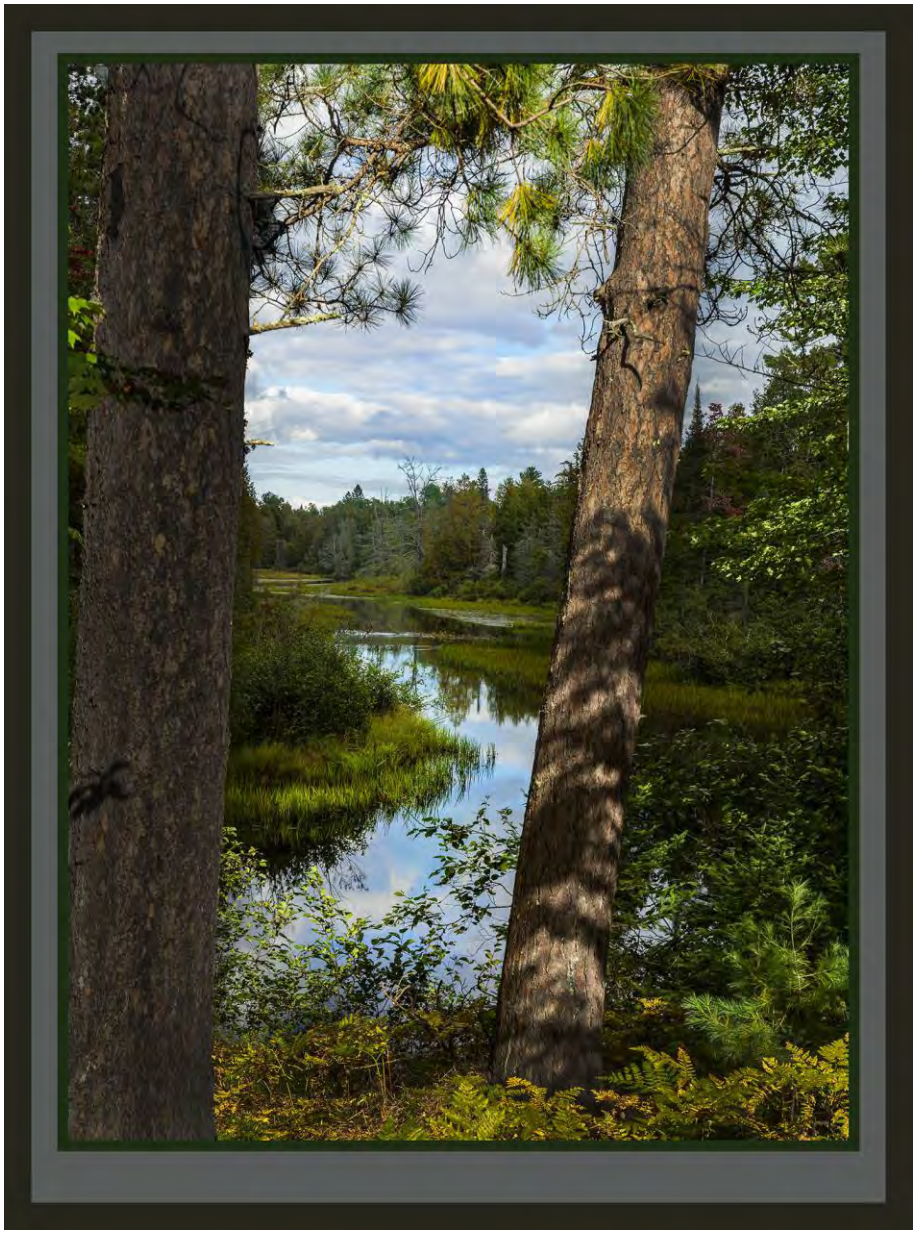
Vilas County
Land and Water Resource Management Plan
2025 – 2034



Final – November 2024

Vilas County
Land and Water
Resource Management Plan
2025-2034

Plan prepared by:

Vilas County
Land and Water Conservation Department,
and
North Central Wisconsin Regional Planning Commission

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PLAN SUMMARY

The Vilas County Land and Water Resource Management Plan is drafted as a 10-year plan (2025-2034) with an included Work Plan in accordance with the requirements set forth in Chapter 92 of the Wisconsin Statutes.

Plan Development

To assist in the revision of the land and water resource management plan, Vilas County Land and Water Conservation invited participants from a variety of resource protection agencies, lake groups, and interested citizens to discuss and prioritize conservation concerns – the *Local Advisory Committee* (LAC).

The LAC's **February 1, 2024** meeting included current resource assessments and concerns unique to Vilas County. Participants were then working in small groups to 1) identify the overarching goal topics to focus on, 2) prioritize the top 3 goal topics, 3) prioritized workload options, and 4) determined how to address identified vulnerabilities.

The LAC's **September 5, 2024** meeting started with extensive review the draft resource assessment section & maps, then the group prioritized the goals, and discussed imperative objectives and activities for the county to accomplish in the next 5 years.

In **September and October**, the revised draft assessment chapters were emailed to LAC members and Vilas County Land & Water Conservation Committee members for additional review and comments; work plan was sent to DATCP for review.

The **November 14, 2024** public hearing on the plan was noticed in the official newspaper. (**Appendix A**)

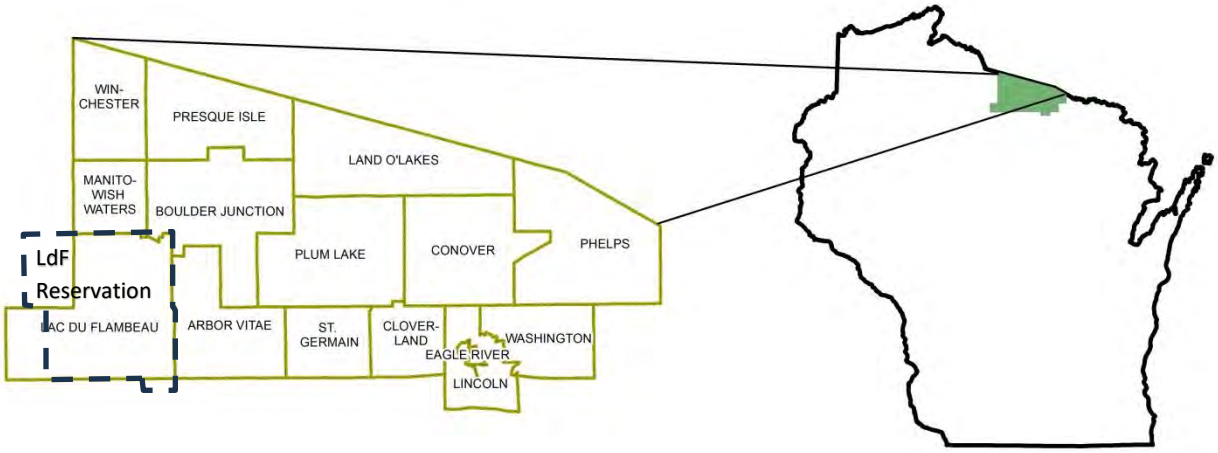
December 3, 2024 – Presentation of Plan to the Wisconsin Land and Water Conservation Board.

December 2024 – DATCP sends letter adopting the plan following LWCB recommendations.

December 2024 – Adoption of the plan by the Vilas County Board of Supervisors.

Vilas County

Vilas County is in northern Wisconsin along the Wisconsin/Michigan border.



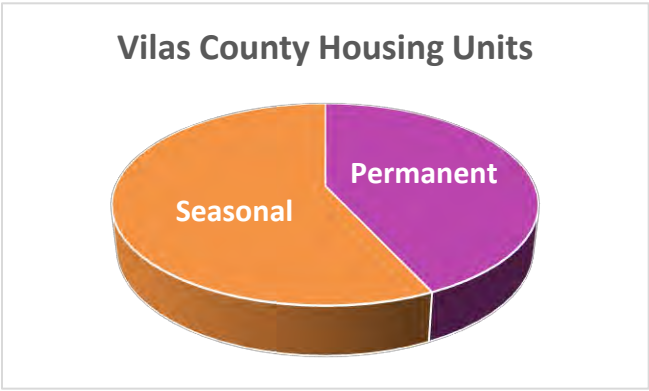
The Northern Highlands ecological landscape includes Vilas County. Studded with thousands of mostly small kettle lakes, this area epitomizes the image of "Up North." This enormous concentration of lakes is a result of the pitted outwash plain left by glaciers and is believed to be the third highest concentration of lakes in the world.

Table 1 Vilas County Land Use

Land Use	2009	2023
Agriculture	0.7%	0.7%
Commercial/Business	0.5%	0.6%
Industrial (includes quarries)	0.3%	0.2%
Government/Institutional	0.2%	0.2%
Open Lands	0.3%	0.2%
Outdoor Recreation	0.3%	0.3%
Residential	5.7%	5.8%
Transportation	1.0%	1.0%
Woodlands	76.2%	76.1%
Water	14.9%	14.9%

Source: WROC & NCWRPC 2009 & 2020

Development pressure in this ecological landscape is intense along lake shores and rivers. There are now more than 13,500 seasonal homes in Vilas County (ACS 2020), the overwhelming majority of which are located along lakes and flowages. Many seasonal homes continue to be converted to year-round residences as their owners retire and permanently move here. New permanent and seasonal homes are being built too. Both trends are projected to continue.



Land use in the uplands is largely oriented towards timber and pulp production. Public and private forests cover about 77% of the county. Forested and open wetlands cover about 18% of the county. Some of the wetlands around Manitowish Waters are used for cranberry production.

Vilas County's median age is 55.3 years. About 86% of the population is European, with about 9% Lac du Flambeau native; about 2.5% Latino; with the remainder a mix.

Natural Resources and their Management in Vilas County

The **soil** types in Vilas County are primarily sandy and loamy which are well suited to forest uses. Due to the sandy and droughty nature of the soil, most are of relatively low agricultural value; in addition, the growing season in the county is short.

Most **agricultural production** in the County consists of forage crops, oats, potatoes, and cranberry bogs. The short growing season limits cropping. Some farms have begun selling their crops directly to consumers through community supported agriculture.

Performance Standards and Enforcement

Soil Erosion from cropland is not a major source of pollution in Vilas County since so little of the county is farmed. However, erosion from many other cumulative sources around the county are considered and addressed in the work plan. Technical assistance to various focus groups, surface water protection, and educational outreach to the public are important components of the county conservation program.

A voluntary educational approach will continue to be used to achieve agricultural erosion control standards in Vilas County. One on one contact with landowners, farmers, and hobbyists who request technical assistance is the most common method used to promote soil conservation in Vilas County.

For the **priority farm strategy**, a general educational approach to providing information to all farmers will occur as part of Goals 1 and 3 in the new work plan (Chapter 6). If a farm has a significant water quality problem, we will work with the landowner to bring them into compliance.

The primary emphasis of the **cost-share program** in Vilas County continues to be implementation of shoreland stabilization practices and restoration of native vegetation to reestablish riparian buffer areas, and to reduce soil erosion by installing erosion control practices. Healthy buffer zones reduce nonpoint source pollution and impede soil erosion.

Land disturbance activities that are subject to stormwater management and erosion control are outlined under **Non-Agricultural Performance Standards** in Chapter 7. A landowner who is out of compliance with State performance standards and prohibitions and refuses technical and financial assistance from the LWCD will be notified by mail that they are subject to enforcement action if they choose not to work with us voluntarily.

Forestry

Vilas County is characterized by well-developed secondary growth forests with a mixture of hardwoods and conifer stands, covering 76% of the County. About half of the forestland in Vilas County is publicly owned; see **Map 2–Land Management**. Vilas County Forestry Department requires that all foresters conducting county forest harvests use Best Management Practices to harvest timber responsibly. The county forest is independently certified as sustainable by Sustainable Forestry Initiative® (SFI®).

Terrestrial Invasive Species

Not all terrestrial plants classified in Wisconsin as invasive pose the same environmental or economic threat to all regions of the state. Some are of great concern in agricultural areas while of lower priority in areas dominated

by woodlands and wetlands, and vice versa. The Wisconsin Headwaters Invasives Partnership (WHIP), serving Vilas and Oneida Counties, places highest priority for early detection monitoring and rapid response management on species classified as "Prohibited," which are those species that are not yet well established, and early detection could enable effective control. Of secondary priority to WHIP are plants classified as "Regulated," which are well established and beyond hope of managing in many areas of Wisconsin, but not yet common within the WHIP region. Detecting those species along roadsides and other areas where they are likely to first appear will present opportunities to slow or stop their advance locally.

Lakes and Rivers

The headwaters of three major river systems are in Vilas County. Brule, Elvoy, and Kentuck Creeks drain about 10% of the county into the Brule and Menomonee Rivers (the border of WI & MI), which empty into Lake Michigan. The Wisconsin River and its tributaries drain about 40% of the county. Bear R., Manitowish R., and Turtle R., and Amber Creek also drain about 40% of the county into the Flambeau River, which empties into the Mississippi River. Presque Isle River and Tenderfoot Creek drain about 10% of the county into Lake Superior. **See Map 6 – Basins & Watersheds.**

Eight natural lake reservoirs exist, and their volume is controlled by the Wisconsin Valley Improvement Company (WVIC). These reservoirs are Lac Vieux Desert, Twin Lakes, Buckatabon, Long-on-Deerskin (Long Lake and Sand Lake), Little Deerskin, Lower Nine Mile, Little St. Germain, and Big St. Germain. The total acreage of these reservoirs is 14,872 acres. The WVIC stores water in reservoirs during wet periods, and releases water when it is dry to maintain uniform water flow in the Wisconsin River for hydroelectric purposes.

In 2021, the DNR's Water Quality Program launched the Healthy Watersheds, High-Quality Waters (HWHQW) initiative (now known as The Wonderful Waters of Wisconsin). This new focus on the "healthiest" waterbodies and watersheds is intended to celebrate these treasures and draw attention to the ecological, financial and societal benefits of protecting clean water.

High-Quality Waters in Vilas County *(See **Appendix F** for a full list)* include:

- 123 High-Quality lakes, rivers, and streams
- 14 Healthy Wetlands
- 16 Rare & Unique Wetlands

As of 2024, there are 92 lake associations in Vilas County and 13 lake districts. These organizations work to protect and restore the lakes and to educate their membership about how to keep the waterbodies healthy.

Aquatic Invasive Species

The aquatic invasive species program in Vilas County has evolved to concentrate efforts in three areas:

1. Public awareness and prevention
2. Early detection presence/absence monitoring, particularly for species that can be managed.
3. Effective management of manageable species (plants)

Details about the AIS efforts in Vilas County can be found in Chapter 4.

Impaired Waters [303(d) Waters]

Waters in Vilas County are 303(d) impaired due to:

1) mercury, which is deposited from the atmosphere – 12 lakes;
2) total phosphorus, from non-point sources – 5 lakes; and
3) unknown pollutant – 2 lakes.

See **Map 7–Designated Waters** for all the current impaired waters countywide. See a list of these waters in **Appendix H**.

Outstanding and Exceptional Resource Waters

- Outstanding resource waters (ORW) in Vilas County include 13 lakes; 17 creeks and springs; and 5 rivers.
- Exceptional resource waters (ERW) in Vilas County include 3 lakes; 23 creeks and springs; and 3 rivers.

See **Map 7–Designated Waters** for all the ORWs and ERWs countywide.

Groundwater

The groundwater in Vilas County is generally of good quality and is the primary source of drinking water for most residents here. The county is susceptible to groundwater contamination in most areas due to the predominance of sandy soil and shallow depth to groundwater. See **Map 4–Groundwater Contamination Susceptibility.** Local differences in groundwater quality are the result of the composition, solubility, and surface of the soil and rock through which the water moves, and the length of time that the water is in contact with these materials.

2018-2024 Workplan Accomplishments

Accomplishments and activities completed from the 2018-2024 Vilas County workplan are discussed in Chapter 2. Knowing what has been completed or needs more attention helps us to determine what actions or activities to include or expand on in future workplans. Land & Water Conservation accomplishments are very listed here in the following categories: Information and Education; Civic Action; Special Projects; Best Management Practices; Grants and Funding; and Coordination and Administration.

INFORMATION & EDUCATION

Youth Education; Public Outreach; Presentations; Professional Development; and Special Professional Recognition

CIVIC ACTION

Formation of Lake Districts; Actions by County Board Resolution; Public Representation and Committee Participation

SPECIAL PROJECTS

Lake Assessment; Northwoods Businesses for Clean Waters; Rice Creek Watershed Protection Planning

BEST MANAGEMENT PRACTICES

Cost-Share Conservation Projects; Healthy Lakes BMP Projects; Point-Intercept Macrophyte Surveys; AIS CB/CW and Decontamination Programs

GRANTS & FUNDING
Staffing DATCP; SWRM Implementation DATCP; Surface Water Grants WDNR; Wildlife Damage and Abatement

COORDINATION & ADMINISTRATION
Partnerships; Sponsorships; Administration Actions

New 2025-2029 Work Plan

Our mission to protect the county's natural communities from degradation will be implemented through the following work plan over the course of a five-year period, from 2025-2029.

The goals are listed in order of priority as determined by the Vilas County Land and Water Committee/ Department in partnership with recommendations from the *Local Advisory Committee*. For more information and a complete listing of objectives and planning actions, refer to Chapter 6.

Goal 1: Increase Conservation Knowledge, Skills, and Stewardship Activity

Goal 2: Monitor and Protect Surface Water Resources

Goal 3: Monitor, Manage, and Protect Upland Resources

Goal 4: Monitor and Protect Groundwater Resources

Goal 5: Protect the County's Resources with Planned Strategies

Tools, Education, Regulation, and Evaluation

There are a few new management tools that conservation professionals can utilize for planning and phosphorus modeling purposes. The Vilas County Land & Water Conservation Department plan to use these tools extensively in the future. They are: The Wonderful Water of Wisconsin, and the SWMM Modeling Tool. During the next few years, we will be working on a few proposed projects that align with our vision of protecting the natural resources of the county. We hope to use cost-share dollars to properly abandon wells and will seek funding to do some strategic groundwater monitoring. We are planning to partner with UW-Trout Lake staff to conduct research about how lakes may be affected by climate change. We will also continue to work on AIS and TIS prevention projects throughout the county.

Educating the public will continue to be an important component of the Vilas County Conservation programming in the years ahead. The programs and topics of education can be found in detail under Goal 1 of the new workplan (Chapter 6).

Vilas County offers priority reimbursement cost-share funding to landowners to help offset the total cost of implementing practices on the land that move them toward compliance with the set **agricultural performance standards and prohibitions under NR 151**. Vilas County has very few agricultural producers, but there are several small hobby farms, seed potato fields, and cranberry farming operations that reside here. Because of the county's large number of lakes and streams, these operators likely reside within water quality management areas (WQMA). Farmer education will continue to be the primary tool used to achieve erosion control standards in the county. We will place effort toward meeting **non-ag performance standards** by continuing a beach

monitoring program in partnership with the Public Health Department that will close public beaches in response to environmental concerns such as high bacterial counts. Land disturbance activities such as construction erosion control or controlling stormwater runoff will be other ways that Vilas County will employ to control sediment and meet the standards. The standards and prohibitions are listed in **Appendix C.**

If a site is identified within the county that needs practice implementation because it is located near a WQMA, and the landowner has not voluntarily contacted the Land & Water Conservation Department, the County Conservationist will send a letter to the landowner informing them of the issues and their options to come into compliance with the state standards. If the landowner chooses not to move ahead with any practice implementation activity within 6 months of the first letter, a second letter to the landowner will be sent and copied to the county Corporation Counsel. If no activity commences within 3 months of the second letter, then Vilas County will communicate with DNR about enforcement action.

An annual **assessment of progress** to implement the Land and Water Resource Management will be monitored by the County Conservationist and the Conservation Committee. Improvement to quantify accomplishments were made during this revision, however, there are still in instances of longer-term activities or programs that do not dictate a means to measure numerically (On-Going or As-Needed), activity progress will be measured by a qualifying means in these cases.

As required within the operation and maintenance portion of the contract agreement signed between a landowner and Vilas County, a landowner must maintain installed practices for a minimum of ten years following project completion and distribution of reimbursement funding. Conservation staff evaluate the land conditions for each site (pre and post project install), along with the DATCP Conservation Engineer. This formal evaluation of practices installed assures us that our designed plans were adhered to during construction and that WI Construction Specifications were followed. Following BMP installation, the site goes on our list for conducting random compliance checks within 10 years of project completion.

Coordination

The LWCD staff seeks cooperation from and works closely with a diverse group of agencies, associations, and organizations involved in resource management and protection in Vilas County. Each agency, organization, association, and individual have its individual resource issues, programs, and plans; but cooperatively we can work together for the greater good of Vilas County's land and water resources.

INTRODUCTION
Chapter 1

1.1 Purpose

The Wisconsin Legislature created Chapter 92 in the State Statutes because the soil resources of this state are being depleted by wind and water erosion and that the waters of this state are being polluted by nonpoint sources of pollution. The legislature further finds that these are statewide problems endangering the health and welfare of the state's citizens, its recreational resources, agricultural productivity and industrial base. (92.02 Wis. Stats.)

Chapter 92 has clearly defined roles and responsibilities. The Department of Agriculture, Trade and Consumer Protection (DATCP) has the primary responsibility to set state conservation program policy. County land and water conservation committees (LWCC's), through their respective land and water conservation departments, have primary responsibility for implementation of conservation programs within their jurisdiction. Both DATCP and county land and water conservation committees have joint responsibility to develop and administer the conservation programs. Chapter ATCP 50 (the Soil and Water Resource Management Administrative Rule) further articulates land and water resources management planning program roles and responsibilities.

As part of the partnership created by Chapter 92 between the Department of Agriculture, Trade and Consumer Protection (DATCP), the Land and Water Conservation Board (LWCB), and the various county Land & Water Conservation Committees (LWCCs), each county is to develop a 10-year land and water resource management plan. A locally-led planning process gives counties greater responsibility in the overall provision of conservation programs within their boundaries.

The development of this document provides Vilas County with guidance to address the natural resource needs of the county over the next ten years. It also provides an opportunity for Vilas County to further develop and expand coordination with other partners and agencies involved in resource management to accomplish the goals and objectives identified in the plan.

1.2 Plan Development

To assist in the update of the Land and Water Resource Management Plan, Vilas County Land and Water Conservation invited participants from a wide variety of resource protection agencies, interested citizens, and lake groups to discuss and prioritize conservation concerns. A *Local Advisory Committee* (LAC) was assembled and met on two occasions in 2024. Representatives from a wide variety of backgrounds and agencies participated in the meetings. Membership of the LAC was comprised of interested citizens; lake organizations; town lake committees; county personnel from the Mapping, Zoning, and Land & Water Conservation Departments; county board supervisors; partners from Lumberjack Resource Conservation & Development (RC&D), the WI Headwaters Invasives Partnership (WHIP), and the Northwoods Land Trust; staff from North

Central Regional Planning Commission (NCWRPC); several state personnel from the WI Department of Natural Resources (WDNR) and researchers from UW Trout Lake Station; staff from the WI Land + Water Association; and federal personnel from Natural Resource Conservation Service (NRCS).

The first advisory committee meeting took place on **February 1, 2024,** at the Vilas County Courthouse in Eagle River, and lasted 4 hours. There were 26 people in attendance. After the group introductions, the LAC became familiar with the specific activities and programs offered to the public by the Vilas County Conservation Department, followed by a thorough explanation of the purpose and planning processes for updating the Land & Water Resource Management Plan (LWRMP). Next, the committee was briefed on the *current* Resource Assessment and Resource Concerns unique to Vilas County, and they reviewed the workplan goals and activities. During the presentations, the members were free to ask questions which generated relevant conversation about the next plan update. To get everyone's voices heard and encourage full participation, the full group was broken out into 4 sub-groups to discuss a series of 7 questions. The questions were designed to get them thinking about differences in our resources today versus 10 years ago; climate change challenges; and what goals might be added, expanded, or removed.

The 4 sub-group discussion results are combined and summarized as follows:

1) Identify 5-9 overarching goals –
   Climate Change, Educate the Public, Surface Water, Groundwater, Invasive Species, Shoreland Protection, Wetlands Protection, Maintain Healthy Forests, Promote Stewardship, Promote Natural Infrastructure, build natural resource resilience, Promote, Protect, Restore, Coordinate, Educate, Monitor, Soils, Habitat Connectivity

2) Prioritize top 3 goals –
   a) Shoreland Protection, Education, Climate Change
   b) Protect Surface Water and Groundwater, Maintain Healthy Forest, Promote Stewardship
   c) Protect Natural Resources, Promote Natural Resources, Manage Natural Resources
   d) Promote, Protect, Coordinate

3) Which choice is best for the county to work on – work with individual groups OR watershed-based work
   a) Both – pick only 1-3 watersheds, then with individual groups
   b) Individual Groups
   c) Both
   d) Watershed-based work

4) How is/will climate change affect VILAS County?
   Weather extremes, forest fires, water level issues, water use increase, population increase, Economy changes, increased development, climate "refugees" will move north

5) How should VILAS County incorporate climate resiliency?
   Protect Everything, Use NIACS tools, address climate issues in each goal, address green and built infrastructure

6) Should Vilas County create a manure storage ordinance?
   Yes; Maybe – it's good to be proactive; No, should be looking at potato farms nutrient management planning; No, look at septage spreading nutrients instead

7) How should we address our vulnerabilities?
   Educate, Manage for climate change by keeping resources resilient, keep looking for funding

Input from the sub-groups were noted, and the concerns were then sorted and summarized into the following goals. Many of the issues and concerns were similar to the older plan, with a few changes. The most notable of those differences were the addition of climate change resiliency and nutrient management programming, the removal of a defined invasive species goal, and the need to protect high quality watersheds and surface waters throughout the county.

Preliminary goals were drafted for the current revision to address the resource concerns that were identified:

Goal: Increase natural resource knowledge, skills, & stewardship opportunities for citizens and staff
Goal: Monitor, manage & protect surface water resources
Goal: Monitor, manage & protect land and water from invasive species
Goal: Monitor & protect groundwater resources
Goal: Protect the county's natural resources with planned strategies

The LAC (16 participants) met again on **September 5, 2024** for 3.5 hours to review the draft resource assessment (including maps) section of the new document, to prioritize the goals and think about imperative objectives and activities for the county to accomplish in the next 5 years. After some excellent discussion with the smaller group size, the committee suggested that the goals be adjusted and prioritized as follows:

Goal 1: Increase conservation knowledge, skills, and stewardship activity
Goal 2: Monitor and protect surface water resources
Goal 3: Monitor, manage, and protect upland resources
Goal 4: Monitor and protect groundwater resources
Goal 5: Protect the county's resources with planned strategies

The LAC gave excellent direction to the staff with additional ideas to include as activities within the new plan. Below are the somewhat different activities that were **added** specifically for the current revision:

- Decrease climate change vulnerability of the county by placing resiliency activities throughout all the goals. We will also develop a lake classification system centered around climate vulnerability. Adaptation strategies identified during the classification project will be shared statewide so that other counties can utilize them for climate resilience.
- Re-invigorate the Department website. Create training videos or modules for the public to ease the "in-person" training workload for staff.
- Shift thinking patterns from individual waterbodies to watersheds and whole watershed management. This activity would include initiating the start-up of watershed protection groups (similar to Farmer-led groups in other parts of the state). It would also include completing HUC 12 protection-based management plans.

- Review annual reports from nutrient management plan participants. Vilas County had never had participants in the program prior to 2024.
- Expand the collection of tools that we can lend out for the publics' use. This will help expand stewardship opportunities to more volunteers.
- Expand stream monitoring data collections throughout the county (including advanced nutrient data).
- Begin testing for PFAS contamination near waste dump sites

The Land and Water Conservation Committee placed a Class I notice in the *Vilas County News Review* and held a **public hearing** at the Vilas County courthouse in Eagle River on **November 14, 2024** at 9:00 a.m. The hearing was held specifically to solicit public feedback and comments on the draft 5-year work plan and the 10-year draft plan document. In addition to the Committee and staff members, 4 people were present at the hearing for a total attendance of 12.

The County Conservationist presented a summary of the revised 2025-2034 LWRMP. As part of the presentation, a few new elements that are set in the 5-year workplan were discussed. One LCC member had a question about how the groundwater monitoring program will be conducted in the department. The LCC Chair commented that collaborations between county departments are improving efficiencies for both partners. Overall, those attending the public hearing had positive comments on the revised plan. There were no written comments received. The public hearing was closed at 9:28 am.

Based on the commentary received at the public hearing, and the comments after the hearing from Land and Water Conservation staff members, the following changes were made to the Work Plan or overall draft plan:

a. Make minor spelling corrections to all the maps.
b. More extensive corrections need to occur on the Land Use map.
c. Five-year budget estimates need correcting in Chapter 6.
d. The Department Mission statement should be added to the front pages of the plan.
e. Map and Appendix reference numbers need to be corrected throughout the written text.
f. All references to the word *Phragmites* should be italicized.
g. Take the Soil Plan waiver out of the Appendix section and delete the waiver reference from Chapter 7.

1.3 Related Plans

Plan summaries that affect land and water resource management in Vilas County are referenced below:

Vilas County Comprehensive Plan, 2023

This plan is a local government's guide to a community's physical, social, and economic development. Comprehensive plans are not meant to serve as land use regulations in themselves; instead, they provide a rational basis for local land use decisions with a twenty-year horizon for future planning and community decisions.

In the Land Use Chapter, see the Existing Land Use Map and Future Land Use Map for where a variety of land uses (e.g., housing, commercial, industrial, woodland, agriculture, and transportation) currently exist and where they are projected to exist over the next 10-years.

Vilas County Forest Comprehensive Land Use Plan, 2021–2035

This plan is a management guide for the Vilas County Forest and is updated every fifteen years. The mission of the plan is to manage and protect natural resources within the county forest on a sustainable basis for the ecological, economic, educational, recreational, and research needs of present and future residents throughout the county. The report includes a number of recommendations for timber management, wildlife habitat and game management, land acquisition and forest boundary management, biodiversity management, watershed management and tourism.

Chapter 100 notes that the Vilas County Forest follows standards of the Forest Stewardship Council® (FSC®) and the Sustainable Forestry Initiative® (SFI®) by approval of the County Board of Supervisors.

Forest certification ensures that forest products come from responsibly managed forests that provide environmental, social and economic benefits. Forest certification has forest management standards which covers key values such as protection of biodiversity, species at risk and wildlife habitat; sustainable harvest levels; protection of water quality; and prompt regeneration. The Vilas County Forest is part of the Wisconsin County Forest Certification Group and is audited as part of that group.

Chapter 600 is all about conservation and protection of the forest resources. The objective is to conserve, manage and protect the trees and resources of the forest from preventable losses resulting from fire, insects, diseases and other destructive elements including those caused by wildlife and people. Protective methods shall include proactive management through silvicultural methods, mechanical treatments and controls, chemical treatments, biological controls, proper planning, regulation establishment and regulation enforcement. Subjects include fire control; forest pests & pathogens management; a whole list of about 25 invasive species and how to control each one; wildlife damage; and human impacts, which includes forest fragmentation, harvesting forest products, recreation development and trails, roads and access, unauthorized use of the forest.

Annually, the County Forestry Department creates a county forest work plan, that includes a desired future forest condition, timber management strategies, county forest road maintenance, land boundary certification work progress, wildlife conservation maintenance and improvement, recreation incorporation per the outdoor recreation plan, trails program administration that includes trails for snowmobiles, ATVs, and OHMs; and an analysis of staffing, budget levels, and facilities analysis.

Vilas County Farmland Preservation Plan, 2015

This plan inventories and analyzes the agriculture related resources of Langlade County including components such as farmland, utilities infrastructure, communications and land use. It describes programs available to help maintain and preserve productive farmland and woodlands. This plan also discusses the importance of the agriculture industry to the local economy. It establishes the goal of promoting working forests and farms, and includes a number of objectives and policies to meet this goal, as well as criteria for designating farmland preservation areas.

Vilas County Forest Comprehensive Land Use Plan, 2021–2035

This plan is a management guide for the Vilas County Forest and is updated every fifteen years. The mission of management on the Vilas County Forest is to utilize, improve and maintain the ability of forest lands to produce timber and income from timber products while maintaining and increasing outdoor recreational opportunities for residents and visitors to Vilas County. Maintenance of forest health and active forest management will provide sustained yield of traditional and special forest products, provide for expanded areas for recreational uses of many types and maintain the natural processes for ecosystem services.

The Plan describes the forest resources, management practices, control of invasive species and wildlife damage, fire control, and recreation facility management.

Wisconsin River TMDL for Phosphorus, 2019

Several reservoir lakes and tributaries in the Wisconsin River Basin are 303(d) impaired by excessive phosphorus nutrient loading. As a result, a comprehensive study of the Wisconsin River Basin (WRB) was initiated by the Wisconsin Department of Natural Resources (WDNR) that has now culminated in the development of a plan to improve the water quality of the river, its impoundments, and tributaries. The water quality improvement study and plan will be undertaken in the form of development and implementation of a Total Maximum Daily Load (TMDL).Total Maximum Daily Load (TMDL).Total Maximum Daily Load (TMDL).

The Total Maximum Daily Load (TMDL) study provides a strategic framework and prioritize resources for water quality improvement in the Wisconsin River Basin. The Wisconsin River TMDL study area spans Wisconsin's central corridor from the headwaters in Vilas County to Lake Wisconsin in Columbia County, covering 9,156 square miles (approximately 15 percent of the state).

About half of Vilas County (50%) is within the Wisconsin River watershed, and therefore covered by the Wisconsin River TMDL.

Healthy Watersheds, High-Quality Waters (HWHQW) Action Plan, 2022

To draw attention to the state's finest waterbodies, the DNR's Water Quality Program has launched a Healthy Watersheds, High-Quality Waters (HWHQW) initiative. This new focus on the "already healthy" waterbodies and watersheds – or land area draining to a lake, stream or wetland – is intended to celebrate these treasures and draw attention to the ecological, financial and societal benefits of protecting clean water.

A guiding principle of the HWHQW Action Plan is that watershed scale protection is essential for high-quality waters to thrive. Tasked with answering the big question of “where are the healthy waters of Wisconsin,” a DNR Healthy Waters Team completed a peer-reviewed modeling and assessment project. Predictive modeling is necessary because Wisconsin’s tremendous amount of water resources makes it nearly impossible – both in time and cost – to directly monitor everything. The data and information generated provides a foundation for planning, implementing and evaluating the Plan.

ACCOMPLISHMENTS 2018-2024
Chapter 2

This section summarizes a variety of accomplishments (not all) and activities completed from 2018-2024 Vilas County Workplan to date. The Land and Water Conservation Department and Land Conservation Committee accomplishments are described here in the following categories: Information and Education, Civic Action, Best Management Practices, Grants and Funding, Coordination and Administration. The categories are then further defined to describe specific elements.

2.1 Information and Education

Through the dedication of county conservation staff and our committee, Vilas County Land and Water Conservation has earned a first-class reputation both locally and statewide for our knowledge, commitment, and innovation in conservation, especially in lake and watershed management. Our information and education programs have been vital in earning the respect and admiration of our peers, volunteers, and the groups we work with every day. Information and education have a strong presence in all our annual workplans. The information shared below summarizes most activities that the Land and Water Conservation staff have accomplished in educating youth of all ages, increasing public awareness and increasing our own professional capacities over the past 7 years.

<u>Youth Education</u>

- We have developed a robust education program for youth. Annually, we sponsored local youth conservation awareness poster contests at the elementary & middle school levels. Our students have won various competitions from both regional and statewide poster contests;
- A staff member from Vilas County actively serves on (and Chairs) the WI Land + Water Youth Education Committee for the last several years. They have worked to improve contest logistics, and have worked with area schoolteachers to make sure the educational programs meet state school standards in several categories.
- Three of the regional school districts and several teachers asked us for assistance in completing environmental programming:
  -Elementary aged students (K-5) have received programs in AIS management and prevention, and have been out in the field learning about lake ecology;
  -Middle school aged students (6-8) have enjoyed programs in stream ecology, AIS identification and management, and water quality testing;
  -High School students (9-12) have received information about lake ecology, AIS biology, prevention, and management. We've coordinated field studies (complete with pontoon classrooms) to create hands-on learning opportunities for students to see how lake managers collect scientific data. We have coordinated a field experience for the students to rear *Galerucella* beetles and manage local populations of invasive purple loosestrife.

Public Outreach

- We seek out the local media (radio, television, newspapers) to attend or do stories about our programs and as another opportunity to reach the public with conservation messages.
- Completed and distributed a targeted informational brochure to all Producers in the county that describes the Land & Water Conservation Department, our staff, and what we offer in services to assist them.
- Each month, we reach out to an email distribution list of approximately 300 recipients in a Constant Contact message. The monthly message contains a variety of news and updates in the Conservation program in Vilas County. We advertise state and local programs, up-coming presentations and workshops, and other relevant conservation-related news we want people to know about.

Presentations

- We have awakened members of the general public, lake organizations, county board members, and our professional peers about the detrimental ecological effects of enhanced surf wakes in our lakes.
- Combined staff have prepared and delivered Powerpoint presentations to lake groups, delivered various professional peer presentations at state conventions, workshops, and lakes fairs on a wide variety of conservation subject matter; including but not limited to: the cost-share program, Forest & wildlife management programs, lake water quality testing and the details about the Vilas County Lakes Assessment project, shoreland buffers and restoration, AIS chemical treatment and research reports, soil erosion control, rain gardens, the Healthy Lakes program, native aquatic and terrestrial plants, aquatic plant management, comprehensive lake management planning, lake grant programs, recreational use patterns and conflict resolution, how to form a "qualified" lake association or district, how to form a town lakes committee, invasive terrestrial plant identification, ets.

Professional Development

We believe that it is essential for personal professional growth, development, and improvement that individuals attend and participate in on-going educational opportunities that are significant to their perspective department positions. Professional development and on-going opportunities for learning allow our staff to stay up-to-date and informed on current issues in conservation, and thus, relay this information to others. Our staff and elected LCC members have participated in (and/or have been active members of planning committees for) the annual statewide WI Lakes Convention, the annual WLWCA Conference, Lake District Commissioner training, Lake Leaders Institute, Aquatic Plant Identification refresher workshops, Vilas Visions Leadership programs, *Clean Boats / Clean Waters* workshops, AIS Coordinator meetings, regional invasive species conferences, quarterly County Conservationist meetings, and quarterly Lakes Partnership meetings.

Special Professional Recognition

Cathy Higley, Vilas County Lake Specialist was recognized by Wisconsin Land + Water in 2024 with an Award as an Outstanding Youth Educator for her continued strong dedication to local and regional youth in learning about and observing the natural world. They are the Conservationists of the future!

2.2 Civic Action

Vilas County Conservation has been active in the democratic processes of the county and state when issues of concern over the health of natural resources, matters concerning the county LWRM goals are being threatened in some way, or for efforts brought to us from lake organizations. The information outlined below gives an overview of some of the actions that the county has taken.

Formation of Lake Districts

The petitioning process that occurs at the county level for the formation of lake organizations falls to the Land and Water Conservation staff and LCC. There is a timed and formal process under Wis. Stat. Chapter 33, that the county needs to follow to see it through completion. During 2021 and 2022, staff was busy meeting with two lake associations that wanted to form lake districts. By 2022, both the Twin Placid (LDF), and Upper and Lower Buckatabon (Conover) lake groups were ready to petition the county to form. The Upper and Lower Buckatabon Lakes Protection and Rehabilitation District was formed at the September, 2022 county board meeting. The Twin Placid Lake District was formed at the November, 2022 county board meeting.

Actions by County Board Resolution

The Land and Water Conservation Committee has moved several resolutions to the full county board for consideration. Resolutions adopted were as follows:

2017: Annual DATCP Grant Funding Application 2018; Boat Decontamination Program Support; AIS Monitoring Project

2018: Annual DATCP Grant Funding Application 2019; 2019 Culvert Inventory Project

2019: Annual DATCP Grant Funding Application 2020; Grant Support for Vilas County Lakes & Shorelands Project; Vilas County Lake Assessments Project 2019 – 2021; 2019 Healthy Lakes Projects

2020: Annual DATCP Grant Funding Application 2021; 2020 AIS Strategic Plan Implementation Grant; AIS Strategic Plan Implementation – Request to Hire a Limited Term Employee; Grant Support – Watershed Protection Planning (Phase 1); 2020 Healthy Lake Projects; Healthy Lakes Projects 2021; Healthy Lakes Fish Habitat Project 2022; Lake Monitoring & Protection Network 2021

2021: Annual DATCP Grant Funding Application 2022; Creation of a Watershed Program Specialist LTE Position; 2022 Road Crossing Inventories; Support for Healthy Lakes Projects 2022-2023; Lake Monitoring & Protection Network 2022

2022: Annual DATCP Grant Funding Application 2023; Approval of the Upper & Lower Buckatabon Lakes Protection and Rehabilitation District Petition; Approval of the Twin Placid Lake District Petition; Lake Monitoring & Protection Network 2023

2023: Annual DATCP Grant Funding Application 2024; Strategic Lake Protection 2024-2026; Support for Healthy Lakes Projects 2024-2025; Boat Decontamination Program 2024; Lake Monitoring & Protection Network 2024; Amendment of Standing Rules and Committee Duties for Vilas County

2024: Annual DATCP Grant Funding Application 2025; Grant Support – AIS Educational Materials 2025; Boat Decontamination Program 2025; Lake Monitoring & Protection Network 2025; Support for commitment of state funds to complete dredging on the Deerskin River; Support of Conservation Easements for two privately-owned Legacy Forests; Support for Effective Regulations that Protect Surface Waters

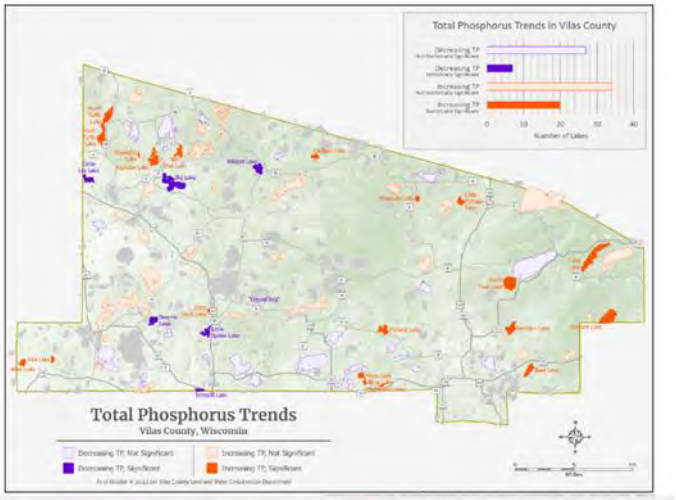
Public Representation and Committee Participation

Vilas County continues to support and hold membership in our regional and state associations – North Central Land & Water Conservation Association and Wisconsin Land + Water Conservation, and the County Conservationist served on the Board of Directors of WI Land + Water from 2012-2024 and Wisconsin Lakes Association from 2014-2019. The Lake Conservation Specialist serves on the WI Land + Water Conservation Youth Education Committee from 2019-present, and the Conservation Specialist has served for the WHIP Steering Committee 2017-2024, the WICCI Rare Plants & Communities Group and assisted Migration Tool 2020-2024, and AITCOM 2021-2024.

Elected Land Conservation Committee members further serve as county-appointed representatives on the lake district commissioner boards of Alma-Moon, Big St. Germain, Buckatabon, Cisco-Chain, Little Arbor Vitae, Little St. Germain, Little Tamarack, Long L., Lost L., N&S Twin Lakes, Twin Placid Lake, Spectacle Lake, and Stella Lakes.

A. Special Projects

Over and above our regular programming, we undertake special types of projects that help us better understand the resources in our county. Here are just three examples of those types of projects we completed over the last few years.



Lakes Assessment

In 2021-2022, Land & Water staff were able to clean and standardize a large water quality dataset from Vilas County waterbodies collected by professionals and trained citizen volunteers going back to 1971. Total phosphorus, chlorophyll *a*, total Kjeldahl nitrogen, alkalinity, calcium, magnesium, and color were included parameters. Data was analyzed using linear regression to determine statistically significant trends and were mapped as appropriate (left). Data comparisons were made relating to lake types (drainage or seepage lakes, etc.), watersheds within Vilas County (HUC 12), and decades where possible. Overall, more lakes showed statistically significant trends of degradation vs. statistically significant trends of improving; county-wide data shows a trend of degradation; and the degradation was statistically significant in the 2010-2019 decade.

Northwoods Business for Clean Waters

This partnership includes Vilas County Land & Water, Vilas County Lakes & Rivers Association, Oneida County Lakes & Rivers Association, Oneida County Land & Water Conservation, the Lac du Flambeau Tribe, and the North Lakeland Discovery Center who maintains a long-term ally program for those local businesses that want to create and implement surface water conservation goals. The program goals are to maintain water quality, prevent aquatic invasive species spread, improving shoreland habitat, and manage stormwater. Examples of some of the completed projects include rain garden installations at a campground, a Doc & Lift company that requires his employees to get trained in AIS prevention and decontamination techniques, installation of native buffer plantings at a local marina, or even businesses that are interested in creating surface water conservation plans!

Rice Creek Watershed Protection Planning

Vilas County Land & Water Staff analyzed erosion data collected by volunteers and professionals within the Rice Creek watershed (HUC 12), which encompasses Big Lake, Round Lake, Wolf Lake Little Crooked Lake, Big Crooked Lake, and Wildcat Lakes in Presque Isle and Boulder Junction townships. An protection management implementation report was prepared in 2024, with the goal of protecting surface water quality in this area.

B. Best Management Practices

Vilas County provides technical assistance in a variety of ways to citizens of Vilas County. Examples of technical assistance and projects offered to the public from 2018-2024 are outlined below.

Cost-Share Conservation Projects

From 2018-2024, we provided technical plans and cost-share assistance to an estimated 16 landowners and implemented conservation projects in the amount of approximately $ 204,155. During a typical summer in Vilas County, when the tourist season is at its peak, our office receives an estimated 5 requests per week for information about numerous conservation topics such as aquatic invasive species identification and management, to questions about cost-share assistance, to freshwater algae identification or water quality training requests. Best efforts were made to consider and respond to the public's requests in a timely fashion in the form of telephone follow-ups, email responses, or direct conversations with walk-in traffic.

2018: we installed 3 practices (2, 50.88 Shoreline Protection, and 1, 50.69 Critical Area Stabilization), for a Cost Share of $22,698 and a total cost of $53,337.

2019: We installed 3 practices (2, 50.88 Shoreline Protection, and 1 50.885 Stream Crossing) for a Cost Share of $21,974 and a total cost of $42,504.

2020: Covid 19 pandemic slowed our processes down. We installed 1 practice (1, 50.88 Shoreline Protection), at a Cost Share of $7,500 and a total cost of $21,600.

2021: We installed 5 practices (4, 50.88 Shoreline Protection, 1, 50.885 Stream Crossing, and 1, 50.97 Well Decommission), for a Cost Share of $33,350 and a total cost of $78,661.

2022: We installed 4 practices (3, 50.88 Shoreline Protection, and 1, 50.70 Diversion), for a Cost Share of $33,743 and a total cost of $73,989.

2023: We installed 5 practices (4, 50.88 Shoreline Protection, and 1, 50.97 Well Decommission), for a Cost Share of $25,748 and a total cost of $69,312. We also had our first request from a landowner for assistance with Nutrient Management. LWCD applied for $1,776 in SEG funding and signed a Cost Share contract with the landowner. We are also working with these landowners on other practices (Grazing Plan) in 2024.

2024: We are currently working to complete 4 practices (3, 50.88 Shoreline Protection, and develop 1, 50.78 Nutrient Mngt Plan)

Healthy Lakes BMP Projects

Funding is partially provided by a grant through WI DNR, and the landowners pay for the remainder of the costs. Projects are limited to Fish Sticks Habitat (cluster of tree drops anchored to shore), Native Plantings, Infiltration Pits/Trenches, Water Diversions, and Rain Gardens. These projects keep excess nutrients such as phosphorus and sediments out of surface water and provide habitat for fish and wildlife using the shores. Between 2017 and 2024, Vilas County implemented 45 best management practices for landowners broken down as follows:

2017-2020: 3 Native Shoreland Plantings, 5 Rock Infiltration, 4 Water Diversion, 3 Raingarden
2021: 1 Native Shoreland Planting, 1 Water Diversion
2022: 3 Fish Habitat, 3 Rock Infiltration
2023: 3 Fish Habitat, 3 Rock Infiltration
2024: 1 Raingarden, 7 Native Shoreland Plantings, 8 Fish Habitat

Point-Intercept Macrophyte Surveys

Why has this topic been placed under the best management practices section? For good reason. The purpose we have started a consistent program of monitoring the counties lakes, especially for aquatic macrophytes, settles into the category of AIS prevention, because of the efficiency these completed surveys create for a lake group IF they should find themselves in a position of dealing with a new AIS on their lake. To move forward with any kind of AIS management action, the state requires a lake group to conduct a baseline monitoring survey of the entire lake ecosystem. This requirement typically puts the group behind by a whole year of management effort to rid the problematic population. Vilas County conducted surveys on 8 lakes from 2018-2024. By conducting these surveys proactively, ahead of an AIS infestation, the lake group can be set up for a successful program of AIS management (a whole year sooner) should they find themselves in that position.

AIS Clean Boats/Clean Waters (CB/CW) and Decontamination Programs

CB/CW: Land & Water Staff trained and re-trained 413 volunteers and paid workers between 2017-2020 to inspect watercraft (CBCW) and educate boaters on aquatic invasive species prevention. These training efforts, along with some help from the Discovery Center, Lac du Flambeau Tribe, and the Forest Lake Association helped see 61,827 hours of boat inspections logged; 86,709 watercraft inspected; and 156,587 boaters contacted. 2021: helped see 14,369 hours of boat inspections logged; 24,184 watercrafts inspected; and 48,409 boaters contacted in Vilas County. 2022: helped see 14,595 hours of boat inspections logged; 25,209 watercrafts inspected; and 46,416 boaters contacted in Vilas County. 2023: 13,748 hours of boat inspections logged; 27,995 watercrafts inspected; and 42,516 boaters contacted in Vilas County.

Decontamination: Starting in 2017, Vilas County Land & Water Conservation partnered with UW-Oshkosh's Environmental Research & Innovation Center and WI DNR to build a voluntary boat decontamination program. The goal of this

program is to slow the spread of the invasive spiny waterflea, by cleaning boats off with a hot water pressure washer at strategic boat landings. This program has been successful and we now seek grant funding and 1 limited term summer employee on an annual basis to prevent further spread of this zooplankton.

2.3 Grants and Funding

Vilas County did well in securing grant funding for purposes of implementing the goals and objectives outlined in the 2018-2024 work plan. Below is a breakdown of the monies that were secured and administered through the Land and Water Conservation Department only. It does not include the grant dollars secured by individual lake organizations, local municipalities, and tribal government to accomplish various lake management and aquatic invasive species management and prevention projects.

- $ 898,499 in Staffing Support from DATCP
- $ 204,155 in SWRM Implementation from DATCP
- $ 343,555 in Surface Water Grants from WDNR
- $ 121,212 in support of the WDNR Wildlife Damage and Abatement Program

2.4 Coordination and Administration

In the past 7 years, the Conservation Department has put in considerable administrative time and effort to make progress on the annual workplans, and ultimately the LWRMP. Land and Water Conservation staff provide the community leadership that is necessary to pull together activities, partnerships, grant funding, projects, and logistics that ultimately complete actions so that the workplan goals are met. Here, we outline a few examples.

