Land and Water Resource Management Plan

Douglas County, WI

Douglas County Land Conservation Committee and
Land and Water Conservation Department

October 2019

For Implementation 2020 – 2029

ACKNOWLEDGEMENTS

This plan was prepared under the authority of Chapter 92, Wisconsin Statutes, and under the direction of the Douglas County Land Conservation Committee, Douglas County Board, and the Land and Water Conservation Department

Douglas County Land Conservation Committee

Chair	Sue Hendrickson
Vice Chair	Mary Lou Bergman
Farm Service Agency Representative	James Soyring
Member	Kathryn McKenzie
Member	Larry Luostari
Member	Wendy Bong

Douglas County Board

Chair	Mark Liebaert
Vice-Chair	Mary Lou Bergman
County Clerk	Susan Sandvick
County Administrator	Ann Doucette

Douglas County Land and Water Conservation Department

Douglas County Conservationist	Ashley Vande Voort
Douglas County Engineering Technician	Cameron Bertsch
Wildlife Damage Specialist	David Schultz

Work Group Facilitator

Amy Eliot

Other Cooperators

Wisconsin Department of Agriculture, Trade & Consumer Protection
Douglas County Land Information Department
Douglas County Planning & Zoning Department
Northwest Regional Planning Commission
University of Wisconsin Extension
USDA Farm Service Agency
USDA Natural Resources Conservation Service
Wisconsin Department of Natural Resources

Special Thanks to Citizens and Agency Staff who gave input

Cameron Bertsch	Douglas County Land Conservation
Dan Corbin	Towns Association Summit
Diane Nelson	City of Superior
Greg Kessler	WDNR
Jane Anklam	UW-Extension Madison, Douglas County
Jim Giffin	Lake Minnesuing Sanitary District, Northwest Region Wisconsin Lakes
Jeremy Bates	WDNR
Kathryn McKenzie	Land Conservation Committee
Kelsey Prihoda	Lake Superior Research Institute
Larry Luostari	Land Conservation Committee, Farmer's Union
Mark Liebaert	County Board Chair, Farmer's Union
Mary Stone-McConnell	Nemadji Watershed Group
Paul Piszczek	WDNR
Robert Erdman	Douglas County Fish & Game League, Wisconsin Conservation Congress
Ron Burnside	Wascott Town Chair
Ruth King	WDNR
Scott Toshner	WDNR
Sue Hendrickson	Douglas County Board of Supervisors, Land Conservation Committee
Tom Johnson	Douglas County Fish & Game League, Wisconsin Conservation Congress
Wendy Bong	Land Conservation Committee
Zach DeVoe	Douglas County Land Services

Plan Approvals

Douglas County Land Conservation Committee on September 17, 2019
Wisconsin Land & Water Conservation Board tentative October 1, 2019
Douglas County Board tentative October 17, 2019

Initial Implementation Period

January 1, 2020 – December 31, 2024

Plan Lifespan

January 1, 2020 – December 31, 2029

RESOLUTION

A RESOLUTION APPROVING THE DOUGLAS COUNTY LAND AND WATER RESOURCE MANAGEMENT PLAN

WHEREAS, Chapter 92.10 of the Wisconsin Statutes requires that all counties in the state of Wisconsin develop a Land and Water Resource Management Plan; and

WHEREAS, two Citizen Advisory committee meetings provided input on goals, objectives, and activities for revision of the Land and Water Resource Management Plan; and

WHEREAS, the resulting plan identifies land and water resource management goals, objectives, and activities for implementation by the Douglas County Land Conservation Committee and their staff for the next ten years, with a review after 5 years; and

WHEREAS, at their September 17, 2019 meeting, the Douglas County Land Conservation Committee approved the Land and Water Resource Management Plan and forwarded the approved plan to the Douglas County Board for their review and action; and

WHEREAS, the Douglas County Land Conservation Committee Committee held one public hearing on September 17, 2019 to solicit public opinion; and

WHEREAS, the Douglas County Land Conservation Committee staff presented the revised Land and Water Resource Management Plan to the Wisconsin Land and Water Conservation Board, at their meeting October 1, 2019; and

WHEREAS, the Wisconsin Land and Water Conservation Board approved the Douglas County Land and Water Resource Management Plan at their meeting October 17, 2019.

NOW THEREFORE BE IT RESOLVED that the Douglas County Board of Supervisors, does approve the Douglas County Land and Water Resource Management Plan to be implemented for the next ten years, with a review after the first 5 years; effective until December 31, 2029.

EXECUTIVE SUMMARY

Douglas County Land & Water Resource Management Plan

Introduction

The Douglas County Land and Water Resource Management Plan was developed to meet requirements in Chapter 92 of the Wisconsin Statutes. The intent of the plan is to foster local water quality planning and increase public participation in natural resource management. The plans are intended to provide counties, through their Land Conservation Committees, the tools, flexibility, and funding to be able to address both statewide goals as well as priorities identified at the local level. The Douglas County Land & Water Resource Management Plan contains realistic objectives and activities intended to meet the goals established by a workgroup of volunteer citizens from throughout the county. The resulting work plan will guide the work of the Land Conservation Committee and their staff through 2029

Plan Organization

The Douglas County Land and Water Resource Management (LWRM) Plan is divided into two main volumes of information. Volume I provides a general overview of the county and an assessment of the county's resources. Volume II identifies the goals, objectives, and activities along with the implementation of the agricultural performance standards for nonpoint pollution reduction and outlines plan implementation. Maps and other supporting information are found in the appendices.

Public Participation

The LWRM Plan was developed through public informational meetings and a hearing, and the efforts of the Land Conservation Committee (LCC). The Land and Water Conservation Department (LWCD) held two Citizen Advisory Committee meetings. LWCD staff also forwarded plan information materials to the Douglas County Board for their September 2019 meeting. Public participation will continue throughout the life of the LWRM Plan at annual planning meetings, annual reports to the county board, and through other group meetings and press releases to Douglas County citizens. Groups, organizations and individuals will also be asked by the LWCD to participate in project planning and/or implementation as necessary.

Goals, Objectives and Activities

The objectives and activities are organized under five main goals:

1) Protect and enhance surface waters and wetlands to preserve and restore water quality, ecological functions, and recreational, scenic and cultural living values.
2) Protect and increase the knowledge of groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.
3) Prevent the introduction and spread of aquatic and terrestrial invasive species to conserve the natural community and the intrinsic and economic resource values.
4) Maintain and preserve farmlands by supporting a diverse agricultural community and sustainable agricultural practices.
5) Create public awareness and stewardship actions relating to conservation and the County's goals for land and water resource management.

Plan Implementation

Volume II outlines roles, responsibilities, and evaluation for each goal, objective, and activity. Volume II also outlines the Douglas County priority farm strategy and agricultural and non-agricultural standards and prohibitions implementation. Priority areas will be targeted for voluntary and educational efforts based on their potential impacts to natural resources. Criteria for priorities for cost-share and technical assistance include geographic, resource, among other criteria. The NR 151 performance standards strategy capitalizes on education and voluntary compliance. A goal of education has been developed with educational focuses emphasizing each of the prior listed plan goals.

It should be noted, that annual work planning will determine the amount of funding needed for plan implementation. The county is the most important source of funding and support for implementation of the plan. County funding is also the most limiting factor as funds from other sources often require a match commitment. However, funding may not be available to implement all of the activities outlined in the work plan. Funding for the plan can come from various sources and therefore, a combination of private, local, state, and federal sources will be sought to implement the plan priorities. Successful implementation will continue to rely, not only on LWCD staff, but also on cooperation between partners, including other county departments. For a full list of plan partners, see Volume II.

Progress Tracking and Plan Evaluation

Plan evaluation is important as it assesses whether goals, objectives, and activities are being accomplished. Measures will be based off the completion of projects. Other activities, such as technical assistance, will also be evaluated on successful installation of the project and the protection received from installation of the conservation practice (estimated soil saved, runoff reduced, wetland acres created, etc.). A written annual report will be provided to the public, the county, and DATCP. This evaluation will also appear in the department's annual budget packet as performance indicators.

The LWCD staff will review progress toward plan completion on a yearly basis and provide bi-monthly staff reports to the LCC. Progress tracking will be made a part of every LCC meeting. Work planning sessions will also provide an opportunity for the LCC, citizens, and staff to meet together, discuss progress, and determine the next fiscal year's projects.

Conclusion

Land and water resources are very important to Douglas County. Unique resources including the St. Croix National Scenic Riverway, the Bois Brule River State Forest, and Lake Superior are a few of the treasures found in the county. These treasures need to be protected. The land and water resource management plans are intended to reflect local needs and encourage local leadership in protecting these important resources. These plans empower Land Conservation Committees to provide local leadership for other agencies, private groups, organizations, and individuals. The plans also serve to set the path the county will follow for more long range planning. The implementation of this plan will provide the basis for the future of land and water conservation in Douglas County.

ACRONYMS

AIS	Aquatic Invasive Species
AOC	Area of Concern
AWAC	Animal Waste Advisory Committee
BMP	Best Management Practices
CAC	Citizen Advisory Committee
CAFO	Concentrated Animal Feeding Operation
DATCP	Wisconsin Department of Agriculture, Trade & Consumer Protection
DST	Decision Support Tool
EPA	Environmental Protection Agency
ERW	Exceptional Resource Waters
FEMA	Federal Emergency Management Agency
FPP	Farmland Preservation Plan , Douglas County, Wisconsin
FSA	Farm Service Agency
GIS	Geographic Information Systems
LCC	Land Conservation Committee
LSRI	UW-Superior Lake Superior Research Institute
LWCD	Land and Water Conservation Department
LWRM Plan	Land and Water Resource Management Plan
NRCS	Natural Resources Conservation Service
OWR	Outstanding Resource Waters
PAHs	Polycyclic Aromatic Hydrocarbons
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UW - Madison, Extension	University of Wisconsin-Madison, Division of Extension, Douglas County
WDNR	Wisconsin Department of Natural Resources
WQM Plans	Water Quality Management Plans

TABLE OF CONTENTS

Figures

Appendixes

Tables

Volume I

Appendix A

INTRODUCTION

Authority

Chapter 92 of the Wisconsin Statutes authorizes the creation and lists duties and responsibilities of Land Conservation Committees (LCC.) Each county is required to have an LCC. The committees are responsible for administering soil and water conservation programs and for providing technical assistance and conservation education. The Wisconsin Department of Agriculture, Trade & Consumer Protection (DATCP) provides grant funding to aid counties in implementing their program through the Soil and Water Resource Management section.

The 1997-1999 biennial budget bill changed the way the State of Wisconsin allocated funds to counties for soil and water resource management. The intent of the change was to foster local water quality planning, termed county land and water resource management plans. These plans are intended to provide counties, through their land conservation committees, the tools, flexibility, and funding to be able to address both statewide goals and priorities identified at the local level.

Plan Requirements

A county land and water resource management plan must include, at a minimum, the following:

- Public participation
- Cropland soil erosion control plan or waiver from plan requirements approved by the Land and Water Conservation Board and DATCP
- Coordinated implementation strategy
- A resource assessment including water quality, soil erosion conditions and causes of nonpoint source water pollution
- Water quality and soil erosion goals
- Standards for the Farmland Preservation Program
- A progress tracking and evaluation method
- A process for landowner notification if needed
- A public hearing
- Agricultural and non-agricultural performance standards

Public Participation

Douglas County provided several opportunities (identified below) to provide input into land and water resource management over the past several plans.

Surveys and Questionnaires

In 1997, 2000, and 2004 the LCC authorized two informal customer surveys asking citizens the types of activities the LCC should be focusing money and efforts on. The Douglas County Board also surveyed citizens when beginning their land use planning process in 1999. The LCC distributed questionnaires during the informational sessions outlining the land and water resource management planning process in 2004. The results were reviewed and the major natural resource themes identified were:

- *Drinking water protection*
- *Land use (forestry, agriculture and development)*
- *Wetland protection*
- *Lakeshore protection*
- *County and town road maintenance and construction*
- *Education*
- *Exotic and invasive species control*
- *Public beach closings*
- *Deer herd management*

2019 Plan Revision

- Two Citizen Advisory Committee (CAC) meetings were held on March 27 and April 15. A range of people were invited to attend such as county employees, WDNR employees, business owners, members of the farmers union, lake organization leaders, town chairs, non-profit organizations, and University of Wisconsin-Madison, Division of Extension, Douglas County (UW - Madison, Extension). At the meetings input was received on goals, objectives and activities. Discussion was moderated by a facilitator.

- Additional input was welcomed for people who were unable to attend via email. There was also an ongoing review open to all members of the CAC to allow the opportunity for input on the final product.

- The plan was open for public comment from May 15 through to the public hearing on June 12.

Local Cooperation

Although Ashland, Bayfield, Douglas, and Iron County Land Conservation Departments are no longer administered cooperatively, the counties still conduct some activities together.

Plan Organization

The Douglas County Land and Water Resource Management Plan (LWRM Plan) is divided into two main volumes of information. Volume I is a general overview of the county and an

assessment of the county's resources. Volume II identifies the goals, objectives, and activities. This volume also outlines plan implementation and addresses the implementation of the agricultural performance standards for nonpoint pollution reduction. It includes discussion of ongoing monitoring efforts in the county.

VOLUME I. PLAN BACKGROUND

County Resource Information

General Description

Douglas County is located in northwestern Wisconsin and covers 1,309 square miles. It is the fourth largest county in Wisconsin. The county is bordered by Carlton, Pine, and St. Louis Counties, Minnesota to the west, Burnett and Washburn Counties to the south, Bayfield County to the east, and Lake Superior to the north.

Geology

Bedrock

Douglas County varies from Precambrian sandstone to igneous bedrock. The northern part of the county is underlain with Superior red sandstone over which is a thick mantle of clay and gravel forming an artesian slope. Crystalline igneous rock underlies the southern two-thirds of the county. Gabbro and basalt outcroppings are common along the Superior escarpment in northern Douglas County and Totagatic River of southeastern Douglas County. Figure 1 is a map of Douglas County bedrock.

Glacial Geology

The glacial geology of Douglas County is represented by four major units:

- glacial lacustrine red clays or clay till
- glacial gravel, sand, boulders and clay
- large pitted outwash plain
- ground moraine

The first unit, made of glacial lacustrine red clays or clay tills, is found on an old lake plain adjoining Lake Superior. These clays were laid down under the waters of a much larger glacial lake that once occupied the Lake Superior Basin and surrounding areas. These calcareous red clay soils are finely textured, resulting in very poor drainage. These soils cover about one fourth of the total county area, and deposits range from very thin portions near the Superior escarpment to over 600 feet in the St. Louis River Valley. Although these clays contain large quantities of ground water, the surface clay deposits effectively prevent the water from reaching the surface as springs and consequently create artesian conditions.

The second major unit is a noticeable end moraine extending northeast across the county from Patzau to Bayfield County. It lies just south of the Superior escarpment. It is a ridge-like accumulation of glacial gravel, sand, boulders, and clay. The moraine consists of steep hills and short ridges interspersed with numerous kettle-like depressions.

The third major unit consists of large pitted outwash plain. This outwash plain lies south of the Brule River, south east of the St. Croix River and northwest of the Ounce River and is a flat, sandy plain resulting from the outwash of the melting glacier. There are many depressions in the

plain, and lakes are more numerous here than in the upland. This flat, sandy plain is locally known as the *Pine Barrens*.

The last major unit of Douglas County consists of ground moraine in the extreme southwest corner of the county and one small portion near the Superior escarpment. The ground moraine of Douglas County is characterized by elongated narrow watersheds separated by gravel eskers which lie in a northeast/southwest configuration.

Soil Associations

Whether you are a resource manager, elected official, developer, contractor, or naturalist, soil survey information is invaluable in making land use decisions. This information provides insight into landscape relationships that no other source of information can provide. Figure 2 is the soil associations map of Douglas County.

The USDA Natural Resources Conservation Service (NRCS) completed a digital soil survey for Douglas County in 2007. This information is available on-line at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

Table 1 describes the soil associations of the county.

Table 1: Soil Associations of Douglas County

Sarwet-Metonga-Goodwit Association (13) - Moderately deep to very deep, gently sloping to moderately steep, moderately well and well drained, loamy and silty soil on glaciated bedrock (basalt and granite) controlled uplands.
Amnicon-Miskoaki-Rockmont Association (14) - Moderately deep to very deep, gently sloping to steep, well drained and moderately well drained, loamy and clayey soils on glaciated bedrock (basalt and granite) controlled uplands.
Sarona-Sarwet-Metonga Association (16) - Moderately deep to very deep, gently sloping to very steep, well drained and moderately well drained, loamy soils on glaciated bedrock (basalt and granite) controlled uplands.
Keweena-Pence Association (19) - Very deep, nearly level to steep, well drained and moderately well drained, sandy soils on disintegration moraines.
Vilas-Keweenaw-Sultz Association (20) - Very deep, nearly level to very steep, well drained to excessively drained, sandy soils on disintegration moraines.
Rubicon-Morganlake-Flink Association (26) - Very deep, nearly level to very steep, excessively drained to somewhat poorly drained, sandy and sandy over loamy soils on disintegration moraines an glacial thrust masses.
Sarona-Stambaugh-Moodig Association (35) - Very deep, nearly level to steep, well drained to somewhat poorly drained, loamy and silty soils on ground moraines.
Cuttre-Miskoaki-Amnicon Association (41) - Very deep, nearly level to steep, somewhat poorly drained to well drained, clayey soils on modified lacustrine moraines.
Anton-Borea-Bohemian Association (45) - Very deep, nearly level and gently sloping, somewhat poorly drained to well drained, clayey an silty soils on modified lacustrine moraines.
Grayling-Deerton-Brownstone Association (51) - Moderately deep to very deep, nearly level to steep, excessively drained, sandy soils on bedrock influenced stream terraces.
Vilas-Rubicon Association (52) - Very deep, nearly level to steep, excessively drained, sandy soils on collapsed outwash plains.
Vilas-Pence Association (53) - Very deep, nearly level to steep, excessively drained, to excessively drained, sandy soils on collapsed and uncollapsed outwash plains.
Menahga Association (55) - Very deep, nearly level to steep, excessively drained, sandy soils on collapsed outwash plains.
Mahtomedi-Menahga-Graycalm Association (56) - Very deep, nearly level to steep, well drained to excessively drained, sandy soils on collapsed outwash plains.
Grayling-Wurtsmith Association (66) - Very deep, nearly level to steep, excessively drained to moderately well drained, sandy soils on outwash plains and dunes.
Rubicon-Vilas Association (67) - Very deep, nearly level to steep, excessively drained to somewhat excessively drained, sandy soils on outwash plains.
Graycalm-Menahga-Mahtomedi Association (68) - Very deep, nearly level to steep, excessively drained to somewhat excessively drained, sandy soils on outwash plains.
Lupton-Tawas Association (87) - Very deep, nearly level, very poorly drained, organic soils on outwash plains, stream terraces, and moraines.
Grayling-Wurtsmith Association (66) - Very deep, nearly level to steep, excessively drained to moderately well drained, sandy soils on outwash plains and dunes.
Rubicon-Vilas Association (67) - Very deep, nearly level to steep, excessively drained to somewhat excessively drained, sandy soils on outwash plains.
Graycalm-Menahga-Mahtomedi Association (68) - Very deep, nearly level to steep, excessively drained to somewhat excessively drained, sandy soils on outwash plains.
Lupton-Tawas Association (87) - Very deep, nearly level, very poorly drained, organic soils on outwash plains, stream terraces, and moraines.
Grayling-Wurtsmith Association (66) - Very deep, nearly level to steep, excessively drained to moderately well drained, sandy soils on outwash plains and dunes.
Rubicon-Vilas Association (67) - Very deep, nearly level to steep, excessively drained to somewhat excessively drained, sandy soils on outwash plains.
Graycalm-Menahga-Mahtomedi Association (68) - Very deep, nearly level to steep, excessively drained to somewhat excessively drained, sandy soils on outwash plains.
Lupton-Tawas Association (87) - Very deep, nearly level, very poorly drained, organic soils on outwash plains, stream terraces, and moraines.

Habitat Type Classifications

Habitat type classifications are important for resource management. They provide information about the vegetation, soils, climate, and wildlife. This information can be used for shoreland vegetation restoration, forest plantings and wildlife habitat improvement plantings, and in making land use decisions. Figure 3 is a map of the habitat types in Douglas County.

Township & Transportation System

Historically, road construction and maintenance has been a problem, especially in the *Lake Superior Clay plain. Efforts such as the Red Clay Project and Nemadji River Basin Project* (Appendix A(VI)) searched for answers on how to stabilize roads along the clayey till plain so they wouldn't increase peak flows during snowmelt and storm events. The increased flows contribute a significant amount of sediment to waterways in the county. Figure 4 is a map of the transportation system in Douglas County.

Historical Vegetative Cover

Vegetative cover is a critical part of watershed management. In order to understand how watersheds function, it is important to look at the history of activities and their results on the watershed. Historical land use practices are especially important in understanding the Lake Superior Basin. Increased runoff results from the over-harvest of large stands of pine and the loss of the duff (organic) layer of the soil. Figure 5 is a map of Finley's Original Vegetation for Douglas County.

Land Ownership

Douglas County has very large blocks of county owned and industrial forest land, smaller blocks of state land, some municipal owned lands and the balance in privately owned lands. The key to implementation of this land and water resource management plan, will be to have all of the various landowners working together to manage their lands. This plan lays out common goals identified through this and many other planning processes. It also lays out direction for the LCC as to how to address the many land and water resource issues in Douglas County. Figure 6 is a map showing the distribution of land ownership in Douglas County.

Resource Assessment

Major Watershed Basins

Douglas County is broke into two major water management units by the Wisconsin Department of Natural Resources (WDNR). These are the Lake Superior Basin and the St. Croix Basin. Figure 7 is a map of the major watersheds and hydrography.

Lake Superior Basin[1]

Lake Superior is the deepest of the Great Lakes and, in surface area, is the largest fresh water lake in the world. The Lake Superior drainage basin in Wisconsin covers about 1.96 million acres or about 3,069 square miles, most of which is forested. Douglas County encompasses 753.5 square miles, nearly a quarter of the total Wisconsin portion of the Lake Superior Basin.

The original vegetation included huge tracts of forest made up of white spruce, balsam fir, hemlock, sugar maple, yellow birch, and mixed pine. Forestlands were interspersed with wetland vegetation. Stands of 200-foot tall white pine held the soils together, shading streams in which fish spawned. The southern portions of the basin were, and are still, dotted with wetlands and lakes.

Most of the Wisconsin portion of the Lake Superior coastal area is composed of red clay deposits left behind by glaciers about 10,000 years ago. These geologically young deposits are highly erodible, especially in disturbed areas or on slopes. The red clay includes small particles of sand that remain behind in streambeds as the finer clay particles are carried out into the lake. Some sections of the southern portion of the basin are composed of rugged hill and kettle relief, formed by thick end moraine deposits and pitted outwash. These landforms dominate the upper reaches of the Brule River in Douglas County. On the southern edge of the old lake plain between the Nemadji and Iron Rivers, are several waterfalls, including Big Manitou Falls on the Black River in Pattison State Park. At 165 feet, it is the highest falls in the state.

The Lake Superior shoreline, including its valuable coastal wetlands, is a significant area of biological diversity. It is characterized by a cool climate, undulating and rolling plains, extensive wetlands, and several unique natural features such as the drowned river mouths and estuaries on the Wisconsin shoreline. The presence of clay soils and lowland boreal forest also contribute to its biological diversity and are an important factor in shaping the coastal wetlands. Extensive peatlands have formed at the mouths of many of the streams entering Lake Superior, usually behind sand spits, providing habitat for many rare plant and animal species.

The City of Superior is working to improve management of the St. Louis River, Lower Nemadji, Upper Nemadji, and Black River Watersheds by creating a WDNR Nine Key Element Plan. The plan is currently in the process of receiving public input and should be completed by December 2019. This will address nonpoint source pollution within these watersheds.

[1] Department of Natural Resources. *The Lake Superior Water Quality Management Plan*. PUBL-WT-278-99-REV. March 1999.

There is a small amount of agriculture in this watershed, mostly hay and livestock rather than row crops. Agriculture is not considered to be a major contributor to nonpoint sources in this watershed in Wisconsin. The turbidity and sediment carried by the Nemadji and tributaries has been exacerbated by historical land use practices, including the logging and fires in the 1800's and wetland loss. Strategic forest management and protection of wetlands are the approaches favored for long term management (Appendix A(XXVII)).

Four main subwatersheds make up the Lake Superior Basin in Douglas County:

- **St. Louis & Lower Nemadji Rivers Watershed**. 284 stream miles and 159 square miles. This watershed is located in the very northwestern corner of Douglas County and extends into Carlton County, Minnesota. Water quality data is available for the area in and around the city of Superior. Water quality data is not readily available in the upper portions of the watershed. Because of the importance of the Great Lakes, and especially Lake Superior, this watershed was selected as an Area of Concern (AOC) by the International Joint Commission. Increased dredging of contaminated sediments in the Duluth/Superior harbors led to its selection as an AOC. The St. Louis River system also exceeded wildlife and human water quality thresholds for cancer causing pollutants. The St. Louis River AOC has multiple projects being performed within its watershed to work towards delisting the AOC. Delisting the AOC requires addressing the Beneficial Use Impairments (BUI) which were selected for the St. Louis AOC. There are nine BUI's placed on the St. Louis River AOC. One impairment, Degradation of Aesthetics, was removed in 2014. In 2018 the Fish Tumors and Deformities BUI was removed. Meeting the remaining seven BUI's is planned to be completed by 2025.

  The two major point sources in Wisconsin are the City of Superior wastewater treatment plant which has three discharge locations: Superior Bay, the St. Louis River, and the Nemadji River, and the Murphy Oil USA refinery which discharges to Newton Creek. Newton Creek flows into Hog Island Inlet of Superior Bay. These point sources are in good compliance status with their WPDES permits.

- **Black & Upper Nemadji Rivers Watershed.** This 125.6 square mile sub-watershed contains 179.5 stream miles, most of which run through red clayey till areas. Large wetlands divide the Lake Superior Basin from the St. Croix Basin in this watershed. Most of the upper portion of this watershed is in Minnesota.

- **Amnicon & Middle Rivers Watershed.** This 288.9 square mile sub-watershed contains 384 stream miles. The upper portions of this watershed consist mainly of sand deposits before entering the red clayey tills of the Lake Superior clay plain. Many wetlands, that feed short streams draining to Lake Superior, dot the landscape. The Amnicon River supports spawning brown and rainbow trout, burbot, salmon, muskellunge walleye and a diverse forage fish community.

- **Bois Brule Watershed.** This 180 square mile watershed is derived in sandy deposits and drains to Lake Superior through the clayey till plain. Most of this watershed is protected

as part of the Bois Brule River State Forest. Many sections of the river are designated as high-quality trout waters. The habitat assessment suggested that the greatest perceived threat to the Bois Brule River and its adjoining forest lands is the threat of use beyond sustainability. The area's popularity for fishing and canoeing could potentially use the river and forest beyond capacity to recover.

St. Croix Basin

The St. Croix River originates at Upper St. Croix Lake near Solon Springs and flows approximately 160 miles to join the Mississippi River at Prescott, Wisconsin. The entire basin drains 7,760 square miles in both Minnesota and Wisconsin (40% and 60%, respectively) (Henrich & Daniel, 1983). Douglas County owns 261,456 acres of county forestland in this watershed[2]. In response to high phosphorous levels and eutrophication of the St. Croix River, a phosphorous study was completed in 2009. A Total Maximum Daily Load (TMDL) report was completed, and this lead to the creation of a Nine Key Element Plan for the St. Croix Watershed in 2014 (Appendix A (III)).

Land in the St. Croix Basin is mostly forested in Douglas County, with small tracts of agricultural land interspersed. As the demand for recreational opportunities and shoreland property increases, a decline in water quality, habitat, and natural scenic beauty can be expected.

Four main subwatersheds make up the St. Croix Basin in Douglas County.

- **Upper Tamarack.** This watershed is located in the very southwestern corner of Douglas County and extends into a small part of Burnett County. Little water quality data is available on the waters within this area because lakes are small and public access is generally not allowed.

- **St. Croix & Eau Claire Rivers.** This watershed includes all of the St. Croix River drainage below the Gordon Dam to Riverside in Burnett County. Much of the watershed contains poorly drained uplands with many wetlands. Little water quality data is available on the waters within this area because lakes are small and public access is generally not allowed.

- **Upper St. Croix & Eau Claire Rivers**. This area is the headwaters of the St. Croix Basin. Intensive development threatens water quality in the lakes within this sub-watershed. Several lakes have been designated by the state under NR102 as O*utstanding Resource Waters.* Lakes are, however, exhibiting an increase in fertility and aquatic vegetation growth, along with a decrease in water clarity. The installation of the municipal waste collection system on Upper St. Croix Lake may reduce these levels over time. The Upper St. Croix & Eau Claire River subwatershed was designated as a priority watershed project in October 1994. A final management plan for the area was approved in October 1997, and implementation of the plan occurred from November 1997 through 2008.

[2] Wisconsin Department of Natural Resources. *The St. Croix River Water Quality Management Plan*. PUBL-WR-270-94-REV. February 1994. Pages 213-223, 229-235.

- **Totogatic River.** This large watershed extends from Bayfield County, to Douglas, Sawyer, and Washburn Counties. The landscape is dotted with lakes and wetlands. Intensive development on lakes in the watershed is causing increased turbidity, increases in fertility and aquatic vegetation, introduction of exotic species (Eurasian water milfoil) and changes in riparian habitats and shoreland communities.

Surface Water

Lakes and Streams

Surface water is a very important part of Douglas County's economy and quality of life. Inland surface waters comprise 22,165 acres of Douglas County. These acres are divided into rivers and streams, natural lakes, impoundments (flowages), and wetlands. Conservation of shorelands is important for the health of adjacent surface waters.

There are about 101 streams and rivers in the county totaling 705.4 miles and covering 8,153 acres. About 234 miles are trout waters which provide many fishing opportunities for anglers. .

There are 431 lakes in Douglas County totaling about 14,012 acres. Eighty-two percent are natural lakes and eighteen percent are impounded waters. Douglas County lakes are very fragile, as 66% are less than 10 acres. Lakes are often categorized into four different types based on how water enters and leaves the lake. Lake categories include seepage lakes, groundwater drainage lakes, drainage lakes, and impoundments.

