources or municipal sewage treatment plants), though they may receive runoff from nonpoint sources. New discharges may be permitted only if their effluent quality is equal to or better than the background water quality of that waterway at all times—no increases of pollutant levels are allowed. If a waterbody has existing point sources at the time of designation, it is more likely to be designated as an ERW. Like ORWs, dischargers to ERW waters are required to maintain background water quality levels; however, exceptions can be made for certain situations when an increase of pollutant loading to an ERW is warranted because human health would otherwise be compromised.

Marengo River Watershed (Nine Key Element) Action Plan

Strategies to protect ORW and ERW water bodies include using Nine Key Element plans (9KEs). A 9KE was approved by the EPA in 2013 for the Marengo River Watershed in Ashland County, titled, "Marengo River Watershed Partnership Project Watershed Action Plan (Marengo River Watershed Action Plan-MRWAP)." There is substantial overlap between Ashland County's LWRM Plan and the MRWAP, both in objectives and timelines.

Waterbody Name	Water Body ID Code	ORW/ERW Determination	Length (mile)
Augustine Creek	2410600	ERW	7.7
Bad River	2891900	ORW	36.8
Bad River Slough	2892100	ORW	173.2 (acres)
Ballou Creek	2930700	ERW	2.3
Beartrap Creek	2891400	ORW	11.2
Bosner Creek (Rapid Creek)	2291000	ERW	1.0
Brunsweiler River	2913800	ORW	21.5
Devils Creek	2929300	ERW	7.0
East Fork Chippewa River	2399800	ORW	61.4
Flambeau River	2225000	ORW	50.0
Hildebrandt Creek	2285500	ERW	1.2
Kakagon Slough	2891700	ORW	70.9 (acres)
Krause Creek	2929000	ERW	6.0
Marengo River	2911900	ORW	40.8
Pine Creek	2278700	ERW	5.9
Potato River	2906200	ORW	25.9
Spring Brook	2915200	ERW	8.0
Troutmere Creek	2919300	ERW	3.0
Tyler Forks	2923100	ORW	6.6
Vaughn Creek	2906300	ERW	9.6
West Fork Chippewa River	2414500	ORW	7.5
White River	2892500	ERW	49.1

Table 3. 2016 Outstanding and Exceptional Resource Waters

One year after the previous Ashland County LWRM 10-year plan was updated, work began on The Marengo River Watershed Action Plan. The Marengo River Watershed Action Plan incorporated the County's 2010-2019 LWRM Plan as a relevant natural resource management reference document. In turn, this current LWRM Plan adopts the goals and objectives outlined in the Marengo River Nine Key Element plan as a way to geographically focus the county's water quality protection efforts.

The four goals in the plan are to maintain hydrologic integrity of the system, healthy soil and water, diverse habitats, and citizen engagement. Best management practices to achieve these goals that are outlined in both the Marengo River Action Plan and the County LWRM Plan include:

- Riparian and upland native tree planting
- Forest management technical assistance
- Wetland restoration
- Rotational grazing, livestock fencing, conservation tillage, and manure storage
- Stream crossings
- Streambank stabilization
- Nutrient Management Plans

Typical EPA nine-element watershed plans include estimates of the amount of a pollutant or pollutants that need to be reduced in order for water quality standards to be met (referred to as “load reductions”). Aside from mercury in fish tissue, no streams or lakes in the Marengo River Watershed are currently listed as impaired by either the State of Wisconsin or the Bad River Tribe. Therefore, rather than estimating load reductions, the objective is to prevent future impairments by identifying and reducing existing pollution sources including excess sediment, high bacteria counts, and excess nutrients.

The MRWAP identifies watershed targets to assess watershed conditions as implementation moves forward. The targets provide a way to integrate water quality standards from Wisconsin and the Bad River Tribe into a set of common objectives, called target objectives, that will help ensure the entire watershed is in a healthy condition (Marengo River Watershed Action Plan Objectives are in Appendix B).

WETLANDS

A wetland is defined by state statute as "an area where water is at, near, or above the land surface long enough to be capable of supporting hydrophytic vegetation and which has soils indicative of wet conditions." Wetlands may be seasonal or permanent and include swamps, marshes, and bogs.

The Wisconsin portion of the Lake Superior Basin contains rare coastal wetlands not found anywhere else in the entire basin, and the aquatic sites should be protected and managed to sustain rare taxa or high species diversity. The priority wetland sites in the county include Big Bay on Madeline Island, the Outer Island sand spit and lagoon, Stockton Island tombolo, Fish Creek slough, Long Island/Chequamegon Point, Bad River/Kakagon sloughs, White River, and Caroline Lake wetlands. In addition to the wetlands themselves, the WDNR has also classified many Ashland County tributaries as “wetland waters” – surface waters that are hydrologically connected to ecologically significant coastal wetlands of Lake Superior.

Wetlands can make lakes, rivers, and streams cleaner and drinking water safer. They provide valuable habitat for both aquatic and terrestrial animals and vegetation. Groundwater is also commonly discharged from wetlands. This discharge water can be important in maintaining stream flows, especially during dry months. Groundwater discharge through wetlands can contribute to high quality water in water ways. Draining and filling of wetlands or nearby development can remove these natural functions and values.

Wetland restoration is a regular practice of the Ashland County LWCD and partner agencies. A multi-agency habitat team has involved representatives of the Lake Superior Land & Water Conservation Departments, Natural Resources Conservation Service, WDNR, and the U.S. Fish & Wildlife Service (FWS).

Particular attention must be given to wetlands within shorelands to ensure protection from development. The Ashland County Shoreland Protection Ordinance restricts wetland activities within the shoreland zone. The federal government and the WDNR restrict development in wetlands through Section 404 of the Clean Water Act and NR103, respectively.

IMPAIRED WATERS

Water quality assessments aid the Ashland County LWCD in determining management actions that are needed to meet the state water quality standards. The county water quality priorities are driven in part by a focus on impaired waters, also known as 303(d) listed waters. These waters do not meet standards as defined by Section 303(d) of the federal Clean Water Act. Every two years, states are required to submit a list of impaired waters to the United States Environmental Protection Agency (USEPA) for approval. The 2018 303(d) impaired waters list in Ashland County is shown in Table 4. The county uses the 303(d) list as the basis for establishing priorities to focus limited funding and staff resources.

Name	Water Body ID Code	Water Type	Pollutant	Impairment	Status	Priority
Bay City Creek	2891100	River	TP	Degraded Biological Community	303d Listed	Low
Bayview Park Beach, Lake Superior	2751220	Great Lakes Beach	E. coli	Recreational Restrictions – Pathogens	Water Delisted	Delisted 2012
Bear Lake	2403200	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Black Lake (Birch)	2401300	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Butternut Lake	2283300	Lake	TP	Excess Algal Growth	303d Listed	Low
Butternut Lake	2283300	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Chequamegon Bay (Ashland Coal Tar Site)	2753770	Bay/Harbor	PAHs	Chronic Aquatic Toxicity, Contaminated Sediment	303d Listed	Low
Day Lake Flowage	2430300	Impoundment	Mercury	Contaminated Fish Tissue	303d Listed	Low
English Lake	2914800	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Galilee Lake	2935500	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Gates Lake	1850200	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Lake Three	2915800	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Marengo River	2911900	River	Fecal Coliform	Recreational Restrictions – Pathogens	303d Listed	Low
Maslowski Beach, Lake Superior	2751220	Great Lakes Beach	E. coli	Recreational Restrictions – Pathogens	303d Listed	Low
Mineral Lake	2916900	Lake	TP	Impairment Unknown	303d Listed	Low
Mineral Lake	2916900	Lake	Mercury	Contaminated Fish Tissue	Water Delisted	Delisted 2012
Moquah Lake	2918200	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Potter Lake	2917200	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Spider Lake	2918600	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Spillerberg Lake	2936200	Lake	Mercury	Contaminated Fish Tissue	303d Listed	Low
Trout Brook	2913900	River	Fecal Coliform	Recreational Restrictions – Pathogens	303d Listed	Low

Table 4. 303d Water List for Ashland County

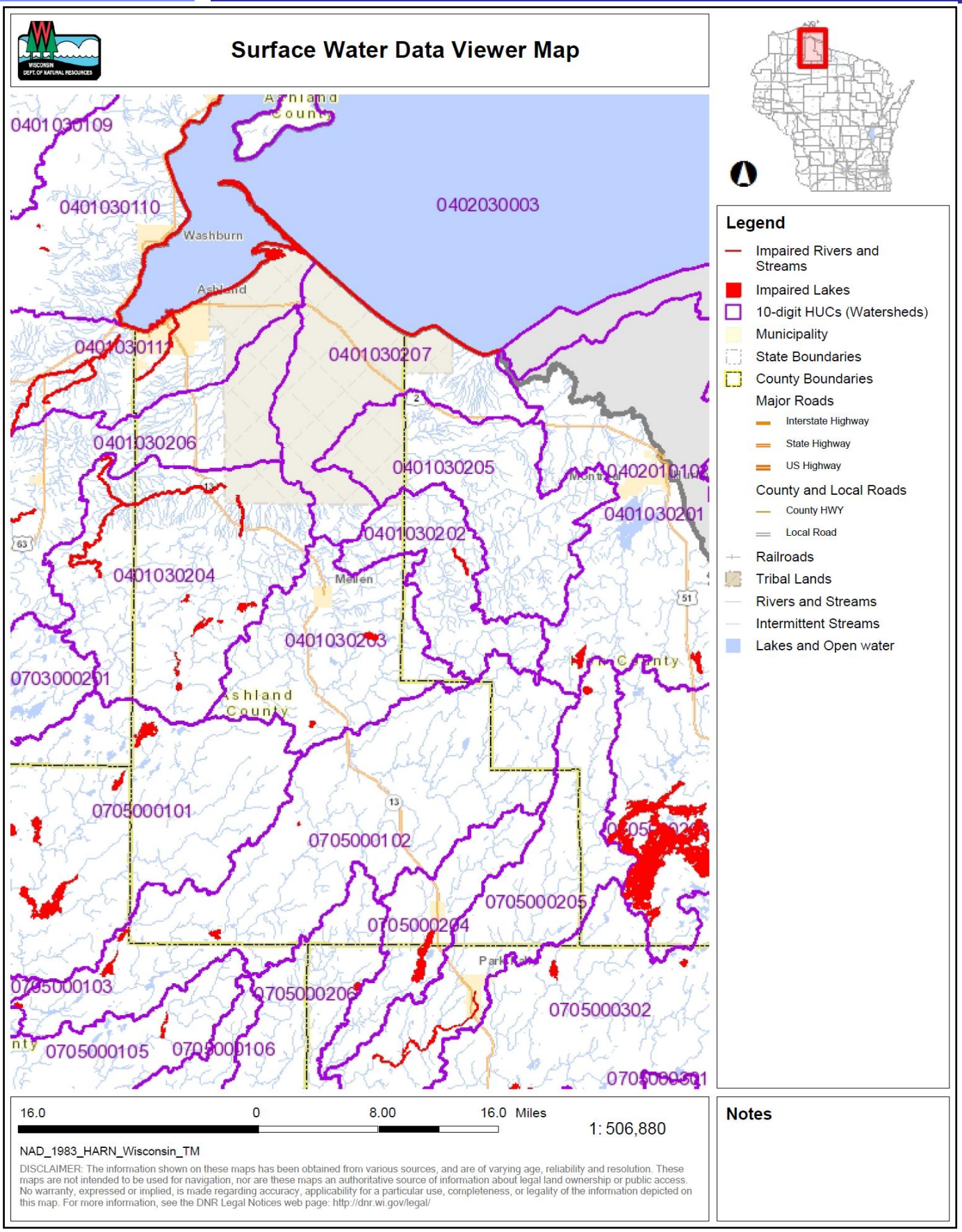


Figure 20. 303d Water List for Ashland County

SHORELANDS

Land within 1,000 feet of the ordinary high water mark (OHWM) of navigable lakes ponds, or flowages and within 300 feet of the OHWM navigable rivers or streams or landward of the floodplain (whichever is greater) are designated as shorelands. Vegetation in shorelands provides a natural buffer which protects surface waters from overland runoff and contaminants. These areas also provide critical habitat for a variety of plants and animals and enhance the aesthetic quality of water bodies. Disturbed shorelands reduce their ability to slow runoff and filter contaminants. Wisconsin requires counties to protect and to prevent erosion of these resources by adopting a shoreland ordinance through Chapter 59.69 of the Wisconsin Statutes. Wisconsin Administrative Code NR115 dictates the shoreland management program.

TRANSPORTATION SYSTEM

The county has experienced road construction and maintenance challenges, especially in the Lake Superior clay plain. Storm waters and snowmelt runs off the impervious clay soils and sloping landscape quickly. The large volume of water and the fast runoff rate can erode streams and damage culverts and bridges constructed on them. Many crossings cannot handle water during flood events. Woody material and other debris washed in by floodwaters can block a crossing and back water up over adjacent land and over the roadway itself, resulting in severe washouts and damage to in-stream habitat. Road ditches also concentrate flow and are direct conduits to surface waters and wetlands.

Ashland County contains approximately 1,175 miles of road, which includes 120 miles of State highways, 93 miles of county roads, 871 miles of local (city, village, town) roads, and 85 miles of forest and park roads. Not included in this total are the many miles of private roads, driveways, logging roads and trails that may also intersect a waterway. Figure 20 shows the road and stream intersections in Ashland County.

State Highway 13 at Highbridge, WI. Ashland County.
Wisconsin Emergency Management, July 13, 2016

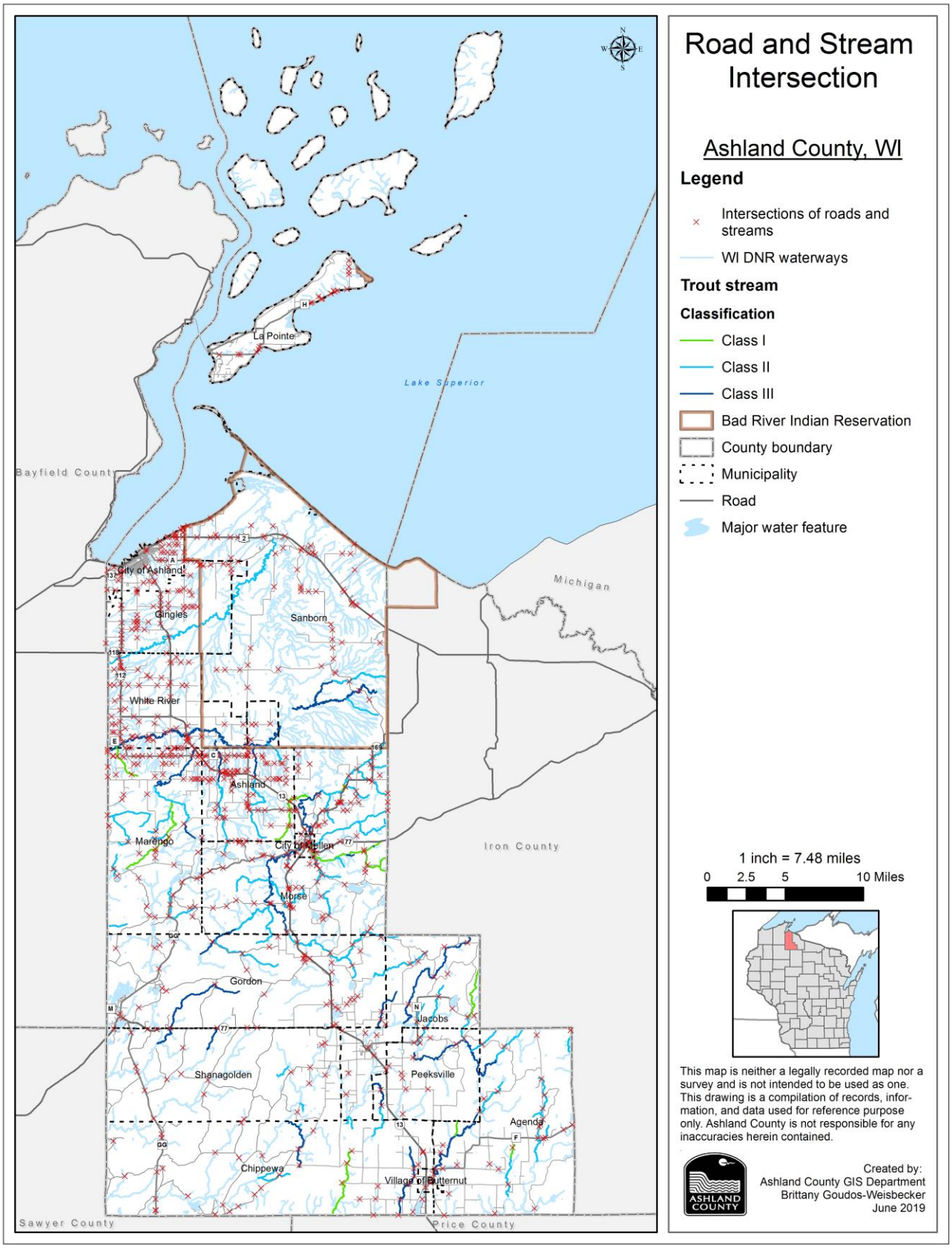


Figure 21. Road and Stream Intersections

WOODLANDS

Woodlands provide habitat for a variety of plants and animals, as well as adding scenic beauty to the landscape. Large continuous blocks of forested land are important habitat for a variety of plants and animals. Woodlands managed according to approved forest management practices can support varying and sometimes complementary objectives, such as timber production and wildlife habitat.
Development can destroy the capacity of woodlands to provide wood products, habitat, and scenic beauty. The value of woodlands for habitat, production, and scenery should be considered before woodlands are converted to other uses.

WATERSHED AND SURFACE WATER CONCERNS

Ashland/Northern States Power Lakefront Superfund Site

Background
The Ashland/Northern States Power Lakefront Superfund site sits on the shore of Chequamegon Bay of Lake Superior, in Ashland, Wisconsin. This site is made up of several properties including those owned by Northern States Power Co. of Wisconsin (Xcel Energy), Canadian National Railroad and the City of Ashland. The 26-acre site contains 16 acres of contaminated lake sediment just off-shore and 10 acres of contaminated upland area. The near-shore portion of the site was formed by the placement of fill consisting of sawdust, wood and wood waste, demolition debris, and other waste material. The upland area was the home to a former manufactured gas plant. Contaminants found in sediment and groundwater includes tar, oil and other waste consisting of polyaromatic hydrocarbons, or PAHs, volatile organic compounds, or VOCs, and metals. Soil, groundwater, and an adjacent residential area were also contaminated causing the closure of two artesian wells and the installation of an onsite wastewater treatment plant.