Partnerships

The County Conservation Department has led the process to initiate, coordinate, and establish a partnership with the North Lakeland Discovery Center to share grant funding through the LMPN program; provided assistance as needed to 8 Town Lakes Committees; initiated legislative actions that have led to significant changes in the state's AIS legislation; have partnered with NCWRPC on the revision of the Forest Comprehensive Plan and the revision of the current LWRMP; initiated a partnership with UW-Oshkosh to continue an AIS decontamination program; and have initiated the expansion of the Clean Boats Clean Water Program in partnership with the Eagle River Chain of Lakes Association.

Sponsorships

On an annual basis, the Department has sponsored students for participation in the annual youth conservation awareness poster contest, we provide funding to one high school student each year to attend the Youth Conservation Camp held one week per year in Vilas County, and we have offered teachers an annual stipend to take an environmental course to earn credits toward their continuing education.

Administration

Staff has been effective in administration of DATCP programs such as timely submittal of annual SWRM grant applications, annual reimbursements for staffing/support/SWRM funding, annual DATCP workplans and accomplishment reports, development of the annual Department budget for the county; Department bill payments and invoicing, monthly budget reconciliation, creation of county board resolutions for conservation projects and budgets, all contract paperwork for LWRM plan implementation projects; WDNR grant project proposals and project closeout reports, administering grant logs for time and money spent; annual audit of grant revenues and expenses, financial administration of the Wildlife Damage and Abatement Program, LWRM plan 5-year revisions, 10-year LWRMP revision, human resource management duties and annual evaluations.

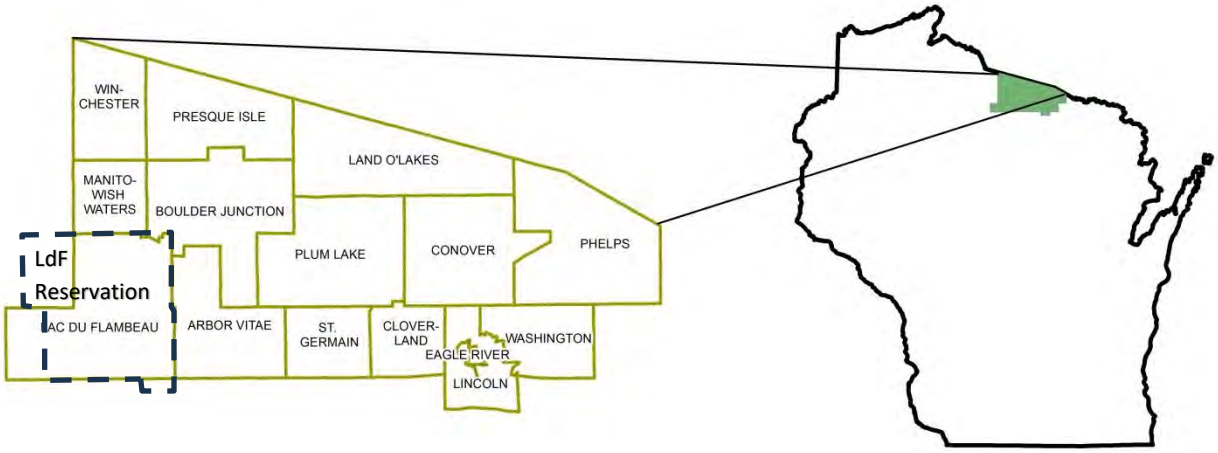
VILAS COUNTY DESCRIPTION AND TRENDS
Chapter 3

This section paints a picture of Vilas County. Social and economic demographics identify who lives here, the high amount of seasonal housing, and what drives the local economy. All of Vilas County's natural resources were developed in a particular climate in northern Wisconsin. Glacial activity created the physiography, geology and soils of the natural resource base that continues to take shape today.

3.1 Location and Geography

Vilas County is located in northern Wisconsin (**Figure 1**) and is bound by Upper Michigan to the north, Forest County to the east, Oneida County to the south, and Iron and Price Counties to the west. The County is approximately 650,886 acres in size, of which about 85% is land, and about 15% is water. Public and private forests cover about 76% of the County.

Figure 1 **Vilas County**



The Northern Highlands ecological landscape includes Vilas County. Studded with thousands of mostly small kettle lakes, this area epitomizes the image of "Up North." This enormous concentration of lakes is a result of the pitted outwash plain left by glaciers and is believed to be the third highest concentration of lakes in the world. (Wisconsin Land Legacy Report)

The area's other key characteristic is its forests. White and red pines, once forming the largest pine forests in the state, dominated the uplands. By the early 1900s, these great forests were largely harvested to feed the mills supplying wood to cities further south. Aspen and other trees common to earlier succession forests are now common in many areas. Significant stands of older hemlock-hardwood forest occur in several parts of this ecological landscape. (Wisconsin Land Legacy Report)

Development pressure in this ecological landscape is intense and focused along lake shores and rivers. There are now more than 12,600 seasonal homes in Vilas County (U.S. Census 2020), the overwhelming majority of which are located along lakes and flowages. Many are being converted to year-round residences. Land use in the uplands is largely oriented towards timber and pulp production. Recreation is also important and contributes significantly to the local economy. Some of the wetlands around Manitowish Waters are used for cranberry production. (Wisconsin Land Legacy Report)

3.2 Land Use

Vilas County is characterized by well developed forests and its abundance of lakes and streams. The total surface area in the County is 650,886 acres, of which 76% is forested, about 15% is water, almost 6% is residential, less than 1% of the County is agricultural lands, and the remaining 2% of the land is developed land uses (commercial, industrial, governmental, outdoor recreation & transportation) as shown in Table 1 and on **Map 1– Existing Land Use**.

Table 1 land use percentages are from the 2009 and 2023 Vilas County Comprehensive Plans. Only percentages are used, because of inconsistent data analysis between the two plans making acreage comparisons inaccurate.

A general description of each land use classification follows:

Table 1 Vilas County Land Use

Land Use	2009	2023
Agriculture	0.7%	0.7%
Commercial/Business	0.5%	0.6%
Industrial (includes quarries)	0.3%	0.2%
Government/Institutional	0.2%	0.2%
Open Lands	0.3%	0.2%
Outdoor Recreation	0.3%	0.3%
Residential	5.7%	5.8%
Transportation	1.0%	1.0%
Woodlands	76.2%	76.1%
Water	14.9%	14.9%

Source: WROC & NCWRPC 2009 & 2020

Agriculture – general crop farming or the raising of livestock, and cranberry operations.

Commercial/Business – Commercial uses include hotels, motels, and resorts; commercial developments located along highways, such as gas/service stations, gift shops, restaurants, grocery stores, medical facilities, banks, and others. There is concentrated commercial in the form of local downtown areas.

Industrial – The majority (70%) of industrial uses in the county consist of active and abandoned gravel pits. Other industrial uses include factories of all types and sizes.

Government/Institutional – Such uses are comprised of lands used for public or private schools, cemeteries, active and closed landfill sites, transfer stations/recycling sites, public facility and service buildings (e.g., municipal buildings, community centers), houses of worship, and provision of community utilities and services such as power, gas, and telephone. In addition, religious camps and scout camps are included here.

Open Lands – Open lands are areas that have no development and are clear of large concentrations of trees, such as open wetlands or fallow farm fields.

Outdoor Recreation – private and public lands that are developed as parks, golf courses, or recreational areas. This does not include the vast resources of land and outdoor recreation found in the Nicolet and Chequamegon National Forest, the Northern Highland-American Legion State Forest, or the Vilas County Forest.

Residential – Residential uses are split into four categories: single family, single family with business, two-family residential, and multifamily residential.

Transportation – roadways and airports. No railroad facilities are located in Vilas County. Various colored map lines overlay these corridors for local wayfinding.

Woodlands – forested lands are also called woodlands.

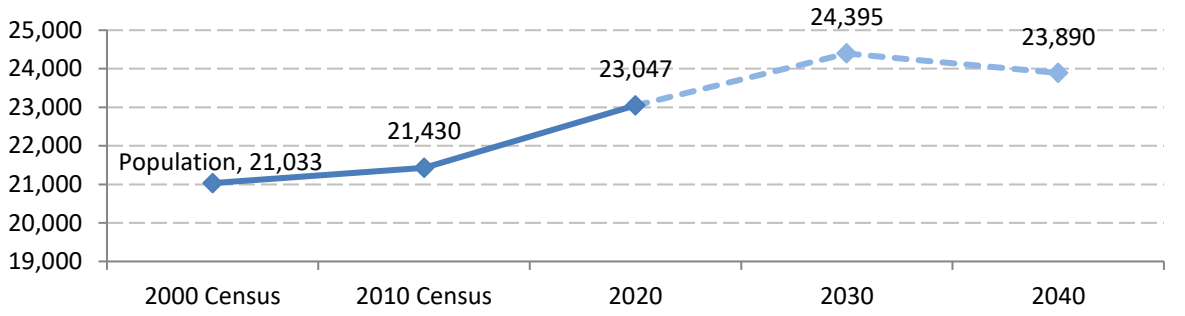
Water – all lakes, rivers, and streams.

3.3 Demographics

A. Population

The 2020 Census population of Vilas County is 20,047 people. This 2020 Census number shows an increase of about 1,617 people since the 2010 Census, as shown in **Figure 2**. In 2013, the Wisconsin Department of Administration projected that Vilas County would continue growing in population through 2030. The 2020 Census number shows that those 2013 projections are still accurate. The population of Vilas County is expected to continue to grow through 2030, and then begin declining in population.

Figure 2: Vilas County Population Change



Source: U.S. Census (2000, 2010, & 2020)
Wisconsin Department of Administration, 2013 projections.

The Office of Economic Advisors (OEA) within the Wisconsin Department of Workforce Development creates countywide workforce profiles that include some demographic data. In 2021, OEA provided the following population perspective:

> Population change can be broken down into two components: net migration and natural increase. Net migration, which is defined as people moving into the county minus those leaving, came in at a rate of 7%, considerably higher than both the statewide rate (.3%) and the nationwide rate (2.7%). Natural increase, which is defined as births minus deaths, came in at a rate of -5.4%, far below the statewide rate (2.7%) and nationwide rate (4%).

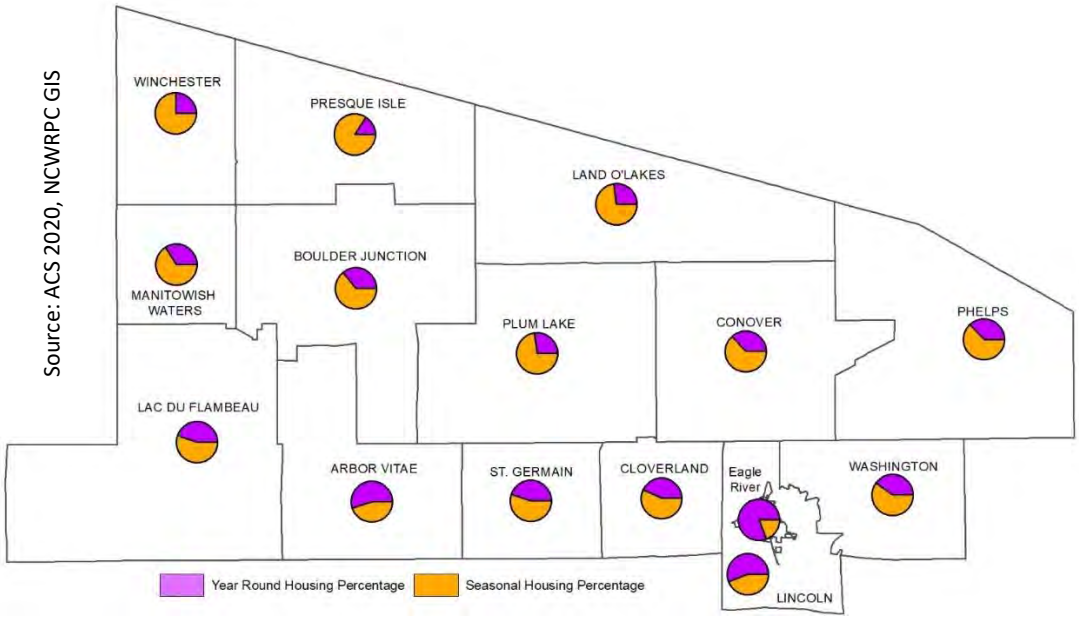
B. Housing

Vilas County has a larger proportion of vacant housing than Wisconsin or the United States. Much of this vacant housing is seasonal, recreational, and occasional use housing (see **Figure 3**). In the 2020 Decennial Census, Vilas County had 24,486 housing units, and about 58% of that housing was vacant for seasonal, recreational, or occasional use, compared to approximately 7.1% in Wisconsin and 4.0% in the United States. Only three municipalities have more year-round housing than seasonal housing—the City of Eagle River, and the Towns of Arbor Vitae and Lincoln.

The towns with high proportions of seasonal housing will have greater fluctuations in population throughout the year.

The trend since the 1980s has been for seasonal home owners to retire in Vilas County, thus becoming permanent residents in their former "cottages." New permanent and seasonal homes are being built too. Both of these trends are projected to continue. Since 2017 Wisconsin Act 59 was enacted (which prohibits local governments from restricting the rental of single family homes for a term of seven days or more) then seasonal dwellings are being purchased and used as lodging facilities. So, seasonal homes in Vilas County are converting to full-time use either by seasonal owners becoming permanent residents or owners renting their seasonal homes out whenever they can.

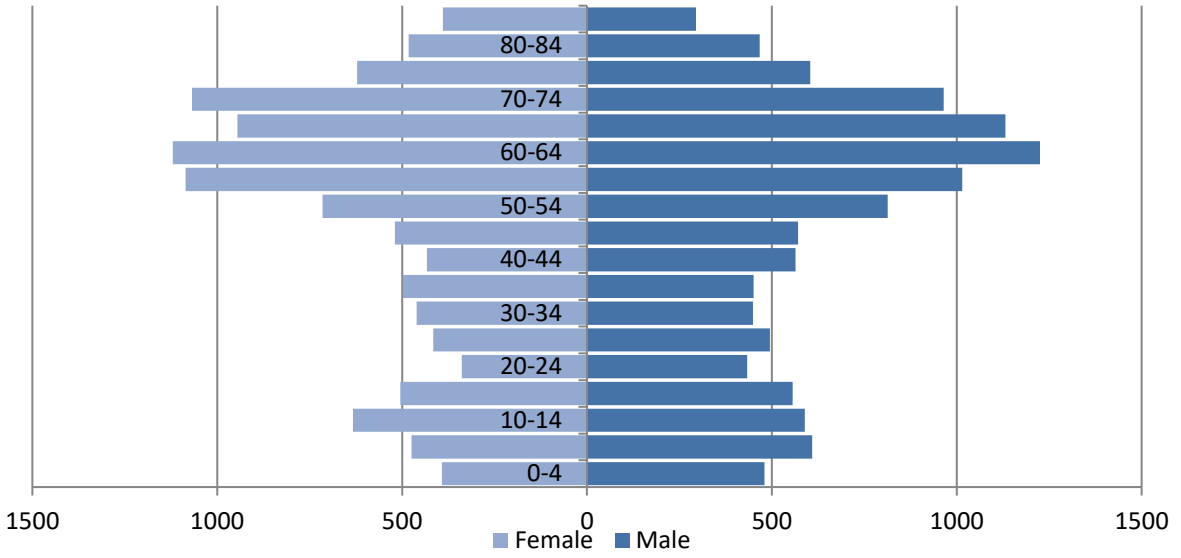
Figure 3: Permanent and Seasonal Housing, 2020



C. Age

The median age of Vilas County in 2020 was 55.1 years old, while Wisconsin was 39.6. The median age has increased in both Vilas County and Wisconsin between 2010 and 2020, from 49.8 to 38.1 years old, respectively. It is evident that the median age in Vilas County has grown faster than the state. **Figure 4** shows the 2020 age distribution in Vilas County. The age distribution in Vilas County is concentrated in the 55-75 year old age groups. The most heavily concentrated age groups are very near to the typical retirement age, which will likely have a greater use of medical services and restaurant/bars.

Figure 4: Vilas County 2020 Age Pyramid



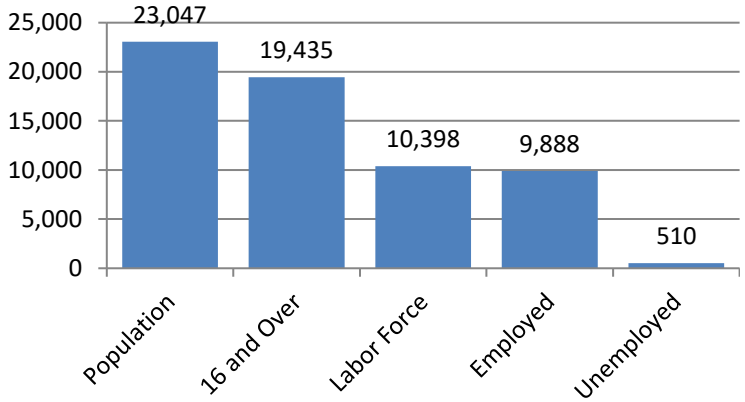
Source: ACS 5-year Estimates, 2020

D. Ethnic Background

The people of Vilas County mostly identify as white, at approximately 85.5% of people, per the 2020 Decennial Census. About 9.8% identify as Native American, and about 0.3% each identify as either African American or Asian, with about 4.2% identifying as some combination of races.

E. Employment and Economy

Figure 5: Vilas County Employment (2021)



Source: 2021 ACS 5-Year

According to the 2021 ACS 5-year estimates, Vilas County has 19,435 people aged 16 and over, 53.3% of which are in the labor force, e.g., actively working or seeking work. See **Figure 5**. The labor force participation rate for Wisconsin as a whole is 65.1%, significantly higher than Vilas County. The unemployment rate in Vilas County in 2021 was 2.6%, which is only slightly higher than 2.3% in the state and lower than the 3.9% in the United States.

Even though much of the recent attention on the labor market has focused on the difficulty employers face with finding and retaining workers, it is important to remember that some of those pressures were building up well before the pandemic – and will likely persist for a long time afterward. One important labor market measure, called the labor force participation rate (LFPR), looks at the relative labor resources available and is expressed as the percentage of the civilian noninstitutional population 16 years and older that is working or actively looking for work. This rate faces downward pressure anytime there is an aging population. Vilas County's LFPR has been trending steadily downward since 2000 when

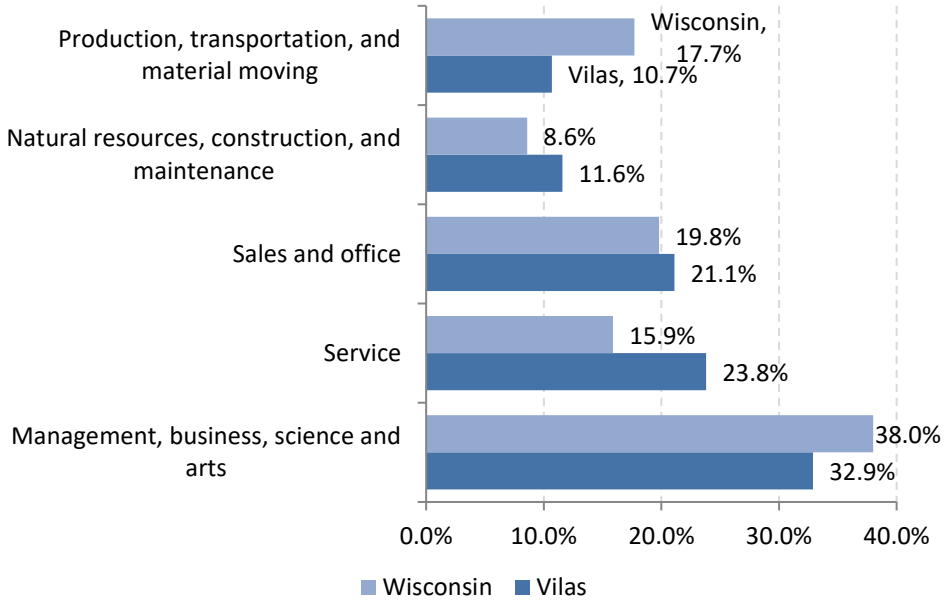
the oldest members of the Baby Boomer generation were in the latest stages of their prime working years (see **Figure 6**). The local LFPR was 64.3% in 2000 and has diminished to 55.3% in 2020. (OEA, 2021)

Figure 6: Labor Force Participation Rate

Source: WI DWD, Office of Economic Advisors (OEA), Vilas County

As shown in **Figure 7**, most residents of Vilas County are employed in Management, business, science and arts occupations at 32.9%; Service occupations at 23.8%; Sales and Office occupations at 21.1%.

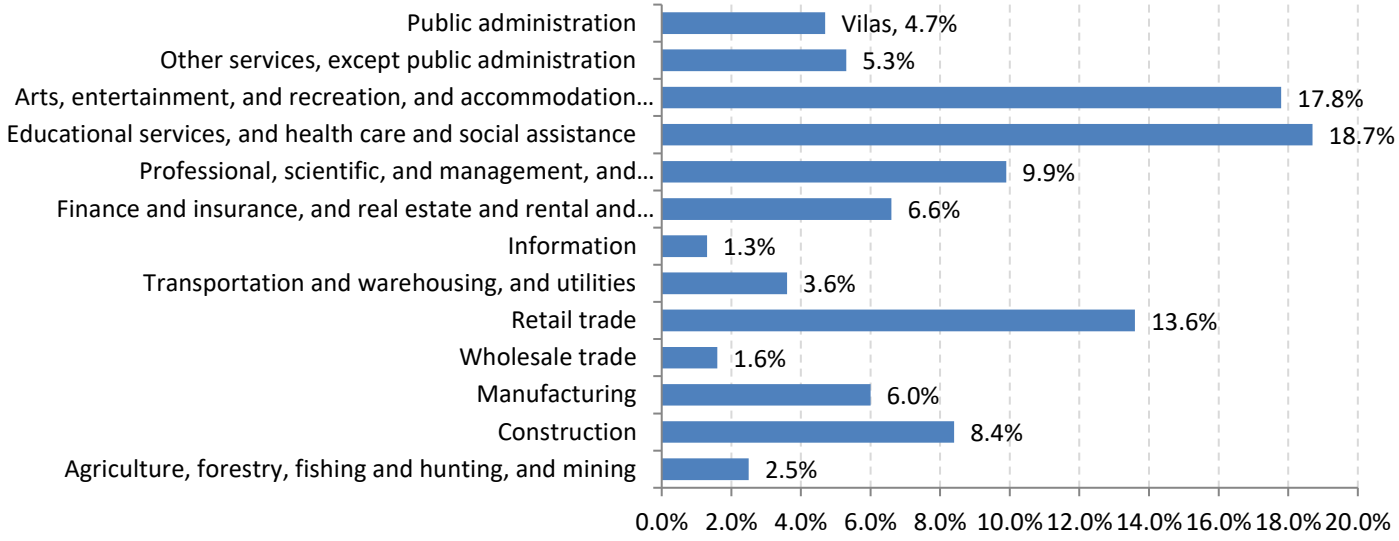
Figure 7: Vilas County Resident Occupation



Source: 2021 ACS 5-Year

The most common industry for Vilas County residents is Education services, health care and social assistance at 18.7%, followed by the Arts, entertainment industry at 17.8%, and then the Retail Trade industry at 13.6%. See **Figure 8**.

Figure 8: Vilas County Resident Industry

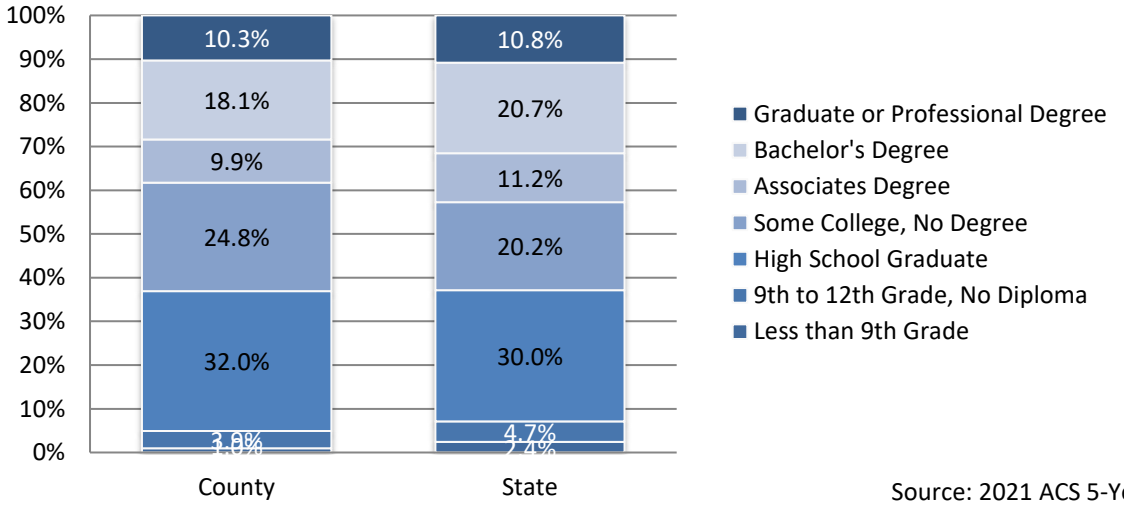


Source: 2021 ACS 5-Year

As of the 2021 ACS 5-Year estimates, median household income in Vilas County was $56,837, with the State median at $67,080. Vilas County's 2021 per capita income was $36,758, vs the State at $36,754.

Figure 9 notes that about 95.1% of Vilas County residents 25 years and over have graduated high school; a few percentage points higher than the 92.9% of State residents. About 28.4% of Vilas County residents have a bachelor's degree or higher, while 31.5% of Wisconsin residents have a bachelor's degree or higher.

Figure 9: Educational Attainment, Age 25 and Older, 2021



Source: 2021 ACS 5-Year

NATURAL RESOURCE ASSESSMENT
Chapter 4

This chapter reviews the natural resource base in Vilas County. Natural resources not only hold significant ecological value, but they also have great economic, recreational, and aesthetic value. The County must continue to achieve a balance between protection of those resources and on-going development that in many cases relies on those resources for economic development in the County.

In 1971 the Vilas County Resource and Conservation Needs bulletin was created to identify the natural resources at that time.

Throughout this chapter are notes taken from the 1971 bulletin and placed in these blue boxes for comparison.

4.1 Geology and Physiography

Vilas County is in the Northern Highland physiographic region of Wisconsin. This region has some of the highest elevations in the state. Elevations range from about 1,560 feet above sea level in an area along Amber Creek in the southwest corner of the county to 1,845 feet at Muskellunge Hill. Elevations differences between high and low points are low, as seen between Amber Creek and Muskellunge Hill. State and federal forests were established in this region from tax delinquent lands in part to protect the headwaters of major statewide rivers that drain from this region to the south.

There are three geographic regions in Vilas County. The drumlins and ground moraines in the eastern portion of the county are characterized by low, smoothly rounded, elongated, and oval ridges that are nearly level to moderately steep, and are interspersed with long, narrow drainage ways. The Winegar moraine area in the western portion of the county is characterized by short, steep slopes and ridges, and by numerous wet depressions, most of which have no outlets. Outside of these moraine areas is an outwash plain, characterized by a rolling or hilly topography with many enclosed basins and depressions. In scattered areas on this plain are sand flats and the communities of Eagle River, Manitowish Waters, Conover, St. Germain, and Boulder Junction.

4.2 Climate

Vilas County's climate is classified as typically continental, with very cold winters. Summers are short and fairly warm. A short freeze-free period in summer limits cropping to forage and small grain crops and to adapted vegetables. (Vilas County Soil Survey, 1988)

Like much of the Midwest, Vilas County has experienced increasing temperatures and precipitation in recent decades. Warming has been concentrated in the winter and spring, while summers have warmed less. Warmer spring temperatures present the additional threat of frost-freeze damage to early-budding fruit trees. The lack of summer warming is reflected in a below average occurrence of very hot days and no overall trend in warm nights. The number of very cold days has been near or below average since 2000, reflecting a winter warming

trend. The increase in winter temperatures has also reduced lake ice cover. Precipitation varies widely from year to year, and most of the state's precipitation falls during the warmer half of the year. (Excerpt from NOAA State Climate Summaries - Wisconsin 2022)

Total winter precipitation and total summer precipitation have been mostly above average over the last 26 years. The frequency of 2-inch extreme precipitation events has increased, with the highest number occurring during the 2015–2020 period. Snowfall varies annually in the north to more than 100 inches along the Gogebic Range. This heavy snowfall along the Gogebic Range is partially due to lake-effect snow events on the south shore of Lake Superior, which has experienced significant upward trends in annual snowfall totals. These upward trends are attributed to warmer air temperatures, which create more moisture availability due to warmer surface water temperatures and reduced lake ice coverage. Annual snowfall totals have also increased over the rest of Wisconsin since 1930. (Excerpt from NOAA State Climate Summaries - Wisconsin 2022)

Weather *changes hour-to-hour and day-by-day.*
Climate *is the long-term average of weather over at least 30 years.*

Historical Temperature and Precipitation Trends

Annual temperature and precipitation trends are provided by the National Centers for Environmental Information (NCEI), is a sub-bureau of the National Oceanic and Atmospheric Administration (NOAA). The NOAA Monthly US Climate Divisional Database (NClimDiv) provides data for temperature, precipitation, drought indices, and heating and cooling degree days for US climate divisions, states, multi-state regions, and the nation from 1895 to the present. County-level temperature and precipitation averages were leveraged to showcase climatic anomalies in comparison to the 20th century average.

Figure 10 shows the 12-month average temperature for over 120 years in Vilas County. January 1950 to December 2023 the average temperature has increased 0.4°F per decade.

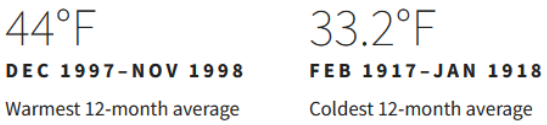
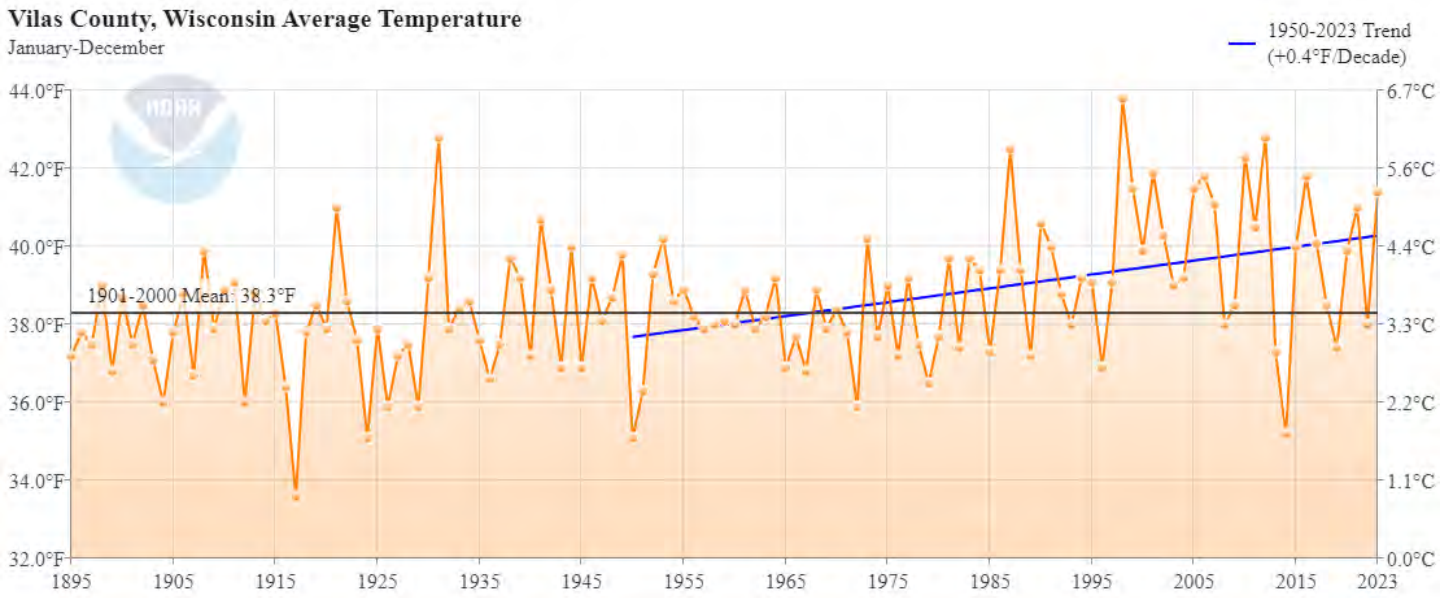


Figure 10 **Temperature Trend in Vilas County, Wisconsin**



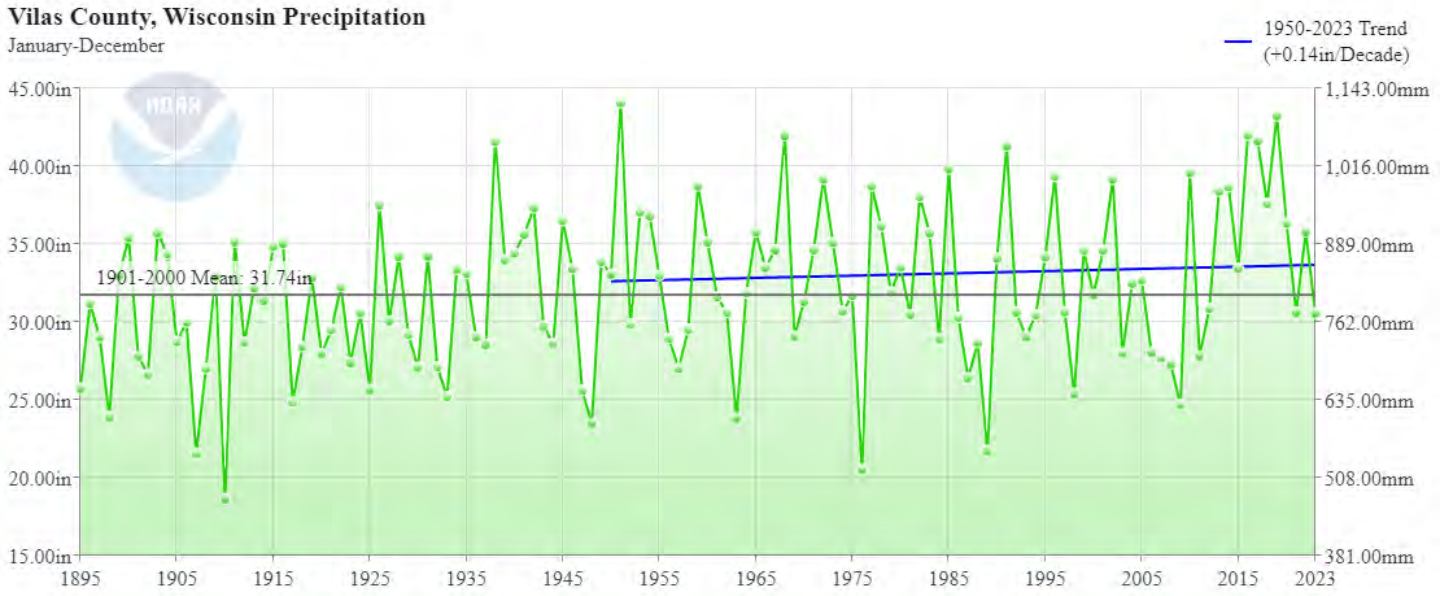
Source: NOAA National Centers for Environmental Information, Climate at a Glance and USA Facts.org

Figure 11 shows the 12-month total precipitation from January 1900 to December 2023 in Vilas County.

47.1 inches
NOV 1950–OCT 1951
Wettest 12-month average

18.1 inches
MAR 1976–FEB 1977
Driest 12-month average

Figure 11 **Precipitation Trend in Vilas County, Wisconsin**



Source: NOAA National Centers for Environmental Information, Climate at a Glance and USA Facts.org

Projected Future Climate Trends

Vilas County, like the rest of Wisconsin, is projected to continue warming in the future (**Figure 12A**), with winters warming more rapidly than other seasons (Wisconsin Initiative on Climate Change Impacts 2021 Assessment Report). With warming winters, Vilas County can expect to see fewer nights per year with below-freezing temperatures (Figure 14B) and With a warming climate comes a shift in lakes predictably freezing over from annually to intermittently. Lake Mendota (Dane County) will likely have intermittent ice by 2040. Trout Lake (Vilas County) will likely start having intermittent ice by 2100. (John J. Magnuson et al, Center for Limnology, UW-Madison, 2019)

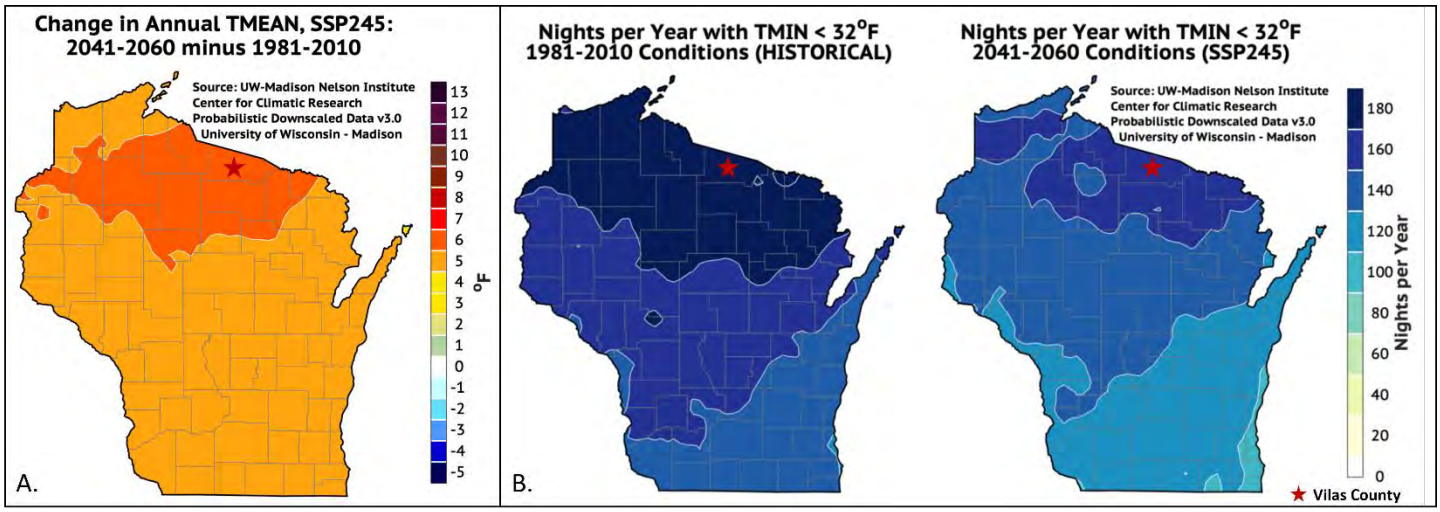
Precipitation is projected to continue increasing in Vilas County and the rest of Wisconsin (**Figure 13**). Most of the precipitation increase is projected to occur during the winter and spring, but snowfall is projected to decline due to warmer temperatures. Additionally, extreme precipitation is projected to increase, potentially increasing the frequency and intensity of floods and causing increased runoff and erosion (Figure 15B). Above normal precipitation enhances the risk of springtime flooding, which could pose a threat to Wisconsin's agricultural industry by delaying planting and causing yield losses. (Excerpt from NOAA State Climate Summaries - Wisconsin 2022)

The intensity of future droughts is projected to increase. Even if precipitation increases in the future, rising temperatures will increase the rate of soil moisture loss during dry periods. Thus, future summer droughts, a natural part of Wisconsin's climate, are likely to be more intense. (Excerpt from NOAA State Climate Summaries - Wisconsin 2022)

Figure 12A shows the projected change in annual mean temperature by mid-21st century, compared to recent historical averages. Annual mean temperatures in Vilas County are projected to increase by approximately 6°F. **Figure 12B** shows the historical frequency of below-freezing (32°F) nights (left) compared to future projections (right). Vilas County is projected to see approximately 20 fewer below-freezing nights per year by the mid-21st century.

Projected Temperature Changes

Figure 12A **Figure 12B**

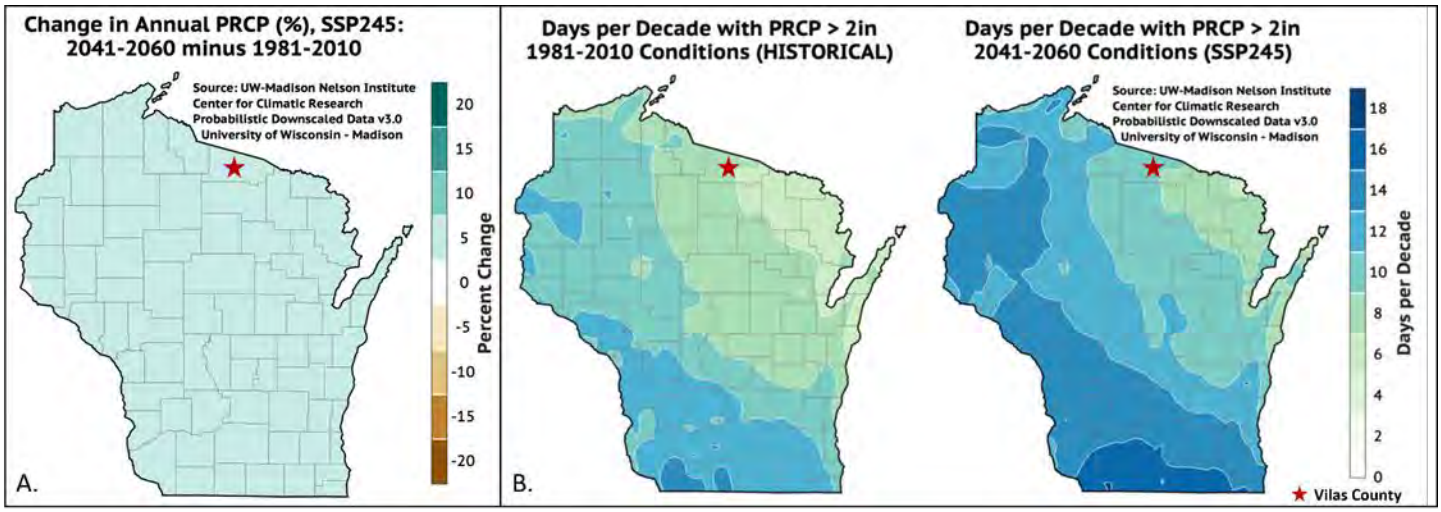


Source: University of Wisconsin-Madison Nelson Institute Center for Climatic Research

Figure 13A shows the projected change in annual precipitation by mid-21st century, compared to recent historical averages. Vilas County, like the rest of Wisconsin, is projected to see an approximately 5% increase in annual precipitation. **Figure 13B** shows the historical frequency of extreme rainfall events (>2 inches per day, left) compared to future projections. Vilas County is expected to see an increase in extreme rainfall events but will likely still experience less intense rainfall than the southern and western portions of Wisconsin.

Projected Precipitation Changes

Figure 13A **Figure 13B**



Source: University of Wisconsin-Madison Nelson Institute Center for Climatic Research

4.3 Soils

A. General Soils

The soils of Vilas County are primarily sandy and loamy soils which are suited to forested/woodland uses. Due to the sandy and droughty nature of the soils, most are of relatively low agricultural value; in addition, the growing season in the county is rather short. See **Map 3 – General Soils**.

The following provides a general discussion of the general soil associations found within Vilas County. It should be noted, however, that these general descriptions are only guidelines and should be referred to as such.

The majority of the county (42%) is dominated by the Rubicon-Sayner-Karlin association which includes most of the southern and central portions of the county. The far eastern portion of the county, including primarily the Town of Phelps and portions of Conover and Washington, is dominated by the Champion and Padus-Pence associations. The Champion association comprises 8% of the county and the Padus-Pence association comprises approximately 21%. The Padus-Pence association is also found along the Presque Isle/Boulder Junction border, in the central portion of Land O' Lakes, the Sayner and Star Lake areas, and the majority of southern/central Arbor Vitae. The majority of Winchester and Presque Isle and approximately half of Land O' Lakes, are comprised of the Gogebic-Pence-Fence association which comprises approximately 14% of the county. The Croswell-Dawson-AuGres association is found

scattered throughout the county, comprising a total of 8% of the soils. The Loxley-Dawson association and the Keweenaw-Karlin association comprise the remaining 2% and 5% of the county's land area, respectively. These areas are also scattered throughout the county.

B. Manage for Soil Carbon

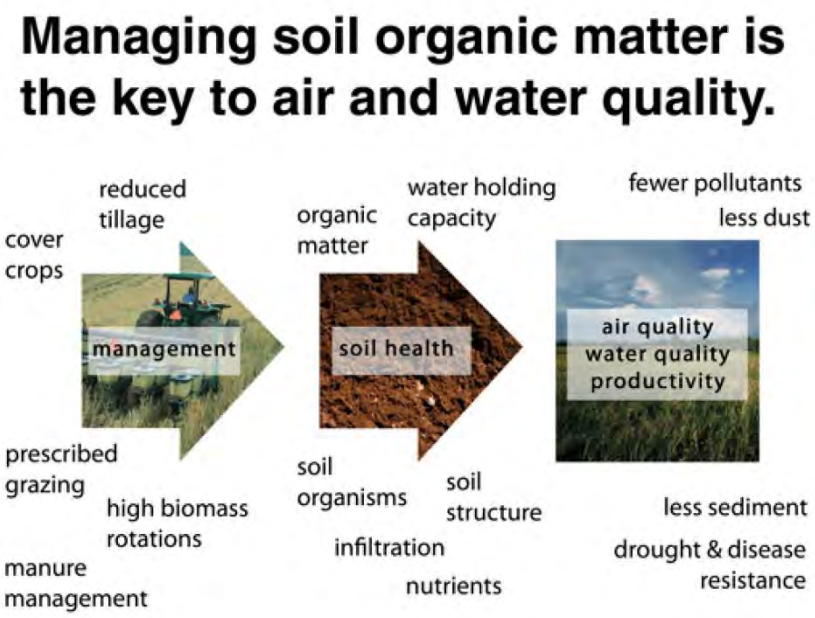
Erosion Control is Not Enough

Soil conservation policy in the United States stems from the devastating erosion events of the 1920s and '30s. Out of concern for preserving agricultural productivity came the concept of tolerable soil loss and the creation of the "T" factor, which is the maximum annual soil loss that can occur on a particular soil while sustaining long-term agricultural productivity. Conservationists focused on reducing soil loss to T by applying practices, such as terraces, contour strips, grassed waterways, and residue management. (NRCS)

By the end of the twentieth century, concerns about air and water quality became as important as concerns about agricultural productivity. To address these environmental goals and maintain the land's productive potential, we must now go beyond erosion control and manage for soil health. How soil functions on every inch of a farm, not just in buffers or waterways, affects erosion rates, agricultural productivity, air quality, and water quality. The most practical way to enhance soil health today is to promote better management of soil organic matter or carbon (C). In short, we should go beyond T and manage for C. (NRCS)

Why Focus on Soil Organic Matter?

Many soil properties impact soil health, but organic matter deserves special attention. It affects several critical soil functions, can be manipulated by land management practices, and is important in most agricultural settings across the country. Because organic matter enhances water and nutrient holding capacity and improves soil structure, managing for soil carbon can enhance productivity and environmental quality, and can reduce the severity and costs of natural phenomena, such as drought, flood, and disease. In addition, increasing soil organic matter levels can reduce atmospheric CO_2 levels that contribute to climate change. (NRCS)

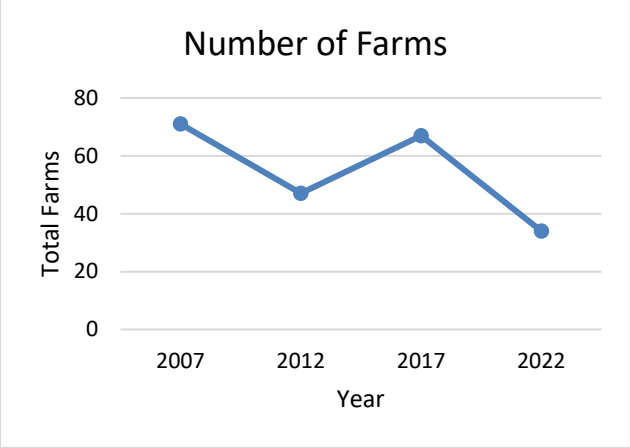


See maps of calculated (2011) and projected (2050) soil organic carbon in Vilas County in **Appendix I**.

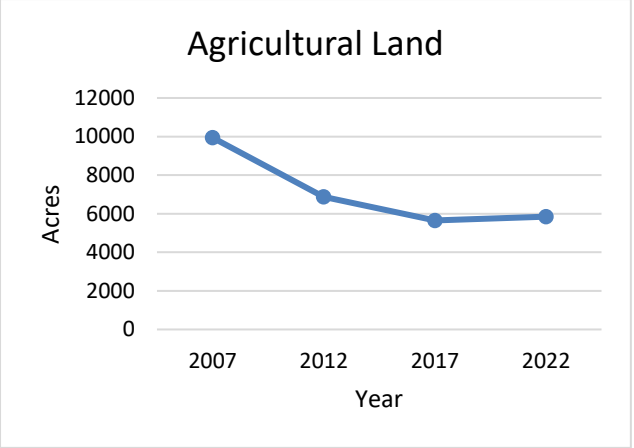
4.4 Agriculture

According to the 2022 USDA Census of Agriculture there was a 41.2% decrease in agricultural land since 2007. **Figure 14** shows the changes in the number of farms from 71 farms (2007), to 47 (2012), to 67 (2017), and finally to 34 (2022). **Figure 14** also shows that the amount of agricultural land has decreased from 9,942 acres (2007), to 6,881 acres (2012), to 5,652 acres (2017),and then increased slightly to 5,847 acres (2022).

