Pepin County Land & Water Resource Management Plan

2021-2030

Pepin County Land Conservation
& Planning Department

December 2020

Pepin County Land Conservation & Planning Department

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Prepared under the direction of the Pepin County Land Conservation & Planning, Extension Committee:

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Cover Photo:
Photo Credit: Brad & Kristin Afdahl

Acknowledgments

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Executive Summary

The Pepin County Land Conservation & Planning Department is dedicated to protecting, maintaining and enhancing the health of the natural resources in Pepin County. All citizens and visitors of Pepin County depend on healthy natural resources to thrive. The condition of our natural resources impacts the health and economic well-being of our society.

Pursuant of Wis. Stat. Chapter 92, this 10-year plan was created through the Land Conservation and Planning Department (LCPD), Land Conservation & Planning, Extension Committee (LCPC), the Water Advisory Group (WAG) and support of the public. Through this process resource concerns have been identified and a strategic plan of action has been mapped out. The following goals were identified through this process:

- Goal I: Protect and enhance the quality and quantity of our water resources
- Goal II: Preserve and maintain our valuable soil resources
- Goal III: Promote a positive conservation ethic
- Goal III: Protect and enhance diverse wildlife habitat
- Goal IV: To mitigate, reverse and respond to changes in our climate

With these goals as the guiding principles, Pepin County will continue to monitor the resource, evaluate strategies based on relationships and perspectives and develop an implementation process to address the variety of natural resource issues. A successful implementation process or strategy requires County staff and policy makers to build relationships with its citizens and land users. Understanding the various perspectives citizens have is important in managing the systems and/or improving the systems of which this plan is required to address as well as the systems involved that are beyond the scope of this plan.

The ability by Pepin County to acquire and provide the necessary financial support to recruit, retain, train and maintain adequate staffing levels may be the greatest limiting factor of this plan. Implementation of this plan, to meet its goals, through the actions established, will continue to hinge on the available staffing capacity. Local county resources continue to limit the ability to specialize in specific conservation or land use areas. The Land Conservation & Planning Department is responsible for a broad spectrum of county services, of which this plan is a primary guiding document.

Overview of Pepin County

As one of the smallest counties in the state of Wisconsin, Pepin County has many unique features in terms of geography and resources, as well as the population that inhabit the county. It is important to understand each aspect before goals and objectives can be presented. The following is a brief overview of the physical characteristics of Pepin County.

Pepin County contains 159,000 acres which includes approximately 11,000 acres of water. The total area of the county is 240 square miles which makes it the second smallest county by land base. Pepin County is located along the western border of Wisconsin. Two major rivers form part of its boundaries. The Mississippi River is on the southwest and separates the county from the State of Minnesota. The Chippewa River forms part of the eastern boundary.

Durand, the county seat, is along the Chippewa River near the center of the county. Durand is about 62 miles southeast of St. Paul, Minnesota and 170 miles northwest of Madison.

In the western and southern parts of Pepin County, the terrain is some of the most rugged in Wisconsin. The most striking topographic features in the county are along the major rivers that drain the county; the Mississippi, Chippewa and Eau Galle Rivers. Glacial melt water streams are responsible for the creation of Lake Pepin. As glacial ice melted, the Chippewa River deposited more sand and gravel at its mouth than the Mississippi River could transport. As a result, a delta was built at the mouth of the Chippewa River, partially damming the Mississippi River and creating Lake Pepin. Lake Pepin is 2.5 miles wide and 22 miles long. It has a maximum depth of 56 feet and an average depth of 30 feet.

The great trench, or gorge of the Mississippi River, west of Lake Pepin, is bounded on both sides by steep bluffs that rise 300–500 feet above the stream level. The valley bottom, along the reaches of the Chippewa River in Pepin County, is wide and deep. In most places the valley is bounded by uplands that rise abruptly to a height between 200 and 400 feet or more above the sandy flood plain to the summits of the hills.

In contrast, the northern and eastern parts of the county typically have a much less rugged landscape, typified by sandstone hills rising a maximum of 150 feet above a nearly level to undulating valley terrain. Multiple levels of terraces and steep terrace risers emerge above the present flood plains along the major rivers. The terraces were formed by the entrenchment of these rivers, which cut deep into the previous flood plains.

Arkansaw Creek, Bear Creek, Fall Creek, and Plum Creek, are all tributaries of the Chippewa River, also drain the county. In addition, Bogus Creek and Lost Creek flow south into Lake Pepin.

Pepin County's landscape provides for many recreational opportunities. Lake Pepin and the Chippewa River provide fishing, boating, and other recreational opportunities. The Tiffany Wildlife area consists of over 13,000 acres of wetlands, grasslands, and woodlands which provide opportunities for all types of outdoor recreation. The county's land and water

resources provide habitat for wildlife. Deer, squirrels, rabbits, wild turkeys and raccoon are abundant throughout the county in their respective habitats. Grouse are also common wildlife. Pheasant populations are dramatically increasing in areas where habitat has been restored. The Mississippi Flyway provides a large number of waterfowl, depending on the time of the year in relation to the hunting season.

Ground water supplies all of the human consumption needs in Pepin County. Since most of Pepin County has been glaciated, with the exception of the extreme southeast corner of the county, glacial materials are present to various depths and provide the dominant character of soil development and ground water sources. Windblown loess also covers much of the landscape and is quite deep in places. About Forty-four (44) percent of the county has bedrock within ten feet of the surface. Shallow ground water in Pepin County is contained mainly in glacial deposits as an unconfined aquifer.