Clean Up and Current Status
In 2002 the site was placed on the Superfund National Priorities List by the WDNR and United States EPA. Access to a portion of the bay and shore was restricted to boats and swimmers. Clean up of this site began in 2013 with the remediation of the 10-acre land portion of the project. A permanent breakwater barrier was built in 2015 in the bay to control wave action during the cleanup and provide a safe harbor for future development of the site. In 2016 a successful pilot wet dredge and soil and groundwater cleanup was completed. In 2018 the full-scale wet dredge cleanup in the Chequamegon Bay was completed and final cap of the site is expected for November 2019. In 2018, a 50-year lakebed lease was signed by the City of Ashland and the Governor of Wisconsin. The site will be ready for redevelopment by June 2020. More information is available at the Vaughn Public Library, 502 W. Main St., Ashland, and at the WDNR Spooner Service Center 810 W. Maple St. Spooner.

Marengo River Watershed

Several studies focused on the Marengo River watershed characterize its geomorphology and hydrologic condition (Fitzpatrick 2005, LSBPT 2007, BRWA 2010). The focus on the Marengo River comes in large part because it is estimated to be the greatest contributor of sediment to the Bad River. The Bad River is the largest U.S. sediment contributor to Lake Superior (Robertson 1997). Sedimentation and its causes are perhaps the greatest issues facing the health of Wisconsin's Lake Superior basin streams.

These studies have revealed evidence of how historical land cover change along a soil transition zone created unstable stream channel conditions that the Marengo River and other, similar Lake Superior watersheds are still responding to about 100 years later. It is these unstable conditions and current human influences that exacerbate the conditions, which lead to many of the water challenges identified in the Marengo River Watershed Action Plan. The streams of the Marengo River Watershed are flashy, particularly in the soil transition and clay plain (Figure 21) where open land, agriculture, and road drainage systems result in rapid transport of surface water to streams. Intermittent streams and drainages may only have flow

in them during and following rain events, carrying surface runoff to the Marengo River and perennial tributaries. These episodic runoff events play a major role in determining when sediment, nutrients, pathogens, and other materials are delivered to and transported in the river, but these events are poorly understood. Pollutants from poorly managed livestock and/or human waste disposal can sit on the landscape and then be flushed into streams during rain or snowmelt events. Water samples collected during dry times may miss the majority of these pollutants and sampling during runoff events can be difficult and costly.

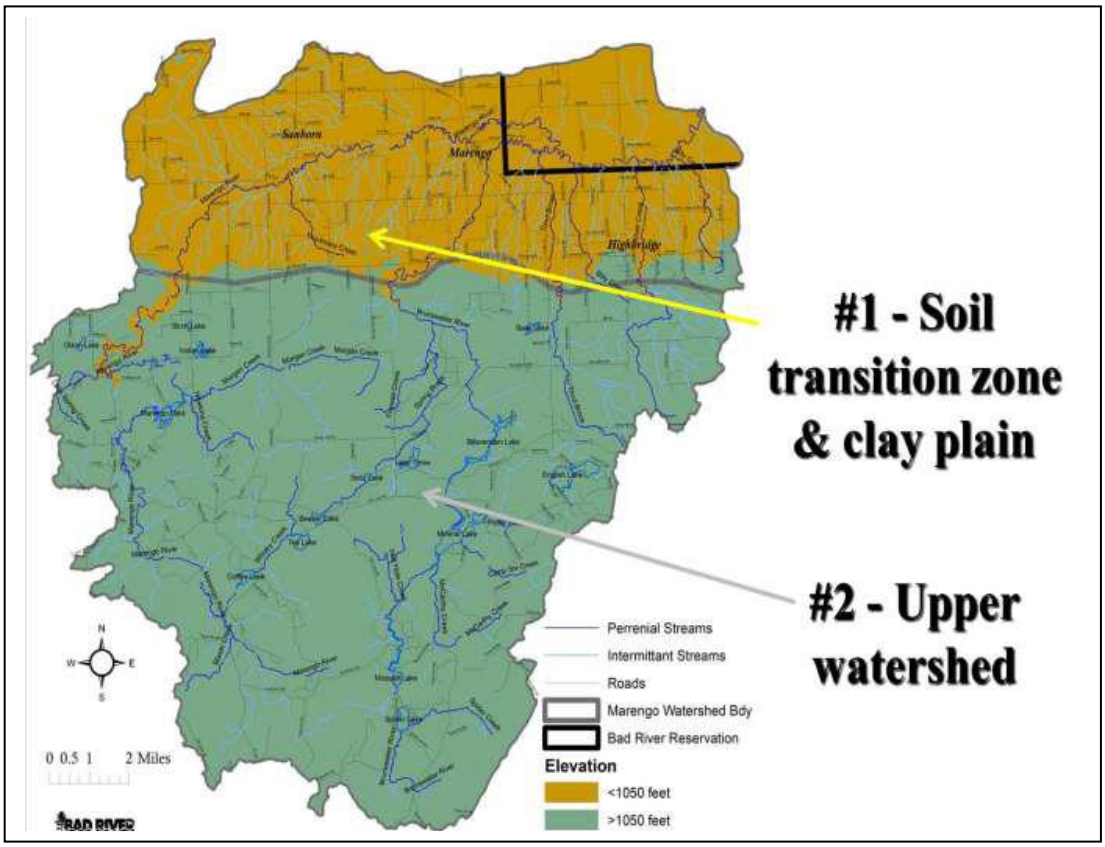


Figure 22. Marengo River Watershed Soil Transition Zone & Clay Plain

Available water quality and geomorphic assessment data from the Bad River Tribe, WDNR, former Ba River Watershed Association (BRWA), and USGS indicate three primary categories of pollutants in the watershed, including bacteria, nutrients, and sediment. Designated uses potentially affected by high bacteria counts include *Recreational Use* and *Public Health and Welfare* under the State of Wisconsin standards and *Cultural* and *Recreational* under the Bad River Tribe's standards. These uses are generally intended to encompass human incidental contact and ingestion of surface waters. Federal criteria for *Escherichia coli* (*E. coli*) were developed after consideration of risk to the swimming public. The Bad River Tribe has collected *E. coli* samples from streams and rivers in the watershed to evaluate the potential health risk of contact through recreational activities and data indicates elevated bacteria counts have been documented at several locations in the soil transition zone and clay plain area. Additional and financial and staff resources are necessary to gain further information.

In 2009, the BRWA and the Center for Watershed Protection completed a watershed assessment. The assessment identified several sites that could be improved with implementation of best management practices, the need to evaluate nutrient concerns and establish a baseline in the soil transition zone and clay plain area, to establish an accurate baseline for peak flows and sediment loading, and to implement "slow the flow" management approaches.

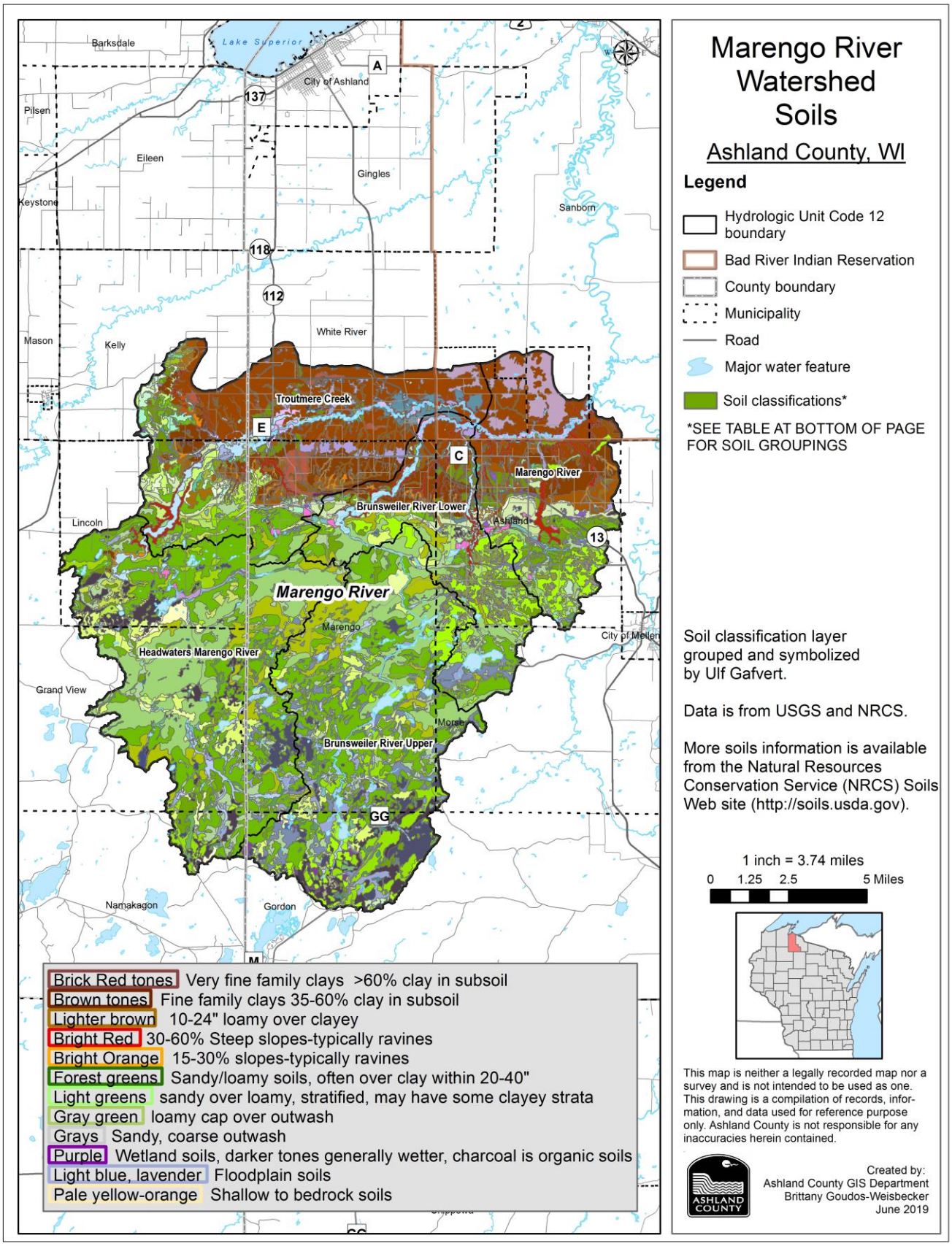


Figure 23. Marengo River Watershed Soils

Fish Consumption Advisories

Wisconsin has been providing consumption advice on eating fish caught from all Wisconsin waters since 2001. Prior to that, advice was given only for specific surface waters. A publication from the Wisconsin Department of Natural Resources, *Choose Wisely – 2016: A Health Guide for Eating Fish in Wisconsin* (Pub FH-824 2016) outlines general consumption advisories for the state. Fish from most waters contain mercury, so statewide safe-eating guidelines provide the same advice for most inland waters. In addition, there are special exceptions to the statewide guidelines for locations with higher levels of contaminants. In Ashland County, these waters include Lake Superior for PCBs and mercury and the following inland lakes for mercury: Lake Three, English Lake, Moquah Lake, Spider Lake, Spillerberg Lake, and Butternut Lake. More restrictive guidelines for these waters can also be found in WDNR publication FH-824 2016.

Wisconsin Beach Monitoring Program

In 2003, the WDNR began implementation of the federal BEACH (Beaches Environmental Assessment and Coastal Health) Act of 2000. The BEACH Act is an amendment to the Clean Water Act requiring all coastal and Great Lakes states to develop programs for effective water quality monitoring and public notification at coastal recreational beaches. The US Environmental Protection Agency has grants available for states to implement a beach program. The WDNR offers support to Lake Michigan and Lake Superior communities to monitor beach water for elevated Escherichia coli (E.coli) levels. This information helps community health officials provide public health information. There are currently five City of Ashland and one Madeline Island beaches being monitored. Data on individual beaches is available on the Beach Health Site, found here: www.wibeaches.us/apex/f?p=181:1:::NO:RP::

Maslowski Beach Monitoring (City of Ashland)

The Mary Griggs Burke Center for Freshwater Innovation at Northland College conducted research[10] to characterize occurrence and potential sources of *Escherichia coli* (*E. coli)* at Maslowski Beach in Ashland. Maslowski is a highly used recreational resource and an important part of the local community and economy. Since 2003, the beach has been impacted by frequent water quality advisories and closures. Northland College conducted water quality monitoring at the beach, adjacent streams, and stormwater exits to measure *E. coli* concentrations. Water quality samples containing high concentrations of *E. coli* were further analyzed to identify DNA markers (e.g., humans, livestock, gulls, etc.). Results from this project suggest that a wide variety of sources of *E. coli* are likely affecting water quality at Maslowski Beach.

Since water quality monitoring began in 2003, it has become clear that Maslowski Beach is significantly impacted by bacterial pollution. For example, in the summer of 2013, *E. coli* levels at Maslowski Beach were observed to be above the state and federal water quality criteria on 14 different occasions. As a result, Maslowski Beach was under a swimming advisory or closure 56 days out of the 95 day-season and is now listed by the WDNR as an impaired waterbody. The ultimate management goal is to reduce pollutant runoff to the beach to eliminate the need for swimming advisories and/or closures.

10 Lehr, et al. Maslowski Beach Summary Report. Northland College. 2017.

Invasive Species

Wisconsin faces an onslaught of invasive species from other regions and countries. Non-native plants, animals and pathogens displace native species, disrupt ecosystems, and harm recreational activities such as fishing, boating, and hiking. They also damage commercial, agricultural, and aquacultural resources. Some invasive species may cause human health problems. Nationwide, control efforts and ecological effects of invasive species cost an estimated $137 billion per year. Because they lack the predators and competitors they faced in their homelands, invasive species can spread rapidly and aggressively. Controlling invasive species is difficult, and getting rid of them is often impossible. People play a major role in spreading invasive species and can also help keep them from spreading.

The Department of Natural Resources and the Wisconsin Council on Invasive Species have been working over the last four years to develop rules to classify and regulate invasive species. The purpose of these rules is to prevent and minimize the introduction and spread of invasive species in the state. The key components of the rule package include: 1) the legal classification categories - prohibited and restricted; 2) criteria for classifying species; 3) a listing or identification of invasive species by category; 4) actions that would be prohibited or restricted; 5) exemptions for possession, sale or other activities involving some invasive species under specific conditions or when authorized by a permit from the Department 6) control requirements and 7) specific enforcement actions that could be taken.

Chapter NR 40 - Invasive Species Identification, Classification and Control (August, 2009) identifies invasive species as prohibited or restricted in each of the following categories:

- Algae and cyanobacteria
- Plants
- Fish and crayfish
- Aquatic invertebrates except crayfish
- Terrestrial invertebrates and plant disease−causing microorganisms
- Terrestrial and aquatic vertebrates except fish

The Chapter NR 40 rule also contains provisions for preventative measures, enforcement, and interagency coordination. The current list of Wisconsin NR 40 classified plants, including fact sheets, literature reviews, and photo galleries can be found at the following internet location:

http://dnr.wi.gov/invasives/classplants.asp

The current list of Wisconsin NR 40 classified animals, fish, algae and other species - including fact sheets, literature reviews, and photo galleries can be found at the following internet location:

http://dnr.wi.gov/invasives/classanimals.asp

Additional information about invasive species in general can be found on the web in many locations including: http://dnr.wi.gov/invasives/

Northwoods Cooperative Weed Management Area (NCWMA)

The Northwoods Cooperative Weed Management Area (NCWMA) is a collective group of state and federal agencies, municipalities, tribes, nonprofits, community organizations, and individuals who have come together to combat invasive species in Douglas, Bayfield, Ashland, and Iron counties in northern Wisconsin. The Northwoods Cooperative Weed Management Area provides a forum to share information and resources, collaborate on planning, and cooperate on invasive species management in northern Wisconsin.

The NCWMA started as a small group of staff from different agencies in Wisconsin's Lake Superior region who shared a growing concern about the spread of invasive species in the area. The group was originally called the Northwoods Weed Initiative. In 2005, they began following the model of Cooperative Weed Management Areas in the western U.S., and formally adopted the name "Northwoods Cooperative Weed Management Area" (NCWMA). This marked the beginning of an effort to bring in additional members and expand the scope of the group. By 2007, they had developed a management plan, annual operating plan, and a Memorandum of Understanding (MOU). In 2007, the group secured its first grant and launched a series of programs in pursuit of its mission.

NCWMA's high priority invasive species in Ashland County

Garlic Mustard	**Knotweeds; (Giant, Bohemian, and Japanese)**	
Wild Parsnip	**Teasels**	
Garden Valerian	**Purple Loosestrife**	
Leafy Spurge	**Yellow Iris**	
Buckthorns (glossy & common)	**Eurasian bush honeysuckles**	**Japanese barberry**

Aquatic Invasive Species

Although all invasive species pose threats to the people and resources of Ashland County, our proximity to Lake Superior along with extensive wetlands, rivers and streams make prevention and control of aquatic invasive species (AIS) a high priority. Bayfield County to the west, Iron County to the east, and now Ashland County all employ AIS Coordinators to implement education programs and control efforts. Additional information on aquatic invasive species and AIS laws in Wisconsin can be found on the WDNR website at:

http://dnr.wi.gov/invasives/aquatic/
http://dnr.wi.gov/invasives/aquatic/laws/

Current as of August, 2009, the following aquatic invasive species are known to occur in Ashland County.

- Banded Mystery Snail
- Chinese Mystery Snail
- Curly-Leaf Pondweed
- Eurasian Water-Milfoil
- Eurasian Water-Milfoil / Northern Milfoil Hybrid
- Freshwater Jellyfish (non-native but not invasive)
- Japanese Mystery Snail
- Purple Loosestrife
- Rainbow Smelt
- Rusty Crayfish
- Spiny Waterflea
- Viral Hemorrhagic Septicemia
- Zebra Mussels

Ashland County Accomplishments (2014 through 2018)

The 2019 plan update focused on addition climate adaptation approaches, resource information, review of the goals and objectives, accomplishments to date, and implementation of activities. The Advisory Committee reviewed goals and objectives and identified current concerns and priorities for the future. Accomplishments from the 2010 plan are illustrated below with selected accomplishments from each goal of the 2014-2018 work plan.

Plan Goals (2010 Plan)

1. Protect and enhance the quality of Ashland County's surface and ground water resources.
2. Conserve and enhance the soil and terrestrial resources of Ashland County.
3. Protect and improve aquatic and terrestrial wildlife habitat in Ashland County.
4. Provide information and education concerning natural resource conservation to private landowners, local governments, non-governmental organizations, and the general public through cooperation and coordination with other resource management entities.

Land and Water Conservation Accomplishments (2014-2018)

Cost Share Conservation Projects

- **29,092 ft.** Livestock Fencing ATCP 50.75
- **17 acres** Wetland Restoration ATCP 50.98
- **765 ft.** Stream Crossing ATCP 50.885
- **12** Well Decommissioning ATCP 50.97
- **19** Livestock Watering Facilities ATCP 50.76

Nutrient Management Plan

1193.77 Acres

1 Manure Storage

4 Producers

2 Ordinances:

* Agricultural Performance Standards and Animal Waste Storage
* Large-Scale Concentrated Animal Feeding Operations

Approved September 20, 2018

Streambank Protection - Brunsweiler River

Excessive Bank Erosion & Sediment Deposition

16 Root Wads placed & secured with Duck Bill Anchors
470' fenced off from cattle

Seeded & planted with 210 native willow stakes

Ashland County WDNR Surface Water Grant
Streambank Protection on Brunsweiler River

The Ashland County Land & Water Conservation Department (LWCD) is grateful to the Wisconsin DNR for the funding granted to increase protection of the high class Brunsweiler River through reduction of soil erosion and sediment loading.

