

# ***DODGE COUNTY***

## **LAND AND WATER**

### **RESOURCE MANAGEMENT PLAN**



**DODGE COUNTY**  
**2022-2032**  
**Land and Water Resource Management Plan**

**October 2022**

**MISSION STATEMENT**

Working together to provide education, information and technical assistance to residents and units of government in Dodge County to protect, restore and sustain our soil and water resources.

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# PLAN SUMMARY

## Introduction

As Dodge County's population continues to grow (87,839 according to the US Census Bureau 2019 Population Estimates), land use pressures and conflicts increase, and the protection of our land and water resources becomes a greater challenge. County residents are demanding that our land and water resources be available for their use in a clean, safe, and undamaged condition. The protection and improvement of our natural resources has become a high priority in the minds of many county citizens. The challenge before us is to meet the public's demand for high quality land and water resources in a timely and cost-effective manner.

In 1997, Wisconsin Act 27 created a county land and water resources management planning initiative. Dodge County's first Land and Water Resource Management Plan was written in 1999, subsequently revised in 2007, and is now revised to address current and future resource management issues. As with the original plan in 1999, the revised plan from 2007, and the revised plan from 2012, this plan was developed using a locally led process for public input and will rely on the locally led process for successful plan implementation. Information and data necessary for plan development was requested and obtained with the assistance of county landowners and other residents, various government agencies, and private conservation organizations. These same landowners, government agencies, and private organizations will need to collaborate to accomplish the identified goals and objectives.

Successful implementation will require that adequate financial resources be provided to cost-share the installation of needed land and water conservation practices. It will also require that adequate financial resources be provided to support the technical staff needed in the Dodge County Land and Water Conservation Department, as well as in other state and federal conservation agencies. Coordination and cooperation between all levels of government and with private conservation organizations will be essential if this plan is to be effectively implemented.

## Chapter Summaries

### Chapter 1: Plan Development Process

Data and information used in the development of this plan was obtained from various local, county, state and federal agencies and private organization documents and reports, the input of various local, county, state and federal agency and private organization staff, and from county citizens. A citizen's advisory committee was convened by the Dodge County Land and Water Conservation Committee to assist with identifying and prioritizing resource concerns in Dodge County. The public was informed and invited to participate in the plan development process by general circulation news releases

### Chapter 2: County Setting, Natural Resources and Trends

Dodge County is located in south central Wisconsin, covering a surface area of 576,000 acres. This chapter describes the county's demographics, provides information and condition of the resources, and trends within the county.

### Chapter 3: Soil Erosion and Water Quality Conditions

Because agriculture dominates Dodge County's landscape, the majority of nonpoint pollutants can be attributed to agricultural land use activities. Data is provided showing soil loss trends based on Dodge County's Transect Survey. Surface water quality conditions are discussed as well as our 5-year countywide well monitoring program for Nitrates. Dodge County contains multiple impaired waters and is subject to the 2012 Rock River TMDL report. Surface water quality continues to be an integral part of the Community lifestyle with a significant portion of the population living on or recreating on our rivers, creeks and lakes.

### Chapter 4: Groundwater Monitoring Program

UW Stevens Point developed a five-year countywide well testing program for Nitrates for Dodge County. We started testing 376 wells with a goal of no less than 240 wells by the end of the program. Our goal is to see trends in Nitrate levels and if there are areas that exceed 10 mg/L nitrate levels or are showing an increase, we can focus our efforts in those areas. In addition, if an area shows a reduction in Nitrates, we can look at those areas to see what has changed to use in other areas.

### Chapter 5: Resource Concerns, Goals and Objectives

Resource concerns that were discussed by the Citizens Advisory Committee (CAC) are listed here. The CAC reviewed the public survey and considered those results when listing their resource concerns. The CAC identified goals and objectives to address the resource concerns.

### Chapter 6: NR 151 Agricultural Performance Standards

A complete presentation of the agricultural nonpoint performance standards and prohibitions as detailed within Administrative Rule NR 151 is outlined. Dodge County's proposed strategy for implementing the NR 151 Runoff Rules is described in this section. The strategy includes information and education activities, a priority farm identification process, a strategy for making one-on-one farm contacts, a description of what documentation will be prepared for NR 151 evaluation activities, and other local regulations that complement the NR 151 implementation process.

### Chapter 7: Information and Education Strategy

Dodge County Land and Water Conservation Department will carry out various information and education activities to help achieve the goals and objectives of this plan. A variety of educational outreach activities are planned, including one-on-one landowner contacts, farmer workshops, newsletters, press releases, and field days.

### Chapter 8: Evaluation and Monitoring

Various activities will be undertaken in an effort to track and evaluate progress in implementing this plan. **Specific measurement tools will be used to monitor the degree of achievement for each of the seven major goals established in the plan.**

# **CHAPTER 1**

## **PLAN DEVELOPMENT PROCESS**

### **Plan Development Process**

The Dodge County Land and Water Resource Management Plan was developed based on data and other information obtained from various local, county, state, federal agency and private organization documents and reports, and from the input of various local, county, state, federal agency and private organization staff and county citizens.

### **Citizen/Public Involvement**

Dodge County initiated a survey in 2021 for public input (Appendix B). Common areas of concern were:

- Loss of Farmland
- Soil Nutrient Runoff
- Groundwater Quality
- Large Farms
- Ag Practices/Soil Health
- Water Quality of Lakes

A Citizens Advisory Committee (CAC) was established to review the survey results and assist in the revision of the Land and Water Plan. A copy of the current Land and Water Plan was provided to the CAC for review before we met. The CAC met on November 30, 2021 and January 26, 2022.

The CAC reviewed the survey results, went through the resource concerns, goals, and objectives of the current plan. Changes were made as needed to the current goals and objectives that addressed Dodge County's resource concerns.

A draft of the proposed 2022 revised plan was distributed to the CAC on June 9, 2022. The public was given opportunities to review and comment on the proposed plan via a news release distributed to local news media outlets for general circulation on August 10 and 17, 2022.

A public hearing was held for the Dodge County Land and Water Resource Management Plan on August 22, 2022.

## **CHAPTER 2**

### **COUNTY SETTING, NATURAL RESOURCES AND TRENDS**

#### **Location**

Dodge County was established in 1836. Dodge County is located in south-central Wisconsin. It has 9 cities, 11 villages, and 24 towns covering 907 square miles with a total land area of 576,000 acres. (See Figure 2-1). The largest city found entirely within the county boundaries is Beaver Dam. Four other large communities found partially in Dodge County and partially in adjoining counties include Randolph and Columbus on the west, Watertown on the south, and Waupun on the north. The City of Juneau is located in the center of Dodge County and is the county seat. There are 9 lakes, 21 ponds, and 26 unnamed impoundments in Dodge County. The largest lake is Beaver Dam Lake at 6,718 acres. There are 46 named rivers and creeks in Dodge County, the longest being the Rock River at approximately 77 miles.

#### **Geography and Topography**

During the Ice Age, a massive ice sheet covered all of Dodge County. The county's present day topography was shaped by the advance and retreat of this ice mass. Glacial debris was deposited as ground moraine and other glacial formations, varying in thickness from 100 to 300 feet in depth. One of the unique glacial formations are the glacial drumlin hills. Dodge County has one of the highest concentrations of drumlins in the world. Figure 2-2 shows the orientation of these drumlin hills. There is approximately 430 feet of elevation change in Dodge County, with the highest point reaching 1,220 feet above sea level in the northeast, to 790 feet above sea level in the southwestern portions of the county. The two most prominent topographic features in the county include the very flat marsh area known as the Horicon Marsh, and the Niagara Escarpment, which runs along the eastern edge of the Horicon Marsh, rising above the marsh in some areas by as much as 190 feet.

#### **Existing Land Use and Land Use Trends**

The land use pattern of Dodge County consists of rural towns containing mostly agricultural land and scattered residential development, along with several small, incorporated communities. The existing land uses in Dodge County are shown on Figure 2-3. Table 2-3 details the existing land uses and acreages of Dodge County.

By far the largest of the land use categories is the combined total for agriculture and undeveloped/vacant land. This category also includes wetlands and open spaces. Agriculture is central to the culture, economy, and landscape of Dodge County. Approximately 70.5% of the total land cover in the county is in farmland uses. Here are some Dodge County stats from the 2012 and 2017 USDA Census of Agriculture:

- The amount of land in farms in Dodge County increased by 1 acre to 405,992 acres.
- The average size of farms increased 0.7% from 216 acres to 232 acres.
- The number of farms decreased by 13 to 1,749.

- The number of dairy operations decreased from 308 to 223.
- The number of milk cows increased from 37,301 to 38,880.
- The number of beef cows increased from 3,314 to 5,673.
- The number of swine decreased from 18,803 to 8,482.
- The acres of corn increased from 134,893 to 155,526.
- The acres of soybeans increased from 66,223 to 93,104.
- The acres of wheat increased from 14,217 to 15,965.
- The acres of hay/forage decreased from 54,060 to 51,503.

Residential development in Dodge County consists mainly of single-family housing, including farmsteads. Limited multi-family housing, manufactured housing, and seasonal housing units are also present. Residential development is mostly scattered throughout the county, and generally follows transportation corridors. However, small concentrations of residential development can be found along lake shorelines, and adjacent to incorporated municipalities. More intensive residential development, such as duplexes, condominiums, and apartments can be found in villages and cities in Dodge County.

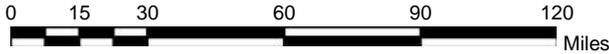
Commercial growth can be witnessed throughout the county. Many of the major roadways attract businesses. In recent years, commercial growth has occurred in the Mayville/Horicon area, and on U.S. Highway 151 and State Highway 33 corridors near Beaver Dam. The Beaver Dam area has captured a substantial number of traditional highway commercial uses such as gasoline stations, fast-food restaurants, and convenience shopping. The City of Waupun has also seen significant commercial development areas along State Highway 49.

Most industrial development can be found in Dodge County's cities and villages, which have the infrastructure (i.e., sewer and water) to support this type of development. Most of the cities and villages have industrial parks. However, some fringe areas around traditional urban centers have recently seen development of open land for industrial uses, due to the expansion of utilities and transportation networks.

Public and quasi-public land uses perform a support function to the people living and working in both urban and rural environments. Land uses within this classification include hospitals, schools, cemeteries, and churches, along with government offices and public buildings. There are five jails and prisons serving a population of 87,833 people. The amount of land devoted to these uses is not large in comparison to the other land use categories, but these facilities provide critical support and employment opportunities to the population of the county.

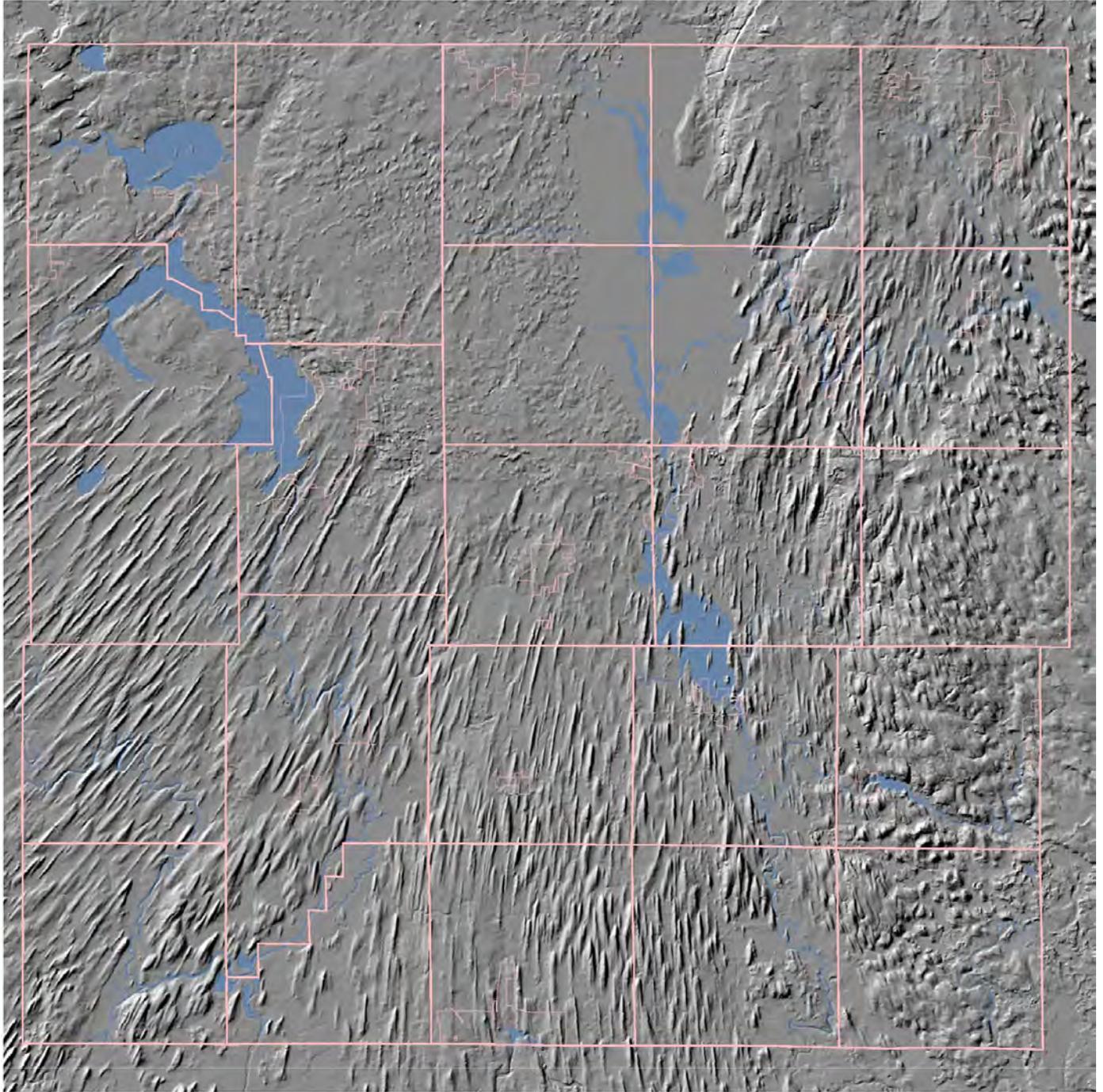
Dodge County has many areas that are dedicated for use as parks and recreational land. The effects of a growing county population, growing interest in outdoor activities, and increases mobility will place greater demands on recreational facilities in the county. The preservation of public recreational areas as the county continues to grow is a key element in maintaining the quality of life in Dodge County.

Figure 2-1, Regional Setting  
Dodge County, Wisconsin



Source: Dodge County Land Resources and Parks Department, June

Figure 2-2, Aerial - Relief  
Dodge County, Wisconsin



Legend

- Municipal Boundary
- Waterbodies

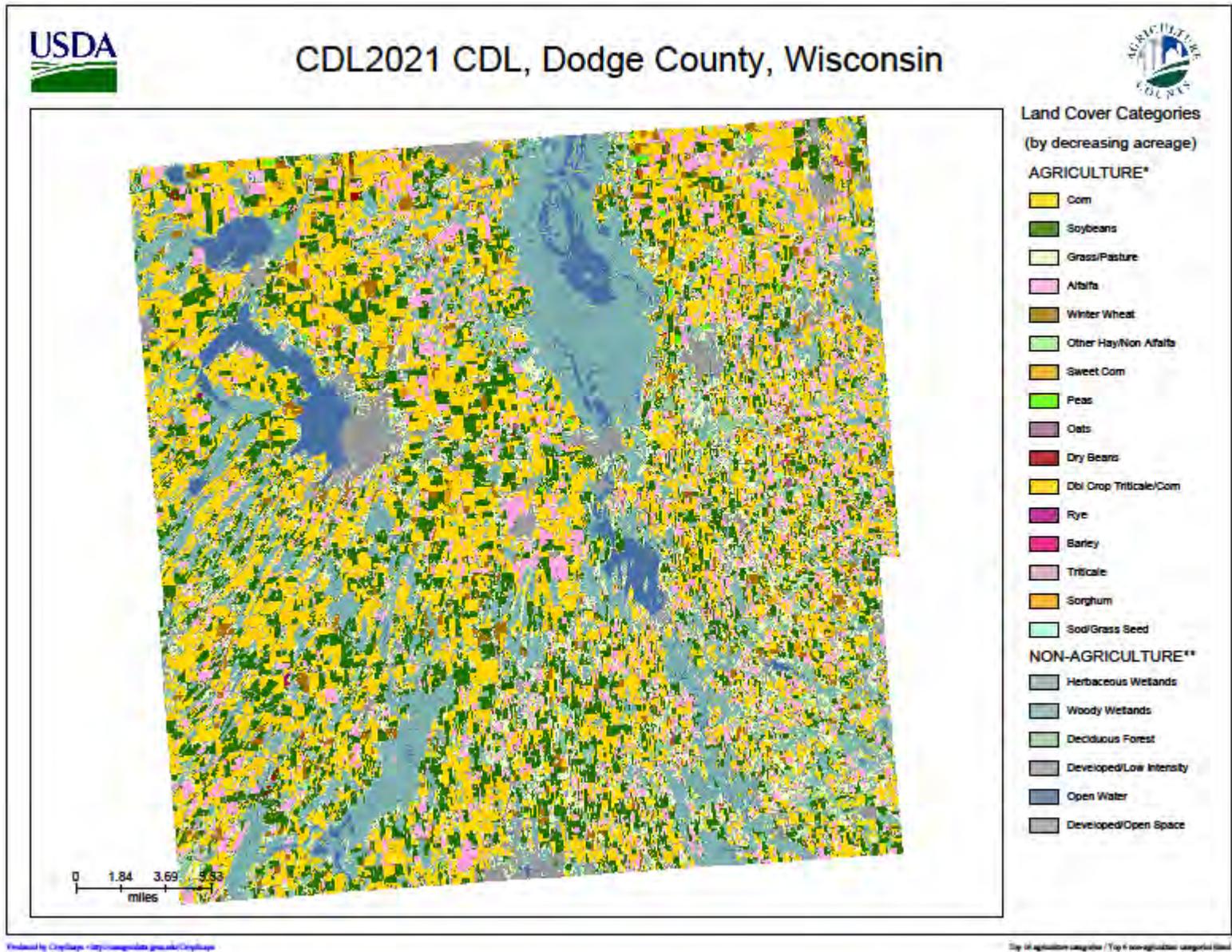
Dodge County  
Land Resources and Parks  
Department



Dodge County Wisconsin

Source: Dodge County Land Resources and Parks Department, June

Figure 2-3, Land Cover Use



**Table 2-1  
Existing Land Use, Dodge County**

Land Use	Acreage	Percent of Total
Developed/Low Intensity	21,831.40	3.76
Developed/Open Space	13,747.30	2.37
Developed/Medium Intensity	8,284.60	1.43
Developed/High Intensity	2,584.20	0.45
Barren	1,117.10	0.19
Forest	26,334.10	4.54
Wetlands	113,830.70	19.61
Open Water	21,328.80	3.67
Corn	155,526.60	26.79
Soybeans	93,104.00	16.04
Grass/Pasture	49,332.50	8.50
Alfalfa	48,704.40	8.39
Winter Wheat	15,965.90	2.75
Other Hay/Non Alfalfa	2,799.50	0.48
Sweet Corn	2,685.90	0.46
Peas	1,211.40	0.21
Other Crops	2,139.90	0.37
<b>Total</b>	<b>580,528.30</b>	<b>100.00</b>

Source: Cropscape - <https://nassgeodata.gmu.edu/CropScape/>

Changes in land use are related to changes in population, housing, transportation, community services, agriculture, natural resources, and economic development. The following land use trends are anticipated in Dodge County over the next 20-25 years, which will likely impact land and water resource management:

- Agriculture will maintain a strong presence in Dodge County. There will likely be a decreasing number of total farms, but an increasing number of large farms. It is likely that the number of dairy farms will continue to decline, but dairy herd sizes will continue to increase, with more farms handling manure in a liquid form.
- Interest in cash cropping is likely to increase, resulting in a decrease in cropland being rotated into hay, and increasing the potential for soil erosion, sediment delivery, and water pollution.
- The county's riverfronts, woodlands, and highland areas will be desired for residential development.
- Residential and highway corridor development will result in a net loss of available agriculture and open space land.
- Interest in using lakes, rivers and public recreational areas will likely increase.
- Groundwater and surface water resource will continue to be threatened by pollution from agriculture and urban development.

## Soils

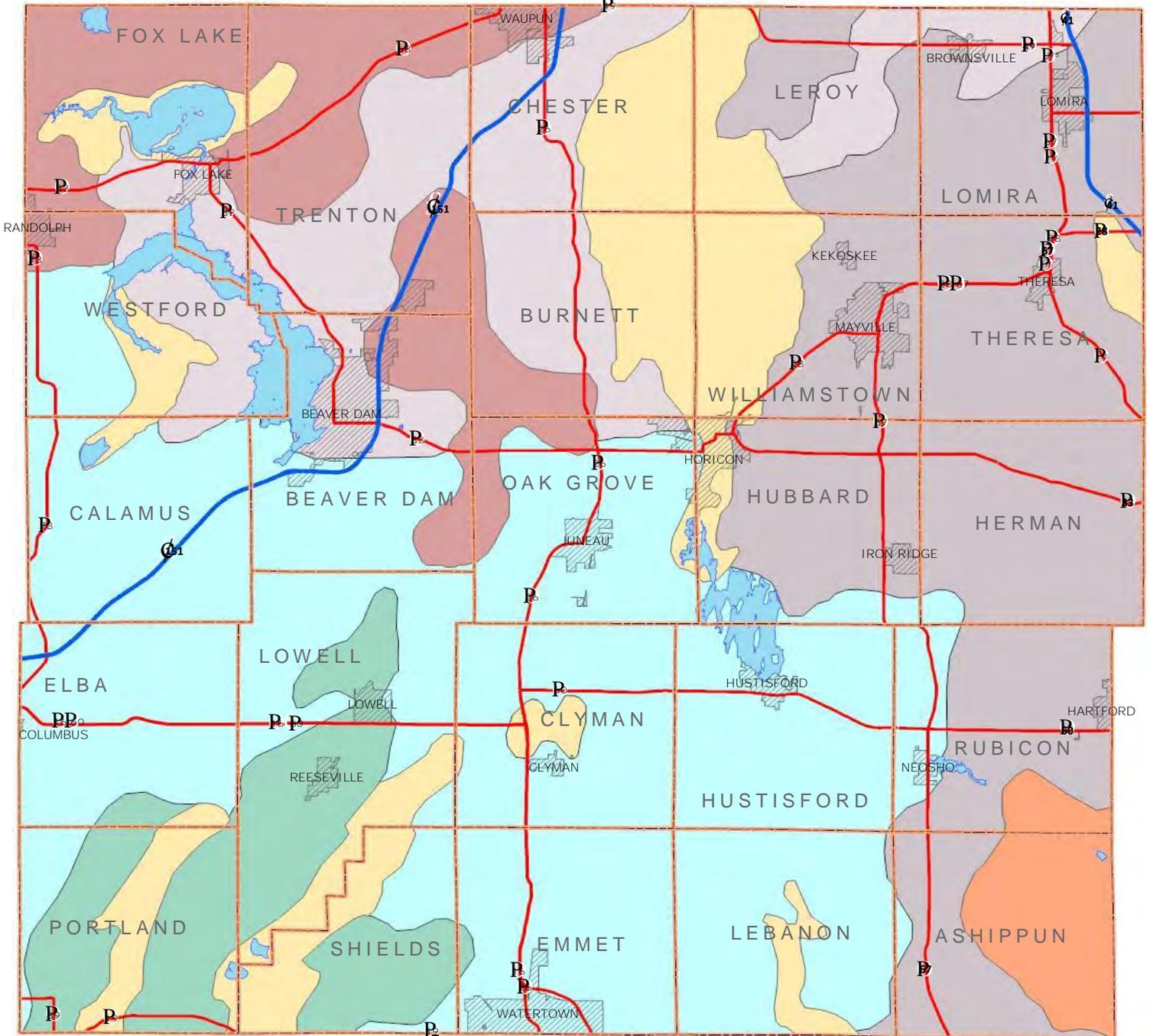
Soil Resources – Soil is comprised of varying proportions of sand, silt, clay, gravel, and organic material. The majority of soils in the county are upland silt loams considered good for agricultural uses. Topsoil generally ranges between 10 and 14 inches in depth. There are seven major soil associations in Dodge County. A soil association represents a unique natural landscape having a distinct pattern of soil, relief, and drainage. Typically, a soil association consists of one or more major soil series and some minor soils. The association is named for the major soils. The seven general soil associations found in the county include Fox-Casco-Rodman, McHenry-Pella, Plano-Mendota, Houghton-Pella, St. Charles-Leroy-Lomira, Theresa-Lamartine-Hochheim, and St. Charles-Miami-Elburn. See Figure 2-4 for the location of the various soil associations. A description of each of these seven soil associations follows.

1. The Plano-Mendota Association consists of deep, nearly level to sloping, well drained and moderately well drained soils that have a silty and loamy subsoil formed on ground moraines and drumlins. This soil association makes up about ten percent of the county. In cultivated areas, the main concern is controlling soil erosion and maintaining good soil health.
2. The Houghton-Pella Association consists of deep, nearly level, very poorly drained organic soils and soils that have a silty subsoil formed in decomposed sedges and reeds or in silty material and glacial drift. This association makes up about ten percent of the county. In cultivated areas, the main management concern is drainage.
3. The St. Charles-Leroy-Lomira Association consists of deep, nearly level to steep, well-drained soils that have a silty and loamy subsoil and is found on ground moraines and drumlins. This

association makes up about eleven percent of the county. In cultivated areas, the main management concern is controlling soil erosion and maintaining good soil health.

4. The Theresa-Lamartine-Hochheim Association consists of deep nearly level to steep, well drained, and somewhat poorly drained soils that have a silty and loamy subsoil. This association makes up about 24 percent of the county. In cultivated areas, the main management concern is controlling soil erosion and maintaining good soil health.
5. The Fox-Casco-Rodman Association consists of deep, nearly level to steep, well-drained and excessively well drained soils that have silty and loamy subsoil. This soil association makes up about two percent of the county. In cultivated areas, the main management concern is controlling soil erosion and maintaining good soil health.
6. The St. Charles-Miami-Elburn Association consists of deep, nearly level to steep, well drained to somewhat poorly drained soils that have a silty and loamy subsoil. This soil association makes up about 36 percent of the county. In cultivated areas, the main management concern is controlling soil erosion and maintaining good soil tilth.
7. The McHenry-Pella Association consists of deep nearly level to moderately steep, well-drained and poorly drained soils that have silty and loamy subsoil. This association makes up about seven percent of the county. In cultivated areas, McHenry soils require careful erosion control management. Pella soils require drainage.

Figure 2-4, General Soil Associations  
Dodge County, Wisconsin



Legend		Soil Associations	
	U.S. Highway		Fox-Casco-Rodman association
	State Highway		Houghton-Pella association
	Town Boundaries		McHenry-Pella association
	Municipalities		Plano-Mendota association
	Lake		St. Charles-Leroy-Lomira association
			St. Charles-Miami-Elburn association
			Theresa-Lamartine-Hochheim association

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Department

Source: Dodge County Land Resources and Parks Department, June 2022  
Derived from US Department of Agriculture, Soil Conservation Service files, August 1998

## Natural Resources

Surface Water Resources – Over 21,000 acres (approximately 3.3% of Dodge County’s surface area) of surface water covers parts of Dodge County, including 31 lakes and ponds, and 50 rivers and streams. Table 2-2 details the amount of surface waters found in Dodge County and its communities. Most of Dodge County is part of the Rock River Basin, contributing surface water runoff and groundwater discharges to the Rock River and ultimately the Mississippi River. The extreme northeast corner (approximately 5 square miles) of the county is located in the Lake Michigan Basin, contributing surface water runoff and groundwater discharges to the Milwaukee River and ultimately Lake Michigan. The extreme northwest corner (approximately 4 square miles) is located in the Upper Fox River Basin, and contributes surface water runoff and groundwater discharges to the Lower Grand River and ultimately Green Bay and Lake Michigan. Major surface water bodies include the Rock River, the Beaver Dam River, the Crawfish River, Fox Lake, Beaver Dam Lake, Lake Sinissippi, and the Horicon Marsh. Figure 2-5 provides an overall view of Dodge County’s surface waters, and Figure 2-6 highlights the major surface water features in Dodge County.