Special Values and Designations[3]

Outstanding and *Exceptional Resource Waters* are protected through the Department of Natural Resources rules NR 102.1 and NR 102.11 of the Wisconsin Administrative Code. The quality of these waters cannot be lowered due to WDNR permitted activities, such as wastewater treatment plants. There are 46 named streams that are part of the 395 stream miles of ORW and ERW in Douglas County.

- **Outstanding Resource Waters** (ORW) have the highest value as a resource, excellent water quality, and high quality fisheries. They do not currently receive wastewater discharges, nor will point source discharges be allowed in the future, unless the discharge waters meet or exceed the quality of the receiving water. This classification includes national and state wild and scenic rivers and the highest quality Class I trout streams in the state.
- **Exceptional Resource Waters** (ERW) have excellent water quality and valued fisheries, but currently receive wastewater discharges or may receive future discharges necessary to correct environmental or public health problems.

[3] Wisconsin Department of Natural Resources. (2019). Outstanding and Exceptional Resource Waters. Retrieved from https://dnr.wi.gov/topic/SurfaceWater/orwerw.html

Douglas County has two rivers, St. Croix River and Bois Brule River, with designations beyond ORW/ERW. In 1968, the St. Croix River was designated a *National Scenic Riverway* under the National Wild and Scenic Rivers Act from the St. Croix Flowage dam to the northern boundary of the St. Croix Falls city limits. This special designation recognizes some of the highest quality waters of the state, and provides a level of protection beyond the water quality standards that apply to all other state waters. The Bois Brule River is classified as a *State Wild and Scenic River.* The Brule River State Forest borders much of the river, and only 3% of the property along the stream is in private ownership. This stream is also considered a world-class trout stream.

Impaired Waters

Threats to surface waters occur when pollutants enter the system. Pollutants can enter lakes, rivers and streams through two different avenues called point and nonpoint pollution. Runoff from various activities can carry pollutants through watersheds and deposit them in rivers and streams. This is known as nonpoint pollution. Point sources of pollution also exist, such as a discharge pipe from a manufacturing plant or wastewater treatment facility or an uncontrolled spill.

Water quality studies from the 1970s and 80s of Douglas County Lakes found high dissolved oxygen levels and overall good water quality. Beyond the upper reaches of the St. Croix headwaters, increased mercury, nitrogen and suspended solids were recorded.

Water quality standards are set by states, territories, and tribes. They identify the uses for each waterbody. Federal, state, and local agencies and organizations regularly cooperate to obtain and update water quality data. Section 303(d) of the Clean Water Act requires each state to publish updated lists of streams and lakes that are not meeting water quality standards and designated uses (such as swimming, drinking water, fishing, etc.) because of excess pollutants. This list has become known as the *TMDL* or *impaired waters list*. A TMDL is a calculation of the maximum amount of pollutant a waterbody can receive, and still meet water quality standards. A TMDL is calculated for each waterbody under Section 303 of the Clean Water Act. The St. Louis River AOC is cited on the impaired waters list. The St. Croix River is classified as an Outstanding Resource Water in Douglas County, however does have a TMDL in its lower reaches. These waters must be brought into compliance, or Wisconsin faces the possibility of losing funding for water quality efforts. A detailed listing of impaired waters can be found in Table 5 in Appendix A(IX), and Figure 8 shows a map of impaired waters in Douglas County.

The impaired waters list for Douglas County reveals water quality in portions of the St. Croix Basin and the Lake Superior Basin are contaminated by[4]:

- Sediment/Total Suspended Solids
- Phosphorus
- Creosote
- PAHs
- E. coli
- Mercury
- PCBs
- Foam/Flocs/St. Croixum/Oil Slicks
- Lead
- 2,3,7,8-Tetrachlorodibenzo-p-dioxin (only)
- DDT
- Dieldrin

Human influences to the watershed have increased the rate at which nutrients and sediments are deposited into surface waters resulting in degradation of water quality. Suspected pollutant sources are from nonpoint pollution such as runoff from construction sites, urban runoff, failing private septic systems, agricultural activities and forestry as well as point source pollution such as manufacturing. Several of the pollutants are legacy contaminants in the sediment of water bodies. Water bodies contaminated by mercury are typically a result of atmospheric deposition. Fish advisories due to mercury have been placed on all lakes in Wisconsin. The above listed pollutants can affect swimming, aquatic life, and drinking water.

Citizen Monitoring

Many lake residents have formed lake associations in order to protect water quality and habitat near their homes. Some lakes have gone a step further and formed districts which are allowed to tax lake property owners in order to fund lake management. Table 2 contains a list of lakes greater than 100 acres with associations or districts and whether or not the lake has volunteer monitoring occurring. This list of associations may not be complete because some lakes have informal associations not documented by the WDNR.

[4]Wisconsin Department of Natural Resources. (2018). Final Approved 2018 Impaired Waters List. Retrieved from https://dnr.wi.gov/topic/impairedwaters/2018IR_IWList.html

Table 2: Douglas County Citizen Lake Involvement			
Lakes	**Volunteer Monitoring Programs (Y / N)**	**Sanitary District (Y / N)**	**District/ Association**
Amnicon / Dowling Lake	Y	Y	District
Bond Lake	Y	N	Association
Cranberry Lake	Y (2007-2012)	N	None
Crystal / Persons Lake	Y (1999-2016)	N	Association
Ellison Lake	Y (2000-2015)	N	None
Lake Minnesuing	Y	Y	District
Lake Nebagamon	Y	N	Association
Leader Lake	Y	N	Association
Little Sand Lake	Y (2006-2014)	N	None
Lower Eau Claire Lake	Y	N	Association
Lyman Lake	Y (2018)	N	None
Mcgraw Lake	Y (2004-2011)	N	Association
Minong Flowage	Y	N	Association
Red Lake	Y	N	Association
Gordon - St. Croix Flowage	Y	Y	Association
Upper St. Croix Lake	Y	Y	Association
Whitefish Lake	Y	N	Association
Information from dnr.wi.gov. Only lakes greater than 100 acres or with previously identified associations are included.			

Citizens concerned about the quality of lakes and streams in Douglas County joined together to form the *Douglas County Association of Lakes & Streams* (DCALS). This organization dissolved around 2017. Recreating this organization could be beneficial for coordinating lake and stream management throughout the county, and would allow lake associations and residents to share ideas about monitoring and management projects.

Monitoring programs are encouraged and used as tools to raise environmental awareness while monitoring lake and habitat quality to establish baseline information. Most often this monitoring is a direct result of public demand. Dedicated citizens devote their time and effort to collecting water quality information and educating their neighbors, as well as themselves, about water quality and lake management. These efforts build awareness and appreciation for the quality of Douglas County's resources in the public. Results from these programs will be used when feasible to monitor progress toward improving surface water quality and wildlife habitat, and to help determine if land and water conservation efforts are successful.

Wetlands

Wetlands are defined as areas where water is within 12 inches of the ground surface for two weeks during the growing season, hydrophytic vegetation is supported and hydric soils exist. Wetlands can be seasonal or permanent and are commonly referred to as potholes, wet meadows, bogs, swamps, and marshes. Figure 9 shows the wetland distribution in Douglas County.

Although historically thought of as wastelands, it is now known that wetlands perform many important functions on the landscape. Wetlands filter pollutants before they enter surface and

groundwater, provide critical habitat and increase diversity for both fish and wildlife, reduce flooding by storing and slowly releasing water from rain and snowmelt, reduce peak stormwater flows, reduce shore erosion by protecting banks from the effects of wave and wind action, and serve as recharge and discharge areas for groundwater. Many rare, threatened, and endangered species are found in wetlands. Draining and filling wetlands can remove these valuable functions.

Mitigation

In 2017, St. Mary's University of Minnesota created a Geographic Information System (GIS) tool to aid in the selection of preferable locations for wetland restoration, enhancement and preservation. The tool is called the Decision Support Tool (DST). Wetland suitability for restoration, enhancement or preservation are based off of biological, socioeconomic, hydrologic and hazard mitigation factors which were prioritized by an advisory committee of stakeholders. The input from this advisory committee, as well as other Lake Superior Basin wetland information, is located in *A Watershed Approach to Wetland Management in the Lake Superior Basin* (Appendix A(XXVI)). The DST was designed to be used in conjunction with a Douglas County In-Lieu of Fee Wetland Mitigation Reserve Program for the Lake Superior Basin which has not yet been approved by the Army Corp of Engineers as of 2019. The DST can be an effective tool for not only planning wetland mitigations, but also managing flood events at a watershed level.

The *Douglas County Mitigation Reserve Program In-Lieu Fee Prospectus*(Appendix A(XXVII)), which has not yet been approved as of 2019, would benefit the county by strategically planning wetland mitigation projects in areas where it is most beneficial for the watershed. It will also allow for a cost effective way for the county to mitigate for projects that have unavoidable wetland impacts. Choosing locations for wetland mitigation projects that will avoid impacts to development or prime farmland will be another positive impact of this program.

Preservation

Critical wetlands are identified in *Wisconsin's Lake Superior Coastal Wetlands Evaluation: Including Other Selected Natural Features of the Lake Superior Basin* developed by the WDNR's Bureau of Endangered Resources in 1997 (Appendix A(XI)). The Wisconsin portion of the Lake Superior basin contains rare coastal wetlands not found anywhere else in the basin. These areas are targeted for acquisition, special protection, and consideration. This document identifies 30 priority wetland sites and 18 priority aquatic sites within the Lake Superior Basin.

Regulation

It is the landowner's responsibility to ensure construction projects involving wetlands are reviewed by the appropriate agency to ensure they meet local, state, and federal wetland regulations prior to construction. The US Army Corps of Engineers, under Section 404 of the Clean Water Act, is responsible for permitting activities in wetlands in nonagricultural situations, such as urban development or road construction. The WDNR has water quality certification over wetlands governed by the Corps of Engineers. Agricultural wetlands are regulated by NRCS. The USDA Farm Service Agency (FSA) keeps records of all agricultural wetland determinations made by NRCS. The WDNR has mapped an inventory of wetlands that are two to five acres and larger. Because these inventories were generally completed through aerial photo interpretation,

not on-site inspection, some wetlands may not appear on the inventory. Non-inventoried wetlands are still subject to all rules and regulations relating to wetland management and protection.

In addition to state and federal wetland regulation, the county has an existing Shoreland-Wetland Zoning Ordinance authorized by NR115, Wisconsin Administrative Code, that regulates activities in wetlands that are within 1000 feet of a lake and 300 feet (or the landward edge of the floodplain) of a river or stream. Cities and villages in the county have similar wetland rules authorized under NR117, Wisconsin Administrative Code.

Wetland regulations were enacted for Wisconsin as of May 8, 2001 in response to a U.S. Supreme Court ruling that small isolated wetlands across the country were no longer protected by federal law. This new law covers some of the most productive wetlands in the state, including sedge meadows, shallow marshes and seasonally flooded lands. With the passage of 2001 Wisconsin Act 6, Wisconsin became the first state in the nation to establish state authority to protect these important wetlands from filling and dredging.

In 2004, Wisconsin Act 118 created a system intended to speed permit decisions without reducing protection of habitat, navigation, water quality, and scenic beauty. A number of activities in or along lakes that previously required a WDNR permit are currently exempt under Act 118. To administer Act 118, the Natural Resources Board adopted a temporary rule NR1 that names areas of special natural resource interest, including Outstanding Resource Water (ORW) and Exceptional Resource Water (ERW), where exemptions are not available. WI Act 118, along with greatly reduced numbers of state regulatory staff in the region, may reduce protection for many vital resource waters.

Changes to Wisconsin wetland regulation occurred in 2017 with the enactment of Act 183. This Act changed regulation on nonfederal wetlands. In urban areas, the act allows up to two acres of wetland impact with the purchase of wetland mitigation credits. In non-urban areas, it allows up to five acres of wetland impact with the purchase of wetland credits. The Act also altered the definition of artificial wetlands to include wetlands unintentionally created after August 1, 1991 as a result of construction activities.

Shorelands

Shorelands include lands near lakes, rivers or streams. Douglas County has 1,410.8 miles of stream frontage, of which about 37% are in public ownership. Lake frontage in the county totals 365.11 miles, with about 27% in public ownership. Douglas County contains diverse coastal wetlands and 23.8 miles of Lake Superior shoreland.

Shorelands are popular for residential development because of their scenic beauty and the access they provide to water. However, shorelands provide much more than scenic beauty and water access. They provide valuable habitat for both aquatic and terrestrial animals and plants, they act as buffers by filtering pollutants before they enter surface water, and control erosion by protecting soil from the impacts of wave action and stormwater runoff. When shoreland areas are mowed, the ecosystem services are no longer provided which makes the shoreline more susceptible to erosion, unable to slow runoff and wildlife habitat is lost.

Many shoreland property owners have removed vegetation in favor of lawn turf in order to maximize the view from the dwelling. Efforts have been made by local, state, and federal agencies to return shorelands to native vegetation. Shoreland restoration is designed to return native species, restore filtering capabilities, reduce peak flows, provide erosion control, and restore natural scenic beauty to the lakes and rivers of Wisconsin.

The county has a Shoreland Zoning Ordinance authorized by NR115, Wisconsin Administrative Code, which regulates activities within shoreland areas. As of July, 2015, Wisconsin Act 55 was implemented in Douglas County which restricted counties from imposing standards more restrictive than the state shoreland standards. This terminated the Lake Classification Zoning which had been in place in Douglas County since 1998, and generally decreased structure setbacks. The county has a shoreland mitigation process in place to allow variances for increased impervious surfaces in shoreland parcels. The County Land Conservationist is responsible for approving plans and creating plans as requested.

Groundwater

Groundwater is the primary source of drinking water for most Douglas County residents, with the exception of the City of Superior. The city utilizes Lake Superior for the drinking water supply. Wells in the Lake Superior Basin are generally deep and may be artesian. Wells in the St. Croix Basin tend to be shallow and may consist of sand points. Because of the sandy soils, shallow water table depth and shallow well depths in the St Croix Basin, groundwater is very susceptible to some types of contamination problems. Sandy soils allow rapid infiltration and tend to be poor filters of some chemical contaminants. Chemical contaminants that can be a problem include nitrates, pesticides, metals and volatile organic compounds. Figure 10 is a map modeling contamination susceptibility of groundwater in Douglas County.

Contamination of groundwater by human activity is a severe problem because contaminants generally travel unnoticed, are difficult to remove, and may persist indefinitely. Water percolating through the soil can pick up pollutants and transport them to the groundwater. Contaminants may also enter the groundwater through unused wells that are not properly sealed. Groundwater contamination comes from a variety of sources including leaking underground petroleum pipes and tanks; failing septic systems; use and storage of road salt; improper use, disposal, and storage of hazardous materials; and improper fertilizer, pesticide, herbicide, and animal waste management.

In 2018, Douglas County performed its first well water sampling study. The study was funded through a grant from the Wisconsin Coastal Management Program. The grant provided funding for 100 well samples as well as an education component which included educational sessions about groundwater quality, how to collect well water samples, and how to interpret water test results. The sampling was completed in the spring of 2018. In the fall of 2018, a second well sampling was performed. This sampling was funded by the Capital Project Fund. An educational component was included as part of the sampling effort of 64 wells. With remaining money from the Capital Project Fund, 29 wells were sampled in spring of 2019. This sampling did not include an educational component due to the small number of samples. In the future it is

advisable to include an educational component to improve the likelihood samples are collected following correct procedures. Figure 11 is a map of groundwater sampling locations from 2018 to 2019.

Interesting and unique characteristics of groundwater and surface water interaction have been studied in Whitefish Lake (Appendix A(XXIII)) and the St. Croix Headwaters (Appendix A(XXV)) by two citizen groups with the help from partnering agencies. The LWCD plans to support efforts such as these by using the resulting information to help prioritize and direct resources (such as incentive programs and technical assistance) to address issues that arise. Information from these studies, and others, will be made available to citizens and decision makers through outreach and education efforts by the sponsoring citizen groups, agencies, and the county.

Unique Resources

Special Values and Designations[5]

Outstanding and *Exceptional Resource Waters* are protected through the Department of Natural Resources rules NR 102.1 and NR 102.11 of the Wisconsin Administrative Code. The quality of these waters cannot be lowered due to WDNR permitted activities, such as wastewater treatment plants. There are 46 named streams that are part of the 395 stream miles of ORW and ERW in Douglas County.

- **Outstanding Resource Waters** (ORW) have the highest value as a resource, excellent water quality, and high quality fisheries. They do not currently receive wastewater discharges, nor will point source discharges be allowed in the future, unless the discharge waters meet or exceed the quality of the receiving water. This classification includes national and state wild and scenic rivers and the highest quality Class I trout streams in the state.
- **Exceptional Resource Waters** (ERW) have excellent water quality and valued fisheries, but currently receive wastewater discharges or may receive future discharges necessary to correct environmental or public health problems.

Douglas County has two rivers, St. Croix River and Bois Brule River, with designations beyond ORW/ERW. In 1968, the St. Croix River was designated a *National Scenic Riverway* under the National Wild and Scenic Rivers Act, from the St. Croix Flowage dam to the northern boundary of the St. Croix Falls city limits. This special designation recognizes some of the highest quality waters of the state, and provides a level of protection beyond the water quality standards that apply to all other state waters. The Bois Brule River is classified as a *State Wild and Scenic River.* The Brule River State Forest borders much of the river, and only 3% of the property along the stream is in private ownership. This stream is also considered a world-class trout stream.

[5] Wisconsin Department of Natural Resources. (2019). Outstanding and Exceptional Resource Waters. Retrieved from https://dnr.wi.gov/topic/SurfaceWater/orwerw.html

Threatened and Endangered Resources

Every component of the ecosystem is important as an indicator of a healthy ecosystem. Rare, threatened, and endangered species are those whose populations are at risk. Federal agencies, in cooperation with the Wisconsin Natural Heritage Inventory, identify plant, animal, and natural communities that are threatened, rare, endangered, or special concern. Special concern species are those for which some problem of abundance or distribution is suspected but not yet proven. Appendix A(XIII) Table 6 lists rare, threatened, endangered and special concern species and natural communities known to exist in Douglas County. The St. Croix Basin in Douglas County contains a high amount of rare, threatened, and endangered species and plant communities.

Cultural Resources

Cultural resources are the physical remains of a people's way of life that provide a picture or map of human activity during that time. These remains are important because they help us to understand past and current cultures, customs, civilizations and communities.

Examples of cultural resources include a wide variety of man-made artifacts like prehistoric pottery, log cabins, logging camps, or bridges. According to the US Department of Agriculture, cultural resources can include both tangible artifacts and less tangible traces of the past such as dance forms, aspects of folk life, landscapes, vistas, and cultural or religious practices.[6]

All of Douglas County falls within ceded territory of the Ojibwe tribes. The southern portion of Douglas County was ceded in the Treaty of 1837 and the northern portion of Douglas County was ceded in the Treaty of 1842. The treaties reserve the tribe's rights to hunt, fish and gather in the ceded territories. These activities are essential to sustain the Ojibwe's cultural way of life in the present day.

Invasive Species

Like other Wisconsin counties, Douglas County faces an onslaught of invasive species from other regions and countries. These non-native plants, animals, and pathogens displace native species, disrupt ecosystems, and harm recreational activities. They also damage commercial and industrial interests.

Because non-native invasive species lack the predators and competitors they faced in their homelands, invasive species can spread rapidly and aggressively. Controlling invasive species is difficult, and getting rid of them is often impossible. People play a major role in spreading invasive species and can also prevent them from spreading.

Douglas County currently partners with Northwoods Weed Cooperative Management Area (NWCMA) to manage invasive species in the county. Non-chemical management techniques, such as physical removal, are often utilized to manage invasive species in Douglas County because no herbicide is permitted to be sprayed on Douglas County owned property without a variance.

[6] USDA-NRCS, via *http://policy.nrcs.usda.gov/national/gm/title420/part401/subparta/index.htm.8/25/3000*

Fifty-four of Douglas County's waterways already contain one or more aquatic invasive species (AIS). Lake Superior has 15 AIS reported and the Saint Louis River and Saint Croix River both contain seven AIS. Douglas County must deal with containing and controlling these existing populations to avoid spreading AIS to other waterways. A listing of the locations of AIS in Douglas County is in Appendix A(XIV) Table 7, and Figure 12 is a map of AIS in Douglas County.

To help find a solution, Douglas County received WDNR AIS Grants between 2009 and 2013 to address the spread and control of AIS in the county. The county used the grant to contract with the UW-Superior Lake Superior Research Institute (LSRI). A major focus of the grant was for LSRI to work with a group of stakeholders on an AIS Strategic Plan for the county. The AIS Strategic Plan was completed in 2010, and was used to pursue additional funding to support AIS Coordinators. The Coordinators organized watercraft inspections, volunteer monitoring, education, cooperation, and collaboration with local waterway groups, municipalities, and other county departments. They also identified long range research and monitoring needs to understand more about how we can protect county lakes and streams. After loss of funding for the AIS Coordinator position in 2013, AIS management in Douglas County has been limited.

Environmental Emergencies

Over the past ten years there were several environmental emergencies in Douglas County. Presidential Declarations that the Federal Emergency Management Agency (FEMA) assists with repairing flood damage occurred in 2012, 2016, and 2018. The flood of 2012 was a 500 year flood event, and the flood of 2018 was a 100 year flood event. The 2012 flood resulted in an estimated $6.3 million in damages (Appendix A(XXVII)). The 2018 flood event was estimated to result in $5 million in damages[7]. These repeated flood events are causing great economic damage due to damage to infrastructure, businesses, homes, human health and safety, and land and water resources.

Another emergency which occurred in April of 2018 was the Husky Refinery Fire. This released polycyclic aromatic hydrocarbons (PAHs) which cause cancer. Following the fire, air quality remained above health-based thresholds. Water did contain a chemical from the firefighting foam, perfluoralkyl sulfonate, as a result of the fire[8]. Ongoing monitoring is occurring in Newton Creek, which is adjacent to the refinery, to monitor the stream's sediments since the fire.

7 Kaeding, D. (2018, June 19). Northern Wisconsin Officials Assessing Flood Damage. *Wisconsin Public Radio.* Retrieved from https://www.wpr.org/northern-wisconsin-officials-assessing-flood-damage

8 Duluth News Tribune. (2018, May 7). Precautions continue following Husky fire. Retrieved from https://www.duluthnewstribune.com/business/energy-and-mining/4442551-precautions-continue-following-husky-fire

Land Use and Management

The majority of Douglas County's land cover is composed of forests and wetlands. Figure 13 shows the land cover of Douglas County. These two land cover types greatly affect the work and priorities of Douglas County as a whole. Wetlands provide space to store floodwaters, and mitigation needs to be performed appropriately for the county's economic and land use needs. In contrast, county owned forests are the greatest source of income for Douglas County.

Agriculture

Agriculture in Douglas County was once a main source of income for residents. Over the years, the number of farmers and farmland has gone down, following the statewide trend. The total number of dairy herds reported to the USDA in 2018 was six herds[9]. Many dairy farmers are no longer in business due to lacking producers willing to travel to Douglas County to purchase milk and nationwide decrease in milk prices. In 2018 there were 6,800 total cattle and calves in Douglas County. Most farms in the county are for the production of beef. Douglas County continues to produce corn and forages for hay such as grass, trefoil, alfalfa, wheat, oats and red clover. Manure is generally stockpiled or stored and spread on fields when conditions allow. Cattle are allowed unlimited access to streams in many cases, causing erosion and sedimentation problems, nutrient loading, and shoreland degradation. Cropland soils erosion is not generally an issue due to long hay rotations and limited row crop production.

The Farmland Preservation Plan, Douglas County, Wisconsin (FPP) (Appendix A (V)), last updated in 2017, includes goals and policies regarding land use and agricultural preservation. Farmland Preservation Soil and Water Standards are incorporated into this LWRM Plan, according to 92.104, 92.105, Wis. Statue, ATCP 50.16, Wis. Adm. Code, and related guidelines. Conformance with these standards is necessary for landowners to remain eligible for farmland tax credits. The Douglas County Land Conservation Committee submitted draft standards to the DATCP for review in September of 2004. The Land and Water Conservation Board approved the Douglas County Soil and Water Conservation Standards on April 5, 2005. A map of the prime farmland and farmland of statewide importance can be found in Figure 14.

Douglas County's Zoning Ordinances are intended to regulate land uses and prevent soil loss from erosion. They are consistent with state standards set forth in applicable WI Statutes and Administrative Rules.

Even with the decline in the number of farms, agriculture still plays a major role in the economy and environment of Douglas County. Funding through local, state and federal agencies has been available to producers on a limited basis, yet fixed farm costs remain the same or increase. DATCP along with WDNR requires farmers to follow certain legislation for manure and nutrient management, protection of soil resources, and additional measures for shoreland management. The Land Conservation Committees and their staff are charged with implementing these

[9] United States Department of Agriculture, Trade and Consumer Protection. (2018). Wisconsin Agricultural Statistics. Retrieved from https://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/Annual_Statistical_Bulletin/2018AgStats-WI.pdf

requirements for the two state agencies. A list of farms, prioritized for assistance, will be developed based on conditions of storage structures and feed lots, cattle accessibility to streams, and nutrient management and soil erosion control. All farmers will be encouraged to enroll in FPP and nutrient management plans. Assistance for completing nutrient management plans can come from the LWCD, UW- Madison, Extension, and private consultants. Properties enrolled in FPP and nutrient management plans will be inspected by the LWCD to ensure compliance every four years.

Forestry

Forests provide many sustainable economic benefits, habitat for plants and animals, and recreational opportunities for Douglas County. Forest management is a vital component of the county's economy. A properly managed forest can provide wildlife habitat, forest products and contribute to watershed health. The majority of forest land is held privately. Table 3 lists public ownership of lands in Douglas County:

TABLE 3: Publicly Owned Conservation & Recreation Land In Douglas County[10]	
Land type	***Acres***
County Parks & Forests	270,813
Total WDNR	52,432
Federal Government	0
Total Publicly Owned Land	**323,245**

Poor forest management practices and unmanaged forests can contribute to sedimentation and increased peak flows in a watershed. Soil compaction, poorly designed stream crossings, harvesting on steep slopes, and over-harvesting all degrade a watershed. Studies on the Nemadji River watershed indicate over-harvesting a watershed results in a large area of young aged stands (0-15 year) which will not hold snow cover as well as older aged stands in the spring. This causes increased peak flow events and contributes to instability of streams in the watershed.

Forestry best management practices have been developed for areas such as the Nemadji River watershed through the Nemadji River Basin Project. The recommended basin-wide guidelines are available through the LWCD. Recommendations for properly managed forests also include the use of Wisconsin's Forestry Best Management Practices for Water Quality. The Douglas County Forestry Department updated their 15-year forest management plan in 2008. The City of Superior is currently creating a forest management plan for their municipal forest.

Recreation

Recreation and tourism are important to Douglas County. Visitors to the area are provided many recreational opportunities including trail riding, skiing, dog sledding, fishing, hunting, boating, swimming, hiking, canoeing, and enjoying the natural scenic beauty, to name a few.

[10] Wisconsin Blue Book 2003-2004.

Abundant and clean water draws many visitors to the area. Recreation can contribute to the degradation of these unique and generally high quality resources. Use of motorized equipment near water can pollute lakes, streams, wetlands, and groundwater.[11] Trails may experience erosion resulting in situations where pristine resources may be affected. User conflicts may also arise. Specific examples of impacts from recreational activities include:

- Soil erosion on recreational trails, campsites, boat landings
- Soil erosion from improper planning, design, and installation of trails
- Fuel and lubricant spills
- Improper use of chemical pesticides, herbicides, or fertilizers
- Increased runoff from recreation based housing or urban development
- Failing septic systems for recreational based housing
- Disturbance or destruction of wetland or wildlife habitat
- Motorboats, especially wake boats, causing damage and erosion to shorelines

Recreational activities require careful thought and planning prior to installation. The use of best management practices for water quality can reduce negative impacts to Douglas County waters.

Urban

The 2010 population census for Douglas County was 44,159. The population estimate for 2018 was 43,208, a slight decline from 2010[12]. About 61% of these people live in the City of Superior. Superior's population has remained fairly constant over the last ten years as it has throughout the rest of the county. However, increasing pressure to develop areas along shorelines has had an impact. The general trend of increasing seasonal residency continues, mostly in the St. Croix Basin around lakes and rivers. Much of what was once agricultural land in Douglas County has been converted to recreational land.

Urban areas pose many threats to water quality. Large scale development, addition of impervious surface, and filling wetland areas all cause significant problems for the natural movement of water through a watershed. Additional pollutants from petroleum, road salt, fertilizers, herbicides, debris, and industrial waste are carried down storm drains and discharged generally untreated. Urban land use practices can result in increased water temperatures, flooding, decreased oxygen levels, streambank erosion, and increased sedimentation.

The City of Superior has flooding problems because most of the city is constructed on wetlands and surrounds the mouth of the Nemadji River. One way to mitigate for this problem is to revitalize the downtown area of the city to reduce the acres of wetland filled and increase the amount of wetland in the watershed. The City of Superior currently performs wetland mitigations under their Special Area Management Plan (SAMP). This unique program has only been authorized in the City of Superior and state of Alaska, and it authorizes the City to sell its own wetland mitigation credits to allow continued growth of the City.

[11] Wisconsin DNR. *Wisconsin's Forestry Best Management Practices for Water Quality Field Manual.* Publication #FR093. 1995. Page 13.
[12] https://www.census.gov/quickfacts/douglascountywisconsin

The City of Superior currently monitors erosion and sediment control best management practices during construction and maintenance of buildings and the city's infrastructure. Many of the impaired waters listed in Appendix A(IX) Table 5, are located within the city limits. Remediation of these waters must be addressed, both in the water and at the source of contamination.

Another urban issue of concern is beach closings along portions of Lake Superior in and near the City of Superior. The beaches close when E. coli levels are measured at concentrations unsafe for human contact. Gull droppings were identified as the main source of contamination. In 2012, Lake Superior experienced its first algal bloom. Suspected causes of the algal blooms include flood events, like the one which occurred in 2012, washing sediments and nutrients into the lake, and rising water temperatures. If toxic blue-green algal blooms occur in the future, it can result in beach closures or a loss of drinking water for the City of Superior which sources its water from Lake Superior.[13]

[13] https://www.mprnews.org/story/2018/08/14/scientists-investigating-unprecidented-algae-bloom-in-lake-superior

Soil and Water Regulations, Standards and Best Management Practices

Federal Regulations

The Environmental Protection Agency (EPA) is responsible for "protecting human health and to safeguard the natural environment – air, water and land – upon which life depends." The EPA administers a number of major environmental laws including the Clean Air Act, Clean Water Act, Pollution Prevention Act, and National Environmental Policy Act. The EPA also defines minimum standards for categories for water body uses (such as swimming, drinking water, etc.) WDNR and DATCP administer EPA programs for the state of Wisconsin. In turn, these state agencies turn over implementation of many of these programs to the LCC and LWCD.

