



# **Fond du Lac County Land & Water Resource Management Plan**

**2018-2028**

# **ACKNOWLEDGEMENTS**

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## **PREFACE**

In 1996, Wisconsin Land and Water Conservation professionals proposed a locally led conservation concept of land and water resource management plans in response to a state legislative call to “redesign” the Wisconsin’s nonpoint pollution abatement programs. The Land and Water Resource Management Plan concept evolved from a long-stated need to establish a locally driven process that ensures local decision making and increased program delivery mechanisms. It also ensures the utilization of local, state and federal funds for greater effectiveness toward the protection of land and water resources within the counties.

In 1997, the Land and Water Resource Management Plan concept became law as Chapter 92.10 of the Wisconsin Statutes was amended. The basic concept of this legislation is meant to:

- Drive a locally led process for plan development and implementation;
- Provide maximum flexibility in program grants and funding sources;
- Drive a comprehensive watershed based approach without excessive planning;
- Support innovation and cost effectiveness toward achieving plan objectives;
- Integrate programs and funding sources, making use of a wide variety of implementation tools; and
- Ensure meaningful program evaluation and accountability.

Chapter 92 legislation that requires counties to develop a County Land and Water Resource Management Plan that must outline a strategy for implementation and enforcement of state performance standards. Chapter 92 also intended this plan to also provide structured means that will integrate and leverage available programs, funds and other resources to:

- Guide the process for resource management planning and decision making;
- Compile information for evaluating land and water resource conditions;
- Develop a multi-year work plan to address land and water resource problems by watershed;
- Strengthen partnerships with landowners, other agencies, municipalities and organizations;
- Integrate efforts with other county and basin level Natural Resource Management Plans;
- Coordinate with Township and County comprehensive land use planning efforts;
- Develop effective information and education strategies that will strengthen and maintain community support for the planned Land and Water Resource Management Plan goals and objectives; and
- Track progress toward the achievement of the plan’s goals and objectives.

The driving force behind the development of the Fond du Lac County Land and Water Resource Management Plan is to, at a minimum, maintain funding levels needed to implement

the conservation practices and programs to make a positive impact on resources in the county. That means individual citizens, units of government, and local, state, and federal agencies must work together to develop a framework which positively integrates natural resource management programs and funding sources. They must also provide the necessary flexibility to allocate staff and financial resources where they will do the most good toward accomplishing resource management objectives

## **PUBLIC PARTICIPATION**

This plan is developed around concerns and recommendations from involved citizens, governmental units and agencies throughout the county.

The LWRMP is built on past goals and objectives while recognizing past and present extensive public participation. The extent to which this plan is successful depends entirely upon community support and landowner participation.

Citizen involvement included:

- LWRMP Citizen's Advisory Committee Meetings on held on June 29<sup>th</sup>, 2016 & March 16<sup>th</sup>, 2017.
- Public Hearing held on August 1<sup>st</sup>, 2017.
- Public comment period through the Fond du Lac County Government website.

## **PLAN APPROVAL**

This plan has met all required approvals on the dates listed below:

- Fond du Lac County Land Conservation Committee approval on October 4<sup>th</sup>, 2017
- County Board Approval on December 19<sup>th</sup>, 2017
- Land & Water Conservation Board December 5<sup>th</sup>, 2017

## Summary of Citizen Advisory Committee Resource Concerns

### **Soil (11)**

Construction Sites - I  
Too much tillage - I  
Liquid manure  
Sheet Erosion - I  
Gully Erosion - I  
Nutrient runoff - I  
Tiling  
Polluted Runoff - III  
Herbicides  
Cover Crops  
Stripping/Stockpiling  
Wind Erosion  
Mining - I  
Soil Structure - I  
Bedding Sand  
Shallow Top Soil over  
Karst/Bedrock

### **Wetlands (2)**

Draining - I  
Invasive Species- I  
Loss / Draining  
Pollution  
Changes to Hydrology  
Beaver/Wildlife damage

### **Wildlife/Habitat (2)**

Damage from Geese, Cranes  
Overabundance of wildlife - I  
Fence Line removal  
Shortage of hunters/trappers  
Rural home building  
Shortage of bees/pollinators – I

### **Air Quality (1)**

Manufacturing  
Farming  
Pollen  
Burning Waste, Silage Bags  
Wood Burning

Oder  
Dust  
Global Warming - I

### **Minerals (2)**

Commercial Opportunities  
Mining – Concerns & Opportunity - I  
Transportation  
Roads - I  
Road Salt  
Mineral Sludge  
Building Waste  
**Geologic**  
Ledge Preservation  
Lakes & Streams  
Groundwater  
I.D. all Karst Areas/Sink holes  
Kettle Moraine Preservation

### **Fish & Aquatic/Habitat (5)**

Invasive Species - I  
Heavy Metal - I  
Agriculture  
Algae/Weeds  
Runoff  
Recreation Management / Harvest  
Management  
Stormwater & Salt – III

### **Groundwater – IIIII (16)**

Liquid Manure - II  
Nitrates - I  
Mining  
Karst Features/Bedrock  
Old Wells - I  
Drinking Wells - I  
High Capacity Wells - II  
Polluted Runoff Contaminants  
Tiling  
Groundwater Levels  
Contamination from Residential - II  
Contamination from Industrial

Contamination from Septic Systems  
Septage Spreading  
Well Water Testing - I  
More Education – I

### **Woodlands / Plants (2)**

Invasive Species  
Management  
Firewood  
Pests – Emerald Ash Borer  
Right of Way Management - I  
More Orchards  
Promoting Bee Keeping &  
Pollinators - I

### **Surface Water – Lakes – I (8)**

Changes to Hydrology – I  
Sewage Pollution – II  
Stormwater – I  
Invasive Plants/Fish  
Urban Nutrient Runoff  
Lack of Buffers  
Tourism  
Flooding – III

### **Surface Water – Rivers & Streams (3)**

Residential Runoff – II  
Debris  
Farm Runoff – I  
Bank Erosion  
Mineral Pollution  
Buffers, Lack of  
Fisheries Habitat  
Burning Ditches  
Cover Crops

### **Other Concerns**

Economy/Economics of Farming  
Garbage

## Cost Share Summary 2012-2016

<b>Cost Sharing Spent 2012-2016</b>				
<b>Year</b>	<b>SEG</b>	<b>Bonding</b>	<b>County</b>	<b>TOTAL/year</b>
2012	\$11,327.20	\$9,500.93	NA	<b>\$20,828.13</b>
2013	\$29,378.40	\$26,023.76	NA	<b>\$55,402.16</b>
2014	\$20,865.70	\$29,965.00	NA	<b>\$50,830.70</b>
2015	\$5,770.56	\$32,195.67	\$24,309.83	<b>\$62,276.06</b>
2016	NA	\$54,028.69	\$15,851.03	<b>\$69,879.72</b>
<b>TOTAL/type</b>	<b>\$67,341.86</b>	<b>\$151,714.05</b>	<b>\$40,160.86</b>	<b>\$259,216.77</b>

<b>Number of Cost Share Contracts 2012-2016</b>			
<b>Practice</b>	<b>SWRM</b>	<b>County</b>	<b>Total</b>
ATCP 50.62 Manure storage systems	1	na	1
ATCP 50.63 Manure storage system closure	5	na	5
ATCP 50.70 Diversion	1	na	1
ATCP 50.77 Milking Center Waste Control	1	na	1
ATCP 50.78 Nutrient management	75	na	75
ATCP 50.88 Streambank/shoreline protection	1	1	2
ATCP 50.91 Terrace System	1	na	1
ATCP 50.95 Water and sediment control basins.	2	2	4
ATCP 50.96 Waterway systems.	4	3	7
ATCP 50.97 Well decommissioning	40	2	42
Streambank Repair	na	1	1
WW / Diversion	2	na	2
<b>TOTAL</b>	<b>133</b>	<b>9</b>	<b>142</b>



# **CHAPTER 1**

## **FOND DU LAC COUNTY LAND USE INFORMATION**

### **PHYSICAL HISTORY OF COUNTY**

As the various stages of the glacier advanced and withdrew it left deposits, which in combination with the bedrock formation, formed the major topographic features of the county. Glacial moraines and other deposition features such as drumlins, kames and eskers form the hills and valleys of the eastern half of the county. The Niagara Escarpment forms the high ridge, which runs just east of Lake Winnebago and swings southwest past Oakfield. The low, flat area around Lake Winnebago was the bed of a large glacial lake. The gently rolling topography of the western part of the county is mostly ground moraine, and the ridges and outcrops near Ripon and Fairwater are bedrock controlled. Lake Winnebago and the Horicon Marsh are part of a long broad valley carved by a lobe of the glacier in the relatively soft shale bedrock previously found there.

There are two main types of bedrock under Fond du Lac County: the older crystalline rock such as granite and the younger sedimentary rocks such as dolomite, sandstone and shale. In some places, this bedrock appears at the surface, as does the dolomite of the Niagara Escarpment and the sandstone and granite at the western edge of the county. In most parts of the county, however, the bedrock is covered with unconsolidated overburden consisting of sand, gravel and clay. This overburden was left by the Pleistocene glaciers last seen in Wisconsin about 10,000 years ago, and it ranges in thickness from several feet to several hundred feet. In some places, this overburden is well sorted; for example, the several hundred feet of clay deposited by the glacial lakes or the sand and gravel found in kames and eskers.

### **CIVIL HISTORY OF COUNTY**

The earliest known inhabitants of the Fond du Lac area were members of the Winnebago tribe. Historic records indicate that the first person of European ancestry to explore the area around present day Fond du Lac was Allouez, a missionary explorer, in 1670. French traders occupied Fond du Lac as early as 1785. Permanent settlement occurred in Fond du Lac in 1835 with the formation of the Fond du Lac Company for the purpose of acquiring and selling land on the south end of Lake Winnebago. The first home was built in Fond du Lac the following year.

In 1847, Fond du Lac incorporated as a village of 519 persons. Fond du Lac established itself as a lumbering center. The community had a water powered sawmill, followed by a steam powered saw mill. In 1852, a 40-mile plank road was constructed linking Fond du Lac to Sheboygan and Lake Michigan. Fond du Lac incorporated as a city that same year with a population of 1,940.



## GENERAL CHARACTERISTICS

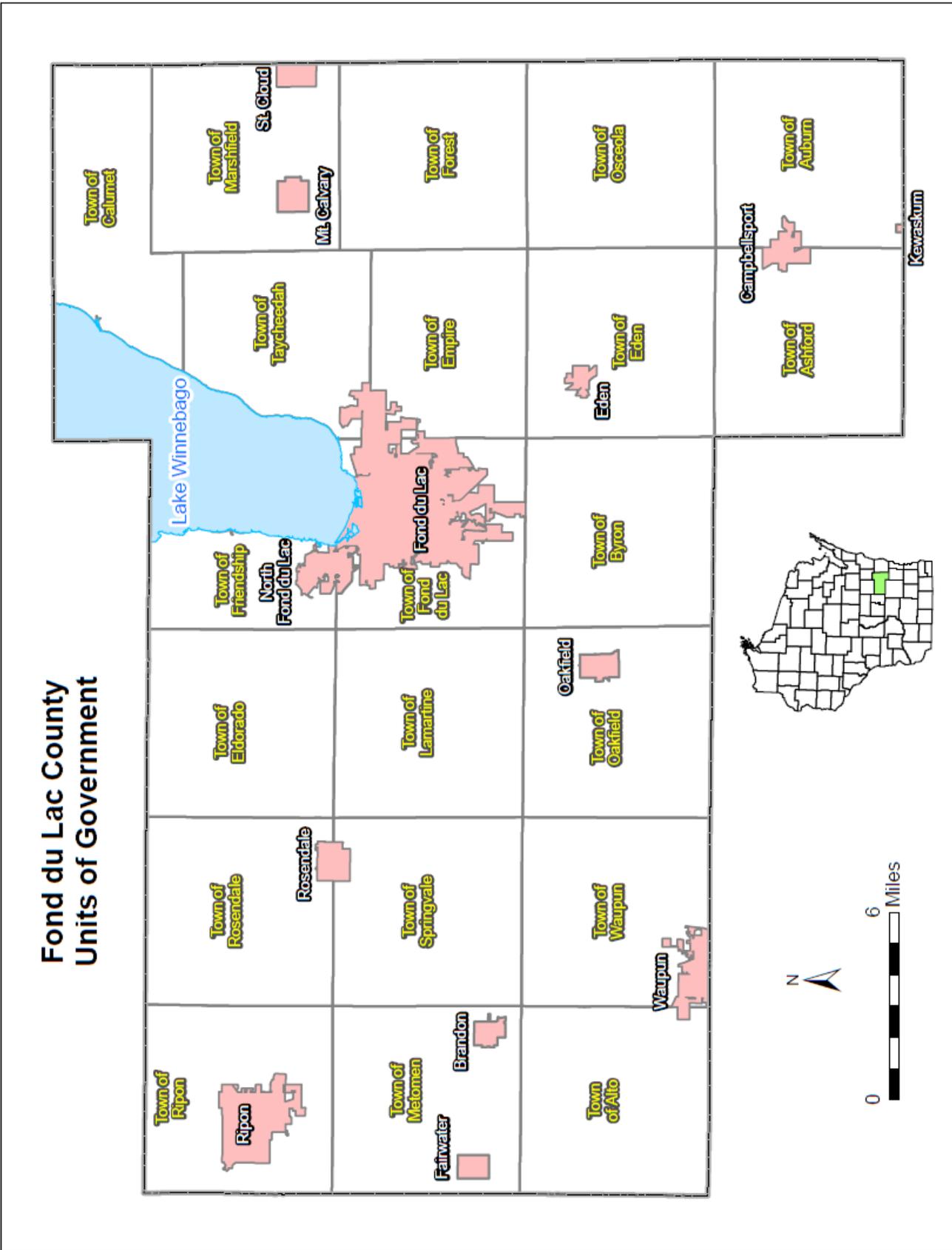
Fond du Lac County is located in east central Wisconsin at the southern end of Lake Winnebago. The total land area of the county is about 724 square miles or 463,360 acres. The county is divided into 21 civil towns, 9 villages and 3 cities. Refer to Map 1-1 on the following page.

According to U.S Census Bureau, a total of 101,973 people live in Fond du Lac County, according to estimates from the most recent U.S. Census. About two-thirds of the population lives in the cities and villages; the City of Fond du Lac alone contains over 42,933 people. The other third of the population is scattered throughout the 21 unincorporated towns, with some concentrations along Lake Winnebago and near Fond du Lac in the Towns of Empire, Fond du Lac, Friendship and Taycheedah.

## LAND USE TRENDS:

The county is located between two major industrial concentrations in the state; the Fox River Valley to the north which is one of the fastest growing development areas in Wisconsin, and the Milwaukee area to the south. Therefore, it lies in the path of expanding urbanization pressures. Agriculture remains a major land use within the county and is expected to retain that role for years to come even as development continues to encroach and put pressure on the county's natural resources. Refer to Map 1-2. Fond du Lac County has a diverse workforce dominated by jobs in manufacturing, services and retail trade. In 2005 the population of Fond du Lac County was 99,337. In 2015, there were 101,973 people living in Fond du Lac County. The estimated population of the county by 2020 is expected to increase to 105,755. By 2040, the county population is projected to be 110,250. Land use planning is needed to control the type and direction that growth is taking. Fond du Lac County along with the townships is continuing to work on the development of comprehensive land use plans. There are many common concerns that face a continually growing township:

- Preserve, protect and keep in production agricultural lands;
- Conserve and protect the integrity of environmental, scenic, cultural and historical resources;
- Encourage urban development that is consistent with the preservation of agricultural lands;
- Promote a land use pattern for the efficient and cost effective provision of public facilities with surrounding towns and with the county;
- Encourage the development of recreational areas;



Map 1-2

Fond du Lac County adopted a Farmland Preservation Plan in 2012 that correlates closely to the agricultural land identified in town comprehensive land use plans. All 21 townships in Fond du Lac County administer farmland preservation zoning ordinances that have been certified by DATCP.

### **AGRICULTURE TRENDS:**

Fond du Lac County has a diverse agricultural economy. Agriculture in Fond du Lac County includes a diverse mix of individual or family owned farms, family owned corporations, family partnerships and non-family corporations as well as food processors, equipment manufacturers, retail and service providers. Dairy farms range in size from few than 100 cows to more than 8,000. Milk production leads the way with nearly 255 million dollars in annual sales. Fond du Lac County ranks as the nations' 26<sup>th</sup> largest dairy county, and in the top 3 Wisconsin counties for milk production. Grain crops, cattle, vegetable crops, other crops and hay combine for an additional 151.10 million dollars in annual sales. Economic, political and social factors will continue to impact agriculture and related rural areas. Some of the more important trends and changes are as follows:

- The number of dairy farms continues to decline. As of 2012, Fond du Lac County had 279 dairy herds. In 2005, there were 414 dairy farms. This compares to 703 farms in 1995 (Source: Wisconsin Ag Statistics Service).
- Dairy farms are getting larger with more cows. In fact, total cow numbers have been on a steady increase in recent years and according to the USDA National Ag. Statistics Service in 2012 there were 55,000 dairy cows in the county. In 2010 dairy cow numbers were roughly 52,000 which tied for third in the state.
- Total milk production and production per cow are steadily increasing. Total milk production put Fond du Lac County at 4<sup>th</sup> overall in the State in 2012. Average milk produced per cow was 23,600 pounds in 2012.
- Soybean acreage had rapidly increased over the past 20 years but has recently remained steady at 45,000 acres grown (compared to less than 30,000 acres in 1995). Most of this increase has come at the expense of oat and vegetable crop acres.
- Forage crops remain important to the dairy industry and there has been a significant upward trend in the number of corn acres harvested for silage.
- Fond du Lac County held its position as a leading producer of commercial vegetables (primarily sweet corn and green peas) and winter wheat. Still, acreage of sweet corn and peas has been lost to the central sands area of Wisconsin.
- Land values and land rents have been increasing dramatically.

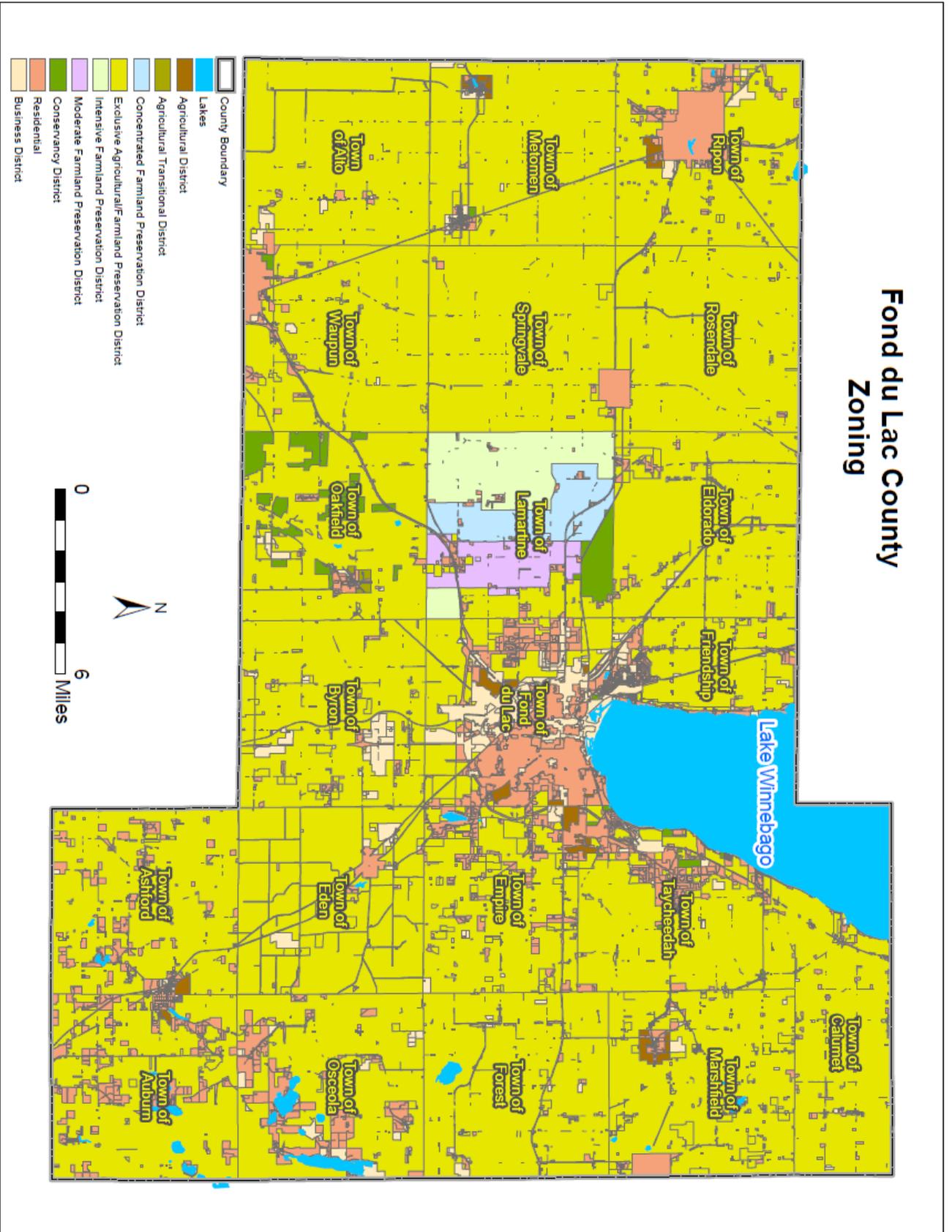
- The number of “hobby farms” continues to grow. Many keep some livestock, including horses.

Horticulture contributes to the diversity of agriculture in Fond du Lac County. Sales of Christmas trees, fruit, sod and other horticultural products from nurseries and greenhouses total \$2.8 million.

- Local goods sales with farmers selling directly to consumers from roadside stands, farmers markets, auctions and pick your own operations account for \$ 442,000 to the economy.
- The total number of farms has declined since the 2012 census of agriculture from 1,643 to 1,399 while the total number of farms with greater than \$100,000 in cash sales has increased from 503 to 529. There has also been an increase in average farm size from 204 acres to 226 acres
- The average age of the principle farm operator continues its upward trend from 56.1 years to 56.8 years
- Total harvested organic acres has increased to 2,579.
- The cost to rent or own crop land in Fond du Lac County continues to climb, with the average price paid for agricultural land per acre at \$4,866 and the average county cash rent value at \$118 per acre in 2012.

All of the above changes have impacted the economic, social, political, and environmental landscape of rural Fond du Lac County. Finding a balance that will insure agricultural profitability, protect landowners’ rights, and provide for a sustainable environment continues to challenge both county leaders and residents.

# Fond du Lac County Zoning



Map 1-3



**CHAPTER 2**  
**LAND & WATER RESOURCE DESCRIPTIONS**  
**AND ASSESSMENTS**

To understand the importance of natural resources within Fond du Lac County and the surrounding area, it is essential to recognize that, in addition to the countless environmental benefits they provide, those resources bring in millions of dollars in revenue to local communities throughout the county each year. That revenue comes primarily from the vast array of rural, urban and recreational users of the natural resources. While it is difficult to place a specific dollar value on these resources, straight-line logic tells us that we absolutely cannot afford to waste them and must do all we can to protect them for present and future generations.

**SOIL RESOURCES**

Soil is naturally made as organic and geologic features breakdown. Even though the generation of soil naturally occurs over time, soil that is suitable to growing crops and other vegetation should be considered a finite resource. There are different characteristics to each soil type, which influences the kind of land use and management taking place within the county (See Map 2-1)

The Fond du Lac County Land and Water Conservation Department uses detailed descriptions of each soil type, including soil patterns, relief and drainage features to determine cropland erosion estimates and sediment load calculations. This in turn determines the type and extent of agricultural practices and management techniques to recommend. .

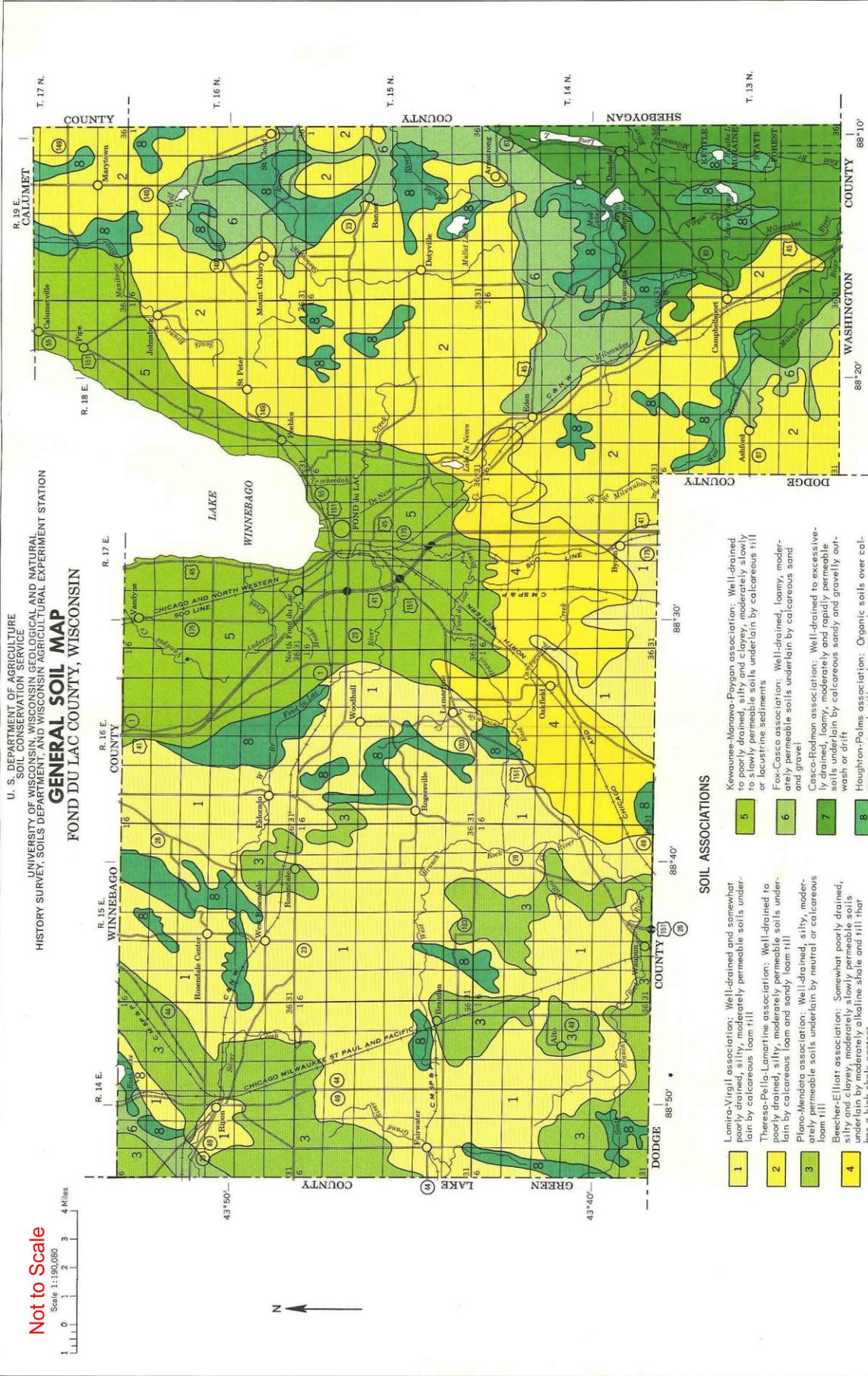
Soil loss is measured in relation to the tolerable soil loss for a given soil type, or “T” value. The “T” value refers to the amount of soil that can be replaced through the natural soil building process for a specific soil type. Operating cropland at or below the tolerable soil loss levels will help maintain the agricultural productivity of the soil and possibly reduce runoff to nearby lakes and streams. The tolerable soil loss for most soils in Fond du Lac County is between 2 and 5 tons per acre per year.

Past transect survey data indicated that the average soil loss in the county was 1.7 tons per acre. More recent average soil loss information for the county has been evaluated utilizing existing nutrient management plan information that has been written using the most recent version SNAP + for the years 2015 – 2017. In 2015 the calculated average soil loss 1.3 tons per acre, In 2016, the average soil loss was 1.5 tons per acre. In 2017 the average soil loss was 1.7 per acre indicates a growing trend of increasing average soil loss throughout the county.

Not to Scale

Scale 1:190,080  
0 1 2 3 4 Miles

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
UNIVERSITY OF WISCONSIN, WISCONSIN GEOLOGICAL AND NATURAL  
HISTORY SURVEY, SOILS DEPARTMENT, AND WISCONSIN AGRICULTURAL EXPERIMENT STATION  
**GENERAL SOIL MAP**  
FOND DU LAC COUNTY, WISCONSIN



SOIL ASSOCIATIONS

- 1** Lomira-Virgil association: Well-drained and somewhat poorly drained, silty, moderately permeable soils underlain by calcareous loam till
- 2** Theresa-Pella-Lamartine association: Well-drained to poorly drained, silty, moderately permeable soils underlain by calcareous loam and sandy loam till
- 3** Plano-Mendota association: Well-drained, silty, moderately permeable soils underlain by neutral or calcareous loam till
- 4** Beecher-Elliott association: Somewhat poorly drained, silty and clayey, moderately slowly permeable soils underlain by moderately alkaline shale and till that has a high shale content
- 5** Kewaunee-Manawa-Poygan association: Well-drained to poorly drained, silty and clayey, moderately slowly to slowly permeable soils underlain by calcareous till or lacustrine sediments
- 6** Fox-Casco association: Well-drained, loamy, moderately permeable soils underlain by calcareous sand and gravel
- 7** Casco-Rodman association: Well-drained to excessively drained, loamy, moderately and rapidly permeable soils underlain by calcareous sandy and gravelly outwash or drift
- 8** Houghton-Palms association: Organic soils over calcareous outwash, till, or lacustrine deposits

This map is for general planning. It shows soil associations in sufficient detail for operational planning.

Published 1971

Map 2-1

## FOND DU LAC COUNTY SOIL TYPES & DESCRIPTIONS

### LOMIRA-VIRGIL ASSOCIATION

These soils are well drained to somewhat poorly drained, silty, and moderately permeable underlain by calcareous loam till. The largest area for these soils is between Rosendale and Brandon. This association consists of 24 percent of the county. The most common use of this association is cropland.

### THESEA-PELLA-LAMARTINE ASSOCIATION

This association is well drained to poorly drained, silty, moderately permeable soils underlain by calcareous loam and sandy loam till. These soils are found mainly in the eastern third of the county. This association consists of 22 percent of the county. The most common land use is cropland.

### PLANO-MENDOTA ASSOCIATION

These soils are well drained, silty, moderately permeable soils underlain by calcareous loam till. The landscape of this association is one that is gently sloping and sloping low ridges and knobs and nearly level uplands and depressions. This association consists of 9 percent of the county. The majority of land use is cropland.

### BEECHER-ELLIOTT ASSOCIATION

These soils are somewhat poorly drained, silty and clayey with moderately slow permeable soils underlain by moderately alkaline shale and till that has high shale content. You will find most of this association in the Oakfield and Byron Townships. This association consists of 6 percent of the county. The major land use is cropland.

### KEWAUNEE-MANAWA-POYGAN ASSOCIATION

This association is well drained to poorly drained and is silty and clayey in nature. These soils are moderately slow to slowly permeable soils underlain by calcareous till or lacustrine sediments. These soils are mainly in the area bordering Lake Winnebago. This association consists of 15 percent of the county. The primary land use is cropland.

### FOX-CASCO ASSOCIATION

This association is well drained, loamy and has moderately permeable soils underlain by calcareous and gravel. These soils are found on outwash plains and terraces. This association consists of 8 percent of the county. The primary land use is cropland.