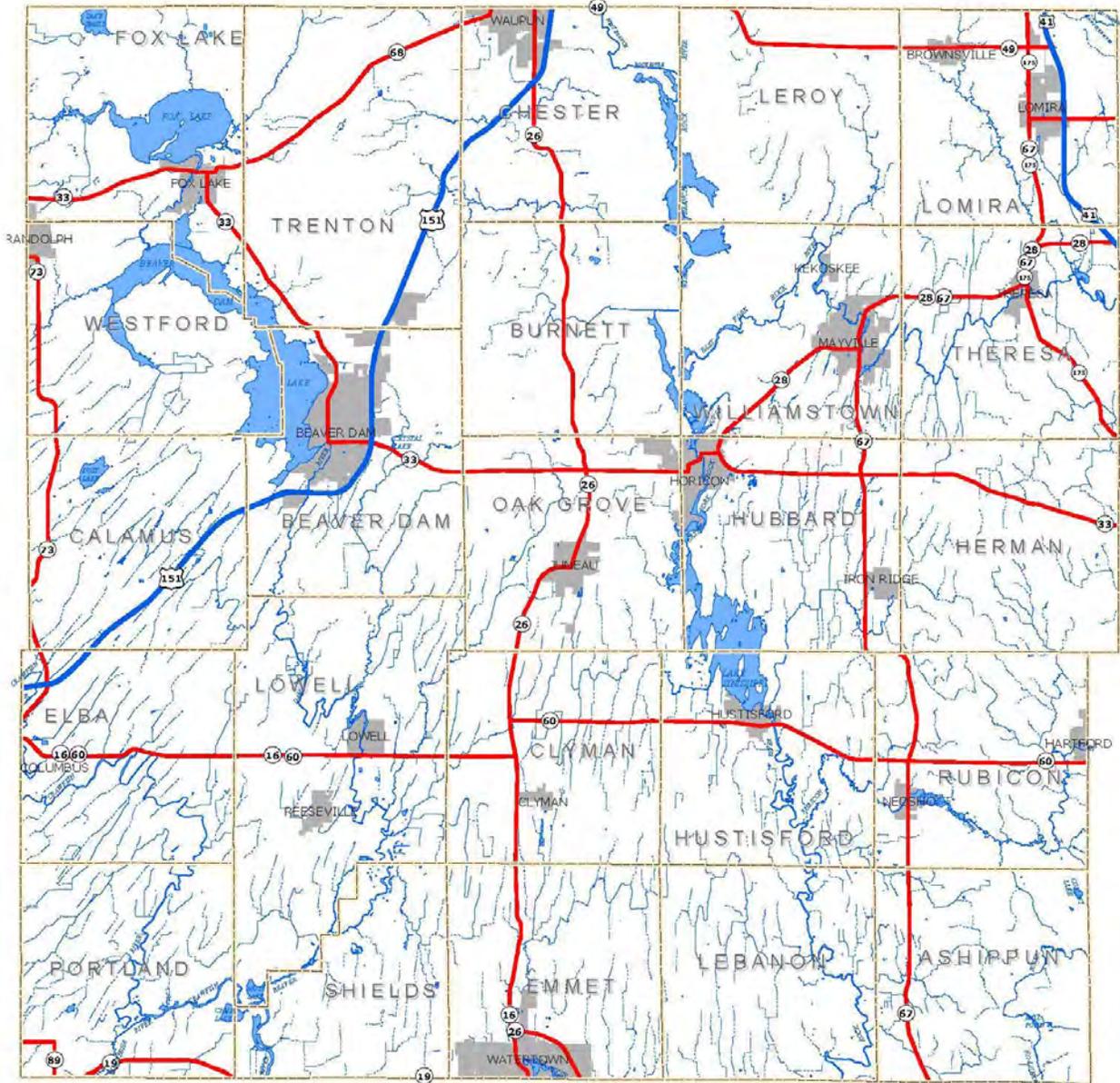
Groundwater Resources – The primary source of drinking water in Dodge County is our groundwater resources. The source of all groundwater is precipitation, which percolates down through the soil until it reaches the saturated zone called an aquifer, where it is then contained. Water in an aquifer travels from its source to a discharge point such as a well, wetland, spring, or lake. During periods of increased precipitation or thaw, groundwater reserves are replenished with water moving by gravity through permeable soils and rock. Poor land use decisions can introduce contaminants into groundwater reservoirs, especially in areas where soils are shallow to bedrock. Figure 4-3 shows the general range of depth to bedrock in Dodge County. In recent years, much has been learned about just how vulnerable our groundwater resources are to various forms of contamination. A Groundwater Flow Computer Model has been developed and can be used by local governments and others in predicting groundwater flow patterns and thereby better protect against groundwater polluting activities.

Table 2-2  
Surface Water, Dodge County

	Acres	% of Total
T. Ashippun	108.8	0.5
T. Beaver dam	2,237.40	10.6
T. Burnett	409.5	1.9
T. Calamus	329	1.6
T. Chester	998.9	4.7
T. Clyman	49.1	0.2
T. Elba	260.1	1.2
T. Emmet	39.5	0.2
T. Fox lake	4,063.80	19.3
T. Herman	25.9	0.1
T. Hubbard	1,732.50	8.2
T. Hustisford	1,219.30	5.8
T. Lebanon	200.4	1.0
T. Leroy	717.6	3.4
T. Lomira	28.7	0.1
T. Lowell	497	2.4
T. Oak grove	222	1.1
T. Portland	406.4	1.9
T. Rubicon	261.9	1.2
T. Shields	334.2	1.6
T. Theresa	360.1	1.7
T. Trenton	499.3	2.4
T. Westford	3,404.10	16.1
T. Williamstown	1,236.00	5.9
V. Brownsville	0.1	0.0
V. Clyman	0	0.0
V. Hustisford	132.3	0.6
V. Iron ridge	2.2	0.0
V. Kekoskee	11.3	0.1
V. Lomira	10	0.0
V. Lowell	36.3	0.2
V. Neosho	21.8	0.1
V. Randolph*	0.2	0.0
V. Reeseville	0.5	0.0
V. Theresa	14.4	0.1
C. Beaver Dam	874.9	4.1
C. Columbus*	1.3	0.0
C. Fox Lake	35.3	0.2
C. Hartford*	1.3	0.0
C. Horicon	132.3	0.6
C. Juneau	0.2	0.0
C. Mayville	72.4	0.3
C. Watertown*	0	0.0
C. Waupun*	106	0.5
Dodge county	21,094.30	100.0

\*Community partially located outside of county, acreage only includes portion in the county.  
Source: Dodge County Land Resources and Parks Department, June 2022.

Figure 2-5, Surface Water Resources  
Dodge County, Wisconsin



**Legend**

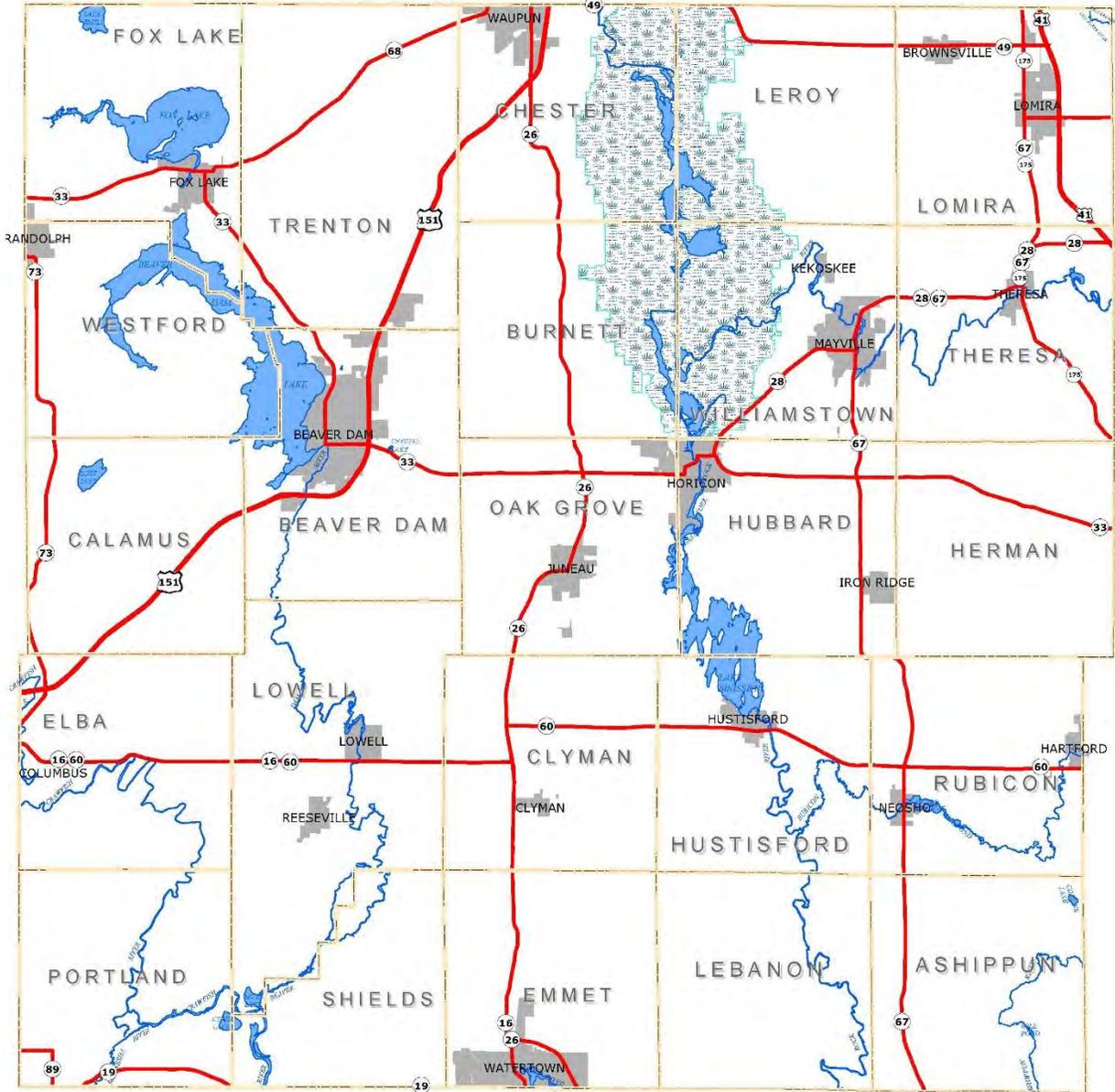
	U.S. Highway		Lakes and Ponds
	State Highway		Rivers and Streams
	Town Boundaries		Intermittent Streams
	Municipalities		

Source: Dodge County Land Resources and Parks Department, June 2022  
Watersheds from DNR, Hydrology derived from USGS topographic maps

**Dodge County  
Land Resources and Parks  
Department**

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Figure 2-6, Major Surface Water Bodies  
Dodge County, Wisconsin

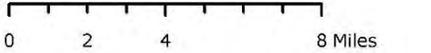


**Legend**

U.S. Highway	Lakes
State Highway	Horicon Marsh
Town Boundaries	Rivers
Municipalities	

Dodge County  
 Land Resources and Parks  
 Department

Source: Dodge County Land Resources and Parks Department, June 2022  
 Watersheds from DNR, Hydrology derived from USGS topographic maps



Woodland Resources – According to U.S. Forest Service Inventory and Analysis (FIA) data from 2019, Dodge County has an estimated 50,507 acres of forested lands. Prior to European settlement as much as 75 percent of the county had been forested. Following European settlement, much of this forested land was converted to agricultural land and/or pasture. Of the forest resources that remain the timber type found east of the Rock River is predominantly northern hardwoods, with sugar maple, basswood, and white ash as the dominant species. To the west of the Rock River, you find primarily mature oak woodlands, which are in the process of converting to more shade tolerant central hardwoods for various reasons. Dominant central hardwood species within the county include hickory, black cherry, elm, and box elder. In addition, according to the U.S. Forest Service FIA data, as much as ½ of the county’s forests are bottomland hardwoods, many of which are dominated by green ash. According to the FIA data, as much as 20 percent of the standing volume of saw timber within the county is ash. This number is dropping fast as the emerald ash borer (EAB) is well established within the county and widespread ash mortality is being seen. Emerald ash borer movement has continued in Wisconsin and the entire state is now under quarantine for ash trees, ash firewood, and ash wood products. Information on emerald ash borers, quarantines, and management of EAB can be found at <http://datcpservices.wisconsin.gov/eab/index.jsp>. Re-foresting low-lying areas where ash used to dominate will be difficult due to the wet/soft terrain, fiercely competing vegetation (native and invasive such as **reed canary grass, cattails and brush**), and limited tree species suited to the wet conditions, and potential rise in the water table with the loss of ash.

Many of the woodlands throughout the county have been severely degraded by pasturing, poor forest management practices such as high grading, and invasive exotic species. Figure 2-7 shows the general location of woodlands in Dodge County. The future of the county’s woodland resources depends on whether the remaining woodlands are managed in a sustainable manner. Woodland management plans help to ensure that sound management practices are used during timber harvests and other woodland uses. There are currently 2,881 acres of land entered into the Managed Forest Law in Dodge County. This is down almost 800 acres from 2012. This program provides a tax incentive to woodland owners for following forest management plans that are written by DNR or private consulting foresters. The DNR forester is the primary provider of technical information and forest management advice within the county. The USDA-FSA and NRCS offices administer the Conservation Reserve Program (CRP), the Conservation Reserve Enhancement Program (CREP), and the Environmental Quality Incentives Program (EQIP), which offer incentives to landowners for tree planting and approved forest management activities. The county LWCD also administers an annual tree sale program.

Other issues affecting forest management within the county include the following:

- Fragmentation and development of woodlands
- Excessive deer damage in localized areas
- Gypsy moth defoliation
- Spread and control of invasive exotic species
- Woodland management that is not sustainable
- Emerald Ash Borer invasive damage to woodlands

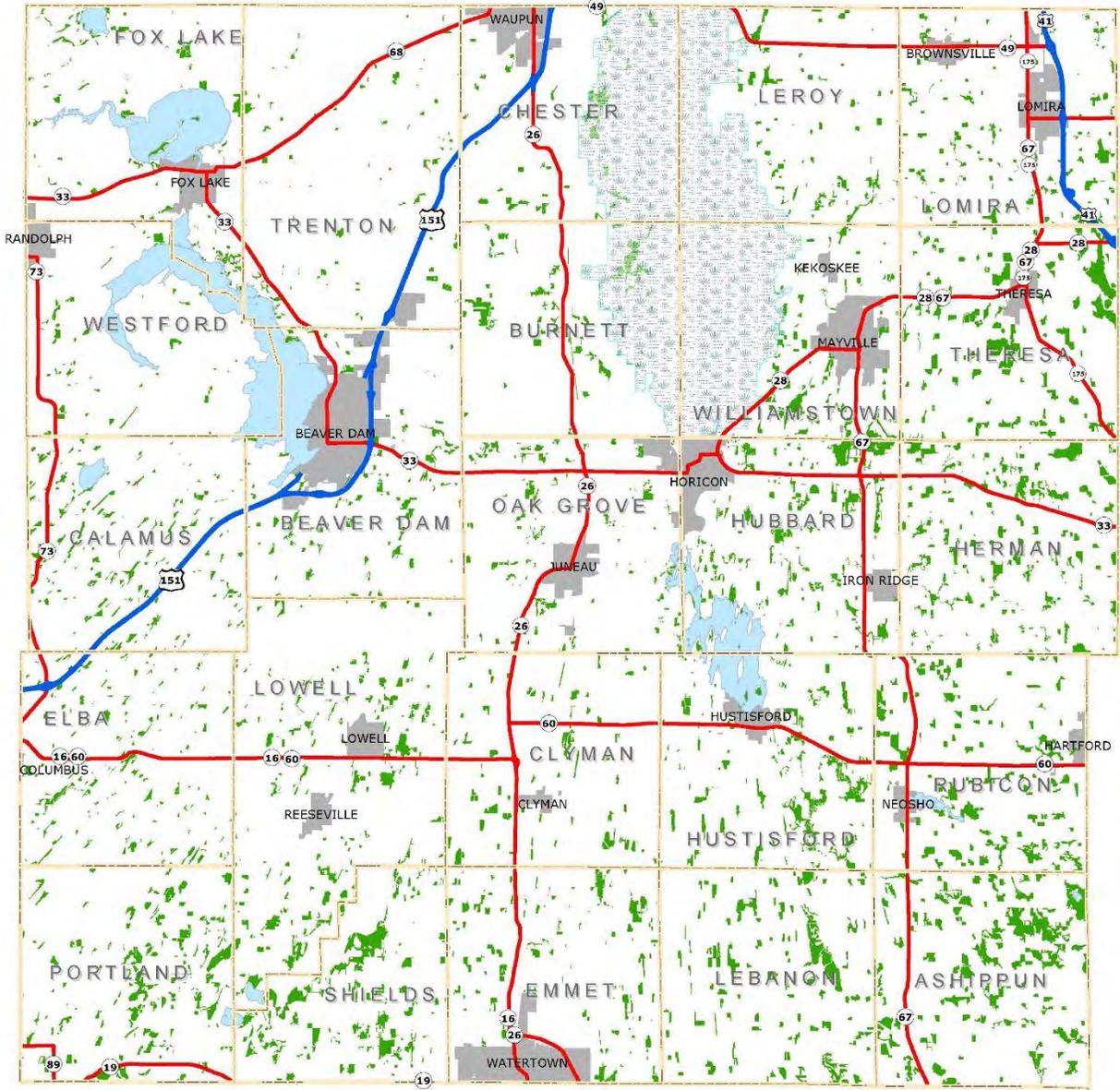
Data/Information from the DNR Forester:

- U.S. Forest Service data from 2019 indicates that there is over 50,500 acres of forested land in Dodge County. According to the same data source, in 2009 there was approximately 37,900 acres of forested land in Dodge County (net gain of 12,600 acres of forested land over the ten-year time period)

Wetland Resources – The hydrology of soils, or the amount of water saturation present, largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promotes the development of characteristic wetland (hydric) soils. Wetlands may be seasonal or permanent, have the capacity to store, and filter pollutants ranging from pesticides to animal wastes. Wetlands also provide valuable habitat for fish, plants and animals. In addition, wetlands are also critical in controlling flooding, replenishing groundwater supplies, and contributing to stream flows, especially during dry months. An extensive series of wetlands are found throughout Dodge County. Table 2-3 details the acreage of wetlands in Dodge County and its communities, and Figure 2-8 shows the general location of wetlands in Dodge County.

Wildlife Resources – Dodge County is known for the nationally important Horicon Marsh and other large marsh and wetland complexes surrounding the Beaver Dam, Rock and Crawfish rivers. At over 33,000 acres, Horicon Marsh is the largest freshwater cattail marsh in the United States. Home to more than 300 species of birds and other wildlife, Horicon Marsh has been formally recognized as a Wetland of International Importance by the Ramsar Convention of the United Nations. In addition, to the hundreds of thousands of geese that migrate to the Horicon Marsh each spring and fall, the county's numerous wetlands are home to ducks, cranes, herons, egrets, swans, and white pelicans. While the birdwatchers and the waterfowl hunters flock to these large, publicly accessible wetlands, Dodge County also offers excellent deer and turkey hunting opportunities on private and public lands. Deer and turkey populations are very strong where good habitat exists. These species along with woodland songbirds and other wildlife that require forest are on the increase in Dodge County. Pheasants, meadowlarks and other wildlife dependent on open grasslands have severely declined with the intensification of agriculture and the re-growth of forest in the past half century.

Figure 2-7, Woodlands  
Dodge County, Wisconsin



**Legend**

	U.S. Highway		Woodlots
	State Highway		Horicon Marsh
	Municipalities		Lake
	Town Boundaries		

**Dodge County  
Land Resources and Parks  
Department**

Source: Dodge County Land Resources and Parks Department, May 2007

Fishery Resources – The majority of waterbodies in Dodge County are large, shallow impoundments (6-19 feet maximum depth), formed by the placement of dams on flowing river systems. Being located in an intensely agricultural county, surface water resources have been negatively impacted by the deposition of eroded soil in lakes and streams. This sedimentation destroys fish and wildlife habitat and limits boating activities on some waterways. Surface water resources are extremely fertile due to runoff of nutrients such as nitrogen and phosphorus. In spring and fall, water is clear, but intense algae blooms are common during the summer months. The fertility of the water combined with shallow water depths make the waterbodies susceptible to both summerkill (summer oxygen depletion) winterkill (winter oxygen depletion). Thirty (30) fish kill investigation reports were documented in Dodge County lakes, streams and rivers from 2004 to 2021 including Beaver Dam Lake (5 reports), Beaver Dam River (4), Butler Creek (2), Dead Creek (1), Fox Lake (3), Lake Emily (5), No Name Creek (1), and Rock River (9) (WDNR Fisheries Biologist, 2021). When needed to reduce the severe effects of winterkill, lake districts and/or lake associations for Fox Lake, Beaver Dam Lake, Lost Lake, and Lake Emily all operate aeration systems during the winter months (WDNR Fisheries Biologist, 2007, 2012 and 2021).

Dodge County lakes are a major source of local fishing opportunity for the angling public. However, the lakes have historically required intensive management effort to produce and maintain such fishing opportunity. All major lakes in Dodge County have undergone chemical treatments to remove rough fish populations (common carp and bullhead species) that had contributed to poor water quality and loss of habitat for other fish and wildlife. Due to their shallow depth, fertile water and warm water temperatures, rough fish overpopulation is quite common (WDNR Fisheries Biologist, 2007 and 2021).

Data from recent DNR fishery surveys indicate that Fox Lake and Beaver Dam Lake offer respectable fisheries for public use and recreation. Comprehensive fishery surveys conducted on Fox Lake in 2019 and Beaver Dam Lake in 2021 indicate healthy populations of species such as northern pike, walleye, largemouth bass, bluegill, yellow perch, and black crappie on both lakes. Walleye population estimates for Fox Lake were 4.3 adults/acre in 2019 and 1.2 adults/acre for Beaver Dam Lake in 2021. The WDNR stocks Beaver Dam Lake with walleye and northern pike in alternate years. The Beaver Dam Lake Association has stocked walleye, bluegill and northern pike in recent years. The Fox Lake Property Owners Association has stocked muskellunge, walleye and yellow perch in recent years. The most recent comprehensive fishery survey of Lake Emily conducted in 2017, showed an over-abundant northern pike population and lower catch rate of bluegill compared to the previous comprehensive survey conducted in 2013. New northern pike and panfish regulations were put in place to address both concerns. All fish species are naturally reproducing in Lake Emily and no fish stocking is required.

The fishery of Lake Sinissippi is dominated by rough fish species including common carp and bullhead. Fall electrofishing surveys conducted in 2008, 2009 and 2011 consistently show low catch rates for panfish (bluegill <1/mile, walleye <6/mile, black crappie <1/mile, yellow perch <7/mile) and gamefish (northern pike <1/mile, walleye <6/mile). Spring electrofishing conducted in May 2018 had similar results. The Lake Sinissippi Association and Lake Sinissippi Improvement District have stocked northern pike, walleye, bluegill, black crappie, yellow perch and channel catfish in recent years. Fall electrofishing conducted on Lost Lake in 2018 showed very low catch rates for bluegill, yellow perch, black crappie and

pumpkinseed compared to the previous survey conducted in 2011. No gamefish species (northern pike, walleye, largemouth bass) were sampled in either survey years.

Dodge County contains three large river systems, including the Beaver Dam River, Crawfish River and Rock River. All three rivers offer a diverse warmwater fishery including northern pike, walleye, panfish, bullhead, catfish and rough fish.

**Table 2-3  
Wetlands, Dodge County**

Municipality	Acres	% of Total
Ashippun	3871.60	3.66%
Beaver dam	2495.52	2.36%
Burnett	7619.95	7.21%
Calamus	4835.57	4.57%
Chester	9580.55	9.06%
Clyman	3730.05	3.53%
Elba	2949.24	2.79%
Emmet	1352.77	1.28%
Fox lake	4012.49	3.79%
Herman	1671.77	1.58%
Hubbard	2676.27	2.53%
Hustisford	5331.88	5.04%
Lebanon	5672.06	5.36%
Leroy	4972.11	4.70%
Lomira	2144.37	2.03%
Lowell	8912.47	8.43%
Oak grove	2136.12	2.02%
Portland	4357.28	4.12%
Rubicon	2258.64	2.14%
Shields	5165.42	4.89%
Theresa	3813.79	3.61%
Trenton	3306.08	3.13%
Westford	3293.78	3.12%
Williamstown	8350.13	7.90%
V. Brownsville	1.25	0.00%
V. Clyman	6.60	0.01%
V. Hustisford	22.23	0.02%
V. Iron ridge	19.14	0.02%
V. Lomira	22.45	0.02%
V. Lowell	93.89	0.09%
V. Neosho	20.11	0.02%
V. Randolph*	0.89	0.00%
V. Reeseville	20.18	0.02%
V. Theresa	18.42	0.02%
C. Beaver dam	185.74	0.18%
C. Columbus*	1.62	0.00%
C. Fox lake	140.39	0.13%
C. Hartford*	24.57	0.02%
C. Horicon	327.67	0.31%
C. Juneau	9.10	0.01%
C. Mayville	114.10	0.11%
C. Watertown*	163.06	0.15%
C. Waupun*	35.07	0.03%
Dodge county Total	105736.39	100.00%

\* Community partially located outside of county, acreage only includes portion in the county.  
Source: Dodge County Land Resources and Parks Department, June 2022.



## **CHAPTER 3**

### **SOIL EROSION AND WATER QUALITY CONDITIONS**

Surface water quality in Dodge County is impacted by both nonpoint and point sources of pollution. The impact from point sources has been reduced greatly in recent years, presently estimated to represent less than 20% of the total pollutant loading, while nonpoint now accounts for more than 80% of the total pollutant load. Pollutants such as sediments, phosphorus, nitrogen, and bacterial pathogens find their way into surface and ground waters, often times degrading fish and wildlife habitat, and posing threats to human health and safety. Because of the rural nature of Dodge County, and the fact that agriculture is the dominant land use, it has long been assumed that the majority of nonpoint pollutants can be attributed to agricultural land use activities. This assumption has now been confirmed with the completion of the Rock River Watershed TMDL Final Report in July of 2011. The Rock River Watershed TMDL Final Report indicates that 67% of total phosphorus (TP), and 92% of total suspended solids (TSS) pollutant loadings to surface waters in the entire Rock River watershed is caused by agricultural land uses. There has also been a growing concern in recent years over the potential for nonpoint pollution of surface waters and groundwater from the storage, treatment, discharge, and land spreading of industrial and municipal wastes.

Section 303(d) of the Federal Clean Water Act (CWA) as amended by the Water Quality Act of 1987, Public Law 100-4 requires the Environmental Protection Agency (EPA) and states to develop Total Maximum Daily Loads (TMDL's) for all pollutants violating or causing violation of applicable water quality standards for each impaired water body. A TMDL determines the maximum number of pollutants that a water body is capable of assimilating while continuing to meet the existing water quality standards. For all the point and nonpoint sources of pollution that cause impairment, such loads are established at levels necessary to meet the applicable standards with consideration given to seasonal variations and margin of safety. TMDL's provide the framework that allows states to establish and implement pollution control and management plans with the ultimate goal indicated in Section 101(a) (2) of the CWA: "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable" (WDNR, Rock River TMDL Final Report, July 2011).

The Wisconsin DNR's most recent impaired waters list identifies 43 waterbodies in Dodge County that are considered impaired for one or more reasons; 37 are rivers or streams, 5 are lakes or mill ponds, and the Horicon Marsh. 21 rivers/streams and 2 lakes/millponds are impaired by sediment/suspended solids; 27 rivers/streams and 4 lakes/millponds are impaired by total phosphorus; 2 rivers/streams are impaired by ammonia; 1 river/stream is impaired by an unknown contaminant; 1 lake has pcb's; and the Horicon Marsh is impaired by sediment/suspended solids and total phosphorus. Table 3-1 contains a listing of Dodge County's impaired waters. Figure 3-1 shows the location of specific watersheds in Dodge County. Figure 3-2 shows the HUC-12 watersheds in Dodge County.