State Regulations

NR243

The purpose of chapter NR 243 is to implement design standards and accepted management practices and to establish permit requirements and the basis for issuing permits to Concentrated Animal Feeding Operation (CAFO). NR 243 also establishes the criteria under which the department may issue a notice of discharge or a permit to other animal feeding operations that discharge pollutants to waters of the state or fail to comply with applicable performance standards and prohibitions in chapter NR 151 <https://docs.legis.wisconsin.gov/document/administrativecode/ch.%20NR%2015 >. A Wisconsin animal feeding operation with 1,000 animal units or more is a CAFO. The DNR may designate a smaller-scale animal feeding operation (fewer than 1,000 animal units) as a CAFO if it has pollutant discharges to navigable waters or contaminates a well.

The U.S. EPA delegates implementation of the Clean Water Act and Federal National Pollution Discharge Elimination System CAFO permit program < https://www.epa.gov/npdes/animal-feeding-operations-afos> to the WDNR. Wisconsin implements the water quality protection permit program by requiring that CAFOs have a DNR approved Wisconsin Pollutant Discharge Elimination System (WPDES) permit in place when they to operate. CAFO WPDES permits ensure farms use proper planning, nutrient management, and structure/system construction to protect Wisconsin waters. These permits apply only to water quality protection. They do not give the DNR authority to address air, odor, traffic, lighting, land use nor any of the social concerns people may have about large farms. Additional information on NR 243 and CAFO's can be found at: https://dnr.wi.gov/topic/AgBusiness/CAFO/.

This is a complaint based program and participants are cited and ordered to repair an operation to meet water quality standards. Investigations and citations are issued by WDNR, cost-sharing is administered by DATCP, and the LCC and LWCD are responsible for implementation of this program.

Cropland Soil Erosion Control Plan

In 1998, Douglas County received a waiver from the requirement to develop a cropland soil erosion control plan. This waiver is no longer valid. The following section will identify the locations of soil erosion, land use which increases the rate of soil erosion, and activities the LWCD can do to slow this erosion.

There northern portion of Douglas County experiences the greatest erosion issues due to several factors:

- Geologically young clays which erode at a higher rate than other soils in the county
- A greater number of streams present which experience erosion along their banks
- Lake Superior and the St. Louis River's shores
- Highest density of population and development
- Contains the majority of livestock agriculture
- Decrease in forest cover, especially coniferous forest

By listening to professionals and citizens' observations, reviewing information in other management plans, reviewing studies on phosphorus loading and driving through the county and observing soil erosion, the greatest contributor of sediment to Douglas County water bodies is shoreline erosion. The DNR performed studies on Bear and Bluff Creek, Black River, and Pokegama River. The results of these studies can be found in the Water Quality Management Plans, which aren't yet published. The watersheds of the study areas ranged from 77-94% undeveloped, which was defined as woodland or wetland. In these watersheds, land use development often consisted of pasture and hayfields. Row crops were not present in the watersheds. All of these watersheds experienced high TSS at some point during the monitoring. The management plans cite streambank erosion from highly erodible clays as the cause of the elevated TSS in the Lake Superior Clay Plain.[14]

In addition to the clay streambank being naturally highly erodible, there are other factors which are causing this rate of erosion to increase. One cause for this increased erosion is due to intense flood events resulting from climate change. Another is historic logging causing increased runoff in the past resulting in increased peak flows causing channelization and disconnection from flood plains.

The shores of Lake Superior and the St. Louis River experience erosion due to wave action. Between 1990 and 2014, Lake Superior's water levels were below average. As of 2014, Lake Superior's water levels rose to above average[15] and have continued to rise to the present 2019.

---

[14] Wisconsin Department of Natural Resources. (not yet published). Bear and Bluff Creeks TWA WQM Plan. *Water Quality Bureau.*

Wisconsin Department of Natural Resources. (not yet published). Black River TWA WQM Plan. *Water Quality Bureau.*

Wisconsin Department of Natural Resources. (not yet published). Pokegama River TWA WQM Plan. *Water Quality Bureau.*

[15] National Oceanic and Atmospheric Administration. (2014, December 10). NOAA and partners document surge in Great Lakes water levels. Retrieved from https://research.noaa.gov/article/ArtMID/587/ArticleID/918/NOAA-and-partners-document-surge-in-Great-Lakes-water-levels-

Elevated water levels are increasing the rate of erosion along shorelines. Another factor in shoreline erosion is development near the lakeshore which increases impervious surfaces and creates additional runoff. Natural vegetation is often cleared resulting in decreased soil stability. Despite the high rate of erosion along Lake Superior and the St. Louis River, correcting this issue is generally beyond the LWCD's ability due to the high expense combined with lack of funding to stabilize these shorelines.

The majority of agriculture in Douglas County is for the production of beef and some dairy. As a result, most of the land use is pasture and hayland. The limited amount of row crop in the county results in a low contribution of erosion from cropping practices. It also translates to lower amounts of phosphorous washing into waterways. In 2018 a study was conducted in the Bardon Creek Watershed for the purpose of Water Quality Trading for phosphorus for the Village of Poplar's wastewater treatment facility. The study evaluated the phosphorus reduction of converting row crops to hayland. Few fields in the watershed qualified for conversion from annual crops such as corn, oats, soybeans, or wheat to hay. On 12 fields which did qualify, review of soil tests and an analysis using SnapPlus was performed. The study determined levels of phosphorus were low to optimum for crop production, and conversion of these lands to hayland would result in marginal phosphorus reduction.[16] A greater cause of agricultural erosion is in areas where cattle are allowed access to streams. Stream banks are trampled by cattle and overgrazed resulting in increased erosion along the banks. This is an issue which can be mitigated for with technical assistance and cost-share money from the LWCD and partner agencies.

Forestry is another form of agriculture which can result in erosion issues. Not following forestry best management practices (BMP's), such harvesting on steep slopes and improper stream crossings, increase erosion. A conversion of forests to open land and tree species composition within forests can increase the rate of snow melt in the spring resulting in greater runoff, higher peak flows, and increased erosion (Appendix XXIX). The LWCD can mitigate for forestry caused erosion by providing technical assistance, cost-share funding, encouraging forest management plans, and providing resources for tree planting.

In the southern portion of the county there is less erosion due to:

- More stable sandy soils
- Less agriculture
- Greater forestry land use

The majority of erosion occurring in the southern portion of Douglas County is a result of shoreland development. Shoreland properties typically experience removal of native vegetation and increase of impervious surface resulting in increased runoff and decreased soil stability. These problems are curbed under State regulation and County Shoreland Zoning Ordinances. Practices to stabilize shorelands can receive technical assistance and cost-share funding from the LWCD.

[16] Wolkowski, R. (2018, June 18). Preliminary Report for Adjusting Agricultural Field Management for Water Quality Trading to Offset P Output from the Village of Poplar Wastewater Treatment Facility. *Alfisol Soil Management, LLC.*

Efforts to further evaluate erosion in Douglas County can be accomplished by establishing monitoring points throughout the county to document through pictures and written evaluations erosion changes over time.

In 2015 there was a project monitoring shoreland practices on one lake in Douglas County, and two lakes in Bayfield County. The project was designed to document shoreland changes over time. Continuing this monitoring would be beneficial for monitoring shoreline practices and erosion along lake shorelines.

NR151 Performance Standards and Prohibitions

In 1998, the Animal Waste Advisory Committee (AWAC) developed four general animal waste prohibitions. The prohibitions were considered the basic animal waste guidelines needed to protect water quality. The WDNR developed NR 151 beginning with the basic prohibitions developed by AWAC. This rule is part of eight WDNR rules that address runoff pollution, the major cause of polluted waters in Wisconsin and the United States.
NR151 includes the following:

- **Subchapter I: Implementation and Enforcement Provisions**
- **Subchapter II: Agricultural Performance Standards**
  - ✓ Nutrient Management
  - ✓ Nonpoint Source Pollution Control
  - ✓ Cropland Soil Erosion Control
- **Subchapter III: Non-Agricultural Performance Standards**
  - ✓ Nutrient Management
  - ✓ Transportation Facility Performance Standards
- **Subchapter IV: Process to Develop and Disseminate Non-agricultural Standards**
  - ✓ Standards Oversight Council (SOC)

These standards and prohibitions were promulgated into law on October 1, 2002, under NR151, Wisconsin Administrative Code. Additional Ag performance standards were promulgated in 2010 which focus upon: managing process wastewater, P-Index for cropland and pastures, tillage setback and sheet, rill and wind erosion. The updated standards can be found here https://docs.legis.wisconsin.gov/code/admin_code/nr/100/151. The Non-Agricultural and Agricultural Performance Standards are included on following pages. The Douglas County approach to NR151 was developed during the 2004/05 planning process. The LCC intends to maintain the same general approach developed in the 2004 planning process through the year 2030.

Additional State Regulations

A companion rule, NR 154 of Wisconsin's Runoff Management Program entitled *Best Management Practices, Conditions, and Standards,* is an important tool for implementing NR 151. DATCP administers ATCP 50 and assists the counties with implementation of this rule.

- NR 154: Best Management Practices, Conditions and Standards (mirrored in ATCP 50)

In addition, the following standards have been incorporated into the implementation section of Douglas County's Land & Water Resource Management Plan. Statewide program rules, to be implemented through the LWRM Plan include:

- NR151 Runoff Management (Performance Standards and Prohibitions)
    - Subchapter II: Agriculture Performance Standards
    - Subchapter III: Non-Agricultural Standards
    - Subchapter IV: Transportation Performance Standards
- NR152 Model Ordinances for Construction Site Erosion Control and Stormwater Management
- NR 153 Targeted Runoff Management Grant Program
- NR 154 Best Management Practices and Cost-Share Conditions
- NR 155 Urban Nonpoint Source Water Pollution and Stormwater Management Grant Program
- NR 216 Storm Water Discharge Permits
- NR 243 Animal Feeding Operations
- ATCP 50 Soil and Water Resource Management Program

AGRICULTURAL PERFORMANCE STANDARDS AND PROHIBITIONS

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.

Non-Agricultural Performance Standards and Prohibitions

The LCC determined that the state requirements and enforcement on the Non-Agricultural Performance Standards are adequate in Douglas County. There are activities included in this plan to assist other agencies in implementing the Non-Agricultural Performance Standards. LWCD will continue to provide plan review and technical recommendations to partner agencies and departments as time allows.

Adopted Non-Agricultural Performance Standards & Prohibitions

For new construction and redevelopment on sites of 1 acre or more:

a) Implement an erosion and sediment control plan using best management practices (BMPs) to control sediment runoff.
b) Educate local units of government and individuals about erosion and sediment control plans.

For most sites covered by construction site erosion control plan:

a) Implement a written storm water management plan to control runoff pollution. These plans shall conform to standards for total suspended solids in runoff, peak discharge rates, infiltration, protective areas, fueling and vehicle maintenance areas, timing and location.

For developed urban areas (population densities of 1000 or more people per square mile):

a) Implement a storm water management plan that includes public education, leaf and grass management where appropriate, nutrient application on municipally-owned land according to an application schedule and detection and elimination of illicit discharges.
b) Permitted municipalities shall meet additional control requirements for reduction in total suspended solids.

For non-municipal property covering 5 or more acres of turf or other pervious surface:

a) Apply nutrient in accordance with a nutrient management schedule.

For transportation facilities:

a) Implement erosion and sediment control plans during construction and management plans for runoff after construction.

County Regulations

Appendix B details specific county ordinance requirements along with Figure 15 showing the zoning districts in Douglas County. Douglas County has relatively few regulations relating to soil and water resource management. The county currently relies on state and federal regulations as well as voluntary BMPs for the protection of soil and water resources. Local regulations/ordinances currently in place include:

- Private Sewage System Ordinance (Zoning)
- Flood Plain Zoning Ordinance (Zoning)
- Shoreland Zoning Ordinance (Zoning & LCC)
- Non-Metallic Mining Reclamation Ordinance (Zoning & LCC)
- Livestock Facilities Licensing Ordinance (Zoning & LCC)
- Pesticide Ordinance (Administration & Forestry)
- Large-Scale Concentrated Animal Feeding Operations (Zoning & LCC)
- Douglas County Animal Manure Storage Ordinance (Zoning & LCC)
- Non-Ferrous Mining Ordinance (Zoning)
- Moratorium on the Importation and Raising of Cervids in Douglas County-ineffective November 15, 2019 (Zoning & LCC)

Other Voluntary Conservation Initiatives

In addition to state and local regulations, Douglas County relies upon voluntary standards such as the WDNR's forestry BMP's located in *Wisconsin's Forestry Best Management Practices for Water Quality: Field Manual for Loggers, Landowners, and Land Managers* (Appendix A(XXVIII)). It is also expected that stormwater management and construction site erosion control technical standards outlined by DATCP and NRCS will be followed. These voluntary standards are strongly encouraged for use in regulatory and non-regulatory situations. Conservation practices that may incorporate voluntary standards are listed in Table 4.

Table 4: Conservation Practices	
Access roads and cattle crossings	Nutrient management
Animal trails and walkways	Pasture & hayland management
Barnyard runoff control systems	Pesticide management
Contour farming	Prescribed grazing
Critical area stabilization	Relocating/abandoning animal feeding operations
Diversions	Riparian buffers
Field windbreaks	Roof runoff systems
Filter strips	Soil & water protection & improvement
Fisheries habitat enhancement	Streambank & shoreline protection
Grade stabilization structures	Timber stand improvement
Grassed waterway	Water & sediment control basins
Heavy use protection	Well decommissioning
Livestock fencing	Wetland development or restoration
Livestock watering facilities	Wildlife habitat enhancement
Manure storage systems	Windbreak/hedgerow establishment

Conclusion

Volume I provides readers with background information about Douglas County. More detailed information regarding past plans, studies, management guides, and initiatives is found in Appendix A of this document.

Volume II outlines the goals, objectives, and activities for the Douglas County LCC and LWCD. While some activities are required by state statute, priorities were determined by work group participants and the LCC. Volume II also includes an implementation plan that prioritizes activities and lists the partners and resources needed to implement each activity.

VOLUME II. PLAN IMPLEMENTATION

Volume II addresses implementation of the NR151 standards in detail; presents goals, objectives and activities for plan implementation; and lists partners and monitoring efforts. Priority activities are identified in the list of activities.

Goals, Objectives and Activities

This land and water management plan is developed to serve for a 10-year period from 2020 through 2030. The plan goals, objectives and activities will be reviewed after 5 years as currently required by the state. A general definition of each term is provided below. A detailed plan of work follows the list of activities.

Goals – General statements of the desired overall result to be accomplished

Objectives – More specific (ideally measurable) steps to reaching plan goals

Activities – Methods and actions to reach goals and objectives. All activities should have a tie to plan goals and objectives. *Or* there should be a clear, defensible explanation for why they are completed (e.g., for example, they are required by state statute). Additional activities consistent with plan objectives may be added during the plan implementation period.

Goals (2020 – 2029)

Goal 1. Protect and enhance surface waters and wetlands to preserve and restore water quality, ecological functions, and recreational, scenic and cultural values.

Goal 2. Protect and increase the knowledge of groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.

Goal 3. Prevent the introduction and spread of aquatic and terrestrial invasive species to conserve the natural community and intrinsic and economic resource values.

Goal 4. Maintain and preserve farmlands by supporting a diverse agricultural community and sustainable agricultural practices.

Goal 5. Create public awareness and stewardship actions relating to conservation and the County's goals for land and water resource management.

Guiding Principles

1. *Uphold the protection of natural resources while considering the importance of the Douglas County economy.*
2. *Utilize limited staff and financial resources efficiently.*
3. *Facilitate partnerships with and support efforts of other organizations where consistent with land and water resource priorities.*
4. *Emphasize education to increase understanding of natural resource concerns and the methods to address these concerns, and encourage beneficial changes in actions.*
5. *Restore and protect native habitats while meeting water quality objectives.*
6. *Utilize information and recommendations with partner organization water quality and habitat management plans.*
7. *Embrace Wisconsin's public trust doctrine that lakes and rivers are public resources owned in common by all Wisconsin citizens.*
8. *Plan for the potential impacts of climate change in all activities.*

Goal 1- Surface Waters

Protect and enhance surface waters and wetlands to preserve and restore water quality, ecological functions, and recreational, scenic and cultural values.

Wetland Objectives

A. Protect wetlands from the impacts of development (agricultural, forestry, commercial, residential).
B. Support the preservation of tracts of land where priority wetlands[17] are present.
C. Restore historic, priority wetlands.
D. Enhance wetlands for ecological function and cultural living uses.
E. Perform wetland projects by integrating watershed strategies, such as Douglas County Mitigation Reserve Program[18] and factoring in climate change and flooding.

Wetland Activities

**Activities prioritized by the Citizen Advisory Committee are in bold.*

1. Support efforts to preserve priority wetlands. This may come in the form of letters of support for grant projects or facilitating transfer of ownership for conservation set aside of priority wetlands. (OBJ A,B)
2. Provide suggestions to mitigate the potential impacts to wetlands as requested by the Zoning Department, WDNR, or private citizens. (OBJ A)
3. **Use Douglas County Decision Support Tool (DST)[19] to prioritize locations of wetland projects. (OBJ B,C,E)**

17 Priority wetlands- preferable for restoration, enhancement and preservation as defined by the Douglas County Decision Support Tool (DST)
18 *Douglas County Mitigation Reserve In-Lieu Fee Prospectus* (Appendix A(XXVII))
19 Douglas County Decision Support Tool (DST)- Created in 2017 by St. Mary's University of Minnesota to prioritize areas of Douglas County for wetland restoration, enhancement and preservation based on criteria determined in *A Watershed Approach to Wetland Management in the Lake Superior Basin* written by Douglas County LWCD (Appendix A(XXVI).

4. Provide technical assistance and cost-sharing to private and public landowners for wetland restoration. (OBJ C)
5. Support wild rice restoration and indigenous cultural uses of wetland areas. (OBJ D)
6. Use Northwest Wisconsin Flood Impact Study to prioritize locations of wetland projects to mitigate for flooding. (OBJ E)

Lakes and Streams Objectives

A. Protect surface water from the impacts of land use and development (agriculture, forestry, commercial, residential).
    1. Shorelands are managed to limit impacts of residential development.
        - Shoreland buffers that meet county standards are in place.
        - Zoning development standards to protect waterways are met or exceeded.
        - Stormwater runoff and erosion are minimized in shoreland areas.
    2. Impacts from road construction, maintenance, and other activities on public lands are minimized.
    3. NR151 Agricultural and Non Agricultural Standards are supported and implemented. Agricultural activities located in Goal 4.
    4. Impacts from nonmetallic mining are minimized.
    5. Private and public landowners follow forestry best management practices for water quality protection, including managing for invasive forest pests that impact water quality through the destruction of land cover.
    6. Open land is converted to conifer forest to minimize the impacts of snowmelt runoff in the Lake Superior Basin (recommendation from Comparative Analysis Project).
B. Inventory watersheds to increase knowledge of their land use patterns, habitats, hydrology, and nutrient issues.
C. Promote balance of cultural life, recreational and scenic water use.
D. Consider increased flooding for lake and stream management.
E. Manage streams with consideration of wildlife needs, such as fish passage.
F. Promote soil health and conservation practices to protect water quality, and prioritize watersheds with impaired waters, Nine Key Element Plans and/or approved TMDLs.

Lakes and Streams Activities

**Activities prioritized by the Citizen Advisory Committee are in bold*

<u>Watershed Activities</u>

1. Review recommended actions of partner organization plans and support where consistent with water quality objectives. (OBJ B, C)
2. Identify water quality monitoring needs for lakes and streams and support volunteer monitoring efforts. (OBJ B)
3. Coordinate with and help develop or implement Watershed Plans, including Nine Key Element Plans. (OBJ A, B)
    a. Identify and prioritize focus areas
    b. Solicit partners and funding sources
    c. Gather study information
    d. Develop management plans

e. Update cost-share priorities to reflect plan recommendations
f. Report projects completed which implement the St. Croix TMDL and 9-Key Element Plan to the WDNR

2. Update open land use map which was last updated in 2009. (OBJ B)
3. Target locations for conservation efforts based on watershed maps which display areas of open lands, agricultural lands, impaired and exceptional resource waters and areas preferable for wetland enhancement, restoration or preservation based on the DST. One of these maps has been created, and maps for the remainder of the county can be created when open land use data is updated. (OBJ B)
4. Utilize WDNR mapping, such as Erosion Vulnerability Assessment for Agricultural Lands (EVAAL), to expand watershed inventory data. (OBJ B)
5. Bardon Creek Watershed's agricultural nutrient contributions were studied in 2018 to conclude the clay soils are phosphorous deprived and not contributing to phosphorous in waterways. This knowledge can be expanded to additional watersheds in the Lake Superior Basin. (OBJ B)
6. Complete watershed inventories for watersheds with other planning efforts occurring such as TMDL's or 9-Key Element Plans. (OBJ B)

Residential Shorelands

4. **Provide technical review of site plans for shoreland zoning land use permit applicants. Provide on-site technical assistance, including development of compliant site plans, as requested.**
5. **Plan, design, and cost-share practices to reduce nonpoint pollution such as shoreline buffers, raingardens, and erosion control. (OBJ A1, E)**
6. For properties in violation of shoreline ordinances, provide on-site technical assistance, including site plans. (OBJ A1)
7. **Inspect previously installed best management practices to ensure standards are maintained. (OBJ A1)**
8. Design cost-share projects and provide assistance to shoreland owners and lake groups to find a balance of cultural, recreational and scenic lake uses in conjunction with overall lake health. (OBJ A1, C)

Public Land

9. **Identify erosion problems in public right of way or public lands and provide erosion control design or cost-share assistance as requested. (OBJ A2, E)**

10. **Provide technical assistance for culvert/barrier removal or reconstruction for wildlife, fish passage and changing hydrology due to increased intense storm events. (OBJ A2, D)**

Urban Stormwater Runoff

11. Provide technical assistance and cost-share for landowners installing practices to mitigate for stormwater runoff. (OBJ A3)
12. Review and provide input on stormwater management plans as requested by the Zoning Department, WDNR, or private landowners. (OBJ A3)
13. Participate in City of Superior's stormdrain adoption program and routinely inspect stormdrains around the courthouse. (OBJ 3)

Nonmetallic mining

14. Provide technical review of NR 135 reclamation plans submitted by applicants as requested. (OBJ A4, E)
15. Provide on-site technical assistance for NR 135 sites. (OBJ A4)

Forestry

16. Provide technical assistance to public and private land managers to implement forestry best management practices for erosion reduction and improved water quality, including managing for destructive forest pests that may remove protective land cover. (OBJA5, E)
17. **Promote tree planting by providing technical assistance and coordinate county tree and shrub sale with emphasis on conifer planting. (OBJ A6, E)**
18. **Assist with county, state, private industrial and forest cooperative owners' forest management plans to encourage implementation of recommendations from Phase II & III Comparative Analysis Project in the Lake Superior Basin.** The main recommendation is conversion of open (grassland, wetland, young forest) to mature conifer forest. This may be implemented through the Conservation Reserve Enhancement Program (CREP), Stewardship for Buffers Program, and North American Wetlands Conservation Act (NAWCA), among other programs. (OBJ A6)
19. **Seek funding in addition to the sources listed above to support mature conifer forest land cover. (OBJ A7)**

Goal 2- Groundwater

Protect and increase the knowledge of groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.

Groundwater Objectives

A. Baseline inventory of drinking water quality is available in Douglas County.
B. Potential negative impacts to groundwater are minimized (road salt, herbicides, fertilizers, bacteria, etc.).
C. Resampling of wells occurs, and changes in water quality are inventoried and analyzed.
D. NR151 Agricultural and Non Agricultural Standards are supported and implemented.

Groundwater Activities

**Activities prioritized by the Citizen Advisory Committee are in bold*

1. **Secure funding and implement 100 annual well-sampling program for bacteria, nitrates, and metals. (OBJ A, C)**
2. Maintain a database and map in GIS of well-sampling results. Make results, without well ownership information, publicly available. (OBJ A,C)
3. Provide cost-sharing and technical assistance for well closures. (OBJ B)
4. **Provide technical assistance in the planning, design, and construction or closure of manure storage facilities. (OBJ B, D)**
5. **Protect areas sensitive to groundwater contamination, such as areas with sandy soils. (OBJ B, D)**
6. **Contact well owners for retesting wells every ten years. (OBJ B)**

Goal 3- Invasive Species

Prevent the introduction and spread of aquatic and terrestrial invasive species to conserve the natural community and intrinsic and economic resource values.

Invasive Species Objectives

A. Perform Aquatic Invasive Species (AIS) coordination at the county level.
B. Coordinate efforts to prevent, control, and eradicate populations of both terrestrial and aquatic invasive species.
C. Support the goals, objectives, and activities identified in the *Douglas County Aquatic Invasive Species Strategic Plan* (Appendix XVII).

Invasive Species Activities

**Activities prioritized by the Citizen Advisory Committee are in bold*

1. **Seek funding for an AIS Coordinator. (OBJ A)**
2. Utilize native species in cost-share practices and technical assistance recommendations whenever feasible. Prohibit the use of invasive species in cost-share installations. (OBJ B, C)
3. Coordinate with other agencies and organizations, such as Northwoods Weed Cooperative Association (NWCMA) and Lake Superior Research Institute (LSRI), to perform prevention and control. (OBJ B)
4. Make invasive species location information available to the public. (OBJ B, C)

WDNR AIS Core Services[20]

**Services to be performed if funding is secured for an AIS Coordinator*

AIS Prevention and Lake Monitoring

(a) Train network monitors and coordinate lake monitoring, AIS monitoring, watercraft inspection, and AIS prevention programs and data entry into Surface Water Integrated Monitoring System (SWIMS).

(b) Purchase and distribute supplies and equipment necessary for network activities.

(c) Provide shipping and handling of samples and specimens and laboratory analysis.

(d) Enter data, program software, and/or conduct other data-management services necessary for tracking and reporting network monitors and activities.

(e) Analyze, report and disseminate reports and results.

(f) Assist applicants with AIS grant application development and submission.

(g) Provide technical assistance to a grantee for AIS prevention and control.

(h) Coordinate communication among network monitors and expand their capacity to conduct network activities.

(i) Conduct any network activities such as participation in:

(1) Citizen Lake Monitoring Network.

(2) Collection and reporting of chemical, biological or physical information about lakes and lake ecosystems including water levels, lake ice extent and duration, aquatic plants, and shoreline habitat conditions following department-approved methods.

(3) Aquatic invasive species early detection monitoring.

(4) Clean Boats Clean Waters watercraft inspection, boater education program and decontamination programs.

(5) Purple Loosestrife Biocontrol program.

(6) Other AIS prevention campaigns and lake protection activities as approved by the department.

Goal 4- Agriculture

Maintain and preserve farmlands by supporting a diverse agricultural community and sustainable agricultural practices.

Agricultural Objectives

A. Support the goals, objectives and activities in the *Farmland Preservation Plan*, *Douglas County, Wisconsin* (Appendix V).
B. Provide cost-share and technical assistance to implement NR151.
C. Implement Goals 1 and 2 on agricultural land.

20 WDR AIS Core Services are from a draft copy of NR193 obtained February 27, 2019.

Agriculture Activities

**Activities prioritized by the Citizen Advisory Committee are in bold*

1. Encourage enrollment in Farmland Preservation. (OBJ A)
2. **Administer and monitor Farmland Preservation Program. (OBJ A)**
3. Distribute cost-share funding for all people across all types of agriculture. (OBJ A, B)
4. **Discourage development and wetland mitigation that impacts prime farmland and support a county-lead in-lieu of fee program. (OBJ A)**
5. **Increase agricultural owner awareness and enrollment of cost-share programs, technical assistance and land management plans. Assist in completing nutrient management plans in collaboration with UW- Madison, Extension and private consultants. (OBJ B)**
6. Provide and prioritize cost-sharing and technical assistance to agricultural producers to implement the NR151 agricultural performance standards. (OBJ B)
7. Properties enrolled in FPP and nutrient management plans will be inspected by the LWCD to ensure compliance every four years. (OBJ B, C)
8. Coordinate and cooperate with WDNR foresters and Douglas County Forestry Department to address soil and water issues through Forest Stewardship Management plans for the Managed Forest Law program. (OBJ B)
9. Encourage farmers to plant trees, manage marginal pastures using forest management best management practices, and participate in forest management programs. (OBJ B)
10. **Provide cost-share and technical assistance for manure storage upgrades and closures. (OBJ B)**
11. Create a list of farms prioritized for assistance based on conditions of storage structures and feed lots, cattle accessibility to streams, and nutrient management and soil erosion control. (OBJ B)

NR151 Implementation in Douglas County

Douglas County regulates animal waste and livestock facilities through the Livestock Facilities Licensing Ordinance and Animal Manure Storage Ordinance. The Land Conservation Committee has not pursued additional local regulation because of the desire for the LWCD to remain an agency that provides only voluntary programs, the limited number of farms in the county, along with limited staff to implement a regulatory program. LCC members agreed voluntary efforts, education, one-on-one meetings with farm operators, and collaboration with WDNR would be the best route for NR151 implementation. The LWCD partners with the WDNR on NR151 compliance.

If a complaint is received regarding compliance, voluntary measures will be pursued to correct the identified concern. If enforcement seems warranted, the case including documentation and existing landowner information will be referred to WDNR through the NR243 or NR151 programs. *(A method for documentation will be developed to eliminate legal concerns over shared record-keeping.)* Traditionally, the Land Conservation Departments have assumed the role of technical provider for these projects and in return received an estimated 10% of the cost of conservation practice construction for their services.

The detailed NR 151 implementation strategy is included on following pages.

Douglas County will assume the lead role for the following components of the strategy:

- Information and education activities
- Records inventory
- Securing funding and providing technical assistance – voluntary component
- Administering funding and technical assistance – re-evaluate parcel
- Compliance monitoring
- Annual reporting

Priority projects

If needed, priority areas will be targeted for voluntary and educational efforts based on their potential impacts to natural resources. Landowners wishing to receive cost-sharing compete for limited funds through the LWCD's annual ranking process. Ranking sheets will be developed for agricultural projects, shoreland restoration projects, and miscellaneous projects. The ranking sheets will be updated to reflect the priorities shown in the implementation strategy below. The number of projects ranked in any given year is variable.