#### CASCO-RODMAN ASSOCIATION

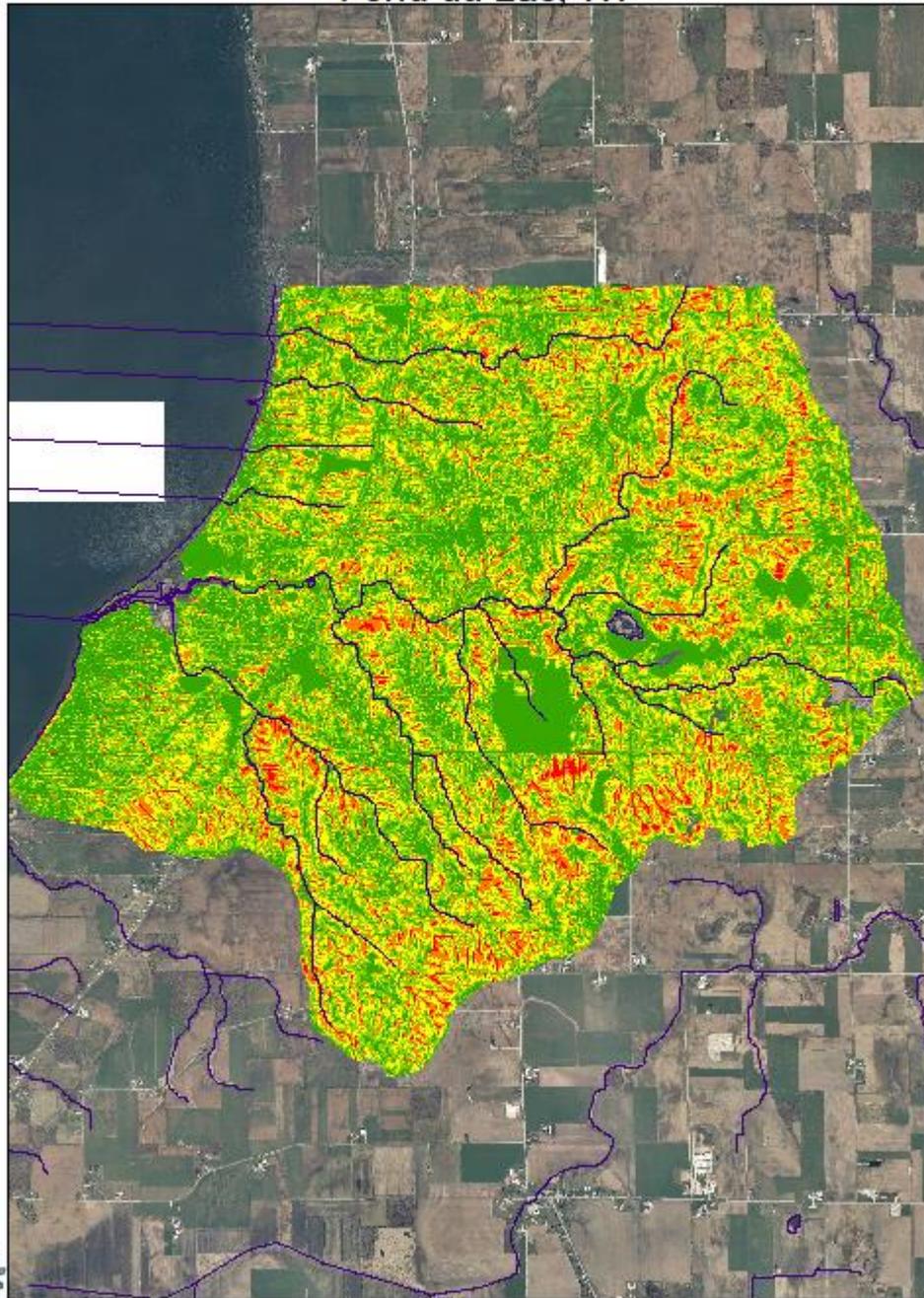
These soils are well drained to excessively drained, loamy, moderately and rapidly permeable soils underlain by calcareous sand and gravelly outwash or drift. These soils occupy the Kettle Moraine area of the county, which is a series of ridges and knobs. This association consists of 8 percent of the county. The majority of the land use is for woodland, wildlife or recreational purposes.

#### HOUGHTON-PALMS ASSOCIATION

Poorly drained soils that are subject to ponding. These organic soils overlay calcareous outwash, till or lacustrine deposits. It occupies large, nearly level depression and wetland areas throughout the County. This association consists of 8 percent of the county. Wetness is a major limitation of these soils for cropland. The majority of land use is for permanent pasture or idle ground.

Fond du lac County has currently prioritized the Rock River Watershed, The Pipe Creek Watershed and the Big Green Lake Watershed as areas to focus on soil erosion and runoff efforts. The LWCD utilized the EVAAL soil erosion prediction software to assess the Pipe Creek and Big Green Lake watersheds to identify areas for focusing efforts that will minimize soil erosion and phosphorus runoff to surface waters. (See Maps 2-2 and 2-3).

# EVAAL Erosion Vulnerability Index Pipe Creek Watershed Fond du Lac, WI

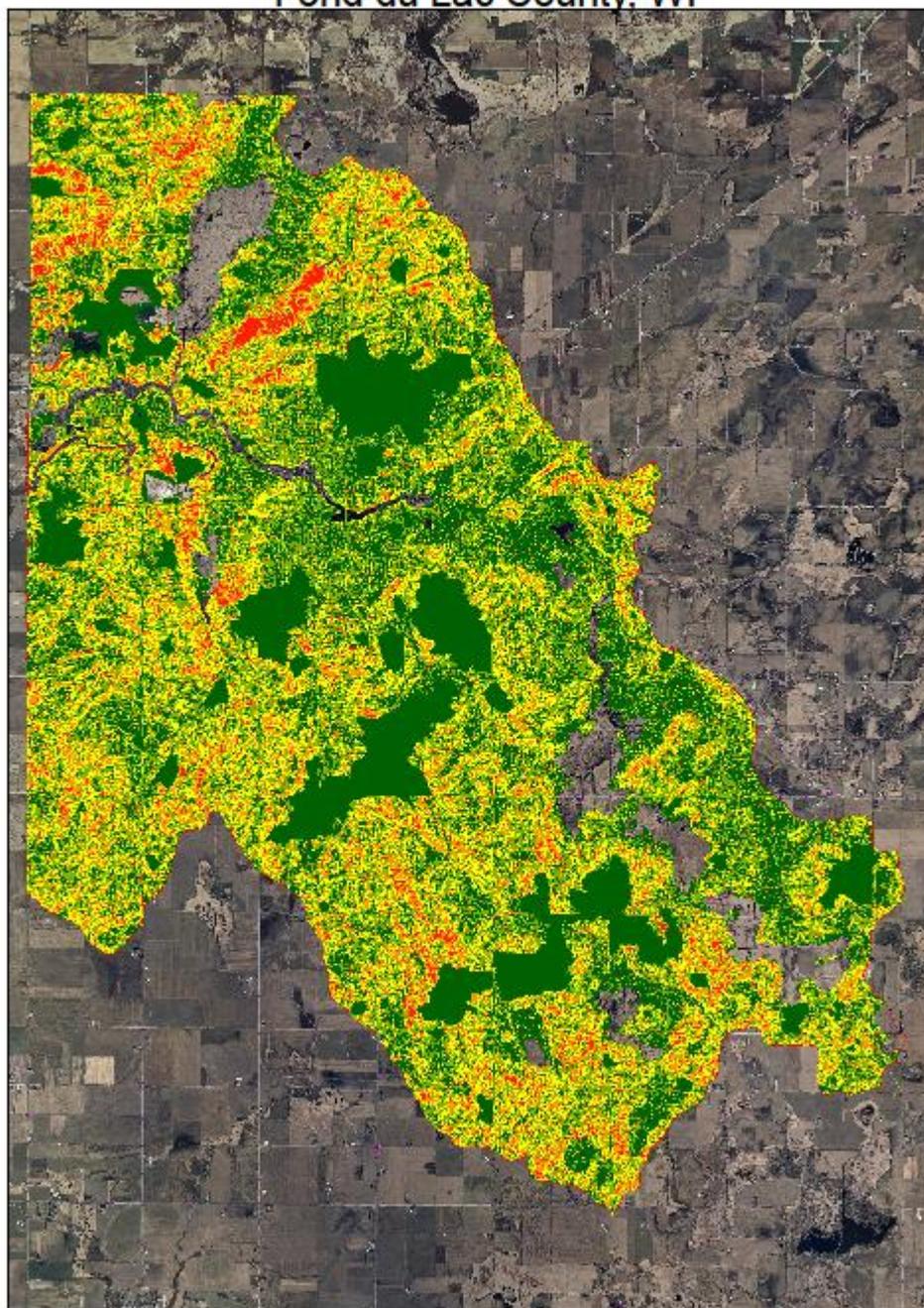


Legend  
Hydrography  
EVAAL Erosion Vulnerability Index  
<VALUE>  
0.224591285 - 1.102885457  
1.102885458 - 0.224308389  
0.224308390 - 1.739153801  
1.739153802 - 3.73891452  
3.738914521 - 11.82870497  
PipeCreek\_Watershed\_3D  
PipeCreek  
Village  
12377.94  
Low: 743.025  
PipeCreekWatershed

0 2,000 4,000  
Feet

Map 2-2

# EVAAL; Erosion Vulnerability Index Green Lake Watershed Fond du Lac County, WI



- Legend
- EVI
- <VALUE>
- 1.93774426 - -1.037768054
  - 1.037768053 - 0.312196255
  - 0.312196255 - 1.790726593
  - 1.790726594 - 3.783533049
  - 3.78353305 - 14.45467949
  - FondDuLac\_Culverts\_3D\_Projec3
  - GLWSSBound2

0 1 2 Miles

Map 2-3

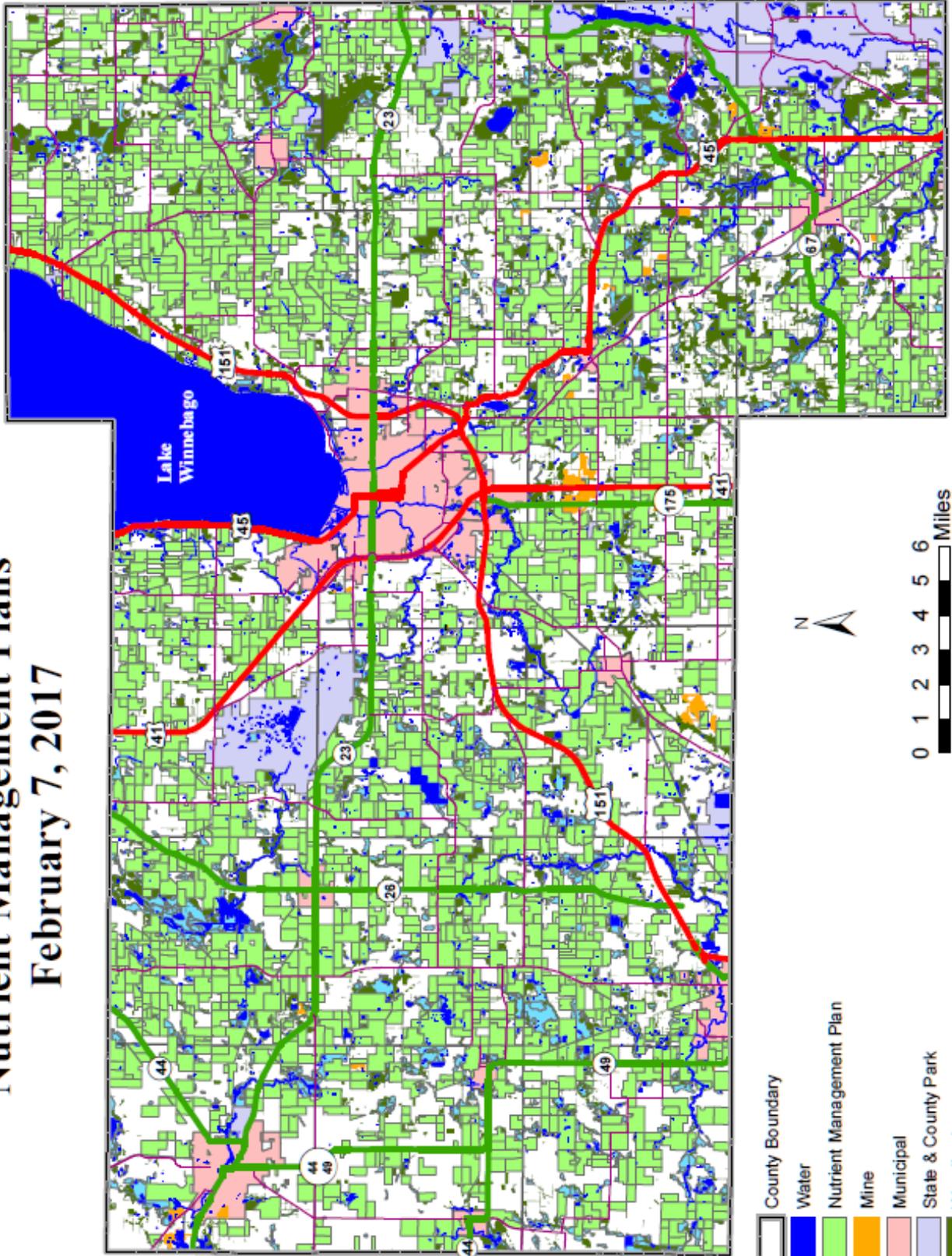
## **NUTRIENT MANAGEMENT PLANNING**

In 2016 Fond du Lac County had approximately 175,000 acres of cropland or roughly 75% that had 590 Nutrient Management Plans. Nearly all 590 Nutrient Management Plans are completed using Snap Plus software. Producers required to send an electronic copy of their updated nutrient management plan along with the signed checklist to the LWCD by March 31<sup>st</sup> of each year. The LWCD completes an annual review of completed nutrient management plans including review of soil loss information for each field.

Fond du Lac County Land & Water Conservation Department offers annual nutrient management training workshops for agronomists and producers to learn how to use the Snap-plus software for writing nutrient management plans. Fond du Lac County has been very active with utilizing the Nutrient Management Farmer Education Grant funding to assist with nutrient management planning education and implementation.

Nutrient Management Planning is also required under the Fond du Lac County Livestock Waste and Utilization Ordinance as part of the manure storage construction permit. Fond du Lac County currently has 900 claimants of the Wisconsin Farmland Preservation Program Tax Credit which also requires the development and implementation of nutrient Management plans. Map 2-4 shows current land within the county that have 590 nutrient management plans.

# Nutrient Management Plans February 7, 2017



Prepared by: Jim Anderson  
 Fond du Lac County, UWCD  
 February 7, 2017

## THE NIAGRA ESCARPMENT

Over half of Fond du Lac County is covered by the Niagara Escarpment (Map 2-5), which has emerged as a statewide critical natural resource area in recent years due to its unique geology, the presence of rare plants and animals, sensitivity to groundwater contamination, and growing development pressure. The global uniqueness of the Niagara Escarpment was documented in **THE NIAGARA ESCARPMENT INVENTORY FINDINGS 1999-2001 AND CONSIDERATIONS FOR MANAGEMENT FINAL REPORT, May, 2002.** This study also documents the relationships of rare plant and animal communities that rely on the Niagara Escarpment.

## MINERAL RESOURCES

The most important minerals produced in the county in order of value are limestone, sand and gravel, lime and clay. These minerals provide aggregate for construction, dimension stone for building and landscaping, sand, gravel and crushed stone for road building and maintenance, lime for agricultural purposes, masonry and the paper industry.

In 1966, a field survey conducted by the Department of Local Affairs and Development showed that there were 564 pits or quarries in Fond du Lac County. Many of those pits were abandoned or unused, which created an unsightly scar in the landscape and an entry point for potential groundwater contamination.

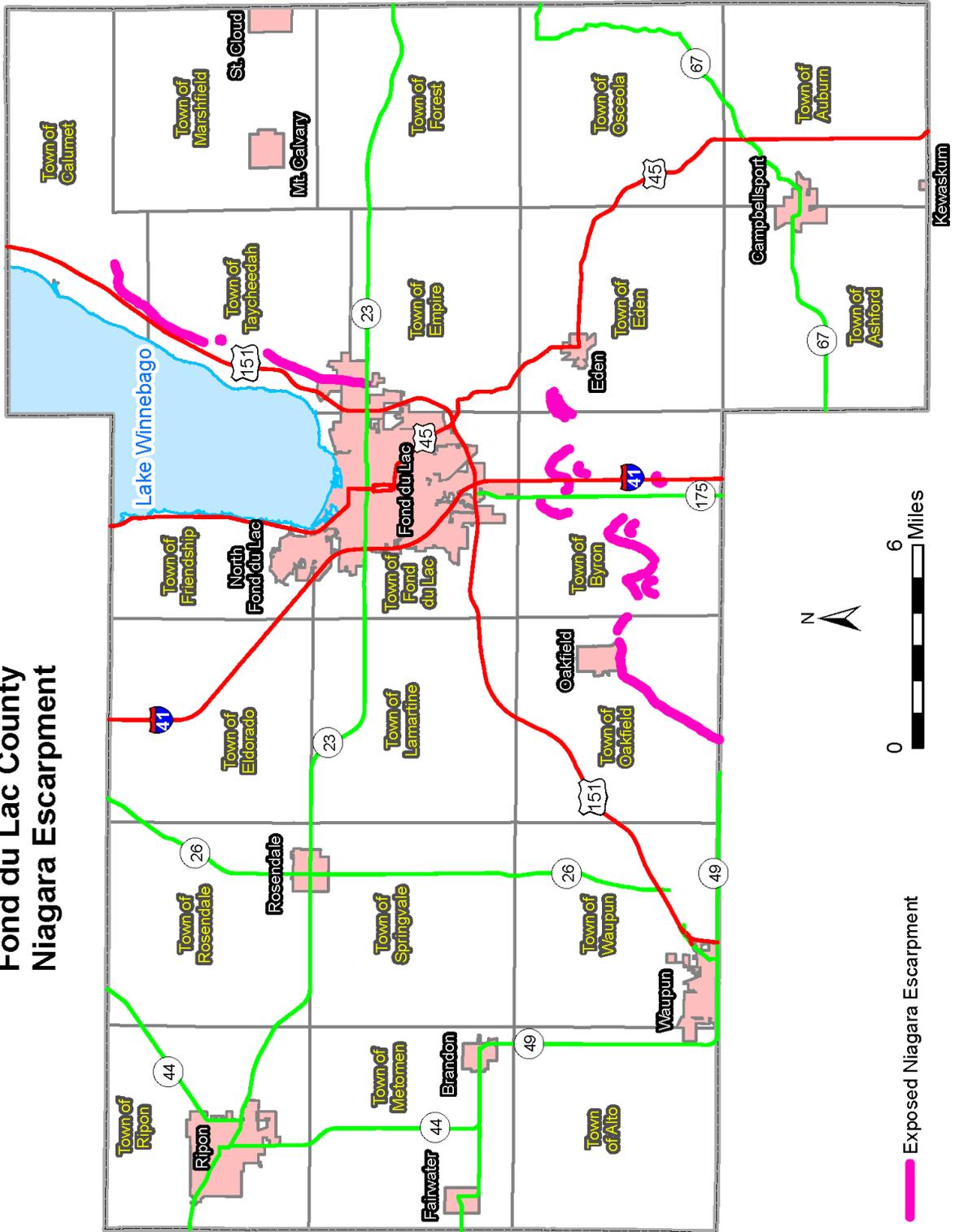
Due to the legacy of abandoned mines in Wisconsin and the absence of regulations Chapter NR 135 of the Wisconsin Administrative Code, titled Nonmetallic Mining Reclamation was developed. The purpose of the chapter is to require reclamation of nonmetallic sites.

By law, every county (except Milwaukee) in Wisconsin is required to enact an ordinance and administer a program that regulates the reclamation of nonmetallic mining sites. The nonmetallic mining reclamation program will ensure that mine sites are returned to a productive and beneficial land use once mining is completed.

The implementation of NR 135 encourages operators and communities at the county and town levels to assess the opening of new pits or quarries and carefully plan in the best interest of both the mineral industry and the consumer to utilize the mineral resources and preserve the natural beauty of the landscape.

As of January 2017 there are 53 nonmetallic mining reclamation permits issued for mines in Fond du Lac County. Landowners of property that contain marketable, nonmetallic mineral deposits are encouraged to register nonmetallic mineral deposits with the intent to reserve natural resources for the need of future generations.

# Fond du Lac County Niagara Escarpment



Map 2-5

## SURFACE WATER RESOURCES

According to the Wisconsin Lakes Book there are 42 lakes total in Fond du Lac County. Of these lakes, 31 are named and 11 are unnamed. Lake Winnebago is by far the largest of these lakes, and provides good opportunities for fishing and water sports. Public access to Lake Winnebago is adequate, but not well developed outside of the City of Fond du Lac.

Other lakes include Rush, Long, Kettle Moraine, Wolf, and Mauthe. All have public access and are well used for recreational purposes. Of the major lakes in the county, only Lake DeNeveu and Mullet Lake are not readily accessible to the public.

There are about 50 streams and rivers within Fond du Lac County, but most are small, slow and shallow. The longest sections of stream are the Milwaukee River, the Rock River and the Fond du Lac River.

Fishing is poor in most of the local streams, although some trout do exist at the headwaters of the East Branch of the Milwaukee River in the Kettle Moraine area, and in Parsons Creek before its confluence with the East Branch of the Fond du Lac River.

### Exceptional Resource Waters (ERW)

Waterbody Name	Portion Within ORW/ERW	Classification Status
Dotyville Creek	From headwaters east of County Road W to crossing at Northview Road	ERW
Feldner's Creek	From headwaters to Mischos Pond	ERW
Lake Fifteen Creek	Entire Creek above & below Lake Fifteen	ERW
East Branch Milwaukee River	From southern Long Lake to Fond du Lac County southern county line	ERW
Parsons Creek	From headwaters to intersection with the East tributary of Parsons Creek south of County Road B and east of Hickory Road	ERW
East Tributary to Parsons Creek	From headwaters east of Highway 41 to intersection with Parsons Creek south of County Road B and east of Hickory Road	ERW

These surface waters have excellent water quality and valued fisheries but already receive discharges. In some cases, new discharges to exceptional waters may be allowed to correct an environmental or public health problem. These streams are listed in NR 102.

### **303(d) IMPAIRED WATERS**

The U.S. Environmental Protection Agency (EPA) has directed the WDNR to establish a list of waters that do not meet water quality standards. This list, also known as the 303(d) list, includes both water quality criteria for specific substances and/or the designated uses of the waters. The EPA has directed the DNR to establish action plans to improve the waters to meet standards.

Impaired waters in Wisconsin are addressed through an analysis, known as a Total Maximum Daily Load (TMDL). A TMDL is the amount of a pollutant a waterbody can receive and still meet water quality standards. Basically, it is a pollution "budget" for a water body or watershed that establishes the pollutant reduction needed from each pollutant source to meet water quality goals. The following identifies surface waters in Fond du Lac County listed by the DNR impaired in the waters database as not meeting water quality standards:

<b>Local Name</b>	<b>Start Mile</b>	<b>End Mile</b>	<b>WBIC</b>	<b>Water Type</b>	<b>County</b>	<b>Pollutant</b>	<b>Impairment</b>	<b>Status</b>	<b>Priority</b>
Anderson Creek	0	7.26	133300	River	Fond du Lac	Total Phosphorus	Degraded Biological Community	Addition	High
Anderson Creek	0	7.26	133300	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Development	High
Byron Creek	0	1.66	137400	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Development	High
Byron Creek	1.67	7.26	137400	River	Fond du Lac	Sediment/Total Suspended Solids	Low DO, Elevated Water Temperature, Degraded Habitat	TMDL Development	High
DeNeveu Creek	0	11	138700	River	Fond du Lac	Total Phosphorus	Impairment Unknown	Proposed for List	High
Deneveu Creek	11	11.88	138700	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Development	High
East Branch Fond du Lac River	0	14.5	135900	River	Fond du Lac	Total Phosphorus	Impairment Unknown	TMDL Development	High
Fond Du Lac River	0	1.56	133700	River	Fond du Lac	Total Phosphorus	Water Quality Use Restrictions	TMDL Development	High

Local Name	Start Mile	End Mile	WBIC	Water Type	County	Pollutant	Impairment	Status	Priority
Fond Du Lac River	0	1.56	133700	River	Fond du Lac	PCBs	Contaminated Fish Tissue	303d Listed	Low
Fond Du Lac River	0	1.56	133700	River	Fond du Lac	Unspecified Metals	Chronic Aquatic Toxicity	303d Listed	Low
Forest Lake			8900	Lake	Fond du Lac	Mercury	Contaminated Fish Tissue	303d Listed	Low
Grand River	21	43	159300	River	Fond du Lac, Green Lake, Marquette	Total Phosphorus	Impairment Unknown	Proposed for List	High
Kummel Creek	11.54	14	863500	River	Dodge, Fond du Lac	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Kummel Creek	11.54	14	863500	River	Dodge, Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Kummel Creek	14	17.96	863500	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Kummel Creek	14	17.96	863500	River	Fond du Lac	Total Phosphorus	Low DO	TMDL Approved	Not Applicable

<b>Local Name</b>	<b>Start Mile</b>	<b>End Mile</b>	<b>WBIC</b>	<b>Water Type</b>	<b>County</b>	<b>Pollutant</b>	<b>Impairment</b>	<b>Status</b>	<b>Priority</b>
Lake Winnebago			131100	Lake	Calumet, Fond du Lac, Winnebago	Sediment/Total Suspended Solids	Turbidity	TMDL Development	High
Lake Winnebago			131100	Lake	Calumet, Fond du Lac, Winnebago	Total Phosphorus	Low DO, Eutrophication, Water Quality Use Restrictions, Excess Algal Growth	TMDL Development	High
Lake Winnebago			131100	Lake	Calumet, Fond du Lac, Winnebago	PCBs	Contaminated Fish Tissue	303d Listed	Low
Lake Winnebago			131100	Lake	Calumet, Fond du Lac, Winnebago	Mercury	Contaminated Fish Tissue	Pollutant Removed	Delisted 2008
Long Lake Kettle Moraine St. Park North Beach			38700	Inland Beach	Fond du Lac	E. coli	Recreational Restrictions - Pathogens	Water Delisted	Delisted 2010

Local Name	Start Mile	End Mile	WBIC	Water Type	County	Pollutant	Impairment	Status	Priority
Long Lake			38700	Lake	Fond du Lac, Sheboygan	Mercury	Contaminated Fish Tissue	303d Listed	Low
Mauthe Lake			38200	Lake	Fond du Lac	Mercury	Contaminated Fish Tissue	303d Listed	Low
Milwaukee River	68.5	103.34	15000	River	Fond du Lac, Washington	Unknown Pollutant	Elevated Water Temperature	Proposed for List	Low
Milwaukee River	68.5	103.34	15000	River	Fond du Lac, Washington	PCBs	Contaminated Sediment	Water Delisted	Delisted 2006
Mosher Creek	0	3	133500	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Development	High
Parsons Creek	0	2.58	136000	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Parsons Creek	0	2.58	136000	River	Fond du Lac	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable
Sevenmile Creek	0	11	136800	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Development	High

<b>Local Name</b>	<b>Start Mile</b>	<b>End Mile</b>	<b>WBIC</b>	<b>Water Type</b>	<b>County</b>	<b>Pollutant</b>	<b>Impairment</b>	<b>Status</b>	<b>Priority</b>
Silver Creek	0.97	12.41	146800	River	Fond du Lac, Green Lake	Sediment/Total Suspended Solids	Elevated Water Temperature, Degraded Habitat	TMDL Development	High
Silver Creek	12.41	14.36	146800	River	Fond du Lac	Sediment/Total Suspended Solids	Elevated Water Temperature, Degraded Habitat	TMDL Development	High
Manitowoc R. So. Branch	12.64	36.58	77900	River	Calumet, Fond du Lac	Total Phosphorus	Degraded Biological Community	Proposed for List	Medium
Rock River, South Branch	0	3.58	869800	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Rock River, South Branch	0	3.58	869800	River	Fond du Lac	Total Phosphorus	Low DO	TMDL Approved	Not Applicable

<b>Local Name</b>	<b>Start Mile</b>	<b>End Mile</b>	<b>WBIC</b>	<b>Water Type</b>	<b>County</b>	<b>Pollutant</b>	<b>Impairment</b>	<b>Status</b>	<b>Priority</b>
Rock River, South Branch	3.58	19.68	869800	River	Fond du Lac, Green Lake	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Rock River, South Branch	3.58	19.68	869800	River	Fond du Lac, Green Lake	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Local Water	0	3.72	138800	River	Fond du Lac	Total Phosphorus	Impairment Unknown	Proposed for List	High
North Tributary to Silver Creek	0	4.42	147400	River	Fond du Lac	Total Phosphorus	Impairment Unknown	Proposed for List	High
Unnamed Trib to Trib of S Br Rock R	0	5.01	871000	River	Fond du Lac	Total Phosphorus	Degraded Biological Community	Proposed for List	Medium
Un. Creek (T14n R18e Nw Ne 27)	0	5.7	44200	River	Fond du Lac	Total Phosphorus	Water Quality Use Restrictions	Proposed for List	Medium

<b>Local Name</b>	<b>Start Mile</b>	<b>End Mile</b>	<b>WBIC</b>	<b>Water Type</b>	<b>County</b>	<b>Pollutant</b>	<b>Impairment</b>	<b>Status</b>	<b>Priority</b>
Local Water	0	7.3	870400	River	Fond du Lac	Total Phosphorus	Impairment Unknown	Proposed for List	Medium
Local Water	0	7.87	870800	River	Fond du Lac	Total Phosphorus	Degraded Biological Community	Proposed for List	Medium
Unnamed Trib to Silver Creek	0	8.14	147700	River	Fond du Lac	Total Phosphorus	Impairment Unknown	Proposed for List	High
Tributary (E.BR) to DeNeveue Creek	0	8.53	139100	River	Fond du Lac	Total Phosphorus	Elevated Water Temperature, Degraded Habitat	TMDL Development	High
East Trib. to Parsons Cr	0.01	1.89	136200	River	Fond du Lac	Elevated Water Temperature	Low DO	TMDL Approved	Not Applicable
East Trib. to Parsons Cr	0.01	1.89	136200	River	Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Van Dyne Creek	1	9.11	132600	River	Fond du Lac, Winnebago	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Development	High

<b>Local Name</b>	<b>Start Mile</b>	<b>End Mile</b>	<b>WBIC</b>	<b>Water Type</b>	<b>County</b>	<b>Pollutant</b>	<b>Impairment</b>	<b>Status</b>	<b>Priority</b>
West Branch Fond Du Lac River	0	26	134000	River	Fond du Lac	Unknown Pollutant	Elevated Water Temperature	Proposed for List	Low
West Branch Fond Du Lac River	0	26	134000	River	Fond du Lac	Total Phosphorus	Water Quality Use Restrictions	Proposed for List	High
West Branch Milwaukee River	0	20.6	40400	River	Dodge, Fond du Lac, Washington	Total Phosphorus	Impairment Unknown	Proposed for List	Medium
Rock River, West Branch	50	87.63	861300	River	Dodge, Fond du Lac	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Rock River, West Branch	50	87.63	861300	River	Dodge, Fond du Lac	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable

## Overview of TMDL Process

The TMDL process was developed as part of Section 303(d) of the Clean Water Act. A TMDL is the amount of a pollutant a waterbody can receive and still meet water quality standards.

$TMDL = \text{Wasteload Allocation (WLA)} + \text{Load Allocation (LA)} + \text{Margin of Safety (MOS)}$ .

The WLA is the total allowable pollutant load from point sources (municipal and industrial wastewater facilities, CAFOs, and MS4s). The LA is the load assigned to nonpoint sources (agricultural runoff, non-regulated urban areas). The MOS is the margin of safety which accounts for uncertainty in the modeling.

To establish the TMDL, goals are defined using numeric water quality standards or applicable water quality targets based on narrative water quality standards. Water quality monitoring determines current pollutant loads to the water body. Sources of the pollutants are determined through monitoring and modeling. Modeling determines the existing load and the target load to calculate the load reduction from each pollutant source.

TMDLs involve a public process, including a minimum 30-day public comment period. Once comments are addressed, the TMDL is approved by the State of Wisconsin and the US Environmental Protection Agency. TMDL Implementation occurs through other programs such as the WPDES program and NPS program.

## DNR BASINS & WATERSHEDS

To develop a direction that addresses non-point source pollution and the impact it has on the environment one must first evaluate the natural resources within the county. The assessment of these resources is based on type, extent and location that are unique to the county. Fond du Lac County has land, which lies in five different drainage basins. A basin is an area of land that is made up of smaller watersheds. This makes it extremely important and beneficial for Fond du Lac County to develop and maintain working relationships with neighboring counties to address common goals and objectives to improve natural resources within basin areas

Surface waters in Fond du Lac County drain either to the Mississippi River Drainage Basin or the Lake Michigan Drainage Basin. In Fond du Lac County these two major drainage basins are comprised of five different DNR Management Basins which are made up of 13 major watersheds (Map 2-6).

The Beaver Dam Watershed, The Upper Rock River Watershed, & and The East Branch of the Rock River are all part of the Rock River Basin. The Rock River Basin is the only basin in Fond du Lac County that drains to the Mississippi River Basin.

The Upper Grand River Watershed, Big Green Lake Watershed, Fox River Watershed, Fond du Lac River Watershed, & East Lake Winnebago Watershed are all part of the Upper Fox River

Basin. The Manitowoc River Watershed is part of the Manitowoc River Basin. The Sheboygan River Watershed and the Mullet River Watershed are part of the Sheboygan River Basin. The East / West Branch Milwaukee River Watershed and the North Branch Milwaukee River Watershed are part of the Milwaukee River Basin. The Upper Fox River Basin, the Manitowoc River Basin, The Sheboygan River Basin, and the Milwaukee River Basin all drain to the Lake Michigan Basin.