**Table 3-1  
Dodge County Lake and Rivers on the Impaired Waters List**

Local Name	Water Type	WBC	County	Size	Pollutant	Impairment	Status	Priority
Alto Creek	River	835900	Dodge	6.2	Sediment/Total Suspended Solids	Low Flow Altercations, Degraded Habitat	TMDL Approved	Not Applicable
Ashippun River	River	835800	Dodge, Jefferson, Washington, Waukesha	33.17	Total Phosphorus	Impairment Unknown	303d Listed	Low
Baker Creek	River	856000	Dodge	10	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Beaver Creek	River	836500	Dodge, Columbia	14.9	Total Phosphorus	Degraded Biological Community	303d Listed	Low
Beaver Dam Lake	Lake	835100	Dodge	6401.6	Total Phosphorus	Eutrophication, Excess Algal Growth	TMDL Approved	Not Applicable
Beaver Dam River	River	831400	Dodge	16	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Beaver Dam River	River	831400	Dodge	3.1	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Beaver Dam River	River	834900	Dodge	17	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Beaver Dam River	River	834900	Dodge	17	Total Phosphorus	Degraded Biological Community	TMDL Approved	Not Applicable
Beaver Dam River	River	836200	Dodge	3	Total Phosphorus	Degraded Biological Community	303d Listed	Low
Beaver Dam River	River	832100	Dodge	2.4	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Calamus Creek	River	834900	Dodge	17	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Calamus Creek	River	834900	Dodge	17	Total Phosphorus	Degraded Biological Community	TMDL Approved	Not Applicable
Cambra Creek	River	836200	Dodge	3	Total Phosphorus	Degraded Biological Community	303d Listed	Low

Local Name	Water Type	WBC	County	Size	Pollutant	Impairment	Status	Priority
Casper Creek	River	832100	Dodge	2.4	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Cold Springs Creek	River	831900	Dodge	4.2	Total Phosphorus	Impairment Unknown	303d Listed	Low
Crawfish River	River	829700	Dodge, Columbia	30	Sediment/Total Suspended Solids	Degraded Habitat	303d Listed	Low
Crawfish River	River	829700	Dodge, Columbia	30	Total Phosphorus	Impairment Unknown	303d Listed	Low
Columbus Mill Pond	Impoundment	842500	Dodge, Columbia	18.4	PCBs	PCB's Contaminated Fish Tissue	303d Listed	Low
Davy Creek	River	855400	Dodge	5.7	Unspecified Metals	Chronic Aquatic Toxicity	303d Listed	Low
Dead Creek	River	860000	Dodge	3.9	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Dead Creek	River	860000	Dodge	5.4	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Dead Creek	River	860000	Dodge	5.4	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Dead Creek	River	860001	Dodge	3.9	Total Phosphorus	Low DO, Degraded Biological Community	TMDL Approved	Not Applicable
Drew Creek	River	836100	Dodge	3	Sediment/Total Suspended Solids	Degraded Habitat	303d Listed	Low
Drew Creek	River	836100	Dodge	3	Total Phosphorus	Impairment Unknown	303d Listed	Low
East Branch Rock River	River	861400	Dodge	11.6	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
East Branch Rock River	River	861400	Dodge	11.6	Total Phosphorus	Low DO, Degraded Biological Community	TMDL Approved	Not Applicable
Fox Lake	Lake	835800	Dodge	2713.3	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Fox Lake	Lake	835800	Dodge	2713.3	Total Phosphorus	Eutrophication, Excess Algal Growth	TMDL Approved	Not Applicable

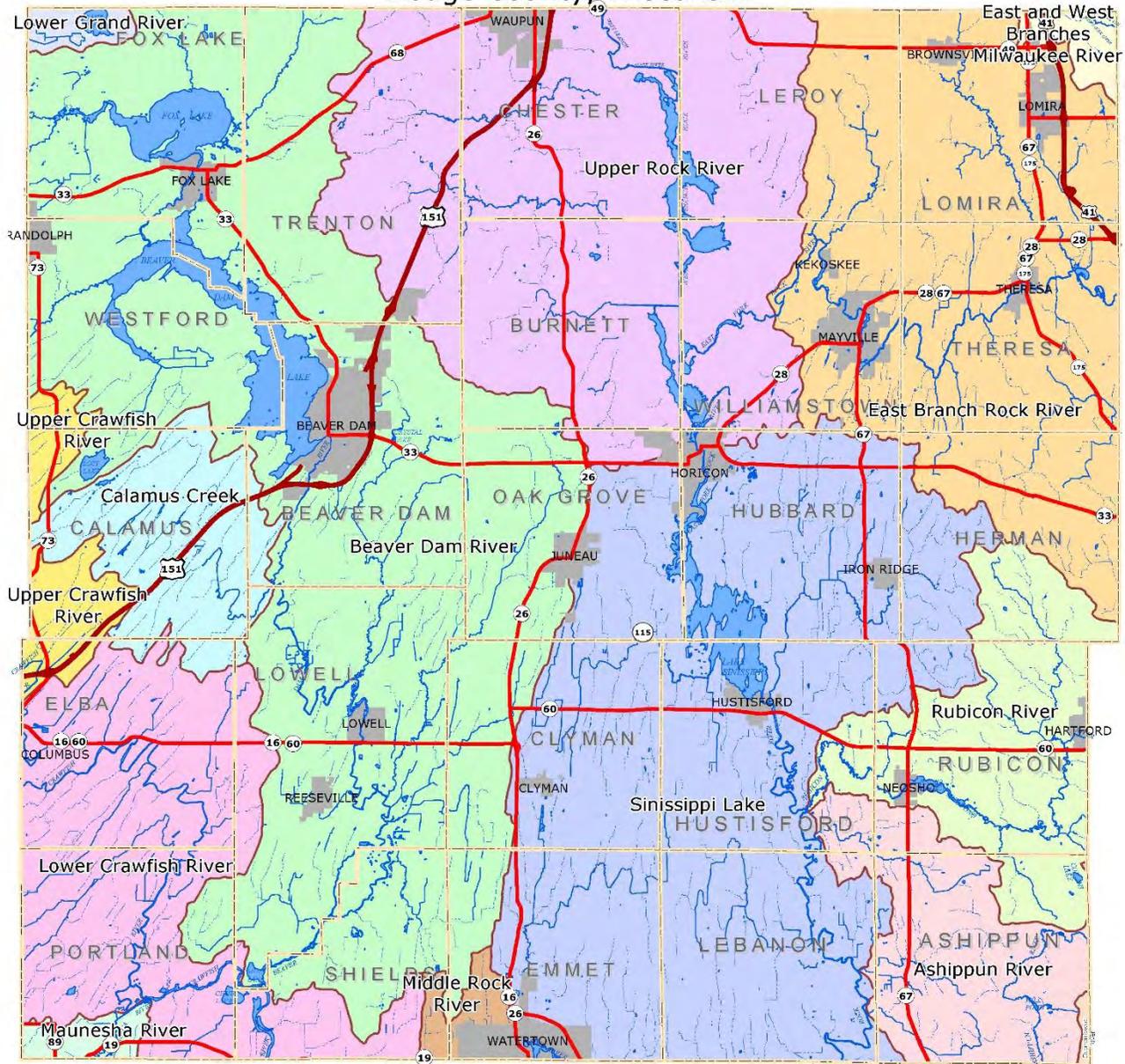
Local Name	Water Type	WBC	County	Size	Pollutant	Impairment	Status	Priority
Gill Creek	River	861700	Dodge	6.3	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Gill Creek	River	861700	Dodge	6.3	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable
Horicon Marsh	Wetlands	861200	Dodge	1000	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Horicon Marsh	Wetlands	861200	Dodge	1000	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Irish Creek	River	861600	Dodge	3.8	Ammonia (Unionized) - Toxin	Acute Aquatic Toxicity	303d Listed	Low
Irish Creek	River	861600	Dodge	3.8	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Irish Creek	River	861600	Dodge	3.8	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable
Kummel Creek	River	863500	Dodge	10.4	Ammonia (Unionized) - Toxin	Acute Aquatic Toxicity	303d Listed	Low
Kummel Creek	River	863500	Dodge	1.2	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Kummel Creek	River	863500	Dodge, Fond du Lac	2.5	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Kummel Creek	River	863500	Dodge	10.4	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Kummel Creek	River	863500	Dodge	1.2	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Kummel Creek	River	863500	Dodge	10.4	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Lake Emily	Lake	161600	Dodge	268.2	Total Phosphorus	Eutrophication, Excess Algal Growth	TMDL Approved	Not Applicable
Lau Creek	River	831600	Dodge	6	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Local Water	River	867800	Dodge	3.7	Total Phosphorus	Impairment Unknown	303d Listed	Low
Lomira Creek	River	864100	Dodge	5.4	Total Phosphorus	Impairment Unknown	303d Listed	Medium

Local Name	Water Type	WBC	County	Size	Pollutant	Impairment	Status	Priority
Mauneshia River	River	837500	Dodge, Jefferson	5.5	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Mauneshia River	River	837500	Dodge, Jefferson	5.5	Total Phosphorus	Low DO	TMDL Approved	Not Applicable
Mill Creek	River	835500	Dodge	3	Sediment/Total Suspended Solids	Degraded Habitat	303d Listed	Low
Mill Creek	River	835500	Dodge	3	Total Phosphorus	Impairment Unknown	303d Listed	Low
Mill Creek	River	867700	Dodge	10.8	Total Phosphorus	High Phosphorous Levels	303d Listed	Low
Mill Creek	River	867700	Dodge	10.8	Total Phosphorus	High Phosphorous Levels	303d Listed	Low
Mud Creek	River	840800	Dodge, Dane	10.8	Total Phosphorus	Degraded Biological Community	303d Listed	Low
Mud Creek	River	840800	Dodge, Dane	10.8	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Mud Creek	River	840800	Dodge, Dane	10.8	Total Phosphorus	Degraded Biological Community	303d Listed	Low
Neda Creek	River	859100	Dodge	3	Total Phosphorus	Degraded Biological Community	303d Listed	Low
Oliver Creek	River	859000	Dodge	4.1	Unknown Pollutant	Degraded Biological Community	303d Listed	Low
Park Creek	River	834400	Dodge	2.4	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Plum Creek	River	868400	Dodge	13.8	Total Phosphorus	Degraded Biological Community	303d Listed	Medium
Rock River	River	788800	Dodge, Jefferson	23.6	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Rock River	River	788800	Dodge	2.2	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Rock River	River	788800	Dodge, Jefferson	23.6	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable

Local Name	Water Type	WBC	County	Size	Pollutant	Impairment	Status	Priority
Rock River	River	788800	Dodge	2.2	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable
Rock River	River	788800	Dodge, Jefferson	35.5	Total Phosphorus	Low DO, Eutrophication, Degraded Biological community	TMDL Approved	Not Applicable
Rock River, West Branch	River	861300	Dodge, Fond du Lac	37.6	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Rock River, West Branch	River	861300	Dodge, Fond du Lac	37.6	Total Phosphorus	Degraded Habitat	TMDL Approved	Not Applicable
Rubicon River	River	856500	Dodge	9.7	Total Phosphorus	High Phosphorous Levels	303d Listed	Low
Rubicon River	River	856500	Dodge, Washington	17.6	Total Phosphorus	High Phosphorous Levels	303d Listed	Low
Schultz Creek	River	833800	Dodge	4.7	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	
Silver Creek	River	847600	Dodge	5.3	Total Phosphorus	Impairment Unknown	303d Listed	Low
Sinissippi Lake	Impoundment	859900	Dodge	1647.8	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Sinissippi Lake	Impoundment	859900	Dodge	1647.8	Total Phosphorus	Eutrophication, Excess Algal Growth	TMDL Approved	Not Applicable
Stony Brook	River	837600	Dodge, Dane, Jefferson	15.4	Sediment/Total Suspended Solids	Degraded Habitat	TMDL Approved	Not Applicable
Tributary to Dead Creek to the Rock River	River	860400	Dodge	1.5	Total Phosphorus	High Phosphorous Levels	303d Listed	Low
Unnamed Trib to Wildcat Creek	River	858700	Dodge	0.9	Total Phosphorus	Impairment Unknown	303d Listed	Low
West Branch Milwaukee River	River	40400	Dodge, Washington, Fond du Lac	20.6	Total Phosphorus	Impairment Unknown	303d Listed	Medium

Local Name	Water Type	WBC	County	Size	Pollutant	Impairment	Status	Priority
Wildcat Creek	River	858600	Dodge	5.1	Total Phosphorus	Impairment Unknown	303d Listed	Low
Wildcat Creek	River	858600	Dodge	8.8	Total Phosphorus	Impairment Unknown	303d Listed	Low

Figure 3-1, Watersheds, Streams, and Surface Water  
Dodge County, Wisconsin



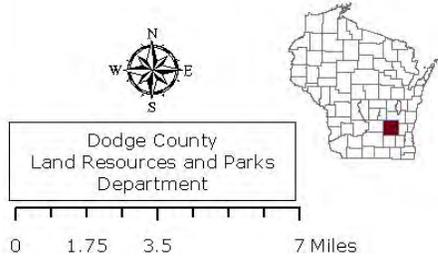
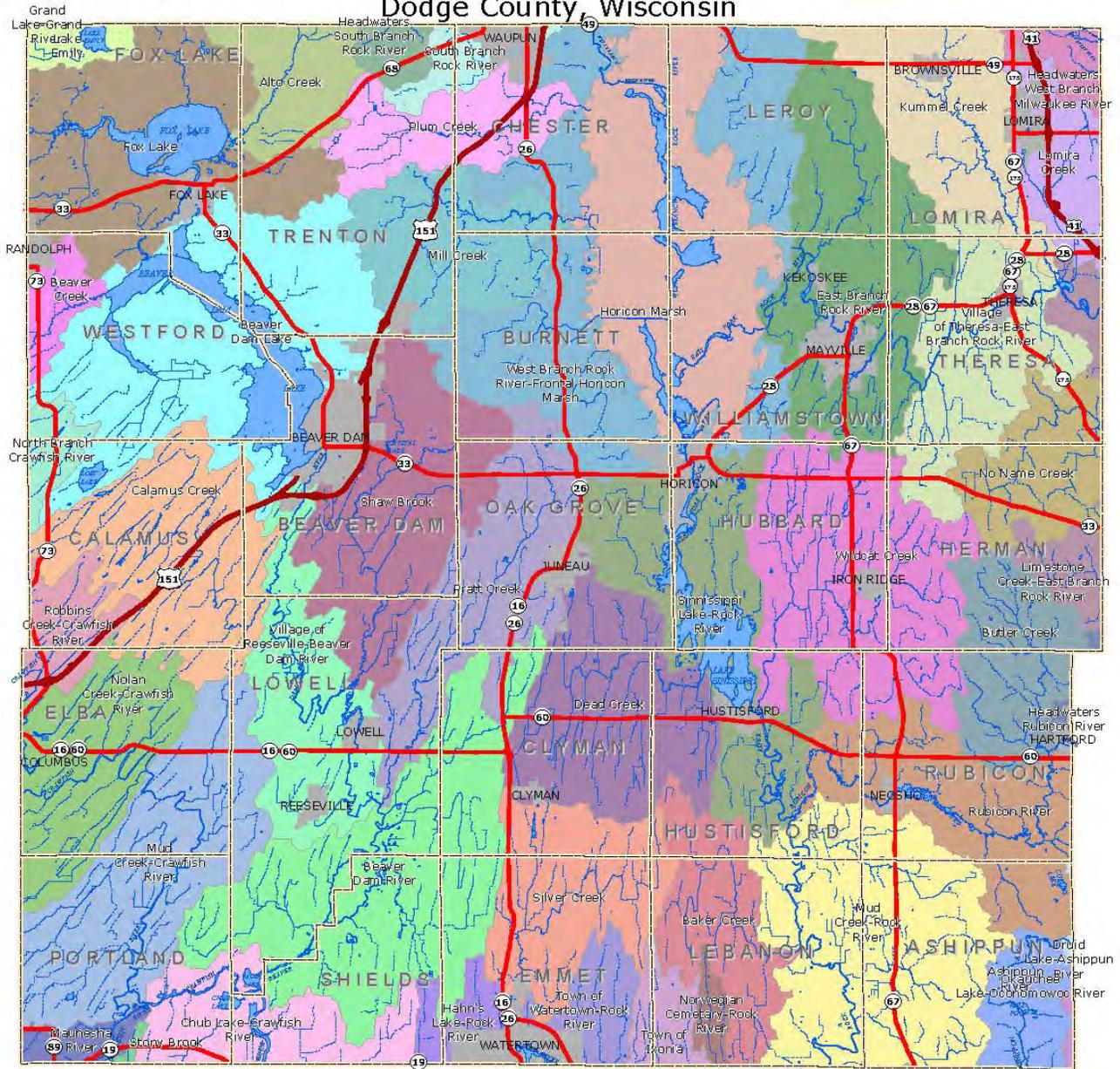
Legend		Watersheds	
	U.S. Highway		Ashippun River
	State Highway		Beaver Dam River
	Town Boundaries		Calamus Creek
	Municipalities		East Branch Rock River
	Horicon Marsh		East and West Branches Milwaukee River
	Lakes, Rivers, Ponds		Lower Crawfish River
	Streams		Lower Grand River
	Intermittent Streams		Maunesha River
			Middle Rock River
			Oconomowoc River
			Rubicon River
			Sinissippi Lake
			Upper Crawfish River
			Upper Rock River

Dodge County  
Land Resources and Parks  
Department

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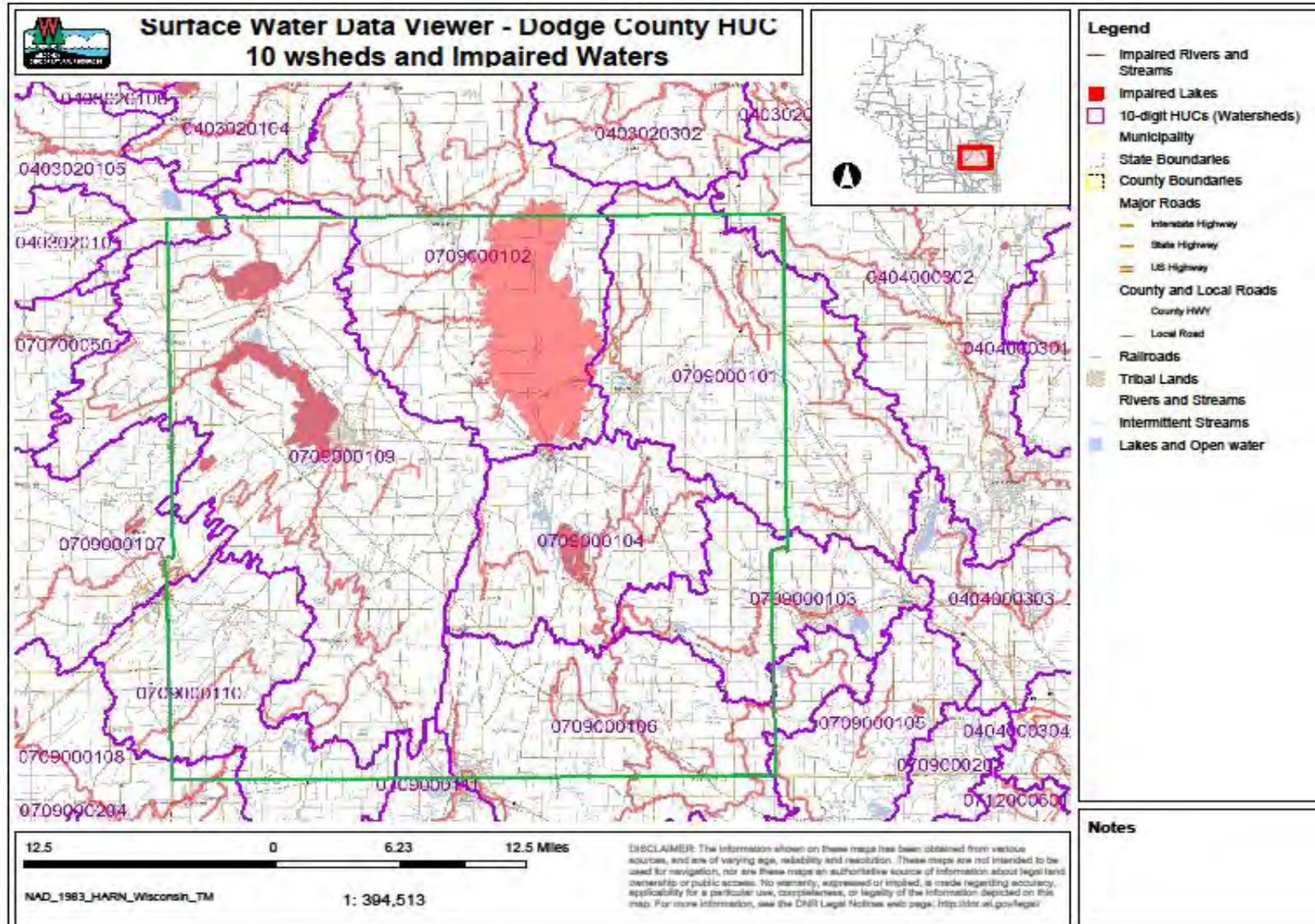
Source: Dodge County Land Resources and Parks Department, June 2022  
Watersheds from DNR, Hydrology derived from USGS topographic maps

Figure 3-2, HUC12 Watersheds, Streams, and Surface Water  
Dodge County, Wisconsin



Source: Dodge County Land Resources and Parks Department, June 2022  
Watersheds from DNR, Hydrology derived from USGS topographic maps

Figure 3-3, Impaired Waters



Soil erosion in Dodge County occurs on cropland, along lakeshores and stream banks, and on residential/commercial construction sites. Although acre for acre construction site and shoreline erosion can be many times greater than cropland erosion, because cropland dominates Dodge County's landscape (over 300,000 acres), the vast majority of soil erosion and sediment delivery can likely be attributed to cropland. Data from Dodge County's annual soil erosion line transect survey in the last 10 years shows the countywide soil loss went from 680,060 tons to 485,151 tons. This is a soil loss reduction of 29%. On a countywide basis, the average cropland soil erosion rate in 2021 is currently 1.56 ton/acre/year, and approximately 8.4% of all cropland acres are eroding above tolerable (T) levels. See Figure 3-4 for trends in Dodge County total soil erosion levels.

### **Upper Rock River Basin – Soil Erosion and Surface Water Quality Conditions**

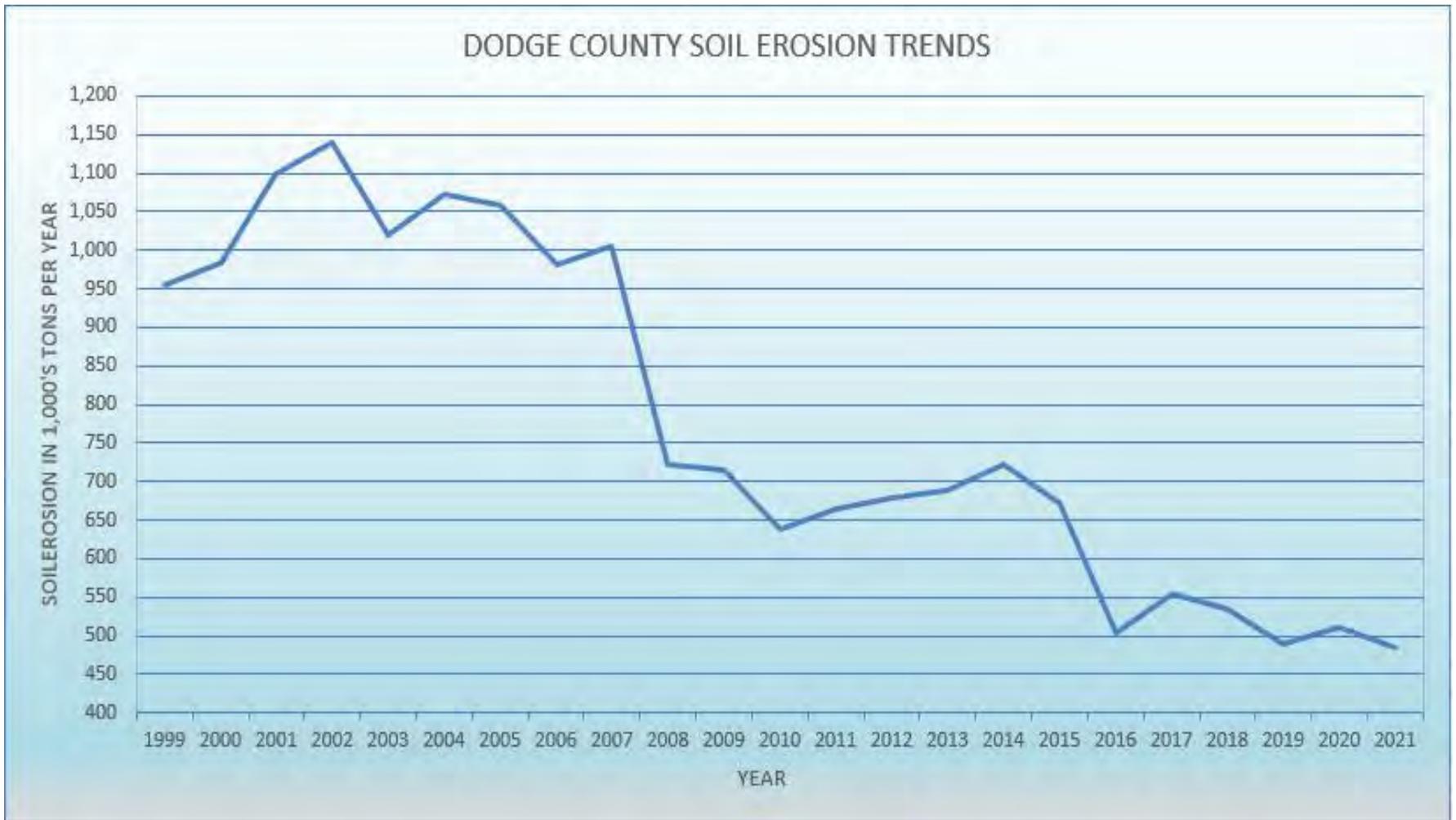
The main difference between groundwater and surface water involves the water quality for each. As a result of air fallout and runoff, surface water can contain high amounts of contaminants, which means that the water will need to be treated extensively before it can be used as a community's water supply. It's common for surface water to be comprised of chemical pollutants that accumulate through runoff. While groundwater is typically cleaner than surface water, it can still contain various contaminants. These contaminants are picked up from seepage and soil percolation. On the other hand, the sediment layers that are found below the water table can filter the water naturally to remove at least some of the contaminants. Since there are fewer contaminants in groundwater, this type of water requires less treatment before being used as drinking water. Dodge County's surface waters are described within their respective watersheds below.

#### Ashippun River Watershed and Surface Waters

(Water Quality Conditions) – The Ashippun River Watershed covers the extreme southeastern portion of Dodge County, running through landscape that is still dominated by agricultural and open space land uses, but one that has undergone substantial residential development over the years. Stream segments and other water bodies located either partially or entirely in Dodge County include the Ashippun River itself, Davy Creek, Dawson Creek, Mud Run Creek, and the Alderley Millpond. Both the Ashippun River and Davy Creek were classified as warm water sport fisheries in 2002, but were only partially supporting that biological use designation. Both Dawson Creek and Mud Run Creek were classified as warm water forage fisheries in 2002 but were only partially supporting that biological use designation. All water bodies in this watershed are being impacted to some degree by nonpoint source water pollutants from both sediments/total suspended solids and total phosphorus (WDNR, Rock River TMDL Final Report, July 2011).

(Soil Erosion Conditions) – This watershed currently has an average annual cropland soil erosion rate of 1.4 ton/acre/year. Approximately 5.3% of all cropland acres are eroding above tolerable (T) levels, and about 84% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Ashippun River watershed aligns with RR TMDL sub-basins 20 and 21. These TMDL sub-basins have an average 21% TSS and 27% TP reduction goal.

Figure 3-4



Source: Dodge County Land and Water Conservation Department

Recent WDNR fisheries stream surveys conducted in the Ashippun River Watershed included: the Ashippun river (3013, one site) and Dawson Creek (2014, one site).