Implementation Strategy for NR 151 Agricultural Nonpoint Performance Standards

Implementation Considerations

The Douglas County LWCD will work with the WDNR and other agencies to implement the agricultural performance standards. Implementation of each component of the strategy outlined below will be dependent upon receiving adequate staffing, support, and cost-share funds for completion.

Implementation of the agricultural performance strategy will be guided by the following concepts:

- Encourage voluntary participation in an ongoing cost-share program for agricultural conservation practices. Participation can be encouraged through farm visits, field days and public information distribution about NR151, technical assistance and the cost-share program.
- Encourage farmer-developed nutrient management plans and enrollment in FPP.
- Target watersheds with pasture based livestock operations that allow unlimited access by livestock to waters of the state in a location where high concentrations of animals prevent the maintenance of adequate sod or self-sustaining vegetative cover; this does not apply to properly designed, installed and maintained livestock or farm equipment crossings - NR 151.08(5(a)+(b).
- Coordinate DATCP funding for conservation practices to meet the agricultural performance standards with other cost-share opportunities such as the Federal EQIP (Environmental Quality Incentives Program of the Natural Resources Conservation Service).
- It is not necessary for a particular farm/site to address all Agricultural Performance Standards in order to qualify for cost-sharing.

1. Conduct information and education activities

The LWCD will distribute information and educational material prepared by the WDNR. The information may be distributed via news media, newsletters, handouts, public information meetings, website, and/or one-on-one contacts.

The educational materials will be designed to meet the following objectives:

- Educate landowners about Wisconsin's agricultural performance standards and prohibitions, applicable conservation practices, and cost-share grant opportunities.
- Promote implementation of conservation practices necessary to meet performance standards and prohibitions.

2. Systematically select and evaluate parcels for compliance with standards and prohibitions

A. Records and map inventory

Records and map inventory will be completed to strategize which landowners are identified for on-site visits.

There may be opportunity to supplement limited file information through requests for information from landowners. Landowners may be willing to voluntarily release information in federal files or from consultant-prepared nutrient management plans, especially if the information supports their compliance with agricultural performance standards.

Selecting Priority Farms for technical assistance, and cost-sharing

The number of farms selected for technical assistance and cost-share money will be dependent upon available time and resources. Priority farms will be identified in the following manner (in order of priority)

1) Voluntary requests for assistance
2) Respond to complaints
3) Support existing efforts (such as watershed plans, TMDL plans, 9-Key Element Plans, restoring nutrient or sediment impaired waters via soil or pasture based conservation practices)

Assistance will be available to both livestock and crop producers. All farmers will be encouraged to enroll in FPP and nutrient management plans.

In addition, the priorities established below will be used to offer technical assistance and distribute agricultural cost-share funding. The most important priorities are highlighted in bold below. Cost-share participants will receive an on-site review and status report under the agricultural performance standards prior to an offer of a cost-share contract.

Location/Resource Considerations

Drains to an outstanding or exceptional resource water
Within a water quality management area (surface water)
Within a water quality management area (groundwater)
Drains to a 303(d) listed water
Is located in an area with a watershed management plan such as a 9-Key Element Plan or TMDL

Cost effectiveness and Practice Implementation
Cost effectiveness of Best Management Practices (BMPs)
Additional funding sources available or committed
Project addresses more than one NR151 standard
Project includes nutrient management planning

Procedure for developing records and map inventory review

1. Select watersheds to prioritize for NR151 implementation based off of Location/Resource Considerations listed above.
2. Develop a list of potential farms to visit.
3. Identify priority level of farm using criteria in list above based on available map and file information. Update farm list in priority order.
4. Evaluate which standards and prohibitions are likely to apply from parcel records.
5. Determine which landowners are currently meeting standards and prohibitions based on above evaluations:
    a. Installed or implemented BMPs under an existing state or federal cost-share agreement; and/or
    b. Maintaining compliance with local or state animal manure regulations (e.g., NR 243, NR151, WPDES, etc.).

- Note: It is expected that most landowners identified as priorities above will require on-site visits.

B. Onsite evaluations procedure

1. Visit farms in priority order as staff time is available.
2. Contact owners of selected parcels and perform site evaluation.
3. Conduct on-site evaluations:
    a. Determine and document the extent of current compliance with each of the performance standards and prohibitions. Consider conditions of storage structures and feed lots, cattle accessibility to streams, nutrient management and soil erosion control.
    b. Determine costs and eligibility for cost-sharing where non-compliant.
    - Note: Cost-share requirements are based upon whether or not the evaluated cropland or livestock facility is new or existing and whether or not corrective measures are eligible for cost-sharing. See NR 151.09(4)(b-c) and 151.095(5)(b-c).
    c. Develop an evaluation form as part of the implementation of the plan.

C. Maintaining voluntary cost-share program

Douglas County plans to maintain a successful voluntary cost-share program with modifications to incorporate the agricultural performance standards. Significant water-quality improvements are made through this voluntary participation. To encourage voluntary participation, outreach must be performed to educate the agricultural community about the technical assistance and cost-share programs which exist.

Voluntary cost-sharing guidance

1. Applicant farms will be screened using the agricultural performance standards on-site evaluation procedure and compliance status documentation.
2. Applicants will receive on-site evaluations as described previously.

3. Cost-sharing offered will be prioritized using the criteria for priority sites. Based off of current cost-share funds, projects to implement NR151 may occur on two to three farms on an annual basis.
4. Scheduling of cost-share practices will be based upon:
    - ✓ State and federal cost-share dollars available
    - ✓ Applicant's desired timeframe and match availability
    - ✓ Applicant's ability to meet agricultural performance standards at a relatively low cost

Cost-sharing may be provided to exceed the agricultural performance standards if water-quality benefits are achieved and practices are relatively low-cost.

3. Document and report compliance status

A) NR151 status report

Following completion of records review and on-site evaluation, prepare and issue NR 151 status report (developed by WDNR and completed by the LWCD) to owners of the evaluated parcels. This report will convey the following information at a minimum:

- Current status of compliance of individual parcels with each of the performance standards and prohibitions.
- Corrective measure options and rough cost-estimates to comply with each of the performance standards and prohibitions for which a parcel is not in compliance.
- Status of eligibility for public cost-sharing[21]
- Grant-funding sources and technical assistance available from federal, state, and local government, and third-party service providers.
- Explanation of conditions that apply if public cost-share funds are used. *(If public funds are used, applicable technical standards must be met.)*
- Timeline for completing corrective measures, if necessary.
- Signature lines indicating landowner agreement or disagreement with report findings.
- Process and procedures to contest evaluation results to county and or state. The LCC will review cases of contested compliance evaluation results at a regularly scheduled LCC meeting.(Optional) Copy of performance standards and prohibitions and technical design standards.

- Note: A cover letter describing the ramifications and assumptions related to the status report will be attached.
- Note: Cost-sharing will be encouraged for voluntary compliance, regardless of status on priority list. Cost-effective practices such as fencing, watering facilities, nutrient management planning, conservation planning, grazing plans, and well-abandonment will be emphasized.

B) Maintain public records

Keep and maintain evaluation and compliance information as public record.

- Note: The primary objective of this step is to ensure subsequent owners are made aware of (and have access to) NR 151 information pertinent to their property. The method for maintaining these records and for ensuring relevant information is conveyed to subsequent owners will be discussed with the Douglas County Corporation Counsel.

21Livestock facilities constructed after October 1, 2002 are not eligible for DATCP cost-sharing to reach compliance with the state agricultural performance standards.

4. Provide or arrange for the provision of technical assistance and cost-sharing available for installation of BMPs

A) Voluntary component (Cooperative)

1. Receive request for cost-share and/or technical assistance from landowner.
   - Note: Landowners will be prompted to voluntarily apply for cost-sharing based on information provided in a NR 151 Compliance Status Report. The LWCD's ability to supply technical assistance and cost-share funding will also be widely promoted.
2. Confirm cost-share grant eligibility and availability of cost-share and technical assistance.
3. Develop and issue cost-share contract (including BMPs to be installed or implemented, estimated costs, project schedule, and notification requirements under NR 151.09(5-6) and/or 151.095(6-7).
   - Note: The WDNR will assist in developing proper notification language.

B) Non-voluntary component (Non-Cooperative)

In the event that a landowner chooses not to install corrective measures either with or without cost-sharing and the LCC wishes to request WDNR assistance to achieve compliance, request that WDNR issue landowner notification per NR 151.09(5-6) and/or 151.095(6-7). The LWCD will provide information including cost-share money available and design assistance as requested by WDNR. WDNR will issue the notification if they choose to pursue it.

- If eligible costs are involved, this notification shall include an offer of cost-sharing.
- If not-eligible costs are involved, or if cost-sharing is or was already made available, the notification will not include an offer of cost-sharing.

The notification referenced above will be designed by the WDNR and contain:

a) A description of the performance standard or prohibition being addressed;
b) The compliance status determination made in accordance with NR 151;
c) The determination of which best management practices or other corrective measures are needed and which, if any, are eligible for cost-sharing;
d) The determination that cost-sharing is or has been made available, including a written offer of cost-sharing when appropriate;
e) An offer to provide or coordinate the provision of technical assistance;
f) A compliance period for meeting the performance standard or prohibition;
g) An explanation of the possible consequences if the owner or operator fails to comply with provisions of the notice; and
h) An explanation of state appeals procedures.

5. Administer funding and technical assistance

A) Execute cost-share agreement.

If cost-sharing is involved, finalize and execute cost-share agreement including schedule for installing or implementing BMP(s).

B) Provide technical services and oversight.

- Provide conservation plan assistance
- Review conservation plans prepared by other parties
- Provide engineering design assistance
- Review engineering designs provided by other parties
- Provide construction oversight
- Evaluate and certify installation of conservation practices

C) Re-evaluate parcel.

After corrective measures are applied, conduct evaluation to determine if parcel is now in compliance with relevant performance(s) standard or prohibition(s).

- If site is compliant with additional performance standards, update "NR 151 Status Report" (see component 3.A.) and issue "Letter of NR151 Compliance."
  - Note: A letter of NR 151compliance serves as official notification that the site has been determined to now be in compliance with applicable performance standards and prohibitions. This letter would also include an appeals process if a landowner wishes to contest the findings. When and where counties are not operating under a local ordinance, the issuance of a letter of NR 151 compliance would likely be a joint effort with the WDNR in order to give it the significance and standing that it merits.
- If not compliant, seek non-regulatory remedies or initiate enforcement action.
  - Note: Follow-up measures at this stage will differ depending on the circumstances, including whether or not failure to comply is the fault of the landowner. If it is not the fault of the landowner, then non-regulatory remedies will likely be sufficient. If not (e.g., there is an intentional breach of contract) then enforcement action may be necessary under Component 6.

6. Issue required notices and conduct enforcement activities

A. Notify WDNR of enforcement action needed

If a landowner refuses to respond appropriately to a notice under 4.B., or is in breach of a cost-share contract under component 5.A., the LCC may choose to notify WDNR who will prepare and issue "Notice of NR 151 Violation" letter.

- Note: Enforcement begins with this letter. It may be pursued in circumstances where:
  1. A breach of contractual agreement including failure to install, implement, or maintain BMPs according to the provisions of the agreement occurs OR the landowner has failed to comply with a notice issued under component 4.B, AND
  2. Non-regulatory attempts to resolve the situation have failed.

The county will not develop or create the forms or documents. The LWCD will provide information to the WDNR who will complete and sign documents.

B. Schedule enforcement conference.

The WDNR will set up any necessary enforcement conferences.

C. Participate in enforcement conference.

The LWCD will participate in an enforcement conference formally initiated by WDNR.

D. Initiate enforcement action

Refer cases to WDNR for enforcement. Priority list to request follow-up enforcement will be based upon the number and extent of performance standard violations and the priority criteria established in component 2A.

7. Monitoring compliance

- Conduct periodic evaluations to verify ongoing compliance. Landowners will be asked to complete a self-certification form annually and return it to the LWCD. The LWCD will also complete spot checks on 25% percent of farms enrolled in FPP or nutrient management on an annual basis to ensure all sites are checked every four years for compliance.
- Respond to public complaints alleging noncompliance. LWCD will respond to complaints by investigating allegations with file review, telephone confirmation, and/or an on-site visit. If the review demonstrates significant violation(s) of the agricultural performance standards, staff will proceed with the strategy for compliance. This process will begin with documentation (Step 3), proceed to technical assistance (Step 4), administering funding (Step 5) then to enforcement actions (Step 6) if necessary.
- Refer noncompliance that threatens public health and safety immediately for enforcement action through appropriate county and state entities.
- Ensure new owners are made aware of (and have access to) NR 151 compliance information that may pertain to the property they have acquired. This may be accomplished through a query of the county tax parcel database.

8. Tracking and reporting program activities and progress

- Maintain and convey a record of annual site evaluations showing their location and compliance status.
- Maintain a record of estimated costs of corrective measures for each evaluated parcel.
- Maintain and convey a record showing parcels where public cost-sharing has been applied to implement standards and prohibitions, the amount and source of those funds, and the landowner share.
- Maintain and convey a record and location of parcels referred to WDNR for enforcement action.
- Maintain and convey a record of the annual cost of technical and administrative assistance needed to administer agricultural performance standards and prohibitions, as established in NR151.

- Note: The LWCD will provide the above information to the Department of Agriculture, Trade, and Consumer Protection and WDNR to meet minimum program requirements.

Goal 5- Education

Create public awareness and stewardship actions relating to conservation and the County's goals for land and water.

Education Objectives

A. Public is informed of actions they can take to conserve soil and water resources.
B. Douglas County citizens are aware of the LWCD and activities performed.
C. Availability of cost-share and technical assistance from the LWCD is known.

Education Activities

**Activities prioritized by the Citizen Advisory Committee are in bold*
Each activity supports all Education Objectives

1. **Host and advertise field "tour" days demonstrating conservation practices.**
2. Share information and provide scholarships for youth education.
3. **Publicize projects and programs through multiple sources (internet, news outlets, etc).**
4. Host volunteer activities for public to participate.
5. Attend meeting of other organizations and introduce LWCD.
6. Share information through tabling and presentations at public events and shows.
7. Contact landowners individually and perform property inspections.
8. Develop an education plan to guide efforts.

<u>Surface Water Education Topics:</u>

- Buffer installation tolerable to landowner and beneficial for conservation
- Ecological services provided by wetlands
- Intrinsic values
- Proper pesticide application (collaborate with UWEX)
- Proper salt application for road crews
- Septic system maintenance and Private Onsite Wastewater Treatment System (POWTS) program
- Shoreline buffers/restoration
- Stormwater solutions, promote City of Superior's stormdrain adoption program
- Tree planting and slow the flow concepts
- Water quality and critical habitat information
- Waterfront owner education through realtors and developers
- Waterfront property owner BMPs
- Wetland identification, preservation, mitigation and restoration

Groundwater Education Topics:

- Floodwater effects to groundwater
- Groundwater chemistry
- Groundwater contamination prevention in susceptible areas
- Groundwater health and protection information to realtors
- Groundwater study results
- Naturally-occurring groundwater contaminants such as arsenic
- Preventing contamination from road salt, herbicides, fertilizers, bacteria, etc.
- Properly disposing of contaminants
- Septic system maintenance and Private Onsight Wastewater Treatment System (POWTS) program
- Septic system, manure storage and well maintenance and impacts
- Surface water connections to groundwater (quality/quantity)
- Well-head protection
- Facilitate involvement and information sharing with lake and stream organizations

Invasive Species Education Topics:

- Avoiding invasive species in seed mixes and garden plantings
- Control methods
- Definition of invasive, and non-native versus invasive
- Economic and ecologic impacts
- Identification
- Importance of prevention and control
- Instruction of reporting invasive species
- Location information
- Modes of spread
- Reporting new sightings

Agricultural Education Topics

- Awareness of cost-share program and technical assistance available
- "Bee friendly" agriculture
- BMPs to prevent wildlife agricultural damage
- Climate change
- Display past cost-share projects
- Educate non-farmers about the importance of agriculture
- Enrollment in land management programs
- Formation of farmer-led councils
- Importance of support for local economy and local food
- Manure storage maintenance and closure
- NR 151
- Nutrient management
- Timber harvest BMPs

Audiences

Agricultural community
Business owners
County board
Educators
General public
Interest groups
Lake organizations
Lake Superior Objibwa
Landowners and managers
Nonprofit organizations
Prospective property owners
Public officials
Realtors
Recreational users
School groups
Waterfront owners
Zoning committee

Additional required activities assigned to the Land Conservation Department

1. Mitigate the impacts of wildlife damage to crops by implementing the Wildlife Damage Program.
2. Administer the Environmental Reserve Project Fund Allocation.

Land and Water Management Plan Implementation

1. Use the LWRM Plan annual implementation chart to report progress toward meeting plan goals to the LCC, the Douglas County Board, DATCP, and potential grantors.
2. Identify and seek the resources needed to implement the LWRM plan. These resources may be in the form of grant support, DATCP funding, county funding, and partnerships.
3. Encourage citizen participation in LWMP activities through newsletter articles, web site, and other outreach tools.

Role of County in Plan Implementation

The LCC is responsible for oversight of the LWRM Plan. LWCD staff is responsible for implementation of the plan, based on annual review and prioritization by the LCC.

Role of other Agencies and Institutions in Plan Implementation

A list of potential partners for implementation of the LWRM Plan are included on the following page. Other county departments are encouraged to work together with the LWCD as the department implements plan activities. Other agencies and organizations are also encouraged to use the plan when performing resource management activities in Douglas County. Partnerships will be actively sought by the LWCD and LCC.

The DATCP has oversight authority for the land and water resource management plans. DATCP also provides funding for implementation of the plan based on annual grant applications from counties.

The WDNR, NRCS, FSA, and other agencies will play a critical role in plan implementation. Although few WDNR staff are located in the area, the nature of many of the planned activities require collaborative relationships between WDNR and county staff. Funding for projects identified in the plan may also be needed from existing or emerging programs.

Examples include the following activities:

- Implementation of the agricultural and non-agricultural performance standards
- Permitting for stabilization of lake and river frontage
- Permitting for town road crossings, other stabilization methods (United States Geological Survey research)
- Access Management Plan for County Forestland
- Assistance/training with Conservation Reserve Enhancement Program
- Funding for Lake/River Planning and Protection
- Funding for cooperative projects with Minnesota's Soil and the Water Conservation District
- Funding for research to be conducted on new stabilization methods or geomorphic assessments proposed as part of an overall watershed study

Monitoring and Assessment

Monitoring and assessment are important to evaluate the progress toward meeting plan goals and objectives. Without data and information, departments cannot characterize the condition of the environment, assess and solve problems, or evaluate the effectiveness of management and regulatory actions. The Clean Water Act and state of Wisconsin law and associated rules mandate monitoring of surface waters. The collection and dissemination of information is also essential in educating and increasing public awareness of the environment and environmental issues.

Wisconsin Department of Natural Resources monitoring programs are implemented to achieve a comprehensive understanding of the state of Wisconsin's surface waters. These types include ambient or baseline monitoring, special project monitoring, long-term trend monitoring, and total maximum daily load monitoring. The WDNR assembled a monitoring strategy that describes the need for various chemical, physical, habitat, and biological monitoring data.

Douglas County LWCD established a groundwater testing study in 2017 to gather baseline data on groundwater quality. The study is anticipated to continue into future years as, funding permits, to gather additional baseline data as well as monitor changes over time.

Douglas County desires to collaborate with partners to collect additional data about surface and groundwater. Recommendations related to the availability of baseline data from which to recognize problems as they develop include the following:

1. WDNR monitoring recommendations within the water quality management plans for the St. Croix and Lake Superior Basins, which can be referenced in Appendix A, should be followed.
2. WDNR and Douglas County should continue to support lake and river groups in their efforts to pursue water quality management projects.
3. WDNR and Douglas County should initiate a joint coordinated monitoring program (surface water and groundwater) to build baseline information where it is needed.
4. WDNR and Douglas County LWCD should continue to encourage and support Self-Help lake monitoring.
5. WDNR and Douglas County LWCD should involve school groups in monitoring program efforts to the extent practicable to promote public understanding.

Citizen Monitoring

Many lake residents have formed individual lake associations in order to protect water quality and habitat near their homes. Douglas County lake associations, self-help monitoring participants and special districts or associations are included in Table 2.

Monitoring programs are encouraged and used as tools to raise environmental awareness while monitoring lake and habitat quality to establish baseline information; and most often are a direct result of public demand. Dedicated citizens devote their time and effort to collecting water quality information and educating their neighbors as well as themselves about water quality and

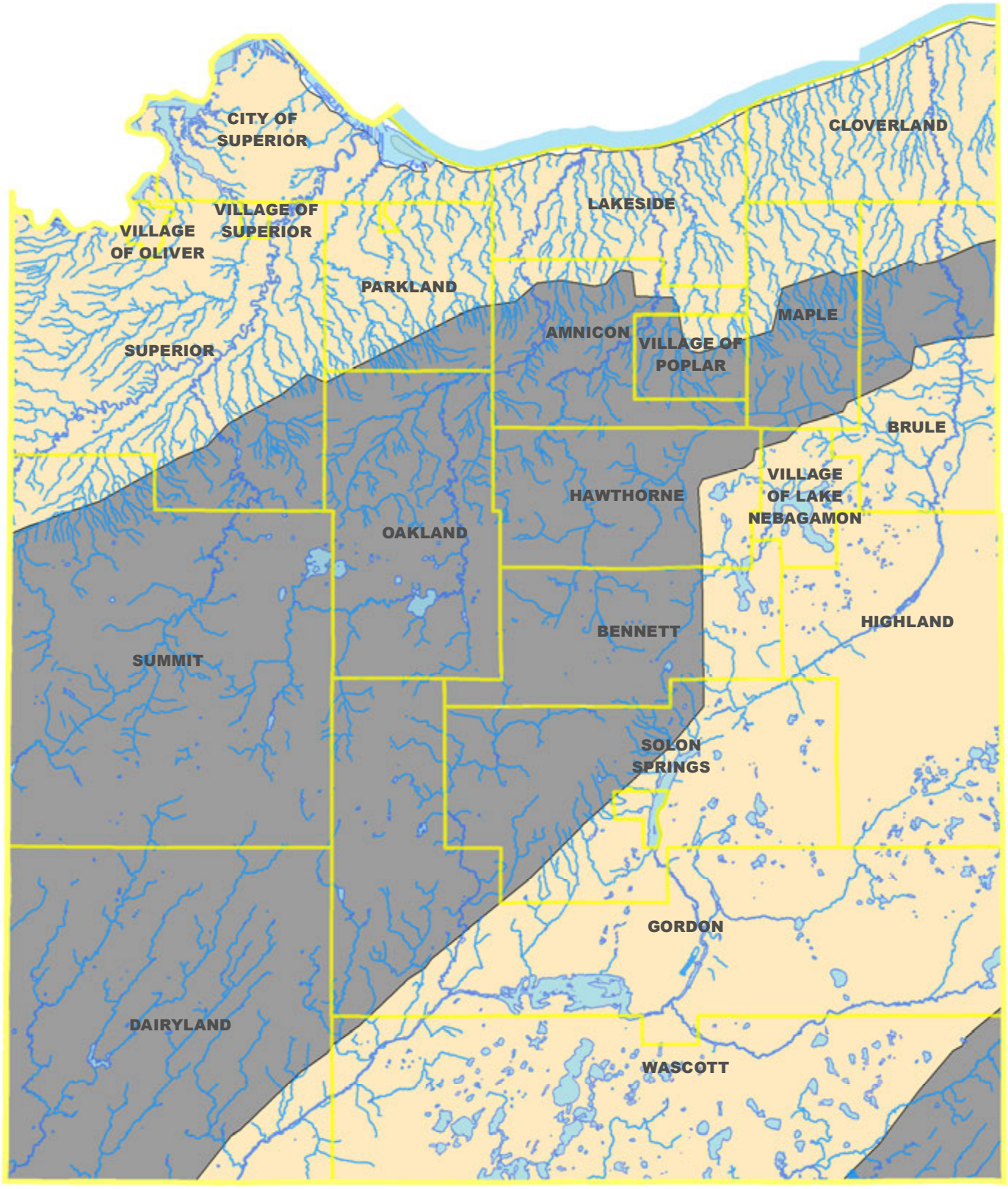
lake management. These efforts build awareness and appreciation for the quality of Douglas County's resources in the resident and non-resident public.

Results from these programs will be used when feasible to monitor progress toward improving surface water quality and wildlife habitat; and to help determine if land and water conservation efforts are successful.

List of LWRMP Partners

CITY	City of Superior
DATCP	Wisconsin Department of Agriculture, Trade, & Consumer Protection
DCB	Douglas County Board of Supervisors
DCDHHS	Douglas County Department of Health & Human Services
DCFD	Douglas County Forestry Department
DCFGL	Douglas County Fish & Game League
DCHD	Douglas County Highway Department
DCLWCD	Douglas County Land and Water Conservation Department (LWCD)
DCLCC	Douglas County Land Conservation Committee (LCC)
DCZD	Douglas County Zoning Department
FOTBS	Friends of the Bird Sanctuary
FOTSCH	Friends of the St. Croix Headwaters
FSA	Farm Service Agency
GLC	Great Lakes Commission
GLCWC	Great Lakes Coastal Wetland Consortium
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
LFC	Lake Superior Living Forest Cooperative
LSBP	Lake Superior Binational Program
LSC	Lake Superior Collaborative
LSRI	Lake Superior Research Institute
	Landmark Conservancy
NERR	National Estuarine Research Reserve
NOAA	National Oceanic & Atmospheric Agency
NRCS	Natural Resources Conservation Service
NCWMA	Northwoods Cooperative Weed Management Area
SLRA	St. Louis River Alliance
SOEI	Sigurd Olson Environmental Institute
T&V	Douglas County Towns and Villages
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish & Wildlife Service
UW- Madison, Extension	University of Wisconsin-Madison, Division of Extension, Douglas County
UWS	University of Wisconsin Superior
WCMP	Wisconsin Coastal Management Program
WDNR	Wisconsin Department of Natural Resources
WLWCA	Wisconsin Land & Water Conservation Association
WSG	Wisconsin Sea Grant
WWA	Wisconsin Wetlands Association

Other partners, not specifically referenced in the work plan, include citizen groups, lake groups, local businesses and organized clubs.