The watershed summaries which follow provide a general description and location of the watersheds and assessments of the type of non-point source pollution that impacts these watersheds (See Table 2-1).

#### UPPER FOX RIVER BASIN:

Fox River Watershed

Big Green Lake Watershed - Previously a Priority Watershed Project Area

Grand River Watershed

Lake Winnebago East Watershed - Previously a Priority Watershed Project Area

Fond du Lac River Watershed - Previously a Priority Watershed Project Area

Winnebago West Watershed - Previously a Priority Watershed Project Area

#### UPPER ROCK RIVER BASIN:

Beaver Dam Watershed - Previously a Priority Watershed Project Area

Rock River Watershed

#### SHEBOYGAN RIVER BASIN:

Sheboygan River Watershed - Previously a Priority Watershed Project Area

Mullet River Watershed

#### LAKESHORE BASIN:

Manitowoc River Watershed

#### MILWAUKEE RIVER BASIN:

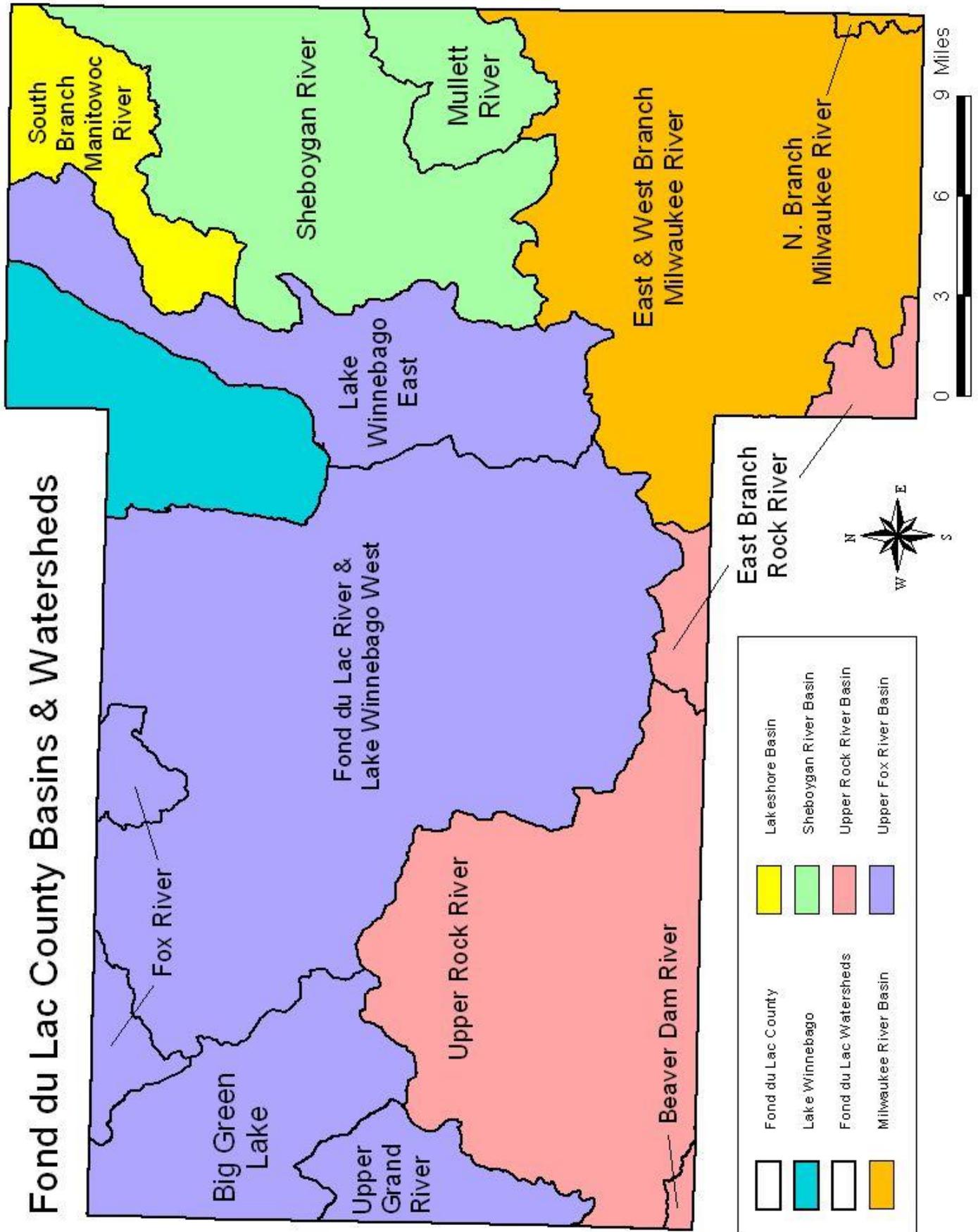
East/West Branch Milwaukee River Watershed - Previously a Priority Watershed Project Area

North Branch Milwaukee River Watershed - Previously a Priority Watershed Project Area

TABLE 2.1: WATERSHED SUMMARY

Watershed	DNR Watershed ID	Cropland acres within Fond du Lac County	Streambanks/Shoreline within Fond du Lac County	Area in 300' Water Quality Management Area (WQMA)	Cropped area in 300' Water Quality Management Area
Rush Creek / Fox River	UF05	7,520 Acres	16 Miles	1,235.5 Acres	951.1 Acres
Big Green Lake	UF07	20,068 Acres	45 Miles	3,229.9 Acres	1,590.3 Acres
Grand River	UF12	9,423 Acres	21 Miles	1,392.1 Acres	734.4 Acres
Lake Winnebago East	UF02	25,283 Acres	84 Miles	5,509.8 Acres	2,971.4 Acres
Fond du Lac River	UF03	86,753 Acres	310 Miles	21,151 Acres	11,235.9 Acres
Beaver Dam River	UR03	821 Acres	2 Miles	133.9 Acres	102.6 Acres
Upper Rock River	UR12	49,696 Acres	112 Miles	8,142.3 Acres	3,768.5 Acres
East Branch Rock River	UR13	6,699 Acres	15 Miles	1,116.5 Acres	767.9 Acres
Sheboygan River	SH03	36,212 Acres	82 Miles	5,768.3 Acres	2,824.2 Acres
Mullett River	SH05	6,363 Acres	15 Miles	812.0 Acres	218.7 Acres
Manitowoc River	MA05	13,434 Acres	28 Miles	2,048.2 Acres	1,285.7 Acres
East/West Branch Milwaukee River	MI06	45,460 Acres	143 Miles	9,478.4 Acres	2,543.6 Acres
North Branch Milwaukee River	MI05	393 Acres	1 Mile	46.4 Acres	26.1 Acres
TOTALS		308,125 Acres	874 Miles	60064.3 Acres	29020.4 Acres

# Fond du Lac County Basins & Watersheds



Map 2-6

## UPPER FOX RIVER BASIN

The Upper Fox River Basin is located in east central Wisconsin and encompasses a number of counties including all of Marquette County and portions of Adams, Calumet, Fond du Lac, Green Lake, Winnebago, Columbia, and Waushara Counties. The total area of the basin is 2,090 square miles. All streams draining to Lake Winnebago other than those in the Wolf River Basin are located within the Upper Fox Basin boundary. The Upper Fox River Basin is very diverse in land use and landscape. Agriculture, urbanization, recreation, and forestland are some of the major land uses that impact the basin. The Fond du Lac County portion of the Upper Fox River Basin is classified as the Southeast Glacial Plains Ecoregion in the description of the resource conditions of the Upper Fox. The streams in this ecoregion are slower moving, through agricultural lands, without the same groundwater base flow as the more western streams in the basin. The eastern streams are more subject to flash flows from runoff and carry comparatively more silt and clay during runoff events. There is very little opportunity for cold water species. These streams still play a crucial role in the character of the basin. These streams provide wildlife habitat as well as feeding open water marshes and sedge meadows. Additional information about the Upper Fox River Basin can be found on the Wisconsin Department of Natural Resources website

### Upper Fox-Wolf Basin TMDL

Many streams and lakes in the Upper-Fox Wolf Watershed including Lake Winnebago are listed as impaired on the EPA 303d Impaired Waters List primarily due to water quality impairments related to phosphorus and total suspended solids. A Total Maximum Daily Load Plan for the entire Upper Fox-Wolf Basin is in the process of being prepared but is not completed as of the writing of this plan. Additional information regarding the status of the TMDL and goals can be found on the WDNR website.

Preliminary information from the Upper Fox-Wolf Basin TMDL study shows that approximately 110,500 tons of sediment and 722,000 pounds of phosphorus reaches the system annually. 86% of the sediment loading and 61% of the phosphorus loading in the entire basin is coming from agriculture.

More specifically, 58,500 tons of sediment and 330,000 pounds of phosphorus reach the Upper Fox Basin system annually. 92% of the sediment loadings and 67% of the phosphorus loadings in the Upper Fox Basin. Point Sources contribute 17% of the total phosphorus in the Upper Fox Basin.

In Fond du Lac County watersheds that are contributing the top 10% of total phosphorus are the West Branch of the Fond du Lac River, Upper Grand River, and Silver Creek Watersheds.

Most other Upper Fox River Basin watersheds in Fond du Lac County also contribute high total phosphorus loads to the system.

Fond du Lac County portions of watersheds in the Upper Fox River Basin that contribute to the top 10% of sediment to the system are the West Branch of the Fond du Lac River, Campground Creek, and most of the East and West Lake Winnebago Watersheds (Watershed Modeling for the Upper Fox-Wolf Basins TMDL, The Camus Group, 6/15/2016).

### **Winnebago Waterways Project and Steering Team**

The Winnebago Waterways Steering Team is comprised of professionals around Lake Winnebago. The steering team was assembled in 2012 from agreement with County Executives (CEO's) of the counties surrounding Lake Winnebago in hope the water quality of the lake could be improved along with improved coordination. The steering team is currently made up of staff from Fond du Lac County, Calumet County, Winnebago County, DNR, UWEX, and Fox-Wolf Watershed Alliance. In late 2012 the Steering team was awarded a DNR Lake Planning Grant to begin working on Phase 1 with the assistance of a consultant. The purpose of Phase 1 was to gather public input of issues on Lake Winnebago. In mid-2013, the 3 main issues from Phase 1 facing the lake were runoff, algae blooms, and aquatic invasive species.

In late 2013 the steering team began working on Phase II to determine the best structure to move forward with addressing the issues identified in Phase I. The steering team was awarded another Lake Planning Grant and worked with the same consultant in Phase I to research and assess feasibility and options to best address the issues identified in Phase 1. After additional public input sessions were held, the final report from Phase 2 was completed in August of 2014. The final report included various organizational structures, both short and long term, for moving forward to address issues identified from the social input in Phase 1. The results were presented back to the CEO's of Fond du Lac, Calumet, and Winnebago counties. The CEO's asked the steering team to come back to them with recommendations on organizational structures. In early 2015 the team recommended to the CEO's that for the short term the steering team be maintained and work on a Lake Management Plan for the Lake Winnebago system. To begin, however additional coordination would be needed. The three county CEO's agreed that each would plan for \$15K in the 2016 budget for a half time coordinator for the steering team to work on a lake management plan. In mid-2015 the steering team began preparing a request for proposals to be sent out to various organizations to host the coordinator position. The steering team also worked on funding options for the lake management plan with the assumption that the coordinator would be in place to begin the plan development. In late 2016, Fox-Wolf Watershed Alliance was contracted for the coordinator position and began working on coordination of the lake management plan. This included applying for DNR Lake Planning Grants. More information

about the Winnebago Waterways Project including the development of the Lake Winnebago System Lake Management Plan is available on the Fox-Wolf Watershed Alliance website.

### **RUSH CREEK / FOX RIVER WATERSHED (Map 2-7)**

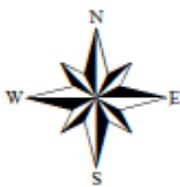
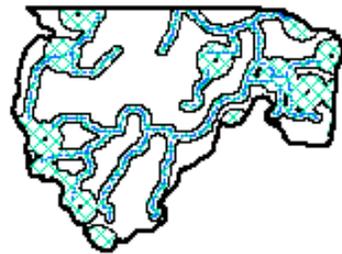
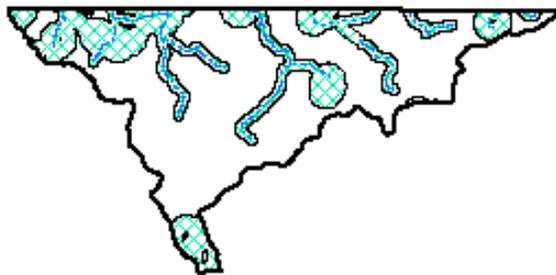
The Fox River Watershed is part of the Fox River/Rush Lake Watershed. There are 13,826.5 acres of wetlands in this watershed. Only a small portion of this watershed is in Fond du Lac County the rest extends into Winnebago County. The primary land use of this watershed is agriculture consisting of cash grain and small dairies. The non-point source of pollution in this area is mainly from agriculture related practices. This watershed is ranked high by the DNR for runoff impacts on streams, high for runoff impacts on lakes and high for runoff impacts on groundwater and therefore has an overall rank of high.

Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of Rush Creek / Fox River Watershed:

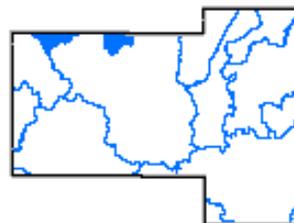
- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.

# Rush Creek Watershed

Water Quality Management Areas



-  Watershed Boundary
-  300 Ft from streams, 1000 Ft from lakes
-  Intermittent Stream
-  Perennial Stream



Map 2-7

## **BIG GREEN LAKE WATERSHED (Map 2-8)**

This watershed is located in the northwestern corner of Fond du Lac and extends into Green Lake County. Green Lake is 7,346 acres in size and has a maximum depth of 236 feet. Green Lake is the second largest lake in Wisconsin by volume surpassed only by Lake Winnebago. Because of its size and depth, Big Green boasts a variety of both warm and cold water sport fisheries. The total drainage of this watershed is approximately 114 square miles with 42.6 square miles located in Fond du Lac County.

Silver Creek (14 miles) drains the largest sub-watershed (58 sq. mi) in the Big Green Lake Watershed. It drains through predominately agricultural areas, but also drains urban areas including the City of Ripon. Stream monitoring data from 1988 to 1995 on this creek shows 15,432 lbs. P to the Green Lake inlet site. The most significant source of P is likely from upland sediment from agricultural fields. This creek is listed on the 303(d) list as a water source not currently meeting water quality standards for sediment and elevated water temperatures. It is estimated that 41% of the annual phosphorus load to Big Green Lake is coming from Silver Creek.

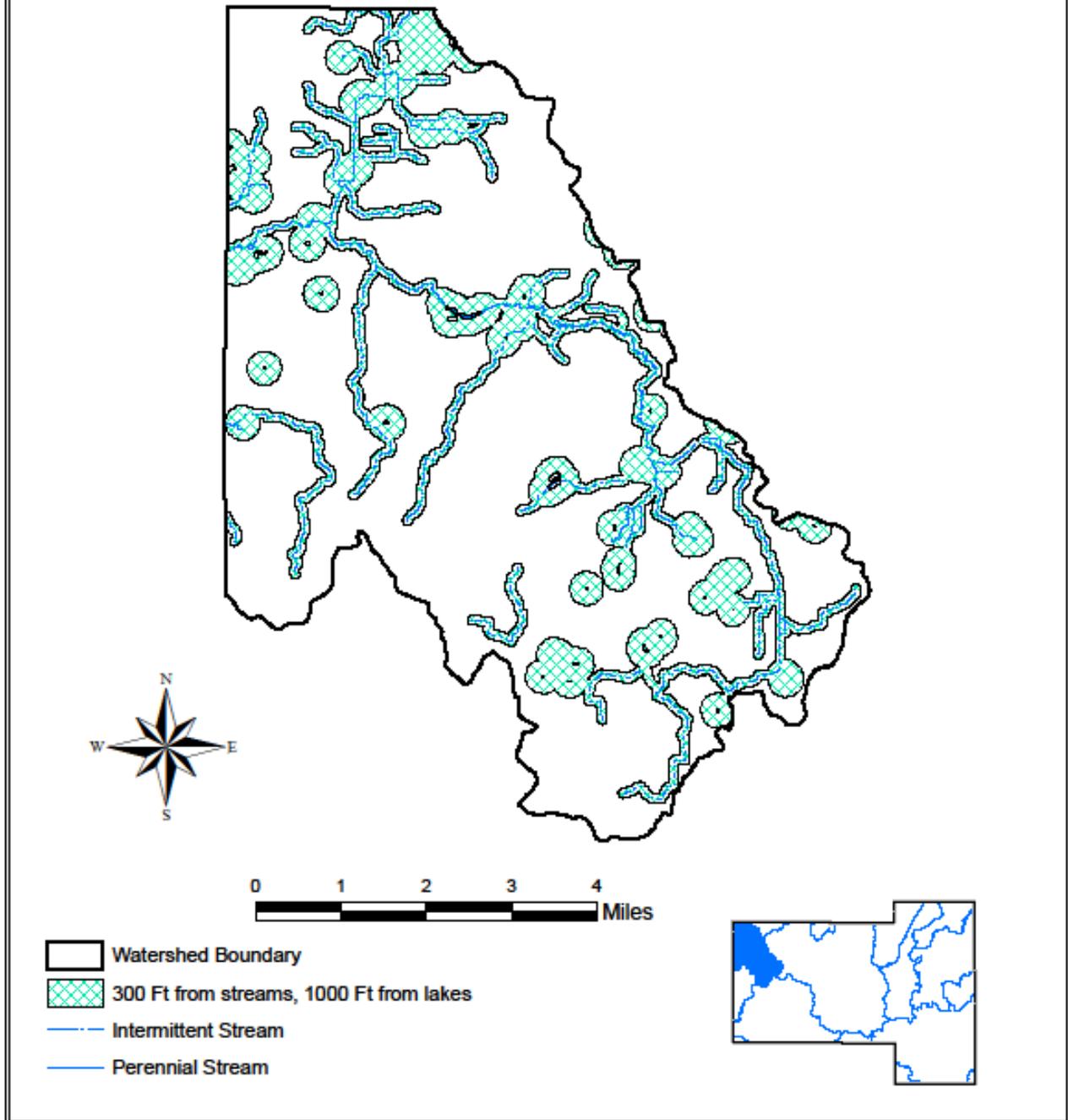
Big Green Lake's diversity in depth and volume tends to mask its water quality issues. This watershed was selected in 1981 as a priority watershed under the Wisconsin Non-point Source Water Pollution Abatement Program and ended in 1992. Recent water quality monitoring by USGS indicates that phosphorus levels have remained consistent over the last several years.

Green Lake County LWCD and NRCS offices implemented numerous conservation practices through the USDA-NRCS National Water Quality Initiative, which is still ongoing as of the writing of this plan. In early 2013 a team of conservation partners used extensive water quality data available in the Green Lake Watershed to develop a Lake Management Plan that will continue to improve the quality of the lake. Partners for this plan include the Green Lake Sanitary District, Green Lake Association, Green Lake and Fond du Lac County LWCD's, Green Lake Conservancy, Wisconsin Department of Natural Resources, and the United States Geological Survey, along with interested citizens. The conservation partnership team continues to work with other entities to improve or provide information about the water quality of Green Lake. This Lake Management Plan was developed using extensive historical data and it is intended to be a living document that can be modified as new information or initiatives become available.

In 2015, Green Lake LWCD completed a streambank inventory of Silver Creek that will provide valuable information about potential streambank restoration needs. Also in 2015, both Green Lake and Fond du Lac County compiled information using the DNR EVAAL tool that can help focus efforts to reduce soil erosion. The Green Lake Sanitary District also partnered with the Green Lake Association to apply for a DNR Lake Protection Grant that will 1) study low oxygen levels found within the thermocline and 2) provide cost sharing for conservation practices that

# Big Green Lake Watershed

Water Quality Management Areas



Map 2-8

reduces sediment or phosphorus runoff in the watershed. The Green Lake Sanitary District has contracted with a former NRCS employee to contact landowners about potential conservation projects and funding opportunities. Any interested landowners will then work with Fond du Lac LWCD staff for technical assistance to install the practice.

Conservation practices that are targeted in the Big Green Watershed are intended to reduce sediment and nutrient delivery to Big Green Lake. Some of those practices are Water and Sediment Control Structures (WASCOB's), Grassed Waterways, Grade Stabilization Structures, Streambank Restoration, Vegetated Buffers, and Wetland Restorations to name a few. Green Lake Sanitary District is also offering up to 100% cost sharing for installation of certain conservation practices along with practice maintenance in perpetuity to help improve water quality of the Lake. Additionally the following additional objectives are recommended:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.



## GRAND RIVER WATERSHED (Map 2-9)

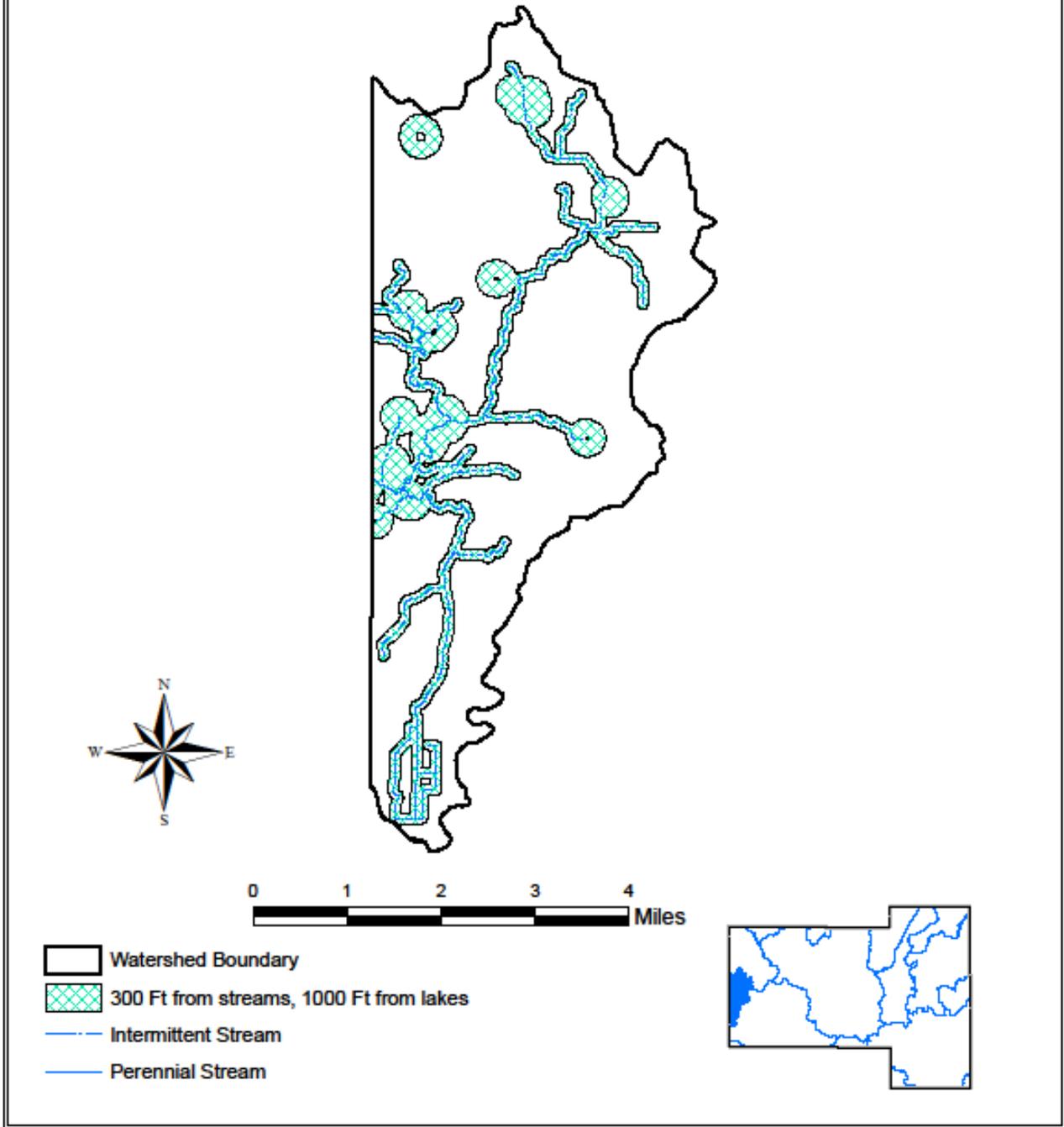
This watershed is located in the southwestern part of Fond du Lac County and extends into Green Lake County. The watershed is 62 square miles and 18 square miles of it is located in Fond du Lac County. Agriculture makes up 76% of the watershed and 8% is grasslands. The river shoreline varies in nature according to the adjacent land use. Common shoreline uses are open marsh, farm pasture, and cultivated cropland.

This watershed is ranked high for nonpoint source issues affecting groundwater and medium for nonpoint source issues affecting streams. Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the Grand River Watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.

# Upper Grand River Watershed

Water Quality Management Areas



Map 2-9

## **FOND DU LAC RIVER WATERSHED (Map 2-10)**

This watershed is located in the western half of Fond du Lac County. The watershed drains approximately 249 square miles west of Lake Winnebago and extends into Winnebago County. Eighty three percent of the watershed is located within Fond du Lac County. Agriculture is the major land use in the watershed with dairy, grain and production of canning crops being the dominant uses.

This watershed was selected as a priority watershed through the Non-point Source Water Pollution Abatement Program in 1995 and inventory work started in 1996. Results from the inventory showed that sediment and nutrient loading from agricultural practices are the most significant source of non-point source pollution. Other major sources include urban runoff and streambank erosion. The Winnebago Comprehensive Management Plan lists the watershed as being a major contributor of sediment to the Lake Winnebago System.

The Nonpoint Source Control Plan for the Fond du Lac River Watershed estimated a 40% sediment reduction goal from cropland erosion and a 25% sediment reduction from streambank erosion. The plan also estimated a 50% reduction in phosphorus from barnyard runoff. This watershed was combined with Winnebago West Watershed and run as one Priority Watershed Project. The Watershed is ranked high for nonpoint source issues affecting streams and groundwater. According to the DNR surface water database, many of the stream segments in the watershed are rated as poor or unknown for Fish and Aquatic Life Conditions.

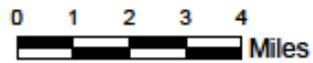
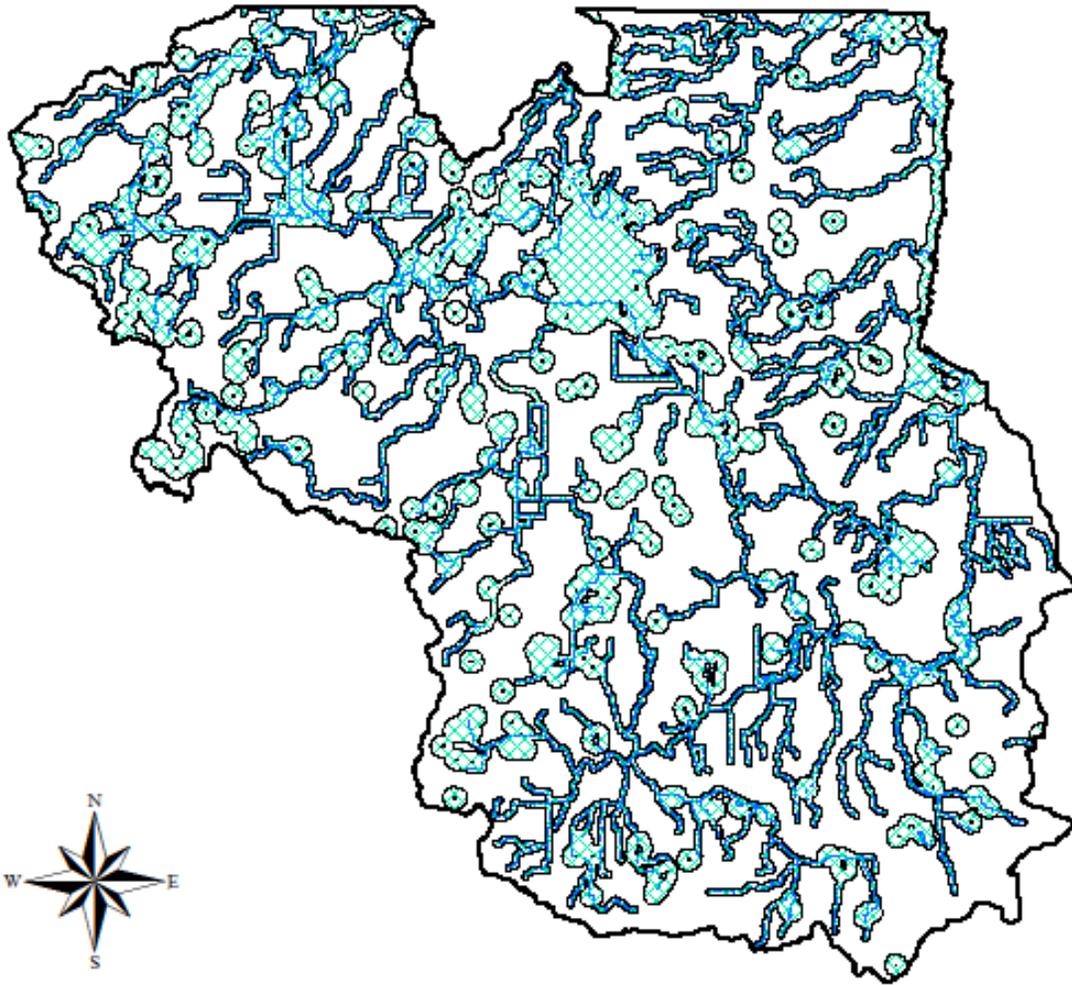
### **East Branch Subwatershed (14.5 miles):**

This branch of the Fond du Lac River drains an area of 82.1 square miles. The dominant land use is agriculture, which is mainly dairy, cash-cropping, and vegetable production. Of all the surface water in this watershed, the East Branch has a very low gradient and therefore is susceptible to sedimentation. The existing biological use for the East Branch is Warm Water Sport Fish (WWSF). However; surveys conducted throughout the summer of 1996 showed very few sport fish being present. Rough fish and several species of forage fish dominated the survey. The East Branch travels through the most intensively managed agricultural land in the entire watershed. Factors impacting water quality include sediment and nutrient loading from agricultural fields, barnyard runoff, stream bank erosion, turbidity, lack of habitat, low dissolved oxygen, common carp, hydrologic manipulation, channelization, urban runoff and construction site erosion. The East Branch is the largest single contributor to Lake Winnebago (Bruch, 1988).

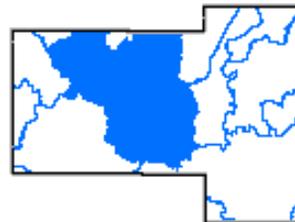
The following objectives were recommended for improving surface waters of the East Branch Subwatershed in the Nonpoint Control Plan of the Fond du Lac River Priority Watershed Project.

# Fond du Lac River Watershed

Water Quality Management Areas



- Watershed Boundary
- 300 Ft from streams, 1000 Ft from lakes
- Intermittent Stream
- Perennial Stream



Map 2-10

Significantly reduce sediment and nutrient loads from agricultural fields, intermittent waterways, and barnyards to enhance overall water quality.

- Significantly reduce upland sediment transport through conservation tillage programs.
- Significantly reduce sediment loads from streambank erosion through stream bank stabilization (shaping, seeding, rip-rap, etc.).
- Protect and Enhance current wetlands on Sevenmile Creek.
- Restore wetlands previously altered for agricultural purposes to increase wildlife habitat and improve water quality.
- Maintain grassland buffers, grassed waterways, wetlands, and upland buffers to aid in retention of sediment and nutrients.
- Maintain proper construction site erosion control practices through the use of environmentally protective land use planning, educational workshops, and installation of BMPs.

In addition landowners and farmers should achieve compliance with the State of Wisconsin NR151 Soil and Water Conservation Standards to reduce runoff.

### **West Branch Subwatershed (26 miles):**

This river has a drainage area of 85.1 square miles and originates from a small wetland south of Rosendale Center. The current biological use for the West Branch Fond du Lac River is Warm Water Sport Fish (WWSF). The dominant land use in this watershed is agriculture, habitat restoration areas, large wetlands, narrow woodlots, urban development and small rural subdivisions. The impact on water quality is sediment and nutrient loading from agricultural fields, barnyard runoff, stream bank erosion, periods of turbidity, wetland loading, hydrologic manipulation, urban runoff and construction site erosion.