This section of river faced fast onset erosion in 2015, and lost approximately 30 feet of bank by the time construction began. The LWCD began initial conversation with the landowner in 2016, followed by project design in 2017, and eventual construction in 2018. The department worked with the landowner to stabilize 390 linear feet of streambank. In addition, 16) 15-foot Root Wads were laid on streambed and anchored into the bank using Duck Bill Anchors and cables, Non-Woven Geotextile was placed on graded banks, and 774 yd^3 rock was placed along banks for high velocity protection.

470 feet of stream was fenced off from cattle, and the area was seeded and planted with 210 willow stakes including *Salix discolor, Salix exigua,* and *Salix nigra.* Construction was completed in early September, and the state engineer signed approval in October. The area is well stabilized and began growing native vegetation. The site will no longer create sedimentation concerns and it will improve aquatic and terrestrial habitat on the Brunsweiler.

Natural Resource Conservation Service:	$8,332.45
WI DNR Grant:	$41,891.25
Department Agriculture, Trade, Protection:	$5,631.30
Total project cost:	$55,855.00

Above: Brunsweiler River looking south, BEFORE.
Below: Brunsweiler River looking south, AFTER.

Above right: Root Wads laid on streambed and duckbills anchored into the bank.

Left: Brunsweiler River looking north, eroding banks, BEFORE.

Right: Brunsweiler River looking north, stabilized banks. AFTER.

Chapter 3. Goals, Objectives and Activities

The goals established in this plan represent priorities for land and water resource management in Ashland County. The advisory committee reviewed and updated the goals in 2019.

It is acknowledged that no one goal is prioritized over another. Instead, there is a continual need to seek balance in the attention given to implementing activities under each goal and the sometimes competing interests that may occur with implementation. Rather, priority is given to locations which could improve water quality conditions (ORW/ERW waters, priority farms, rapid response AIS project, etc).

PLAN GOALS

1. Maintain and enhance the quality of Ashland County's surface and ground water resources.
2. Conserve and enhance the soil and terrestrial resources of Ashland County.
3. Protect and improve aquatic and terrestrial wildlife habitat in Ashland County.
4. Provide conservation education to private landowners, local officials, non-governmental organizations, and the general public through collaboration with other natural resource management entities.

IMPLEMENTATION STRATEGIES

An implementation strategy is provided for each goal in the following section. The objectives are the detailed and measurable steps toward reaching each goal. Activities are the means for reaching the objectives. Priority activities are shown in bold lettering. The objectives that correlate with each activity are identified in parenthesis following the activity. Implementation of activities to be completed in 2018 is detailed in the work plan in Appendix B. There is also a list of activities to be carried out primarily by partners or considered at a later date. Additional lower priority activities were considered, but eliminated from the plan because of resource constraints. Each goal includes an information & education strategy.

OVERALL ACTIVITIES

1. Coordinate LWCD activities with other county departments, neighboring counties, nonprofit and non- governmental organizations, and state and federal agency partners.
2. Utilize existing resource plan goals and priorities in county decision-making processes.
3. Implement changing state and federal regulations locally.
4. Provide input to federal and state policies and programs.
5. Provide software, hardware, staff training, and data for an integrated geographic information system (GIS). Map and house this data appropriately.

INFORMATION AND EDUCATION STRATEGY

Information and education activities are critical to reaching each plan goal. The general actions that will be used for implementing the information and education (I & E) strategy of the LWRMP are is outlined in the boxes following the objectives and activities for each goal. In the information and education strategy, target audiences and key messages are identified, and the recommended activities to deliver those messages are listed. The timeline for implementation of the information and education is annual unless otherwise noted by a specific year in the work plan.

Public and elected official engagement are important components of implementation of this plan. More information about Ashland's conservation education strategy is found under Goal 4.

Full implementation of I & E strategies is currently limited by staff and funding resources. When possible, I & E is integrated with project implementation and program administration.

Common Educational Tools

Media

1. Newspaper articles, conservation columns and public service announcements
2. County website, social media, email
3. Advertising campaigns - newspaper, radio
4. Direct mail

Youth Education

5. School presentations
6. Envirothon
7. Field trips
8. WI Land & Water Conservation poster & speech contest

Adult Education

9. County Board and Lake Association meetings
10. Northwest WI Lakes Conference
11. Technical assistance, project planning, site inspections
12. News articles, newsletters, accomplishment reports, and web site postings
13. Public presentations, workshops, tours, demonstrations, field days, volunteer opportunities
14. Displays at events: e.g., Farm & Garden Show, county fair, Lake Superior Day
15. Annual Tree & Shrub Sale

Common Educational Strategy Audiences

Each of the first three goals has targeted audiences for message delivery. Where audiences are common to more than one goal, they are listed below.

16. Agricultural landowners
17. Residential landowners
18. Agricultural service providers
19. General public
20. City, town, village, and county officials
21. Developers, builders, surveyors, etc.
22. Youth: schools, organizations
23. Adult organizations: sportsmen's groups, gardening, non-profit organizations

GOAL 1

Maintain and enhance the quality of Ashland County's surface and ground water resources.

Objectives

A. Reduce non-point pollution and water quality risks through adaptive strategies on agricultural, urban and forested lands. (*)

B. Establish baseline data and develop monitoring of groundwater/drinking water quality across Ashland County. (*)

C. Account for variable future hydrologic conditions through restoration or adapted structure and system design. (*#)

D. Identify and reduce point source pollution originating from rural and urban lands.

E. Minimize the environmental effects of non-metallic and metallic mining while ensuring public safety.

General Activities (see following Ashland County LWRM Work Plan 2020-2024 for details)

Technical and financial assistance

1. Provide technical assistance; reduce erosion, slow runoff, & increase water storage. (^*#)
2. Implement voluntary nutrient management plans and NR 151 performance standards through technical assistance and cost share. (^+)
3. Manage farmlands on a landscape level; implement Marengo River Watershed Action Plan. (*+)
4. Work with adjacent counties on cross-boundary watershed projects. (^)
5. Encourage slow-the-flow demonstration project to account for variable future conditions. (^*#+)
6. Provide well abandonment technical assistance and cost share. (+)

Enforcement and compliance

1. Evaluate parcels, notify landowner regarding compliance status, offer cost sharing, provide technical assistance, and participate in enforcement actions to implement the Ashland County Agricultural Performance Standards and Animal Waste Storage Ordinance. (Appendix E)
2. Conduct annual Farmland Preservation Plan site visits to monitor for compliance.
3. Revise the county's land use, agricultural operations, and zoning ordinances to protect surface and groundwater resources.

Evaluation/Monitoring

1. Partner with UW Stevens Point Center for Watershed Science and Education and Ashland County Health Department to establish a county-wide drinking water testing program and create baseline data to measure drinking water quality over time.

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^ Supports actions listed in the Lake Superior Collaborative Action Plan 2019 (LSCAP).
* Supports Northern Institute of Applied Climate Science (NIACS) Adaptation Strategies: Agriculture, Forests, Forest Watersheds & Non-Forest Wetlands.
# Supports actions listed in Lake Superior Lake-Wide Management Plan: Biological Conservation Strategies.
+ Supports actions listed in the Marengo River Watershed Action Plan (MRWAP).

SURFACE and GROUNDWATER EDUCATIONAL STRATEGY

Audiences

Private landowners
Farmers / Agricultural producers
Private well owners
Public well owners: schools, parks, campgrounds
Well drillers, plumbers
Realtors

Messages

1. Ashland County has exceptional water resources.
2. Protection of surface and groundwater resources is important to our quality of life.
3. Many people come to Ashland County for activities on or near the water.
4. Adaptation strategies promote climate resiliency and encourage healthy agriculture systems.
5. We all drink groundwater in Ashland County; protection of groundwater is essential.
6. Surface and groundwater health hazards include: bacteria and nitrates.
7. Excess nutrients may adversely impact water quality.
8. Fertilizers contain nitrate. Nitrate in groundwater can cause health problems.
9. Abandoned wells are direct conduits to groundwater. They need to be properly sealed.
10. Nutrient management plans are required for livestock producers and nutrient application.
11. Use environmentally friendly alternatives to chemicals, pesticides, etc.
12. Wetlands protect surface and groundwater, control flooding, and provide wildlife habitat.
13. Shoreline and streambank buffers protect surface water: lakes, streams, and wetlands.

Tools/Activities

GIS mapping tools & maps
Distribute information prepared by WDNR regarding NR151
Farmer education classes (e.g., nutrient management plans)
Climate adaptation workshop with Northern Institute of Applicate Climate Science for natural resource managers and elected officials
Individual well tests supported with groundwater information
Increase promotion of cost sharing for filling and sealing wells
Annual Tree and Shrub Sale
Clean Sweep programs

GOAL 2

Conserve and enhance the soil and terrestrial resources of Ashland County.

Objectives

A. Promote good stewardship of public and private forests, agricultural lands, open space and wetlands.
B. Maintain/restore forests & vegetative cover, and facilitate adaptation through species transition. (*#)
C. Preserve agricultural lands for sustainable production of crops and livestock while protecting soil resources, wildlife habitat, scenic values and human health.
D. Facilitate development of a farmer-led conservation initiative.

General Activities (see the Ashland County LWRM Work Plan 2020-2024 for details)

Technical and financial assistance

1. Increase technical assistance and cost share to farmers for voluntary development of NM Plans and implementation of NR 151 agricultural performance standards.
2. Maintain and enhance the Farmland Preservation Program.

Enforcement and compliance

1. Evaluate parcels, notify landowner regarding compliance status, offer cost sharing, provide technical assistance, and participate in enforcement actions to implement the Ashland County Agricultural Performance Standards and Animal Waste Storage Ordinance (Appendix E).
2. Conduct annual Farmland Preservation Plan site visits to monitor compliance.

Evaluation and monitoring

1. Track annual conservation projects and unit measurements of practices installed in database.
2. Conduct status reviews and Nutrient Management Plan annual checklist.
3. Track compliance and non-compliance in landowner database.
4. Utilize GIS to track, monitor and report NR 151 compliance.

Administration of NR151 Agricultural Performance Standards

Since October 2002, the WI Administrative Code has defined the NR 151 minimum performance standards for farms, rural development, and urban areas needed to achieve water quality standards by limiting non-point source pollution. The LWCD assists implementation of NR151 through technical assistance and cost-share. Ashland County implements all of the NR 151 Performance Standards and Prohibitions as identified in the administrative code: https://docs.legis.wisconsin.gov/code/admin_code/nr/100/151. Ashland County promotes voluntary compliance of NR 151. However, in September 2018, Ashland's County Board approved the Agricultural Performance Standards and Animal Waste Storage Ordinance (Appendix E). The ordinance is utilized as necessary to further gain compliance. Considerable progress has been made with voluntary implementation of BMPs and development of nutrient management plans. However, restricted staff and funding limits the ability of full implementation.

NR151 - Agricultural Information and Education

The LWCD will continue to provide information and farmer education workshops in coordination with WDNR, UW Extension, and DATCP partners, and will continue to seek incentive opportunities for NR151 compliance through the Environmental Quality Incentives Program (EQIP), DATCP, and other opportunities.

NR151 - Agricultural Evaluation and monitoring

The LWCD will conduct status reviews, with a NR 151 checklist, of livestock operations to determine the extent of compliance. The status review information is stored in the tracking database. The LWCD will upload status review results to a GIS tracking system annually based on available staff time. The results will be reviewed with the landowner. The LWCD will offer technical assistance and cost share to pursue full compliance in situations where it has not been achieved.

Farms subject to regulatory enforcement of NR 151 include:

1. Cropped lands, livestock operations, manure storage and applications, fertilizer and other nutrient applications not in compliance with NR 151.
2. Permitted actions under the County Agricultural Performance Standards Ordinance.
3. Producers enrolled in the Farmland Preservation Program or under Nutrient Management Plans.

Priorities for Servicing Farms

Currently there is high demand for administrative, technical, cost-sharing, and regulatory services administered through the LWCD. To most efficiently and cost effectively meet these demands, the priority categories of farms and water resource areas are identified below.

High Priority

1. Ashland County farms located within the Lake Superior Basin, for practices that meet or exceed the performance standards for nutrient management.
2. Farms located within watersheds of impaired waters where implementation plans have been prepared, with highest priority for practices that address the identified impairments. Impaired waters in Ashland County that meet these criteria at this time include the Marengo River.
3. Status reviews for compliance with NR151 Standards for farms located in the county that are in cost sharing, permitting, or other programs that require compliance with one or more of the state standards:
    - Animal Waste Management Ordinance
    - Livestock Siting Special Exception permits
    - Farmland Preservation Program participants
    - Participants in other voluntary cost sharing programs (WDNR, DATCP SEG, or other)
4. In responding to public complaints or staff observations, highest priority is assigned to:
    - Sites identified above as high priority for services
    - Sites where there is an immediate threat to fish, wildlife, and habitat
    - Sites with severe resource impacts, and compliance can be achieved cost- effectively

Medium Priority

5. Farms located within watersheds of ORW or ERW waters.
6. Farms located in watersheds of impaired waters where implementation plans do not exist.
7. In responding to public complaints or staff observations, medium priority is assigned to:
    - Sites where impact is less severe and achieving compliance is not as effective.

Low Priority for Services

8. All other operations

Nutrient management plan cost share is offered on a first-come, first-serve basis based on available funds and landowner willingness to develop their own plan with assistance from UW Extension and the LWCD.

NR151 Non-Agricultural Performance Standards

Construction Sites >1 acre: must control 80% of sediment load from sites

Stormwater management plans on developed sites (>1 acre) must meet standards:

Total suspended solids
Peak discharge rate
Infiltration
Riparian buffers

Developed urban areas (>1000 persons/square mile) must address the following:

Public education
Yard waste management
Nutrient management
Reduction of suspended solid

AGRICULTURAL EDUCATIONAL STRATEGY

Additional Audiences

Absentee landowners & renters

Messages

1. Agricultural Performance Standards are outlined in Chapter NR151, which establishes expectations for compliance and consequences for non-compliance.
2. Standards are in place to protect soil health and surface water and groundwater quality.
3. Cost sharing is available to implement state performance standards.
4. Farmers are carrying out conservation efforts.
5. Sustainable agriculture practices help your business and protect natural resources.
6. Soil is an important resource. Protect your soil health.
7. Follow UWEX recommendations and nutrient standards for phosphorus requirements.
8. Keep nutrients where they are beneficial.
9. Excess nutrients may adversely impact water quality.
10. Soil erosion may adversely impact surface water and wetlands.
11. Winter spreading of manure can cause surface water and groundwater pollution.
12. Rotational grazing is economically viable and benefits herd health and the environment.
13. Alternative waste treatment systems are under development.

Tools/Activities

Distribute information prepared by WDNR regarding NR151
One-on-one work with farm operators (conservation planning, nutrient management)
Farmer training: soil health, nutrient management, conservation practices
Tours of local conservation successes
Native tree and plant sale

FARMLAND PRESERVATION PROGRAM and NR 151 - CONSERVATION PERFORMANCE PRACTICE REQUIREMENTS[1]

1) **Landowners with Cropland or Pasture:**

- **Cropland and Pasture Soil Erosion Control**
  - Maintain soil erosion rates at or below Tolerable level, "T"
    - Control gully erosion

- **Cropland and *Pasture Nutrient Management**
  - Annually develop and follow a Nutrient Management plan that meets Natural Resources Conservation Service (NRCS) Standard 590 on cropland.
  - *On pasture land if:
    - Receives mechanical applications of nutrients, and/or
    - Is stocked at >1 animal unit per acre during the grazing season
  - Average rotational phosphorus index (PI) of 6 or less, and annual PI of 12 or less, on all cropland, pasture land, and winter grazing areas

- **Tillage Setback**
  - No tillage within 5' (up to 20') from surface water

2) **Landowners with Livestock, Livestock Facilities, or Manure:**

- **Manure Storage Facilities**
  - New Construction and Alterations must meet NRCS Standard 313.
  - Manure storage facilities must be closed within 2 years of abandonment according to NRCS Standard 360.
  - Manure storage facilities that are failing or leaking must be upgraded, replaced, or closed.

    (**Note:** These activities all require an Animal Waste Storage Facilities Permit from St. Croix County Community Development Department prior to beginning work.)

- **Clean Water Diversion**
  - Divert runoff away from feedlots, manure storage, and barnyards. Applies to:
    - Livestock Producers within Water Quality Management Areas (WQMAs).

      (**WQMAs** are areas within 300' of river or stream; areas within 1000' of lake, flowage or pond; and sites susceptible to groundwater contamination or potential direct conduit to groundwater.)

- **Process Wastewater Management**
  - No significant discharge to waters of the State. Applies to: feed leachate, milking center waste, wash water, watering system spillage or overflow, etc.

- **Manure Management Prohibitions**
  - All Livestock Producers
    - No overflow of manure storage facilities
    - No unconfined manure piles in WQMAs (see above for definition)
    - No direct runoff from feedlots, stored manure, and barnyards to waters of the State
    - No unlimited livestock access to waters of the State where sod or vegetative cover cannot be maintained

Footnotes: [1] Informational Summary Only. See WI Administrative Codes ATCP 50 and NR 151 for complete codes and details.

(● = **new** "2012" standards)

(Produced 9/06, rev. 9/08, 1/11, 3/11, 7/13, 7/14, 9/14, 11/14, 11/15)

NON-AGRICULTURAL EDUCATIONAL STRATEGY

Additional Audience

Elected officials (including towns)
Lake associations and groups
Homeowner's associations
Realtors and appraisers
Tourism businesses

Messages

1. Surface water quality depends on upland land use.
2. Everyone is connected to surface water by ditches or storm drains.
3. Lawn care chemicals can negatively impact surface water.
4. Nutrients adversely impact water quality by causing algae blooms that affect the water appearance, aquatic species, and cause odors.
5. Residential sources of nutrients include septic systems and fertilizers.
6. Inhibit algae growth by decreasing phosphorus runoff.
7. Non-Agricultural Performance Standards are outlined in Chapter NR151. Establish expectations for compliance and consequences for non-compliance.
8. Construction site erosion control is required and critical for protection of water resources.
9. Impervious surfaces increase runoff and water pollution.
10. Practices like porous surfacing, rain gardens, infiltration basins allow infiltration and improve nearby surface water quality and prevent flooding.
11. Designing for increased storm events provides a greater level of safety.
12. Wetlands control flooding, protect water resources, and provide wildlife habitat.
13. Protection of wetlands and shoreland vegetation is preferable to restoration.
14. Promote conservation of vegetative buffers for lakes, streams and wetlands.
15. Encourage road departments to use the WI County Highway Association's Standard Erosion Control Plan.
16. Tourism is good for the local economy.
17. Aquatic invasive species threaten to take over native species habitat and create nuisance conditions. Aquatic plants can be spread by boats and trailers into lakes and streams. Inspect boats and trailers to prevent transporting invasive species.
18. Protect sensitive trout resources and the cold water ecosystem - Trout need cold water
19. Home values drop as water quality diminishes.