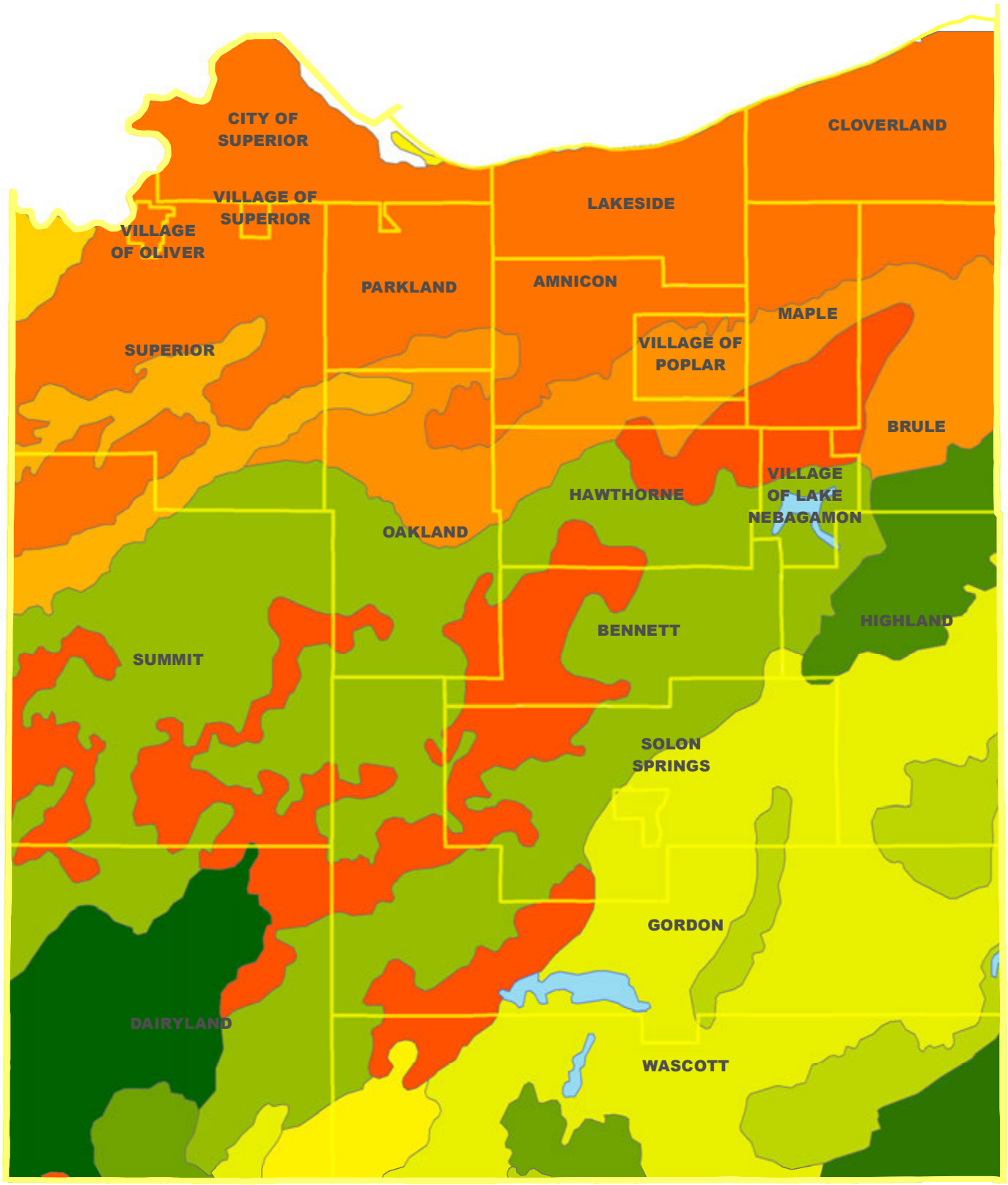


Source: Groundwater Contamination Susceptibility Model Wisconsin Department of Natural Resources, US Geological Survey (USGS), the Wisconsin Geological & Natural History Survey (WGNHS), and the University of Wisconsin – Madison

Bedrock Type

- Sandstone
- Igneous, metamorphic, and volcanic rock

Figure 1 - Bedrock Type



Soil Associations

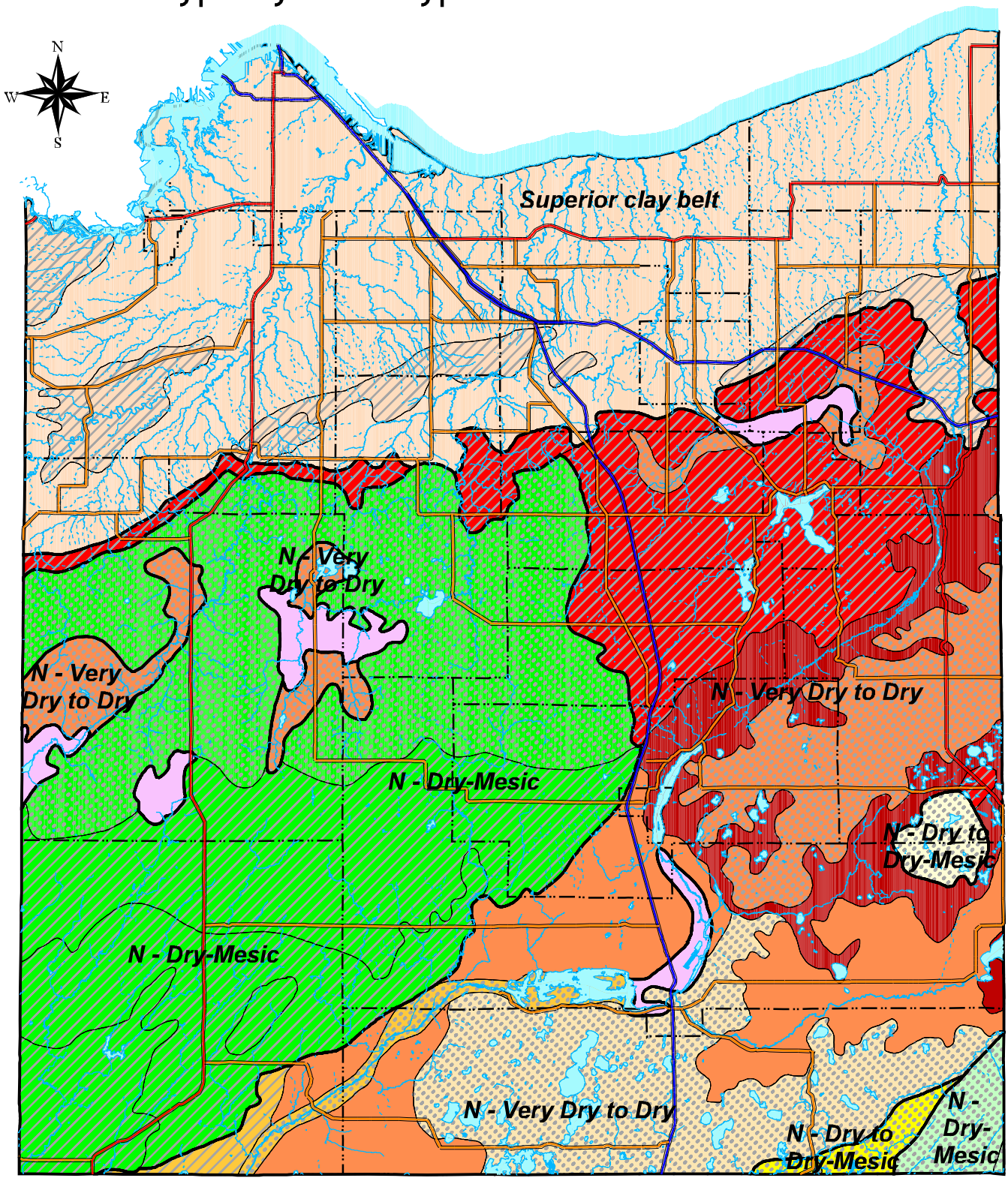
- Santiago, Freeon, Freer, Milaca and Cable silt loam; peat soils
- Freer, Freeon, Almena and Auburndale silt loam
- Cloquet, Gogebic and Pence loams; and peat soils
- Pence sandy loam; Vilas sand; and peat soils
- Gogebic, Iron River and Cloquet loams and sandy loam; Vilas sand; Cable loams
- Vilas, Omega and Hiawatha loamy sand and sand; and peat soils
- Omega and Vilas loamy sand and sand; Pence sandy loam; and peat soils
- Omega and Vilas loamy sand and sand; Chetek and Pence sandy loam; and peat soils
- Hibbing clay loam; Leonidas, Superior and Ogemaw sandy loams
- Hibbing, Pickford and ontonagon loams and silty clay loam; Bibon sand
- Hibbing silty clay loam; leonidas and Gogebic loams; and Bibon sand
- Ontonagon, Hibbing and Rudyard silty clay loam
- Moss peat over acid sedge and woody peat soils; Au Gres sand; and Cable loams
- Water (errors are from source data)

Source: Groundwater Contamination Susceptibility Model Hole, F.D. et al. Soils of Wisconsin. 1968.
Wisconsin Department of natural Resources, US Geological Survey (USGS), The Wisconsin Geological & Natural History Survey (WGNHS, and the University of Wisconsin - Madison.

Figure 2 - Soil Associations

Figure 3

Habitat Type by Land Type Association



Major Habitat

N - Very Dry to Dry
- ArQTr/ArQV-Sm
- ArQV-Sm
- QAc/ArQTr
- QGCe
- QGCe-

Other
- Lowland North

N - Dry to Dry Mesic
- PAm
- PMV-Po

N - Dry Mesic
- ACl
- AVDe

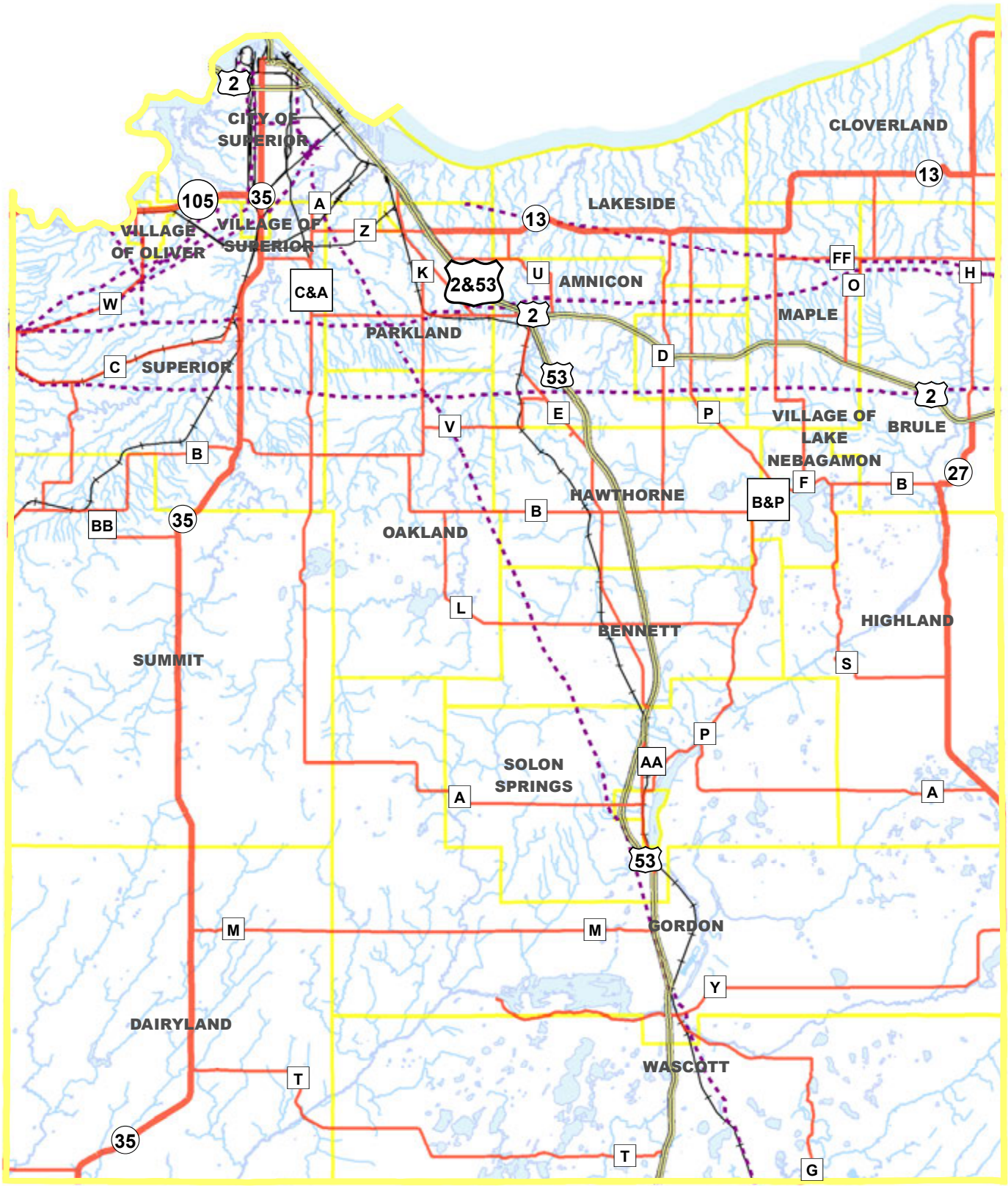
Superior Clay Belt
- AbArSn

2 0 2 4 6 8 10 12 Miles

Percent of LTA Covered by the Major Habitat
- Less than 50%
- 50% - 74%
- 75% or Greater

This project was funded by Douglas County, Wisconsin Department of Natural Resources, and the Wisconsin Coastal Management Program.

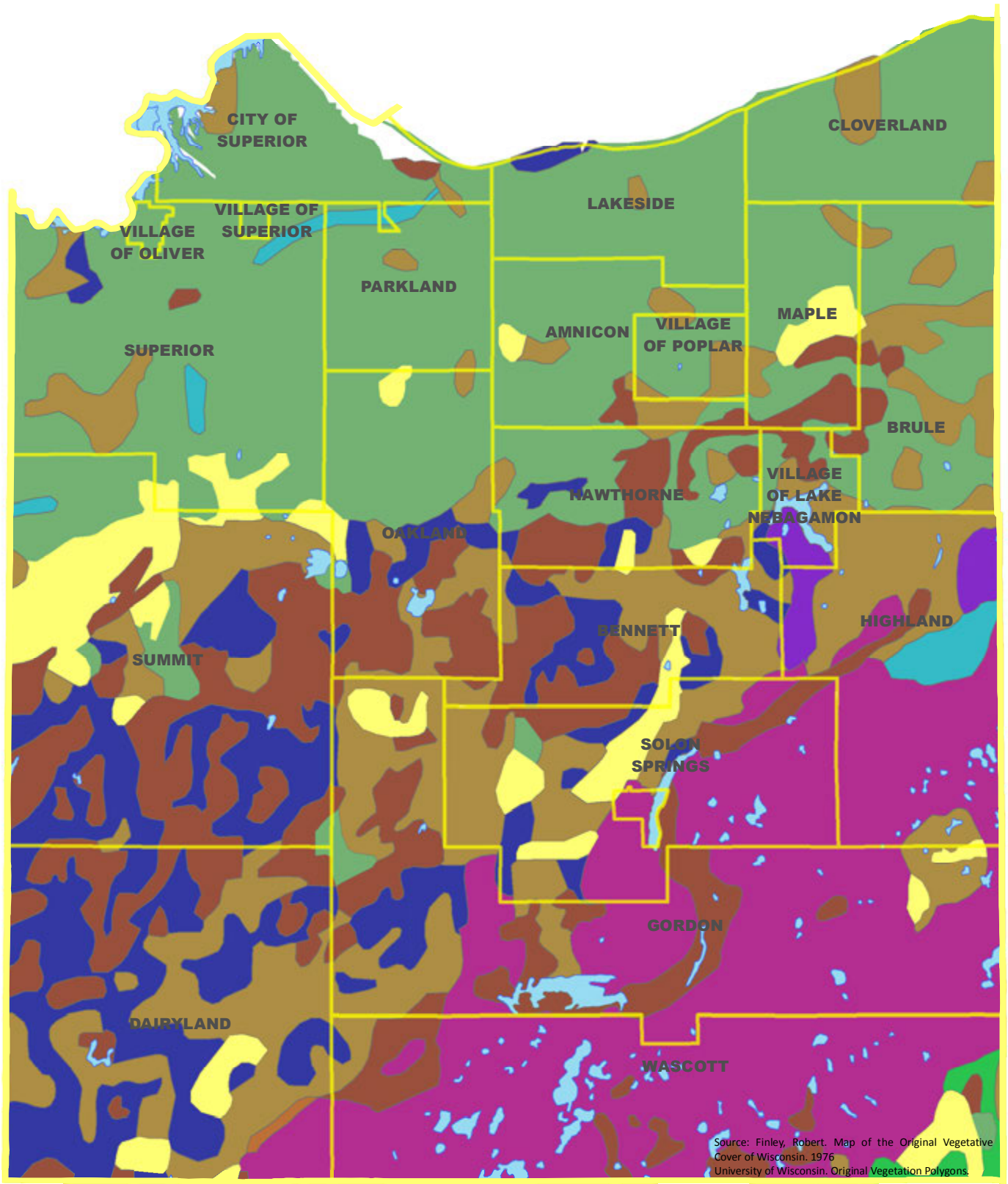
Northwest Regional Planning Commission
an economic development district



Source: Douglas County GIS

Federal Hwy
State Hwy
County Hwy
Pipeline
Railroad

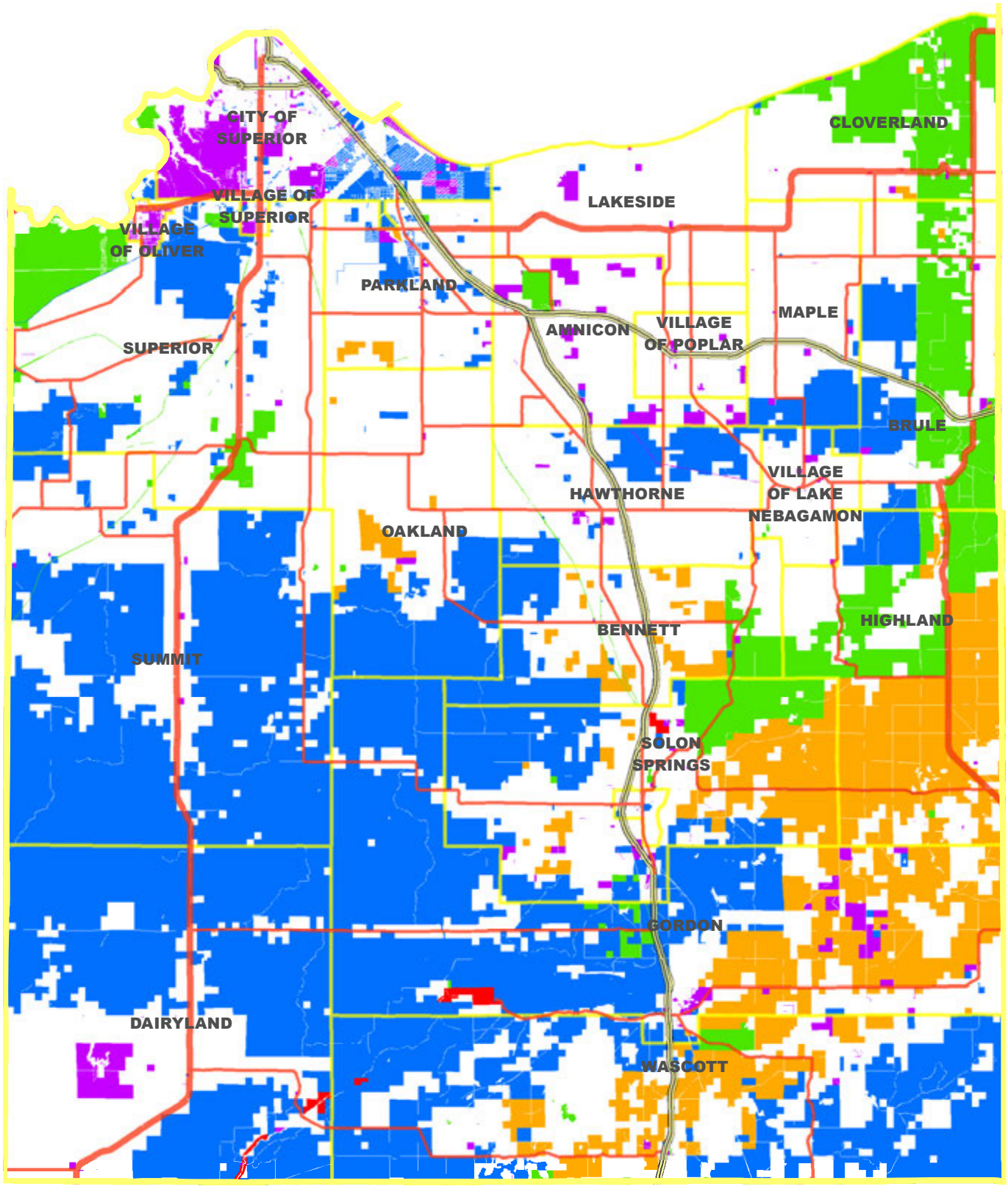
Figure 4 - Transportation



Species

- Aspen, White Birch, Pine
- Brush
- Hemlock, Sugar Maple, Yellow Birch, White Pine, Red Pine
- Jack Pine, Scrub (Hill's), Oak Forest and Barrens
- Lowland Hardwoods - Willow, Soft Maple, Box Elder, Ash, Elm, Cottonwood, River Birch
- Oak - White Oak, Black Oak, Bur Oak
- Sugar Maple, Yellow Birch, White Pine, Red Pine
- Swamp Conifers - White Cedar, Black Spruce, Tamarack, Hemlock
- Water
- White Pine, Red Pine
- White Spruce, Balsam Fir, Tamarack, White Cedar, White Birch, Aspen

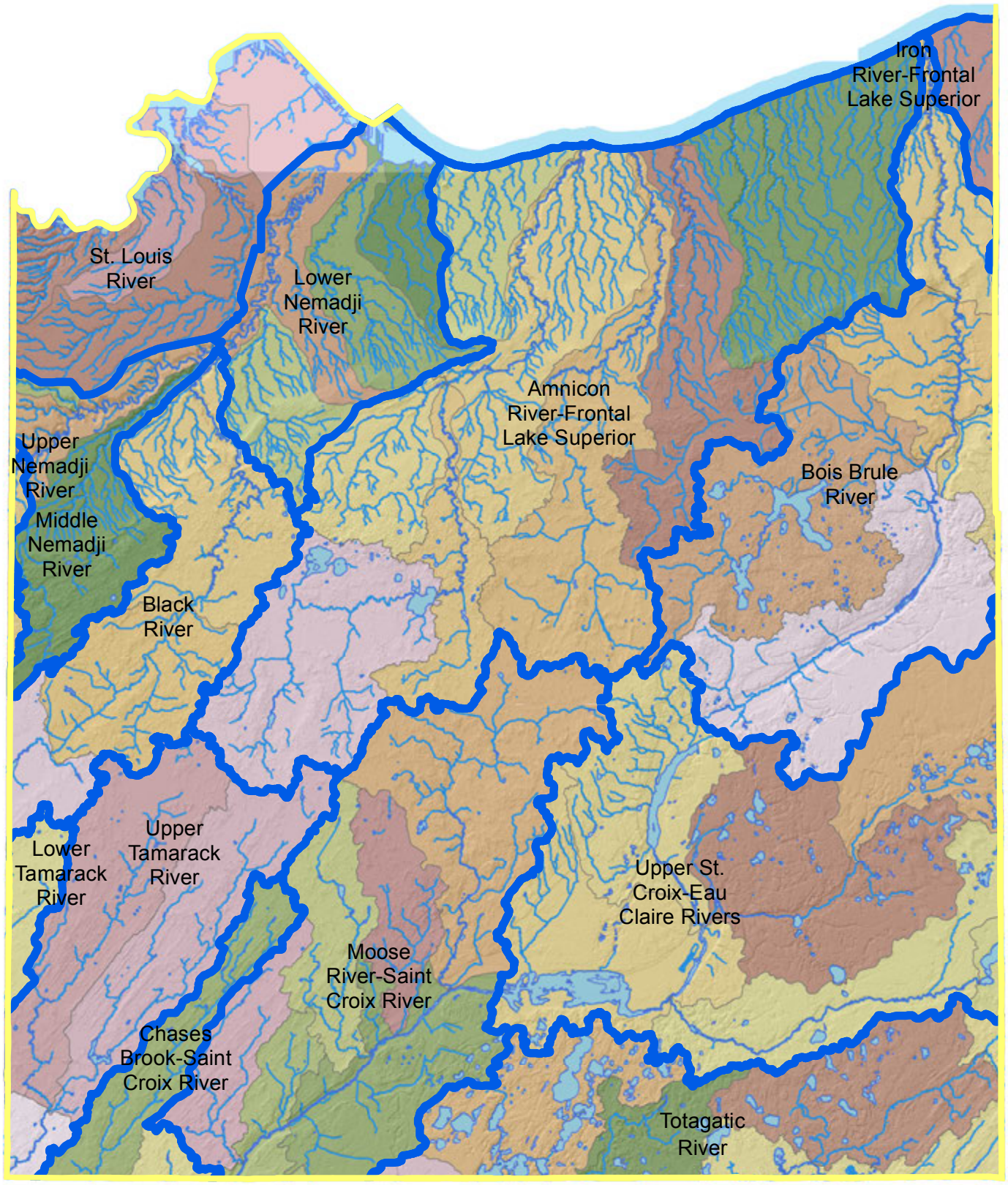
Figure 5 - Finley's Original Vegetation



Source: Douglas County GIS

- National Park Service
- State of Wisconsin
- Douglas County
- Municipally Owned Lands
- Industrial Forest Land

Figure 6 - Land Ownership



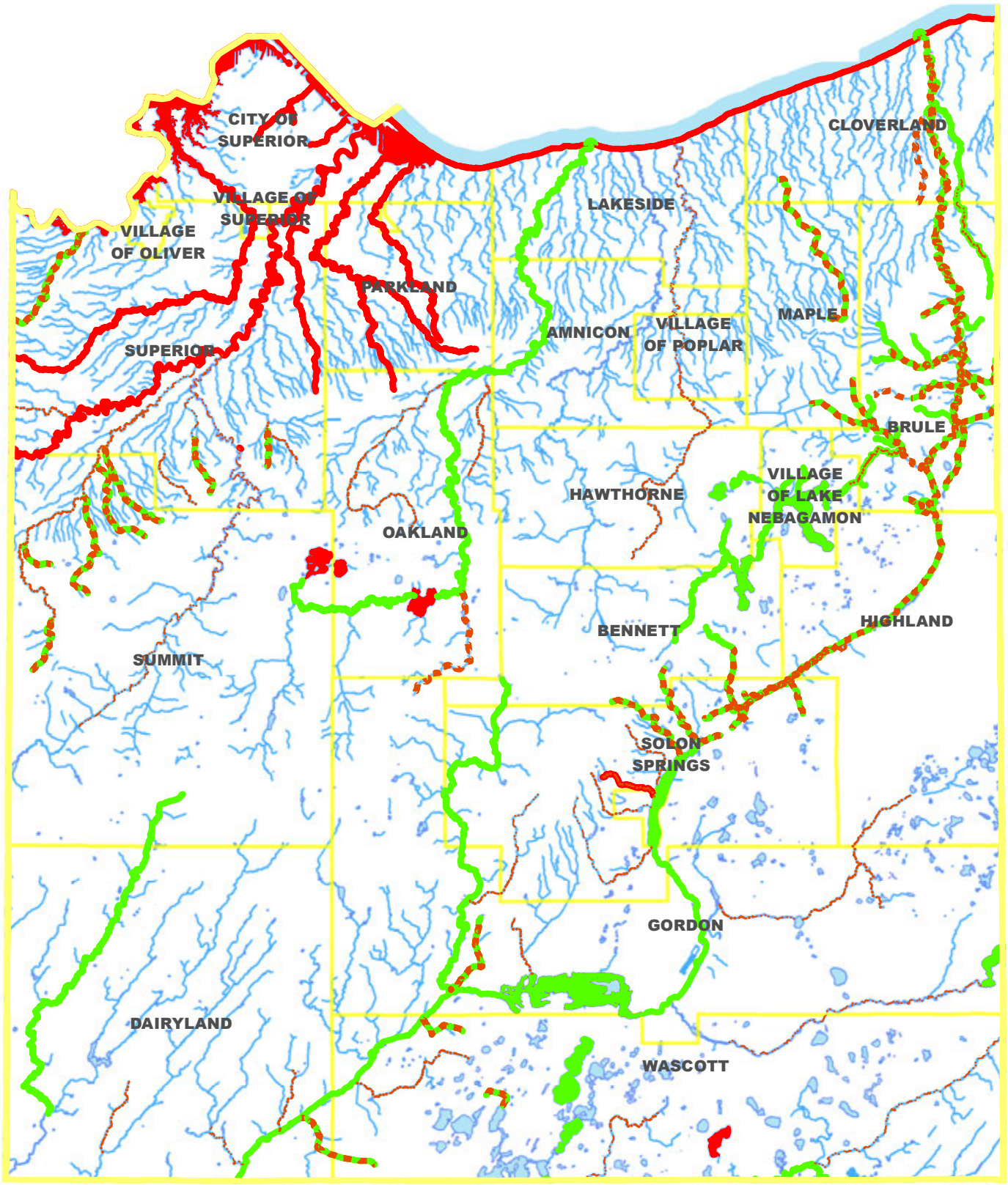
Source: National Hydrography Dataset

DOUGLAS COUNTY WISCONSIN 1854 1954

HUC-10 Watersheds

HUC-12 Watersheds

Figure 7 - Watersheds

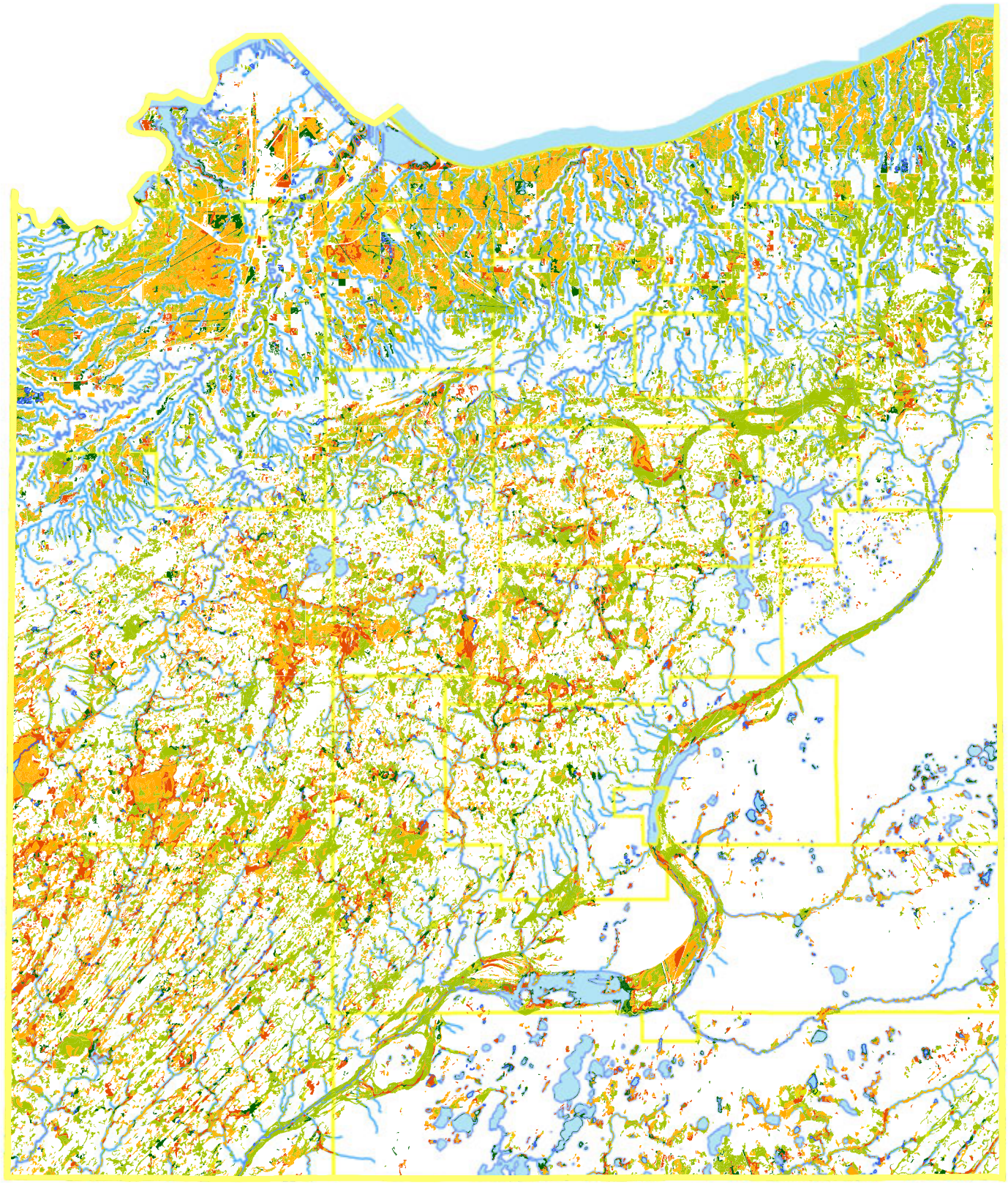


Source: Wisconsin Department of Natural Resources

Trout Stream Class

- CLASS I
- CLASS II
- CLASS III
- Outstanding and Exceptional Rivers and Streams
- Outstanding and Exceptional Lakes
- 303d Impaired Rivers and Streams
- 303d Impaired Lakes