### Beaver Dam River Watershed and Surface Waters

(Water Quality Conditions) – The Beaver Dam River Watershed is located primarily in Dodge County, with smaller segments lying in Columbia, Green Lake, and Fond du Lac Counties. As with other watersheds, land use is primarily agricultural, with dairy farming and cash grain cropping predominant. Past water quality monitoring indicated that polluted runoff effects are severe on most streams and lakes. Because of this, the Wisconsin DNR selected the watershed as a priority watershed project in 1990. This project was completed in December of 2006. Streams that drain the Beaver Dam River Watershed include Alto Creek, Beaver Creek, Beaver Dam River, Casper Creek, Cambra Creek, Crystal Creek, Drew Creek, Lau Creek, Mill Creek, Park Creek, Pratt Creek, Schultz Creek, and Shaw Brook. Lakes that are located within the Beaver Dam River Watershed include Beaver Dam Lake, Chub Lake, Crystal Lake, Fox Lake, Lost Lake, Lowell Millpond, and Mud Lake.

While many improvements were realized under the Beaver Dam River Priority Watershed Project, water quality of streams and lakes alike continues to be impacted by various pollutants, including total phosphorus and sediment/total suspended solids. High levels of organic nitrogen and nitrate/nitrite that exceed statewide averages have also been found recently in the surface waters of Drew Creek (Drew Creek Monitoring Project Final Report, December 2009). Water quality impairments caused by pollutants include degraded fish and wildlife habitat, low dissolved oxygen, sediment deposition, high water turbidity, excess algal growth, and eutrophication (WDNR, Rock River TMDL Final Report, July 2011). From 2004 to 2021, fish kill investigations were reported on Beaver Dam Lake (5 reports), Beaver Dam River (4) and Fox Lake (3). Beaver Dam Lake, Fox Lake and Lost lake all have a history of summerkill and winterkill due to low dissolved oxygen levels. All three lakes have aerator systems, operated by local lake groups to protect the fishery by avoiding winterkill.

Data from recent DNR fishery surveys indicate that Fox Lake and Beaver Dam Lake offer respectable fisheries for public use and recreation. Comprehensive fishery surveys conducted on Fox Lake in 2019 and Beaver Dam Lake in 2021 indicate healthy populations of species such as northern pike, walleye, largemouth bass, bluegill, yellow perch, and black crappie in both lakes. Walleye population estimates for Fox Lake were 4.3 adults/acre in 2019 and 1.2 adults/acre for Beaver Dam Lake in 2021. The WDNR stocks Beaver Dam Lake with walleye and northern pike in alternate years. The Beaver Dam Lake Association has stocked walleye, bluegill and northern pike in recent years. The WDNR stocks Fox Lake with walleye in alternate years, however data suggests northern pike stocking is unnecessary and was discontinued in 2019. The Fox Lake Property Owners Inc. has stocked muskellunge, walleye and yellow perch in recent years.

Aquatic invasive species documented in Beaver Dam Lake include Curly-Leaf Pondweed, Eurasian Water-Milfoil and Zebra Mussel. Aquatic invasive species documented in Fox Lake include Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Hybrid Eurasian / Northern Water-Milfoil, Purple Loosestrife, Rusty Crayfish and Zebra Mussel.

Fall electrofishing conducted on Lost Lake in 2018 showed very low catch rates for bluegill, yellow perch, black crappie and pumpkinseed compared to the previous survey conducted in 2011. No gamefish species (northern pike, walleye, largemouth bass) were sampled in either survey years.

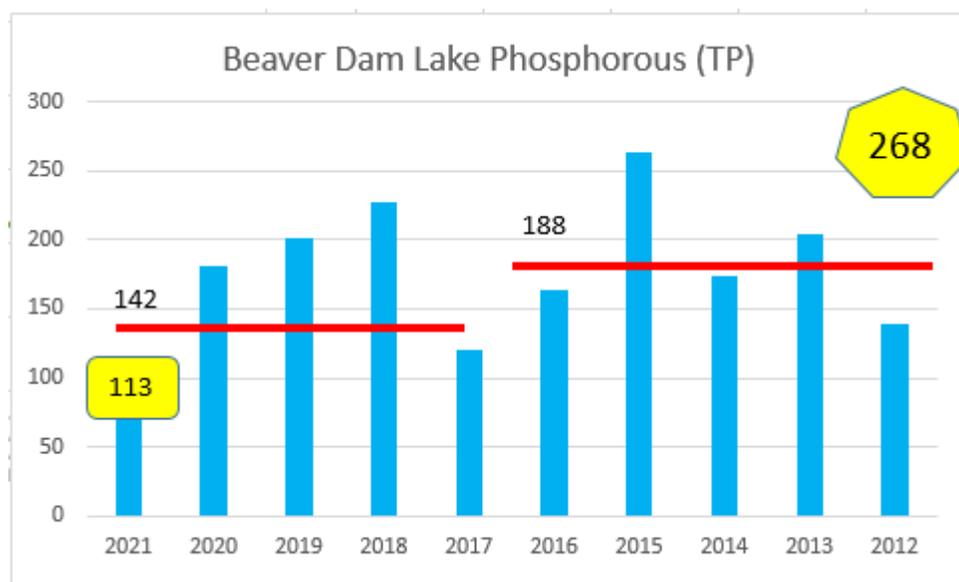
Aquatic invasive species documented in Lost Lake include Curly-Leaf Pondweed and Yellow Iris.

Recent WDNR fisheries stream surveys conducted in the Beaver Dam River Watershed included: Alto Creek (2015, two sites), Beaver Creek (2017, two sites and 2018, one site), Beaver Dam River (2013, one site), Casper Creek (2011, one site), Crystal Creek (2016, two sites), Drew Creek (2016, one site), Mill Creek (2013, one site), Schultz Creek (2016, two sites) and Shaw Brook (2016, one site) (WDNR Fisheries Biologist, 2021).

Some evidence of improving water quality in Dodge County is the declining phosphorus levels that have been found in recent years in Fox Lake and Beaver Dam Lake. Water samples analyzed from Fox Lake in 2000 showed phosphorus levels in the lake averaging around 150 ug/liter. Water samples analyzed during 2012, and for several years prior, have showed phosphorus levels averaging around 100 ug/liter. (Citizen monitoring by the Beaver Dam Lake District/Association).

Samples on Beaver Dam Lake over the five-year period from 2012 to 2016 resulted in a phosphorus levels with a seasonal average of 188 ug/liter and from 2017-2021 with a seasonal average of 142 ug/liter. It was further noted that the seasonal average for year 2021 was an improved 113 ug/liter (Figure 3-5). These improvements can be attributed to shoreline practices, producer awareness and work performed during the Priority Watershed Project. Additional collaborative programs and practices are underway with continued progress anticipated. While this improvement is good news, these levels still exceed water quality standards of 40 ug/liter, so more improvement is still needed.

Figure 3-5



Source: Beaver Dam Lake District

There are several projects identified that would have a huge impact on improving water quality in Beaver Dam Lake. Here are a few:

1. Puckagee Springs Shoreline
  - a. Restore shoreline protection to prevent loss of near shore wetland and associated habitat. This is a priority area for BDL with pike spawning and waterfowl nesting in this spring fed portion of the watershed.
2. Rakes Bay Tributary
  - a. Restore hydraulic and hydrologic flow for storm water runoff. Ditch ways have been altered which have resulted in high surge flows during storm events. These elevated velocities have been found to transport high levels of sediment and nutrients to the lake. Flow management weirs and two level stream profiles will reduce velocity and retain the sediment and nutrients prior to entering the open waters of the lake. Rakes Bay contributes 9 % of the storm water runoff to BDL with a disproportionate 30+ % of phosphorus loading.
3. Beaver Creek
  - a. Implement practices to restore and enhance the creek bank and adjacent shoreline buffer, manage hydraulic and hydronic flow to improve up-stream retention. Implementation of two stage creek/ditch profiles will reduce run off velocity and improve retention. Beaver Creek contributes 20 % of the storm water runoff to BDL and thus would have a significant impact on nutrient loading.
4. Mill Creek
  - a. Initiate a priority River Plan for study of Mill Creek from the Fox Lake Dam to Beaver Dam Lake. Identify upland and near shore areas for immediate and long term restoration. Evaluate lost creek bank/shoreline at mouth of Mill Creek for best practices. Implement finding in a phased manner which will build on progressive improvements. Game fish have a strong presence from West Fox Rd. to BDL and should be enhanced to provide additional cover and spawning structure.
5. Edgewater Park-McKinley Shoreline Restoration
  - a. Excessive erosion has occurred in this segment of the lake with shoreline recession in excess of 25 ft. Near shore wetlands have deteriorated with loss of vegetation and habitat with rough fish further damaging these waters. Multiple practices will need to be employed to correct this deteriorating condition and avoid further loss of transitional wetland.
6. Gilfins Bay, et al
  - a. Restore selected shoreline areas in need of repair and erosion control to reduce phosphorus from entering the lake and restore lost habitat.
7. The Forester Tern is attempting to establish a recovery in this area and artificial islands should be investigated and if found appropriate implemented.
8. Determine if offshore artificial habitat will provide spawning and rearing cover.
9. Determine if offshore barriers will provide protection from fetch.

10. Conduct shoreline survey which will identify sensitive segments that should be restored and protected.
11. Fishery Plan
  - a. Analysis of the current fishery status with recommendations for structures, habitat and stocking to promote biodiversity. Provide a fish biomass study of rough fish with recruitment pattern identified which provide the science for a multi-year management program.
12. Water Quality Analysis
  - a. Install stream sampling monitors at tributary inlet and at the Beaver Dam River to measure phosphorus loads. Currently only grab samples are collected and may not provide a clear picture for storm runoff events. Flow and nutrient sampling will provide this critical data for decision making.
13. Lake Fetch Reduction
  - a. Wind and wave force has been shown to be detrimental to natural shoreline while at the same time suspends nutrients from the lake bottom.
  - b. BDL longest fetch length of 14 miles from northwest to southeast, with multiple other points experiencing 5 – 6 mile fetch lengths. Determine if in lake barriers will reduce wind fetch to diminish erosion and nutrient resuspension.
14. Aquatic Plant Survey
  - a. Perform a point intercept survey to quantify and identify the current aquatic plant population as compared to the 2015 Lake Management Plan Report.
  - b. Further, identify the presence Aquatic Invasive Species is needed along with the preparation of an eradication plan.

Several water bodies within this watershed appear on the Wisconsin DNR's Impaired Waters List, including Alto Creek, Beaver Dam River, Casper Creek, Fox Lake, Lau Creek, Park Creek, Schultz Creek, and Beaver Dam Lake. Most of these water bodies have an assigned default biological designated use rating of warm water sport fishery, except for Alto Creek, which has a designated use of limited forage fishery, and Crystal Creek, which is designated as a Class III trout stream. Not all water bodies are currently supporting the full potential of their designated use (WDNR, Rock River TMDL Final Report, July 2011. Beaver Dam River TMDL for Phosphorus June 20, 2018. Beaver Creek Targeted Watershed Assessment 2020, By DNR, Sorge, et al).

(Soil Erosion Conditions) – Soil erosion in the Beaver Dam River Watershed was reduced because of best management practice installations under the Beaver Dam River Priority Watershed Project. The average annual cropland soil erosion rate has been further reduced over the past five years, and currently stands at 1.4 ton/acre/year, the same as the county average. Only 4.4% of all cropland acres are determined to be eroding above tolerable (T) levels, and about 85.8% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Beaver Dam River watershed aligns with RR TMDL sub-basins 32-43. These TMDL sub-basins have an average 28% TSS and 28% TP reduction goal.

### Calamus Creek Watershed and Surface Waters

(Water Quality Conditions) – Calamus Creek is a small watershed in west central Dodge County consisting only of Calamus Creek. The watershed is approximately 30 square miles, and the land use is approximately 67% agricultural. Calamus Creek is currently on the Wisconsin DNR’s 2022 Impaired Waters List. Although current information regarding the condition of this watershed is limited, it has been determined, that the water quality of the creek is impacted by pollutants such as total phosphorus and sediment/total suspended solids. Calamus Creek has a default biological designated use rating of warm water sport fishery, although it is currently not supporting the full potential of this designated use, currently only having a limited forage fishery (WDNR, Rock River TMDL Final Report, July 2011). Recent WDNR fisheries stream surveys conducted in the Calamus Creek Watershed included two sites on Calamus Creek in 2016 (WDNR Fisheries Biologist, 2021).

(Soil Erosion Conditions) – The average annual cropland soil erosion rate in the Calamus Creek Watershed currently stands at 1.9 ton/acre/year. Approximately 3.4% of all cropland acres are eroding above tolerable (T) levels, and about 76% of all cropland fields maintain at least 30% crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Calamus Creek watershed aligns with RR TMDL sub-basin 35. This TMDL sub-basin has an average 28% TSS and 28% TP reduction goal.

### East Branch Rock River Watershed and Surface Waters

(Water Quality Conditions) – The East Branch Rock River lies directly east of the Horicon Marsh, with the western portion of the watershed in Dodge County and the eastern portion in Washington County. The primary land use is agriculture (66%). Theresa Marsh Wildlife Area and Allenton Wildlife Area are large wetland complexes in the watershed. The East Branch Rock River meanders through almost the entire width of the watershed, approximately 45 miles. The East Branch Rock River is the primary source of water for the state owned portion of the Horicon Marsh, and is the main source of sediment loading to the marsh (WDNR, 2002). The East Branch Rock River has also been determined to be the greatest contributor of sediment and phosphorus loads per acre of any watershed within the Upper Rock River Basin (WDNR, Rock River TMDL Final Report, July 2011).

Some reductions in phosphorus loading appear to have occurred in the East Branch Rock River based on lower average phosphorus concentrations found in water quality samples taken during the period of 2009-2011, as compared with water quality samples taken during the period of 1997-2000.

There are over 315 miles of rivers and streams in this watershed; 82 miles of which have had water quality assessments performed by the Wisconsin DNR. Of these 82 miles, only about six are meeting their fish and aquatic life use designations and are considered to be in “good” condition while over 70% are not meeting their fish and aquatic life designated uses, and are considered to be in “poor” condition. Stream segments located either partially or entirely within Dodge County include the East Branch Rock River itself, Fink Creek, Kummel Creek, Lomira Creek, Gill Creek, Irish Creek, the Kekoskee Millpond, Limestone Creek, the Lomira Millpond, the Lower and Upper Mayville Millponds, the Theresa Marsh, and the Theresa Millpond. Most streams and rivers are classified as either limited forage fishery

or warm water sport fishery, except for Gill Creek and Irish Creek, which are both, classified as class II trout streams (WDNR, 2011 Water Quality Management Plan Update – East Branch Rock River Watershed, December 2011). Water bodies that currently appear on the Wisconsin DNR’s Impaired Waters List are the East Branch Rock River, Gill Creek, Irish Creek, and Kummel Creek.

Recent WDNR fisheries stream surveys conducted in the East Branch Rock River Watershed included: East Branch Rock River (2014, two sites and 2019, one site), Fink Creek (2016, one site), Gill Creek (2015, one site, 2019, three sites, 2020, two sites), and Irish Creek (2015, two sites, 2016, three sites, 2019, three sites, 2020, 2 sites).

(Soil Erosion Conditions) – This watershed currently has an average cropland soil erosion rate of 2.0 ton/acre/year. Approximately 22.8% of all cropland acres are eroding above tolerable (T) levels, and about 79% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The East Branch Rock River watershed aligns with RR TMDL sub-basins 8-16. These sub-basins have an average 27% TSS and 33% TP reduction goal.

#### Lower Crawfish River Watershed and Surface Waters

(Water Quality Conditions) – The Crawfish River below Columbus is wide, shallow and low gradient. The river was once narrow and deeper and supported stands of wild rice. Primarily agricultural land use over the past 150 years has altered the river to its present condition. The stream partially supports a viable warm water sport fishery. The river’s shallowness, bank erosion and lack of cover is suspected of limiting habitat for adult game fish in reaches that have been surveyed. The Crawfish River contains a diverse warmwater fishery composed of northern pike, walleye, largemouth bass, smallmouth bass and channel catfish (WDNR, 20212). Water quality of all stream segments, including Mud Creek, Nolan Creek, Crawfish River, and the Danville Millpond is being impacted to some degree by nonpoint source pollutants from both sediments/total suspended solids and total phosphorus (WDNR, Rock River TMDL Final Report, July 2011). Mud Creek is currently included on the Wisconsin DNR’s most recent listing of impaired waters.

(Soil Erosion Conditions) – Soil erosion in the Lower Crawfish River Watershed is slightly above the average for Dodge County. The average annual cropland soil erosion rate currently stands at 1.3 ton/acre/year. Approximately 1.2% of all cropland acres are determined to be eroding above tolerable (T) levels, and about 91% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Lower Crawfish River watershed aligns with RR TMDL sub-basins 49, 50, 51, and 53. These TMDL sub-basins have an average 21% TSS and 25% TP reduction goal.

#### Maunasha River Watershed and Surface Waters

(Water Quality Conditions) – Dodge County’s portion of the Maunasha River Watershed covers a surface area of less than four (4) square miles. Agriculture is the dominant land use, and pollutants such as total phosphorus and sediments/total suspended solids are thought to be the cause for water quality impairments including degraded fish and wildlife habitat and low dissolved oxygen. The two

stream segments located in Dodge County include Stony Brook and a section of the Mauneshia River itself. Both streams have been given a default biological use designation of warm water sport fishery, but both streams are currently not supporting that potential biological use rating. Stony Brook currently supports only a limited forage fishery (WDNR, Rock River TMDL Final Report, July 2011).

No recent WDNR fisheries stream surveys have been conducted in the Mauneshia River Watershed.

(Soil Erosion Conditions) – Dodge County Land Conservation Department’s county-wide soil erosion transect survey does not include any sample points within this watershed, and therefore no modeled erosion data is available. It could be assumed that cropland soil erosion conditions within this watershed are likely quite comparable to the adjoining Lower Crawfish River Watershed.

#### Middle Rock River Watershed and Surface Waters

(Water Quality Conditions) – This 132 square mile watershed originates in south central Dodge County, and comprises a very small part of the total county land area. The Rock River is very wide and low gradient in this reach and carries a heavy sediment load, due partly to the size of the watershed area feeding it. Dodge County’s portion of this watershed is dominated by agricultural and open space land uses, although it also includes a portion of the City of Watertown.

This portion of the Rock River is currently listed as an impaired water on Wisconsin’s Impaired Waters List, with water quality impacted by nonpoint sources of pollution, including total phosphorus. This portion of the Rock River has been assigned a designated use of warm water sport fishery. However it currently is not fully supporting that designated use. Instead it is currently only able to support a warm water forage fishery (WDNR, Rock River TMDL Final Report, July, 2011). No recent WDNR fisheries stream surveys were conducted in the Middle Rock River Watershed.

(Soil Erosion Conditions) – Soil erosion in the Middle Rock River Watershed is currently considered under control. The average annual cropland soil erosion rate currently stands at 1.4 ton/acre/year. Less than 5% of all cropland acres are determined to be eroding above tolerable (T) levels, and at least 62% of all cropland fields maintain 30% or more crop residue cover on the soil surface after planting (Dodge County LCD, 2021). The Middle Rock River watershed aligns with RR TMDL sub-basins 29 and 53. These TMDL sub-basins have an average 16% TSS and 27% TP reduction goal.

#### Rubicon River Watershed and Surface Waters

(Water Quality Conditions) – Approximately one-half of the Rubicon River Watershed lies within Dodge County, with the other half lying within Washington County. The primary land use in Dodge County’s portion is agricultural, although some urbanization is occurring near Hartford and around Neosho. Stream segments and other water bodies located either partially or entirely within Dodge County include the Rubicon River itself, Butler Creek, Hepp Creek, Mud Lake Creek, Collins Lake, and the Neosho Millpond. The Rubicon River itself was classified as a warm water sport fishery in 2002, but was only partially supporting that biological use designation. Butler Creek was classified as a warm water forage fishery in 2002, but also was only partially supporting that biological use designation. From 2004

to 2021, two (2) fish kill investigations were reported on Butler Creek. Hepp Creek and Mud Lake Creek had unknown classifications (WDNR, 2002). All water bodies in this watershed are being impacted to some degree by nonpoint source water pollutants from both sediments/total suspended solids and total phosphorus (WDNR, Rock River TMDL Final Report, July 2011).

Recent WDNR fisheries stream surveys conducted in the Rubicon River Watershed included: Rubicon River (2015, one site, 2017, one site), Butler Creek (2015, one site) and Mud Lake Creek (2014, one site).

Fall electrofishing conducted on the Neosho Millpond in 2009 and 2017 showed very low catch rates for bluegill, black crappie, rock bass, white bass and yellow perch in both survey years. Gamefish species sampled included largemouth bass in both survey years, although the catch rate was much lower in 2017 than in 2009. Northern pike and smallmouth bass were sampled in 2009 but were not sampled in the 2017 survey. While both species were present in 2009, the catch rates were very low (northern pike <1/mile, smallmouth bass <2/mile).

Aquatic invasive species documented in the Neosho Millpond include curly-leaf pondweed.

(Soil Erosion Conditions) – This watershed currently has an average cropland soil erosion rate of 1.6 ton/acre/year. Approximately 17.6% of all cropland acres are eroding above tolerable (T) levels, and about 74% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Rubicon River watershed aligns with RR TMDL sub-basins 8 and 9. These TMDL sub-basins have an average 22% TSS and 27% TP reduction goal.

### Sinissippi Lake Watershed and Surface Waters

(Water Quality Conditions) – A large portion of this 237 square mile watershed lies within Dodge County, stretching from the dam at Horicon downstream to the Watertown dam. Land use is predominantly agricultural. Primary tributaries to the main stem of the Rock River in this watershed include Baker Creek, Clyman Creek, Dead Creek, Lentz Creek, Neda Creek, Oliver Creek, Silver Creek, Wildcat Creek and Woodland Creek. All water bodies, except for Clyman Creek and Silver Creek, are listed on the 2022 Impaired Waters list. Baker Creek, the Rock River, and Lake Sinissippi have all been given a default biological use designation of warm water sport fishery, but none of these water bodies is currently supporting that potential biological use rating. Dead Creek has been given a biological use designation of limited forage fishery, but is also currently not supporting that potential biological use rating (WDNR, Rock River TMDL Final Report, July 2011).

WDNR conducted a fisheries stream survey in 2019 in the Wildcat Creek HUC12 watershed. The Wildcat Creek watershed contained mostly transitional and warmwater fish species. Biologists noted a paucity of fish in certain systems, particularly in several unnamed tributaries, as well as the headwaters of Wildcat Creek and Woodland Creek. Most streams in this watershed were modeled as cold transitional (cool-warm) headwaters (Lyons, 2008), however, a majority were verified as warm transitional (cool-warm) headwaters based on the fish community that was found (WDNR, 2019). Qualitative habitat surveys showed overall habitat to be “fair” to “good” at most sites.

Macroinvertebrates samples were collected from 13 sites throughout the watershed in fall of 2019. In general, MIBIs were fair to good. (Assessment of water quality in the Wildcat Creek Watershed WDNR, 2019.)

Two HUC 12 9-Key Element plans were written in the Sinissippi Lake Watershed. The Wildcat Creek Watershed plan was written in 2018, and the Lake Sinissippi-Rock River Watershed plan was written in 2019. The DNR and EPA approved both plans. One part of the plans required stream monitoring. Stream monitoring occurred in 2019, 2020 and 2021 for Wildcat Creek and 2020, and 2021 for Lake Sinissippi-Rock River. Total phosphorus data was collected during the 2019 and 2020 growing season at seven sites on streams throughout the watershed. The average total phosphorus concentrations varied from 0.077mg/L to 0.156 mg/L (WDNR, 2019). In 2021, Rock River Coalition trained citizen-monitoring teams to monitor nine sites in the two watersheds. Dodge County Land and Water Conservation Department will apply for Targeted Runoff Management (TRM) grants to provide cost sharing to landowners in the watersheds to help offset the cost of implementing Best Management Practices to reduce soil erosion and nutrient runoff. Multi-Discharge Variance monies are being targeted to the watersheds until a TRM grant is received.

Lake Sinissippi is a 2,855-acre impoundment on the main stem of the Rock River, with a drainage area of 511 square miles. Historically this was a rapids area of the Rock River before the stretch was dammed. The lake has a maximum depth of eight (8) feet (directly above the dam), with an average depth of 4 to 4.5 feet. It is a shallow, unstratified river impoundment with conditions of high turbidity, planktonic algae, reduced oxygen content and has historically suffered from summerkill and winterkill of the fishery due to low dissolved oxygen levels. Water quality data collected by the Lake Sinissippi Improvement District (LSID) show that the lake is highly eutrophic with summer levels of chlorophyll *a* of 180.5 ug/l, total phosphorus of 0.26 mg/l, total Kjeldahl nitrogen of 3.03 mg/l, total suspended solids of 44 mg/l, total 5-day BOD of 16 mg/l, and Secchi disk depth of less than 1 foot. The lake has been slowly filling with sediment, with depositions ranging from 1-12 feet (Planning Assistance to States, Section 22 Program Alternatives Report, U.S. Army Corp of Engineers, September 2009).

The fishery of Lake Sinissippi is dominated by rough fish species including common carp and bullhead. Fall electrofishing surveys conducted in 2008, 2009 and 2011 consistently show low catch rates for panfish (bluegill <1/mile), pumpkinseed <2/mile, black crappie <1/mile, yellow perch <7/mile and gamefish (northern pike <1/mile, walleye <6/mile. Spring electrofishing conducted in May 2018 had similar results. The Lake Sinissippi Association and Lake Sinissippi Improvement District have stocked northern pike, walleye, bluegill, black crappie, yellow perch and channel catfish in recent years.

(Soil Erosion Conditions) – This watershed currently has an annual cropland soil erosion rate of 1.6 ton/acre/year. Approximately 8.8% of all cropland acres are eroding above tolerable (T) levels, and about 79% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Sinissippi River watershed aligns with RR TMDL sub-basins 18-21, 28, and 29. These TMDL sub-basins have an average 20% TSS and 35% TP reduction goal.

### Upper Crawfish River Watershed and Surface Waters

(Water Quality Conditions) – The majority of this watershed lies within Columbia County. Dodge County’s portion covers approximately twelve (12) square miles of surface area in west central Dodge County. The major land use in the watershed is farming, either dairy, cash crops or feeder animals – similar to other watersheds in the basin. The main stem of the Crawfish River in this watershed has been given the biological use designation of warm water sport fishery (WDNR, 2002). This portion of the Crawfish River is impacted to some degree by nonpoint source water pollutants from both sediments/total suspended solids and total phosphorus (WDNR, Rock River TMDL Final Report, July 2011).

(Soil Erosion Conditions) – This watershed currently has an average annual cropland soil erosion rate of 1.9 ton/acre/year. Approximately 5% of all cropland acres are eroding above tolerable (T) levels, and about 95% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Upper Crawfish River watershed aligns with RR TMDL sub-basin 51. This TMDL sub-basin has a 23% TSS and 30% TP reduction goal.

### Upper Rock River Watershed and Surface Waters

(Water Quality Conditions) – The southern half of this watershed lies within Dodge County. The approximate size of the entire watershed is 259 square miles. As in most other watersheds in the Rock River Basin, the streams in this watershed have low gradients. The primary land use is agricultural (66%), but urbanization continues to grow. Stream segments and other water bodies located either partially or entirely within Dodge County include Conners Ditch, Libby Creek, Luebke Ditch, Main Ditch, Mieske Ditch, Mill Creek, Plum Creek, South Branch Rock River, Spring Brook, Townline Ditch, West Branch Rock River, and the Horicon Marsh. Many stream and river segments are classified as limited forage fisheries or warm water sport fisheries. Most streams and rivers are being impacted to some degree by nonpoint source pollutants from both sediments/total suspended solids and total phosphorus. Water quality impairments include degraded fish and wildlife habitat and low dissolved oxygen. Two fish kill investigations were reported in the Horicon Marsh and Rock River between the Horicon Dam and Lake Sinissippi in 2014 and 2015. The cause of the 2014 fish kill was koi herpes virus which affected the Rock River from the headwaters in Fond du Lac County to approximately Lake Koshkonong. Water bodies within this watershed that currently appear on the Wisconsin DNR’s Impaired Waters List include the South and West Branches of the Rock River, and the Horicon Marsh (WDNR, Rock River TMDL Final Report, July 2011). Recent WDNR fisheries stream surveys conducted in the Upper Rock River Watershed included: Spring Brook (2018, one site).