The following objectives were recommended for improving surface waters of the West Branch Subwatershed in the Nonpoint Control Plan of the Fond du Lac River Priority Watershed Project.

- Significantly reduce sediment and nutrient loads from agricultural fields and barnyard runoff to enhance overall water quality.
- Maintain proper native grassland buffers, grassed waterways, and other buffer areas to aid in nutrient uptake and sediment retention. Try to increase the amount of CRP, HRA, and WP A acres throughout the watershed.

- Maintain proper construction site erosion control practices in areas where soil has been disturbed (residential, commercial, or highways) through the use of planning, educational workshops, and proper installation of BMPs.
- Protect, maintain, and enhance the Eldorado Marsh Wildlife Area. Ongoing management efforts should continue to ensure this resource will continue to flourish with wildlife.
- Promote proper soil conserving tillage practices to reduce soil and nutrient loss.
- Restore and repair eroded streambanks and gullies using rip-rap, shaping, sloping, and seeding.
- Protect and enhance existing wetlands, particularly those upstream of STH 23 to the headwaters of the West Branch and its tributaries.
- Restore wetlands previously drained for agricultural purposes to increase wildlife habitat and improve overall water quality.

In addition landowners and farmers should achieve compliance with the State of Wisconsin NR151 Soil and Water Conservation Standards to reduce runoff.

### **Campground and Parsons Creek Subwatershed (12.3 Miles):**

Campground Creek is the smallest of the four subwatersheds (12,674 acres); it contains two named streams (Parsons and Campground Creek), and several unnamed intermittent and perennial tributaries. There are several drainage ditch systems covering large expanses of agricultural soils. These systems maintain flow throughout the entire year contributing large amounts of soil to adjacent surface waters. This subwatershed contains 9.0 miles of stream classified as Cold Water Class I and II trout water. Parsons Creek has two miles of the trout water considered to be Exceptional Resource Waters as defined by S.NR 102.11, Wis. Adm. Code. This subwatershed has a drainage area of 19.8 square miles with land use dominated by agriculture: dairy farming, cash cropping, and vegetable production. The remaining land uses include wetlands, woodlands, and residential development.

The following objectives were recommended for improving surface waters of the Campground Creek and Parsons Creek Subwatershed in the Nonpoint Control Plan of the Fond du Lac River Priority Watershed Project.

- Significantly reduce sediment and nutrient loading from agricultural fields, intermittent waterways, and barnyards to enhance overall water quality.
- Improve the fishery, including restoration of cold-water species, by making habitat improvements.

- Protect streambanks and address gully erosion on Parsons and Campground Creek by implementing Best Management Practices (BMP's).
- Maintain native grassland buffers, grassed waterways, woodland, wetland, and upland buffers to help mitigate sediment erosion and nutrient enrichment.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed through the use of environmentally protective land use planning, educational workshops, and installation of BMP's.
- Prevent fish kills through proper handling and disposal of canning wastes and livestock manure.

In addition landowners and farmers should achieve compliance with the State of Wisconsin NR151 Soil and Water Conservation Standards to reduce runoff.

## **WINNEBAGO WEST WATERSHED**

This watershed is located west of Lake Winnebago and is located in Fond du Lac and Winnebago Counties. The City of Oshkosh is located on the north and the City of Fond du Lac is located on the south end of this watershed.

In 1995 this watershed was selected and combined with the Fond du Lac River Watershed under Wisconsin's Non-point Source Water Pollution Abatement Program to become a priority watershed project. Numerous storm sewer outlets discharge directly into Lake Winnebago from this area. Currently there are several large drainage ditch systems that drain large expanses of agricultural land. Urban development is expected to continue in this area so runoff is expected to increase in the future.

Mosher Creek (3 miles) This intermittent stream flows northeasterly through the center of the Village of North Fond du Lac. The current biological use is considered intermittent for 2.8 miles and fish and aquatic life for 0.2 miles. Fish surveys were not conducted on this creek due to the intermittent nature. The land use in this area is predominately agriculture and urban development with areas of small woodlots and small wetlands. Nutrient and sediment loading from urban and agricultural runoff, loss of habitat, low flow, low dissolved oxygen, high temperatures, stream bank erosion and construction site erosion are factors all influencing the water quality in this area.

Anderson Creek (5 miles) This intermittent stream flows easterly to Lake Winnebago on the north side of the Village of North Fond du Lac. During high runoff periods this creek turns very flashy which then delivers excessive sediment and nutrients. The land use in this area is intensive agriculture and small wetlands with increasing urban development. Sediment and nutrient loading from agriculture, urban practices, and construction site erosion influence the water quality of this creek. Habitat evaluations were conducted on this creek and were rated fair to poor due to the intermittent nature of the creek.

Van Dyne Creek (8 miles) This intermittent tributary originates in the township of Eldorado and drains an area of 9.59 square miles with a gradient of 13.7 feet per mile. Agriculture, urban development, narrow wetlands and small woodlots are the dominant land uses. Factors influencing water quality include sediment and nutrient loading from urban, agricultural and barnyard runoff, intermittent nature of stream flow, high temperatures, low dissolved oxygen, loss of habitat, and channelization of stream and construction site erosion. Habitat evaluations were conducted at eleven locations reflecting a fair to poor habitat score.

The following objectives were recommended for improving surface waters of the Winnebago West Subwatershed in the Nonpoint Control Plan of the Fond du Lac River Priority Watershed Project.

- Reduce sediment and nutrient loading from agricultural fields, intermittent waterways, and barnyards by a high level to enhance overall water quality.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-up, tall grass prairie restoration, and by creating more habitat restoration areas (HRA's) similar to those in Winnebago County.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Prevent future fish kills through proper handling of point source discharges.
- Emphasize the importance of soil conservation tillage practices to reduce soil and nutrient loss.
- Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.

In addition landowners and farmers should achieve compliance with the State of Wisconsin NR151 Soil and Water Conservation Standards to reduce runoff.

### **Priority Watershed Water Quality Evaluation for the Fond du Lac River Watershed Fond du Lac County, Wisconsin (Bolha, WDNR, Feb 2017)**

This project evaluated water quality improvements made in the Fond Du Lac River Watershed from 1997 through 2008 as part of the Fond Du Lac River Priority Watershed Project.

This project determined if the goals of the Priority Watershed Project to implement Best Management Practices (BMPs) to reduce Nonpoint Source (NPS) loads and enhance the water quality were met by collecting biological, physical and chemistry information throughout the watershed in 2015 and 2016.



## WINNEBAGO EAST WATERSHED (Map 2-11)

This watershed is located east of Lake Winnebago and is located in Fond du Lac and Calumet Counties. This watershed drains from approximately 93 square miles with 66 percent of the watershed located in Fond du Lac County.

Under the Wisconsin Non-point Source Water Pollution Abatement Program this watershed was a priority watershed starting in 1989 and ending in 2004. Two land features dominate the watershed; the rolling land in the eastern and southern parts of the watershed and the more level lands found in the western part. The Niagara Escarpment or "ledge" as it is known locally predominates throughout this watershed. The soils within this watershed are characterized as heavy clay soils with poor infiltration and high fertility. Predominate land use in this watershed has been agriculture; however, there is continual pressure from urban development. The eastern half of the City of Fond du Lac is located within this watershed. The non-point source pollution in this area can be contributed to the sediment and nutrient loading from agriculture and urban practices, loss of habitat, and construction site erosion.

Taycheedah Creek (10 miles) This stream is one of the major streams in the Lake Winnebago East watershed. Most of Taycheedah Creek is classified as a warm water sport fish community. Evaluations of water quality in the Taycheedah Creek show that it is in a degraded state. After rainfall or snowmelt the stream is very turbid and water clarity is very poor. Agriculture and increased urbanization pressure are the suspected sources. Habitat evaluations classify the Upper Taycheedah as fair habitat compared to the Lower Taycheedah.

DeNeveu Creek (11 miles) This is the longest stream in the Lake Winnebago East Watershed. The land use is agriculture and urban with increased pressure of urbanization along this stream. The majority of the City of Fond du Lac's storm water is pumped through the storm water sewer system, which goes directly into DeNeveu Creek. Water quality impacts are water turbidity, loss of habitat, hydrologic modifications, sediment and nutrient loading from urban and rural sources. After snowmelt or rainfall this stream can become extremely turbid. This stream is classified as supporting warm water forage fish community.

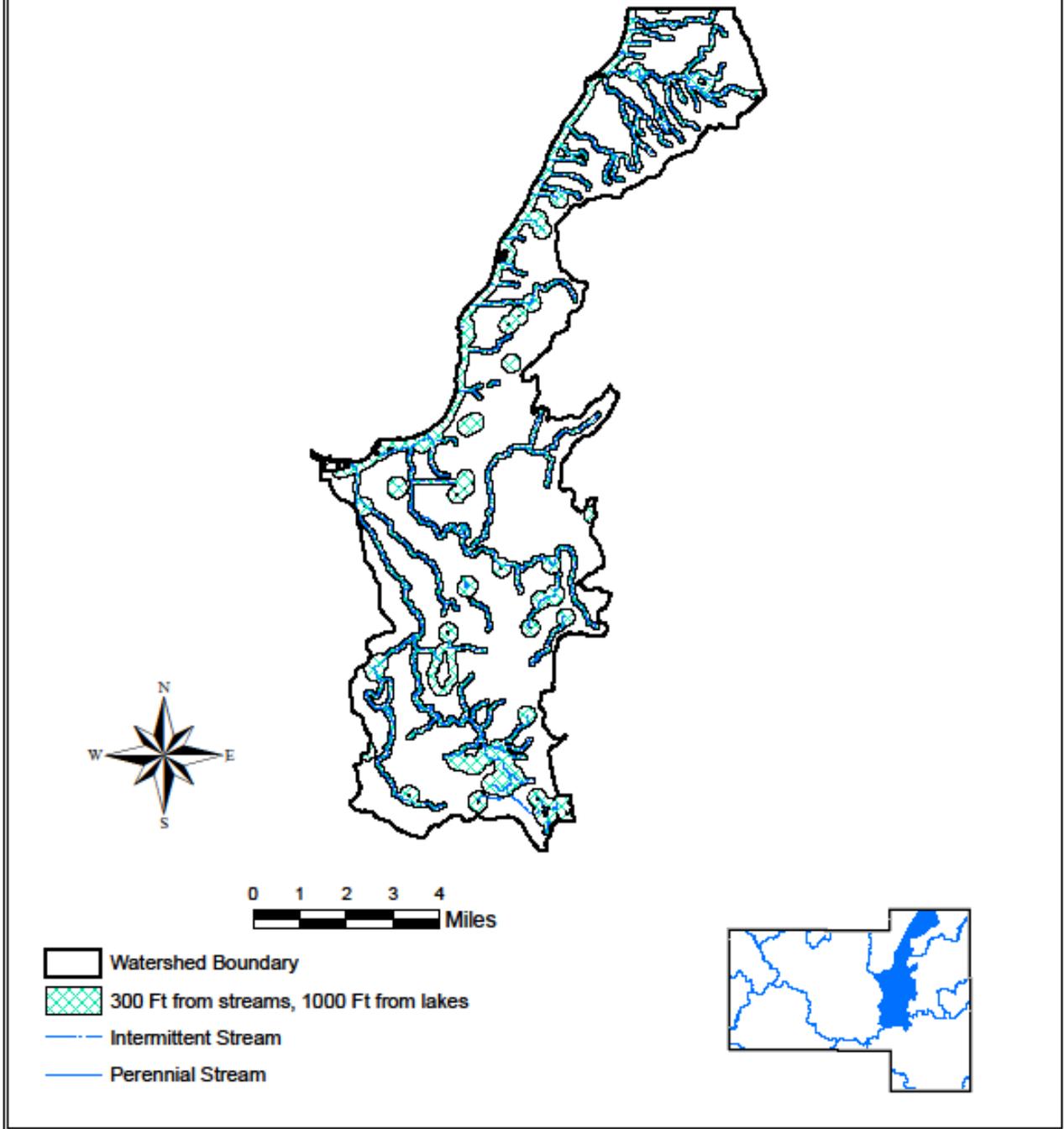
The Nonpoint Source Control Plan for the Lake Winnebago East watershed identified a 33% overall reduction in sediment from upland erosion and a 70% reduction in phosphorus from barnyard runoff. The watershed is ranked high for nonpoint sources affecting streams and groundwater. According to the DNR surface water database, many of the stream segments in the watershed are rated as poor or unknown for Fish and Aquatic Life Conditions.

The following objectives are recommended for improving surface waters of the Winnebago East watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.

# East Shore of Lake Winnebago Watershed

Water Quality Management Areas



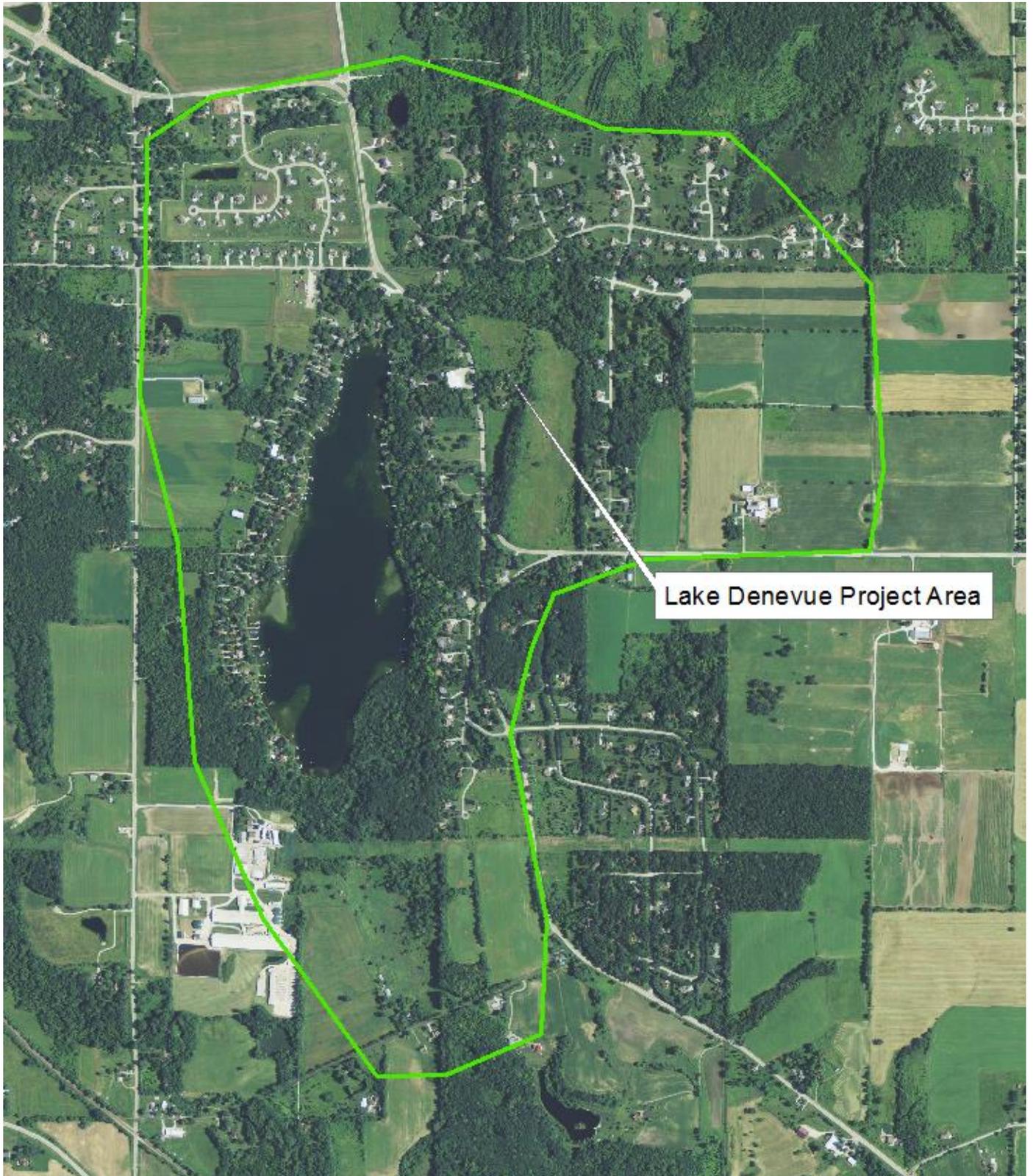
Map 2-11

Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures, intermittent waterways, and barnyards with .

- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
- Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.

### **Lake DeNevue Watershed Project**

Lake DeNevue is located in the southern portion of Lake Winnebago East Watershed. Lake DeNevue is currently experiencing increased flooding and runoff on the east and northeast parts of the lake. It is believed by lakeshore homeowners that the increase in the frequency of flooding and runoff is related to changes in drainage from urban development in the northeastern part of the watershed. In 2015, The Town of Empire requested assistance from the East Central Wisconsin Regional Planning Commission (ECWRPC) to study and make recommendations to address the concern. ECWRPC's report was completed in July, 2015. In 2016, stakeholders were convened to discuss possible next steps for implementation of the recommendations. A 3 phase program was developed. In phase 1, an engineering firm was secured to begin developing plans for implementing projects and/or best management practices to reduce runoff and mitigate flooding. In phase 2, the engineering firm will then develop plans for the specific projects that stakeholders select. Phase 3 will then work towards implementation of the selected projects.



Map 2-12

## **Pipe Creek Watershed Project**

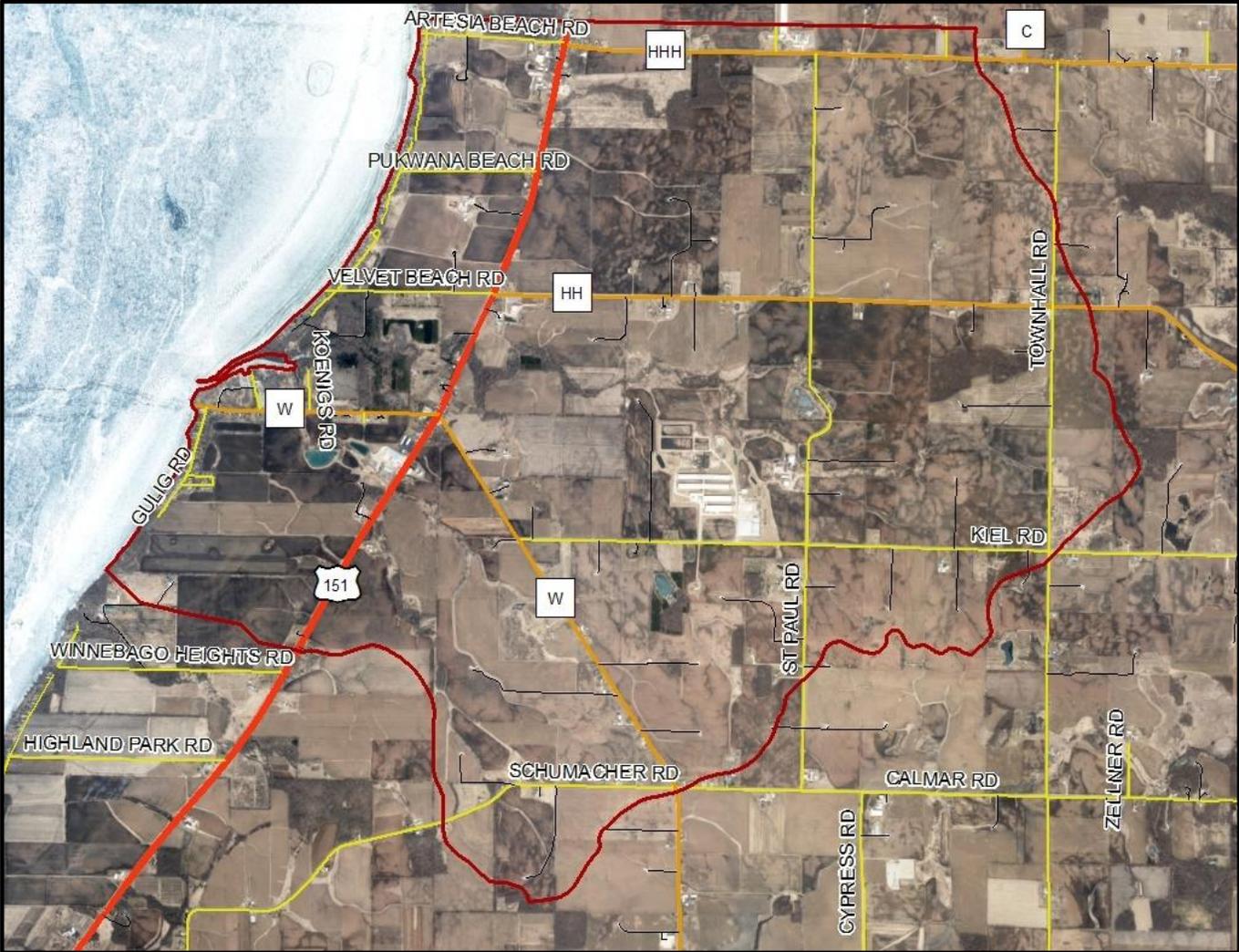
The watershed project area is approximately 5,463 acres in size and includes the unnamed tributaries north of Pipe Creek to the Fond du Lac County line. The Pipe Creek Watershed is the northern most sub-watershed in the Fond du Lac County portion of the Lake Winnebago East watershed and also located in the Upper Fox River Drainage Basin. The watershed is located exclusively in the Town of Calumet. Pipe Creek and the unnamed tributaries to the north flow westerly to Lake Winnebago. The land use in the watershed is predominantly agricultural with heavy residential development along the lake shore. The Niagara Escarpment formation, or ledge, runs mostly north and south through the middle of the watershed generally following the STH 151 corridor. The highest elevation in the in the watershed is 1000 feet above sea level, with an elevation drop of approximately 250 feet within 2.5 miles to the lakeshore.

The Pipe Creek Watershed has experienced considerable impairments due to runoff quality and quantity. Landowners have expressed concerns over increased runoff resulting in decreased water quality and also an increased frequency of flooding. Landowners also expressed that flooding along the lakeshore of Lake Winnebago has increased over time not only due to changing hydrology throughout the entire watershed but also due to compounding drainage changes along US HWY 151. These changes in hydrology over time have increased the quantity of water flowing through traditional watercourses which ultimately is affecting water quality in the watershed and Lake Winnebago.

A partial assessment for BMP identification has been completed in the Pipe Creek Watershed by the Fond du Lac County Land & Water Conservation Department (LWCD) in cooperation with the Wisconsin Department of Agriculture, Trade, and Consumer Protection (WDACTP) to determine BMP's that could initially improve both water quality and reduce water quantity issues. The LWCD also met some landowners and producers in the watershed as well as lakeshore homeowners of Lake Winnebago in 2014 to get input on issues and feasibility of BMP's. While potential BMP's have been identified in the partial watershed assessment, some of the BMP's initially identified may not be feasible due to design or permitting limitations.

While the initial assessment identified immediate projects that could potentially be installed, a complete BMP assessment of the watershed is needed to further determine the feasible number of BMP's that are needed in the watershed to reach water quality goals. A complete assessment of the watershed will provide information to be used for BMP identification and effectiveness, gauging landowner interest, BMP design requirements, and BMP installation cost and timing. A complete assessment will provide information needed for timing of the installation of BMP's due to potential limitations of both LWCD & WDATCP staff and cost share funding that may be required.

# Pipe Creek Watershed Project Area



The Fond du Lac County LWCD has been targeting as much available staff and cost share resources as possible to reduce sediment and phosphorus runoff and also mitigate runoff flooding. Beginning in 2014, Fond du Lac County also began offering county cost sharing to increase cost sharing available for BMP adoption. In early 2016, The Fond du Lac County LWCD applied for a grant through the Great Lakes Commission that will offer additional cost share assistance for the adoption of cropping practices that reduce sediment and phosphorus runoff.

This project is titled The Pipe “P” Trap: A Collaboration for Cleaner Water and will utilize DNR EVAAL assessment tool to focus conservation practices based on areas that are more susceptible to erosion. This project will offer incentives for BMP’s including harvestable buffers that will allow the benefits of vegetative treatment while also allowing the farmer to utilize and/or maintain the vegetation along riparian areas. In addition, the LWCD will continue to search for placement of structural BMP’s such as water and sediment control basin’s that trap sediment and reduce runoff.



## **ROCK RIVER BASIN**

The Upper Rock River Basin is part of the larger Rock River Basin and is primarily located in southern Wisconsin. The Rock River Basin covers over ten counties and is made up of 28 smaller watersheds that eventually drain to the Mississippi River. Due to the size of the basin the land uses within its boundaries are quite varied. Agricultural cropland accounts for 62% of the land uses in the Basin. Wetlands, grasslands, and forests make up 30% and urban areas, open water and barren land makes up the remaining 8%. Portions of the Beaver Dam Watershed, The Upper Rock River Watershed, and East Branch of the Rock River Watershed are all located in the Rock River Basin and make up the southwestern part of Fond du Lac County.

### **Rock River Basin TMDL**

Over 40 waterbodies in the Rock River Basin is listed as impaired on the EPA 303d Impaired Waters List primarily due to water quality impairments related to phosphorus and total suspended solids. This includes the West Branch Rock River and Kummel Creek Watersheds in Fond du Lac County. A Total Maximum Daily Load Report was prepared and approved for implementation in December, 2010. Additional information on the Rock River Basin can be found on the Wisconsin Department of Natural Resources website.

## **BEAVER DAM WATERSHED (Map 2-14)**

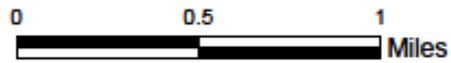
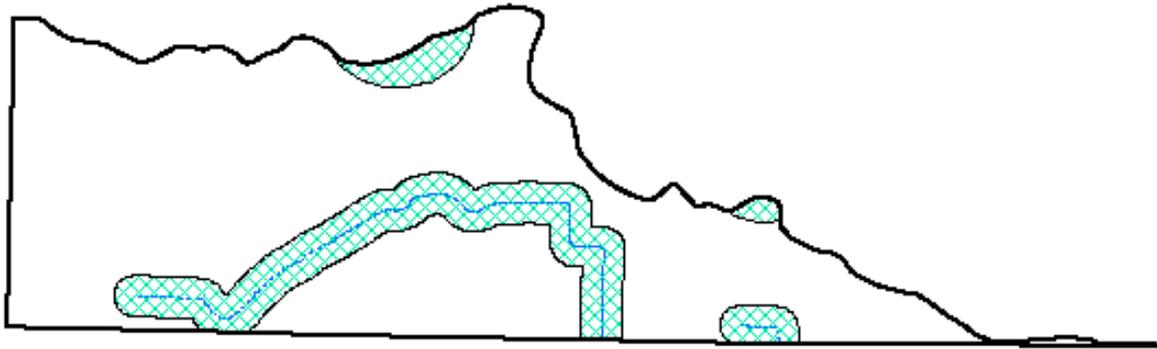
There is a small segment of the Beaver Dam Watershed located in the extreme southwestern portion of Fond du Lac County. The land use in this watershed is mainly agriculture. Water quality monitoring indicates that the streams are affected by non-point source pollution from barnyard, cropland, construction site erosion as well as other urban runoff. This watershed contains the Fox Lake, Beaver Dam Lake, and Lost Lake, which are shallow and experience eutrophication. The Beaver Dam Watershed was selected for a priority watershed project in 1990.

Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the Beaver Dam Watershed:

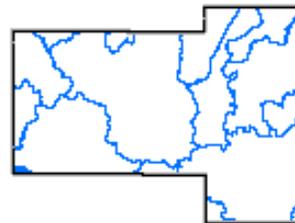
- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.

# Beaver Dam River Watershed

Water Quality Management Areas



-  Watershed Boundary
-  300 Ft from streams, 1000 Ft from lakes
-  Intermittent Stream
-  Perennial Stream



Map 2-14

Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.

- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.



## WEST BRANCH ROCK RIVER WATERSHED (MAP 2-15)

Agency have also added monetary incentives to the "Project". Local corporations and municipalities involved as partners include Grande Cheese - Brownsville, Michaels Corporation - Brownsville, the cities of Waupun and Horicon, and, Saputo Cheese – Alto.