Figure 14: Number of Farms and Agricultural Land in Vilas County



Source: Census of Agriculture 2007-2022

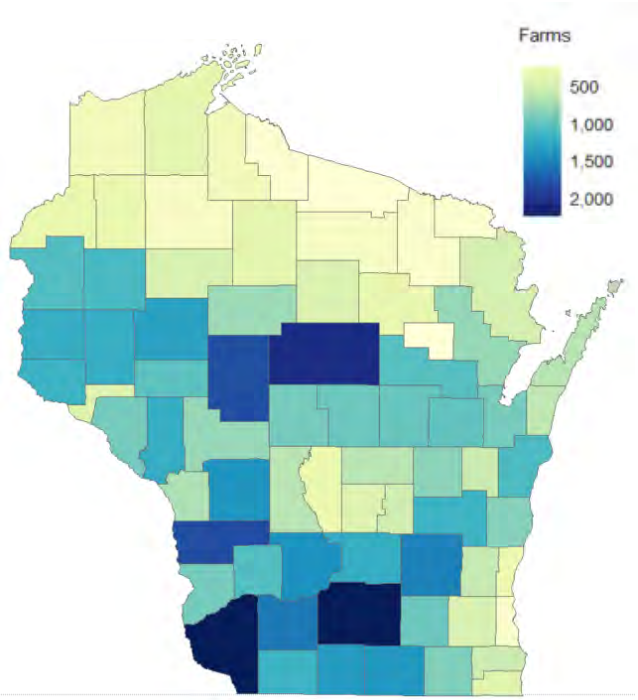


Source: Census of Agriculture 2007-2022

The 2022 Census of Agriculture highlighted the continuation of many historical and national trends for the Wisconsin farming economy. Many operators continued to exit, and this happened rapidly among Wisconsin dairy farms. At the same time, the farms that remained were increasing in size, as both the share and number of farms producing over $500,000 in annual revenue increased since 2017. Still, smaller farms (those with sales under $100,000) accounted for the majority of all Wisconsin farms. See **Figures 15 & 16**. (Windicators, UW-Extension, Vol.7, Issues1, 2024)

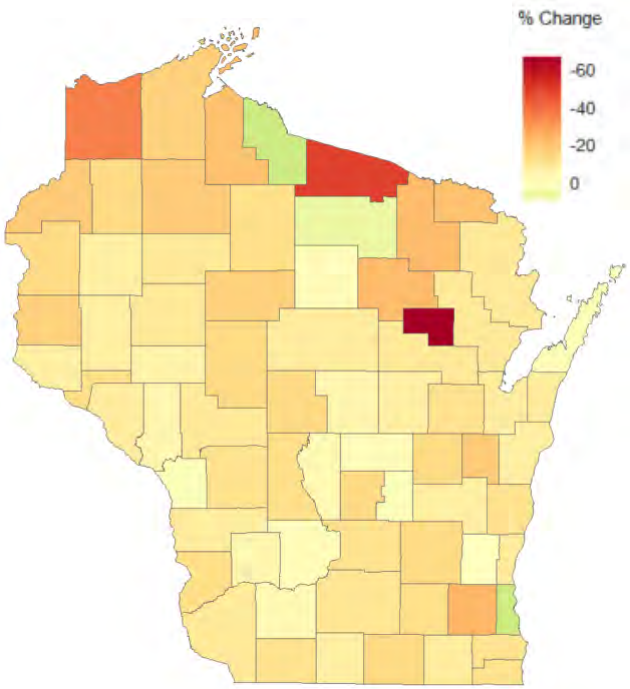
Most agricultural production in Vilas County consists of forage crops, oats, potatoes, and cranberry bogs. A short growing season limits cropping. About 24% of farmers in the County sell directly to consumers per the 2022 Ag Census.

Figure 15: Number of Farms by County, 2022



Source: UW-Madison Extension,

Figure 16: Percent Change in Number of Farms, 1997-2022



Source: UW-Madison Extension

Soil Erosion from Cropland

Croplands are located mainly near Eagle River, Phelps, and Woodruff, with scattered cropland elsewhere. Concern regarding cropland erosion is generally low in the County because of the limited amount of croplands and low erosion rates.

The State requires each County to prepare a Soil Erosion Control plan. In 1997 the Vilas County Board approved a resolution asking the Department of Agriculture Trade and Consumer Protection (DATCP) to grant them a waiver from preparing this plan. Since Vilas County has relatively small amounts of cropland and the magnitude and extent of cropland erosion is small, Vilas County was granted a waiver from DATCP to release them from their obligation to develop a Soil Erosion Control plan.

A voluntary educational approach will continue to be used to achieve erosion control standards in Vilas County. One-on-one contacts with landowners and operators who request technical assistance is the most common method used to promote soil conservation in Vilas County.

Cranberry Farm Nutrient Management

Cranberry bogs are located mainly in Manitowish Waters. There is concern about nutrients applied to cranberry bogs, because flooded bogs may drain directly to surface waters. All of the cranberry bogs in Vilas County have nutrient management plans.

Wet harvesting begins the night before the harvest. The grower floods the dry bog with up to eighteen inches of water. The next day, water reels, nicknamed "egg beaters" are used to stir up water in the bogs. The cranberries are loosened from the vines and float to the surface of the water. They are corralled and loaded into trucks. The berries are then delivered to a central receiving station where they undergo a thorough sorting process. After the bog is harvested, the water is pumped to another bog, and the process starts over again.

All Wisconsin farmers are required, by the State of Wisconsin, to have a nutrient management plan in place that meets the NRCS Nutrient Management Conservation Practice Standard (the so-called "590 Standard"). The NRCS guidelines for cranberry nutrient management are included within Wisconsin Conservation Planning Technical Note WI-1, which is a companion document to the 590 Standard. See **Appendix B** for a copy of this document.

4.5 Forestry

Vilas County is characterized by well developed secondary growth forests with a mixture of hardwoods and conifer stands, covering 76% of the County. About 44% of the land in Vilas County is publicly owned forestland; and about 32% of land in the County is privately owned forestland, of which, 24% is enrolled in MFL. See **Map 2–Land Management**. Vilas County has about 42,000 acres (7.1% of land in the county) in county forest, the DNR has 149,733 acres (27% of land in the county) in the Northern Highland–American Legion State Forest, and 54,504 acres (9.8% of land in the county) of forestland is part of the Chequamegon-Nicolet National Forest.

Woodlands, 1971

"It takes time to grow a high quality tree—more than half a man's lifetime for an aspen, twice a lifetime for maple."

Soil Erosion from Woodlands

The primary concern in protecting soil is to make sure areas where soil is exposed are covered as soon as possible. Timber harvests may require either temporary or permanent road construction, which exposes areas to soil erosion.

Vilas County Forestry Department requires that all foresters conducting county forest harvests use Best Management Practices to harvest timber responsibly. The county forest is independently certified as sustainable by Sustainable Forestry Initiative® (SFI®). The SFI 2005-2009 Standard promotes sustainable forest management through nine principles, 13 objectives, 34 performance measures and 102 indicators developed by professional foresters, conservationists, scientists and others. The standard addresses key environmental, social and economic forest values – from water quality and biodiversity to harvesting and regeneration.

Terrestrial Invasive Species

Invasive plants can cause significant negative impacts to the forest. Invasive species can displace native plants and hinder the forest regeneration of desired species, preventing those species from dominating habitats where those species are critical to the long-term health of the forest. There are a number of invasive plant species in varying densities on the County Forest. Some warrant immediate and continual treatment efforts while others may be allowed to remain due to extent and financial ability to control them. The County will continue to train staff in invasive species identification as well as attempt to secure funding sources to control them as much as

is practical. Invasive plants on the forest should be documented as well as potential response to new infestations. (Vilas County 15-year County Forest Plan)

Climate Adaptation in Forestry (WI 2020 Statewide Forest Action Plan)

Climate change is and will continue to be one of the most critical factors affecting Wisconsin's forests. Adapting Wisconsin's forests to climate change will be critical. Forests are a natural way for carbon mitigation and Wisconsin has a high potential for both mitigation and adaptation actions due to its larger forested areas.

Climate change refers to the observable and predictable changes in the Earth system processes that affect Earth's climate due the relationships among greenhouse gas emissions and atmospheric concentrations of these gases. Greenhouse gases cause an imbalance of heat trapped by the atmosphere compared to an equilibrium state (Melillo, Richmond, & Yohe, 2014).

One of the most common and known greenhouse gases is carbon dioxide (CO_2), which is removed from the atmosphere by natural processes at a rate that is roughly half of the current rate of emissions from natural and human activities. Therefore, mitigation efforts that only stabilize global emissions will not reduce atmospheric concentrations of carbon dioxide but will only limit their rate of increase.

In the U.S., sources of carbon have been relatively stable over the last two decades, while sinks have been more variable. Studies have shown that there is a large land-use carbon sink in the United States(Birdsey, Pregitzer, & Lucier, 2006; Pacala et al., 2007; USDA, 2011). Many publications attribute this sink to forest re-growth, and the sink is projected to decline as a result of forest aging (Pan et al., 2011; Williams, Collatz, Masek, & Goward, 2012; Zhang et al., 2012; Zheng, Heath, Ducey, & Smith, 2011) and factors like drought, fire and insect infestations reducing the carbon sink of these regions.

Wisconsin's climate is changing, and forests will respond to these changes in a variety of ways. Some of which include:

- Currently, Wisconsin already receives about 2 inches more annual precipitation than in the earlier 1900s and the projection is to continue to increase by another 1 to 3 inches by the end of the century. Most of the increases will be concentrated in spring and winter and from heavier rainfall events, which have impacts on soil moisture, depth of snowpack, frozen ground duration, flooding, and surface runoff.
- Wisconsin's growing season has already increased by almost two weeks over the past 70 years and this trend is expected to continue by 14 to 49 days by the end of the century. A longer growing season has both advantages and disadvantages depending on the species and if the trees acquire the additional water and nutrients needed. Earlier warm temperatures will lead to trees breaking dormancy sooner, creating a greater risk for frost damage. Due to these changes, some forest types could have their ranges expand or contract. Central Hardwoods may expand their range, although it is uncertain how this forest type will be affected by much wetter or much drier conditions. Boreal species are at risk due to warmer winter temperatures and possible late summer droughts. White-tailed deer are expected to benefit from warmer winters and reduced snow depth, which can result in greater impacts on forests across Wisconsin. Heavy browsing of some species that are anticipated to gain suitable habitat with warmer temperatures, such as sugar maple, white oak, and northern red oak, can limit their actual ability to increase on the landscape. While other species that are not browsed so heavily, such as ironwood and

black cherry or invasive species, like buckthorn or Japanese barberry, can be favored. Jack pine could be resilient because it's adapted to extremely dry sandy sites and not so dependent on climate. Conifer lowlands are vulnerable due to sensitivity to changes in water tables and snow cover. Urban forests can respond well if cities replant with species suited to warmer temperatures.

- Wildfires are expected to increase in both frequency and intensity and therefore burn more acres, particularly in boreal and temperate conifer forests. However, more wildfire could be beneficial for some forest types, such as jack pine and other fire-dependent systems.

4.6 Wildlife

Vilas County contains important wildlife species associated with the high density of kettle lakes, pine-dominated dry and dry-mesic forest communities, forested and non-forested acid peatlands, wild rice marshes, sedge meadows, mixed mesic hardwood-conifer forests, headwaters of major streams, and forested watersheds. Forests in the county support and has high potential to continue supporting wide-ranging mammals, forest interior songbirds and raptors, species that use lake, stream, and shoreline habitats, conifer specialists (especially those associated with forests of pine, eastern hemlock, spruce, and balsam fir), peatland specialists, and certain marsh species. (Vilas County 15-year County Forest Plan)

Common mammals found in the county include black bear, white tailed deer, coyote, porcupine, beaver, red fox, snowshoe hare, otter, raccoon, skunk, red and gray squirrel, mink, muskrat, and other small animals. Other mammals include timber wolf, fisher, bobcat, and pine marten. (Vilas County Soil Survey)

Ruffed grouse and woodcock are common upland game birds. Ducks and geese migrate through the County. Wood ducks, mallards, black ducks, and blue winged teal are common throughout the county. Mergansers, loons, herons, bald eagles, osprey, and several species of hawks, owls, woodpeckers, and songbirds inhabit the county. Bird watching opportunities are plentiful in Vilas County. (Vilas County Soil Survey)

The abundance of wildlife species depends on the timber types and the stages of tree growth. Timber and pulp cutting practices play a large role in determining the dominant tree species and the mixture of growth stages and thus the wildlife species that can thrive. (Vilas County Soil Survey)

There is potential for large block management for forest interior species in Vilas County since the county forest is only moderately fragmented, and it is possible to maintain or create forested connections to other public lands. (Vilas County 15-year County Forest Plan)

Because of the abundant aquatic resources, Vilas County supports significant populations of water-dependent wildlife species, such as Common Loon, Osprey, Bald Eagle, Black Tern, and North American river otter. All fish, amphibians, many invertebrates, and aquatic plants also depend on lake and stream habitats. The lakes and streams are also important for nesting Mallard, American Black Duck, Ring-necked Duck, and Wood Duck populations. (Vilas County 15-year County Forest Plan)

A large number of rare aquatic animals reflects the abundance of high-quality lakes, streams, and wetlands in Vilas County as well as the generally good condition of most watersheds, which are mostly forested. Aquatic environments are highly significant to several rare dragonflies, for example, the mottled darner, the lake emerald, and the Wisconsin Threatened pygmy snaketail. One of two Wisconsin locations for the globally rare robust Dubiraphian riffle beetle is associated with the predominant ecological landscape of the County forest. (Vilas County 15-year County Forest Plan)

4.7 Rare Species and Natural Communities

Areas of critical environmental sensitivity are those unique areas of the natural environment that should be preserved, and therefore excluded from intensive development. Typically, areas of critical environmental sensitivity include wetlands, floodplains, floodways, shorelands, areas of steep slope (especially those adjacent wetlands and shorelands), publicly-owned scientific and natural areas (e.g. fish & wildlife habitats), and identified cultural and archaeological sites. The protection of such areas is intended to:

1.) protect the health, safety, and welfare of the general public;
2.) protect surface water and groundwater quality;
3.) reduce damage from flooding and stormwater runoff; and
4.) maintain important wildlife habitats or recreational areas.

Most of the known areas of critical environmental sensitivity within Vilas County are already managed or regulated at the federal, state, and county levels. Wetlands, floodplains, shorelands, and state natural areas are all publicly regulated.

See the FORESTRY section and **Map 2 – Land Management** for more information about publicly-owned lands.

Private landowners in the County have opportunities to voluntarily protect their property using tools like conservation easements and property transfers that are donated to qualified local land conservation organizations such as Northwoods Land Trust (NWLT). This avenue for conservation offers a way to permanently protect private property in the County that harbors areas of high conservation value or critical environmental sensitivity as a benefit for the public.

NWLT currently protects 3,647 acres of land in the county, which includes just under 18 total miles of shoreline.

The Nature Conservancy has the following managed lands in Vilas County:

Fee preserves:
Catherine Wolter Wilderness Area: 2,641.83 acres
Guido Rahr Sr Tenderfoot Forest Reserve: 971.06 acres

Easement properties:
Kresser (46 Degrees): 12.5 acres
Dunne: 502.7 acres
Tenderfoot Forest Reserve Company 4.5 acres

The DNR maintains a listing of all rare, threatened, and endangered species and natural communities within the state. A listing of the species and communities which exist in Vilas County is available by town on the DNR's website under: *Natural Heritage Inventory (NHI)*.

A comprehensive inventory does not exist, but when rare species or rare natural communities are found, then they are entered into the NHI.

State Natural Areas (SNAs)

State natural areas were acquired to protect the state's natural diversity, provide sites for research and environmental education, and serve as benchmarks for assessing and guiding use of other lands in the state. Natural areas are defined as tracts of land or water, which have native biotic communities, unique natural features, or significant geological or archeological sites. These sites do not have much facility development, though there may be a designated trail on the site. See **Map 2** for the general SNA locations.

The Department of Natural Resources listed the following areas within Vilas County:

CNNF = Chequamegon-Nicolet National Forest
NHAL = Northern Highland American Legion (State Forest)

1. **Allequash Lake and Pines SNA (No.508)** is 398 acres located in the NHAL State Forest.
2. **Anvil Lake Trail SNA (No. 449)** is 980 acres located in the CNNF.
3. **Aurora Lake SNA (No. 127)** is 250 acres located in the NHAL State Forest.
4. **Beaver Creek SNA (No. 478)** is 697 acres located in the CNNF.
5. **Bittersweet Lakes SNA (No. 34)** is 1,070 acres located in the NHAL State Forest.
6. **Black Tern Bog SNA (No. 49)** is 26 acres located in the Town of Arbor Vitae.
7. **Blackjack Springs SNA (No. 308)** is 1,395 acres located in the CNNF.
8. **Border Lakes SNA (No. 411)** is 2,383 acres located in the Town of Presque Isle.
9. **Camp Lake and Pines SNA (No. 506)** is 243 acres located in the NHAL State Forest.
10. **Chippewa Trail SNA (No. 440)** is 897 acres located in the CNNF.
11. **Day Lake SNA (No. 189)** is 209 acres located in the NHAL State Forest.
12. **Devine Lake and Mishonagon Creek SNA (No. 507)** is 1,186 acres located in the NHAL State Forest.
13. **Dunn Lake SNA (No. 237)** is 954 acres located in the Town of Presque Isle.
14. **Haymeadow Creek SNA (No. 479)** is 957 acres located in the CNNF.
15. **Headwater Lakes SNA (No.)** is 2,893 acres located in the CNNF.
16. **Johnson Lake Barrens and Springs SNA (No. 107)** is 1,125 acres located in the NHAL State Forest.
17. **Kentuck Lake SNA (No. 442)** is 291 acres located in the CNNF.
18. **Lake Alva Birch-Hemlock SNA (No. 509)** is 314 acres in the NHAL State Forest.

19. **Lake Laura Hardwoods SNA (No. 500)** is 852 acres in the NHAL State Forest.
20. **Lost Canoe SNA (No. 108)** is 1,119 acres located in the NHAL State Forest.
21. **Mary Lake SNA (No. 264)** is 44 acres located in the Town of Presque Isle.
22. **Nell Lake SNA (No. 672)** is 117 acres in the NHAL State Forest.
23. **Nixon Lake SNA (No. 186)** is 737 acres located in the NHAL State Forest.
24. **Trout Lake Conifer Swamp SNA (No. 21)** is 25 acres located in the NHAL State Forest.
25. **Papoose Creek Pines SNA (No. 503)** is 563 acres located in the NHAL State Forest.
26. **Pat Shay Lake SNA (No. 446)** is 736 acres located in the CNNF.
27. **Plum Lake Hemlock Forest SNA (No. 26)** is 747 acres located in the NHAL State Forest.
28. **Rice Creek SNA (No. 504)** is 435 acres located in the NHAL State Forest.
29. **Spruce Grouse Swamp SNA (No. 540)** is 400 acres located in the Town of Conover.
30. **Toy Lake Swamp SNA (No. 22)** is 2,308 acres located in the NHAL State Forest.
31. **Trout River SNA (No. 505)** is 108 acres located in the NHAL State Forest.
32. **Upper Buckatabon Springs SNA (No. 609)** is 279 acres located in the Town of Conover.
33. **Van Vliet Hemlocks (No. 673)** is 412 acres located in the NHAL State Forest.

Wisconsin Land Legacy Report 2006-2056

This report is a comprehensive inventory of the special places that will be critical to meet future conservation and outdoor recreation needs for the next fifty years. The study focused on identifying what of our state or regionally significant green infrastructure remains to be protected. See **Map 2** for the general Land Legacy locations.

The report recommends protection of these lands by using federal, state, and local funding opportunities; along with possibly creating new kinds of incentives for landowners, working to draft comprehensive plans, or offering different types of technical assistance.

Each Vilas County Legacy Area is summarized below with 5 stars representing the highest level for that category:

CN Chequamegon-Nicolet Nat'l Forest

Size	Large
Protection Initiated	Substantial
Protection Remaining	Limited
Conservation Significance	☆☆☆☆☆
Recreation Potential	☆☆☆☆☆

NA Northern Highland-American Legion State Forest

Size	Large
Protection Initiated	Substantial
Protection Remaining	Limited
Conservation Significance	☆☆☆☆☆
Recreation Potential	☆☆☆☆☆

BL Border Lakes Region

Size	Large
Protection Initiated	Moderate
Protection Remaining	Moderate
Conservation Significance	☆☆☆☆☆
Recreation Potential	☆☆

UW Upper Wisconsin River

Size	Large
Protection Initiated	Moderate
Protection Remaining	Moderate
Conservation Significance	☆☆☆
Recreation Potential	☆☆☆

DK Deerskin River

Size	Small
Protection Initiated	Moderate
Protection Remaining	Limited
Conservation Significance	☆☆☆
Recreation Potential	☆

4.8 Terrestrial Invasive Species

Invasive non-native plants can alter and even destroy habitat critical to the survival of native flora and fauna that have evolved together over time to be dependent on one another. Some species can cause harm to human health, or damage the economic value of landscapes and natural communities.

Vilas County Land & Water Department (LWCD) works in partnership with the Wisconsin Headwater Invasives Partnership, Cooperative Invasive Species Management Area (WHIP CISMA) to identify, map and control terrestrial invasive species (TIS) and to educate the public about them. TIS awareness by the public in Vilas County lags behind awareness of Aquatic Invasive species in Vilas County lakes and rivers. Meanwhile many of the common invasives such as common tansy, non-native thistles, and the knapweeds are being spread from gravel pits along most town and county roads during roadwork. Mowing and utility installation activities in the Rights-of-way (ROW) then spread their seeds across the county as well as other TIS including garden valerian, dames rocket, reed canary grass, leafy and Cypress spurges, crown vetch, garlic mustard, and white bedstraw.

Gardeners are also planting and spreading invasive species such as woodland forget-me-not, non-native lupine, garden yellow loosestrife, moneywort, Japanese knotweed, Bishop's goutweed, and creeping bellflower amongst others. As the population of Vilas County grows, more opportunities for the introduction of non-native species occurs. The species of most concern are those listed as Prohibited and Restricted under the state invasive species rule NR 40.

Because the invasions are so slow across the county, or some of the species were planted intentionally before knowledge of their damaging effects were know (especially landscaping shrubs like Eurasian honeysuckles, Buckthorns, Japanese barberry and Japanese knotweed) public awareness is limited. Most landowners and road managers are not knowledgeable about plants, let alone TIS, so interest in this issue is limited. In Wisconsin, funding for education, mapping, and management of TIS is limited compared to AIS so less time and effort are available to increase public awareness and concern about the impact of TIS on natural communities.

Additional threats to forest communities in Vilas County come from invasive pests. According to monitoring by the WI DNR both Oak Wilt and Emerald Ash Borer are attacking Vilas County forest lands. Loss of ash species are affecting urban trees in the city of Eagle River, requiring removal and possible replacement of urban trees. Ecologically, the more significant effects will be the loss of black ash in forested wetlands across the county. This will diminish the amount of forested deciduous wetlands and bird habitat if specific management to try to introduce other deciduous tree species to those wetlands. Other communities are investigating whether Swamp white oak or river birch could survive in Vilas County. Red and pin oak species are dominant species in the Northern Dry Forest cover type. Oak wilt is significantly changing community composition on public forest lands, private industrial lands, and private non-industrial lands. Oak are significant keystone species that provide significant pollinator habitat, bird and wildlife habitat and food resources. Unfortunately, the red oak group are more susceptible to oak wilt than the white oak group. Other communities are looking to replace red oaks with less susceptible species like burr oak to try and maintain some oak species in the forest communities. Education is needed to make sure the public and Town/County road crews limit cutting/mowing/trimming of oak species to the time of year less likely to encourage the spread of oak wilt (August through March).

4.9 Basins and Watersheds

Hydrologic unit codes (HUCs) provide a hierarchical, numeric code that uniquely identifies hydrologic units or watershed boundaries. There are six HUC levels: 2-digit (region of USA), 4-digit (subregion of USA), 6-digit (accounting unit), 8-digit (sub-basin), 10-digit (watershed), and 12-digit (sub-watershed).

HUCs provide a common geographic area for counties to: 1) focus and track Land & Water Resource Management Plan implementation efforts, 2) submit grant applications, 3) develop and implement 9 Key Element plans, 4) work to restore impaired waters, and 5) coordinate with DNR to complete water quality monitoring.

Wisconsin's largest river systems form 24 drainage basins (HUC 8s) - 6 of which are in Vilas County on **Map 6 – Basins & Watersheds**.

There are 13 watersheds (HUC 10s) contained completely or partially within Vilas County as shown on **Map 6 – Basins & Watersheds**. The majority of Vilas County drains into the Mississippi River. A small area in the eastern part of the County drains into Lake Michigan, and a small portion along the state line drains to Lake Superior.

4.10 Groundwater

Groundwater is an important resource in Vilas County. It is the source of almost all water used for domestic, agricultural, commercial, and industrial purposes in the County.

According to the Vilas County Soil Survey report, most groundwater is obtained from sand and gravel aquifers. These aquifers occur as surficial sand and gravel deposits or as isolated buried deposits in most of the moraine areas of eastern and northwestern Vilas County. In the moraine areas, water is obtained mainly from lenses of saturated sand and gravel buried within or below the glacial till. Depth to these lenses range from 20-200 feet.

Well yields generally range from 5-50 gallons per minute, but may reach as high as 200 gallons per minute. Wells in the moraine areas commonly are not subject to pollution. (Soil Survey)

The surficial sand and gravel deposits are mainly on extensive outwash plains. They are highly permeable and yield large quantities of water to wells. Most high capacity wells are 40 to 130 feet deep. Well yields range from 50 to 2,000 gallons per minute. Shallow wells in the areas of surficial outwash are subject to pollution. (Soil Survey)

Groundwater in Vilas County is generally of good quality. Local differences in quality are the result of the composition, solubility, and surface of the soil and rock through which the water moves, and the length of time that the water is in contact with these materials. The main components in the water are calcium, magnesium, and bicarbonate ions. Some groundwater in the moraines is hard. A large concentration of iron is in the groundwater throughout the County, but is not considered to be a health hazard. (Soil Survey)

4.11 Susceptibility of Groundwater to Contaminants

The groundwater quality in Vilas County is generally good, however the County is susceptible to groundwater contamination in most areas due to the predominance of sandy soils and shallow depth to groundwater.

"Susceptibility of Groundwater to Pollutants" is defined here as the ease with which a contaminant can be transported from the land surface to the top of the groundwater called the "water table". Many materials that overlie the groundwater offer good protection from contaminants that might be transported by infiltrating waters. The amount of protection offered by the overlying material varies, however, depending on the materials. Thus, in some areas, the overlying soil and bedrock materials allow contaminants to reach the groundwater more easily than in other areas of the state.

In order to identify areas sensitive to contamination, the Wisconsin Department of Natural Resources, in cooperation with the University of Wisconsin-Extension, Wisconsin Geological and Natural History Survey and the USGS, have evaluated the physical resource characteristics that influence this sensitivity.

Five physical resource characteristics were identified as important in determining how easily a contaminant can be carried through overlying materials to the groundwater.
These characteristics are:

1. depth to bedrock,
2. type of bedrock,
3. soil characteristics,
4. depth to water table; and
5. characteristics of surficial deposits.

The resulting map shows that most of Vilas County is "more susceptible" to groundwater contamination, but the northern part of Lac du Flambeau and the southern part of Manitowish Waters is "less susceptible" based upon soil characteristics, surficial deposits, depth to water table, depth to bedrock, and type of bedrock. See **Map 4– Groundwater Contamination Susceptibility.**

Many land use activities have the potential to impact the quality of groundwater. A landfill may leach contaminants into the ground that end up contaminating groundwater. Gasoline may leak from an underground storage tank into groundwater. Fertilizers and pesticides can seep into the ground from application on farm fields, golf courses, or lawns. Leaking fluids from cars in junkyards, intentional dumping or accidental spills of paint, used motor oil, or other chemicals on the ground can result in contaminated groundwater.

DRINKING WATER TEST RESULTS

Safe drinking water is something that many people commonly take for granted. Most residents in Vilas County draw their water supply from private wells. In the past 5 years (2019-2023), 183 households in Vilas County tested their well water through the UW-Stevens Point Environmental Task Force Lab. The following summary for bacteria, nitrate, and chloride levels are based on data collected from 2019 through 2023. The period from 2004 through 2008, 520 Vilas County households submitted samples for one or more parameters. Please note that the following information represents averages for samples received in a 5-year period. Because wells sampled from 2019 through 2023, and previously from 2009 through 2014, were in many cases different wells than those sampled from 2004 through 2008, the data does not necessarily reflect trends in groundwater quality.

Bacteria

From 2004 through 2008, 6% of the water sampled had evidence of coliform bacteria. Between 2009 and 2014, 13% of the water sampled had evidence of coliform bacteria. From 2019 through 2023, 9.1% of the water sampled had evidence of coliform bacteria. Coliform bacteria are microorganisms commonly found in surface water and soil. Coliform bacteria usually do not cause disease; however, its presence indicates the potential for other harmful pathogenic (disease causing) organisms may be contaminating the water. The presence of E. coli is rare, but its presence is evidence that human and/or animal fecal waste are contaminating the water. When E. coli is present there is a significant risk of gastrointestinal diseases, many of which can be severe, particularly to immune compromised individuals. From 2019 through 2023 no wells in Vilas County detected E. coli bacteria.

Nitrate

From 2004 through 2008, 14% of the water samples had nitrate levels above the naturally occurring range, and less than 1% showed levels above the Federal Drinking Water Standard. Between 2008 and 2014, 15% of the water samples had nitrate levels above the naturally occurring range, and just under 3% of samples showed levels above the Federal Drinking Water Standard. From 2019 through 2023, 8.2% of the water samples had nitrate levels above the naturally occurring range, and none showed levels above the Federal Drinking Water Standard. Levels that are above the naturally occurring level usually indicate contamination from fertilizer, septic system effluent, animal wastes, and landfills. Vilas County appears significantly better than the statewide average, it is estimated that 9% of private wells statewide are above the 10mg/L drinking water standard.

Chloride

From 2004 through 2008, 22% of the water sampled had chloride levels above the naturally occurring range. Between 2009 and 2014, just under 22% of the water sampled had chloride levels above the naturally occurring

level. From 2019 through 2023, 14.4% of the water sampled had chloride levels above the naturally occurring range. There is no health standard for this contaminant. Chloride at levels greater than 10 mg/L (the natural level) usually indicate contamination by onsite wastewater treatment systems (including water softener regeneration), road salt, fertilizer, animal waste, or other wastes. Chloride is not toxic in concentrations typically found in groundwater, but some people can detect a salty taste at 250 mg/L (less than 1% samples tested above 200 mg/L). Levels of chloride that are above what is typical under natural conditions indicate that groundwater is being affected by human activities, and extra care should be taken to ensure that land use activities do not further degrade water quality.

MUNICIPAL WELLHEAD PROTECTION PLANS AND ORDINANCES

- 5 of 5 (up from 4 in 2014) municipal water systems serving Vilas County have a wellhead protection plan: Eagle River, Lac du Flambeau, Lakeland, Land O' Lakes, and Phelps. (V.C. 2024)
- 3 of 5 (up from 1 in 2024) municipal water systems serving Vilas County have a wellhead protection ordinance: Lac du Flambeau. (V.C. 2024)

Wellhead protection plans are developed to achieve groundwater pollution prevention measures within public water supply wellhead areas. A wellhead protection plan uses public involvement to delineate the wellhead protection area, inventory potential groundwater contamination sources, and manage the wellhead protection area. All new municipal wells are required to have a wellhead protection plan. A wellhead protection ordinance is a zoning ordinance that implements the wellhead protection plan by controlling land uses in the wellhead protection area.

Of those municipal water systems that have wellhead protection (WHP) plans, some have a WHP plan for all of their wells, while others only have a plan for one or some of their wells. Similarly, of those municipal water systems that have WHP ordinances, some ordinances apply to all of their wells and others just one or some of their wells.

LANDFILLS

In Vilas County there are 48 known landfills. The Hwy G landfill is the only operating landfill in the County. There are 13 active transfer sites – 12 municipal (town) and 1 private (Republic Services – Eagle River). (V.C. 2024)

Open landfills do not mean that environmental contamination has occurred, is occurring, or will occur in the future. DNR requires a 1,200-foot buffer away from landfills where no wells are allowed.

CONTAMINATED SITES

Vilas County and local municipalities sponsor hazardous waste collections. Hazardous waste collection is also available at the Oneida County Landfill near Rhinelander. (V.C. 2024)

The DNR Internet database known as the **Bureau of Remediation and Redevelopment Tracking System (BRRTS)** provides information about contaminated properties and other activities related to the investigation and cleanup of contaminated soil or groundwater in Wisconsin.

ERP sites are sites other than LUSTs that have contaminated soil and/or groundwater.
AC sites had abandoned containers on them.

LUST site has contaminated soil and/or groundwater with petroleum, which includes toxic and cancer causing substances.
Spills are a discharge of a hazardous substance that may adversely impact, or threaten to impact public health, welfare or the environment.

The BRRTS listing showed 42 *closed* ERPs, 13 *closed* ACs, 170 *closed* LUSTs, and 151 *closed* Spills. A "*closed*" site means that the DNR has approved the final clean-up of that site, and now it is available for re-use.

The BRRTS listing showed 5 *open* ERPs, no *open* ACs, 4 *open* LUSTs, and no *open* Spills. Sites listed as "*open*" still need remediation before being reused.

PFAS – PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES
Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of human-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

There are five municipal water systems serving Vilas County: Eagle River, Lac du Flambeau, Lakeland, Land O' Lakes, and Phelps. There are no PFAS-based fish consumption advisories in Vilas County.

PFAS Sampling Results for Municipal Water Systems in Vilas County

Eagle River – PFAS not detected in any samples from the water system

Lac du Flambeau – Not tested as of 2024.

Lakeland – PFAS detected below hazard index in one or more samples from the water system

Land O' Lakes – PFAS detected below hazard index in one or more samples from the water system

Phelps – PFAS not detected in any samples from the water system

Sparkling Lake, 1971

In 1971, a Secchi Disk could be seen 30 ½ feet deep in this lake.

******

In 2001, a Secchi Disk could be seen at about 16 feet deep.

4.12 Surface Water

A. River Drainage System

Vilas County is the source area of major river systems. Brule, Elvoy, and Kentuck Creeks drain about 10% of the County into the Brule and Menominee Rivers, which empty into Lake Michigan. The Wisconsin River and its tributaries drain about 40% of the county. Bear, Manitowish, and Turtle Rivers and Amber Creek also drain about 40% of the county into the Flambeau River, which empties into the Mississippi River. Presque Isle River and Tenderfoot Creek drain about 10% of the county into Lake Superior. (Soil Survey) See **Map 1 – Existing Land Use** for the general distribution of lakes and rivers, and **Map 6 – Basins & Watersheds**.

The secondary drainage system is poorly defined. The County has an abundance of lakes, many of which drain into the river system through shallow, crooked drainageways. Glacial meltwater was unable to establish a system of deeper channels in the hummocky glacial topography. Many lakes have no outlets. (Soil Survey)

B. Lakes and Streams

One of the highest concentrations of natural lakes in the world is found in Vilas County along with Oneida County to the south. In Vilas County alone there are over 1,320 lakes (563 with names, and 757 without names). Numerous rivers and streams are also located within Vilas County. There are 35 cold-water streams and 116 warm water streams.

Eight natural lake reservoirs exist, and are controlled by the Wisconsin Valley Improvement Company (WVIC). These reservoirs are Lac Vieux Desert, Twin Lakes, Buckatabon, Long-on-Deerskin (Long Lake and Sand Lake), Little Deerskin, Lower Nine Mile, Little St. Germain, and Big St. Germain. The total acreage of these reservoirs is 14,872 acres. The WVIC stores water in reservoirs during wet periods, and releases water during dry periods to maintain uniform water flow in the Wisconsin River for hydroelectric purposes.

As of 2024, there are 92 (21 more than in 2009, but down from a high of 104 in 2014) lake associations in Vilas County and 13 lake districts (up from 10 in 2014). Lake associations can form without any formal requirements, although many incorporate under Chapter 181 of the Wisconsin Statutes to be eligible for state cost sharing grants. The focus of many of the lake associations is to provide lake education and information to its members. Lake districts are governmental bodies with elected or appointed leaders and annual budgets funded from tax levies or special assessments. Lake districts also have some capabilities to regulate lake use, such as local boating ordinances and sewage management. Many of these groups (lake associations and districts) have initiated comprehensive lake management efforts, volunteer AIS protection efforts, and volunteer water quality monitoring programs. Several organizations are also participating in lake management studies funded through the DNR Lake Planning Grant program.

C. Wetlands

Wetlands perform many undervalued roles in the proper function of the hydrologic cycle and local ecological systems. In Vilas County the water table is close to the surface, which is evident because about 18% of the County is covered with wetlands. In terms of hazard mitigation, they act as water storage devices in times of high water. Like sponges, wetlands are able to absorb excess water and release it back into the watershed slowly, preventing flooding and minimizing flood damage. As more impermeable surfaces are developed, this water runoff storage becomes increasingly important.

Plants and soils in wetlands have the capacity to store and filter pollutants ranging from pesticides to animal wastes. Calm wetland waters, with their flat surface and flow characteristics, allow particles of toxins and nutrients to settle out of the water column. Plants take up certain nutrients from the water. Other substances can be stored or transformed to a less toxic state within wetlands. As a result, the lakes, rivers and streams are cleaner.

Wetlands that filter or store sediments or nutrients for extended periods may undergo fundamental changes. Sediments will eventually fill in wetlands and nutrients will eventually modify the vegetation. Such changes may result in the loss of this function over time. Eradication of wetlands can occur through the use of fill material. This can destroy the hydrological function of the site and open the area to improper development. The DNR has promulgated minimum standards for managing wetlands.

Wetlands contribute both directly and indirectly to the economic base of Vilas County, most especially through the health of the lakes. When wetlands are damaged or destroyed, these ecological functions are lost. To restore or replace these functions is incredibly expensive and not always effective. Per unit area, wetlands contribute more ecological services than their area predicts.

See pictures and descriptions of some wetland plants of concern in **Appendix E**. See a table of wetland natural communities in **Appendix G**.

Vilas County is a mecca of wetlands and wetland activity (see **Figure 17**). **Table 2** lists the types of wetlands and ecosystem services they provide.

Table 2 **Wetland Types & Acreages Found in Vilas County**

WETLAND CLASSIFICATION	~Acres in Vilas County	Ecosystem Services Present
Aquatic Bed	81	FS, WH, WR, FP, RH, RC
Emergent / Wet Meadow / Open Water	3178	SP, GF, WS, WH, WR, FP, RH, RC, PH
Drained / Filled Wetland	35	
Forested	41951	GF, WS, WH, FP, RH, RC, TB
Forested / Emergent / Wet Meadow	1773	CS, GF, WS, WH, WR FP, RH, RC, TB, PH
Forested / Open Water	710	SP, GF, WS, WH, FP, RH, RC, FS
Forested / Scrub / Shrub	23430	CS, GF, WS, WH, FP, RH, RC, TB, PH
TOTAL	**101707**	

Abbreviations Ecosystem Services	Abbreviations Ecosystem Services
(FS) Fisheries Support	(GF) Groundwater Filter
(WH) Wildlife Habitat	(WS) Water Storage
(WR) Wild Rice	(PH) Pollinator Habitat
(FP) Flood Protection	(CS) Carbon Sequester
(RH) Rare Species Habitat	(TB) Timber
(RC) Recreation	(SP) Shore Protection

Source: WI Wetland Inventory (Ramsar website)

In 2020 LWCD measured the health and vulnerability of Vilas County wetlands, using a combination of four components of information that were collected to gain an overall rank for each HUC 12 watershed. The loss of wetland ecosystem services was identified for each HUC 12 using the Wetlands by Design program. We then scored each HUC 12 watershed for the amount of wetland acres each contained, and for how many of those acres were in private land ownership. The last component was the percentage of lost original wetland area in Vilas County. These components were used to rank the vulnerability of wetlands in each HUC 12 in the county by low, medium, and, high (see **Table 3**).

Table 3 Vulnerability Scores of Wetlands in Vilas County

HUC 12	Point Value	HUC 12	Point Value
040201010301	8	070700010104	8
040201010302	10	070700010204	7
040201010303	10	070700010206	9
040201010305	10	070700010301	7
040201020101	8	070700010302	9
040201020102	6	070700010303	7
040201060103	0	070700010304	7
040301060301	8	070700010305	10
040301060302	7	070700010306	7
070500020101	6	070700010307	8
070500020102	7	070700010308	8
070500020103	8	070700010401	8
070500020104	7	070700010402	7
070500020105	7	070700010403	7
070500020106	8	070700010404	10
070500020107	9	070700010501	8
070500020108	7	070700010502	9
070500020201	8	070700010503	8
070500020202	8	070700010801	9
070500020203	7	070700010803	10
070500020302	8	070700010804	8
070500030202	7	070700010806	7
070500030203	6		
070700010101	11	5 - 8	Low Vulnerability
070700010102	8	9	Med Vulnerability
070700010103	6	10-12	High Vulnerability

Wetlands, 1971

"In low, wet areas, extensive marshes and swamps have developed. In the Northern Highland Region, marshes, or muskeg cover about 21 percent of the area in Vilas, Oneida, and adjacent counties. The peat in these bogs is a resource which is not being utilized at present. Cranberry farms may also utilize these areas for production.

These marshes also serve a most important function as an area of water reserve, absorbing water during periods of precipitation. The county occupies an important role in the economy of the rest of the state from this viewpoint."

Most watersheds within Vilas County ranked in a low vulnerability status and need to be protected as such. Five watersheds ranked in the medium vulnerability category for wetlands, which means that they are threatened in some capacity and should be watched. The remaining seven watersheds ranked in the high category for wetland vulnerability. These rankings help prioritize the LWCD workload.

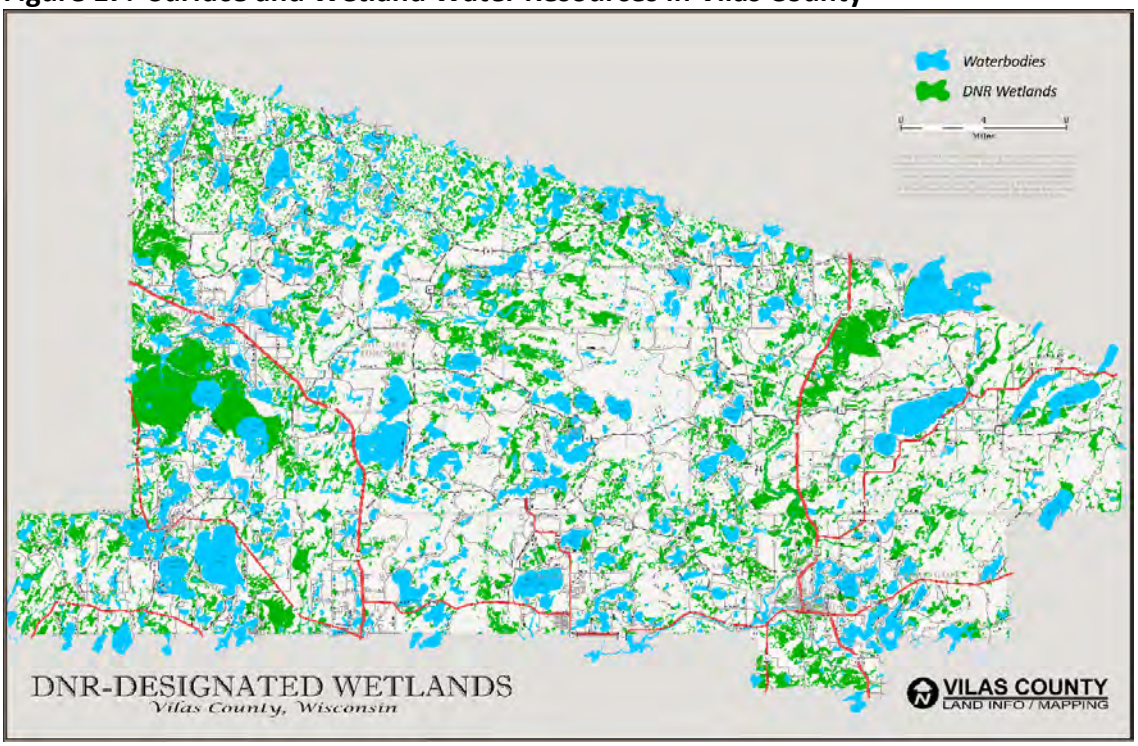
Vilas County had placed additional wetlands efforts as one of the goals in the current Land & Water Conservation Plan so that we could begin to clarify what the Conservation Department could do to raise awareness of, and protect, these vital natural resources. A review of the existing Vilas County Zoning Ordinance was completed to determine wetland protection factors that may be improved in the future. Next, a simple monitoring protocol was created, specific to Vilas County, so that we could accomplish field assessments quickly and efficiently and begin to collect information about the wetland resources that exist throughout the county. Finally, we wanted to increase awareness of wetlands and the way they function, so we incorporated educational efforts.

Wetlands encompass nearly 20% of the land base in Vilas County; see **Figure 17**. The landscape includes many large northern bogs in addition to black spruce and other conifer swamps. Many streams are bordered by mixtures of alder thickets and poor fens. Unfortunately, many residents and visitors think of wetlands as "wasteland - good for nothing but breeding mosquitos." Many people are even scared of walking through wetland areas.

Wetlands serve as living habitat for plants, birds and other wildlife species, they act as sponges for water infiltration, serve to recharge groundwater supplies, they soak up and store large volumes of stormwater to prevent flood disaster, and recharge surface waters during drought periods. Vilas County Land & Water Conservation recognize our role and responsibility to educate the public about wetlands.

The best way to get people to move past their fear of wetlands is to spend time in one. County staff regularly lead tours on foot (or paddle) into wetland complexes for local outdoor groups, schools, or as part of regional nature festivals. During these fun field experiences information is shared about how wetlands were formed, why they occur in that particular spot in relation to the landscape, what the dominant vegetation is, unique plant survival strategies, and about what types of wildlife are dependent on these communities.

Figure 17: Surface and Wetland Water Resources in Vilas County



County Ordinance Review

Prior to Wisconsin's Legislature Act 55 changes to local shoreland zoning in 2017, Vilas County had a lake classification system in place that may have incidentally provided more protections to wetlands. As part of the local lake classification system, lakes of a size greater than 50 acres were classified based upon sensitivity to development and the level of existing development along privately-owned shoreline. Wetlands associated with high and medium sensitivity waters with low to medium development levels might have been indirectly protected by the larger lot sizes and width requirements that facilitated the avoidance of wetland impacts. However, this classification system is no longer in place.

Nonetheless there are wetland provisions in the Vilas County Shoreland Zoning Ordinance. In Section 1.3, the Shoreland Zoning Ordinance identifies "preserving wetlands and other fish and aquatic habitat" as a way to achieve the goals of "promoting the public health, safety, convenience and welfare, and to: 1) Further the maintenance of safe and healthful conditions; 2) Protect spawning grounds, fish and aquatic life; 3) Preserve and restore shoreland vegetation and natural scenic beauty; 4) Prevent and control water pollution; 5) Prevent erosion of the soil; 6) Preserve the compatibility of proposed development with existing land and water usage; and 7) Control building sites, development, placement of structures and land uses."

The shoreland ordinance only applies to lands located within 1,000 feet of the ordinary high-water mark (OHWM) of navigable lakes, ponds or flowages, or to lands within 300 feet of the OHWM of navigable rivers or streams, or to the landward side of the floodplain, whichever distance is greater. It protects all wetlands that are within the shoreland-wetland district and are identified on the Wisconsin Wetland Inventory maps available from the Department of Natural Resources (DNR) Surface Water Data Viewer online. In addition, if a wetland is not correctly mapped and field conditions meet wetland criteria as identified by a staff member of the Vilas County Zoning Department, it can be treated as a wetland.

Outside of the shoreland-wetland district, wetlands are regulated by the U.S. Army Corps of Engineers and the Wisconsin DNR. This includes wetlands that are identified as Waters of the US, i.e. navigable bodies or those that are connected to navigable bodies. The Wisconsin DNR regulations address the waters of the state which include wetlands (including what are now called non-federal wetlands), as identified by the state's wetland inventory maps. Under these rules provisioned under Chapter 30 WI Statutes, development levels in wetlands should be limited to the greatest extent possible. When development is permitted in a wetland, it should occur in a manner that minimizes the adverse impacts upon the wetland ecosystem.

Currently, neither the Vilas County Shoreland Ordinance nor the General Zoning Ordinance contain permitting requirements that encourage applicants to avoid and minimize indirect wetland impacts. There are no required setbacks from wetland edges. There are no rules to prevent changes in hydrology. There are no provisions that facilitate the approval of conservation subdivisions. Vilas County is proposing to put a wetland setback in the General Zoning Ordinance. This would require a 10-foot buffer around a wetland area for any structure placements. This proposed change may occur sometime in the first quarter of 2021, pending County Board approval.

Vilas County has no current plans to address other wetland protection methods at the local level. Perhaps certain wetland protections in the future could be beneficial to protecting the water quality of Vilas County,

including incentivizing wetland owners of those wetland types at most risk from development, or highly productive wetlands, to be protected with conservation easements or large buffer zones? Another option might be to target wetland protection within a high-risk watersheds to benefit from a desired ecosystem services? Perhaps downstream users, who benefit from those ecosystem services, would contribute financially to protect those wetlands in a way that benefits the landowners? There is a ripe opportunity to address wetland protections in Vilas County now, while those wetlands are in relatively good condition.

Wild Rice (Manoomin in Ojibwe)

Though recognized as a prized food source for Native Americans, both historically and today, few people are aware of the importance of wild rice to many of Wisconsin's wildlife species. Capable of producing over 500 pounds of seed per acre, wild rice provides a nutrient-rich food source, offers refuge from predators and increases the overall vegetation structure on the landscape, in turn enhancing biodiversity. (DNR)

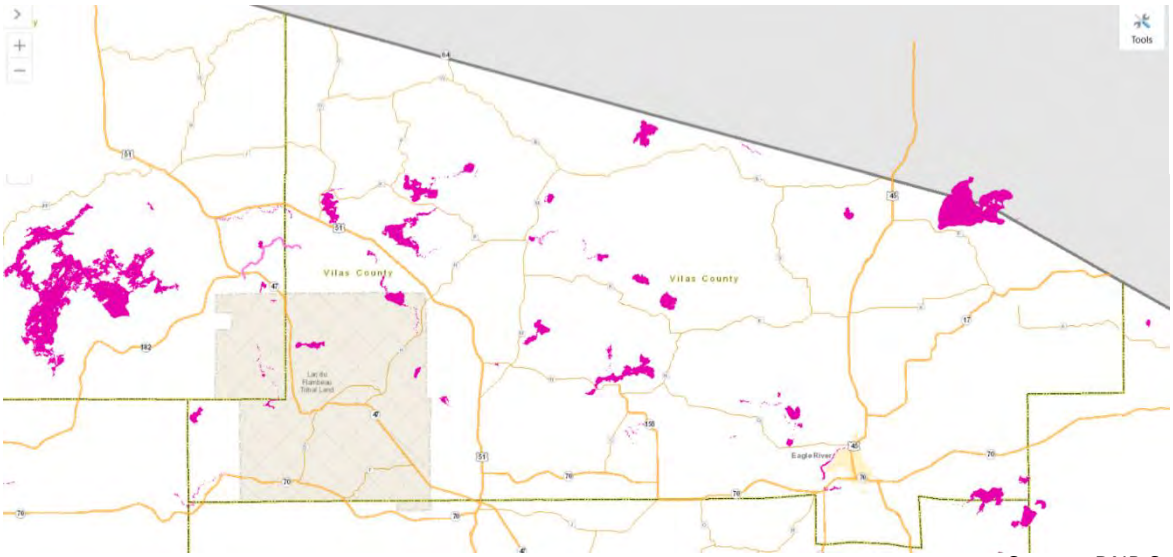
Habitat requirements for wild rice are fairly specific. Wild rice grows best in gently flowing waters with a mucky or organic bottom and in areas with relatively stable water levels during the growing season. Wild rice prefers a water depth between six inches and three feet. Often, these areas are near the inlet or outlet of a lake. (DNR)

Wild rice is most-often known for its importance to fall-migrating waterfowl. Mallard, blue-winged teal, ring-necked duck and wood duck consume wild rice. Common loons, red-necked grebes and muskrats commonly use wild rice for nesting materials. Muskrats forage heavily on the green shoots of wild rice during the spring. The presence of muskrats enhances the use of rice beds by some waterfowl species due to the small openings created amid dense cover. Additionally, muskrat houses are used as nesting sites by trumpeter swans and Canada geese, as perching sites for herons and eagles and as sunning areas for turtles. Other species that forage on wild rice include beaver, white-tailed deer and moose. (DNR)

A rich community of insects—both terrestrial and aquatic—is found among wild rice, providing a bountiful food source for blackbirds, bobolinks, rails and wrens. Wild rice is also a source of food for amphibian and fish populations, which in turn attracts loons, herons and mink. (DNR)

Wild rice beds exist as places of high biological diversity with numerous benefits that extend throughout the food chain. Protecting important areas where wild rice thrives will help ensure the persistence of many of Wisconsin's wildlife for all to enjoy. See **Figure 18** for wild rice beds in Vilas County. (DNR)

Figure 18 Wild Rice Waters in Vilas County



Source: DNR Surface Water Data Viewer

= Wild rice lakes, rivers and streams

4.13 Water Designations

A. Outstanding and Exceptional Resource Waters

The DNR has given special designations to water resources throughout the State of Wisconsin that have the highest water quality and fisheries in the State and therefore deserve special protection. Outstanding Resource Waters (ORWs) and Exceptional Resource Waters (ERWs) share many of the same environmental and ecological characteristics. The primary difference between the two is that ORWs typically do not have any direct point sources discharging pollutants directly to the water. In addition, any pollutant load discharged to an ORW must meet background water quality at all times. Exceptions are made for certain types of discharge situations to ERWs to allow pollutant loads that are greater than background water quality when human health would otherwise be compromised.