The Horicon Marsh consists of both the Horicon National Wildlife Refuge (HNWR), which is managed by the U.S. Fish and Wildlife Service, and the Horicon Marsh State Wildlife Area (HMWA), which is managed by the Wisconsin DNR. The HNWR covers 20,976 acres in the northern 2/3 of the marsh, and the HMWA covers 10,928 acres in the southern 1/3 of the marsh, for a combined total of 31,904 acres. The size of the marsh makes it one of the largest freshwater wetlands in the United States. There are 216 species of birds, which use Horicon Marsh, as well as 32 other bird species, which have been reported in the marsh. There is also a wide variety of fish, aquatic animals and mammals, which utilize

the marsh. Due to the extremely large size of the marsh, as well as other factors such as the diversity of flora and fauna and the large populations of waterfowl it supports, Horicon Marsh has been designated as a “Wetland of International Importance” (WDNR, 2010 Water Quality Management Plan Update – Upper Rock River Watershed, May 2010. Corps of Engineers study of Horicon Marsh 2020. Horicon Marsh and Rock River Recovery, corps of Engineers, Feb 17, 2015. Rapid Watershed Assessment Program, Upper Rock River October 2007).

The primary sources of water to the HNWR are the West and South Branches of the Rock River, and the primary source of water to the HMWA is the East Branch Rock River. The most severe problem threatening the marsh is siltation due to soil erosion from the surrounding watersheds, as determined by water quality monitoring conducted by the Rock River Partnership in 1998 and 1999. Historic Wisconsin DNR documents have stated that heavy silt loads, particularly from the East Branch Rock River, contribute too much shallower waters in many of the marsh’s bays and channels. The largest source of sediment to the marsh is soil erosion from agricultural lands. Farming practices such as wetland drainage, fall plowing, farming too close to stream banks, farming on steep slopes, livestock grazing, and stream bank erosion all contribute to the marsh’s siltation problems. The high inflow of nutrients (phosphorus and nitrogen) into Horicon Marsh from surrounding farm fields where manure and other fertilizers are spread is also a serious problem. Nonpoint source pollution needs to be addressed in a comprehensive manner if the problems of the marsh are going to be resolved. Other problems in the marsh are rough fish infestation, invasive plant species infestation, and loss of wildlife habitat (WDNR, 2010 Water Quality Management Plan Update – Upper Rock River Watershed, May 2010).

The fishery of the Horicon Marsh is dominated by rough fish species including common carp and bullhead. Both the federal and state portions of the Horicon Marsh have undergone chemical treatments to remove rough fish populations (common carp and bullhead species) that had contributed to poor water quality and loss of habitat for other fish and wildlife. Due to their shallow depth, fertile water and warm water temperatures, rough fish overpopulation is quite common (WDNR Fisheries Biologist, 2007 and 2021). The most recent chemical treatment occurred in 2000. WDNR has stocked walleye and northern pike into the Horicon Marsh, but the stocking of both has been discontinued due to minimal improvement to the fishery.

(Soil Erosion Conditions) – This watershed currently has an average cropland soil erosion rate of 1.5 ton/acre/year. Approximately 8.8% of all cropland acres are eroding above tolerable (T) levels, and only about 84% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021). The Upper Rock River watershed aligns with RR TMDL sub-basins 2-4. These TMDL sub-basins have an average 19% TSS and 45% TP reduction goal.

### **Milwaukee River Basin – Soil Erosion and Surface Water Quality Conditions**

(Water Quality Conditions) – Less than five (5) square miles comprise the portion of the East-West Branch Milwaukee River Watershed in Dodge County. The primary land use in Dodge County’s portion of this watershed is agriculture, with some scattered residential development. Nutrients and sediment from agricultural runoff and stream modification have affected water quality. This section of the

Milwaukee River has historically been classified as a warm water sport fishery (WDNR Website, East-West Milwaukee River Watershed Detail, 2011).

(Soil Erosion Conditions) – This watershed currently has an average cropland soil erosion rate of 0.6 ton/acre/year. (Note: Only three soil erosion sample points are visited once per year to calculate erosion levels, and therefore calculation results may fluctuate and be somewhat misleading). Less than 5% of all cropland acres are determined to be eroding above tolerable (T) levels, and about 100% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021).

## **Upper Fox River Basin – Soil Erosion and Surface Water Quality Conditions**

### Lower Grand River Watershed

(Water Quality Conditions) – Less than four (4) square miles comprise the portion of the Lower Grand River Watershed located in Dodge County. The watershed is rural in nature, with agriculture being the primary land use (WDNR, 2001). The primary surface water feature is Lake Emily, a 268-acre lake with a maximum depth of 14 feet. Little data exists regarding the water quality of Lake Emily, although it continues to be a popular fishing lake. The lake outlet travels westward and is a tributary to the Lower Grand River.

Lake Emily does not have a specific biological use designation, but is considered as “fishable and swimmable”. Average Secchi disk readings during the months of July and August since 2012 is 2-3 feet. The lake has historically been classified as eutrophic; having problems with degraded fish and wildlife habitat, high levels of submerged aquatic vegetation, high turbidity levels, and seasonal low dissolved oxygen levels (WDNR Website, Lower Grand River Watershed Detail, 2010). From 2004 to 2021, five (5) fish kill investigations were reported on Lake Emily. The Lake Emily Fishing Improvement Club conducts water quality testing and is responsible for the operation of a helixor-type aerator system to protect the fishery by avoiding winterkill. Lake Emily was chemically treated in 1959 to remove an over-abundant carp population that resulted from breaching of the Lake Emily Dam during flooding, allowing common carp to enter the lake via Grand River Creek. The treatment was successful at removing common carp from the lake and the species was not observed in Lake Emily until 2009, after the regional flooding of 2008. The most recent comprehensive fishery survey of Lake Emily, conducted in 2017, showed an over-abundant northern pike population and lower catch rate of bluegill compared to the previous comprehensive survey conducted in 2013. New northern pike and panfish regulations were put in place to address both concerns. All fish species are naturally reproducing in Lake Emily and fish stocking is not required. However, the Lake Emily Fishing Improvement Club has conducted supplemental stocking of yellow perch, largemouth bass, and black crappie in recent years.

Aquatic invasive species documented in Lake Emily include curly-leaf pondweed, Eurasian water-milfoil, phragmites and zebra mussel.

(Soil Erosion Conditions) – This watershed currently has an average annual cropland soil erosion rate of 2.1 ton/acre/year. (Note: Only four soil erosion sample points are visited once per year to calculate

erosion levels, and therefore calculation results may fluctuate and be somewhat misleading). Approximately 75% of all cropland acres are eroding above tolerable (T) levels, and about 33% of all cropland fields maintain 30% or more crop residue cover on the soil surface after spring planting (Dodge County LCD, 2021).

#### Producer Led Groups and Soil and Water Conservation in Dodge County

Dodge County's Producer Led Group "Dodge County Farmers for Healthy Soil, Healthy Water" formed in 2016. Dodge County Land and Water Conservation Department has assisted the farmer group since its inception and became the collaborator for housing their grants in 2018. The mission for this group is "To improve soil and water through conservation practices and education across Dodge County". Members focus on improving soil health and water quality through the use of cover crops, residue management and reduced tillage.

This group has received \$190,580 in grants. Conducted 32 educational events (winter conferences, field demonstrations, and workshops) held on farms throughout different Dodge County watersheds with over 2,800 attendees

The group has provided a Cover Crop Incentive Payment Program for 4 years with over 70 participants. Phosphorus and Sediment savings for 2021 were 1,082 lbs. Phosphorus and 987 T. Sediment. They have participated in some Nitrogen Use Efficiency trials, completed soil health demonstrations and trials, and developed a Pay for Performance Phosphorus Reduction program. Several members have been featured in the National No-Till Magazine. The group was featured in the 2019 DATCP report on Conservation benefits of soil health practices – <https://datcp.wi.gov/Documents2/ConservationBenefitsDodge.pdf> One member received the Wisconsin Conservation Farmer award in 2019.

The Dodge County Farmer for Healthy Soil, Healthy Water group efforts directly support soil conservation and align well with many goals, objectives and actions within the LWRM plan. Accordingly, Dodge County is committed to maintaining support and helping to expand this farmer led effort over the next 10 years.

Website: <https://dodgecountyfarmers.com>

Facebook: <https://facebook.com/DodgeCoFarmersHealthySoilWater/>

## CHAPTER 4

### GROUNDWATER MONITORING PROGRAM

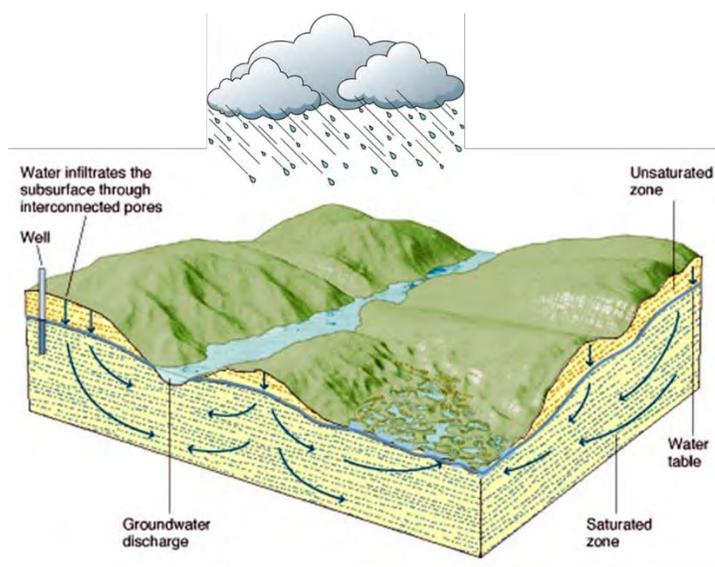
#### Groundwater Basics

Dodge County receives an average of 32 inches of precipitation annually. Almost two-thirds (roughly 20 inches) of this precipitation ends up back in the atmosphere by direct evaporation or by passing through plants in the process of transpiration. The remaining 12 inches either soaks into the ground past the root zone of plants or, may runoff directly into lakes, rivers, streams, or wetlands. The rate at which water soaks into the ground is determined mostly by the uppermost soil layer. Runoff is generated when rain falls (or snow melts) faster than water can infiltrate, or soak into the soil.

Fine-textured soils such as clay do not allow water to infiltrate very quickly. They generate more runoff than coarse-textured soils made up of mostly sand, which allow more infiltration. On average, only about 2 inches of water reaches lakes and rivers as runoff.

The remaining 10 inches of annual precipitation is an estimate of what actually infiltrates past the root zone of plants and ultimately becomes groundwater. The infiltrating water moves downward because of gravity until it reaches the water table, the point at which all the empty spaces between the soil particles or rock are completely filled with water. The water table represents the top of the groundwater resource. Groundwater moves very slowly between particles of sand and gravel or through cracks in rocks. Water-bearing geological units such as sand and gravel are called aquifers.

Groundwater is always moving. (Figure 4-1) It is able to move because the empty spaces within aquifers are interconnected. The size and connectivity of the spaces within an aquifer determine how quickly groundwater moves, how easily it is contaminated, and how much water a well is able to pump.



**Figure 4-1. Groundwater and the water table illustration from Merritts, Menking, & De Wet, Environmental Geology: An Earth Systems Science Approach. 2<sup>nd</sup> Edition. 2014**

Groundwater moves because of differences in energy. Water at any point in an aquifer has energy associated with it, and its movement can be predicted by measuring changes in energy between two locations. More simply, groundwater moves from high energy to low energy. One measurement of energy is groundwater elevation.

Groundwater elevation maps show the height of the top of the groundwater above a common measuring point, which is sea level. Those maps indicate that the water table is not flat; it is oftentimes a more muted version of the actual land surface. From a map of groundwater elevation, groundwater flow direction can be determined.

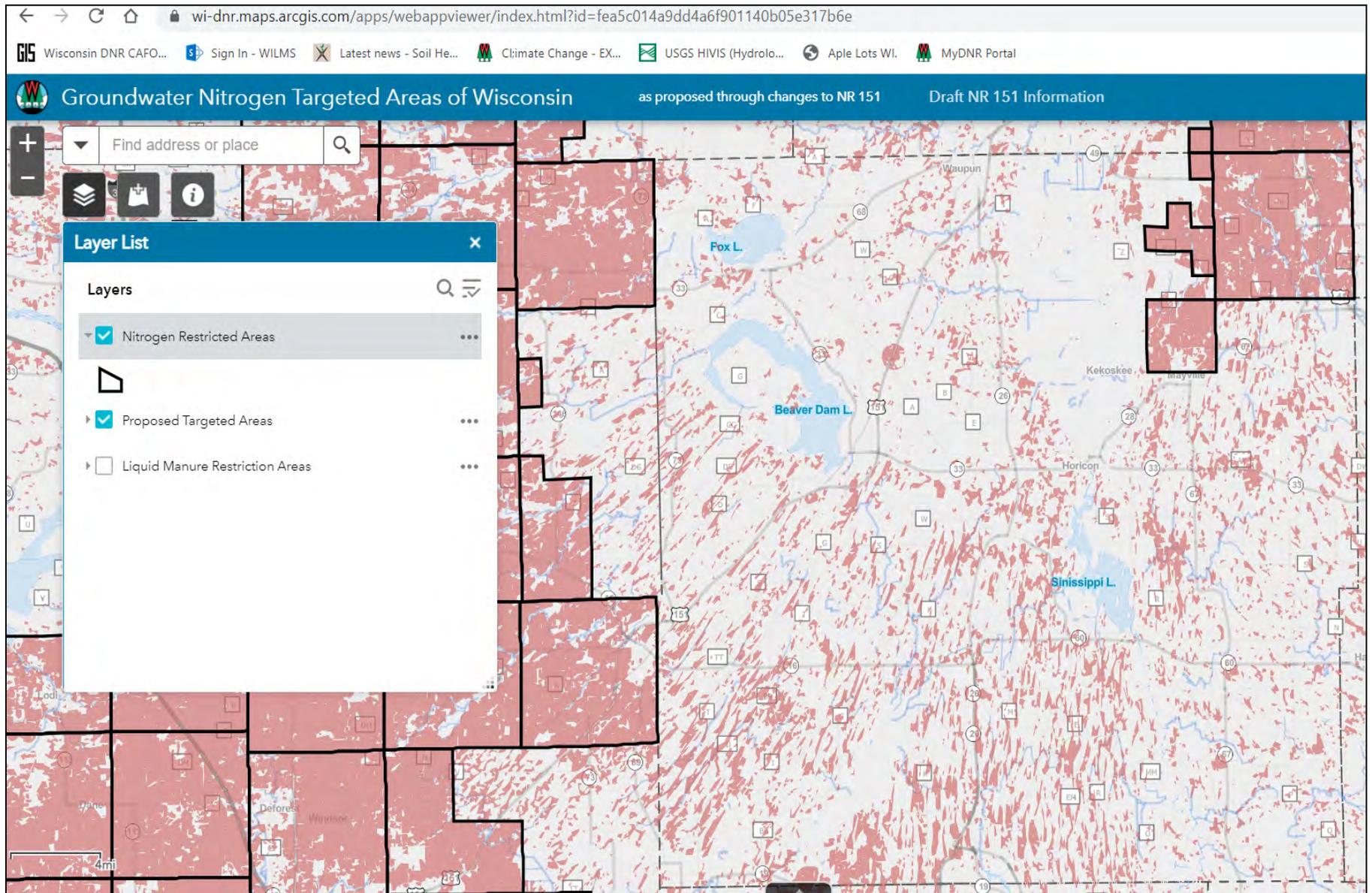
Groundwater generally moves from areas where the water table elevation is higher to areas where it is lower. The water-table elevation map illustrates how groundwater generally moves towards these low spots on the landscape. In Wisconsin, rivers, lakes, and streams are considered groundwater discharge locations and are located at areas where the water table intersects the land surface. Because they are connected, scientists generally consider surface waters and groundwater as a single resource.

### **Groundwater Susceptibility**

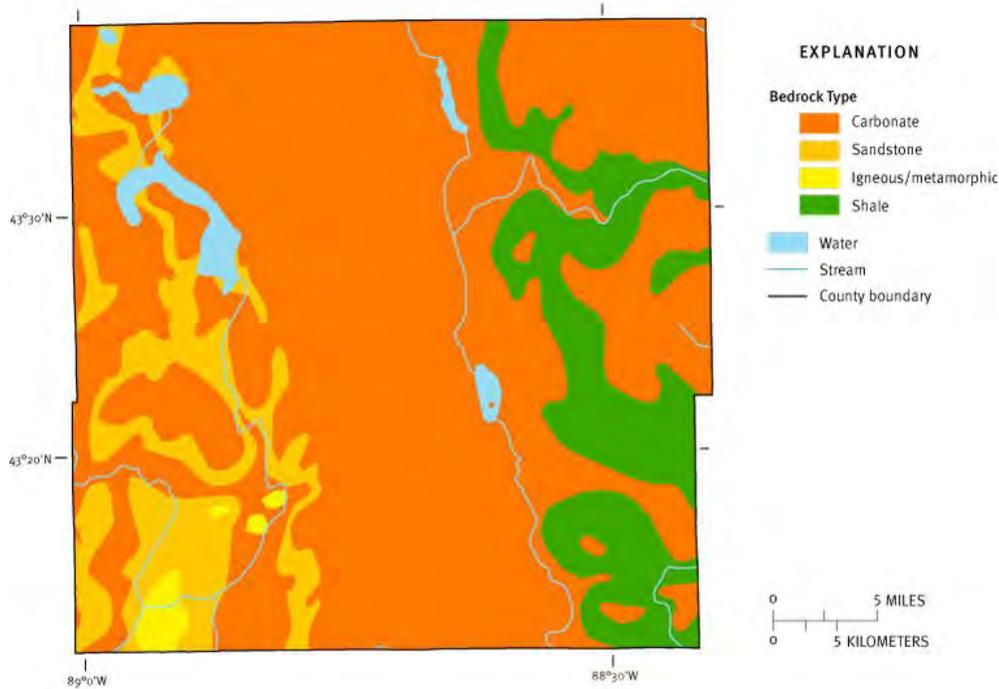
Geology and soils can play a role in determining how susceptible groundwater in an area is to contamination. (Figure 4-3) Areas where the depth to bedrock is shallow (or areas where the bedrock is close to the land surface) often result in less filtering of water before it enters the groundwater aquifer. (Figure 4-4) This is particularly important in areas where the underlying bedrock is fractured carbonate rock or limestone. Soil drainage can also play a role for contaminants such as nitrate that are highly water-soluble. Areas where soil is more well drained tend to be associated with greater potential for leaching of contaminants such as nitrate. (Figure 4-2) shows the Nitrogen Restricted areas in Dodge County. This is another tool to help focus conservation efforts in high nitrate areas.

**Figure 4-2 DNR Groundwater Nitrogen Targeted Areas of Wisconsin – Dodge County**

Source: <https://dnr.wisconsin.gov/topic/nonpoint/nr151nitrate.html>



**Figure 4-3. Uppermost bedrock type of Dodge County.**

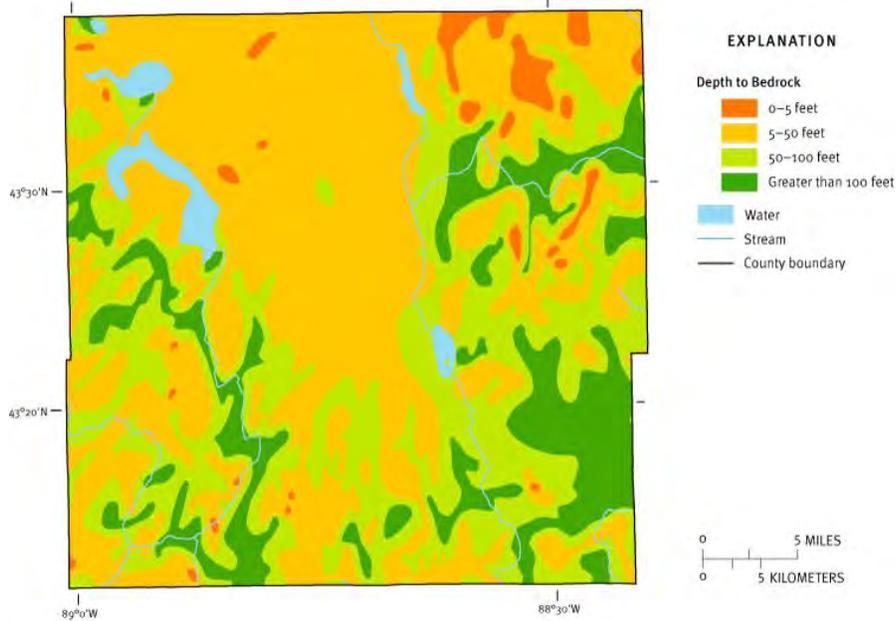


This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, <http://wi.water.usgs.gov/gwcomp/>

**Figure 4-4. Map showing areas where the depth to bedrock is likely to be shallow versus deep.**

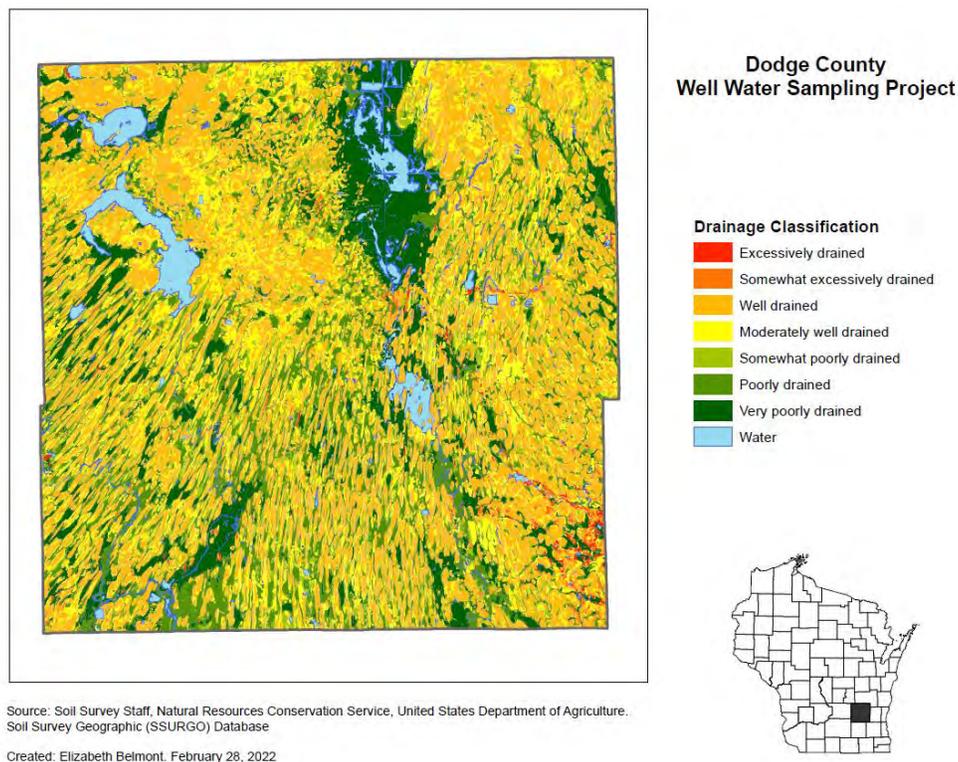


This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, <http://wi.water.usgs.gov/gwcomp/>

**Figure 4-5. Soil drainage plays an important role in determining how quickly water and certain contaminants like nitrate move through the soil.**



### **Groundwater Quality**

Groundwater resources in Dodge County are, for the most part, of good quality but some wells do show elevated levels of nitrate. Agriculture is the primary source of nitrate to groundwater; nitrogen fertilizers, manure, and other bio-solid applications to agricultural fields that is not removed while growing crops can leach to groundwater as nitrate. In other areas, septic system drain fields can also represent a source of nitrate to groundwater.

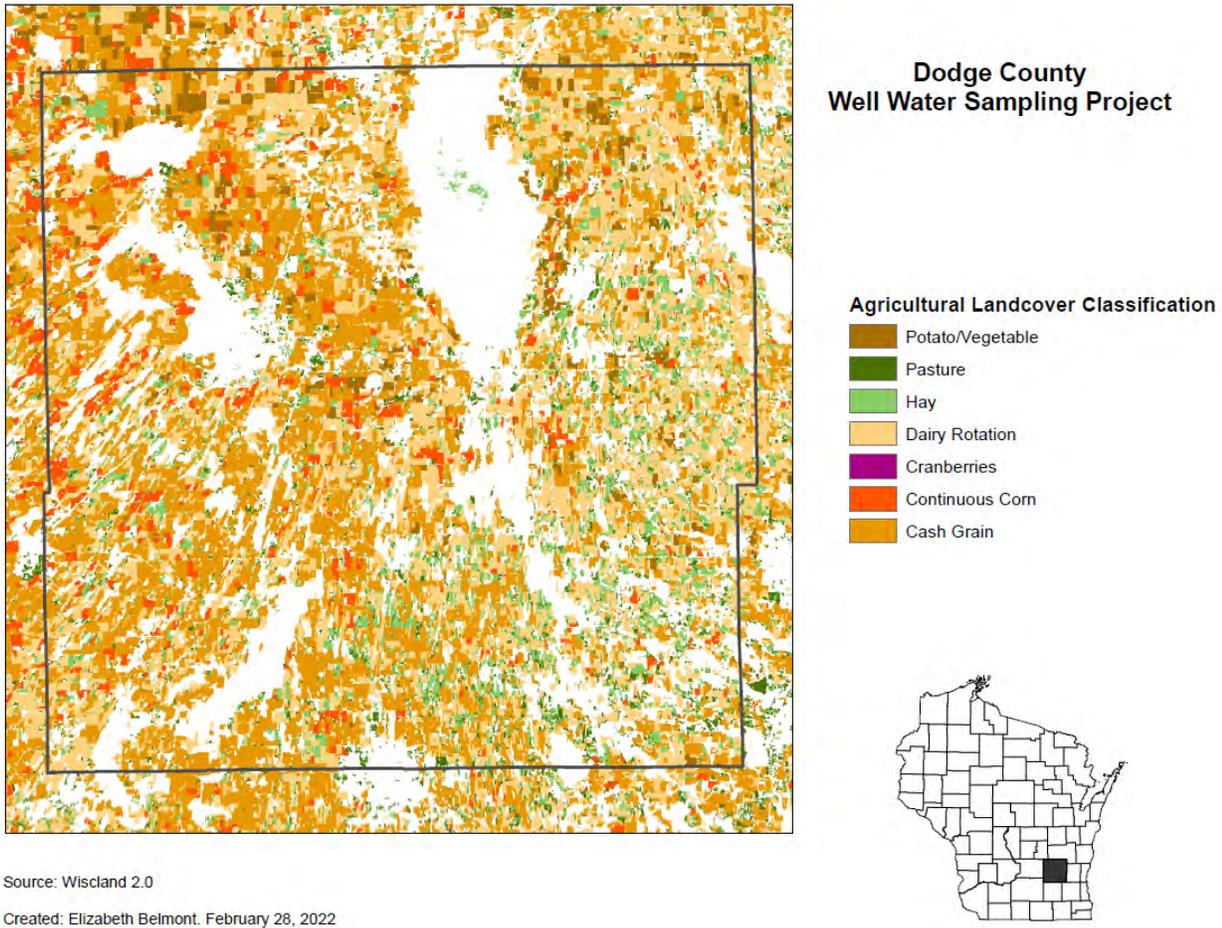
Eight percent of private wells in Dodge County exceed the 10 mg/L nitrate-nitrogen drinking water standard. (Figure 4-6) The extent of nitrate contamination is more noticeable in the towns of Burnett, Lomira, Oak Grove, Trenton and Williamstown (Table 4-1). This is essentially the same as the statewide average of 8.2% reported in a 2017 Wisconsin Department of Agriculture, Trade and Consumer Protection Study (DATCP, 2018). Soil drainage properties (Figure 4-5) combined with agricultural land cover (Figure 4-7) help to explain both the extent and magnitude of nitrate concentrations in Dodge County. Somewhat to very poorly drained soils may limit the amount of nitrate movement to groundwater through a process called denitrification. In these areas, chloride may serve as a better indicator of land-use impacts to groundwater quality.

