

WISCONSIN
**Calumet
County**

Land and Water Conservation

**Land & Water Resource Management Plan
2020 - 2029**



CALUMET COUNTY

LAND & WATER RESOURCE MANAGEMENT PLAN

2020 – 2029

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MAJOR CONTRIBUTORS

Anthony Reali, County Conservationist
Danielle Santry, Water Resource Specialist

**Calumet County
Land & Water Conservation Department**



MISSION STATEMENT

To preserve, protect, and enhance the natural resources of Calumet County by assisting land users in adopting wise and sustainable land use practices.

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Citizen Advisory Committee

Adam Faust	Nick Dallman
Kristen Birschbach	Joe Brantmeier
Lyle Ott	Bob Nagel
Joseph Hanke	Corey Schmidt
Wilmer Geiser	Mike Hofberger
Jeremy Hansen	Nick Vande Hey

Calumet County Land & Water Conservation Committee

Mike Hofberger (Chair)	Dave LaShay
Patrick Laughrin	Judith Hartl
Merlin Gentz	Amy Shiplett

Agency Advisory Committee & DNR Basin Leaders & Professionals

Erin Carviou	Danielle Block
Keith Marquardt	Amber O’Brien
Lisa Trumble	Andrew Craig
Adam Nickel	Frank Kirschling
Joe Smedberg	Steve Easterly
Tom Schneider	Dale Rebezek
Mary Gansberg	Crystal Von Holdt

Land & Water Conservation Department Staff

Anthony Realì – County Conservationist
Jared Grunewald – Conservation Project Technician
Danielle Santry – Water Resource Specialist
Amanda Kleiber – Land Resource Specialist (Agronomist)
Brent Jalonen – Erosion Control & Stormwater Specialist
Jonathon Lisowe – Conservation Project Technician

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DEFINITIONS

Aquifer	An underground layer of soil material or bedrock that contains groundwater.
Basin	An extremely large watershed area, used by DNR to identify major drainage patterns in the State. Calumet County falls within the Lake Michigan basin.
Crop Residue	The plant residue left on the soil surface after the harvest of a crop and preparation of the soil for the following crop.
Dolomite	A limestone-like rock that can be dissolved by rain water.
Erosion	The process by which rainwater and runoff detach soil particles from the soil surface and carry them downhill.
Glacial Till	Rock fragments and soil materials transported and deposited by the ice of glaciers.
Impaired Waters 303(d) List	A DNR list of water bodies, required by the federal Clean Water Act, that do not meet or are not expected to meet water quality standards.
Karst	Landform features formed on the land surface and underground in fractured limestone or dolomite bedrock. The features are formed by rain water and snowmelt running through the fractures, dissolving and enlarging them. Karst features include sinkholes, caves, and disappearing streams.
Non-point Source Pollution	The pollution that occurs when rainfall or snowmelt runs over land surface or through the soil, picks up natural and human applied pollutants, and deposits them into surface water or groundwater. Pollutants include soil particles, fertilizers, animal waste, pesticides, petroleum products, and other toxic materials.

Nutrient Management	A conservation practice designed to minimize the contamination of surface and ground water by limiting the amount of nutrients applied to the soil to no more than what the crop rotation is expected to use. It involves frequent soil testing and annual planning of the techniques, placement, rate, and timing of fertilizer and animal waste applications. Also includes an analysis of soil erosion rates based on cropping and tillage practices.
Parent Material	The original rock and organic materials that a soil formed from. Climate, landscape position, plants, and animals act on these materials over time to form soils with unique properties.
Sedimentation	The transport and deposition of soil particles from soil erosion and by surface runoff. The particles may be deposited onto the land surface or into surface water or groundwater.
Storm Water	The portion of rainfall and snowmelt that runs over the land surface and does not soak into the ground. Paved surfaces and roofs increase storm water quantities. Storm water often delivers pollutants to surface waters.
Sub-basin	A large watershed area, used by DNR as a management unit for strategic planning. Calumet County falls within 4 DNR sub-basins – Lakeshore, Upper Fox River, Lower Fox River and Sheboygan River sub-basins.
Surface Water Quality Management Area	A land area draining to and within 1,000 feet of a lake or 300 feet of a stream.
Technical Standards	The specifications for the design, construction, implementation and maintenance of conservation practices.
Tillage	Farming operations which mechanically disturb the soil in preparation for planting a crop. Clean tillage, or moldboard plowing, buries all or most of the crop residue from the previous crop. Minimum tillage, reduced tillage, and conservation tillage leave a portion of the crop residue from the previous crop on the soil surface after planting to protect the soil from erosion. No-till leaves all of the crop residue on the soil surface.

Tolerable Soil Loss (T) The maximum rate of soil erosion, in tons per acre per year, that is allowable for a particular soil to sustain its productivity for growing plants and crops.

Watershed A land area that drains to a common point such as to a stream or lake, or to a group of streams and/or lakes.

ABBREVIATIONS

ACEP	Agricultural Conservation Easement Program
APHIS	Animal and Plant Health Inspection Service
BMP	Best management practice
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
DATCP	Department of Agriculture, Trade, and Consumer Protection (Wisconsin)
DNR	Department of Natural Resources (Wisconsin)
ECWRPC	East Central Wisconsin Regional Planning Commission
EPA	Environmental Protection Agency (United States)
EQIP	Environmental Quality Incentives Program
FPP	Farmland Preservation Program
FSA	Farm Service Agency
GIS	Geographic Information Systems
CAC	Citizen Advisory Committee
LWCC	Land and Water Conservation Committee
LWCD	Land and Water Conservation Department
LWRM	Land and Water Resource Management (Plan)
NASS	National Agricultural Statistics Service (USDA)
NEWSC	Northeast Wisconsin Stormwater Consortium
NHI	Natural Heritage Inventory
NMFE	Nutrient Management Farmer Education Grant
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service (USDA)
P	Phosphorus
PCB	Polychlorinated biphenyl
PPM	Parts per million
T	Tolerable soil loss
TAC	Technical Advisory Committee
TMDL	Total maximum daily load
TRM	Targeted runoff management (grant)
TSS	Total suspended solids
UNPS&SW	Urban Nonpoint Source and Storm Water Management (grant)
USDA	United States Department of Agriculture
UWEX	University of Wisconsin – Extension
WGNHS	Wisconsin Geological and Natural History Survey
WPDES	Wisconsin Pollution Discharge Elimination System

PLAN SUMMARY

INTRODUCTION

What is a Land & Water Resource Management Plan?

Locally led natural resource management is an important concept for land and water conservation in Wisconsin. State and federal agencies support the notion that local governments and residents are best suited to identify and provide solutions for natural resource problems within a county. For this reason, Wisconsin State Statutes require each county to develop and implement a Land and Water Resource Management (LWRM) plan and to involve its residents and partner agencies in the development process. A LWRM plan serves as a strategic plan to the county, giving direction to their land and water conservation efforts. It summarizes land and water resource conditions, identifies resource concerns, and outlines strategies for addressing those concerns.

COUNTY TRENDS

Population

According to the U.S. Census, the population of Calumet County was 48,971 in 2010. Census statistics indicated that the county was the second fastest growing county in Wisconsin. Population within the county increased 20.53% between 2000 and 2010. Most of this growth has occurred and is projected to continue to occur in the northwestern corner of the county, due to an influx of new people into the Fox Cities region. Calumet County has continued to grow with an estimated population of 52,658 as of January 1, 2018 according to the WI Department of Administration's Demographic Services Center.

Land Use & Trends

Land use statistics from 2015 indicate that 62% of land in Calumet County was in cropland and farm related use; 13% was in woodlands; and 10% was in residential, industrial, and commercial land uses, roads, and utilities. According to the United States Department of Agriculture (USDA) Census of Agriculture statistics, the number of farms and land acres in farms had decreased between 2007 and 2012. More recent statistics were not available at the time this document was published. The majority of farms continue to be either dairy farms or farms raising feed and livestock for dairy farms. USDA 2017 statistics indicate that there are 31,000 milk cows and 73,000 head of livestock in Calumet County and that milk cows and livestock numbers are increasing. The increase is accompanied by a trend of fewer and larger size dairy herds, with more cows being confined and milked on one site. Accompanying this trend are feeding and animal waste management strategies that may negatively impact land and water resources. The use of low residue crops for feed can increase overall cropland erosion. The

handling and application of manure in a liquid form may increase the potential for polluted runoff delivery to surface water and groundwater.

The growing population in the northwest corner of Calumet County will have a corresponding impact on land and water resources. As land is converted to residential and commercial uses, soil is disturbed for construction and more impervious surfaces are created. Erosion and runoff may increase and result in sedimentation, flooding, and increased delivery of polluted runoff to surface waters. The increased population will require more drinking water and generate more waste products for disposal and treatment.

LAND & WATER RESOURCES

Landforms & Geology

The rolling topography and landforms of the county are a product of glacial activity that deposited soil and rock materials over bedrock. Most of the county is underlain by limestone-like bedrock called Niagara dolomite. The western edge of this bedrock forms a steep, prominent slope and cliff face running through the county called the Niagara Escarpment. The Escarpment provides vital habitat for endangered and threatened plant and animal species.

The Niagara dolomite is an important geologic layer in that it provides a drinking water supply for the majority of county residents. It is highly fractured and groundwater moves rapidly through it. The fractures are dissolved by water and grow with time. The growing fractures form karst features on the land surface, creating direct conduits for polluted surface runoff to enter groundwater.

Soils

Many of the soils in the county were formed from material left by the glaciers. Time, climate, plants, animals, and landscape position acted on these “parent materials” to form different soils with unique properties. These properties determine the suitability of each soil for specific land uses and the associated resource concerns with each use. Soil erosion is a natural process. It is increased dramatically when land uses, such as farming and construction, leave the soil surface bare and unprotected. As erosion rates increase, more soil sediment is delivered to surface waters.

Research done by the LWCD using nutrient management plans indicate that cropland erosion rates and sediment delivery to surface waters are higher in certain sub-watersheds of the county. Conservation efforts to reduce soil erosion and sediment delivery will be targeted to these areas.

Surface Water

Surface water bodies encompass approximately 20% of the total area of Calumet County. Lake Winnebago accounts for the majority of this percentage. The county also has all or part of four

other named lakes and twenty named rivers and streams. There are many marshes, seasonal streams, ponds, flooded quarries, and drainage ditches as well. The Wisconsin DNR has divided the Northeast Wisconsin region into large watersheds, or basins, and has developed strategic management plans for each of them. Calumet County falls within the boundaries of four of these basins.

According to the DNR basin plans, most streams and lakes in Calumet County are negatively impacted by polluted runoff from various land uses. Polluted runoff is created when surface runoff from rain and snowmelt picks up soil particles, fertilizers, animal wastes, pesticides and other pollutants and carries them to surface water and groundwater. Polluted runoff can be reduced by the use of conservation practices.

Groundwater

Groundwater is found in the cracks and spaces of the soil, sediment, and bedrock. Most Calumet County residents depend on it for their drinking water. Groundwater is replenished by rain and snowmelt. As this water runs over the land surface, it picks up pollutants and carries them downward into the soil towards groundwater. Normally, the soil filters out these pollutants. However, thin and/or sandy soils make poor filters and pollutants reach groundwater. Old wells and karst features, such as sinkholes or exposed bedrock, act as direct conduits for polluted runoff to reach groundwater.

A majority of municipal and private wells tap the highly fractured Silurian dolomite aquifer for drinking water. Thin and/or sandy soils and karst features are common in the southwest portion of the county and so are problems with poor groundwater quality. Well water testing results indicate that unsafe levels of nitrates and bacteria, as well as other harmful substances, are found in many wells. Groundwater is highly susceptible to contamination in these areas. The pollutants come from land use practices on the surface of the land. Animal waste and cropland fertilizers are major sources of these pollutants. The use of conservation practices, such as nutrient management, can reduce groundwater contamination and is actively promoted in these areas.

Declining groundwater levels are a problem in some parts of the County and can cause the release of natural occurring contaminants such as arsenic. .

Woodlands, Wetlands, Wildlife & Plant Resources

Approximately 13% of the total land surface area of the county is woodland and 13% is wetland. Most of these land areas are located in large DNR owned wildlife areas and along the corridors of major streams. The rest are scattered across the landscape on private lands. Many of these natural areas are located on isolated tracts of land that are not connected, decreasing their value as wildlife habitat and travel corridors. The preservation, sustainable use, and management of these areas are important. Planting of non-native and invasive species, potential invasions of diseases, insects, and non-native species and improper placement of new plantings on the landscape are concerns. Wildlife needs quality habitat that is not fragmented

and that supports a diverse community of plants, animals, and aquatic life. Proper woodland management, wetland and grassland restorations, invasive species control, and tree and native species plantings will help meet this need.

Climate Change

Recent studies indicate that Wisconsin's climate is changing. These changes may bring about warmer temperatures, increased precipitation, and more frequent large storm events. If the projected changes happen, they will impact land and water resources and animal, plant, and human communities. They will also impact how the land is used and what conservation practices are necessary.

STANDARDS & PROHIBITIONS

Agricultural Runoff

In 2001, Wisconsin enacted state-wide minimum performance standards and prohibitions for agriculture to reduce polluted runoff and help achieve state water quality standards. The standards were updated in 2011 and again in 2018 and address soil erosion, animal waste and feed storage, nutrient management, and polluted runoff. DNR and DATCP administer the regulations and procedures to implement them. Calumet County incorporated all of the performance standards and prohibitions into county ordinance in May 2011. The LWCD and LWCC intend to communicate and cooperate with DNR and DATCP in implementation and enforcement of the state standards and the county ordinance.

Priority Farm Strategy

Office records, aerial photography, farmer interviews, and in-field investigations will be used to review farms and cropland for compliance with the county ordinance and the state standards and prohibitions. To ensure that all farms and related croplands are reviewed, the following priority order will be used:

1. Farms whose operators request a review or need one for program participation (Farmland Preservation Program) or a permit application.
2. Farms in the Calumet County Groundwater Protection Area that are known to be or found to be in significant noncompliance with the standards and prohibitions that impact groundwater.
3. Farms in targeted watersheds (Total Maximum Daily Load or EPA Approved Key Element Plan watersheds) that are known to be or found to be in significant noncompliance with the standards and prohibitions that impact surface water. Farms in surface water quality management areas within these watersheds will be reviewed first.
4. Other farms in karst areas.
5. Other farms in Surface Water Quality Management Areas.
6. All other farms.

Non-Agricultural Runoff

In 2002, Wisconsin also enacted state-wide performance standards for construction site erosion control and post-construction storm water management. These standards were put into place to reduce erosion from building sites, as well as to reduce polluted runoff from roads, parking lots, building roofs, and impervious surfaces. Calumet County incorporated the standards into county ordinance in October 2008. The ordinance is administered by the LWCD and LWCC. Related state and federal rules required Calumet County to obtain a DNR storm water permit. As part of permit requirements, the LWCD developed and is implementing a comprehensive educational program on erosion control and storm water management. In addition, Calumet County approved the addition of an Erosion Control and Stormwater Specialist to the department staff to emphasize work on MS4 permit requirements, construction site erosion control & stormwater management as well as providing technical assistance on erosion issues on cropland, lakeshores and streambanks.

Total Maximum Daily Load (TMDL) and EPA 9 Key Element Plans

Land users may be required to meet stricter agricultural and non-agricultural performance standards if their land falls within the watershed boundaries of a lake or stream for which a TMDL has been established. A TMDL was approved for the Lower Fox River Basin and Lower Green Bay in 2012. LWCD has participated in implementation of the Lower Fox River Basin including hiring targeted staff for the watershed effort. It is anticipated that a TMDL for the Upper Fox and Wolf River Basins will be approved in 2019. Currently there are 9 Key Element watershed plans approved for the Plum/Kankapot watershed and Upper East River watershed. A 9 Key Element plan for the CalMan Lakes watershed in the northeast portion of the county has been submitted to the DNR and EPA and was approved at the end of March 2019. Work has begun on the potential development of a TMDL for the Manitowoc River Basin with 9 Key Element watershed planning beginning in 2018 in the North Branch Manitowoc River watershed.

GOALS & OBJECTIVES

Development of Goals & Objectives

The goals and objectives of this plan were developed using the 2012 – 2019 (extended) Calumet County LWRM Plan, state performance standards for runoff, DNR basin and watershed plans, concerns from the CAC, input from residents and resource professionals, surveys, comprehensive land use plans, resource inventories, and modeling.

Goals & Objectives

The resulting goals are listed below in the priority order in which they will be addressed by the LWCD and LWCC. Objectives are also listed for each goal.

GOAL 1: IMPROVE & PROTECT GROUNDWATER & SURFACE WATER QUALITY

- Increase Public Awareness of Water Quality

- Increase Use of Nutrient Management Planning
- Reduce Polluted Runoff & Sediment Delivery to Groundwater & Surface Water
- Promote Water Conservation

GOAL 2: IMPROVE & PROTECT SOIL QUALITY

- Increase Public Awareness of Soil Quality & Erosion
- Reduce Soil Erosion on Cropland to Tolerable Levels
- Reduce Soil Erosion on Construction Sites to Tolerable Levels
- Control Streambank & Shoreline Erosion

GOAL 3: IMPROVE & PROTECT HABITAT QUALITY

- Preserve & Restore Wetland Areas
- Promote Tree Planting & Sustainable Woodlands Management
- Preserve & Restore Aquatic and Shoreland Habitat & Vegetated Corridors Along Surface Waters
- Preserve & Restore Threatened & Endangered Species & Species of Special Conservation Needs Habitat
- Prevent the Spread of Invasive Species
- Preserve & Restore Native Plant Communities

Actions were developed for each objective. A 2019 work plan, with measurable expected outcomes for each action, is in **Appendix F**.

TOOLS & STRATEGIES

All actions to implement the goals and objectives in this plan can be categorized under one of the following tools:

- Information and education
- Conservation practices
- Incentives
- Critical areas and targeting
- Regulations
- Programs, plans and partnerships

Strategies for Compliance

Calumet County LWCD and LWCC prefer that farmers comply with county ordinances and state standards voluntarily. Education, technical assistance, incentives, targeting of resources, programs, and partnerships will be used as first choice tools to assist in voluntary compliance. Enforcement action will be used as a tool of last choice.

MONITORING & EVALUATION

A variety of methods will be used to monitor progress in achieving the goals and objectives and evaluating the effectiveness of the implementation strategies. Methods will include:

- Review of accomplishments from annual progress reports to DNR and DATCP;
- Review of measurable workplan outcomes;
- Computerized mapping of land under nutrient management plans and other conservation practices;
- Soil erosion rate modeling and vulnerability modeling;
- Well water testing and targeted groundwater monitoring programs;
- Pollutant load and sediment delivery modeling; and
- Surface water quality sampling and testing.

CONCLUSION

A LWRM plan is a living document that evolves and changes with time. This document acts as a useful guide for the Calumet County LWCD and LWCC, directing their priorities, strategies and activities for the next ten years. Changes and additions to the plan may be needed as new resource concerns emerge and new conservation techniques and technologies are created.

SECTION 1: INTRODUCTION

What is a Land & Water Resource Management Plan?

Locally led natural resource management is an important concept for land and water conservation in Wisconsin. State and federal agencies support the notion that local governments and residents are best suited to identify and provide solutions for natural resource problems within a county. As a result, Chapter 92 of the Wisconsin State Statutes was amended in 1997 to require each county to develop and implement a Land and Water Resource Management (LWRM) plan. Chapter 92 can be found on-line at: <http://legis.wisconsin.gov/rsb/stats.html>. A LWRM plan serves as a strategic plan to the county, giving direction to their land and water conservation efforts. It summarizes land and water resource conditions, identifies resource concerns, and outlines strategies for addressing those concerns.

At a minimum, a LWRM plan must describe:

- An assessment of water quality and soil erosion conditions throughout the County.
- Water quality objectives for each water basin.
- Best management practices to achieve water quality objectives and tolerable erosion levels.
- Identification of applicable performance standards and prohibitions related to control of pollution from nonpoint sources.
- Yearly description of planned county activities and priorities related to land and water resources.
- A system to monitor progress of activities described in the plan.
- A strategy to provide information and education related to soil and water resource management.
- Methods for coordinating activities described in the plan with programs of other local, state and federal agencies.

Previous Calumet County Land & Water Resource Management Plans

Calumet County developed its first LWRM plan in 1999 and implemented it through 2006. It replaced an earlier document entitled the *Soil Erosion Control Plan for Calumet County*. It contained one overall goal, “to restore, improve, and protect ecological diversity and quality by promoting beneficial uses of land, water, and related resources.” The second LWRM plan was developed in 2006 and implemented in 2007 through 2011. The 4 major goals in the plan, in prioritized order, were: 1) Improve and protect groundwater quality; 2) Improve and protect

surface water quality; 3) Improve and protect soil quality; 4) Improve and protect habitat quality.

1.1 Calumet County Land & Water Resource Management Plan, 1999 – 2006

Calumet County's first LWRM plan was developed in 1999 and was implemented from its inception through 2006. It replaced an earlier document entitled the *Soil Erosion Control Plan for Calumet County*. The erosion control plan was published in 1986 and primarily addressed soil erosion. Copies of both of these plans are available for viewing at the Calumet County LWCD office.

1.1(a) Goals & Objectives

The overall goal in the 1999 LWRM plan was to restore, improve, and protect ecological diversity and quality by promoting beneficial uses of land, water, and related resources. The objectives were to reduce soil loss on all fields in Calumet County to tolerable soil loss (T) or below and to implement the four prohibitions proposed by the Wisconsin Animal Waste Advisory Committee county-wide. These prohibitions were listed in the plan as follows:

- No overflow of manure storage structures
- No unconfined manure stacking adjacent to stream banks and shorelines and in drainage channels
- No direct runoff from feedlots or stored manure to waters of the state
- No unlimited livestock access to waters of the state where high concentrations of animals prevent adequate sod cover

The objectives also included a 50% reduction in phosphorus and sediment delivery to surface waters within 10 years. They were similar to the goals for phosphorus and sediment reduction that were included in the Lake Winnebago East, Sheboygan River, and East River Priority Watershed Project Plans. The Plans were being implemented when the 1999 LWRM plan was developed.

A local citizen advisory group identified and selected the following priority natural resource issues and concerns to be included as objectives in the 1999 plan:

- Obtaining funding for LWCD staff and cost sharing
- Reduction of cropland erosion
- Protection of groundwater recharge areas
- Installation and maintenance grassed waterways
- Promotion of nutrient management
- Control of construction site erosion

Implementation strategies included targeting plan implementation efforts on priority sites within boundaries of the Lake Winnebago East, East River, and Sheboygan River Priority

Watershed Projects and on sites within other parts of the county that were near lakes and streams.

1.2 Calumet County Land & Water Resource Management Plan 2007 - 2011

The County's second LWRM plan was developed in 2006. The LWCD and LWCC chose to develop a completely new plan rather than to update the old one for a number of reasons. New guidelines had been issued for the development, adoption, and content of LWRM plans. New resource problems and concerns within the County had been recognized, such as poor groundwater quality. The plan was adopted by County Board in December, 2006 and implemented in 2007 through 2011. Copies of the plan are available for public review at the Calumet County LWCD office.

1.2(a) Goals & Objectives

The goals and objectives in the 2007 - 2011 LWRM plan were developed by considering existing resource inventory data and management plans, state mandates, and priority concerns from County residents and state and local resource professionals. Four major goals were developed and prioritized from the information collected from these sources. Specific objectives for each goal and general actions to achieve them were also developed.

The four major goals are listed below in prioritized order, with the specific objectives listed underneath them.

1. Improve and protect groundwater quality
 - Increase public awareness of groundwater quality
 - Increase use of nutrient management planning in karst areas
 - Reduce polluted runoff and sediment delivery to karst features
 - Ensure the proper abandonment of old unused wells
 - Promote water conservation

2. Improve and protect surface water quality
 - Increase public awareness of surface quality
 - Increase use of nutrient management planning
 - Reduce polluted runoff and sediment delivery to surface waters

3. Improve and protect soil quality
 - Increase public awareness of soil quality and erosion
 - Reduce soil erosion on cropland to tolerable levels
 - Reduce soil erosion on construction sites to tolerable levels
 - Control soil erosion on stream banks and Lake Winnebago shoreline

4. Improve and protect habitat quality
 - Preserve and restore wetland areas

- Promote tree planting and sustainable woodland management
- Preserve and restore in-stream habitat and riparian corridors
- Preserve and restore threatened and endangered species habitat
- Prevent the spread of invasive species
- Preserve and restore grassland and native plant communities

Actions to implement each goal and objective are not listed above. A list of them can be found in Section 5 of the *Calumet County Land and Water Resource Management Plan 2007 – 2011*. Each action was placed in one of six categories of tools that would be used to implement the plan. The six categories of tools included:

1. Information and education
2. Conservation practices
3. Incentives
4. Critical areas and targeting
5. Regulations
6. Programs and partnerships

For each tool category, specific tools were listed. Examples of specific tools for each category listed above (in order) include one-on-one contacts, soil erosion control practices, cost sharing for practice installation, targeting Karst areas, the County manure storage and runoff management ordinance, and the Farmland Preservation Program. Implementation strategies were developed for each tool category. A 5-year workplan, with actions and measurable outcomes for the LWCD and its partners, was included in the plan. The workplan was modified several times during the 5 year period to address new programs and opportunities.

1.3 Calumet County Land & Water Resource Management Plan 2012 – 2019 (as extended)

The LWCD and LWCC began the development process for the 2012 – 2019 LWRM plan in 2011. New documents, data, resource inventories, and management plans relative to land and water resources of Calumet County and statistics on population and land use trends were reviewed. Conversations and correspondence with local, state, and federal resource professionals (Technical Advisory Committee) followed the review and continued throughout the process. By actively participating on the Local Advisory Committee (LAC) and other public review procedures, residents helped develop and fine-tune the priority resource concerns, goals, objectives, and activities in the plan.

The original plan period was from January 1, 2012 through December 31, 2016. The Calumet County LWRM Plan was granted a 3 year extension from January 1, 2017 through December 31, 2019. This extension was approved by order on August 25th, 2016.

1.3(a) Goals & Objectives

The goals and objectives in the 2012 - 2019 LWRM plan were developed by considering existing resource inventory data and management plans, state mandates, and priority concerns from County residents and state and local resource professionals. Three major goals were developed and prioritized from the information collected from these sources. Specific objectives for each goal and general actions to achieve them were also developed.

The three major goals are listed below in prioritized order, with the specific objectives listed underneath them:

1. Improve & protect groundwater and surface water
 - Increase public awareness of water quality
 - Increase the use of nutrient management planning
 - Reduce polluted runoff & sediment delivery to groundwater & surface water
 - Promote water conservation

2. Improve & protect soil quality
 - Increase public awareness of soil quality and erosion
 - Reduce soil erosion on cropland to tolerable levels
 - Reduce soil erosion on construction sites to tolerable levels
 - Control streambank & shoreline erosion

3. Improve habitat quality
 - Preserve & restore wetland areas
 - Promote tree planting & sustainable woodlands management
 - Preserve & restore aquatic and shoreland habitat & vegetated corridors along surface waters
 - Preserve and restore threatened and endangered species and species of greatest conservation need habitat
 - Prevent the spread of invasive species
 - Preserve & restore native plant communities

Specific actions to implement each goal and objective are not listed above. A list of them can be found in **Section 5** of the *Calumet County Land and Water Resource Management Plan 2012 – 2019*. Each action was placed in one of six categories of tools that would be used to implement the plan. The six categories of tools included:

1. Information and education
2. Conservation practices
3. Incentives
4. Critical areas and targeting

5. Regulations
6. Programs and partnerships

For each tool category, specific tools were listed. Examples of specific tools for each category listed above (in order) include one-on-one contacts, soil erosion control practices, cost sharing for practice installation, targeting karst areas, the County manure storage and runoff management ordinance, and the Farmland Preservation Program. Implementation strategies were developed for each tool category. A 5-year workplan, with actions and measurable outcomes for the LWCD and its partners, was included in the plan. The workplan was modified several times during the 5 year period to address new programs and opportunities.

1.4 Procedures & Processes for a 2020 - 2029 LWRM Plan

It was evident that the goals and objectives in the 2012 – 2019 plan were not completely achieved, were still pertinent, and needed to be carried forward into a new plan. However, some new priority resource problems and concerns had emerged since the previous plan was developed, along with new tools to address them. New county, state, and federal programs and regulations required new actions and approaches from the LWCD and its partnering agencies. For these reasons, the LWCD and LWCC decided to keep significant portions of the 2012 – 2019 plan and update and add to other portions. This document is the result of those decisions.

1.4(a) Review of Relevant Information

Calumet County LWCD staff began the process of developing a new LWRM plan in mid-2018. Staff began collecting and reviewing new documents, data, resource inventories, and management plans on the land and water resources of Calumet County and newer statistics on land use trends. This information came from a wide variety of sources including local, state, and federal agencies.

1.4(b) Involvement of DNR Basin Supervisors & Professional Staff as the “Technical Advisory Committee”

In March 2019, DATCP, and DNR staff as well as the USDA District Conservationist and UWEX Agricultural Educator in the county were asked to review the draft plan and provide comments. Most of the individuals responded after their reviews that they were satisfied with the content. Minor comments were received from DATCP and DNR, and were addressed in this plan.

1.4(c) Involvement of Citizen Advisory Committee

By actively participating on the Citizen Advisory Committee (CAC) and other public review procedures, residents helped develop and fine-tune the priority resource concerns, goals, objectives, and activities in the plan. Their involvement included the following meetings and reviews:

- CAC meeting in December 2018 members received information on the Land & Water Resource Management Plan background, reviewed the 2012 – 2019 plan, received background on the land and water resources of the county, identified and prioritized new or missing resource issues, and made recommendations on goals and objectives for the new plan.
- CAC meeting in January 16, 2019 members reviewed resource concerns identified in the first meeting, reviewed and finalized the revised goals and objectives based on input from the first meeting and reviewed tools and strategies that will be used to meet the goals and objectives.
- CAC and public review of draft plan in March 2019.
- Public hearing for the plan on April 24, 2019.

CAC members were surveyed on a list of resource concerns that could be found in the County and were also asked to write down on their survey any resource concerns or topics that were not found on the survey. CAC members were then asked to discuss and provide feedback on issues that they felt were most important. Numerous members spoke up and voiced opinions about various issues within the county. A summary of the survey results as well as comments received can be found in **Appendix B**. The group came to a consensus that the three goals and objectives in the 2012 – 2019 plan were still relevant and that they should be carried over into the updated plan. However, there were several comments and suggestions received in regard to specific action items contained in each objective. Those comments are also included in **Appendix B**.

The main takeaways from the survey results and comments received included:

- Groundwater and surface water quality are still at the forefront of resource concerns in the county.
- There is a need for accurate and available karst feature and depth to bedrock mapping.
- There is a need to partner with farm groups and assist with the formation and function of producer led conservation groups.
- There is a need for more soil health education and field days.
- There is a need for education for the farming community as well as the non-farm rural residents.
- The increase in large storm events is a concern for residents of all types.
- The link between conservation and farm economics is not yet well defined or described.

In March 2019, CAC members were sent a letter inviting them to review and comment on the entire draft plan. No additional comments were received for the draft plan.

1.4(d) Agency & Public Review of Plan Drafts

The first draft of the *Calumet County Land and Water Resource Management Plan, 2020 - 2029* was completed in February 2019 and was sent via email to the DATCP Coordinator for initial review. Electronic copies were also sent to staff at the DNR Madison and Regional offices for

review and comment. DNR staff included Andrew Craig, Keith Marquardt, Erin Carviou, James Kasdorf, Adam Nickel, and Mary Gansberg. NRCS staff included Joe Smedberg and FSA staff included Tom Schneider and UWEX staff included Amber O'Brien. Citizen Advisory Committee members and officials from all town governments within the county were also sent a letter and the link and invited to comment and to attend the public hearing for the plan. Comments and recommendations were incorporated into the draft plan.

Copies of the draft were made available to all county residents by posting the draft on the LWCD website. Availability of the copies and a request for comments was announced by word of mouth, press release, County Facebook page, by posts on the department website, by Class 2 hearing notices in all County newspapers, and by news articles in county newspapers. The draft plan was presented to and reviewed by interested Calumet County residents at a noticed public hearing on April 24, 2019. See **Appendix C** for the public notice of the hearing, hearing minutes, and comments received from the public and other agencies. Comments from the hearing were incorporated, where possible, into the final draft plan.

1.4(e) Approval of Plan

The final draft LWRM plan was submitted to DATCP and DNR in May 2019. It was considered and approved by the Wisconsin Land and Water Board at their June 4, 2019 meeting. Approval by the Calumet County Board occurred on June 18, 2019. An order approving the plan was signed by DATCP on #####. Implementation of the plan will begin on January 1, 2020 and will end on December 31, 2029.

SECTION 2: COUNTY LAND USE TRENDS

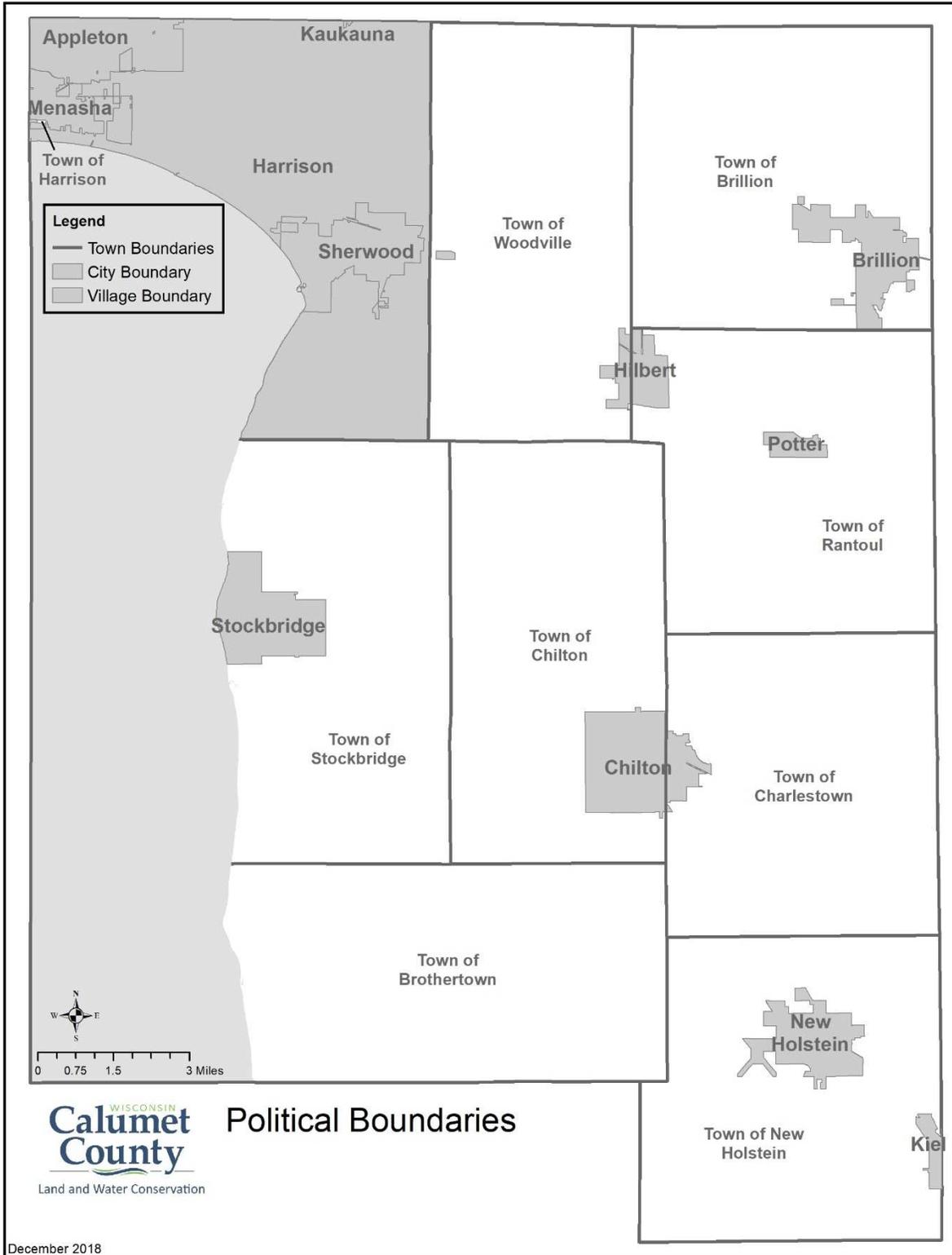
Calumet County is located in east-central Wisconsin between Lake Winnebago and Manitowoc County, as illustrated in **Figure 1**. The county is 24 miles north to south and 18 miles east to west at its widest parts and encompasses a total land area of 320 square miles or 204,793 acres. Since Calumet County’s western boundary lies within Lake Winnebago, an additional area of over 47,000 acres of the lake’s water surface is included within the county boundaries.

Figure 1: Calumet County



Political subdivisions within the county include eight townships, five incorporated villages, and seven cities. Four of the cities – Appleton, Kaukauna, Kiel and Menasha – are partially located within the county. Eleven other named, but unincorporated, communities are also within the county. See **Figure 2** for a map of the major political boundaries.

Figure 2: Major Political Boundaries



2.1 Population

According to the U.S. Bureau of Census, the population of Calumet County in 2010 was 48,971. The County was the second fastest growing county in the state with a population growth of 20.53% between 2000 and 2010. The majority of population, approximately 59%, lives in incorporated cities and villages. The remaining population lives in rural areas. The majority of land area within the county lies outside of city and village boundaries. This land is considered rural in nature, with small urbanized areas and single family residences interspersed within agricultural and natural lands.

The land area within the northwestern corner of the county in the Village of Harrison is quickly becoming urbanized with residential and commercial development. This trend is due to its proximity to the Cities of Appleton, Menasha, and Kaukauna and the rapidly developing Fox Valley region. Calumet County has continued to grow since the last census with an estimated population of 52,658 as of January 1, 2018 according to WI Department of Administration-Demographic Services Center. Due to the incorporation of the Town of Harrison into the Village of Harrison it is estimated that now 82% live in incorporated areas.

2.2 Land Use

The predominant land use in Calumet County is related to agriculture, as indicated in **Figure 3** and **Table 1**. According to 2015 land use study completed by the East Central Wisconsin Regional Planning Commission (See **Table 1**), cropland and farm building sites accounted for 62% of total land use in the county. This data shows a decrease in land in farms from 66% from statistics in the *2004 Calumet County Smart Growth Plan*.

The next largest land use, woodlands, accounted for 13% of total land use. Many of these woodlands are located on DNR property such as the Brillion, Killsnake, and Kiel Marsh Wildlife Areas or on private land along major rivers and streams.

Residential, industrial, and commercial land uses, including roads and utilities, account for approximately 10% of total land use. Intensive or improper management practices with any of these land uses can negatively impact our natural resources, especially our soil, surface waters, and groundwater.

2.2(a) Agricultural Trends

According to the USDA *Census of Agriculture*, there were 719 farms within Calumet County in 2012. In the 2007 Census, there were 732 farms within the county. Total land area in farms within Calumet County was 142,374 acres in the 2012 census and 151,659 acres in the 2007 Census. Total cropland was 120,851 acres and 128,524 acres in the 2012 and 2007 censuses respectively. These statistics indicate that both the number of farms and the total farmed land area are slowly decreasing. The average size of farms remained about the same. More recent statistics were not available at the time that this document was published.