Outstanding resource waters (ORW) in Vilas County include 13 lakes (12 lakes in 2009); 17 creeks and springs (9 in 2009); and 5 river (4 rivers in 2009).

Exceptional resource waters (ERW) in Vilas County include 3 lakes; 23 creeks and springs; and 3 rivers.

See **Map 7–Designated Waters** for all the ORWs and ERWs countywide.

B. Impaired Waters – 303(d) Waters

Section 303(d) of the federal Clean Water Act requires states to develop a list of impaired waters, commonly referred to as the "303(d) list." A water body is considered impaired if a) the current water quality does not meet the numeric or narrative criteria in a water quality standard or b) the designated use that is described in Wisconsin Administrative Code is not being achieved. A documented methodology is used to articulate the

approach used to list waters in Wisconsin. Every two years, states are required to submit a list of impaired waters to EPA for approval. See **Map 7–Designated Waters** for all the current *impaired waters* countywide. See a list of these waters in **Appendix H**.

Waters in Vilas County are 303(d) impaired due to:

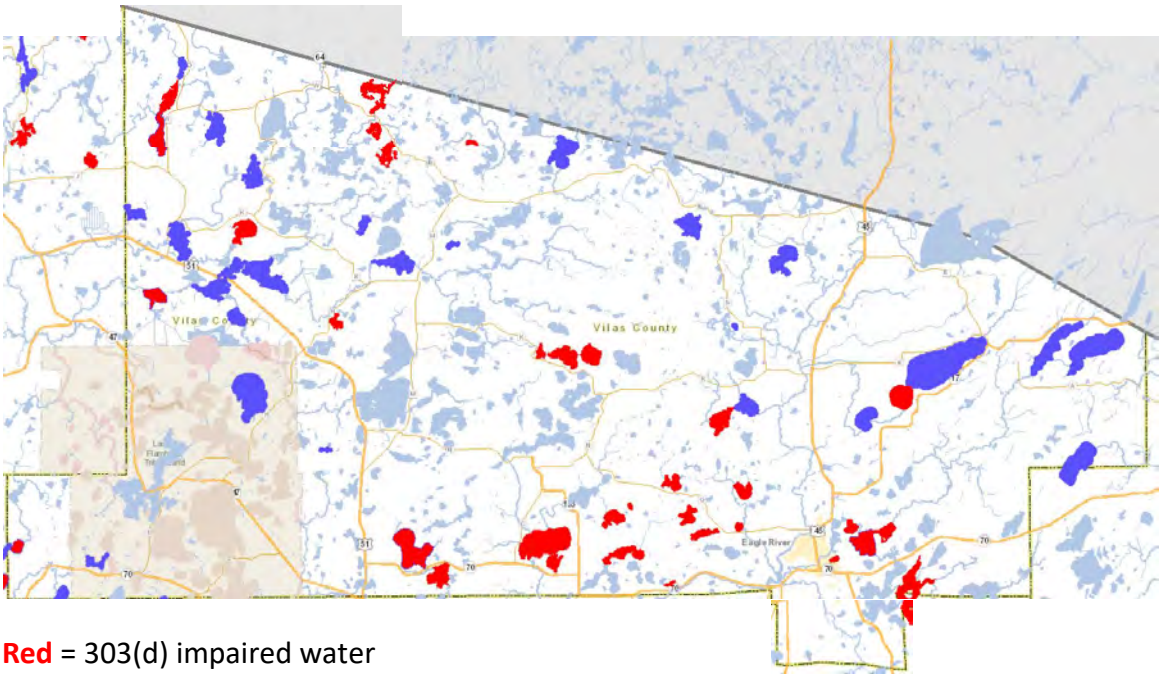
1) mercury, which is deposited from the atmosphere – 12 lakes;
2) total phosphorus, from non-point sources – 5 lakes; and
3) unknown pollutant – 2 lakes.

Many lakes in Vilas County are no longer 303(d) impaired:

1) mercury – 20 lakes;
2) total phosphorus – 4 lakes; and
3) unknown pollutant – 2 lakes.

The earliest de-listed waters in **Figure 19** go back to 2006.

Figure 19 303(d) Listed and Un-Listed Waters in Vilas County



Source: DNR's Surface Water Data Viewer

Red = 303(d) impaired water
Blue = waterbody no longer 303(d) impaired

In 2014 there were 30 waterbodies in Vilas County on the 303(d) list, which was up from 24 waterbodies in 2008. Most of these waterbodies are listed due to fish consumption advisories for mercury contamination, with "total phosphorus" being the other major reason for water impairment.

As of 2024, there are 34 impaired waterbodies [303(d) listed] in Vilas County. About 9 lakes are still impaired due to mercury, which comes from coal fired power plant emissions. About 16 lakes are now impaired due to total phosphorus levels, which is up from 1 lake in 2014. Another 9 lakes have excessive algae growth from an

unknown pollutant. Twenty lakes are no longer impaired by mercury, and 4 lakes are no longer impaired by total phosphorus. Some of the de-listed lakes in **Figure 19** were delisted as long ago as 2006, but many don't have delisting dates identified.

Mercury Impairment

Mercury in lakes comes from atmospheric deposition of exhaust from coal fired power plants. Twenty lakes in Vilas County are no longer impaired by mercury. About 9 lakes are still impaired due to mercury.

Here are some changes to the closest coal fired power plants to Vilas County: The Ashland power plant replaced its last coal-fired boiler with a biomass boiler as of 2013. The other two boilers in Ashland burned biomass since 1979. The Weston Power Plant near Wausau retired Weston 1 in 2015 (60 MW from coal), retired Weston 2 in 2023 (81.6 MW from coal). Weston 3 is 350.5 MW from coal since 1981. In 2008 Weston 4 came online generating 595 MW from coal. Since mercury impairment of lakes in Vilas County has decreased, then probably the prevailing winds over the Weston power plant are not traveling over Vilas County, or Weston 3 and Weston 4 boilers have the latest pollution prevention controls on their emissions.

Phosphorus Impairment

Phosphorus levels in Vilas County lakes have been going up. About 16 lakes are now impaired due to total phosphorus levels, which is up from 1 lake in 2014. Another 9 lakes have excessive algae growth from an unknown pollutant.

A leading cause of phosphorus pollution in Vilas County lakes is from "nonpoint" sources. A "point" source would come out of a pipe, like from a factory or water treatment plant – none of which exist on lakes in Vilas County. Such nonpoint source pollution occurs when rains and melting snow wash over and through the ground. Runoff from farms, feedlots, fertilized lawns, building roofs, and streets & parking areas; failing septic systems, and decomposing natural sources like leaves, needles, and vegetation, are all sources of phosphorus entering rivers and lakes in Vilas County.

Figure 20 & Map 7 used data sourced from the DNR SWIMS database, professional and volunteer collected data from 1990-2019 was used to run linear regression analyses looking for total phosphorus trends over time in Vilas County Lakes. See **Map 8–Phosphorus Trends** for lakes countywide over the 1990 to 2019 timeframe.

To be considered usable, the data had to meet specific criteria:

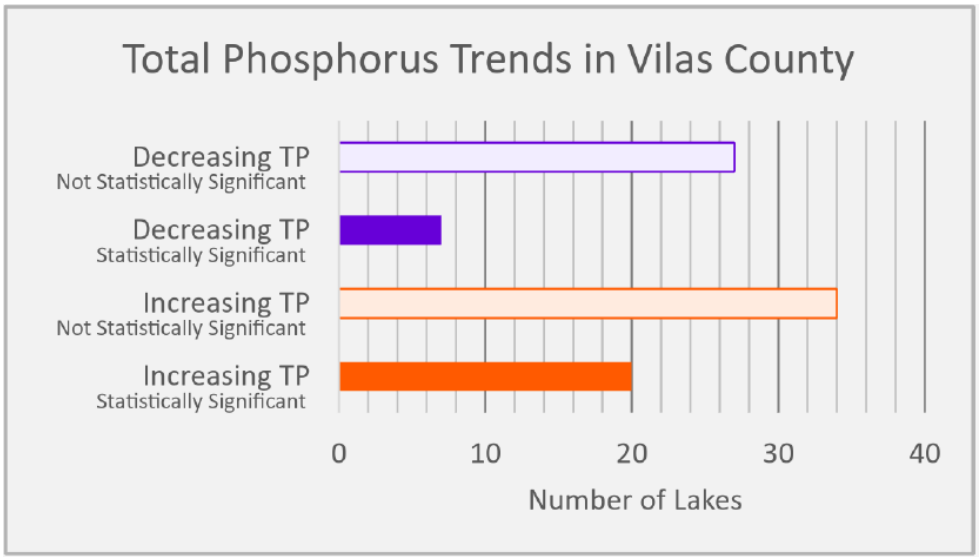
- Sampling point had to be from the deep hole of the lakes;
- Sampling depth had to be between 0-6 feet in depth (surface samples are ok, but bottom samples are not);
- The sample must be been taken between June 1-Sep 30;
- Must not be a blank or duplicate sample;
- Must not be hypereutrophic;
- Field and lab comments must indicate a valid sample was collected and properly processed; and
- Data must "make sense" – questionable/conflicting locations, depths, and results are omitted;

After the above criteria are met, then there must still be at least 5 usable data points per decade; and at least 1 sampling point must occur in each half of that decade.

Linear regression was used to detect trends in total phosphorus from the 88 lakes that met the above criteria, and trends were considered statistically significant if p-values were less than 0.05.

Most lakes (61 of 88) did not show statistically significant total phosphorus trends over time. However, 27 had statistically significant total phosphorus trends over time. Of these, 20 lakes were increasing in total phosphorus (74% of significant trends); and 7 were decreasing in total phosphorus (26% of significant trends).

Figure 20 Total Phosphorus Trends in Vilas County, 1990-2019



Source: Vilas County Land & Water Conservation, DNR SWIMS database 1990-2019.

Phosphorus Impairment – Wisconsin River TMDL, 2019

Due to very high annual amounts of algae in Petenwell and Castle Rock Lakes, the DNR and stakeholders created the Wisconsin River TMDL. This Total Maximum Daily Load (TMDL) study provides a strategic framework and prioritize resources for water quality improvement in the Wisconsin River Basin. The Wisconsin River TMDL study area spans Wisconsin's central corridor from the headwaters in Vilas County (Lac Vieux Desert) to Lake Wisconsin in Columbia County, covering 9,156 square miles (approximately 15 percent of the state). The U.S. EPA approved the Wisconsin River TMDL in 2019.

The TMDL study and implementation plan provides a strategic framework and prioritizes resources for water quality improvement. A review of the TMDL study shows that non-point source pollution below the Tomahawk Dam on the Wisconsin River are the main causes of phosphorus pollution in the Wisconsin River – but also that individual lakes in Vilas County are impaired by phosphorus from non-point source pollution.

C. Healthy Watersheds, High Quality Waters (DNR)

Background & General Overview

In 2022, the DNR's Water Quality Program launched the Healthy Watersheds, High-Quality Waters (HWHQW) initiative. This new focus on the "already healthy" waterbodies and watersheds – or land area draining to a lake, stream or wetland – is intended to celebrate these treasures and draw attention to the ecological, financial and societal benefits of protecting clean water.

This initiative utilized the US EPA Watershed Recovery Potential Screening Tool to model watershed health at the HUC12 scale throughout the state. The DNR also identified individual high-quality lakes, streams, rivers, and wetlands utilizing existing monitoring data and resource classifications. The modeled watersheds (HUC12 scale) can be sorted statewide and by major drainage basin (HUC6). The 30% healthiest watersheds in the state and within each major drainage basin are the geographic protection priorities for this statewide plan. As outlined in the Healthy Watersheds, High-Quality Waters Action Plan, the statewide goal is to keep 100% of the watershed protection priorities and high-quality waters within them healthy through 2030. The HWHQW website features an accompanying technical report, action plan for how to use this data, and ready-made maps and information dashboards.

HEALTHY WATERSHED

An area draining to a stream, lake or wetland where natural land cover supports the dynamic processes, habitat size and connectivity, and water quality conditions able to support healthy biological communities (adapted from EPA, epa.gov/hwp).

HIGH-QUALITY WATERS

Lakes, streams, and rivers with *at least two* of the following attributes:

- **unique or rare resource,**
- **attaining state water quality standards,**
- **or good-to-excellent biotic integrity.**

Also included are unique wetlands and those with least disturbed or reference conditions.

Historically, much of the DNR's emphasis has been to restore polluted waters as required by the federal Clean Water Act. Evidence is mounting, however, that actively protecting healthy water resources is a wise public investment, and the shift towards protection efforts is growing nationally. Within Vilas County where there is vast forested watersheds and limited agricultural and urban development compared to other parts of the state, adopting a watershed scale approach to protection is essential for high-quality waters to thrive. Identifying watershed protection priorities also serves to expand funding opportunities as more agencies, such as the EPA, promote the use of watershed planning monies for protection efforts.

Modeling Watershed Vulnerability, Opportunities, & Protection Potential

In addition to modeling watershed health, the HWHQW modeling team worked in collaboration with US EPA to customize the Recovery Potential Screening (RPS) tool to create additional indices to model watershed stressors (hurdles to long-term protection) and opportunities for protection. These indices are referred to respectively as the Vulnerability Index and Opportunity Index. A list of the metrics used to inform these indices can be found below. Ultimately, the watershed health, vulnerability, and opportunity index scores for a given watershed can be used to calculate a Protection Potential Index (PPI). The PPI was developed based on feedback from partners to prioritize the healthiest watersheds first, and secondly consider the likely greatest potential for protection

success in areas with the least modeled vulnerability and greatest known opportunities. PPI scores may be useful to understand vulnerability through time and integrate across DNR programs and partner efforts to leverage resources to the get "the most bang for your protection buck."

Vulnerabilities:

- Shoreland, Wetland & Watershed Habitat Alterations – past
- Loss of Wetland Services – past
- Watershed Land Use, including Urban and Agriculture – past and projected
- Climate Change – projected

Opportunities:

- DNR Forestry Ecological Landscape Priorities
- DNR Wildlife Conservation Opportunity Areas
- DNR Fisheries Brook Trout Environmental Resilience Reserves
- DNR Protection-based watersheds within approved TMDL areas
- Local lake, river & watershed organizations
- Freshwater fishing demand

Modeling & Assessment Results for Vilas County

Here are the overall results for Vilas County based on the 2021 DNR modeling and assessment effort. For the most up to date information, please refer to DNR's HWHQW webpage.

High-Quality Waters in Vilas County *(See **Appendix F** for a full list)* include:

- 123 High-Quality lakes, rivers, and streams
- 14 Healthy Wetlands
- 16 Rare & Unique Wetlands

In Vilas County, there are 42 HUC12 watersheds that were modeled as part of the HWHQW initiative. This includes watersheds whose area overlaps with other counties. The watershed model did not include any watersheds who have >50% of their area outside of the WI state border. Due to Vilas County sharing a border with the State of MI, there were five watersheds located partially in Vilas County that were not modeled

Watershed Protection Priorities in Vilas County *(See **Appendix F** for a full list and maps)* include:

- 33 watersheds, 33 (79%) are considered a Top 30% Statewide Watershed Priority.
- 29 watersheds (69%) are considered a Top 30% Large River & Great Lakes Basin (HUC6) Watershed Protection Priority.
- There are five HUC6 basins that overlap with Vilas County, but the large majority (38 of out 42) of the HUC12 watersheds in Vilas County are located in the Wisconsin River or Chippewa River basins.

See **Appendix F** for the following Vilas County HWHQW maps and tables:

- Table of High Quality Waters
- Table of HUC12 Watershed Health Scores & Ranks
- Map of High-Quality Waters
- Map of Watershed Protection Priorities – Statewide Top 30%

- Map of Watershed Protection Priorities – Chippewa River Basin Top 30%
- Map of Watershed Protection Priorities – Wisconsin River Basin Top 30%

4.14 Aquatic Invasive Species

The aquatic invasive species program in Vilas County has evolved since 2004 to concentrate efforts in three areas:

1. Public awareness and prevention
2. Early detection presence/absence monitoring, particularly for species that can be managed.
3. Effective management of manageable species (plants)

A. Public Awareness and Prevention

With the majority of area lakes not yet populated with any AIS, the objective of awareness and prevention is to help boaters understand how to prevent the spread of harmful plants and animals. General public awareness of AIS laws intended to promote good boater hygiene practices provides a foundation for prevention, but some aspects of the laws are not understood by all boats resulting in less than optimal compliance. If boaters fail to understand that some AIS are small-bodied microorganisms capable of being moved in on-board water, such as the spiny water flea, there will be a reluctance to properly drain all water from boats when moving equipment between lakes.

The perception that "weeds are the only species we need be concerned about" ended in late 2013 when an abundant population of spiny water fleas was found in Star Lake in central Vilas County. Previously believed to be in only Stormy Lake, a seepage lake with relatively little public access and therefore rather minimal risk of outward movement of the invader, the spiny water flea was regarded with lesser concern than invasive plants. Finding this species in Star Lake, one of three interconnected drainage lakes, all with heavily used public boat landings, was a wake-up call that transporting water between lakes in live wells, bilges and bait containers could easily result in the spread of harmful small-bodied microorganisms. Increased interest in wake sports that require boats with ballast tanks or bladders may exacerbate this issue, as these tanks can be difficult or sometimes impossible to thoroughly drain, retaining gallons of water.

In 2014 the Clean Boats, Clean Waters (CBCW) program was revised to emphasize explaining the reasons for the AIS prevention laws in WI. Using the spiny water flea as an example of how moving seemingly harmless water between lakes can have potentially devastating results to fish populations, it is believed that boaters will more readily comply with a law that may not have been understood previously. DNR and Extension Lakes continue to conduct a boater behavior survey which attempts to track overall boaters' behavior in relation to AIS prevention steps, and continue to find draining water from boats, equipment, and livewells is the most difficult behavior to change.

The CBCW program is regarded by many local lake organizations as their best defense against spreading AIS. While originally intended to be a program of limited duration and therefore sustainable by volunteers for as long as needed, it is now regarded as necessary for well into the future. The DNR CBCW grant program was simplified in 2012 making funding easy to obtain for hiring seasonal employees to interact with boaters at public

landings. In 2023 Vilas County Land & Water Staff were able to train (or re-train) 74 CBCW inspectors representing 36 different lake organizations. In 2023 paid and volunteer CBCW inspectors logged over 13,900 hours on boat landings in Vilas County and were able to contact over 42,000 boaters.

B. Early Detection Presence/Absence Monitoring

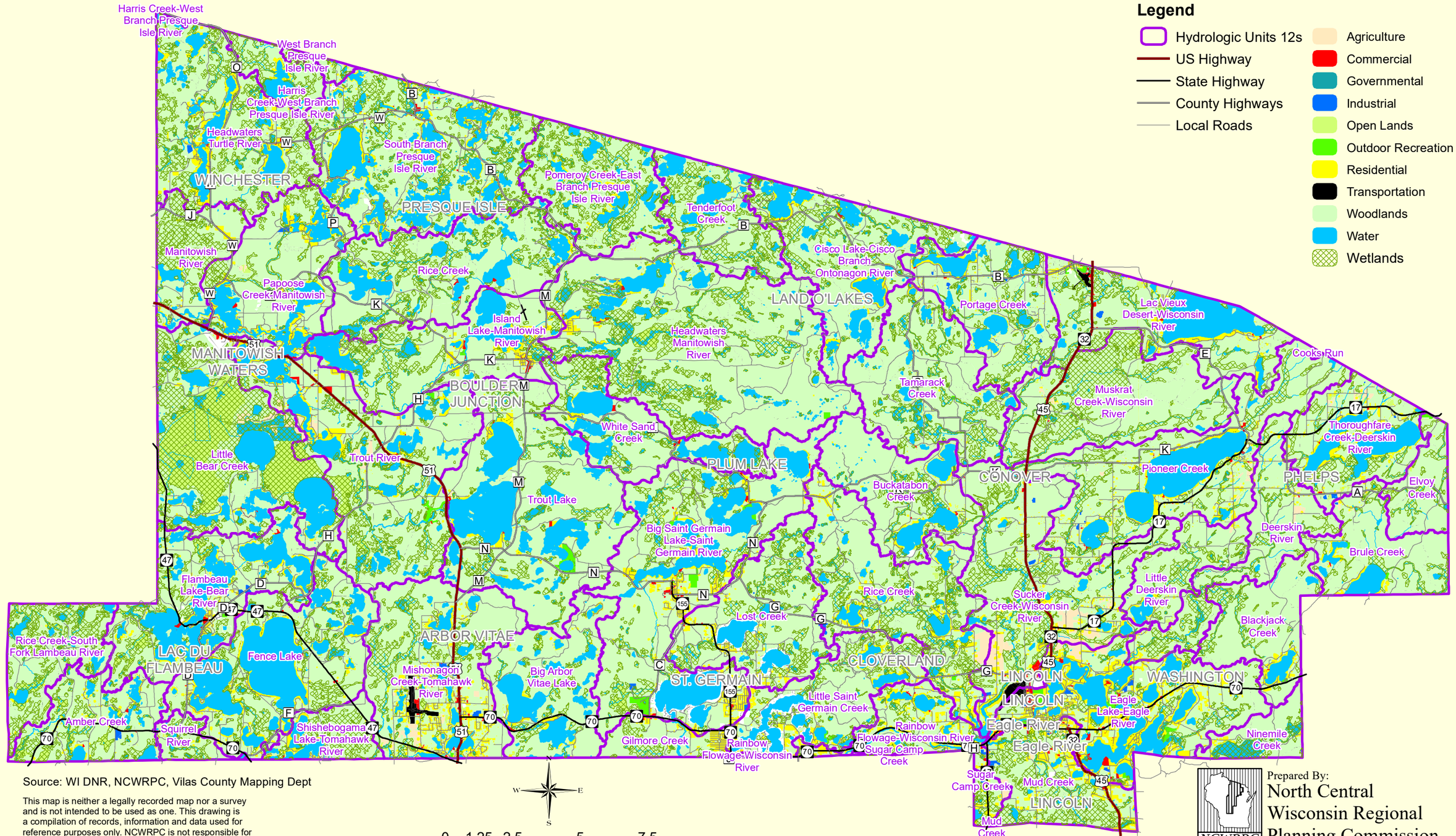
Since it is only plant species that can be managed effectively and many of the animal species require special equipment and training to detect, citizen monitoring in Vilas County for presence/absence of AIS is predominantly for Eurasian watermilfoil and Curly-leaf pondweed. Shoreline invasives such as Phragmites, purple loosestrife, and knotweeds are also best managed if detected early, and are included in training efforts. Lake organizations have come to understand that early detection of these plants, before their populations are well established, typically results in more effective and lower cost management efforts. Seasonal workshops to help citizen monitors detect and report suspicious plants are an important aspect of effective monitoring.

C. Effective Management of Manageable Species

DNR and other professional partners have been monitoring managed and unmanaged populations of Eurasian watermilfoil statewide. This project hopes to show a “purchased management” picture for herbicide use based on location of lakes in the state. The Northern Region of WI had less of a decrease in Eurasian watermilfoil frequency of occurrence after herbicide treatments than in other regions of the state, showing that “purchased management” was less impactful in the Northern Region. This may provide a case for the need for integrated pest management in the Northern Region. Invasive plant management options like hand harvesting, diver assisted suction harvesting (DASH), biocontrol such as milfoil weevils, and mechanical harvesting can be permitted methods of control in addition to, or in place of, herbicide treatments.

Curly leaf pondweed management in Vilas County has been more challenging likely due to the persistence of its turions in lake sediments. Treatment with herbicides, DASH, and hand pulling have been the primary methods for control. There is no approved biocontrol for curly leaf pondweed. More needs to be learned about curly leaf pondweed management and collaboration with partners is essential to build collective knowledge on how and when to best manage it.

Tactics for management of shoreline invasives such as Phragmites, knotweeds, purple loosestrife, and yellow iris have been teased out from projects elsewhere in WI and surrounding states. Strategies for hand removal, how and when to best apply which herbicides, and understanding the need for site restoration after treatment have been developed with collaborative groups. There is an effective biocontrol for purple loosestrife (*Gallerucella* beetles), that has been used for many years in Vilas County. There is currently no approved biocontrol for yellow iris, Phragmites, knotweeds, or garden yellow loosestrife.



Source: WI DNR, NCWRPC, Vilas County Mapping Dept

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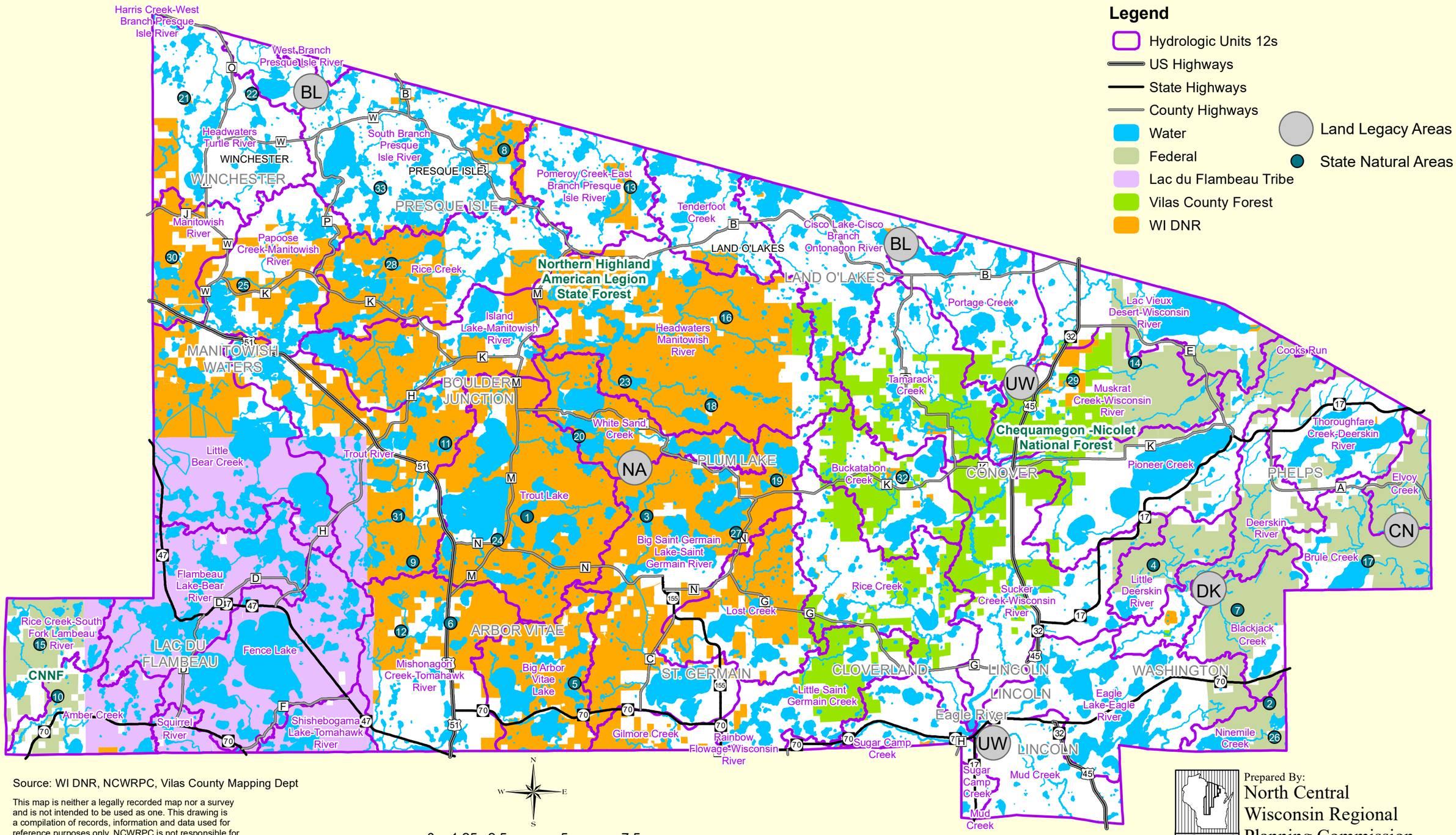

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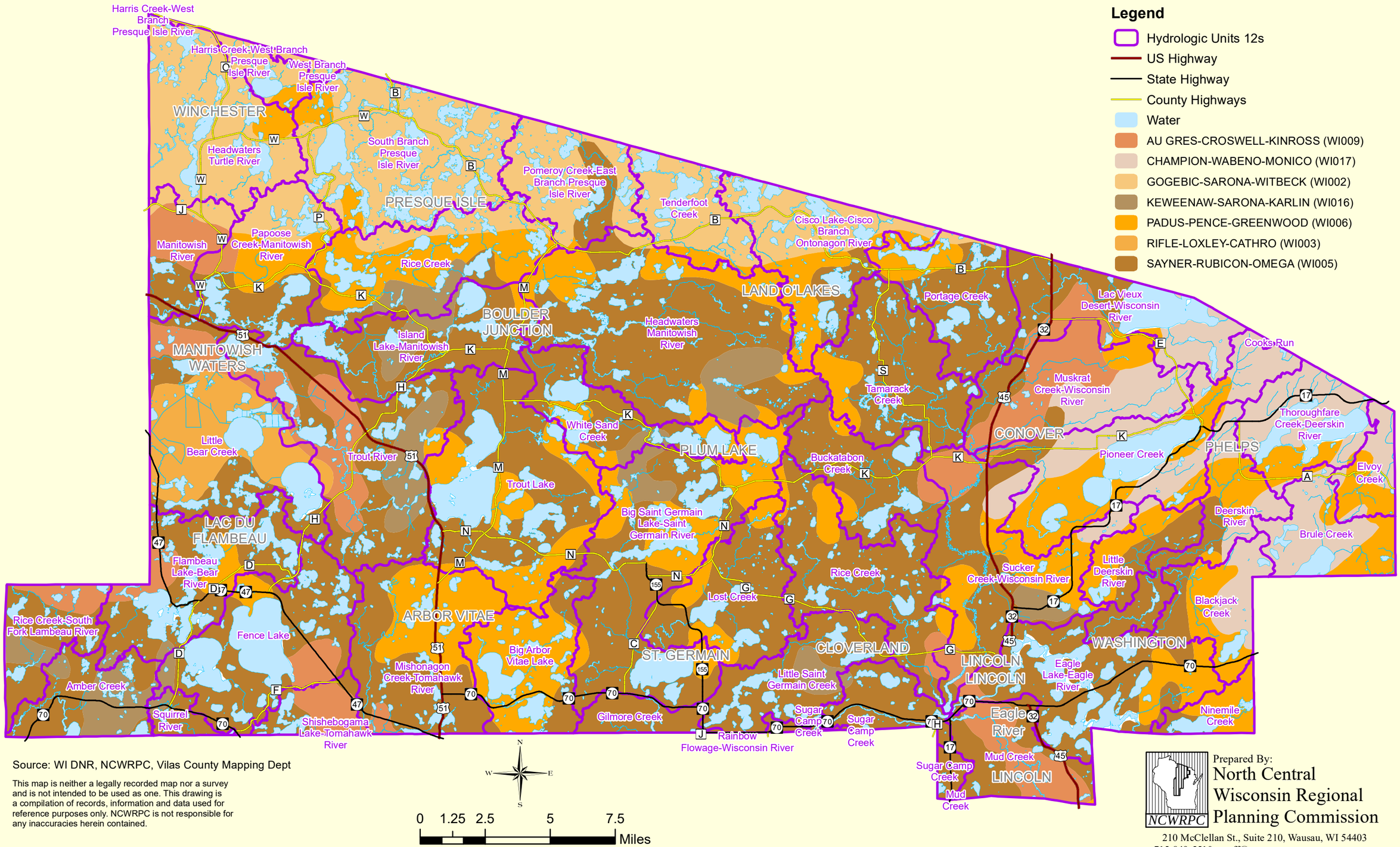

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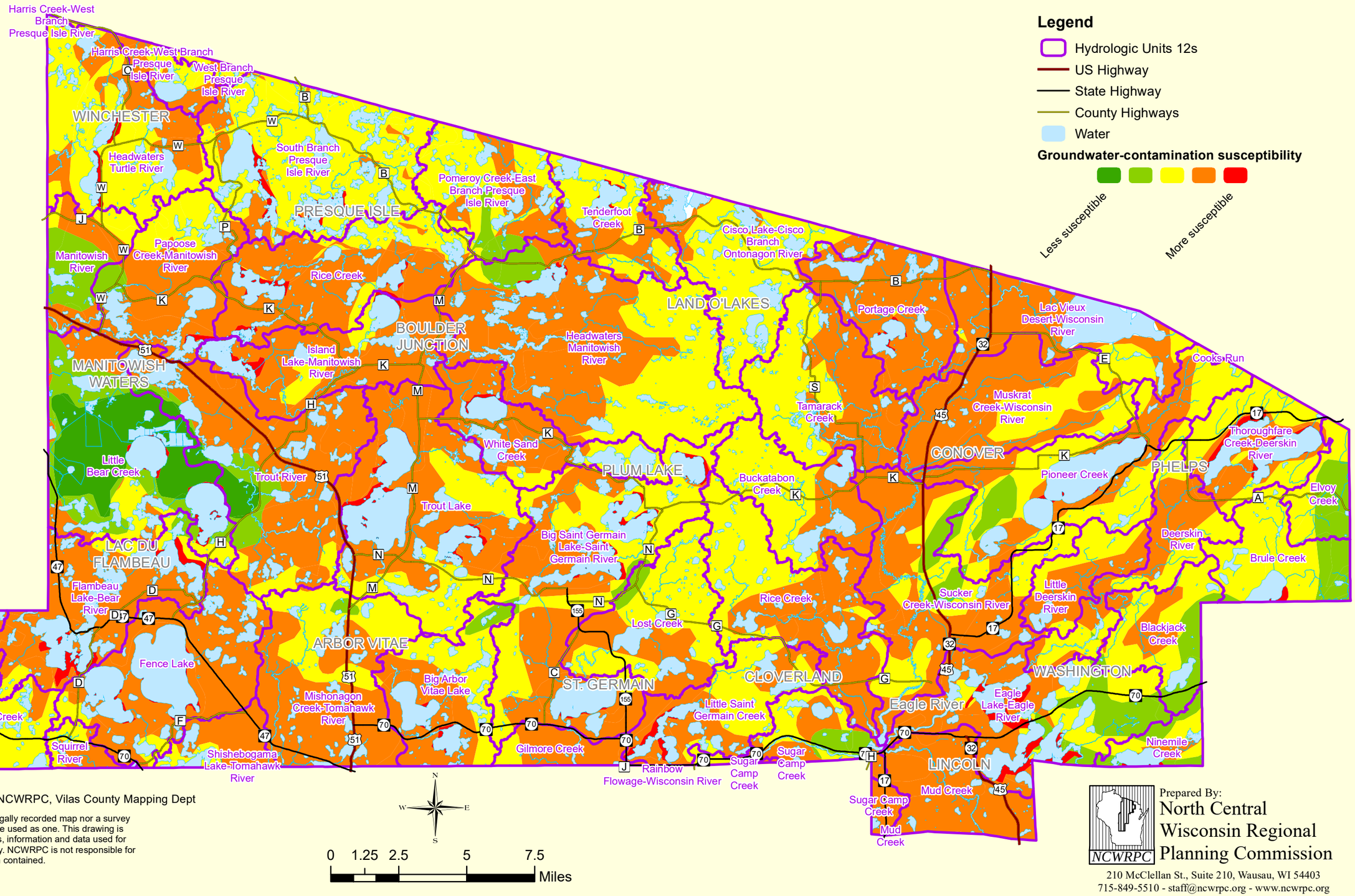

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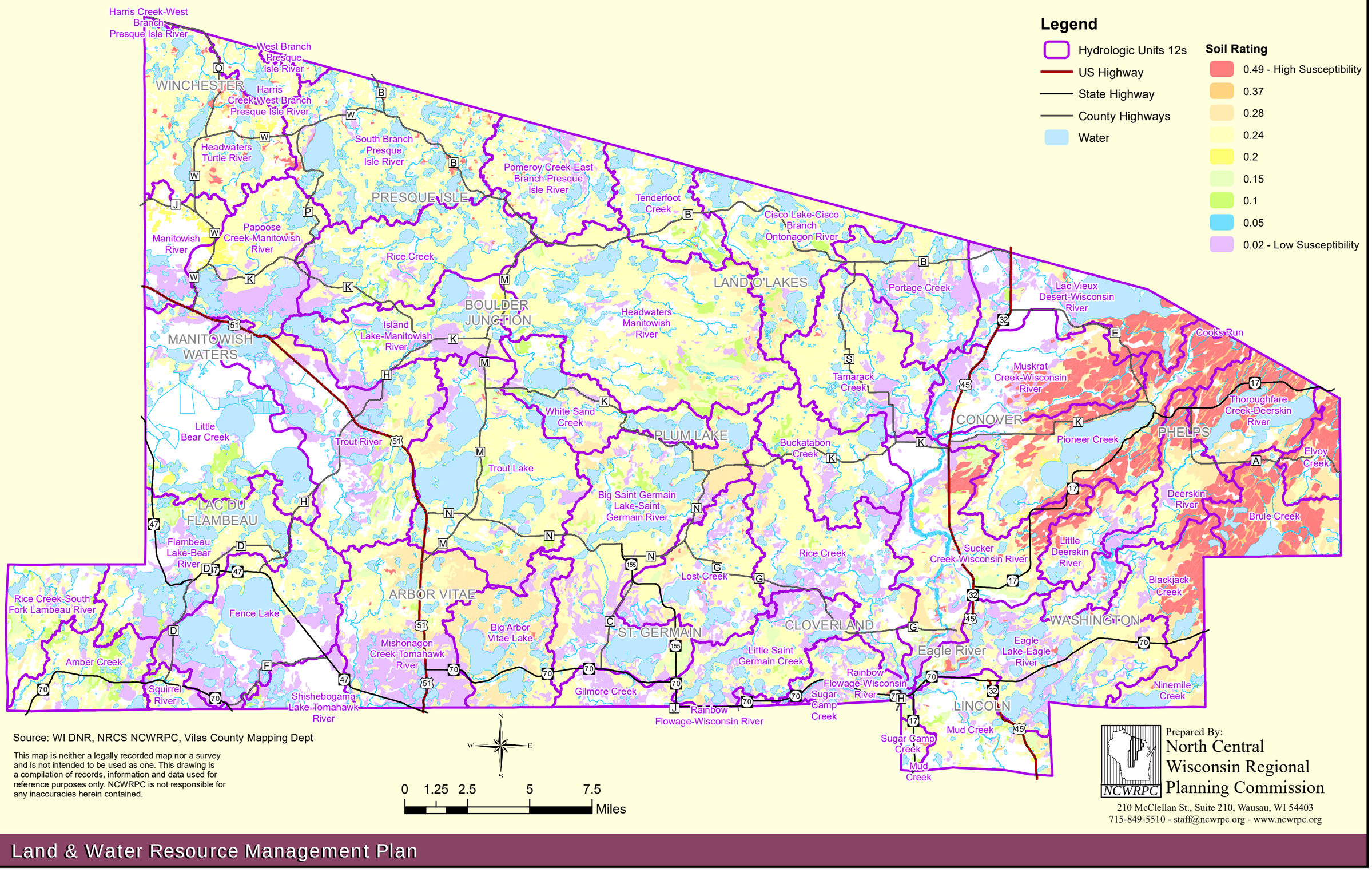

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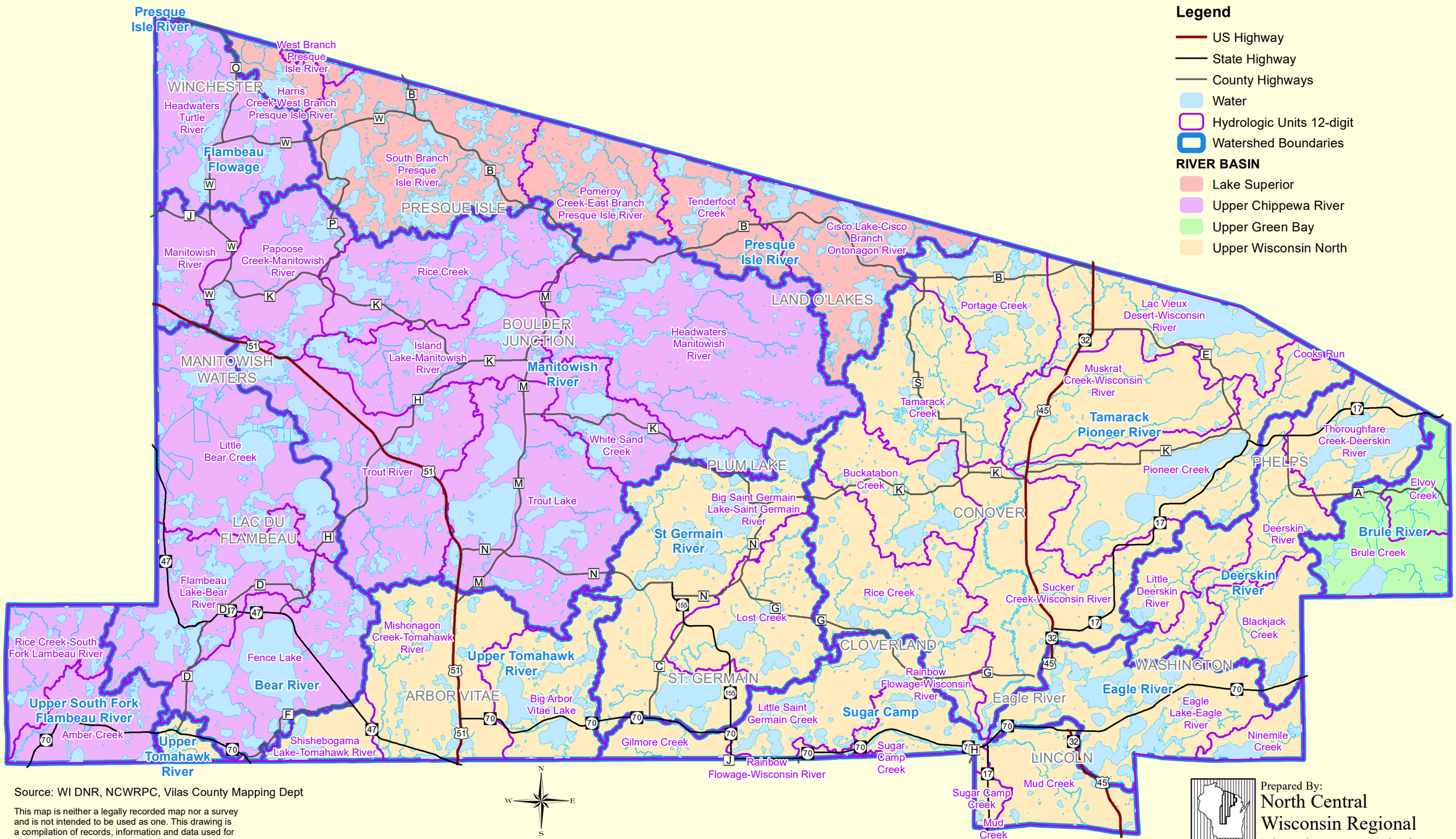

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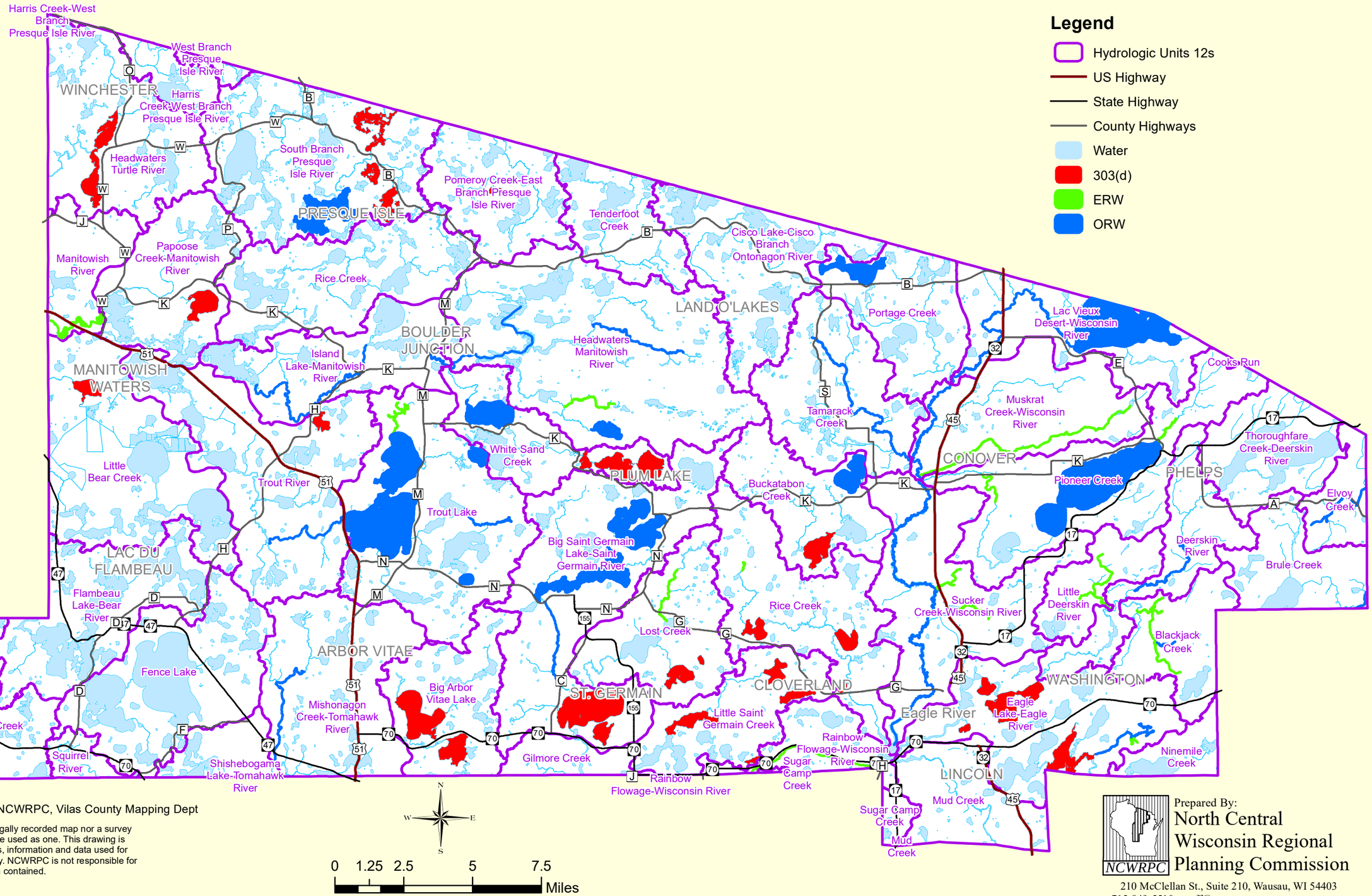

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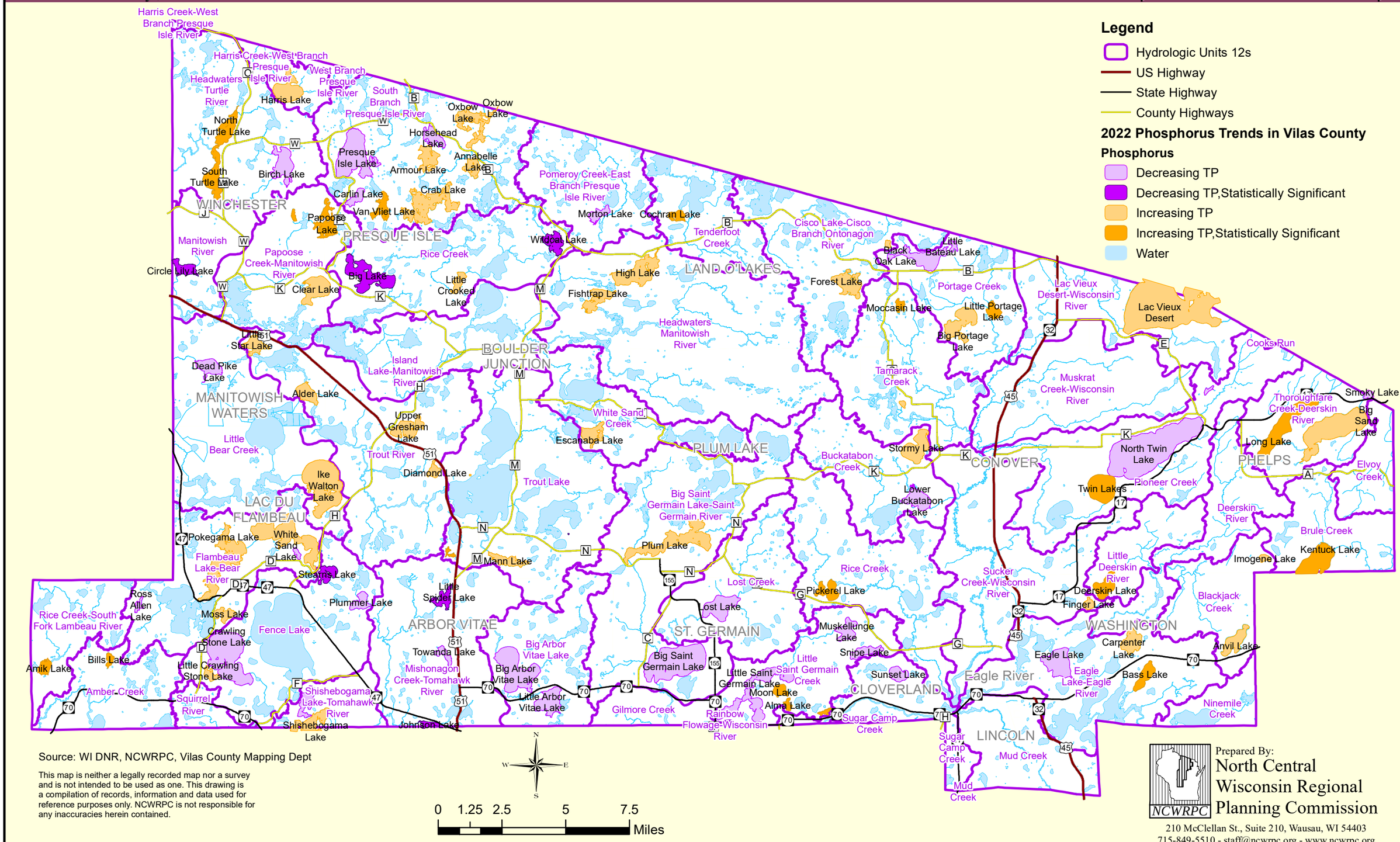

Legend

- Hydrologic Units 12s
- US Highway
- State Highway
- County Highways

2022 Phosphorus Trends in Vilas County

Phosphorus

- Decreasing TP
- Decreasing TP,Statistically Significant
- Increasing TP
- Increasing TP,Statistically Significant
- Water

Source: WI DNR, NCWRPC, Vilas County Mapping Dept

N W E S

0 1.25 2.5 5 7.5 Miles

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CURLY-LEAF PONDWEED

1. Big Arbor Vitae Lake
2. Harris Lake
3. Island Lake
4. Little Arbor Vitae Lake

CURLY-LEAF PONDWEED

5. Mamie Lake
6. Rest Lake
7. Rice Creek
8. Shishebogama Lake
9. Tomahawk River
10. Vance Lake

EWM & CLP

11. Anvil Lake
12. Big Sand Lake
13. Fawn Lake
14. Johnson Lake
15. Kentuck Lake
16. Lac Vieux Desert
17. Little St. Germain Lake
18. Lost Lake
19. Manitowish Lake
20. Spider Lake
21. Stone Lake
22. Wisconsin River

EURASIAN WATER-MILFOIL

24. Arrowhead Lake
25. Big Lake
26. Boot Lake
27. Brandy Lake
28. Catfish Lake
29. Clearwater Lake
30. Cranberry Lake
31. Deerskin Lake
32. Duck Lake
33. Eagle Lake
34. Forest Lake
35. Found Lake
36. Little Spider Lake

EURASIAN WATER-MILFOIL

37. Little Star Lake
38. Little Star Lake (MW Chain)
39. Long Lake
40. Lower Buckatabon Lake
41. Lynx Lake
42. Middle Gresham Lake
43. Muskellunge Lake
44. North Twin Lake
45. Ontonagon River
46. Otter Lake
47. Palmer Lake
48. Scattering Rice Lake
49. Silver Lake
50. Smoky Lake
51. South Twin Lake
52. Tenderfoot Lake

EURASIAN WATER-MILFOIL

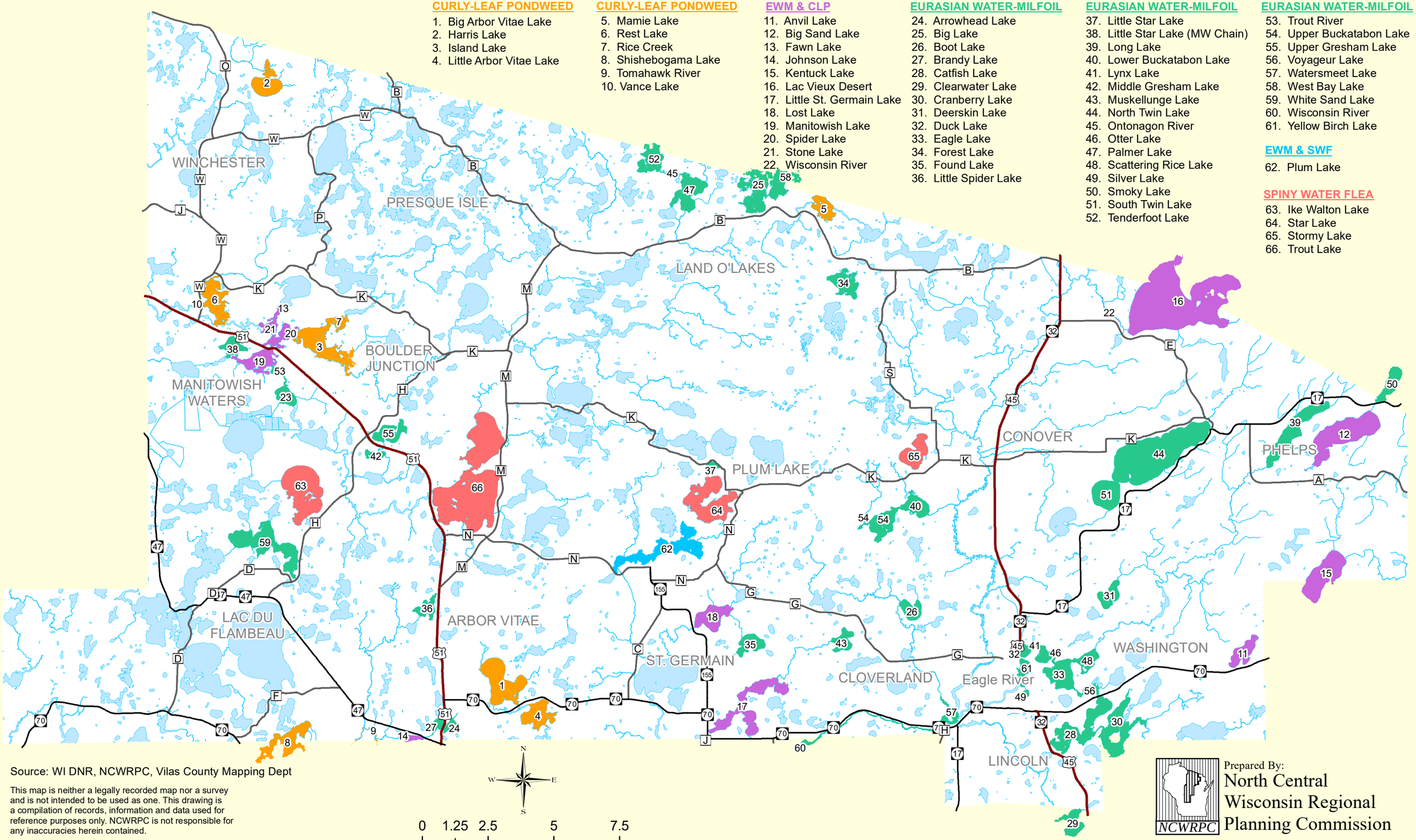
53. Trout River
54. Upper Buckatabon Lake
55. Upper Gresham Lake
56. Voyageur Lake
57. Watersmeet Lake
58. West Bay Lake
59. White Sand Lake
60. Wisconsin River
61. Yellow Birch Lake

EWM & SWF

62. Plum Lake

SPINY WATER FLEA

63. Ike Walton Lake
64. Star Lake
65. Stormy Lake
66. Trout Lake



Source: WI DNR, NCWRPC, Vilas County Mapping Dept

This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. NCWRPC is not responsible for any inaccuracies herein contained.