Figure 4-6. Average nitrate-nitrogen concentration by section for Dodge County and surrounding areas. Sections not colored contain insufficient data to summarize. Source: WI Well Water Viewer. 2020. <https://www.uwsp.edu/cnr-ap/watershed/Pages/WellWaterViewer.aspx>



Approximately 72% of wells tested measured less than 2 mg/L nitrate-nitrogen, which are generally considered background or natural levels of nitrate in groundwater. Even though much of Dodge County is agricultural land, the soils and other geologic factors appear to limit the amount of nitrate from cropland that ends up in groundwater. Drain tile may intercept nitrate and route directly to surface waters rather than groundwater; as a results surface water monitoring is also critical to understanding the fate of nitrogen from the landscape of Dodge County.

Figure 4-7. Agricultural land-use of Dodge County.



### **Nutrient Management Plans**

Dodge County currently tracks 132,286 acres (41% of cropland acres) of nutrient management plans. Most of these acres are through the Farmland Preservation Program. While landowners in Beaver Dam, Lowell, Clyman, Emmet, and Rubicon townships may have nutrient management plans, we do not track them as they are not zoned for Farmland Preservation. We do track those acres covered by CAFO's or those covered under the Manure Storage Ordinance. (See Appendix H)

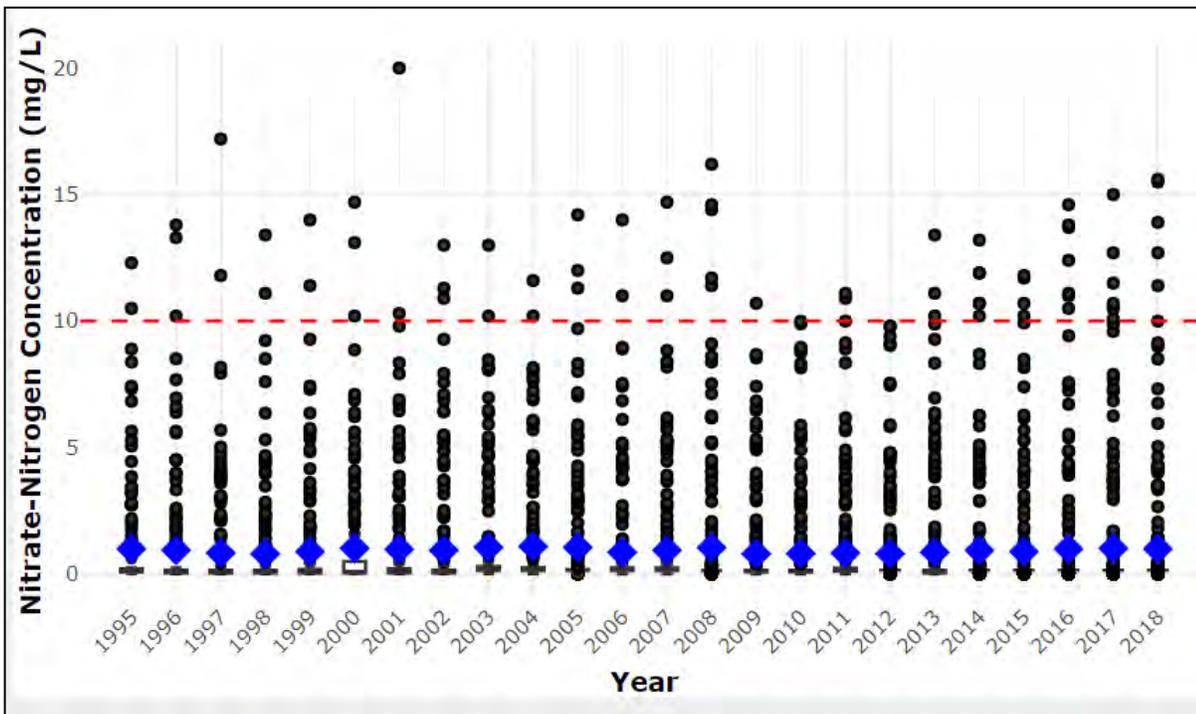
Table 4-1. Summary of nitrate-nitrogen & coliform bacteria data for Dodge County towns. Source: WI Well Water Viewer. 2022. <https://www.uwsp.edu/cnr-ap/watershed/Pages/WellWaterViewer.aspx>

Municipality	n	Minimum	Maximum	Mean	Median	%> 10	Coliform Bacteria		
							n	# Positive	% Positive
T. of Ashippun	268	<0.1	67.9	2.2	<0.1	8	106	15	14
T. of Bever Dam	829	<0.1	25.3	2.7	0.7	5	392	102	26
T. of Burnett	222	<0.1	52	4.3	1	18	152	19	13
T. of Calamus	210	<0.1	14.9	1.1	0.1	2	94	23	24
T. of Chester	115	<0.1	14.2	1.2	<0.1	3	84	13	15
T. of Clyman	177	<0.1	17.5	1.5	0.1	4	87	16	18
T. of Elba	183	<0.1	18.5	1.1	<0.1	2	86	21	24
T. of Emmet	242	<0.1	13.8	1.6	0.3	2	127	20	16
T. of Fox Lake	704	<0.1	24.2	2.3	<0.1	8	538	112	21
T. of Herman	160	<0.1	21.5	2.1	<0.1	9	71	12	17
T. of Hubbard	260	<0.1	20.4	0.8	<0.1	3	170	34	20
T. of Hustisford	162	<0.1	10.1	0.2	<0.1	<1	80	22	28
T. of Lebanon	136	<0.1	14.2	0.4	<0.1	1	76	19	25
T. of Leroy	191	<0.1	23.4	2.7	<0.1	12	135	20	15
T. of Lomira	302	<0.1	24	6.8	7.1	31	203	44	22
T. of Lowell	180	<0.1	32	1.8	0.1	6	75	27	36
T. of Oak Grove	223	<0.1	41.6	2.5	0.1	17	158	27	17
T. of Portland	190	<0.1	18	2.9	0.5	10	66	25	38
T. of Rubicon	256	<0.1	25.3	1.3	<0.1	4	92	24	26
T. of Shields	100	<0.1	24.2	1.7	<0.1	5	39	9	23
T. of Theresa	107	<0.1	20.4	1.6	<0.1	7	57	14	25
T. of Trenton	297	<0.1	36.5	5.1	4.7	16	143	31	22
T. of Westford	288	<0.1	22.5	1.1	<0.1	2	141	31	22
T. of Williamstown	98	<0.1	44	6	<0.1	21	52	9	17
Dodge County	6059	<0.01	67.9	2.4	0.1	8	3350	719	21
Statewide Avg						9 <sup>1</sup>			15-25% <sup>1</sup>

## Nitrate Trends

Public water supply wells are required to be tested for nitrate on a regular basis. These results are reported to the WI Department of Natural Resources and serve as a valuable long-term dataset of nitrate water quality. (Figure 4-8) These historical records can be used to assess how groundwater quality is changing in various location across Dodge County. Since 1995, the overall nitrate-nitrogen average of public water supply systems has remained fairly stable.

**Figure 4-8. Average nitrate-nitrogen concentration for all public water systems in Dodge County by year. Data Source: WI DNR Groundwater Retrieval Network.**

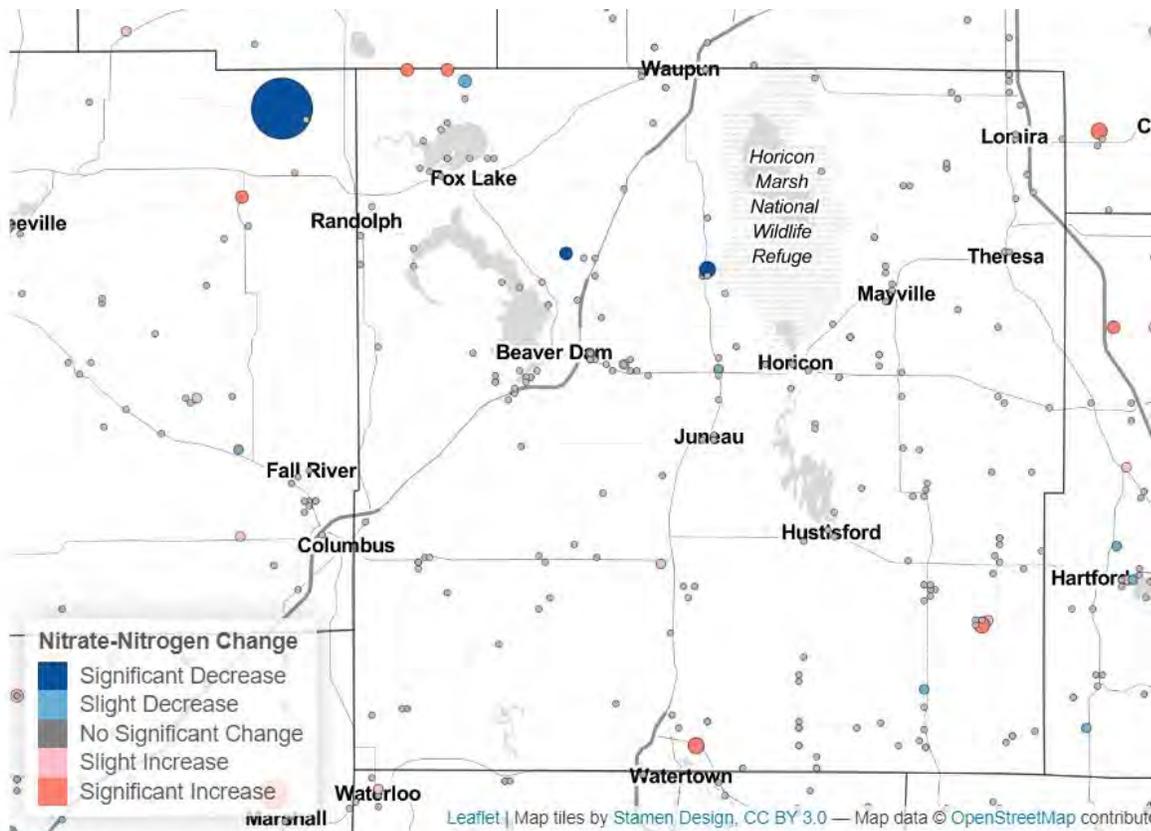


When looking at all public wells with more than 6 years of data, the majority of Dodge County public wells show no significant change. (Table 4-2 and Figure 4-9) While seven wells suggest increasing nitrate concentrations, six wells show evidence of improvements or reductions in nitrate concentrations over time. Additional information on these wells can be found by visiting: [https://shiny.theopenwaterlog.com/nitrate\\_trends/](https://shiny.theopenwaterlog.com/nitrate_trends/). Using current and future well testing data, and nutrient management plan data, we can prioritize our work efforts in the county.

**Table 4-2. Summary of public supply well data for all wells in Dodge County with more than 6 years of testing data and a sample submitted within the past 3 years.**

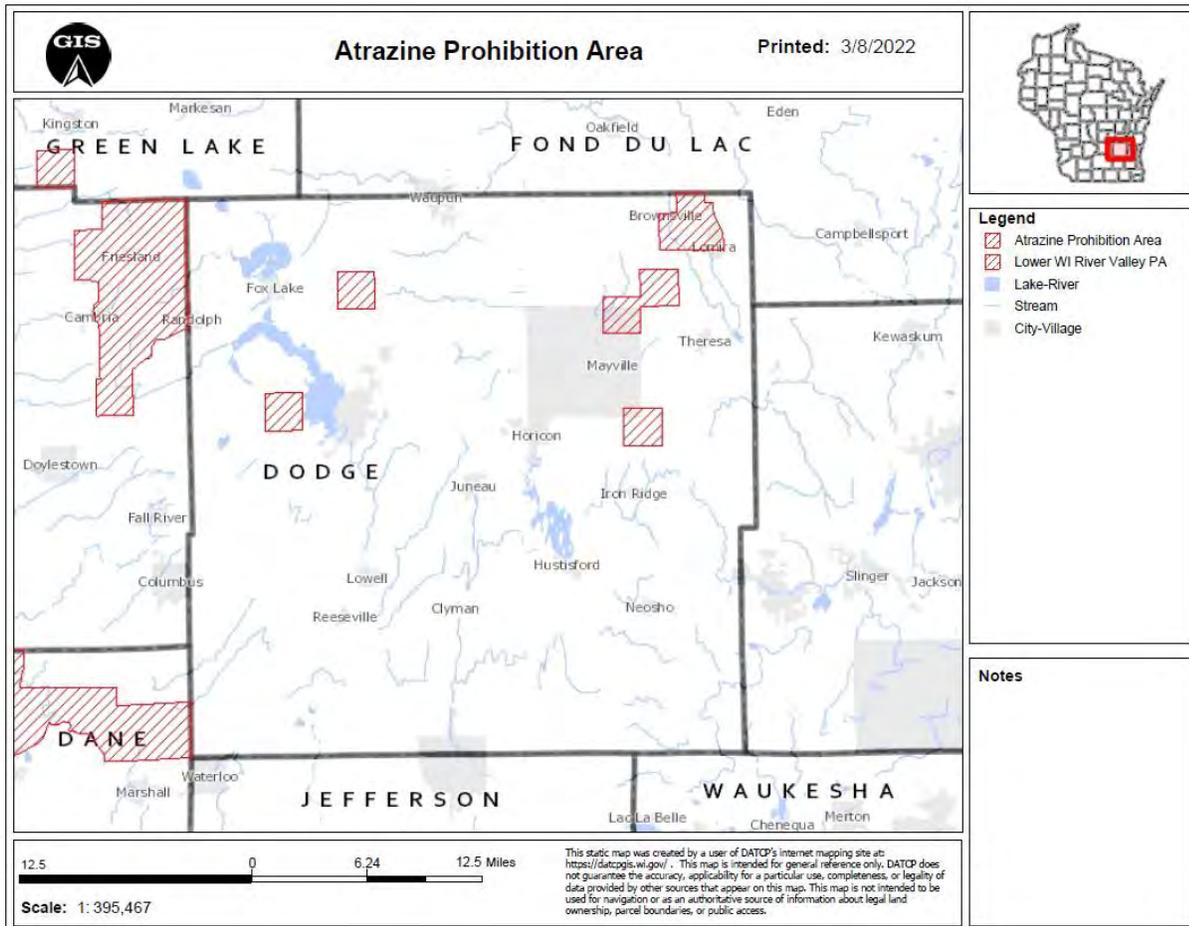
Nitrate Trend	Number of Wells
Significant Increase (p-value <0.05 and rate of change > 0.025)	3
Slight Increase (p-value <0.05 and 0.01 > rate of change < 0.025)	4
No Significant Change (p-value > 0.05 or rate of change < 0.01)	213
Slight Decrease (p-value <0.05 and (-)0.01 > rate of change < (-)0.025)	4
Significant Decrease (p-value <0.05 and rate of change < (-)0.025)	2

**Figure 4-9. Map showing general location of public water supply wells. Color indicates whether there is a significant change and if so, the magnitude and direction of the change. Most wells in Dodge County do not show a significant trend. Source: Nitrate in Wisconsin Public Water Systems. 2020.**



## Atrazine

Some wells in the county have tested above the state standard for atrazine levels of 3ppb. (Figure 4-10) To help reduce the levels of atrazine in groundwater, Atrazine Prohibition Areas are identified in the county. This means in these areas no atrazine may be applied to the land. Dodge County has five Atrazine Prohibition Areas. For more detailed maps of the prohibition areas, see the Dodge County Land and Water Conservation Department or Chapter ATCP 30 of the Wisconsin Administrative Code.



**Figure 4-10. Map of atrazine prohibition areas. Source: WI Department of Agriculture, Trade and Consumer Protection. 2022 [https://datcp.wi.gov/Pages/Programs\\_Services/Atrazine.aspx](https://datcp.wi.gov/Pages/Programs_Services/Atrazine.aspx)**

## General Groundwater Quality

Dodge County's groundwater can generally be characterized as slightly basic (mean pH = 7.82), hard water (mean total hardness = 396 mg/L as CaCO<sub>3</sub>), and high alkalinity (mean = 323 mg/L as CaCO<sub>3</sub>). Iron and manganese are often observed at levels known to impact appearance and taste. (Figure 4-9) Naturally occurring sulfate found east of the Horicon Marsh may also impact smell and taste of water, particularly under low oxygen conditions where sulfate can be converted into hydrogen sulfide.

The aesthetic characteristics of the water are largely influenced by the geologic materials groundwater is stored and transported in. Water with total hardness concentrations and alkalinity greater than 200

mg/L as CaCO<sub>3</sub> is likely to cause aesthetic problems, mainly scale formation. As a result, water softeners are expected to be commonplace for most households in the county. Chloride provides additional insight into the effects of land-use on water quality; background levels of chloride in groundwater are typically less than 10 mg/L. The mean in Dodge County is 25.9 mg/L; 73% of wells show levels greater than 10 mg/L suggesting land-use impacts. Elevated chloride concentrations are likely results of agricultural activity (mainly potash fertilizers) and development density (i.e. roads and septic systems). Concentrations of chloride greater than 250 mg/L may give water a salty taste; these high concentrations of chloride often occur near major roadways or impervious areas where runoff from winter deicing activities are concentrated.

**Table 4-3. Dodge County well water quality summary for other parameters. Source: WI Well Water Viewer. 2022. <https://www.uwsp.edu/cnr-ap/watershed/Pages/WellWaterViewer.aspx>**

Parameter (units)	Number of Samples	Minimum	Maximum	Mean	Median	Exceed Health Standard
Alkalinity	3,849	No Detect	657	323	324	NA
Arsenic (ppb)	1,368	No Detect	1510	6	No Detect	8%
Atrazine (ppb)	1,221	No Detect	10.6	0.2	No Detect	ND
Chloride (mg/L)	3,855	No Detect	1135	40.3	25.9	NA
Conductivity (umhos/cm)	3,848	16	6140	799	754	NA
Iron (mg/L)	632	No Detect	22.6	0.7	No Detect	NA
Manganese (ppb)	949	No Detect	612	19	5	<1%
pH (std units)	3,849	5.36	8.82	7.82	7.87	NA
Sulfate (mg/L)	826	No Detect	2445	86.4	44.2	NA
Total Hardness	3,451	10	1652	396	392	NA

NA Not Applicable – No health based groundwater standard

ND Not able to be determined from the dataset

## **CHAPTER 5**

### **RESOURCE CONCERNS, GOALS AND OBJECTIVES**

The process of updating Dodge County's Land & Water Resource Management Plan began with a series of meetings with a ten member Citizens Advisory Committee (CAC). The purpose of these meetings was to identify, prioritize, and discuss possible solutions to the most important land and water resource issues and concerns. The following is a grouped summary of the prioritized resource issues identified by the CAC:

1. Groundwater Protection

- Protection from chemical contamination
- Contaminant source identification (location and type)
- Protection from bacterial contamination
- Monitoring of groundwater quality

2. Soil Erosion / Sediment Delivery

- Sediment delivery from cropland to surface waters
- Sediment delivery from construction sites, municipalities, and residential
- Soil Erosion
- Nonpoint runoff pollution
- More conservation practice implementation on farms
- Shore land, streambank, wetland protection and erosion control
- Sediment deposition and removal from waterways
- Stormwater management to reduce incident of localized flooding

3. Farm Drainage / Wetland Management

- Increased tiling threatening surface water quality
- Need for vegetative buffers/cover crops to keep runoff out of drainage ditches
- High nitrates in tile water discharges

4. Nutrient Management

- Improper spreading of liquid manure
- Land spreading of industrial wastes
- More applicable follow up is needed on land spreading of manure
- Lack of nutrient management plans for non-permitted farms
- Effective education of the state phosphorus-free lawn fertilizer law
- Improper residential application of herbicides and pesticides and yard waste management

5. Wildlife Management Control

- Crop damage caused by Sand Hill Cranes
- Loss of shoreline vegetation and soil from nesting Double-Crested Cormorants
- Fecal contamination of recreational waters by resident Canada Geese
- Excess carp production

- Restore upland and wetland habitat
  - Protect surface water resources and habitat quality through implementation of conservation practices; buffers, diversions, stream bank protection, etc.
  - Individual programs proposed for each Lake should be identified
6. Conservation Education of Agricultural Producers
- Education needed about nutrient management practices
  - Education needed about cropping, tillage practices, and cover cropping
  - Buildup of crop residues from new corn hybrids making no-till planting a challenge
  - Carbon crediting and other incentive programs
7. Conservation Education of the General Public
- Education needed about polluted runoff from applied lawn fertilizer
  - More dialogue needed between agriculture interests and lake interests
  - General public apathy about land & water conservation issues
  - Education of storm water and yard runoff, rain gardens etc.
  - Causes of and hazards to people and pets from Blue Green Algae
  - General public education regarding role of Agriculture in Dodge County
8. Loss of Farm Land
- More regulations over solar farms
  - Urban development and Ag Land Tradeoffs
9. Encourage Environmentally Desirable Types of Land Use Conversion
- Restore marginally productive cropland to their original wetland uses
  - Restore marginally productive cropland to their original woodland uses
  - Restore marginally productive cropland to their original grassland uses
  - Strategic acquisition or restoration of land next to water
10. Miscellaneous Resource Issues
- Rules regarding erosion and runoff not strong enough
  - Global markets are driving more intensive farming practices which threaten land & water resources
  - Land being removed and/or not being re-enrolled in the Conservation Reserve Program (CRP and/or CREP)
  - Terrestrial and aquatic invasive plant and animal species
  - Use of phosphorus lawn fertilizer causing nonpoint pollution
  - Lack of funding for technical assistance and cost sharing
  - Lack of funding for new agricultural conservation equipment
  - Increased frequency of large weather events
  - Increasing number of large concentrated animal feeding operations
  - Increasing impervious areas
  - Consider ways to remove legacy phosphorous in our lakes and streams

- Modifications to shorelines
- Provide grant writing education
- Education of conservation needs to Legislatures, state and county agencies

Having determined what are the most critical land and water resource management issues in Dodge County, the CAC met again to consider possible ways to begin resolving these issues. Eight major goals were established to address the top nine issues identified, and from one to five objectives were then established for each goal. The next section outlines these goals and objectives.

## **GOAL AND OBJECTIVES**

Following is a listing of goals and objectives established to address the top nine land and water resource issues identified. A more detailed five-year work plan is in Appendix G.

### Goal 1: Protect and Improve the Quality of Dodge County's Ground Water Resources

[Objectives]

1. Protect/seal direct conduits to ground water to prevent contaminants from reaching groundwater reservoirs.
2. Promote farmer adoption and implementation of 16,500 new acres of nutrient management plans, 5,000 new acres of cover crops and 3,000 new acres of reduced tillage annually.
3. Pursue regulations that are more appropriate of land spreading of commercial and industrial wastes.
4. Use Lidar and other spatial data for identifying potential conduits to ground water.
5. To better track the location of manure spreading in groundwater sensitive areas.

### Goal 2: Protect and Improve the Quality of Dodge County's Soil Resources and Surface Water Resources

[Objectives]

1. Install conservation practices that reduce cropland soil erosion by 5,000 tons per year, 500 tons sediment delivery to surface waters per year, and 5,000 pounds phosphorous delivery to surface waters per year.
2. Install agricultural practices that help farmers and other rural landowners comply with the NR151 Nonpoint Runoff Rules.
3. Install conservation practices along shorelines and creek banks to improve bank stabilization and restore natural hydrology to the greatest extent possible

### Goal 3: Protect Dodge County Land & Water Resources from Adverse Impacts Caused by Cropland Drainage and Wetland Alterations

[Objectives]

1. Install conservation practices on 16,500 new acres per year that reduces or eliminates the percolation of bacteria, nutrients and other chemicals through cropland soils and into subsurface drain tile.

2. Install conservation practices on 5 new miles per year that protect drainage ditches or other surface waters from polluted cropland runoff.
3. Install wetland/wildlife habitat practices that restore prior converted wetlands.

Goal 4: Protect Dodge County Agricultural Interests from Wildlife Crop Damage

[Objectives]

1. Help Dodge County farmers to obtain services available under the Wildlife Damage Abatement and Claims Program (WDACP).

Goal 5: Increase Farmer and Rural Landowner Awareness and Knowledge of Land and Water Resource Issues in Dodge County

[Objectives]

1. Provide a wide variety of educational opportunities to farmers and other rural landowners to increase their understanding and knowledge of the resource issues that may exist on their land, and to help them use their land to its fullest potential without degrading land and water resources.

Goal 6: Increase General Public Awareness and Knowledge of Land & Water Resource Issues in Dodge County

[Objectives]

1. Perform educational activities directed at the general public and legislators to increase their understanding and knowledge of land and water resource issues currently impacting Dodge County.

Goal 7: Encourage Environmentally Desirable Types of Land Use Conversions

[Objectives]

1. Restore 100 new acres per year of low return-on-investment cropland to their original wetland uses.
2. Restore 100 new acres per year of low return-on-investment cropland to their original woodland uses.
3. Restore 200 new acres per year of low return-on-investment cropland to their original grassland uses.
4. Strategic acquisition or restoration of land next to water
5. Connect landowners with technical experts and funding sources for conversion of marginal cropland to perennial vegetation.

Goal 8: Resource Enhancement through Collaboration

[Objectives]

1. Intra County Department collaboration. Coordinate with County Highway and Emergency Management hydrologic impact to watershed and infrastructure with revised DOT storm water runoff guidelines.
2. Periodic County intra department review for projects, which affect environmental conditions and may be improved as part of the project.
3. At least twice a year meet with Lake Districts and Associations to share new practices and Lake plans.

4. The WI. DNR has significant acreage within Dodge County. These properties have been overlooked as a resource for conservation enhancements. The properties should be optimized to develop integrated programs, which improve watershed practices with property managers identifying long-range plans and routine upkeep.

## CHAPTER 6

### NR 151 AGRICULTURAL PERFORMANCE STANDARDS

#### NR 151 Nonpoint Runoff Rules

On October 1, 2002, Administrative Rule NR 151 went into effect, establishing minimum statewide nonpoint runoff prohibitions and performance standards designed to protect Wisconsin's surface and groundwater resources. Revisions that inserted additional performance standards into NR 151 went into effect on 2012 and 2018. Landowners are encouraged to voluntarily implement conservation practices that comply with Wisconsin's nonpoint runoff rules. The NR 151 Prohibitions and Performance Standards are listed below:

- NR 151.02 Sheet, Rill and Wind Erosion
- 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.
- NR 151.04 Phosphorus Index
- NR 151.05 Manure Storage Facilities
- NR 151.055 Process Wastewater Handling
- NR 151.06 Clean Water Diversions
- NR 151.07 Nutrient Management
- NR 151.075 Silurian Bedrock Performance Standards
- NR 151.08 Manure Management Prohibitions
  1. A livestock operation shall have no overflow of manure storage facilities.
  2. A livestock operation shall have no unconfined manure pile in a water quality management area.
  3. A livestock operation shall have no direct runoff from a feedlot or stored manure into the waters of the state.
  4. A livestock operation may not allow unlimited access by livestock to the waters of the state in a location where high concentrations of animals prevent the maintenance of adequate sod cover or self-sustaining vegetative cover.

For a more detailed description of the prohibitions and performance standards, visit the following web site: [https://docs.legis.wisconsin.gov/code/admin\\_code/nr/100/151](https://docs.legis.wisconsin.gov/code/admin_code/nr/100/151)

#### Local Implementation Strategy

The Dodge County Land and Water Conservation Committee intends to work cooperatively with local Wisconsin DNR and other agency staff to implement the NR 151 runoff rules in Dodge County. Following is a description of the activities that the Dodge County Land and Water Conservation Department proposes to undertake in this joint effort with the state. Actual work activity type and work accomplishments will be highly dependent on the availability of adequate financial and human resources for conservation practice installation and for local technical staff.

### Information and Education

The Dodge County Land and Water Conservation Department feels it is most effective using one-on-one landowner contacts to educate and implement the NR 151 nonpoint runoff rules. Information and educational material prepared by the DNR, Land and Water Conservation Department, and other agencies will be distributed via news articles/letters, social media, public meetings, field events, workshops, and one-on-one contacts.