The majority of farming operations in Calumet County are either dairy farms or farms that provide feed or livestock to dairy operations. According to USDA-National Agricultural Statistics Service (NASS) surveys, there were 29,000 milk cows in 2011 and 31,000 milk cows in Calumet County in both 2016 and 2017. These numbers have leveled off due to a depressed dairy economy. Numbers for all cattle were 64,000 head in 2011 and 72,000 head in 2018. These statistics indicate that livestock numbers, as well as the number of milk cows, have increased within Calumet County. In the *Wisconsin Agricultural Statistics*, it listed a total of 180 dairy herds in Calumet County in 2009 and 103 dairy herds in the County in 2017. This trend explains that the larger dairies are maintaining their cow numbers while small dairy farms, which do not have a significant impact on total cow numbers, are exiting the industry. The trend is also reflected in a 2018 tally of larger dairy farm operations by the LWCD. The tally indicated that there were nine dairy farms in the county that were over the animal unit equivalent of 714 mature dairy cows (1,000 animal units).

Accompanying the trend of increasing livestock numbers are feeding and animal waste management strategies that can negatively impact land and water resources through increased soil erosion and a high potential of animal waste runoff. The use of low residue crops like corn silage for feed, instead of hay and grasses, can increase cropland erosion. The handling, transportation, and land application of increasing amounts of animal waste in a liquid form increases the potential for waste spills and runoff to surface waters and groundwater.

Table 1: Land Use Statistics (2015)

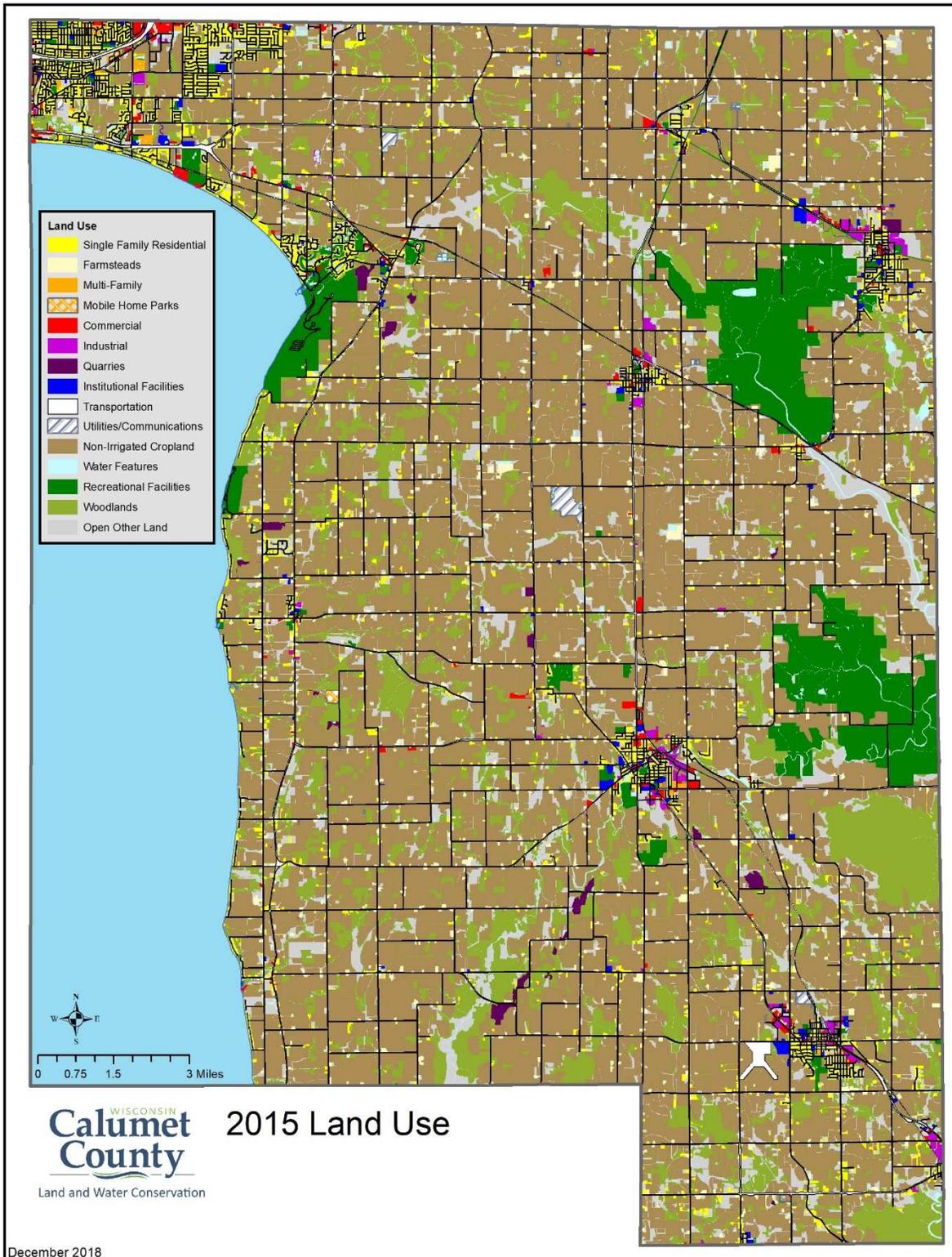
Feature	% of Total Land Use
Commercial	0.48
Farm	2.13
Woodlands	13.15
Industrial	0.33
Institutional	0.33
Mobile Home	0.07
Multi-Family	0.13
Non-Irrigated Cropland	60.19
Open/Other	7.60
Quarry	0.29
Recreational	5.73
Single Family Residential	4.19
Transportation	4.09
Utilities	0.23
Water	1.05

East Central Wisconsin Regional Planning Commission - 2015

2.3 Conclusion

With more livestock and animal waste, and increasing population, there will be impacts to the land and water resources of the county. This LWRM plan will address those impacts in the hopes of conserving the County's land and water resources in a sustainable manner for generations to come.

Figure 3: Land Use Map



SECTION 3: LAND & WATER RESOURCES

Calumet County is primarily an agricultural community with an expanding urbanized area. Both types of land uses have the potential to have negative impacts on land and water resources. Residents need assistance in adopting sustainable land use practices to protect, preserve, and enhance the resources of the county. There are many tools available to provide such assistance. This section identifies the major natural resources within the county and their current conditions, which guided the development of the goals and objectives for this plan.

3.1 Landforms

The rolling topography and landforms of Calumet County are products of glacial activity over 10,000 years ago and the bedrock underneath. Most of the county is underlain by limestone-like bedrock, called Niagara dolomite. This bedrock layer slopes downward from west to east, toward Lake Michigan. Its western edge forms a steep, prominent escarpment called the Niagara Escarpment. It runs east of and roughly parallel to the shores of Lake Winnebago, from the southern county border to the Village of Sherwood. It curves off to the northeast at Sherwood. The Escarpment is discontinuous, is buried by soil in many places, and appears as a long, steep slope. The two highest locations of escarpment in the county are near the community of Quinney (333 feet above the base) and in High Cliff State Park (223 feet above the base). The exposed rock face within these areas is less than 100 feet in height. The dolomite can surface less prominently as small escarpments and bedrock exposures in other areas of the county. It also forms scattered high points and hills throughout the county which are overlain with soil.

Glacial activity played a dominant role in the land formations above the Niagara dolomite. The earliest glacial activity, the Cary substage of the Wisconsin Age of Glaciation, deposited glacial drift, till, and outwash on top of the bedrock. The glacial materials from the Cary substage can be recognized by their yellowish color. A later stage of glaciation, the Valdres substage, buried the Cary substage materials in the northern two thirds of Calumet County with its own drift, till, and outwash. Materials from the Valdres substage are reddish in color.

Glacial drift and till are rock materials that are broken, rounded, and ground up and then transported and deposited by glacial ice. This material formed uneven, rolling landforms characterized by drumlins and moraines. Drumlins are long, cigar shaped hills of till and are found in the southern part of the county. Moraines are hills of soil and rock that were deposited by melting ice at the glaciers' edge. A prominent moraine parallels the Killsnake River in the center of the county.

Water from melting glacial ice created streams flowing on top, through, and underneath the glaciers; as well as on the land downstream of the glacier's edge. These streams carried, sorted, and deposited sands and gravels, called outwash, on top of drift, till, and bedrock.

Melted ice formed glacial lakes. Fine soil and rock particles settled to the lake bottoms resulting in lacustrine deposits. These fine-grained materials were exposed when the glacial lakes dried up and the materials later developed into clay textured soils.

3.2 Geology

Geology is the foundation of the landscape. It defines the topography of the land, determines the location of springs and rivers, and provides drinking water from its bedrock aquifers. An aquifer is an underground layer of soil material or bedrock that contains groundwater. See **Figure 4** for a cross section of Calumet County geology and bedrock. The layers of bedrock tip easterly toward Lake Michigan. See **Figure 5** for the location of the upper-most bedrock layers in the county. The bedrock layers and aquifers are described below:

- *Silurian (Niagaran) Dolomite*: As the upper most layer of bedrock in much of the County, the Silurian dolomite provides drinking water to a large number of residents. This layer has unique qualities that identify it as a resource worthy of special concern. The dolomite is a hard, fractured, limestone-like rock that dissolves in water over time. Slightly acidic rain water and groundwater cause existing fractures to grow and new fractures and karst features to form. Karst features are commonly associated with this type of bedrock. The surface of the landscape above it may have many karst features including:
 - Sinkholes;
 - Exposed or shallow bedrock;
 - Springs;
 - Disappearing streams and ponds;
 - Fracture traces; and
 - Bedrock outcroppings (Niagara Escarpment).

These unique features can serve as direct conduits for groundwater contamination. Polluted runoff may enter them and move downward through the fractures to groundwater. Installation of conservation practices to protect groundwater in areas with karst features can be challenging. The Silurian dolomite layer and associated karst features are not found in the northwestern and north central portions of the county or along the shores of Lake Winnebago, south of High Cliff State Park.

- *Maquoketa Shale*: The Maquoketa shale layer is found below the Silurian dolomite. This dense layer formed from clay particles. It acts as a confining layer – slowing the downward movement of water from the Silurian dolomite above into the deeper aquifers. The shale is used by a limited number of county residents for drinking water. Low water yields, salt content, and taste and odor problems may occur in this aquifer. Sedimentation problems can occur in wells tapping this aquifer when the water table is

lowered. The shale is the upper-most bedrock layer in the northwestern portion of the county and is overlain with glacial drift.

- *Sinnipee Dolomite:* The Sinnipee dolomite is found below the Maquoketa shale and has similar qualities to the Silurian dolomite. It is a fractured, limestone-like rock that can also dissolve in water over time. However, it has less fractures than the Silurian since it is deeper in the earth. This layer is not known to produce enough water for wells due to the small number of fractures. It generally is not used for drinking water purposes by county residents.
- *St. Peter Sandstone:* The St. Peter sandstone layer is below the Sinnipee dolomite and is part of the Ancell Group. This layer consists of sand particles cemented together to form a rock. A number of private and municipal wells in the county use this layer for drinking water. The layer is known to produce salt water, as well as arsenic laden water from arsenic veins. These potential problems are found sporadically throughout the layer, making it difficult to predict where they may occur.
- *Precambrian Bedrock:* Below the St. Peter Sandstone are layers of hard, impermeable Precambrian rock. These layers are not generally used for drinking water in Calumet County and form the bottom layers of the aquifer system in the county.

The Niagara Escarpment is a bedrock ridge that runs from New York, through Canada and into Wisconsin. One of the most famous features associated with the ridge is Niagara Falls on the New York/Ontario boarder. In Wisconsin the ridge extends from Rock Island in Door County, down through Calumet County, and south to the Milwaukee area. It is comprised of dolomite rock and is part of the Silurian dolomite bedrock layer. There are many unique and rare plant and animal communities and natural areas associated with this feature which need special attention and protection from the impacts of land use practices and changes along the escarpment.

Figure 4: View of Geologic Cross Section

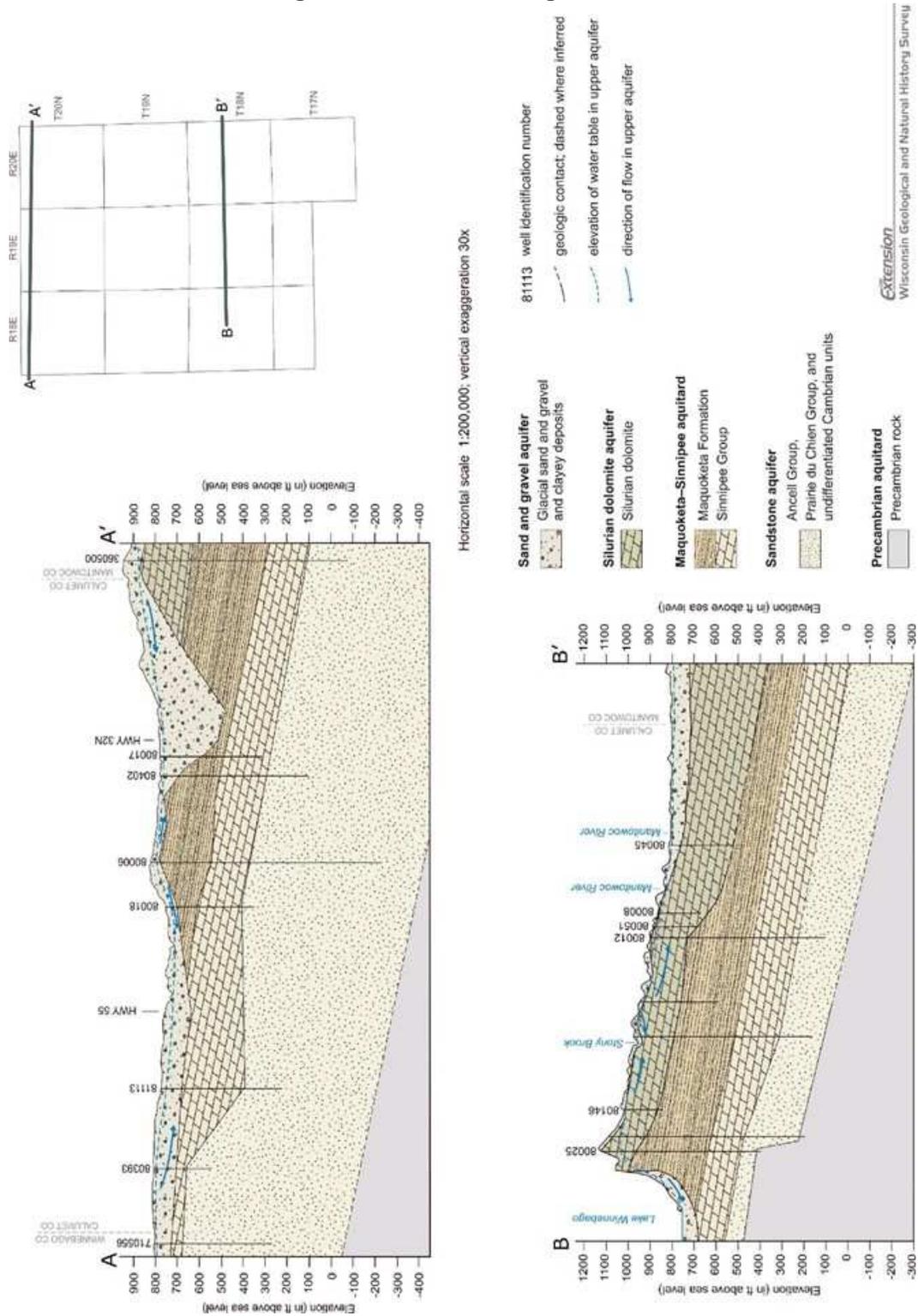


Figure 5: Upper-Most Geologic Units



3.3 Soil

Soil is made up of mineral particles, organic matter, air, and water. The soils of Calumet County developed from weathered rock particles deposited by wind, water, and glacial ice or were weathered-in-place from bedrock. They also developed from decaying plant and animal matter. In some cases, these materials were deposited on top of each other. Time, climate, plants, animals, and landscape position acted on these “parent” materials to form differing soils with unique physical and chemical properties. These properties determine the suitability of and management requirements for each soil for a specific land use.

3.3(a) Soil Survey

To make informed decisions about land use and management, knowledge of the location of the different soils across the landscape is needed. As part of the National Cooperative Soil Survey, soil scientists from USDA – NRCS have investigated and mapped the soils in Calumet County. They have published their findings as the *Soil Survey of Calumet and Manitowoc Counties, Wisconsin*. The survey contains:

- Maps of the boundaries and locations of soils or groups of soils on aerial photos of the landscape;
- Descriptions of each soil or group;
- Tables of important physical and chemical properties; and
- Information on use and management of each soil or group.

The information in the survey can be used to plan, change, and manage land use according to the limitations and potentials of the soils. Printed copies of the original soil survey are available free of charge from the Calumet County USDA – NRCS office. An updated version of the survey can be found online on the USDA – NRCS website at:

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

According to the survey, many of the soils in Calumet County were formed from glacial till, developed under forest vegetation, and are predominantly clay or loam in texture. There are 46 named soils in the county and 60 detailed soil mapping units. Named soils are soils that have similar physical and chemical characteristics. Soil mapping units are soils or groups of soils that are found together on the landscape. The dominant named soils in Calumet County are red clay soils, named Kewaunee and Manawa. They are found in just over one third of the land area of the county.

The general soil map within the *Soil Survey* shows the location of the dominant soils within the county. It allows for comparisons of the potential of large land areas for general types of land uses. The map units on it are distinctive patterns of soils, relief, and drainage and are named for the major soils within them. The map is not suitable for planning a land use on a specific site, such as cropping or building. More detailed maps within the *Soil Survey* can be used for such cases. However, soils can change rapidly across the landscape and soil maps are based on

limited investigations. It is recommended that an on-site soils investigation be conducted by digging or drilling into the soil prior to making any land use decisions. **Figure 6** is the General Soils Map for Calumet County and **Figure 7** is the corresponding map key. Both figures are from the *Soil Survey of Calumet and Manitowoc Counties, Wisconsin*. **Figure 8** shows the locations of shallow and lighter textured soils. Areas with these soils have been associated with poor groundwater quality.

3.3(b) Soil Map Units

Below are descriptions of the soil map units found on general soils map of Calumet County (**Figure 6**) and the general resource concerns related to some of the soils. Refer to the *Soil Survey* for definitions of drainage classes.

Soils Formed in Glacial Till:

- **Kewaunee-Manawa-Poygan (1)** – These soils and similar soils occupy much of the northeastern two thirds of the county and border Lake Winnebago. The soils formed in reddish glacial till that was deposited during the Valdres substage of the Wisconsin Age of Glaciation. The soils are predominantly clay loam and clay throughout and are well drained to poorly drained, depending on where they occur on the landscape and the depth to the water table. The physical properties of soils can affect erosion rates and water quality. Precipitation soaks slowly into these clay soils and may instead run off over the land surface. On steeper slopes, the runoff can cause excessive soil erosion. The runoff may carry the small clay particles, fertilizers, and land-applied waste materials offsite and into surface waters, causing sedimentation, cloudy water, and nutrient enrichment.
- **Hochheim-Lamartine-Mayville (3)** – These soils and similar soils occupy a large part of the southeastern one third of the county and are often adjacent to the thin Channahon-Whalen-Kolberg soils. The soils formed in yellowish glacial till that was deposited during the Cary substage of the Wisconsin Age of Glaciation. They are predominantly loamy throughout and often have gravels in their lower layers. These soils are well drained to somewhat poorly drained, depending on where they occur on the landscape. Due to their high permeability, precipitation rapidly soaks into and moves down through them. Fertilizers and other land-applied materials on the soil surface may be easily carried downward through them to the groundwater. Well water testing data indicates that groundwater under areas of these soils is high in nitrates.

Soils Formed in Old Lake Deposits:

- **Pella-Mundelein-Shiocton (5)** – These soils and similar soils are found in a small area of the county, just west of Brillion. The soils formed in old glacial lake basins. These soils are predominantly loamy throughout and are somewhat poorly drained to poorly drained.

Soils Formed in Glacial Outwash Deposits

- **Wasepi-Plainfield-Boyer (8)** – These soils and similar soils are found in small areas on the western edge of the county including along Mill Creek, near the Lake Winnebago shoreline just northwest of the Village of Stockbridge, and in the extreme northeast corner of the county. The soils formed in sandy material deposited by melting glacial ice and melt-water streams. These soils are predominantly sandy and loamy throughout and are excessively drained to somewhat poorly drained, depending on where they occur on the landscape. Because they are sandy and very permeable, pollutants from the land surface may be carried downward through them to groundwater.
- **Granby-Oakville-Tedrow (9)** – These soils and similar soils are found in a small area on the northern shore of Lake Winnebago. The soils formed in sandy material deposited by melting glacial ice and on old lake beaches. These soils are predominantly sandy throughout and are well drained to poorly drained, depending on where they occur on the landscape.

Soils Formed in Decaying Plant Materials

- **Houghton-Palms-Willette (10)** – These soils and similar soils are found in low, marshy areas and in areas along streams throughout Calumet County. The soils formed from decaying plant materials. These soils are predominantly well decomposed organic matter (muck) over mineral materials of varying textures. They are very poorly drained. Most areas of these soils are in natural vegetation of trees and sedges or are used as pasture.

Thin Soils Formed in Glacial Till

- **Channahon-Whalon-Kolberg (11)** – These soils and similar soils are found in small areas in the southeastern one third of the county. Recent studies have indicated that they may be prevalent in larger areas than what is shown on the general soils map. The soils formed in various loamy and clayey glacial materials 40 inches or less in depth over dolomite bedrock. They are predominantly loamy throughout and are well drained. Because thin soils make poor filters, pollutants from the land surface may be carried downward through them to groundwater. Well water testing data indicates that groundwater under areas of these soils is high in nitrates.

Figure 6: General Soils Map

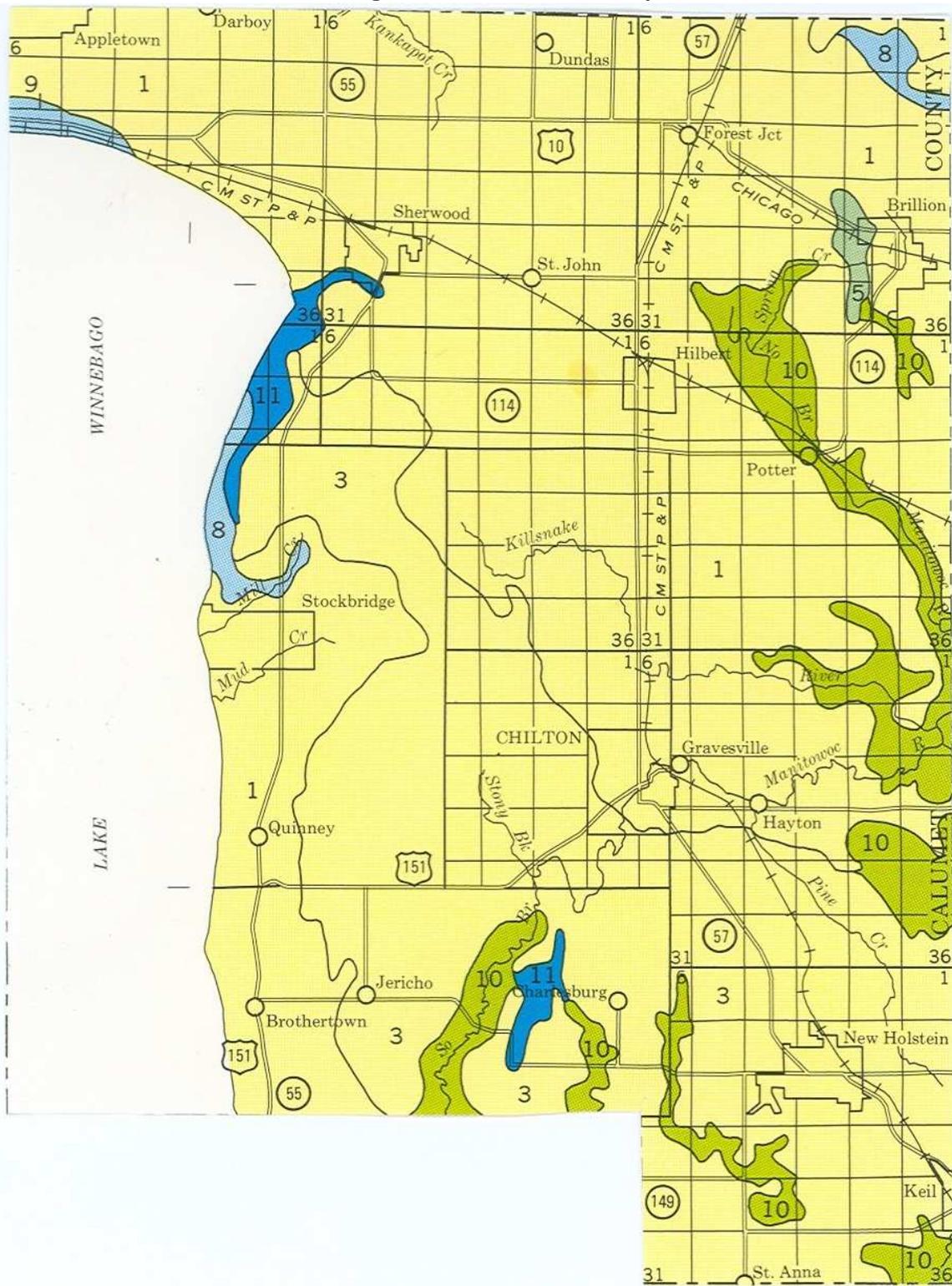
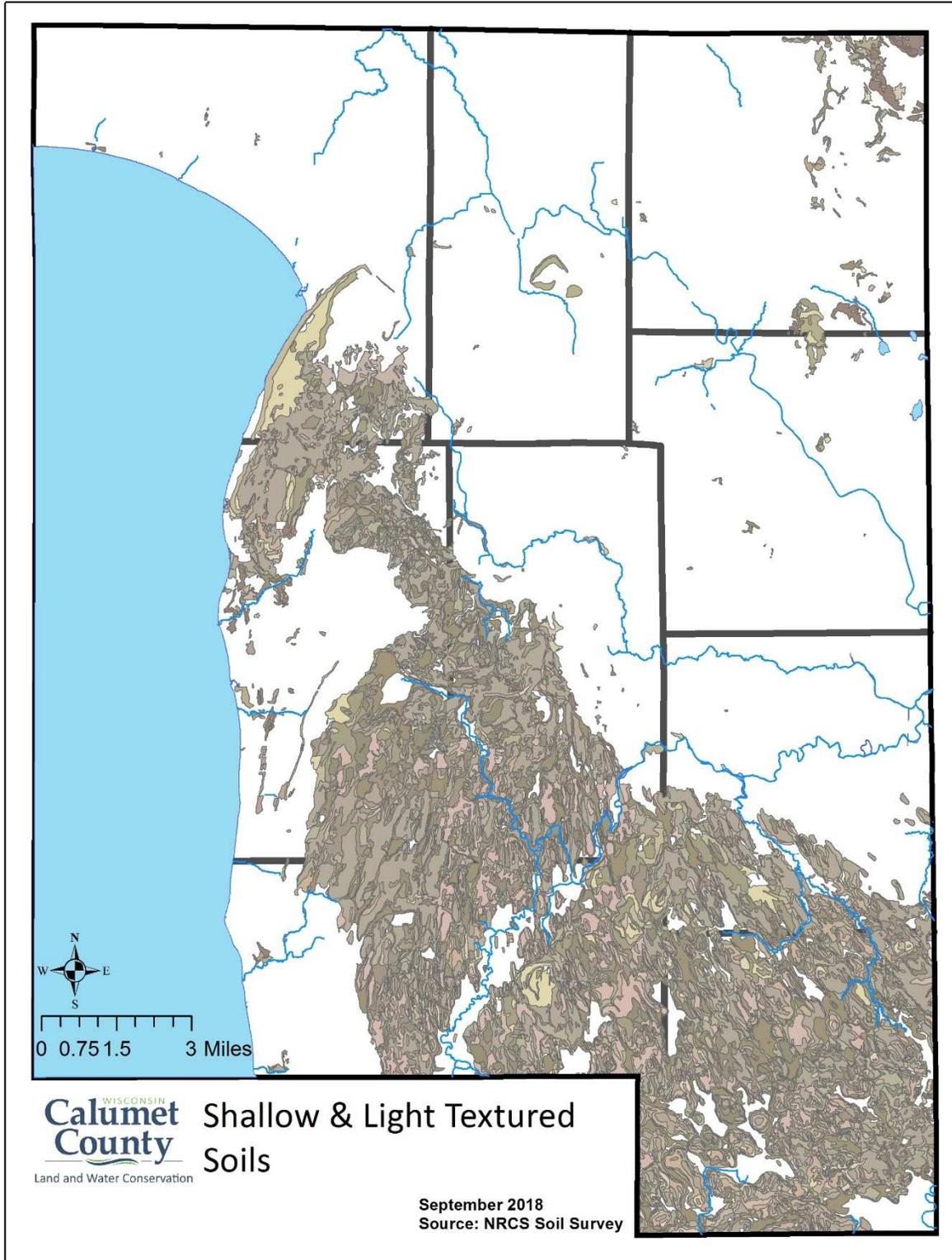


Figure 7: Key for General Soils Map

AREAS DOMINATED BY SOILS THAT FORMED IN GLACIAL TILL	
1	Kewaunee–Manawa–Poygan: Nearly level to sloping, well drained to poorly drained soils that have a dominantly clayey subsoil and substratum
2	Hortonville–Symco: Nearly level to moderately steep, well drained and somewhat poorly drained soils that are loamy throughout
3	Hochheim–Larmartine–Mayville: Nearly level to moderately steep, well drained to somewhat poorly drained soils that are loamy throughout
AREAS DOMINATED BY SOILS THAT FORMED IN LACUSTRINE DEPOSITS	
4	Zurich–Mundelein–Briggsville: Nearly level to sloping, well drained to somewhat poorly drained soils that have a loamy or clayey subsoil
5	Pella–Mundelein–Shiocton: Nearly level and gently sloping, somewhat poorly drained and poorly drained soils that are dominantly loamy throughout
AREAS DOMINATED BY SOILS THAT FORMED IN GLACIAL DRIFT	
6	Kewaunee–Boyer–Nichols: Gently sloping to steep, well drained and moderately well drained soils that are sandy, loamy, or clayey
7	Hochheim–Lutzke: Gently sloping to steep, well drained loamy soils
AREAS DOMINATED BY SOILS THAT ARE UNDERLAIN BY OUTWASH DEPOSITS	
8	Wasepi–Plainfield–Boyer: Nearly level to moderately steep, excessively drained to somewhat poorly drained, sandy and loamy soils
9	Granby–Oakville–Tedrow: Nearly level to sloping, well drained to poorly drained soils that are dominantly sandy throughout
AREAS DOMINATED BY ORGANIC SOILS	
10	Houghton–Palms–Willette: Nearly level, very poorly drained organic soils
AREAS DOMINATED BY SOILS THAT ARE UNDERLAIN BY DOLOMITE	
11	Channahon–Whalan–Kolberg: Gently sloping and sloping, well drained loamy soils that have a dolomite substratum

Figure 8: Shallow & Light Textured Soils



3.3(c) Erosion & Sediment

Soil erosion is a natural process. However, it is accelerated when land use practices, such as farming and construction, leave the soil surface bare and unprotected. Raindrops striking bare soil surfaces detach soil particles and a thin layer of runoff carries the particles downhill. The soil particles are deposited as sediment on adjacent land or may enter surface waters or groundwater. This type of erosion is called sheet and rill erosion. When runoff concentrates in the natural drainage ways of the land, soil erosion is more dramatic and is called gully erosion.

Some other forms of soil erosion include stream bank and lakeshore erosion. Stream bank and lakeshore erosion may occur when the vegetative cover along the banks of the stream or shore of the lake is removed or disturbed, or replaced with non-native vegetation. This type of erosion often occurs on pasture areas, along urbanized stream channels, and on lakefront lots and building sites.

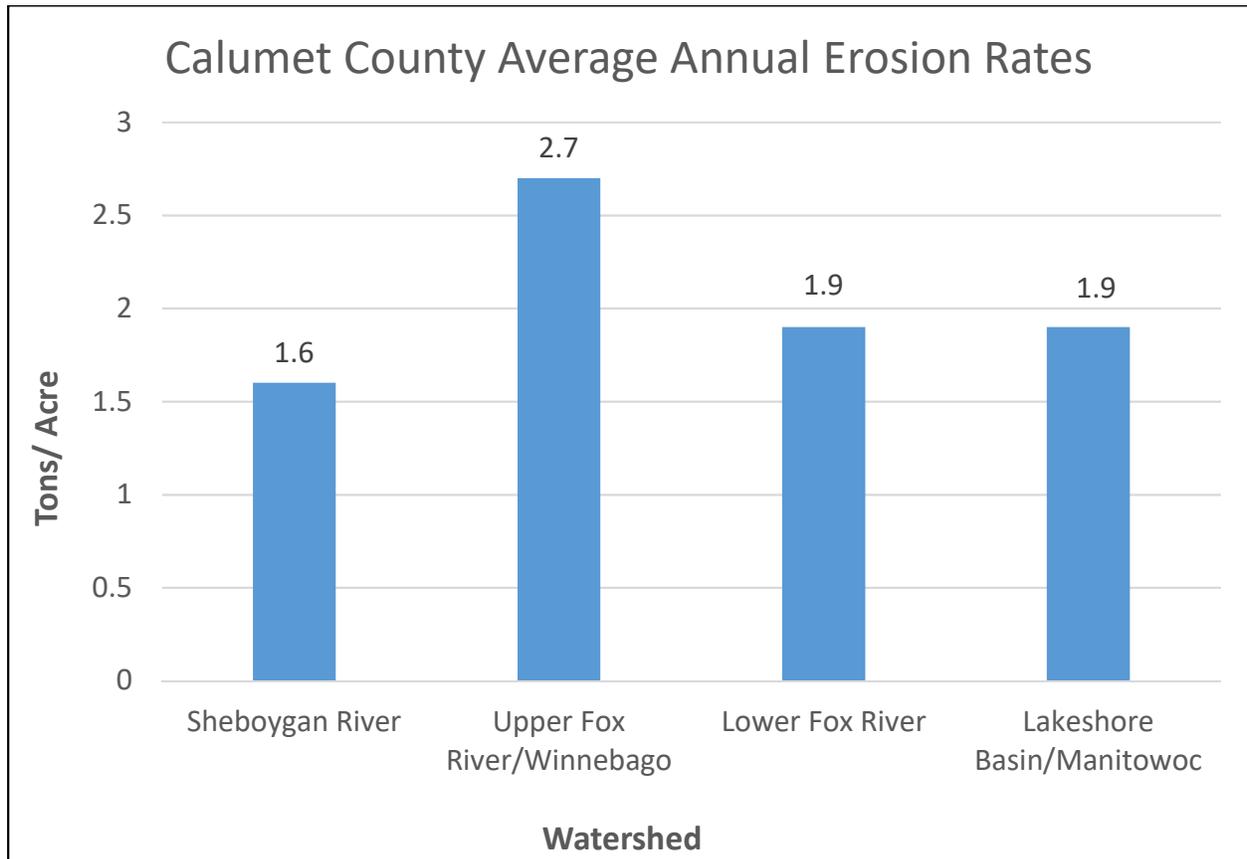
Soil erosion has impacts on and off of the site where it occurs. When excessive soil erosion occurs on cropland, decreases in the productivity of the soil for future crops may occur. If the resulting sediment ends up in road ditches, local governments must spend money to clean them out. When eroded soil particles reach surface waters, the result is muddy water and soil particles settling to the bottom as sediment, creating difficult conditions for fish and other aquatic life. If the particles reach groundwater, they can render the water undrinkable.

3.3(d) Soil Erosion Rates

Land planted with annual crops, like corn and soybeans, is often tilled every year. Tillage buries the residue from the previous crop, exposing the soil surface to erosion. Moldboard plowing, also called clean tillage, turns most of the crop residue underground and leaves the soil surface bare. Minimum tillage and no-till practices leave residue on the soil surface, protecting it from erosion. As amounts of residue cover increase, erosion and runoff decrease.

LWCD staff conducted a study of nutrient management plans to determine soil loss rates in each of the four major watersheds in the County. Between the major watersheds it was determined that the average soil erosion rate in the County is about 2.0 tons per acre per year. This rate is at or below tolerable soil loss for a majority of the soil types in the County but it is acknowledged that these rates assume that erosion in concentrated flow channels has been eliminated and it is understood that this is not always the case. About 100 fields were used county-wide between the four major watersheds. Fields were selected with the intent of representing as many of the various soil types in the County as possible. Three of the four watersheds were similar in erosion rates with the Upper Fox River/Winnebago watershed showing the highest erosion rates due to steeper slopes in the watershed.

Table 2: Calumet County Average Annual Erosion Rates



3.3(e) Stream Bank & Lakeshore Erosion

Stream bank and lakeshore erosion are continuing problems in the county. Through the use of education and financial incentives, the LWCD has convinced many landowners to move their pastures away from streams and to control lakeshore erosion with vegetation and riprap. These efforts will need to be continued to address remaining problem sites in the county. Enforcement of County ordinance requirements is also an option.

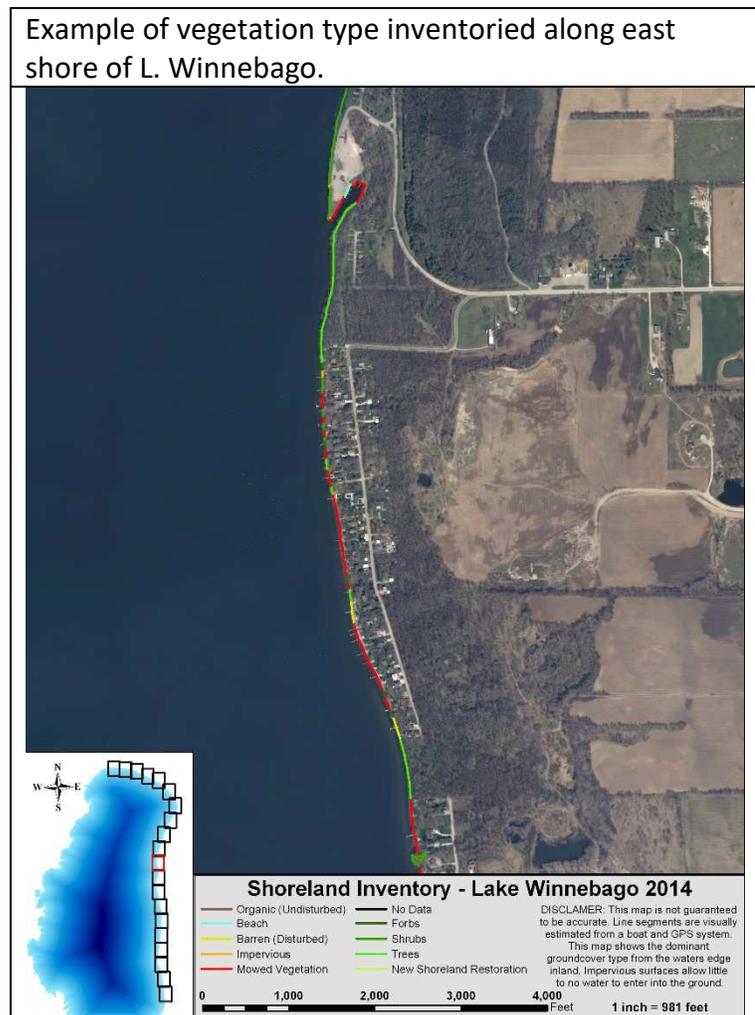
Tiling on cropland delivers large amounts of rain water to streams quickly, causing large flow volumes and subsequent erosion. The creation of impervious surfaces from building roofs, streets, and parking lots is increasing the rate of runoff and in turn flooding and overwhelming the not-so natural streams and channels in the developed areas. Detention ponds, sediment basins, and rain gardens can be used to retain runoff and slowly release it or allow it to soak into the ground. These practices need to be included in educational programs. Installation of them may also be required by County ordinance.