0 1.25 2.5 5 7.5 Miles

As of October 10, 2024 per Vilas County Land and Water Conservation Department

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RESOURCE CONCERNS
Chapter 5

The natural resource base of Vilas County was outlined in Chapter 4. Following that baseline review, this chapter identifies what concerns were identified by the Local Advisory Committee, the Conservation Committee, local partners, citizens, or natural resource professionals regarding how the resources may degrade as time moves forward. We will also discuss how the county will address each of the concerns through education, technical assistance, working with partners, or through existing conservation programs.

5.1 Resource Concern: Climate Change

Like the rest of Wisconsin, changes in weather patterns have already been noticed in Vilas County. Over the period that this plan covers changes will continue and temperature and precipitation shifts will likely have widespread effects on many natural resources, both foreseen and unforeseen.

Increases in temperatures and changes in precipitation patterns will have effects on land and water and the flora and fauna that inhabit this area. One example may be as we experience warmer winters, the amount of time that we experience snowpack and lake ice will be noticeably reduced, leading to shifts in species composition or migration patterns. Below is an incomplete (yet substantial) listing of potential impacts that we may experience (EPA).

Warmer Waters:

Streams, lakes, and wetlands are warmer
Shifts in nutrient / chemical balances of high-quality water
Warmer water holds less dissolved oxygen
Greater amounts of algae growth
Enhanced likelihood of harmful bacteria & parasite growth in waters
Enhanced likelihood of increased parasites like mosquitos or ticks (& increased use of chemical to rid)
Longer or continuous stratification time for lakes
Desirable fish habitat for certain species no longer present
Lower oxygen leads to fish kills
Sensitive organisms may be further stressed and die off
Aquatic Invasive Species may be more likely to take hold in stressed ecosystems

Warmer Winters & Summers:

Wildfires increasingly abundant and risk of more soil erosion on bare slopes
Higher rates of evapotranspiration lead to worsened chance for wild fire
Longer growing season may increase lawn fertilizers and pesticide use
Spring runoff pulse may disappear
Thinner ice cover on lakes; ice duration is lessened
Disrupted food webs
Normal die-off of pests that normally happen over cold winters no longer occurs

Terrestrial Invasive Species may have better chances of survival on stressed landscapes

Continued - Warmer Winters & Summers:

Disrupted wildlife migrations and food supplies
Heat stressed flora and fauna
Longer duration for water recreation
Increased upstream water use may impact downstream supplies
Freeze/Thaw cycles can weaken infrastructure and shorelands
Increased air conditioning/energy use leads to higher Carbon emissions
Increased duration of allergy season

Increased Drought & Storm Intensity:

Intense flushing of debris from the landscape
Flooding more likely
Septic system failures due to higher rain amounts
Streambank erosion and scour
Turbidity in surface waters increased
Natural or green infrastructure could be damaged during intense rain
Drought may increase dust storms and airborne pathogens
Groundwater recharge is less due to drought or less infiltration of intense rain
Baseflow of stream may decrease due to increased water use
Groundwater quality diminished
Water level fluctuations may affect shorelands, wild rice populations

Through the planned strategies written within Goal 5 of the workplan section of this document, we will attempt to answer some of the climate concerns that apply to Wisconsin lakes. Climate mitigation strategies that are already an integral part of our regular programming are also scattered throughout the other workplan goals to build a more resilient natural resource base over time. Here are only some examples of workplan tasks already included in our workplan to mitigate climate issues:

1) **Culvert assessments** will help reduce the likelihood of flooding by making sure that properly sized infrastructure is placed and maintained. These assessments also help identify structures that need work to connect waterbodies and expand habitat or reproductive success for fishery populations.

2) Conduct a **groundwater sampling** event and educate landowners about options to improve their drinking water supply.

3) **Protect wild rice** populations by making sure culverts are properly maintained to mitigate flooding potential.

4) **Place best management practices** on landscapes and shorelands to lessen potential soil erosion and turbidity issues. This will increase the potential that lakes and streams remain clear and running cold to boost oxygen levels and maintain preferred fish species.

5) Support efforts to **protect large segments of natural areas** on the land by partnering with Northwoods Land trust or supporting conservation easements.

6) **Advocate for lake and land protection** by working with lake organizations and participating in state and local policy actions.

7) Increase formal **volunteer water level monitoring of lakes** throughout the county so that we can keep informed about where individuals or lake groups may need our BMP assistance programs, or where culverts may need maintenance to ease flooding.

5.2 Resource Concern: Soil Erosion

Soil erosion is a priority concern in Vilas County because of the water quality damage that sediments and nutrients can cause. The predominant soil type in Vilas County is sandy, so the likelihood of soil movement is high if the ground is left unvegetated. At the molecular level, soil particles are covered in nutrients and pollutants. Soil erosion can occur in various areas such as on croplands, on shoreland banks, or in upland areas like roads or in construction areas. The eroded soil can then be deposited into nearby surface waters. Once deposited, nutrients can increase algae growth and sediments may cover important fish spawning habitat. Fishery research conducted by Dr. Gregory Sass from the Escanaba Lake research station has shown notable declines in walleye fish populations' natural ability to reproduce in northern lakes. Sass believes that the decline may be the result of sedimentation from development within watersheds and increasing levels of shoreline bank erosion caused by high energy waves hitting the shore.

Keeping native vegetation on shorelines at a minimum depth of 35 feet from the bank and fixing problem areas are very important to the health of our abundant water resources. County Conservation personnel will continue to educate landowners and visitors to reduce soil disturbance and minimize erosion potential on their land. Best management practices (BMPs) offered through the conservation cost share and *Healthy Lakes* programs can help combat soil erosion and will continue to be offered to private landowners. The County will respond to problem areas as necessary in consultation with partners and will conduct watershed health studies to determine areas within the county that are most likely to experience soil erosion.

5.3 Resource Concern: Non-point Source Pollution and Phosphorus Loading

Non-point source (NPS) pollution comes from a variety of different sources within a given watershed. As precipitation (snow melt or rain) runs off the land, it picks up and carries with it pollutants which eventually get deposited into lakes, rivers, wetlands, or groundwater resources.

Nonpoint sources of pollution will begin to cause degradation of surface waters by feeding algae or aquatic plant growth from the added nutrients. When those plants die back later in the season, oxygen supplies may become low or non-existent during the decomposition process. Water runoff that contains soil sediment can also damage important fishery habitat by covering spawning areas for certain species of fish.

The EPA lists examples of non-point sources of pollution as:

- Oil, grease and toxic chemicals from urban runoff and energy production
- Fertilizers, herbicides and insecticides from agricultural lands and residential areas
- Sediment form improperly managed construction sites, crop and forest lands, and eroding stream banks
- Salt from irrigation practices and acid drainage from abandoned mines
- Bacteria and nutrients from livestock, pet waste and faulty septic systems
- Atmospheric deposition

To combat non-point source pollution in Vilas County, staff will continue to offer private landowners' partial reimbursement for practices they install on their land that combat non-point source pollution. The practices would slow down water flow and ultimately let the water infiltrate into the soil, thus the pollutants would not be deposited into a nearby waterbody. We will support the Zoning Department septic system maintenance program and encourage landowners to use incentive programs that NRCS offers for water quality protection. Education will also take place to various groups about how they can be good conservation stewards and how to use best management practices on their land.

5.4 Resource Concern: Fluctuating Water Levels

Vilas County depends on clean and healthy lakes, streams, and wetlands to sustain our tourism-based economy. High quality waters also enable residents and visitors to enjoy the peace and solitude that healthy environments can offer.

Although annual fluctuations of water level are a natural and on-going process for water resources, Vilas County has experienced a long-term trend toward lower lake levels in recent years. In fact, according to John Lenters, Associate Professor at the University of Nebraska – Lincoln, lake water levels in northern Wisconsin had dropped an average of 42 inches from 1997-2007. This drop provided dramatic visual proof and sparked real public concerns about Vilas County lakes. Lenters thinks that although there are likely many contributing factors to the lowered levels, significant influences are precipitation, water temperatures, and evaporation.

The long-term lowering of annual average precipitation in Vilas County resulted in lowered water levels on the lakes. Many lakes in this area are "seepage" lakes, which means that they rely on precipitation and groundwater sources to sustain levels. Lowered precipitation over several years disabled the recharge rates to groundwater supplies, thus lake levels remained lowered each year. Once lowered, lake temperatures rose, which then increased the evaporation rates even more than normal. The good news is that in current years, levels are back on the rise.

Vilas County believes that monitoring of water levels is more important now than ever, especially with the variability in climate we are likely to experience moving forward. Long-term data collection on many Wisconsin water bodies is necessary to closely monitor variability in lake levels. The Land & Water Department will take an active role and encourage consistency in monitoring lake levels through the Citizen Lake Monitoring Network.

5.5 Resource Concern: Water Quality

Sustaining high quality water resources has always been a resource priority and concern in Vilas County. Human activities that occur within watersheds and on riparian shores have direct effects on the quality of our waters. For example, consider nitrogen and phosphorus fertilizers that are applied to crops and lawns. These nutrients easily dissolve and runoff in rain storms or in snowmelt, entering lakes or streams. Excess algae and plant growth can result in low oxygen levels and potential fish kills.

Vilas County Land and Water Conservation will pay close attention to water quality in our surface waters, and there are numerous activities outlined in the workplan that directly or indirectly affect the quality of the county's water resources:

- County staff will educate the public through various workshops and presentations that will focus on sustaining high water quality.

- Water quality monitor volunteers participating in the Citizen Lake Monitoring Network will continue to be trained by county staff.
- Wetlands education will be offered to the public and to local decision makers.
- Private landowners with soil erosion concerns can contact us to design and cost-share BMP's on their lands.
- Invasive species and the boat inspection program will remain a priority in the county work plan.
- Support comprehensive planning and protection projects for surface waters.
- The STEPL model will be used to estimate nutrient reductions within most county watersheds.
- Areas within the county that are most vulnerable to water quality degradation will be identified and prioritized.

5.6 Resource Concern: Road Salt

In recent years there has been a growing concern about the effects of road salt on natural habitats and organisms across the US. Research has traced how road salt and deicers leave the pavement and what happens next. Chemicals either infiltrate through the soil and into groundwater or move directly into a nearby surface water. Salt can travel directly through soil and can stay there for decades, polluting groundwater. Increases in sodium and chloride have also been shown to increase mobilization of heavy metals in soil along major highways. In areas associated with heavily salted roads or near salt storage areas, groundwater contamination can negatively affect the taste of drinking water from wells.

In lakes and streams, salty water is dense and it sinks into deep pockets. This water is less able to mix, so the salty, cold water becomes de-oxygenated, reducing habitat for fish and other aquatic organisms that are dependent on these colder waters.

At moderate levels, road deicing agents that enter wetlands can affect amphibians, both directly in terms of health and reproduction, and indirectly by altering the food web. Plants are also negatively affected, allowing aggressive non-native species to settle. These changes diminish both the quality of wetlands as living habitat for native species and the function of the wetland to protect water quality.

Road salt and de-icing agents also become airborne and directly affect plants along roadsides. The chemicals land on all plant parts, causing damage to the plant, so it is less able to withstand harsh winter conditions. These dying plants are also more susceptible to other plant diseases, insects and pathogens. As plants die off and conditions are unfavorable to native species, opportunities for salt tolerant invasive species open.

The Vilas County Land & Water Conservation staff will do their part to educate the public about the adverse effects that result from the use of road salt.

5.7 Resource Concern: Forest Fragmentation

The Society of American Foresters defines *forest fragmentation* as: "The process of dividing large tracts of contiguous forest into smaller isolated tracts surrounded by human modified environments." In Vilas County

the main causes of forest fragmentation are real estate development, road and trail development, and power line corridors. From 1980 to 2000 there was a 22% increase in housing in Vilas County, and it appears that a slowdown of this trend is not likely.

Fragmentation degrades the quality of habitat for interior wildlife species that depend on large tracts of contiguous forest. Development in or near forested areas reduces the amount of contiguous or undisturbed forest habitat, alters the structure of native vegetation, causes an upset in the habitat for certain wildlife species, and may exacerbate invasion of non-native invasive species. Timber harvests may be limited if housing development creates parcels that are too small for commercially viable harvests. Proximity to residential areas can also limit the range of management practices available in a forest, particularly limiting the use of controlled burns (Forest Megatrends).

Vilas County Conservation will attempt to protect these sensitive areas in a few different ways. Through education, we can inform decision makers of the hazards of forest fragmentation. We will also work in partnership with the local land trust to let landowners know there are ways to protect their land in perpetuity. Conservation staff will also work to support local efforts in protecting large tracts of land through conservation easements.

5.8 Resource Concern: Wildlife

- Increased populations of nuisance wildlife:
  - Waterfowl - with the attendant problems such as deposits of feces and being potential reservoirs of swimmer's itch.
  - Overabundance of deer – deer feeding stations attract large herds of deer, which also eat and/or damage native vegetation and landscaping.
  - Simplification of animal communities including birds, small mammals, and amphibians. Sometimes these changes can contribute to cascading changes which may include increases in disease carrying tick or mosquito populations
- Loss of living habitat due to "tidying" up of shorelines. A 1996 study determined that some developed lakes in Vilas County are 200 years behind in the amount of coarse woody habitat (fallen trees) that should be in the lake compared to undeveloped lakes. Similarly, loss of native structure provided by vegetation and fallen trees on shore contributes to a loss of native amphibian, mammalian, and insect species.
- Increased chemical spraying (for mosquitos) has detrimental effects on pollinator habitat and firefly population.
- Decline of Native Bats due to white nose syndrome.

Workplan activities in this document include education for the public on these types of topics as well as maintenance of local pollinator gardens and collection of native seed (from same gardens) to increase pollinator habitat throughout the county. We will continue to train volunteers in the use of bat monitoring equipment and collect data to help state Wildlife Scientists determine species diversity and densities of bats in Vilas County.

5.9 Resource Concern: Terrestrial Invasive Species (TIS)

In 2021 VL&W worked with our regional partners in the WI Headwaters Invasive Partnership (WHIP) to update the priority list of TIS that we will address moving forward. Species that are only found in a few isolated areas are easier to eradicate and are identified as **Early Detection** and rapid **Response** species:

- Wild Chervil, *Anthriscus sylvestris*
- Common Red (non-native), *Phragmites australis*
- Oriental Bittersweet, *Celastrus orbiculatus*
- Wild Parsnip, *Pastinaca sativa*
- Garden Valerian, *Valeriana officinalis*
- European Marsh Thistle, *Cirsium palustre*
- Butterfly Dock, *Petasites hybridus*
- February Daphne shrub, *Daphne mezereum*

Priority Management species are well established in Vilas County. These species diminish the quality of natural areas and require control and management to protect healthy plant communities.

- Glossy Buckthorn, *Frangula alnus*
- Common Buckthorn, *Rhamnus cathartica*
- Garlic Mustard, *Allaria petiolata*
- Purple loosestrife, *Lythrum salicaria*
- Japanese knotweed, *Polygonum cuspidatum*
- Yello Flag Iris, *Iris pseudacorus*
- Eurasian Honeysuckles, *Lonicera tartarica, L. morrowii, L. x bella*
- Leafy and Cypress Spurge, *Euphorbia esula, E. cyparissias*
- Thistles (Canada, Plumeless and Musk), *Cirsium arvense, Carduus acanthoides, C. natans*
- Japanese Barberry, *Berberis thunbergia*
- Garden Yellow Loosestrife, *Lysimachia vulgaris*
- Common Tansy, *Tanacetum vulgare*
- Crown vetch, *Coronilla varia*

There is a **Watch** category of species not yet observed in Vilas County but are nearby and very damaging to natural communities.

- Giant Hogweed, *Heracleum mantagazzanium*
- Bohemian and Giant Knotweed, *Polygonum x bohemicum, P. sachalinense*
- Policeman's Helmet, *Impatiens glandulifera*

Staff in the Vilas County Land and Water Conservation Department will continue to work with our partners (WHIP) to identify areas in the county where these species may have settled and coordinate management efforts to control the spread. We will also lend support to efforts involved in seeking grant money to employ professionals that work in this area by including our professional time in grant applications and letters of support.

5.10 Resource Concern: Shorelands

Vilas County has 1,743 miles of inland lake shoreline. Almost 6% of the total miles of inland lake shoreline in Wisconsin. Due to the high percentage of the land cover of Vilas County being maintained as either managed forest or relatively intact wetland, the greatest direct threat to water quality on the lakes is the development of shorelines. Loss of native vegetation, soil erosion, historical changes in water levels, and increases in impervious surfaces all negatively affect shoreline condition.

Healthy, intact shorelines have a full complement of native vegetation. Native plant buffers absorb stormwater runoff, trapping sediment and pollutants before they enter the lake. The buffer also provides wildlife habitat, wildlife travel corridors, erosion protection for the bank, and are the source for future coarse woody habitat in the lake. In fact, 90% of birds, fish, insects, and mammals that are found in and around lakes use the shoreline area for at least one part of their lifecycle.

Many shorelines in Vilas County are unstable due to their past history. During the logging era of the second half of the 18th Century, several stream and river channels were dammed up to support the transportation of logs. In some cases, water levels were raised above their normal levels. When the dams were released and the logs allowed to flow downstream, both the flooding and the actual impact of logs on shorelines damaged whatever vegetation had remained. As humans settled on the lakes, many of the dams were maintained or improved to create flowages between lakes. Shorelines are still adjusting to the new higher lake levels, especially the steeper slopes composed of the fragile sandy soils that are common in Vilas County. The adjustments include slumping and undercutting.

The continued residential development of lakeshores in Vilas County has increased in both pace and density over the last 50 years. Additional stressors include removal of vegetation, increased impervious surface, and increased wave energy from recreation. The result is shoreline areas that provide little habitat or energy buffering capacity and ultimately, a decline in water quality.

Some of the issues associated with developed shorelines are:

- Increased runoff of nutrients causing the development of algae blooms, some of which can be toxic to humans and pets.
- Loss of habitat due to “cleaned up” shorelines.
- “Hardening” of the shoreline. To protect their properties from erosion, landowners use artificial products including riprap and sea walls which eliminate critical wildlife habitat and access to and from the lake.
- Impervious surfaces created by roads, roofs, driveways, patios, and other impermeable surfaces, all block the infiltration of water into the ground.
- When water quality diminishes humans are less likely to recreate or purchase property on a lake.

County staff will focus a lot of time and energy to protect and retore shoreland areas on many of the lakes with installation of best management practices. Workplan goal 2, focuses many activities on the protection of surface waters.

5.11 Resource Concern: Wetlands

The economic and environmental health of Vilas County is dependent on the quality of the lakes and streams. In turn their quality depends on the healthy and effective functioning of wetlands. The environmental benefits of wetlands include:

- Water purification - They trap nutrients, sediments, and pollutants before they enter our waters. (Wetlands can filter as much as 91% of the phosphorus and 86% of the nitrogen that enter the water stream).
- Flood protection – They act like sponges to store and slowly release rain and snow melt. With the high intensity rainstorms expected as climate change continues, the flooding protection that wetlands provide will be an essential service to each community in the county.
- Shoreline stabilization - They help buffer water level fluctuations that cause erosion. (Shoreline erosion is a major concern of riparian landowners in Vilas County).
- Groundwater recharge and streamflow maintenance – providing both drinking water and the main source of water for some of our lakes and streams.
- Wetlands also provide critical habitat for fish and wildlife, including endangered species. (75% of wildlife species are dependent on wetlands habitats at some point in their lifecycle – including many game species. Most species of freshwater fish are dependent on wetlands for food, breeding habitat or cover).
- Wetlands generate fishing, hunting, and other recreational opportunities such as hiking, bird-watching and photography.

Activities included in workplan goals 1 and 2 will focus on the protection of surface waters, including wetlands, and offering wetland educational opportunities. Staff will educate groups about the importance and numerous ecological services that wetlands provide, while also conducting field tours to various groups. Education about wetlands will increase awareness about the importance of keeping them intact and protected from pollution inputs. Wetlands are also vulnerable to aquatic invasive species (AIS) and the county will continue to manage existing invasive populations while concurrently looking for new stands.

5.12 Resource Concern: Aquatic Invasive Species (AIS)

Four main points form the foundation of the Vilas County AIS programs as we will continue our AIS prevention and management activity:

1. Eurasian watermilfoil and curly-leaf pondweed are submersed plants known to exist in approximately 55 Vilas County waterbodies. More than half a million dollars have been spent managing and preventing the spread of these two plant species in Vilas County in the last five years (2020-2024). While the effect of these plants on aquatic ecosystems and waterbody navigability varies from lake to lake, the fear of extreme harm, even to the point of waterfront property value reduction, is the foundation for AIS prevention, early detection monitoring and rapid response efforts. Climate change will likely enable additional aquatic species that have not yet spread into northern Wisconsin to eventually thrive here.

2. Small bodied non-native microorganisms such as the spiny water flea and the veliger life stage of the zebra mussel are of rapidly growing local concern. The water chemistry of most Vilas County lakes lacks sufficient calcium to support zebra mussel shell growth thereby limiting the potential for this species to become established. Spiny water flea's potential to upset the food chain from the bottom up – very young fish

cannot eat them. One study in Minnesota showed that walleye living in spiny waterflea verified lakes are smaller and less abundant than walleye living in non-invested lakes. It only takes one waterflea to populate a lake yet detecting them can be like finding a needle in a haystack. There is likely a long lag time between spiny waterflea colonization to detection. Prevention is of paramount importance. This is why transporting water in live wells, bait containers, and boat bilges is generally prohibited.

3. Shoreline/wetland invasive plants can sometimes become dense and can also reduce ecosystem services. Whether these plants such as purple loosestrife, yellow iris, garden loosestrife or Japanese knotweed should be regarded as aquatic or terrestrial species is debatable. But because most grow primarily above ordinary highwater levels along shorelines and in wetlands, often on private lands, responsibility for managing these plants falls to landowners as opposed to the management of truly aquatic species who live entirely in state owned waters over state owned lake beds. However, often grant money for management and prevention of these shoreline plants can be sourced aquatic invasive species funds. Increased detections of invasive giant reed (*Phragmites australis australis*) classified as Prohibited in Vilas County, as well as its native look-a-like *Phragmites australis americanus* occurred in Vilas County in the last five years. Management of giant reed can be quite costly, so early detection and management will be critical to keep costs down.

   Note: *Phragmites* has an invasive subspecies, while the native subspecies is fine — i.e., invasive = *Phragmites australis australis* vs. native = *Phragmites australis americanus*.

4. A holistic approach and stakeholder patience with aquatic invasive species management is needed to buffer unintended impacts to living organisms like fish, native plants, wildlife, or wild rice. Sometimes management of AIS can cause more harm than good. Some stakeholders can become hyper-focused on eradicating the invaders at the risk of knowing how they would impact the lake ecosystem (such as plant diversity and navigability). There are many methods for management, but not all are permittable or appropriate in all situations. While the DNR regulates what methods are permittable for AIS control, stakeholder education by multiple organizations are important to promote the ideas of: sometimes the "cure is worse than the disease"; integrated pest management is an important tactic; and that the "no management" option may be acceptable in certain situations.

5.13 Resource Concern: Groundwater Quality and Quantity

Groundwater is a vital natural resource here in Vilas County because most residents and visitors depend on clean groundwater for their main drinking water supply. It is also a vulnerable resource because it has the potential to be depleted or degraded by human activities.

The following are several reasons that groundwater has been identified as a priority concern:

1) Susceptibility to groundwater contamination is naturally high in Vilas County because of our mostly sandy soils, and the shallow depth to groundwater.
2) Certain land use practices can result in contamination to groundwater by elevating concentrations of bacteria, nutrients, pesticides, or a host of other watershed pollutants.
3) Nitrates or other substances naturally found in groundwater can be harmful to humans at elevated levels.

4) Unused wells that have not been abandoned properly are susceptible to contamination or may become a human safety hazard.

Measures to protect groundwater resources in Vilas County should be enacted before degradation occurs because once contaminated, groundwater cleanup and remediation can prove to be very expensive. In order to protect this vital resource, it must be periodically assessed and managed properly.

Attention to groundwater will be incorporated into future work efforts of county staff. Since the county has such sandy soil, infiltration of contaminated water can occur very quickly especially in shallow groundwater areas. Based on the contaminant in question, a drinking water supply may become unsuitable for human consumption. Grant money will help the county in hosting a ten year follow-up assessment of the groundwater, similar to the one completed in 2011. Comparisons of the groundwater quality will be made at that time, in addition to educating the public through workshops where they will receive their test results. Staff will also begin to address unused wells and assist the public to abandon them properly by utilizing our cost share funds.

WORK PLAN 2025-2029
Chapter 6

WORKPLAN APPROACH: The mission of Vilas County Land and Water Conservation is to *protect the county's natural communities from degradation* which will be implemented through the following workplan. The workplan outlines strategies that staff and partners will complete over a five-year period, beginning in 2025 and extending through 2029. Each of the overarching prioritized goals represent how Vilas County will address the resource concerns that were identified through the gathering of information for resource assessment (prepared by the North Central Wisconsin Regional Planning Commission), and through meetings of the *Local Advisory Committee (LAC)*. The activities listed provide more detailed and measurable steps toward reaching each objective under the goals. Vilas County personnel, along with our partners, lake groups, and citizen volunteers will implement all action items as time and funding become available.

The Vision of Vilas County Conservation is to protect, maintain, and restore aquatic and terrestrial ecosystems in order to preserve the strong recreation and tourism-based economy which is dependent upon a healthy natural environment

The goals listed below are in order of priority as determined by the Vilas County *Local Advisory Committee.* Technical assistance to various focus groups and educational outreach are important components of the county conservation program, thus, Goal 1 was ranked as highest priority. The impacts that climate may have on the environment was also a featured discussion amongst the LAC. As protection and restoration of the county's natural resources are the vision of the Department, considerable thought went into the resource concerns around climate and mitigation strategies that could be addressed in the next 5-10 years. Many of the mitigation strategies are activities that we have consistently implemented in the past and are again listed within the workplan goals, but Goal 5 was added here to provide a platform to boost both mitigation activities around climate issues and to provide a placeholder for strategically planned, research-based projects. We believe that these special projects will help us better understand how climate change may affect our unique county resources, so we can efficiently focus our staff capacity to build resilient communities moving forward.

<u>2025-2034 Work Plan Goals:</u>

Goal 1: Increase Conservation Knowledge, Skills, and Stewardship Activity

Goal 2: Monitor and Protect Surface Water Resources

Goal 3: Monitor, Manage, and Protect Upland Resources

Goal 4: Monitor and Protect Groundwater Resources

Goal 5: Protect the County's Resources with Planned Strategies

For further clarity of the goals, objectives, activities, and accomplishment measures listed in the workplan implementation tables, definitions of each are listed here to explain the subtle differences amongst the elements:

GOAL: a succinct statement about Vilas County's intended long-term outcome (5-10 years)
OBJECTIVE: a statement that provides a targeted direction to help meet a goal (1-5 years)
ACTIVITY: key action steps that will help achieve the objective (varied timelines); priority activities are in bold font
ACCOMPLISHMENT MEASURE: terms that define when a given activity has been completed

The following updated workplan will commence starting in 2025 and continue through 2029. A 5-year review of accomplished activities will be summarized and presented, and a new 5-year workplan will then be written to define the county's activities from 2030-2034. The goals will stay the same during the 5-year update in 2030, but objectives and activities that may have evolved will need to be adjusted at that time. The workplan is intended to provide a focused direction for county conservation personnel and should serve as a tool for the County Conservationist during the annual DATCP work-planning process that is required of all counties for eligibility of funding.

BUDGET ESTIMATE: An annual estimated budget for the 2025-2029 work plan is outlined here. In estimating the budget, it is presumed that the county will continue to staff the Land and Water Conservation Department at its current level of three FTE. It is further presumed that DATCP / WDNR will meet their financial obligations for staffing of local conservation personnel and projects.

YEAR	COUNTY	DATCP	WDNR	OTHER	TOTAL ESTIMATE
2025	$ 150,000	$ 187,000	$ 49,000	$ 0	$ 386,000
2026	$ 152,000	$ 189,000	$ 50,000	$ 10,000	$ 401,000
2027	$ 154,000	$ 192,000	$ 50,000	$ 0	$ 396,000
2028	$ 156,000	$ 194,000	$ 50,000	$ 10,000	$ 410,000
2029	$ 158,000	$ 196,000	$ 55,000	$ 0	$ 409,000

Vilas County has been successful in attaining funds from several partners. During the implementation phase of the following work plan, we intend to continue applying for grants to sustain or exceed the current level of staff and project funding. Potential sources of conservation funding may come from the following:

- Natural Resource Conservation Service (NRCS) Public Assistance Programs (Wildlife Damage)
- Department of Agriculture, Trade, and Consumer Protection (DATCP) Soil and Water Resource Management funding
- Wisconsin Department of Natural Resources (WDNR) Surface Water Grant Programs; and AIS Education & Management Programs
- Wisconsin Department of Natural Resources (WDNR) Targeted Runoff Management Program - Small scale non-TMDL projects
- Vilas County Annual Tax Levy Assessments
- Lumberjack Resource Conservation & Development (RC&D)
- Great Lakes Restoration Funds
- Federal / State Government Ecological Protection Funding
- Others as they may become available

Goal 1: Increase conservation knowledge, skills, and stewardship activity

Objective	Activities (prioritized in bold)	Planned Year(s)		Accomplishment Measure
A. Offer training, workshops, field tours, events, and information				
	1. Provide CB/CW training to new and existing volunteers	Annual		4+ trainings
	2. Provide CLMN training for new and existing volunteers	Annual		1+ training
	3. Provide WAV training to new and existing volunteers	Annual		2+ trainings
	4. Create online training / YouTube modules for various conservation topics (e.g., how to take Secchi, AIS/TIS, shoreland habitat, IPM, pollinator habitat)	Even Years		2+ created
	5. Provide field tours to interested groups (e.g., shorelands, wetlands, gardens, IPM sites, etc)	Annual		1+ field tour
	6. Host “end of season” event for county lake partners	Annual		1 event
	7. Hold a “volunteer opportunities” workshop to increase awareness of and interest from potential volunteers (early summer)	2025, 2028		2 events total
	8. Host a shorelands health workshop to select lake groups and interested public (BMPs, grants)	Annual		2+ workshops
	9. Host a technical BMP workshop for shoreline consultants (proper planning for HL, CS bmps)	Odd Years		1 biennial workshop
	10. Offer other relevant workshops for the public to learn about conservation topics	Even Years		1 biennial workshop
	11. Host a training for local lake district commissioners	Odd Years		1 biennial training
	12. Acknowledge citizen volunteers for contributed efforts and stewardship activity (lunch, awards, etc)	Annual		1+ event

	13. Participate in AIS campaigns to increase awareness (drain campaign, Snapshot, Landing Blitz, etc)	Annual		2+ events
	14. Increase awareness of integrated pest management (IPM). Create a story or YouTube module for the website.	2026		1 created
B. Shift thinking patterns to watersheds and watershed management				
	1. Explore possibility & Place HUC 12 signage throughout the county. (e.g., "You are now entering Rice Creek Watershed")	Even Years		2 signs installed
	2. Give basic presentations about watersheds, water movement, and the hydrologic cycle	Annual		2+ groups annually
	3. Initiate this topic with Town Lakes Committees about changing to Watershed Committees (eliminate local govt politic conflicts)	On-going		1 group annually
	4. Encourage the concept of starting a watershed protection group (e.g., same concept as Farmer-Led group)	On-going		1 group biennially
C. Provide conservation education to youth				
	1. Hold local Conservation Awareness poster and speaking contest	**Annual**		Contest complete; # of participants in each
	2. Give incentive awards to top 2 speech winners in each age group to increase participation in speaking contest	Annual		Budget $300 for prizes
	3. Encourage students to enter the local invasive species awareness poster contest	Annual		# Vilas participants
	4. Educate & encourage teachers & home schoolers about the youth programs	Annual		Contact 1+ new teacher or local homeschool group
	5. Offer scholarships to middle and high-school aged students to attend Conservation Camp	Annual		1-2 scholarships awarded
	6. Implement a Conservation Field event for local youth	Annual		1 event
	7. Implement a Conservation classroom day for local youth; topics may include hydrology, lakes, streams, watersheds, challenges	Annual		1 event
	8. Participate as a camp counselor at local conservation camp	Time permitting		complete
	9. Scope idea & encourage area youth team to participate in Envirothon; coach the team through the process	2027-2029		complete

D. Improve the Conservation website platform for the public				
	1. Seek grant funding to pay an LTE or private contractor to develop an improved Department website	2025		Application complete; Staff hired
	2. Develop the Department website	2025, 2026		complete
	3. Maintain Department website	On-going		complete
	4. Develop a map of public access points for use on the website	2027		complete
	5. Develop an online presence for selling native plants and native seed packets	2025, 2026		complete
	6. Develop an online AIS / TIS identification (or management) module (G1A4)	2028, 2029		complete
	7. Develop a "Before/After" photo gallery of past, established BMP projects (cost share or Healthy Lakes)	2025, 2026		complete
E. Share news and department updates with the public				
	1. Share news with Lake list-serv recipients (Constant Contact)	Annual		12 emails
	2. Increase social media presence (program news and seasonal information)	Annual		12+ posts
	3. Develop a list-serv list for gardeners (seed available, natives, pollinator sps, etc)	2025		complete
	4. Share news with Gardener list-serv recipients (Constant Contact)	Annual		6+ emails
	5. Share conservation programs / issues with the media (newspaper, radio, TV, etc)	Annual		1+ time(s)
F. Present / provide conservation related information to local groups				
	1. Present information at lake organization meetings (incl G1B2)	Annual		3+ presentations
	2. Present information to town lakes or watershed committees	Annual		3+ presentations

	3. Present updates & information to local governments; provide updates of the Department to county board (1+ presentations)	Annual		2 presentations total
	4. Advertise the WDNR certification training program for soil erosion protection which is targeted to foresters and private loggers	On-going		Provide a website link; create a CC email list-serv
G. Professional development & participation for staff and LCC members				
	1. Attend professional conference(s) to improve skills & knowledge	Annual		1-2 conferences
	2. Participate in professional committee(s) of choice	Annual		1 committee
	3. Share department project information at professional venues	Biennial		1+ presentation
H. Offer conservation-related tools to expand the public's stewardship activity				
	1. Develop a collection of tools that can be "checked out" by the public for use in various volunteer activities	Annual		Budget $300 for tool purchases
	2. Seek funding for appropriate tools (e.g., DO meter, auger, gardening, etc)	On-going		Include tool purchases in grant applications

Goal 2: Monitor and protect surface water resources

Objective	Activities (prioritized in bold)	Planned Year(s)		Accomplishment Measure
A. Manage soil erosion & reduce runoff pollution on shorelands *riparian, in-lake*				
	1**. Seek funding to implement best management practices for Cost-Share / Healthy Lakes**	Annual		$ received for each
	2. Design Cost-Share & Healthy Lakes best management practices; increase native plant diversity in each project	Annual		3+ CS projects; 10+ HL projects
	3. Install best management practices near shorelands to reduce runoff pollution	Annual		3+ CS project; 10+ HL projects
	4. Complete compliance checks for previously installed projects; report the status to landowners and assist with issues	Annual		Check 2 CS sites; Check 3 HL sites
	5. Calculate estimates of total phosphorus "savings" by using the new SWMM modeling procedure. Report to DATCP annually.	Annual		Calculate for all relevant HL or CS practices installed.
	6. Educate and encourage participation to install best management practices (G1A8)	Annual		2X on Lakes list-serv; host workshops
	7. Encourage lake orgs & other groups to identify* and protect in-lake and shoreland habitat areas (*create a module G1A4)	Annual		2 Lake list emails; Create module
	8. Continue the *Northwoods Businesses for Clean Waters* program and lend technical guidance to interested parties	Annual		1+ project
B. Monitor lakes & streams for health status				
	1. Strategically scope and target lakes to be surveyed each year (303d, highest quality, WDNR request, other)	Annual		complete
	2. Seek WDNR funding to monitor lakes	As needed		$ received for each grant
	3. Conduct monitoring for water quality, aquatic plant, & shore habitat on selected lakes	Annual		1+ lakes monitored

	4. Conduct AIS early detection surveys on selected lakes	Annual		2+ lakes monitored
	5. Conduct 2nd year monitoring of water quality as per WisCALM standard	As needed		2nd year complete
	6. Write up a summary report for each monitored lake and present results to lake organization	Annual		1+ report written; results shared
	7. Coordinate WAV volunteers to collect baseline and advanced data (TP, other)	Annual		3+ streams monitored
	8. Partner with other County Departments to manage water issues as appropriate (Highway, Forestry, Public Health)	As needed		complete
C. Assist lake organizations and related groups				
	1. Encourage organizations to implement (or update) completed management plans (to seek a grant for that purpose)	Biennial		Newsletter article for VCLRA; post online
	2. Assist individuals with SWIMS data entry	As needed		complete
	3. Write letters of support for grants	Per Request		# completed
	4. Lend technical assistance to groups dealing with AIS	As need		complete; group?
	5. Assist groups with lake organization formation (associations, lake districts)	Per Request		complete
	6. Attend group planning sessions or informational meetings	Annual		# meetings attended
	7. Assist individuals with relevant office walk-in questions	As needed		# completed (topics?)
D. Monitor road / stream crossings to ensure hydrologic integrity				
	1. Create or seek a map of public road/stream crossings at targeted locations (Man Waters, Winchester, LDF, Presque Isle)	Annual		1 map of culvert locations

	2. Survey road/stream crossings at each targeted location for integrity; upload new data to the MI HUB	Annual		4 areas complete by 2029
	3. Report results to municipalities; encourage restorations	Annual		1 annually
	4. Meet with county forestry to scope the possibility of completing culvert surveys on forestlands	2025		Meeting complete
	5. Create or seek a map of county forestlands road/stream crossings	2025		Map complete; # of crossings
	6. Conduct culvert assessments for county forest road/stream crossings	Annual		Complete by 2028
	7. Report culvert assessment results to the forestry committee	2028		1X when all are complete
E. Protect the top 30% healthiest watersheds in the County				
	1. Complete the Rice Creek HUC 12 protection-based management plan (use as prototype for future protection plans)	2025		Plan complete
	2. Seek grant funds to begin additional HUC 12 protection-based management plan(s)	2026; 2029		Applications submitted
	3. Conduct erosion surveys (or similar) on at least 2 of the healthiest HUC 12 watersheds	2027; 2030		Surveys complete
	4. Write HUC 12 protection-based management plan(s)	2028; 2031		2 Plan(s) complete by 2031
F. Manage AIS in surface waters (incl wetlands)				
	1. Update county AIS maps	Annual		complete
	2. Check boat landing signage for accuracy; update as necessary	2025-2027; & 2030-2032		review & update all landings
	3. Respond to newly discovered AIS	As needed		complete; ID lake

	4. Manage existing populations of wetland AIS (phragmites, PL, Yellow Iris); maintain partnerships for this purpose	Annual		2+ sites
	5. Protect lakes from AIS utilizing decontamination spraying at targeted boat landings; seek funding for this activity	Annual		complete; 1 LTE
	6. Monitor lakes for early detection or existing populations of AIS	Annual		1+ ED surveys
	7. Monitor and assist lake organizations at sites where we can demonstrate an increased awareness of Integrated Pest Mngt (IPM) of AIS populations	Annual		1 site visit / assist 1 lake org.

Goal 3: Monitor, manage, and protect upland resources

Objective	Activities (prioritized in bold)	Planned Year(s)		Accomplishment Measure
A. Manage soil erosion & reduce runoff pollution on upland areas *agriculture lands, forests, non-riparian, roads*				
	1. Seek cost-share funds to implement best management practices	Annual		$ received
	2. Design & install best management practices on uplands	Annual		1+ upland project
	3. Increase plant diversity for each designed project to aid in climate mitigation	Annual		complete
	4. Complete compliance checks for previously installed projects; report the status to landowners and assist them with problems	Annual		1 project check
	5. Calculate TP load reductions on all completed projects using "newly finished" shorelands model; share on annual DATCP report	Annual		Calculations complete
	5. Market and encourage participation in BMP programs; target outreach to farmers, private forests, municipalities	Annual		Send targeted letters to 1 group each yr
	6. Maintain tracker spreadsheet for all completed HL and cost share projects; prepare (& maintain) a "location" map of all completed past projects	Annual		complete
B. Monitor nutrient management plans				
	1. Contact participants & review annual reports from each nutrient mngt plan	Annual		Reviews completed
	2. Stay updated on details of nutrient management program	Annual		1+ training

	3. Report Nutrient Management program to DATCP	Per Request		complete
C. Manage Terrestrial Invasive Species (TIS) populations on upland areas				
	1. Attend WI Headwaters Invasives Partnership (WHIP) meetings	Annual		4+ meetings
	2. Partner with WHIP to identify new TIS populations county-wide	On-going		complete
	3. Eradicate or stop the spread of TIS populations; coordinate the activities to manage TIS (partner with Highway, Forestry)	As needed		complete
	4. Design and restore native vegetation at eradication sites using a diverse array of species to increase resilience	As needed		complete
	5. Identify and discuss with WHIP, the species predicted to move north due to climate shifts	2025		complete
D. Protect and enhance the health of wildlife habitats & populations				
	1. Train new and returning volunteers to conduct bat surveys	Annual		1+ new volunteer per year
	2. Conduct bat surveys; track declines or re-established populations (WDNR partner)	Annual		# of annual surveys complete
	3. Maintain native gardens for the benefits of source native seed and enhanced pollinator habitats	Annual		2 gardens maintained
	4. Collect & clean seed for the Department native seed library and to distribute to private landowners	Annual		Fall collection complete; seed cleaned and stored
	5. Administer the venison donation & wildlife damage abatement programs	Annual		Budget admin & reimburse; pymt to venison butchers

Goal 4: Monitor and protect groundwater resources

Objective	Activities (prioritized in bold)	Planned Year(s)		Accomplishment Measure
A. Reduce / Prevent pollution and contamination of groundwater				
	1. Seek cost share participants for proper well abandonment	Annual		2 List serve emails 1 newspaper release
	2. Design & install well decommission project	Per Request		complete
	3. Encourage proper maintenance of septic systems	Annual		2 List serve emails
B. Protect groundwater from pollutants				
	1. Obtain current septage spreading site application list from the WDNR wastewater section	2028		List received
	2. Seek participants near septage areas to monitor their wells by targeted outreach	2029		Letters / calls to landowners
	3. Seek funding to conduct PFAS testing near waste dumping sites throughout the county (Lumberjack, WDNR, Public Health)	2028		Grant application submitted
	4. Monitor wells near existing septage spreading sites and send samples to testing lab (UWSP). Share test results with participants. Include PFAS tests at all sites.	2029-2030		3+ wells tested
	5. Offer a public workshop to learn about general well testing (G1A10)	2026		1+ workshop
	6. Initiate a municipal wellhead protection project – map where source groundwater supplies come from (for proactive PFAS issues) (contact Rural Water Association)	2026-2030		Project complete

Goal 5: Protect the County's Resources with Planned Strategies

Objective	Activities (prioritized in bold)	Planned Year(s)		Accomplishment Measure
A. Develop a lake classification system around vulnerability/resilience to shifts in climate				
	1. Meet w/ collaboration team to discuss project ideas and details; seek grant funds	2025		Attend Meetings; Apply for grant
	2. Develop the classification system for all lake types VS stressors (habitat loss, level fluctuations, precip/temp extremes, AIS, erosion)	2026		complete
	3. Identify adaptation strategies for each of the lake stressors	2026		complete
	4. Create an adaptation guidebook for statewide use and for other counties to use for planning purposes; seek funds	2026-2027		Apply for grant (2026); guidebook complete
B. Protect wild rice populations				
	1. Assess functionality of culverts above and below targeted wild rice waters to identify flooding risk	2026		complete
	2. Establish / expand formal volunteer water level monitoring program on lakes with wild rice populations – utilize contractor for seasonal calibration surveys	Annual		Add 1 new lake ea yr; 1 new volunteer ea yr
C. Improve fisheries habitat to increase climate resiliency for gamefish				
	1. Seek funds to place *Healthy Lakes* "Fish Sticks" and other types of cover habitat to benefit cool or cold water fish species (Grant Ideas: DNR Surface Water or HL, Great Lakes Fisheries, the Cherish Wisconsin Outdoors Fund – NRF)	2027-2029		Application(s) submitted
	2. Utilize the online *Midwest Glacial Lakes Partnership* Conservation Planner to prioritize and select publicly accessible lakes with climate threatened cold water systems (partner with DNR fisheries staff)	2027		4+ lakes selected

	3. Implement habitat improvement projects on lakes and streams	2028-2030		Project complete
D. Assess the nutrient levels of Vilas County Lakes				
	1. Seek funding to conduct a comparison study of the Lakes Assessment completed in 2029	2029		Application submitted
	2. Conduct a lakes assessment project and compare results to our 2019 project; OR encourage local lake research staff to conduct it	2030-2032		Project complete
	3. Present results to professional peers, municipalities, lake organizations – "the state of Vilas County lakes"	2032-2034		3+ presentations 2029 & 2030
E. Develop a Natural Hazards Mitigation Plan for Vilas County Conservation				
	1. Initiate and meet w/ a small collaboration group to scope plan concept and ideas; include Zoning, Public Health, Emergency Mngt, UW Trout L Research	Feb 2027		Meeting 1 complete
	2. Assess the existing county pre- and post-hazard policy, mitigation capabilities, and potential funding for mitigation; Write up a draft of hazards (present / future) that would be relevant to Conservation Dept programs	Mar 2027		Meeting 2 complete
	3. Write up a strategy plan that is relevant to County Conservation programs – present and future, that includes goals & guidelines that would improve natural resource resiliency	2027-2028		Plan complete
F. Protect undeveloped lands				
	1. Promote & support land conservation easements	As Needed		complete
	2. Encourage landowners to work with *Northwoods Land Trust* to protect tracts of land in perpetuity	Annual		3+ List-serv posts
	3. Promote the value of undeveloped land and green space habitats (module for the website)(G1A4); encourage use of public access map	Annual		Website module complete

G. Protect natural resources with effective policy				
	1. Protect surface waters with effective legislation and policy-making	As Needed		complete
	2. Protect groundwater with effective legislation and policy-making	As Needed		complete
	3. Participate and vote at WI Land + Water Annual Meetings	Annual		complete

TOOLS, EDUCATION, REGULATION, AND EVALUATION
Chapter 7

7.1. New Management Tools and Proposed Projects

NEW MANAGEMENT TOOLS:

THE WONDERFUL WATERS OF WISCONSIN

To draw attention to the state's finest waterbodies and surface waters, the Wisconsin DNR launched its Healthy Watersheds, High Quality Waters (HWHQW) initiative in 2021. One goal of this program for the state is to inspire meaningful protection planning for the heathiest waters and watersheds statewide. Predictive modeling completed as part of this initiative resulted in numeric scores and rankings (top 10-30%) for every HUC 12 scale watershed and it identified the highest-quality surface waters in Wisconsin. Detailed information about this initiative can be found on the WDNR website Healthy Watersheds, High-Quality Waters | Protecting Wisconsin's Water Resources | Wisconsin DNR. Maps and tables that list the healthiest waters in Vilas County are included in Appendix F.