Landowners and land users have been extremely active in this water quality effort as identified in Map 2-16 - Upper Rock River Watershed - South and West Branches. The following accomplishments have been realized:

**Landowners/Land users contacted:**

871 - (one or more contacts)

1588 - tracts of land evaluated

**Grassed Buffers along Streams, Tributaries, and Wetlands:**

101 Miles - Identified as needed Planned

43 Miles - Planned

33 Miles – Installed

**Conservation Plans and Revisions:**

48,313 Acres

**Nutrient Management Plans - New and Revisions:**

44,855 Acres

**Upland Wildlife Nesting Cover:**

1,045 Acres Planned

810 Acres Installed

Programs Used CRP, CREP, SAFE, USFWS, DNR, SAFE-Pollinator

**Shallow Water Areas for Wildlife:**

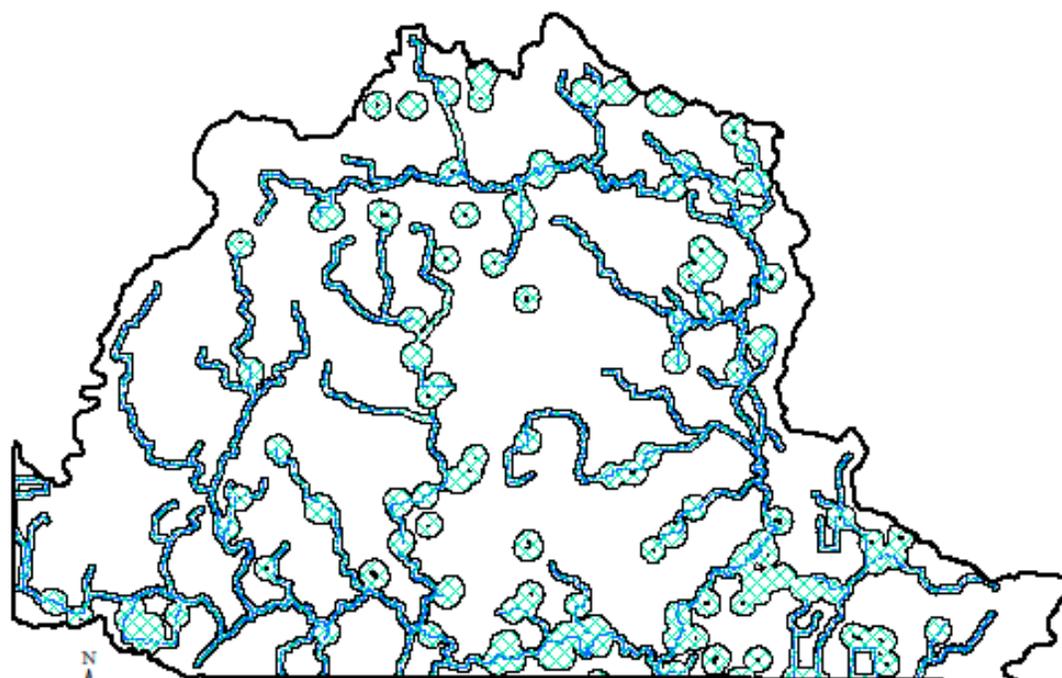
43 - Planned

36 – Installed

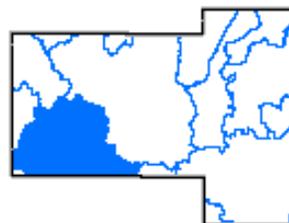
An overall water quality monitoring program was begun in mid-2007 with the Trout Unlimited and Park Watch - Fond du Lac volunteers. This regular program continues today. The us Fish & Wildlife Service - Horicon staff, and Grande Cheese - Brownsville have joined this effort with 13 more sites since 2010, and 2014 respectively. (see Map 2-17 )

# West Branch Rock River Watershed

Water Quality  
Management Areas



-  Watershed Boundary
-  300 Ft from streams, 1000 Ft from lakes
-  Intermittent Stream
-  Perennial Stream



Map 2-15

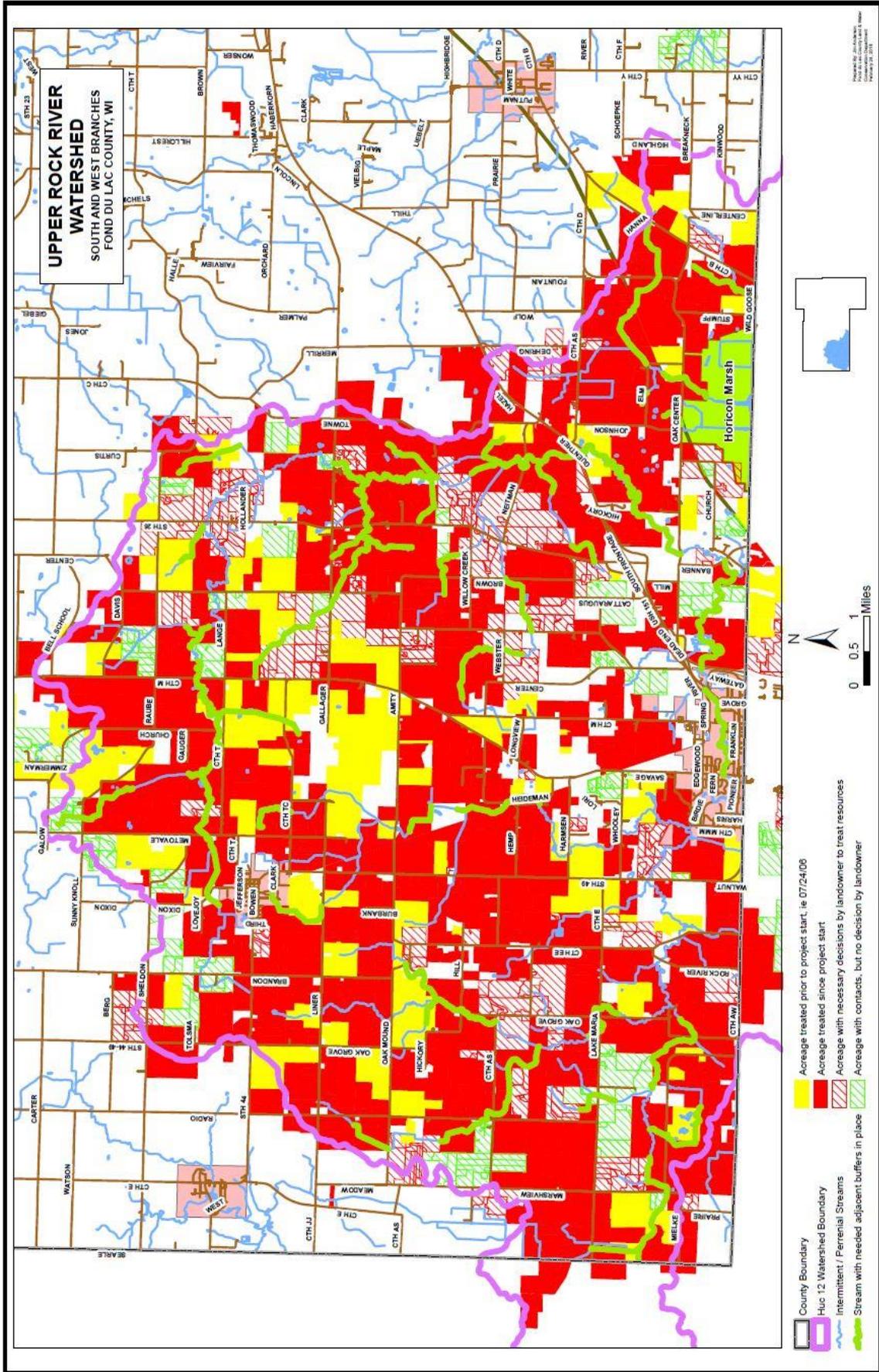
The Rock River Coalition in two detailed reports have evaluated the success of this overall water quality improvement effort. Their conclusions show the following results at the entrance of the two main branches into the Horicon Marsh NWR on the north:

1997-2000 - Peak TSS - 584 mg/L

2012 - Peak TSS - 98 mg/L

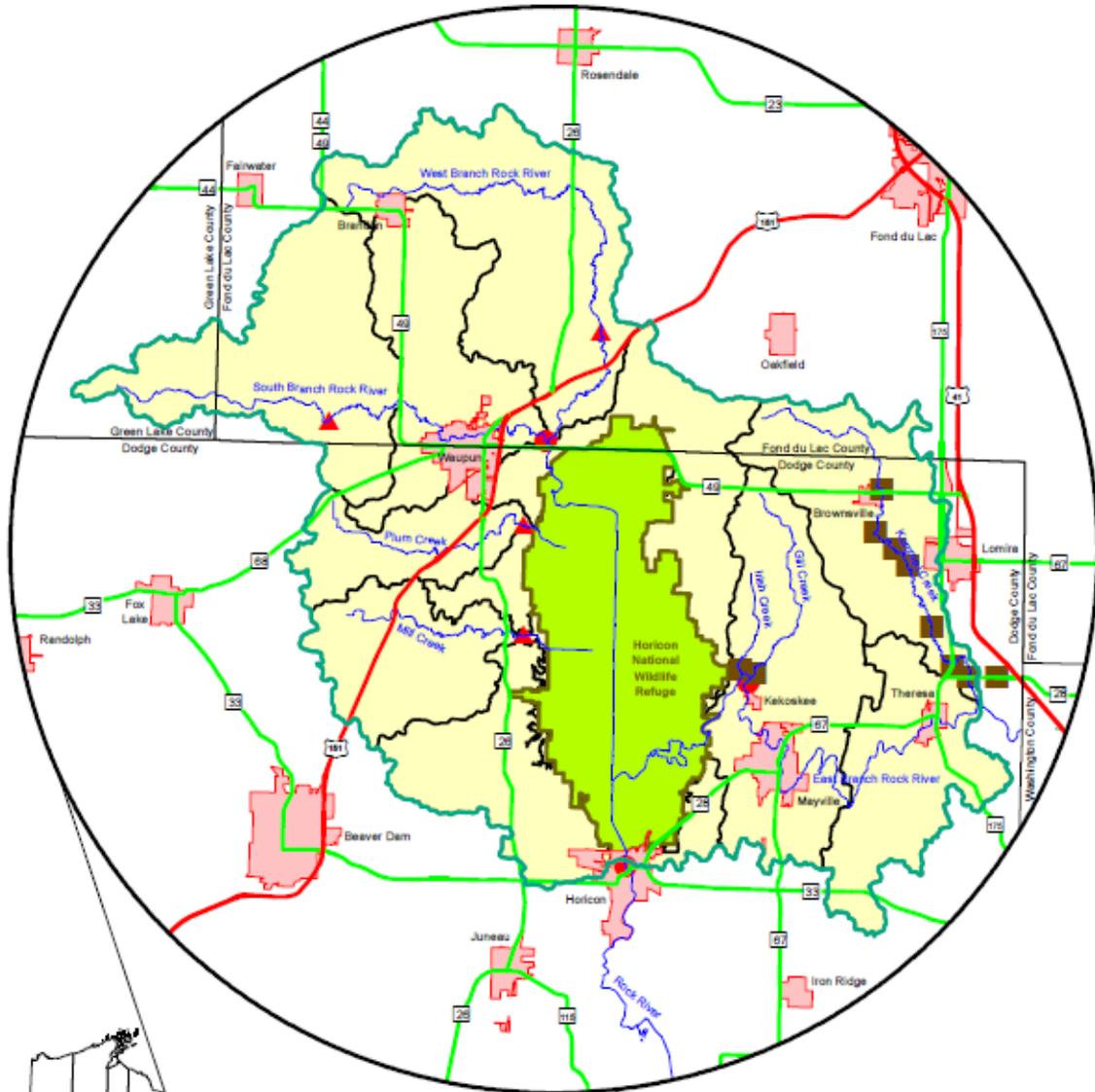
1997-2000 - Peak Total Phosphorus - 3.2 mg/L

2012 - Peak Total Phosphorus - 0.6 mg/L



Map 2-16

# UPPER ROCK RIVER PRIORITY AREA



- ▲ - Monthly Monitoring Trout Unlimited, Park Watch 2010, USFWS
- - Daily Monitoring USGS & Volunteers
- - Monthly Monitoring Grande Cheese

Prepared by: Jim Anderson  
 Fond du Lac County Land & Water  
 Conservation Department  
 January 21, 2014

Map 2-17



## EAST BRANCH ROCK RIVER WATERSHED (MAP 2-18)

This watershed extends through three counties: Washington and Dodge with a small portion in Fond du Lac County. It is located to the east of and drains into Horicon Marsh. The watershed is predominately agriculture; however, there are at least seven small communities that have nonpoint pollution from street and parking lot runoff. These communities are also point source contributors. In addition, runoff from agriculture is adversely affecting water quality in the rivers and streams.

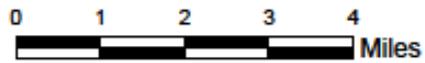
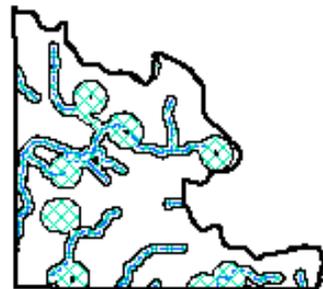
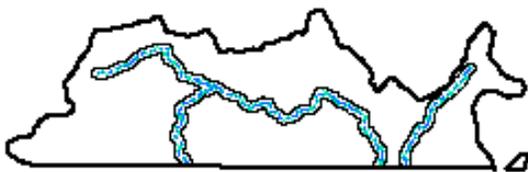
According to the DNR, the Rock River Basin TMDL report shows that the East Branch Rock River Watershed has the highest sediment and phosphorus loads per acre of any watershed in the basin. The East Branch of the Rock River watershed is ranked as a high priority overall for nonpoint source (NPS) pollution and is similarly ranked for stream NPS pollution. The East Branch Rock River NPS rank is listed as high stream.

Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the East Branch of the Rock River Watershed:

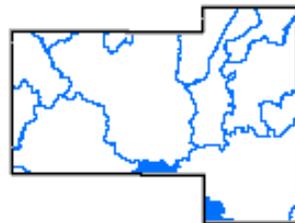
- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.

# East Branch Rock River Watershed

Water Quality Management Areas



-  Watershed Boundary
-  300 Ft from streams, 1000 Ft from lakes
-  Intermittent Stream
-  Perennial Stream



Map 2-18

## **SHEBOYGAN RIVER BASIN**

The Sheboygan River Basin is located in eastern Wisconsin on the west shore of Lake Michigan. The Basin is comprised of six large watersheds is located in portions of Sheboygan, Fond du Lac, Manitowoc, Calumet, and Ozaukee Counties. The Sheboygan River and Mullet River both originate in eastern Fond du Lac County and flow to Lake Michigan. Additional information on the Sheboygan River Basin can be found on the Wisconsin Department of Natural Resources website.

## **SHEBOYGAN RIVER WATERSHED (Map 2-19)**

This watershed drains an area of land between Lake Winnebago and Lake Michigan and lies in portions of four counties: Sheboygan, Fond du Lac, Calumet and Manitowoc. Seventy-four square miles or thirty percent of this watershed is located in Fond du Lac County.

The Sheboygan River Watershed was selected in 1985 as a priority watershed through Wisconsin's Non-point Source Water Pollution Abatement Program. This priority watershed ended in 2002. The land uses in this watershed include agriculture, open spaces, wetlands, woodlands and urban areas. The topography of the Sheboygan River is characterized by drumlin fields, irregular ridges and drift hills all which were left by the glacier when it receded. Most of the land use in the Fond du Lac County portion of watershed is agriculture with a few small communities throughout that are experiencing growth pressures. Woodlands, wetlands and surface water comprise the rest of the watershed.

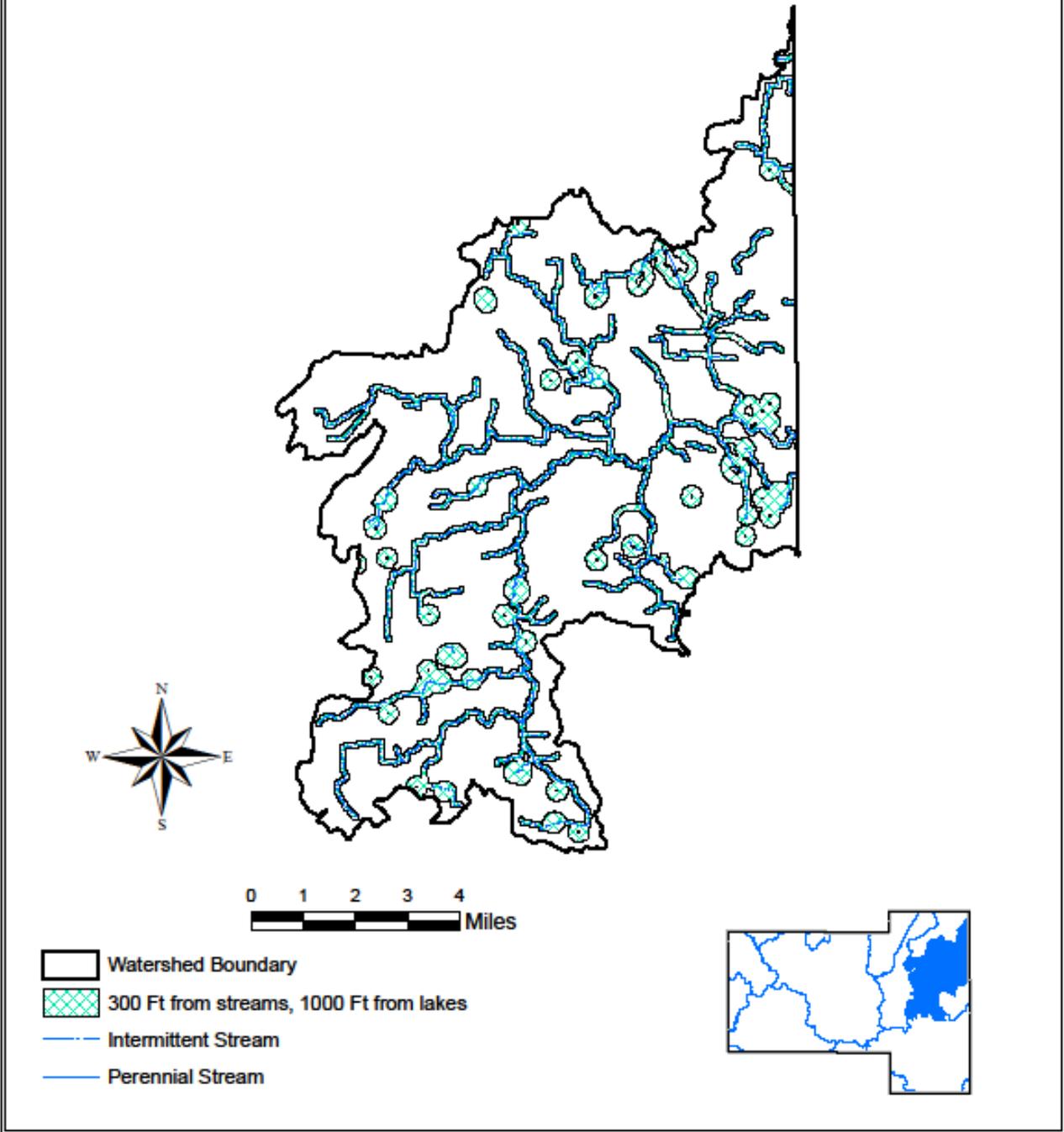
The Nonpoint Source Control Plan for the Sheboygan River Watershed identified a 50% reduction from upland sediment and streambank erosion. The plan estimated that 95% of upland sediment was coming from cropland erosion. The plan also estimated a 50% reduction in phosphorus loading from barnyard runoff and winter spread manure.

The following objectives are recommended for improving surface waters of the Sheboygan River Watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.

# Sheboygan River Watershed

Water Quality Management Areas



Map 2-19

- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
- Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.



## MULLET RIVER WATERSHED (Map 2-20)

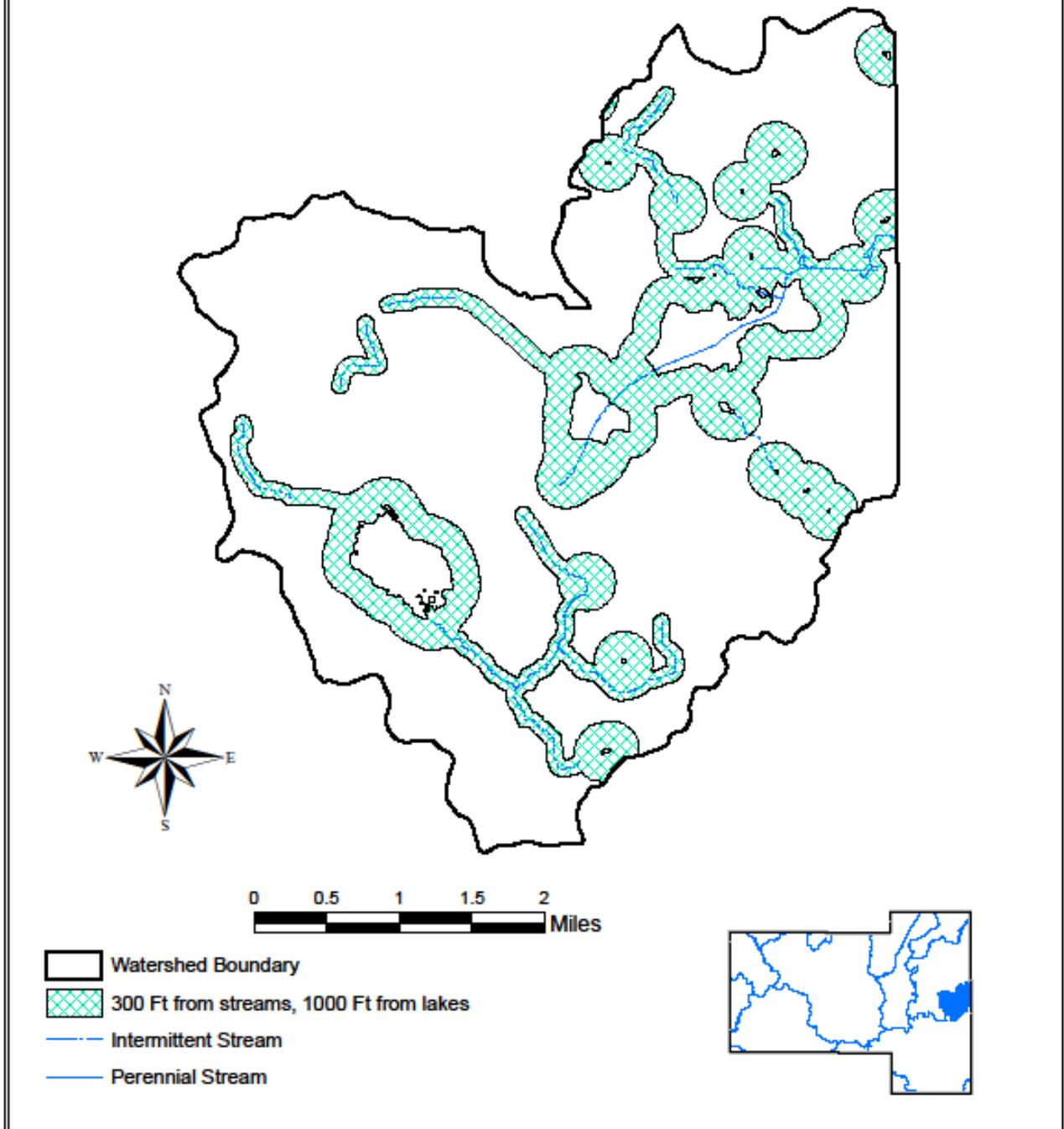
The Mullet River is the outlet stream from Mullet Lake, which is a shallow 200-acre lake valued primarily for waterfowl hunting and wildlife. The land use in the watershed is primarily agriculture (55%), with a mix of forest (19%), wetland (12%) and other uses (14%). Annual winterkill conditions, due to the shallow depth of the lake, and the rooted aquatic plants limit the fishing opportunities. The Mullet River is one of two main tributaries to the Sheboygan River which confluence with the Sheboygan River in the Town of Sheboygan Falls, 17 miles upstream from Lake Michigan.

According to the DNR, this watershed is ranked high for runoff impacts on streams and high for runoff impacts on groundwater. Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the Mullet River Watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.

# Mullet River Watershed

Water Quality Management Areas



Map 2-20

## LAKESHORE BASIN

The Lakeshore Basin is located along the western lakeshore of Lake Michigan and the eastern shore of Green Bay and encompasses all of Door and Kewanee Counties and parts of Brown, Manitowoc, Calumet, Fond du Lac, and Sheboygan Counties. The Lakeshore basin is comprised of 12 large watersheds. A portion of the South Branch of the Manitowoc River Watershed extends down into Fond du Lac County. For more information on the Lakeshore Basin please refer to the Wisconsin Department of Natural Resources The State of the Lakeshore Basin, 2001 PUB WT 667 2000 available at <http://dnr.wi.gov/org/gmu/stateofbasin.html>.

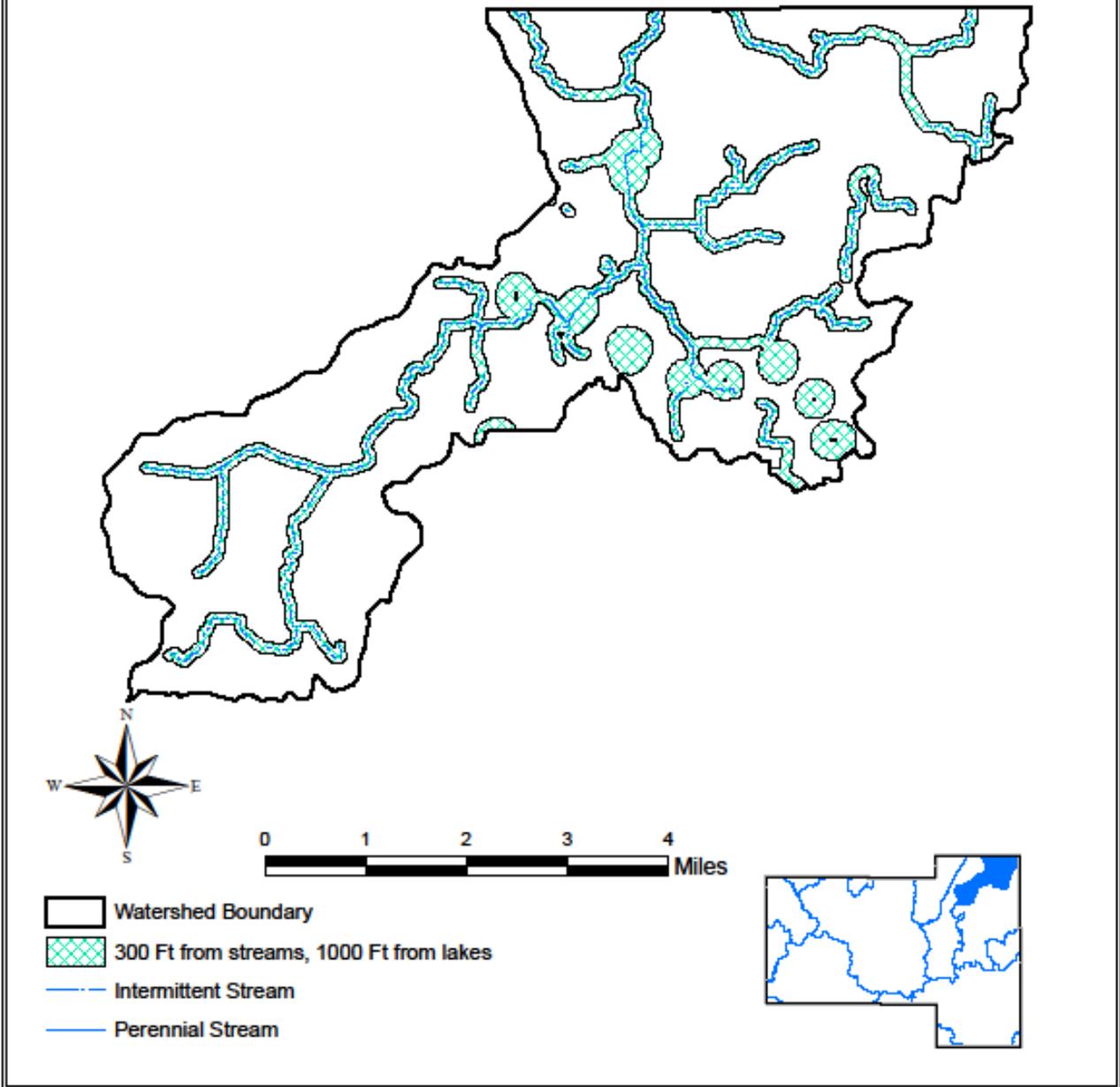
## MANITOWOC RIVER WATERSHED (Map 2-21)

The Manitowoc River Basin is comprised of four watersheds that extend throughout five counties. The South Branch of the Manitowoc River begins in the northeastern tip of Fond du Lac County. The major land use in this watershed is agricultural (73%). Sediment and nutrient loading are the major sources of non-point source pollution. The Manitowoc River Watershed is ranked high by the DNR for nonpoint source issues affecting streams, lakes and groundwater. Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the Manitowoc River Watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
- Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.

# South Branch Manitowoc River Watershed

Water Quality Management Areas



Map 2-21

## **MILWAUKEE RIVER BASIN**

### **Milwaukee River Basin TMDL**

The Milwaukee River Basin is 838 square miles and includes six drainage areas, which are the North Branch, East/West Branch, Milwaukee River South, Menomonee, Cedar Creek, and the Kinnickinnic. The basin drains through the city of Milwaukee and into Lake Michigan and occupies portions of seven counties. The basin houses more than a million people and contains nearly 500 miles of streams and 21 major lakes with a combined surface area of 3400 acres.

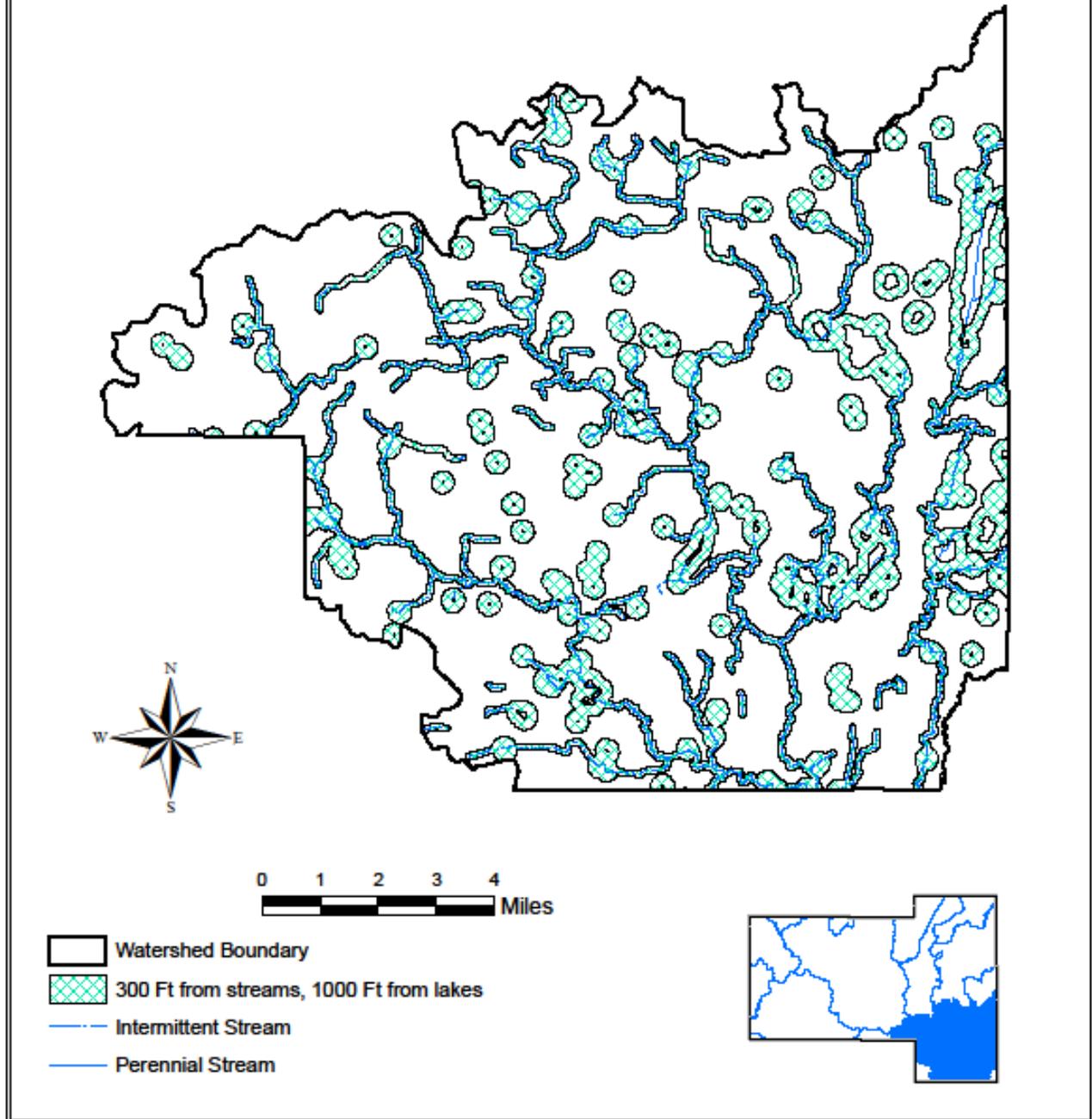
## **EAST / WEST BRANCH MILWAUKEE RIVER WATERSHED (MAP 2-22)**

The entire Milwaukee River Basin is listed as impaired on the EPA 303d Impaired Waters List primarily due to water quality impairments related to phosphorus and total suspended solids. As of the writing of this plan a Total Maximum Daily Load Report has been prepared and is pending approval for implementation. Additional information regarding the status of the TMDL and goals can be found on the DNR website at <http://dnr.wi.gov/water/tmdlDetail.aspx?key=> The East/West Branch of the Milwaukee River is one of five watersheds in the Milwaukee River Basin. This watershed was designated as a priority watershed in 1984 under Wisconsin's Non-point Source Water Pollution Abatement Program and was completed in 2001. Approximately 50 percent of this watershed lies in the southeastern portion of Fond du Lac County. The predominant land use is agriculture, wetlands, surface water, woodlands and urban uses. Siltation, nutrient enrichment, elevated bacteria, channelization, urbanization and degraded impoundment are the principal factors limiting the quality of the recreational and aquatic life uses in these streams.

The reduction goals in the Non-Point Source Control Plan for the Milwaukee River Watershed identified a different reduction goal for each subwatershed. Generally the plan identified a 50% reduction in sediment and 50% reduction in phosphorus.

# East/West Branch Milwaukee River Watershed

Water Quality  
Management Areas



Map 2-22

**Sediment and Phosphorus Reduction Goals for the East-West Milwaukee River Sub-watersheds\***

Sub-watershed (1.)	Sediment		Phosphorus	
	Reduction Goal (2.)	Notes	Reduction Goal (2.)	Notes
WC - Watercress Creek	50%	Control will also affect Long L.	25%	Control will also affect Long L.
LL - Long Lake	-	most pollution sources are in WC	4%	Most pollution sources are in WC
ML - Mauthe Lake	10%		30%	
LD - Low Delivery				
HW - Headwaters	50%	25% for IN sediment; additional	30% will also benefit LB	
LB - Lake Bernice	50%		30X	
WM - Wayne Marsh	50%	25% for WM sediment; additional control for Mil.River Sediment	50%	30% for WM nutrients; additional control for Mil. River
GW - Greenway Rd	25%		50%	
IA - Ice Age Reserve	10%		30%	
ED - Eden Township	50%		50%	
KM - Kettle Moraine Lake	50%	35% for KM sediment; additional control for CP sediment	50%	
MM - McCullough Marsh	10%		50%	
AC - Auburn lake & Creek	50%	25% for AC sediment; additional control for CP & Mil. River Sediment	50%	
CP - Campbellsport	50%		50%	
UT - Unnamed Trib	25%		50%	

\*Based on judgements of district water resources management staff. These reductions represent those desired to achieve the potential beneficial uses of the waterbodies contained within the subwatersheds. In general, the Milwaukee River has pollution reduction goals of 50% for sediment and phosphorus, and major contributing subwatersheds are consistent with this goal.

Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the East/West Branch of the Milwaukee River Watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
- Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.