A shoreline inventory was conducted in 2014 to better understand nearshore habitats and conditions of County lake shorelines. The entire shoreline of each lake was assessed linearly for

changes in land use and documented vegetation, erosion issues, and anthropogenic disturbances. Riparian vegetative buffer lengths and widths were documented, along with any points of development, such as boat houses, piers, and seawalls. In addition, a shoreland health scoring system was developed and a score was calculated for each parcel. A scoring system can be used to communicate the quality of shoreland conditions for riparian property owners and to the general public. The Lake Winnebago Shoreline was assessed by each county as a part of the Winnebago Waterways Lake Planning effort.

Figure 9: Winnebago Shoreland Inventory

Overall, the Winnebago shoreline can be characterized as developed, with riprap and seawalls used as common practices to prevent shoreline erosion from wave action. Often, vegetation is present when slope steepness makes it challenging to maintain mowed turf. Large stretches of shoreline are well-buffered and treed, primarily along larger parcels of cropland or with limited development. Wetland areas are infrequent and wetland restoration potential is minimal. Advancing shoreland practices on the east shore of Winnebago is challenging due to steep slopes and high wave energy, and prescribing popular shoreland practices common on smaller Wisconsin lakes is difficult. Still, landowners should be encouraged to adopt practices that reduce impact of runoff and improve plant root structure to stabilize banks.



3.3(f) Construction Site Erosion

The soil surface is often left bare for long periods of time during installation of roads for subdivisions, home building, and other construction activities. The rate of soil erosion and the resulting sediment quantities from these construction sites can exceed that of cropland. Observations and complaint investigations by the LWCD and DNR staff indicate that it can be a major problem if construction sites are not managed properly. This is especially true in the

northwestern portion of the County, where rapidly increasing populations are causing a large amount of new construction.

Construction site erosion can be controlled by the use of conservation practices, such as mulching of disturbed areas and leaving natural vegetation in place. The resulting runoff and sediment for land disturbance can be controlled with practices like silt fencing and sediment traps. Widespread use of these practices on construction sites can address most problems. Prospective homeowners, builders and developers must be encouraged to use them. As with other conservations practices. A long term education program on the use and benefits of these practices is run regionally in cooperation with other communities that participate in the Northeast Wisconsin Stormwater Consortium (NEWSC). Demonstrations of proper practice installation need to be part of the program. Enforcement of County ordinances requiring their installation are used in conjunction with education. The rapidly urbanizing northwest corner of Calumet County should be targeted for this program.

Wisconsin DNR and U.S. Environmental Protection Agency (EPA) regulations required the County to develop and implement a comprehensive erosion control program as part of meeting its WPDES Municipal Separate Storm Sewer System (MS4) permit. The LWCD played a lead role in the development and implementation of the plan and will continue to do so.

Figure 10: Calumet County Sub-watersheds, 12-Digit HUC Numbers

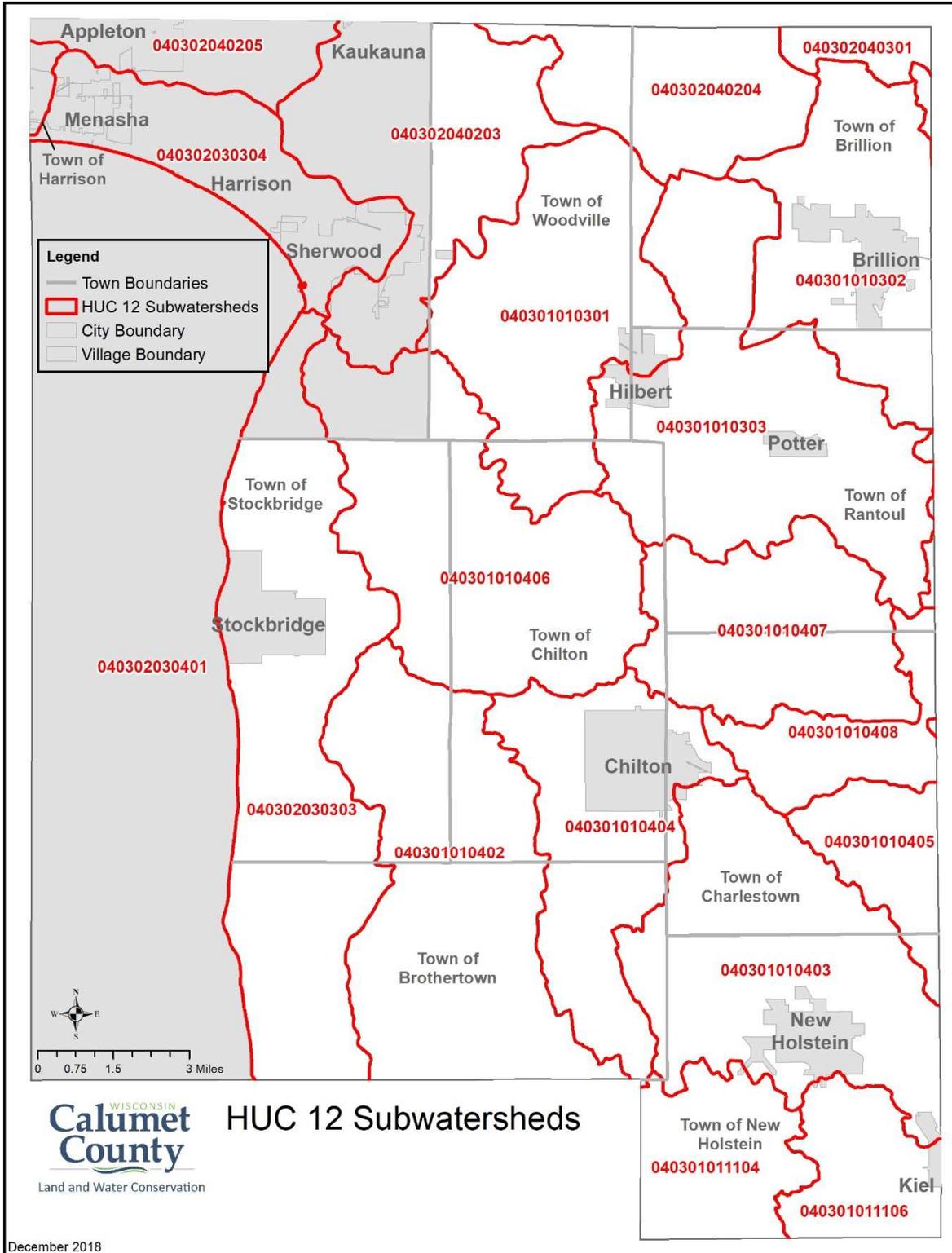
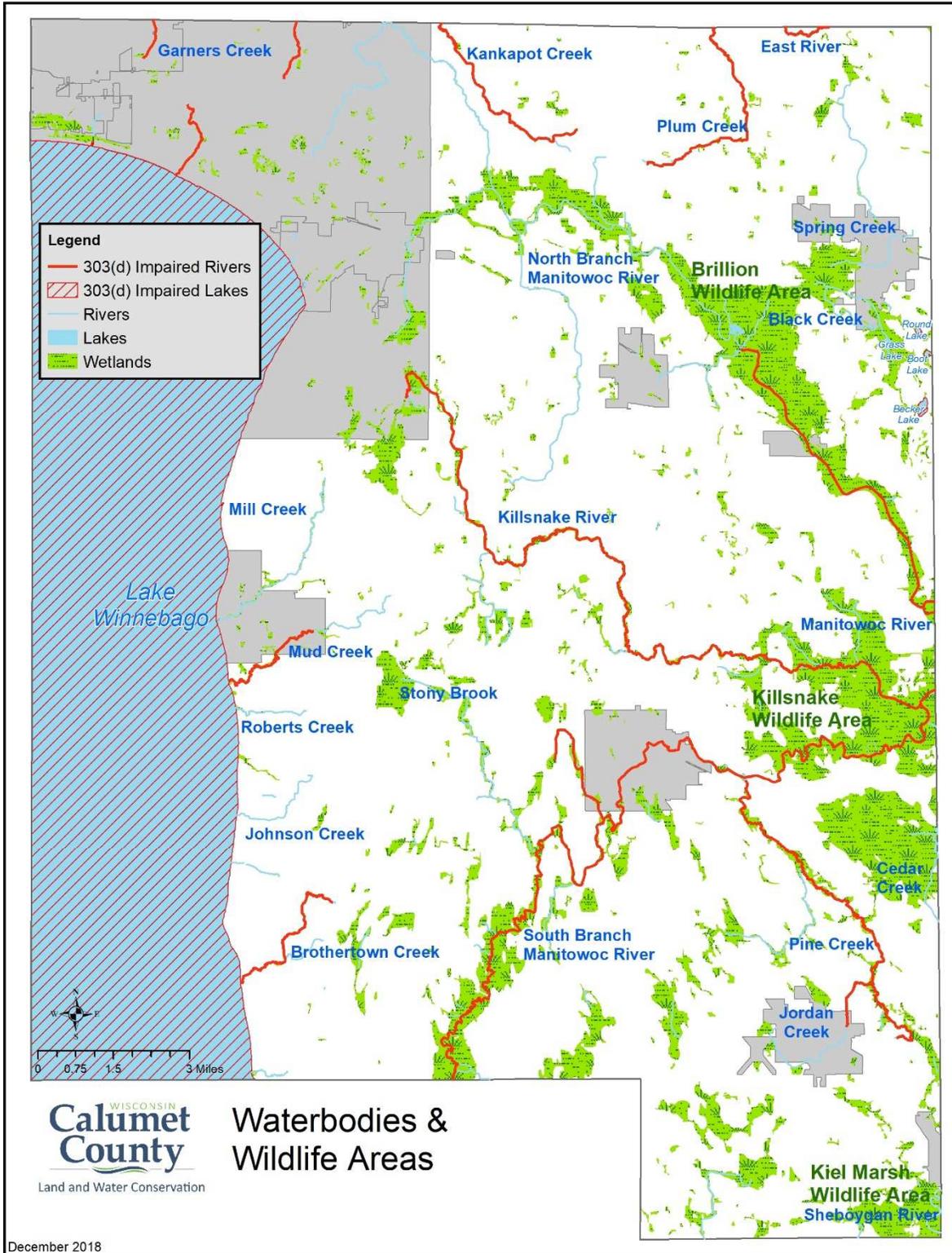


Figure 11: Map of Rivers, Lakes & Wildlife Areas



3.4 Surface Water

Calumet County has a variety of named water bodies including:

- Lakes: Lake Winnebago, Round Lake, Boot Lake, Becker Lake and Grass Lake;
- Millponds: Chilton Millpond and Hayton Millpond;
- Marshes: Brillion State Wildlife Area, Killsnake State Wildlife Area and Kiel Marsh State Wildlife Area; and
- Streams: Garners Creek, Kankapot Creek, Plum Creek, East River, North Branch Manitowoc River, Spring Creek, Black Creek, Killsnake River, Mill Creek, Mud Creek, Stony Brook, Manitowoc River, Roberts Creek, Johnson Creek, Brothertown Creek, South Branch Manitowoc River, Jordan Creek, Pine Creek, Cedar Creek, and Sheboygan River.

Many other seasonal streams, channels, ponds, flooded quarries, and drainage ditches exist in the county. It is estimated that surface water bodies encompass approximately 20% of the total area within Calumet County boundaries. See **Figure 11** for a map of the water bodies in the county. All streams in the county drain to Lake Michigan either indirectly via Lake Winnebago and the Fox River into Green Bay or directly into Lake Michigan via the Manitowoc and Sheboygan Rivers.

3.4(a) Watersheds & DNR Basins

A watershed is an area of land that drains to a common point, a certain lake or stream, or a group of lakes and/or streams. Watersheds are often used in natural resource management and conservation because land use practices within the watershed can impact the water quality of the stream or lake. Adoption and implementation of conservation practices within a watershed should improve the water quality of the lake or stream that it drains to. A large watershed may contain many smaller watersheds.

The DNR has divided Wisconsin into three large watersheds or basins. Calumet County falls entirely within the Lake Michigan Basin. The DNR has further subdivided these watersheds into 23 smaller watersheds, geographic management units called sub-basins. The sub-basins are used for management and planning purposes, as well as to define work areas for staff. A strategic plan, often called a *State of the Basin* report, has been developed by the DNR for each of these sub-basin watersheds. A copy of each report is on file in the Calumet County LWCD office or can be found on the DNR website on-line at <https://dnr.wi.gov/topic/Watersheds/basins/>. These plans identify the conditions of the land and water resources within the sub-basins, assess and prioritize resource concerns within them, and contain a strategic plan of action to address the concerns. They were used by the LWCD to assist in the development of this LWRM plan.

Calumet County falls into the following four management units or sub-basins, which are depicted in **Figure 12**:

- Upper Fox River Basin;
- Lower Fox River Basin;
- Lakeshore Basin;
- Sheboygan River Basin.

The DNR has further divided these four management units within Calumet County into eight smaller watersheds. Each of these watersheds drains to a major stream in the county and is named after it. All of the watersheds have boundaries that reach outside of Calumet County. The watersheds, listed by sub-basins, are:

- Upper Fox River Sub-basin – Lake Winnebago East, Lake Winnebago North and West;
- Lower Fox River Sub-basin – Plum & Kankapot Creeks, East River, Garners Creek/Fox River;
- Lakeshore Sub-basin – Lower Manitowoc River, North Branch Manitowoc River and South Branch Manitowoc River; and
- Sheboygan River Sub-basin – Sheboygan River.

See **Figure 13** for a map of the watersheds. It should be noted that these watersheds may contain other streams and lakes that are not in their name. A single stream or lake or multiple streams and lakes within these watersheds may also have their own smaller watershed area called a sub-watershed. See **Figure 10** for sub-watersheds in Calumet County.

3.4(b) Polluted Runoff and Non-point Source Pollution

Most streams and lakes, and much of the groundwater in Calumet County, are negatively impacted by polluted runoff and non-point pollution from various land uses. Polluted runoff is created by rain and snowmelt flowing across the land surface, picking up and carrying away natural and man-made pollutants. If the polluted runoff enters lakes, streams, wetlands, or groundwater, it is called non-point source pollution. Non-point source pollution differs from point source pollution in that it does not come from a single point like a pipe.

Pollutants found in runoff come from a variety of land uses, both agricultural and urban. The pollutants can include soil particles from cropland and construction site erosion, fertilizers from cropland and lawn applications, animal waste from manure applications and pets, pesticides from cropland and lawn applications, and other toxic materials. Soil particles cloud water and make it difficult for fish and aquatic life to find food and breathe. As the particles settle out, they bury habitat and breeding grounds for aquatic life. Fertilizers and animal wastes add excess nutrients to surface waters, creating algae blooms and excess plant growth. As the algae and plants die, the decomposition process depletes the oxygen levels in the water causing fish kills. Nitrogen and bacteria can make our groundwater unsafe to drink. Toxic materials in runoff may poison our surface waters and groundwater.

Polluted runoff can be reduced or eliminated with conservation practices, such as conservation tillage to control soil erosion and nutrient management planning to control and reduce runoff of nutrients. The land use and type of pollutant determines which practices can and should be used. The use of these practices is promoted through education of and incentives for land users. Use of conservation practices may also be required by County ordinances.

3.4(c) Excess Storm Water Runoff and Impacts

Historical loss of wetlands and an increase in impervious surfaces from construction of buildings, driveways, parking lots, and roads has resulted in increased volumes of runoff after precipitation and snowmelt in some areas of the county. The increase in volume has caused flooding problems and channel erosion on specific sites within these areas. Restoration of wetlands and installation of conservation practices such as rain gardens, rain barrels, and pervious driveways and parking lots upslope of these sites can increase infiltration of rainfall and snowmelt and reduce flooding and erosion problems. The *Calumet County All Hazards Mitigation Plan* listed educational programming, potential runoff studies, partnerships, and additional conservation practices that may be necessary to address these impacts.

3.4(d) Impaired Waters (303d) List

The federal Clean Water Act requires states or delegated authorities to issue water quality status reports every two years for surface water bodies within their state boundaries. As part of these reports, each state must list water bodies that do not meet or are not expected to meet state water quality standards. These polluted or degraded waters are put on an impaired water list, otherwise known as a 303(d) list. The list name refers to the section of the federal Clean Water Act that requires the list.

All of the larger rivers in Calumet County are on 303(d) list. Lake Winnebago is also on the current list. The 303(d) water bodies in Calumet County are listed in **Table 3** and shown on **Figure 11**. The pollutant(s) and impairment(s) are listed next to each water body in the table.

Figure 12: DNR Sub-Basins

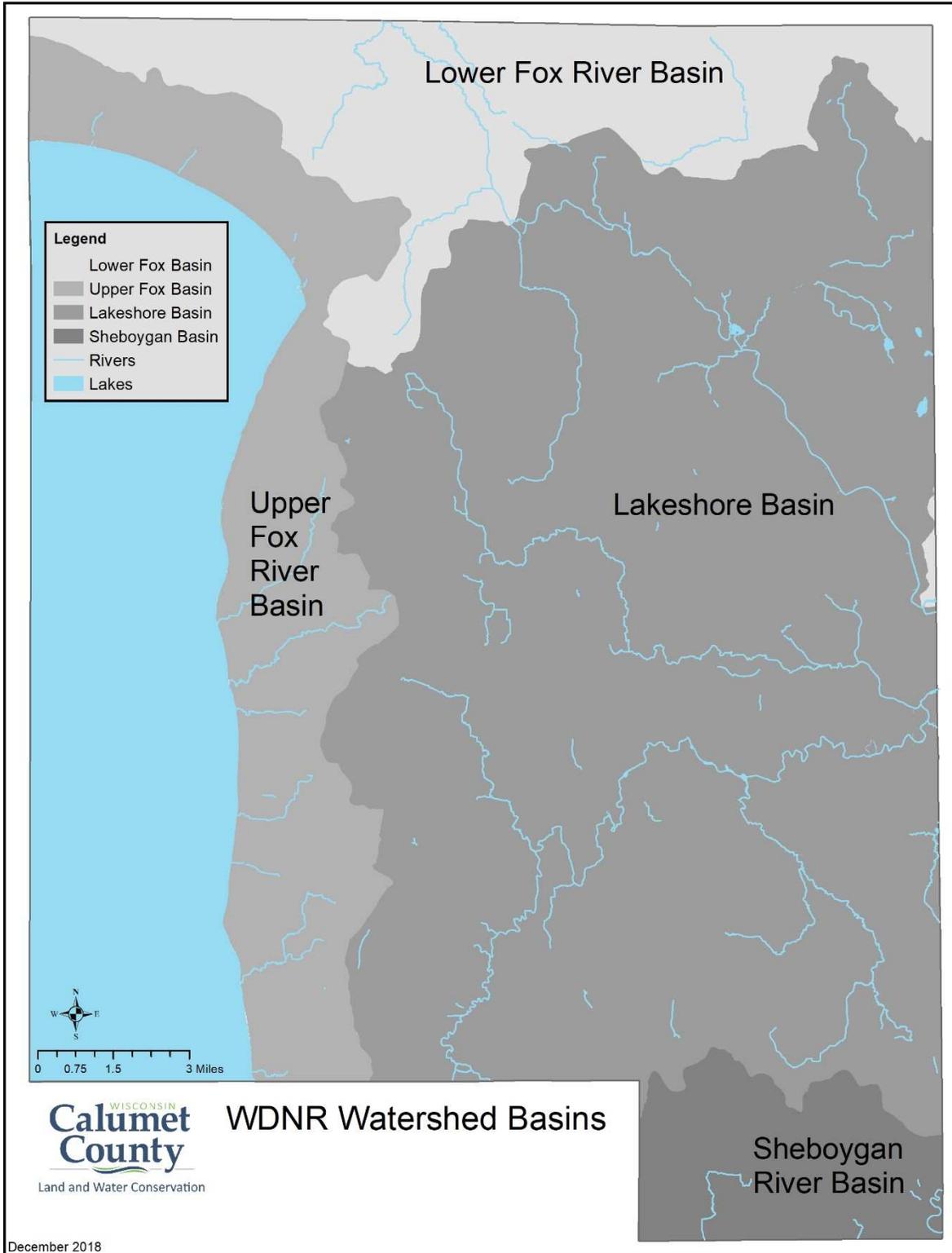


Figure 13: DNR Watersheds



Table 3: Impaired Waterbodies

Waterbody (WBIC)	Stream Segment (Miles)		Pollutant	Impairment
	Start	End		
North Branch Manitowoc River (75900)	0	7.35	TP, TSS	Low DO, Degraded Habitat
South Branch Manitowoc River (77900)	0	12.64	TP, PCBs, Unknown Pollutant	WQ Use Restrictions, Contaminated Fish/Sediment, Elevated Water Temperature
South Branch Manitowoc River (77900)	12.64	36.58	TP	Degraded Biological Community
Killsnake River (78200)	0	19.73	TP, Unknown Pollutant	WQ Use Restrictions, Elevated Water Temperature
Pine Creek (79900)	5.54	9.12	TP	Degraded Biological Community
Pine Creek (79900)	0	9.12	PCBs	Contaminated Sediment
Jordan Creek (80200)	0	1.36	PCBs	Contaminated Fish Tissue, Contaminated Sediment
East River (11800)	14.15	42.25	TP, TSS, Unspecified Metals	Low DO, Degraded Biological Community, Degraded Habitat, Chronic Aquatic Toxicity
Plum Creek (125100)	13.87	19.5	TSS	Elevated Water Temperature, Degraded Habitat
Kankapot Creek (126800)	2.66	9.57	TP, TSS	Degraded Habitat
Garners Creek (127700)	0	6.99	TP, TSS, Chlorides	Degraded Biological Community, Degraded Habitat, Chronic Aquatic Toxicity
Unnamed Trib to Winnebago (131130)	0	1.89	TP	Water Quality Use Restrictions
Mud Creek (131600)	0	3	TP	Degraded Biological Community
Brothertown Creek (132100)	0	3.75	TP	Impairment Unknown
Unnamed Trib to SB Manitowoc (300057)	0	2.92	TSS	Degraded Habitat
Unnamed Trib to Garners Creek (5022162)	0	4.71	Total Phosphorus	Degraded Biological Community
Killsnake River (78200)	0	19.73	PCBs	Delisted 2002- Contaminated Fish Tissue

3.4(e) Total Maximum Daily Load (TMDL) and EPA 9 Approved 9 Key Element Plans

The Clean Water Act also requires states to develop a watershed restoration action plan called a Total Maximum Daily Load (TMDL) for each impaired water body on the 303(d) list. A TMDL is the maximum amount of a pollutant that a water body can receive and still meet water quality standards. A TMDL is established by defining water quality goals for pollutants causing water quality impairment, determining current pollutant loads and their sources, and using modeling to calculate the pollutant load reduction needed from each pollutant source. The restoration plan assigns responsibilities to each source for needed actions to attain pollutant load reduction goals.

In November 2010, the Wisconsin legislature enacted water quality criteria for total phosphorus in Wisconsin streams and lakes. The criteria are listed in Wisconsin Administrative Code NR 102 Water Quality Standards for Wisconsin Surface Waters and are used to develop water quality goals.

Development of TMDL's and the associated restoration plans are public processes that can take months or years to complete. A TMDL must be approved by the State of Wisconsin and the United States Environmental Protection Agency (EPA). A TMDL plan addressing phosphorus and total suspended solids was developed for the Lower Fox River Sub-basin and approved in 2012. The Lower Fox River Sub-basin includes the reaches of Plum and Kankapot Creeks and East River in Calumet County. 9 Key Element watershed plans have been developed and approved for both of those watersheds. Plan implementation started taking place in 2015 in the Plum and Kankapot Creek watersheds and will continue into the future. Implementation began in the East River in 2018.

TMDL development for the Upper Fox River Sub-basin has been taking place over the last several years and it is anticipated that the TMDL will be approved sometime in 2019. This sub-basin includes the streams and land area in Calumet County draining to Lake Winnebago.

Additional work has begun in the development of the Northeast Lakeshore TMDL which will include the North and South Branches of the Manitowoc River as well as the Sheboygan River in Calumet County. 9 Key Element Watershed planning has already begun in the North Branch Manitowoc watershed with plan completion and approval slated for summer 2019.

3.4(f) Trophic Status

Trophic status or state is an indicator of water quality, based on the nutrient levels within the water and bottom sediments and water clarity. Lakes can be divided into the following three categories as follows:

- Oligotrophic – lake is generally clear, deep, low in nutrients and free of undesirable vegetation or large algae blooms;
- Eutrophic – lake is high in nutrients, supports a large biomass (plants and animals) and weedy or subject to frequent algae blooms or both; and

- Mesotrophic – lake lies between the two stages above.

The trophic status of each lake in the county is listed under the description of the lake in the next section.

3.4(a) Surface Water Sources for Drinking Water

Some residents of Calumet County, as well as businesses and industries, rely on surface water as their source of water for drinking and other purposes. The Cities of Appleton and Menasha and the Village of Sherwood use Lake Winnebago water for their water source. Some private residences along and near the Lake Winnebago shoreline use springs and small streams flowing out of the Niagara Escarpment for their water sources. The quality of water in Lake Winnebago is impacted by nonpoint and point source pollution and must be filtered and treated before consumption and use. Millions of dollars have been spent for construction and annual maintenance of the Appleton Water Treatment Plant which serves the Cities of Appleton, Sherwood, and Menasha and the Waverly Sanitary District. These costs are shouldered by water users.

Discussions have occurred between LWCD staff and DNR water supply officials on potential use of Lake Winnebago as a source of water for areas within the county with serious groundwater contamination problems.

3.5 DNR Assessments of Watersheds & Water Resources

The following descriptions and assessments of watersheds and water resources of Calumet County area are arranged by DNR management units or sub-basins. Much of the individual stream and lake description information and assessments of water quality came from the individual *State of the Basin* reports and other DNR publications listed in **Section 8: References**. For further information on fishery classifications and non-point source rankings, see the individual *State of the Basin* reports.

3.5(a) Lower Fox River Sub-basin

Three DNR watersheds can be found from the Lower Fox River Sub-basin in Calumet County. These watersheds include:

- Plum and Kankapot Creek Watershed;
- East River Watershed; and
- Little Lake Butte des Morts Watershed.

Each of these watersheds has major water bodies that need to be evaluated in order to protect the health of the watershed and basin. More information can be found on-line at:

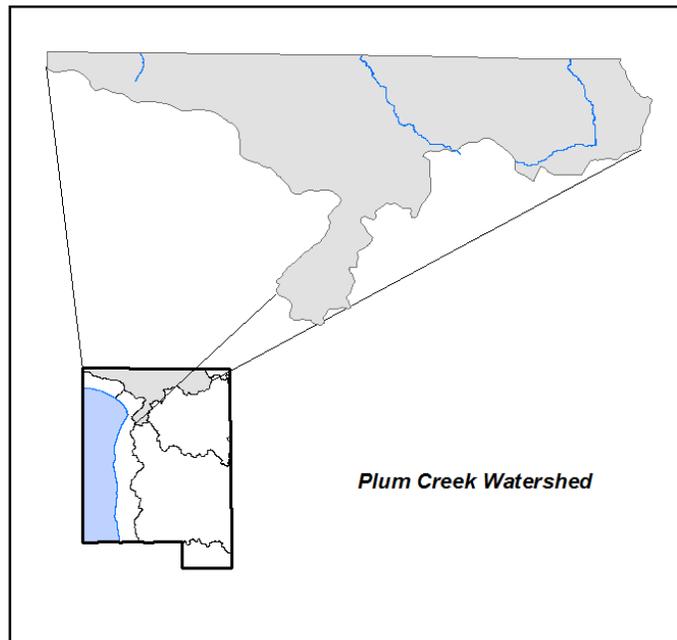
<https://dnr.wi.gov/topic/watersheds/basins/lowerfox/>

The TMDL for the Lower Fox River Basin and Lower Green Bay has been developed and approved by the EPA in 2012. The final TMDL can be found at: <https://dnr.wi.gov/topic/TMDLs/documents/lowerfox/LowerFoxRiverTMDLReport2012.pdf>

In addition EPA approved 9 Key Element Nonpoint Source Implementation Plans have been approved for the Plum and Kankapot Creek watershed as well as the East River watershed. Links to the individual watershed plans can be found below under the respective watershed detail sections.

- **Plum and Kankapot Creek Watershed(LF03)**

The Plum and Kankapot Creek Watershed encompasses 42 square miles within Calumet County and makes up 13% of the county's land area. It drains north to the Fox River. Historically, this watershed has water quality problems. According to the DNR, poor land use practices have caused nonpoint pollution resulting in low dissolved oxygen and high nutrient and sediment levels in its streams. The headwaters are intensively farmed and cropland erosion and barnyard runoff are common. A 9 Key Element nonpoint source implementation plan has been developed and approved by the EPA and can be found here: <https://www.outagamie.org/home/showdocument?id=33151>



- **Garners Creek**

Garners Creek is a five mile long stream that originates in Calumet County and flows north into Outagamie County to join the Fox River. Less than one mile of the stream is located in Calumet County. The fishery is classified as limited forage fishery. Land use within the watershed in Calumet County is mostly urban. Stream flows fluctuate rapidly from rain events and flow is very low during mid-summer. Water quality in Garners Creek is poor and is primarily impacted in Calumet County by urban erosion and polluted storm water runoff. This causes elevated bacteria levels, flashy flows, stream bank erosion, nutrient enrichment, and sedimentation. Garners Creek is on the DNR 303 (d) list for total phosphorus and sediment.

Impairment: Degraded Habitat

Pollutant Loads: 6,575 lbs/yr TP; 2,863,318 lbs/yr TSS

Load Reduction Goals: 3,626 lbs/yr TP (55.1%); 1,404,273 lbs/yr TSS (49.0%)

➤ Kankapot Creek

Kankapot Creek is a turbid (muddy) stream that originates in Calumet County and flows north into Outagamie County to join the Fox River. Only 2.4 miles of its nine mile length are in Calumet County. The fishery is classified as limited forage fishery. Land use within the Calumet County portion of its watershed is primarily agricultural, but is becoming increasingly urban within its northern part. Water quality in Kankapot Creek is poor and primarily impacted in Calumet County by agricultural erosion and polluted runoff causing sedimentation, elevated bacterial levels, flashy flows, stream bank erosion, and nutrient enrichment. Kankapot Creek is on the 2018 DNR 303(d) list for total phosphorus and sediment.

Impairment: Degraded Habitat

Pollutant Loads: 20,050 lbs/yr TP; 7,253,520 lbs/yr TSS

Load Reduction Goals: 14,502 lbs/yr TP (72.3%); 4,508,794 lbs/yr TSS (62.2%)

➤ Plum Creek

Plum Creek is a nineteen mile long stream that originates in Calumet County and flows north into Brown County to the Fox River. Approximately five miles of the creek are in Calumet County. The fishery is classified as a warm water forage fishery. Land use in the Calumet County portion of the watershed is primarily agricultural, but is increasingly becoming urbanized around the headwaters near the community of Forest Junction. Water quality in Plum Creek is poor and primarily impacted by agricultural erosion and polluted runoff causing sedimentation, flashy flows, stream bank erosion, elevated bacterial levels, nutrient enrichment, and low dissolved oxygen. It is on the 2018 DNR 303(d) list for total phosphorus and sediment.

Impairment: Degraded Habitat and Elevated Water Temperature

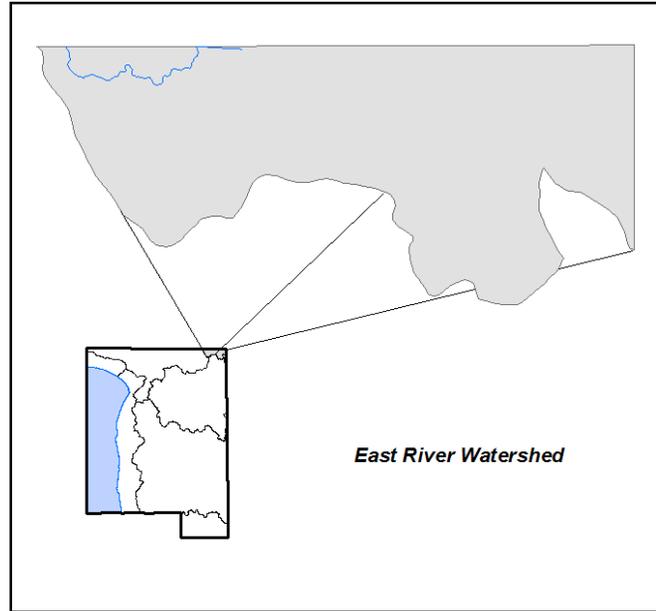
Pollutant Loads: 31,569 lbs/yr TP; 12,038,905 lbs/yr TSS

Load Reduction Goals: 24,376 lbs/yr TP (77.2%); 8,480,587 lbs/yr TSS (70.4%)

- **East River Watershed (LF01)**

The East River Watershed encompasses three square miles within Calumet County and makes up less than one percent of the county's land area. It drains northwest toward Green Bay into the Fox River. The East River was first listed as an impaired waterway in 1998. The East River is impaired due to excess phosphorus, sediment loading and unspecified metals. The Lower Fox River TMDL only addresses phosphorus and sediment loading in the Lower Fox River tributaries. In the Calumet County portion of the watershed, agricultural land uses were contributing to these impairments. A 9 Key Element nonpoint source implementation plan has been developed and approved by the EPA and can be found here:

<https://dnr.wi.gov/topic/nonpoint/documents/9kep/UpperEastRiver-Plan.pdf>



- **East River**

The East River is a hard water and turbid stream, 39 miles in length. It originates in Brown County, meanders through less than a mile of the northeastern Calumet County, and then flows north through Brown County into Green Bay. The fishery in Calumet County is classified as limited forage fish. Land use within the Calumet County portion of its watershed is primarily agricultural. Water quality in the East River is poor and primarily impacted by agricultural erosion and polluted runoff causing sedimentation and nutrient enrichment. It is on the 2018 DNR 303(d) list for metals, phosphorus and sediment.

Impairments: Degraded Habitat, Low Dissolved Oxygen, and Chronic Aquatic Toxicity

Pollutant Loads: 48,748 lbs/yr TP; 19,796,496 lbs/yr TSS

Load Reduction Goals: 34,156 lbs/yr TP (70.1%); 12,565,366 lbs/yr TSS (63.5%)

- **Little Lake Butte des Morts Watershed(LF06)**

The Little Lake Butte des Morts Watershed encompasses less than one square mile within Calumet County, makes up less than 0.3 % of the county's land area, and is located within the Cities of Appleton and Menasha. It drains west to Little Lake Butte des Morts. There are no named streams in Calumet County within this watershed. According to the DNR, sediment and nutrients are main surface water pollutants in this watershed. Soil erosion and storm water runoff from urban land uses in Calumet County contribute some pollutants. The watershed area is too small to show on a diagram.

3.5(b) Upper Fox River Sub-basin

Two DNR watersheds forming the Upper Fox River Sub-basin can be found in Calumet County. These watersheds include:

- Lake Winnebago North and West Watershed; and
- Lake Winnebago East Watershed.

Each of these watersheds has major water bodies that need to be evaluated in order to protect the health of the watershed and basin. More information can be found on-line at:

<https://dnr.wi.gov/topic/watersheds/basins/upfox/>. At the time of this plan a TMDL is in development and in draft form for the Upper Fox and Wolf Basins and can be found here: <https://dnr.wi.gov/topic/TMDLs/documents/UFW/UFWDraftTMDLReport20181130.pdf>

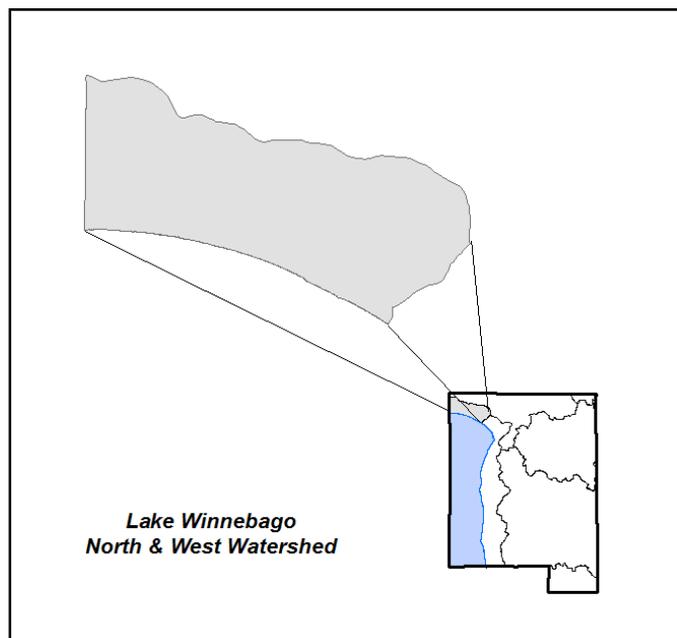
Pollutant Loads¹: 84,840 lbs/yr TP; 3,039,966 lbs/yr TSS

Load Reduction Goals²: 38,297 lbs/yr TP (83%); 641,294 lbs/yr TSS³

Lake Winnebago North and West Watershed (UF-01)

The Lake Winnebago North and West Watershed encompasses nine square miles within Calumet County and makes up three percent of the county's land area. It drains south and west to Lake Winnebago. In Calumet County, it lies within a predominantly urban area, with some agricultural land use on its eastern side. According to the DNR, storm water outfalls from urban areas represent the most important source of non-point pollution within the watershed. Road ditches and intermittent drainage ways carry polluted runoff into Lake Winnebago.

There are no named streams in Calumet County within this watershed.



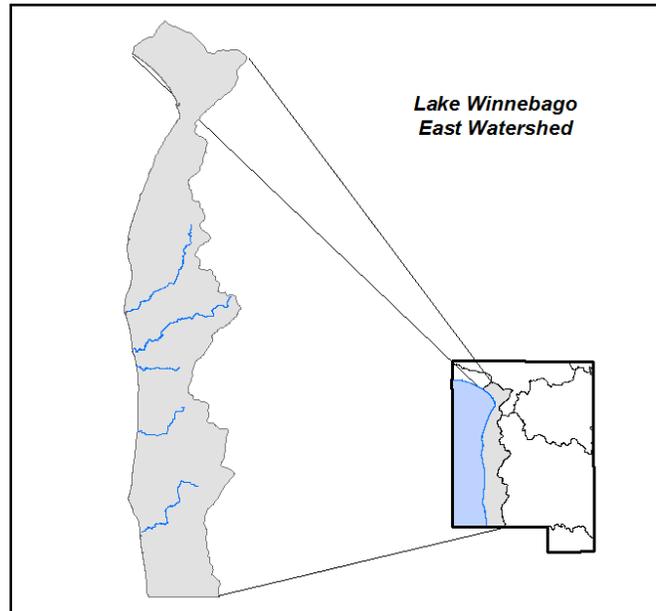
¹ Pollutant Loads in the draft Upper Fox/Wolf TMDL are reported at the HUC 8 scale, and include loads in adjacent HUC 12s in Fond du Lac and Winnebago Counties. Mud Creek loads are included in reported numbers.

² Load Reduction Goals in the draft Upper Fox/Wolf TMDL are reported by individual permit holder; nonpoint reduction goals (agricultural and MS4) are given a blanket target of 83% reduction at the HUC 8 scale. Reported numbers represent the sum allocations from all sources.