Vilas County intends to utilize this new tool when selecting and prioritizing future project sites. In the next 5-year workplan, we will begin new protection management planning and implementation for a minimum of one or two HUC 12 scale top 30% watersheds. Refer to Goal 2 in our 2025-2029 workplan for more information about the project(s) that are planned.

SWMM MODELING TOOL

Vilas County will utilize a new (and simplified) SWMM modeling procedure to track pounds of total phosphorus "saved" from entry into surface waters by implementation of various BMPs placed throughout the county. Pounds of total phosphorus will be calculated annually by use of the model for relevant Cost Share or Healthy Lakes practices and will be reported to DATCP through the annual reporting process (Goal 2). Over time, significant phosphorus loads are saved from entry into surface waters throughout the county by very small installation practices on shorelands. This simple model now allows us to monitor those savings. The model allows managers to report even small amounts of TP savings, with the idea that these savings will accumulate over time and demonstrate that even by small BMP placements, there is an accumulative progression toward higher quality surface water.

PROPOSED PROJECT SUMMARIES:

PROPER WELL ABANDONMENT & GROUNDWATER MONITORING

We want to increase awareness of the importance of groundwater protection in the county because for most landowners, our groundwater serves as the main drinking water source. To address groundwater protection, management, and education, Vilas Conservation staff will continue to properly abandoned wells in the county by use of cost share dollars. The primary purpose in doing so will be to protect county residents and visitors from potential groundwater contamination issues because of open, abandoned wellheads.

The staff will also seek funding for and hold a targeted outreach effort for groundwater monitoring. We will reach out to landowners who own parcels near areas of known septage spreading sites or areas of known waste dumping. We will seek volunteers to test their wells for PFAS or other pollutants like *e.coli* or nitrates. Once the results are in from the lab, we will share them with the landowners at an educational presentation. Staff will seek assistance from the County Zoning and Public Health Departments as needed to implement the voluntary program with an educational emphasis for residents. For more information about these initiatives, refer to the 2024-2029 workplan Goal 4.

SURFACE WATER ADAPTATION STRATEGIES RESEARCH & GUIDEBOOK

As climate change affects our local communities in Wisconsin, we will be working toward creating mitigation strategies for our largest resource in Vilas County, our surface waters. In collaboration with UW-Madison Trout Lake Research Station, we will initiate discussions that focus on research relevant to answering climate change effects that are specific to lakes, wetlands, and rivers. Further details of the research project(s) are unknown at the time of this report, but it is the intention of county conservation to lend assistance where they can and to foster the project to make it a success.

Concurrent to the effort described above, we intend to create a "surface water climate mitigation strategies" guidebook that will be usable by other counties during their annual or resource management planning efforts. We want these strategies to be easily incorporated into workplans for county staff while addressing climate impacts that may otherwise alter surface waters. The end goal will be to protect surface waters from climate-induced stressors, creating resilient surface water ecosystems throughout the state.

AIS / TIS PREVENTION PROJECTS

Vilas County Conservation will continue efforts to prevent (and contain the spread of) aquatic invasive species. We will strive to secure annual funds to continue and improve our prevention efforts regarding both aquatic and terrestrial invasive species. We will continue to engage in prevention activities throughout the life of this plan, such as our CB/CW training events. For the 2025 field season, we have additional AIS and TIS prevention projects as described below.

The latest prevention project involves offering a hot water pressure washing station at strategically selected boat landings in the county (Decontamination). At the time of this writing, the spiney waterflea has been verified in 5 lakes in the county. We intend to offer 100 hours of boat and equipment decontamination washing at all five of these lakes throughout the open water season, lessening the potential spread of this harmful species to neighboring waterbodies.

We also place high priority to containing further spread of terrestrial invasive species (TIS). In partnership with WHIP, we will embark on a multi-tiered educational campaign to increase public awareness of TIS such as *Phagmites*, knotweeds, and purple loosestrife. We will create easy to understand brochures about these species so that people are aware of what they look like and how to reduce their spread. Workshops will be held throughout the busy summer season (when tourists and visitors are here). The third approach to this prevention effort will be to engage our County Highway Department crew in training for identification and proper equipment cleaning to manage further spread along roadways.

7.2 Information and Education Strategy

Information and education strategies play a fundamental role in this plan and in Vilas County's conservation programs. Educational opportunities for youth and property owners need to remain available to create and maintain a heightened awareness of the importance of resource protection, enhancement and stewardship. Many of the objectives in the work plan emphasize educational strategies like *Constant Contact* posts, giving presentations, training and workshops that are offered to the public, working with the local media, participation in WI Land + Water sponsored youth programs, and distribution of informational brochures. As work plan implementation proceeds the LWCD will adapt how to create additional information and education strategies as needs arise.

There are other general networking activities that are regularly performed by LWCD staff that keep us informed of the latest news and information about conservation which allow us to inform the public, such as: partnering with local and State conservation associations to coordinate a multi-County and/or State approach to conservation programs; planning and coordination of the public information and educational programs of the LWCC, such as hosting youth poster contests, encouraging participation in the annual WI Land + Water Youth Conservation Camps, and award recognition of outstanding conservation stewards and educators. County staff also participate regularly in Lumberjack Resource Conservation and Development (RC&D) council meetings; our regional North Central Land and Water Conservation Association (NCLWCA) meetings; we serve on various committees of the WI Land + Water association; we serve in an advisory capacity for Vilas County Lakes & Rivers Association (VCLRA); and attend professional conferences that are relevant for our programs.

7.3 Performance Standards and Prohibitions

Wisconsin adopted revised NR 151 administrative rules in 2011 (**Appendix C**), which set statewide performance standards and prohibitions for all Wisconsin farms. All Wisconsin farmers must follow these standards and prohibitions. Vilas County offers reimbursement cost-share funding to landowners to help offset the total cost of implementing practices on the land that move them toward compliance with these standards. Some state and local programs may require compliance whether cost-share funds are available or not. A listing of the standards is as follows:

Agricultural Performance Standards

- Sheet, rill and wind erosion: All cropped fields shall meet the tolerable (T) soil erosion rate established for that soil.
- Tillage setback: No tillage operations may be conducted within 5 feet of the top of the channel of surface waters.
- Phosphorus index: Croplands, pastures, and winter grazing areas shall average a phosphorus index of 6 or less over the accounting period and may not exceed a phosphorus index of 12 in any individual year within the accounting period.
- Manure storage facilities: All new, substantially altered, or abandoned manure storage facilities shall be constructed, maintained or abandoned in accordance with accepted standards. Failing and leaking

existing facilities posing an imminent threat to public health or fish and aquatic life or violate groundwater standards shall be upgraded or replaced.

- Process wastewater handling: There may be no significant discharge of process wastewater to waters of the state.
- Clean water diversions: Runoff from agricultural buildings and fields shall be diverted away from contacting feedlots, manure storage areas and barnyards located within water quality management areas (300 feet from a stream or 1,000 feet from a lake or areas susceptible to groundwater contamination).
- Nutrient management: Agricultural operations applying nutrients to agricultural fields shall do so according to a nutrient management plan.

Manure Management Prohibitions

- No overflow of manure storage facilities.
- No unconfined manure piles in a water quality management area.
- No direct runoff from feedlots or stored manure into state waters.
- No unlimited livestock access to waters of the state in locations where high concentrations of animals prevent the maintenance of adequate or self–sustaining vegetative cover.

Ag Performance Standards and Prohibitions - Implementation Strategies

A. Cost-share program funding to minimize nonpoint source pollution: The program is designed to conserve Wisconsin's soil and water resources, reduce soil erosion, prevent nonpoint source pollution and enhance water quality. The LWCD offers a cost-share program for County landowners through ATCP 50 SWRM grant funding. The primary emphasis of the program continues to be implementation of shoreland stabilization practices and restoration of native vegetation to reestablish riparian buffer areas (including WQMAs), and to reduce soil erosion by installing erosion control practices.

B. County land and water resource management plans are the local mechanism to implement NR 151 performance standards and prohibitions. The Wisconsin Legislature amended State statues (through Act 27) to allow counties to develop implementation strategies for addressing water quality priorities that relate to erosion, sedimentation, and nonpoint source (NPS) water pollution.

   Vilas County has very few agricultural producers, but there are several small hobby farms, seed potato fields, and cranberry farming operations that reside here. Because of the county's large number of lakes and streams, these operators likely reside within water quality management areas (WQMA). Farmer education will continue to be the primary tool used to achieve erosion control standards in the county.

   Landowners who request technical assistance will be the most common method used to promote soil conservation in Vilas County. County conservation staff will continue to distribute educational

brochures that review best management practices (BMPs) most suited to reduce soil erosion and slow down stormwater runoff.

All Cranberry operators in Vilas County follow the nutrient management plan standard. County Conservation partners with the local NRCS office to determine if these operators remain in compliance on an annual basis.

Animal waste is generally not a pollution concern due to the relatively low number and size of livestock operations in this county. Yet small-scale farms of horse, goat, and beef cattle do exist and the county offers priority cost-share assistance to these landowners so that they may be in compliance with manure management prohibitions.

C. Farmland Preservation Plans (FPP): Conservation plans, which plan individual crop fields to the tolerable soil loss rate or "T", are prepared for participants in the Farmland Preservation Program. Participation in the tax incentive program has been very low to non-existent in Vilas County. Participation in the tax incentive program is voluntary and completed through an individual agreement process. During the most recent revision to the Farmland Preservation Plan, there have been several eligible small-scale producers identified in Vilas County. The Land and Water Conservation and Zoning Departments will continue to manage future agreements for the Farmland Preservation Program.

D. Management of croplands is the usual focus of Land and Water Resource Management plans because soil erosion is a vitally important resource concern. Vilas County's largest crop is timber which covers 76% of Vilas County. Implementation of forestry BMPs is a land-based resource focus as shown in Workplan Goal 3: Monitor, manage, and protect upland resources. The Vilas County Forestry Department administers the Comprehensive Land Use Plan 2021-2035 (§28.11, Wis Stats.), which addresses erosion on county forest lands. The WDNR oversees the creation of private forest management plans when landowners enroll their land in the Managed Forest Law (MFL) program to receive a low pre-set property tax rate per acre. The LWCD will offer cost-share assistance for landowners residing in water quality management areas (WQMAs), and highly erodible lands draining to outstanding and exceptional resource waters in Vilas County.

E. The State requires each county to prepare Soil Erosion Control plans. In 1997 the Vilas County Board approved a resolution asking the Department of Agriculture Trade and Consumer Protection (DATCP) to grant them a waiver from preparing this plan. Since Vilas County has relatively small amounts of agricultural cropland and the magnitude and extent of cropland erosion is small, Vilas County was granted a waiver from DATCP to release them from their obligation to develop a Soil Erosion Control plan. Refer to Appendix J for a copy of the waiver.

F. A priority farm is one that is found to be non-compliant with the State prohibitions and performance standards. Criteria for ranking priority farms will be based on geographical location in water quality management areas (300 feet from a stream or 1,000 feet from a lake or areas susceptible to groundwater contamination). For the **priority farm strategy**, a general approach to providing information to all farmers will occur as written in workplan activities. If a farm has a significant water

quality problem, we will work with the landowner to bring them into compliance. Enforcement procedures are described later in this chapter.

Non-Agricultural Performance Standards

Beach Monitoring: A beach monitoring program has been created by the Vilas County Public Health Department in response to public health and other environmental concerns over the levels of total coliform bacteria and *E. coli* in area surface waters. Monitoring work for this program is accomplished by lake organizations, public health officials, UW-Oshkosh staff and others to make sure that recreational beaches are safe for public use. Protocols have been developed to close heavily polluted beaches until concerning levels decrease and are safe for use.

Land Disturbances: Construction site erosion and uncontrolled stormwater runoff from land disturbing and land development activities can have significant adverse effects on nearby surface water resources; the health, safety and general welfare of the community; and can diminish public enjoyment of recreational areas.

Land Disturbance Activities Subject to Stormwater Management and Erosion Control:

All activities directly related to the planting, growing, and harvesting of agricultural crops are not considered land disturbance activities under this section. Land disturbance activities to the shoreland zone are regulated by the Vilas County Zoning and Shoreland Protection Ordinance. Vilas County also requires new businesses to address erosion control and stormwater management through Administrative Review permits and Conditional Use permits.

Standards for Stormwater Management and Erosion Control:

Stormwater runoff, soil erosion, siltation, or sedimentation from all land disturbing and development activities shall meet standards in NR 151 and NR 216, Wis. Adm. Code and/or shall be controlled in accordance with Technical Guidelines as developed by the U.S. Department of Agriculture, Natural Resources Conservation Service, or the Wisconsin Department of Natural Resources.

For a listing of all relevant conservation practices to achieve compliance with Agricultural and Non-Agricultural performance standards and prohibitions and to address water quality and soil erosion issues, refer to **Appendix J**.

7.4 Enforcement Process

It is by LCC recommendation that the Ag and Non-Ag Performance Standards continue to be implemented on a voluntary basis in Vilas County.

If a site is identified within the county that needs practice implementation because it is located near a WQMA, and the landowner has not voluntarily contacted the Land & Water Conservation Department, the County Conservationist will send a letter to the landowner informing them of the issues and their options to come into compliance with the state standards. If the landowner chooses not to move ahead with any practice implementation activity within 6 months of the first letter, a second letter to the landowner will be sent and copied to the county Corporation Counsel. If no activity commences within 3 months of the second letter, then Vilas County will communicate with DNR about enforcement action.

7.5 Regulations

State: Vilas County has relied on the following State regulations for the protection of natural resources:

- Department of Natural Resources – Chapter 30, Wisconsin Statutes – Navigable Waters
- Department of Natural Resources – Administrative Code NR102 – Water Quality Standards for Wisconsin Surface Waters
- Department of Natural Resources – Administrative Code NR103 – Water Quality Standards for Wetlands
- Department of Natural Resources – Administrative Code NR 140 – General Groundwater Quality
- Department of Natural Resources – Wisconsin Pollution Discharge Elimination System Permits
- Department of Natural Resources – Administrative Code NR151, Performance Standards
- Department of Natural Resources – Administration Code NR216, Storm water Discharge Permits and Construction Site Erosion Control
- Department of Natural Resources – Chapter 29.601, Wisconsin Statutes – Noxious Substances
- Department of Agriculture, Trade, & Consumer Protection – ATCP 50, Soil and Water Resource Management Program

Local: Local regulations used to protect natural resources in Vilas County are:

- Vilas County Subdivision Code
- Vilas County Zoning and Shoreland Protection Ordinances

County: Vilas County has initiated the following policy to improve the distribution of conservation funding and practice implementation on the land:

- Cost Share Program Policy for Tier Level Practices to improve the distribution of conservation practice implementation on the land. Each of the cost-sharable conservation practices available to landowners are placed into one of three tier levels of grant funding that are defined in the policy (see details in **Appendix D**).

7.6 Assessment, Monitoring, and Evaluation

Monitoring and evaluation of specific resource issues can be accomplished as described below:

Work Plan Progress Assessment
The Vilas County LWRM plan is intended to be a working document that will be reviewed by the LWCC and LWCD to track progress in accomplishing the goals and actions of the Workplan. An annual assessment of the Land and Water Resource Management Workplan will be implemented by both quantifiable and qualifying means to determine the overall accomplishments or specific successes of a given objective or activity. Because program accomplishments do not always lend themselves to specific measurable units, there will be observations made and conclusions drawn as to forward progress. Quantifiable tracking measures will be assessed annually and in instances of longer-term activities or programs that do not dictate a means to measure numerically (On-Going or As Needed), activity progress will be measured by qualifying means. For example, as time progresses, some of the objectives will be illustrated by a percentage (%) of the total goal met, the specific number of trained volunteers, or whether a program was successful by certain behaviors occurring (or NOT occurring) within the public sector.

All ATCP 50 BMPs placed on the land are logged in an on-going spreadsheet. Conservation staff tracks the annual implementation of practices and reports that progress to DATCP. Timely annual reporting of workplan accomplishments to DATCP helps to serve as a guide for assessment of our work plan progress.

Performance Standards and Prohibitions Monitoring and Evaluation
County staff regularly visit landowner parcels through voluntary requests. Conservation staff evaluate the land conditions for each site (pre and post project install), along with the DATCP Conservation Engineer. This formal evaluation of practices installed assures us that our designed plans were adhered to during construction and that WI Construction Specifications were followed. Following BMP installation, the site goes on our list for conducting compliance checks within 10 years of project completion. Conservation staff visit a minimum of six, randomly selected “past” project sites to check on the efficacy of the practice(s), ensure that the landowner is adhering to their contract requirements, and to discuss any further water quality or erosion problems that we may see at the site. The landowner then receives a follow up letter that describes the site visit and addresses any issues that were discovered during the compliance check.

Water Quality & Lake Monitoring
Many citizen volunteers monitor our lakes through participation in the Citizen Lake Monitoring Network (CLMN) program. Volunteers continue to collect valuable lake chemistry and water clarity data, and presence/absence data related to aquatic invasive species and native macrophyte growth within the county’s lake ecosystems. Vilas County supports volunteer monitoring efforts and will continue to encourage lake associations, lake property owners, and lake users to participate in the CLMN program. Vilas County will continue to pursue Lake Planning and Protection Grants from the state to fund lake monitoring projects through the county Conservation Department. We strive to complete about 1-2 strategically selected lakes each year for a comprehensive monitoring effort. The comprehensive monitoring program includes completion of five surveys of the lake: aquatic plants, AIS early detection, shoreland habitat, coarse woody habitat, and water quality. Vilas County staff will continue to provide this service to monitor water quality.

Phosphorus Loading & Nutrient Management

Phosphorus loading can adversely affect water quality by promoting excessive plant and algae growth. To reduce nutrient loading by animal waste, any newly installed barnyard systems will be evaluated to ensure compliance with STEPL calculations, which will require annual phosphorus runoff reductions.

In cooperation with DATCP and NRCS, Vilas County will monitor and measure nutrient management progress by tracking nutrient management plan checklists for the acreage with the planner (NRCS or an individual), and by annual tracking of nutrient management plans.

All the methods outlined above can relate to each other since phosphorus loading will be noticed when monitoring water quality. If there is phosphorus loading, then a nutrient management plan can be developed. If citizen lake monitoring and evaluation is not working, then more volunteers will be necessary to increase water quality testing. Nutrient management will be accomplished by monitoring steps 1 through 5.

7.7 Coordination

The LWCD staff seeks cooperation from and works closely with a diverse group of agencies, associations, and organizations involved in resource management and protection in Vilas County. These agencies and groups include: United States Department of Agriculture – Farm Service Agency (FSA), Natural Resource Conservation Service (NRCS), Animal and Plant Health Inspection Service – Wildlife Services (APHIS-WS), and United States Forest Service (USFS); Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP); Wisconsin Department of Natural Resources (WDNR) staff such as Water Resources Management Specialists, Fisheries Biologists, Water Regulations and Zoning Specialists, Water Program Management staff, Watershed Management Staff, Invasive Species Management staff, and Forestry staff; Army Corp of Engineers, University of Wisconsin – Extension Lakes; Vilas County Forestry, Mapping, Public Health, Zoning, Emergency Management, and Highway Departments; individual Vilas County Lake Organizations; Vilas County Lakes & Rivers Association, and Wisconsin Lakes (WL).

Each agency, organization, association, and individual have its individual resource issues, programs, and plans; but cooperatively we can work together for the greater good of Vilas County's land and water resources.

GLOSSARY
Chapter 8

303(d) Waters – Also called **List of Impaired Waters**. This list identifies waters that do not meet water quality standards, including both water quality criteria for specific substances or their designated uses. It is used as the basis for development of Total Maximum Daily Loads (TMDLs) under the provisions of section 303(d)(1)(C) of the Clean Water Act, U.S. Environmental Protection Agency (EPA). The EPA requires that the DNR update its list every 2 years.

Animal Waste Management Program – This regulatory program, administered by the DNR via NR 243, seeks to identify and correct animal waste-related water quality problems.

Animal and Plant Health Inspection Service – Wildlife Services (APHIS-WS) – Part of USDA, APHIS-WS that aids producers in the management of animal crop damage.

Aquatic Invasive Species (AIS) – AIS are aquatic flora or fauna that invade ecosystems beyond their natural, historic range. Their presence may harm native ecosystems or commercial, agricultural, or recreational activities dependent on these ecosystems.

ATCP 50 – The chapter of Wisconsin's Administrative Code that implements the Land and Water Resource Management Program as described in Chapter 92 of the WI Statutes. It identifies those conservation practices that may be used to meet performance standards.

Best Management Practices (BMPs) – The most effective conservation practice or combination of conservation practices for reducing nonpoint source pollution to acceptable levels.

Chapter 92 – Portion of Wisconsin Statutes outlining the soil and water conservation, agricultural shoreland management, and animal waste management laws and policies of the State.

Conservation Plan – A record of decisions and intentions made by land users regarding the conservation of the soil, water and related natural resources of a particular unit of land.

Conservation Reserve Enhancement Program (CREP) – An add-on to the CRP program, which expands and builds on CRP's success in certain areas of the State.

Conservation Reserve Program (CRP) – A provision of the federal Farm Bill that takes eligible cropland out of production and puts it into grass or tree cover for 10-15 years.

Cooperator – A landowner or operator who is working with, or has signed a cooperative agreement with, a County LWCC.

Cooperative Weed Management Area (CWMA) – a non-profit group of volunteers working together to plan and implement weed management projects. In Vilas and Oneida counties, this group is called WHIP – the Wisconsin Headwaters Invasives Partnership.

County Conservationist – County Land and Water Conservation Department head, responsible for implementing programs assigned to the LWCD and for supervising LWCD staff.

Critical Sites – Those sites that are significant sources of nonpoint source pollution upon which best management practices shall be implemented as described in s. 281.65(4)(g) 8.am., WI stats.

Crop Consultants – Independent Crop Consultants provide services to growers in integrated crop and farm management programs, working directly with farmers, and advising them in areas such as watershed management, integrated nutrient and pest management, and animal waste management. Their primary purpose is implementing scientific and technological advances to enhance environmental sustainability and profitability on clients' farms.

Department of Administration (DOA) – The State agency responsible for establishing the comprehensive planning grant program.

Department of Agriculture, Trade, and Consumer Protection (DATCP) – The State agency responsible for establishing Statewide soil and water conservation policies and administering the State's soil and water conservation programs. The DATCP administers State cost-sharing funds for a variety of LWCC operations, including support for staff, materials and conservation practices. Referred to in the LWRM plan guidelines as the "department".

Department of Natural Resources (DNR) – The State agency responsible for managing State owned lands and protecting public waters. DNR also administers programs to regulate, guide and assist LWCCs, LWCDs and individual land users in managing land, water, fish and wildlife. The DNR administers State cost-sharing funds for priority watershed projects, Targeted Runoff Management (TRM) grants, and Urban Nonpoint Source Construction and Planning grants.

District Conservationist (DC) – NRCS employee responsible for administering federal conservation programs at the local level.

Environmental Protection Agency (EPA) – The agency of the federal government responsible for carrying out the nation's pollution control laws. It provides technical and financial assistance to reduce and control air, water, and land pollution.

Environmental Quality Incentives Program (EQIP) – Federal program to provide technical and cost-sharing assistance to landowners for conservation practices that provide water quality protection.

Extension, University of Wisconsin-Madison (Ext) – Extension's mission is to connect people with the University of Wisconsin=Madison. We teach, learn, lead and serve, transforming lives and communities.

Farm Service Agency (FSA) – USDA agency that administers agricultural assistance programs including price supports, production controls, and conservation cost sharing.

Farmland Preservation Program (FPP) – A DATCP land-use program under Chapter 91, Wisconsin Statutes, that helps preserve farmland through local planning and zoning, promotes soil and water conservation, and provides State tax relief to participating landowners.

Forest Crop Law (FCL) – FCL is a landowner incentive program that encourages long-term, sustainable management of private woodlands. The FCL program was enacted in 1927, and enrollment was closed on January 1, 1986. MFL took its place in 1986.

Forestry – The Forestry, Recreation, and Land Department of Vilas County. This term is used in the Work Plan.

Geographic Information System (GIS) – (See **Mapping.**) A computerized system of maps and layers of data about land including soils, land cover, topography, field boundaries, roads and streams. Such geographically based data layers improve the ability to analyze complex data for decision making.

Health – The Vilas County Public Health department. This term is used in the Work Plan.

Highway (HWY) – The Highway Department of Vilas County. This term is used in the Work Plan.

HUC 12 – Hydrologic unit code (HUC) consisting of several numbered digits based on the classification in the hydrologic unit system. HUC 12 is a more local sub-watershed level (12 numbered digits) that captures tributary systems. This term is used in reference to watershed maps.

Impaired Waters – See **303(d) Waters**.

Lac du Flambeau Tribe – The Lac du Flambeau Band of Lake Superior Chippewa Indians, who have land located primarily in the Town of Lac du Flambeau in Vilas County but include areas in adjacent counties.

Land and Water Conservation Board (LWCB) – This Statewide board is composed of three local elected officials, four appointed by the Governor (one shall be a resident of a city with a population of 50,000 or more, one shall represent a governmental unit involved in river management, one shall be a farmer, and one shall be a member of a charitable corporation, charitable association or charitable trust) and leaders from DNR, DATCP, and DOA. The LWCB oversees the approval of County land and water management plans (s.92.04, stats.).

Land and Water Resource Management Plan (LWRM plan) – A locally developed and implemented multi-year strategic plan with an emphasis on partnerships and program integration. The plan includes a resource assessment, identifies the applicable performance standards and related control of pollution from nonpoint sources, identifies a multi-year description of planned activities, establishes a progress tracking system, and describes an approach for coordinating information and implementation programs with other local, State and federal agencies, communities and organization (s. ATCP 50.12).

Land and Water Conservation Committee (LWCC) – The unit of County government empowered, by Chapter 92 of the Wisconsin Statutes, to conserve and protect the County's soil, water and related natural resources. Referred to in the LWRM guidelines as the "committee".

Land and Water Conservation Department (LWCD) – The department of County government responsible for administering the conservation programs and policies of the Land and Water Conservation Committee.

Light Detection and Ranging (LiDAR) – A remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light.

Limited Term Employee (LTE) – Limited term employees are those persons who are hired to perform a grouping of duties and responsibilities on a seasonal basis. LTE positions are temporary in nature and the conditions for these appointments do not provide for permanent employment status.

List of Impaired Waters – Also called **303(d) Waters.** This list identifies surface waters that are not meeting water quality standards, including both water quality criteria for specific substances and the designated uses. It is used as the basis for development of Total Maximum Daily Loads (TMDLs) under the provisions of section 303(d)(1)(C) of the Clean Water Act, U.S. Environmental Protection Agency (EPA). The EPA requires that the DNR update its list every 2 years.

Mapping – The Vilas County Land Information Department, which includes mapping using ArcGIS. This term is used in the Workplan.

Managed Forest Law (MFL) – This DNR program is a landowner incentive program that encourages sustainable forestry on private woodland. In exchange for following sound forest management, the landowner pays reduced property taxes. It was enacted in 1985 and replaced the Woodland Tax Law and the Forest Crop Law.

Natural Resources Conservation Service (NRCS) – Part of USDA, NRCS provides soil survey, conservation planning and technical assistance to local land users.

Nonpoint Source Pollution (NPS) – Pollution from many small or diffuse urban and rural sources. Livestock waste finding its way into a stream and causing water pollution is an example of non-point source pollution.

Nonpoint Source Pollution Abatement Program – A DNR water quality program under Chapters 120 and 281, Wisconsin Statutes, that provides technical assistance and cost-sharing to landowners to develop and maintain management practices to prevent or reduce nonpoint source water pollution in designated watersheds.

North Central Wisconsin Regional Planning Commission (NCWRPC) – A voluntary association of governments established in 1973 under Wisconsin Statute §66.0309, to provide: economic development, geographic information systems (GIS), intergovernmental cooperation, land use, and transportation services to member communities.

Northwoods Land Trust – The Northwoods Land Trust is a non-profit, tax-exempt conservation organization headquartered in Eagle River, WI. They promote conservation of private shorelands, woodlands, wetlands, and other natural resources, as public benefits for present and future generations.

NR 115 – DNR's administrative code that requires counties to adopt DNR's minimum shoreland zoning standards to limit the direct and cumulative impacts of shoreland development on water quality; near-shore aquatic, wetland and upland wildlife habitat; and natural scenic beauty.

NR 151 – DNR's administrative code that establishes runoff pollution performance standards for non-agricultural facilities and transportation facilities and performance standards and prohibitions for agricultural facilities and practices designed to meet water quality standards.

NR 216 – DNR's administrative code to minimize the discharge of pollutants carried by storm water runoff from certain industrial facilities, construction sites and municipal separate storm sewer systems (MS4s).

Nutrient Management Plan – The Nutrient Management Plan means any of the following: (a) A plan required under s. ATCP 50.04 (3) or 50.62 (5) (f). (b) A farm nutrient plan prepared or approved, for a landowner, by a qualified nutrient management planner.

Outstanding Resource Waters/Exceptional Resource Waters (ORW/ERW) – DNR classifies streams as Outstanding Resource Waters (ORW) and Exceptional Resource Waters (ERW) as listed in NR 102.10 and NR 102.11. ORW waters have excellent water quality and high-quality fisheries and do not receive wastewater discharges. ERW waters have excellent water quality and valued fisheries but may already receive wastewater discharges.

Priority Farms – Farms identified by the County for having excessive runoff from soil erosion and/or manure resulting in existing or potential water quality problems.

Resource Conservation and Development (RC&D) – Vilas County is one of 10 counties in the Lumberjack RC&D Council. This term is used in the Workplan.

Revised Universal Soil Loss Equation 2 (RUSLE2) – The "Revised Universal Soil Loss Equation 2" (RUSLE2) is an advanced computer-based model used to estimate soil erosion rates, particularly focusing on rill erosion, across various land types, by taking into account factors like vegetation cover, slope characteristics, and soil properties, allowing for more accurate predictions compared to its predecessor, RUSLE, especially on complex slopes where deposition can occur; it is primarily used for conservation planning and sediment yield calculations. This model was created and maintained by USDA Agricultural Research Service.

Shall – The term “shall” in the guideline represents components of a LWRM plan that are required in law and rule.

Soil and Water Resource Management Program (SWRM) – DATCP program that provides counties with funds to hire and support Land and Water Conservation Department staff and to assist land users in implementing DATCP conservation programs (ATCP 50).

Soil Loss Tolerance (“T”) – Erosion rate in tons per acre per year of soil that a field could lose and still maintain productivity.

Soil Survey – NRCS conducts the National Cooperative Soil Survey and publishes soil survey reports. Soils data is designed to evaluate the potential of the soil and management needed for maximum food and fiber production.

Solid Waste – The Solid Waste Department of Vilas County. This term is used in the Work Plan.

State Natural Area (SNA) – State natural areas (SNAs) protect outstanding examples of Wisconsin's native landscape of natural communities, significant geological formations and archeological sites.

Spreadsheet Tool for Estimating Pollutant Load (STEPL) – a management tool to estimate phosphorus load reductions on the landscape over a given year.

Total phosphorus (TP) is a way to measure phosphorus in lakes, because it includes both ortho-phosphate and the phosphorus in plant and animal fragments suspended in lake water.

Terrestrial Invasive Species (TIS) – TIS are non-native plants, animals and other organisms that evolved to live on the land.

Total Maximum Daily Load (TMDL) – A Total Maximum Daily Load is a regulatory term in the U.S. Clean Water Act, describing a plan for restoring impaired waters that identifies the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards.

Targeted Runoff Management (TRM) – The Targeted Runoff Management (TRM) Grant Program offers competitive grants for local governments for the control of pollution that comes from diffuse sources, also called “nonpoint source (NPS)” pollution.

United States Department of Agriculture (USDA) – Branch of federal government with responsibilities in the areas of food production, inspection, and storage. Agencies with resource conservation programs and responsibilities, such as FSA, NRCS, APHIS-WS, and Forest Service and others are agencies of the USDA.

University of Wisconsin-Extension – See **Extension**.

Vilas County Lakes & Rivers Association (VCLRA) – A non-profit group dedicated to protecting lakes and other surface waters in Vilas County. This term is used in the Work Plan.

V.C. 2024 – A fact that is sourced to Vilas County Zoning and Planning Department.

Water Quality Management Area (WQMA) – The area within 1,000 feet from the ordinary high water mark of navigable waters that consist of a lake, pond or flowage, except that, for a navigable water that is a glacial pothole lake, the term means the area within 1,000 feet from the high water mark of the lake; the area within 300 feet from the ordinary high water mark of navigable waters that consist of a river or stream; and a site that is susceptible to groundwater contamination, or that has the potential to be a direct conduit for contamination to reach groundwater.

Watershed – (Also see **HUC 12**) The geographic area that drains to a particular river, stream, or water body providing its water supply.

Wetlands Reserve Program (WRP) – A provision of the federal Farm Bill that compensates landowners for voluntarily restoring and protecting wetlands on their property.

Wildlife Habitat Incentives Program (WHIP) – Federal program to help improve wildlife habitat on private lands.

Wisconsin Headwaters Invasive Partnership (WHIP) – a multi-agency cooperative weed management unit serving both Vilas and Oneida Counties to educate, manage, and protect against invasive terrestrial plants. WHIP is one of roughly 14 Cooperative Invasive Species Management Areas (CISMAs) across Wisconsin, and there are many more nationwide.

Wisconsin Lakes (WL) – A state non-profit agency working to protect the lakes of Wisconsin through sound policy and legislation

Wisconsin Land and Water Conservation Association (WLWCA) – Membership organization that represents the State's 72 County Land and Water Conservation Committees and Departments

Wisconsin Wetlands Association (WWA) – A non-profit agency working to protect Wisconsin's Wetlands

Work Plan – A 5-year working document that outlines goals, objectives, and activities for local county staff; used as a tool to implement their Land & Water Resource Management Plan.

Zoning – The Vilas County Zoning and Planning Department. This term is used in the Work Plan.

Appendix A

Public Hearing Notice

From:
Vilas County

NOTICE OF PUBLIC HEARING – Class I

NOTICE IS HEREBY GIVEN that a public hearing will be held pursuant to Wis. Stat. §92.10(6)(c) on Thursday, November 14, 2024 at 9:00 a.m. in Conference Room #B of the Vilas County Courthouse, 330 Court Street, Eagle River, Wisconsin, 54521. The hearing concerns the Vilas County 2025-2034 Land and Water Resource Management Plan and will be held before the Vilas County Land & Water Conservation Committee. Written and oral comments on the draft plan will be taken at that time.

According to the provisions outlined in Wis. Stat. §92.10(6) and Wis. Admin. Code §ATCP 50.12, 50.30(3), Vilas County supports a locally led process that enhances decision-making during their current revision of the 2025 - 2034 Land and Water Resource Management Plan. The County is in the process of identifying land and water resource concerns and prioritizing work tasks into a five-year work plan. The draft plan is available for review online at the Northcentral Wisconsin Regional Planning Commission website or upon request from the Vilas County Land and Water Conservation office, 330 Court Street, Eagle River, Wisconsin from 8:00 am – 4:00 pm Monday through Friday.

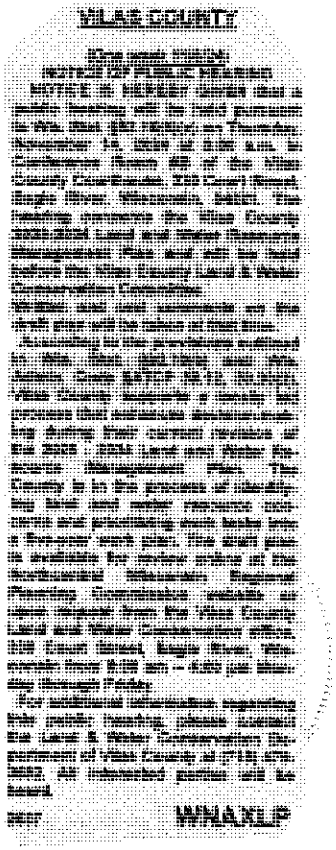
For additional information regarding this public hearing, please contact the Land & Water Conservation Department of Vilas County at (715) 479-3682. All interested parties will be heard.

*Legal Notice to be published as a Class 1 notice in the Vilas County News-Review.

Vilas County Land + Water Conservation 2637

STATE OF WISCONSIN } ss.

Vilas County



(Seal)

Kurt L Krueger, being duly sworn, deposes and says that he (she) is an authorized representative of the Vilas County News-Review and The Three Lakes News, a weekly newspaper published at Eagle River, the seat of government of said county, and that an advertisement of which the annexed is a true copy, taken from said paper, was published therein on

November 6, 2024

(Signed) Kurt L Krueger

Publisher (Title)

Subscribed and sworn to before me this 6th day of November, 2024.

Dawn R Molnar

Notary Public, Vilas County, Wisconsin

My Commission expires May 22, 2028.

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Appendix B
Nutrient Management Conservation Practice Standard

From: Natural Resources Conservation Service (NRCS)

APPENDIX 2. NUTRIENT MANAGEMENT FOR WISCONSIN CRANBERRY PRODUCTION

This appendix to the Wisconsin Conservation Planning Technical Note WI-1 (WI CP-TN-1) has been developed in order to provide guidance for nutrient management planning on cranberry production systems. A cranberry nutrient management plan that meets the criteria included in this appendix should satisfy the requirements of the Wisconsin NRCS Nutrient Management Conservation Practice Technical Standard (WI NRCS CPS, Nutrient Management (Code 590)) and the technical note. Reference is made to particular sections of the 590 standard and the technical note, where special attention may be needed.

The guidance and instructions included in this appendix are in addition to those found in the 590 standard. Implementation of a plan developed based upon the guidance included in this document must be in accordance with the 590 standard. Federal, state, and local laws may provide additional requirements.

This appendix provides detailed guidance on the following:

Section I: Criteria Unique to Cranberry Nutrient Management Planning

Section II: Cranberry Nutrient Management Tables

Section III: Cranberry Nutrient Management Plan

Section I: Criteria Unique to Cranberry Nutrient Management Planning

A. General

1. Cranberry nutrient management planning shall be based on plant tissue analysis. Plant tissue analysis shall be performed annually, on each individual nutrient management unit, in accordance with Cranberry Tissue Testing for Producing Beds in North America (Extension publication EM-8610). Tissue analysis should be performed by a reputable laboratory—preferably one that participates in the North American Proficiency Testing Program. A minimum of one sample shall be collected per management unit per year. In addition, a total of at least one sample per 5 acres of cranberry beds, within each nutrient management unit, shall be collected every 4 years. (For example, on a 25-acre nutrient management unit, collect at least one tissue sample every year and a total of at least 5 samples over a 4-year period.) Refer to EM- 8610 and "How to Take a Cranberry Tissue Sample," (Teryl R. Roper, Professor and Extension Fruit Crops Specialist, UW- Madison, 2006) for further guidance.

2. Soil fertility analysis should also be considered in cranberry nutrient management planning. Soil samples must be analyzed by an approved Wisconsin laboratory. (Refer to Appendix 2 of this technical note for contact information.) Consider collecting a total of at least one composite sample per 5 acres of producing cranberry beds, within each nutrient management unit, every 4 years. Refer to Sampling Soils for Testing (UW-Extension publication A2100) and "How to Take a Cranberry Soil Sample," (Teryl R. Roper, Professor and Extension Fruit Crops Specialist, UW-Madison, 2006) for further guidance.

3. Additional considerations in cranberry nutrient management planning should include monitoring and observation of plant vigor and appearance, production history, and grower experience, in addition to the considerations described in the Extension publications referenced in this document.

4. Ensure that application equipment is properly calibrated.

5. Applications of nutrient and soil amendments should not be made when soil temperatures are low (<50 deg. F) or fields are saturated with water.

6. Applications of nutrient and soil amendments should be rescheduled when predicted weather conditions are likely to transport these amendments to non-target areas (i.e. precipitation events, planned irrigation events, frost protection events, etc.). The nutrient management plan shall document mitigation practices to be implemented when rescheduling is not possible.

7. An analysis of the water chemistry of irrigation and/or flood water should be considered when the conservation planning resource assessment has identified that water chemistry may significantly

influence nutrient management by altering soil acidity and/or resulting in the application of significant quantities of plant nutrients.

8. Efforts should be made to limit the detachment and transport of vegetation and soil materials (i.e. material that is removed or disturbed in the processes of bed renovation/construction or managed "floods"), which may result in the deposition of these materials into surface waters.

B. Soil Acidity

1. Maintain soil pH at or below 6.0, where practical. The "target pH" is 5.6 for mineral soils and 5.4 for organic soils, as identified in Nutrient Application Guidelines for Field, Vegetable, and Fruit Crops in Wisconsin (UWEX publication A2809). Note circumstances where the difference between the actual soil pH and the target pH is greater than 0.5, and describe procedures utilized to adjust pH, if such efforts are made.

2. Annual sulfur applications should not exceed 500 lbs elemental S per acre.

3. Individual sulfur applications should not exceed 150 lbs elemental S per acre.

C. Nitrogen (for producing beds)

1. Nitrogen management strategies shall be in accordance with Nitrogen for Bearing Cranberries in North America (Extension publication EM-8741). Note: Hybrid varieties, such as Stevens and Pilgrim, may benefit from tissue-N concentrations up to 1.3% (2006 Wisconsin Cranberry School Proceedings, Teryl Roper, UW-Extension).

2. Ammonium or urea forms of nitrogen fertilizer should be used.

3. Individual nitrogen applications should not exceed 20 lbs/ac.

4. Identify and implement water quality mitigation practices for beds where soil pH is greater than 5.5 and 70 lbs or more of nitrogen fertilizer are applied per acre per year.

5. Annual applications of fertilizer containing N should be made using a minimum of three passes, unless total planned applications for the season do not exceed 20 lbs N per acre.

6. Applications of fertilizer containing N should be timed to coincide with peak crop demand (active growth).

D. Phosphorous (for producing beds)

1. Phosphorous management strategies shall be in accordance with Phosphorous for Bearing Cranberries in North America (UW- Extension publication, Nov. 2004).

2. Annual phosphorous applications shall not exceed 20 lbs actual P per acre (~45 lbs P2 O5 per acre), unless the need for additional annual P is documented by plant tissue analysis or other considerations as outlined in Phosphorous for Bearing Cranberries in North America.

3. Develop a fertilizer reduction strategy where planned, annual applications of phosphorous fertilizer exceed 20 lbs actual P per acre (~45 lbs P2 O5 per acre), on producing beds; tissue analysis demonstrates that nutrient concentrations are within or exceed recommended levels; and no deficiency of phosphorous has been demonstrated through soil fertility analysis. Cranberry tissue nutrient content guidelines for producing beds and soil test interpretation categories for phosphorous are summarized in Section II of this appendix.

4. Applications of fertilizer containing P should be timed to coincide with peak crop demand (hook to fruit set). Multiple, lighter applications of fertilizer containing P are preferred over fewer, heavier applications.

E. Potassium (for producing beds)

1. The goal of potassium fertility management should be to maintain plant tissue concentrations within the recommended range (refer to EM-8610 or Section II).

2. Large doses of potassium fertilizer have the potential to disrupt the balance of available cations (positively-charged ions) in the soil. Because of this, individual applications of fertilizer containing potassium should not exceed ~62 lbs actual K per acre (75 lbs K20 per acre).

3. Multiple, lighter applications of fertilizer containing K are preferred over fewer, heavier applications.

F. New Plantings

1. Nutrient management strategies for new plantings shall be based upon soil fertility analysis and consideration of soil characteristics. Collect soil samples for analysis at a rate of one composite sample per 5 acres of cranberry beds after the beds have been prepared for planting. Refer to UWEX publication A2809, or Section II of this Appendix, for fertilizer application guidelines based on soil test results.

2. Annual applications of nitrogen should not exceed 150 lbs/ac.

3. Individual applications of fertilizer should not exceed 15 lbs N per acre.

4. If fertilizers containing phosphorous and/or potassium are to be applied after the plants have become established, consider alternating fertilizer applications between nitrogen-only products [i.e. urea or ammonium sulfate (21-0-0)] and complete, N-P-K blends [i.e. 13-13-13, 10-10-30, or similar products].

5. Pre-plant applications of fertilizer containing phosphorous and/or potassium should be incorporated into the soil. Applications must be based upon soil test results and UW-Extension guidelines (see A2809 or Section II of this Appendix).

6. Frequent, lighter applications of fertilizers are preferred on new plantings over fewer, heavier applications.

SECTION II: CRANBERRY NUTRIENT MANAGEMENT TABLES

Table 1: Soil test interpretation categories for phosphorous (P) and potassium (K) for *common cranberry soils

Nutrient	Very Low	Low	Optimum	High	Very High	Excessively High
P (ppm)	<18	18-25	26-37	38-55	>55	
K (ppm)	<50	50-80	81-120	121-160	161-220	>220

*These categories apply to Subsoil Group E [Sandy, coarse-textured soils (sands and loamy sands)] and Subsoil Group O [Organic soils (mucks and peats)], as defined in Nutrient Application Guidelines for Field, Vegetable, and Fruit Crops in Wisconsin (UWEX publication A2809). Refer to A2809 if the dominant soil type does not meet either of these descriptions.

Table 2: Phosphorous and potassium fertilizer application rate guidelines [from UWEX publication A2809]

Fertilizer Component	Very Low	Low	Optimum	High	Very High	Excessively High
P2 O5 (lbs/ac)	†200	†125	NA	NA	--	NA
K2 O (lbs/ac)	†250	†200	NA	NA	NA	NA

†These rates are only applicable prior to cranberry bed establishment. Incorporate all P2 O5 and K2 O before planting. For established cranberry beds, use tissue testing to guide fertilizer application rates.

Table 3: Cranberry tissue nutrient content guidelines for producing beds

Nutrient	Normal Concentration (%)	Nutrient	Normal Concentration (ppm)
Nitrogen (N)	0.90 – ‡1.10	Boron (B)	15 – 60
Phosphorous (P)	0.10 – 0.20	Iron (Fe)	>20
Potassium (K)	0.40 – 0.75	Manganese (Mn)	>10
Calcium (Ca)	0.30 – 0.80	Zinc (Zn)	15 – 30
Magnesium (Mg)	0.15 – 0.25	Copper (Cu)	4 – 10
Sulfur (S)	0.08 – 0.25		

‡Hybrid varieties, such as Stevens and Pilgrim, may benefit from tissue-N concentrations of up to 1.30%.

SECTION III: CRANBERRY NUTRIENT MANAGEMENT PLAN OUTLINE AND OPTIONAL FORMS

A cranberry nutrient management plan shall be developed according to the 590 standard, as well as the criteria included in this technical note. The following outline should be used as a guide in the development of a cranberry nutrient management plan. The attached forms may be useful tools when developing a plan. These forms are not required. [Bracketed references to individual forms are included, for guidance, within this outline.] Note: Completing the optional forms may satisfy some of the items listed below. However, use of the optional forms will not preclude the need to develop a plan narrative, as some items will require further explanation.

Consider organizing the plan around nutrient management units. *Nutrient management units are groups of fields or beds that are managed similarly. A single management unit may include a group of beds with similar soil conditions, production status (new plantings, plantings of similar age, fresh-fruit beds, non-producing beds, etc.), or other considerations, which allow the unit to be managed as a whole.*

A cranberry nutrient management plan should satisfy the requirements of the 590 standard by satisfying the following items, as well as the criteria outlined in Section I of this appendix:

I. Plan Narrative:

The purpose of the narrative is to provide an overview of the operation and describe the nutrient management strategies for the growing season, including descriptions of how the plan will be implemented and why the proposed strategies were selected. The narrative should provide an overview of the operation, identify the nutrient management units on the marsh, explain past practices and results, explain how current strategies have been developed or refined, and discuss potential factors that may cause deviation from the intended strategies.

The narrative should explain how the nutrient management plan will be implemented, with an explanation of how nutrient management decisions will be made.

A. Identify nutrient management units and include the following information:

[Management Unit Identification Worksheet]

1. Current production status.
2. A general description of the soil, including subsoil characteristics and soil characteristics within the rooting zone. Explain bed construction/renovation and management histories, including sanding practices. Focus on those characteristics and past activities that may influence nutrient management.

B. Summarize records of nutrient and soil amendment applications, tissue and soil fertility test results, and crop yields from previous years. If available, records from the most recent four years should be summarized in the narrative and either included with the plan or referenced if available in another format or easily accessible location. Include the following details per individual management unit:

[5-Year Nutrient Management Summary per Management Unit]

1. Applications of commercial fertilizers, organic byproducts (i.e. fish waste), and soil amendments (i.e. elemental sulfur), including the form, rate, and timing.

2. Plant tissue analysis results.

3. Soil fertility analysis results.

4. Historic crop yields.

C. Planned nutrient and soil amendment applications, including the rate, form, and timing. In addition, identify anticipated or expected yields per management unit. These should be based on historical production records, crop conditions, crop varieties grown, and grower experience.