## **NORTH BRANCH MILWAUKEE RIVER WATERSHED (MAP 2-23)**

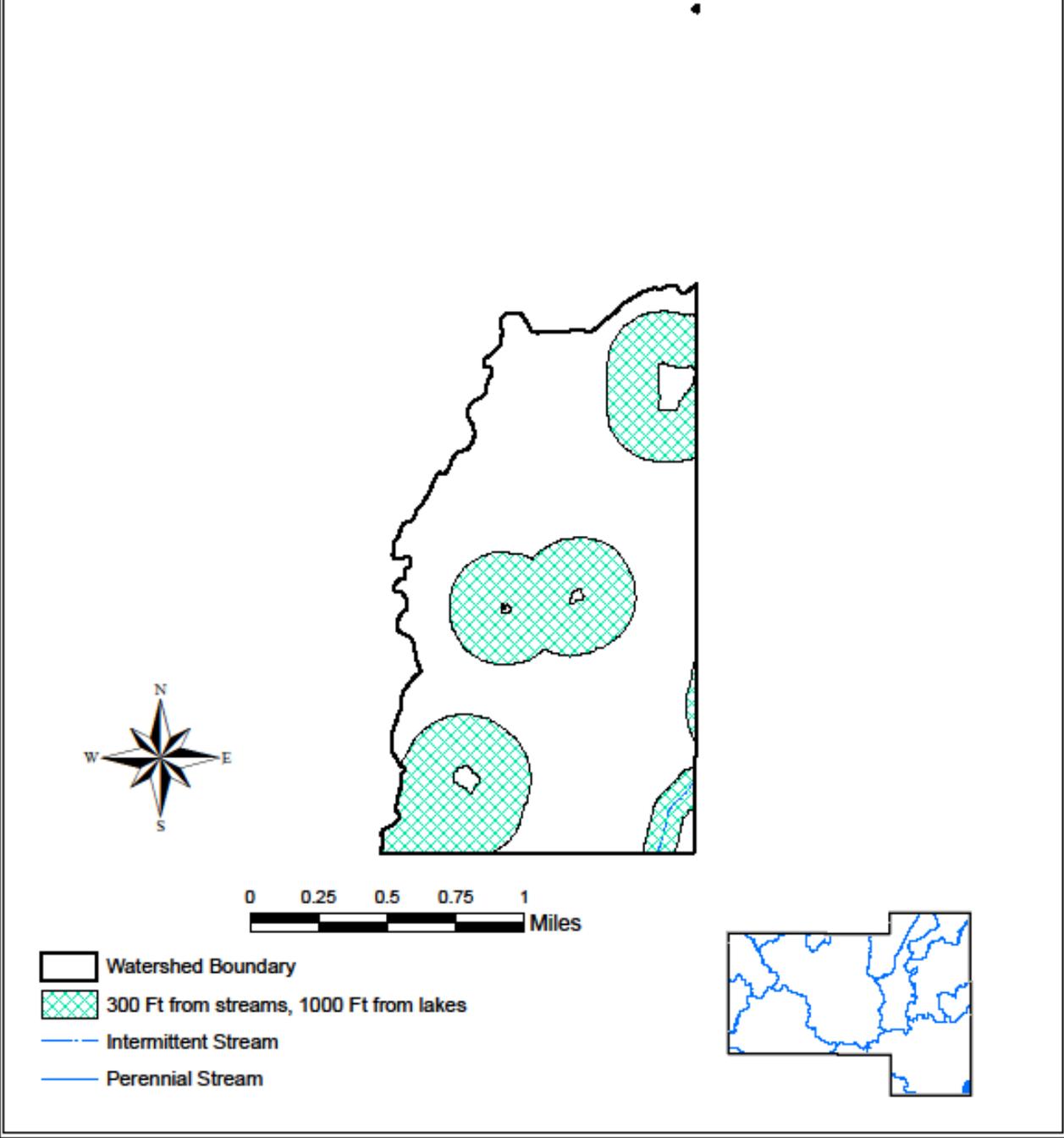
The North Branch is one of five drainage areas in the Milwaukee River Basin. It was designated as a priority watershed in 1984 by Wisconsin's Non-point Source Water Pollution Abatement Program. Only about 1 percent (1.3 square miles) is located in Fond du Lac County. This area borders the Kettle Moraine State Forest. Its land use is predominately agriculture and other open spaces. Sediment and nutrient loading are major contributors to non-point source pollution.

Until more information for the Fond du Lac County portion of this watershed can be collected the following objectives are recommended for improving surface waters of the East/West Branch of the Milwaukee River Watershed:

- Work with producers and landowners to meet all NR151 soil and water conservation standards.
- Reduce sediment and nutrient loading from agricultural fields through the implementation of 590 nutrient management plans and the adoption of soil conservation practices such as tillage adjustments, cover crops, riparian buffers, grassed waterways, grade stabilizations, water and sediment control structures.
- Reduce sediment loads by repairing eroded stream banks and gullies by proper implementation of BMP's.
- Maintain native grasslands, grassed waterways, woodland, wetland, and upland buffers to aid in the retention of sediment and nutrients.
- Restore uplands to species native to prairies through CRP sign-ups.
- Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
- Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.

# North Branch Milwaukee River Watershed

Water Quality Management Areas

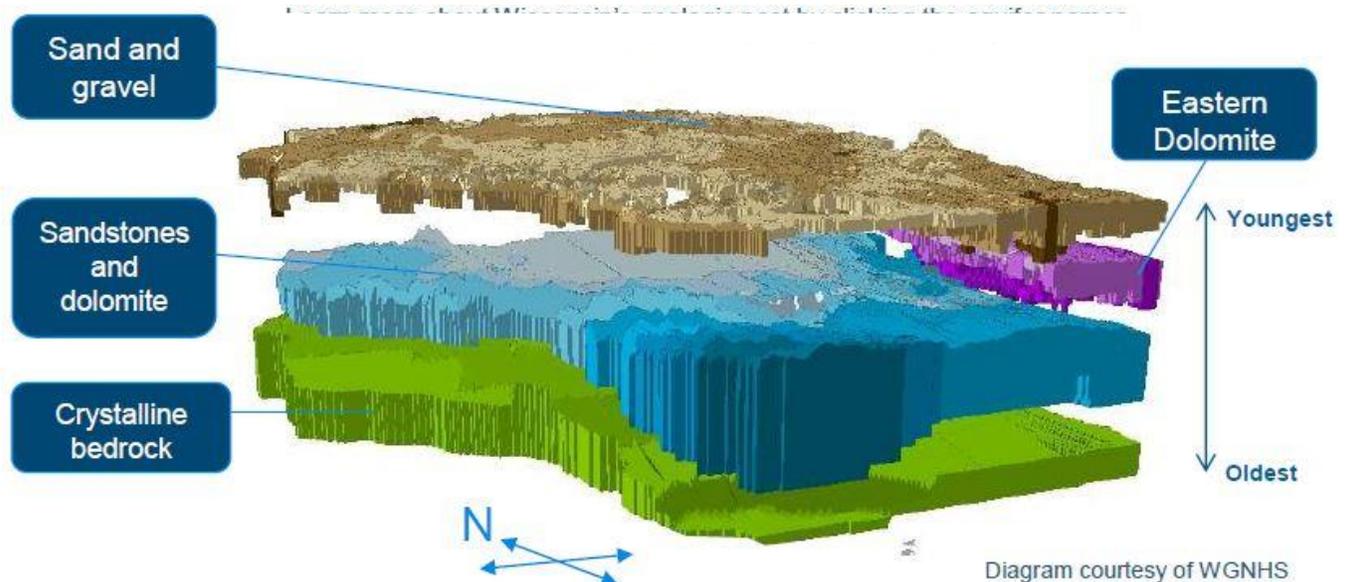


Map 2-23

## GROUNDWATER RESOURCES

Fond du Lac County relies on groundwater as their drinking water resource. It is the source of public and private as well as industrial water supplies. Groundwater is defined as water that collects or flows beneath the surface of the ground, saturating porous spaces in soil and rocks. In our region, groundwater is locally replenished or recharged by precipitation of rain and snow melt. Groundwater is stored in, and moves through permeable rocks called aquifers. An aquifer is a water bearing formation that can store and transmit water.

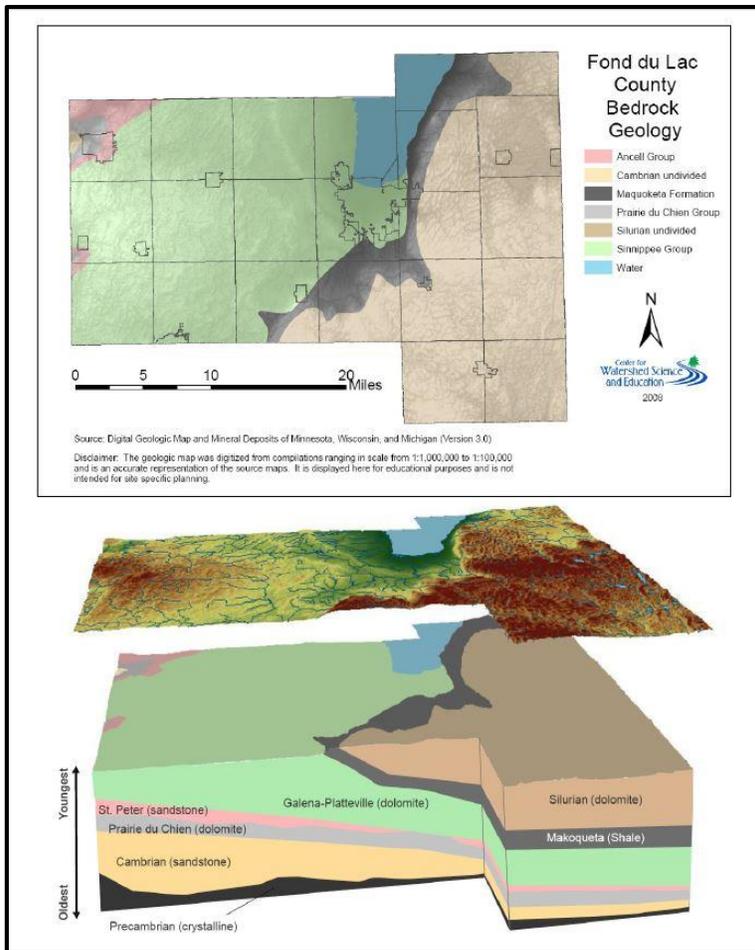
Wisconsin has four major aquifers referred to as: 1) the sand and gravel aquifer, 2) the eastern dolomite aquifer (Silurian aquifer), 3) the sandstone and dolomite aquifer (Cambrian aquifer, Cambrian Ordovician aquifer or Cambrian Sandstones, and 4) the crystalline bedrock aquifer (crystalline aquifer or Precambrian aquifer).



Fond du Lac County primarily obtains its groundwater from the sandstone and dolomite aquifer (Cambrian aquifer) and the eastern dolomite aquifer (Silurian aquifer).

Eleven municipalities as well as industrial wells throughout the county obtain their water supplies from wells that are drilled into the Cambrian and Ordovician age sandstones. Most private/rural wells, stock wells and some industrial wells obtain their water from the Ordovician Galena Platteville Formation and from the Silurian Eastern dolomite aquifer.

Groundwater throughout the county is impacted by local geology and land use, with some problems occurring naturally and others from human activity.



Karst landscapes or karst topography is located in areas of the county which have thin soils or shallow unconsolidated deposits overlying fractured bedrock, particularly along the Niagara Escarpment areas of the county. Karst is a landscape created by groundwater dissolving sedimentary rock such as limestone where the soil layer is often thin or absent.

Karst areas allow water (and contaminants) from the surface to rapidly reach groundwater aquifers and wells with little or no filtration by the soil.

Sinkholes are holes that form naturally in the ground and are usually found in karst areas. Sinkholes can range in size from a few inches in diameter to hundreds of feet across although most of the sinkholes in Fond du Lac County are not that large. Sinkholes pose a significant risk to groundwater resources by allowing runoff to drain directly into groundwater. Sinkholes can vary greatly in size which can make them very difficult to identify and protect. The Fond du Lac County Land and Water Conservation Department has been actively documenting sinkholes in the County to establish a database for protection of groundwater and to provide useful information for land use planning. It is possible to fill a sinkhole with soil and rocks or cement, however this does not tend to be a permanent fix as they often open up after time.

Much like sinkholes, old and unused wells are direct conduits to the ground water supply and if they have not been properly filled and sealed they can pose a significant risk for groundwater contamination and physical safety. In 2008 the Department of Natural Resources (DNR) estimated that there were 15,000 wells in Fond du Lac County. Of those 15,000 wells the DNR estimated that there were approximately 4,265 wells that were either unused, non- code compliant or needed to be properly filled and sealed. Fond du Lac County Code Enforcement,

Fond du Lac County Land & Water Conservation and local well drillers have been working together educating and promoting well filling and sealing.

More specific information about Fond du Lac County's groundwater can be found in the UW-Extension publication Fond du Lac County Groundwater, A Community Resource, K.C. Masarik, D. Tscheschlok, D.J. Mechenich, 2010.

## **WETLAND RESOURCES**

Wetlands, once classified as wastelands with little to no value, are now being recognized as having extremely beneficial values. The positive effect of wetlands on providing critical habitat for wildlife, flood storage, protecting and enhancing water quality, and recreational activities for sports persons and wildlife watchers alike has become very evident. Until the 1970s, state and federal programs encouraged the draining of wetlands to promote more area for cultivation. This resulted in the loss of nearly 50% of Wisconsin's original wetland acreage. The implementation of the Clean Water Act of 1972 helped to quell this loss, but did not stop loss to urbanization or the degradation of the remaining wetlands.

As indicated on Map 2-24, Fond du Lac County has roughly 70,000 acres of wetland comprising about 15.0% of the total land area in the county, according to the Wisconsin Department of Natural Resources Wetland Inventory. Fond du Lac County's wetland acreage accounts for about 1.3% of the state of Wisconsin total wetland acreage. A portion of the county's wetlands are owned and/or managed by the state and federal government. Wisconsin DNR owns and manages large areas like Eldorado Marsh and Mullet Creek Wildlife Area as well as numerous smaller wetland complexes throughout the county. The federal government also owns and/or manages many acres of wetlands in Fond du Lac County including Horicon Marsh to the south. Most wetlands in Fond du Lac County are small, less than 10 acres, and under private ownership.

Fond du Lac county wetlands fall into several categories of wetland types. Most of the county's wetlands would fall into the emergent marsh (having herbaceous plants that emerge from the water surface) category. Eldorado Marsh and Horicon Marsh are good examples of this category. The other categories represented include aquatic bed (deeper standing water with floating or submerged vegetation), scrub-shrub (dominated by woody species other than trees), and forested (dominated by trees) wetlands. These other categories can be found in pockets throughout the county.

Urban and agricultural runoff and invasion by exotic species still impact the quality of wetlands in Fond du Lac County. The future of the wetland resource in Fond du Lac County will rely on protecting the existing resource and restoring degraded or drained wetlands to near original conditions.

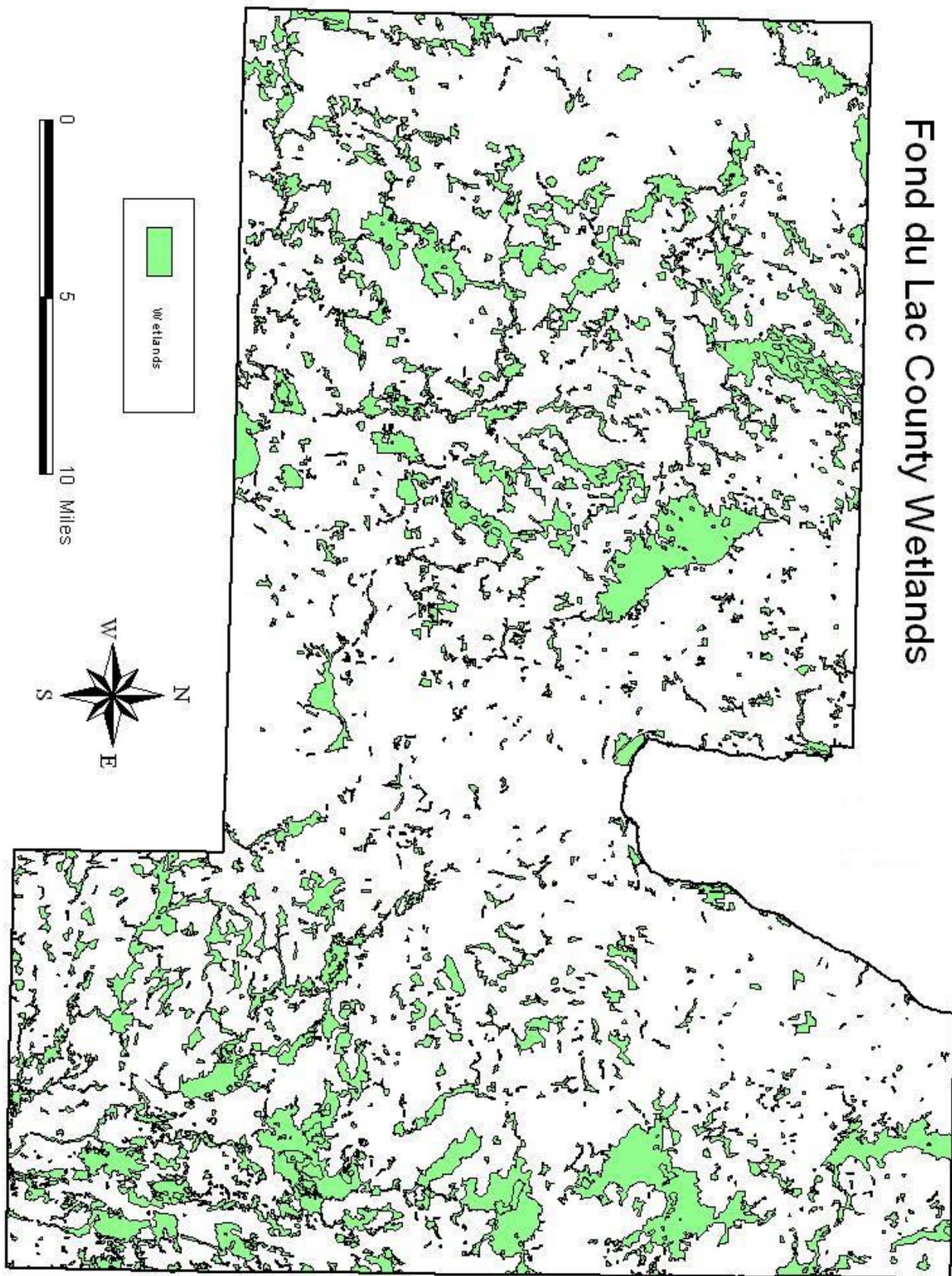
Securing a positive future for the wetland resource in Fond du Lac County is crucial. The wildlife, flood mitigation, and water quality benefits of wetlands, by themselves, are essential to the health of the county. These benefits are not just environmental, but socioeconomic as well. The wildlife benefit provides recreational opportunities to county as well as out of county individuals, creating revenue for local businesses and promoting the county as a whole. The flood mitigation benefit helps to lower the damage to private and public areas from excessive flooding, which could become costly. The water quality benefit will help to enhance local wildlife, crop production and public water resources. Properly managing this resource is vital for these reasons and many more.

With most of the wetlands in Fond du Lac County under private ownership public outreach and education is the key to protecting the wetland resource. Informing the public on the values of wetlands and guiding them on the proper way to manage their wetlands is essential. Information on private, county, state and federal programs that provide technical guidance and/or funding for wetland management should be made readily available. As well as, continuing to operate programs that help to mitigate the upland practices that degrade wetlands. Excessive sedimentation and nutrient runoff into wetlands is a major concern that must be monitored and controlled. Cooperation between government and private wetland conservation groups needs to be maintained. With the general impression of most landowners still being that a wetland is wasteland, public outreach will be essential in preserving this resource. Landowners are encouraged to contact the DNR ahead of time for any wetland restoration proposals as this may require permitting.

Monitoring and mapping of the resource is also essential. Understanding the importance of landscape position and the health of a wetland complex enhances its values. By managing and/or restoring wetlands in critical areas we can greatly enhance their functional value. Restoring wetlands in flood prone areas, areas with critical wildlife dependent on wetlands, and/or areas that have water quality issues would be beneficial.

Fond du Lac County has many conservation minded individuals living in it. We need to nurture their interest and that of others. The local conservation clubs and other individuals have shown a lot of interest in protecting and enhancing this resource. We must work with them and other government and private groups to protect the future of all of our Natural Resources.

# Fond du Lac County Wetlands



Map 2-24

## **WILDLIFE RESOURCES**

Fond du Lac County's pre-Euro-American settlement vegetation was a mix of tall grass prairie/oak savanna in the western 2/3 and upland/lowland southern hardwood forest and scattered pockets of swamp conifer forest in the eastern 1/3, with the entire countryside scattered with sedge meadow/emergent wetlands. This mosaic of diverse native plant communities created a rich diversity of wildlife species. Pre-Euro-American settlement wildlife sightings included wild turkey, passenger pigeon, bison, elk, wolves, prairie chickens and sharp-tailed grouse. But as the county began to be settled in the 1840's, the prairies were turned over, forests were cutover and cleared, wetlands were drained; combined with unregulated harvest most of the county's wildlife species declined or disappeared. What occurred was a dramatic transformation of the native plant communities to agriculture and town development.

A slow awakening that Wisconsin's natural resources were not infinite began with the 20<sup>th</sup> century. Starting in the 1920's, the concept of habitat preservation and restoration evolved to the point that in some cases we are able to bring wildlife populations back to historic levels and beyond, to the point that some wildlife species have become a nuisance problem. The reintroduction of the wild turkey in the county, 1989-91, is an excellent example of what can happen when you have the support and cooperation of private landowners, non-profit conservation organizations and county/state government agencies. The restoration and proper management of woodlands combined with using wild stock Missouri turkeys resulted in a successful reintroduction program.

Today, wildlife provides significant opportunities in the county. All wetlands, streams and lakes provide wildlife habitat to many wildlife species. Muskrat, mink, beaver, otter, sandhill crane and sedge wren are common to these communities. They provide recreational opportunities such as wildlife observation and trapping. All of our amphibians and reptiles, such as eastern gray tree frog, American toad, Blanding's turtle (Special Concern) and Butler's garter snake (Special Concern) has some part of their life cycle associated to these communities. There are numerous state and federal funding programs, such as WI Waterfowl Stamp, Wetland Reserve Program, and DU-Marsh available to producers and recreational landowners to restore drained wetlands and enhance degraded wetlands for wetland dependent wildlife species in the county. We will never return to historic county wetland acreage levels but we can return to pre-1970 levels.

The continued loss of farmland, decreased funding to CRP and other set aside programs, wetland and woodland habitat to urban/rural residential development, invasion of exotic species, and intensive row crop cultivation will have consequences to the county's wildlife resource. The county's wildlife resource future will be determined in large part by Comprehensive Smart Growth Planning that is now required of each township, municipality and county. These plans will provide the framework and context to consider when making future land use decisions and each plan has

an agricultural/natural resource/cultural element providing the documentation supporting the municipality when making land use decisions.

Tremendous strides are being made improving local surface water quality through nutrient management planning, buffer initiatives, and storm water runoff management programs. The Department of Agriculture, Trade and Consumer Protection (DATCP) Working Lands Initiative will be a critical program determining the future of farming in Wisconsin. The best way to preserve the county's rural character is to maintain our farming heritage through conservation easements, purchasing development rights (PDR's) and transfer of development rights (TDR's).

Another plan, known as the Wisconsin Wildlife Action Plan, is the result of a statewide effort to identify which of our native Wisconsin species are of greatest conservation need. The Action Plan presents priority conservation actions to protect the species and their habitats. Fond du Lac County is located in the Southeast Glacial Plain ecological landscape. A complete list of wildlife species identified with the greatest conservation need can be found on the WDNR website. The plan identifies specific threats and issues and conservation actions for each wildlife species. The State Wildlife Grant is the critical funding source for these specific wildlife species.

The DNR conducts annual wildlife surveys in the county to monitor wildlife occurrence, abundance and population trends. Some of the surveys are:

- Frog and Toad Surveys
- Spring Waterfowl Survey
- Mid-Winter Waterfowl Survey
- Pheasant Crowing Survey
- Summer Upland Game Bird Brood Observations
- Summer Deer Observations
- Deer Aging Survey
- Body Condition Assessments of Car-Killed Deer
- Otter Survey

Local sporting clubs and other interested conservation groups are working hard to preserve, protect and maintain wildlife populations for future generations in Fond du Lac County. There are many county, state and federal programs available to landowners providing technical advice. For a list of current programs available contact the county Wildlife Biologist.

## **PLANT AND TERRESTRIAL SPECIES**

Once, native tall grass prairie and oak savanna were the most extensive native plant communities in the county. Today, there are only a few remnant sites in the county that have been placed in the WDNR State Natural Areas program to protect these very rare gems. Ripon Dry Prairie, Oakfield Railroad Prairie and Oakfield Ledge SNA are some of those gems.

Fond du Lac County was once home to two native prairie grouse species, greater prairie chicken and prairie sharp-tailed grouse. They have been replaced by ring-necked pheasants better adapted to an intensive agricultural land base. A number of habitat restoration programs such as Glacial Habitat Restoration Area Project, State Acres For Wildlife Enhancement (SAFE) Program, Conservation Reserve Program, and the Conservation Reserve Enhancement Program are making great accomplishments in restoring grassland and riparian habitat. They will never replace the native grasslands but they do provide the necessary life requirements for our grassland dependent wildlife species. Those programs have been successful enough that the WDNR will be doing a feasibility study to determine if prairie grouse can successfully be reintroduced into the county and surrounding counties.

Non-native plants and animals can thrive in new areas because their natural predators are not there to keep population in check. The spread of invasive species leads to the loss of the native species which can throw entire ecosystems of balance. The spread of non-native plants and animals is often accelerated by human activities. Education about what invasive species are and tracking their spread can improve the chances of controlling them. The following is a list of documented invasive species in Fond du Lac County Waterbodies

<b>Waterbody Name</b>	<b>Waterbody ID Code (WBIC)</b>	<b>Invasive Species</b>
Auburn Lake	42400	Curly-Leaf Pondweed, Eurasian Water-Milfoil, Phragmites (non-native)*, Rusty Crayfish, Zebra Mussel
Auburn Lake Creek	41600	Phragmites (non-native)*
Barton Pond	35400	Eurasian Water-Milfoil
Bernice Lake	40900	Eurasian Water-Milfoil
Campbellsport Millpond	43300	Eurasian Water-Milfoil
Campground Creek	137400	Rusty Crayfish*
Crooked Lake	37900	Banded Mystery Snail*, Chinese Mystery Snail*, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Zebra Mussel*
DeNeveu Creek	138700	Curly-Leaf Pondweed*, Eurasian Water-Milfoil*, Faucet Snail, Faucet Snail*, Purple Loosestrife*, Rusty Crayfish*, Zebra Mussel*
East Branch Fond Du Lac River	135900	Rusty Crayfish, Viral Hemorrhagic Septicemia, Zebra Mussel
East Branch Milwaukee River	36900	Rusty Crayfish
Fond Du Lac River	133700	Chinese Mystery Snail, Eurasian Water-Milfoil*, Faucet Snail, Japanese Knotweed*, Phragmites (non-native)*, Purple Loosestrife*, Rusty Crayfish, Zebra Mussel*
Forest Lake	8900	Eurasian Water-Milfoil, Hybrid Eurasian / Northern Water-Milfoil
Fox River	117900	Curly-Leaf Pondweed, Rusty Crayfish*
Kettle Moraine Lake	43900	Chinese Mystery Snail, Curly-Leaf Pondweed,

		Eurasian Water-Milfoil, Zebra Mussel
Lake Winnebago	131100	Curly-Leaf Pondweed, Eurasian Water-Milfoil, Faucet Snail, Phragmites (non-native)*, Rusty Crayfish*, Zebra Mussel
Long Lake	38700	Banded Mystery Snail, Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Hybrid Eurasian / Northern Water-Milfoil, Purple Loosestrife, Purple Loosestrife*, Rusty Crayfish*, Zebra Mussel
Mauthe Lake	38200	Curly-Leaf Pondweed, Eurasian Water-Milfoil, Zebra Mussel
Milwaukee River	15000	Eurasian Water-Milfoil, Rusty Crayfish
Mullet River	53400	Rusty Crayfish
Newburg Pond	34300	Eurasian Water-Milfoil
Parsons Creek	136000	Rusty Crayfish*, Viral Hemorrhagic Septicemia
Rush Lake	141400	Curly-Leaf Pondweed, Phragmites (non-native)*, Spiny Naiad, Viral Hemorrhagic Septicemia
Sheboygan River	50700	Eurasian Water-Milfoil, Rusty Crayfish
Silver Creek	146800	Japanese Knotweed*, Rusty Crayfish, Rusty Crayfish*
South Branch Manitowoc River	77900	Rusty Crayfish
South Branch Rock River	869800	Rusty Crayfish
Supple Marsh	133600	Chinese Mystery Snail*, Curly-Leaf Pondweed, Eurasian Water-Milfoil*, Faucet Snail, Phragmites (non-native)*, Zebra Mussel*
Taycheedah Creek	138400	Chinese Mystery Snail, Eurasian Water-Milfoil*, Phragmites (non-native)*, Purple Loosestrife*, Rusty Crayfish*, Zebra Mussel, Zebra Mussel*
Tittle Lake	38900	Chinese Mystery Snail
Unnamed	37300	Banded Mystery Snail*, Chinese Mystery Snail*, Zebra Mussel*
Unnamed	133800	Eurasian Water-Milfoil*, Faucet Snail, Zebra Mussel*
Unnamed	133900	Eurasian Water-Milfoil*, Faucet Snail, Purple Loosestrife*
Unnamed	136300	Phragmites (non-native)*
Unnamed	3000188	Eurasian Water-Milfoil*, Faucet Snail*
Unnamed	3000540	Faucet Snail*, Phragmites (non-native)*, Zebra Mussel*
Unnamed	5562315	Eurasian Water-Milfoil*, Faucet Snail, Faucet Snail*, Phragmites (non-native)*, Purple Loosestrife*, Zebra Mussel*
Unnamed	5562318	Phragmites (non-native)*
Unnamed	5562445	Banded Mystery Snail, Banded Mystery Snail*, Chinese Mystery Snail, Chinese Mystery Snail*, Eurasian Water-Milfoil*, Faucet Snail, Flowering Rush*, Water Lettuce, Zebra Mussel*

Unnamed	5562446	Banded Mystery Snail, Eurasian Water-Milfoil*, Faucet Snail, Zebra Mussel*
Unnamed	5562460	Phragmites (non-native)*
Unnamed	5565295	Eurasian Water-Milfoil
Unnamed	5565316	Eurasian Water-Milfoil
Unnamed	5569225	Eurasian Water-Milfoil
West Branch Fond Du Lac River	134000	Rusty Crayfish, Viral Hemorrhagic Septicemia
West Branch Milwaukee River	40400	Eurasian Water-Milfoil, Rusty Crayfish
Wolf Lake	60800	Curly-Leaf Pondweed, Eurasian Water-Milfoil

Additional information on all regulated and non-regulated plant and animal invasive species can be found on the Wisconsin Department of Natural Resources website at <http://dnr.wi.gov/topic/Invasives/>

## WOODLAND RESOURCES

Woodlands once covered between 40 and 80 percent of Fond du Lac County, and now only make up between 10 and 20 percent of the land cover. Woodland acreage has declined in the county from pre Euro-American settlement times. Over the past ten years heavy pressure to convert more acres of land to agriculture has resulted in the loss of additional acres of forested land. Woodlands, even small ones on farms, are a valuable resource in this highly agricultural county. Areas where larger blocks of woodlands still exist are areas of public ownership such as the Northern Unit of the Kettle Moraine State Forest, or areas that have physical characteristics that make them poor farmland. Areas of high bedrock, wet soils, or steep slopes that did not make good farmland have been left in trees and now comprise a valuable asset to the environment. They provide wildlife habitat, reduce soil erosion, help to cleanse the air, and provide recreational opportunities.

Today, the southeastern corner of Fond du Lac County is where the largest block of the woodland acres occurs. The Northern Unit-Kettle Moraine State Forest is the largest, continuous block of forest cover in the county, >10,000 acres. Primarily due to the steep topography left during the Wisconsin glacial period, around 10,000 years ago, made it less desirable for conversion to agriculture. Not to say it was not impacted as it has all been cutover and we are witnessing the second and third growth stands of oak and maple. Secondly, it was also impacted by cattle grazing up until the mid-1970s. Both of these factors combined with invasive species are negatively impacting regeneration of our woodlands especially the oak-hickory forest type. Invasive species such as buckthorn, garlic mustard, boxelder, black locust and prickly ash create such a dense understory, there is not enough light reaching the forest floor to allow the germination of oak acorns and hickory nuts. Poor oak and hickory seedling survival is due to over browsing by an overpopulated white-tail deer herd in the county. Many hardwood tree

plantings have failed due to heavy deer browsing. Emerald Ash Borer has now been found in multiple locations (2017) across the county so management of ash is a high priority. Conversion to other tree species were viable should be a priority for forest landowners. Lastly, many private forests have not been properly managed for quality trees or to ensure their regeneration. Funding and programs, such as Wisconsin Forest Landowner Grant Program, Equip, and Managed Forest Law are available to woodland owners to assist with managing their woodlands in a sustainable manner. This will benefit all woodland dependent wildlife species, such as turkeys, white-tailed deer and many native bird species.