Additional Tool/Activities

Rain barrel distribution
Demonstration projects
Clean Boats/Clean Waters program
Native tree and plant sale
Presentations at city and town meetings
Support volunteer monitoring efforts: Water Action Volunteers, Citizen Lakes Monitoring
Workshops: e.g., erosion control, rain gardens, invasive species management

GOAL 3

Protect and improve aquatic and terrestrial wildlife habitat in Ashland County.

Objectives

A. Restore and enhance habitat within and adjacent to lakes, rivers, and streams.

B. Restore, conserve, and enhance ecological functions of wetlands for wildlife habitat and watershed health. (*#+)

C. Identify, restore, and protect high quality areas to ensure diverse, healthy, and self-sustaining populations. (*#+)

D. Establish and sustain an Aquatic Invasive Species Coordinator to provide outreach and education. (#)

General Activities (see following Ashland County LWRM Work Plan 2020-2024 for details)

Technical and financial assistance

1. Provide technical assistance/cost share; reduce erosion, slow runoff, & increase water storage. (^*#)
2. Implement voluntary nutrient management plans and NR 151 performance standards through technical assistance and cost share. (^+)
3. Manage farmlands on a landscape level; implement Marengo River Watershed Action Plan. (*+)
4. Work with adjacent counties on cross-boundary watershed projects. (^)
5. Encourage “slow-the-flow” demonstration project to account for variable future conditions. (^*#+)
6. Provide well abandonment technical assistance and cost share. (+)
7. Monitor, control, and map and support similar partner activities for invasive species populations. (^*#)

Priority Best Management Practice

Riparian buffers

Streambank restoration

^ Supports actions listed in the Lake Superior Collaborative Action Plan 2019 (LSCAP).
* Supports Northern Institute of Applied Climate Science (NIACS) Adaptation Strategies: Agriculture, Forests, Forest Watersheds & Non-Forest Wetlands.
# Supports actions listed in Lake Superior Lake-Wide Management Plan: Biological Conservation Strategies.
+ Supports actions listed in the Marengo River Watershed Action Plan (MRWAP).

HABITAT EDUCATIONAL STRATEGY

Additional Audiences

Absentee landowners & renters
Women for the Land

Aquatic Habitat Messages

1. Shoreline and aquatic habitats are home to a diverse variety of creatures; if we preserve their homes, we can enjoy their presence.
2. Shoreline regulations are in place to protect habitat for fish and wildlife, stabilize the shoreline, and limit visual impacts of development.
3. Aquatic habitat is destroyed by sediment carried in runoff.
4. Technical assistance is available to restore shoreline habitat.

Upland Habitat Messages

1. Prairie and woodland were historically prevalent in St. Croix County and are important wildlife areas.
2. Prairies provide habitat for threatened songbirds and mammals.
3. Undeveloped land and native plant species provide many benefits including diverse wildlife, surface and groundwater quality, soil erosion control, recreation, economic, and natural beauty.
4. Rotational grazing provides quality pasture, healthy cattle, and enhances wildlife habitat.
5. Agricultural land adjacent to natural habitat areas enhances wildlife and recreational benefits.
6. Blocks of wooded and grassland habitat are better than small, scattered, fragmented pieces. These contiguous wildland corridors are essential to sustain healthy wildlife.
7. Wisconsin Managed Forest Law program offers sustainable forestry alternatives to agricultural land owners. Forest management can complement farming operations or replace grazing or cultivation of less productive land.
8. Invasive species threaten to take over native species habitat and create nuisance conditions.

Activities

Encourage use of conservation easements and other land protection tools.
Encourage habitat protection in land division review (conservation design development)
Promote available government programs such as CRP, CREP, SAFE, FRPP, MFL, WFLGP, and WRP.
Provide technical assistance to landowners of small tracts.
Encourage landowners to preserve native plant remnant communities.
Support and promote a model “green development.” Include consideration of habitat, fill and seal wells, POWTS, recycling, composting, low-impact lawns, etc.
Promotion of public access on private lands (similar to WDNR Project Respect)
School involvement
Host landowner invasive species control workshop
Provide invasive species control guidance to Highway Department
Native tree and plant sale

GOAL 4

Provide conservation education to private landowners, local officials, non-government organizations, and the public through collaboration with other resource management entities.

Objectives

A. Facilitate teamwork among conservation partners.

B. Work toward a common vision and conservation land use ethic among government representatives, land managers, and conservation partners in Ashland county and surrounding areas.

C. Increase awareness of land use regulations, land management practices, watershed stewardship, and best management practices necessary to protect and improve soil, water, and habitat resources.

Activities

Technical and Financial Assistance

1. **Implement technical assistance and cost share for conservation practices.**
2. **Host conservation workshops for landowners, resource partners, and interested citizens.**
3. **Provide public education opportunities to elected officials, students, and the general public.**

Chapter 4. Plan Implementation

The Land Conservation Committee is responsible for oversight of the LWRMP while the Land and Water Conservation Department (LWCD) staff is responsible for implementation of the plan.
Both the magnitude of the plan, and the fact that implementation activities cross political and social boundaries, require participation of a wide variety of partners to ensure success. Many other agencies and organizations work collaboratively with the Ashland County LWCD and LCC. Both DATCP and the WDNR have major roles in providing funding and direction on state-wide priorities. Coordination with other resource agencies, local government, and non-governmental organizations is essential to success.

WORK PLAN AND TIMELINE

The LWCD's 2019 work plan (Appendix C) outlines planned activities and performance measures. It also includes staff hours and expected costs (including for cost sharing). The document is submitted annually to DATCP and updated at the year-end for an annual report. The 2020-2024 work plan (Appendix C) identifies the LWCD's goals, objectives, activities and measureable outcomes for the next five years.

PARTNERS

Local Government and Nonprofit

- Adjacent counties (Bayfield, Iron. & Price Counties)
- Ashland County Emergency Management
- Ashland County Forestry Department
- Ashland County Highway Department
- Ashland County Zoning Department
- City and Town Governments

Local Nonprofit

- Bad River Band of Lake Superior Chippewa Natural Resources
- Great Lakes Indian Fish & Wildlife Commission
- Lake Associations
- Lake Superior Collaborative
- Northwoods Cooperative Weed Management Area
- Sigurd Olson Environmental Institute and Northland College
- Superior Rivers Association

State

- Department of Agriculture, Trade and Consumer Protection
- University of Wisconsin-Madison Extension
- WI Department of Natural Resources
- WI Land & Water Association

Federal

- Farm Service Agency (FSA)
- National Park Service (NPS)
- Natural Resources Conservation Service (NRCS)
- US Fish and Wildlife Service (FWS)
- US Forest Service (USFS)
- US Geological Survey (USGS)

Land Trusts

- Landmark Conservancy

Sportsmen's Alliance

- Ducks Unlimited
- Pheasants Forever
- Wild Rivers Chapter of Trout Unlimited

Schools (K-12) and Universities

- Ashland High School
- Our Lady of the Lake Catholic School
- Northland College

LANDOWNER INCENTIVE PROGRAMS

The LWCD utilizes landowner incentives to implement best management conservation practices to reduce nonpoint source pollution and protect and improve water quality.

Conservation Reserve Enhancement Program (CREP): Land retirement program that provides technical and financial assistance to eligible farmers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner.

Environmental Quality Incentives Program (EQIP) and State DATCP: Cost-share programs that provides technical and financial help to landowners for conservation practices that protect soil and water quality. This includes a variety of best management practices that help slow the flow, reduce sedimentation, and reduce bacteria and nutrient inputs.

Managed Forest Law (MFL): Land management incentive program that encourages sustainable forestry on private woodlands by reducing and/or deferring property taxes.

Wetland Reserve Program (WRP): Land retirement program to restore and protect private wetlands.

Wisconsin Forest Landowner Grant Program (WFLGP): Cost-share program that provides assistance to protect and enhance their forested lands, prairies, and waters.

Partners for Fish and Wildlife: Provides technical and cost-share funding assistance to restore wetland and other wildlife habitats on private property.

Coastal Program-Great Lakes: Provides technical and cost-share funding assistance to private landowners for design and construction of wetland restoration and wildlife habitat activities.

Nutrient Management Farmer Education Program: Provides cost share and technical assistance for landowners to develop nutrient management plans.

My Lake Superior Northwoods: Technical assistance program for landowners in Northwest Wisconsin to foster land best management decisions. The program provides site visits and information about wildlife management, recreation, aesthetics, forest income, family heritage, invasive species, and more. *Lead Agency*: American Forest Foundation, USDA-NRCS – Ashland Service Center, USDA-Forest Service.

POTENTIAL FUNDING SOURCES

The Ashland County Land and Water Resource Management Plan is a document that can be used by all of the partners that work to protect natural resources in Ashland County. A combination of private, local, state, and federal funding sources will be sought to implement the priorities of the plan. A partial list of potential funding sources is outlined below. The agency to pursue funding will depend on the project.

Private Sources

- Private Foundations
  - Apostle Islands, Chequamegon Bay, and Duluth Superior Area Community Funds
  - Excel Energy Foundation
  - National Fish and Wildlife Foundation
- Individual Contributions
- Volunteer Hours

Local Government Sources

- Ashland County

State Government Sources

- Department of Agriculture, Trade and Consumer Protection
  - Annual Joint Allocation Plan (SWRM – WDNR/DATCP)
  - Nutrient Management Farmer Education Grants (NMFE)
  - Farmer-Led/Producer-Led Grants
- Department of Natural Resources
  - Aquatic Invasive Species Grants
  - Lake Planning Grants
  - Lake Protection Grants
  - River and Stream Planning and Protection Grants
  - Targeted Runoff Management
- WDNR Wildlife Sources
  - Segregated Funds (general license)
  - Wisconsin Waterfowl Stamp & Trout Stamp (Inland)
- Wisconsin Environmental Education Board Grants Programs
- Wisconsin Geologic and Natural History Survey
- Wisconsin Groundwater Resource Center

Federal Sources

- United States Department of Agriculture
  - Farm Service Agency
    - Conservation Reserve Program (CRP)
    - Conservation Reserve Enhancement Program (CREP)
  - Natural Resources Conservation Service
    - Environmental Quality Incentives Program (EQIP)
    - Wetland Reserve Program (WRP)
  - U.S. Fish and Wildlife Service
    - Partners for Fish and Wildlife

Chapter 5. Monitoring & Evaluation

This chapter includes both water quality and habitat monitoring to evaluate progress to meet plan goals and tracking of plan activities. Although they are interrelated, each has a distinct function.

Project and Program Monitoring

As with plan evaluation, the LWCD does not have adequate staff or funding to perform in-depth monitoring of the effectiveness of each project or program. Several tools will be employed to provide the LWCD and LCC with the information to identify project effectiveness, learn from our mistakes and successes, and adapt new techniques to improve the decision making and delivery of projects and programs in Ashland County.

- The LWCD will participate in engineering spot checks and reviews.
- The LWCD will conduct yearly field reviews of project effectiveness and maintenance needs.
- The LWCD staff will provide workshop evaluations for programs they take the lead on, and provide meaningful feedback to the workshop evaluations of others to improve the connection to LWCD programs and projects.
- The LWCD may provide customer satisfaction surveys to individuals and organizations to help improve customer service and better understand the needs of others.
- The LWCD staff and LCC will document written and verbal feedback concerning project and program planning and implementation.
- The LWCD will cooperate and coordinate with other partners to develop a monitoring strategy that is watershed based and includes components of water quality monitoring (surface, ground, and well water); water and sediment quantity monitoring; and wildlife species and habitat monitoring. Through implementation of a comprehensive monitoring program, the LWCD and other resource management partners will gain the information to make better decisions needed to implement projects and programs on a landscape scale in a cost-effective manner.

State and federal agencies conduct many fish and wildlife habitat monitoring activities. The LWCD does not implement habitat monitoring other than for specified invasive species. However, the LWCD will cooperate and assist other partners to conduct monitoring including water quality monitoring (surface, ground, and well water); water and sediment quantity monitoring; and wildlife species and habitat monitoring. The LWCD utilizes monitoring data from partner organizations to gain the information necessary in decision-making, and to implement programs in a cost-effective manner.

WATER QUALITY MONITORING

A partial list of current efforts to monitor water resources is included below.

Table 5. Water Quality Monitoring

Program	Resource	Responsible Agency
Self-Help Lakes Monitoring	Lakes	WDNR, Lakes Associations
Lake Planning Grant	Lakes	WDNR, Lakes Associations
Chemical Measurements	Lakes/Streams	BRNR, DNR, USGS, Lake Associations
Habitat	Lakes/Streams	BRNR, WDNR
Biological Assessments	Lakes/Streams	WDNR
Nitrate Testing	Groundwater	County Public Health, LWCD

HABITAT MONITORING

State and federal agencies that emphasize fish and wildlife habitat restoration and protection have many ongoing efforts to monitor habitats and species. Some of these efforts are listed below. The LWCD does not implement habitat monitoring activities.

Table 6. Habitat Monitoring

Resource	Responsible Agency
Purple loosestrife, Wild parsnip, Garlic mustard control	GLIFWC, NCWMA, LWCD, City of Ashland
Giant & Japanese knotweed control	NCWMA & WDNR
Frog and Toad Survey	WDNR
Breeding Bird Survey	WDNR
Deer Count	WDNR
Loon Population Survey	Loon Watch
Breeding Waterfowl Survey	USFWS
Rare, Threatened, & Endangered Plant and Animals	WDNR

CITIZEN MONITORING

Volunteer citizen monitoring will be encouraged to assist in evaluating progress toward goals and objectives and to increase public involvement. Participation in the Department of Natural Resources Self Help Lakes Monitoring Program will be encouraged to monitor progress toward improving lake water quality. Galilee Lake currently has active volunteers.

INVENTORIES

Inventories track changes in land use or land management practices that affect water quality or habitat. Several methods are currently used by resource agencies to track these changes.

Table 7. Resource Inventories in Ashland County

Inventory Method	Resource/Source	Responsible Agency
Site Visit	FPP Compliance	LWCD
SNAP Plus	Ag Practice Pollutant Reduction	LWCD
Location	Closed & Sealed Wells	LWCD
Location	Animal Waste Facilities	LWCD
Water Quality/Quantity	Groundwater	WDNR & County Health Department
National Resource	Land Use	NRCS
LandSat	Land Cover	GIS Coordinator

PROJECT TRACKING

Ashland County uses several tools that are helpful for establishing priorities, managing programs, and tracking project status. A checklist is used to monitor, and database used to track, NR151 compliance for Farmland Preservation Program and Nutrient Management participants. SnapPlus used to produce Nutrient Management Plans and store information.

A selection of implemented projects and tracked accomplishments are shown in the Ashland County 2014-2016 Project Accomplishments graphic on Page 65.

Digital *Tracking Review* files store items associated with a given landowner such as engineering documents, NMP files, FPP certificates, photos, notes, etc.

PLAN EVALUATION

Plan evaluation is important component of the LWRM Plan, and assesses if goals, objectives and activities are being attained. However, the LWCD does not have adequate staff or funding to perform in-depth analysis to determine to what degree the cost-share projects, educational activities, and partner collaboration are contributing toward completion of the LWRM Plan. Using any or all of these simple evaluation tools will provide the LWCD and LCC with needed information to identify strengths and weaknesses and improve their program delivery throughout Ashland County.

- An annual accomplishment report is published and presented to the County Board.
- The LWCD staff will review provide progress reports on cost-share project status and other activities at each scheduled LCC meeting.
- Ongoing planning meetings will provide an opportunity for the LCC, staff, and partners to discuss progress on the LWRMP and match the current year's work plan with the available funding.
- The LCC, County Board and partners attend an annual tour of conservation practices.
- The County Conservationist and LCC may develop annual work plans for each employee that contains measureable outcomes and serves to attain the goals and objectives of the LWRMP.
- The LWCD will complete annual financial reports, DATCP accomplishment reports, and audit procedures in a timely manner.

Plan evaluation assesses whether the objectives and activities of the plan are being accomplished. Performance measures are listed for each plan activity in the 2019 work plan in Appendix C.

Measures of success and/or evaluation methods are relatively straightforward for most of the objectives. However, evaluating the success of the information and education objectives poses special challenges. It is often difficult to economically measure if an educational technique is effective.

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APPENDIX A

Northern Institute of Applied Climate Science
Climate Adaptation Resources

Climate Adaptation Resources

Forests across the United States are expected to undergo numerous changes in response to the changing climate. The *Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd edition* provides a collection of resources designed to help forest managers incorporate climate change considerations into management and devise adaptation tactics. The tools, ideas, and resources in the workbook are intended to inform existing decision making processes. The full workbook can be found at: https://www.nrs.fs.fed.us/pubs/52760

The *Adaptation Resources for Agriculture: Responding to Climate Variability and Change in the Midwest and Northeast* publication provides perspectives, information, resources, and tools to producers, service providers, and educators in the Midwest and Northeast regions of the United States for responding to climate variability and change. Broadly defined, climate change adaptation includes all adjustments, both planned and unplanned, in natural and human systems occurring in response to climatic changes and subsequent effects (Parry et al. 2007; Smit et al. 1999). Since the effects of climate change are complex and far-reaching, and the scope, severity, and pace of future impacts are difficult to predict, numerous government agencies, universities, and private partners are working together to develop information, resources, and tools that support adaptation across all sectors of society. Of particular interest to agricultural producers and other land managers, the USDA is providing coordinated climate change assistance through the Regional Climate Hubs. The USDA Climate Hubs develop and deliver science-based, region-specific information and tools to land managers to enable climate informed decision making and provide access to USDA resources to implement those decisions.
https://www.climatehubs.oce.usda.gov/hubs/northeast/topic/adaptation-resources-agriculture-responding-climate-variability-and-change

Many northern tree species that provide economic and cultural benefits are adapted to cold climates and will be under greater stress as temperatures increase and conditions become less favorable. The region's forests will be affected by a changing climate during this century, but individual tree species will respond uniquely to climate change, depending on their ecological tolerances. The following document summarizes general climate change projections for tree species across several large landscapes in Minnesota, Wisconsin, and Michigan based on future projections from the Climate Change Tree Atlas and LANDIS models. It can be found at: https://forestadaptation.org/assess/tree-species-risks

The Northern Institute of Applied Climate Science has led the development of adaptation strategies and approaches for a variety of natural resource topics, which can be used with the Adaptation Workbook. The following “menus” provide adaptation actions for land managers to use based on their unique project location and desired goals. Menus of Adaptation Strategies and Approaches have been published for: Forests, Forested Watersheds, Agriculture, Non-Forested Wetlands, and more. Included here are those which are identified as activities in the Ashland County LWRM Work Plan. The following menus can be found at: https://forestadaptation.org/adapt/adaptation-strategies

Menu of Adaptation Strategies and Approaches

Developed for Agricultural systems

A continuum of adaptation actions is available to address needs at appropriate scales and levels of management.