Figure 8 - Designated Waters

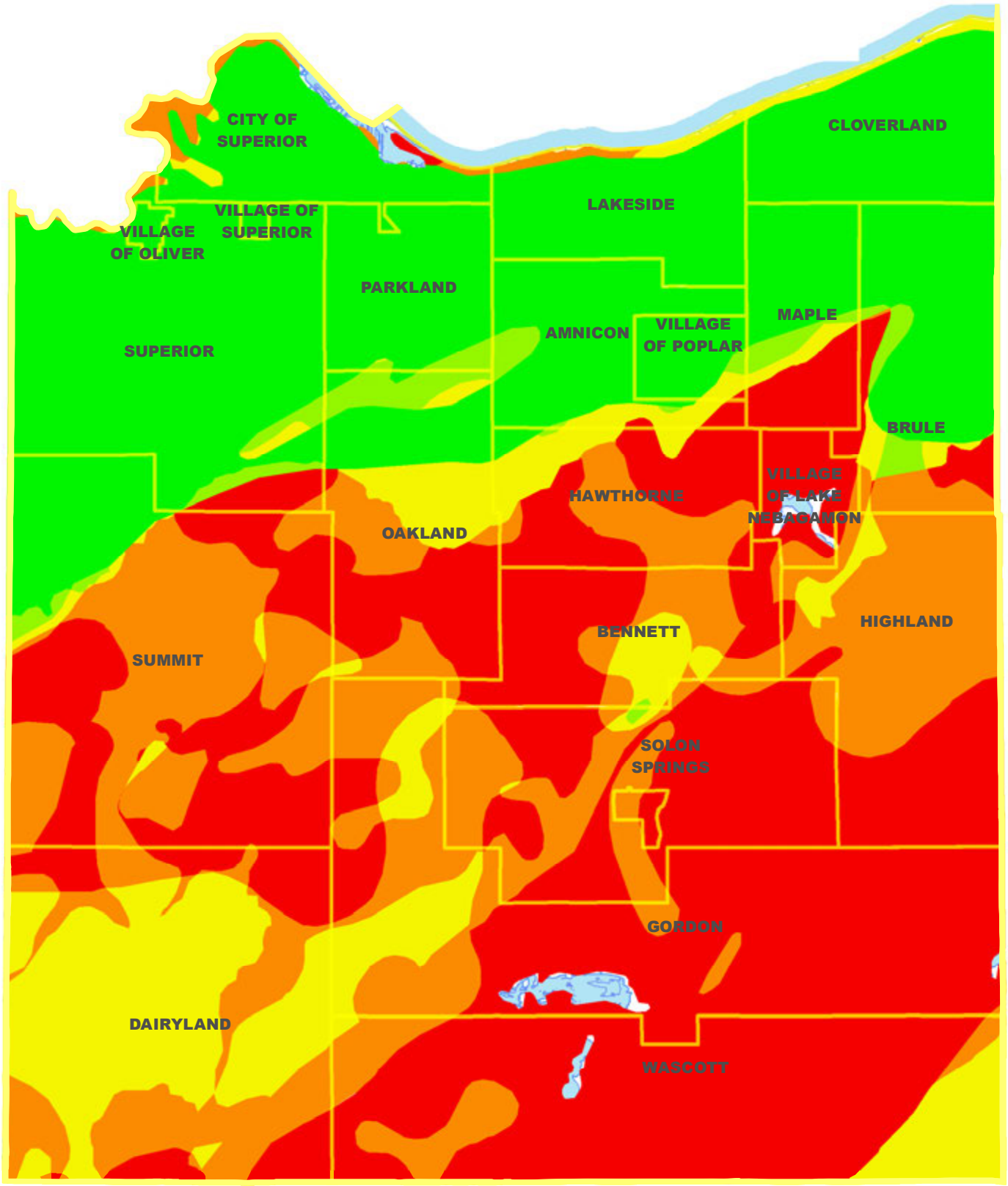


Source: Wisconsin Wetland Inventory

Wetland Class

- Emergent/wet meadow
- Emergent/wet meadow, Flats/unvegetated wet soil
- Emergent/wet meadow, Open Water
- Forested
- Forested, Emergent/wet meadow
- Forested, Flats/unvegetated wet soil
- Forested, Scrub/shrub
- Open Water
- Scrub/shrub
- Scrub/shrub, Emergent/wet meadow

Figure 9 - Wetland Inventory

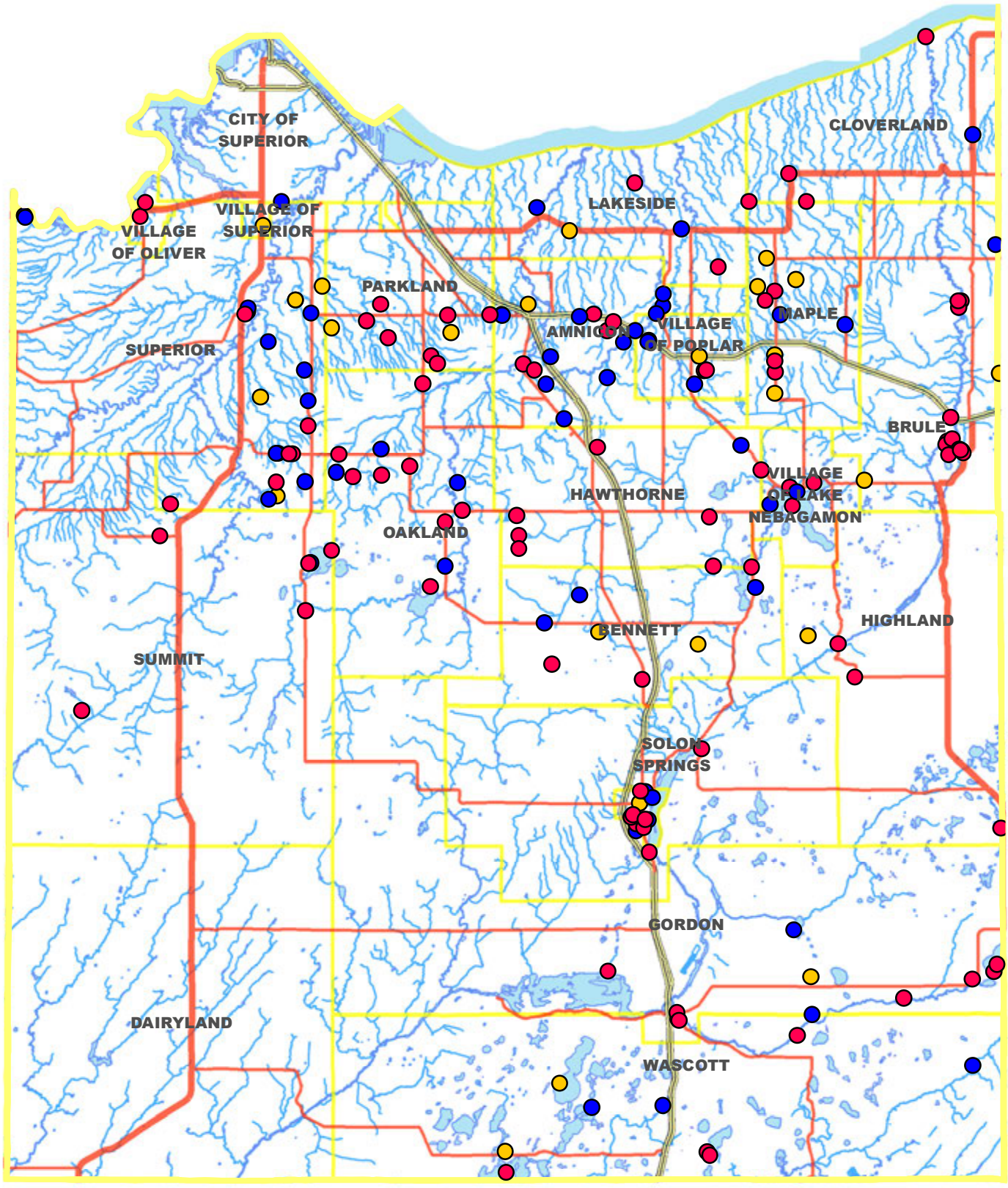


Source: Groundwater Contamination Susceptibility Model. Wisconsin DNR, US Geological Survey, Wisconsin Geological & Natural History Survey, and UW Madison.

Groundwater Susceptibility

- High
- Average
- Low

Figure 10 - Groundwater Contaminataion Susceptibility

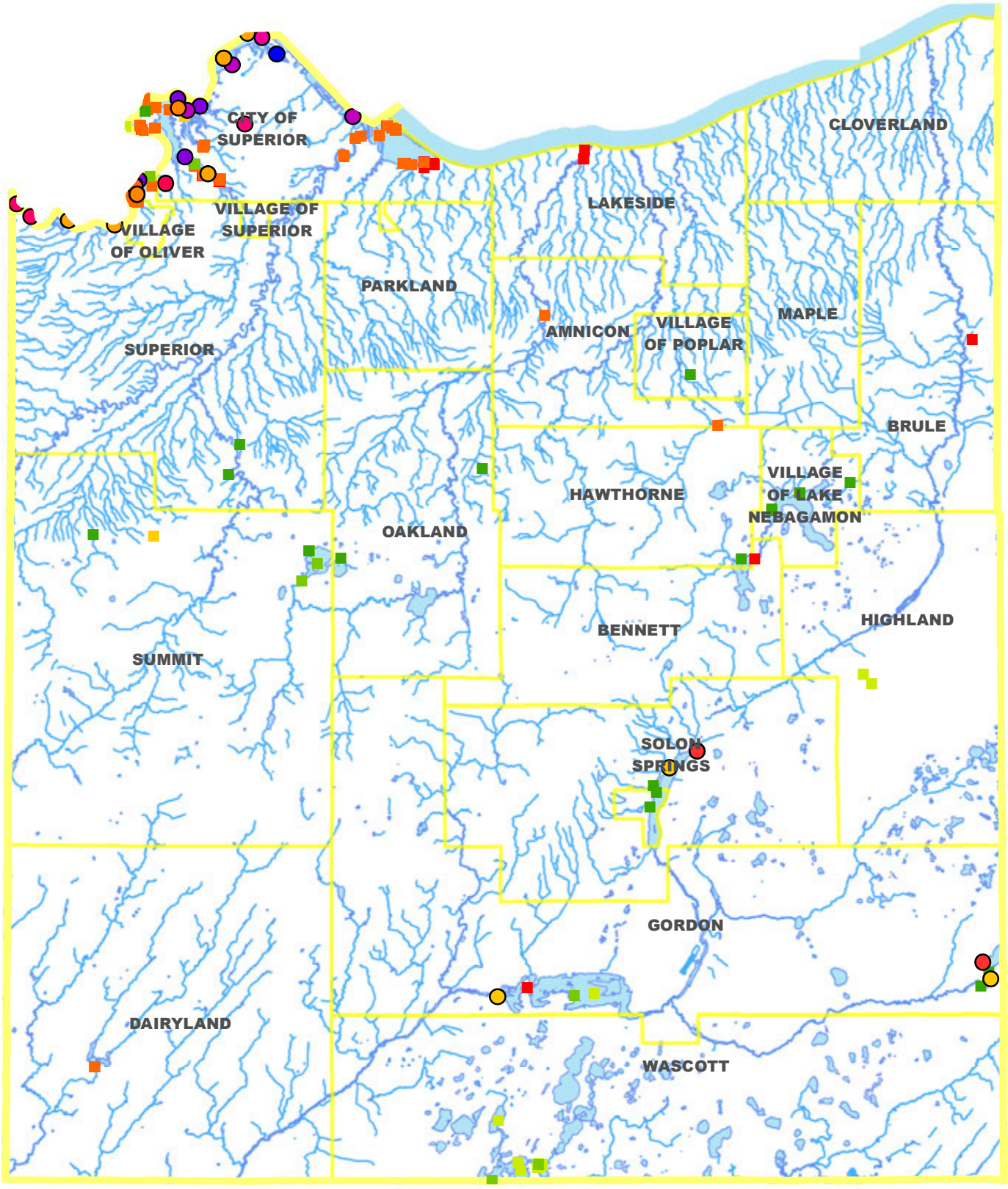


Source: Douglas County Land & Water Conservation Department

GROUP

- DOUGLAS 18OCT
- DOUGLAS 19APR
- DOUGLAS CO 18FEB

Figure 11 - Groundwater Study Sample Locations



Source: Wisconsin Department of Natural Resources, Invasive Species Archive

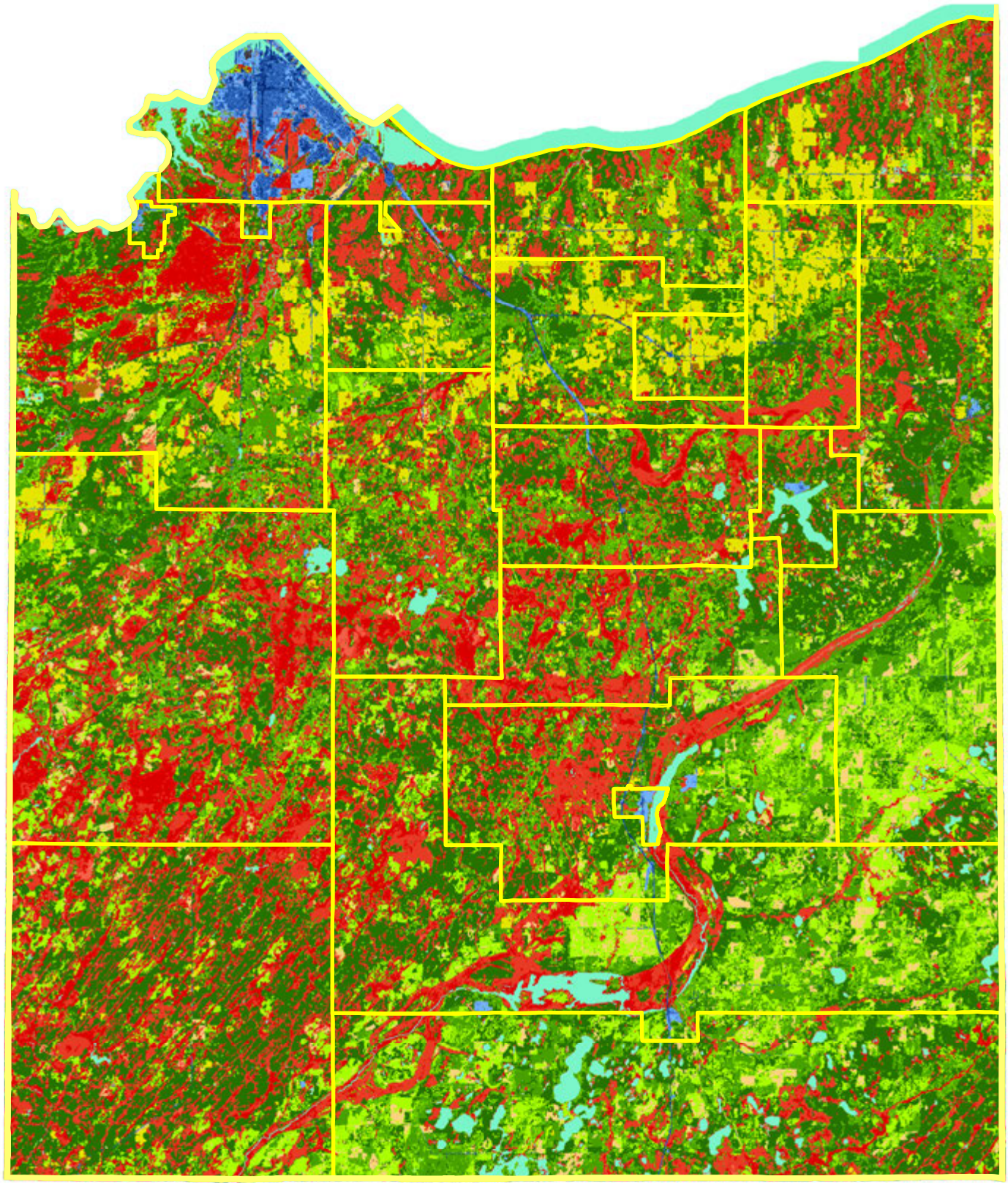
Aquatic Animals

- Chinese mysterysnail
- Eurasian ruffe
- round goby
- alewife
- banded mysterysnail
- common carp
- sea lamprey
- spiny waterflea
- threespine stickleback
- tubenose goby
- white perch
- zebra mussel

Aquatic Plants

- aquatic forget-me-not
- curly-leaf Pondweed
- Eurasian water-milfoil
- European common reed
- hybrid cattail
- narrow-leaved cattail

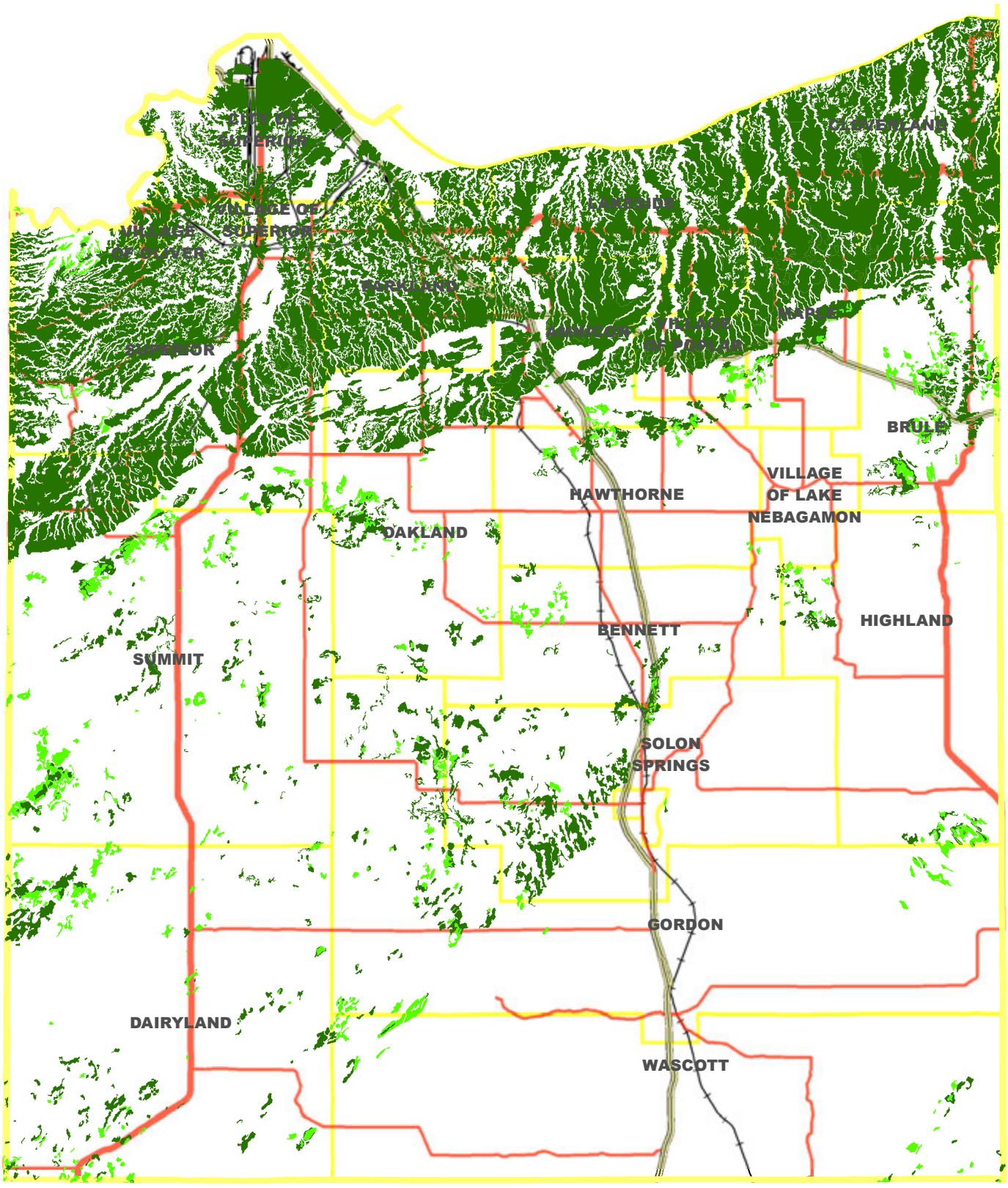
Figure 12 - Aquatic Invasive Species



Source: NOAA CCAP Land Cover 2016

- Bare Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Estuarine Emergent Wetland
- Estuarine Forested Wetland
- Estuarine Scrub/Shrub Wetland
- Evergreen Forest
- Grassland/Herbaceous
- Mixed Forest
- Open Water
- Palustrine Emergent Wetland
- Palustrine Forested Wetland
- Palustrine Scrub/Shrub Wetland
- Pasture/Hay
- Scrub/Shrub
- Unconsolidated Shore

Figure 13 - Land Cover

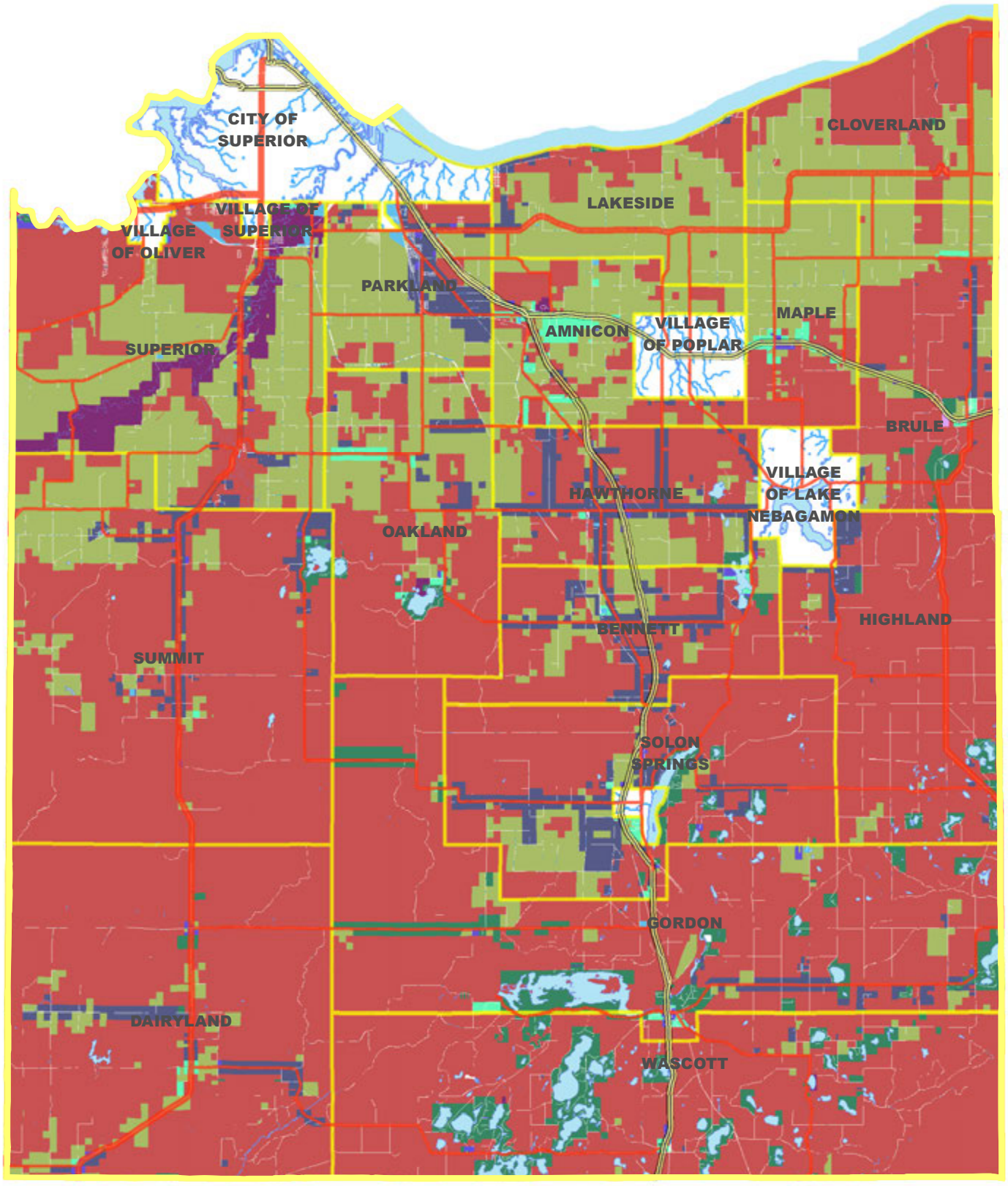


Source: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey.

Farmland Classification

- Prime Farmland
- Farmland of statewide importance

Figure 14 - Prime Farmland



Source: Wisconsin Wetland Inventory

DOUGLAS COUNTY WISCONSIN 1854 1954

- A-1 Agricultural District
- C-1 Commercial District
- F-1 Forestry District
- I-1 Industrial District
- Planned Unit Development
- R-1 Residential District
- R-2 Residential District
- RR-1 Residential-Recreation District
- W-1 Resource Conservation District

Figure 15 - Zoning

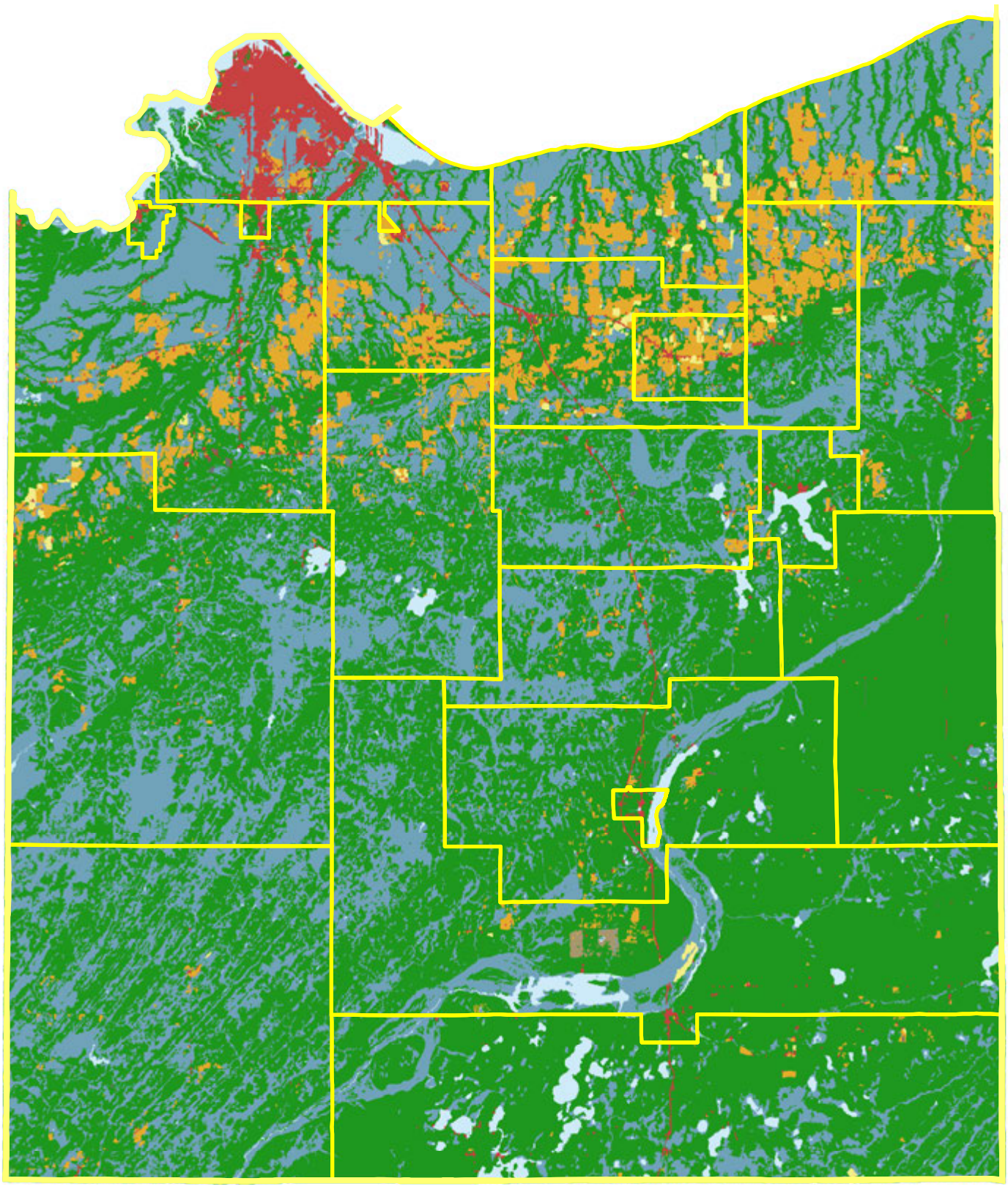


Figure 16 - Land Cover (Wiscland 2)

APPENDIX A: OTHER RESOURCE MANAGEMENT PLANS

Every effort was made to include strategies outlined in other resource management plans to determine the goals and objectives of the Douglas County LWRM Plan. A brief discussion of each plan and resulting recommendations are listed in this appendix. Past efforts reviewed during the planning process include:

I. 2010 WQM Plan - St. Louis and Lower Nemadji River Watershed, Lake Superior Basin

WDNR, August 2010
https://dnr.wi.gov/topic/Watersheds/basins/superior/
Water quality in the St. Louis and Lower Nemadji River Watersheds is impaired. The goal of this plan is to reduce contaminant loads within these watersheds. Point sources of pollution include the City of Superior wastewater treatment plant and Murphy Oil Refinery. A non-point sources of pollution include agriculture, but this is minimal. The high TSS in the waterways can be attributed to historic loss of wetlands and logging practices.

Priority Issues
- Delist the Area of Concern
- Remove contaminated sediments
- Restore Hog Island Inlet
- Support projects that reduce sediment loading
- Promote projects that protect and restore wetlands in the watershed
- Promote projects that maintain oligotrophic status of Lake Superior

II. The State of the Saint Croix Basin

WDNR, March 2002
https://dnr.wi.gov/water/basin/stcroix/stcroix_final_3-26-02.pdf
The St. Croix River originates at Upper St. Croix Lake near Solon springs in Douglas County, Wisconsin and flows approximately 160 miles to join the Mississippi River at Prescott, Wisconsin. The St. Croix River basin drains 4,165 square miles in Wisconsin.

Key Priorities:
- Shoreland (lakes and rivers) habitat protection and restoration
- Nonpoint source runoff contamination of surface waters
- Cooperation with grassland/prairie and wetland restoration to protect soil and water quality and enhance wildlife habitat
- Northwest Sands Integrated Ecosystem Management Plan

Managing access to the river was cited as a future challenge. Managing this should not primarily be competed through land acquisition, but instead by education about stewardship to residents and recreationists within the watershed.

III. Implementation Plan for the Lake St. Croix Total Maximum Daily Load

WDNR, October 2012, Revised February 2013
https://dnr.wi.gov/topic/nonpoint/documents/9kep/St_Croix_River_Basin-Plan.pdf
This plan was put into place to reduce the load of phosphorous in the St. Croix Watershed to meet the TMDL.

The point sources of pollution identified are:
- 52 municipal and industrial wastewater facilities
- 25 municipalities regulated for storm water runoff by a MS4 permit
- 10 concentrated animal feeding operations, or CAFOs

The most common land use type in the basin is forestry. Most of the portion of the watershed which falls within Douglas County is forest land. No phosphorous reduction requirements were set for the forestry land use type.