³ Only Mud Creek Reductions Goals listed.

- **Lake Winnebago East Watershed (UF-02)**

The Lake Winnebago East Watershed encompasses 41 square miles within Calumet County and makes up 13% of the county's land area. It drains westward to Lake Winnebago. All of the streams within the watershed are short with a steep gradient and flow directly into Lake Winnebago. Many of them are subject to wide fluctuations in flow and are seasonal, limiting their potential for major improvements in fish populations.



According to the Lake Winnebago East Plan published in 1994, heavy soils and intensive agricultural use increase surface runoff and soil erosion resulting in high levels of suspended solids and muddy water in streams and Lake Winnebago after rainfall. Animal waste applications contribute nutrients to Lake Winnebago. Steep slopes along the Niagara Escarpment intensify the effects. Today, these issues continue to persist. A 9KE plan is under development to address the soil erosion and nutrient runoff.

- **Lake Winnebago**

Lake Winnebago has a surface area of 138,000 acres, is 28 miles long and 10 miles wide, and is the largest inland lake in Wisconsin. Approximately 47,000 acres of the lake fall within the boundaries of Calumet County. It has a maximum depth of 21 feet and is classified as a drainage lake, meaning it has an inlet and outlet and the main water source is stream drainage (the Fox River). Its watershed is 5,700 square miles, about 12% of the entire area of Wisconsin. The Calumet County portion of the watershed is about 50 square miles.

The Lake Winnebago Pool (the lake and connected smaller lakes and streams) has the largest self-reproducing lake sturgeon population in North America. It is also considered to be one to the top walleye fisheries in the nation. Other game fish and panfish are common in the lake. Lake Winnebago is considered a eutrophic lake. It is on the 2018 DNR 303(d) list for total phosphorus and sediment. The impairments are low dissolved oxygen, eutrophication, fish consumption advisory, and sedimentation. In 2019, it is anticipated that a TMDL for Lake Winnebago and the Upper Fox/Wolf River Basin will be approved.

Not mentioned in the basin report is an increasing concern of blue-green algae blooms on Lake Winnebago. Blue-green algae blooms occur when water is warm and enriched with nutrients, usually in late summer. The algae are generally not eaten by other organisms and blooms can be odorous. As the algae dies and decomposes, it can use up dissolved oxygen in the water and release toxins. Aquatic life may die from lack of oxygen and exposure by animal and humans to the toxins may cause serious health problems.

DNR staff have noted that the natural spawning areas for sauger on the northern part of the lake have disappeared, likely buried by sediment from soil erosion. However, new spawning reefs have been constructed on the northeast side of the lake. These artificial reefs are being used as breeding grounds by sauger. The DNR has collected eggs from these areas, raised them in portable hatcheries and stocked the fish back in the lake. Indications are that the population is recovering.

Recovery of the fishery in the lake is important not only to the ecology and biology of the lake, but also for the economics of the area. A 2006 study, *Economic Impact of the Winnebago System Fishery*, looked at the economic impacts of fishing in the Lake Winnebago chain. It was conducted by University of Wisconsin – Green Bay professor, Dr. John Stoll, in conjunction with the DNR, UWEX, University of Wisconsin – Madison, local sportsmen’s clubs, economic development groups, and local businesses. Surveys and modeling results show that the sports fishery of the Lake Winnebago chain brings over \$200 million to the area and supports 4,200 jobs. The study proves that good water quality is an important component to the economic health of the region.

Land uses within the Calumet County portion of the lake’s watershed that contribute to water quality impairments include agricultural, residential, commercial and industrial uses. Sediment from cropland and construction site erosion, waste and nutrient runoff from agricultural land and residential areas, and polluted storm water runoff from urban areas enter the lake from Calumet County.

Lake Winnebago also serves as the primary drinking water source for the Cities of Appleton, Neenah, Menasha and Oshkosh and Village of Sherwood, where removal of these pollutants has become costly. Further information can be found in the DNR publication, [Water Quality in the Lake Winnebago Pool](#). A copy of the publication is available for viewing at the Calumet County LWCD office.

Lake Winnebago is affected by seasonal lake level manipulations using dams at the outlet on the Fox River. Lake Winnebago was much shallower and was bordered by shallow bays and wetlands until 1850s, when two dams were built on the outlet at Neenah and Menasha. The dams and later improvements raised Lake water levels two and a half to three feet. Many of the bays and wetlands were permanently flooded, destroying the wetland vegetation. The wetlands captured sediment and nutrients

before they reached the main lake body. The Army Corp of Engineers now manipulates the lake levels to simulate natural, seasonal changes. Due to demands for recreational uses of lake, the simulated water levels are unnaturally high and reduce wetland plant growth and reproduction.

In 1989, the [Winnebago Comprehensive Management Plan](#) was developed as a long term strategic plan for management activities on the lake. The plan listed management objectives and options to improve the Winnebago Pool System. While some objectives were met, the plan is significantly outdated and does not address new problems, such as aquatic invasive species, aquatic plant management and toxic blue-green algae blooms.

In 2012, a partnership between Calumet, Fond du Lac, Winnebago and Waushara Counties as well as other partners was formed to advance effective management of the Lake Winnebago System. The Winnebago Waterways Program was created from that partnership and the current priority of that program is to develop a new comprehensive lake management plan for all four lakes. Plan completion is anticipated for early 2020, and will include 9KE plans for the sub watersheds in the program area. The overall plan, along with the 9KE plans for E. Winnebago and N. & W. Winnebago watersheds will guide future implementation of conservation practices by the LWCD.

➤ Mill Creek

Mill Creek is a clear, hard water stream that is four miles long. It originates on top of the Niagara Escarpment and flows southwest into Lake Winnebago. Springs contribute to its flow. The fishery is classified as warm water sport fishery. Land use in its watershed is predominantly agricultural. Water quality in Mill Creek is good. However, it can be impacted by agricultural erosion and runoff causing sedimentation and muddiness. These impacts occur especially after rainfalls.

Impairment: Low DO, Eutrophication, Water Quality Use Restrictions, Turbidity, Mercury Contaminated Fish Tissue, Excess Algal Growth, PCBs Contaminated Fish Tissue

➤ Mud Creek

Mud Creek is a hard water stream that is three miles long. It originates on top of the Niagara Escarpment and flows southwest into Lake Winnebago. Some years the flow is seasonal. The fishery is classified as a warm water forage fishery in a portion of its length and a warm water sport fishery in the remaining length. Land use in its watershed is predominantly agricultural. Water quality in the main stem is good and the DNR has found perch and bluegill in it. The creek is impacted by agricultural erosion and runoff, causing sedimentation and muddiness after rainfalls. It is on the 2018 DNR 303(d) list for Total Phosphorus.

➤ Roberts Creek

Roberts Creek is a clear, hard water stream that is two miles long. It originates on top of the Niagara Escarpment and flow west into Lake Winnebago. The fishery is classified as a warm water forage fishery. Land use in the watershed is predominantly agricultural. Water quality is good. It can be impacted after rainfall by agricultural erosion and runoff, causing sedimentation and muddiness.

➤ Johnson Creek

Johnson Creek is a hard water stream that is one mile long. It originates on top of the Niagara Escarpment and flows west into Lake Winnebago. The flow is seasonal in some years. The fishery is classified as a warm water forage fishery. Land use in the watershed is predominantly agricultural. Water quality is good. It can be impacted by agricultural erosion and runoff, causing sedimentation and muddiness after rainfalls.

➤ Brothertown Creek

Brothertown Creek is a clear, hard water stream originating from springs on top of the Niagara Escarpment and flowing southwest into Lake Winnebago. It is three miles long with no fishery classification. The DNR lists no use problems or impacts. Land use in its watershed is predominantly agricultural. Observations by LWCD staff indicate the creek is impacted by agricultural erosion and runoff causing flash flows, sedimentation and muddy water after rainfalls. Impairment(s): Unknown

3.5(c) Lakeshore Sub-basin

Three DNR watersheds from the Lakeshore Sub-basin can be found in Calumet County. These watersheds include:

- Lower Manitowoc River Watershed;
- North Branch Manitowoc River Watershed; and
- South Branch Manitowoc River Watershed.

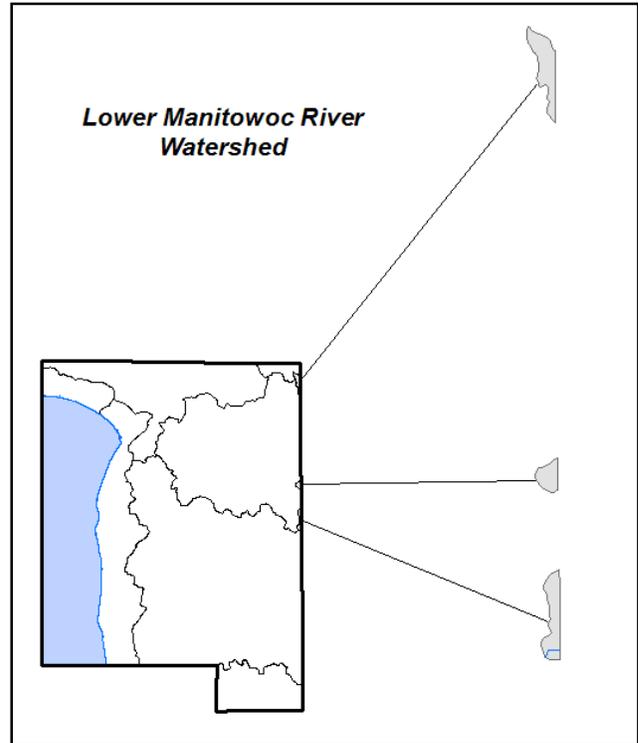
Each of these watersheds has major water bodies that need to be evaluated in order to protect the health of the watershed and basin. More information can be found on-line at:

<https://dnr.wi.gov/topic/watersheds/basins/lakeshore/>

It is anticipated that pollutant loads and load reductions goals will be identified and established with the conclusion of the Manitowoc River TMDL.

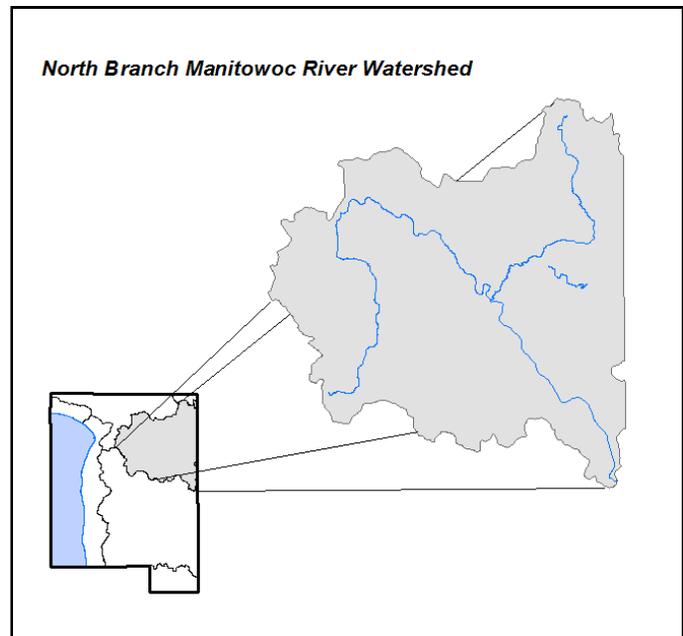
- **Lower Manitowoc River Watershed (MA02)**

The Lower Manitowoc River Watershed encompasses less than one square mile of land within Calumet County and makes up less than 0.3% of the county's land area. It drains east and south to the Manitowoc River. Three discontinuous portions of the watershed are located on the eastern edge of northern and central part of the County including unnamed streams within in Calumet County. Land use is predominantly agricultural. The watershed areas drain to the east into Manitowoc County. There are few impacts from these areas to receiving County surface waters.



- **North Branch Manitowoc River Watershed (MA04)**

The North Branch Manitowoc River Watershed encompasses 73 square miles of land within Calumet County and makes up 23% of the county's land area. It is the second largest DNR watershed within the county. The watershed is located in the north central portion of the county and drains southeast to the Manitowoc River in Manitowoc County. It includes the communities of Brillion, Hilbert, and Potter. It also includes the Brillion Wildlife Area, a large DNR owned wetland area, and three named lakes with public access. Land use in the watershed is predominantly agricultural and most surface waters are impacted by soil erosion and polluted, nutrient rich runoff.



A 9KE plan is currently in development, and will determine Total Phosphorus and Total Suspended Solids loads as well as load reduction goals for each pollutant.

➤ North Branch Manitowoc River

The North Branch Manitowoc River is hard water, turbid stream 10 miles in length. It originates in central part of Calumet County, flows northward, then southeastward through the Brillion Wildlife Area, and eventually joins the South Branch Manitowoc River in the Killsnake State Wildlife Area. It is a very slow flowing stream and at times does not have a measurable flow. Wetland areas are common along the banks of the River. The fishery is classified as a warm water sport fishery. However, DNR fishery biologists believe that sport fish populations are low in some river sections. Land use in the watershed is predominantly agricultural. Water quality is very poor and is impacted by agricultural erosion and runoff causing muddiness, sedimentation, and degradation of aquatic habitat. It can be found on the 2018 DNR 303(d) list for sediment and total phosphorus. The impairment is degraded habitat and low dissolved oxygen. In addition, historic reductions in forest and wetland vegetation have resulted in less infiltration and retention of precipitation and snow melt, causing flashy runoff that overwhelms channels and habitat. The runoff delivers excess sediment and nutrients to the stream and limits its base flows. Restoration efforts should focus on increasing the overall percentage of forested and wetland vegetation in this watershed to restore a more natural hydrologic regime and minimize the impacts of flashy runoff and an altered hydrologic regime.

Impairment: Low Dissolved Oxygen, Degraded Habitat

➤ Spring Creek

Spring Creek is a very hard water stream, eight miles in length. It originates north of the City of Brillion in Calumet County and flows southerly through the City of Brillion and the Brillion State Wildlife Area. Here it joins the North Branch Manitowoc River. In some places within the Wildlife Area, the stream is not visible and flows very slowly due to dense, cattail vegetation. The fishery is classified as a warm water forage fishery, with seasonal use by warm water sport fish. Land use in the watershed is predominantly agricultural except in the city and wildlife area. It is impacted by agricultural erosion and runoff, causing sedimentation, nutrient enrichment, stream flow fluctuations, and low dissolved oxygen. Construction site erosion and polluted storm water runoff from the City of Brillion, as well as industrial and wastewater discharges, add to the impacts. Testing of water samples from the DNR indicate high levels of metals and oils.

➤ Brillion Wildlife Area

The Brillion Wildlife Area is owned by the DNR and contains the largest wetland area within the watershed. The land area is managed for waterfowl production, while being used extensively for public recreation, hunting, and trapping. Its watershed area is approximately 73 square miles with the dam at Cato Falls acting as the point of control and releasing water approximately 20 miles downstream. Erosion and polluted runoff contribute to sediment loads and nutrient enrichment of surface waters in the Wildlife Areas via Spring and Black Creeks, North Branch of the Manitowoc River, and many

small unnamed tributaries. Shallow water combined with nutrient enrichment cause excessive cattail growth. Cattails reduce open water, limiting the value of the Wildlife Area for waterfowl and other aquatic life.

➤ Black Creek

Black Creek is an intermittent stream that seasonally flows into Brillion Marsh. According to the DNR, the stream has little or no potential for a fishery or other forms of aquatic recreation. There are very few natural vegetative buffers along the stream and it is likely affected by runoff from agricultural and other land uses.

➤ Grass Lake

Grass Lake is a 15 acre lake in a marshy basin. It is classified as a drained lake, with a continuously flowing outlet and no defined inlet. In high water periods, it is likely hydrologically connected to Becker Lake. Water sources include rainfall, runoff, and possibly groundwater. It is a northern Wisconsin bog type lake in a more southern setting. Bog plants are prevalent. The DNR considers it a notable lake from a wildlife and plant standpoint. The DNR lacks sufficient data to make management recommendations for the lake or to determine its trophic class. The lake is surrounded by privately-owned marsh and woodlands, which reduce the impacts of soil erosion and runoff from cropland in the area. Depth and common fish species are unknown. In order to protect the uniqueness of the lake, sediment and nutrient runoff should be reduced to help maintain and improve the water quality and aquatic ecology.

➤ Round Lake

Round Lake is a ten acre landlocked lake with a 44 acre watershed. Round Lake was included in the 2018 CalMan Watershed Plan, which included updates to many of the DNR assessments. The maximum depth is listed at 55 feet, but recent monitoring suggests the current maximum depth is 51 feet, likely due to excessive sediment runoff. It is classified as a deep headwater drainage lake with a water residence time of 10 years. During high water periods, it may be hydrologically connected to Long Lake by wetlands. The last recorded winterkill was in 2009. Largemouth bass and panfish were common in the lake before this fish kill. Trout were stocked on an annual basis by the DNR until the mid-2000's, after which stocking was discontinued because of poor water quality. The trophic class is considered eutrophic, and added to the 303(d) impaired waters list in 2016. Cropland surrounds the lake, but small wetland areas can be found along much of its shore. It is likely that water quality in the wetlands and lake are impacted by soil erosion and runoff from the cropland surrounding them. The 2018 CalMan Watershed Plan was submitted to the DNR in October 2018 as a 9KE plan, and is awaiting approval. .

Impairment(s): Eutrophication, Excess Algal Growth

Pollutant Loads: 207 lbs/yr TP;

Load Reduction Goals: 192 lbs/yr TP (92.7%)

➤ Boot Lake

Boot Lake was included in the 2018 CalMan Watershed Plan, which included updates to many of the DNR assessments. Only a small western portion of the 11 acre landlocked lake is in Calumet County. The rest of the lake is in Manitowoc County. The maximum depth is 15 feet. The lake is classified as a deep headwater lake. The watershed is 116 acres and during high water periods it is connected to Long Lake in Manitowoc County by wetlands. Northern pike, largemouth bass, and panfish are common in the lake and winterkills regularly. Its trophic class is eutrophic and added to the 303(d) impaired waters list in 2016. Fairly large wetland areas and woodlands surround the lake, reducing the impacts of soil erosion and runoff from cropland to the north. A shoreland assessment indicated that Boot Lake had the healthiest shoreline of all four lakes in the CalMan watershed. The 2018 CalMan Watershed Plan was submitted to the DNR in October 2018 as a 9KE plan, and is awaiting approval.

Impairment(s): Eutrophication, Excess Algal Growth

Pollutant Loads: 238 lbs/yr TP;

Load Reduction Goals: 224.8 lbs/yr TP (94.4%)

➤ Becker Lake

Becker Lake was included in the 2018 CalMan Watershed Plan, which included updates to many of the DNR assessments. Becker Lake is a 31 acre deep headwaters drainage lake. There is an intermittent inlet and outlet which sometimes connect the lake to Grass Lake (outlet) and Long Lake in Manitowoc County (inlet). The maximum depth is 51 feet and the watershed area is 1,258 acres. Northern pike and largemouth are present, while panfish are common. There are occasional to frequent winterkills with the most recent kill occurring in 2010. Becker Lake's trophic status is eutrophic and added to the 303(d) impaired waters list in 2016. Steep cropland surrounds much of the lake and soil erosion and polluted runoff likely have large impacts on its water quality. Calumet County owns land on the south and west shores of the lake and has designated it as a park. In cooperation with the DNR, grassland prairie seeding and tree planting was completed in 2004. Wetland areas south of the lake were restored. The goal was to provide more wildlife habitat and recreational opportunities. Sediment and nutrient runoff from surrounding cropland should be reduced in order to protect and improve the water quality and aquatic ecology. The 2018 CalMan Watershed Plan was submitted to the DNR in October 2018 as a 9KE plan, and is awaiting approval.

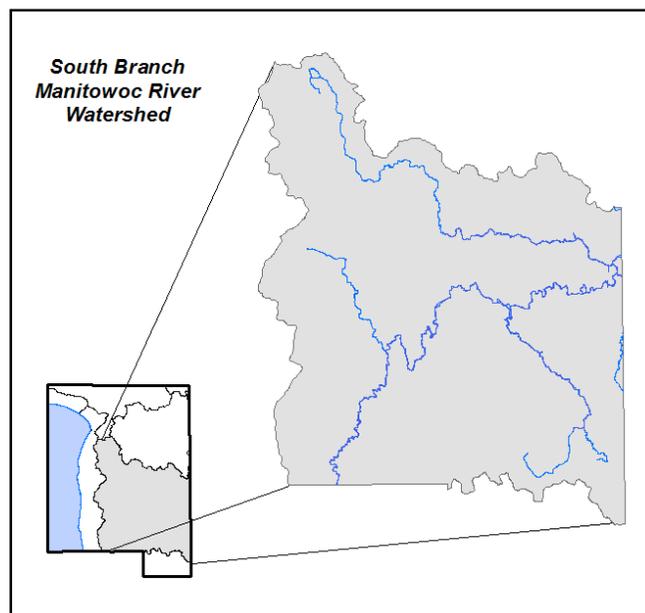
Impairment(s): Eutrophication, Excess Algal Growth

Pollutant Loads: 1038 lbs/yr TP;

Load Reduction Goals: 939 lbs/yr TP (90.4%)

- **South Branch Manitowoc River Watershed (MA05)**

The South Branch Manitowoc River Watershed encompasses 135 square miles of land within Calumet County and makes up 42% of the county's land area. The watershed is located in the south and south central portions of the county and drains eastward to the Manitowoc River in Manitowoc County. It is the largest DNR watershed in Calumet County and includes the City of Chilton and City of New Holstein. It also includes a large portion of the Killsnake Wildlife Area, a large DNR owned wetland area. Land use in the watershed is predominantly agricultural. Most surface waters within the watershed are impacted by soil erosion and polluted and nutrient rich runoff from this land use.



- South Branch Manitowoc River

The South Branch Manitowoc River is a hard water stream that originates in northeastern Fond du Lac County, flows north to Chilton, and then flows east and joins the North Branch Manitowoc River in the Killsnake Wildlife Area. It is 37 miles long and drains almost one half of the land area in the county. Two impoundments, the Chilton Millpond and the Hayton Millpond, have been created by dams. Wetland and woodland areas are common along its banks. The fishery is classified as a warm water sport fishery. Land use in the watershed is predominantly agricultural. The waterbody was added to the 2016 303(d) impaired waters list for degraded biological community, primarily due to excess phosphorous.

The DNR lists environmental problems from municipal and industrial point sources, causing sediment contamination and fish consumption advisories for PCBs in the lower stretches. It is on the 2018 DNR 303 (d) list for PCBs and Total Phosphorus. In addition, historic reductions in forest and wetland vegetation have resulted in less infiltration and retention of precipitation and snow melt causing flashy runoff that overwhelms channels and habitat. The runoff delivers excess sediments and nutrients to the stream and limits its base flows.

Impairment: Contaminated Fish Tissue, Contaminated Sediment, Elevated Water Temperature, Water Quality Use Restrictions, Degraded Biological Community

➤ Killsnake River

The Killsnake River is a 20 mile long stream that originates in the northwestern part of the county and joins the North Branch Manitowoc River in the Killsnake Wildlife Area. It also flows through a large, privately owned wetland area known as Aebisher's Marsh. The fishery is classified as a warm water sport fishery supporting northern pike and panfish. Land use in the watershed is predominantly agricultural. The water quality is fairly poor due to impacts from agricultural erosion and runoff. According to the DNR, agricultural land use practices have left fish and wildlife habitat in poor shape due to excessive siltation. The stream has a history of fish kills. The Killsnake River was added to the DNR 303 (d) list for Total Phosphorus in 2018.

Impairment(s): Water Quality Use Restrictions, Elevated Water Temperature

➤ Cedar Creek

Cedar Creek is a shallow stream that originates as an outlet of Mud Lake in Manitowoc County and flows north for seven miles to join the South Branch Manitowoc River in the Killsnake Wildlife Area, just inside of the eastern Calumet County boundary. Less than 0.2 mile of its length is in Calumet County. However, a large tributary branch parallels the main stream and flows through two miles of the Hayton Marsh in eastern Calumet County. Since the marsh acts as a buffer around the tributary branch, it is unlikely that agricultural erosion and runoff have a significant impact on the tributary.

➤ Killsnake Wildlife Area

The Killsnake Wildlife Area is owned by the DNR and managed for wildlife and public recreation. Its watershed area is about 193 square miles and the South Branch of the Manitowoc River, Killsnake River, and Cedar Creek join within its boundaries. These streams and adjacent cropland contribute sediment loads and nutrients to the surface waters in the Wildlife Area. The shallow and nutrient enriched surface waters foster excessive growth of coontail, water milfoil, pondweeds, and other aquatic plants that reduce open water areas. This limits the value of the Wildlife Area for recreation and wildlife habitat. The area supports many species of water birds, reptiles, and amphibians. DNR has restored wetlands and grasslands within the area to buffer wetlands and streams and prevent further deterioration.

➤ Stony Brook

Stony Brook is a clear, hard water stream six miles in length. It originates in a wetland area in the west central part of the county and flows southeast joining the South Branch of the Manitowoc River. The fishery is classified as a cold water fishery. Land use in its watershed is predominantly agricultural. Water quality is good to excellent, depending upon the year. The LWCD believes that water quality in the stream is likely impacted by agricultural erosion, runoff, and pasturing near the stream. Muddiness, sedimentation, and increased water temperatures are some of the impacts. During the 1970s, the DNR

stocked the stream with brown trout. It was believed that the stream could not support natural reproduction by trout. Later stream surveys and citizen comments have indicated that natural reproduction may be taking place on a small scale, but it is unlikely that it is large enough to maintain a brown trout population.

In 2015, the DNR and Chilton School District began stocking the stream with brown trout as part of a “Trout in the Classroom” project. Annual stocking continues through the program, and efforts are underway to determine survival rates of stocked trout. DNR has determined that year-round water temperatures and the current macroinvertebrate community is sufficient to support trout. Several fishery easements have been established and habitat improvement projects are planned for 2020 and beyond.

➤ Chilton Millpond

The Chilton Millpond is a ten acre impoundment on the South Branch of the Manitowoc River in Chilton. The maximum depth is listed as seven feet, but is likely less due to sedimentation. Panfish are present but more common fish species are carp, bullhead, suckers and minnows. Winterkills are frequent in and upstream from the millpond. Its trophic status is highly eutrophic. The DNR advises that current low dissolved oxygen and high temperature profiles will not allow a viable sport fishery. The millpond is located in the part of the South Branch of the Manitowoc River that is on the 2018 DNR 303 (d) list for PCBs and Total Phosphorus. The impairment is fish consumption advisory. A [Lake Planning Grant Study](#) was completed by the LWCD in 2003; results indicated that the millpond water quality is severely impacted by soil erosion and nutrient runoff from agricultural land upstream and by polluted and nutrient rich runoff from yards, streets, and parking lots in the City of Chilton.

➤ Hayton Millpond

The Hayton Millpond is a 27 acre impoundment on the South Branch of the Manitowoc River. The maximum depth is five feet and it has a watershed of 104 square miles. Carp, bullheads, suckers, and minnows are the common fish species. Northern pike and panfish are present in small numbers. The millpond is located in the part of the South Branch of the Manitowoc River that is on the 2018 DNR 303 (d) list for PCBs and Total Phosphorus. The impairment is a fish consumption advisory. Fish tissue monitoring in 1990 revealed a high levels of PCB in fish within the millpond. Further investigations by the DNR of water, sediment, and fish tissues identified widespread PCB contamination in the eight mile upstream sections of Pine and Jordan Creeks, up to the City of New Holstein. See next section in regard to Pine Creek for detail on past and future PCB removal activities.

➤ Pine Creek

Pine Creek is a clear, hard water stream that is nine miles in length. The creek originates in the southeastern corner of the county, flows northeast, and joins the South Branch of the Manitowoc River at the Hayton Millpond. The fishery is classified as a warm water sport fishery with the potential to support trout according to some DNR staff. Pine Creek has a wide floodplain along much of the length that buffers the stream with trees, wetlands, and native vegetation. The stream has very good water quality until its confluence with Jordan Creek, after which it is contaminated with PCBs. The contamination came from sources on the headwaters of Jordan Creek. A contaminated sediment removal project began upstream in Jordan Creek in 2003 and is still underway. Land use in its watershed is predominantly agricultural. Soil erosion and agricultural runoff from sloping cropland adjacent to the stream floodplain likely impact water quality. Pine Creek is on the 2018 DNR 303(d) list for Total Phosphorus and PCBs. The impairment is a fish consumption advisory. TRC Consultants, working for Tecumseh Products, is continuing work to address PCB contaminated sediment and soil in the Pine Creek watershed. Since work started in 2000 approximately 9 miles of PCB contamination has been addressed. In the coming construction season TRC is expected to continue PCB removal work in Pine Creek approximately a mile above the Hayton Dam on the South Branch Manitowoc River. In the river below the dam, the consultants will work on a site investigation to define the degree and extent of PCBs in the soil and sediment.

Impairment(s): PCB Contaminated Sediments, Degraded Biological Community

➤ Jordan Creek

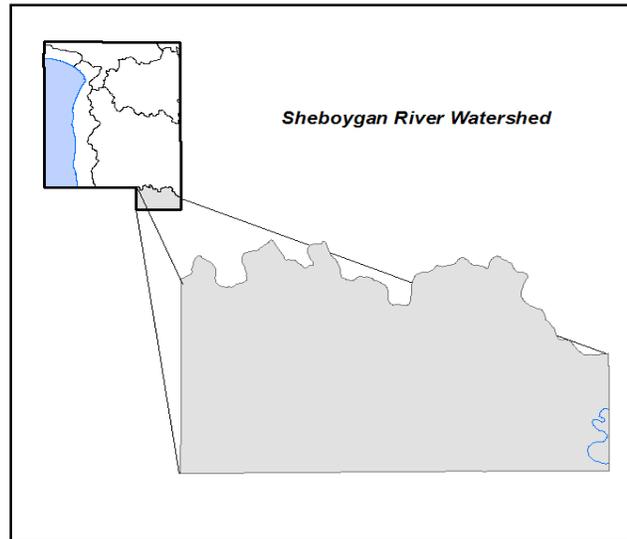
Jordan Creek is a four mile long stream that originates on the western edge of the City of New Holstein, flows through the city, and joins Pine Creek northeast of the city. The fishery is classified as a warm water forage fishery. Water quality is poor to fair due to PCB contamination from industrial sources in New Holstein. A contaminated sediment removal project began in 2003. Since then, all of the high level contaminated sediments have been removed. Land use in the watershed is primarily agricultural, except where the creek flows through the city. Agricultural erosion and runoff impact water quality in the stream, causing sedimentation. Jordan Creek is on the 2018 DNR 303(d) list for PCBs. The impairment is fish consumption advisory.

Impairment(s): PCB Contaminated Sediments, PCBs Contaminated Fish Tissue

3.5(d) Sheboygan River Sub-basin

Only one DNR watershed from the Sheboygan River Sub-basin is found in Calumet County. This is the Sheboygan River Watershed.

This watershed has major water bodies that need to be evaluated in order to protect the health of the watershed and basin. More information can be found on-line at



<https://dnr.wi.gov/topic/watersheds/basins/sheboygan/>

- ***Sheboygan River Watershed (SH03)***

The Sheboygan River Watershed encompasses 18 square miles of land within Calumet County and makes up six percent of the county's land area. The watershed is located in the extreme southern portion of the county and drains south to the Sheboygan River in Sheboygan County. It includes the community of Kiel as well as the Kiel Marsh State Wildlife Area, a large DNR owned wetland area. Land use in the Calumet County portion of the watershed is agricultural. Cropland erosion and agricultural runoff may impact seasonal streams in the watershed. These streams drain to the Sheboygan River or the Kiel Marsh State Wildlife Area. Construction site erosion and polluted storm water runoff from the Calumet County portion of the City of Kiel may impact the main stem of the Sheboygan River in Manitowoc and Sheboygan Counties.

- Kiel Marsh Wildlife Area

Only a portion of the 833 acre Kiel Marsh Wildlife Area lies within Calumet County. It is an ecologically diverse area of cedar swamps, lowland hardwoods, marshes, and open water surrounding the Sheboygan River to the south in Sheboygan County. These vegetated areas filter out most of the nutrients and sediment in runoff before they reach the main stem of the river.

- Sheboygan River

Less than two miles of the 23 mile long Sheboygan River flow through Calumet County and all of it is within the Kiel Marsh Wildlife Area. The fishery is classified as a warm water sport fishery. There have been several fish kills in the river due to low dissolved oxygen levels. Cropland erosion and agricultural nutrient runoff along seasonal tributaries to the River may impact its main stem upstream in Sheboygan County.

3.6 Groundwater

Groundwater is found in the cracks and spaces of the soil, sediments, and bedrock. Much like water in sponges, the cracks and spaces become saturated with water. Wells intersect these cracks and spaces and draw water from them. Different types of soil, sediment, and rocks form layers underground. Distinguishable layers that contain groundwater are called aquifers. These aquifers are important sources of drinking water for the residents of Calumet County. Groundwater is ranked as a high resource concern among residents and protection and improvement of its quality will continue to be a priority goal for the LWCD.

3.6(a) Sources of Groundwater

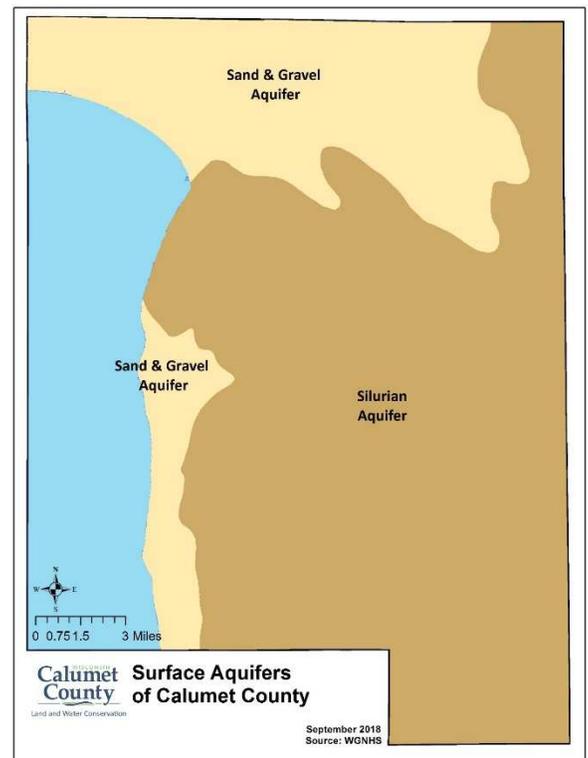
The majority of residents of Calumet County rely on groundwater as their sole source of water. Farms, businesses, and industries also rely on it. According to the latest information from the DNR, there are 4,001 private wells and 69 high capacity wells serving municipalities and local businesses in Calumet County.

There are three major aquifers in Calumet County: the Silurian Aquifer, the Sand & Gravel Aquifer, and the Sandstone Aquifer. **Figure 14** shows the general location of the two aquifers closest to the surface – called surface aquifers. A majority of wells in Calumet County draw water from the Silurian aquifer. This aquifer is made up of Niagara dolomite bedrock, which tends to be highly fractured. These fractures act like underground pipes and transmit water very rapidly. Water quality problems are common in the Silurian Aquifer due to the proximity of the aquifer to the surface.

The sand and gravel aquifer is the surface aquifer covering the remainder of the county. Soil and glacial sediments make up this aquifer. While historically used as the main water source, many households, farms and most municipalities in sand and gravel aquifer areas now rely on water from the deeper sandstone aquifer or surface water from Lake Winnebago due to surface contamination issues.

The Sandstone or Unlithified Aquifer underlies the entire county. It is separated from the surface aquifers by a layer of rock call the Maquoketa Shale, a confining layer which protects the sandstone aquifer from most contamination from the surface. Water from the sandstone aquifer can be salty and mineral laden, particularly along Lake Winnebago. These minerals can

Figure 14: Surface Aquifers

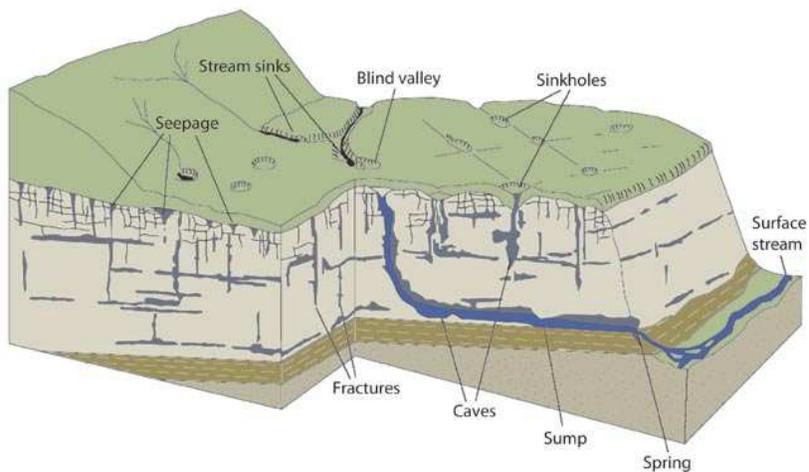


make the water aesthetically unpleasing and troublesome to plumbing. In very deep portions of the sandstone aquifer, radon and boron naturally leach from the sandstone and unsafe levels of these contaminants have been found in the groundwater. Declining water levels and arsenic levels can also be problems.

3.6(b) Pollution of Groundwater

Groundwater is replenished by precipitation. Rain or snowmelt soak into the ground and slowly move through the soil and sediments downward to the water table. However, precipitation often runs over the land surface, picking up pollutants along the way, prior to soaking into the ground. Sources include land use activities where pollutants have been spread, spilled, buried, or piled on the land surface. Nitrates and bacteria are examples of such pollutants from land applied fertilizers and waste from animal, human and industrial sources. Typically, the soil filters out or captures many of the pollutants before they reach groundwater. However, in areas where the soil is highly permeable (sandy) or where little soil exists above bedrock, the pollutants may not be filtered or captured. Instead, the pollutants move downward and contaminate groundwater.

Figure 15: Karst landscape diagram (Runkel and others)



Groundwater can also become contaminated through direct conduits to groundwater from the land surface. A direct conduit to groundwater works like a pipe through which polluted surface runoff can reach groundwater without being filtered by soil. Karst features are prime examples of direct conduits to groundwater. Karst features include sinkholes and

exposed bedrock. Polluted surface runoff can enter these features, contaminating groundwater. Karst features are found in areas of Calumet County where the Niagara dolomite (Silurian aquifer) is present and near the surface. Poor groundwater quality is often found in these areas. Old unused wells can also serve as direct conduits for polluted runoff to enter groundwater.

Animal waste storage facilities may also contaminate groundwater. All new or substantially altered facilities shall comply with current USDA Technical Standards. Older manure storage facilities built prior to October 1, 2002 may not be meeting current standards. These facilities may still be functioning, but should be inspected to ensure they do not impose an imminent

threat to public health, fish and aquatic life, and groundwater. Animal waste in these facilities may leak downward, saturating the soil underneath and eventually contaminating groundwater. Facilities found to be posing imminent threats to groundwater shall be upgraded or properly abandoned. An inventory of existing animal waste storage facilities found that there are 88 pre-ordinance unpermitted facilities in the County.