## **FISHERY RESOURCES**

Fond du Lac County is known for its warm water fishery. Lake Winnebago is the most popular area lake. It is heavily fished by residents and visitors to the county. Fish species like northern pike, walleye, bass, sturgeon, catfish and various panfish can be found in the waters throughout the county. The Winnebago System is known throughout the Midwest for its walleye and Lake Sturgeon fishery.

As with wildlife, the destruction of habitat is resulting in reductions in desirable fish populations. Fish spawning habitat and shoreline cover is being progressively destroyed which leads to the decline in desirable fish populations. Annual fish winterkills affect a number of the county's lakes. Nonpoint source pollution causes eutrophication or over fertilization and water clarity problems in lakes. Most of the streams in Fond du Lac County offer minimal fishing opportunities. Contributing factors resulting in reduced gamefish populations in county streams include high fertility, siltation, pollution, grazed streambank, rough fish and extremes of flood and drought.

More fisheries information for Fond du Lac County can be found in the Watershed descriptions at the beginning of this chapter.

## **AIR QUALITY**

Air quality is a concern that the Citizen Advisory Committee felt needed to be included as a resource in this plan. Air quality through the natural water cycle can have an impact on soil and water resources. The committee expressed concerns over particulates that are given off during maintenance burns for wildlife habitats, as well as, other pollutants that are given off from recreational outdoor fire pits and outdoor boilers for home heating. The increasing number and size of manure storage facilities also presents a new challenge for odor abatement technology. While the air quality of Fond du Lac County appears to be good, the LWCD currently has no air quality data to make an appraisal of the overall air quality for Fond du Lac County. The WDNR is currently in the process of updating its Air Quality Monitoring Plan and is planning to install an

ozone monitoring station in Fond du Lac County. Additional air quality information can be found on the WDNR website.

## **CHAPTER 3**

### **RESOURCE CHALLENGES & GOALS**

This chapter is intended to identify the main challenges impacting the land & water resources within the county and to outline actions to guide the LWCD and partnering agencies with achieving the defined goals.

#### **Identification of Resource Challenges**

Identification of the resource challenges and ultimately the goals and objectives for this Land & Water Resource Management Plan was based upon existing resource management plans for the county, concerns expressed by county residents, the experience of local LWCD staff and the Citizen Advisory Committee. The top three resource challenges identified by the Citizen Advisory Committee were impacts to Groundwater, Soil Health and Erosion, and Polluted Runoff to Surface Waters. Planning staff worked with conservation partners to develop resource summaries and appraisals and to also provide input on resource goals and objectives. The resource challenges are ranked in terms of importance to assist with prioritizing efforts and funding. It is the opinion of the County Conservationist that reducing soil erosion and implementation of nutrient management plans are the highest priorities in Fond du Lac County.

#### **Challenge: *Soil Erosion & Sedimentation from Cropland***

Webster's Dictionary defines erosion as a natural process by which earth or rock is gradually worn away and removed by wind, water, etc. Human activities can accelerate the rate at which this process naturally occurs and excessive soil erosion can have huge environmental impacts. The degradation of soil quality and productivity can be very obvious, such as, the formation of a gully through a field. Other times it is so subtle that it may go unnoticed for years until eventually crops cannot be grown in part of a field. Maintaining good soil quality and reducing soil erosion is important both to the environment and to the economy of Fond du Lac County.

Sedimentation occurs when eroded soil is deposited into surface waters such as local rivers, lakes, streams, or wetlands. Sedimentation can be devastating to water quality and aquatic life. Sedimentation reduces water clarity blocking sunlight to aquatic plants, causes irritations on the gills of fish, and fills in critical fish spawning habitats. Sediment often has nutrients, pesticides, and heavy metals attached to soil particles that can cause algae blooms and can be toxic to humans and aquatic life.

**Goal: *Maintain soil productivity and reduce soil erosion and sedimentation.***

**Objectives:**

1. Provide technical assistance for conservation practices to eliminate gully erosion.
2. Reduce soil erosion rates to “T” or lower for all croplands through the implementation of 590 nutrient management plans.
3. Continue providing cost sharing and technical assistance for the establishment of soil conservation practices to reduce sediment reaching surface waters.

Promote the adoption of soil conservation practices to improve soil health and quality such as grassed waterways, vegetative buffers, water and sediment control basins, and terraces to reduce sediment reaching surface waters.

**Challenge: *Nutrient and Pest Management***

Landowners apply nutrients to the soil to enhance crop production levels. High yielding crops are essential to maintain profitability on the farm. However, without proper soil testing, and precise nutrient crediting from the on farm nutrient sources such as legumes and manure, the potential for excessive nutrient applications exists. Knowledge of both inorganic and organic sources of nutrient is imperative for any landowner. Without correct application rates and proper nutrient crediting, these nutrients have the potential of running off site to environmentally vulnerable areas. The result of nutrient flow off site can cause both surface and groundwater contamination. Excessive nutrients in surface water causes unwanted weed growth, lowers dissolved oxygen and increases algal growth. This degradation severely stresses aquatic life and their habitat. Bacteria levels increase as well, which impedes recreational activities.

Nutrients and bacteria can also be transported through the soil profile, into cracks and bedrock crevices. The leaching of these materials has the potential of contaminating groundwater to an unsafe level for human consumption. Infants, along with pregnant and nursing women have to be particularly cautious if they are drinking well water. Nitrate levels in drinking water must be monitored to stay below 10 parts per million.

The urban sector is not exempt when it comes to nutrient management. Homeowners must also follow labels and directions when applying nutrients. The land practices that the urban communities enact could also cause harm to the natural resources if they are not cognitive of their nutrient application methods.

Pest management plans must also be implemented so that the environment is not detrimentally affected. Both the rural and urban sector has to know the pest they are

targeting and then select the correct product for combating that pest. Identification of the pest is integral when developing a pest management plan. Misuse of pesticides can harm the environment and the food chain.

**Goal: *Minimize runoff, leaching, and drift of nutrients and pesticides to surface and ground water.***

**Objectives:**

1. Promote the development and implementation of nutrient management plans that meet the most current USDA-NRCS 590 standard on all cropland.
2. Coordinate annual farmer training workshops to assist farmers with writing and implementing nutrient management plans utilizing the most current software, such as Snap +.
3. Promote best management practices to home owners to reduce nutrient from urban areas.
4. Advocate correct use of pesticides in both rural and urban sectors.
5. Continue coordination of regular Agricultural and Household Clean Sweeps.

**Challenge: *Degradation of Groundwater and Drinking Water Quality and Quantity***

Water in the form of rain and melting snow begins a long and slow journey through the many layers of soil and rock before it becomes ground water. As water passes through these layers of soil and rock it becomes naturally purified. Runoff of nutrients, biological organisms, pesticides, and petroleum along with other human activities can cause this natural purification process to “short circuit” and contaminate ground water resources. Landforms and other geological features like the Niagara Escarpment and karst areas have elevated risks of ground water contamination. Fractured bedrock, sinkholes, along with old and unused drinking water wells act as direct conduits for runoff to reach ground water supplies.

Municipalities, businesses, and citizens of Fond du Lac County depend on ground water as the primary source of drinking water. Ground water is a finite resource with an ever growing demand which places a huge emphasis on the protection of ground water resources.

Pharmaceuticals are showing up in the water in some areas of the country. Flushing them down the drain is no longer an approved disposal method. Municipal wastewater treatment facilities and private septic systems do not properly treat many drugs.

Pharmaceuticals are also used to treat livestock and may be passed through to the environment.

**Goal: *Protection and Conservation of Ground Water Quality and Quantity***

**Objectives:**

1. Promote the development and implementation of nutrient management plans that meet the most current USDA –NRCS 590 standard on all cropland to reduce the risk of ground water contamination from manure and other fertilizers.
2. Continue the implementation and enforcement of the Fond du Lac County Well Abandonment Ordinance
3. Provide cost sharing and technical assistance for the abandonment of old or unused wells.
4. Develop a database for the documentation of karst areas, sinkholes, and other geologic features in the county that pose elevated risks of ground water contamination.
5. Minimize usage of groundwater resources.
6. Educate residents about drinking water wells and potential contaminants.
7. Educate residents about proper storage and disposal of chemicals and continue coordination of ag and household clean sweeps
8. Educate residents about locations for the proper disposal of pharmaceutical supplies and medical wastes.
9. Continue well water sampling programs in the county to educate residents about their drinking water

**Challenge: *Land Disturbing and Land Development Activities***

Rapidly developing areas can greatly impact soil and water resources by significantly increasing the amount of sediment, nutrients and other pollutants that reach local lakes, streams and wetlands. Poorly planned development activities can increase peak flow rates causing increased flooding and bank erosion potentials. It can also reduce base flow rates of streams or lower water levels of local lakes which adversely impacts fish habitat water resource potential. Land disturbing and development activities can impact area groundwater resources by reducing groundwater recharge rates and increasing the potential for pollutants to reach drinking water supplies.

Along with increased runoff, land development and urbanization causes the loss of prime cropland. In developing areas, the loss of cropland increases agricultural and developmental pressure on remaining cropland. This increased pressure often leads to increased nuisance complaints about odor and over spreading of manure on fields next to residential areas. Along with increased complaints, higher taxes and rental rates on remaining cropland also adds to land use pressures.

Loss of wetlands and wildlife habitat from development activities also adversely affects water quality and enjoyment of natural resources within the county. Wetlands provide habitat for an endless variety of wildlife and store flood water and filter out sediment and pollutants before they reach surface and ground water resources.

**Goal: *Minimize the impacts of land disturbing and land development activities within the county.***

**Objectives:**

1. Continue implementation of the Fond du Lac County Erosion Control and Stormwater Management Ordinances to reduce sedimentation and overland flow from construction sites and development.
2. Minimize urban sprawl and protect prime farmland by promoting comprehensive land use planning.
3. Minimize the loss of prime agricultural lands by continuing to promote and administer the Farmland Preservation Program.
4. Preserve and protect lakeshores, stream corridors, wetlands and wildlife habitats by continuing to enforce the County's Shoreland Zoning Ordinance.
5. Continue to promote and provide technical assistance for the establishment of vegetative buffers and wildlife habitat through the Conservation Reserve Enhancement Program (CREP) and the State Acres For Wildlife Enhancement (SAFE) Program.

**Challenge: *Runoff and Storage of Animal Waste and Feed***

Animal waste runoff from livestock operations contains nutrient and biologic contaminants that can be detrimental to surface and ground water quality. Runoff from animal waste is high in phosphorus that causes excessive weed growth and algae blooms and also lowers oxygen levels in nearby lakes and streams. Nitrates found in animal waste and leachate from animal feed storage can leach down through the soil profile contaminating ground water resources. Animal effluent and leachate from feed storage can also be a

source for bacteria and other pathogens that can contaminate drinking water wells and can be harmful or even fatal to humans and wildlife. Excessive bacteria and pathogen levels in surface and ground water are becoming more frequent which can lead to increased beach closures on area lakes and boiling advisories for drinking water.

**Goal: *Reduce the impacts from runoff and storage of animal waste and feed.***

**Objectives:**

1. Continue implementation and enforcement of the Fond du Lac County Livestock Waste Storage and Utilization Ordinance to ensure that animal waste storage facilities are constructed and abandoned according to the most current USDA-NRCS Technical Standards.
2. Conduct farm evaluations through the Farmland Preservation Program or the NR 151 Priority Farm Strategy to inform landowners of animal waste or runoff problems for compliance with NR151 standards.
3. Provide cost sharing and technical assistance for the adoption of best management practices that reduce runoff of animal waste and feed storage leachate .
4. Continue the enforcement of the Fond du Lac County Erosion Control and Stormwater Management Ordinances.

**Challenge: *Runoff from Urban Areas***

Soil erosion and sediment delivery in urban areas of the county originate primarily as construction sites where areas of exposed soil remain for extended periods of time. University research has shown that soil loss from construction sites range from 10 to 50 tons or more of silt and sediment per acre. This source of sediment is currently being addressed through the county stormwater management and construction site erosion control ordinances.

Runoff from fertilizers and pesticides in urban areas also has an impact on area water quality. Lawn fertilizers and pesticides that are over applied or ill-timed can runoff to nearby storm drains without any chance of buffering before reaching local surface waters. Over applications of fertilizers and pesticides can also pollute drinking water resources.

**Goal: *Minimize Impacts of Runoff from Urban Areas.***

**Objectives:**

1. Continue to coordinate activities with municipalities in Fond du Lac County to reduce runoff of pollutants to surface waters.
2. Promote best management practices such as rain gardens and rain barrels that increase infiltration and reduce peak flows
3. Provide technical assistance to protect shoreline and stream banks from erosion in urban areas.
4. Reduce runoff from construction sites through the continued implementation of the Fond du Lac County Erosion Control Ordinance.
5. Educate homeowners on ways to reduce the over application of fertilizers & pesticides.

**Challenge: *Development and Coordination of Lake Management Planning***

It has long been recognized that lakeshore owners play a vital role in the overall health and wellbeing of their lake. Lake organizations can provide numerous information and education opportunities for lakeshore owners and users, as well as, become a unified voice for improvement and protection of their lakes resources.

Unfortunately, many lakes in the county either do not have lake organizations, or if they do, they lack participation that is necessary to effectively coordinate activities.

**Goal: *Support the Development and Coordination of Lake Management Planning.*****Objectives:**

1. Provide information and education to lakeshore owners and lake organizations about the benefits of development of Lake Management Plans.
2. Maintain proper construction site erosion control practices on areas where soil has been disturbed (commercial, residential, or highways) through proper planning, educational workshops, and proper installation of BMP's.
3. Continue to address storm water runoff through proper planning for future growth areas, holding educational workshops, and installing proper control structures.
4. Continue the implementation of the Fond du Lac County Shoreland Zoning Ordinance to protect shoreline habitat and vegetation.

## **Challenge: *Loss and Degradation of Critical Fish and Wildlife Habitats***

Many fish and wildlife resources within the county are not meeting their resource potentials due to degrading habitat quality or loss of habitat altogether. Many rivers and streams are impacted by sedimentation and nutrient runoff limiting the reproduction of native fisheries. Years of sedimentation has filled in natural spawning areas making it impossible for native fish species to reproduce. Many rivers and streams are also adversely affected by increased water temperatures. Increased water temperatures decreases survival of high quality cold water fish species that are less tolerant of warm water temperatures. The result of warming of surface water is the increase of less desirable rough fish that are more tolerant to warm water temperatures.

Pressure from development and more intensive farming practices has adversely impacted the amount of quality wildlife habitat in the county. The once abundant wildlife habitat becomes fragmented due to urban sprawl and other development. More intensive row crop production allows little cover for wildlife during nesting periods of the year. More intensive farming also causes the decline of critical streambank corridor habitats.

### **Goal: *Restore and Preserve Critical Fish & Wildlife Habitats.***

#### **Objectives:**

1. Identify critical fish and wildlife habitats to landowners for protection and/or restoration.
2. Identify relic native prairie reservoirs, such as pastures, cemeteries, old railroad grades, etc. for preservation or expansion.
3. Continue the implementation of the Fond du Lac County Shoreland Zoning Ordinance to protect critical fish and wildlife habitat and vegetation.

## **Challenge: *Exotic & Invasive Species***

Invasive species are plants or animals that have the potential to take over native species populations and upset the fragile balance of native ecosystems. Exotic species are plants and animals that are not native to an area and are transplanted by human or animal activities. Because exotic species are not native to the area, they often do not compete with other plants or animals that keep populations in check and have a huge potential of becoming invasive to other native plants and animals. When exotic and invasive species populations are not kept in check with natural predators or human activities, they can flourish wiping out other native species and wreaking havoc on entire ecosystems.

**Goal: *Minimize the Threat and Spread of Exotic & Invasive Species.***

**Objectives:**

1. Support activities like the Bridge Snapshot Field Day to educate landowners about the ecological and economic impacts of exotic & invasive species.
2. Continue to partner with lake and conservation organizations to identify and promote proper management techniques of exotic & invasive plants and organisms to reduce their spread.
3. Provide information and education to lakeshore owners and lake organizations about the benefits of development of Lake Management Plans have include exotic and invasive species management coordination.

**Challenge: *Energy Use & Air Quality***

Poor air quality can be attributed to a wide variety of factors; however, the use of coal and oil for energy production and transportation impacts local air quality. The environmental effects of poor air quality can directly and indirectly impact our health as well as our environment. Poor air quality can be linked to a variety of respiratory ailments, as well as, the cause of acid rain. Parts of southeast Wisconsin already experience Air Quality Watches or Advisories to warn residents about unhealthy air quality caused by ozone and other particulates.

**Goal: *Use Less Energy and Improve Air Quality***

**Objectives:**

1. Educate residents about the effects of poor air quality, what it's caused from, and how they can improve air quality.
2. Educate residents about ways they can conserve energy.
3. Educate residents about the use of alternative fuels and "Green" technologies that produce less harmful emissions and improve gas mileage for commercial and passenger vehicles.
4. Educate residents about steps to conserve energy on the road, in the home and on the farm.



## **CHAPTER 4**

### ***PLAN COORDINATION & IMPLEMENTATION STRATEGIES***

The goals of the Fond du Lac County Land and Water Resource Management Plan cannot be accomplished without the assistance and cooperation of landowners, private local and national organizations and our government agency partners on all levels. This plans coordination and implementation strategies are essential for effective implementation of the goals that have been outlined. Fond du Lac County has always attempted to make the best use of all resources in addressing conservation issues. Program issues and ideas are discussed frequently with staff from all agencies. The following outlines common conservation partners, programs and/or resources that are typically used for conservation efforts in Fond du Lac County, however additional programs and partners are continually sought out to assist with accomplishing conservation goals:

#### ***National and Federal Conservation Partners:***

##### **United States Department of Agriculture (USDA) Programs – Environmental Quality Incentives Program (EQIP).**

Provides cost-sharing for a variety of conservation practices (see BMP definitions in appendix) to address erosion and nutrient management issues.

##### **Wildlife Habitat Incentives Program (WHIP).**

Provides cost-sharing for fish and wildlife habitat improvement practices.

##### **Conservation Reserve Program (CRP).**

Provides incentives to set aside land for conservation purposes.

##### **Conservation Reserve Enhancement Program (CREP).**

A multi-agency effort (DATCP, FSA, NRCS, and Fond du Lac County) that provides incentives to create buffers along streams and waterways.

##### **Wetlands Reserve Program (WRP).**

Provides cost-sharing to restore wetlands previously altered for agricultural use.

##### **Animal Plant & Health Inspection Service (APHIS).**

Provides Federal leadership and expertise to resolve wildlife conflicts and create a balance that allows people and wildlife to coexist peacefully.

### **US Fish and Wildlife Service (USF&W) Programs –**

US Fish and Wildlife Programs are used in Wisconsin to assist in wetland restoration, fish and wildlife habitat improvement, and restoration of habitats of special concern.

#### **Upper Rock River Special Project.**

This program originally provided special funding from the USF&W and the Environmental Protection Agency (EPA) for LWCD staff to assist landowners in the Upper Rock River Watershed with information and education of Federal, State, & Local conservation programs that are available to reduce nonpoint source runoff.

Partnerships with other organizations like Ducks Unlimited continue to fund the efforts of this project.

### **United States Geological Survey (USGS)**

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

As the Nation's largest water, earth, and biological science and civilian mapping agency, the U.S. Geological Survey (USGS) collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems.

### **Pheasants Forever (PF) –**

Pheasants Forever is dedicated to the conservation of pheasants, quail and other wildlife through habitat improvements, public awareness, education and land management policies and programs.

### **Trout Unlimited (TU) –**

Trout Unlimited is dedicated to improving trout fisheries through improved water quality, habitat improvements, public awareness, education and land management policies and programs.

### **Ducks Unlimited (DU) –**

Ducks Unlimited is dedicated to improving wetland and waterfowl through partnerships with private individuals, landowners, agencies, scientific communities and other entities.

### **Great Lakes Commission –**

The Great Lakes Commission is an interstate compact agency that promotes the orderly, integrated and comprehensive development, use and conservation of the water

and related natural resources of the Great Lakes basin and St. Lawrence River. Its members include the eight Great Lakes states with associate member status for the Canadian provinces of Ontario and Québec. Each jurisdiction appoints a delegation of three to five members comprised of senior agency officials, legislators and/or appointees of the governor or premier.

The Commission was established by joint legislative action of the Great Lakes states in 1955 (the Great Lakes Basin Compact) and granted congressional consent in 1968. A Declaration of Partnership established associate membership for the provinces in 1999.

### **Fish America Foundation –**

The FishAmerica Foundation is the conservation and research foundation of the American Sportfishing Association—keeping our nation's fish and waters healthy. FishAmerica provides grants to non-profits, conservation minded groups to enhance fish populations, restore fisheries habitat, improve water quality and advance fisheries research to improve sportfishing opportunities and success. The Fond du Lac County LWCD has partnered with the Fish America Foundation to attain grants and coordinate cost sharing for conservation projects.

## ***Regional and State Conservation Partners***

### **Wisconsin Department of Natural Resources (DNR) Programs –**

#### **Targeted Resource Management Program (TRM).**

Counties can apply for grants through this program to offer cost sharing on a variety of conservation practices to address nonpoint source runoff.

#### **DNR Tree Sale Program.**

Landowners can purchase large quantities of trees for planting on their land.

#### **Wildlife Damage Control**

Wildlife damage abatement in conjunction with USDA-APHIS.

#### **Surface Water Grants**

Offers financial assistance to help with planning and protection of surface waters.

## **Wisconsin Department of Agriculture, Trade, & Consumer Protection (DATCP) Programs**

### **Soil and Water Resource Management (SWRM).**

This program provides grants to counties to hire staff and to cost-share the installation of conservation practices on private land.

### **Working Lands Initiative (WLI)**

The Wisconsin Working Lands Initiative was signed into law in 2009 and is comprised of the following three programs:

#### **Farmland Preservation Program (FPP). Map 4-1**

This program provides income tax relief to participants to protect farmland by complying with manure management and agricultural performance standards set forth by the State of Wisconsin.

#### **Agricultural Enterprise Area Program**

Local communities can voluntarily pursue designation of an “agricultural enterprise area” (AEA) by submitting a petition to the Department of Agriculture, Trade and Consumer Protection (DATCP). Through this designation, the community can encourage continued agricultural production and investment in the agricultural economy. Farmers within designated AEAs are eligible to enter into voluntary farmland preservation agreements to collect the farmland preservation tax credits.

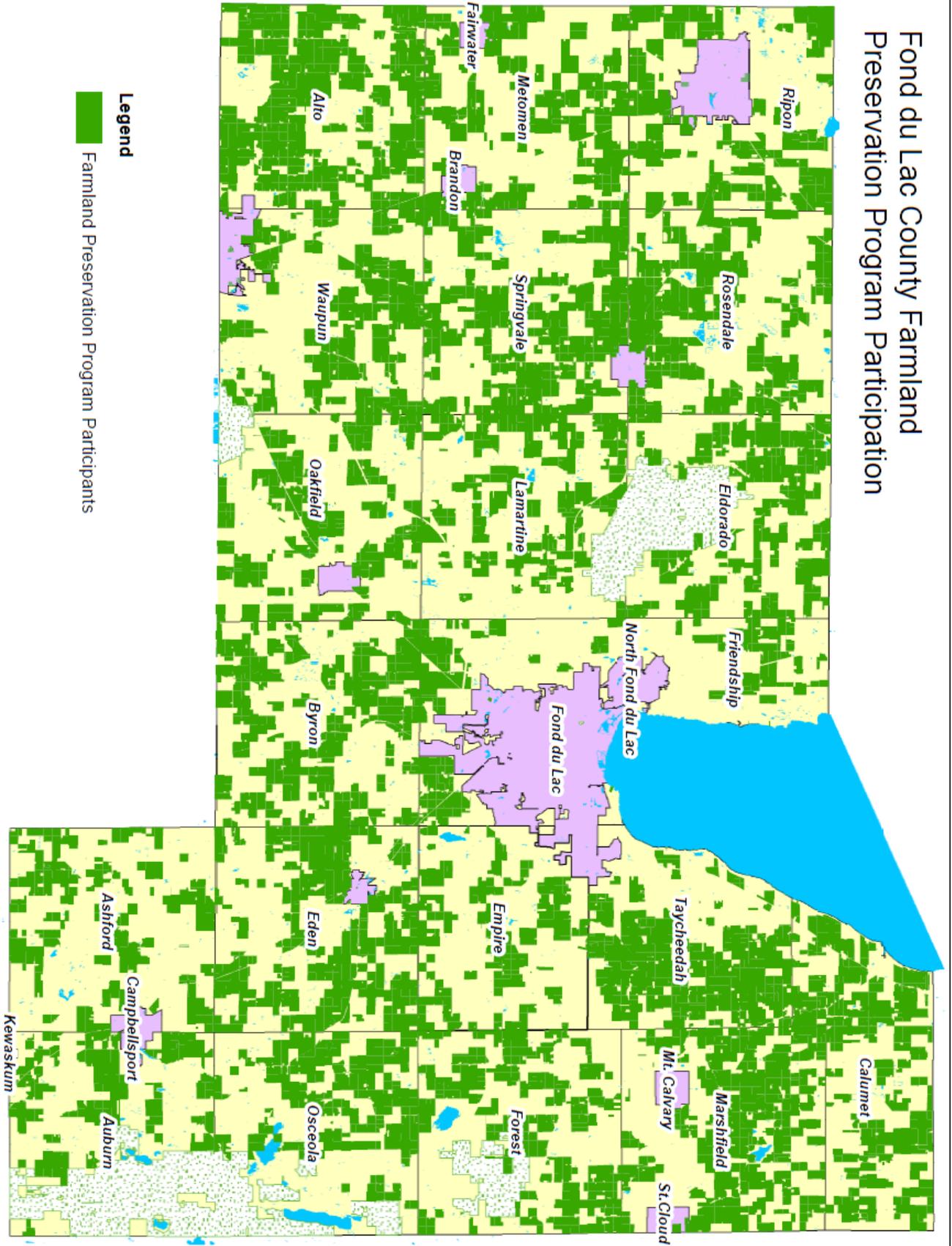
#### **Purchase of Agricultural Conservation Easement Program (PACE)**

The Working Lands Program establishes a new program to provide up to 50% of the cost of purchasing agricultural conservation easements, including transaction costs. Through the Purchase of Agricultural Conservation Easements (PACE) program, the state will provide funding to cooperating local governments or non-profit organizations to purchase easements from willing landowners. Land with an agricultural conservation easement cannot be developed for any purpose that would prevent its use for agriculture.

#### **Agricultural and Household Clean Sweep.**

Counties can utilize this program for free collection and safe disposal of hazardous chemicals.

# Fond du Lac County Farmland Preservation Program Participation



Map 4-1

## **Wisconsin Land + Water Conservation Association (WLWCA)**

WLWCA's mission is to assist county Land Conservation Committees and Departments with the protection, enhancement and sustainable use of Wisconsin's natural resources and to represent them through education and governmental interaction.

## **University of Wisconsin Cooperative Extension (UWEX) Programs –**

The University Wisconsin Cooperative Extension provides information and education assistance in the county. Fond du Lac County UWEX has agents that specialize in Dairy & Livestock, Crops & Soils, Family Living, & 4-H & Youth Development.

### **Farmer Nutrient Management Education Grant**

The Farmer Nutrient Management Education Grant was started to help integrate educational programming and local conservation efforts. Program support comes from the Natural Resources Conservation Service (NRCS), the Wisconsin Department of Natural Resources (WDNR), the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP), the Farm Service Agency (FSA), and the University of Wisconsin-Extension (UWEX). Funding for winning grant proposals comes from NRCS, DNR, and UWEX. Fond du Lac County has been utilizing this grant for assistance with nutrient management education.

## **Fox-Wolf Watershed Alliance (FWWA) –**

Fox-Wolf Watershed Alliance is an independent nonprofit organization that identifies issues and advocates effective policies and actions that protect, restore, and sustain the water resources of the Fox-Wolf River Basin.

The FWWA is the organization that is housing the coordinator position for the weigh in on Winnebago steering team which will coordinate between the lake counties to obtain grant funding and work on lake management planning.

## **Northeast Wisconsin Stormwater Consortium (NEWSC) –**

Northeast Wisconsin Stormwater Consortium ...

The Northeast Wisconsin Stormwater Consortium which was formed in 2005 as a subsidiary of the Fox-Wolf Watershed Alliance is made of a consortium of member communities with leadership elected annually from within its members.

To facilitate efficient implementation of stormwater programs locally and regionally that will meet DNR and EPA regulatory requirements and maximize the benefit of stormwater activities to the watershed by:

- Fostering Partnerships
- Sharing Information
- Seeking Administrative Efficiency
- Pooling Financial Resources

NEWSC has worked with Fond du Lac County and other northeast counties to draft and implement a regional stormwater and erosion control ordinance that can be adopted by counties for consistent implementation of stormwater and erosion control regulations across county lines

### **Resource Conservation & Development (Glacierland RC&D) –**

RC&D is a non-biased, rural development program focusing on the conservation, development and utilization of area resources to improve the standard of living. It joins forces with individuals, agencies and groups to improve the social, economic and environmental opportunities of the local area. The mission of the RC&D is to conserve, develop and utilize local resources to raise the level of economic activity in the area, while enhancing the environment and the standard of living.

### **Sand County Foundation –**

Fond du Lac County LWCD has partnered with the Sand County Foundation to attain grants for conservation projects.

## ***Local Conservation Partners***

### **Fond du Lac County Land & Water Conservation Department –**

In cooperation with Federal, State, and county agencies the Fond du Lac County Land & Water Conservation Department is responsible for promoting, protecting, and enhancing the land & water resources of Fond du Lac County. Some of the many services offered by this department are: Administration of State and Local Conservation Programs, Technical & Design Assistance for Conservation Practices, Providing Financial Assistance, Information & Education Equipment and Programs, Manure Spreader Calibrations, Administration of the Livestock Waste Storage Ordinance and also the Erosion Control & Stormwater Management Ordinance, Erosion Control Product Sales & Rental, Tree Sale & Tree Planter rental Programs.

### **Fond du Lac County Code Enforcement Department–**

The County Code Enforcement Office administers the Floodplain Zoning Ordinance, the Private Onsite Wastewater Treatment System (POWTS), the Shoreland Zoning Ordinance, the Automobile, Tire and Junk Ordinance, the Lead Poisoning, Prevention,

Control Ordinance, Well Abandonment Ordinance, and the Non-Metallic Reclamation Ordinance.

**Fond du Lac County Parks & Planning Department –**

The Planning Division is responsible for supervision and budgeting for the division, administration of the land division ordinance and other land regulatory ordinances in the unincorporated areas of the County, and to provide assistance to towns, villages, and cities in the county with planning, zoning, and parks related issues. The purpose of these responsibilities is to help assure the accuracy of land divisions and land transactions and to help assure orderly development and protection of natural resources in the county.

**Fond du Lac County Land Information Department –**

The LID oversees the County's Real Property Listing functions, coordinates and manages all Geographic Information System (GIS) projects and is responsible for the coordination and implementation of the Land Records Modernization Plan.

**Fond du Lac County Health Department –**

Fond du Lac County Health Department prevents disease, protects the community, and promotes healthy living for all.

**Local Townships, Cities, & Villages –**

All zoning within the county is governed by the individual townships, cities, and villages.

**Green Lake Sanitary District –**

The District was formed as a means to protect Big Green Lake and its associated resources with respect to sanitation and related land, air and water quality matters. In addition to coordinating solid waste collection in parts of four different Townships, the District also oversees the treatment of wastewater from approximately 1300 homes. The Fond du Lac County LWCD has partnered with the GLSD to attain grants and coordinate cost sharing for conservation projects.

**Green Lake Association (GLA)–**

The GLA's mission is to promote the conservation of Big Green Lake and its watershed.

**Lake Winnebago Quality Improvement Association (LWQIA)**

The Lake Winnebago Quality Improvement Association is a non-profit organization striving to improve the water quality of Lake Winnebago, for the betterment of the lake's natural habitat as well as for public recreational use. The association takes action on

lake quality issues through education, communication, and social fund raising meetings for members and guests, and promotes cooperation among governmental units, interested organizations, and the public.

**Marion University –**

Marion University partners with the Fond du Lac County LWCD on a variety of service-learning based community projects.

**University Wisconsin Fond du Lac (UW-FDL)–**

UW-FDL partners with the Fond du Lac County LWCD on a variety of community conservation education projects.

**Moraine Park Technical College (MPTC)–**

UW-FDL partners with the Fond du Lac County LWCD on a variety of community conservation education projects.

**Area School Districts –**

Fond du Lac Area School Districts partner with Fond du Lac LWCD to conduct in class conservation education curriculums.