Strategy 1: Sustain fundamental functions of soil and water.
Approach 1.1: Maintain and improve soil health.
Approach 1.2: Protect water quality.
Approach 1.3: Match practices to water supply and demand.

Strategy 2: Reduce existing stressors of crops and livestock.
Approach 2.1: Reduce the impacts of pests and pathogens on crops.
Approach 2.2: Reduce competition from weedy and invasive species.
Approach 2.3: Maintain livestock health and performance.

Strategy 3: Reduce risks from warmer and drier conditions.
Approach 3.1: Adjust the timing or location of on-farm activities.
Approach 3.2: Manage crops to cope with warmer and drier conditions.
Approach 3.3: Manage livestock to cope with warmer and drier conditions.

Strategy 4: Reduce the risk and long-term impacts of extreme weather.
Approach 4.1: Reduce peak flow, runoff velocity, and soil erosion.
Approach 4.2: Reduce severity or extent of water-saturated soil and flood damage.
Approach 4.3: Reduce severity or extent of wind damage to soils and crops.

Strategy 5: Manage farms and fields as part of a larger landscape.
Approach 5.1: Maintain or restore natural ecosystems.
Approach 5.2: Promote biological diversity across the landscape.
Approach 5.3: Enhance landscape connectivity.

Strategy 6: Alter management to accommodate expected future conditions.
Approach 6.1: Diversify crop or livestock species, varieties or breeds, or products.
Approach 6.2: Diversify existing systems with new combinations of varieties or breeds.
Approach 6.3: Switch to commodities expected to be better suited to future conditions.

Strategy 7: Alter agricultural systems or lands to new climate conditions.
Approach 7.1: Minimize potential impacts following disturbance.
Approach 7.2: Realign severely altered systems toward future conditions.
Approach 7.3: Alter lands in agricultural production.

Strategy 8: Alter infrastructure to match new and expected conditions.
Approach 8.1: Expand or improve water systems to match water demand and supply.
Approach 8.2: Use structures to increase environmental control for plant crops.
Approach 8.3: Improve or develop structures to reduce animal heat stress.
Approach 8.4: Match infrastructure and equipment to new and expected conditions.

For the full resource, visit

Janowiak et al, 2016. Adaptation Resources for Agriculture.
https://www.climatehubs.oce.usda.gov/sites/default/files/adaptation_resources_workbook_ne_mw.pdf

Menu of Adaptation Strategies and Approaches

Developed for forests

Strategy 1: Sustain fundamental ecological functions.
1.1. Reduce impacts to soils and nutrient cycling.
1.2. Maintain or restore hydrology.
1.3. Maintain or restore riparian areas.
1.4. Reduce competition for moisture, nutrients, and light.
1.5. Restore or maintain fire in fire-adapted ecosystems.

Strategy 2: Reduce the impact of biological stressors.
2.1. Maintain or improve the ability of forests to resist pests and pathogens.
2.2. Prevent the introduction and establishment of invasive plant species and remove existing invasive species.
2.3. Manage herbivory to promote regeneration of desired species.

Strategy 3: Reduce the risk and long-term impacts of severe disturbances.
3.1. Alter forest structure or composition to reduce risk or severity of wildfire.
3.2. Establish fuelbreaks to slow the spread of catastrophic fire.
3.3. Alter forest structure to reduce severity or extent of wind and ice damage.
3.4. Promptly revegetate sites after disturbance.

Strategy 4: Maintain or create refugia.
4.1. Prioritize and maintain unique sites.
4.2. Prioritize and maintain sensitive or at-risk species or communities.
4.3. Establish artificial reserves for at-risk and displaced species.

Strategy 5: Maintain and enhance species and structural diversity.
5.1. Promote diverse age classes.
5.2. Maintain and restore diversity of native species.
5.3. Retain biological legacies.
5.4. Establish reserves to maintain ecosystem diversity.

Strategy 6: Increase ecosystem redundancy across the landscape.
6.1. Manage habitats over a range of sites and conditions.
6.2. Expand the boundaries of reserves to increase diversity.

Strategy 7: Promote landscape connectivity.
7.1. Reduce landscape fragmentation.
7.2. Maintain and create habitat corridors through reforestation or restoration.

Strategy 8: Maintain and enhance genetic diversity.
8.1. Use seeds, germplasm, and other genetic material from across a greater geographic range.
8.2. Favor existing genotypes that are better adapted to future conditions.

Strategy 9: Facilitate community adjustments through species transitions.
9.1. Favor or restore native species that are expected to be adapted to future conditions.
9.2. Establish or encourage new mixes of native species.
9.3. Guide changes in species composition at early stages of stand development.
9.4. Protect future-adapted seedlings and saplings.
9.5. Disfavor species that are distinctly maladapted.
9.6. Manage for species and genotypes with wide moisture and temperature tolerances.
9.7. Introduce species that are expected to be adapted to future conditions.
9.8. Move at-risk species to locations that are expected to provide habitat.

Strategy 10: Realign ecosystems after disturbance.
10.1 Promptly revegetate sites after disturbance.
10.2. Allow for areas of natural regeneration to test for future-adapted species.
10.3. Realign significantly disrupted ecosystems to meet expected future conditions.

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Swanston et al, 2016. Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd edition - http://www.treesearch.fs.fed.us/pubs/52760, www.forestadaptation.org/adapt/adaptation-strategies

Menu of Adaptation Strategies and Approaches

Developed for forested watersheds

Strategy 1: Sustain fundamental hydrologic processes
Approach 1.1: Maintain and enhance infiltration and water storage capacity of forest soils
Approach 1.2: Maintain and restore hydrologic connectivity
Approach 1.3: Maintain and restore stream channel form and function
Approach 1.4: Maintain and restore floodplain connectivity
Approach 1.5: Maintain and restore forested wetlands and lowland areas

Strategy 2: Maintain and enhance water quality
Approach 2.1: Moderate surface water temperature increases
Approach 2.2: Reduce export and loading of nutrients and other pollutants
Approach 2.3: Reduce soil erosion and sediment deposition

Strategy 3: Maintain or restore forests and vegetative cover
Approach 3.1: Maintain or restore forest and vegetative cover in riparian areas
Approach 3.2: Promptly revegetate areas after disturbance
Approach 3.3: Maintain or improve the ability of forests to resist pests and pathogens
Approach 3.4: Prevent invasive species establishment and remove existing invasive species
Approach 3.5: Prioritize and maintain unique habitats for refugia
Approach 3.6: Enhance species age classes and structural diversity in forests
Approach 3.7: Identify, maintain, and enhance important habitats for fish and wildlife

Strategy 4: Facilitate forest ecosystem adjustments through species transitions
Approach 4.1: Favor or restore native species that are expected to be adapted to future conditions
Approach 4.2: Establish or encourage new mixes of native species
Approach 4.3: Disfavor species that are distinctly maladapted
Approach 4.4: Introduce species that are expected to be adapted to future conditions
Approach 4.5: Move at-risk species to locations that are expected to provide habitat

Strategy 5: Accommodate altered hydrologic processes
Approach 5.1: Manage systems to cope with decreased water levels and limited water availability
Approach 5.2: Enhance the ability of systems to retain water
Approach 5.3: Adjust systems to cope with increased water abundance, and high water levels
Approach 5.4: Respond to or prepare for excessive overland flows (surface runoff)

Strategy 6: Design and modify infrastructure to accommodate future conditions
Approach 6.1: Reinforce infrastructure to meet expected conditions
Approach 6.2: Reroute or relocate infrastructure, or use temporary structures
Approach 6.3: Incorporate natural or low impact development into designs
Approach 6.4: Remove infrastructure and readjust system

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Shannon et al, 2019. Adaptation Strategies and Approaches for Forested Watersheds. Climate Services. https://doi.org/10.1016/j.cliser.2019.01.005 .

A supplemental topic to be used in the decision-making framework – Swanston et al, 2016. Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd edition - http://www.treesearch.fs.fed.us/pubs/52760 ***More information can be found at*** *www.forestadaptation.org/adapt/adaptation-strategies*

Menu of Adaptation Strategies and Approaches

Developed for non-forested wetlands

Draft – March 2019

Strategy 1: Maintain and enhance hydrologic processes and water quantity
Approach 1.1: Maintain and enhance infiltration and water storage within wetlands, adjacent uplands, and groundwater recharge areas
Approach 1.2: Maintain and restore a natural hydrologic regime
Approach 1.3: Restore stream channel form and restore hydrologic function of streams and ditches.

Strategy 2: Maintain and enhance water quality of wetland habitats
Approach 2.1: Moderate surface water temperature increases
Approach 2.2: Reduce soil erosion and sediment deposition
Approach 2.3: Reduce loading and export of nutrients and other pollutants

Strategy 3: Maintain or restore wetland vegetation
Approach 3.1: Maintain and enhance wetland structure
Approach 3.2: Enhance and maintain species diversity, floristic quality, and plant trait diversity in wetlands
Approach 3.3: Promote prescribed fire in fire-adapted wetlands
Approach 3.4: Promptly revegetate bare soils with species that are likely to persist under variable and extreme conditions
Approach 3.5: Prevent non-native invasive species establishment and limit their impacts where they already occur

Strategy 4: Facilitate transformation of wetland communities by adjusting species composition
Approach 4.1: Favor and restore native species and genotypes that are expected to be adapted to future conditions
Approach 4.2: Increase genetic diversity of seed mixes
Approach 4.3: Move at-risk species to locations that are expected to provide more suitable habitat
Approach 4.5: Adjust wetland structure and composition to meet functional values

Strategy 5: Adjust wetland systems to cope with altered hydrology
Approach 5.1: Manage systems to cope with decreased water levels and limited water availability
Approach 5.2: Adjust systems to cope with increased water abundance and higher water levels
Approach 5.3: Design enhanced and created wetlands to accommodate changing hydrology

Strategy 6: Design and modify infrastructure to accommodate future conditions
Approach 6.1: Reinforce infrastructure to meet expected conditions
Approach 6.2: Reroute or relocate infrastructure, or use temporary structures
Approach 6.3: Incorporate natural or low impact development into designs
Approach 6.4: Remove infrastructure and readjust system

Wisconsin Initiative on Climate Change Impacts

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Supplemental topic to be used in the decision-making framework –
Swanston et al, 2016. Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd edition - http://www.treesearch.fs.fed.us/pubs/52760, www.forestadaptation.org/adapt/adaptation-strategies

Climate Change Projections for Individual Tree Species
Northern Wisconsin and Western Upper Michigan

CLIMATE CHANGE PROJECTIONS FOR INDIVIDUAL TREE SPECIES

NORTHERN WISCONSIN AND WESTERN UPPER MICHIGAN

Northern forests will be affected by climate change during this century. A team of forest managers and researchers created a report that describes the vulnerability of forests in northern Wisconsin and western Upper Michigan (Janowiak et al. 2014). This report includes information on the current landscape, observed climate trends, and a range of projected future climates. It also describes many potential climate change impacts to forests and summarizes key vulnerabilities for major forest types. This handout is summarized from the full report.

Remember that models are just tools, and they're not perfect. Models don't account for some factors that could be modified by climate change, like droughts, wildfire activity, and invasive species. If a species is rare or confined to a small area, Tree Atlas results may also be less reliable. These factors, and others, could cause a particular species to perform better or worse than a model projects. Human choices will also continue to influence forest distribution, especially for tree species that are projected to increase. Planting programs may assist the movement of future-adapted species, but this will depend on management decisions.

TREE SPECIES INFORMATION:

This report uses two climate scenarios to "bracket" a range of possible futures. These future climate projections were used with two forest impact models (Tree Atlas and LANDIS) to provide information about how individual tree species may respond to a changing climate. More information on the climate and forest impact models can be found in the full report. This page shows the most common tree species in this local area, organized into general categories of future expectations. Results for all species can be compared side-by-side on page 2.

Despite these limits, models provide useful information about future expectations. It's perhaps best to think of these projections as indicators of possibility and potential change. The model results presented here were combined with information from published reports and local management expertise to draw conclusions about potential risk and change in the region's forests.

SPECIES	ADDITIONAL CONSIDERATIONS
LIKELY TO DECREASE	
Balsam fir	Requires cold climate and susceptible to drought, fire, and insects
Black ash	Emerald ash borer causes mortality
Black spruce	Requires cold climate, susceptible to insect pests and drought
Northern white-cedar	Requires cold climate and susceptible to fire and herbivory
Paper birch	Early-sucessional colonizer, but susceptible to insects and drought
Quaking aspen	Early-sucessional colonizer, but susceptible to heat and drought
White spruce	Requires cold climate, susceptible to insect pests
Yellow birch	Good disperser, but susceptible to fire, insects, and disease
MAY DECREASE	
Balsam poplar	Early-sucessional colonizer, but susceptible to drought
Eastern white pine	Good disperser, but susceptible to drought and insects
Jack pine	Tolerates drought and fire, but susceptible to insect pests
Red pine	Susceptible to insect pests and diseases, and limited dispersal.
Sugar maple	Grows across a variety of sites and tolerates shade
Tamarack	Requires cold climate and susceptible to drought, fire, and insects

SPECIES	ADDITIONAL CONSIDERATIONS
MIXED MODEL RESULTS	
Bigtooth aspen	Early-sucessional colonizer, but susceptible to drought
Eastern hemlock	Hemlock woolly adelgid causes mortality
Green ash	Emerald ash borer causes mortality
Red maple	Competitive colonizer tolerant of disturbance and diverse sites
NO CHANGE	
Northern red oak	Susceptible to some insect pests and oak wilt
MAY INCREASE	
American basswood	Tolerates shade but susceptible to fire
American elm	Affected by Dutch elm disease, grows across a variety of sites
American hornbeam	Shade-tolerant, but susceptible to fire and drought
Black cherry	Susceptible to insects and fire, tolerates some drought
Bur oak	Tolerates drought and fire
Ironwood	Grows across a variety of sites and tolerates shade
Northern pin oak	Tolerates drought and fire
White ash	Emerald ash borer causes mortality
White oak	Fire-adapted and grows on a variety of sites

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Get this handout online at: www.forestadaptation.org/Northwoods_treehandouts

FUTURE PROJECTIONS

Data for the end of the century are summarized for two forest impact models under two climate change scenarios. The Climate Change Tree Atlas (www.fs.fed.us/nrs/atlas) models future suitable habitat, while LANDIS models changes in forest growth over time (future biomass presented in this table).

▲ **INCREASE**
Projected increase of >20% by 2100

● **NO CHANGE**
Little change (<20%) projected by 2100

▼ **DECREASE**
Projected decrease of >20% by 2100

★ **NEW HABITAT**
Tree Atlas projects new habitat for species not currently present

ADAPTABILITY

Factors not included in the models, such as the ability to respond favorably to disturbance, may make a species more or less able to adapt to future stressors.

+ high
Species may perform better than modeled

. medium

– low
Species may perform worse than modeled

	LOW CLIMATE CHANGE (PCM B1)		HIGH CLIMATE CHANGE (GFDL A1FI)		
SPECIES	TREE ATLAS	LANDIS	TREE ATLAS	LANDIS	ADAPT
American basswood	●	▲	▲	▲	.
American beech	▲	▲	▲	▲	.
American elm	▲		▲		.
American hornbeam	▲		▲		.
Balsam fir	▼	▼	▼	▼	–
Balsam poplar	▼	●	●	▼	.
Bigtooth aspen	●	▲	▼	●	.
Bitternut hickory	▲	▲	▲	▲	+
Black ash	▼	●	▼	▼	–
Black cherry	▲	●	▲	▲	–
Black hickory			★		.
Black oak	▲	▲	▲	▲	.
Black spruce	▼	▼	▼	▼	.
Black walnut	▲		▲		.
Black willow	▲		▲		–
Blackgum			★		+
Blackjack oak	★		★		+
Boxelder	▲		▲		+
Bur oak	▲	▲	▲	▲	+
Butternut	▲		▼		–
Chestnut oak			★		+
Chinkapin oak	★		★		.
Chokecherry	●		▼		.
Common persimmon			★		+
Eastern cottonwood	▲		▲		.
Eastern hemlock	▲	▲	▼	▲	–
Eastern redbud	▼		▲		.
Eastern redcedar	★		★		.
Eastern white pine	●	●	▼	▼	.
Flowering dogwood	★		★		.
Gray birch	★		★		.
Green ash	▼	▲	▲	●	.
Hackberry	▲		▲		+
Honeylocust	★		★		+
Ironwood	●		▲		+
Jack pine	●	▼	▼	▼	.
Mockernut hickory	★		★		+
Mountain maple	▼		▼		+
Northern catalpa			★		.