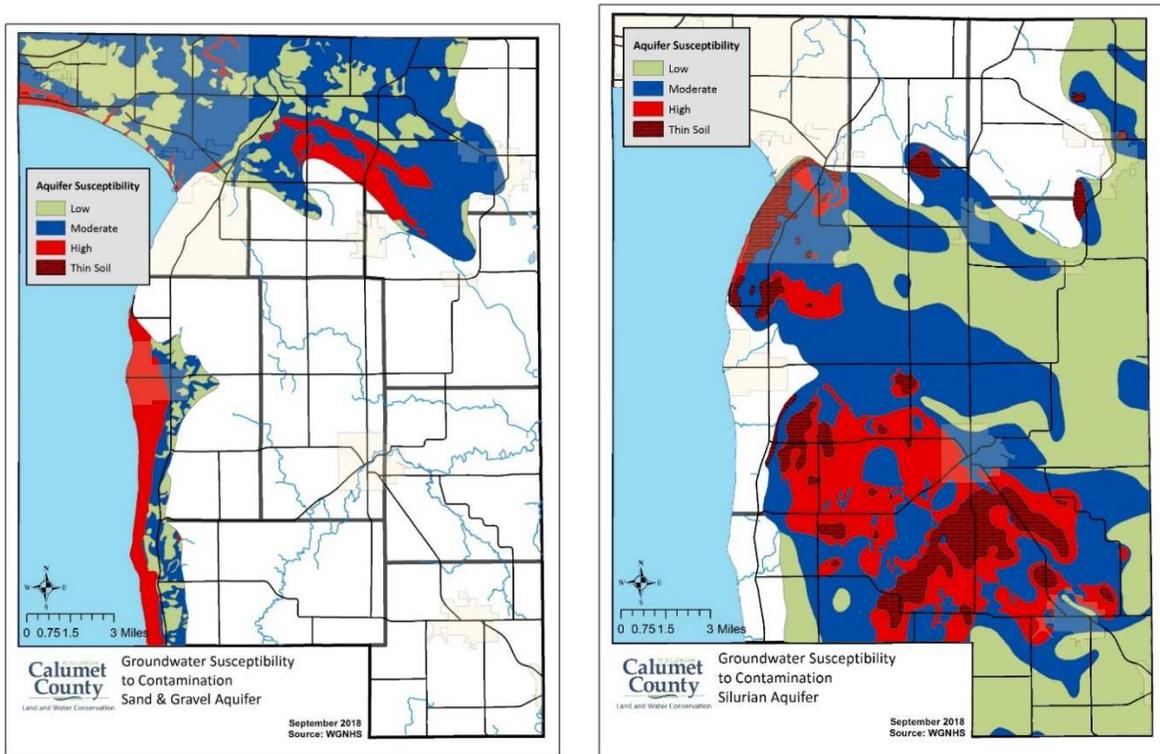
Not all pollutants are influenced by land use at the surface. Pollutants can also be from natural sources, such as geology or type of rock. Examples of these pollutants include arsenic, boron, and radon.

3.6(c) Groundwater Quality and Private Wells

It is well documented that areas of Calumet County are susceptible to groundwater contamination. Most recent well data indicates that 32% of wells exceed the safe drinking water standard for coliform bacteria and/or nitrate. In some neighborhoods, over 80% of wells are unsafe to drink.

Areas with high susceptibility to groundwater contamination from the surface are shown on the Silurian Aquifer susceptibility map (**Figure 16**). High susceptibility ratings on this map are areas where permeable soils and shallow depth to bedrock exist. These areas have a higher probability of having karst features at or near the surface to serve as direct conduits from the land surface to groundwater.

Figure 16: Groundwater Susceptibility of the Unlithified Aquifer (left) and Silurian Aquifer (right)



Source: WGNHS 2004

Private Well Sampling & Testing Programs

Long-term well water sampling and testing programs were established to identify and analyze groundwater quality and trends. Water testing results were collected from other programs and studies to assist with the analysis.

The LWCD developed and continues to implement a voluntary self-sampling program for county residents. Self-sampling kits are made available to well owners via two options. Residents can purchase sampling kits from the LWCD office and pay for the analysis as a year-round option. As a second option, residents can participate in LWCD group sampling events, in which participants sample on the same day. The LWCD partners with the Calumet Groundwater Guardians, a local volunteer group, and conducts the group testing event in two to three townships annually.

The Calumet County Health & Human Services Department also provides well water tests for households with infants and shares results with the LWCD. Other sampling programs have been conducted within the county by DNR, DATCP, and researchers from the University of Wisconsin System, with assistance from LWCD. The County’s foster care program and Land Subdivision Ordinance also require private well sampling and testing in some situations.

Well testing results are tracked through the County’s GIS database. While individual testing results are kept confidential, all available and readily accessible data are compiled and mapped for public education and analysis.

Table 4: County Wide Test Results from Calumet County Private Wells⁴

Private Well Test Results County-Wide 2005-2018										
7/5/2018	Coliform Bacteria					Nitrates			Bacteria Present and/or Nitrate > 10 mg/L (%)	
	# wells	Coliform Bacteria Positive	% Positive	E. coli Positive (%)	% E.coli	# wells	Nitrate > 10 mg/L	% Unsafe Wells (≥ 10 mg/L)	Unsafe (Bacteria present AND Nitrates)	%
2005	246	52	21%	10	4%	246	48	20%	86	35.0%
2006	248	56	23%	11	4%	248	75	30%	110	44.4%
2007	367	70	19%	7	2%	367	77	21%	130	35.4%
2008	305	79	26%	8	3%	305	90	30%	142	46.6%
2009	261	53	20%	6	2%	261	53	20%	93	35.6%
2010	250	61	24%	13	5%	250	55	22%	96	38.4%
2011	190	39	21%	4	2%	190	44	23%	69	36.3%
2012	197	30	15%	4	2%	197	38	19%	55	27.9%
2013	133	21	16%	1	1%	133	24	18%	42	31.6%
2014	188	41	22%	11	6%	188	33	18%	59	31.4%
2015	232	40	17%	5	2%	232	57	25%	84	36.2%
2016	199	54	27%	7	4%	199	43	22%	81	40.7%
2017	201	22	11%	2	1%	198	28	14%	46	22.9%
2018	213	48	23%	18	8%	192	25	13%	68	31.9%
Cummulative Data*	1539	328	21.3%	54	3.5%	1452	239	16.5%	497	32%

⁴ Wells in Calumet County Test Program may be sampled multiple years or more than once in a year. These data represent the most recent sample from each participating well.

Figure 17: Coliform Bacteria Results, 2004 – 2018

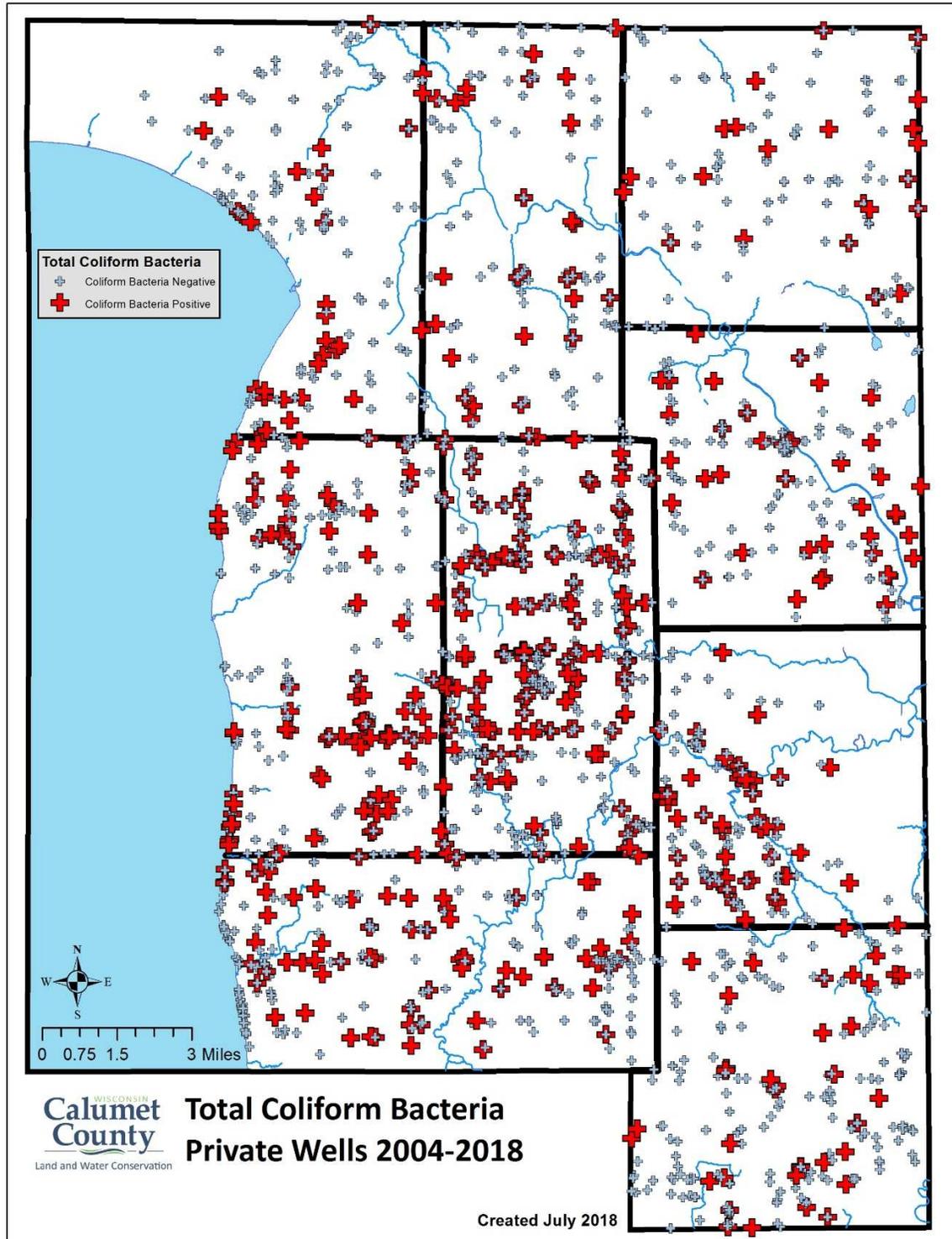


Figure 18: Nitrate Results, 2004 – 2018

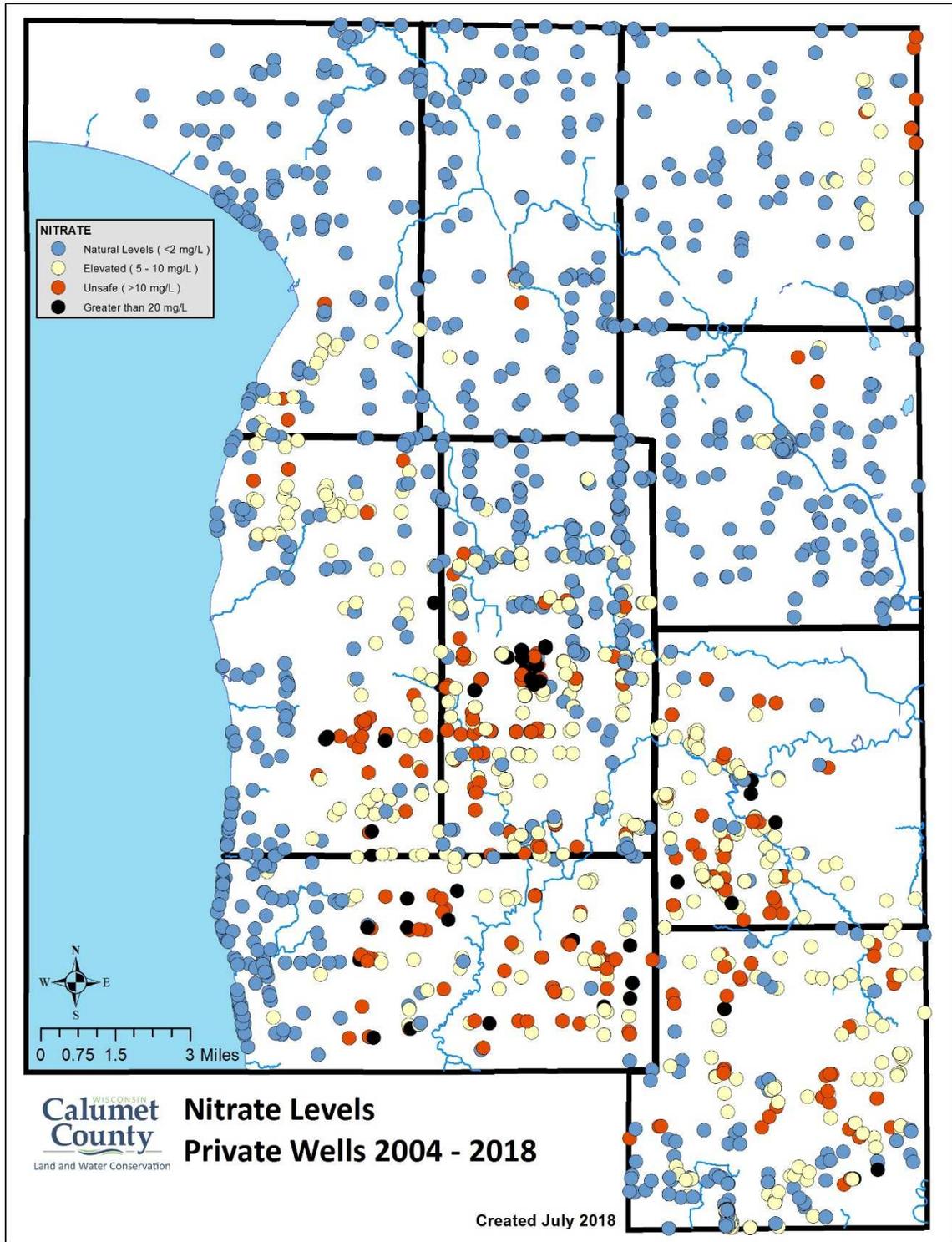
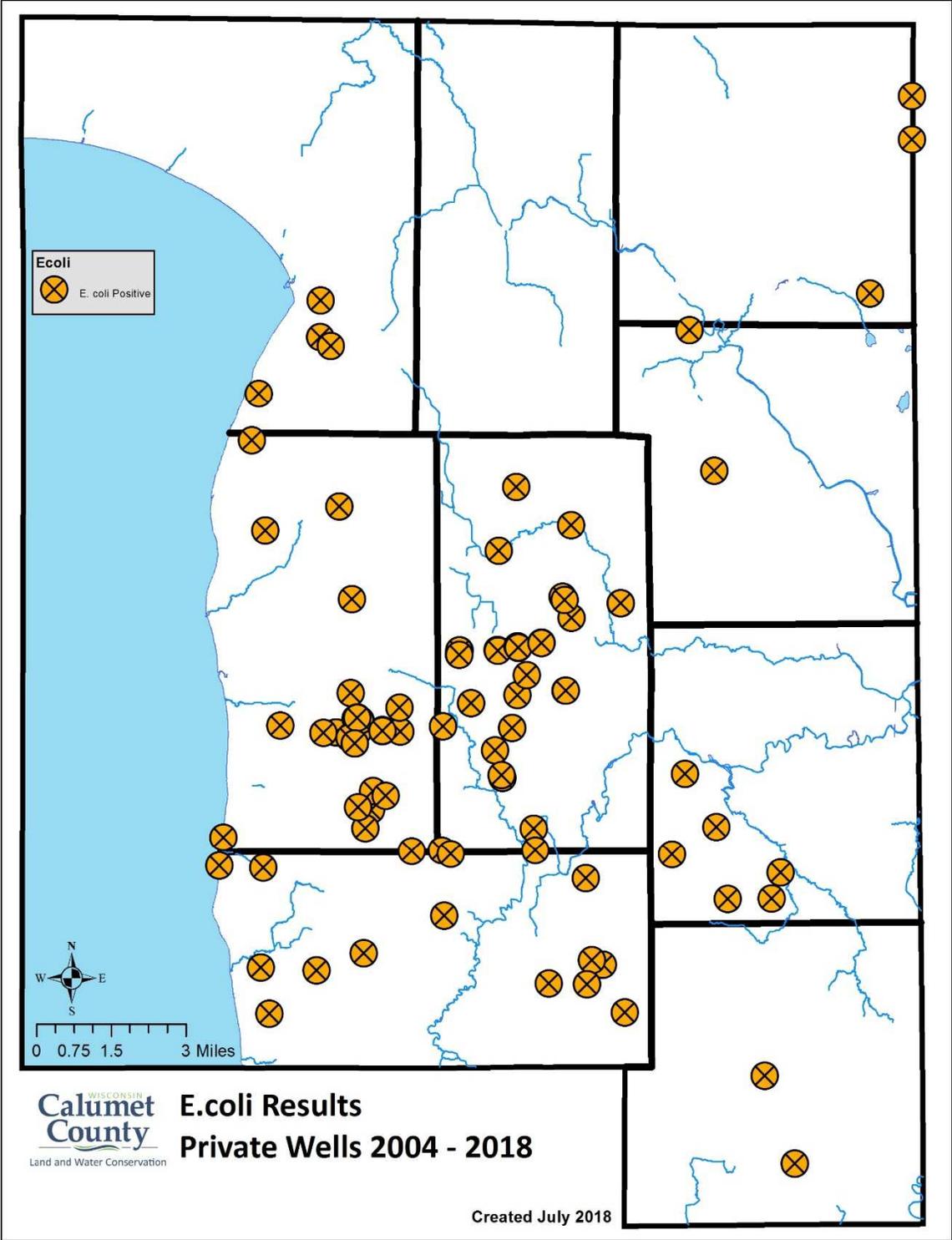


Figure 19: E.Coli Results, 2004 – 2018



Groundwater Quality

Private well data (**Table 4**) indicate that broad areas of the County have poor groundwater quality and unsafe drinking water. Thirty-two percent of the 1539 wells tested throughout the County had water that was unsafe to drink, due to high levels of nitrates and/or the presence of bacteria. In some neighborhoods, the water in 70 – 90% of tested wells had water unsafe for drinking.

Analysis of Well Testing Maps (**Figures 17, 18, & 19**) and Aquifer Susceptibility maps (**Figure 16**) indicate that poor well testing results correlate closely with highly to moderately susceptible areas on the Silurian Aquifer. Agriculture is the major land use in these areas and most cropland receives applications of animal waste and/or commercial fertilizers (**Figure 3**). These applications are likely contributing to groundwater quality problems, as are other land use activities on the surface of the land. Preliminary nitrate budgeting of potential sources for nitrates from land uses in these areas indicates that agricultural fertilizers and animal waste are likely the dominant source of nitrates in groundwater. Nitrate budgeting indicates that residential land uses, including discharges from septic systems, are in most cases minor contributors of nitrates to groundwater.

In 2007, the Calumet County Board of Supervisors established a Groundwater Protection Area (GPA) depicted in **Figure 22**. The LWCD is using the Groundwater Protection Area (GPA) Map, as well as well testing result maps, to target technical assistance and grant funds for groundwater protection and improvement within this LWRM plan. These maps will also be used for targeting stricter performance standards in county ordinances. County and town governments continue to use these maps for comprehensive land use planning.

Testing results from 2005 - 2018 are listed in **Table 4**. Bacteria-positive results and nitrate results above 10 parts per million (ppm) indicate that the water is unsafe to drink. Nitrate results above 2 ppm indicate that the water supply is influenced by fertilizers, animal or human waste, or other non-natural sources of nitrates. This is due in part to the difference in well water testing results from the two locations.

Well testing results from wells located in karst areas indicate poor water quality when compared to wells located in less sensitive areas. For example, 43% of wells located in the defined karst area exceed the safe drinking water standard for coliform bacteria and/or nitrate (**Table 5**). In comparison, 18% of all sampled wells located outside of the karst area⁵ have tested positive for coliform bacteria; with only 10 out of 824 wells testing above 10 mg/L for nitrate. County-wide, 32% of wells exceed the safe drinking water standard.

⁵ Defined as all participating wells located in the unlithified or sandstone aquifers; or Silurian Aquifer wells located in the areas of low susceptibility.

Table 5: Test Results from Calumet County Private Wells⁶ in Karst Areas

Private Well Test Results in Karst Areas 2005-2018										
7/5/2018	Coliform Bacteria					Nitrates			Bacteria Present and/or Nitrate ≥ 10 mg/L (%)	Bacteria Present and/or Nitrate ≥ 10 mg/L
	# wells	Coliform Bacteria Positive	% Positive	E. coli Positive	% E.coli	# wells	Nitrate ≥ 10 mg/L	% Unsafe Wells (≥ 10 mg/L)	Number	%
2005	194	40	21%	10	5%	173	48	28%	73	37.6%
2006	139	41	29%	9	6%	138	52	38%	75	54.0%
2007	219	54	25%	7	3%	217	80	37%	109	49.8%
2008	193	55	28%	8	4%	189	70	37%	100	51.8%
2009	140	31	22%	6	4%	137	50	36%	73	52.1%
2010	131	31	24%	13	10%	132	44	33%	58	44.3%
2011	123	31	25%	4	3%	121	42	35%	60	48.8%
2012	129	29	22%	4	3%	124	37	30%	53	41.1%
2013	83	16	19%	1	1%	82	21	26%	34	41.0%
2014	119	35	29%	11	9%	101	28	28%	49	41.2%
2015	153	26	17%	5	3%	143	54	38%	69	45.1%
2016	125	35	28%	7	6%	121	38	31%	59	47.2%
2017	120	19	16%	2	2%	118	27	23%	42	35.0%
2018	118	30	25%	17	14%	99	21	21%	47	39.8%
Cummulative Data*	828	196	25%	43	5%	770	207	28%	342	43%

* Wells in the Calumet County Test Program may be sampled multiple years or more than once in a year. These data represent the most recent sample from each participating well.

Discolored Water Incidents

Private well owners within the county have reported incidents of sudden discoloration of water to the LWCD and the DNR. The incidents usually occur shortly after heavy rainfalls or during a winter warming period with significant snow melt. Most of the incidents occur within the thin soil and karst areas of the county. In some cases, a strong animal waste-like odor has accompanied the discoloration.

In 2014, Microbial Source Tracking (MST) was performed by Wisconsin DNR on a discolored well water sample. Results documented a significant presence of both bovine and human waste, leading to the DNR designating the area as a Special Casing Area. This designation established eligibility for Wisconsin’s Well Compensation Program.

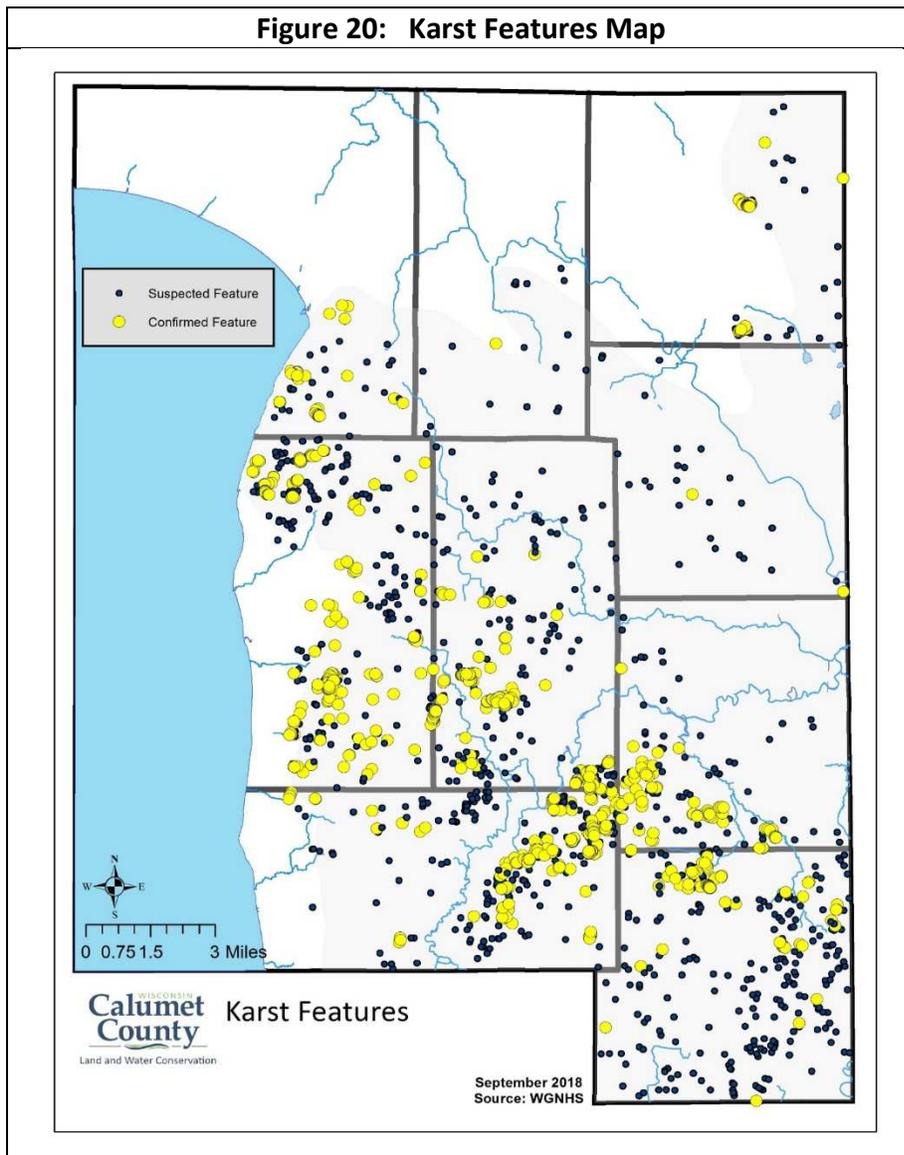
3.6(e) Karst Mapping

In 2011, the LWCD began mapping karst features within the county. The maps will serve as a tool for farmers and their crop consultants in developing nutrient management plans. During the initial effort, 1,186 features were identified as “suspected” karst features using aerial photo

⁶ Wells in Calumet County Test Program may be sampled multiple years or more than once in a year. These data represent the most recent sample from each participating well.

interpretation. Out of 176 suspected features investigated through field visits, 155 were verified as karst features. Both suspected and field investigated features were GPS located, photographed when applicable, and entered into the County GIS mapping system. **Figure 20** shows the location of these mapped karst features. It is anticipated that this mapping effort will continue throughout the county to provide accurate and detailed maps to land users. The maps will allow farmers, crop consultants, custom manure and fertilizer applicators, and other land users to make land application decisions to reduce risk of groundwater pollution.

Updating the Karst Map will be a priority for the department moving forward, as it will be a necessary tool to implement the NR 151 Targeted Performance Standards passed in July 2018.

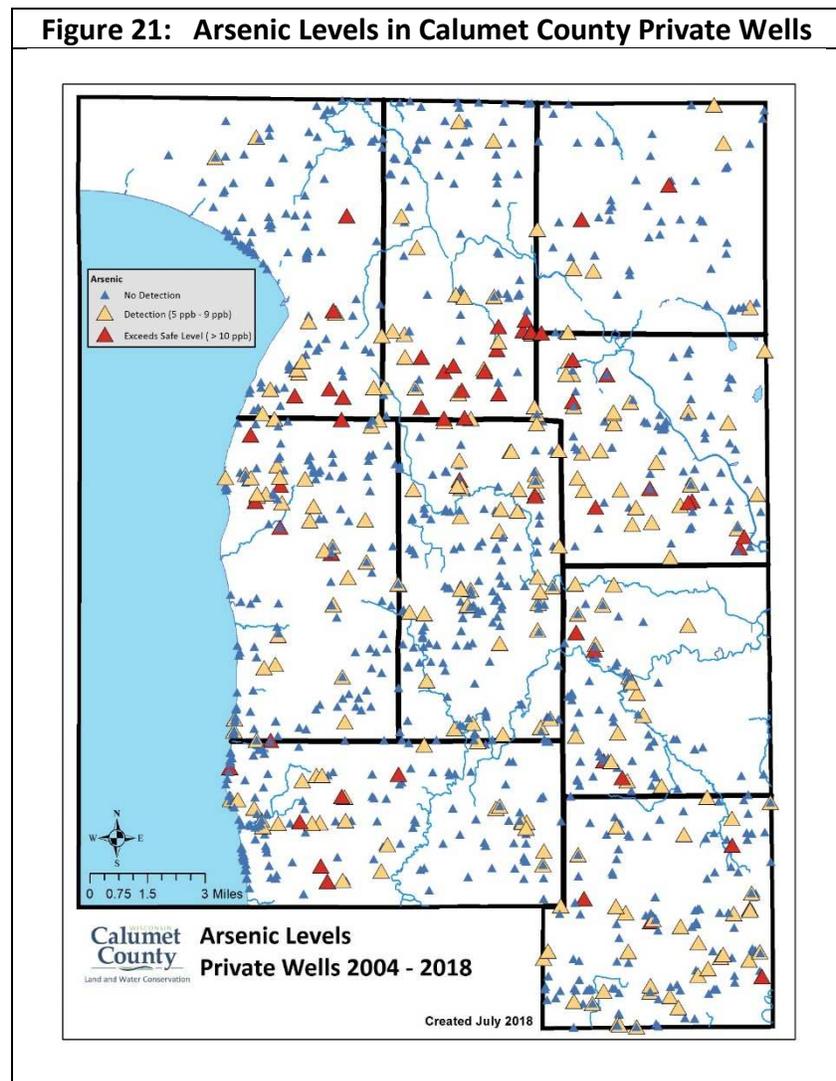


3.6(f) Groundwater Quantity

As the population of the county grows and development increases in the northern part of the County, drinking water quantity may become a major concern. Areas of the county have experienced reductions in groundwater levels. Some residents have lowered their well pumps, deepened their wells, or have drilled new wells to obtain water. Between 1988 and 2011, 505 wells were replaced or reconstructed within the County. The reported reason for replacing or deepening of 40% of the wells was they were dry or low yielding. Decreasing groundwater levels can have an effect on the quality of the water. Naturally occurring contaminants such as arsenic and radium can be released from the rock layers when well water levels decrease.

3.6(g) Arsenic

Arsenic is a naturally occurring metal, but its release into groundwater can be due in part to declining groundwater levels. Declining groundwater levels have affected arsenic levels in private wells in Outagamie and Winnebago counties. Calumet County began tracking Arsenic levels in 2007. Of the 878 wells that have tested for arsenic, 120 wells (13%) exceed the enforcement standard of 0.01 mg/L (10 ppm). The highest level found was 0.026 mg/L. **Figure 21** maps the arsenic testing results from private wells. It is recommended that every private well owner should test for arsenic at least once; and test every 3-5 years if found to be elevated or unsafe.



3.6(h) Municipal Wellhead Protection Plans

Public water supply systems utilizing groundwater for drinking purposes are regulated by the DNR through the Drinking Water and Groundwater Program. Systems regulated include those

of churches, schools, bars/restaurants, parks, municipalities and other public establishments that provide well water for public consumption. It is important to recognize that the municipal systems within the county are tapping into the same groundwater resource as private well owners. The following communities utilize groundwater for their public water supplies:

- City of Brillion;
- City of Chilton;
- City of Kiel;
- City of New Holstein;
- Village of Hilbert;
- Village of Stockbridge;
- Forest Junction (unincorporated);
- Town of Harrison (unincorporated, Darboy Sanitary District No. 1 Only).

Municipalities are required to develop and implement wellhead protection plans for new municipal wells. The purpose of these plans is to reduce potential sources of contamination in the land area that recharges the groundwater supply for their wells. Wellhead protection plans are on record with the DNR for Chilton, Darboy Sanitary District No. 1, New Holstein, Stockbridge, and Kiel. Communities in the Fox Cities area have also banded together to develop a source water protection plan with the assistance from the Wisconsin Rural Water Association, titled the *Fox Cities Area Source Water Protection Plan*. The objective of the plan is to improve and protect the long-term viability of regional groundwater resources. The LWCD will assist communities to develop, maintain and implement their wellhead protection and source water protection plans. These plans are seen as promising tools, aiding in the protection of groundwater quality. For example, a plan can aid the LWCD in successfully competing for cost share grants to implement agricultural conservation practices within the defined wellhead protection area.

3.6(i) Atrazine Prohibition Area

Atrazine is an herbicide used on corn crops to help control weeds. It is thought to cause sickness and health problems in humans and has been found in groundwater throughout the state and in Calumet County. Wisconsin was the first state in the nation to develop atrazine prohibitions in areas where atrazine was found in groundwater. The use of atrazine on cropland is strictly regulated in these areas. The extreme northeastern portion of Calumet County is included in the Manitowoc County atrazine prohibition area (PA 97-36-01). The area includes all of Section 1 and the northern half of Section 12, Township 20 north, Range 20 east in the Town of Brillion as displayed in **Figure 23**. Sandy soils in this area may have allowed the atrazine to reach groundwater. Limited testing of well water within the County for diaminochlorotriazine, a by-product of atrazine, indicated that 34 out of 152 samples had detectable levels of the pesticide by-product. It is recommended that wells with nitrate levels above 5ppm test for diaminochlorotriazine or other pesticides at least once.

Figure 22: Groundwater Protection Area

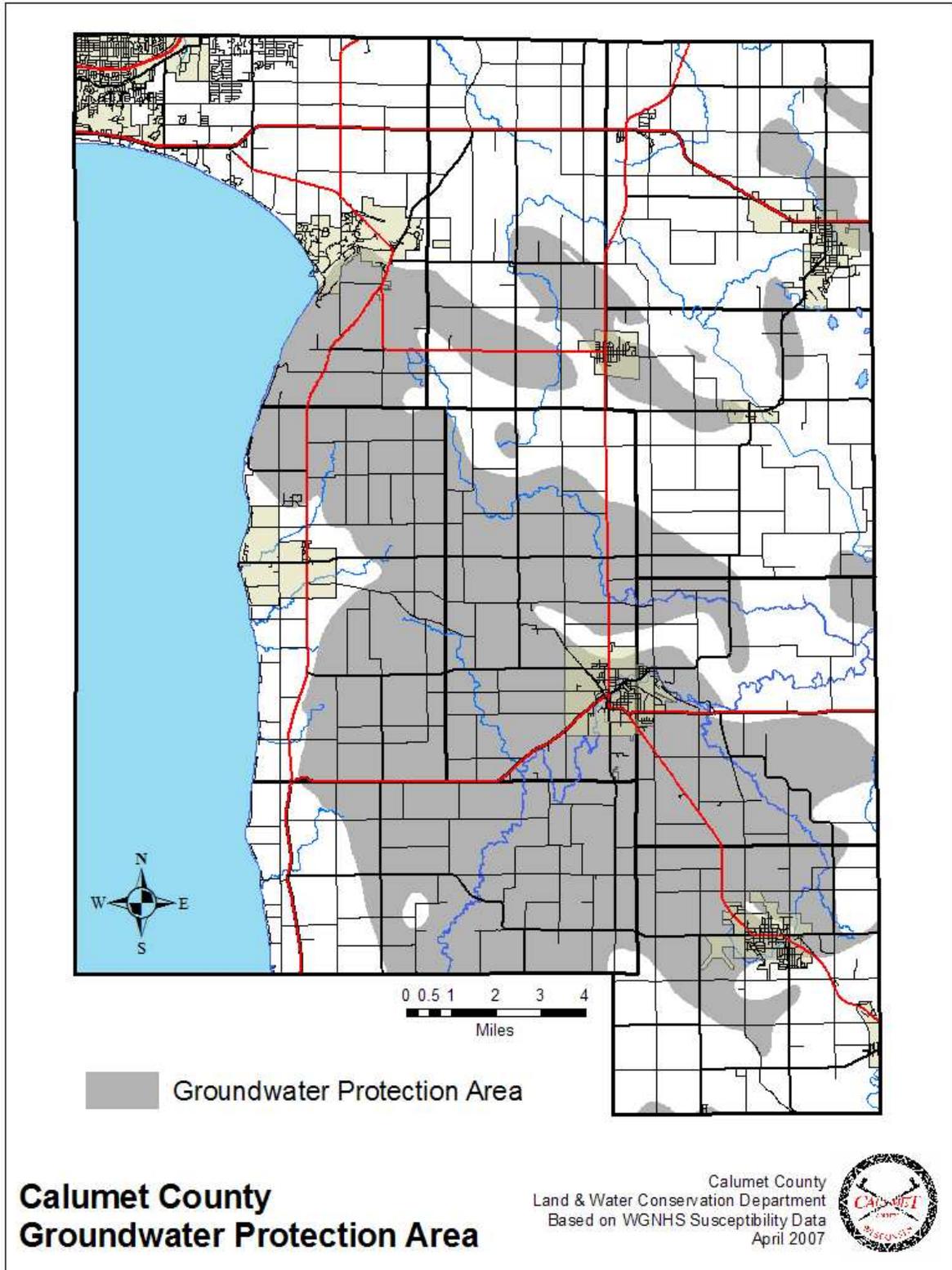
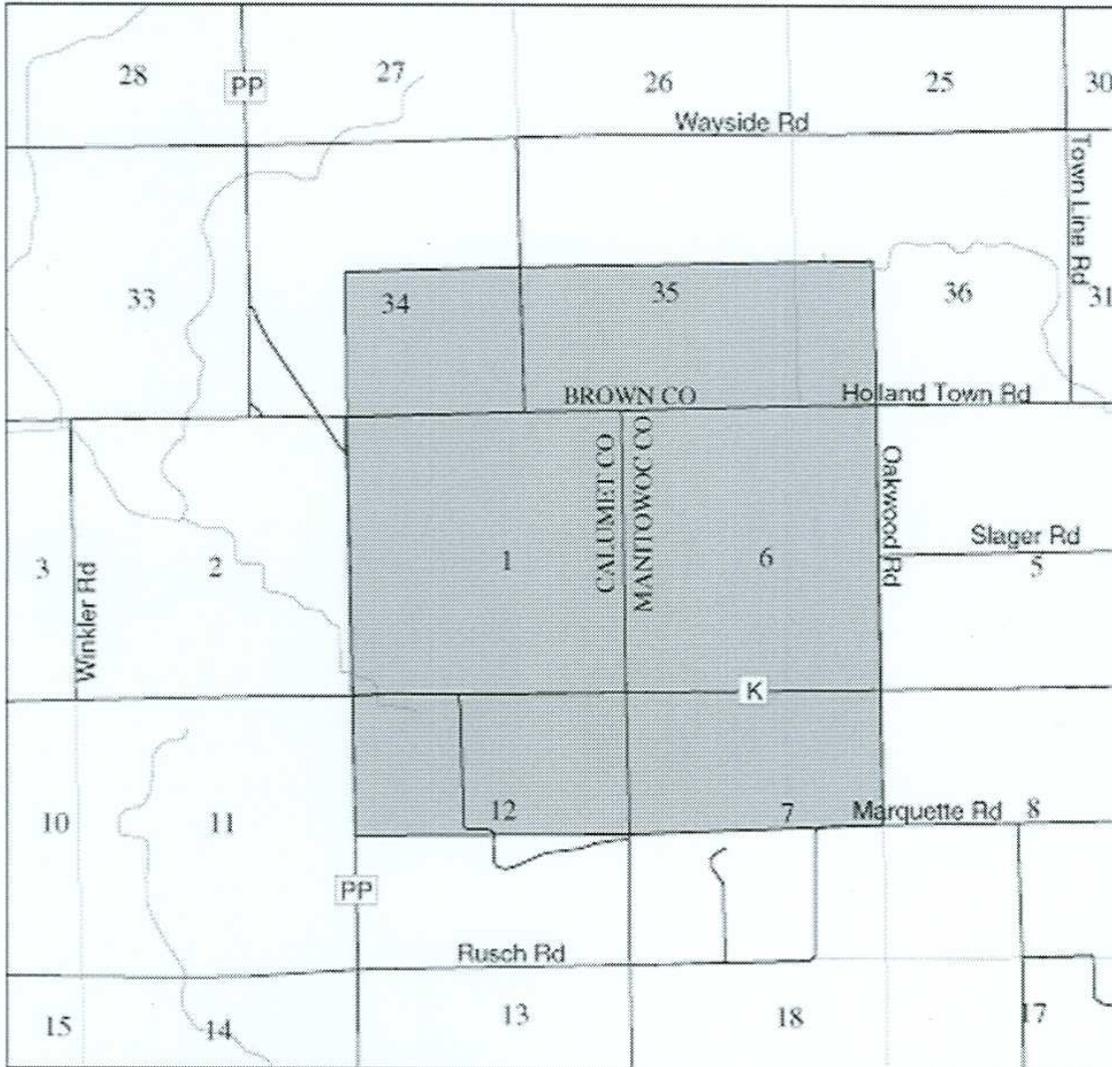
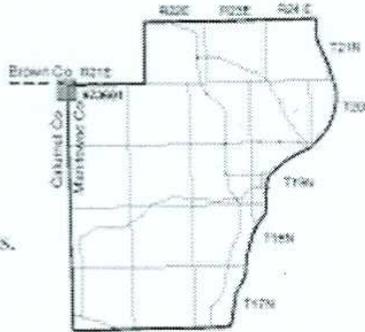


Figure 23: Atrazine Prohibition Area

Manitowoc County
 Town of Maple Grove
 T20N R21E PA 97-36-01
 Calumet County, Town of Brillion
 T20N R20E
 Brown County, Town of Holland
 T21N R20E

All uses of atrazine are prohibited on lands within the shaded regions. This prohibition area is shared by Manitowoc, Brown and Calumet Counties. There are no other prohibition areas in either Manitowoc or Calumet Counties. There are two other prohibition areas in Brown County. Refer to each map for specific locations.