[Planned Nutrient Management Practices worksheet]

[Fertilizer Decision-Making Checklist]

II. Aerial photographs and/or maps of the farm containing:

A. Boundaries, identification numbers, and acreage for all beds and nutrient management units. The Wisconsin DNR has a free, internet mapping program, which may be used to generate marsh maps based on aerial photography or topographic maps: http://maps.dnr.state.wi.us.

B. A soil map. NRCS has a free, internet mapping program, which may be used to generate soil maps: http://websoilsurvey.nrcs.usda.gov.

C. Locate and identify features that require additional protection. These may include groundwater risk areas (i.e. abandoned wells), surface water risk areas (i.e. water conveyance ditches, reservoirs, streams or lakes, wetlands, etc.), or other sensitive areas. Delineate boundaries for nutrient application restriction areas. Consider depicting routes of surface water flow, reservoirs, and key surface water control points (i.e. water control structures or bulkheads), which allow for the storage or recovery of discharges from beds. Include a legend of map symbols.

III. Documentation of nutrient management activities:

Document the following within-season activities per individual nutrient management unit:

A. Actual nutrient and soil amendment applications, including the rate, form, and timing.

[Actual Nutrient Management Practices worksheet]

B. Monitoring efforts (i.e. measurements of crop potential, upright growth, soil temperatures, precipitation, etc.) and observations (i.e. plant vigor and appearance, weather events and climatic conditions, etc.) made in support of nutrient management decisions. Nutrient management activities that are inconsistent with the plan narrative should be documented.

[Annual Nutrient Management Observation Checklist]

Cranberry Nutrient Management Optional Forms are included on the following pages

Appendix C

NR151 Performance Standards and Prohibitions Fact Sheets

From:
NRCS, Extension, DNR, DATCP, & WI L+W

Wisconsin's Runoff Rules

what farmers need to know

January 2013 DNR Pub. No. WT 756 REV 1/13

Farms, like all major industries, must follow environmental requirements to control runoff from fields, pastures and livestock facilities. Otherwise this pollution can harm our lakes, streams, wetlands and groundwater.

Wisconsin adopted administrative rules in 2002 (NR 151), with revisions effective in 2011 that set statewide performance standards and prohibitions for all Wisconsin farms. All farmers must comply with these standards and prohibitions. Cost-share funding may be available to assist with compliance. Some state and local programs may require compliance whether or not cost-share funds are available.

This fact sheet explains the basic information that farmers need to know about these rules and how to comply with them. It is recommended that farmers contact their county land conservation staff for further details on these rules and their impact on farm operations.

► Agricultural Standards and Prohibitions:

ALL FARMERS MUST:

- *Meet tolerable soil loss ("T") on cropped fields and pastures.*
- *Annually develop and follow a Nutrient Management Plan (NMP) designed to keep nutrients and sediment from entering lakes, streams, wetlands and groundwater. Farmers may hire a certified crop advisor or prepare their own NMP if they have received proper training.*
- *Use the phosphorous index (PI) standard to ensure that their NMP adequately controls phosphorous runoff over the accounting period.*
- *Avoid tilling within 5 feet of the edge of the bank of surface waters. This setback may be extended up to 20 feet to ensure bank integrity and prevent soil deposition.*

► Additional Standards:

FARMERS WITH LIVESTOCK MUST:

- *Prevent direct runoff from feedlots or stored manure from entering lakes, streams, wetlands and groundwater.*
- *Limit access or otherwise manage livestock along lakes, streams and wetlands to maintain vegetative cover and prevent erosion.*
- *Prevent significant discharges of process wastewater (milkhouse waste, feed leachate, etc.) into lakes, streams, wetlands, or groundwater.*

FARMERS WHO HAVE, OR PLAN TO BUILD, MANURE STORAGE STRUCTURES MUST:

- *Maintain structures to prevent overflow and maintain contents at or below the specified margin of safety.*
- *Repair or upgrade any failing or leaking structures to prevent negative impacts to public health, aquatic life and groundwater.*
- *Close idle structures according to accepted standards.*
- *Meet technical standards for newly constructed or significantly altered structures.*

FARMERS WITH LAND IN A WATER QUALITY MANAGEMENT AREA *(300 feet from streams, 1,000 feet from a lake, or in areas susceptible to groundwater contamination)* **MUST:**

- *Avoid stacking manure in unconfined piles.*
- *Divert clean water away from feedlots, manure storage areas, and barnyards located within this area.*

Photos: Jeffrey J. Strobel, Duane Popple and Lynda Schweikert

Wisconsin's Runoff Rules

what farmers need to know

DNR Pub. No. WT 756 REV 1/13

► Farmland Preservation Tax Credit:

A farmer must comply with applicable state standards to receive the Farmland Preservation Tax Credit, even if cost sharing is not available. Farmers may be considered in compliance by entering into a schedule of compliance.

This requirement applies to farmers whose land is located in a certified farmland preservation zoning district (i.e. exclusive agriculture), or for farmers who signed a farmland preservation agreement after standards were in effect for that county. Farmers should contact their county land conservation staff for more information regarding applicable standards and compliance documentation.

► Implementation and Financial Assistance:

Under DNR rules, a landowner is normally entitled to cost sharing if the landowner is required to implement best management practices on "existing cropland" or an "existing" livestock facility or operation in order to comply with a DNR performance standard. Cropland or livestock facilities brought into service after the effective date of the standard are considered "new" and must meet standards and prohibitions without cost-share funding. Farmers with existing cropland or livestock facilities may be eligible for state or federal cost sharing and are encouraged to contact their county land conservation staff or USDA Natural Resources Conservation Service (NRCS) office for information about current funding sources, rates and practices eligible for cost sharing.

Farmers also should work with their land conservation staff to determine how these performance standards and prohibitions may affect their participation in various federal, state and local programs, such as Farmland Preservation. You can find a directory of land conservation offices and related agencies at http://datcp.wi.gov/Environment under "Land and Water Conservation."

► Permits and Licensing:

Farmers may be required to meet NR 151 Standards in order to obtain local and state permits. For livestock siting and manure storage ordinance permits, for example, nutrient management plans and other requirements may be imposed on livestock operations without providing cost sharing. Contact your local officials for additional information.

Farmers with 1,000 or more animal units must operate under a Wisconsin Pollutant Discharge Elimination System (WPDES) permit and do not qualify for state cost sharing to meet permit requirements. Contact your DNR Service Center for more information about WPDES permits.

For more information about runoff management in Wisconsin and topics found in this brochure please visit:

runoffinfo.uwex.edu

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

UW Extension
Cooperative Extension

Wisconsin Department of Natural Resources

Department of Agriculture, Trade & Consumer Protection · Wisconsin

Wisconsin Land and Water Conservation Association, Inc.
wlwca.org

Wisconsin Department of Natural Resources (WDNR), Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP), in cooperation with: USDA Natural Resources Conservation Service (NRCS), University of Wisconsin-Extension (UWEX), County Land Conservation Departments (LCD).

Graphic design by Jeffrey J. Strobel
UW–Extension Environmental Resources Center

Non-Agricultural Revisions to Chapter NR 151, Runoff Management Rule

The Wisconsin Department of Natural Resources (WDNR) has revised Chapter NR 151, Wisconsin Administrative Code, an administrative rule that establishes runoff pollution performance standards for both agricultural and non-agricultural practices and manure management prohibitions for agricultural facilities and practices. These standards and prohibitions are intended to achieve water quality standards. Polluted runoff from both urban and agricultural land uses contribute to the nutrients that cause unsightly algae blooms, the loss of aquatic habitat, fish kills, and other water quality problems that affect Wisconsin's lakes and streams. The rule was originally promulgated in 2002. The revised rule was published in December 2010 and became effective on January 1, 2011.

Please note that under state budget bill 2011 Wisconsin Act 32, there were two provisions which became effective on July 1, 2011, that impact implementation of Chapter NR 151. Those provisions will be mentioned under the section related to the developed urban area performance standards.

This fact sheet includes a summary of major non-agricultural revisions to Chapter NR 151 and is not inclusive of all the revisions that were made to the rule. The complete version of Chapter NR 151 can be found at http://legis.wisconsin.gov/rsb/code/nr/nr151.pdf. This fact sheet includes information on the following:

Subchapter I – General Provisions
Revisions to Key Definitions
Revisions to Location of Best Management Practices on Navigable Waters

Subchapter III – Non-Agricultural Performance Standards

Revisions to the Construction Site Performance Standards
Revisions to the Post-Construction Performance Standards
Revisions to the Developed Urban Area Performance Standards

Subchapter IV – Transportation Facility Performance Standards
Revisions to Transportation Performance Standards

SUBCHAPTER I – GENERAL PROVISIONS

Revisions to Key Definitions

Several definitions were added because they are used in revisions to the performance standards. The terms added are "direct conduits to groundwater", "existing development", "filtering layer", "impaired water", "silviculture activity", and "total maximum daily load".

Several definitions were amended to add clarification: "average annual rainfall", "connected imperviousness", "impervious surface", and "in-fill". The most significant change is to the definition of MEP or "maximum extent practicable" in s. NR 151.002(25). This definition was modified to indicate that MEP is a different level of achieving a performance standard. Section NR 151.006 was created to identify when MEP applies. This definition will be used for all performance standards except those in s. NR 151.13, the developed urban area performance standard for municipalities.

Revisions to Location of Best Management Practices on Navigable Waters

In the 2002 version of the rule, best management practices (BMPs) associated with construction sites for new development may not be located in navigable waters to receive credit for meeting any performance standard in Chapter NR 151. This restriction has been retained in the revised rule. Also in the 2002 version of the rule, best management practices for existing development, re-development or in-fill development could receive credit for construction in either perennial and intermittent streams if all applicable permits were received. As of January 1, 2011, s. NR 151.003 only allows treatment credit for newly constructed BMPs in intermittent streams for which all applicable permits have been received.

SUBCHAPTER III – NON-AGRICULTURAL PERFORMANCE STANDARDS

Revisions to the Construction Site Performance Standards

1. Construction Site Performance Standards for Non-Permitted Sites

Specific erosion and sediment control requirements have been added for non-permitted sites. Non-permitted sites may include: construction sites that consist of land disturbing construction activity of less than one acre and construction projects that are exempted by federal statutes or regulations. Some construction sites are exempt from the performance standards. The exempt sites include one- and two family dwellings regulated by the Department of Safety and Professional Services (DSPS) (formerly the Wisconsin Department of Commerce), agricultural facilities and practices, and silviculture activities.

The revisions set minimum standards for smaller sites to protect water quality. Erosion and sediment control practices are now required at non-permitted sites to prevent or reduce all of the following:
(a) The deposition of soil from being tracked onto streets by vehicles.
(b) The discharge of sediment from disturbed areas into on-site storm water inlets.
(c) The discharge of sediment from disturbed areas into adjacent waters of the state.
(d) The discharge of sediment from drainage ways that flow off the site.
(e) The discharge of sediment by dewatering activities.
(f) The discharge of sediment eroding from soil stockpiles existing for more than 7 days.
(g) The transport by runoff into waters of the state of chemicals, cement and other building compounds and materials on the construction site during the construction period. However, projects that require the placement of these materials in waters of the state, such as constructing bridge footings or BMP installations are not prohibited by this paragraph.

A permit under Subchapter III of Chapter 216, Wis. Adm. Code, is not required for these construction sites unless the WDNR determines under s. NR 216.51(3) that a permit is needed. These revisions do not include a requirement for an erosion control plan or any kind of modeling to demonstrate compliance with a numeric performance standard. Compliance can be achieved by selecting and implementing practices in accordance with WDNR technical standards as appropriate. The WDNR technical standards can be found at http://dnr.wi.gov/runoff/stormwater/techstds.htm.

2. Construction Site Performance Standards for Permitted Sites

The revisions to the construction site performance standards for permitted sites are found in s. NR 151.11(6m). The construction site performance standards promulgated in 2002 were retained in s. NR 151.11(6) for sites where a Notice of Intent (NOI) was submitted prior to January 1, 2011. The revisions apply to sites that are permitted under subchapter III of Chapter 216, Wis. Adm. Code, and for which an NOI is submitted to the WDNR on or after January 1, 2011. Erosion and sediment control requirements for permitted sites have been modified to incorporate non-numeric effluent limit guidelines from the United States Environmental Protection Agency (USEPA). The USEPA's non-

numeric effluent limits became effective in February 2010. In addition, the erosion and sediment control requirements for permitted sites have been modified to be consistent with the erosion and sediment control standards of ch. COMM 60 for commercial building construction sites originally under the authority of the Wisconsin Department of Commerce (now DSPS). Revisions to the construction site standards for permitted sites can be broken down into four categories: *Erosion and Sediment Control Practices, Sediment Performance Standards, Preventive Measures,* and *Location and Implementation*.

Erosion and Sediment Control Practices
Erosion and sediment control practices are required at permitted sites to prevent or reduce the following:

- Items (a) through (g) listed in 1 above for non-permitted sites.
- The discharge of sediment from erosive flows at outlets and in downstream channels.
- The transport by runoff into waters of the state of untreated wash water from vehicle and wheel washing.

Sediment Performance Standards
The performance standard of 80% sediment reduction will remain in effect until January 1, 2013, after which the standard will change to a maximum discharge of 5 tons per acre per year of sediment. This modification results in a measurable number expressed as a load, making it consistent with the way total maximum daily loads (TMDLs) are calculated. The change to a load also provides equity with the sheet, rill and wind erosion performance measure for agriculture. Five tons per acre per year is roughly equivalent to the most prevalent tolerable soil loss rate in the state.

The WDNR is currently working on a modification to the revised universal soil loss equation 2 (RUSLE2) model that can be used to estimate the sediment load leaving a construction site under varying land and management conditions. The WDNR anticipates that the model will be available for public use prior to January 1, 2013. If it is not available, compliance will continue to be determined by the development of an adequate erosion and sediment control plan that utilizes appropriate BMPs that are consistent with the technical standards.

Preventive Measures
The erosion control plan for permitted sites must incorporate maintenance of existing vegetation, especially adjacent to surface waters whenever possible, minimization of soil compaction and preservation of topsoil, minimization of land disturbing construction activity on slopes of 20% or more and the development of spill prevention and response procedures.

Location and Implementation
BMPs must be located so that treatment occurs before runoff enters waters of the state. Also, the BMPs used to comply with the performance standards must be implemented as follows:

- Erosion and sediment control practices must be constructed or installed in accordance with the erosion control plan before land disturbing construction activities begin.
- Erosion and sediment control practices must be maintained until final stabilization.
- Final stabilization must commence when land disturbing construction activities cease and final grade has been reached on any portion of the site.
- Temporary stabilization activity must commence when land disturbing construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days.
- BMPs that are no longer necessary for erosion and sediment control must be removed by the responsible party.

Revisions to the Post-Construction Performance Standards

The revisions to the post-construction performance standards were added via s. NR 151.12(2)(bm) and ss. NR 151.121 to 151.128. The post-construction performance standards promulgated in 2002 were retained in s. NR 151.12(5) for sites where an NOI was submitted prior to January 1, 2011. The revisions to the post construction performance standards in ss. NR 151.121 to 151.128 only apply to sites required to obtain coverage under a construction site discharge permit as regulated under Chapter NR 216, Wis. Adm. Code, and that are subject to the construction performance standards of s. NR 151.11, and only apply to those sites where an NOI was received by the WDNR on or after January 1, 2011.

1. Applicability

The exception for a redevelopment post-construction site with no increase in exposed parking lots or roads was eliminated for sites where an NOI is filed on or after January 1, 2011.

2. Maintenance of Effort

For redevelopment sites where the redevelopment will be replacing older development that was subject to the post-construction performance standards of the 2002 version of Chapter NR 151, the storm water management plan must meet the TSS reduction, peak flow control, infiltration, and protective areas standards applicable to the older development or meet the redevelopment standards of the revised code, whichever is more stringent. The purpose of this is to prevent back-sliding to a lesser standard.

3. Total Suspended Solids (TSS) Performance Standard for Redevelopment

The requirement to reduce the TSS load by 40% compared to no controls for the entire redevelopment post-construction site has been revised to 40% reduction of the TSS generated on parking areas and roads on a redevelopment post-construction site. This focuses the treatment effort on the dirtiest source areas for TSS.

4. Peak Discharge Performance Standard

The peak discharge performance standard has been revised to include the 1-year, 24-hour design storm along with the current 2-year, 24-hour design storm as peak flow rates that must match the pre-development 1- and 2-year storms. This change is based on research showing that the previous standard was not protective enough of the bank-full condition.

Maximum pre-development runoff curve numbers have been added for woodland and grassland cover condition. The revised Table 2 is included below.

Table 2. Maximum Pre-Development Runoff Curve Numbers

Runoff Curve Number	Hydrologic Soil Group			
	A	B	C	D
Woodland	30	55	70	77
Grassland	39	61	71	78
Cropland	55	69	78	83

The peak discharge exemption for not increasing the existing surface water elevation at any point within the downstream receiving water by more than 0.01 of a foot for the 2-year, 24-hour storm event has been eliminated and replaced with an exemption for a post-construction site where the discharge

is directly into a lake over 5,000 acres or a stream or river segment draining more than 500 square miles. A map identifying lakes over 5,000 acres and stream and river segments draining more than 500 square miles is included in the WDNR's guidance document for Modeling Post-Construction Storm Water Management Treatment dated December 20, 2010. This document can be found at: http://dnr.wi.gov/runoff/stormwater/guidance/Modeling_PostConstruction.pdf.

5. Infiltration Performance Standard

The revised infiltration standards are summarized in the following table:

Level of Connected Imperviousness[1]	**Infiltration Performance Standard**	**Maximum % of the Post-Construction Site Required as Effective Infiltration area**
Low Imperviousness *Up to 40% Connected Imperviousness*	90% of the pre-development infiltration volume	1%
Moderate Imperviousness *More than 40% and up to 80% Connected Imperviousness*	75% of the pre-development infiltration volume	2%
High Imperviousness *More than 80% Connected Imperviousness*	60% of the pre-development infiltration volume	2%

[1]A histogram showing typical percent connected imperviousness for various standard land uses can be found in the WDNR's guidance document for Developed Urban Areas and the 20% and 40% TSS Reductions dated November 24, 2010. This document can be found at: http://dnr.wi.gov/runoff/stormwater/guidance/Guidance_TSS.pdf

The prohibitions, exemptions, and other limitations for infiltration previously outlined under ss. NR 151.12(5)(c)5. and 6. have been reorganized. The actual language of the section remains largely unchanged. The section has been reorganized as follows:

Source Areas

Prohibitions – Runoff from certain source areas may not be infiltrated and no credit will be given towards meeting the infiltration performance standard.

Exemptions – Infiltration of runoff from certain source areas may be credited towards meeting the standard, but infiltration is optional.

Location of Practices

Prohibitions – Infiltration practices may not be located in certain areas. Minimum distances between the bottom of the infiltration system and bedrock or groundwater are indentified based on source areas.

Exemptions – Infiltration rate exemptions are provided for low permeable soils and certain soil classifications.

6. Protective Area Performance Standard

The rule revisions increase the protective area from 50 feet to 75 feet for certain high quality wetlands such as sedge meadows, open and coniferous bogs, low prairies, calcareous fens, coniferous

swamps, lowland hardwood swamps and ephemeral ponds. Information on wetland types can be found at: http://dnr.wi.gov/wetlands/types.html

Revisions to the Developed Urban Area Performance Standards

Revisions to this section included an option for permitted municipalities that may have difficulty meeting the 40% TSS reduction requirement by March 31, 2013. A permittee could declare they were unable to meet the deadline and the rule revisions identified a process for them to follow. The process included the requirement for a storm water management plan, storm water management plan submittal requirements, the WDNR review process, and the allowance of up to 10 more years to comply with the standard provided the plan is followed. Under state budget bill 2011 Wisconsin Act 32, there were two provisions which directly impact implementation of the revisions to the developed urban area performance standard. First, specific to the requirement to reduce TSS by 40% by 2013, 2011 Wisconsin Act 32 prohibits the WDNR from enforcing the 40% TSS performance standard by a certain date. This provision of the budget bill does not impact any other performance standards in Chapter NR 151. The requirement to meet the 20% TSS reduction is still in force as are all performance standards addressing new construction and redevelopment. A second provision of 2011 Wisconsin Act 32 identifies that where a permitted municipality has achieved a reduction above the 20% TSS performance standard, all structural best management practices in place on July 1, 2011, must be maintained to the maximum extent practicable.

Implementation of the provisions of 2011 Wisconsin Act 32 will be reflected in the MS4 general permit and MS4 individual permits when those permits are issued or reissued.

SUBCHAPTER IV – TRANSPORTATION FACILITY PERFORMANCE STANDARDS

Revisions to Transportation Performance Standards

The modifications to Subchapter IV include many of the same changes to the performance standards in Subchapter III. However, since Subchapter IV is specifically for transportation, several provisions are tailored to those types of facilities.

1. Applicability

Transportation facilities include highways, railroads, public mass transit facilities, public-use airports, public trails, and harbor improvements. The modifications of new construction site and post-construction performance standards only apply to transportation facility construction sites for which the WDNR receives a Notice of Intent to apply for construction site storm water discharge permit coverage under Chapter NR 216, Wis. Adm. Code, on or after January 1, 2011; or to transportation facility construction sites for which bids have been advertised or construction contracts signed for which no bid was advertised on or after January 1, 2011.

2. Definitions

The definition of “minor reconstruction” as it applies to a highway no longer includes the replacement of a vegetated drainage system with a non-vegetated drainage system. If there is a conversion of the drainage system from vegetated to non-vegetated (e.g., swales to storm sewer), then the area of the conversion is not minor reconstruction and is subject to the applicable reconstruction performance standards.

3. Performance Standards for Small Sites and Routine Maintenance

The prescriptive construction site performance standards for transportation facility construction sites disturbing less that one acre of land and routine maintenance consisting of less than 5 acres are the

same as those listed for non-permitted construction sites (See *Construction Site Performance Standards for Non-Permitted Sites* on page 2 above).

4. Performance Standards for Sites Disturbing One or More Acre

The construction site performance standards for transportation facility construction sites disturbing one acre or more of land are the same as those listed for permitted construction sites (See *Construction Site Performance Standards for Permitted Sites* on page 2 above).

5. Post-Construction Performance Standards

There have been some modifications to the post-construction performance standards and exemptions for highways. The table below illustrates the applicability and exemptions of the post-construction performance standards for highways.

Post-Construction Performance Standards for Highways

	Minor Highway Reconstruction	**Highway Reconstruction[1]**	**New Highway Construction**
TSS Reduction	No	Yes (40% reduction)[2]	Yes (80% reduction)
Peak Discharge	No	No	Yes
Infiltration	No	No	No[3]
Protective Areas	Yes	Yes	Yes

[1] For highway reconstruction less than 1.5 miles that does not qualify as minor reconstruction because of the drainage system conversion, the 40% TSS performance standard only applies to the areas converted from a vegetated drainage system to a non-vegetated drainage system.

[2] For municipalities covered under a municipal separate storm sewer system (MS4) permit, this 40% TSS performance standard first applies 1/1/2017. For municipalities not covered by an MS4 permit, this 40% TSS performance standard applies as of 1/1/2011.

[3] This exemption applies to new stand-alone highways such as an interstate, state highway, county highway, or local road. New roads that are part of a larger common plan of development such as residential, commercial, or industrial development are subject to Subchapter III of Chapter NR 151.

Swale Treatment

The swale treatment performance standard references compliance with the existing technical standard for swales, "Vegetated Infiltration Swale" (Technical Standard No. 1005). This technical standard is available at: http://dnr.wi.gov/runoff/stormwater/techstds.htm#Post. Additional guidance on implementation of this performance standard is available in the WDNR's guidance document for Modeling Post-Construction Storm Water Management Treatment dated December 20, 2010. This document can be found at: http://dnr.wi.gov/runoff/stormwater/guidance/Modeling_PostConstruction.pdf.

Appendix D
Conservation Cost Share Program Policy – Tier Level Practices

From:
Vilas County Land and Water Conservation Department

VILAS COUNTY LAND AND WATER CONSERVATION
Conservation Cost Share Program Policy – Tier Level Practices

I. AUTHORIZATION

On October 16, 2012, the Vilas County Land and Water Conservation Committee (LCC) adopted the following policy in regard to Conservation Cost Share program practices that are offered to private landowners through the Vilas County Land and Water Conservation Department. Conservation practices that are offered to private landowners are defined under ATCP 50 Administrative Rule – Soil and Water Resource Management Program. Each of the cost-sharable conservation practices available to landowners are placed into one of three tier levels of grant funding that are defined in this policy. When a private landowner voluntarily participates in the Conservation Cost Share Program starting on or after January 1, 2013, the policy will become applicable when they enter into a contract agreement with Vilas County. All tier level cost share practices and rates are subject to the terms and conditions set forth in this policy.

II. PURPOSE

The intent of this policy is to clarify what conservation practices are available to private landowners in Vilas County under the Conservation Cost Share Program and in which percentage level of grant coverage those practices will be cost shared.

III. OBJECTIVES

- To initiate a cost containment measure that will serve to divide the grant funding received in Vilas County annually to provide conservation projects to as many private landowners as possible in a given year.
- To offer cost-sharing grant incentives to private landowners who voluntarily choose to implement conservation practices on their land.
- To prioritize the conservation practices implemented on the land that will meet goals and objectives outlined in the most current Land and Water Conservation Resource Management Plan.

IV. ADMINISTRATION

Administration of tier level cost share practices and this policy will be the responsibility of the Vilas County Conservationist. The Conservationist will oversee the review process for all conservation cost share applications that are submitted to the Land and Water Conservation office. The appropriate cost share rate for each project being implemented at the site will then be determined. If the landowner believes that they may qualify for economic hardship status, the Conservationist will require that the landowner submit further documentation to determine eligibility (refer to *Determination of Economic Hardship* below).

V. PROCEDURES

Conservation practices are divided among three tier levels outlined below in order of increased potential intensity of soil erosion or pollution on the landscape, to groundwater or to surface water resources.

TIER I Practices and Cost Share Rate:

In general, Tier I practices provide funding for practices that have minor erosion or pollution potential, normal toe erosion of banks, or to improve wildlife or fishery habitats. The County's portion of cost share for Tier I practices will be up to 50% of the total cost of a project. There will be no set maximum cost for any practice installed unless otherwise noted on the attached Table 1 and limited to the remaining annual grant funding available to the county. Practices in this category include: Riparian Buffers, Streambank and Shoreland Protection, Field Windbreaks, Residue Management, Strip-cropping, Terrace Systems, Wetland Development or Restoration (refer to Table 1).

TIER II Practices and Cost Share Rate:

In general, Tier II practices provide funding for practices that have increasing levels of soil erosion or pollution potential, to create wildlife or fishery habitat, or to install soft agricultural practices. The County's portion of cost share for Tier II practices will be up to 60% of the total cost of a project. There will be no set maximum cost for any practice installed unless otherwise noted on the attached Table 2 and limited to the remaining annual grant funding available to the county. Practices in this category include: Access Roads and Cattle Crossing, Animal Trails and Walkways, Contour Farming, Cover Crop, Critical Area Stabilization, Diversions, Filter Strip, Grade Stabilization Structure, Roofs, Roof Runoff Systems, Sediment Basins, Sinkhole Treatment, Subsurface Drains, Underground Outlets, Water and Sediment Control Basins, Waterway Systems (refer to Table 2).

TIER III Practices and Cost Share Rate:

In general, Tier III practices provide funding for practices that have major levels of soil erosion or pollution potential, to create management plans, or to install hard agricultural practices. The County's portion of cost share for Tier III practices will be up to 70% of the total cost of a project. There will be no set maximum cost for any practice installed unless otherwise noted on the attached Table 3 and limited to the remaining annual grant funding available to the county. Practices in this category include: Manure Storage System, Manure Storage System Closure, Barnyard Runoff Systems, Heavy Use Area Protection, Livestock Fencing, Milking Center Waste Control Systems, Livestock Watering Facilities, Nutrient Management, Pesticide Management, Prescribed Grazing, Relocation / Abandon Animal Feeding Operations, Waste Transfer System, Wastewater Treatment, Strips, Well Decommissioning (refer to Table 3).

Economic Hardship:
If the landowner qualifies for economic hardship status as determined by the county, the county's share of the cost share grant for each of the tier levels will increase by 20%, and the hourly rate technical service fees associated with normal cost share projects will be waived. The landowner will still be responsible for paying the application fee of $25, the contract processing fee of $50, and the optional project permit fee of $100 (if applicable). Tier I cost share rate will increase to 70%; Tier II cost share rate will increase to 80%; and Tier III cost share rate will not exceed 90% of the total cost of an installed practice.

Determination of Economic Hardship:

A. If a landowner believes they may qualify for economic hardship status under ATCP 50.42 (4), the Vilas County Land and Water Conservation Committee will require the landowner to submit a financial statement prepared according to generally accepted accounting principles. This financial statement may be compiled, reviewed or audited; however, it must contain a balance sheet and income statement and should be in sufficient details to determine the following:
   1) The landowner will be unable to pay the normal landowner share of the practice(s) installed, and
   2) The landowner would be able to pay for the installed practice(s) at the economic hardship rate.

B. The Vilas County Land and Water Conservation Committee will also require the landowner to certify in a sworn affidavit (a form will be provided by the department), a full and true disclosure of the landowner's financial condition, including documents used to support the economic hardship. If it becomes necessary to copy those records for our files, the department will protect those records from public disclosure to the extent allowable under Wisconsin's Public Records Law.

C. Review of the landowner request for economic hardship status will take place during the next regularly scheduled Land and Water Conservation Committee meeting following submittal of the financial statement. Elected officials of the Land and Water Conservation Committee will make the final determination of economic hardship status within a reasonable time period not to exceed two months following the submittal of the financial statement.

VI. ENFORCEMENT

Enforcement of this policy will be the responsibility of the Vilas County Conservationist. All landowners who participate in the Conservation Cost Share Program will be responsible for paying all assessed charges and fees associated with their project(s). For more information on the fee schedule, refer to the Vilas County Land and Water Conservation Technical Service Fee Policy.

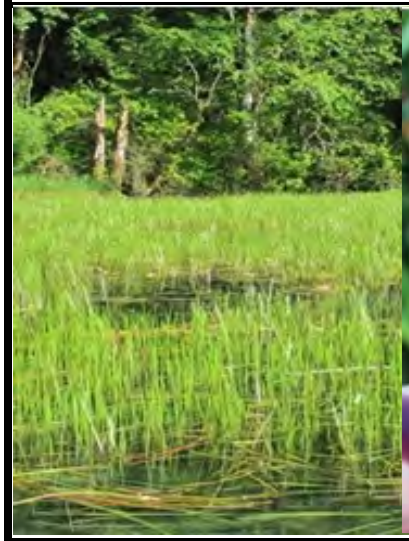
Appendix E

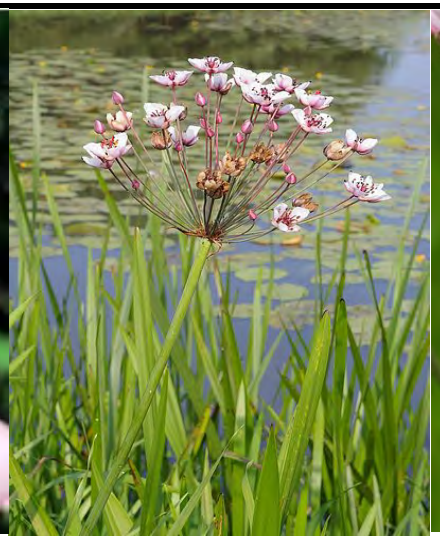
Wetland Plants of Concern

From:
Vilas County Land and Water Conservation Department

ENVIRONMENTALLY HARMFUL WETLAND PLANTS OF CONCERN IN NORTHERN WI

Prepared by Vilas County Land & Water Conservation Department, spring 2014





Flowering rush *(Butomus umbellatus)*

When to look: Mid to late summer in shallow water when the plants are in bloom. Throughout the aquatic growing season in deeper water as blossoms will not form.

Where to look: Wetlands, lakeshores, slow-moving rivers, and in water up to 10 feet deep.

Key features: A rhizomatous perennial aquatic plant capable of growing as an emergent in shallow water or submersed in water up to 10 feet deep. Leaves are thin, linear, pointed, 3 feet long or more, untoothed, paralled veined, twisted, triangular in cross-section and arise in two rows along the rhizome/base. When in deep water the leaves are limp and floating, reaching the surface where they move with the water, and the plant does not bloom. When in shallow water the leaves stand erect above the water, resembling bulruhes, and the plant booms. Flowers grow on tall, cylindrical stalks in round-topped umbrella-like clusters of 20-50 flowers having three large pink petals. The three sepals under the petals are also pink and look like small petals, thus the flower is sometimes described as having six pink petals. Bulbils (little bulb-like plant sprouts) may be present at the base of flower stalks and at the roots. Bulbils released from the plants can float freely to start new plants elsewhere. Rhizomes are fleshy and grow trailing along the ground.

Sources for additional information:

http://dnr.wi.gov/topic/invasives/fact/floweringrush.html
http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/flowering-rush.aspx
http://www.issg.org/database/species/ecology.asp?si=610&
http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/mtpmstn10617.pdf

ENVIRONMENTALLY HARMFUL WETLAND PLANTS OF CONCERN IN NORTHERN WI

Prepared by Vilas County Land & Water Conservation Department, spring 2014

Garden loosestrife *(Lysimachia vulgaris)*

Also known as yellow loosestrife, willowweed and willowwort

When to look: When blooming during late summer, approximately July to September

Where to look: Moist habitats such as fens, wet woods, wetlands, riparian areas, lakeshores, stream banks, ditches

Key features: Erect rhizomatous (stoloniferous) perennial attaining a height of 3 to 5 feet or more. Stems and leaves are softly hairy. Leaves are 3 to 5 inches long and egg-shaped, usually growing 3 leaves in a whorl. Showy, bright yellow flowers grow in clusters near the top of the plant. Flowers have 5 petals joined at the base and sometimes have a red or orange eye. Base of the flowers is ringed by green sepals with orange-brown edges. Roots form creeping stems that are partly or entirely underground. Rhizomes can be up to 15 feet long. Once established, is highly competitive and able to spread aggressively by seeds and rhizomes into stands of established vegetation. Able to out-compete cattails and purple loosestrife.

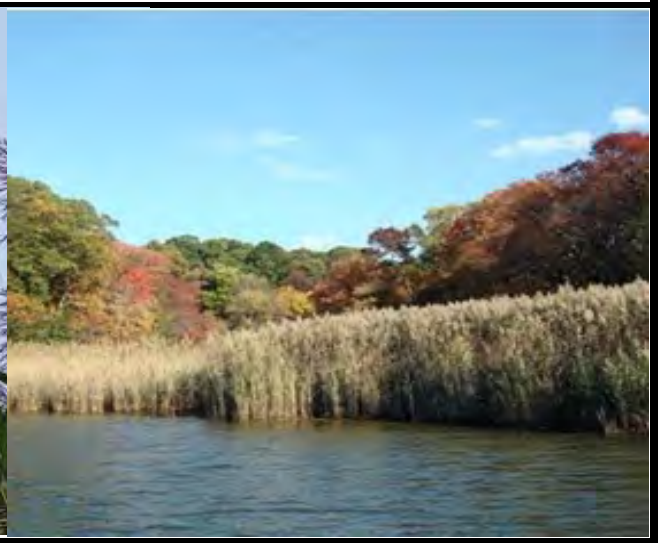
Sources for additional information:

http://luirig.altervista.org/photos-search/index2.php?rcn=17966
http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/garden
http://www.ecy.wa.gov/programs/wq/plants/weeds/GardenLoosestrife.html
http://piercecountyweedboard.wsu.edu/gardenloosestrife

ENVIRONMENTALLY HARMFUL WETLAND PLANTS OF CONCERN IN NORTHERN WI

Prepared by Vilas County Land & Water Conservation Department, spring 2014





Giant common reed grass *(Phragmites australis)*

Also known as common reed grass, ditch reed, giant reed

When to look: Year round as dead brown leaves from previous growing season remain standing throughout winters. Spring prompts new growth of leaves and summer flowers.

Where to look: Freshwater marshes, river edges, shores of lakes and ponds, roadsides, disturbed areas.

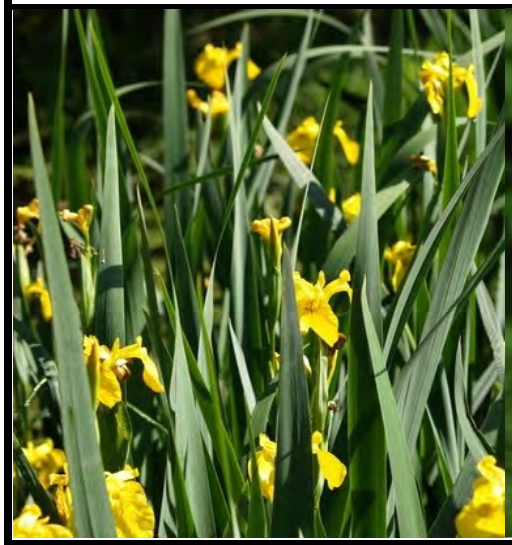
Key features: Phragmites is a tall perennial grass. The non-invasive strain native to WI is typically found in small, low density populations whereas the non-native, invasive phragmites forms large, tall, dense stands attaining a height of 10 - 15 feet or more including both live stems and standing dead stems from the previous growing season. Stems are round and hollow growing from stout, creeping rhizomes. Leaves are light green in early summer turning to light brown in fall, flat, 1-1.5 inches wide at their widest point, elongate, tapered to a point and attached to the stem by smooth sheaths. Flowers, grouped into spikelets borne on highly branching purple inflorescences, form bushy panicles in mid to late summer and are usually purple or golden in color. As seeds mature, the panicles begin to look "fluffy" and take on a grey sheen due to the hairs on the seeds. Roots form dense networks of rhizomes several feet deep. Plant spreads horizontally by sending out rhizome runners which can grow 10 or more feet in a single growing season.

Sources for additional information:

http://dnr.wi.gov/topic/invasives/fact/phragmites.html
http://www.great-lakes.net/envt/flora-fauna/invasive/pdf/phragmites_glc_factsheet_2011.pdf
http://www.nps.gov/plants/alien/fact/pdf/phau1.pdf

ENVIRONMENTALLY HARMFUL WETLAND PLANTS OF CONCERN IN NORTHERN WI

Prepared by Vilas County Land & Water Conservation Department, spring 2014




Yellow iris *(Iris pseudacorus)*

Also known as yellow flag iris, Yellow iris and Water flag

When to look: Short flowering season, late spring to early summer

Where to look: Wetlands, along streambanks and shorelines and in water up to 10-12 inches deep

Key features: Herbaceous flowering perenniel attaining a height of 3 to 6 feet in dense stands of robust plants. Erect sward shaped leaves up to 3 feet long and 1.5 inches wide are easily confused with cattails when plant is not blooming. Leaves are folded and clasp the stem at the base in a fan-like fashion. Flowers are especially showy, bright yellow and 3 to 4 inches accross, with a darker yellow zone and brown or violet veining on each fall. Flowers give way to large, glossy green, triangular shaped seed pods. Grows best in very wet conditions where it tolerates submersion, low pH, and anoxic soils. Spreads quickly by both rhizome and water-dispersed seed. While primarily an aquatic plant, the rhizomes can survive prolonged dry conditions. Can create dense, monotypic stands, outcompeting native plants. All parts of plant are poisonous, especially the rhizomes, resulting in lowered wildlife food sources in areas where it dominates.

Sources for additional information:

http://dnr.wi.gov/topic/Invasives/fact/YellowFlagIris.html
http://plants.ifas.ufl.edu/node/205
http://www.na.fs.fed.us/fhp/invasive_plants/weeds/yellow-iris.pdf
http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/yellow-iris.aspx

Appendix F

Healthy Watersheds, High Quality Waters Maps & Tables

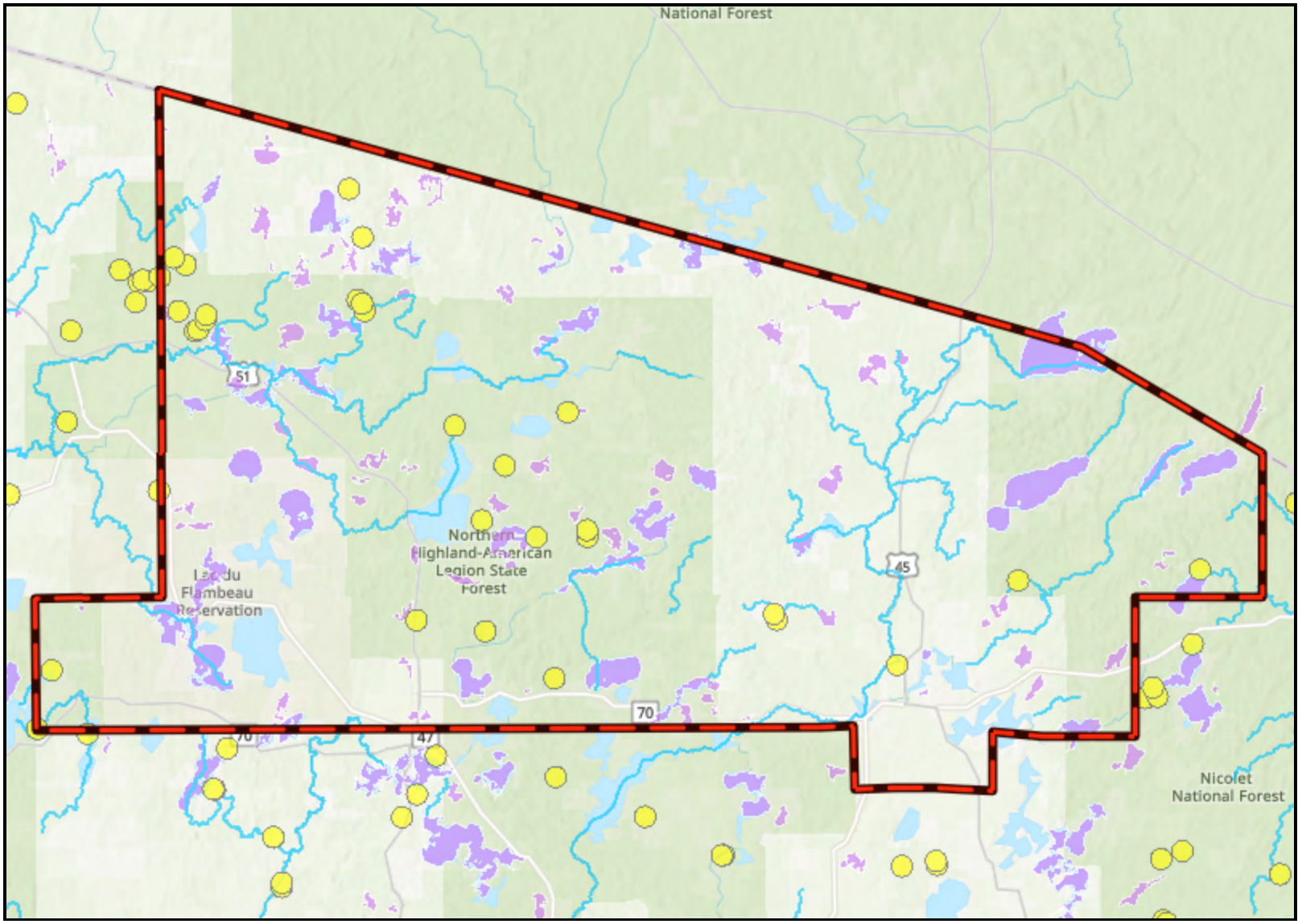
From:
Wisconsin Department of Natural Resources (WDNR)

Contents Within This Appendix:

1. Map of Vilas County's High Quality Waters
2. List of High Quality Waters in Vilas County
3. List of Watershed Health Scores & Rank in Vilas County
4. Map: Watershed Protection Priorities – Statewide Top 30%
5. Map: Watershed Protection Priorities – Chippewa River Basin Top 30%
6. Map: Watershed Protection Priorities – Wisconsin River Basin Top 30%

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Vilas County: High-Quality Waters



Legend

Protection - Healthy Watersheds, High-Quality Waters

Healthy & Rare Wetlands

High-Quality Streams

High-Quality Lakes & Large Rivers

Notes

Map displays the WDNR identified High-Quality Waters that are current as of 2021. For the most up to date information, please reference the assessment results and mapping services on the website: https://dnr.wisconsin.gov/topic/SurfaceWater/HQW.html

Service layer credits:
Luke Beringer, Pamela Toshner, Aaron Marti

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Date Printed: 08/15/2024

2021 High-Quality Waters: Lakes, Rivers, Streams

Vilas County - 123 High-Quality Waters identified in 2021

Data sorted by alphabetical county and alphabetical waterbody name

OFFICIAL NAME	LOCAL NAME	WBIC	PRIORITY WATERSHEDS HUC6: • State: •• Both: •••	COUNTY NAME (STREAM MOUTH & LAKE LOCATION)	HUC6	HUC12 CODE (STREAM MOUTH & LAKE LOCATION)	UNIQUE & RARE RESOURCES (COUNT)	Attaining WQS (COUNT)	IBIs (COUNT)	HQW CRITERIA (COUNT)
Alder Lake		2329600	••	Vilas	Chippewa	070500020106		1	1	2
Allequash Lake		2332400	•••	Vilas	Chippewa	070500020105	2		3	2
Alma Lake		967900	••	Vilas	Wisconsin	070700010403		1	2	2
Anvil Lake		968800	•••	Vilas	Wisconsin	070700010102		2	3	2
Armour Lake		2953200	•••	Vilas	SC Lake Superior	040201010303		1	1	2
Arrowhead Lake	Little Star	1541500	•	Vilas	Wisconsin	070700010803	1		14	2
Averill Lake	Mud	2956700	•••	Vilas	SC Lake Superior	040201010303	1		3	2
Bass Lake		1604200		Vilas	Wisconsin	070700010206		1	1	2
Beaver Lake		2960600		Vilas	SC Lake Superior	040201010301		1	2	2
Benson Lake		2327100	•••	Vilas	Chippewa	070500020108	1		1	2
Big Arbor Vitae Lake		1545600	•••	Vilas	Wisconsin	070700010801	1		3	2
Big Lake		2334700	••	Vilas	Chippewa	070500020103	3		2	2
Big Lake		2963800	•••	Vilas	SC Lake Superior	040201020101		1	2	2
Big Muskellunge Lake		1835300	•••	Vilas	Chippewa	070500020105	1	1	2	3
Big Portage Lake		1629500	•••	Vilas	Wisconsin	070700010301		1	2	2
Big Saint Germain Lake		1591100	•••	Vilas	Wisconsin	070700010502	1		2	2
Big Sand Lake		1602600		Vilas	Wisconsin	070700010101		1	8	2
Birch Lake		2311100	••	Vilas	Chippewa	070500020302		1	1	2
Black Oak Lake		1630100	•••	Vilas	Wisconsin	070700010301	2	2	2	3
Boot Lake		1619100	••	Vilas	Wisconsin	070700010307	1		27	2
Brandy Lake	Cecilia, Branley	1541300	•	Vilas	Wisconsin	070700010803	1	2	4	3
Buckatabon Creek	W Br	1620800	•••	Vilas	Wisconsin	070700010308	2		3	2
Carlin Lake		2757900	•••	Vilas	SC Lake Superior	040201010303		1	1	2
Carpenter Lake		976100		Vilas	Wisconsin	070700010206		1	1	2
Circle Lily Lake		2326700	•••	Vilas	Chippewa	070500020108	1	1	1	3
Clear Lake		2329000	••	Vilas	Chippewa	070500020107	1		1	2
Cochran Lake		2963500		Vilas	SC Lake Superior	040201020102		1	2	2
Crab Lake		2953500	•	Vilas	SC Lake Superior	040201010303	2	1	2	3
Crawling Stone Lake		2322800		Vilas	Chippewa	070500020201	1	1		2
Crystal Lake		1842400	•••	Vilas	Chippewa	070500020105	1	2	1	3
Day Lake		1843500	••	Vilas	Chippewa	070500020106	1		1	2
Dead Pike Lake		2316600	•••	Vilas	Chippewa	070500020203	1		2	2
Deerskin Lake		1601300	•••	Vilas	Wisconsin	070700010103		1	1	2
Deerskin River		1600400		Vilas	Wisconsin	070700010206	4	3	6	3
Duck Lake		1599900		Vilas	Wisconsin	070700010206		1	3	2
Dunn Lake		2960000		Vilas	SC Lake Superior	040201010301	1		2	2
Escanaba Lake	Rock	2339900		Vilas	Chippewa	070500020101	1		1	2
Finger Lake		984700	•••	Vilas	Wisconsin	070700010308		1	2	2
Fishtrap Lake		2343200	•••	Vilas	Chippewa	070500020102		1	3	2
Flambeau Lake	Lac Du Flambeau	2320500	••	Vilas	Chippewa	070500020202	1	1		2
Forest Lake	Goose	2762200	•••	Vilas	SC Lake Superior	040201020101	1		4	2
Frank Lake	Bear	985900	•••	Vilas	Wisconsin	070700010502	1		1	2
Gunlock Lake		1539700	•••	Vilas	Wisconsin	070700010806		1	1	2
Harris Lake		2958500		Vilas	SC Lake Superior	040201010302		1	1	2
Haymeadow Creek		1628800	•••	Vilas	Wisconsin	070700010304	2		1	2
Hiawatha Lake	Little Long	2328400		Vilas	Chippewa	070500020107		1	1	2
High Lake		2344000	•••	Vilas	Chippewa	070500020102		1	2	2
Horsehead Lake		2953100	•••	Vilas	SC Lake Superior	040201010303		1	1	2
Ike Walton Lake		2321800	•••	Vilas	Chippewa	070500020203		1	1	2