	LOW CLIMATE CHANGE (PCM B1)		HIGH CLIMATE CHANGE (GFDL A1FI)		
SPECIES	TREE ATLAS	LANDIS	TREE ATLAS	LANDIS	ADAPT
Northern pin oak	●	▲	●	▲	+
Northern red oak	▲	●	●	●	+
Northern white-cedar	▼	●	▼	▼	.
Ohio buckeye	★		★		.
Osage-orange	★		★		+
Paper birch	▼	▼	▼	▼	.
Peachleaf willow			▲		.
Pignut hickory	★		★		.
Pin cherry	●		▼		.
Pin oak	★		★		–
Post oak	★		★		+
Quaking aspen	▼	▼	▼	▼	.
Red maple	●	▲	▼	▲	+
Red mulberry	▲		▲		.
Red pine	●	▼	●	▼	.
River birch	▲		▲		.
Rock elm	▼		●		–
Sassafras	★		★		.
Scarlet oak	★		★		.
Serviceberry	★		★		.
Shagbark hickory	▲		▲		.
Shellbark hickory			★		.
Shingle oak	★		★		.
Silver maple	▲		▲		+
Slippery elm	▲		▲		.
Striped maple	●		●		.
Sugar maple	●	●	▼	▼	+
Sugarberry			★		.
Swamp white oak	●		▲		.
Sweet birch	★		★		–
Sweetgum			★		.
Sycamore	★		★		.
Tamarack	●		▼		–
White ash	▲	▲	▲	▲	–
White oak	▲	▲	▲	▲	+
White spruce	▼	▼	▼	▼	.
Wild plum	▼		▲		.
Yellow birch	▼	●	▼	▼	.
Yellow-poplar	★		★		+

SOURCE: Janowiak, M.K., et al. 2014. Forest ecosystem vulnerability assessment and synthesis for northern Wisconsin and western Upper Michigan. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. GTR-NRS-136. 247p. www.nrs.fs.fed.us/pubs/46393

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APPENDIX B

Marengo River Watershed Action Plan
Target Objectives

Table 5.25. Prioritized target objectives, selected best management practices and management alternatives, and some examples of current programs that could be used to implement the BMP or management alternative. EQIP refers to the Environmental Quality Incentives Program and all current, approved practices for Wisconsin (NRCS 2012). ATCP 50 refers to current, approved practices listed in Chapter Agriculture, Trade, and Consumer Protection (ATCP) 50 of Wisconsin Administrative Code (WAC 2012).		
Target Objectives (Prioritized)	**Best Management Practices and Management Alternatives**	**Examples of Current Programs and Practice Implementation:**
		• BRNRD Silviculture Monitoring Project • Shared Landscape Initiative (coordinated by USFS)
	D. Implement managed intensive (prescribed) grazing for livestock producers.	• Lake Superior Grazing Specialist • All applicable EQIP and ATCP practices
	E. Implement conservation practices associated with livestock exclusion fencing.	• All applicable EQIP and ATCP practices
	F. Implement conservation practices associated with livestock watering facilities.	• All applicable EQIP and ATCP practices
	G. Increase conservation tillage acreage.	• All applicable EQIP and ATCP practices
	H. Improve drainage from heavy-use areas.	• All applicable EQIP and ATCP practices
	I. Plug/break agricultural drainage systems no longer in use.	• All applicable EQIP and ATCP practices
3. Reduce hydrologic connectivity of road right of way and recreational trail system to less than 12% of the surface area of the watershed.	A. Establish baseline of road/ditch area and evaluate upland flow attenuation for road system.	• N/A
4. Reduce sediment contributions from roads, recreational trail systems, railroads, and all waterway crossings.	A. Replace or re-design eroding and poorly functioning crossings and sections of roads, trails, and railroads at interactions with all types of waterways (streams, wetlands, lakes, etc).	• BRWA Culvert Program • All applicable EQIP and ATCP practices
	B. Implement conservation practices associated with waterway crossings.	• All applicable EQIP and ATCP practices

Table 5.25. Prioritized target objectives, selected best management practices and management alternatives, and some examples of current programs that could be used to implement the BMP or management alternative. EQIP refers to the Environmental Quality Incentives Program and all current, approved practices for Wisconsin (NRCS 2012). ATCP 50 refers to current, approved practices listed in Chapter Agriculture, Trade, and Consumer Protection (ATCP) 50 of Wisconsin Administrative Code (WAC 2012).		
Target Objectives (Prioritized)	**Best Management Practices and Management Alternatives**	**Examples of Current Programs and Practice Implementation:**
5. Reduce bluff/stream bank erosion.	A. Stabilize eroding bluffs/streambanks.	• All applicable EQIP and ATCP practices • Wildlife Habitat Incentive Program • Partners for Fish and Wildlife Program
6. Evaluate extent of nutrient and pathogen concerns and establish a baseline in the soil transition zone and clay plain area.	A. Conduct impaired water assessment for fecal coliform/*E. coli* and total phosphorus.	• WDNR, Bad River Tribe water quality monitoring programs
7. Implement agriculture conservation practices that improve manure storage and management.	A. Develop and implement nutrient management plans.	• South Shore Nutrient Management Farmer Education Program • All applicable EQIP and ATCP practices
	B. Implement conservation programs to improve livestock waste management.	• All applicable EQIP and ATCP practices
8. Inventory and replace failing, poorly designed, and poorly functioning private on-site wastewater treatment systems (POWTS).	A. Replace/update priority sites.	• Wisconsin Fund, Private Sewage System Replacement or Rehabilitation Grant Program • Bad River POWTS program
9. Insure POWTS are maintained on a regular basis.	A. Expand and/or continue POWTS maintenance programs.	• Ashland and Bayfield Co., Bad River POWTS programs
10. Restore floodplain connectivity in incised reaches and reaches with excessive overbank sedimentation.	A. Legacy sediment/levee scrapes.	• Wildlife Habitat Incentive Program
	B. Grade control/stabilization.	• All applicable EQIP and ATCP practices
	C. Raise stream bed.	• N/A
11. Increase channel roughness.	A. Add natural material such as coarse woody debris, rock.	• All applicable EQIP and ATCP practices • Partners for Fish and Wildlife Program
12. Strengthen local zoning ordinances and encourage practices that protect watershed health while meeting development needs.	A. Utilize available zoning ordinance review and update tools, such as the Better Site Design Tools from the Center for Watershed Protection (CWP 2012).	• Ashland and Bayfield County NR 115 Update • BRNRD
13. Identify available and potential habitat for	A. Riparian and upland habitat assessments.	• WDNR, Bad River Tribe

Table 5.25. Prioritized target objectives, selected best management practices and management alternatives, and some examples of current programs that could be used to implement the BMP or management alternative. EQIP refers to the Environmental Quality Incentives Program and all current, approved practices for Wisconsin (NRCS 2012). ATCP 50 refers to current, approved practices listed in Chapter Agriculture, Trade, and Consumer Protection (ATCP) 50 of Wisconsin Administrative Code (WAC 2012).		
Target Objectives (Prioritized)	**Best Management Practices and Management Alternatives**	**Examples of Current Programs and Practice Implementation:**
terrestrial and riparian species of conservation interest.		
14. Identify available and potential habitat for aquatic species of conservation interest.	A. Identify/confirm perennial and intermittent streams. B. Conduct aquatic habitat assessments.	• WDNR, Bad River Tribe, BRWA
15. Secure protection of existing priority riparian, aquatic, and terrestrial conservation areas and habitats.	A. Special designations.	• WDNR, Bad River Tribe water quality standards
	B. Land acquisition/conservation easements.	• Wisconsin Knowles-Nelson Stewardship Program • Bayfield Regional Conservancy • West Wisconsin Land Trust • North American Wetlands Conservation Act
	C. Tax incentives to maintain ecosystem services.	• N/A
16. Restore and improve priority aquatic and terrestrial habitats.	A. Improve fish and other aquatic life passage at road crossings.	• BRWA Culvert Program • All applicable EQIP and ATCP practices • Partners for Fish and Wildlife Program
	B. Add natural material such as coarse woody debris, rock.	• All applicable EQIP and ATCP practices • Partners for Fish and Wildlife Program
	C. Improve riparian vegetation to promote growth of long lived species.	• All applicable EQIP and ATCP practices • Partners for Fish and Wildlife Program
	D. Dam inspections/removals.	• WDNR Dam Removal Grant Program
17. Inventory and control invasive species.	A. Increase and improve surveys and monitoring.	• Northwoods Cooperative Weed Management Area • WI Coastal Management Program
	B. Control terrestrial and aquatic infestations with established control methods.	

Table 5.25. Prioritized target objectives, selected best management practices and management alternatives, and some examples of current programs that could be used to implement the BMP or management alternative. EQIP refers to the Environmental Quality Incentives Program and all current, approved practices for Wisconsin (NRCS 2012). ATCP 50 refers to current, approved practices listed in Chapter Agriculture, Trade, and Consumer Protection (ATCP) 50 of Wisconsin Administrative Code (WAC 2012).		
Target Objectives (Prioritized)	**Best Management Practices and Management Alternatives**	**Examples of Current Programs and Practice Implementation:**
18. Develop and encourage market-driven solutions to conservation on agricultural and forest land.	A. Upland agroforestry.	• Agriculture and Energy Resource Center
	B. Utilize Wisconsin's Working Lands Initiative	• WI Working Lands Initiative
19. Coordinate and increase opportunities for proper household hazardous waste, pharmaceuticals, pesticides, white goods (i.e. stoves, refrigerators, etc.), and tire disposal.	A. Household hazardous waste collection events.	• Bad River, NW-Regional Planning Commission regional clean sweeps
20. Inventory and remediate existing brownfield sites and leaking underground storage tanks (LUST).	A. Inventory all brownfield/LUST sites. B. Remediate known brownfield/LUST sites.	• WDNR Remediation and Redevelopment Program
21. Identify and close abandoned wells.	A. Well decommissioning.	• All applicable EQIP and ATCP practices • BRNRD
22. Map groundwater flow, quantity, and recharge areas.	A. Complete seepage run.	• USGS
23. Monitor groundwater quality via private well testing.	A. Develop private well monitoring program.	• Community Drinking Water Program through UW-Stevens Point
24. Increase general public's awareness and knowledge of water quality and watershed health.	A. Continue implementing the Marengo River Watershed Partnership.	• Marengo River Watershed Partnership
25. Increase public participation in watershed stewardship activities.	A. Host watershed stewardship events.	• Marengo River Watershed Partnership
26. Develop and improve recreational opportunities for all types of users.	A. Evaluate recreational opportunities for all types of users.	• N/A
27. Resolve conflicts related to wildlife management.	A. Host community discussion event.	• N/A

APPENDIX C

Ashland County 2019 Annual Work Plan
Ashland County 2020-2024 Annual Work Plan

Table 1: Planned activities and performance measures by category

CATEGORY	PLANNED ACTIVITIES WITH BENCHMARKS	PERFORMANCE MEASUREMENTS
Cropland, soil health and/or nutrient management	**Nutrient Management** (County-wide) o Encourage development of nutrient management plans for agricultural producers through cost-share o Develop new nutrient management plans on 500 acres of farmland with $20,000 SEG cost-share **Ordinances and Zoning** (County-wide) o Implement Ashland County Agricultural Performance Standards and Animal Waste Storage Ordinance o Implement Large-Scale Concentrated Animal Feeding Operations Ordinance **No-Till** (County-wide) o Administer 200 acres of no-till seeding using the department's rental no-till planter **Practice installation:** Provide technical assistance including planning, survey, design and construction of conservation practices o 1 Nutrient Management Plan completed 450' livestock fencing; 1 landowner (Miller) (LS12) o 580'access road;2 landowners (Jolma/Pierce) 350'stream crossing;2 landowners (Miller/Jolma)	Hours of staff time expended Amount of cost-share dollars spent Acres of no-till from rental planter Type and units of practice(s) installed Number and type of ordinances and permits developed Acres and percent of total cropland covered by NMPs Number of people receiving technical assistance
Livestock	**Practice installation:** Provide technical assistance planning, survey, design and construction of conservation practices o 2 livestock watering facilities (Kysar/Oliphant) o 1 manure storage closure (Pupp) (LS12)	Hours of staff time expended Amount of cost-share dollars spent Type and units of practice(s) installed Number of people receiving technical assistance
Water quality/quantity (activities <u>not</u> listed in other categories)	**Practice installation:** Provide technical assistance including planning, survey, design and construction of practices o 182' Lined waterway; 1 landowner (Wilson) (LS10) **CREP** (Lake Superior Basin) o Promote participation in the Lake Superior CREP o Track existing CREP contracts **Groundwater/surface water testing** (County-wide) o Coordinate with local well drillers to properly abandon unused/non-compliant wells with cost-share assistance o Collaborate w/ Northland College, Superior Rivers, and others to characterize surface water quality	Hours of staff time expended Amount of cost-share dollars spent Type and units of practice(s) installed Number of CREP contracts in compliance Number of people receiving technical assistance Number of meetings attended/presentations given

CATEGORY	PLANNED ACTIVITIES WITH BENCHMARKS	PERFORMANCE MEASUREMENTS
	Citizen Monitoring (County-wide) ○ Provide technical assistance/cost-share to encourage citizen monitoring of groundwater and surface waters ○ Encourage development of lake associations ○ Promote Citizen Lake Monitoring and WDNR Surface Water grant application for Lake Galilee **Planning** (Lake Superior Basin) (LS08) ○ Work with the City of Ashland to complete their drinking water source protection plan ○ Coordinate with the City of Ashland for mitigation of city wastewater overflows	
Forestry	○ Promote landowner forest management plan development with cost-share assistance through EQIP and other forestry incentive programs	Hours of staff time/ Cost-share dollars spent Type and units of practice(s) installed Number of people receiving technical assistance
Invasive species	**Coordination and Staffing** (County-wide) ○ Implement WDNR Surface Water Grant for an Aquatic Invasive Species (AIS) Program ○ Coordinate Invasive Species activities with adjacent counties, municipalities, agencies, Northland College, NGOs, and tribal organizations ○ Support efforts of the Northwoods Cooperative Weed Management Area (NCWMA) **Surveys** (County-wide) ○ Contribute data on the location and size of invasive species occurrences in Ashland County **Management plans** (County-wide) ○ Support efforts of City of Ashland with management of invasive/nuisance species **Control** (County-wide) ○ Participate in collaborative control efforts for invasive species within Ashland County ○ Share equipment for invasive species management ○ Galerucella beetles rearing for Purple loosestrife **Education**(County-wide) ○ Provide AIS education program at local schools/events ○ Respond to public requests for recommendations on invasive species identification and control **Citizen monitoring** ○ Provide technical assistance and funding for citizen monitoring/reporting of invasive species	Hours of staff time expended Amount of cost-share dollars spent Type and units of practice(s) installed Number of invasive species surveys completed Number of invasive species sites treated Number of participants at volunteer events Number of people receiving technical assistance Number of meetings attended/presentations given

CATEGORY	PLANNED ACTIVITIES WITH BENCHMARKS	PERFORMANCE MEASUREMENTS
Wildlife-Wetlands-Habitat (other than forestry or invasive species)	**Wetlands** (County-wide) Provide technical assistance for wetland restoration including planning, survey, design and construction o 1 wetland restoration totaling 15 acres (LS08) o Work with Wisconsin Wetlands Association (WWA) to develop wetland conservation goals o Support WWA to identify critical wetland restoration sites flood adaptation **Aquatic Organism Passage** (County-wide) o Identify and prioritize culvert crossings to remove barriers to aquatic organism passage o Replace culvert barrier with a bottomless arch through US Fish and Wildlife Service grant funding **Wildlife Damage Abatement and Control** o Provide office space, equipment, supplies and vehicle for WDNR Wildlife Damage Program Specialist o Facilitate payroll, procurement, and program reimbursements through county system **Tree and Plant Sales** (County-wide) o Provide native trees and shrubs at annual sale o Provide native plant recommendations & education o Fund scholarships and awards for youth and adult education opportunities from annual proceeds	Hours of staff time expended Amount of cost-share dollars spent Type and units of practice(s) installed Acres of wetland restored and upland protected Number of culvert crossings and other obstructions evaluated Amount of financial assistance obtained for AO passage and erosion control. Number of meetings attended/presentations given Number of trees and shrubs sold Number of people receiving technical assistance Amount of scholarship funding generated
Urban issues	**Stormwater Management** (LS08) o Assist municipalities w/ erosion/stormwater control o Assist Ashland w/ city wastewater overflows o Technical assistance for rain gardens o Coordinate Rain Barrel Sale	Hours of staff time expended Amount of cost-share dollars spent Type and units of practice(s) installed Number of people receiving technical assistance Number of meetings attended/presentations given
Watershed strategies	**Landscape-scale surveys & inventories** o Use watershed modeling to assess existing condition, potential threats, and impairments o Prioritize conservation activities by watershed based on current research & flood potential o Use watershed modeling to protect and improve the City of Ashland drinking water source o Update County LWRMP based on watershed flood potential models, Marengo 9-Key Element Plan, County Comprehensive Plan, and others **Producer-led Watershed Group** (LS14) o Promote grant application by producers to improve water quality in Agricultural Enterprise Areas	Hours of staff time expended Number of people and organizations receiving technical assistance Number of computer models tested and completed Number of partnership activities accomplished Number of meetings attended/presentations given

CATEGORY	PLANNED ACTIVITIES WITH BENCHMARKS	PERFORMANCE MEASUREMENTS
Other	**Farmland Preservation & Comprehensive Plan** ○ Encourage FPP participation ○ Ensure consistent implementation between the County Comprehensive Plan and Farmland Preservation Plan **Mining** ○ Assist Zoning Department in review of Metallic/Non-Metallic Mining Ordinance Review/applications **Environmental Education** (County-wide) ○ Participate in outreach & education events ○ Provide technical assistance to the public ○ Provide youth conservation programs **Partnerships and Collaboration** (County-wide) ○ Support tribal/ non-governmental conservation efforts Collaborate on regional grants for conservation efforts ○ Maintain coordination with Federal, State, Tribal, and local governments and county offices including zoning, forestry, highway, and ag extension	Hours of staff time expended Amount of cost-share dollars spent Type and units of practice(s) installed Number of people receiving technical assistance and environmental education Number of meetings attended/presentations given

Table 2: Planned activity related to permits and ordinances

Permits and Ordinances	Plans/application reviews anticipated	Permits anticipated to be issued
Feedlot permits	0	
Manure storage construction and transfer	0	
Manure storage closure	1	1
Livestock facility siting	0	
Nonmetallic/frac-sand mining	0	
Stormwater and construction site erosion control	2	
Shoreland zoning	2	
Wetlands and waterways (Ch. 30)	2	2
Other	0	

Table 3: Planned inspections

Inspections	Number of inspections planned
Total Farm Inspections	10
For FPP	5
For NR 151	10
Animal waste ordinance	2
Livestock facility siting	0
Stormwater and construction site erosion control	2
Nonmetallic mining	0

Table 4: Planned outreach and education activities

Activity	Number
Tours	5
Field days	4
Trainings/workshops	3
School-age programs (camps, field days, class)	25
Newsletters	0
Social media posts	5
News release/story	5

Table 5: Staff Hours and Expected Costs

Staff/Support	Hours	Costs
County Conservationist	1950	$77,916
Civil Engineering Technician	1950	$71,326
Program Assistant	962	$15,873
Aquatic Invasive Species Coordinator	1200	$20,400
Support Costs	N/A	$65,094
Cost Sharing	**Hours**	**Costs**
Bonding	N/A	$59,475
SEG NMP	N/A	$20,000

Ashland County LWRM Work Plan 2020-2024 Priorities are shaded gray. ^LSCAP *NIACS #LSBCS +MRWAP

GOAL 1: MAINTAIN/ ENHANCE THE QUALITY OF ASHLAND COUNTY'S SURFACE AND GROUND WATER RESOURCES.	
Objective A: Reduce non-point pollution/water quality risk through adaptive strategies on agricultural, urban and forested lands. (*)	
ACTIVITY	**ANNUAL OUTCOME *(UNLESS NOTED)***
Offer landowners technical assistance/cost-share to voluntarily install projects that reduce erosion, slow runoff, & increase water storage.(^*#)	• **Secure grant to maximize number of projects.** • **Implement 4+ conservation practices.** • **Assist 5+ landowners.**
Offer farmers technical assistance/cost-share to voluntarily adopt Nutrient Management plans and NR 151 performance standards. (^+)	• **Implement 4+ conservation practices.** • **Assist 5+ landowners.**
Encourage a landscape-scale demonstration project to evaluate "slow-the-flow" practices to account for present and future conditions. (^*#+)	• **Seek alternative funding to maximize number of projects.** • **Implement cover crops/filter strips/other adaptive measures.**
Offer farmers technical assistance/cost-share for new manure storage systems and closure of old facilities. (+)	• **Implement 2+ conservation practices.** • **Assist 2+ landowners.**
Minimize extreme weather impacts through adaptive practices that reduce peak flow, runoff velocity, and soil erosion. (*#)	• **Implement 1+ adaptive practice as possible.**
Manage farmlands and fields on a landscape level; implement Marengo River Watershed Action Plan Recommendations. (*+)	• **Implement cost-share for conservation practices.** • **Assist landowners as possible.**
Seek alternative grant funds to implement restorative conservation practices in the Marengo River watershed. (*#+)	• **Actively pursue a Targeted Runoff Management Grant. (2021/2022)**
Encourage crops, planting dates, livestock breeds, products and commodities to account for variable future conditions. (*#)	• **Implement conservation practices on highly erodible lands.** • **Adaptive measures implemented as possible.**
Work w/ Bayfield or Price on cross-boundary watershed projects. (^)	• **Actively pursue collaborative project on Butternut Lake w/ Price Co.** • **Actively pursue Marengo River Watershed project with Bayfield Co.**
Objective B: Establish baseline data, and develop monitoring of groundwater drinking water quality across Ashland County. (*)	
Partner with UW Stevens Point and County Health Department to establish an Ashland County drinking water testing program.	• **Secure funds to subsidize landowners private well tests. (2021)**
Seek groundwater hydro study; identify recharge/discharge area. (#+)	• **Seek funding. (2023)**
Provide well abandonment cost-share & technical assistance. (+)	• **Properly close 1+ wells.**
Support fecal coliform/*E.coli*/Total P testing in soil transition zone. (+)	• **Seek funding. (2023)**
Objective C: Account for variable future hydrologic conditions through restoration or adapted structure/system design. (*#)	
Provide technical assistance/cost-share to reduce future runoff. (*)	• **Implement NIACS strategies as adaptive measures.**
Restore hydrologic/floodplain function to support climate resilience. (*)	• **Implement NIACS strategies as adaptive measures.**
Design or relocate structure/system to account for future condition. (*)	• **Implement NIACS strategies as adaptive measures.**

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* Supports Northern Institute of Applied Climate Science (NIACS) Adaptation Strategies: Agriculture, Forests, Forest Watersheds & Non-Forest Wetlands.
# Supports actions listed in Lake Superior Lake-Wide Management Plan: Biological Conservation Strategies.
+ Supports actions listed in the Marengo River Watershed Action Plan (MRWAP).