DATCP

3.7 Woodland Resources

Prior to settlement, the majority of land area in Calumet County was forested. The species of trees in the forests were determined by soil type, hydrology, and disturbance history. Sugar maple was predominant on upland mesic sites with a mix of other hardwoods including beech, basswood, and white ash. On the upland drier sites, red, white, and bur oak occurred along with hickory, ash, and other hardwoods. In lowland swamps, black and green ash, elm, soft maple, swamp white oak, white cedar, and tamarack were common. In 1980, the main timber types within the county were listed in order of prevalence as oak, hickory, maple, beech, birch, elm, ash, cottonwood, aspen and conifers.

Approximately 13% of the total land area of the county, or 26,935 acres, is currently in woodland (see **Table 1** and **Figure 3**). Much of this woodland area is located on DNR owned public lands; including the Brillion, Killsnake, and Kiel Marsh Wildlife Areas, Stockbridge Ledge Natural Area, and High Cliff State Park. Another large portion occurs on privately owned wetland areas and along the corridors of major streams in the county. The rest of the woodlands occur on small, discontinuous, and privately owned tracts of land.

One small, unique area of old growth forest still exists and should be preserved in Calumet County. Old growth forests are what forests in Wisconsin looked like before settlers began logging them for timber. The area is along the South Branch of the Manitowoc River in the Town of Brothertown. Numerous managed areas of significant mature forest are located throughout the county. One is called Ludwig Mesic Forest and is privately owned. It is located in the Town of Stockbridge.

Woodlands are important for a variety of reasons. These include:

- Providing food and habitat for many wildlife species, including birds;
- Serving as sources of timber for building and wood products such as lumber, pulpwood, and firewood;
- Reducing soil erosion from wind and water by covering the land surface and holding the soil in place; and
- Shading and cooling the water along stream banks while providing woody debris for aquatic life habitat.

DNR resource professionals provided the following issues of concern related to woodlands in Calumet County.

- Fragmentation of woodlands;
- Attempts to establish woodlands using tree species that are not suitable for the soil types, hydrology, or other land conditions;
- Deer browse damage, causing problems for establishment and re-establishment of woodlands;
- Use of non-native tree species in woodland planting;

- Not enough mixing of species in woodland planting;
- Spread of Dutch elm disease in bottomland areas;
- Potential invasions of emerald ash borer into bottomland areas;
- Potential invasions of gypsy moths; and
- Woodland management that is not sustainable, but tailored to meet needs of logging or timber companies.
- Loss of trees due to flooding or saturated soil conditions

3.7(a) Woodland Management Plans

The future of the county's woodland resources depends on whether they are managed in a sustainable fashion. Woodland management plans ensure that sound management practices are used during timber harvests and other woodland uses. About 3,700 acres of privately owned woodlands in the County are managed according to these management plans because they are enrolled under the Wisconsin Managed Forest Law program. The program provides a reduction in property taxes on woodlands for following management plans. The plans are currently written by private consulting foresters and reviewed and approved by DNR foresters.

DNR and private foresters provide most of the necessary informational, technical, and management services on trees and woodlands to county residents. The LWCD and NRCS assist residents in signing up for federal and state programs to plant and maintain woodlands. Programs include the Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentives Program (EQIP), and Wisconsin Forest Landowner Grant Program (WFLGP). The NRCS provides some management planning services for the plantings. The LWCD also helps residents obtain trees to plant by administering an annual tree and shrub sale program and by distributing order forms for annual DNR trees sales.

3.8 Wetland Resources

About 27,312 acres, 13 % of the land area of the county, are wetlands (see **Table 1 and Figure 3**). Most of these wetlands are located on DNR owned public lands in the Brillion, Killsnake, and Kiel Marsh Wildlife Areas. Scattered large areas are privately owned such as the Hayton Marsh on the eastern edge of the county, Aebisher's Marsh along the Killsnake River, and contiguous floodplains along the South Branch of the Manitowoc River in the Town of Brothertown. Other smaller and discontinuous wetland areas occur along stream corridors, in glacial potholes, and in small internally drained areas.

Wetlands can be categorized as ephemeral (not connected to streams or other waterbodies), seasonal, or permanent wetlands; and on the types of plants found within them. DNR wetland maps, showing the types and locations of wetland areas (greater than two acres) in the county, can be viewed at the Calumet County LWCD office or online on the DNR Surface Water Data Viewer at: <https://dnr.wi.gov/topic/SurfaceWater/swdv/>.

It should be noted that the DNR Surface Water Data Viewer does not accurately describe or identify all wetlands as they exist on the landscape. Also, when a wetland area is identified, there may be several agencies involved in governing projects that impact the wetland.

The land area of wetlands in the county is less than half of what it was in the mid-1800's, due to draining or filling for agricultural and development purposes. In the past, county and state resource professionals and programs assisted with the draining of wetlands for agricultural use. In recent years, the many benefits of wetlands have been realized and the emphasis is on their creation and restoration. New regulations and program policies discourage the destruction or alterations of wetlands for agriculture, as well as development. The rules are not as strict for small and marginal wetlands that are destroyed or altered for residential and commercial development. Such development is more common in the northwest corner of the county and is impacting wetlands throughout the county.

The historical loss of wetlands has resulted in negative impacts to other natural resources and humans. Loss of habitat, flooding, stream bank erosion, and degraded surface water and groundwater quality are a few of the impacts within Calumet County. Wetlands provide important habitat, breeding areas, and food sources for many species of wildlife and fish. They capture surface runoff and release it slowly to surface water or let it soak down to groundwater, reducing flooding and increasing groundwater recharge. Soil sediments settle out in the wetlands and nutrients and toxins are captured by wetland plants; cleaning the runoff before it enters surface waters or groundwater.

The County shoreland ordinance provides the County's regulation of wetlands located in the shoreland zone. The Calumet County LWCD can provide assistance in the restoration of wetlands in areas that have been drained or filled. Wetland design, land survey, and construction site services are available to county landowners. The LWCD can also provide information on and application assistance for federal and state programs to cost share restorations. These programs include the Agricultural Conservation Easement Program (ACEP), the Conservation Reserve Program (CRP), and Partners in Fish and Wildlife.

3.9 Wildlife Resources

The changing topography and vegetative communities in Calumet County are prime habitat for a large variety of upland and wetland wildlife species, including mammals, birds, amphibians, reptiles, invertebrates, and fish. The combinations of trees, shrubs, grasslands, cropland, open water areas, and marshes provide a wide variety of food and cover, allowing many species to thrive. Whitetail deer and wild turkey are common in the areas of cropland. The Niagara Escarpment, with caves and cool micro-environments, supports a variety of rare land snails and hibernating bats. Large wetland areas serve as stopover grounds for migrating water and shore birds and as homes for countless amphibians, reptiles, and fish. These areas provide valuable nesting cover and brood habitat for waterfowl, game birds and song birds. Lake Winnebago and connected lakes are home to the largest self-sustaining population of lake sturgeon in the world.

Healthy and sustainable wildlife populations depend on a clean environment and adequate habitat for food, cover, and water. Land use and development are negatively impacting their environment and habitat within Calumet County. Development and rural home building are fragmenting woodland and grassland habitat, disturbing wildlife travel corridors, and destroying cover and food sources. Non-point source pollution from agricultural and urban land uses are degrading surface waters to the point that they are no longer supporting the variety of fish species that they were capable of. The draining and filling of wetlands are destroying habitat and breeding grounds for fish and other species.

According to DNR resource professionals, the following are issues of concern related to wildlife and wildlife habitat in Calumet County:

- Fragmentation of woodlands and grasslands create fragmented wildlife habitat;
- Need more contiguous habitat comprised of grassland or woodland areas for neo-tropical birds. Important bird species of special concern in grassland areas include eastern and western meadowlarks, bob-o-links, dickcissels, upland sandpipers, Henslow sparrows, and blue-winged teal. Species in woodland areas include woodcock, thrushes, warblers, and orioles;
- Privately created woodlands and grasslands are not matching the surrounding landscape, creating fragmented or isolated habitat;
- Impacts of high deer populations on woodlands, croplands, and domestic plantings; and
- County owned parks are becoming deer refuges during hunting seasons.

According to DNR professionals, the following are issues of concern related to fisheries in Calumet County:

- Need more trees along streams and lakes to shade and cool water;
- Nutrient and sediment inputs to surface waters have degraded water quality and destroyed habitat;
- Loss of wetlands have made river systems flashy resulting in low flows during critical periods of the year;
- Fragmentation of fish habitat from dams and other structures (small or perched culverts) have negatively impacted stream fisheries;
- Alteration of shorelines and stream banks have reduced valuable fish and wildlife habitat;
- Need more trees along streams and lakes to create woody debris in stream for fish, other aquatic life, and wildlife habitat; and
- Reed canary grass along streams catches sediment and weight collapses stream bank.

The Calumet County LWCD can provide assistance in the restoration of wildlife habitat, including in-stream habitat, to County residents. Streambank, lakeshore and wetland design, land survey, and construction site services are available to County landowners. The LWCD also provides information on and application assistance for federal and State programs to cost share restorations.

3.10 Endangered & Threatened Species and Species of Greatest Conservation Need

Threatened and endangered species require special management due to their protected status and small populations. These species can be plants or animals and can be aquatic or terrestrial. Some natural areas, unique geographical locations, or natural communities can be identified as at risk as well. There are generally three categories a species can be classified in at both the state and federal levels. Based on the category, different regulations apply for their protection. Endangered species are those species whose continued existence is at risk. Threatened species are those species that have the potential to become endangered in the near future. Species of greatest conservation need have low and/or declining populations that are in need of conservation actions. These species of need, and priority conservation actions needed to protect them and their habitat are listed in the DNR publication *Wisconsin Strategy for Wildlife Species of Greatest Conservation Need*. Potential problems for all of these species include habitat loss and fragmentation as well as invasive species.

3.10(a) Wisconsin Natural Heritage Inventory (NHI)

The Wisconsin Natural Heritage Inventory (NHI) is an international network that collects, processes, and manages biodiversity data. This program was established in Wisconsin in 1985 and is administered by the DNR Natural Heritage Conservation. This program is used to record and track rare plants, animals and natural communities in the state. There are three main program objectives:

1. Collect information on occurrences of rare plants and animals, high-quality natural communities, and significant natural features in Wisconsin;
2. Standardize this information, and enter it into an electronic database; and
3. Use this information to protect and manage rare species, natural communities, and natural features.

Table 6: Plants, Animals, and Natural Features of Concern

Common Name	Scientific Name	State Status	Group Name
Blanchard’s Cricket Frog	<i>Acris blanchardi</i>	Endangered	Rare Amphibian
Black Tern	<i>Chlidonias niger</i>	Endangered	Bird
Big Brown Bat	<i>Eptesicus fuscus</i>	Threatened	Rare Mammals
Deep-throated Vertigo	<i>Vertigo nylanderi</i>	Special Concern	Rare Aquatic and Terrestrial Snails
Dentate Supercoil	<i>Paravitrea multidentata</i>	Special Concern	Rare Aquatic and Terrestrial Snails
Eastern Pipistrelle	<i>Perimyotis subflavas</i>	Threatened	Rare Mammals
Gorgone Checker Spot	<i>Chlosyne gorgone</i>	Special Concern	Rare Butterflies and Moths
Great Water-leaf	<i>Hydrophyllum appendiculatum</i>	Special Concern	Rare Plants
Henslow’s Sparrow	<i>Ammodramus henslowii</i>	Threatened	Rare Birds
Little Brown Bat	<i>Myotis lucifugus</i>	Threatened	Rare Mammals
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Rare Mammals
Pickerel Frog	<i>Lithobates palustris</i>	Special Concern	Rare Amphibians
Prairie Parsley	<i>Polytaenia nuttallii</i>	Threatened	Rare Plants
Ram’s-Head Lady’s-Slipper	<i>Cypripedium arietinum</i>	Threatened	Rare Plants
Red-shouldered hawk	<i>Buteo lineatus</i>	Threatened	Rare Birds
Short’s Rock-Cress	<i>Boechera dentata</i>	Special Concern	Rare Plants
Snow Trillium	<i>Trillium nivale</i>	Threatened	Rare Plants
Yellow Rail	<i>Coturnicops noveboracensis</i>	Threatened	Rare Birds

Changes in land uses and habitat destruction are significant threats to these rare species and natural communities. The following natural communities are listed as being present within Calumet County:

- Dry Cliff;
- Moist Cliff;
- Southern Mesic Forest;
- Talus Forest;
- Emergent Marsh;
- Floodplain Forest;
- Northern Wet Forest;
- Bat Hibernaculum;
- Bird Rookery;
- Herp Hibernaculum;
- Migratory Bird Concentration Site;
- Open Bog; and
- Shrub-Carr.

Table 6 shows the plants, animals, and natural features of concern in Calumet County identified in the NHI database in 2018. At the time of this plan Henslow's Sparrow and the Black Tern were federally listed as Species of Concern and the Northern Long-eared Bat was federally listed as threatened.

3.7(b) DNR Basin Plans

The four basin plans that cover portions of the county address rare, endangered, and threatened species in a general manner. Priority concerns and activities identified by the reports include:

- Maintaining viable populations of rare species and assure the sustainability of native species and natural communities;
- Collecting data for the NHI system;
- Screening projects and management actions for impacts to state and federally listed species;
- Educating landowners, towns, and county governments on the ecological values of different types of habitat and how development affects them;
- Work with other programs and agencies to ensure all federal, state, and local actions, including private when possible, are screened for at risk species; and
- Restore, purchase, and preserve critical habitat.

These priorities from the basin plans correlate with the priorities list developed by DNR staff in attendance at meetings for previous LWRM plans. The LWCD has assisted and will continue to assist the DNR and others to address the concerns related to rare, endangered, threatened, and special concern species in the county.

3.11 Invasive Terrestrial & Aquatic Species

There is growing concern over invasive species in Calumet County. Both aquatic and terrestrial non-native species can pose serious threats to land and water resources. The spread of these species can endanger the ecologic diversity and health of native wildlife and plant communities. Recreational and economic uses of land and water resources may be also be impacted.

While a complete field inventory of invasive species has not been completed, the following species have been found in the County and posed the greatest concern in 2018:

- Emerald Ash Borer;
- Purple Loosestrife;
- Japanese Knotweed;
- Tall Manna Grass;
- Phragmites australis;
- Eurasian Water Milfoil;
- Curly-Leaf Pondweed;
- Rusty Crayfish;
- Zebra Mussel;
- Banded Mystery Snail;
- Canada Thistle;
- Common and Cut-Leaf Teasel;
- Honeysuckle;
- Spotted Knapweed;
- Tansy;
- Wild Parsnip;
- Gypsy Moth;
- Garlic Mustard; and
- Buckthorn.

The following species had not yet been found in Calumet County in 2018, but were found nearby and will likely post threats to our resources:

- Giant Hogweed;
- Quagga Mussel;
- Round Goby; and
- Ruffe.

3.11(a) Invasive Species Programs

From 2008 through 2017, Calumet County housed a part-time Aquatic Invasive Species Coordinator. The Coordinator worked with citizens and organizations to educate the

public about and monitor and control invasive species in the county. The Coordinator also maintained a website at <http://www.calumetinvasivespecies.com/>. Currently aquatic invasive species work is carried out on a more regional basis by the Fox/Wolf Watershed Alliance through the Winnebago Waterways lake planning effort. Calumet County has also been able to budget limited funds to contract with an invasive species coordinator to assist landowners and municipalities on terrestrial invasive species issues.

The LWCD will continue to assist the Invasive Species Coordinator, and other agencies and organizations to prevent and reduce invasive species populations within the County.

3.12 Climate Change

According to a report published by the Wisconsin Initiative on Climate Change Impacts, Wisconsin's climate is changing. Precipitation and temperature data from the past 60 years indicate that overall our state has become warmer and wetter. In the report, *Wisconsin's Changing Climate: Impacts and Adaptations*, University of Wisconsin climate scientists project that the statewide annual average temperature will increase by 6 – 7° F by the middle of the century. Average winter temperature will increase by about 8° F; more than other seasons. The number of summer days that exceed 90° F will increase statewide and the number of winter nights that are below 0° F will decrease significantly.

The projections indicate that overall average precipitation will also increase by the middle of the century and more of the increase will be in the winter, spring, and fall. The frequency of large storm events will increase in the spring and fall. The amount of precipitation that falls as rain rather than snow in the winter will increase significantly, with increasing occurrences of freezing rain.

These projected climate changes will impact our land and water resources and animal, plant, and human communities. They will also impact our land use and the conservation practices that we use to improve and protect our land and water resources.

In the near future, the LWCD and its partners will need to begin developing adaptation strategies to address the negative impacts of climate change on our natural resources, communities, and conservation practices. The LWCD will proactively educate county and local officials on the need for such strategies and on follow-up action to implement them, and actively participate in their development and implementation.

3.13 Conclusion

Calumet County has an abundance and wide variety of land and water resources, some of which are unique to the county. Many of these resources are being negatively impacted by our land use practices. Climate change may worsen the impacts. We must reduce these impacts to ensure a sustainable and healthy environment for ourselves

and future generations. Government, citizen groups, and residents need to work together to get the needed conservation practices on the land to improve and protect our land and water resources.

SECTION 4: STANDARDS AND PROHIBITIONS

The State of Wisconsin has enacted and is implementing runoff management regulations for agricultural and urban land uses to help achieve state water quality goals. Counties are expected to assist in their implementation through their local land and water conservation programming. These regulations fit in two broad categories of land use practices: agricultural runoff management and non-agricultural runoff management. The goals of the regulations are to reduce polluted runoff to waters of the state. A different approach will be taken by the LWCD to implement each category because of the very different nature of landscapes, land uses, land users, and regulations.

4.1 Agricultural Runoff

Polluted agricultural runoff is caused by a wide range of agricultural land use practices. Feedlots, barnyards, feed storage areas, animal waste storage facilities, and cropland are potential sources of polluted runoff. Animal waste, fertilizers, and soil from these areas can be picked up and carried off by runoff from rainfall or snow melt. The polluted runoff eventually ends up in surface waters or groundwater, causing their degradation. The state standards and prohibitions, implemented at a local level, can have a positive effect on surface water and groundwater quality.

4.1(a) Standards & Prohibitions

On October 1, 2001 the state enacted state-wide minimum performance standards and prohibitions for agricultural runoff. These standards were put in place to limit non-point source pollution from agriculture and to help achieve state water quality standards. The performance standards were updated and revised on January 1, 2011 and again in July 2018 adding the Silurian Bedrock Performance Standards. They can be found in Wisconsin Administrative Code NR 151 Runoff Management. NR 151 also contains requirements for implementing the standards including non-compliance notification, enforcement procedures, and cost sharing requirements. A related portion in Wisconsin Administrative Code, ATCP 50 Soil and Water Resource Management, identifies the conservation practices that farmers may use to meet the standards. ATCP 50 was most recently revised in January of 2018. A copy of NR 151 can be found here:

http://docs.legis.wisconsin.gov/code/admin_code/nr/100/151.pdf and a copy of ATCP 50 can be found here:

http://docs.legis.wisconsin.gov/code/admin_code/atcp/020/50.pdf

The standards and prohibitions are summarized as follows:

- All cropland erosion must be controlled to tolerable soil loss levels (T);

- A minimum 5-foot wide no-till zone of hay, grass, or other self-sustaining vegetation must be installed and maintained along the top of the channel of surface waters;
- New and altered animal waste storage facilities must be built according to technical standards and specifications;
- Unused animal waste storage facilities must be properly closed when a livestock operation ceases or it is unused for 2 years;
- Existing manure storage facilities that pose an imminent threat to public health, fish and aquatic life, or groundwater shall be upgraded, replaced, or abandoned;
- Levels of materials in an animal waste storage facility may not exceed the margin of safety level;
- Clean water runoff must be diverted away from barnyards, waste storage facilities and animal lots if they are located near streams and lakes or in areas susceptible to groundwater contamination;
- Cropland applications of animal waste and nutrients must be in accordance with a nutrient management plan meeting USDA-NRCS 590 Technical Standards. Cropland, pastures, and winter grazing areas must also meet a phosphorus index standard;
- Mechanically applied manure in the Silurian bedrock region of the state must comply with the Silurian bedrock performance standards;
- There shall be no overflow of animal waste storage facilities;
- No unconfined piles of animal waste near streams and lakes and in areas susceptible to groundwater contamination;
- No polluted runoff or leachate from barnyards, feedlots, stored manure, feed storage areas, and milking centers to surface waters and groundwater; and
- No unlimited livestock access to streams and lakes if it causes destruction of adequate vegetative cover on their banks and shores.

4.1(b) Silurian Bedrock Performance Standards

As part of the effort to address groundwater issues and protect drinking water and public health across Wisconsin, the Department of Natural Resources adopted the Silurian Bedrock Performance Standards in June of 2018 and they were put into effect starting July 1, 2018. The standards created provide additional mechanical manure application standards for cropland or pasture within the Silurian bedrock area of Wisconsin which includes Calumet County.

At the time of this plan the DNR as well as the Wisconsin Standards Oversight Council have convened groups to create guidance on implementation of the standards including the creation of the Verification of Land Features standard.

Calumet County LWCD has developed a preliminary strategy for the implementation of the new standards until a statewide strategy and verification standard has been created and approved. The strategy is as follows:

- Educate/collaborate with agronomists who write nutrient management plans to get new standards and preliminary SnapMaps depth to bedrock information included in nutrient management plans.
- Educate/collaborate with operators and manure applicators to understand new standards and preliminary SnapMaps depth to bedrock information.
- Participate in the Standards Oversight Council Verification of Land Features practice standard team.
- Work with neighboring Counties in Silurian bedrock area of the state on preliminary verification guidance to assist with implementation of the new standards.
- Work with local DNR staff on nutrient management plan review and field verification for the new standards.

In many cases, a farmer must be offered cost sharing to install conservation practices to meet the standards and prohibitions before enforcement actions can be taken. State agencies expect that county land and water conservation departments will assist farmers in the installation and implementation of those practices. A list of the conservation practices contained in Wisconsin Administrative Code ATCP 50 can be found in **Appendix D**.

4.1(c) Compliance Inventory, Notification & Enforcement Strategies

The LWCD has held discussions with DNR on cooperative efforts to implement the standards and prohibitions within Calumet County. The discussions have focused on compliance notifications and enforcement procedures and the staffing resources needed to complete them. As a result of these discussions and subsequent enactment of a county runoff management ordinance, most steps in the implementation of the NR 151 standards and prohibitions will be completed by the LWCD.

Calumet County enacted a Manure Storage and Runoff Management ordinance in May, 2011. All of the standards and prohibitions from the 2011 and July 2018 updates of NR 151 are incorporated into the ordinance by reference. The cost share requirements, notification requirements, compliance periods, and appeal procedures in NR 151 and ATCP 50 were also included in the ordinance.

The LWCD intends to cooperate and communicate with DNR in implementation and enforcement of the agricultural standards and prohibitions. The LWCD and DNR may develop a memorandum of understanding to formally lay out the process. Many of the components of the February 5, 2003 implementation strategy developed by DNR will be used by the LWCD in implementation and enforcement and that they will serve as a

basis for the memorandum. LWCD intends on conducting a detailed inventory of each of the HUC 12 size watersheds to determine the level of confirmed NR 151 compliance. This inventory would take place within the first two years of this plan. See **Appendix E** for a copy of the DNR implementation strategy.

4.1(d) Priority Farm Strategies

All farms in the county are being reviewed to ensure compliance with the standards and prohibitions. Office records and documents such as conservation plans, cost share agreements, and animal waste storage facility permits are used as part of the review process. Digital aerial photography, farmer interviews, and in-field investigations of all sites with livestock operations will also be used. Compliance or noncompliance of each farm with each individual performance standard and prohibition is recorded on standard forms and is tracked on a computer database. In 2011, the LWCD began to track all cropland under nutrient management plans on the County's Geographical Information System (GIS).

Farms are and will be chosen for review on compliance with one or more of the standards and prohibitions using the following priority ranking of one through six. Because of the public health implications of poor groundwater quality, compliance with standards that have a potential to improve groundwater quality are given a higher priority than those that impact surface water quality.

1. Farms whose operators request a review or need one for program participation (Farmland Preservation Program) or a permit application.
2. Farms in the designated Calumet County Groundwater Protection Area (**see Figure 22**) that are known to be or found to be in significant noncompliance with the standards and prohibitions that impact groundwater.
3. Farms in targeted watersheds (Total Maximum Daily Load or EPA approved 9 Key Element watersheds) that are known to be or found to be in significant noncompliance with the standards and prohibitions that impact surface water. See Section 6.4 Critical Areas and Targeting, Surface Water Quality for a list of targeted watersheds. Farms in Surface Water Quality Management Areas within these watersheds will be reviewed first.
4. Other farms in karst areas.
5. Other farms in Surface Water Quality Management Areas.
6. All other farms.

Using the ranking system above, the LWCD attempts to review and certify compliance or noncompliance of at least 50 farms per year. The actual number reviewed depends on available staffing resources, the size of the farming operations reviewed, and complexity of any noncompliance problems found on the farms.

4.1(e) Tools for Voluntary Compliance

Calumet County LWCD and LWCC prefer that agricultural landowners and operators comply with the state and local performance standards and prohibitions voluntarily. The main tools of choice to accomplish voluntary compliance include: education; conservation practices; incentives; and targeting of resources, programs, and partnerships. These tools will be used by the LWCD and its partners to achieve the goals and objectives of this LWRM Plan. However, enforcement of State and County regulations will be used when deemed necessary.

4.2 Non-Agricultural Runoff

Non-agricultural runoff can come from a variety of sources and contain many pollutants. Driveways, parking lots, construction sites, roads, roofs of buildings, lawns, and sidewalks are all sources of non-agricultural runoff. Pollutants that can be picked up and carried in runoff include soil particles, nutrients, organic materials, petroleum products, pet wastes, and road salt. As with agricultural runoff, polluted runoff may eventually enter and impact surface and ground water. The state standards were designed to minimize these impacts.

4.2(a) Standards

On October 1, 2002, the State of Wisconsin enacted state-wide minimum performance standards for construction site erosion control and post-construction storm water management within Wisconsin Administrative Code NR 151 Runoff Management. These standards were put in place to limit non-point source pollution from the construction and post-construction phases of development and to help achieve state water quality standards. Calumet County incorporated the standards into county ordinance in October of 2008. The standards were revised and updated on January 1, 2011. They can be viewed in the current version of NR 151 available on-line at:

https://docs.legis.wisconsin.gov/code/admin_code/nr/100/151

4.2(b) Conservation Practices and Permits

The state standards for construction site erosion control apply to sites with construction related land disturbance. On sites with less than one acre of disturbance, erosion and sediment control practices must be installed to prevent or reduce tracking of soil onto roads and discharge of sediment offsite. Sites of one acre or more require development and implementation of an erosion and sediment control plan using conservation practices, also called best management practices (BMPs). The BMPs must prevent or reduce tracking and sediment discharge and also reduce sediment loads in runoff by a certain percentage.

The state standards for post-construction site storm water management apply to construction sites with one acre or more of disturbance after construction is completed.

A storm water management plan with BMPs must be developed and implemented using best management practices. The BMPs must reduce total suspended solids (TSS) in runoff and allow runoff to infiltrate by certain percentages. Other standards require pretreatment of runoff from roads and parking lots; vegetative buffers along lakes, streams, and wetlands; and reductions in petroleum product runoff. Similar best management practices and TSS reductions are required for construction of roads and other public transportation systems. Refer to **Appendix D** for a list of conservation practices that can be used to meet these standards. A current list of practices can also be found on-line at <https://dnr.wi.gov/topic/stormwater/>.

In addition, Total Maximum Daily Loads (TMDL) have been approved and are in development for impaired waterways that include watersheds within Calumet County. TMDLs target specific sources of pollution that impair waterways with the goal of reducing the pollutant loading to levels that the waterway can naturally manage. Calumet County is currently subject to TMDLs for the Lower Fox River that target phosphorus and sediment. These goals have been integrated into the County erosion control and stormwater management ordinances. As of this plan revision, TMDLs are being developed for the Upper Fox & Wolf Rivers and the early phases of development for the Lakeshore Basin including the Manitowoc River watershed have begun.

The standards are implemented through county, town, and state regulations and associated permit systems. The Village of Harrison administers a village ordinance and permit system for construction sites within village boundaries. The Calumet County LWCD administers a county ordinance and permit system for all other construction sites in the county in unincorporated areas. The county ordinance includes all state standards for construction site erosion control and post-construction storm water management and applies to smaller areas of land disturbance than the state standards. Wisconsin DNR administers Wisconsin State Administrative Code NR 216 and a notice of intent/permit system for all construction sites with 1 acre or more land disturbance, even those under village and county permit requirements.

Land disturbance and storm water discharges during the planting, growing, cultivating, and harvesting of crops, pasturing and yarding of livestock, and sod farms and nurseries are exempt from the standards and permit processes. This exemption does not apply to construction of barns, manure storage facilities, or barnyard runoff control systems.

4.2(c) Municipal Storm Water Permit

Wisconsin State Administrative Code NR 151, NR 216 Storm Water Discharge Permits, and federal rules (EPA National Pollution Discharge Elimination System (NPDES) Phase II) require government owners of storm sewer systems with large population densities to obtain a storm water permit from the state. Permitted governments are required to develop and implement a comprehensive construction site erosion control and storm

water management program and reduce delivery of suspended solids in runoff from their storm sewers and road ditches to waters of the state by a certain percentage.

The comprehensive erosion control and storm water management program for permitted governments must contain six components. These components are:

1. Public education and outreach;
2. Public participation and involvement;
3. Illicit discharge detection and elimination;
4. Construction site runoff control for erosion and sediment (includes enactment and enforcement of an ordinance);
5. Post-construction site runoff control (includes enactment and enforcement of an ordinance); and
6. Pollution prevention and good housekeeping on governmental properties and roads.

Calumet County is a governmental unit that was required to obtain a storm water permit from DNR, as were other governmental units within County boundaries. The other units included the City of Appleton, City of Menasha, the Village of Sherwood and the Village of Harrison. The Calumet County LWCD applied for and received the permit, which had a start date of May 1, 2014 and expiration date of April 30, 2019. LWCD has sent a letter serving as notice of re-application for the permit on September 25, 2018.

While meeting the requirements in the permit is not the sole responsibility of the LWCD, the LWCD is heavily involved in many of its aspects. Public education and participation components are two of their major responsibilities. The LWCD has developed and is implementing a public education and participation workplan. The LWCD also administers and enforces the County construction site erosion control and post-construction storm water management ordinance and provides technical assistance to the public in meeting ordinance requirements. The LWCD plays a lead role in ensuring that the County meets all of its permit requirements in a timely fashion and develops and submits annual permit activity and progress reports to DNR.

Since this is a Wisconsin mandated permit and program, permit requirements are included as goals, objectives, and work activities in this LWRM Plan. Partnerships have been formed with the other permitted government units within the county and region to share in the development and implementation of some parts of the required storm water program.

Non-permitted, incorporated municipalities with certain population densities are also impacted by NR 151. They are required to conduct public education on reducing polluted runoff, to establish programs for leaf and grass clipping collection and management and illicit discharge detection and elimination, and to implement nutrient management planning on public lands greater than five acres. Calumet County LWCD

anticipates that some municipalities will ask for assistance in setting up their programs and will provide it.

The state rules related to these requirements, including NR 151 and NR 216, can be found on-line at: <http://www.legis.state.wi.us/rsb/code/codtoc.html>. A copy of the County's storm water permit and other information about storm water regulations for municipalities can be found on-line at: <http://dnr.wi.gov/topic/stormwater>.

4.3 Total Maximum Daily Loads (TMDL)

Land users may be required to meet stricter agricultural and non-agricultural performance standards if the land falls within the watershed boundaries of a lake or stream for which a TMDL has been established. See the preceding **Section 3: Land and Water Resources** for more information on a TMDL. The stricter standards are established through Wisconsin Administrative Code. TMDL standards have been established for the Lower Fox River and it is anticipated that TMDL standards for the Upper Fox River including Lake Winnebago will be established in 2019. Groups have been meeting over the last few years having discussions and developing strategies for development of a TMDL for the lakeshore watersheds. Specifically, Calumet County has been working with a group in regard to the Manitowoc River watershed and have been conducting planning activities to help facilitate the development of a TMDL for the Manitowoc River watershed.

4.4 Conclusion

The standards and prohibitions for runoff management set forth in State regulations will influence many of the goals, objectives and work activities of the LWCD. However, many of the resource concerns addressed by these standards are also concerns of county residents. Implementation of the standards and prohibitions in NR 151 and other Wisconsin Administrative Codes will help address local land and water resource concerns and problems within Calumet County.

SECTION 5: GOALS & OBJECTIVES

This section details the main goals and objectives of the LWRM Plan. These goals and objectives will guide the work activities of the Calumet County LWCD over the next ten years with review and possible revisions after five years. Development of definable and measurable work activities under each goal gives direction to the LWCD, partnering agencies, and local citizens as they work together to solve local concerns and problems related to the land and water resources of Calumet County.

5.1 Development of Goals & Objectives

The goals and objectives for this LWRM Plan were developed by considering existing resource inventories and management plans, state mandates, and concerns and recommendations from county residents and natural resource professionals. Some of the major sources of information included the following:

- Goals and objectives from the *Calumet County Land and Water Resource Management Plan, 2012 – 2019 as extended*;
- Performance standards and prohibitions in NR 151 for agriculture, including Silurian bedrock performance standards;
- Performance standards and mandated programs in NR 151 for construction site erosion control and post construction storm water management;
- Resource conditions and concerns from four DNR basin plans and basin staff;
- Resource concerns from residents on the CAC;
- Resource concerns from local, state, and federal natural resource professionals on the TAC;
- Resource concerns from the Smart Growth process;
- Local resource inventories and modeling.

5.1(a) Calumet County Land & Water Resource Management Plan, 2012 – 2019

There were three major goals in the 2012 – 2019 LWRM Plan. Specific objectives were developed for each goal. The following below are the three major goals, listed in prioritized order, with the specific objectives listed underneath them.

- Improve & Protect Groundwater and Surface Water Quality
 - Increase public awareness of water quality
 - Increase use of nutrient management planning
 - Reduce polluted runoff and sediment delivery to groundwater and surface water
 - Promote water conservation

- Improve and protect soil quality
 - Increase public awareness of soil quality & erosion
 - Reduce soil erosion on cropland to tolerable levels
 - Reduce soil erosion on construction sites to tolerable levels
 - Control streambank and shoreline erosion

- Improve and protect habitat quality
 - Preserve and restore wetland areas
 - Promote tree planting and sustainable woodlands management
 - Preserve and restore aquatic and shoreland habitat & vegetated corridors along surface waters
 - Preserve and restore threatened and endangered species and species of greatest conservation need habitat
 - Prevent the spread of invasive species
 - Preserve and restore native plant communities

On the advice of the CAC, all of the goals and objectives were carried forward into the goals and objectives of this LWRM Plan with some additions and minor rewording of some objectives.

5.1(b) Citizen Advisory Committee (CAC)

The CAC reviewed the goals and objectives of the 2012 – 2019 LWRM Plan at their first meeting. The group came to a consensus that the three goals and objectives in the Plan were still relevant and that they should be carried over into the 2020 - 2029 Plan. These recommendations were due to the fact that surface water and groundwater are connected and similar objectives and tools are used to accomplish the two goals. The CAC recommendations are described more fully in **Section 1.4** of this document. Also see **Appendix B** for the CAC identified resource concerns and their rankings.

5.1(c) Technical Advisory Committee (TAC)

TAC members were asked to review the goals and objectives in the first draft of the 2020 – 2029 plan as well as other content contained in the plan. See **Section 1.4** for a further description of the process.

5.2 Goals & Objectives

The following are the goals, objectives and activities developed from those in the previous LWRM Plan and the information collected via the various methods described in the previous sections. Three general goals emerged related to improving and protecting the land and water resources of Calumet County. The following are the three major goals, listed in the prioritized order, with specific objectives and actions in the sections below:

1. IMPROVE & PROTECT GROUNDWATER AND SURFACE WATER QUALITY.
2. IMPROVE & PROTECT SOIL QUALITY.
3. IMPROVE & PROTECT HABITAT QUALITY.