Imogene Lake		586800	•••	Vilas	Wisconsin	070700010102		1	1	2
Irving Lake		2340900		Vilas	Chippewa	070500020101	1		1	2
Island Lake		2334400	••	Vilas	Chippewa	070500020104	2		1	2
Johnson Lake		1541100	•	Vilas	Wisconsin	070700010803	1	1		2
Kentuck Creek		716400	••	Vilas	NW Lake Michigan	040301060301	1		1	2
Kentuck Lake		716800	••	Vilas	NW Lake Michigan	040301060301	1		4	2
Lac Vieux Desert		1631900		Vilas	Wisconsin	070700010302	2	2	2	3
Lake Laura		995200	•••	Vilas	Wisconsin	070700010502	1		1	2
Little Crawling Stone Lake		2324000		Vilas	Chippewa	070500020201	1	1		2
Little Deerskin River		1600600	•••	Vilas	Wisconsin	070700010104	2		1	2
Little Portage Lake		1629200	•••	Vilas	Wisconsin	070700010301	1	1		2
Little Saint Germain Lake		1596300		Vilas	Wisconsin	070700010403	1	2	1	3
Little Spider Lake	Gaffrey	1540400	•	Vilas	Wisconsin	070700010803		1	1	2
Little Star Lake		1593200	•••	Vilas	Wisconsin	070700010502		1	2	2
Little Star Lake		2334300	••	Vilas	Chippewa	070500020106	1		1	2
Little Trout Lake		2321600	•••	Vilas	Chippewa	070500020203	1		1	2
Long Interlaken Lake	Long L	2322300	••	Vilas	Chippewa	070500020202	1		1	2
Long Lake		1602300		Vilas	Wisconsin	070700010101	1	1	3	3
Lower Gresham Lake		2330300	••	Vilas	Chippewa	070500020106		1	1	2
Lower Sugarbush Lake		2317600	•••	Vilas	Chippewa	070500020203	1	1		2
Mamie Lake	Lake Mamie	2964100	•••	Vilas	SC Lake Superior	040201020101		1	3	2
Manitowish Lake		2329400	••	Vilas	Chippewa	070500020106	1	1	1	3
Manitowish River	Manitou,Wide	2324400	•••	Vilas	Chippewa	070500020307	5		3	2
Mann Lake		2332000	•••	Vilas	Chippewa	070500020105		1	1	2
McCullough Lake		2960400		Vilas	SC Lake Superior	040201010301	1		2	2
McDonald Lake		1003700		Vilas	Wisconsin	070700010403		1	1	2
Middle Gresham Lake		2330700	••	Vilas	Chippewa	070500020106		1	1	2
Middle Sugarbush Lake		2317700	•••	Vilas	Chippewa	070500020203	2	1		2
Military Creek		1623900	•	Vilas	Wisconsin	070700010305	3		1	2
Moon Lake		1005800		Vilas	Wisconsin	070700010403		1	2	2
Morton Lake		2960300		Vilas	SC Lake Superior	040201010301	1	1	2	3
Muskellunge Creek		1596400		Vilas	Wisconsin	070700010403	1	1		2
Nixon Lake		2341200	•••	Vilas	Chippewa	070500020102	2		1	2
North Creek		2333200	•••	Vilas	Chippewa	070500020105	2		1	2
North Turtle Lake		2310400	••	Vilas	Chippewa	070500020302	1		1	2
Oxbow Lake		2954800	•••	Vilas	SC Lake Superior	040201010303	1		3	2
Papoose Creek		2327800		Vilas	Chippewa	070500020107	4	1	1	3
Papoose Lake		2328700		Vilas	Chippewa	070500020107	1	1	1	3
Pickerel Creek		1619200	••	Vilas	Wisconsin	070700010307	1		1	2
Pioneer Creek		1623000	•••	Vilas	Wisconsin	070700010304	3		1	2
Plum Creek		1592100	•••	Vilas	Wisconsin	070700010502	4		1	2
Plum Lake		1592400	•••	Vilas	Wisconsin	070700010502	4	1	2	3
Pokegama Lake		2320800	••	Vilas	Chippewa	070500020202	1	1		2
Portage Creek		1628900	•••	Vilas	Wisconsin	070700010301	1		1	2
Presque Isle Lake		2956500	•••	Vilas	SC Lake Superior	040201010303	1	1	3	3
Prong Lake		1013200	•••	Vilas	Wisconsin	070700010801	1		1	2
Razorback Lake		1013800	•••	Vilas	Wisconsin	070700010502	1		1	2
Rest Lake		2327500		Vilas	Chippewa	070500020107	3	1	2	3
Rice Creek	Crooked	2334500	••	Vilas	Chippewa	070500020104	2		1	2
Round Lake		2334900	••	Vilas	Chippewa	070500020103	1		2	2
Silver Lake		1599800		Vilas	Wisconsin	070700010206		2	1	2
Siphon Creek		2342200	•••	Vilas	Chippewa	070500020102	3		1	2
Smoky Lake	Long Lake	1018300		Vilas	Wisconsin	070700010101	1	1	2	3
Sparkling Lake	Silver	1881900	•••	Vilas	Chippewa	070500020105	1		1	2
Spectacle Lake		717400	••	Vilas	NW Lake Michigan	040301060301		1	1	2
Spider Lake		2329300		Vilas	Chippewa	070500020107	1		1	2
Spring Meadow Creek		1604300		Vilas	Wisconsin	070700010206	2		2	2

Star Lake		1593100	•••	Vilas	Wisconsin	070700010502	3		1	2
Stella Creek		1593900	•••	Vilas	Wisconsin	070700010501	3		4	2
Stormy Lake		1020300	•	Vilas	Wisconsin	070700010306	2		1	2
Sturgeon Lake	Deer	2327200	•••	Vilas	Chippewa	070500020108	1		2	2
Tamarack Creek	Emil	1624800	•••	Vilas	Wisconsin	070700010304	4		4	2
Towanda Lake	Bass	1022900	•	Vilas	Wisconsin	070700010803		1	1	2
Trout River		2329500		Vilas	Chippewa	070500020107	3		2	2
Twin Lakes (North)	North Twin Lake	1623800	•	Vilas	Wisconsin	070700010305	2		2	2
Twin Lakes (South)	South Twin Lake	1623700	•	Vilas	Wisconsin	070700010305	2		10	2
Upper Buckatabon Lake		1621800	•	Vilas	Wisconsin	070700010306	1		3	2
Upper Gresham Lake		2330800	••	Vilas	Chippewa	070500020106		1	5	2
Van Vliet Lake		2956800	•••	Vilas	SC Lake Superior	040201010303	1	1	2	3
Vance Lake	Dam,Dan	2327300	•••	Vilas	Chippewa	070500020108	1		1	2
Wabasso Lake	Clear, Bass	2045000	••	Vilas	Chippewa	070500030203	1		1	2
West Plum Lake		1592500	•••	Vilas	Wisconsin	070700010502	1		2	2
Wild Rice Lake	Half Way	2329800	••	Vilas	Chippewa	070500020106	1		2	2
Wildcat Lake		2336800	••	Vilas	Chippewa	070500020103		1	3	2

2021 High-Quality Waters: Healthy Wetlands

Vilas County - 14 Healthy Wetlands identified in 2021

Data sorted by alphabetical county and increasing Healthy Wetland ID

WETLAND ID	SITE NAME	SITE ID	PRIORITY WATERSHEDS HUC6: • State: •• Both: •••	COUNTY NAME	HUC6	HUC12 CODE	DISTURBANCE RANK	PLANT COMMUNITY CONDITION	LAT	LONG
Healthy_433	NLF-344	NL359	•••	Vilas	Wisconsin	070700010308	2	2	45.938886	-89.2626
Healthy_440	NLF-346	NL361	•••	Vilas	Wisconsin	070700010307	1	1	45.967487	-89.371635
Healthy_441	NLF-345	NL360	•••	Vilas	Wisconsin	070700010307	1	1	45.971059	-89.374254
Healthy_443	Kentuck Lake SNA	NL264	••	Vilas	NW Lake Michigan	040301060301	1	1	45.999069	-88.988239
Healthy_464	Nixon Lake SNA	NL478	•••	Vilas	Chippewa	070500020102	2	2	46.09814	-89.561168
Healthy_467	NLF-412	NL427	•••	Vilas	Chippewa	070500020108	1	1	46.149139	-89.898811
Healthy_468	NLF-413	NL428	•••	Vilas	Chippewa	070500020108	1	1	46.150198	-89.896047
Healthy_469	Toy Lake Swamp	NL469		Vilas	Chippewa	070500020107	2	2	46.156063	-89.889507
Healthy_470	Toy Lake Swamp	NL468		Vilas	Chippewa	070500020107	1	1	46.159299	-89.888749
Healthy_471	NLF-434	NL449	•••	Vilas	Chippewa	070500020108	2	2	46.161707	-89.913913
Healthy_472	Rice Creek SNA	NL480	••	Vilas	Chippewa	070500020103	1	1	46.1671	-89.74797
Healthy_473	Rice Creek SNA	NL479	••	Vilas	Chippewa	070500020103	1	1	46.168765	-89.751549
Healthy_485	NLF-355	NL370	•••	Vilas	Chippewa	070500020108	2	2	46.190749	-89.9074
Healthy_487	NLF-356	NL371	•••	Vilas	Chippewa	070500020108	1	1	46.195326	-89.918234

2021 High-Quality Waters: Rare & Unique Wetlands

Vilas County - 16 Rare & Unique Wetlands identified in 2021

Data sorted by alphabetical county and increasing Rare & Unique Wetland ID

WETLAND ID	WETLAND TYPE	SITE ID	PRIORITY WATERSHEDS HUC6: • State: •• Both: •••	COUNTY NAME	HUC6	HUC12 CODE	SRANK	GRANK	LAT	LONG
Rare_322	Wild Rice Marsh	CPHER057WI	•••	Vilas	Chippewa	070500030202	S3	G3G4	45.898551	-90.041831
Rare_324	Poor Fen	CPHER069WI	•••	Vilas	Wisconsin	070700010502	S3	G3G4	45.930565	-89.573211
Rare_326	Poor Fen	CPHER069WI	••	Vilas	Chippewa	070500030203	S3	G3G4	45.935439	-90.028791
Rare_328	Poor Fen	CPHER069WI	•••	Vilas	Wisconsin	070700010801	S3	G3G4	45.960142	-89.635785
Rare_329	Poor Fen	CPHER069WI	•	Vilas	Wisconsin	070700010803	S3	G3G4	45.967155	-89.698159

Rare_330	Poor Fen	CPHER069WI	•••	Vilas	Wisconsin	070700010103	S3	G3G4	45.992129	-89.153001
Rare_334	Poor Fen	CPHER069WI	•••	Vilas	Chippewa	070500020105	S3	G3G4	46.019458	-89.589614
Rare_335	Wild Rice Marsh	CPHER057WI	•••	Vilas	Wisconsin	070700010502	S3	G3G4	46.019807	-89.543405
Rare_336	Boreal Rich Fen	CPHER065WI	•••	Vilas	Wisconsin	070700010502	S2	G4G5	46.023948	-89.543562
Rare_337	Wild Rice Marsh	CPHER057WI	•••	Vilas	Chippewa	070500020105	S3	G3G4	46.030024	-89.638851
Rare_340	Poor Fen	CPHER069WI	•••	Vilas	Chippewa	070500020105	S3	G3G4	46.064463	-89.618197
Rare_342	Poor Fen	CPHER069WI	•••	Vilas	Chippewa	070500020105	S3	G3G4	46.089636	-89.663735
Rare_346	Wild Rice Marsh	CPHER057WI	••	Vilas	Chippewa	070500020103	S3	G3G4	46.161912	-89.745253
Rare_347	Boreal Rich Fen	CPHER065WI	••	Vilas	Chippewa	070500020103	S2	G4G5	46.166423	-89.747325
Rare_350	Poor Fen	CPHER069WI	•••	Vilas	SC Lake Superior	040201010303	S3	G3G4	46.208227	-89.747046
Rare_352	Boreal Rich Fen	CPHER065WI	•	Vilas	SC Lake Superior	040201010303	S2	G4G5	46.238466	-89.759394

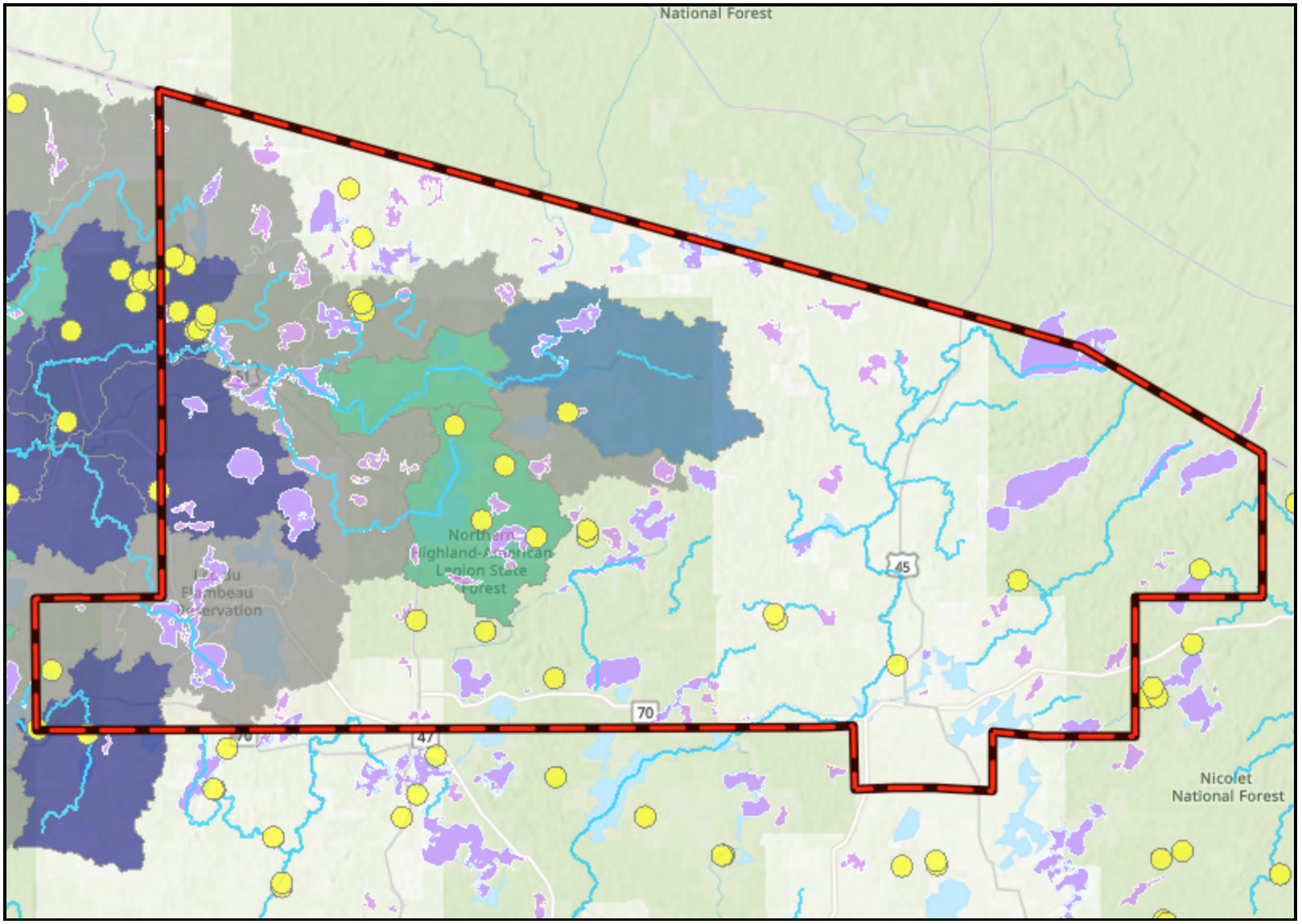
2021 Healthy Watersheds Scores & Ranks: Vilas County

HUC12 References			Statewide Score & Rank			
Watershed_ID	HUC12_NAME	HUC6_NAME	WATERSHED HEALTH SCORE	STATEWIDE RANK	STATEWIDE TOP 30% PRIORITY	HUC6 TOP 30% PRIORITY
040201010303	South Branch Presque Isle River	Southcentral Lake Superior	0.68205	360	Y	Y
040201020101	Cisco Lake-Cisco Branch Ontonagon River	Southcentral Lake Superior	0.68040	367	Y	Y
040301060301	Brule Creek	Northwestern Lake Michigan	0.67497	394	Y	
040301060302	Elvoy Creek	Northwestern Lake Michigan	0.69032	331	Y	
070500020101	White Sand Creek	Chippewa	0.62865	556		
070500020102	Headwaters Manitowish River	Chippewa	0.72566	131	Y	Y
070500020103	Rice Creek	Chippewa	0.68021	368	Y	
070500020104	Island Lake-Manitowish River	Chippewa	0.70708	231	Y	Y
070500020105	Trout Lake	Chippewa	0.69798	282	Y	Y
070500020106	Trout River	Chippewa	0.67270	402	Y	
070500020107	Papoose Creek-Manitowish River	Chippewa	0.63261	539		
070500020108	Manitowish River	Chippewa	0.77641	2	Y	Y
070500020201	Fence Lake	Chippewa	0.62714	563		
070500020202	Flambeau Lake-Bear River	Chippewa	0.67553	392	Y	
070500020203	Little Bear Creek	Chippewa	0.75814	15	Y	Y
070500020302	Headwaters Turtle River	Chippewa	0.68159	362	Y	
070500030202	Squaw Creek	Chippewa	0.74645	40	Y	Y
070500030203	Rice Creek-South Fork Lambeau River	Chippewa	0.69225	321	Y	
070700010101	Thoroughfare Creek-Deerskin River	Wisconsin	0.62184	582		
070700010102	Blackjack Creek	Wisconsin	0.71159	205	Y	Y
070700010103	Little Deerskin River	Wisconsin	0.69825	279	Y	Y
070700010104	Deerskin River	Wisconsin	0.73147	103	Y	Y
070700010204	Ninemile Creek	Wisconsin	0.64160	512	Y	Y
070700010206	Eagle Lake-Eagle River	Wisconsin	0.61428	613		
070700010301	Portage Creek	Wisconsin	0.69138	327	Y	Y
070700010303	Tamarack Creek	Wisconsin	0.69326	312	Y	Y

Watershed_ID	HUC12_NAME	HUC6_NAME	WATERSHED HEALTH SCORE	STATEWIDE RANK	STATEWIDE TOP 30% PRIORITY	HUC6 TOP 30% PRIORITY
070700010304	Muskrat Creek-Wisconsin River	Wisconsin	0.75078	30	Y	Y
070700010305	Pioneer Creek	Wisconsin	0.63792	527		Y
070700010306	Buckatabon Creek	Wisconsin	0.63033	549		Y
070700010307	Rice Creek	Wisconsin	0.68713	348	Y	Y
070700010308	Sucker Creek-Wisconsin River	Wisconsin	0.70023	262	Y	Y
070700010401	Mud Creek	Wisconsin	0.69937	272	Y	Y
070700010402	Sugar Camp Creek	Wisconsin	0.71454	191	Y	Y
070700010403	Little Saint Germain Creek	Wisconsin	0.58407	705		
070700010404	Rainbow Flowage-Wisconsin River	Wisconsin	0.65439	468	Y	Y
070700010501	Lost Creek	Wisconsin	0.72030	159	Y	Y
070700010502	Big Saint Germain Lake-Saint Germain River	Wisconsin	0.68094	363	Y	Y
070700010503	Gilmore Creek	Wisconsin	0.68979	336	Y	Y
070700010801	Big Arbor Vitae Lake	Wisconsin	0.68988	335	Y	Y
070700010803	Mishonagon Creek-Tomahawk River	Wisconsin	0.62287	579		Y
070700010804	Squirrel River	Wisconsin	0.67790	381	Y	Y
070700010806	Shishebogama Lake-Tomahawk River	Wisconsin	0.73189	99	Y	Y

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Vilas County: Watershed Protection Priorities - Chippewa River Basin (HUC6) Top 30%



Legend

Protection - Healthy Watersheds, High-Quality Waters

Healthy & Rare Wetlands

High-Quality Streams

High-Quality Lakes & Large Rivers

Watershed Health Index

Highest

High

HUC12 Boundaries

Notes

Map displays the WDNR Identified Chippewa River Basin (HUC6) Top 30% Protection Priority Watersheds (HUC12) and the identified High-Quality Waters. For the most up to date information, please reference the assessment results and mapping services on the website: https://dnr.wisconsin.gov/topic/SurfaceWater/HQW.html

Service layer credits:
Luke Beringer, Pamela Toshner, Aaron Marti

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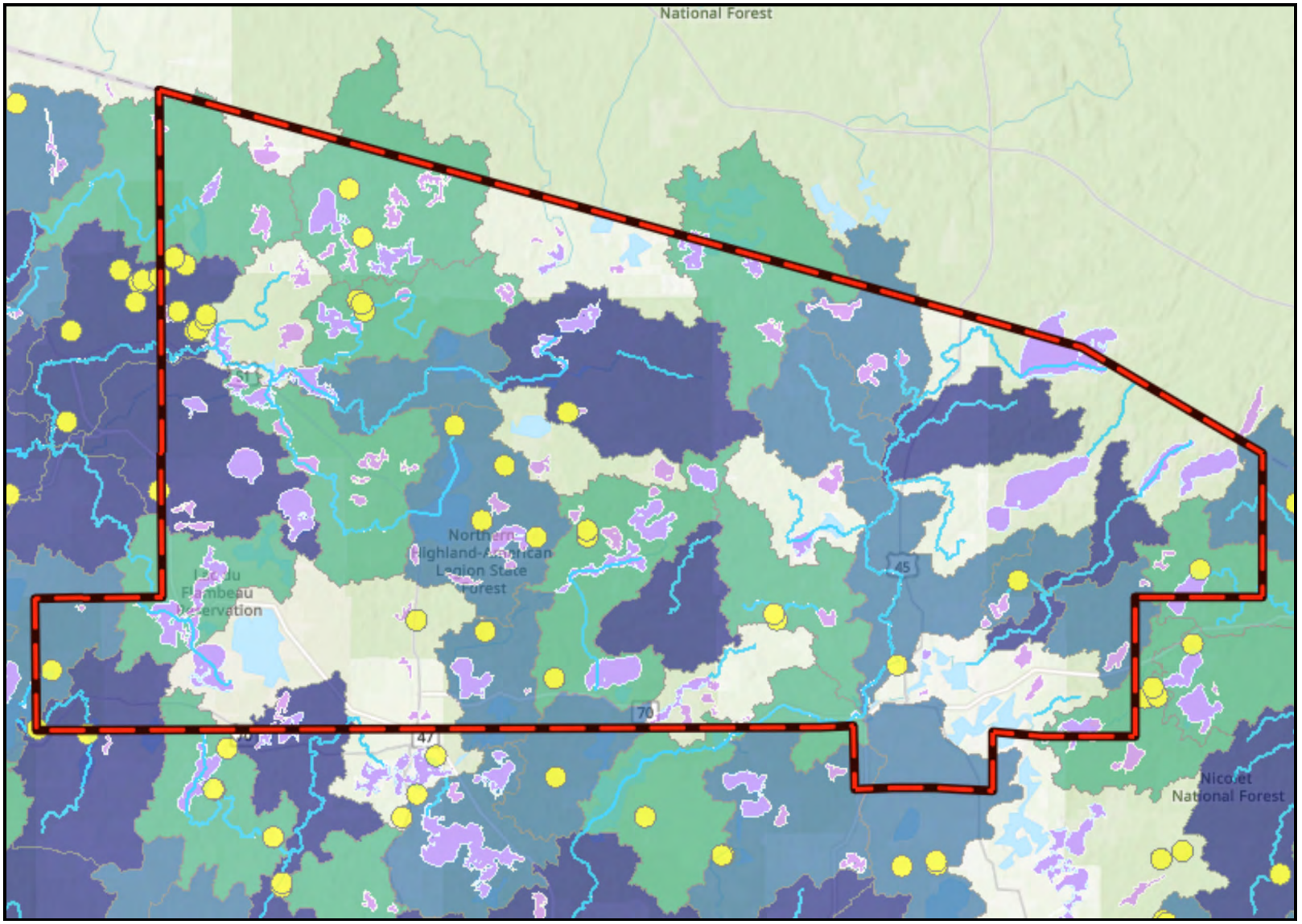
Date Printed: 08/15/2024

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Vilas County: Watershed Protection Priorities - Statewide Top 30%



Legend

Protection - Healthy Watersheds, High-Quality Waters

Healthy & Rare Wetlands

High-Quality Streams

High-Quality Lakes & Large Rivers

Watershed Health Score

- Top 10%
- Top 10 - 20%
- Top 20 - 30%

Notes

Map displays the WDNR Identified Statewide Top 30% Protection Priority Watersheds (HUC12) and the identified High-Quality Waters. For the most up to date information, please reference the assessment results and mapping services on the website: https://dnr.wisconsin.gov/topic/SurfaceWater/HQW.html

Service layer credits:
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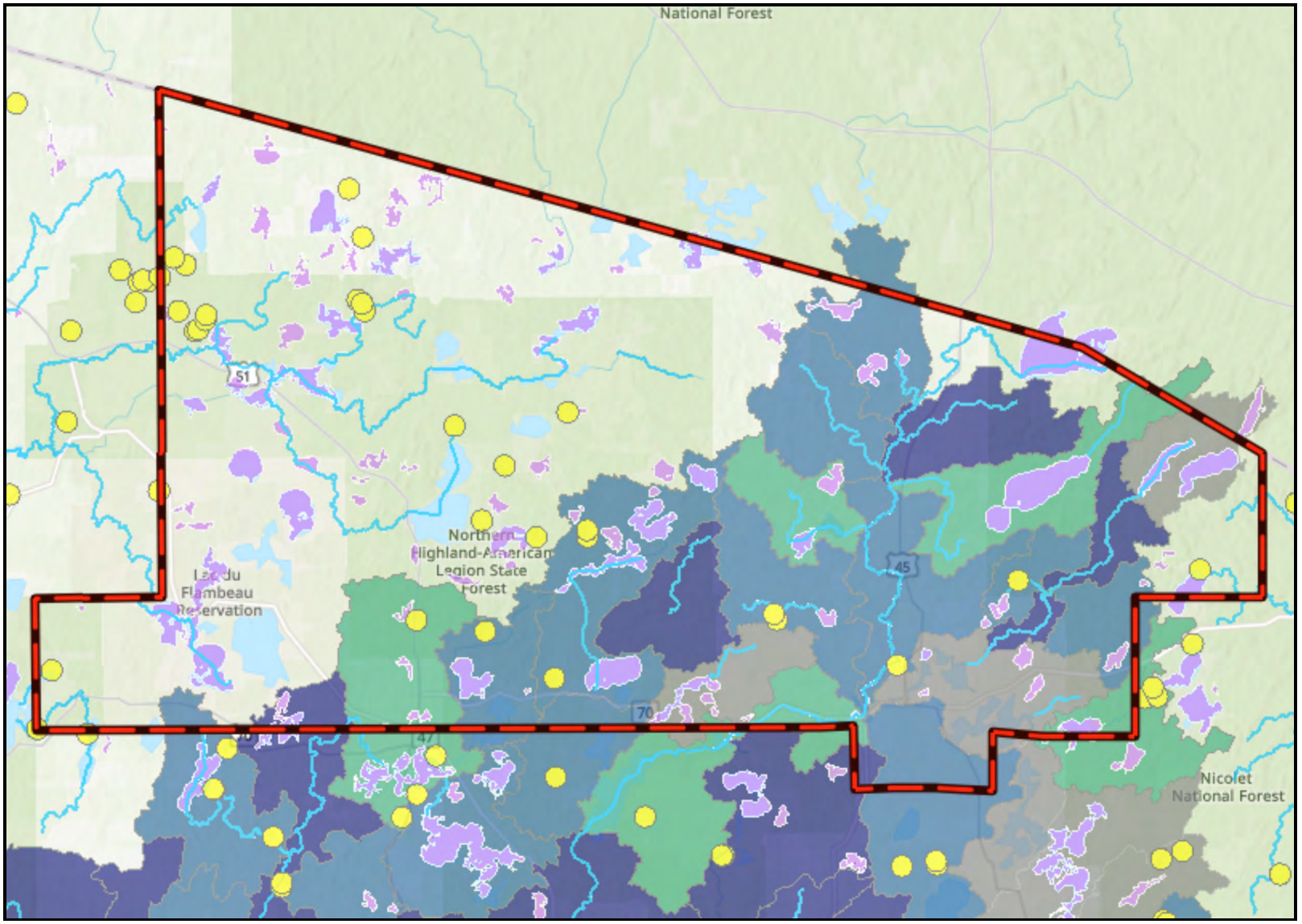
Date Printed: 08/15/2024

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Vilas County: Watershed Protection Priorities - Wisconsin River Basin (HUC6) Top 30%



Legend

Protection - Healthy Watersheds, High-Quality Waters

Healthy & Rare Wetlands

High-Quality Streams

High-Quality Lakes & Large Rivers

Watershed Health Index

Highest

High

HUC12 Boundaries

Notes

Map displays the WDNR Identified Wisconsin River Basin (HUC6) Top 30% Protection Priority Watersheds (HUC12) and the identified High-Quality Waters. For the most up to date information, please reference the assessment results and mapping services on the website: https://dnr.wisconsin.gov/topic/SurfaceWater/HQW.html

Service layer credits:
Luke Beringer, Pamela Toshner, Aaron Marti

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Date Printed: 08/15/2024

Appendix G

Wetland Natural Communities Table

From:
Wisconsin Department of Natural Resources (WDNR)

	Wetland Natural Community	Occurrence in County?	Possible Natural Communities
Forested Communities	Black Spruce Swamp	Y	x
	Northern Hardwood Swamp	Y	x
	Northern Tamarack Swamp	Y	x
	Northern Wet-Mesic Forest	Y	x
	Southern Hardwood Swamp	Y	x
Shrub Communities	Alder Thicket	Y	x
	Shrub-Carr	Y	x
Open Communities	Boreal Rich Fen	Y	x
	Emergent Marsh	Y	x
	Ephemeral Pond	Y	x
	Floating-Leaved Marsh	P	x
	Inland Beach	Y	x
	Muskeg	Y	x
	Northern Sedge Meadow	Y	x
	Oligotrophic Marsh	P	x
	Open Bog	Y	x
	Patterned Peatland	Y	x
	Poor Fen	Y	x
	Submergent Marsh	Y	x
	Wild Rice Marsh	Y	x
Other Communities in State:	American Lotus-Lily Marsh		x
	Bog Relict	n	
	Calcareous Fen	n	
	Central Poor Fen	n	
	Coastal Plain Marsh	n	
	Floodplain Forest		x
	Forested Seep		x
	Great Lakes Ridge and Swale	n	
	Great Lakes Shore Fen	n	
	Interdunal Wetland	n	
	Moist Sandy Meadow	n	
	Southern Sedge Meadow	n	
	Southern Tamarack Swamp		x
	Wet Prairie	n	
	Wet-Mesic Prairie	n	
	White Pine- Red Maple Swamp		x
	Total recognized communities	36	*Total Possible Communities* 25
	% Present or Likely Present	55.55555556	% Present or Likely Present 80

Key to Wetland Natural communities

"Y" = confirmed in county based on WDNR Natural Heritage Inventory Data (NHI).

"P" = Likely present based on Water Quality Biologist and Natural Heritage District Ecologist observations, but unconfirmed by NHI.

Total Recognized Communities = All wetland natural communities based on Key to Wetland Natural Communities above.

Total Possible Communities = All wetland natural communities within the county not excluded by specific geography or natural geographic differences used for community classification (e.g. adjacency to Great Lake, natural geologic and soil distributions within the state, etc)

Appendix H

Impaired Waters List – 303(d)

From:
Wisconsin Department of Natural Resources (WDNR)

Row #	Waterbody Name	Local Waterbody Name	Water Type	Start Mile	End Mile	Size (Miles or Acres)	AU Listing Category	Cycle Listed	Source	Pollutants (Causes)	Impairments (Observed Effects)	Pollutant Listing Category	TMDL Priority	Use(s) Not Attained	WBIC	WDNR AU ID	EPA AU ID	Counties	Watershed Code	Watershed Name
12	Amik Lake	Amik Lake, Pike Lake Chain	LAKE			140.8	5C	2016	NPS	PHOSPHORUS, TOTAL	Impairment Unknown, Excess Algal Growth	5C	Low	FAL, REC	2268600	14815	WI10003623	Vilas	UC10	Upper South Fork Flambeau River
19	Annabelle Lake	Anna Lake	LAKE			194.5	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	2953800	128391	WI10007528	Vilas	LS16	Presque Isle River
37	Ballard Lake	Ballard Lake (Ballard Chain)	LAKE			502.6	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	2340700	15235	WI10003970	Vilas	UC16	Manitowish River
65	Beaver Lake	Beaver Lake	LAKE			62.0	5C	2024	NPS	CAUSE UNKNOWN	Excess Algal Growth	5C	Low	REC	2960600	128402	WI10007538	Vilas	LS16	Presque Isle River
70	Big Arbor Vitae Lake	Big Arbor Vitae Lake	LAKE			1,070	5A	2018	NPS	PHOSPHORUS, TOTAL	Impairment Unknown, Excess Algal Growth	5A	Low	FAL, REC	1545600	128406	WI10008937	Vilas	UW38	Upper Tomahawk River
87	Big Saint Germain Lake	Big Saint Germain Lake	LAKE			1,622	5A	2014	NPS	PHOSPHORUS, TOTAL	Eutrophication, Excess Algal Growth	5A	Low	FAL, REC	1591100	128411	WI10007545	Vilas	UW43	St. Germain River
132	Boot Lake	Boot Lake	LAKE			285.8	5C	2018	NPS	CAUSE UNKNOWN	Eutrophication, Excess Algal Growth	5C	Low	FAL, REC	1619100	128416	WI10007549	Vilas	UW45	Tamarack Pioneer River
191	Clear Lake	Clear Lake	LAKE			515.2	5P	2014	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5P	Low	FAL, REC	2329000	128438	WI10027803	Vilas	UC16	Manitowish River
210	Cranberry Lake	Cranberry Lake (Eagle Chain)	LAKE			924.4	5A	2014	NPS	CAUSE UNKNOWN	Excess Algal Growth	5A	Low	REC	1603800	128768	WI10007862	Oneida, Vilas	UW44	Eagle River
277	Eagle Lake	Eagle Lake (Eagle Chain)	LAKE			574.8	5A	2018	NPS	CAUSE UNKNOWN	Excess Algal Growth	5A	Low	REC	1600200	128460	WI10026531	Vilas	UW44	Eagle River
333	Found Lake	Found Lake	LAKE			336.4	5A	2024	NPS	CAUSE UNKNOWN	Excess Algal Growth	5A	Low	REC	1593800	128476	WI10007601	Vilas	UW43	St. Germain River
450	Irving Lake	Irving Lake (Ballard Chain)	LAKE			418.7	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	2340900	15236	WI10003971	Vilas	UC16	Manitowish River
456	Jag Lake	Jag Lake	LAKE			161.7	5A	1998	Contam. Sed.	MERCURY	Mercury Contaminated Fish Tissue	5A	Low	FC	1855900	15126	WI10003879	Vilas	UC16	Manitowish River
508	Lake Content	Lake Content	LAKE			239.0	5A	2014	NPS	PHOSPHORUS, TOTAL	Excess Algal Growth	5A	Low	REC	1592000	128514	WI10007633	Vilas	UW43	St. Germain River
568	Little Arbor Vitae Lake	Little Arbor Vitae Lake	LAKE			479.9	5C	2016	NPS	PHOSPHORUS, TOTAL	Impairment Unknown, Excess Algal Growth	5C	Low	FAL, REC	1545300	128524	WI10007641	Vilas	UW38	Upper Tomahawk River
592	Little Saint Germain Lake	Little Saint Germain Lake North and East Lobes	LAKE			446.5	5A	2020	NPS	PHOSPHORUS, TOTAL	Eutrophication, Excess Algal Growth	5A	Low	FAL, REC	1596300	8128745	WI8128746	Vilas	UW42	Sugar Camp Creek
639	Lynx Lake	Lynx Lake	LAKE			307.2	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	2954500	128549	WI10007663	Vilas	LS16	Presque Isle River
660	McDonald Lake	McDonald Lake	LAKE			41.4	5P	2024	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5P	Low	FAL, REC	1003700	128553	WI10007666	Vilas	UW42	Sugar Camp Creek
757	Muskellunge Lake	Muskellunge Lake	LAKE			269.9	5A	2014	NPS	CAUSE UNKNOWN	Excess Algal Growth	5A	Low	REC	1596600	128570	WI10007681	Vilas	UW42	Sugar Camp Creek
800	North Turtle Lake	Turtle Lake, North	LAKE			359.2	5C	2020	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5C	Low	FAL, REC	2310400	15010	WI10003782	Vilas	UC14	Flambeau Flowage
833	Otter Lake	Otter Lake (Eagle Chain)	LAKE			173.8	5A	2024	NPS	PHOSPHORUS, TOTAL	Excess Algal Growth	5A	Low	FAL, REC	1600100	128580	WI10007690	Vilas	UW44	Eagle River
837	Oxbow Lake	Oxbow Lake	LAKE			523.2	5A	2014	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	2954800	128581	WI10007691	Vilas	LS16	Presque Isle River
838	Oxbow Lake	Oxbow Lake	LAKE			523.2	5A	2014	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5P	Low	FAL, REC	2954800	128581	WI10007691	Vilas	LS16	Presque Isle River
864	Pickerel Lake	Pickerel Lake	LAKE			270.3	5C	2020	NPS	CAUSE UNKNOWN	Excess Algal Growth	5C	Low	REC	1619700	128585	WI10007694	Vilas	UW45	Tamarack Pioneer River
929	Red Bass Lake	Red Bass Lake	LAKE			27.1	5P	2024	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5P	Low	FAL, REC	2954700	128594	WI10007701	Vilas	LS16	Presque Isle River
942	Rice Lake	Rice Lake	LAKE			79.0	5A	2022	NPS	PHOSPHORUS, TOTAL	Impairment Unknown, Excess Algal Growth	5A	Low	FAL, REC	1618600	128786	WI10026161	Vilas	UW45	Tamarack Pioneer River
1,001	Scattering Rice Lake	Scattering Rice Lake (Eagle Chain)	LAKE			263.3	5A	2024	NPS	CAUSE UNKNOWN	Excess Algal Growth	5A	Low	REC	1600300	128607	WI10007713	Vilas	UW44	Eagle River
1,015	Shannon Lake	Shannon Lake	LAKE			34.9	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	1016800	128610	WI10026107	Vilas	UW43	St. Germain River
1,028	Silver Lake	Silver Lake	LAKE			57.5	5A	2024	NPS	CAUSE UNKNOWN	Degraded Aquatic Plant Community (Macrophytes)	5A	Low	FAL	1599800	128611	WI10007716	Vilas	UW44	Eagle River
1,041	Snipe Lake	Snipe Lake	LAKE			215.5	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	1018500	128615	WI10007719	Vilas	UW42	Sugar Camp Creek
1,175	Turner Lake	Turner Lake (Pike Lake Chain)	LAKE			158.6	5C	2018	NPS	PHOSPHORUS, TOTAL	Impairment Unknown, Excess Algal Growth	5C	Low	FAL, REC	2268500	14814	WI10003622	Price, Vilas	UC10	Upper South Fork Flambeau River
1,187	Twin Lakes (South)	Twin Lakes	LAKE			627.7	5P	2018	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5P	Low	FAL, REC	1623700	128617	WI10007721	Vilas	UW45	Tamarack Pioneer River
1,362	Upper Buckatabon Lake	Upper Buckatabon Lake	LAKE			493.0	5C	2016	NPS	PHOSPHORUS, TOTAL	Impairment Unknown	5C	Low	FAL, REC	1621800	128692	WI10007795	Vilas	UW45	Tamarack Pioneer River
1,408	White Birch Lake	White Birch Lake (Ballard Chain)	LAKE			112.9	5B	1998	Atm. Dep.	MERCURY	Mercury Contaminated Fish Tissue	5B	Low	FC	2340500	15234	WI10003969	Vilas	UC16	Manitowish River

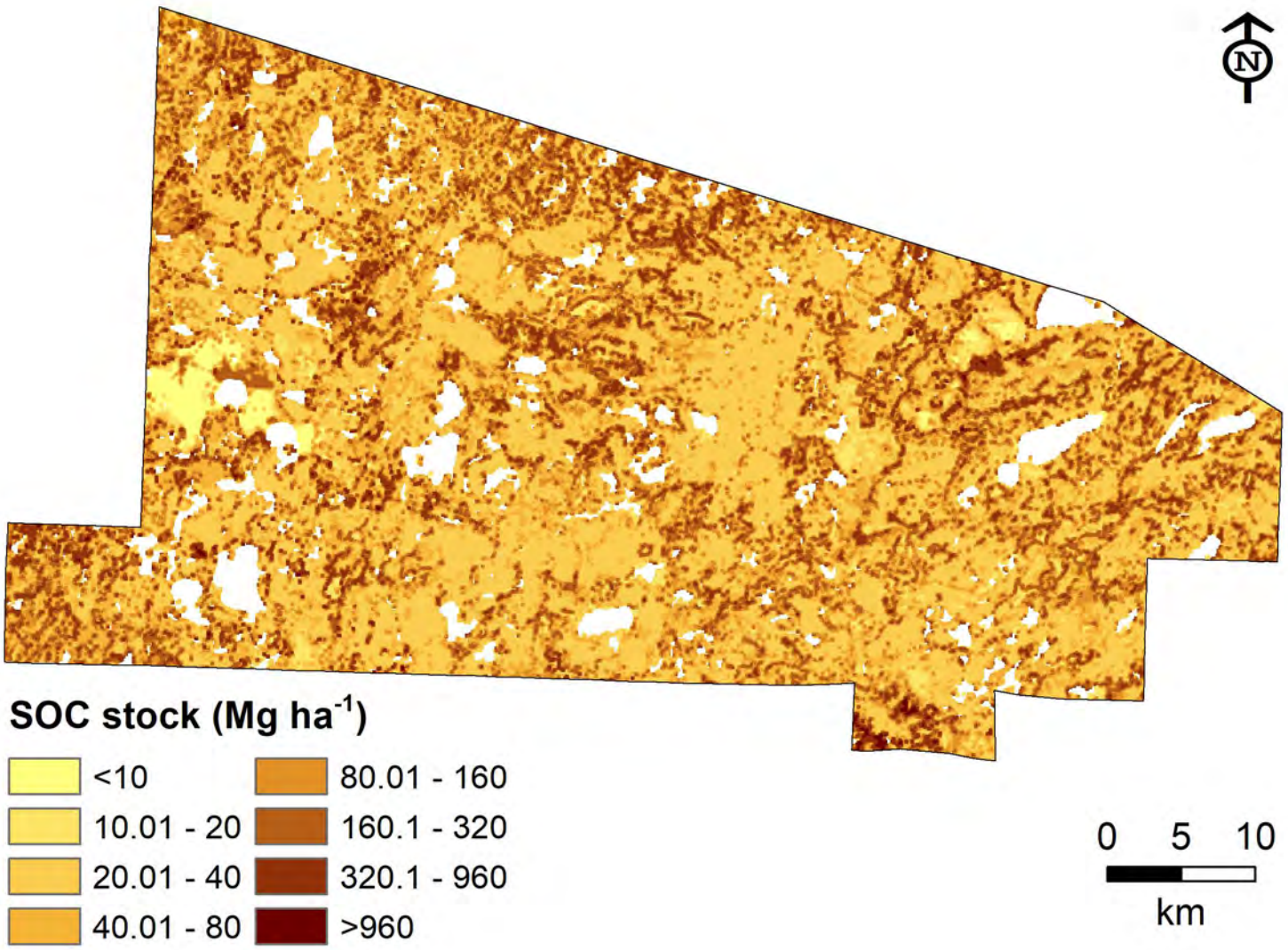
Appendix I

Soil Organic Carbon Maps

From:
Wisconsin Department of Natural Resources (WDNR)

Soil Organic Carbon Stock

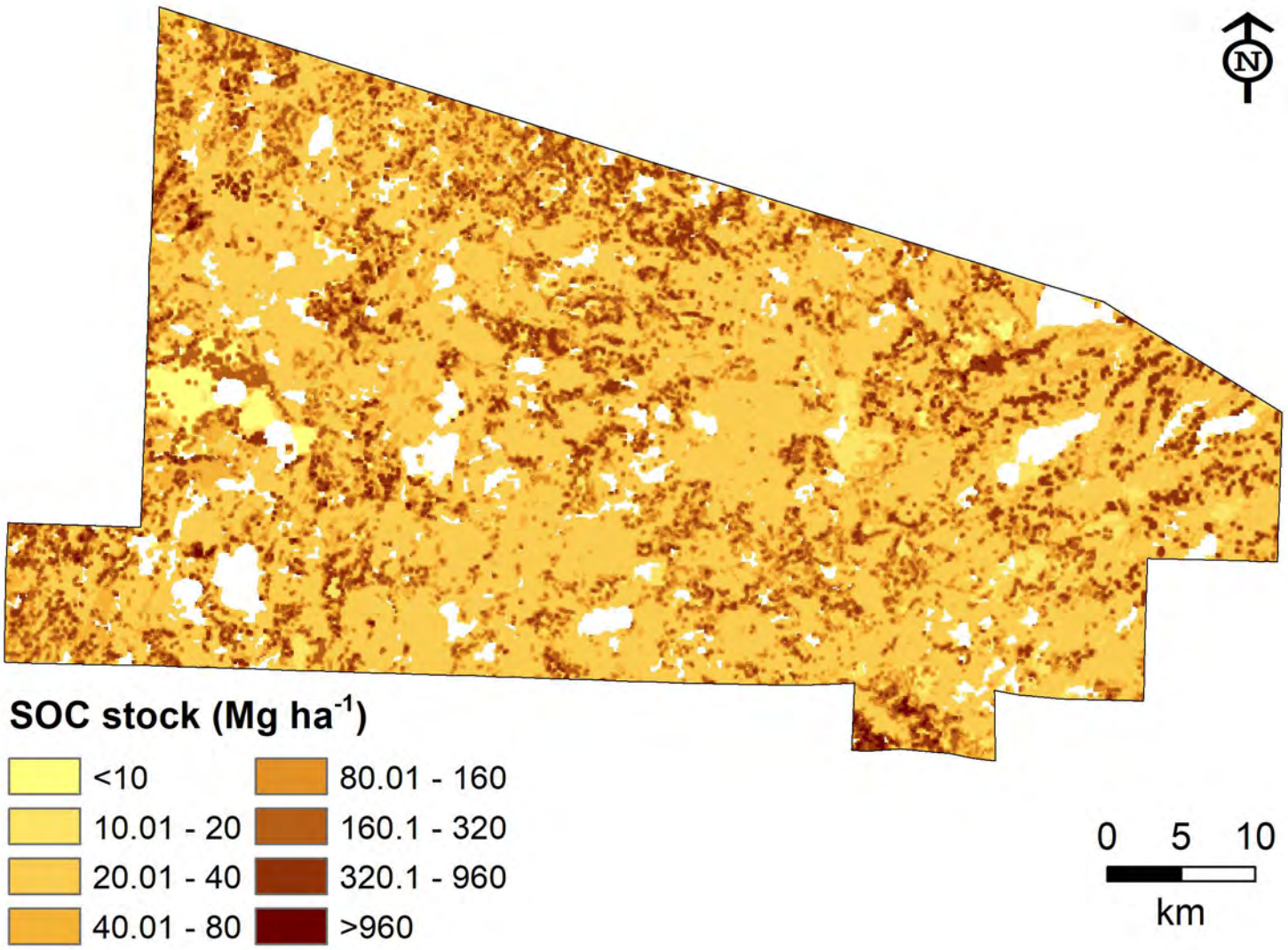
Calculated for Vilas County Topsoil (0 to 30 cm), 2011



Source: Adhikari K, Owens PR, Libohova Z, Miller DM, Wills SA, Nemecek J. Assessing soil organic carbon stock of Wisconsin, USA and its fate under future land use and climate change. Sci Total Environ. 2019 Jun 1;667:833-845. doi: 10.1016/j.scitotenv.2019.02.420. Epub 2019 Feb 28. PMID: 30852437.

Soil Organic Carbon Stock

Projected for Vilas County Topsoil (0 to 30 cm), 2050



Source: Adhikari K, Owens PR, Libohova Z, Miller DM, Wills SA, Nemecek J. Assessing soil organic carbon stock of Wisconsin, USA and its fate under future land use and climate change. Sci Total Environ. 2019 Jun 1;667:833-845. doi: 10.1016/j.scitotenv.2019.02.420. Epub 2019 Feb 28. PMID: 30852437.

Appendix J

List of Conservation Practices

From:
Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP)

SECTION 2.2

COST-SHARE FUNDING SOURCE TABLE AND NR 151 CODING

The following will help you in signing cost-share contracts and completing reimbursement requests. It consists of two parts:

(1) A table listing all conservation practices cost-shareable under ch. ATCP 50, the source of funds you must use for cost-sharing the specific practice, and the units of measurement to quantify each cost-shared practice, and

(2) Guidance for completing the column on the reimbursement form related to the NR 151 compliance.

COST-SHARE PRACTICE/FUNDING SOURCE TABLE

PRACTICE or ACTIVITY	ATCP 50 Reference	Funding Source	Units of Measurement
Land taken out of agricultural production (Cost-share contract must list the new or existing farm practice that takes land out of production)	50.08(3)	Structural	Acres
Riparian land taken out of agricultural production (CREP Equivalent) (Cost-share contract must list the new or existing farm practice that takes land out of production)	50.08(4), 50.42(1)	Structural	Acres
Manure storage systems	50.62	Structural	Number
Manure storage closure	50.63	Structural	Number
Barnyard runoff control systems (specify components including heavy use area protection)	50.64	Structural	Number
Access road	50.65	Structural	Linear Ft.
Trails and walkways	50.66	Structural	Linear Ft.
Conservation cover	50.663	SEG[1]	Acres
Conservation crop rotation	50.668	SEG[1]	Acres
Contour farming	50.67	SEG[1]	Acres
Cover crop – single species + termination	50.68(1)	SEG[1]	Acres
Cover crop – single species	50.68(2)	SEG[1]	Acres
Cover crop – multi-species	50.68(3)	SEG[1]	Acres
Critical area stabilization	50.69	Structural	Number
Diversions	50.70	Structural	Linear Ft.
Feed storage runoff control systems	50.705	Structural	Number
Field windbreaks	50.71	Structural	Linear Ft.
Filter strips	50.72	Structural	Acres
Grade stabilization structures	50.73	Structural	Number
Habitat diversification	50.733	SEG[1]	Acres
Harvestable buffers	50.738	SEG[1]	Acres
Hydrologic restoration	50.74	Structural	Acres
Livestock fencing	50.75	Structural	Linear Ft.
Livestock watering facilities	50.76	Structural	Number
Milking center waste control systems	50.77	Structural	Number
Nutrient management for cropland or pasture	50.78(1)	SEG[1]	Acres

[1] *See footnote on page 3*

COST-SHARE PRACTICE/FUNDING SOURCE TABLE			
PRACTICE or ACTIVITY	**ATCP 50 Reference**	**Funding Source**	**Units of Measurement**
Nutrient management for Silurian	50.78(2)	No Funds Available	Acres
Nutrient treatment systems	50.785	Structural	Number
Pesticide management	50.79	Structural	Number
Prescribed grazing	50.80		
1. Management plan	50.80(1)	No Funds Available	Number
2. Fencing (not permanent)	50.80(2)	No Funds Available	Linear Ft.
3. Fencing (permanent)	50.80(3)	Structural	Linear Ft.
4. Establish permanent pasture (seeding)	50.80(4)	Structural	Acres
Relocating or abandoning animal feeding operations	50.81	Structural	Number
Residue management	50.82	SEG[1]	Acres
Riparian buffers	50.83	Structural	Acres
Roofs	50.84	Structural	Number
Roof runoff systems	50.85	Structural	Number
Sediment basins	50.86	Structural	Number
Sinkhole treatment	50.87	Structural	Number
Stream bank and shoreline protection	50.88	Structural	Linear Ft.
Stream restorations	50.882	Structural	Linear Ft.
Stream Crossing	50.885	Structural	Linear Ft.
Strip-cropping	50.89	SEG[1]	Acres
Subsurface drains	50.90	Structural	Number
Terrace systems	50.91	Structural	Linear Ft.
Underground outlet	50.92	Structural	Number
Verification depth to bedrock	50.925	No Funds Available	Number
Waste transfer systems	50.93	Structural	Number
Wastewater treatment strips	50.94	Structural	Linear Ft.
Water and sediment control basins	50.95	Structural	Number
Waterway systems	50.96	Structural	Acres
Well decommissioning	50.97	Structural	Number
Wetland restoration	50.98	Structural	Acres
Engineering services provided in connection with a completed cost-share practice for which Structural revenue may be used (also refer to 50.40(7)).	50.34(4)	Structural	
Other practices with DATCP's written approval	50.40(3)(a)		