Ashland County LWRM Work Plan 2020-2024 Priorities are shaded gray. ^LSCAP *NIACS #LSBCS +MRWAP

Objective D: Identify and reduce point source pollution originating from rural and urban lands.	
ACTIVITY	**ANNUAL OUTCOME *(UNLESS NOTED)***
Support County GIS mapping of potential groundwater pollution sites.	• **New GIS groundwater data layer.** • **Data reported in annual report/newsletter.**
Assist City of Ashland with wastewater/stormwater best management and outreach to reduce wastewater treatment facility overflows. (#)	• **3+ programs, workshops, or public tours.**
Assist City of Ashland to promote residential rain barrels/rain gardens.	• **50+ rain barrels purchased and/or gardens installed. (2020 & 2021)**
Objective E: Minimize the environmental effects of non-metallic and metallic mining while ensuring public safety.	
Support Zoning Department in ordinance and plan reviews.	• **Review ordinances, attend hearings, & comment as necessary.**
Promote BMPs for slope stability, erosion control and water quality.	• **Provide technical assistance/cost-share as requested.**
Offer technical assistance to minimize environmental impacts.	• **Provide technical assistance/cost-share as requested.**

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GOAL #2: CONSERVE & ENHANCE THE SOIL AND TERRESTRIAL RESOURCES OF ASHLAND COUNTY.	
Objective A: Encourage good stewardship of public and private forest lands, agricultural lands, open spaces, and wetlands.	
ACTIVITY	**ANNUAL OUTCOME (UNLESS NOTED)**
Reduce erosion and critical problems on existing recreational trails, forest roads, landings, and waterway crossings. (#+)	• **Provide technical assistance as requested.** • **Cost-share 1+ conservation practice.**
Promote NRCS and other programs to protect riparian areas. (^#)	• **Provide outreach efforts to landowners and news release.**
Restore agricultural drainage systems no longer in use. (+)	• **Cost-share 1+ conservation practice.**
Support recycling of agriculture plastic feed bags.	• **Support efforts to develop recycling program.**
Objective B: Maintain/restore forests and vegetative cover, and facilitate forest adaptation through species transitions. (*#)	
Maintain/restore forest and vegetative cover in riparian areas and promptly revegetated after disturbance. (^#+)	• **Provide technical assistance/cost-share as requested.**
Prevent terrestrial invasive species establishment and spread. (#+)	• **Assist local groups with control at 2+ sites.** • **Provide technical assistance/cost-share as requested.**
Promote native species expected to adapt to future conditions on conservation projects and in annual Tree and Shrub Sale. (#)	• **Continue annual Tree and Shrub Sale.** • **Utilize NIACS to promote best native species for future conditions.**
Identify, maintain, and enhance important fish & wildlife habitat. (^+)	• **Implement 2+ conservation practices/ assist landowners.**
Objective C: Preserve agricultural lands for sustainable production of crops and livestock while protecting soil resources, wildlife habitat, scenic values and human health.	
Increase farmer technical assistance/cost-share to develop nutrient management plans through Farmer Education programs. (^+)	• **Provide 500 ac. of nutrient management cost share.** • **Assist landowners in development of NM plans.**
Support managed intensive grazing for livestock producers.	• **Provide technical assistance/cost-share as requested.**
Maintain and enhance Farmland Preservation Program.	• **Contact AEA landowners; conduct 2 FPP reviews; foster new FPPs.** • **Pursue Farmland Preservation Zoning.**
Support farmer compliance with the Nutrient Management Checklist.	• **Conduct 5 farm checks.**
Promote soil conservation through no-till planter rental & demos. (*^+)	• **Implement no-till planting 200+ acres.** • **Technical assistance/training to 5+ landowners.**
Encourage agricultural conservation easements.	• **Seek Agricultural Enterprise Area expansion/ exclusive ag zoning.**
Objective D: Facilitate development of a farmer-led conservation initiative.	
Encourage farmer-led conservation project grant application.	• **Support efforts to seek funding for cost-share projects. (2022)**

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# Supports actions listed in Lake Superior Lake-Wide Management Plan: Biological Conservation Strategies.
+ Supports actions listed in the Marengo River Watershed Action Plan (MRWAP).

Ashland County LWRM Work Plan 2020-2024 Priority activities & outcomes are shaded gray. ^LSCAP *NIACS #LSBCS

GOAL #3: PROTECT AND IMPROVE AQUATIC AND TERRESTRIAL WILDLIFE HABITAT IN ASHLAND COUNTY.	
Objective A: Restore and enhance habitat within and adjacent to lakes, rivers, and streams.	
ACTIVITY	**ANNUAL OUTCOME (UNLESS NOTED)**
Provide assistance/cost-share for voluntary shoreline habitat protection on Lake Superior and inland Outstanding/Exceptional waters. (^#)	• **Provide technical assistance/cost-share to riparian landowners.** • **Implement 1+ shoreland restoration project.**
Encourage development of lake associations & county-wide group.	• **Promote Clam Lake Association.**
Support restriction of activities that impact shoreline/bank habitat and increase awareness of shoreline best management practices. (^+)	• **Support regulation; identify potential restoration sites as necessary.**
Assist the Ashland County Zoning/WDNR with shoreland mitigation.	• **Prepare/review mitigation plans as requested.**
Assist groups in grant applications for lake and river projects.	• **Support efforts to seek grant funds.**
Objective B: Restore, conserve, and enhance ecological functions of wetlands for wildlife habitat and watershed health. (*#+)	
Provide technical assistance/cost-share for wetland restoration. (^+)	• **Cost-share 1+ wetland restorations.**
Continue partnership with USFWS; protect migratory bird wetlands. (^)	• **Pursue grant funds for 1+ wetland projects.**
Support Lake Superior Collaborative & other watershed groups. (^)	• **Technical and financial contribution as necessary.**
Support WDNR Habitat Team; evaluate wetland restoration projects.(^#)	• **Attend WDNR Habitat Team meetings; support group efforts.**
Objective C: Identify, restore, and protect high quality area to ensure diverse, healthy, and self-sustaining populations. (*#+)	
Support LSC in efforts to protect at-risk and sensitive areas. (^)	• **Collaborate with partners; support local efforts as necessary.**
Maintain or enhance sensitive or at-risk species and communities. (*)	• **Support GIS data efforts.** • **Implement NIACS strategies as adaptive measures as possible.**
Promote landowner incentives to increase protection of sensitive areas.	• **Investigate programs in other counties.** • **Seek grant funds for landowner incentives.**

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Objective D: Develop a comprehensive aquatic invasive species education and control program.	
ACTIVITY	**ANNUAL OUTCOME *(UNLESS NOTED)***
Establish & sustain an Aquatic Invasive Species Coordinator in Ashland County to implement education outreach and control efforts. (#)	• **Secure funding to support AIS programming.** • **Train, supervise, support 1+ staff positions.** • **Develop Ashland County AIS Strategic Plan. (2021)** • **Provide outreach & education 500+ hours.**
Prevent the introduction of, and control existing, AIS populations. (^*#)	• **Secure funding to support watercraft inspection staff.** • **Support WDNR efforts; hire staff to conduct watercraft inspections.** • **Provide 100+ hours of inspection at selected landings.**
Support partner efforts; monitor, control and map invasive populations.	• **Support NCWMA and GLIFWC control efforts.**
Coordinate with NCWMA to share use of a portable boat washing unit.	• **Implement 100 hours for boat wash at Lake Superior landings.**
Objective E: Maintain or enhance habitat connectivity for terrestrial and aquatic wildlife. (*+)	
Maintain forested waterways to protect cold-water species. (#)	• **Support WDNR and other groups in cold-water habitat protection.**
Support NCWMA to control invasive species and restore wildlife habitat.	• **Attend 4+ NCWMA meetings.** • **Provide 20+ volunteer hours to NCWMA for control efforts.**
Provide technical assistance/cost-share to reduce fish/aquatic barriers and forest fragmentation, and to restore riparian corridors. (^*#+)	• **Provide technical assistance to towns, landowners, and County.** • **Implement cost-share project as requested.**
Promote native diverse forest age class adapted to future conditions. (*)	• **Implement NIACS strategies as adaptive measures as possible.**
Objective F: Support the Ashland, Bayfield, Douglas & Iron Counties Wildlife Damage Abatement & Claims Program (WDACP).	
Continue to host the Wildlife Damage Specialist position.	• **Provide office space, computer support and vehicle; supervise staff.** • **Support WDNR and USDA-APHIS efforts.**
Coordinate the deer donation program.	• **Provide news release prior to deer season.** • **Coordination with 3+ processors and food shelves.**
Provide technical assistance for wildlife damage and abatement.	• **Technical assistance to 5+ landowners.**
Attend conservation congress; provide input on wildlife damage issues.	• **Attend annual meeting**
Increase education outreach and knowledge of wildlife damage impacts.	• **4+ news releases and articles; Annual report summary.** • **Activity reports to 4 Land Conservation Committees.**

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# Supports actions listed in Lake Superior Lake-Wide Management Plan: Biological Conservation Strategies.
+ Supports actions listed in the Marengo River Watershed Action Plan (MRWAP).

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GOAL 4: PROVIDE CONSERVATION EDUCATION TO PRIVATE LANDOWNERS, LOCAL OFFICIALS, NON-GOVERNMENT ORGANIZATIONS, & THE PUBLIC THROUGH COLLABORATION WITH OTHER RESOURCE MANAGEMENT ENTITIES. (^#)	
Objective A: Facilitate teamwork among conservation partners.	
ACTIVITY	**ANNUAL OUTCOME *(UNLESS NOTED)***
Network with state/regional conservation management organizations.	• **Attend 6-12 regional and statewide meetings and trainings**
Organize, host & attend local conservation partner meetings. (^+)	• **Attend 10+ local coordination meetings/ workshops.**
Increase environmental education and conservation education for students at Ashland County schools.	• **Assist local Envirothon.** • **Teach 5+ conservation education programs.** • **Award 2+ scholarships for student conservation opportunities.** • **Host local Land & Water Poster and Speaking Contest.** • **Volunteer at regional Poster & Speaking Contest.**
Offer conservation education opportunities for adults.	• **Farm and Garden Show, Bay Days, Youth events, etc.** • **Host Northland College student employment position**
Objective B: Work to attain a common vision and a conservation land use ethic among government representatives, land managers, and conservation partners in Ashland County and surrounding areas.	
Align LWCD priorities w/ regional plan goals: Farmland Preservation, Comprehensive, Lake Superior Collaborative Action, Lake Superior Biological Conservation Strategies, & Marengo River Watershed.(^#+)	• **Participate in meetings on collaborative plan updates as necessary**
Objective C: Increase awareness of land use regulations, land management practices, watershed stewardship, and best management practices necessary to protect and improve soil, water, and habitat resources.	
Increase public awareness about non-point source pollution and watershed health; provide BMPs information to reduce impacts. (+)	• **1-2 workshops and trainings** • **Handouts and displays at local events**
Encourage participation in state and federal conservation programs including WDNR AIS, NRCS EQIP, and others	• **Publish 1-2 news releases** • **Direct mailings to 20-50 targeted landowners** • **Handouts and displays at fairs and other events**
Provide information on BMPs, climate adaptations, and forest management for private landowners. (^*+)	• **Workshops and trainings as necessary** • **Handouts and displays at local events**
Increase public awareness of invasive species & impacts. (#+)	• **Publish 1-2 news releases.** • **Table at 5+ local events.**
Provide information and educational materials about the location and extent of point sources of pollution	• Provide handouts and displays at fairs and other events
Provide technical assistance/information to landowners through Lake Superior Collaborative and My Lake Superior Northwoods. (^#)	• Provide 1-2 workshops and trainings • Handouts and displays at fairs and other events

^ Supports actions listed in the Lake Superior Collaborative Action Plan 2019 (LSCAP).
* Supports Northern Institute of Applied Climate Science (NIACS) Adaptation Strategies: Agriculture, Forests, Forest Watersheds & Non-Forest Wetlands.
# Supports actions listed in Lake Superior Lake-Wide Management Plan: Biological Conservation Strategies.
+ Supports actions listed in the Marengo River Watershed Action Plan (MRWAP).

APPENDIX D

Additional Information

Additional Information

There have been many other plans, reports, and guidance documents published in the region that refer to land and water resources and issues within Ashland County. This appendix provides a list of some of these resources and how to locate them for more information.

D1. MARENGO RIVER WATERSHED PARTNERSHIP PROJECT WATERSHED ACTION PLAN

The Marengo River is truly a river of change. From its sleepy beginnings in the wetlands of the Penokee hills of northern Wisconsin, to its journey through a large valley that once formed the shoreline of glacial Lake Duluth, and its final leg through the flat, agricultural areas of the Lake Superior clay plain, this river and all the streams that flow into it are truly special.

However, the Marengo River is not unaffected by human activity. The Marengo River Watershed experienced extensive logging and farming activities around the turn of the 20th Century. The effects of this large-scale land cover conversion had tremendous impacts on streams and rivers that are still felt today.

The people that live, work, and play here recognize this and the Marengo River Watershed Partnership (MRWP) was formed as a way for watershed residents, local government leaders, and natural resource professionals to express things they value about the watershed, concerns they have about its health, and to identify actions needed to maintain and improve the health of the watershed for future generations.

The resulting Watershed Action Plan outlined in this document provides a tool for local governments, agencies, organizations, and watershed residents to carry out these actions and attract the resources needed to do it.

Vision and Watershed Goals

The MRWP developed a vision statement that reads:

“We would like to see a Marengo River Watershed that has clean, flowing water; supports healthy, diverse, and resilient plant and animal communities free of invasive species; and is a vital community of watershed stewards who take actions to care for the watershed, while enabling a productive livelihood.”

To achieve this vision the Marengo River Watershed Action Plan provides a framework to accomplish the following goals:

Goal #1: The hydrologic system in the Marengo River Watershed is stable and resilient.

Goal #2: Safe water and healthy, productive soil are available and maintained for all human and wildlife uses.

Goal #3: The Marengo River Watershed has diverse, healthy, and resilient native communities of plants and animals and their habitats on land and in water.

Goal #4: Citizens of the Marengo River Watershed are active and engaged in maintaining the integrity of the watershed.

Watershed Challenges and Sources

Challenges are the existing stresses or issues and concerns that prevent watershed goals from being met. Challenges specific to the Marengo River Watershed and their sources, were identified and prioritized by the MRWP based on their “severity” and “scope.” The challenges are: 1) Unstable hydrologic system; 2) excess sediment; 3) excess nutrients; 4) high bacteria counts; 5) loss of aquatic habitat; 6) terrestrial habitat fragmentation and alteration. Sources of these challenges are generally from nonpoint source pollution.

The most widespread challenges facing the Marengo River Watershed (and many other watersheds in the Lake Superior Basin of Wisconsin) are related to the altered and unstable hydrologic system caused by past land uses. The sources of these challenges are part of a natural watershed response to disturbance, but in many cases are being exacerbated by current human activity. They prevent the watershed from achieving its full habitat potential and improving its resilience to climate change and other potential disturbances. Improving the unstable hydrologic system, reducing sediment loads, and establishing a more stable and resilient Marengo River Watershed will take time. While these challenges are widespread and

require management responses on a watershed scale, the sources of other challenges such as pathogen and nutrient concerns are more localized. Better implementation of human and livestock waste management practices will be required to see improvement. Improvement for these localized concerns is more readily achievable in the short term and much good work has already been done. Success will be related to the willingness of the watershed community to embrace and implement solutions that meet these challenges.

Watershed Action Plan

In order to realize the vision and long-term goals for the Marengo River Watershed, a short term (10-year) Watershed Action Plan was developed. Nearly 100 recommended action items set the stage for work that is needed to prevent future impairments, build upon, and maintain the watershed's high quality features. From protection to restoration to outreach, the action steps are designed to reduce or prevent nonpoint source pollution and also to build a base of knowledge about the watershed that will allow future management efforts to adapt to changes in our understanding of watersheds and changes in human needs and pressures on watershed resources. For each action item, the partner organization(s) best suited to implement the task was identified, along with an estimated cost and potential funding source(s). A measure of success was also identified for each action item to assist in evaluation of plan progress. A timeframe of 10 years was used to determine the scope of activities.

D2. Coastal Wetlands of Wisconsin's Great Lakes – 2002 (A Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, 2002 PUBL ER-803 2002)

Numerous inventories and reports have been completed pertaining to coastal wetlands throughout Wisconsin. For example, the Bureau of Endangered Resources (BER) has completed a number of important inventory and data assessment projects over the last decade aimed at improving our understanding of coastal ecosystems and coastal wetland sites, in particular. However, when this project was initiated in 1999, a comprehensive synthesis of coastal wetland information for the Great Lakes had not been completed. Moreover, significant inventory gaps existed throughout the coastal zone in Wisconsin. Phase 3 of the project was initiated in 2001 with the primary goals of:

1) Continuing to gather and incorporate coastal wetlands data into BER's Biological Conservation Database (BCD)
2) Filling in data gaps as resources allowed through limited field inventory for high ranking sites identified during phase 2
3) Developing the products that began in Phase 2 (coastal wetlands website, CD-ROM, and technical report including site descriptions).