### Priority Farm Identification

There are approximately 1,749 farms in Dodge County, (US Ag. Census 2017) 610 farms are currently in compliance with NR 151 nonpoint runoff rules through Farmland Preservation and the Manure Storage Ordinance. We will continue to work with other farms in Dodge County using the following strategy:

- First Priority: Farms where a valid complaint has been received, and a NR 151 violation has been investigated and confirmed, for one or more of the nonpoint prohibitions or performance standards. Farms being assessed for meeting our Manure Storage Ordinance needing Nutrient Management plans.
- Second Priority: Farms applying for new Farmland Preservation Program Ag Enterprise Agreements or farms enrolling for the first time into the Farmland Preservation Program under farmland preservation zoning.
- Third Priority: Existing farmland preservation zoning participants enrolling new land into the Farmland Preservation Program.
- Fourth Priority: Farms located in priority watershed areas (i.e. impaired waters including but not limited to the Wildcat Creek, and Sinissippi Lake-Rock River Watersheds) where 9-Key Element plans have been approved by the DNR and EPA.
- Fifth Priority: All other farms not included above, as time and resources permit.

### One-on-One Farm Contacts

#### (Complaints)

Dodge County Land and Water Conservation Department staff have historically accompanied and assisted DNR staff on investigations of complaints regarding NR 243 and NR 151 violations. The Dodge County and Water Land Conservation Committee intends to continue providing that assistance by Land and Water Conservation Department staff. The determination as to whether a site is compliant with state runoff rules will be made by the DNR and LWCD staff. The DNR and LWCD will generate and issue the various compliance letters associated with these farm contacts. Given adequate financial and human resources, it will continue to be the county's responsibility to provide technical planning, design and construction inspection services to correct non-compliant sites. The county, with the assistance of DNR staff, will also attempt to secure financial resources needed to make an official offer of cost sharing in order to correct non-compliant sites.

(Newly Enrolled Farmland Preservation Program Lands)

Dodge County Land and Water Conservation Department staff will continue to evaluate land that is proposed for new enrollment in the Farmland Preservation Program under farmland preservation zoning, for compliance with NR 151 nonpoint runoff rules. Owners of land proposed for enrollment under an Ag Enterprise agreement will be contacted to make them aware of the conservation compliance requirements of the program, and to offer the services of Land and Water Conservation Department staff to assist them in achieving full compliance with the conservation standards prior to signing the long-term agreement. If landowners do request assistance, Land and Water Conservation Department staff will evaluate their compliance status, and help them become compliant in any areas where they are determined to be not yet compliant. Owners of land proposed for enrollment under zoning will be assisted on a first-come, first-served basis. Dodge County Land and Water Conservation Department staff and DNR staff will discuss and monitor landowner compliance with the NR 151 runoff rules under the program.

(Priority/Impaired Waters Watersheds)

As special project funding becomes available, and/or as staff resources allow, Dodge County Land and Water Conservation Department staff will systematically contact and evaluate other farms located in priority/impaired waters watersheds. The intent would be to work with farmers located in either the Wildcat Creek, or Sinissippi Lake-Rock River Watersheds first. Dodge County Land and Water Conservation Department staff will make the initial determination on compliance status for these farms, but will seek DNR confirmation if needed.

### **Documentation of NR 151 Evaluations and Landowner Notifications**

(Complaints)

It is intended that Wisconsin DNR staff will be responsible for documentation and recording of compliance determinations on all NR 151 runoff rule complaints investigated. DNR staff will also be responsible for generating and issuing the various landowner notification letters of compliance or non-compliance. Dodge County Land and Water Conservation Department staff will record and track landowner/parcel compliance after it has been determined that specific land parcels have been found to be in compliance, or have been brought into compliance, with NR 151 runoff rules.

(Farmland Preservation Program Evaluations and Landowner Evaluations)

Dodge County Land and Water Conservation Department staff will be responsible for documentation and recording of compliance determinations related to participants in the Farmland Preservation Program. A single sheet form has been developed and used to serve as the method of documenting evaluation findings, as well as serving as the means of notifying a program participant of the status of their compliance with NR 151 runoff rules. A “continuing compliance” cover letter will continue to be used when mailing out the landowner copy of the conservation plan to further notify/remind participants of their need to maintain compliance with NR 151 runoff rules.

(Priority/Impaired Waters Watersheds)

Dodge County Land and Water Conservation Department staff will use a modified version of the Farmland Preservation Program evaluation and notification form as we would begin contacting and evaluating other county farms located in priority/impaired waters watersheds. Dodge County Land and Water Conservation Department staff will be responsible for documentation, recording, notifying, and tracking of landowner/parcel compliance after it has been determined that specific land parcels have been found to be in compliance, or have been brought into compliance, with NR 151 runoff rules.

#### Enforcement Actions

If a Farmland Preservation Program participant fails to comply with NR 151 runoff rules as directed and within the allotted time frame, the Dodge County Land and Water Conservation Department will initiate action to issue a Notice of Noncompliance for the Farmland Preservation Program. Dodge County Land and Water Conservation Department staff will work with local DNR staff in undertaking enforcement action associated with NR 151.09 or NR 151.095 for any landowners who need to correct one or more NR 151 non-compliance issues on their land but who also refuse to do so voluntarily.

#### Appeals

Landowners wishing to appeal a non-compliance determination or decision by the Dodge County Land and Water Conservation Department may file a written appeal of the determination or decision with the Dodge County Land and Water Conservation Department. The appeal will be presented to the Land and Water Conservation Committee and a hearing on the appeal shall be held within 60 days of the date of the written appeal. Landowners wishing to appeal a non-compliance determination or decision made by the Wisconsin DNR will be directed to contact the DNR.

#### Other Local Regulations

Dodge County currently administers local regulations that address several of the Nonpoint Runoff Rules specified within NR 151. The Dodge County Land Use Code, which is administered primarily by the Dodge County Land Resources and Parks Department, requires the preparation, submittal, review and approval of construction site erosion control and storm water management plans on commercial and residential development projects in Dodge County. Staff of the Dodge County Land and Water Conservation Department assists in reviewing and reporting on the adequacy of submitted plans.

The Dodge County Land and Water Conservation Department has been administering the Dodge County Manure Storage and Nutrient Utilization Ordinance since 1997. This ordinance was amended in May 2007 to include requirements calling for the preparation and annual updating of a nutrient management plan for manure stored in all storage facilities permitted under the amended ordinance, and requiring the proper closure of idled/unused manure storage facilities.

#### **Coordination with other agencies and programs**

Coordination and cooperation across agency lines, using various federal, state and local conservation programs, will be necessary to achieve the goals and objectives proposed in this plan. Dodge County Land and Water Conservation Department intends to utilize all of the following programs, as

appropriate, to assist county landowners in meeting the conservation needs on their land, and in meeting the goals and objectives of our plan.

### Federal Programs

1. Environmental Quality Incentives Program (EQIP) – Provides financial and technical assistance to agricultural producers and non-industrial forest managers to address natural resource concerns and deliver environmental benefits. This program is administered by the USDA-Natural Resources Conservation Service (NRCS).
2. Conservation Reserve Program (CRP) – Is a land conservation program that provides annual rental payments to landowners who agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality for 10-15 years. The USDA-Farm Services Agency (FSA) administers this program, with technical assistance provided by USDA-NRCS.
3. Conservation Reserve Enhancement Program (CREP) – Provides annual rental payments to landowners to install conservation buffers, grass waterways, and wetland restorations on riparian cropland under 15 year agreements or perpetual easements. USDA-FSA, Dodge County LCD, and the Wisconsin DATCP jointly administer this program, with technical assistance provided by USDA-NRCS.
4. 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.
5. Wetland Reserve Program (WRP) – Provides technical and financial assistance to property owners for the restoration and protections of wetlands. This program is administered by the USDA-NRCS.
6. Conservation Stewardship Program (CSP) – Provides incentive payments to landowners currently using land and water conservation practices in their farming operations, and encourages the use of additional conservation farming practices. This program is administered by the USDA-NRCS.
7. US Fish & Wildlife Service (USF&W) Program – Provides technical and financial assistance with restoring wetlands and improving fish and wildlife habitat on private lands. The U.S. Fish and Wildlife Service administer this program.
8. Planning Assistance to States, Section 22 Program, U.S. Army Corps of Engineers – Provides planning assistance to aid in the proper utilization and conservation of water and related land resources.

9. Mississippi River Basin Initiative (MRBI) – Provides expanded conservation practice cost-share funding through USDA-NRCS under a cooperative federal, state and local nonpoint source pollution control watershed project.

### State Programs

1. Soil and Water Resource Management Program (SWRM) – Provides cost share assistance and staffing grants to county Land and Water Conservation departments to implement their Land and Water Resource Management Plans. The Wisconsin DATCP funds this program.
2. Nonpoint Runoff Rules (NR 151) – Establishes statewide runoff rules and performance standards that are designed to achieve water quality standards to protect Wisconsin's surface and groundwater.
3. Targeted Resource Management Program (TRM) – Offers competitive grants for local governments to provide cost share assistance to landowners who install conservation practices to address nonpoint runoff pollution problems on targeted farms or in targeted areas. The Wisconsin DNR funds this program.
4. Wisconsin Farmland Preservation Program (FPP) – Provides property tax relief as an incentive to maintain farmland in agricultural use. Compliance with state soil and water conservation standards is required. Dodge County Land and Water Conservation Department is responsible for helping program participants achieve compliance with state conservation standards, and to monitor the on-going status of program participant conservation compliance.
5. Managed Forest Law (MFL) – Is a landowner incentive program that encourages sustainable forestry on private woodland. In exchange for following sound forest management, the landowner pays reduced property taxes.
6. Wisconsin Department of Health Services (DHS) – Provides environmental health resources and assistance to address human health and safety concerns related to shore land and wetland areas that are threatened by fecal or other contaminants caused by human or wildlife activities.

### County and Local Programs

1. Dodge County Manure Storage and Nutrient Utilization Ordinance – Regulates the location, design, construction and operation of manure storage facilities, as well as the proper application of manure stored in permitted facilities. Administered by the Dodge County Land and Water Conservation Department, and can be viewed on-line at [[www.co.dodge.wi.us](http://www.co.dodge.wi.us)], or a copy obtained for review purposes by contacting the Dodge County Land Conservation Department.

2. Construction Site Erosion Control, Storm ater Management, and Livestock Siting – Requires the submission and county review of construction site erosion control and storm water management plans for residential and commercial development projects disturbing 2,000 square feet or more of land, and/or adding 20,000 square feet or more impervious surface. These regulations are administered by Dodge County Land Resources and Parks Department, with plan review services provided by Dodge County Land and Water Conservation Department and are intended to regulate land disturbing activities associated with a major subdivision, minor land division, or a condominium development project. In addition, these regulations are intended to regulate land disturbing activities within those towns which have adopted the County Land Use Code and on those lands within the unincorporated areas of the County within 1000 feet of a navigable lake, pond or flowage and within 300 feet of a navigable river or stream or to the landward side of the floodplain. These ordinance provisions can be viewed by contacting the Dodge County Land Resources and Parks Department, or by visiting the Land Resources and Parks Department website at [Ordinances and Zoning Maps | Dodge County, WI](#) The County site erosion and stormwater management provisions of the Ordinance can be found in Chapter 7 of the Land Use Code.
3. Tree Sales Program – Provides for the sale and distribution of small bundles of trees (10-25 trees per bundle). Administered by the Dodge County Land and Water Conservation Department.
4. Reforestation Program – Provides tree planting machines and planting bars to those planting large quantities of trees for reforestation purposes. Administered jointly by the Dodge County Land and Water Conservation Department and the Wisconsin DNR Forester assigned to Dodge County.
5. Dodge County Human Services – Public Health – Provides assistance in water quality monitoring of surface water and ground water, and in providing environmental health programs to Dodge County residents.
6. Dodge County Land Resources and Parks Department – Provides for the administration and enforcement of state and county shore land and wetland protection regulations and livestock siting.
7. Municipalities, lake districts and sanitary districts – Undertake various responsibilities and initiatives that address land and water resource issues that are impacting their specific areas of jurisdiction.

#### Private Conservation Organizations

1. Pheasants Forever – Provide technical and financial assistance with establishment and improvement of grass-based conservation practices to provide healthy soil, clean air and water, and wildlife habitat.

2. Wings Over Wisconsin – Provide technical and financial assistance with wetland restorations and nesting cover establishment.
3. Ducks Unlimited – Provide technical and financial assistance with wetland restorations and establishment of nesting cover.
4. Rock River Coalition – Provides educational, financial and administrative support to individuals, local, state and federal units of government in the protection of land and water resources within the Rock River Basin. The Rock River Coalition also coordinates a citizen water quality-monitoring program within the Rock River Basin.
5. Lake Associations – Perform lake planning and water quality monitoring activities on Dodge County lakes, and provide support for land and water conservation activities of local, county, state, and federal government agencies.
6. Land Trusts and Land Conservancies – Facilitate the purchase of various conservation easements to protect environmentally sensitive and/or geographically unique lands from undesirable land use conversions.
7. Dodge County Farmers for Healthy Soil, Healthy Water – A Farmer Led group that encompasses the entire county. Their focus is reducing nutrient and sediment runoff through the use of reduced tillage and cover crops.
8. Dodge County Alliance for Healthy Soil, Healthy Water – A group of farmers and lake property owners that collaboratively support the Farmer Led group by fund raising and educating people on conservation practices.

## **CHAPTER 7**

### **INFORMATION AND EDUCATION STRATEGY**

Landowner awareness through education of conservation practices and programs is essential to being able to meet any goals in this plan. Working with staff of the Dodge County UWEX, USDA-NRCS, USDA-FSA and others, the Dodge County Land and Water Conservation Department will carry out various information and education activities designed to achieve the goals and objectives established in this Land & Water Resource Management Plan. It is intended that these information and education activities will raise awareness of land and water resource issues among rural landowners and land operators, among local and state legislators, and among the general public. The assumption is that a well-informed citizenry can and will make better land use and better public policy decisions with regard to land and water resource management.

Some ways to provide information to landowners are:

- One-on-one landowner contacts
- Support activities of Dodge County's Farmers for Healthy Soil Healthy Water
- Provide one-on-one and group Nutrient Management planning workshops
- Conservation brochures
- Maintain Department website
- Collaboration with Producer-Led Group
- Youth Programs
- Support Rock River Coalition's citizen stream monitoring workshops and aquatic invasive species program
- Direct mailings
- Workshops
- Field days
- Annual Reports
- News Releases
- Provide awareness and encourage the use of new technologies

## CHAPTER 8 EVALUATION AND MONITORING

Various methods will be used to track and evaluate our progress in achieving the goals and objectives in this plan. The following list describes some of the activities that will be used by Dodge County Land and Water Conservation Department to document our progress in implementing Dodge County's Land & Water Resource Management Plan.

### Methods:

- Staff Progress Reports – these reports will be used to keep track of the number of landowner contacts, practices installed, and phosphorous and sediment savings.
- Department Database – was developed two years ago. Is used for keeping track of participants in different programs, compliance with Farmland Preservation and NR-151, practices installed, and phosphorous and sediment savings.
- EVAAL – was run on two HUC12 watersheds that led to two 9-Key Element Watershed plans. We plan to run EVAAL on the rest of the county in the next couple of years.
- STEPL – is used in our two 9-Key Element Watershed to keep track of progress and show phosphorous and sediment reductions.
- Transect Survey – has been used in Dodge County since 1999. It is used to show trends in cropping practices in the county.
- County Wide Well Testing Program – This is a 5 year program where we test the same well and monitor Nitrate levels. This program will help us target our efforts in certain areas in an effort to improve ground water quality.
- Citizen Stream Monitoring – supporting Rock River Coalition as they train citizen stream monitoring teams will provide us with information on stream water quality.
- Farmland Preservation – participants self-certify every year for compliance and are spot checked once every four years.
- Nutrient Management – required annually for Farmland Preservation participants and the Animal Waste Ordinance.
- Annual Work Plan – required annually and will be used to set goals and monitor progress.
- Hydraulic and Hydronic sub watershed surveys – H/H to be used as a management tool for storm water runoff and restore hydrology within watersheds.

## **Appendix A**

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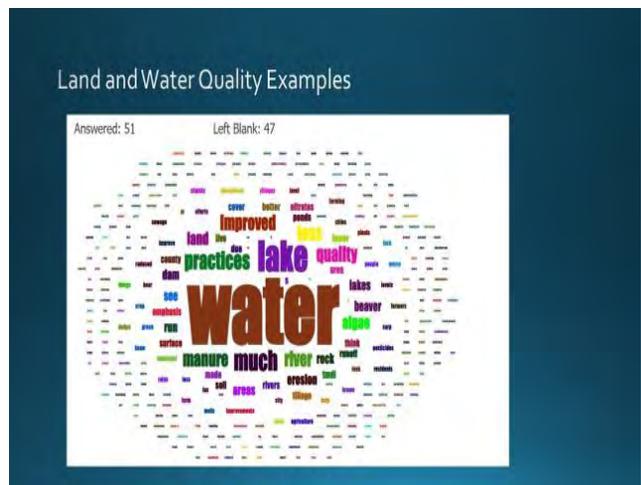
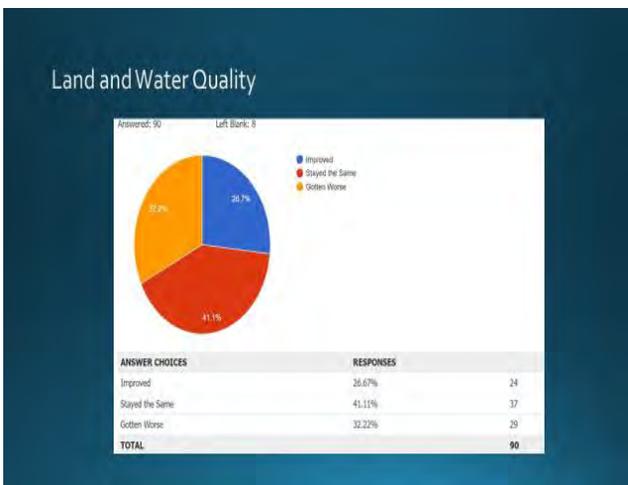
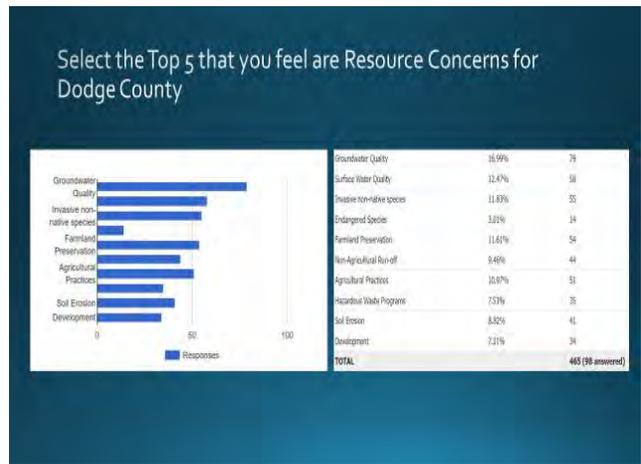
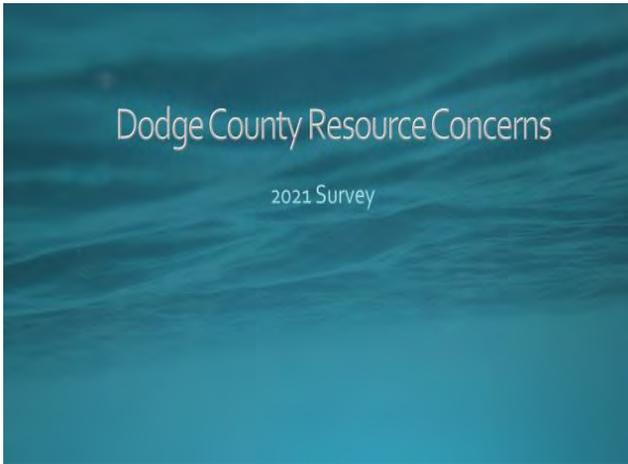
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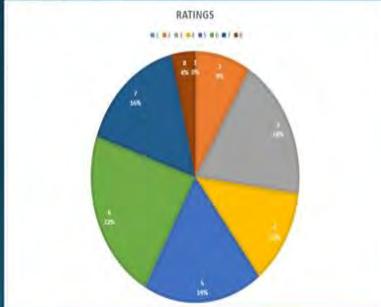
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## Appendix B 2021 Survey Results



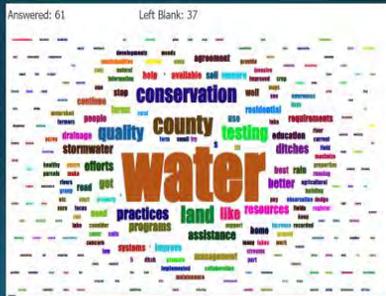
Land and Water Quality – Rank on an eight point scale with 1 being the best



What do you like best about rural Dodge County?



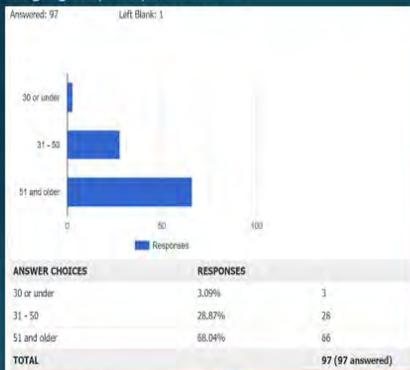
What services could Land and Water Conservation Department offer to assist your efforts to improve land and water conservation?



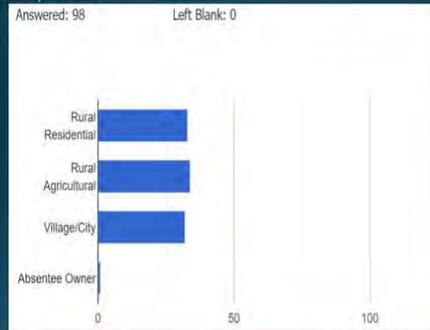
What sources do you currently rely upon for information regarding land and water conservation?



What age group do you fall into?



Where do you live?



**Appendix C**  
**ATCP 50 Standards for Cost-Shared Practices**

- Manure Storage Systems ..... [ATCP 50.62]
- Manure Storage System Closure ..... [ATCP 50.63]
- Barnyard Runoff Control Systems ..... [ATCP 50.64]
- Access Road ..... [ATCP 50.65]
- Trails and Walkways ..... [ATCP 50.66]
- Contour Farming ..... [ATCP 50.67]
- Cover Crop ..... [ATCP 50.68]
- Critical Area Stabilization ..... [ATCP 50.69]
- Diversions ..... [ATCP 50.70]
- Feed Storage Runoff Control Systems ..... [ATCP 50.705]
- Field Windbreaks ..... [ATCP 50.71]
- Filter Strips ..... [ATCP 50.72]
- Grade Stabilization Structures ..... [ATCP 50.73]
- Livestock Fencing ..... [ATCP 50.75]
- Livestock Watering Facilities ..... [ATCP 50.76]
- Milking Center Waste Control Systems ..... [ATCP 50.77]
- Nutrient Management ..... [ATCP 50.78]
- Pesticide Management ..... [ATCP 50.79]
- Prescribed Grazing ..... [ATCP 50.80]
- Relocating or Abandoning Animal Feeding Operations ..... [ATCP 50.81]
- Residue Management ..... [ATCP 50.82]
- Riparian Buffers ..... [ATCP 50.83]
- Roofs ..... [ATCP 50.84]
- Roof Runoff Systems ..... [ATCP 50.85]
- Sediment Basins ..... [ATCP 50.86]
- Sinkhole Treatment ..... [ATCP 50.87]
- Streambank and Shoreline Protection ..... [ATCP 50.88]
- Stream Crossing ..... [ATCP 50.885]
- Stripcropping ..... [ATCP 50.89]
- Subsurface Drains ..... [ATCP 50.90]
- Terrace Systems ..... [ATCP 50.91]
- Underground Outlets ..... [ATCP 50.92]
- Waste Transfer Systems ..... [ATCP 50.93]
- Wastewater Treatment Strips ..... [ATCP 50.94]
- Water and Sediment Control Basins ..... [ATCP 50.95]
- Waterway Systems ..... [ATCP 50.96]
- Well Decommissioning ..... [ATCP 50.97]
- Wetland Development or Restoration ..... [ATCP 50.98]

## **Appendix D**

### **Best Management Practices**

Access Roads	Residue Management
Barnyard runoff Control Systems	Riparian Buffers
Contour Farming	Roof runoff Systems
Cover Crop	Roofs
Critical Area Stabilization	Sediment Basins
Diversions	Shoreline Habitat Restoration for Developed Areas
Feed Storage Runoff Control Systems	Sinkhole Treatment
Field Windbreaks	Stream Crossing
Filter Strips	Streambank or Shoreline Protection
Grade Stabilization	Stripcropping
Lake Sediment Treatment	Subsurface Drains
Livestock Fencing	Terrace Systems
Livestock Watering Facilities	Trails and Walkways
Manure Storage system Closure	Underground Outlets
Manure Storage Systems	Waste Transfer Systems
Milking Center Waste Control Systems	Wastewater Treatment Strips
Nutrient Management	Water and Sediment Control Basins
Pesticide Management	Waterway Systems
Prescribed Grazing	Well Decommissioning
Relocating or Abandoning Animal Feeding Operations	Wetland Development or Restoration

## Appendix E

### Endangered Species List

Scientific Name	Common Name	WI Status	Federal Status	Group	Upland
<i>Acris blanchardi</i>	Blanchard's Cricket Frog	END		Rare Amphibians	
<i>Alasmidonta marginata</i>	Elktoe	SC/P		Rare Mussels and Clams	
<i>Alasmidonta viridis</i>	Slippershell Mussel	THR		Rare Mussels and Clams	
<i>Anguilla rostrata</i>	American Eel	SC/N		Rare Fishes	
<i>Ardea alba</i>	Great Egret	THR		Rare Birds	x
Bat Hibernaculum	Bat Hibernaculum	SC		Miscellaneous Elements	x
Bird Rookery	Bird Rookery	SC		Miscellaneous Elements	x
<i>Boechera dentata</i>	Short's Rock-cress	SC		Rare Plants	
<i>Bombus affinis</i>	Rusty Patched Bumble Bee	SC/FL	LE	Rare Ants, Wasps, and Bees	x
<i>Botaurus lentiginosus</i>	American Bittern	SC/M		Rare Birds	x
Calcareous fen	Calcareous Fen	NA		Herbaceous Communities - Sedge Meadows, Fens, and Bogs	
<i>Centronyx henslowii</i>	Henslow's Sparrow	THR	SOC	Rare Birds	x
<i>Chlidonias niger</i>	Black Tern	END	SOC	Rare Birds	x
<i>Chlosyne gorgone</i>	Gorgone Checker Spot	SC/N		Rare Butterflies and Moths	x
<i>Cuscuta glomerata</i>	Rope Dodder	SC		Rare Plants	x
<i>Cypripedium candidum</i>	White Lady's-slipper	THR		Rare Plants	x
Emergent marsh	Emergent Marsh	NA		Herbaceous Communities - Marshes	
<i>Empidonax virescens</i>	Acadian Flycatcher	THR		Rare Birds	x
<i>Emydoidea blandingii</i>	Blanding's Turtle	SC/P	SOC	Rare Reptiles	
<i>Eptesicus fuscus</i>	Big Brown Bat	THR		Rare Mammals	x
<i>Etheostoma microperca</i>	Least Darter	SC/N		Rare Fishes	
<i>Galium brevipes</i>	Swamp Bedstraw	SC		Rare Plants	
<i>Gymnocladus dioicus</i>	Kentucky Coffee-tree	SC		Rare Plants	x
Herp Hibernaculum	Herp Hibernaculum	SC		Miscellaneous Elements	x
<i>Himantopus mexicanus</i>	Black-necked Stilt	SC/M		Rare Birds	x
<i>Hydrastis canadensis</i>	Golden-seal	SC		Rare Plants	x
<i>Ixobrychus exilis</i>	Least Bittern	SC/M		Rare Birds	x

Scientific Name	Common Name	WI Status	Federal Status	Group	Upland
Lake--shallow, hard, seepage	Lake--Shallow, Hard, Seepage	NA		Lakes and Ponds	
Liodessus cantralli	Cantrall's Bog Beetle	SC/N		Rare Beetles	
Luxilus chrysocephalus	Striped Shiner	END		Rare Fishes	
Lythrurus umbratilis	Redfin Shiner	THR		Rare Fishes	
Mesic prairie	Mesic Prairie	NA		Herbaceous Communities - Prairies	x
Microtus ochrogaster	Prairie Vole	SC/N		Rare Mammals	x
Moist cliff	Moist Cliff	NA		Primary Habitats - Bedrock Dependent	x
Moxostoma carinatum	River Redhorse	THR		Rare Fishes	
Myotis lucifugus	Little Brown Bat	THR		Rare Mammals	x
Myotis septentrionalis	Northern Long-eared Bat	THR	LT	Rare Mammals	x
Northern wet forest	Northern Wet Forest	NA		Northern Forests	x
Nycticorax nycticorax	Black-crowned Night-Heron	SC/M		Rare Birds	x
Perimyotis subflavus	Eastern Pipistrelle	THR		Rare Mammals	x
Podiceps grisegena	Red-necked Grebe	END		Rare Birds	x
Poliocitellus franklinii	Franklin's Ground Squirrel	SC/N		Rare Mammals	x
Ptelea trifoliata ssp. trifoliata var. trifoliata	Wafer-ash	SC		Rare Plants	x
Rallus elegans	King Rail	SC/M		Rare Birds	x
Shrub-carr	Shrub-carr	NA		Shrub Communities	x
Southern dry-mesic forest	Southern Dry-mesic Forest	NA		Southern Forests	x
Southern mesic forest	Southern Mesic Forest	NA		Southern Forests	x
Southern sedge meadow	Southern Sedge Meadow	NA		Herbaceous Communities - Sedge Meadows, Fens, and Bogs	
Springs and spring runs, hard	Hard	NA		Springs and Streams	
Sterna forsteri	Forster's Tern	END		Rare Birds	x
Thamnophis butleri	Butler's Gartersnake	SC/H		Rare Reptiles	x
Thamnophis radix	Plains Gartersnake	SC/H		Rare Reptiles	x
Venustaconcha ellipsiformis	Ellipse	THR		Rare Mussels and Clams	
Vertigo hubrichti	Hubricht's Vertigo	END		Rare Aquatic and Terrestrial Snails	
Wet-mesic prairie	Wet-mesic Prairie	NA		Herbaceous Communities - Prairies	x
Xanthocephalus xanthocephalus	Yellow-headed Blackbird	SC/M		Rare Birds	x

**Appendix F**  
**Land and Water Plan Budget**

Table F-1 is an estimated total cost for the first 5 years of this plan. Future projections are difficult to determine as materials and contractor costs will change. Successful implementation of the County’s Land and Water plan will depend on adequate funding. Dodge County currently has six full time employees dedicated to the implementation of this plan. Staffing costs are subject to the annual budgeting process, while BMP costs are subject to the amount and types of conservation practices installed.