IV. A Plan for the Resources of Douglas County Soil & Water Conservation District

Douglas County, 1981

Authorized under Chapter 92, Wis. Stats., Soil and Water Conservation Districts (SWCD) had the responsibility for developing resource conservation programs for the county. The plans served as the basis for developing the SWCD's annual plan of work and gave direction to SWCD operations. The Douglas County plan identified the following issues in their 1981 Resource Conservation Plan:

The most important issues identified were:

- Agriculture
  - protect soil resources
  - preserve and protect prime agriculture lands
  - protect water resources
- Forestry
- Protect resource base for fiber production
- Provide growth opportunities
- Protection of public lands
- Multiple use opportunities
- Roadside erosion control
- Identification and protection of sensitive/critical habitats
- Recreation

Plan Goals:

All items identified as plan issues were to be addressed. However, no staff were available to implement the plans. Many of the issues identified in these plans continue to be priority concerns.

V. Farmland Preservation Program, Douglas County, Wisconsin

Douglas County, 1982, Updated 2017

https://www.douglascountywi.org/892/Farmland-Preservation-Plan

The Douglas County Board adopted a resolution in 1980 requesting state funds to prepare county-wide Farmland Preservation Plans under the Wisconsin Farmland Preservation Act. The intent of each plan is to protect each county's farmland from potential development and to help guide future development. Producers enrolled in this state program are eligible for tax relief in return for developing a soil and water conservation plan for their farm.

Douglas County promotes:

- A diverse array of agricultural products
- Zoning and other policies that protects productive agricultural land
- Forests managed according to best management practices
- Maintaining the current balance of forest, agricultural and recreational land
- The preservation of historically farmed and prime farmlands designated on the approved 2017 Douglas County

Farmland Preservation Map.

FPP updated policy – Douglas County requires owners with new agreements certify meeting the new soil and water conservation standards including agricultural performance standards identified as priorities in that county's approved Land and Water Resource Management Plan. New agreements will be reviewed at least every four years based upon the priorities established in that county's approved Land and Water Resource Management Plan.

VI. Impact of Nonpoint Pollution Control on Western Lake Superior: Red Clay Project Final Report

EPA, 1979

https://nepis.epa.gov

The Red Clay Project in the Lake Superior Basin was a research and demonstration project sponsored by five Soil & Water Conservation Districts (SWCDs) from two states during the period from 1974-1979. The SWCDs were charged with the task of seeking practical solutions to the many forms of red clay erosion and the resulting water quality problems.

Nonpoint source pollution, especially in the red clay region, has historically degraded water quality and fisheries habitat. Much of this naturally occurring bank erosion is difficult to control on a wide scale. However, efforts to better plan upland land uses and management objectives can have a significant impact on the hydrology of the area.

The most important issues identified were:

- shoreline and stream bank stability
- general slope stability
- roadside erosion control
- nonpoint source pollution
- contaminated sediments
- loss of fish habitat
- land use
- forest management

Plan Goals:

- streambank and roadside erosion control
- shoreline stabilization
- water quality monitoring
- rainfall and temperature monitoring

VII. Northern Initiatives: A Strategic Plan for the Next Decade

Department of Natural Resources, 1995

The *Northern Initiatives Project* began in 1993 when Secretary George Meyer asked the three northern districts to study the WDNR's impact on this region. An internal review of WDNR regulations and policies revealed that the WDNR plays a larger role in the economic well-being of northern Wisconsin than it does in other regions of the state. Staff concluded this was due to so much of the north's economy being based on tourism and recreation, forestry, and the area's national reputation for clean air, water and soil.

As a result of these findings, WDNR held 20 town meetings across northern Wisconsin with more than a thousand people attending. They also surveyed youth in the region and a focus group in southern Wisconsin. The theme was "You talk, we'll listen." The major issues emerging from these open houses included:

The most important issues identified were:

- the quickening pace of change in the north
- impacts of shoreline development
- concerns about mining
- forest management practices
- the WDNR's role in the north
- land use

Plan Goals:

- Involve citizens in WDNR decision-making.
- Foster greater understanding between the public and the WDNR.
- Long-range resource planning.
- Recognize the important role of the WDNR in the north.
- Reshape the WDNR's programs and decision-making for northern Wisconsin.

Update: **Northern Initiatives Mid-Term Report Card 1996-2000, August 2000**

The midterm report provides a look at the Northern Initiatives Lakes & Shoreland s accomplishments over the past five years. Accomplishments include:

* Education: workshops, forums, conferences, videos, educational CD presentations, slide shows, pamphlets, and web sites.

* Voluntary Conservation: The Wild Lakes list was updated and the Northern Rivers list created. Burnett County initiated a program of property tax credit incentives in exchange for landowners protecting and restoring shoreland habitat.

* Technical Assistance: WDNR, UWEX, and WAL have increased staff to assist local governments with lake classification efforts, amend shoreland zoning ordinances, secure funding for land use planning grants, and provide educational programs.

VIII. Northern Rivers Initiative

WDNR, et al., 2000

The Department of Natural Resources spearheaded the *Northern Rivers Initiative* in order to develop a classification system for northern Wisconsin rivers and streams. This system is no longer in use with the passage of Wisconsin Act 55 in July, 2015.

IX. Wisconsin's Section 303(d) Waterbody Program

WDNR, 2018

https://dnr.wi.gov/topic/impairedwaters/2018IR_IWList.html

The US Environmental Protection Agency (EPA), under the Clean Water Act (s. 303(d)), requires states to list those waters which are not meeting water quality standards. Both water quality criteria

for specific substances and the designated uses are used as the basis for development of *total maximum daily loads (TMDLs)*. This list is known as the ***impaired waters list***. Table 5 is a comprehensive listing of Douglas County waters included on the Wisconsin 303(d) list.

Table 5: Wisconsin 303 (d) List				
Local Waterbody Name	***Source Category***	***Pollutant***	***Impairment Indicator***	***Watershed***
Amnicon Lake	NPS	Sediment/Total Suspended Solids	Elevated Water Temperature, Degraded Habitat	Lake Superior
Bear Creek	NPS	Total Phosphorus	Impairment Unknown	Lake Superior
Birch Creek	PS/NPS	Unknown Pollutant	Degraded Biological Community	Lake Superior
Bluff Creek	NPS	Total Phosphorus	Impairment Unknown	Lake Superior
Crawford Creek	Contam. Sed.	Creosote	Chronic Aquatic Toxicity	Lake Superior
Crawford Creek	Contam. Sed.	PAHs	Chronic Aquatic Toxicity	Lake Superior
Dowling Lake	NPS	Unknown Pollutant	Excess Algal Growth	Lake Superior
Pattison Beach (State Park)	PS/NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Unnamed (Trib To Crawford Creek)	Contam. Sed.	Creosote	Chronic Aquatic Toxicity	Lake Superior
Unnamed (Trib To Crawford Creek)	Contam. Sed.	PAHs	Chronic Aquatic Toxicity	Lake Superior
Minnesuing Lake	Atm. Dep.	Mercury	Contaminated Fish Tissue	Lake Superior
Lake Nebagamon	Atm. Dep.	Mercury	Contaminated Fish Tissue	Lake Superior
Amnicon River Beach, Lake Superior	PS/NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Brule River State Forest Beach #3, Lake Superior	PS/NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Lake Superior	Contam. Sed.	PCBs	Contaminated Fish Tissue	Lake Superior
Lake Superior	Atm. Dep.	Mercury	Contaminated Fish Tissue	Lake Superior
Lake Superior (mouth of Bois Brule River)	Contam. Sed.	PCBs	Contaminated Fish Tissue	Lake Superior
Lake Superior (mouth of Bois Brule River)	Atm. Dep.	Mercury	Contaminated Fish Tissue	Lake Superior
Middle River Beach, Lake Superior	PS/NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Wisconsin Point Beach #2, Lake Superior	Other	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Wisconsin Point Beach 1, Lake Superior	NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Wisconsin Point Beach 3, Lake Superior	NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Barker Island Inner Beach	PS/NPS	E. coli	Recreational Restrictions - Pathogens	Lake Superior
Lyman Lake	Atm. Dep.	Mercury	Contaminated Fish Tissue	Lake Superior
Lower Nemadji River	NPS	Sediment/Total Suspended Solids	Degraded Habitat	Lake Superior
Newton Creek	PS/NPS	Unknown Pollutant	Degraded Biological Community	Lake Superior

Newton Creek	Contam. Sed.	Foam/Flocs/St. Croixum/Oil Slicks	Chronic Aquatic Toxicity	Lake Superior
Newton Creek	Contam. Sed.	PAHs	Chronic Aquatic Toxicity	Lake Superior
Newton Creek	Contam. Sed.	Unspecified MetaLake Superior	Chronic Aquatic Toxicity	Lake Superior
Pokegema River	PS/NPS	Total Phosphorus	Impairment Unknown	Lake Superior
Table 5: Wisconsin 303 (d) List				
Local Waterbody Name	***Source Category***	***Pollutant***	***Impairment Indicator***	***Watershed***
Red Lake	Atm. Dep.	Mercury	Contaminated Fish Tissue	St. Croix
St. Louis River AOC, Howards Bay	Other	Mercury	Contaminated Fish Tissue	Lake Superior
St. Louis River AOC, Howards Bay	Other	PCBs	Contaminated Fish Tissue	Lake Superior
St. Louis River AOC, Howards Bay	Contam. Sed.	Lead	Contaminated Sediment	Lake Superior
St. Louis River AOC, St. Louis River	Other	PAHs	Chronic Aquatic Toxicity	Lake Superior
St. Louis River AOC, St. Louis River	Other	2,3,7,8-Tetrachlorodibenzo-p-dioxin (only)	Contaminated Sediment	Lake Superior
St. Louis River AOC, St. Louis River	Other	PCBs	Contaminated Fish Tissue	Lake Superior
St. Louis River AOC, St. Louis River	Other	DDT	Contaminated Sediment	Lake Superior
St. Louis River AOC, St. Louis River	Other	Mercury	Contaminated Fish Tissue	Lake Superior
St. Louis River AOC, St. Louis River	Other	Dieldrin	Contaminated Sediment	Lake Superior
St. Louis River AOC, St. Louis River	Other	Unspecified MetaLake Superior	Chronic Aquatic Toxicity	Lake Superior
St Croix Creek	PS/NPS	Unknown Pollutant	Elevated Water Temperature	St. Croix
St. Croix Flowage	Atm. Dep.	Mercury	Contaminated Fish Tissue	St. Croix
Hog Island Inlet	Contam. Sed.	Foam/Flocs/St. Croixum/Oil Slicks	Chronic Aquatic Toxicity	Lake Superior
Hog Island Inlet	Contam. Sed.	PAHs	Chronic Aquatic Toxicity	Lake Superior
Hog Island Inlet	Contam. Sed.	Unspecified MetaLake Superior	Chronic Aquatic Toxicity	Lake Superior
Faxon (Central Park) Creek	NPS	Unknown Pollutant	Degraded Biological Community	Lake Superior
Spring Creek (Solon Spring Creek)	PS/NPS	Unknown Pollutant	Elevated Water Temperature	St. Croix
Unnamed Creek	NPS	Unknown Pollutant	Degraded Biological Community	Lake Superior

Contam. Sed. (contaminated sediments), Atm Dep (Atmospheric Deposition), PS (point source of pollution), NPS (non-point source pollution), Other(several sources of contamination)

X. Erosion and Sedimentation in the Nemadji River Basin, Nemadji River

Basin Project Final Report

NRCS, USFS, Jan. 1998

https://dnr.wi.gov/topic/GreatLakes/documents/NemadjiRiverBasinProjectReport.pdf

Due to concern over accelerated pollution of the Great Lakes, the U.S. and Canada entered into the Great Lakes Water Quality Agreement (WQA) in 1972. Subsequent amendments to the agreement resulted in the designation of 43 "Areas of Concern." The St. Louis River System as one of these areas, and the Nemadji River is a subwatershed of this system.

Remedial Action Plans (RAPs) for these "Areas of Concern" were formulated to implement provisions of the WQA and restore beneficial uses to those areas. The RAP committee enlisted the assistance of Carlton County Soil and Water Conservation District, the Douglas County Land Conservation Committee, and the Onanegozie Resource Conservation and Development Council. The result was the *Nemadji River Basin Project.*

The ultimate long-term goal of the recommendations is to restore beneficial uses to the Nemadji River system. It is recognized the watershed has accelerated erosion due mainly to an alteration in the hydrologic processes of the watershed. Specific hydrologic processes requiring restoration include:

- decreased runoff volumes and peak discharges through increased infiltration
- "de-channelizing" runoff paths from uplands to main channels
- re-establishing healthy riparian corridors, and
- maintaining diverse land cover conditions.

Some short-term goals include for the watershed include:

- prevent further degradation of hydrologic condition,
- maintain economic viability for the current land users, and
- formulate partnerships that can coordinate land use decisions.

Objectives and action strategies devised to meet the short-term goals:

1. **Coordinate Forestry Management** - Coordinate logging activities that would benefit the hydrology of the watershed include the following:
    a. On a small hydrologic basis, ensure that no more than 40 percent of the area is in open land and young forest.
    b. Develop a coordinated, watershed-wide logging transpiration plan.
    c. Coordinate activities within the defined riparian zone to maintain physical continuity of that zone throughout a hydrologic unit.
    d. Develop forest harvesting research proposals and seek funding for proposals.

2. **Agriculture Waste Management Systems and Nutrient Management** - A livestock concentration inventory was completed in early 1995 which showed 85 sites in Minnesota and 42 sites in Wisconsin. Of the 127 total sites, 51 were rated as high hazard for surface or groundwater pollution potential. Agriculture waste management usually involves on-site animal waste storage or filtering whereas nutrient management includes the proper management and planned application of one or both inorganic (commercial) and organic (animal waste) fertilizers and nutrients. Recommendations for implementation of agricultural objectives include:
    a. Increase planning and monetary assistance to implement the nutrient management and waste management objectives.

b. Potentially high hazard livestock concentration areas should receive priority technical assistance.
c. Implement a first level awareness nutrient management education effort
d. Inform local agribusiness of the efforts of the Nemadji River Basin Project.
e. Reduce impacts of livestock grazing by using rotational or controlled grazing and other pasture management techniques. This will reduce compaction and produce healthier vegetation to reduce water yield from pastures.
f. Eliminate or control livestock access to riparian zone and stream channels.

3. **Engineering Techniques** - Conventional engineering techniques reduce erosion and prevent downstream transport of sediments and could involve the following:
    a. Implement grade controls using drop structures to reduce downcutting.
    b. Perform streambank and stream toe protection.
    c. Improve drainage of slopes which are unstable due to high soil water content.

4. **Wetland Enhancement and Creation** - Wetland enhancement and creation can improve water quantity and quality and wildlife conditions within a watershed. Water quantity benefits include reduction of peak flows by virtue of the storage properties of the wetland and maintaining base flows by acting as a groundwater recharge areas.

5. **Erosion Control with Soil Bioengineering/Geotechnical Construction Techniques** - Soil bioengineering/geotechnical construction offers a promising alternative to traditional riparian engineering techniques. These techniques combine mechanical, biological, and ecological concepts and treatments to reduce slope failures and erosion. Recommendation:
    a. Where possible use soil bioengineering/geotechnical construction to incorporate large woody debris, such as root wads, into streams. It is highly recommended that a person with considerable experience in soil bioengineering techniques be consulted prior to planning these systems. Rosgen's stream classification, or a similar system, should be used.

6. **Open Land Management** - Open land management is maintaining a small percentage of the area of a subwatershed in a condition devoid of large overstory trees and usually vegetated by healthy growth of native grasses, forbs, and shrubs. These open lands are not generally grazed by livestock, but are left unmanaged. Recommendations include:
    a. Work with state and local wildlife managers and conservationists to create an inventory of current/planned open areas. Maintain this inventory on a GIS System.
    b. Encourage all resource managers to consider benefits of maintaining open area.
    c. Encourage landowners to include input from wildlife managers, foresters, and conservationists when deciding on options for land use conversion.
    d. Open and young forest area should not exceed 40 percent of the area by watershed planning unit. Discourage tree planting initiatives in subwatersheds where the percent open and young forest area is less than 20 percent.

7. **Riparian Zone Management –** Recommendations include:
    a. Continue forestry coordination in the watershed that was begun by the Nemadji River Basin Project.

b. Provide financial incentives, educational opportunities, and technical assistance to landowners to enable them to manage their riparian zones for stream ecosystem improvement.
c. Create a riparian management zone for streams in the Nemadji River Basin.
d. Manage the riparian zone for large woody debris.
e. Livestock use of the riparian zone should be managed to prevent the loss of benefits from other uses.
f. Take precautions to avoid blocking floodplain when building a road across a stream.
g. Where roadbeds cross floodplain, use long bridges, multiple elevation culverts, or rock fords rather than single culverts in the streambed.

8. **Roadside Erosion Management** - One percent of all watershed erosion in the Nemadji River Basin is estimated to be from roadside erosion, which represents over 3,000 tons per year. Also roads and ditches increase peak flows and streambank erosion. Recommendations include:
    a. Continue coordination of the transportation committee and meet annually to discuss progress on practices and recommendations.
    b. Utilize statewide Best Management Practice Standards and Specifications and modify practices to address unique soil, runoff, and vegetation establishment problems.
    c. Research measures that have been used in other areas dealing with same soil.
    d. More frequent use of traverse drains, ditch blocks, etc. to reduce road ditch flow.
    e. Develop a prioritization system using the roadside erosion inventory.
    f. Work with township road supervisors to inventory and prioritize existing erosion problems on minimum maintenance roads.
    g. Complete work on two or more problem sites each summer in each county.
    h. Try bioengineering in select locations for erosion control.
    i. Minimize road building in the red-clay area of the watershed.
    j. Conduct workshops for road construction contractors to discuss special problems of working with red-clay soil in the watershed.
    k. Gate and close "problem" minimum maintenance roads and other travel ways during wet times of year.
    l. Coordinate construction of logging roads among different logging companies to minimize total miles of roads.
    m. Work with the Department of Tourism to educate people on the hydrologic impacts from rutting and soil compaction due to the use of recreational vehicles.

9. **Upland Forest Management** – Recommendations include:
    a. Continue forestry coordination in the watershed that began with the Nemadji River Basin Project by forming Forestry Coordination Committee.
    b. Open area percent within a subwatershed unit not to exceed 40 percent.
    c. Manage forest land for species and land cover diversity.
    d. Encourage the Wisconsin BMP Committees to accelerate the BMP monitoring process on red-clay soils.
    e. Increase the amount of forestry technical assistance available to non-industrial private forest landowners.
    f. Encourage non-industrial private forest landowners to manage their forest land.
    g. Encourage the use of a logging contract on all timber sales.
    h. Ongoing research on forest hydrology, causes slumping in clay soils, logging BMP's and soil compaction caused by logging equipment should be monitored.

10. **Inventory and Data Needs** - The following items were identified as important to the ultimate success of completing the goals and objectives of this plan:
    a. Stream systems should be classified using a geomorphic approach as outlined by Rosgen (1994).
    b. A watershed-wide Geographic Information System (GIS) database would be extremely useful in future implementation efforts.
        - This is now available through the WDNR's Surface Water Data View at https://dnr.wi.gov/topic/surfacewater/swdv/
    c. Complete soil survey for Douglas County
        - This is now available through NRCS's Web Soil Survey at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
    d. Geographic Information System (GIS) data layers including soils, cover type, habitat type, ownership, zoning, etc.
        - These are now available
    e. Method for integrating land records with offices working with landowners
        - Land records are available through Douglas County Planning and Zoning and can be found at https://www.douglascountywi.org/406/GIS-Mapping
    f. Complete surface and groundwater surveys
        - Water quality information is always being gathered, and more is always needed. Douglas County LWCD began testing groundwater quality in 2018
    g. Evaluate and prioritize water bodies for eligibility in WDNR's nonpoint pollution program and for generally addressing nonpoint pollution through various other federal, state, and private funding sources
        - Nonpoint source pollution is being addressed through the creation of Nine-Key Element Plans. There is currently a plan in place for the St. Croix Watershed and one in the process of creation for the St. Louis, Lower and Middle Nemadji, and Black River Watersheds.

XI. Wisconsin's Lake Superior Coastal Wetlands Evaluation, Including Other Selected Natural Features of the Lake Superior Basin

Bureau of Endangered Resources, WDNR, 1997

https://dnr.wi.gov/topic/wetlands/cw/pdfs/superior/superior_text.pdf

This field manual identifies 30 priority wetland sites and 18 priority aquatic sites within the Lake Superior Basin. The WDNR Lake Superior Basin Water Quality Management Plan also lists these priority wetland sites.

XII. The Ecological Landscapes of Wisconsin: An Assessment of Ecological Resources and a Guide to Planning Sustainable Management, Chapter 17 Northwest Sands Ecological Landscape

WDNR, 2015

https://dnr.wi.gov/topic/landscapes/documents/1805Ch17.pdf

This report presents the result of a landscape level management planning effort for the northwest sands area. The area is 1 of 16 ecological landscapes identified in the assessment. The purpose of the plan was to produce a comprehensive database of information for the area and to identify opportunities that individual jurisdictions could consider acting on within their individual areas of responsibility.

XIII. Rare, Threatened and Endangered Species and Natural Communities in Douglas County

Natural Heritage Inventory, WDNR, Updated April 2019

http://www.dnr.state.wi.us

Table 6: Rare, Threatened and Species and Natural Communities in Douglas County				
Scientific Name	**Common Name**	**WI Status ***	**Federal Status** ***	**Group**
Bat Hibernaculum	Bat Hibernaculum	SC		Miscellaneous Elements
Bird Rookery	Bird Rookery	SC		Miscellaneous Elements
Migratory Bird Concentration Site	Migratory Bird Concentration Site	SC		Miscellaneous Elements
Hemidactylium scutatum	Four-toed Salamander	SC/H		Rare Amphibians
Lithobates septentrionalis	Mink Frog	SC/H		Rare Amphibians
Zoogenetes harpa	Boreal Top	SC/N		Rare Aquatic and Terrestrial Snails
Cicindela hirticollis rhodensis	Hairy-necked Tiger Beetle	END		Rare Beetles
Cicindela patruela patruela	Northern Barrens Tiger Beetle	SC/N		Rare Beetles
Hydraena angulicollis	A Minute Moss Beetle	SC/N		Rare Beetles
Hygrotus falli	A Predaceous Diving Beetle	SC/N		Rare Beetles
Hygrotus farctus	A Predaceous Diving Beetle	SC/N		Rare Beetles
Ilybius angustior	A Predaceous Diving Beetle	SC/N		Rare Beetles
Accipiter gentilis	Northern Goshawk	SC/M	SOC	Rare Birds
Ammospiza leconteii	LeConte's Sparrow	SC/M		Rare Birds
Bartramia longicauda	Upland Sandpiper	THR		Rare Birds
Botaurus lentiginosus	American Bittern	SC/M		Rare Birds
Catharus ustulatus	Swainson's Thrush	SC/M		Rare Birds
Charadrius melodus	Piping Plover	END	LE	Rare Birds
Chlidonias niger	Black Tern	END	SOC	Rare Birds
Chordeiles minor	Common Nighthawk	SC/M		Rare Birds
Contopus cooperi	Olive-sided Flycatcher	SC/M		Rare Birds
Coturnicops noveboracensis	Yellow Rail	THR		Rare Birds
Falcipennis canadensis	Spruce Grouse	THR		Rare Birds
Falco peregrinus	Peregrine Falcon	END		Rare Birds
Hydroprogne caspia	Caspian Tern	END		Rare Birds
Ixobrychus exilis	Least Bittern	SC/M		Rare Birds
Oporornis agilis	Connecticut Warbler	SC/M		Rare Birds

Table 6: Rare, Threatened and Species and Natural Communities in Douglas County				
Scientific Name	**Common Name**	**WI Status ***	**Federal Status** ***	**Group**
Picoides arcticus	Black-backed Woodpecker	SC/M		Rare Birds
Regulus calendula	Ruby-crowned Kinglet	SC/M		Rare Birds
Setophaga cerulea	Cerulean Warbler	THR	SOC	Rare Birds
Setophaga kirtlandii	Kirtland's Warbler	END	LE	Rare Birds
Sterna hirundo	Common Tern	END	SOC	Rare Birds
Sturnella neglecta	Western Meadowlark	SC/M		Rare Birds
Tympanuchus phasianellus	Sharp-tailed Grouse	SC/H		Rare Birds
Xanthocephalus xanthocephalus	Yellow-headed Blackbird	SC/M		Rare Birds
Atrytonopsis hianna	Dusted Skipper	SC/N		Rare Butterflies and Moths
Boloria chariclea	Arctic Fritillary	SC/N		Rare Butterflies and Moths
Erynnis martialis	Mottled Dusky Wing	SC/N		Rare Butterflies and Moths
Hemileuca nevadensis ssp. 3	Midwestern Fen Buckmoth	SC/N		Rare Butterflies and Moths
Hesperia metea	Cobweb Skipper	SC/N		Rare Butterflies and Moths
Oeneis chryxus	Chryxus Arctic	SC/N		Rare Butterflies and Moths
Brachycentrus lateralis	A Humpless Casemaker Caddisfly	SC/N		Rare Caddisflies
Aeshna clepsydra	Mottled Darner	SC/N		Rare Dragonflies and Damselflies
Aeshna subarctica	Subarctic Darner	SC/N		Rare Dragonflies and Damselflies
Enallagma clausum	Alkali Bluet	SC/N		Rare Dragonflies and Damselflies
Ophiogomphus anomalus	Extra-striped Snaketail	END		Rare Dragonflies and Damselflies
Phanogomphus graslinellus	Pronghorn Clubtail	SC/N		Rare Dragonflies and Damselflies
Somatochlora ensigera	Plains Emerald	SC/N		Rare Dragonflies and Damselflies
Somatochlora forcipata	Forcipate Emerald	SC/N		Rare Dragonflies and Damselflies
Acipenser fulvescens	Lake Sturgeon	SC/H		Rare Fishes
Anguilla rostrata	American Eel	SC/N		Rare Fishes
Etheostoma microperca	Least Darter	SC/N		Rare Fishes
Moxostoma carinatum	River Redhorse	THR		Rare Fishes
Percina evides	Gilt Darter	THR		Rare Fishes
Arphia conspersa	Speckled Rangeland Grasshopper	SC/N		Rare Grasshoppers and Allies

Table 6: Rare, Threatened and Species and Natural Communities in Douglas County				
Scientific Name	**Common Name**	**WI Status ***	**Federal Status** ***	**Group**
Chloealtis abdominalis	Rocky Mountain Sprinkled Locust	SC/N		Rare Grasshoppers and Allies
Ahtiana aurescens	Eastern Candlewax Lichen	SC		Rare Lichens
Hypogymnia tubulosa	Powder-headed Tube Lichen	SC		Rare Lichens
Ramalina unifolia	One Leaf Ramalina	SC		Rare Lichens
Canis lupus	Gray Wolf	SC/FL	LE	Rare Mammals
Glaucomys sabrinus	Northern Flying Squirrel	SC/P		Rare Mammals
Myotis lucifugus	Little Brown Bat	THR		Rare Mammals
Myotis septentrionalis	Northern Long-eared Bat	THR	LT	Rare Mammals
Napaeozapus insignis	Woodland Jumping Mouse	SC/N		Rare Mammals
Poliocitellus franklinii	Franklin's Ground Squirrel	SC/N		Rare Mammals
Sorex palustris	Water Shrew	SC/N		Rare Mammals
Maccaffertium pulchellum	A Flat-headed Mayfly	SC/N		Rare Mayflies
Alasmidonta marginata	Elktoe	SC/P		Rare Mussels and Clams
Cyclonaias tuberculata	Purple Wartyback	END		Rare Mussels and Clams
Elliptio complanata	Eastern Elliptio	SC/P		Rare Mussels and Clams
Asclepias ovalifolia	Dwarf Milkweed	THR		Rare Plants
Botrychium minganense	Mingan's Moonwort	SC		Rare Plants
Callitriche hermaphroditica	Autumnal Water-starwort	SC		Rare Plants
Caltha natans	Floating Marsh Marigold	END		Rare Plants
Calypso bulbosa	Calypso Orchid	THR		Rare Plants
Canadanthus modestus	Northwestern Sticky Aster	SC		Rare Plants
Carex backii	Rocky Mountain Sedge	SC		Rare Plants
Carex merritt-fernaldii	Fernald's Sedge	SC		Rare Plants
Carex nigra	Smooth Black Sedge	SC		Rare Plants
Cirsium hillii	Hill's Thistle	THR	SOC	Rare Plants
Cirsium pitcheri	Pitcher's Thistle	THR	LT	Rare Plants

Table 6: Rare, Threatened and Species and Natural Communities in Douglas County				
Scientific Name	**Common Name**	**WI Status ***	**Federal Status** ***	**Group**
Cypripedium arietinum	Ram's-head Lady's-slipper	THR		Rare Plants
Cystopteris laurentiana	Laurentian Bladder Fern	SC		Rare Plants
Eleocharis compressa var. compressa	Flat-stemmed Spike-rush	SC		Rare Plants
Eleocharis mamillata	Mamillate Spike-rush	SC		Rare Plants
Eleocharis nitida	Neat Spike-rush	END		Rare Plants
Eleocharis robbinsii	Robbins' Spike-rush	SC		Rare Plants
Equisetum palustre	Marsh Horsetail	SC		Rare Plants
Eriophorum russeolum ssp. leiocarpum	Russet Cotton-grass	SC		Rare Plants
Geum macrophyllum var. macrophyllum	Large-leaved Avens	SC		Rare Plants
Huperzia selago	Fir Clubmoss	SC		Rare Plants
Juncus vaseyi	Vasey's Rush	SC		Rare Plants
Leucophysalis grandiflora	Large-flowered Ground-cherry	SC		Rare Plants
Littorella uniflora	American Shoreweed	SC		Rare Plants
Myosotis laxa	Small Forget-me-not	SC		Rare Plants
Parnassia palustris	Marsh Grass-of-Parnassus	THR		Rare Plants
Petasites sagittatus	Sweet Colt's-foot	THR		Rare Plants
Pinguicula vulgaris	Common Butterwort	END		Rare Plants
Platanthera hookeri	Hooker's Orchid	SC		Rare Plants
Potamogeton bicupulatus	Snail-seed Pondweed	SC		Rare Plants
Potamogeton diversifolius	Water-thread Pondweed	SC		Rare Plants
Potamogeton perfoliatus	Clasping-leaf Pondweed	SC		Rare Plants
Potamogeton vaseyi	Vasey's Pondweed	SC		Rare Plants
Pyrola minor	Lesser Wintergreen	END		Rare Plants
Ranunculus cymbalaria	Seaside Crowfoot	THR		Rare Plants
Ranunculus gmelinii	Small Yellow Water Crowfoot	END		Rare Plants
Ranunculus lapponicus	Lapland Buttercup	END		Rare Plants

Table 6: Rare, Threatened and Species and Natural Communities in Douglas County				
Scientific Name	**Common Name**	**WI Status ***	**Federal Status** ***	**Group**
Rhynchospora fusca	Brown Beak-rush	SC		Rare Plants
Ribes oxyacanthoides ssp. oxyacanthoides	Canadian Gooseberry	THR		Rare Plants
Salix planifolia ssp. planifolia	Tea-leaved Willow	THR		Rare Plants
Sceptridium rugulosum	Rugulose Grape-fern	SC		Rare Plants
Schoenoplectus torreyi	Torrey's Bulrush	SC		Rare Plants
Scirpus georgianus	Georgia Bulrush	SC		Rare Plants
Scirpus pallidus	Pale Bulrush	SC		Rare Plants
Sparganium glomeratum	Clustered Bur-reed	THR		Rare Plants
Symphyotrichum robynsianum	Robyns' Aster	SC		Rare Plants
Tephroseris palustris	Marsh Ragwort	SC		Rare Plants
Thalictrum venulosum	Veined Meadowrue	SC		Rare Plants
Utricularia resupinata	Northeastern Bladderwort	SC		Rare Plants
Vaccinium vitis-idaea	Mountain Cranberry	END		Rare Plants
Woodsia oregana ssp. cathcartiana	Oregon Woodsia	SC		Rare Plants
Emydoidea blandingii	Blanding's Turtle	SC/P	SOC	Rare Reptiles
Glyptemys insculpta	Wood Turtle	THR	SOC	Rare Reptiles
Plestiodon septentrionalis	Prairie Skink	SC/H		Rare Reptiles
Isogenoides olivaceus	A Perlodid Stonefly	SC/N		Rare Stoneflies

**WI Status*
END = Endangered
THR = Threatened
SC = Special Concern
WDNR and federal regulations regarding Special Concern species range from full protection to no protection. The current categories and their respective levels of protection are as follows:
SC/P = protected wild animal
SC/N = no laws regulating use, possession, or harvesting
SC/H = take regulated by establishment of open closed seasons
SC/FL = federally protected as endangered or threatened, but not so designated by WDNR
SC/M = fully protected by federal and state laws under the Migratory Bird Act.