GOAL 1: IMPROVE & PROTECT GROUNDWATER AND SURFACE WATER QUALITY

INCREASE PUBLIC AWARENESS OF WATER QUALITY

- Provide and promote private well water testing program
- Continue development and implementation of a groundwater and surface water quality education program including proper protocol for water sample collection
- Develop and foster partnerships with citizen organizations and local governments to deliver water a quality education program
- Recognize land users for conservation efforts to improve water quality

INCREASE USE OF NUTRIENT MANAGEMENT PLANNING

- Train farmers, crop consultants, and others who plan and carry out land applications of manure, wastes, and nutrients about nutrient management
- Assist farmers, consultants, and nutrient applicators to prepare and implement nutrient management plans
- Ensure that nutrient management plans are updated and implemented by farmers, consultants, and nutrient applicators
- Implement NR 151 agricultural performance standard for nutrient management
- Use program requirements to require use of nutrient management
- Provide cost sharing for nutrient management and waste storage

REDUCE POLLUTED RUNOFF & SEDIMENT DELIVERY TO GROUNDWATER & SURFACE WATER

- Identify, map and verify karst features as well as depth to bedrock, make information available for public use
- Increase use of nutrient management

- Reduce soil erosion from all land uses
- Promote the use of soil health principles
- Promote establishment and maintenance of vegetative buffers along karst features and surface waters
- Provide technical assistance and cost sharing for installation of conservation practices to reduce polluted runoff and delivery to groundwater and surface water
- Implement NR 151 performance standards and prohibitions for agriculture
- Use program requirements to require installation of necessary conservation practices
- Promote compliance with NR 151 silurian bedrock performance standards
- Implement NR 151 and NR 216 performance standards for storm water runoff and county's DNR MS4 storm water discharge permit
- Implement NR 151 and NR 216 performance standards for construction site erosion control and post-construction storm water management
- Implement watershed restoration plans for TMDL watersheds and other targeted watersheds
- Ensure the proper abandonment of unused wells
- Promote the use of less intensive agricultural practices within karst and critical areas
- Promote demonstration farm participation and encourage and participate in farmer-led conservation groups
- Extend education program to non-farm rural residents

PROMOTE WATER CONSERVATION

- Implement an education program on water conservation

GOAL 2: IMPROVE & PROTECT SOIL QUALITY

INCREASE PUBLIC AWARENESS OF SOIL QUALITY & EROSION

- Continue development and implementation of a soil quality and soil erosion public education program
- Promote the use of the soil health principles

REDUCE SOIL EROSION ON CROPLAND TO TOLERABLE LEVELS

- Increase the use of conservation tillage and cover crops to reduce soil erosion
- Increase the use of grassed waterways to reduce gully erosion
- Implement NR 151 performance standards for agriculture

- Use program requirements to require the use of conservation practices to control soil erosion
- Utilize soil erosion modeling to identify areas most vulnerable to soil erosion

REDUCE SOIL EROSION ON CONSTRUCTION SITES TO TOLERABLE LEVELS

- Develop and implement a training program on proper installation of conservation practices for prospective homeowners, builders, contractors, and developers
- Implement NR 151 and NR 216 performance standards for construction site erosion control and post-construction storm water management

CONTROL STREAMBANK & SHORELINE EROSION

- Provide technical assistance and cost sharing for conservation practices to control streambank and shoreline erosion
- Implement NR 151 performance standards for tillage setback and pasturing of livestock along surface waters
- Promote CREP program areas along surface waters including wetlands
- Promote upland practices to reduce downstream impacts of storm events

GOAL 3: IMPROVE & PROTECT HABITAT QUALITY

PRESERVE & RESTORE WETLAND AREAS

- Promote programs and provide technical assistance for wetland preservation and restoration
- Promote correct placement of wetlands on the landscape to improve habitat and travel corridors for wildlife

PROMOTE TREE PLANTING & SUSTAINABLE WOODLANDS MANAGEMENT

- Promote programs for tree planting and sustainable woodland management
- Promote correct placement of woodland plantings on the landscape to improve habitat and travel corridors for wildlife
- Administer tree sale program for county residents

PRESERVE & RESTORE AQUATIC AND SHORELAND HABITAT & VEGETATED

CORRIDORS ALONG SURFACE WATERS

- Promote programs and provide technical assistance for restoring aquatic and shoreland habitat
- Promote correct placement of buffers on the landscape to improve habitat and travel corridors for wildlife

PRESERVE & RESTORE THREATENED & ENDANGERED SPECIES & SPECIES OF GREATEST CONSERVATION NEED HABITAT

- Promote programs for restoring and preserving habitat along the Niagara Escarpment and other critical areas and no loss of unique habitat
- Promote correct placement of habitat on landscape to improve habitat and travel corridors for species
- Ensure that projects to install conservation practices do not negatively impact species or their habitat
- Promote and provide information on pollinator habitat restoration

PREVENT THE SPREAD OF INVASIVE SPECIES

- Provide informational materials to the public on invasive species
- Assist invasive species coordinators, civic organizations, and DNR in mapping populations of invasive plant species
- Explore options for phragmites control projects

PRESERVE & RESTORE NATIVE PLANT COMMUNITIES

- Provide informational materials to the public on native species of grasses, forbs, shrubs and trees
- Promote programs for preservation and restoration of native plant and grassland communities
- Promote optimal placement of communities on the landscape to improve habitat and travel corridors for wildlife
- Assist civic organizations and DNR in locating and mapping native plant communities

5.3 Conclusion

These goals and objectives will be used to develop annual work plans for the LWCD. These work plans will go into the details of how the LWCD plans to address these goals and objectives and accomplish measurable outcomes. The 2019 work plan can be found in **Appendix F** and includes: the categories, planned activities with benchmarks, performance measurements, and the estimated staff hours and financial resources that will be needed to complete them.

SECTION 6: TOOLS AND STRATEGIES

The actions that will be used to implement the goals and objectives in this plan can be placed in one of six categories of tools. The categories of tools include:

- Information and Education;
- Conservation Practices;
- Incentives;
- Critical Areas and Targeting;
- Regulations; and
- Programs, Plans and Partnerships.

The LAC and TAC used these categories of tools to identify ways that the LWCD and its partners could address priority resource issues and concerns. The same categories of tools can and will be used by Calumet County to implement the state performance standards and prohibitions for agricultural and nonagricultural runoff. A description of each category is found below along with the strategy with which it will be used.

6.1 Information & Education

The Calumet County LWCD and LWCC have always believed that public information and education on natural resource concerns and conservation practices is the preferred method to prevent and solve natural resource problems. Voluntary compliance with standards and regulations is preferable to enforcement procedures. Because of these beliefs, a majority of LWCD staffing resources and support dollars are and will be used for information and education. A concerted effort will be made to inform all farmers about the standards and prohibitions and what they need to do to comply with them.

Following is a list of many of the methods that the LWCD will use to educate residents and farmers on resource problems, conservation practices, and performance standards and prohibitions in NR 151:

- Locally developed PowerPoint presentations to farmer and citizen groups and governmental officials;
- Annual publication and distribution of LWCD newsletter;
- One-on-one contacts;
- Direct mailings;
- News articles in local papers;
- Television and radio interviews;
- Annual presentations and reports to County Board;
- Distribution of federal and state developed brochures and fact sheets;

- Distribution of locally developed brochures, fact sheets, and maps;
- Bus tours;
- Traveling displays at local events;
- County fair booth;
- Workshops on agricultural and urban conservation practices;
- Town meetings;
- Field demonstrations of agricultural and urban conservation practices;
- and
- Annual award to conservation cooperator.

LWCD staff has developed partnerships with other departmental and agency staff and citizen groups to deliver information and education. Some of these partners include:

- Local UWEX agents;
- UWEX Basin Educators;
- Calumet County Emergency Management;
- Calumet County Planning and Zoning;
- Regional DNR resource professionals;
- USDA-NRCS staff;
- Farm Service Agency (FSA) staff;
- Glacierland Resource, Conservation, & Development (RC&D);
- Lakeshore Natural Resources Partnership (LNRP);
- Other LWCD staff from area counties;
- Local outdoor sports clubs;
- Calumet Groundwater Guardian citizen organization;
- Agribusiness employees; and
- Agribusiness employees and crop consultants.

These relationships will be discussed further under the programs and partnerships section below.

6.2 Conservation Practices

Conservation practices are constructed practices or land management techniques that will reduce or prevent soil erosion and polluted runoff or reduce the amount of runoff that reaches surface and ground waters.

See **Appendix D** for a list of conservation practices that can be used to solve resource concerns related to soil erosion and polluted runoff from agricultural sources and comply with performance standards and prohibitions in NR 151 related to agricultural runoff.

USDA – NRCS Technical Standards contain the specifications for the design, construction, implementation, and maintenance of these practices. Copies of the USDA – NRCS Technical Standards can be viewed at the LWCD office or on-line at: <https://efotg.sc.gov.usda.gov/#/>.

A list of conservation practices that can be used to solve resource concerns related to soil erosion and polluted runoff from building construction and urban sources and to comply with the performance standards in NR 151 related to construction site erosion control and post-construction storm water management are in **Appendix D**. Conservation practices and state technical standards can be viewed on-line at: <http://dnr.wi.gov/topic/stormwater/standards> .

The LWCD will promote the installation and use of conservation practices by using other categories of tools. Information and education, incentives, regulations and programs and partnerships will be used. The LWCD will also assist county residents with the design, installation, and maintenance of the conservation practices by providing technical assistance and expertise.

6.3 Incentives

Incentives can play a significant role in convincing land users to install conservation practices, some of which are very expensive. Incentives also can be used to obtain voluntary compliance with performance standards and regulations. Incentives for conservation are usually monetary, but they can also be in the form of public recognition.

Examples of monetary incentives include tax credits, cost sharing, and rental or lump sum payments. They are often connected with participation in federal, state, or local programs. Most monetary incentives are spent within the County, often on goods and services to install conservation practices. In addition to helping improve and protect the land and water resources, these monetary incentives contribute to the economic growth and health of the County. Some of the monetary incentives and related programs that the LWCD will use to further the goals and objectives of this plan and to gain compliance with performance standards and prohibitions include:

- Tax credits – Farmland Preservation Program;
- Cost sharing – Environmental Quality Incentives Program, Soil and Water Resource Management Program, Targeted Runoff Management Program, Multi-Discharger Variance Program, Nutrient Management Farmer Education Grants Program, Notice of Discharge Grant Program, Great Lakes Restoration Initiative Grant Program, other targeted USDA-NRCS grant programs; and
- Rental and lump sum payments - Conservation Reserve Program, Conservation Reserve Enhancement Program.

- Pollutant trading – point source funding for nonpoint source conservation practices.
- Adaptive Management – strategy to achieve phosphorus water quality standards in the most economically efficient manner and similar to pollutant trading.

Public recognition may include an award or publication of conservation efforts. The LWCD will use the following public recognition incentives:

- Annual Conservation Cooperator of the Year award; and
- News articles on land users who are practicing conservation.

The LWCD will continue to search for new programs and grant funds to provide incentives for County land users. For more information on existing programs and grant funds, see the **Programs, Plans and Partnerships** section of this document.

6.4 Critical Areas & Targeting

Limited staffing resources and funding for conservation practices limit the number of actions that can be performed under each goal and objective. To get the most efficiency out of limited resources, the Calumet County LWCD and LWCC will target their actions and resources to critical areas within the county. Critical areas are areas in the county or areas on the landscape that are contributing the most to natural resource problems. They were identified through resource inventories and/or modeling of land use impacts.

The following critical areas were established for the goals and objectives of this plan:

- Improve and Protect Groundwater and Surface Water Quality
 - Groundwater Quality - Areas within the county with thin soils and karst features, designated by the County Board as the Calumet County Groundwater Protection Area. See **Figure 22** for a diagram of where these areas are located.
 - Surface Water Quality – Land within the Pine Creek, City of Chilton, and Stony Brook (South Branch Manitowoc River) subwatersheds, Pipe Creek (Lake Winnebago) sub-watershed, and the Lower Fox River watershed; the North Branch Manitowoc River Watershed land within Becker, Boot, Round, and Grass lake combined watershed; and other lands within 300 feet of a stream or within 1,000 feet of a lake.
- Improve and Protect Soil Quality – Cropland within the Pine Creek, City of Chilton, and Stony Brook (South Branch Manitowoc River) subwatersheds, Pipe

Creek (Lake Winnebago) sub-watershed, and the Lower Fox River watershed; the North Branch Manitowoc River Watershed land within Becker, Boot, Round, and Grass lake combined watershed; and other lands within 300 feet of a stream or within 1,000 feet of a lake.

These critical areas will also be used in the county implementation of performance standards and prohibitions for agricultural runoff in NR 151 and the County Manure Storage and Runoff Management Ordinance. New critical areas may be created as a result of new resource inventories, TMDL’s, or modeling efforts.

6.5 Regulations

Natural resource regulations serve as a guide for land users to follow in their land use activities to protect our land and water resources. The Calumet County LWCC and LWCD prefer to see landowners voluntarily comply with regulations, rather than through enforcement actions. However, if the other tools such as information and education, incentives, and programs and partnerships do not bring about compliance, the LWCC and LWCD will take enforcement actions.

When compliance is required for a permit under a county ordinance, it will be expected that the applicant comply with all ordinance requirements before the permit or license is issued. The following section contains the county, state and local regulations that the LWCC and LWCD will use to implement the goals and objectives of this LWRM Plan and the performance standards and prohibitions for agricultural and other runoff in NR 151.

6.5(a) Existing Ordinances

Calumet County has a variety of ordinances already in place to address certain issues within the county. Some of these ordinances are administered through the LWCD, others through the County Planning and Zoning Office, and others through combined efforts of multiple County departments and County Board Committees.

Table 7: Local Ordinances

Ordinance	Responsible Department	Purpose
Manure Storage and Runoff Management	Land & Water Conservation	Regulates construction, alteration, closure or conversion of manure storage, transfer and treatment. Incorporates NR 151 agricultural performance standards and prohibitions as well as nutrient management plan requirements.

Construction Site Erosion Control and Post-Construction Stormwater Management	Land & Water Conservation	Requires the development and implementation of construction site erosion control and post-construction stormwater management plan using best management practices.
Non-Metallic Mining Reclamation	Land & Water Conservation	Regulates new and existing nonmetallic mines in regard to operation and reclamation under NR 135 – Nonmetallic Mining Reclamation.
Illicit Discharge	Land & Water Conservation	Regulates non-storm water discharges to County road drainage systems.
Private Water Systems – Well Decommissioning	Land & Water Conservation	Requires proper abandonment of all private wells that are not in service or in compliance with State well codes.
Floodplain Zoning	Planning & Zoning	Places prohibitions and restrictions on building and development in flood prone areas.
Land Division	Planning & Zoning	Regulates and manages the division of land in unincorporated areas.
Sanitary Systems	Planning & Zoning	Establishes minimum standards and criteria for the design, installation, operation, inspection, and management of private on-site wastewater treatment systems.
Shoreland Zoning	Planning & Zoning	Establishes shoreland-wetland zones where land use activities are restricted such as building setbacks from high water marks, vegetation removal restrictions, and

		limitations on impervious surfaces.
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6.5(b) Wisconsin Statutes & Administrative Codes

The following regulations are found in state codes and statutes but are administered at the local level by the LWCD.

Table 8: State Statutes and Administrative Codes

Statute or Administrative Code	Purpose
WI State Statute Chapter 91 – Farmland Preservation	Establishes eligibility requirements for the Farmland Preservation Program including meeting soil and water conservation standards.
WI State Statute Chapter 92 – Soil & Water Conservation & Animal Waste Management	Allows creation of and establishes powers of land and water conservation committees and departments. Outlines requirements for development and content of land and water resource management plans, establishes soil and water conservation planning requirements for FPP and procedures and required content for local animal waste and agricultural land use ordinances.
WI State Statute Chapter 281 – Water & Sewage	Requires that agricultural operations and activities comply with certain performance standards and prohibitions and gives DNR & DATCP authority to develop the standards. Establishes conservation practices and standards and cost-share requirements.
WI Administrative Code ATCP 50 – Soil & Water Resource Management	Establishes conservation practices, cost-sharing requirements, requirements for County soil and water programs, cost-share grants, soil and water professionals and local ordinances. Content and development process for land and water resource management plans is also described.
WI Administrative Code NR 102 – Water Quality Standards for Wisconsin Surface Waters	Contains specific water quality standards for Wisconsin streams and lakes including general standards and numerical standards for total phosphorus.
WI Administrative Code NR 151 – Runoff Management	Contains the performance standards and prohibitions for control of agricultural runoff, procedures for noncompliance

	<p>notifications, cost-share offers, and enforcement actions. Also contains performance standards for nonagricultural and transportation runoff related to construction site erosion and post construction stormwater.</p>
<p>WI Administrative Code NR 216 – Stormwater Discharge Permits</p>	<p>Outlines the requirements for stormwater permits for construction sites, industrial facilities, and units of government. Outlines components of the comprehensive erosion control and stormwater program for permitted governments.</p>
<p>WI Administrative Code NR 135 – Nonmetallic Mining Reclamation</p>	<p>Requires permitting, standards and oversight guidance for the required reclamation of nonmetallic mines</p>
<p>Wisconsin Administrative Code NR 243 – Animal Feeding Operations</p>	<p>Contains performance standards and prohibitions for livestock operations with over 1,000 animal units and the requirement of those operations to obtain a WPDES permit from the DNR.</p>
<p>Wisconsin Administrative Code NR 812 – Well Construction & Pump Installation</p>	<p>Prescribes the materials and construction techniques for well construction, reconstruction and pump installation. Also contains required setbacks from different features. Also includes materials and procedures for proper well abandonment.</p>

6.6 Programs, Plans, and Partnerships

Programs play a significant role in convincing land users to install conservation practices to voluntarily to meet LWRM Plan goals and objectives and to comply with the performance standards and prohibitions in NR 151 and County ordinances. Programs often provide incentives for practice installation, which can pay some or the entire cost for installation.

Partnerships are important in that they can supplement limited local resources for advancing the goals and objectives of the LWRM Plan. Partnerships can also help partnering agencies and departments to accomplish their own goals and objectives.

The LWCC and LWCD intend to use the following programs, plans, and partnerships to further the goals and objectives of this LWRM plan and to gain compliance with performance standards and prohibitions for agricultural, nonagricultural, and transportation related runoff in NR 151 and County ordinances. The LWCD will also use newly developed partnerships and programs as they become available.

Table 9: Programs

Program	Purpose
Calumet County Well Water Testing Program	In cooperation with UW – Stevens Point, LWCD coordinates a self-sampling program for county well owners. LWCD provides instruction, water sampling procedures and assistance with test result interpretation. Yearly group sampling events are carried out in partnership with town governments. LWCD also assists the Health and Human Services department with the infant sampling program and provided follow up with poor test results. LWCD tracks and maps all test results in GIS based database.
Conservation Cooperator of the Year Award	Award given each year to a person or group that they feel has done an outstanding job in implementing conservation on their land and a demonstrated conservation ethic.
Conservation Reserve Enhancement Program (CREP)	A joint federal and state program that provides annual rental payments up to 15 years for establishing vegetative buffer areas adjacent to surface water and sinkholes.

Conservation Reserve Program (CRP)	Federal USDA program providing annual rental payments for taking environmentally sensitive land out of production for 10 to 15 years. Provides cost-sharing incentives and technical assistance for planting and maintenance.
Conservation Stewardship Program (CSP)	Federal USDA program that provides payments to land users to maintain present conservation practices and make new conservation improvements.
Environmental Quality Incentives Program (EQIP)	Federal USDA program that provides financial and technical assistance to farm operators for the installation of various conservation practices to reduce erosion and polluted runoff to surface and ground water.
Farmland Preservation Program (FPP)	Tax incentive program available to farmland owners who keep their land in agricultural production and comply with the soil and water conservation standards.
Great Lakes Restoration Initiative (GLRI)	EPA and other federal agencies, such as NRCS, have make grant funding available to governmental bodies and non-profits to improve the health and ecology of the Great Lakes region.
Invasive Species Grants	DNR grants to local governments for invasive species prevention and control.
Lake Planning and Protection Grants	DNR grants to local governments, lake organizations or non-profits for lake planning activities such as collection and analysis of information, broadening public understanding of lakes, forming lake organizations, and developing lake management plans. Protection grants used to purchase conservation easements, to restore wetlands and shoreland, develop lake protection regulations, and implement lake plans.
Managed Forest Law (MFL)	DNR program providing reduction in property taxes to woodland owners if they enroll their woodland in the program for 25 or 50 years and develop

	and follow a sustainable forestry management plan.
Nutrient Management Farmer Education Grants (NMFE)	Wisconsin DATCP grants used to teach farmers, manure haulers, and crop consultants about nutrient management planning and nutrient applications.
NRCS Demonstration Farm Project Funding	Provides a network for farmers to share information on the effectiveness of conservation systems used to improve water quality, while also providing educational opportunities for the public.
Producer-Led Watershed Protection Grants	Producer-Led grant program that focuses on ways to prevent and reduce runoff from farm fields and that works to increase farm participation in voluntary efforts.
Notice of Discharge Grants	DNR cost-share grants to help owners and operators of livestock operations meet pollution control requirements. Provides a portion of the installation costs for best management practices to control or reduce pollutant discharge.
Partners for Fish and Wildlife Program	US Fish and Wildlife program to provide cost-sharing and/or assistance to landowners to restore wetlands, grasslands, and threatened and endangered species.
River Planning and Protection Grants	DNR planning grants to collect and analyze information needed to manage rivers. Projects may include the broadening of public understanding, forming river organizations, and developing river management plans. Protection grants to purchase conservation easements, restore wetlands or shoreland, develop river protection regulations and implement river plans.
Soil and Water Resource Management Staffing Grants	DATCP grant that provides funds to LWCDs to support staffing and cost-sharing of conservation practices.
Targeted Runoff Management Grants	DNR grants used to cost-share conservation practices for controlling

	polluted runoff from urban and agricultural sources.
USDA – NRCS Contribution Agreements	Provides funding to county land and water conservation departments for delivery of technical services to farmers participating in USDA programs.
Urban Nonpoint Source & Stormwater Management Grants	DNR grants used for storm water management planning or for construction of required storm water management infrastructure.
Water Quality Trading Program	A program that can be used by point source WPDES permit holders to demonstrate compliance with water quality based effluent limitations. Generally involves a point source compensating another party to achieve a less costly pollutant reduction with the same or greater water quality benefit.
Multi-Discharger Variance Program	Extends the timeline for point sources to comply with low-level phosphorus limits. Point sources commit step-wise reductions of phosphorus as well as help address nonpoint sources of phosphorus from farm fields, cities and natural areas.
Agricultural Conservation Easement Program (ACEP) – Wetland Reserve	USDA program providing 30 year or perpetual easement and cost-share for restoring wetlands previously altered for cropland.
Wellhead and Source Water Protection Program	State sponsored program to prevent contaminants from entering public water supply wells and surface water sources. Delineates wellhead and source water protection areas, inventory of potential contamination sources and lists actions to be taken to protect wells and source waters from contamination.
Wildlife Damage Abatement and Claims Program	Provides damage prevention and assistance and partial compensation to farmers when wild deer, elk, bear, geese and turkeys damage their agricultural crops.
Wisconsin Forest Landowner Grant Program (WFLGP)	DNR program that provides cost share funds of up to 50% of costs to prepare

	management plans and installation of necessary conservation practices identified in their plans.
Wisconsin Pollution Discharge Elimination System (WPDES) Permit Program	DNR program that requires livestock operations of over 1,000 animal units to obtain a permit to operate. Requires certain performance standards and prohibitions to prevent pollutant discharges to waters of the state.

Table 10: Plans

Plan	Purpose
Calumet County All Hazards Mitigation Plan	Identifies natural hazards such as flooding, severe thunderstorms, and winter storms and outlines a planned set of actions designed to reduce long term risks to people and property from the effects of those hazards. Includes risks of groundwater and surface water contamination from polluted runoff during torrential rains and flooding, and outlines planned actions by County government and the LWCD to minimize those risks.
Calumet County Smart Year 2025 Smart Growth Plan	Adopted in 2007 this comprehensive plan is Calumet County's guide to community physical, social, and economic development. Includes information on Agricultural, Natural, and Cultural Resources.
Lower Fox River Basin and Lower Green Bay TMDL Report	Establishes current pollutant loading entering waterways in the Lower Fox Basin and reductions needed from specific sources to meet water quality standards.
Plum & Kankapot Nonpoint Source Implementation Plan	Establishes an inventory of resources in the Plum and Kankapot creeks subwatershed in the Lower Fox Basin and sets a nonpoint source implementation plan.
Upper East River Nonpoint Source Implementation Plan	Establishes and inventory of resources in the Upper East River subwatershed in the

	Lower Fox Basin and sets a nonpoint source implementation plan.
Upper Fox/Wolf TMDL Report	Establishes current pollutant loading entering waterways in the Upper Fox and Wolf Basin and reductions needed from specific sources to meet water quality standards. Not approved at this time, to be approved in 2019.
North Branch Manitowoc River Nonpoint Source Implementation Plan	Establishes an inventory of resources in the North Branch subwatershed in the Lakeshore Basin and sets a nonpoint source implementation plan. In development stage. Completion and approval expected in 2019.
Final Report of the Upper Manitowoc River Watershed Taskforce	Establishes recommendations addressing long-term stormwater and flooding issues in the Upper Manitowoc River Watershed region including portions of the North and South Branch Manitowoc River watersheds in northeastern Calumet County and west central Manitowoc County.

Table 11: Partners

Partner	Description
Animal and Plant Health Inspection Service (APHIS)	USDA agency which administers the Wildlife Damage Abatement and Claims program for Calumet County.
Calumet County Groundwater Guardians	Volunteer citizen group that was formed in 2003 to help county government raise public awareness on the groundwater resource and on ways to improve and protect the resource. Helps with groundwater related educational materials and activities, including displays at local events, group well water sampling days and public presentations
Chilton Millpond Lake District	The Chilton Millpond Lake district boundaries are completely within the City of Chilton. The LWCD is assisting the Lake District in implementing the strategic plan by providing education, technical services, and incentives for the installation of conservation practices by land users within the Millpond watershed.
Glacierland Resource Conservation and Development (RC & D)	For a nine county area, RC&D is a rural development program focusing on the conservation, development, and utilization of area natural resources to improve the standard of living. It partners with individuals, agencies, and groups to improve the social, economic, and environmental opportunities of the local area.
Lake Organizations	There are several types of lake organizations with varying degrees of organization and powers including lake associations and lake districts. All lake organizations can raise funds, work with units of government, have educational programs, and conduct lake management activities. Certain types are also eligible for DNR Lake Planning Grants and Lake Protection Grants.

Lakeshore Natural Resources Partnership (LNRP)	This private, nonprofit organization uses education and coordination to support local community efforts to maintain or improve the health of land and water resources. It does this by fostering partnerships, providing grant funding, promoting discussion forums, and supporting activities that advocate a balance between land use and natural resource conservation.
Fox/Wolf Watershed Alliance (FWWA)	An independent nonprofit organization that identifies issues and advocates effective policies and actions that protect, restore, and sustain water resources in the Fox-Wolf River Basin. LWCD has utilized grants applied for by FWWA to add targeted staff and provide cost-share to landowners. FWWA has also taken the lead on the Winnebago Waterways Program.
Northeast Wisconsin Stormwater Consortium (NEWSC)	An alliance of local and county governments and environmental consultants from northeast Wisconsin formed to assist members in implementing construction site erosion control and storm water management programs mandated by state and federal rules.
USDA Local Workgroup	A committee of local producers, USDA, UWEX, and LWCD staff and LWCC members that prioritizes resource concerns within the county for EQIP.
USDA – Natural Resources Conservation Service (NRCS)	The LWCD has an operational agreement with USDA-NRCS to cooperatively provide education and technical expertise to Calumet County residents for local, state, and federal programs. The purpose of the agreement is to share staff expertise and field equipment to service land users, regardless of program enrollment.
USDA – Farm Service Agency (FSA)	Federal Agency that serves farmers, ranchers, and agricultural partners through the delivery of agricultural

	programs including conservation programs such as the Conservation reserve Program.
University of Wisconsin Extension (UWEX)	Assists LWCD with educational content delivery that can include various topics such as agricultural conservation information and groundwater education.
Wisconsin Department of Natural Resources (WI DNR)	Wisconsin's lead agency on environmental, recreational and wildlife resources.
WI Land & Water	This non-profit association of land and water conservation committees and employees assists their members to deliver land and water conservation services throughout Wisconsin. The association works with state and federal agencies to provide technical assistance, recommendations, and financial support for land and water conservation activities. It also collectively represents common interests of land and water conservation committees and department and communicates those interests to federal and state agency officials and policy makers. The association sponsors conferences, workshops, and training opportunities for its members.

6.7 Conclusion

Utilizing a wide variety of tools and strategies identified in this section will assist the LWCD and county residents in achieving the goals and objectives of this LWRM plan. While not every tool or strategy will be used to achieve each goal and objective, their use should help land users adopt many of the necessary conservation practices.

SECTION 7: MONITORING AND EVALUATION

The LWCD will annually monitor progress in achievement of the goals and objectives of this LWRM plan. The condition of land and water resources within Calumet County should improve as progress is made in achieving the goals and objectives. During the monitoring process, the LWCD will also evaluate the effectiveness of the implementation strategies in this plan to accomplish the goals and objectives contained within it and make needed changes to increase their effectiveness.

7.1 Monitoring

A variety of methods can be used to monitor the progress of meeting the goals and objectives of this plan. Monitoring various activities will help with the evaluation of meeting the goals and objectives.

7.1(a) Progress Reports

In March of each year, the LWCD completes and submits progress reporting forms to DATCP on land and water resource management activities completed in the prior year. Most recent reported activities include:

- Practices installed including the estimated pollutant load reductions under the categories of:
 - Cropland/Soil Health/Nutrient Management
 - Livestock Facilities
 - Water Quality/Quantity
 - Wetlands/Wildlife/Habitat
 - Forestry
- Whether benchmarks in our annual workplan have been met and reasons, if not
- Activities in regard to invasive species
- Watershed strategies utilized
- Types and numbers of permits issued through the department
- Number of inspections for Farmland Preservation Program or NR 151 compliance
- Estimated amount of funding used and the funding source for conservation practices as well as staff funding levels and sources
- Types and number of outreach and education activities and estimated number of people reached

The LWCD intends to use the activities reported on these progress forms to track quantitative progress towards accomplishing the goals and objectives of the plan.

7.1(b) Workplan Outcomes

For each goal and objective in this plan, there are actions and expected outcomes listed in the workplan (See **Appendix F**). The majority of expected outcomes have a quantitative value attached to them, such as number reviews completed per year or acres of plans developed per year. The LWCD will track quantities of completed outcomes on an annual basis. This data will be used to track progress towards accomplishing the goals and objectives of this plan. Comparing expected and completed outcome quantities will assist in evaluating whether goals and objectives can be accomplished in a timely manner using the implementation strategies of the plan. The workplan and expected outcomes are contained in **Appendix F**.

7.1(c) Implementation of Nutrient Management Planning

Additional methods are used by the LWCD to track the implementation of nutrient management planning, both to accomplish the goals and objectives of the plan and to track compliance with the nutrient management performance standards. Cropland acres under nutrient management plans are mapped using the county's computerized GIS mapping system. The maps are used to evaluate progress in implementing nutrient management in the county and in critical areas and to target education, incentives, and regulatory actions to non-complying landowners. GIS is also used for tracking implementation of other conservation practices and compliance with other performance standards.

7.1(d) Farmland Preservation Program Compliance Monitoring

The LWCD is responsible for monitoring compliance with the conservation standards found in ATCP 50.04 for landowners that wish to participate and are in properly zoned areas of the County. LWCD utilizes farmstead and cropland field visits as well as aerial photography interpretation to determine compliance with the standards. Compliance documentation on each of the property owners are recorded on forms and kept in files at the LWCD. Certificates of Compliance are generated in an online application which was purchased from Transcendent Technologies and locations of participant's parcels can be mapped in GIS. As indicated above nutrient management plans are tracked county-wide in GIS and this system is also used to confirm compliance with that component of compliance. LWCD intends on reviewing 50 or more participants per year to stay on track with ensuring participant's compliance on a 4 year rotation.

7.1(e) Erosion Rate Monitoring

To attempt to measure trends and improvement in soil loss rates from cropland, the LWCD will use modeling data, surveys, and maps from outside sources as they become available. The LWCD has and will continue to use nutrient management plans to evaluate areas of the County that show the highest levels of soil erosion. A long term decrease in estimated erosion rates and sediment delivery, or an increase in the use of reduced tillage, would indicate that progress is being made to reduce soil erosion.

To estimate location and acres of cropland which are at or below tolerable soil loss rates, the LWCD will continue to track and map cropland with nutrient management plans that comply with USDA – Technical Standard 590, Nutrient Management. In order to comply with this standard, the cropland must be managed so that it is at or below tolerable soil loss rates. An increase in cropland acres under nutrient management plans should indicate that more land is managed in a way that controls soil erosion to acceptable levels.

7.1(f) Groundwater Monitoring

General trends in groundwater quality and critical areas with poor groundwater quality can be determined through the county well testing program. The LWCD holds group testing events for 2-3 specific townships as well as others interested in participating each year. For these events, participants are given water sampling kits and instructions on how to take a water sample. They then sample their water on a given day and the samples are sent to a certified lab. Participants and the LWCD receive the testing results. The sampling kits are also available through the LWCD at any time for county residents who wish to sample and test their well water.

Annually, over 200 residents test their well water for nitrates and bacteria through this sampling and testing program. Many also have their water tested for metals, such as arsenic, and pesticides, such as triazine herbicide residues. Testing results are entered into and mapped using GIS. The resulting maps are analyzed on a continual basis to identify critical areas for targeting conservation efforts and to assess changes and trends in groundwater quality due to implementation of conservation practices and well improvements. Additional data is collected and entered into GIS from other private well sampling efforts, including the County Infant Testing Program and the County Land Division Ordinance.

7.1(g) Modeling of Pollutant and Sediment Delivery to Surface Waters

The DNR has developed TMDLs for portions of Calumet County. TMDLs consider all sources of pollution to an impaired waterbody and set target pollutant loads that need to be met in order to meet water quality standards. The TMDL is then established by allocating the allowable load from point sources and nonpoint sources. Load reductions are then determined and high loading watersheds are defined and targeted. The Lower Fox River (Plum/Kankapot Creek, East River & Garners Creek) has had an approved TMDL since 2012. The Upper Fox/Wolf TMDL is in the final stages of development and approval, and preliminary work has begun on TMDL development for the Lakeshore Basin.

In the past year the LWCD has begun the use of the Spreadsheet Tool for Estimating Pollutant Load (STEPL) to calculate nutrient and sediment loads from different land uses and the load reductions that would result from the implementation of various best

management practices. STEPL and EVAAL have been integral planning tools in the development of EPA 9 key element watershed plans. In addition LWCD staff has been utilizing STEPL to model pollutant load reductions gained from BMPs that have been installed.

7.1(h) Surface Water Quality Testing

The LWCD has promoted and will continue to promote the use of citizen volunteers to conduct water quality sampling and testing programs for lakes and streams within the County. Examples of such programs include the UW – Extension Water Action Volunteers (WAV) program and DNR Citizen Lake Monitoring Network (CLMN). It is the intention of the LWCD to continue these partnerships and to encourage other volunteers and school groups to assist with monitoring water quality in lakes and streams. The LWCD will also seek grant funding to assist with these efforts.

DNR also maintains a webpage with water quality testing data from volunteer groups and resource professionals, the Surface Water Integrated Monitoring System (SWIMS). The LWCD has access to this web page and will periodically review water quality monitoring data from it and use the data to analyze trends in water quality within the County and progress towards goals within this Plan.

7.2 Evaluation

Data collected through the various monitoring methods listed in this section can be analyzed to determine how effective the goals and objectives of the LWRM plan are and where improvements need to be made. Short-term and long-term evaluation processes are essential to understanding whether or not the goals and objectives are being met and are having a positive impact. With each reporting year and the completion of projects, evaluation of the data as well as the goals, objectives, workplan activities, and expected outcomes will occur. This evaluation process will allow for changes to the workplan as necessary.

7.3 Conclusion

A LWRM plan is a living document that evolves and changes with time. It is designed to act as a guide for land and water resource conservation within a county for a 10 year period. However, as new resource concerns, regulations, technologies, and tools emerge; goals, strategies, and priorities need to change. Evaluation of progress in implementing the plan may also result in needed changes. These changes will be reflected in annual updates, as needed, of the LWCD work plan contained in the **Appendix F** of this document. Copies of updated work plans will be available for review at the LWCD office and will be forwarded to DNR and DATCP.

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APPENDIX A: 2012 – 2019 Plan Accomplishments Summary

- Table Summaries of Technical and Financial Assistance to landowners/producers from various programs

DATCP-SWRM SEG Nutrient Management Cost Share Summary 2012 – 2018

Year	Acreage	Cost-Share Dollars
2012	690.9	\$19,345.20
2013	1,215.2	\$34,025.60
2014	1,525.7	\$42,719.60
2015	2,689.3	\$75,300.40
2016	2993.1	\$83,806.80
2017	872.6	\$24,432.80
2018	1,670.5	\$66,820.00
Total	11,657.3	\$346,450.40

**WI Nutrient Management Update indicate Calumet Counties percentage of cropland in NMPs increased from 56% to 75% over the plan period.

DATCP-SWRM Bond Cost-Share Summary 2012-2018

2012

Practice	Amount	Cost-Share
Waste Transfer	Piston Pump, 160 ft. PVC	\$9,657.50
Waste Storage	Earthen, 972,026 gal.	\$18,802.47
Milking Center Waste Control	1	\$3,528.67
Barnyard Runoff Control	1	\$10,335.37
Waste Storage Closure	580,029 gal.	\$13,650.00
Total		\$55,974.01

2013

Practice	Amount	Cost-Share
Waste Storage Closure	201,496 gal.	\$8050.00

2014

Practice	Amount	Cost-Share
Well Abandonment	Dug, 10 ft.	\$483.00
Waste Storage	82,130 gal.	\$31,707.50
Lined Waterway	255 Lin ft.	\$7,884.81
Grassed Waterway	1472 Lin ft.	\$4,491.19
Total		\$44,566.50

2015

Practice	Amount	Cost-Share
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Grassed Waterway	912 Lin ft.	\$10,692.79
Diversion, Grassed Waterway	1720 Lin ft.	\$32,055.03
Lined Waterway	358 Lin ft.	\$4,543.13
Barnyard Runoff	1	\$12,967.05
Shoreline Stabilization	74 Lin ft.	\$4,295.00
Grassed Waterway	700 Lin ft.	\$6,066.14
Well Abandonment	Drilled, 85 ft.	\$462.00
Total		\$71,081.14

2016

Practice	Amount	Cost-Share
Waste Storage Closure	923,627 gal.	\$5,600.00
Well Abandonment (2)	Dug, both 30ft. depth (60 ft.)	\$356.47
Barnyard Runoff	1	\$2,602.95
Waste Storage Closure	534,439 gal.	\$13,125.00
Barnyard Runoff	1	\$3,546.20
Total		\$25,230.62

2017

Practice	Amount	Cost-Share
Waste Storage Closure	2,102,228 gal.	\$20,900.25
Well Abandonment	Drilled, 34 ft.	\$1,001.69
Well Abandonment	Drilled, 115 ft.	\$547.40
Well Abandonment	Drilled, 637 ft.	\$2,229.15
Total		\$24,678.49

2018

Practice	Amount	Cost-Share
Streambank Stabilization	117 Lin ft.	\$1,933.44
Grassed Waterway	1306 Lin ft.	\$8,380.25
Water and Sediment Control Basin - 2	9.3 ac. treated	\$20,793.81
Grassed Waterway	615 Lin ft.	\$6,853.28
Well Abandonment	Dug/driven point 30 ft.	\$668.50
Total		\$38,629.28

Total DATCP-SWRM Bond Funding Utilized for Projects = \$268,210.04

Small Scale DNR Targeted Runoff Management Grant Funded Projects 2012 – 2018

2012

Practice	Amount	Cost-Share
Waste Storage	Concrete, 4,115,760 gal.	\$150,000.00

2015

Practice	Amount	Cost-Share
Waste Storage	Concrete, 3,000,000 gal.	\$150,000.00
Barnyard Roof	31,365 sq. ft.	\$150,000.00
Total		\$300,000.00

2017

Practice	Amount	Cost-Share
Waste Storage	5,000,000 gal.	\$150,000.00

2018

Practice	Amount	Cost-Share
Milking Center Waste Control	444 Lin Ft. PVC	\$5,815.02
Waste Storage	Concrete, 2,121,940 gal.	\$7,790.98
Total		\$13,606.00

Total Small Scale TRM Grant Funding Utilized for Projects = \$613,606.00

Large Scale Targeted Runoff Management – Plum & Kankapot Watershed (Outagamie County Grant, Calumet Technical Assistance)

2017

Practice	Amount	Cost-Share
Stream Crossing	1	\$441.00
Grassed Waterway	1000 Lin ft.	\$4,285.95
Water and Sediment Control Basin, Grassed Waterway	5 ac. Treated WASCOD, 1572 Lin ft. WW	\$10,392.00
Water & Sediment Control Basin, Diversion, Grassed Waterway	2 ac. Treated WASCOD, 860 Lin ft. Diversion, 121 Lin ft. WW	\$7,727.10
Grassed Waterway	588 Lin ft.	\$1,449.00
Water & Sediment Control Basin	4.8 ac. treated	\$2,839.32
Grassed Waterway	713 Lin ft.	\$2,894.21
Total		\$30,028.58

2018

Practice	Amount	Cost-Share
Stream Crossing	1	\$1,445.00
Grassed Waterway	1180 Lin ft.	\$3,717.85
Streambank Stabilization	887 Lin ft.	\$19,966.42
Total		\$25,129.27

Great Lakes Restoration Initiative – Plum & Kankapot Watershed (Outagamie and Calumet County Grants via Fox/Wolf Watershed Alliance) 2016 - 2018

Practice	Amount	Cost-Share
Streambank Stabilization	700 Lin ft.	\$5,760.00
Streambank Stabilization	1525 Lin ft.	\$5,760.00
Streambank Stabilization	3730 Lin ft.	\$28,314.25
Total		\$39,834.25

Total Cost-Sharing Provided – All County Associated Programs = \$1,313,258.54

USDA-NRCS Practices and Cost-Share in Calumet County (EQIP & CSP) 2012-2018

Practice	Amount Reported	Cost-Share
Waste Storage Facility	17	\$1,456,533.68
Waste Transfer	16	\$296,786.96
Waste Treatment	8	\$654,791.93
Nutrient Management	5404.1 ac.	\$90719.14
Comprehensive Nutrient Management Plans	13	\$95,444.94
Conservation Cover	12.6 ac.	\$9,498.59
Residue & Tillage Management	902.2 ac.	\$11,830.36
Cover Crops	5501.9	\$317,332.89
Diversion	2066.0 Lin Ft.	\$4,423.73
Lined Waterway	2,735.0 Lin Ft.	\$47,907.79
Grassed Waterway	72.7 ac.	\$101,452.90
Total Cost-Share		\$3,086,722.91

Total 2012 – 2018 Funding for Conservation Practices in Calumet County

Program	Cost-Share Dollars
DATCP SWRM - SEG	\$346,450.40
DATCP SWRM - BOND	\$268,210.04

Small Scale Targeted Runoff Management	\$613.606.00
Large Scale Targeted Runoff Management (Plum & Kankapot) Outagamie County Grant	\$55,157.85
Great Lakes Restoration Initiative (Plum & Kankapot) Calumet, Outagamie, FWWA	\$39,834.25
USDA/NRCS	\$3,086,722.91
Total	\$4,409,981.45

APPENDIX B: Local Advisory Committee

- Members of the Citizen Advisory Committee (CAC)
- Citizen Advisory Committee Summary of Resource Concerns and Rankings

LWRM PLAN CITIZEN ADVISORY COMMITTEE MEMBERS

Members represented four general categories: Government Representative, Educational Representative, Citizen/Farmer Representative, DNR Representative and Agronomic Representative. CAC Meetings were held on December 4, 2018 and January 16, 2019. Participants were asked to review and prioritize resource concerns that can be found in the County. Results from their input can be found below. Participants were also asked to provide input on specific topics on the Goals and Objectives of this Plan found in Section 5.