**Estimated Total Costs**

<b>Cost Category</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Staff and Benefits*	\$494,910	\$514,706	\$535,294	\$562,059	\$590,162
Operating Expenses	\$31,957	\$33,235	\$34,564	\$35,947	\$37,385
<b>Total</b>	<b>\$526,867</b>	<b>\$547,941</b>	<b>\$569,858</b>	<b>\$598,006</b>	<b>\$627,547</b>
BMP Cost-Sharing	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000
<b>Grand Total</b>	<b>\$606,867</b>	<b>\$627,941</b>	<b>\$649,858</b>	<b>\$678,006</b>	<b>\$707,547</b>

\*For six FTE with 4% increase in salary and benefits each year. Increased costs in Health Care could increase salary and benefits costs.

**Appendix G**  
2023-2028 DODGE COUNTY WORK PLAN

CATEGORY	PLANNED ACTIVITIES WITH BENCHMARKS	PERFORMANCE MEASUREMENTS
<p>• <b><i>Goal 1: Protect and Improve the Quality of Dodge County’s Ground Water Resources</i></b></p>		
Protect/seal direct conduits to ground water to prevent contaminants from reaching groundwater reservoirs.	<p>-Promote the proper closure of 3-5 idled/unused rural wells annually.</p> <p>-Promote the buffering and/or sealing of 3-5 sinkholes annually.</p> <p>-Promote the proper closure of 3-5 idled/unused manure storage structures annually.</p>	<p># of staff hours expended for training, design and installation.</p> <p># of wells properly closed.</p> <p># of sinkholes buffered and/or sealed.</p> <p># of manure storage structures closed.</p>
Promote farmer adoption and implementation of nutrient management plans, cover crops and reduced tillage.	<p>-Promote the increase of 16,500 new acres of nutrient management plans annually.</p> <p>-Promote the increase of 5,000 new acres of cover crops annually.</p> <p>-Promote the increase of 3,000 new acres of reduced tillage annually.</p>	<p># of staff hours expended for training, design and installation.</p> <p># of new acres of Nutrient Management Plans, cover crops and reduced tillage.</p> <p># lbs of sediment reduced (using any approved method).</p> <p># lbs of P reduced (using any approved method).</p> <p># lbs of N reduced (using any approved method).</p>
Pursue regulations that are more restrictive and more aggressive monitoring and enforcement of land spreading of commercial and industrial wastes.	<p>-Meet/contact with legislatures to discuss concerns over land applied industrial wastes.</p>	<p># of meetings/contacts with legislatures and any changes in industrial waste application rules.</p>
Use Lidar and other spatial data for identifying potential conduits to ground water.	<p>-Create a geospatial layer to identify closed depressions in Dodge County. This layer can be used to locate sinkholes.</p>	<p># of sinkholes identified.</p>
<p>• <b><i>Goal 2: Protect and Improve the Quality of Dodge County’s Soil Resources and Surface Water Resources</i></b></p>		
Install conservation practices that reduce cropland soil erosion, sediment and phosphorous delivery to surface waters.	<p>-Promote the increase use of cover crops annually. (See Goal 1).</p> <p>-Promote the increase use of reduced tillage annually. (See Goal 1).</p>	<p># of staff hours expended for training, design and installation.</p> <p># lbs of sediment reduced (using any approved method).</p> <p># lbs of P reduced (using any approved method).</p> <p># lbs of N reduced (using any approved method).</p>
Install agricultural practices that help farmers and other rural landowners comply with the NR151 Nonpoint Runoff Rules.	<p>-Promote the increase of Farmland Preservation participants by 16,500 acres annually.</p>	<p># of staff hours expended for training, design and installation.</p> <p># lbs of sediment reduced (using any approved method).</p> <p># lbs of P reduced (using any approved method).</p> <p># lbs of N reduced (using any approved method).</p>

Install conservation practices along shorelines and creek banks to improve bank stabilization and restore natural hydrology to the greatest extent possible.	-Promote the increase of 300 acres of Riparian buffers through CREP annually. -Promote the increase of 500 feet of stream bank and shoreline stabilization annually.	# of new acres in CREP. # of feet of new stream bank and shoreline stabilization protected. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
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**• Goal 3: Protect Dodge County Land and Water Resources from Adverse Impacts Caused by Cropland Drainage and Wetland Alterations**

Install conservation practices that reduce or eliminate the percolation of bacteria, nutrients and other chemicals through cropland soils and into subsurface drain tile.	-Promote the increase of nutrient management plans annually. (See Goal 1). -Promote the increase of cover crops annually. (See Goal 1). -Promote the increase of reduced tillage annually. (See Goal 1).	# of new acres of Nutrient Management Plans, cover crops and reduced tillage. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
Install conservation practices that protect drainage ditches or other surface waters from polluted cropland runoff.	-Promote the increase of Riparian buffers through CREP annually. (See Goal 2).	# of new acres in CREP. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
Install wetland/wildlife habitat practices that restore prior converted wetlands.	-Promote the restoration of 100 new acres of wetlands.	# of new acres converted to Wetlands. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).

**• Goal 4: Protect Dodge County Agricultural Interests from Wildlife Crop Damage**

Help Dodge County farmers to obtain services available under the Wildlife Damage Abatement and Claims Program (WDACP).	-Promote the benefits of the Wildlife Damage Abatement and Claims program to farmers.	# of new claims.
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**• Goal 5: Increase Farmer and Rural Landowner Awareness and Knowledge of Land and Water Resource Issues in Dodge County**

Provide a wide variety of educational opportunities to farmers and other rural landowners to increase their understanding and knowledge of the resource issues	-Emphasize one-on-one contacts. -Direct mailings. -Social Media. -Provide Nutrient Management Training classes. -Provide 2-3 Field Day Events.	# of new contacts.
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that may exist on their land, and to help them use their land to its fullest potential without degrading land and water resources.	-Work with other agencies to provide informational events.	
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• **Goal 6: Increase General Public Awareness and Knowledge of Land and Water Resource Issues in Dodge County**

Perform educational activities directed at the public and legislators to increase their understanding and knowledge of land and water resource issues currently impacting Dodge County.	-See activities in Goal 5.	# of new contacts.
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• **Goal 7: Encourage Environmentally Desirable Types of Land Use Conversions**

Restore low return-on-investment cropland to their original wetland uses.	-Promote the restoration of wetlands. (See Goal 3).	# of new acres converted to Wetlands. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
Restore low return-on-investment cropland to their original woodland uses.	-Promote the restoration of 100 new acres of woodlands through CRP annually.	# of new acres converted to Woodlands. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
Restore low return-on-investment cropland to their original grassland uses.	-Promote the restoration of 200 new acres of grasslands through CRP annually.	# of new acres converted to Grasslands. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
Strategic acquisition or restoration of land next to water.	-Promote the increase of Riparian buffers through CREP annually. (See Goal 2).	# of new acres converted to Wetlands. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).
Connect landowners with technical experts and funding sources for conversion of marginal cropland to perennial vegetation.	-See educational activities in Goal 5.	# of new acres converted to Perennial Vegetation. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).

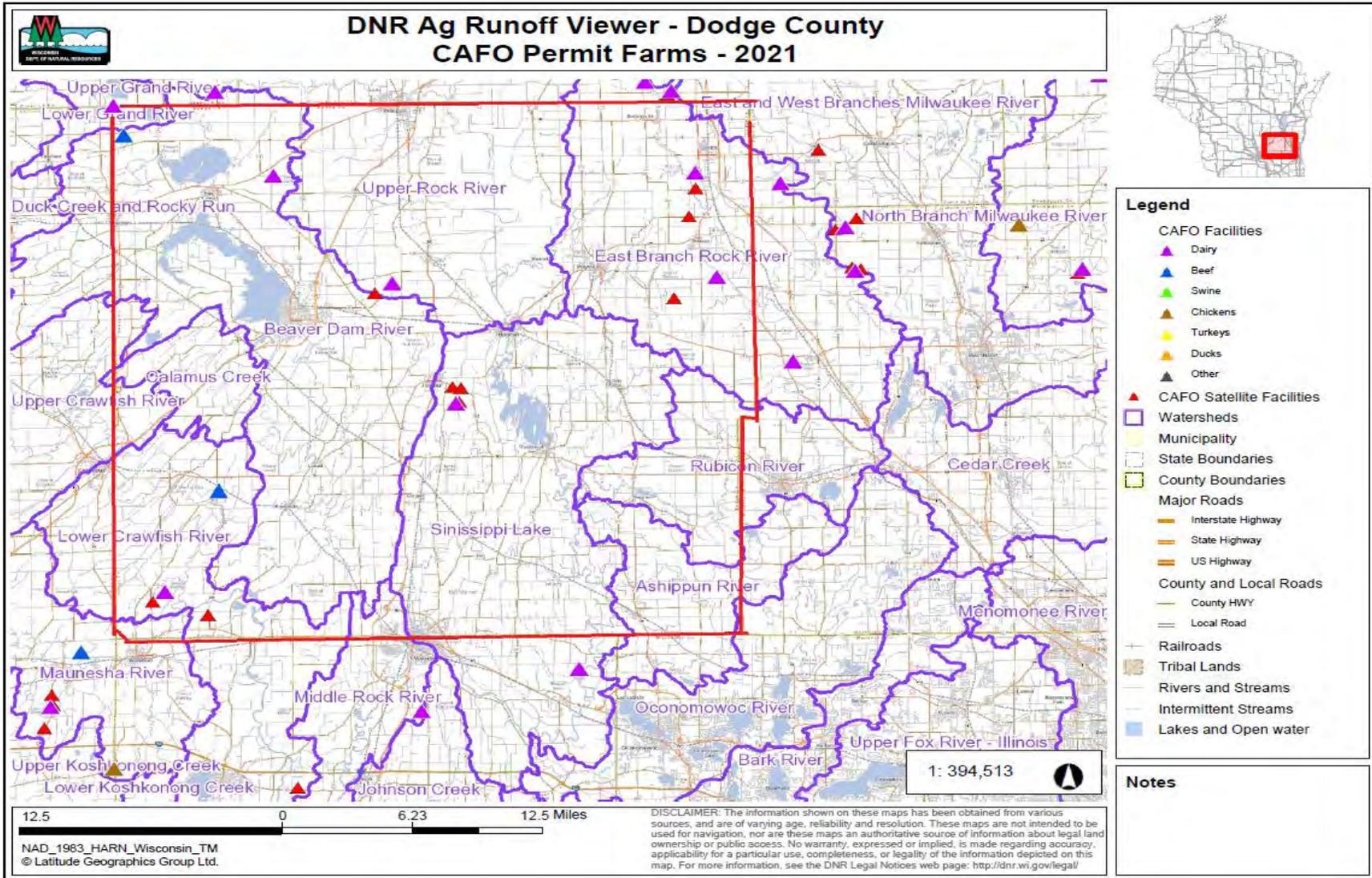
• **Goal 8: Resource Enhancement through Collaboration**

<p>Intra County Department collaboration. Coordinate with County Highway and Emergency Management hydrologic impact to watershed and infrastructure with revised DOT storm water runoff guidelines.</p>	<p><i>-Meet with Highway Department and Emergency Management at least once times per year to discuss DOT storm water runoff guidelines.</i></p>	<p><i># of projects coordinated that serve a dual purpose.</i></p>
<p>Periodic County intra department review for projects, which affect environmental conditions and may be improved as part of the project.</p>	<p><i>-Review the sections of livestock siting applications pertinent to our department as requested by Land Resources and Parks Department. -Review development site plans for storm water runoff as requested by Land Resources and Parks Department.</i></p>	<p><i># of applications reviewed.</i></p>
<p>At least twice a year meet with Lake Districts and Association to share new practices and Lake plans.</p>	<p><i>-At least twice a year meet with Lake Districts and Association to share new practices and Lake plans.</i></p>	<p><i># of coordinated conservation practices installed.</i></p>
<p>The Wisconsin DNR has significant acreage within Dodge County. These properties have been overlooked as a resource for conservation enhancements. The properties should be optimized to develop integrated programs, which improve watershed practices with property managers identifying long-range plans and routine upkeep.</p>	<p><i>-Meet with DNR to discuss possible conservation measures/practices they could install on DNR owned land to improve runoff.</i></p>	<p><i># of conservation practices installed. # lbs of sediment reduced (using any approved method). # lbs of P reduced (using any approved method). # lbs of N reduced (using any approved method).</i></p>

## Appendix H Dodge County NM Plan acres - 2021

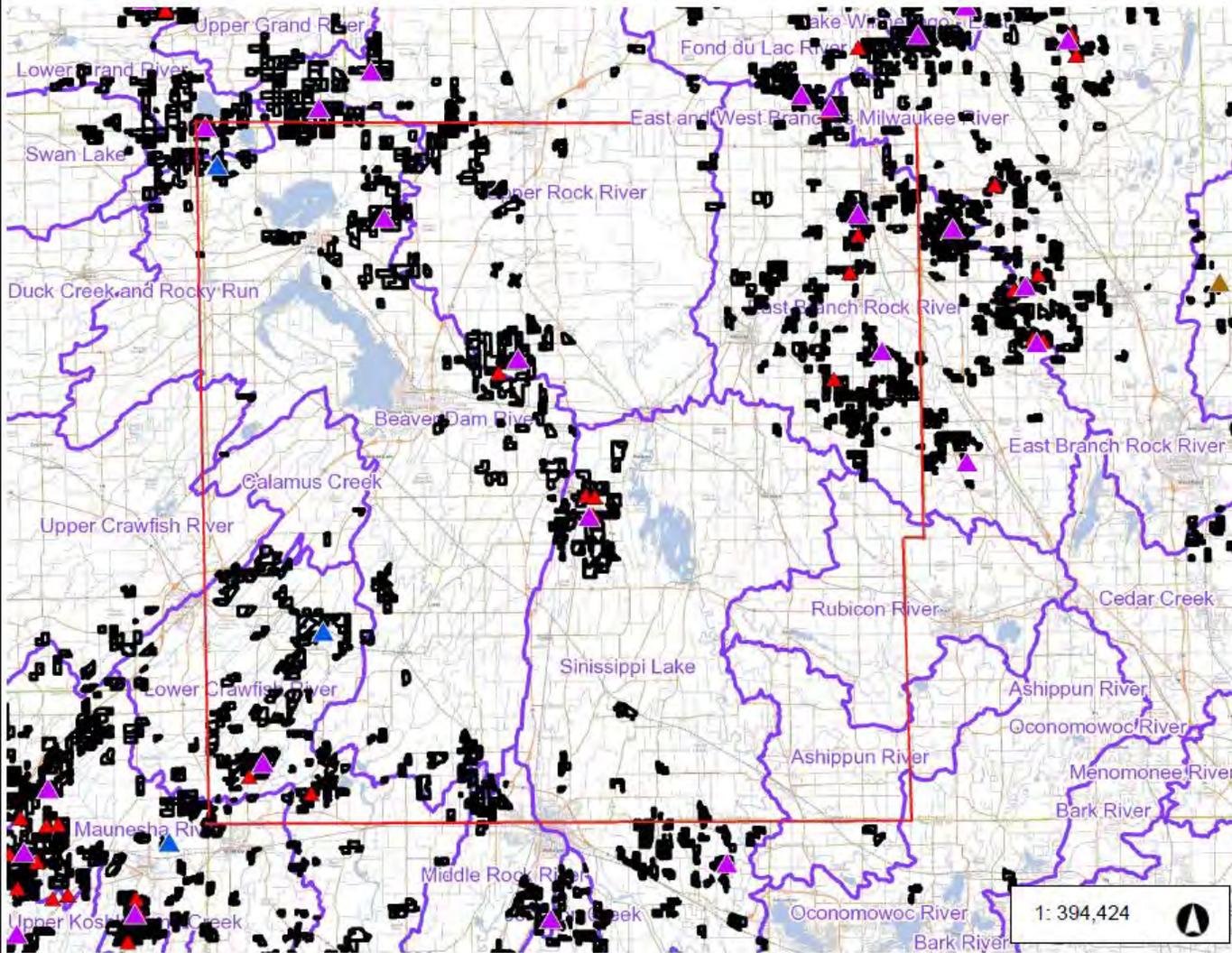
Source: DATCP 2021 NM planning Data Report - [https://datcp.wi.gov/Pages/Programs\\_Services/NutrientManagement.aspx](https://datcp.wi.gov/Pages/Programs_Services/NutrientManagement.aspx)

**AFO Permit Farms and CAFO Fields – Dodge County – 2021** Source: DNR Agricultural Runoff viewer





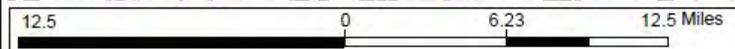
# DNR Ag Runoff Viewer - Dodge County CAFO Permit Farms and Fields - 2021



### Legend

- CAFO Facilities**
  - ▲ Dairy
  - ▲ Beef
  - ▲ Swine
  - ▲ Chickens
  - ▲ Turkeys
  - ▲ Ducks
  - ▲ Other
  - ▲ CAFO Satellite Facilities
- CAFO Fields
- ▭ Watersheds
- ▭ Municipality
- ▭ State Boundaries
- ▭ County Boundaries
- Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads**
  - County HWY
  - Local Road
- Railroads
- ▭ Tribal Lands
- Rivers and Streams
- Intermittent Streams
- ▭ Lakes and Open water

1: 394,424



NAD\_1983\_HARN\_Wisconsin\_TM  
© Latitude Geographics Group Ltd.

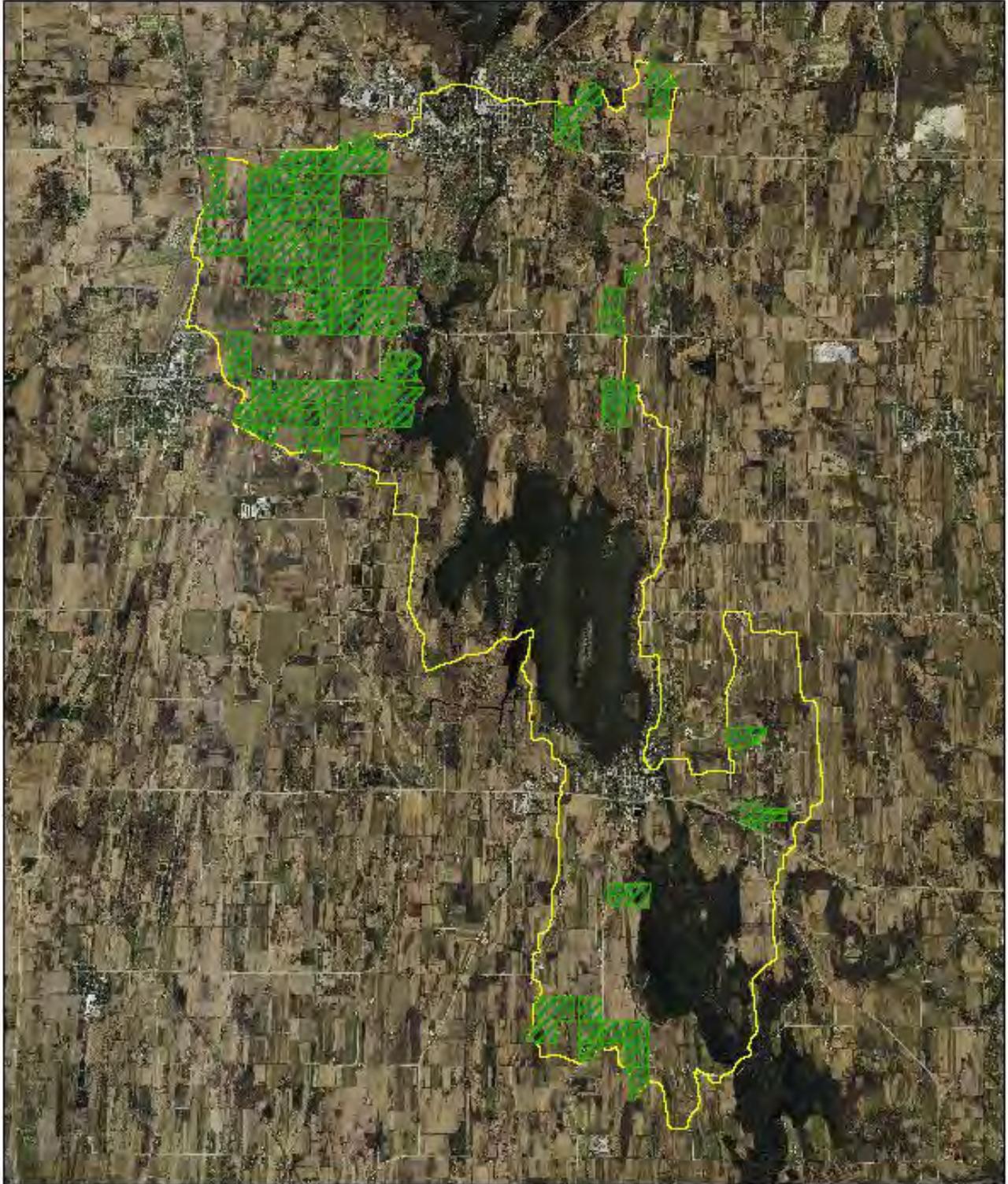
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**Notes**

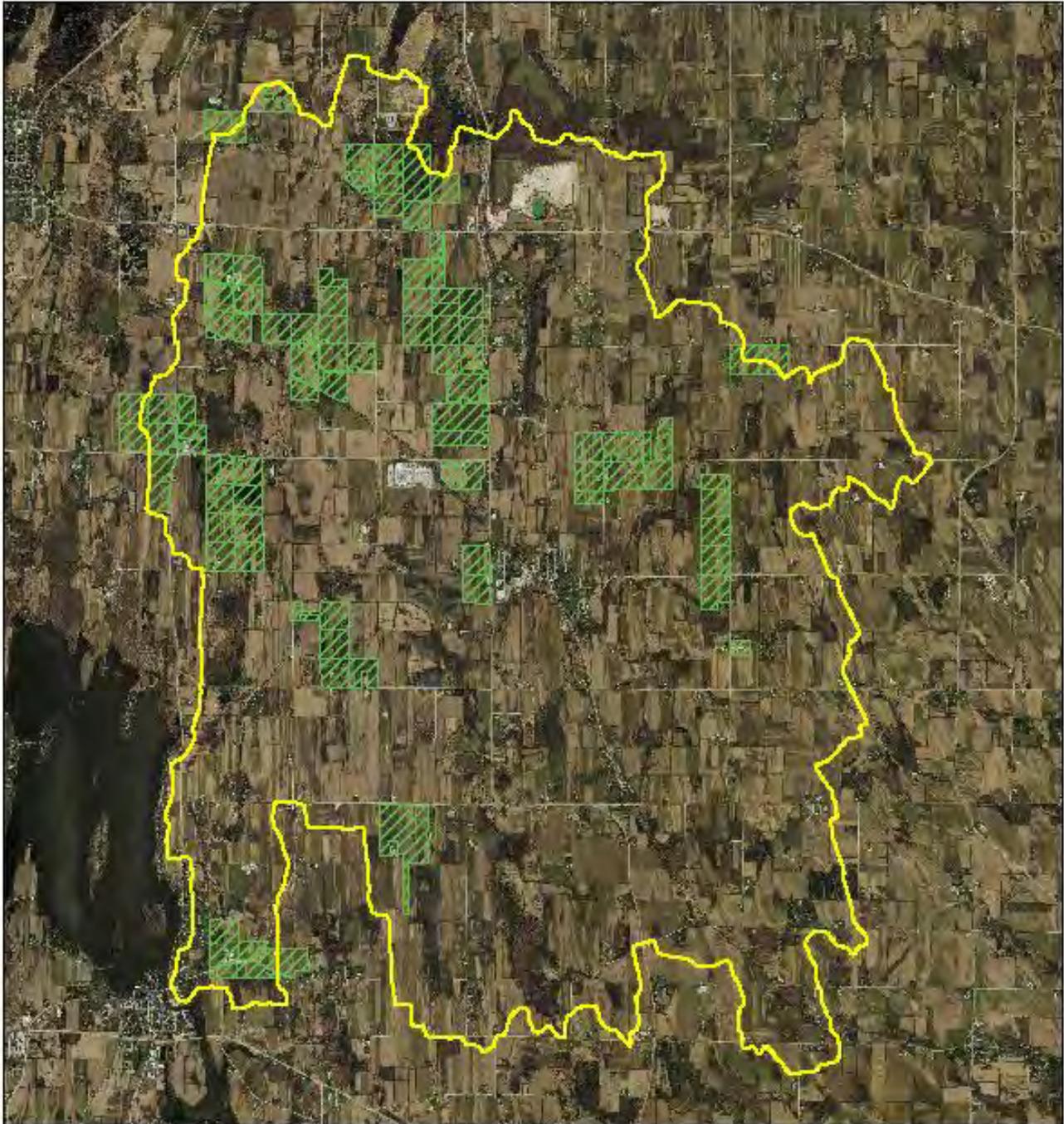


# 590 Nutrient Plans in Lake Sinnissippi 2019 Crop Year

Mapped By:  
Robert Bird



## 590 Nutrient Plans in Wildcat Creek 2018 Crop Year



Disclaimer: The data and acreages presented are representations intended to be a general reference to the public, does not replace a survey, are not intended for legal or other related uses and are advisory only. Dodge County assumes no liability for any use or misuse of this information.