***Federal Status*
LE = listed endangered
LT = listed threatened
PE = proposed for listed as endangered
PT = proposed for listed as threatened
NEP = nonessential experimental population(s) in part of its range
C = candidate for future listing
CH = Critical Habitat
SOC = Species of Concern
HPR = High Potential

XIV. Aquatic Invasive Species

WDNR, 2019
https://dnr.wi.gov/lakes/invasives/AISByWaterbody.aspx?location=16

Table 7: Locations of AIS in Douglas County	
Waterbody Name	**Invasive Species****
Amnicon Lake	Curly-Leaf Pondweed, Purple Loosestrife, Yellow Iris*
Amnicon River	Yellow Iris*
Bear Creek	Narrow-leaf cattail*
Bear Lake	Purple Loosestrife*
Big Lake	Yellow Iris*
Bois Brule River	Aquatic forget-me-not*, Garden heliotrope, Narrow-leaf cattail*, Queen of the meadow*, Yellow Iris
Cranberry Creek	Purple Loosestrife, Rusty Crayfish*
Cranberry Lake	Eurasian Water-Milfoil
Crystal Lake	Chinese Mystery Snail, Freshwater Jellyfish
Dowling Lake	Curly-Leaf Pondweed, Ornamental water lilies (non-native Nymphaea sp.) , Purple Loosestrife*, Yellow Iris*
Eau Claire River	Aquatic forget-me-not*, Banded Mystery Snail, Chinese Mystery Snail*, Purple Loosestrife, Rusty Crayfish, Rusty Crayfish*
Hay Creek	Phragmites (non-native)*
Lake Minnesuing	Purple Loosestrife, Rusty Crayfish, Yellow Iris*
Lake Nebagamon	Chinese Mystery Snail, Japanese Knotweed, Narrow-leaf cattail, Purple Loosestrife, Rusty Crayfish, Yellow Iris*
Lake Superior	Asiatic Clam, Eurasian Water-Milfoil, Faucet Snail, Garden heliotrope*, Narrow-leaf cattail*, Phragmites (non-native)*, Purple Loosestrife*, Quagga Mussel, Rainbow Smelt, Round Goby, Ruffe, Threespine Stickleback*, Tubenose Goby*, Yellow Iris*, Zebra Mussel
Little Bois Brule River	Garden heliotrope
Little Sand Lake	Banded Mystery Snail*, Chinese Mystery Snail*
Lower Eau Claire Lake	Aquatic forget-me-not*, Banded Mystery Snail, Chinese Mystery Snail*, Purple Loosestrife, Rusty Crayfish
Lower Ox Creek	Banded Mystery Snail*
Lower Ox Lake	Banded Mystery Snail*
Lucius Lake	Yellow Iris*
Lyman Lake	Yellow Iris*
McGraw Lake	Phragmites (non-native)*
Minnesuing Creek	Purple Loosestrife, Rusty Crayfish, Yellow Iris*
Minong Flowage	Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Purple Loosestrife, Rusty Crayfish
Mud Lake	Zebra Mussel
Nebagamon Creek	Japanese Knotweed, Narrow-leaf cattail, Yellow Iris*
Newton Creek	Round Goby
Person Lake	Chinese Mystery Snail

Table 7: Locations of AIS in Douglas County	
Waterbody Name	**Invasive Species**
Pokegama River	Aquatic forget-me-not*, Garden heliotrope*, Narrow-leaf cattail, Narrow-leaf cattail*, Phragmites (non-native)*, Purple Loosestrife, Yellow Iris*
Radigan Flowage	Narrow-leaf cattail
Red Lake	Eurasian Water-Milfoil, Freshwater Jellyfish
Red River	Aquatic forget-me-not*, Purple Loosestrife*, Yellow Iris*
Saint Croix River	Aquatic forget-me-not*, Japanese Knotweed*, Japanese Mystery Snail, Purple Loosestrife*, Yellow Iris
Saint Louis River	Asiatic Clam (Corbicula), Curly-Leaf Pondweed, Faucet Snail, New Zealand Mudsnail, Phragmites (non-native), Purple Loosestrife, Zebra Mussel
Sauntrys Pocket Lake	Chinese Mystery Snail
Simms Lake	Purple Loosestrife*, Rusty Crayfish
Spirit Lake	Phragmites (non-native)*, Purple Loosestrife*
Spring Lake	Yellow Iris*
St Croix Flowage	Aquatic forget-me-not*, Banded Mystery Snail, Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Narrow-leaf cattail, Purple Loosestrife
Sucker Lake	Yellow Iris*
Superior Bay	Eurasian Water-Milfoil
Totagatic River	Purple Loosestrife, Rusty Crayfish*
Unnamed	Rusty Crayfish
Unnamed	Japanese Knotweed*, Yellow Iris
Unnamed	Asiatic Clam
Unnamed	Curly-Leaf Pondweed, Ornamental water lilies (non-native Nymphaea sp.) , Yellow Iris*
Unnamed	Yellow Iris*
Unnamed	Asiatic Clam
Unnamed	Phragmites (non-native)*
Unnamed	Phragmites (non-native)*
Unnamed	Zebra Mussel
Unnamed	Asiatic Clam
Unnamed	Yellow Iris*
Unnamed	Round Goby
Upper Saint Croix Lake	Banded Mystery Snail, Chinese Mystery Snail, Curly-Leaf Pondweed, Japanese Knotweed*, Purple Loosestrife, Rusty Crayfish, Yellow Iris
Upper Tamarack River	Rusty Crayfish*
Whitefish Lake	Rainbow Smelt

** Observed – This is a record that has been observed in the field, but a specimen has not been verified by a taxonomic expert or an established population has not been found within the waterbody. Only dead AIS or few individuals of one age class have been observed, not an established breeding population. This will include dead individuals observed outside their growing season that will need to be revisited during target times to verify. This also includes historic monitoring data that has not been verified by a taxonomic expert.*
*** Purple Loosestrife - WDNR has only a partial list of locations. For more extensive data, visit the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) website [exit DNR]. Fish species - This web page only has a partial list of locations. For more extensive data, visit the Wisconsin Department of Natural Resources Map of Distribution of WI Fish Species [exit DNR].*

XV. Douglas County Comprehensive Land Use Plan

Douglas County, 2010
https://www.douglascountywi.org/565/Comprehensive-Plan-2010-2030
Douglas County has a county wide comprehensive land use plan coordinated by the North West Regional Planning Commission (NWRPC). Steps have been taken to include all county plans in the Comprehensive Land Use Plan.

XVI. Douglas County Forest Comprehensive Land-Use Plan 2006-2020

Douglas County Forestry Department, 2006
https://www.douglascountywi.org/214/Comprehensive-Land-Use-Plan-2006-2020
This plan reflects the uniqueness of the Douglas County Forest and presents how it will be managed, used and developed, how it will look, and the benefits it will provide over the course of the 2006 - 2020 planning period. It is intended to inform both the public and resource managers of the many planned uses and management activities of the forest. The department is committed to sustainable management; an approach that incorporates ecological, economic, and social benefits for current and future generations. The Douglas County Forestry Department includes the Douglas County Land Access Management Plan which was develop to provide users of the forest a wide array of experiences, including those for both motorized and non-motorized pursuits. Objectives of the plan development were as follows:

- Ensure sustainability of natural resources
- Provide a range of opportunities for all users
- Minimize conflict between users
- Ensure public safety for all users

XVII. Douglas County Aquatic Invasive Species Strategic Plan

Douglas County LWCD, 2010
https://www.douglascountywi.org/637/Invasive-Species
The Douglas County Aquatic Invasive Species Strategic Plan (AIS Plan) addresses control and containment of new and existing populations of AIS in county waterways. It was funded by a one-year grant from the WDNR Aquatic Invasive Species Grant Program.

Plan Goals:

- Goal 1: Aquatic invasive species (AIS) infestations already existing in the County are controlled or eradicated and prevented from spreading; new AIS infestations are prevented.
- Goal 2: Communication between lake and river residents, watershed groups, visitors, and other waterway organizations is improved and education is provided for all users.
- Goal 3: The County and municipalities participate in the protection of water resources and understand how critical the resource is to the County, municipalities, northern Wisconsin and the region.
- Goal 4: Sustainable funding for AIS research, monitoring, planning, restoration and education activities are adequately provided by private, local, County, state, federal, and tribal sources.

XVIII. Lake Superior Management Plan (LaMP)

The Lake Superior Partnership, Updated for 2015-2019
https://binational.net/wp-content/uploads/2016/09/Lake%20Superior%20LAMP%202015-2019.pdf

One of the most significant environmental agreements in the history of the Great Lakes was put in place with the signing of the Great Lakes Water Quality Agreement of 1978 (GLWQA), between the United States and Canada. This historic agreement committed the U.S. and Canada (the Parties) to address the water quality issues of the Great Lakes in a coordinated, joint fashion. The purpose of the agreement was to "restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem" (IJC 1993). The 1987 amendment to the GLWQA required the development of Lakewide Management Plans (LaMPs) which "shall embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses...they are to serve as an important step toward virtual elimination of persistent toxic substances..." This document represents the current LaMP for Lake Superior.

The Great Lakes Water Quality Agreement specifies that the LaMPs are to be completed in four stages. However, under a streamlined LaMP review and approval process, the LaMPs now treat problem identification, selection of remedial and regulatory measures, and implementation as a concurrent, integrated process rather than a sequential or staged one. In the Lake Superior LaMP, Stages 1 and 2 for critical chemicals were completed before the decision was made to integrate. Stage 3 was merged into LaMP 2000 as the critical chemicals chapter.

In addition, the LaMPs go beyond the requirement of a LaMP for critical pollutants and use an ecosystem approach, which integrates environmental protection and natural resource management. LaMP progress is now reported every four years. Adaptive management is used to allow the process to change as needed by building upon successes, accepting new information and drawing from public involvement and input. The LaMP therefore, can be adjusted over time to respond to the most pertinent issues facing the lake ecosystem. Additional details on this can be found in Chapter 1. The Lake Superior LaMP is unique because of an additional agreement between the federal governments, states and province surrounding Lake Superior. Announced in 1991, the agreement, called the "Binational Program to Restore and Protect the Lake Superior Basin," established a Zero Discharge Demonstration Program and a broader ecosystem approach.

The LaMP/Lake Superior Binational Program contains appropriate funded and proposed (non-funded) actions for restoration and protection to bring about actual improvement in the ecosystem. Actions include commitments by the Parties, governments and regulatory programs, as well as suggested voluntary actions that could be taken by non-governmental partners.

XIX. Great Lakes Strategy

WDNR, 2009
https://dnr.wi.gov/topic/greatlakes/strategy.html

In 2006, the Wisconsin Department of Natural Resources´ (WDNR) Office of the Great Lakes, with the help of countless individuals and organizations, began developing a Wisconsin specific strategy to parallel the Great Lakes Regional Collaboration Strategy. Called the **Wisconsin´s Great Lakes Strategy** (Strategy), it brought together information from the various past planning efforts to build a comprehensive state action agenda. The strategy will serve as the vehicle for coordinating and allocating resources and will better position Wisconsin to begin program and project implementation

in the event that significant funding comes from the US Congress for the restoration of the Great Lakes.
The strategy is, and rightfully needs to be, a dynamic document. The Office of the Great Lakes sought input for an update in the fall of 2008 relying on both internal and external partners to provide input on new issues and priorities. The updated strategy reflects these changes and recommended actions since 2006, including recognition of the potential impacts from a changing climate.

XX. Hog Island/Newton Creek Ecological Restoration Master Plan

EPA, 2007
https://archive.epa.gov/ecopage/web/pdf/hog-island-newton-creek-ecological-restoration-master-plan-200709-136pp.pdf
The Hog Island and Newton Creek Ecological Restoration Master Plan provides a "blueprint" for the restoration of natural communities and ecosystem processes for Newton Creek, the Hog Island Inlet, and Hog Island in Superior, Wisconsin. Historically, this area has been contaminated by industrial discharges and a former municipal combined sewer overflow. From 1997 to 2005, multiple partners remediated the contaminated sediments in Newton Creek and Hog Island Inlet. Through a process of stakeholder engagement and collaboration, this Ecological Restoration Master Plan intends to build upon the success of these remediation efforts by proposing a guiding "vision" as well as specific goals, objectives, and actions that will help to restore terrestrial, riparian, wetlands, and aquatic habitats; increase ecosystem biodiversity and resilience; and reduce threats to the natural communities in the area. It also intends to increase environmental awareness, community enjoyment, and economic vitality through passive recreational, educational, and stewardship opportunities. The Ecological Restoration Master Plan incorporates specific recommendations of the existing St. Louis River Habitat Plan, and attempts to address a suite of beneficial use impairments within the St. Louis River watershed. Hog Island, Hog Island Inlet, and Newton Creek lie within the St. Louis River watershed that drains into Superior harbor, at the westernmost tip of Lake Superior. Newton Creek is a 1.5 mile long perennial stream that originates from a large wetland complex and the discharge of the Murphy Oil refinery. It meanders through open wetland, grassland, and woodland areas before the channel straightens into the residential areas of the City of Superior and drains into Hog Island Inlet. The 17-acre inlet supports shallow water habitats including wetlands and mudflats. Hog Island itself is an artificial island, created in the 1920s and 1930s from dredge spoils from Superior harbor. It has developed a diverse array of vegetation and wildlife communities and remains under the management of Douglas County.

XXI. St. Louis River Remedial Action Plan

Minnesota Pollution Control Agency, 1987, Updated 2018
https://dnr.wi.gov/topic/GreatLakes/StLouis.html
The St. Louis River Area of Concern (AOC) was designated by the Great Lakes Water Quality Agreement (WQA) between the United States and Canada in 1972. Nine beneficial use impairments (BUI's) have been recognized:

1) Restrictions on fish and wildlife consumption;
2) Degradation of fish and wildlife populations;
3) Fish tumors or other deformities;
4) Degradation of benthos;
5) Restrictions on dredging activities;
6) Eutrophication or undesirable algae;
7) Beach closings;

8) Degradation of aesthetics; and
9) Loss of fish and wildlife habitat.

The Remedial Action Plan (RAP) was developed in 1987 to restore beneficial uses of this area. The goal of the RAP is to define problems and their causes, and then recommend actions and timetables to restore all beneficial uses of the AOCs. Restoring uses are to be achieved through implementation of programs and measures to control pollution sources and remediate environmental problems (St. Louis River Citizens Action Committee).

In 1993, the Citizen's Advisory Committee of the RAP requested the Natural Resources Conservation Service identify methods for reducing sedimentation in the Nemadji River (Nemadji River Basin Project, Phase II). The Nemadji River Basin Project (NRBP) began in October 1993. The effort is led by the Natural Resources Conservation Service, which applied for the funds with local sponsors (Carlton County Board, Douglas County Board, Carlton County Soil & Water Conservation District, and Duluth/Superior Metropolitan Interstate Committee).

The RAP advised that agencies secure funding to implement recommendations generated by the NRBP. These recommendations will forward the goal of reducing sediment input from the Nemadji River watershed. The RAP calls for a basin project to reduce erosion and sedimentation, with a watershed-wide focus, determinations of the extent and causes of runoff problems, and strategies to implement practices that would reduce erosion and sedimentation. The NRBS builds on previous work of the Red Clay Project, which focused on engineering solutions to streambank erosion – they concluded that 90 percent of the sediment discharged to Lake Superior originated in 2 percent of the area, namely streambanks, channels, and gullies (WDNR Basin Plan). As part of the NRBP, the WDNR has been involved in developing practices for land use, soil management, and forestry that will help protect and improve water quality condition. A detailed sediment budget was also developed for the watershed. Data provided by the project will be used to rank the basin for priority watershed selection, with the knowledge that the watershed could benefit from priority watershed status (Nemadji River Basin Project, Phase II).

To date two of the nine BUI's have been removed. One impairment, Degradation of Aesthetics, was removed in 2014. In 2018 the Fish Tumors and Deformities BUI was removed. Meeting the remaining seven BUI's is planned to be completed by 2025.

XXII. Biotic Inventory Report for the Brule River State Forest

WDNR, June 2016
https://dnr.wi.gov/files/PDF/pubs/nh/NH0856_ext.pdf
This plan documents biological information to assist in revision of the Brule River State Forest Master Plan.

Survey Efforts focus on:

- Identifying and evaluating ecologically important areas, including re-evaluating previously designated Primary Sites
- Documenting or updating rare species occurrences
- Documenting or updating occurrences of high quality natural communities.

XXIII. Water Quality and Hydrology of Whitefish (Bardon) Lake, Douglas County, Wisconsin, With Special Emphasis on Responses of an Oligotrophic Seepage Lake to Changes in Phosphorus Loading and Water Level

US- Geologic Survey, 2009
https://pubs.usgs.gov/sir/2009/5089/pdf/sir2009-5089_web.pdf
Studies have found that riparian property values are highest on lakes that have clear water and undisturbed shorelines. Whitefish Lake is a stand-out among Wisconsin's many lakes because it retains its wild character along most of its shoreline; contains deep, clear waters; cultivates a complex fishery that may result in trophy fish; and provides important habitat for many species of wildlife.

Phosphorous inputs threaten the water quality of the lake. The average annual load of phosphorus to the lake was 232 pounds: 56 percent from precipitation, 27 percent from groundwater, and 16 percent from septic systems. More input from the atmosphere was contributed than originally assumed. As shoreline development continues to increase, decision-makers and the general public must find ways to ensure that fish and wildlife habitat is not degraded.

XXIV. Minong Flowage Washburn and Douglas Counties: Aquatic Plant Management Plan

Minong Flowage Association, Updated 2016-2020
http://minongflowage.org/invasive-species/management-plans/
The Minong Flowage Association is currently implementing its Aquatic Plant Management Plan, among other programs. Aquatic Plant Management Plans have been in place since 2008 for the Minong Flowage to control invasive plant species such as Eurasian Water Milfoil.

XXV. St. Croix Headwaters Management Plan

WDNR, June 2013
http://dnr.wi.gov/lakes/publications/stcroix/

Protecting the headwater of the St. Croix River is a high priority. Two endangered species of mussels live in the St. Croix River, and it is classified as National Scenic Riverway. This study evaluated different components of the headwaters including lake and stream water quality and quantity, water level management and fish passage, wetlands, critical habitat, AIS, and current and future land use. Currently 66% of the headwaters are forested and only 5% of land use is agricultural or developed. Using policy and regulations, restoration, education, coordination, and monitoring will be important for protecting water quality into the future.

XXVI. A Watershed Approach to Wetland Management in The Lake Superior Basin

Douglas County LWCD, May 2016
https://www.douglascountywi.org/DocumentCenter/View/8288/Final-LS-Watershed-based-Plan-5_9_16?bidId=
This document reflects the input of a citizen advisory committee to guide wetland mitigation in the Douglas County Lake Superior Basin. The document establishes prioritization of locations for wetland preservation, enhancement, and restoration projects.

For wetland restoration, site-level criteria will include, at a minimum, all identified potentially restorable wetland areas that:

- Are located on or adjacent to transitional agricultural land
- Have identified pour points and catchments that intersect highways and roads
- Have a direct hydrologic connection to streams and rivers
- Are adjacent to current wetlands with significant surface water detention function
- Are adjacent to public land currently managed for conservation and/or preservation of unique habitats

For wetland preservation, site-level criteria will include, at a minimum:

- Current wetlands with moderate to high function for storm water detention (SWD), especially in the headwaters and floodplain areas in all Lake Superior Basin watersheds of Douglas County.
- Current wetlands adjacent to public land currently managed for conservation and/or preservation of unique habitats.

XXVII. Douglas County Mitigation Reserve Program In-Lieu Fee Prospectus

Douglas County LWCD
This tentative plan is designed to benefit the county by strategically planning wetland mitigation projects in areas where it is most beneficial for the watershed and land use designations. The following is a list of plan objectives:

A. Provide high quality mitigation for unavoidable impacts to aquatic resources due to development.
B. Utilize scale efficiencies by combining the impacts from individual smaller projects within a service area into mitigation at larger sites.
C. Develop an ecologically-based site selection process to identify the most appropriate mitigation options that result in greater ecological benefit to a watershed than could be achieved through permittee-responsible mitigation.
D. Select the best mitigation sites for the program through a rigorous analysis by a group of professional resource managers and local experts, drawing from personal knowledge and best available science and analyses of existing plans and data for a watershed.
E. Provide an alternative to permittee-responsible mitigation.
F. Provide an effective and transparent accounting structure for collecting in-lieu fees, disbursing project funds, and compliance reporting.
G. Work in an efficient and transparent manner with the Interagency Review Team to assure all activities are conducted in accordance with the Guidelines for Compensatory Mitigation in Wisconsin,

XXVIII. Wisconsin's Forestry Best Management Practices for Water Quality: Field Manual for Loggers, Landowners, and Land Managers

WDNR, 2010

https://dnr.wi.gov/files/pdf/pubs/fr/FR0093.pdf

This manual defines BMP's for Wisconsin's forests. Wisconsin's timber industry yields $20 billion per year, and to continue this industry into the future care must be taken to manage resources properly.

Forestry BMPs are designed to protect:

- General water quality, by minimizing inputs of polluted runoff
- Water temperature, by ensuring an adequate and appropriate amount of shade along shorelines and streambanks
- Nutrient balances, by providing necessary inputs of organic material and nutrients that serve as the basis of aquatic food chains
- Habitat diversity, by making certain there is an adequate source of large woody debris for aquatic systems
- Hydrologic processes, by limiting disturbances to water flow patterns

XXIX. Managing Woodlands on Lake Superior's Red Clay Plain: Slowing the Flow of Runoff

WDNR, 2007

https://dnr.wi.gov/files/pdf/pubs/fr/FR0385.pdf

This document provides guidance for forest owners on how to manage their timber in clay areas such as the Northern portion of Douglas County. The main concept of this document is the "slow the flow" slogan, which means to slow the runoff of precipitation on the landscape to prevent erosion.

XXX. Brule River State Forest Master Plan

WDNR, October 2017

https://www.dnr.state.wi.us/topic/Lands/PropertyPlanning/MPComplete.html

This plan defines the land and recreation management of the Brule River State Forest. It includes the goals:

- Maintain and enhance the high water quality and natural flow of the Bois Brule River.
- Provide an environment that emphasizes natural beauty and enhances a sense of solitude and quietness.
- Maintain and enhance the quality of the fishery and fishing opportunities.
- Maintain hunting opportunities on the BRSF.
- Provide and accommodate a range of land and water based recreational opportunities while protecting the natural beauty and quiet experiences.
- Use sustainable forestry practices to manage the forest resources for present and future generations.
- Maintain and restore native ecological communities and habitats.
- In consultation with tribal governments, manage the land and other natural resources to provide for the exercise of Chippewa Treaty rights, in accordance with applicable law.
- Increase educational opportunities on the forest for all users.
- Involve the public as partners in the planning and management of the forest.
- Continue to purchase private land from willing sellers that are within the Brule River State

Forest boundary, as such land becomes available.

XXXI. Superior Coastal Plain Regional Master Plan

WDNR, February 2019

This plan defines management in the red-clay plain and coastline of Lake Superior. The Douglas County WDNR owned properties within this ecological landscape include Amnicon Falls State Park, Pattison State Park, Pokegema-Carnegia Wetland State Natural Area and St. Louis River Streambank Protection Area. Ecological significance is cited for coastal estuaries, red clay wetlands and boreal forest.

XXXII. Northwest Lowlands Regional Master Plan

WDNR, February 2019

This plan defines management for the biodiverse, large, and greatly undeveloped lowland forests in Northwest Wisconsin. The Douglas County WDNR owned properties within this ecological landscape include Lake Nebagamon State Habitat Area, the Amnicon Lake Islands- Dollar, Little, and Tomahawk, and the Steele Lake Islands- Number 1 and Number 2. Ecological significance is cited for the St. Croix River corridor, headwaters of the Black and Amnicon Rivers, and large tracts of county forestland.

XXXIII. Northwest Sands Regional Master Plan

WDNR, February 2019

This plan defines management for the oak and pine barrens mixed with wetlands in Northwest Wisconsin. These communities are fire-adapted, and also pose the greatest risk for uncontrolled forest fire. The Douglas County WDNR owned property within this ecological landscape is the Douglas County Wildlife Area. Ecological significance is cited for the St. Croix National Scenic Riverway and Bois Brule River.

XXXIV. Lake Superior Biodiversity Conservation Strategy: Final Regional Plan

Lake Superior Partnership, September 2015

This plan includes strategies to restore and protect the unique ecosystems and biodiversity in the Lake Superior Watershed. The Lake Superior Watershed Basin was divided into 20 regions, and plan 12 covers the St. Louis and Cloquet region and 13 covers the Nemadji to Fish Creek region. The St. Louis and Cloquet region plan prioritizes conservation of the St. Louis River headwaters and also the estuary's progresss toward delisting the Area of Concern. The Nemadji to Fish Creek region plan prioritizes conservation in estuary areas, such as the mouth of the Amnicon River, and coldwater trout streams, such as the Brule River. Both plans strategize the reduction of the impact of dams and barriers. They also both strategize managing habitats for priority species, controlling the spread of invasive species, and adaption to climate change.

APPENDIX B: COUNTY ORDINANCES[1]

Ordinances

- Private Sewage System Ordinance
- Flood Plain Zoning Ordinance
- Shoreland Zoning Ordinance
- Non-Metallic Mining Reclamation Ordinance
- Livestock Facilities Licensing Ordinance
- Pesticide Ordinance (Administration & Forestry)
- Large-Scale Concentrated Animal Feeding Operations
- Douglas County Animal Manure Storage Ordinance
- Non-Ferrous Mining Ordinance
- Moratorium on the Importation and Raising of Cervids in Douglas County-ineffective November 15, 2019

These ordinances appear in detail on the Douglas County website at the following address:

https://www.douglascountywi.org/411/Chapter-VIII-Zoning-Planning

[1]A full listing of all county ordinances is available from the Douglas County Zoning Department.

APPENDIX C: POTENTIAL FUNDING SOURCES[2]

Department of Administration (DOA)
- Coastal Management Program (CMP)

Department of Agriculture, Trade & Consumer Protection (DATCP)
- Farmland Preservation Program
- Land & Water Resource Management Implementation (LWRM)
- Nutrient and Pest Management (NPM)
- Sustainable Agriculture Program

Wisconsin Department of Natural Resources (WDNR)
- Basin Team Funding (Lake Superior, St. Croix)
- Lake Protection Grant Program
- Notice of Discharge Program
- Priority Watershed Program (Upper St. Croix & Eau Claire Rivers Project)
- River Protection Grant Program
- Stewardship Grants
- Targeted Runoff Management Program
- Wildlife Sources – Segregated Funds (general License), Wisconsin Waterfowl Stamp, Trout Stamp
- Wisconsin Forest Landowner Grants

Douglas County
Ducks Unlimited (DU)
Environmental Protection Agency (EPA)
Forestry Education Grant Program
Forest Productivity Council (FPC)
Great Lakes Commission (GLC)
Great Lakes Restoration Initiative (GLRI)
Individual Contributions
Lake Organizations
National Farmers Organization (NFO)
North American Wetland Conservation Act (NAWCA)
Private Foundations
River Organizations
Sports Clubs
Trout Unlimited
University of Wisconsin Extension
US Fish & Wildlife Service (FWS)
- Private Lands Funding for Wetland Restoration
- Challenge Grants (wetlands/fisheries/habitat)

US Geological Survey (USGS)
USDA Natural Resources Conservation Service (NRCS)
- Conservation Reserve Program (CRP)
- Environmental Quality Incentive Program (EQIP)
- Land & Water Education Grant Program
- Wetland Reserve Program (WRP)

Wisconsin Environmental Education Board (WEEB)
Wisconsin Geologic & Natural History (WGNHS)
Wisconsin Greens
Wisconsin Tree Farm Commission
Wisconsin Waterfowl Association
Wisconsin Woodland Owners Association

[2] Partial Listing