The ultimate intended outcome of the project will be a publicly distributed product in an easy-to-read format, filled with pictures, maps and graphics that would help increase public awareness to the importance of coastal wetlands in Wisconsin. The basis for these products would be the ecologically significant sites, their site descriptions, and the regional and local ecological importance of each site.

Primary coastal wetland sites in "eastern Lake Superior" were identified during Phase 1 of the project. The sites identified in or very near to Ashland County include:

- Fish Creek Slough
- Long Island-Chequamegon Point
- Big Bay
- Stockton Island Tombolo
- Outer Island Sandspit and Lagoon
- Bad River – Kakagon Slough

General information about coastal wetlands of the Great Lakes can be found on the WDNR website at: https://dnr.wi.gov/topic/wetlands/coastal/

The final (Phase 3) report contains all of the materials from the website as of July 2002. However, the report will not be updated, so the website contains the most current information. The Phase 3 report may be found at: https://dnr.wi.gov/files/PDF/pubs/ER/ER0803.pdf

D3. Wisconsin Land Legacy Report: An inventory of places to meet Wisconsin's future conservation and recreation needs – 2006

Superior Coastal Plain Legacy Places

The Superior Coastal Plain is located on the low plains of Lake Superior's south shore. The landscape is marked by many small rivers and streams which cover the lake plain and peninsula. A great portion of this landscape remains forested, with only a small percentage being used for agriculture. Urban development threatens some of these areas but a large number of public lands are included in this area. The quality of these coastal areas provides critical habitat for migratory songbirds, waterfowl, shorebirds and rare plants. These areas also provide exceptional opportunity for recreation, and draws visitors from throughout North America. The rivers and streams offer excellent opportunity for fishing, especially for trout and salmon. Sites such as the Apostle Island National Lakeshore and many other state and local parks offer camping, hiking, boating, bird watching and a variety of other recreational opportunities for visitors. The legacy places of the Lake Superior coastal plain are listed below.

Apostle Islands: These 22 islands (17 of which are within Ashland County) feature sandstone cliffs, sea caves, and sand beaches, not to mention a multitude of scenic features. The islands have been substantially protected and limited amounts of old growth forest and a diverse array of mammals and birds inhabit the island. Providing a unique and remote experience for all who visit the Apostle Islands attract visitors from throughout the sandstone cliffs, sea caves, and sand beaches, not to mention a multitude of scenic features. The islands have been substantially protected and limited amounts of old growth forest and a diverse array of mammals and birds inhabit the island. Providing a unique and remote experience for all who visit the Apostle Islands attract visitors from throughout the country.

Bad River: The Bad River flows through a wide variety of wetland habitats in a very short distance. The river is fed by many high quality tributaries, including the White, Marengo, Potato and the Tyler Forks Rivers. The lower portions of the river flow primarily through the Bad River Indian Reservation, but Copper Falls State Park contains many canyons, streams and waterfalls that are extremely popular with photographers, hikers and campers. For more information on Legacy Places and the Superior Coastal Plain, please see the Wisconsin Land Legacy Report in Part II, Chapter 4 Legacy Places by Ecological Landscape.

Big Bay: A large bay on the eastern side of Madeline Island, consisting of a coastal barrier spit, beach and dunes, xeric pine forest, lagoon and a wide array of peatlands. These natural communities are some of the most unusual and pristine within all the Great Lakes. This entire area has been protected within Big Bay State Park.

Chequamegon Point/Kakagon Slough: The sloughs at the mouth of the Bad River are some of the largest and highest quality within the Great Lakes. A narrow sandspit along these wetlands provides habit for migratory waterfowl, shorebirds, and songbirds. This wetland also provides an important spawning and nursery area for a multitude of fish species.

White River: Originating from a series of spring fed lakes that feed many tributaries in Bayfield County, the White River flows from the Chequamegon National Forest through the Bibon Swamp before entering Ashland County and joining with the Bad River. In Ashland County, the White River flows through high quality forests and wetlands. Anadromous runs of trout and salmon occur below the White River flowage, and Lake Sturgeon are known to give the anglers an exciting surprise.

Copies of this report may be obtained through the WDNR

D4. Rare, Threatened, Endangered and Special Concern Species and Natural Communities

Extensive information about these species and natural communities exists in a variety of formats and locations. A good place to start learning more about the species and programs is at: http://www.dnr.state.wi.us/org/land/er/

The Wisconsin endangered and threatened species laws and a list of those species (PUBL-ER-001 2004, revised February 2004) can be found on the WDNR website at: http://www.dnr.state.wi.us/org/land/er/wlist/WI_ET_Laws_List.pdf

The Wisconsin Natural Heritage Inventory (NHI) program is part of an international network of NHI programs. This network was established by The Nature Conservancy and is currently coordinated by NatureServe (http://www.natureserve.org/). All NHI programs use a standard methodology for collecting, characterizing, and managing data, making it possible to combine data at various scales to address local, state, regional, and national issues. NHI programs focus on locating and documenting occurrences of rare species and natural communities, including state and federal endangered and threatened species.
http://www.dnr.state.wi.us/org/land/er/nhi/

The Wisconsin Natural Heritage Working List contains species known or suspected to be rare in Wisconsin. It includes species legally designated as "Endangered" or "Threatened" as well as species in the advisory "Special Concern" category. Most of the species and natural communities on the list are actively tracked and data submissions on these species are encouraged. General information about the program can be found on the WDNR website at: http://www.dnr.state.wi.us/org/land/er/wlist/

A generalized version of the NHI database is provided for Ashland County. This information is for general reference and should not be used as a substitute for having the WDNR conduct a review of a specific project area. The NHI database is dynamic; records are continually being added and/or updated. The following data are current as of 07/22/2008:
http://www.dnr.state.wi.us/org/land/er/nhi/CountyData/pdfs/Ashland_County.pdf

Another way to learn more about rare species and habitats in Ashland County is by examining Wisconsin's Wildlife Action Plan. This program identifies Wisconsin's wildlife species of greatest conservation need. Species of greatest conservation need have low and/or declining populations that are in need of conservation action. They include various birds, fish, mammals, reptiles, amphibians, and invertebrates tat are already listed as threatened or endangered; at risk because of threats to their life history needs or their habitats; stable in number in Wisconsin, but declining in adjacent states or nationally; or of unknown status in Wisconsin and suspected to be vulnerable. An interactive tool to find out more about the species of greatest conservation need in any county of Wisconsin can be found at:
http://www.dnr.state.wi.us/org/land/er/wwap/explore/county.asp

D5. Forestry Best Management Practices – Wisconsin Department of Natural Resources

Several excellent guides to forestry BMPs can be downloaded as PDFs from the WDNR websites listed below the publication or ordered hardcopy from the Wisconsin DNR Division of Forestry P.O. Box 7921 Madison, WI 53707-7921 (608) 267-7494

Wisconsin's Forestry Best Management Practices for Water Quality – a Field Manual for Loggers, Landowners & Land Mangers – 1993
(PUB FR-093) http://dnr.wi.gov/forestry/publications/pdf/FR-093.pdf

Managing Woodlands on Lake Superior's Red Clay Plain - Slowing the Flow of Runoff (PUB FR-385) http://dnr.wi.gov/forestry/publications/pdf/FR-385.pdf

Managing Woodlands for Wisconsin's Coastal Trout Streams - Protecting Water Quality and Trout Stream Habitat (PUB-FR 386) http://dnr.wi.gov/forestry/publications/pdf/FR-386.pdf

Management Recommendations for Forestry Practices along Wisconsin's Coastal Trout Streams – 2007 (PUB-FR 388) http://dnr.wi.gov/forestry/publications/pdf/FR-388.pdf

Maintaining Soil Quality in Woodlands - A Lake States Field Guide – 2008 (PUB FR-409) http://dnr.wi.gov/forestry/publications/pdf/FR-409.pdf

APPENDIX E

Ashland County Agricultural Performance Standards and Animal Waste Ordinance Summary

Ashland County implements all of the NR 151 Performance Standards and Prohibitions as identified in the administrative code: https://docs.legis.wisconsin.gov/code/admin_code/nr/100/151.

ASHLAND COUNTY

AGRICULTURAL PERFORMANCE STANDARDS AND ANIMAL WASTE STORAGE ORDINANCE

This ordinance was approved by the Ashland County Board of Supervisors on September 20, 2018.

Subchapter I – Introduction

Subchapter II – Administration
1.20 Delegation of Authority
1.21 Administrative Duties
1.22 Inspection Authority
1.23 Enforcement Authority

Subchapter III – Agricultural Performance Standards and Prohibitions
1.30 Activities Subject to Agricultural State Performance Standards and Prohibitions
1.31 Performance Standards and Prohibitions
1.32 Cost-sharing required
1.33 Implementation and Enforcement Procedures for Cropland Performance Standards
1.34 Implementation and Enforcement Procedures for Livestock Performance Standards and Prohibitions

Subchapter IV – Manure Storage and Transfer Permits
1.40 Permits Required and Permit Fees
1.41 Exception to Permit Requirement
1.42 Manure Storage Facility Construction Plan and Nutrient Management Plan Required
1.43 Manure Storage Closure Plan Required
1.44 Unconfined Manure Stacking Permit Required
1.45 Manure Spray Irrigation Permit Required
1.46 Permit Standards
1.47 Review of Application
1.48 Permit Approval Conditions, Permit Expiration, and Permit Revocation

Subchapter V – Variances, Enforcement, and Appeals
1.50 Variances
1.51 Violations and Enforcement
1.52 Appeals

Subchapter I – Introduction

1.01 Authority. This section is adopted under authority granted by ATCP 50.56 Wisconsin Administrative Code; and Sections 50.56, 59.01-59.04, 59.54, 59.69, 59.70, 66.0113, 92.07, 92.09, 92.15, and 92.16 Wisconsin Statutes.

1.02 Title. The "Ashland County Agricultural Performance Standards and Animal Waste Storage Ordinance."

1.03 Findings and Declaration of Policy.

(1) The Ashland County Board of Supervisors recognizes the importance of protecting ground and surface water resources and finds that proper management of agricultural practices contributes to the protection of: ground and surface waters; public health; plant, animal, and aquatic life; tourism; and property tax base of Ashland County.

(2) The Ashland County Board of Supervisors recognizes that water quality and other benefits specified in 1.03(1) will be enhanced by implementing the performance standards and prohibitions of NR 151.

(3) The Ashland County Board of Supervisors recognizes the importance of agricultural activities to the social, economic, historic, and cultural significance and subsistence of Ashland County residents and transients.

(4) The residents of Ashland County have the right to implement agricultural activities on the land surface, so long as these activities are implemented in a responsible manner so as not to adversely affect ground and surface waters; public health; and plant, animal, and aquatic life of Ashland County.

(5) The citizens of Ashland County have the right to implement agricultural practices and shall not have nuisance actions brought against them unless the agricultural practice is a substantial threat to public health or safety.

(6) The dominant aim of this ordinance is to promote the public health, safety, convenience and general welfare of Ashland County residents and transients.

1.04 Purpose. This Ordinance establishes the right to farm responsibly and implements the Agricultural Performance Standards and Prohibitions in NR 151 Wis. Admin. Code and Animal Waste Storage Ordinance.

Subchapter II – Administration.

1.20 Delegation of Authority. The Ashland County Board of Supervisors hereby designates the Land and Water Conservation Department (LWCD) as the permitting and enforcement authority. This delegation may be modified.

1.21 Administration. The provisions of this Ordinance shall be administered by the LWCD under the direction of the County Conservationist and oversight of the Land Conservation Committee.

1.22 Entry and Inspection Authority.

1.23 Enforcement Authority.

Subchapter III – Agricultural Performance Standards and Prohibitions

1.30 Activities Subject to Agricultural Performance Standards and Prohibitions.

(1) CROPPED LANDS.

(2) LIVESTOCK OPERATION.

(3) MANURE HANDLING, STORAGE AND APPLICATION.

(4) APPLICATIONS OF MANURE, COMMERCIAL FERTILIZERS AND OTHER NUTRIENTS TO AGRICULTURAL LANDS.

1.31 Performance Standards and Prohibitions.

(1) SHEET, RILL AND WIND EROSION.

(2) MANURE STORAGE FACILITIES.

(3) CLEAN WATER DIVERSIONS

(4) NUTRIENT MANAGEMENT

(5) MANURE MANAGEMENT PROHIBITIONS.

(6) TILLAGE SETBACK PERFORMANCE STANDARD

(7) PHOSPHORUS INDEX PERFORMANCE STANDARD

(8) PROCESS WASTEWATER HANDLING.

1.32 Cost-Sharing Required

An owner or operator of an agricultural facility or practice that is in existence before October 1, 2002, may not be required to comply with the performance standards, prohibitions, conservation practices or technical standards under this ordinance unless cost-sharing is available from any source, to the owner or operator.

1.33 Implementation and Enforcement Procedures for Cropland Performance Standards.

(1) LANDOWNER AND OPERATOR REQUIREMENTS.

(2) LAND AND WATER CONSERVATION DEPARTMENT (LWCD) DETERMINATIONS.

(3) NOTIFICATION REQUIREMENTS AND COMPLIANCE PERIODS FOR EXISTING CROPLANDS WHEN COST-SHARING IS REQUIRED.

(4) NOTIFICATION REQUIREMENTS AND COMPLIANCE PERIODS FOR EXISTING CROPLANDS IN SITUATIONS WHEN NO ELIGIBLE COSTS ARE INVOLVED.

1.34 Implementation and Enforcement Procedures for Livestock Performance Standards and Prohibitions.

(1) LIVESTOCK OWNER AND OPERATOR REQUIREMENTS.

(2) LAND AND WATER CONSERVATION DEPARTMENT (LWCD) DETERMINATIONS.

(3) NOTIFICATION REQUIREMENTS AND COMPLIANCE PERIODS FOR EXISTING LIVESTOCK FACILITIES WHEN COST-SHARING IS REQUIRED.

(4) NOTIFICATION REQUIREMENTS AND COMPLIANCE PERIODS FOR EXISTING LIVESTOCK FACILITIES IN SITUATIONS WHEN NO ELIGIBLE COSTS ARE INVOLVED.

Subchapter IV – Manure Storage and Transfer Permits

1.40 Permits Required and Permit Fees

1.41 Exception to Permit Requirement.

1.42 Manure Storage Facility Construction Plan and Nutrient Management Plan Required.

1.43 Manure Storage Closure or Converted Use Plan Required.

1.44 Unconfined Manure Stacking Permit and Nutrient Management Plan Required.

1.45 Manure Spray Irrigation Permit and Nutrient Management Plan Required.

1.46 Permit Standards

1.47 Review of Application.

1.48 Permit Approval Conditions, Permit Expiration, and Permit Revocation.

Subchapter V – Variances, Enforcement, and Appeals

APPENDIX F

ATCP 50 Cost Share Practices

The following table lists all conservation practices currently listed in Chapter ATCP 50 and the funding source for the installation of the practice or activity. Ashland County cost shares on all ATCP 50 practices.

Practice	ATCP 50 Code	Funding Source	Units
Manure storage systems	50.62	Bonding	#
Manure storage closure	50.63	Bonding	#
Barnyard runoff control systems	50.64	Bonding	#
Access road	50.65	Bonding	Linear Ft.
Trails and walkways	50.66	Bonding	Linear Ft.
Contour farming	50.67	GPR	Acres
Cover crop	50.68	GPR	Acres
Critical area stabilization	50.69	Bonding	#
Diversions	50.70	Bonding	Linear Ft.
Feed storage runoff control systems	50.705	Bonding	#
Field windbreaks	50.71	Bonding	Linear Ft.
Filter strips	50.72	Bonding	Acres
Grade stabilization structures	50.73	Bonding	#
Heavy use area protection	50.74	Bonding	Acres
Livestock fencing	50.75	Bonding	Linear Ft.
Livestock watering facilities	50.76	Bonding	#
Milking center waste control systems	50.77	Bonding	#
Nutrient management	50.78	GPR	Acres
Pesticide management	50.79	GPR	#
Prescribed grazing	50.80		
Relocating or abandoning animal feeding operations	50.81	Bonding	#
Residue management	50.82	GPR	Acres
Riparian buffers	50.83		
Roofs	50.84	Bonding	#
Roof runoff systems	50.85	Bonding	#
Sediment basins	50.86	Bonding	#
Sinkhole treatment	50.87	Bonding	#
Streambank and shoreline protection	50.88	Bonding	Linear Ft.
Stream crossing	50.885	Bonding	Linear Ft.
Strip-cropping	50.89	GPR	Acres
Subsurface drains	50.90	Bonding	#
Terrace systems	50.91	Bonding	Linear Ft.
Underground outlet	50.92	Bonding	#
Waste transfer systems	50.93	Bonding	#
Wastewater treatment strips	50.94	Bonding	Linear Ft.
Water and sediment control basins	50.95	Bonding	#
Waterway systems	50.96	Bonding	Acres
Well decommissioning	50.97	Bonding	#
Wetland restoration	50.98	Bonding	Acres

APPENDIX G

Commonly Used Acronyms

Commonly Used Acronyms

BIA	Bureau of Indian Affairs
BMP	Best Management Practice
CNNF	Chequamegon-Nicolet National Forest
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
DATCP	Wisconsin Department of Agriculture, Trade & Consumer Protection
DNR	(Wisconsin) Department of Natural Resources
EQIP	Environmental Quality Incentives Program (USDA-NRCS)
EPA	U.S. Environmental Protection Agency
FPP	Wisconsin Farmland Preservation Program
FSA	Farm Service Agency (USDA)
GIS	Geographic Information System
GLIFWC	Great Lakes Indian Fish & Wildlife Commission
GLNAC	Great Lakes Nonpoint Abatement Coalition
GMU	Geographic Management Unit
HEL	Highly Erodible Land
I&E	Information and Education
IRMP	Integrated Resource Management Plan
LAC	Local Advisory Committee
LCC	Land and Water Conservation Committee
LWCB	Land and Water Conservation Board
LWCD	Land and Water Conservation Department
LWRMP	Land & Water Resource Management Plan
NACD	National Association of Conservation Districts
NERR	National Estuarine Research Reserve
NMP	Nutrient Management Plan
NRCS	Natural Resources Conservation Service
NWLCA	Northwest Land Conservation Association
ORW/ERW	Outstanding/Exceptional Resource Waters
SIP	Stewardship Incentive Program
SOC	Standard Oversights Council
SWRM	Soil & Water Resource Management (DATCP)
USFWS	United States Fish and Wildlife Service
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWEX	University of Wisconsin-Extension
WDNR	Wisconsin Department of Natural Resources
WEEB	Wisconsin Environmental Education Board
WGNHS	Wisconsin Geological and Natural History Survey
WHIP	Wildlife Habitat Incentives Program (NRCS)
WLWCA	Wisconsin Land and Water Conservation Association
WPDES	Wisconsin Pollutant Discharge Elimination System
WRP	Wetland Reserve Program