**Mercury Marine –**

Fond du Lac County LWCD has partnered with Mercury Marine to sponsor events and attain grants for conservation projects.

**Winnebago Land Conservation Alliance –**

This group is comprised of hunting and fishing organizations from around the Lake Winnebago Area.

**NR 151 PERFORMANCE STANDARDS**

NR151 of Wisconsin State Statute establishes runoff pollution performance standards for non-agricultural facilities and transportation facilities and performance standards and prohibitions for agricultural facilities and practices designed to achieve water quality standards as required by s. 281.16 (2) and (3), Stats. This section also specifies a process for the development and dissemination of department technical standards to implement the non-agricultural performance standards as required by s. 281.16 (2) (b), Stats. If these performance standards and prohibitions do not achieve water quality standards, this chapter specifies how the department may develop targeted performance standards in conformance with s. NR 151.004.

## **NR 151 AGRICULTURAL PERFORMANCE STANDARDS**

**NR 151.02; Sheet, rill and wind erosion** - All land where crops or feed are grown, including pastures, shall be managed to achieve a soil erosion rate equal to, or less than, the “tolerable” (T) rate established for that soil.

**NR 151.03; Tillage setback** – The purpose of this standard is to prevent tillage operations from destroying stream banks and depositing soil directly in surface waters. No crop producer may conduct a tillage operation that negatively impacts stream bank integrity or deposits soil directly in surface waters. No tillage operations may be conducted within 5 feet of the top of the channel of surface waters. Tillage setbacks greater than 5 feet but no more than 20 feet may be required to meet this standard. Crop producers shall maintain the area within the tillage setback required in adequate sod or self-sustaining vegetative cover that provides a minimum of 70% coverage.

**NR 151.04; Phosphorous index performance standard– All crop and livestock producers shall comply with this section.** Croplands, pastures, and winter grazing areas shall average a phosphorus index of 6 or less over the accounting period and may not exceed a phosphorus index of 12 in any individual year within the accounting period. If the phosphorus index is not applicable to a particular crop or situation, an equivalent calculation approved by the department shall be used to meet the requirements of this section. Producers may not apply nutrients or manure directly, through mechanical means, to surface waters. The phosphorus index requirement first takes effect for pastures beginning July 1, 2012.

**NR 151.05 Manure storage facilities performance standards**- New or substantially altered manure storage facilities shall be designed, constructed and maintained to minimize the risk of structural failure of the facility and minimize leakage of the facility in order to comply with groundwater standards.

The levels of materials in the storage facility may not exceed the margin of safety level. Storage facilities that are constructed or significantly altered on or after January 1, 2011, shall be designed and operated to contain the additional volume of runoff and direct precipitation entering the facility as a result of a 25-year, 24-hour storm. A new manure storage facility means a facility constructed after October 1<sup>st</sup>, 2002. A substantially altered manure storage facility is a manure storage facility that is substantially altered after October 1<sup>st</sup>, 2002.

Closure of a manure storage facility shall occur when an operation where the facility is located ceases operations, or manure has not been added or removed from the facility for a period of 24 months. Manure facilities shall be closed in a manner that will prevent future contamination of groundwater and surface waters. The owner or operator may retain the facility for a longer period of time if they can demonstrate to the LWCD that all of these conditions are met: the facility is designed, constructed and maintained in accordance with NR 151/state standards,

the facility is designed to store manure for a period of time longer than 24 months, and retention of the facility is warranted based on anticipated future use.

Manure storage facilities in existence as of October 1<sup>st</sup>, 2002, that pose an imminent threat to public health, fish and aquatic life, or ground water shall be upgraded, replaced, or abandoned in accordance with the manure storage facility section of NR 151. Levels of materials in storage facilities may not exceed the margin of safety level.

**NR 151.055 Process wastewater handling performance standard-** All livestock producers shall comply with this section. There may be no significant discharge of process wastewater to waters of the state. The LWCD will consider all of the following factors when determining whether a discharge of process wastewater is a significant discharge to waters of the state:

1. Volume and frequency of the discharge
2. location of the source relative to receiving waters
3. means of process wastewater conveyance to waters of the state
4. Slope, vegetation, rainfall and other factors affecting the likelihood or frequency of process wastewater discharge to waters of the state. Available evidence of discharge to a surface water of the state or to a direct conduit to groundwater
5. Whether the process wastewater discharge is to a site that is defined as a site susceptible to groundwater contamination
6. Other factors relevant to the impact of the discharge on water quality standards of the receiving water or to ground water standards

**NR 151.06 Clean water diversion performance standard** – All livestock producers within a water quality management area shall comply with this section. Runoff shall be diverted away from contacting feedlot, manure storage areas and barnyard areas within Water Quality Management Areas (WQMA's) except that a diversion to protect a private well is required only when the feedlot, manure storage area or barnyard area is located upslope from the private well. WQMA's are defined as any wetlands, areas within 300' from rivers or streams and areas within 1000' from any lakes or ponds.

**NR 151.07 Nutrient Management** – All crop producers and livestock producers that apply manure or other nutrients directly or through contract to agricultural fields shall comply with this standard. Apply manure and other fertilizers according to an approved USDA-NRCS 590 nutrient management plan.

**Manure Management Prohibitions:**

- *A livestock operation shall have no overflow of manure storage facilities.*

- *A livestock operation shall have no unconfined manure piles within Water Quality Management Areas (WQMA's). WQMA's are defined as any wetlands, areas within 300' from rivers or streams and areas within 1000' from any lakes or ponds.*
- *A livestock operation shall have no direct runoff from a feedlot or stored manure into the waters of the state.*
- *A livestock operation may not allow unlimited access by livestock to waters of the state in a location where high concentrations of animals prevent the maintenance of adequate sod or self-sustaining vegetative cover.*

#### **NR 151.10 NON-AGRICULTURAL PERFORMANCE STANDARDS**

NR 151.11 - Construction site performance standard for new development and redevelopment.

NR 151.12 - Post-construction performance standard for new development and redevelopment.

NR 151.13 - Developed urban area performance standard.

NR 151.14 - Non-municipal property fertilizer performance standard.

#### **NR 151.20 TRANSPORTATION FACILITY PERFORMANCE STANDARDS**

NR 151.23 - Construction site performance standard

NR 151.24 - Post-construction performance standard

NR 151.25 - Developed urban area performance standard

### **NR 151 PERFORMANCE STANDARDS IMPLEMENTATION STRATEGY**

Fond du Lac County is firmly committed to voluntary implementation of State performance standards and will exhaust every option available to bring a site into compliance voluntarily before any enforcement action is taken. Changes to the Wisconsin Farmland Preservation Program (FPP) require all participants to achieve compliance with 2002 standards by no later than Dec.31<sup>st</sup>, 2016. The Fond du Lac County Livestock Waste Storage and Utilization Ordinance, Erosion Control and Post Construction Stormwater Management Ordinances, and the State of Wisconsin Farmland Preservation Program are Fond du Lac County's primary mechanisms for achieving compliance with the NR 151 Performance Standards. In 2016, Fond du Lac County had 891 landowners claiming the FPP Tax credit on 167,371 acres. Fond du Lac County LWCD staff completes farm evaluations for compliance with NR151 standards for 25% of all Farmland Preservation Program participants annually. This equates to approximately 200 farm evaluations annually, with eventually all FPP participants having an evaluation completed once every four years.

The following outlines the strategy for implementation of the Performance Standards for landowners that are not claiming the FPP tax credit:

### **Priority Farm Strategy**

Fond du Lac County utilizes a tracking database for compliance with standards for the Farmland Preservation Program. This database allows the use of GIS to show and track Farmland Preservation Participation. This GIS information will be assessed to determine needs for additional evaluations for compliance with state standards for landowners not in the Farmland Preservation Program, see Map 4-1. Once additional needs are have assessed, farms will be prioritized for review of compliance with performance standards and prohibitions in the following way:

1. Non-WPDES Permitted CAFO Livestock Operations
2. Cash Grain Producers Operating 1,000 acres or more
3. Cash Grain Producers Operating between 750-999 acres
4. Cash Grain Producers Operating between 500-749 acres
5. Cash Grain Producers Operating between 250-499 acres
6. Cash Grain Producers Operating between 0-249 acres
7. Additionally farms may be evaluated for compliance based on citizen complaints or other observations.

In addition to the 200 farm evaluations that are completed each year for the Farmland Preservation Program and based on current staff numbers and workload, the LWCD can review an average of 10 Priority farms per year for compliance of State Performance Standards. Additional farm evaluations will be completed if time and workload allow.

### **NR 151 COMPLIANCE REVIEW & NOTIFICATION PROCESS**

#### **Record Reviews**

A records inventory shall be used initially to determine current compliance to the performance standards. Existing conservation plan information developed for FPP, LWRM & Watershed participant files as well as data gathered for barnyard, manure storage, and streambank inventories shall be used as a starting point.

A complete records review will also be conducted when landowners request technical assistance, cost sharing, livestock waste storage permit applications, and stormwater and erosion control permit application. Each review will be accompanied by a NR 151 Evaluation Report. The NR 151 Evaluation Report documents initial findings from the record review and compliance or non-compliance with performance standards.

### **Initial Notification**

Upon completion of a records review LWCD staff will contact the landowner to verify information in the records review for accuracy. If a landowner is shown to be in compliance, a notification letter will be sent documenting compliance of performance standards. The notification letter will also explain to the landowner the continued obligation of meeting the performance standards. If the record review documents potential noncompliance an initial notification will be sent to the landowner/operator stating the need for a follow-up on-site evaluation. Once this notification letter is sent, a follow up contact will be scheduled.

### **On Site Evaluations**

After a record review has been conducted and an initial notification has been made, the LWCD will conduct on site evaluations. On site evaluations will also be conducted for sites that have: (1) Reports of environmental incidents with the potential to adversely affect public health & safety such as fish kills and well contamination, or (2) Complaints regarding violations on a particular site or sites.

The on-site evaluation will identify and document all NR151 standards pertaining to the property. Once the on-site evaluation is conducted and the NR 151 Evaluation Report is completed, compliance determination can be made.

As record reviews are completed and on-site evaluations are conducted, farms will be prioritized for targeting available cost share funding and technical assistance. Prioritization for funding and technical assistance will be reviewed annually to ensure that available cost share funding and technical assistance are targeted to the highest priority sites.

### **Compliant Sites**

After completion of an on-site evaluation and the landowner is found to be in compliance, a letter documenting full compliance with Chapter NR 151, Wis. Admin. Code will be sent. This letter documents the record review has been completed, any necessary on-sites have been conducted, and states the landowner's obligation with compliance of the performance standards, now and in the future.

### **Non-Compliant Sites**

Once an on-site is made and the landowner is found to be not meeting compliance of an NR151 Standard(s), a notification letter will be sent. This letter will document that a record review has been conducted, necessary on-sites have been conducted, and states that the landowner is out of compliance with the performance standards and is required to take corrective actions. This letter will also include the following:

- Explanation of the State's Performance standards and the specific standard that the landowner is not meeting.
- Corrective measures prescribed for achieving compliance of the specific standard(s) that are noncompliant. An estimated cost for installation of corrective measures along with a list of appropriate technical standards and maintenance schedule will also be included.
- The status of cost share eligibility and potential funding sources to assist with any corrective measures.
- The time table for compliance with standards based on the availability of cost sharing.
- A notice of process and procedure for appeals on the compliance determination.

If funding is not immediately available for installation of the BMP's, the landowner will be advised that funding is not currently available and they will be notified when funds are prioritized and become available for necessary corrective measures.

### **Appeal of Compliance Determinations**

Landowners may appeal their determination for compliance with State Performance Standards. The following outlines the procedures for appeals. The rules, procedures, duties and powers of the committee and provisions of Wis. Stats. Ch. 68 shall apply to appeals under this article.

1. A request for an appeal shall be filed with the department within 30 days of landowner notification.
2. The appeal shall be heard by the committee at a regularly scheduled meeting with public notice as required by Wis. Stats. 19.81. The appeal shall be heard within 45 days of the date the appeal is filed with the department. A copy of the meeting notice shall be sent to the applicant. The department shall transmit to the committee all documents constituting the record from which the appeal was taken.
3. A written decision regarding the appeal shall be made within 30 days.
4. The final decision on an appeal shall be in the form of a written determination signed by the chairperson or designee of the committee. The determination shall state the specific facts that are the basis for the committee's decision and shall affirm, reverse, vary or modify the order, requirement, decision or determination appealed, in whole or in part; or deny the appeal for lack of justification.

## Enforcement of State Performance Standards

LWCD staff will exhaust every option with the landowner to achieve voluntary compliance with State Performance Standards. The following questions will act as a check list to determine why the site has not been brought into compliance:

- (1) Has cost sharing & technical assistance been offered?
- (2) Will the landowner agree to an implementation schedule?
- (3) Has a cost share agreement been signed with no installation of BMP's within the installation period?
- (4) Are there extenuating circumstances that prohibit the landowner from complying within the installation schedule?

Sites that have been designated by the LWCD as noncompliant, were unsuccessful in their appeal to change their status, have refused cost sharing and technical assistance, and have refused to bring the site into compliance voluntarily will be served with a Notice of Noncompliance stating that they may subject to additional enforcement action to ensure compliance with standards.

## **MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT IMPLEMENTATION**

To meet the requirements of the federal Clean Water Act, DNR developed the Wisconsin Pollutant Discharge Elimination System (WPDES) Storm Water Discharge Permit Program which is administered under the authority of ch. NR 216, Wis. Adm. Code. The WPDES Storm Water Program regulates the discharge of storm water in Wisconsin from three potential sources:

- Construction sites
- Industrial facilities
- Municipal separate storm sewer systems (MS4s)

Regulated storm water discharges are considered point sources, so owners or operators of these sources are required to receive a WPDES permit for their discharge. This permitting mechanism is designed to prevent storm water runoff from washing harmful pollutants into local surface waters such as streams, rivers, lakes or coastal waters. The following is a list of municipalities that are currently required to have MS4 permits:

Village of Eden, Empire Township, Fond du Lac County, City of Fond du Lac, Fond du Lac Township, Friendship Township, Village North Fond du Lac, and Taycheedah Township.

## **LOCAL ORDINANCE IMPLEMENTATION**

The LWCD enforces local ordinances to assist with compliance of State regulations. The County will revise ordinances in order to keep current with new technical standards and state laws. The following is a list of ordinances that impact land and water activities in Fond du Lac County:

### **Animal Waste Storage Ordinance (Chapter 14)**

This ordinance is administered by the LWCD and the purpose of this article is to assure the safe handling and spreading of manure as well as to regulate the location, design, construction, installation, alteration, operation, and maintenance of all new livestock manure storage facilities. Also regulate the closure of livestock manure storage facilities in order to prevent water pollution, protect the health and safety of residents and transients, prevent the spread of disease, and promote the prosperity and general welfare of the citizens of Fond du Lac County. The Fond du Lac County Board adopted an Animal Manure Storage Ordinance on April 23, 1996, with revisions to the Ordinance being adopted in 2004 and again in 2014

### **Erosion Control Ordinance (Chapter 27.0) & Post-construction Stormwater Management Ordinance (27.2)**

These ordinances were originally adopted in 2002 and revised again in 2016. The ordinances are administered by the LWCD and the purpose of this chapter is to set forth requirements for land development and land disturbing activities aimed to minimize sedimentation, water pollution, flooding and related property and environmental damage caused by soil erosion and uncontrolled stormwater runoff during and after construction, in order to diminish the threats to public health, safety, welfare, and the natural resources of Fond du Lac County. A permit may be required if any of the following applies:

#### **A. Land Disturbance (Erosion Control Permit Only)**

1. Disturbs 4,000 square feet or more of total land surface area;
2. Involves 400 cu. yd. of excavation, filling or any combination thereof;
3. Other land disturbing activities, having a high risk of polluting water.

#### **B. Land Development (Erosion Control and Stormwater Management Permit)**

1. Divides an existing tax parcel into 5 separate parcels of 5 acres or less each;
2. Ultimately results in the addition of impervious surfaces of 20,000 square feet or greater in total area, including smaller individual sites that are part of a common plan of development; or
4. Other land development activities, having a high risk of polluting water.

Agriculture is exempt meeting the pollutant reduction requirements of the stormwater management ordinance and is also exempt from the ordinance for activities such as planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or

yarding of livestock as well as sod farms and tree nurseries. However, agriculture is still required to obtain erosion control permit and follow erosion and sediment control plan. Furthermore, construction of an agricultural building or facility that meets the land development criteria must obtain an erosion control and stormwater management permit and have an approved stormwater plan that meets the quantity reductions of the ordinance.

#### **Shoreland Zoning Ordinance (Chapter 44)**

This ordinance is administered through the Fond du Lac County Code Enforcement Department and its purpose is to (1) Further the maintenance of safe and healthful conditions and prevent and control water pollution; (2) Protect spawning grounds, fish and aquatic life; (3) Control building sites, placement of structures and land uses; and (4) Preserve shore cover and natural beauty.

#### **Non-metallic Mining Ordinance (Chapter 36)**

This ordinance is administered through the Fond du Lac County Code Enforcement Department and applies to operators of non-metallic mining sites within the county operating on or after August 1<sup>st</sup>, 2001.

#### **Private Onsite Wastewater Treatment Ordinance (Chapter 58)**

This ordinance is administered through the Fond du Lac County Code Enforcement Department and its purpose is to provide a basis for the regulation of siting, construction, and maintenance of Private Onsite Wastewater Treatment System (POWTS), as well as to regulate the disposal of septage and sewage from such systems, in order to protect the public health.

#### **Well Abandonment (Ch 58, Article III)**

The Private Water System Ordinance was enacted in January 2009. This ordinance regulates the proper abandonment of any well that is not in service, taken out of service, and/or any well that is not in compliance with Wisconsin Administrative Code NR 812.

### **TOTAL MAXIMUM DAILY LOAD (TMDL) IMPLEMENTATION STRATEGY**

Current TMDL basin or watersheds located within Fond du Lac County are the Rock River Basin, The Milwaukee River Basin, and the Upper-Fox/Wolf River Basin. The Manitowoc River Watershed is also currently under discussion for TMDL planning. Often, TMDL implementation relies heavily on the ability to focus available conservation resources to meet long term planning goals for the basin or watershed. Stakeholders such as landowners, farmers, local businesses, government leaders and agencies, conservation organizations coordinating efforts together within

the basin or watershed will bring the most opportunity to maximize available resources and funding. County Land & Water Conservation Departments can play a significant role in the implementation of local TMDL efforts.

Development of watershed plans that are consistent with EPA's nine key elements provide a framework for improving water quality in a holistic manner within a geographic watershed. The nine elements help assess the contributing causes and sources of nonpoint source pollution, involve key stakeholders and prioritize restoration and protection strategies to address water quality problems. EPA approved nine key element plans improve coordination of efforts and increases the potential for funding opportunities in TMDL basins and watersheds, however development of nine key element plans is up to local stakeholders. Lack of available resources can be a significant obstacle for the development of nine key element plans. Fond du Lac County Land & Water Conservation Department supports development of nine key element plans for implementation in TMDL watersheds and basins in the county and will assist with the coordination and development to the greatest extent possible. Fond du Lac County Land & Water Conservation will also support the development and implementation of nine key element plans by documenting and reporting any reductions through conservation activities that help reach TMDL goals.

## **INFORMATION & EDUCATION STRATEGY**

A key component of the Land & Water Resource Management Planning process is the development and implementation of an Information and Education strategy. Behavioral change can sometimes take a long time, however the time it takes to adopt behavioral changes can be expedited if sound information is provided to decision makers showing that the benefits of changing outweigh the status quo. The benefits of adopting behavioral or management changes that effect our environment often comes down to economics versus stewardship. It is easier for a decision maker to adopt management changes when there is a positive economic and a positive stewardship benefit.

The goal of the Fond du Lac County LWCD Information and Education strategy is to provide landowners with the information they need to make decisions that have a positive environmental impact. The Information and Education Strategy will focus on providing information that: (1) Raises awareness of environmental issues and regulations; (2) Raises knowledge of best management practices needed to correct environmental problems and maintain compliance with regulations; (3) Raises awareness of programs and cost share opportunities for adopting best management practices; (4) Promotes a sense of ownership of the environment. The following activities will be implemented as part of the Information & Education strategy:

**One on One Contacts:**

One on one contacts will be used as a way to inform and educate landowners about conservation issues and regulations. One on one contacts are typically the most effective way to communicate and pass along information to landowners.

**Newsletters & Mailings:**

In the past the LWCD was able to coordinate with the Farm Service Agency to send out a quarterly newsletter. Unfortunately, sending a regular newsletter was an effort that could no longer be supported. Mailings will also be sent as necessary to provide information to relevant groups. In particular, regular mailings for the Farmland Preservation Program are sent out for annual self-certifications which allows an opportunity to include other program or department information.

**Workshops & Tours:**

Educational workshops and tours will continue to be conducted to get people involved and provide them with the skills and information that they need to become good stewards of the land. Workshops and tours will be targeted to specific groups such as coops, contractors, operators, landowners, and nutrient management groups.

**Shows/Fairs:**

Events with large attendance such as county fairs and farm shows are excellent venues for using a display and handout materials to reach large amounts of people. Depending on the type of event will determine whether the display will be manned or not. These displays are well supplied with fact sheets and informational handouts pertaining to the environment, soil & water quality, and nonpoint source pollution.

**Mass Media:**

Newspapers, radio, and television are effective ways to distribute information because they can reach large amounts of people. News releases can be used to describe the impact of nonpoint source pollution on our natural resources. The Fond du Lac County Ag Service Center has a weekly radio air time on AM1450 to share news about department programs and opportunities.

**County Website, Social Media, & Email:**

County websites can be efficient ways to provide needed documents such as permit applications as well as other planning documents pertaining to the LWCD. Email and use of

social media can also be an effective way to inform and educate. The LWCD will continue to expand its use of its website services and social media as opportunities arise.

**Classroom Education:**

Curriculums have been prepared for grades 1-5 that educate students about the importance of protecting our soil and water resources. The LWCD will continue classroom education for elementary grades within the county.

**Hands-on Activities:**

River Clean-up and Storm Drain Stenciling are hands-on activities that help citizens build a sense of ownership with local rivers and lakes. LWCD works in partnership with the Fond du Lac High School Environmental Club to conduct an annual River Clean-up.

**I & E Goals & Evaluation**

Accomplishing the goals of the I & E strategy will require a collaborative effort between the Fond du Lac County LWCD and many other agencies and groups. As part of the annual accomplishment report, the county will prepare a summary of its information and education efforts over the year. The report will address how the Information & Education strategy was implemented, how residents participated, and a measure of behavior changes.

The staff will summarize the Information & Education activities they accomplish during the year. If the I & E strategy was used to select and plan activities, it can be seen as an indication that the strategy should be working. Whether the activities actually reached their intended audiences and whether they caused participants to successfully change their behavior can be measured by evaluation participation rates and the BMP adoption process.

Since the strategy depends on activities to get people aware and involved, participation at activities can help evaluate the success of the Information & Education efforts. Participation means more than just attendance at field days and volunteer events, but also includes newsletter readership, requests for information, and signed cost-share agreements. If residents are attending planned I & E events and signing cost share agreements, I & E activities are probably having their desired impact. If residents never call the LWCD office to learn more about the project or attendance at field days and demonstrations are consistently low, this would probably indicate that new activities were needed.

The first step of monitoring the adoption process involves evaluating Information & Education activities as they occur. Such techniques include informal discussion with participants, confidential discussion, observation and polls. The staff will use the information gathered to improve each activity. The second step of monitoring the adoption process involves determining if

the Information & Education objectives are being achieved. The same techniques described above can be used to evaluate the objectives. More formal and time-consuming ways to evaluate include phone surveys, focus groups and examining performance records.

Evaluating I & E success based primarily on participation can be misleading since participation is not an indicator of successful BMP adoption. For example, just because someone attended a demonstration does not mean that they are using it successfully. To determine if the I & E Strategy is causing residents to successfully adopt BMPs involves monitoring the performance of the participants.

Evaluating the adoption process involves keeping careful records of the successes and failures in the beginning of the projects that participants had with the BMPs along with documentation of their performance with the new BMP. This means that the staff will continue working with the participants after the BMP is installed to ensure that the practice has been adopted successfully. Success means that the BMP benefits both the participant's operation and water quality.

## CHAPTER 5 PLAN BUDGET

Sufficient funding for this Land & Water Resource Management Plan is essential for successful implementation and attainment of its goals. Presently, the majority funding for the LWCD is primarily comprised of county funding combined with grants received from DATCP and the DNR. Current funding levels for staff and cost sharing needed to successfully implement portions of this plan are insufficient. Until funding increases, projects will need to be selected for cost share funding based the highest water quality priority and/or pollution reduction achieved.

A lack of individual farm data along with other unknown economic variables makes it difficult to fully determine the type and quantity of practices needed to meet the goals set forth in this plan. Therefore, until a complete county-wide inventory can be completed, all estimates are preliminary and subject to change. The following budgets reflect the estimated funding needed for cost sharing and staff over the next five years. Please note that these estimates utilize methodology that is based on the maintenance of all currently funded staff positions over the next five years.

<b>Annual Conservation BMP Funding Needs</b>			
<b>Category</b>	<b>State Funding</b>	<b>County Funding</b>	<b>Total</b>
Livestock Waste Runoff Management	\$15,000	N/A	\$15,000
Streambank Protection & Stabilization	\$0	N/A	\$0
Nutrient & Management Planning	\$60,000	N/A	\$60,000
Upland Erosion Control	\$35,000	\$30,000	\$65,000
Ground Water Protection	\$5,000	N/A	\$5,000
<b>Total</b>	<b>\$120,000</b>	<b>\$30,000</b>	<b>\$150,000</b>

<b>Annual Staff Funding</b>		
<b>Category</b>	<b>FTE</b>	<b>Cost</b>
Staff Wages & Fringes	8	\$585,669.00
State Conservation Staff Funding Formula	4.7	\$359,377.00
Current State Funding Level	1.3	\$141,760.00

## **CHAPTER 6**

### **PLAN EVALUATION**

The LWCD will evaluate achievement of goals and objectives outlined in this plan annually by departmental review of activities and assessment of quantifiable data. Along with evaluation of overall progress towards reaching goals, specific activities will also be assessed for effectiveness.

#### **Annual Progress Reports**

Accomplishments will be reported annually to DATCP and DNR. Annual reports will act as the mechanism for monitoring accomplishments based on results of activities conducted throughout the previous year. The annual report will include information on the following activities:

Landowner Contacts	Cost Agreements and Reimbursements
Technical Assistance and BMP installation	Information & Education
Conservation Planning	Permitting Activities
Nutrient Management Planning	Progress with NR 151 Implementation

The LWCD will evaluate activities to determine their effectiveness of reaching targeted audiences and goals and will make decisions to either change or discontinue certain activities.

#### **Monitoring Vs. Modeling**

It is accepted that the best way to determine achievement of water quality goals is to directly monitor water resources. However lack of resources to gather current water quality data makes it 1) difficult to determine sources and locations of pollution and 2) adequately measure reductions from activities. Until more comprehensive water quality monitoring can be conducted locally, LWCD will continue to encourage and support DNR, USGS, and citizen based monitoring and evaluation of water quality, as well as, relying on other various statewide and regional monitoring data.

Modeling is an alternative to actual water quality monitoring, but because modeling is usually based on hypothetical scenarios it often does not carry the weight that actual monitoring does, thus it can be viewed as subjective. Modeling, however, can still provide useful data for use in planning. Examples of computer programs that are used by the LWCD that utilize modeling are Snap-Plus & Rusle 2 for evaluating soil loss, EVAAL for determining potential for erosion in watersheds, BARNY for evaluating barnyard runoff, and STEPL for estimating sediment and phosphors reductions in watersheds. As resources or technology become available that utilize modeling, the LWCD will evaluate whether to use those resources and technologies for assessing water quality within the county.



## APPENDIX A

### COMMON BEST MANAGEMENT PRACTICES DEFINITIONS

**Contour Farming:** The farming of sloped land so that all operations from seedbed preparation to harvest are done on the contour.

**Contour Strip-cropping:** Growing alternating strips of row crops and grasses or legumes on the contour.

**Field Diversions:** A channel constructed across the slope with a supporting ridge on the lower side, to divert excess water to safe outlet in other areas.

**Terraces:** A system of ridges and channels with suitable spacing and constructed on the contour with a suitable grade to prevent erosion in the channel.

**Grassed Waterways:** A natural or constructed channel shaped, graded and established with suitable cover as needed to prevent erosion by runoff waters.

**High Residue Management:** A system, which leaves at least 30 percent of the ground, covered with crop residue after crops are planted.

**Nutrient Management:** The management and crediting of nutrients from all sources, including legumes, manure, and soil reserves for the application of manure and commercial fertilizers. Management includes the rate, method and timing of application of all sources of nutrients to minimize the amount of nutrients entering surface and groundwater. This practice includes manure nutrient testing, routing soil testing and residual nitrogen soil testing.

**Cropland Protection Cover (Green Manure):** Cropland protection cover are close-growing grasses, legumes or small grain grown for seasonal soil erosion protection and soil improvement.

**Intensive Grazing Management (Rotational Grazing):** Intensive grazing management is the division of pastures into multiple cells that receive a short but intensive grazing period followed by a period of recovery of the vegetative cover. Rotational grazing systems can correct existing pasturing practices that result in degradation and should replace the practice of summer dry-lots when this practice results in water quality degradation.

**Critical Area Stabilization:** The planting of suitable vegetation on nonpoint source sites and other treatment necessary to stabilize eroding lands.

**Grade Stabilization Structure:** A structure used to reduce the grade in a channel to protect the channel from erosion or to prevent the formation or advance of gullies.

**Water and Sediment Control Basins:** A structure designed to reduce the transport of sediment of other pollutants eroded from agricultural fields to surface waters and wetlands.

**Shoreline and Streambank Stabilization:** The stabilization and protection of stream and land banks against erosion and the protection of fish habitat and water quality from livestock access.

**Shoreline/Riparian Buffers:** A permanently vegetated area immediately adjacent to lakes, streams, channels and wetlands designed and constructed to manage critical nonpoint sources or to filter pollutants from nonpoint sources.

**Lake Sediment Treatment:** Lake Sediment treatment is a chemical, physical or biological treatment of polluted lake sediments. Sources of pollution to the lake must be controlled prior to treatment of Lake Sediments. Treatment does not include dredging.

**Wetland Restoration:** The construction of berms or destruction of the function of tile lines or drainage ditches to create conditions suitable for wetland vegetation.

**Barnyard Runoff Management:** Structural measures to redirect surface runoff around the barnyard, and collect, convey or temporarily store runoff from the barnyard.

**Barnyard Abandonment or Relocation:** Relocation of an animal lot from a critical site such as a floodway to a suitable site to minimize the amount of pollutants from the lot to surface or groundwater.

**Manure Storage Facility:** A structure for the storage of manure for a period of time that is needed to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winter spread on fields that have a high potential for runoff. The facility is needed to store and properly spread manure according to a 590 management plan.

**Manure Storage Facility Abandonment:** Manure storage system abandonment is the proper abandonment of leaking and improperly sited manure storage systems, including: a system with bottom at or below groundwater level; a system whose pit fills with groundwater; a system whose pit leads into the bedrock; a system which has documented reports of discharging manure into surface or groundwater due to structural failure; and a system where there is evidence of structural failure. The practice includes proper removal and disposal of wastes, liner materials and saturated soil as well as shaping, filling and seeding of the area.

**Milkhouse Center Waste Control Systems:** A milking center waste control system is a piece of equipment, practice or combination of practices installed in a milking center for purposed of reducing the quantity or pollution potential of the wastes.

**Roofs for Barnyard Runoff Management and Manure Storage Facilities:** Roofs for barnyard runoff management and manure storage facilities are a roof and supporting structure constructed specifically to prevent rain and snow from contacting manure.

**Livestock Exclusion from Woodlots:** The exclusion of livestock from woodlots to protect the woodlots from grazing by fencing or other means.

**Cattle Mounds:** Cattle mounds are earthen mounds used in conjunction with feeding and dry lot operations and are intended to provide a dry and stable surface area for cattle.

**Structural Urban Best Management Practices:** These practices are source area measures, transport systems and end-of-pipe measures designed to control storm water runoff rates, volumes and discharge quality. These practices will reduce the amount of pollutants carried in runoff and flows destructive to stream habitat. These measures include such practices as infiltration trenches, porous pavement, oil water separators, sediment chambers, sand filtration units, grassed swales, infiltration basins and detention/retention basins.

**Easements:** Easements are legally binding restrictions on land titles. Easements are purchased to provide permanent vegetative cover.

**Land Acquisition:** The purchase of land or the interest in land, which is contributing or will contribute nonpoint source pollution or for the construction of an urban structural practice.

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