Government Representatives

Mike Hofberger	County Board Supervisor and LWCC Chair
Anthony Reali	County Conservationist
Matt Payette	Director, Planning & Zoning
Joe Smedberg	District Conservationist, NRCS

Educational Representative

Amber O'Brien	Agricultural Educator, UWEX, County Resident
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Citizen/Farmer Representatives

Corey Schmidt	Farmer, Town of Woodville Supervisor
Nick Vande Hey	County Landowner, Water Resource Engineer
Lyle Ott	Farmer/Landowner, Town of Brillion
Willie Geiser	Farmer, Town of Charlestown Chair
Nick Dallman	Farmer, Town of Rantoul
Adam Faust	Farmer, Calumet County Forage Council
Joe Hanke	Farmer, Town of Brothertown
Joe Brantmeier	Farmer, Village of Sherwood

DNR Representatives

Erin Carviou	Nonpoint Source Coordinator
Danielle Block	Agricultural Runoff Management Specialist

Agronomic Representatives

Kristen Birschbach	Kapral Agronomy
Jeremy Hanson	CCA, Fox Valley Technical College

During roundtable discussion of the Goals and Objectives the following specific topics were discussed:

Ensuring proper protocol for well tests	Education to the non-farm public
Brown water events	Tillage practices now a strength
Pesticide use-impact on pollinators	Farmer led group need
Soil health initiative need	Too much tillage still happening
Extreme weather events	Runoff from roads
Urban stormwater & population growth	Wildlife habitat loss – ditch cutting
Need for accurate karst mapping	Manure management
ROW Management	Education
Farm economics	Well contamination
Sewage spreading	Soil health – soil infiltration
Drainage – marshes not draining	Internal loading in lakes
Value of properly handled manure	Less alfalfa = more erosion

Resource Concerns and Rankings Identified by the Citizen Advisory Committee

Groundwater Related		Surface Water (Lakes, Rivers, Streams)	
Nitrates in Groundwater	9	Farm Runoff to Surface Water (Lakes)	9
Shallow Soils over Bedrock or Groundwater	8	Farm Runoff to Surface Water (Rivers/Streams)	8
Liquid Manure Contamination of Groundwater	8	Nutrient Runoff	7
Karst/Sinkhole Mapping	7	Lack of buffers - Lakes	5
Old Wells (Abandonment need)	5	Residential Runoff to Rivers	5
Residential Contam. Groundwater	5	Residential Runoff to Lakes	4
Well testing need	5	Bank erosion on Lakes	4
Education on Groundwater	5	Lack of Buffers Streams	4
Industrial Contamination of Groundwater	4	Bank Erosion in Rivers/Streams	3
Septic Contamination of Groundwater	4		
Septage Spreading - Groundwater	3		
Mining Activities - Groundwater	2		
Brown water Events - Groundwater	2		
Pesticide Use - Groundwater	2		
Herbicide Use	1		
High Capacity Wells	1		
Clean Drinking Water	1		
Well testing protocol education	1		
Total	73	Total	49

Woodland/Wetland/Wildlife

Invasive Species in Woodland	6
Loss/Draining wetlands	5
Bee keepers/Pollinator need	5
Invasive Species in wetlands	4
Wildlife Damage - Wetlands	4
Bees/Pollinators Habitat	4
Wildlife Damage	3
Hunters/Trappers needed	3
Hydrology Changes - Wetlands	2
Pests-Emerald Ashborer	1
ROW Management	1
Small bird habitat	1
Trees dying at young age	1

Total	40
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Soils Related

Too much tillage	6
Gully Erosion	6
Soil Drainage	6
Sheet Erosion	5
Cover Crops Need	5
Fenceline Removal	5
Wind Erosion	2
Soil Structure	2
Construction Site Erosion	1
Clay loam - permeability issue	1

Total	39
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Air Quality

Burning Waste - Air Quality	4
Manufacturing/Industry-Air Quality	2
Wood Burning - Air Quality	1

Total	7
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Roads/Mining/Transportation

Road Conditions	3
Mining Concerns/Opportunities	1
Transportation	1

Total	5
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Ag Education

Economics	5
Ag education to the general public	1
Need for farmer led groups	1

Total	7
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Other

P Release from broken down plants	1
Addressing all types of manure (solid/Liquid)	1

Total	2
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APPENDIX C: Public Involvement

- Class 2 Public Notice Announcement for LWRM Plan Public Hearing
- Public Hearing Agenda
- Public Hearing Minutes

PUBLIC HEARING NOTICE

CALUMET COUNTY LAND & WATER CONSERVATION COMMITTEE

The Calumet County Land & Water Conservation Committee will hold a public hearing beginning at 1:00 p.m. on April 24, 2019 in Conference Room 015 of the Calumet County Courthouse. Use Courthouse Entrance B and follow the signs.

Individuals interested in the following issues are encouraged to attend and/or submit their oral and/or written testimony prior to the hearing to the Calumet County Land & Water Conservation Department, 206 Court Street, Chilton, WI 53014, (920) 849-1442 or 989-2700.

PURPOSE OF THE HEARING

Calumet County residents are invited to review and comment on the DRAFT Calumet County Land & Water Resource Management Plan. The plan includes a summary of the land and water resources of the county, applicable standards and prohibitions, goals and objectives of the plan, tools and strategies to meet the goals and objectives and how progress will be monitored and evaluated. To view the plan, visit the Land & Water Conservation Department website at <http://www.co.calumet.wi.us/index.aspx?nid=186> or in Room 227 of the Courthouse in Chilton, 8:00 a.m. – 4:30 p.m. weekdays. Comments may be submitted in person, by telephone at (920) 849-1442, by mail to Calumet County LWCD, 206 Court St, Chilton, WI 53014, or by email to Anthony.Reali@calumetcounty.org.

DECISION

The Committee will make their decision in open session providing all appropriate information is available.

Respectfully submitted:

Michael Hofberger, Chair
Land & Water Conservation Committee

“Any person wishing to attend who, because of a disability, requires special accommodations should contact the Land & Water Conservation Department at (920) 849-1442 at least 24 hours before the scheduled meeting time so appropriate arrangements can be made.”

**CALUMET COUNTY
LAND AND WATER CONSERVATION COMMITTEE
AGENDA**

Date: April 24, 2019
Time: 1:00 pm
Place: Room 015 Courthouse

Agenda:

1. Meeting Announcement and Posting
2. Roll Call
3. Pledge of Allegiance
4. Approval of Agenda
5. Convene Meeting and Enter Public Hearing
 - Calumet County 2020-2029 Land and Water Resource Management Plan
 - Staff Presentation
 - Public Testimony
6. Close Public Hearing
7. Committee Discussion and Action
 - Committee will discuss and may take action on recommended changes to the plan.
8. Adjourn

So as not to disturb the meeting, all cell phones must be placed on vibrate and all calls taken outside the meeting room.
Any person wishing to attend who, because of a disability, requires a special accommodation, should contact the Land & Water Conservation Department at (920)849-1442 at least 24 hours before the scheduled meeting time so appropriate arrangements can be made.
This is a public meeting. As such, all members or a majority of the members of the County Board may be in attendance. While a majority of the County Board members or the majority of any given County Board Committee may be present, only the above committee will take official action based on the above agenda.



**CALUMET COUNTY
LAND AND WATER CONSERVATION COMMITTEE
LAND & WATER RESOURCE MANAGEMENT PLAN PUBLIC HEARING
April 24, 2019
THESE MINUTES HAVE BEEN APPROVED**

1. Meeting Announcement and Posting

The meeting was properly announced and posted. Chair Hofberger called the meeting to order at 1:00 p.m.

2. Roll Call

Committee Members Present: Hofberger, Laughrin, Hartl, Shiplett

Committee Members Excused: LaShay, Gentz

Staff Members Present for All or Part of the Meeting: Reali, Santry

Others present: City of Chilton Resident Mark Buelke, Town of Stockbridge Chair Ken Schaefer, Town of Charlestown Chair Wilmer Geiser

3. Pledge of Allegiance

The Pledge of Allegiance was recited by all.

4. Approval of Agenda

Motion by Shiplett and second by Hartl to approve the agenda. Motion carried unanimously.

5. Convene Meeting and Enter Public Hearing

Motion by Hartl and second by Laughrin to enter Public Hearing. Motion Carried Unanimously. Committee entered Public Hearing at 1:05.

• **Calumet County 2020-2029 Land and Water Resource Management Plan**

○ Staff Presentation

Reali gave a presentation of the Land and Water Resource Management Plan providing an overview of each of the sections.

○ Public Testimony

- Mark Buelke, resident of the City of Chilton, suggested adding more benchmarks to the Goals & Objectives in regard to soil erosion rates and groundwater quality.
- Ken Schaefer, Town of Stockbridge Chair, expressed concern in regard to the increased severity of rain events and the amount of erosion that these rain events cause in the watershed of Lake Winnebago.
- Wilmer Geiser, Town of Charlestown Chair, expressed concerns in regard to the need to exceed technical standards for cropland practices due to the increased severity of storm events and the costs and loss of cropland that could come with exceeding technical standards.



6. Close Public Hearing

Motion by Hartl and second by Shiplett to close the public hearing. Motion carried unanimously. Public Hearing closed at 2:11.

7. Committee Discussion and Action

- **Committee will discuss and may take action on recommended changes to the plan**

Reali discussed with the committee the comments received from the public and comments received from DATCP and DNR. Comments other than wordage changes were as follows:

- Public comment in regard to the issue of flooding of woodlands and the loss of trees. Reali recommended adding this issue to Section 3.7 Woodland Resources under issues of concern related to woodlands in Calumet County.
- DATCP commented that there should be some information on the process that the County uses to monitor Farmland Preservation Program compliance included in the plan. Reali presented language that will be inserted into Section 7.1 (d) to meet this requirement.
- DNR commented on the soil erosion rates study in Section 3.3 (d) in regard to clarification on how study was conducted and what determinations can be made from the study. Reali recommended that staff add information on how the study was conducted and why one watershed had higher rates of erosion.
- DNR commented on the need to do an analysis of confirmed NR 151 compliance in each of the HUC 12s. Reali indicated that due to the time remaining before the final draft needs to be submitted that it would be difficult to produce this. This component is not part of the requirements listed on the LWRMP checklist.
- DNR commented that they should be included in the list of partners in Table 11. Reali indicated that they have been added.

Motion by Hartl and second by Laughrin to accept the proposed changes and add them to the plan. Motion carried unanimously.

Motion by Hartl and second by Laughrin to approve and forward the plan with the approved changes to DATCP and the Land & Water Conservation Board for review. Motion carried unanimously.

8. Adjourn

Hofberger adjourned the meeting. Meeting adjourned at 2:28 p.m.

Respectfully submitted
Anthony Reali, Recording Secretary

APPENDIX D: Conservation Practices

- Conservation Practices for Agriculture
- Conservation Practices for Construction Sites & Urban Areas

CONSERVATION PRACTICES FOR AGRICULTURE

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

CONSERVATION PRACTICES FOR CONSTRUCTION SITES AND URBAN AREAS

EROSION AND SEDIMENT CONTROL PRACTICES	PRACTICE NUMBER
Channel Erosion Mat	1053
Construction Site Diversion	1066
Ditch Checks	1062
Dust Control	1068
Land Application of Additives for Erosion Control	1050
Mulching for Construction Sites	1058
Non-channel Erosion Mat	1052
Seeding	1059
Trackout Control Practices	1057
Grading Practices for Erosion Control	1067
Vegetative Buffer for Construction Sites	1054
De-watering	1061
Sediment Bale Barrier	1055
Sediment Basin	1064
Sediment Trap	1063
Silt Curtain	1070
Silt Fence	1056
Storm Drain Inlet Protection for Construction Sites	1060
Turbidity Barrier	1069
Water Application of Additives for Sediment Control	1051
Interim Manufactured Perimeter Control and Slope Interruption Products	1071
Rock Rip-Rap	WCS 009

POST-CONSTRUCTION STORM WATER MANAGEMENT	PRACTICE NUMBER
Bioretention for Infiltration	1004
Compost	S100
Infiltration Basin	1003
Infiltration Trench	1007
Permeable Pavement	1008
Proprietary Storm Water Sedimentation Devices	1006
Rain Gardens	1009
Site Evaluation for Stormwater Infiltration	1002
Vegetated swale	1005
Wet Detention Pond	1001
Diversions*	50.70
Roof runoff system*	50.85
Underground outlets*	50.92
Water and sediment control basins*	50.95
Waterway systems*	50.96
Well decommissioning*	50.97
Wetland development or restoration*	50.98

- *ATCP 50 practices that may have applicability on agricultural post-construction sites.

APPENDIX E: NR 151 Implementation Strategy

- NR 151 Implementation Strategy

Implementation Strategy for NR 151 Agricultural Nonpoint Performance Standards and Prohibitions

OVERVIEW

This document sets forth a comprehensive strategy for the implementation of Wisconsin's agricultural performance standards and prohibitions, as defined in NR 151. If implemented consistently on a statewide basis, it will ensure that all landowners and other responsible parties comply with these standards and prohibitions. It will also bring accountability and organization to an otherwise complex and obscure redesigned nonpoint program. This document will evolve as needed as program partners gain more experience with implementing the performance standards and prohibitions.

While a successful agricultural nonpoint program will take the cooperative effort of multiple agencies, the framers of the redesign intended that Land Conservation Committees and Departments would play the lead role in the implementation of agricultural standards and prohibitions, using authorities and funding grants under Chapter 92, Wisconsin State Statutes. Thus, consistent with § 92.10(6)(a)5 and ATCP 50.12(2)(i) wis. Admin. Code, the first component of this framework establishes that in their Land and Water Resource Management Plans, counties identify the strategy they will use locally to implement and ensure compliance with the State's agricultural performance standards and prohibitions.

Preferably, these local strategies will be developed with input from local, state and federal cooperating agencies. Likewise, the resource management and/or work plans of other agencies should be developed with input from the county. This will help ensure everyone's plans are somewhat consistent and complimentary when it comes to implementing the state nonpoint standards. While resource and work plans communicate the activities of their respective agency, they do not always communicate the roles of other participating agencies or how we'll all work together, however. Since clearly defined roles and responsibilities are critical for achieving a successful program, the second component of this framework provides that each participating agency clearly communicate and document their level of commitment towards each of the activities required to implement NR 151.

Components three through eight of the strategy outline the procedural and logistical steps and activities necessary to administer the program. These components are modeled after existing program protocols, including critical sites, animal waste (NR 243) and the Farmland Preservation Program. Components nine and ten represent the final requirements of a well-organized program, and include ongoing monitoring and reporting.

As a precursory step to blanket implementation of this strategy, the DNR will conduct surveys of counties and other partner agencies to determine what each will commit to the NR 151 workload. The survey will list the components of the strategy in a format that allows each agency to indicate which of the activities they will help accomplish by way of staff time and financial resources. The DNR will use information gathered from the surveys to subsequently develop internal workload plans and partnership arrangements.

It should be noted that this strategy is not a mandate nor does it mandate any specific county responsibilities. While it is necessary that each component must be accomplished in order for the program to be complete, counties may choose the degree and extent to which it intends to implement some, all or none of them. Consequently, the DNR will assume (to the extent is able) or assign lead responsibilities in implementing those activities for which a county is unable or unwilling to carry out. Where there are insufficient resources and or willingness by either the county, state or federal agency to carry out one or more activities, the overall program will likely be compromised both at the local as well as the state level.

Implementation Strategy for NR 151 Agricultural Nonpoint Performance Standards

Component 1: Plan the Implementation Approach

A. Develop and adopt a systematic and comprehensive strategy to implement agricultural nonpoint source pollution control standards and prohibitions under NR 151. To be consistent with this statewide program, the local strategy should describe the methodology to be used for carrying out activities under components three through ten (below) including:

- Conducting information and education activities;
- Systematically selecting and evaluating parcels for compliance with standards and prohibitions;
- Documenting and reporting compliance status;
- Providing or arranging for the provision of technical assistance;
- Making cost sharing available as needed to install or implement BMPs;
- Issuing required notices and conducting enforcement activities;
- Tracking and reporting program activities and progress; and
- Monitoring compliance.

Notes:

1. *For counties choosing to implement this component, the strategy must a) be defined in the county Land and Water Plan per ATCP 50.12(2)(1), Wis.*

Administrative Code, and b) ensure that compliance with the standards and prohibitions is achieved, per § 92.10(6)(a)5 Wis. Stats. And ATCP 50.12(2)(i) Wis. Admin. Code.

2. *The systematic selection of parcels will ensure that a prescribed amount of evaluations will regularly occur (e.g. annually). This will, in turn, ensure that realistic projections concerning timeframes and needed financial resources can be made and routinely updated on a statewide basis. In order to be systematic, a strategy for selecting and evaluating parcels and subsequently implementing standards does not rely only on voluntary participation.*

Component 2: Define Level of Agencies' Commitment to NR 151 Workload

Consider, communicate and document the level of agency (county, state and federal) commitment (staff participation, financial resources, etc.) towards NR 151 workload, including but not limited to carrying out the activities under components 3 through 10.

Component 3: Conduct Information and Education Activities

- A. Develop information and education materials designed to achieve 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;
- Inform landowners about procedures and agency roles to be used statewide and locally for ensuring compliance with the performance standards and prohibitions; and
- Establish expectations for compliance and consequences for non-compliance.

Notes: The DNR and DATCP have agreed that they will take the "lead" role in developing I&E materials for statewide use, and will look to the counties to take the lead role in providing that information to landowners.

- B. Deliver information and education materials (via news media, newsletters, public information meetings and one-on-one contacts) as outlined in the County LWRM Plan.

Component 4: Determine Current Compliance

- A. Records Inventory

(Note: The records inventory is a review of existing records of landowners throughout the county who may already be in compliance based upon past and/or present program participation. This step is intended to take less than 90 days and would be conducted before the onset of systematic

onsite evaluation. Onsite evaluations for these operations are optional, except for those where O&M periods may have expired.)

1. Compile records of existing state and/or federal program participants who have previously signed contracts to install conservation practices to control soil and erosion and nonpoint sources of pollution.
2. From records, evaluate which parcels are subject to which standards and prohibitions.

(Note: For the purposes of this document, the term "parcel" may be defined as a cropped field, an agricultural or livestock facility or a group of fields (e.g. tax parcel or FSA tract) and is defined by the county based on how they organize and manage geographic data.)

3. Based on above evaluations, determine which landowners are currently already meeting standards and prohibitions as a result of:
 - i. Having installed or implemented BMPs under an existing state or federal cost share agreement;
 - ii. Maintaining compliance with Wisconsin Farmland Preservation Program and federal farm program conservation provisions; and/or
 - iii. Maintaining compliance with state animal waste regulations (e.g. NR 243, WPDES, etc.)

B. Onsite Evaluations

(Note: Onsite evaluations would occur after the countywide records inventory has been completed, beginning with targeted sites and/or in high-priority areas, as defined in the county's LWRM Plan. Also, it is not necessary to complete on-site evaluations of the entire before proceeding with the components that follow.)

1. Compile list of parcels for which on-site evaluations will be conducted according to systematic methodology outlined in the county Land and Water Plan.
2. Contact owners of selected parcels and schedule site evaluations.
3. Conduct onsite evaluations:
 - i. Determine and document the extent of current compliance with each of the performance standards and prohibitions.
 - ii. Where non-complaint, determine costs and eligibility for cost sharing.

(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 entail eligible costs. See NR 151.09(4)(b-c) and 151.095(5)(b-c).)

Component 5: Prepare Report and Notify Landowners of Compliance Status

- A. Following completion of records review and or on-site evaluation, prepare and issue NR 151 Status Report to owners of the evaluated parcels. This report will convey, at a minimum, the following information:

1. Current status of compliance of individual parcels with each of the performance standards and prohibitions.
2. Identify 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.
3. Status of eligibility for public cost sharing.
4. Grant funding sources and technical assistance available from federal, state and local sources, and third party service providers.
5. An explanation of conditions that apply if public cost share fund are used (if public funds are used, applicable technical standards must be met).
6. Signatures lines indicating landowner agreement or disagreement with report findings.
7. Process and procedures to contest evaluation results to county and/or state.
8. (Optional) A copy of performance standards and prohibitions and technical design standards.

(Note: A cover letter (signed jointly by the DNR and LCD) which describes the ramifications and assumptions related to the Status Report would be attached.)

- B. 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. Local authority may determine the method that will work best for maintaining these records and for ensuring relevant information is conveyed to subsequent owners.)

Component 6: Secure Funding and Technical Assistance/Issue NR 151 Notice

A. Voluntary Component

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.)
2. Confirm cost-share grant eligibility and determine availability of cost share and technical assistance.
3. Develop and issue cost-share contract (including BMPs to be installed or implemented, estimated costs and project schedule and notification requirements under NR 151.09(5-6) and/or 151.095(6-7)).
4. The DNR will assist in developing proper notification language.

B. Non-voluntary Component

In the event that a landowner chooses not to voluntarily apply for public funding to install or implement corrective measures that entail eligible costs, or to

voluntarily install or implement corrective measures that do not entail eligible cost, issue Landowner Notification per NR 151.09(5-6) and/or 151.095(6-7).

1. If eligible costs are involved, this notification shall include an offer of cost sharing.
2. If no eligible costs are involved, or if cost sharing is or was already made available, the notification will not include an offer of cost sharing.

(Note: The Notification reference above will be designed by the DNR 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 as to 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 or local appeals procedures.)

Component 7: Administer Funding and Technical Assistance/Re-evaluate Parcel

- A. If cost sharing is involved, finalize and execute cost-share agreement including schedule for installing or implementing BMPs.
- B. Provide technical services and oversight:
 1. Provide conservation plan assistance.
 2. Review conservation plans prepared by other parties.
 3. Provide engineering design assistance.
 4. Review engineering designs provided by other parties.
 5. Provide construction oversight.
 6. Evaluate and certify installation of conservation practices.
- C. After corrective measures are applied, conduct evaluation to determine if parcel is now in compliance with relevant performance standards or prohibitions.
 1. If site is compliant, update "NR 151 Status Report" (see per component 5.A.) and issues "Letter of NR 151 Compliance."

(Note: A Letter of NR 151 Compliance 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 DNR in order to give it the significance and standing that it merits.)

2. 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 this is the case, 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.)

Component 8: Enforcement

- A. If a landowner refuses to respond appropriately to a Notice under 6.B, or is in breach of a cost share contract under component 7.A, then prepare and issues “Notice of NR 151 Violation” letter, or other appropriate notice per local ordinance, pursuant to NR 151.09(5) or 151.095(6) or (7).
(Note: Enforcement, which really first begins with this letter, will be pursued in circumstances where: (a) there is a breach of contractual agreement including failing to install, implement or maintain BMPs according to the provisions of the agreement OR the landowner has failed to comply with notice issued under component 6.B, AND 9b) non-regulatory attempts to resolve the situation have failed.)
- B. Schedule enforcement conference.
- C. Participate in enforcement conference.
- D. Initiate enforcement action:
 1. Refer cases to DNR for enforcement.
 2. Enforce through separate county ordinance, which incorporates standards.
 3. Enforce through financial sanctions available through State program (e.g. FPP).
 4. Enforcement through local District Attorney.

Component 9: Ongoing Compliance Monitoring

- Conduct periodic evaluations to verify ongoing compliance (similar to FPP monitoring).
- Respond to public complaints alleging noncompliance.
- Ensure new owners are made aware of (and have access to) NR 151 compliance information that may pertain to the property they have just acquired.

Component 10: Annual Reporting

- A. Maintain and convey a record of annual site evaluations which shows their location and compliance status.
- B. Report estimated timeframe and staff resources needed to complete remaining site evaluations in the county.
- C. Maintain a record of estimated costs of corrective measures for each parcel that has been evaluated and for which corrective measures have been estimated.
- D. 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.

- E. Maintain and convey a record and location of parcels receiving notifications under component 5.B and violation letters under Component 8.A.
- F. 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 NR 151.
- G. Other reports as may be required in ATCP 50.
- H. Compile locally-developed reports into regional statewide NR 151 Progress Reports.

Note: Program partners will jointly develop reporting forms. State agencies will provide reporting forms and guidance to counties on how these forms should be filled out. State agencies will assume responsibility for compiling county reports into statewide reports.

APPENDIX F: Workplan

- Calumet County 2019 Workplan

Table 1: Planned activities and performance measures by category

CATEGORY (goal and objective from LWRM plan can be added in each category)	PLANNED ACTIVITIES WITH BENCHMARKS If applicable identify focus areas, e.g. HUC 12 watershed code (examples of types of “planned activities” in italics)	PERFORMANCE MEASUREMENTS (examples in italics)
<ul style="list-style-type: none"> • Cropland 		
<p>Cropland, soil health and/or nutrient management</p>	<p><i>Install cropland practices throughout the County but concentrating in future and future TMDL watersheds as well as karst areas for nutrient management compliance:</i></p> <ul style="list-style-type: none"> • <i>Install 5000 ft. (3.7 acres) of waterway</i> • <i>Install 165 ft. of lined waterway</i> • <i>1037 new NMP acres implemented/reviewed</i> • <i>1000 new acres of nutrient management plans contracted</i> • <i>Install 3 WASCOBS</i> • <i>Install 1 stream crossing</i> • <i>Install 1 grade stabilization structure</i> <p><i>Monitor and track nutrient plan updates and implementation</i></p> <ul style="list-style-type: none"> • <i>89,000 acres of NMP plans reviews and entered into GIS database</i> • <i>10% of total NMP plans with thorough review for quality assurance</i> <p><i>Utilize karst feature inventory during NMP review – emphasize areas where well contamination events are common</i></p> <p><i>Assist and partner with WI DNR in manure hauling/spreading audits targeting areas of known well contamination</i></p>	<p><i>Type and units of practice(s) installed</i></p> <p><i>Amount of cost-share dollars spent</i></p> <p><i># lbs of sediment reduced (using any approved method)</i></p> <p><i># lbs of P reduced (using any approved method)</i></p> <p><i># acres of cropland in compliance with a performance standard</i></p> <p><i># NMP plans reviewed in total acres, # plans w/ in-depth review</i></p> <p><i># Contacts made regarding new standards and manure hauling audits</i></p> <p><i># Plans completed</i></p>

	<p><i>Provide education and outreach in regard to new NR 151 Silurian Bedrock Performance Standards, review NMPs for incorporation of standards</i></p> <p><i>Complete and plan for implementation of North Branch Manitowoc 9KE plan</i></p> <p><i>Complete and plan for implementation of watershed plan for implementation East Winnebago watershed for Multi-Discharger Variance funding</i></p> <p><i>Emphasis in county adopted groundwater protection area</i></p> <p><i>Emphasis in approved and developing TMDL areas (HUC 0403020302, Lower Fox)</i></p> <p><i>(HUC 0403020303, Upper Fox, Winnebago)</i></p> <p><i>(HUC 0403010103, North Branch Manitowoc)</i></p>	
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• Livestock

<p>Livestock</p>	<p><i>Install livestock practices</i></p> <ul style="list-style-type: none"> • <i>Install 1 barnyard runoff control system</i> • <i>Install 1 barnyard roof</i> • <i>Install 3 roof runoff systems (1188 ft.)</i> • <i>Install 325 ft. clean water diversion</i> • <i>Close and properly abandon 1 unused or leaking manure storage structures</i> • <i>Install 1 process wastewater management systems</i> • <i>Install 2 manure storage or stacking structures</i> • <i>Install 1 managed grazing system (13 ac.)</i> <p><i>Complete and plan for implementation of North Branch Manitowoc 9KE plan</i></p> <p><i>Complete and plan for implementation of watershed plan for implementation East Winnebago watershed for Multi-Discharger Variance funding</i></p>	<p><i>Type and units of practice(s) installed</i></p> <p><i>Amount of cost-share dollars spent</i></p> <p><i># lbs of sediment reduced (using any approved method)</i></p> <p><i># lbs of P reduced (using any approved method)</i></p> <p><i># of livestock facilities in compliance with a performance standard</i></p> <p><i># Plans completed</i></p>
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	<p><i>Emphasis in county adopted groundwater protection area</i></p> <p><i>Emphasis in approved and developing TMDL areas</i> <i>(HUC 0403020302, Lower Fox)</i> <i>(HUC 0403020303, Upper Fox, Winnebago)</i> <i>(HUC 0403010103, North Branch Manitowoc)</i></p>	
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- Water quality

<p>Water quality/quantity (other than activities already listed in other categories)</p>	<p><i>Install 6219 ft. of streambank/shoreline protection</i></p> <p><i>Partner with FSA & NRCS to negotiate 5 agreements to establish buffers under CREP or similar program</i></p> <p><i>Properly decommission 3 unused wells</i></p> <p><i>Identify and treat 1 sinkhole</i></p> <p><i>Complete and plan for implementation of North Branch Manitowoc 9KE plan</i></p> <p><i>Complete and plan for implementation of watershed plan for implementation East Winnebago watershed for Multi-Discharger Variance funding</i></p> <p><i>Assist and continue participation in steering team activities in regard to development of the Lake Winnebago and pool lakes management plan</i></p> <p><i>Continue identifying and confirming karst features to add to GIS data set for tracking</i></p> <p><i>Explore options for funding staff for work on karst inventory, in-field nutrient management compliance and Silurian bedrock performance standards</i></p> <p><i>Groundwater program – 200 private wells sampled and tested countywide, conduct one group sampling</i></p>	<p><i>Type and units of practice(s) installed</i></p> <p><i>Amount of cost-share dollars spent</i> <i># lbs of sediment reduced (using any approved method)</i></p> <p><i># lbs of P reduced (using any approved method)</i></p> <p><i># agreements</i></p> <p><i># wells decommissioned</i></p> <p><i># sinkholes treated</i></p> <p><i># Meetings attended</i></p> <p><i># wells sampled,</i></p>

	<p><i>event, conduct educational workshops on test results and countywide data</i></p> <p><i>Citizen monitoring</i></p> <ul style="list-style-type: none"> <i>Provide assistance w/ 5 WAV monitoring sites, 1 citizen monitoring site in CLMN</i> <p><i>Emphasis in county adopted groundwater protection area</i></p> <p><i>Emphasis in approved and developing TMDL areas (HUC 0403020302, Lower Fox)</i></p> <p><i>(HUC 0403020303, Upper Fox, Winnebago)</i></p> <p><i>(HUC 0403010103, North Branch Manitowoc)</i></p>	<p><i># workshops conducted</i></p> <p><i># sites monitored</i></p>
<ul style="list-style-type: none"> • Forestry • Invasive 		
<p>Invasive species</p>	<p><i>Conduct Clean Boats/Clean Waters project</i></p> <ul style="list-style-type: none"> <i>Grant funded intern – 250 hours of watercraft inspections at two landings, data reported in SWIMS</i> <p><i>Terrestrial Invasive Species – contractual agreement to provide invasive species public education, outreach and support</i></p> <p><i>AIS Snapshot Day</i></p>	<p><i># Hours conducting inspections/contacts made</i></p> <p><i># Public inquiries responded to</i></p> <p><i># Outreach events attended/presented at</i></p> <p><i># Sites assisted with</i></p>
<ul style="list-style-type: none"> • Wildlife 		
<p>Wildlife-Wetlands-Habitat (other than forestry or invasive species)</p>	<p><i>1 Wetland Restoration & Enhancement</i></p> <p><i>Administer Wildlife damage program</i></p> <p><i>1 Tree and plant sales program</i></p>	<p><i>Acres of wetland restored</i></p> <p><i># Wildlife damage claims approved</i></p> <p><i>Number of trees sold/distributed to Calumet County citizens</i></p>

- Urban

<p>Urban issues</p>	<p><i>Issue 3 large scale post-construction stormwater permits</i></p> <p><i>Issue 3 large site (> 1 ac.) erosion control permits</i></p> <p><i>Issue 15 small site (< 1 ac.) erosion control permits</i></p> <p><i>Develop MS4 Annual Report and submit to DNR in compliance with permit conditions</i></p> <p><i>Conduct training and outreach activities in accordance with MS4 permit requirements</i></p>	<p><i># inspections</i></p> <p><i># plans reviews</i></p> <p><i># permits issued</i></p> <p><i># compliance issues resolved</i></p> <p><i># contacts/trainings assisted with/attended</i></p>
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- Watershed

<p>Watershed strategies</p>	<p><i>Land & Water Resource Management Plan</i></p> <ul style="list-style-type: none"> • <i>Complete and gain approval for 2020-2029 LWRMP</i> <p><i>Watershed and Lake Planning</i></p> <ul style="list-style-type: none"> • <i>Complete 9KE plan for CalMan Lakes watershed and gain DNR and EPA approval</i> • <i>Complete 9KE plan for North Branch Manitowoc River watershed and gain DNR and EPA approval</i> • <i>Continue assistance with Winnebago Waterways lake management planning effort, including participation on steering and tech teams. Effort includes watershed plan meeting EPA 9KE</i> <p><i>Watershed plan implementation, funding & planning</i></p> <ul style="list-style-type: none"> • <i>Plum/Kankapot Watershed – Lower Fox (HUCs 040302040203 & 040302040204)</i> • <i>North Branch Manitowoc River (HUC 0403010103) includes CalMan Lakes watershed</i> 	<p><i>Number of meetings attended/presentations given, plan approved</i></p> <p><i>Watershed plans completed and approved</i></p>
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	<ul style="list-style-type: none"> • <i>Pipe Creek – Frontal Lake Winnebago (HUC 040302030401)</i> <p><i>P-compliance</i></p> <ul style="list-style-type: none"> • <i>Apply for MDV funds based on point source participation/funds available</i> • <i>Complete watershed plans for eligible watersheds</i> <p><i>TMDL coordination</i></p> <ul style="list-style-type: none"> • <i>Continue work with Manitowoc River stakeholders in the development of a TMDL as well as completing 9KE plan for North Branch Manitowoc River watershed</i> • <i>Continue work with project partners on TMDL implementation in Lower Fox River watershed</i> • <p><i>Producer-led</i></p> <ul style="list-style-type: none"> • <i>Continue work with newly forming Calumet County Agricultural Stewardship Alliance (CCASA)</i> <p><i>Demo Farm</i></p> <ul style="list-style-type: none"> • <i>Work on development of Demo Farm project.</i> • <i>Gather adjacent County interest in the formation of multi-county project</i> • <i>Enter into agreement with NRCS for funding</i> 	<p><i>Number of partnership development activities accomplished</i></p> <p><i>Number of meetings attended</i></p>
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- Other

Other	<i>Non-metallic mining</i> <ul style="list-style-type: none"> • <i>Conduct mine/operator inspections for 18 mines permitted in County</i> • <i>Collect fees, compile mining activity data and submit annual report to DNR by March 31 deadline</i> • <i>Promote contemporaneous reclamation of mining sites</i> 	<i># plans reviewed</i> <i># inspections</i> <i># Acres reclaimed in County</i>
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Table 2: Planned activity related to permits and ordinances

Permits and Ordinances	Plans/application reviews anticipated	Permits anticipated to be issued
Feedlot permits	0	0
Manure storage construction and transfer systems	6	6
Manure storage closure	3	3
Livestock facility siting	0	0
Nonmetallic/frac sand mining	0	0
Stormwater and construction site erosion control	21	21
Shoreland zoning	0	0
Wetlands and waterways (Ch. 30)	4	DNR Issues
Other	0	0

Table 3: Planned inspections

Inspections	Number of inspections planned
Total Farm Inspections	60
For FPP	50
For NR 151	10
Animal waste ordinance	15
Livestock facility siting	0
Stormwater and construction site erosion control	100
Nonmetallic mining	18

Table 4: Planned outreach and education activities

Activity	Number
Tours	1
Field days	1
Trainings/workshops	4
School-age programs (camps, field days, classroom)	4
Newsletters	1
Social media posts	15
News release/story	3

Table 5: Staff Hours and Expected Costs (staff can be combined or listed individually)

Staff/Support	Hours	Costs
County Conservationist	1950	\$103,235.01
Water Resource Specialist	1950	\$95,033.11
Land Resource Specialist	1950	\$93,683.39
Erosion Control and Stormwater Specialist	1950	\$80,057.86
Conservation Project Technician	1950	\$72,586.14
Conservation Project Technician – GLRI Funded	1950	\$67,459.39
Clean Boats/Clean Waters Intern – DNR Funded	250	\$2,867.24
Total Conservation Staff Costs		\$514,922.14
Cost Sharing (can be combined)		
<i>All</i>		\$556,475.00