The rolling hills and flat valley bottoms make farming a profitable and important factor in Pepin County revenues. Farm production is one of the largest sources of revenue for the county. Dairy products are the largest commodity but corn and soybeans are becoming a much larger percentage than ten (10) years ago. Specialty crops such as sweet corn, red kidney beans, squash, melons, potatoes and strawberries are grown on some of the coarse textured soils.

Pepin County developed a strong conservation ethic that dates back to the 1930's. In 1933 camps of the Civilian Conservation Corps were located in Pepin County. Workers from these camps completed a number of dams and planted trees to control erosion.

Watershed structures were constructed through PL 566, in the years of 1958– 1967, in Lost Creek, Bogus Creek and Plum Creek Valleys. These structures were built to control gullies and reduce flooding. Each structure is inspected annually to ensure that they continue to provide watershed protection.

Woodlands occupy one-third of the land area in Pepin County. There were several small sawmills located throughout the county however with recent economic trends the status of these sawmills has been declining. In addition to logging there are other small industries such as a tire retread company, and a cheese factory.

Chapter 1 – Plan Development

Statutory Authority

Through Wisconsin Act 27 (1997-1999 Biennial Budget Bill), Chapter 92 of the Wisconsin Statutes was amended, creating a county land and water resource management-planning program. The idea behind the program is to have a locally led process to protect Wisconsin's decision-making, and make better use of local, state and federal funds. This LWRM plan revises the current plan written for 2011 – 2020. It reflects an overall effort to tie together with conservation programs, available funding, and other resources, to effectively address land and water resource issues facing Pepin County from 2021 - 2030.

This plan will incorporate existing and future programs in delivering the basis for conservation education, implementation, performance measurement, and long-term evaluation, while serving our diverse clientele. This plan is the incorporation of runoff guidelines and performance standards that were established through NR 151, which became effective on October 1, 2002 and modified in 2012, and again in 2018. This plan includes a comprehensive review of the accomplishments from the previous plan. In addition, conservation programs utilized by the Pepin County LCD to implement the goals and strategies outlined are discussed. These programs provide the necessary administrative and technical support for implementing conservation practices in Pepin County.

Pepin County's LWRM Plan is intended to complement and coordinate existing plans rather than replace them. It is an action and implementation plan that emphasizes cooperation with our conservation partners. By focusing on the Pepin County Land Conservation & Planning, Extension Committee (LCPEC) and Land Conservation & Planning Department's (LCPD) strengths regarding conservation planning, technical assistance, program administration and information and education, diverse interests can act together in effective protection and enhancement of Pepin County's resources. The successful implementation of this plan is dependent upon many individuals, agencies and organizations. Successful implementation will only be achieved with the continued level of staffing and availability of financial resources. It is through continued cooperation between the LCPEC and other agencies and organizations that Pepin County's natural resources will be enhanced for citizens to enjoy today and into the future.

Land and Water Resource Planning

The land and water resource management plan is an "umbrella" which will coordinate all available programs. Through this coordinated effort Pepin County will have a working and dynamic document. Our major goals in this process will be as follows:

- Identify and prioritize resource concerns of Pepin County
- Outline a seamless approach for resource program integration
- Incorporate other existing regional and statewide resource plans
- Maintain local partnerships and develop strategies for new partners
- Develop a comprehensive information and educational program to implement the plan
- Develop annual tracking system toward meeting the plan goals, including compliance with state standards
- Leverage local, state, federal and private resources

The Pepin County Land Conservation & Planning, Extension Committee and staff, along with the assistance of all partners, will take the initiative to actively solicit public information in planning, evaluating and improving the delivery of land and water resource programs.

Local Plan Development

In April 2019, the Pepin County Land Conservation & Planning, Extension Committee and Department solicited a local advisory group in existence called the Water Advisory Group (WAG).The WAG consisted of community leaders who were interested in the county's natural resources specifically it's water resources and the land use activities that effect those resources. The group identified resource concerns existing in Pepin County. Additionally, in March 2018, the Pepin County Board of Supervisor's enacted a Moratorium on Expansion and Creation of Large-scale Livestock Facilities. As a part of this moratorium, a report was produced in December 2018 and presented to the County Board. Data and information gathered for that report, including a public survey, was also utilized and incorporated into this LWRM Plan update. See **Appendix B** for a list of all the issues that were collected from this advisory group.

The group identified the following as the four (4) most important resource issues facing our county:

- Nutrient management
- Livestock manure management
- Soil erosion
- Groundwater quality

As a part of the Large-scale Livestock Moratorium Report, a public survey was also conducted to receive additional input on the resource issues facing Pepin County landowners. See **Appendix C.** Including support for the following actions to address land use and non-point source pollution in Pepin County:

- More education
- Better enforcement of existing regulations
- Increased protection of sensitive soil types

A public hearing was held on October 12, 2020 to allow the public to comment on the plan. The plan was also available to the public for a 14 day review period. Copies of the plan were available at the Durand Public Library, Durand City Hall, Pepin County Clerk's office, Pepin Village Hall and Clerk's office, as well as the Land Conservation & Planning Department's office.

Chapter 2 - Resource Assessments and Land Use & Trends

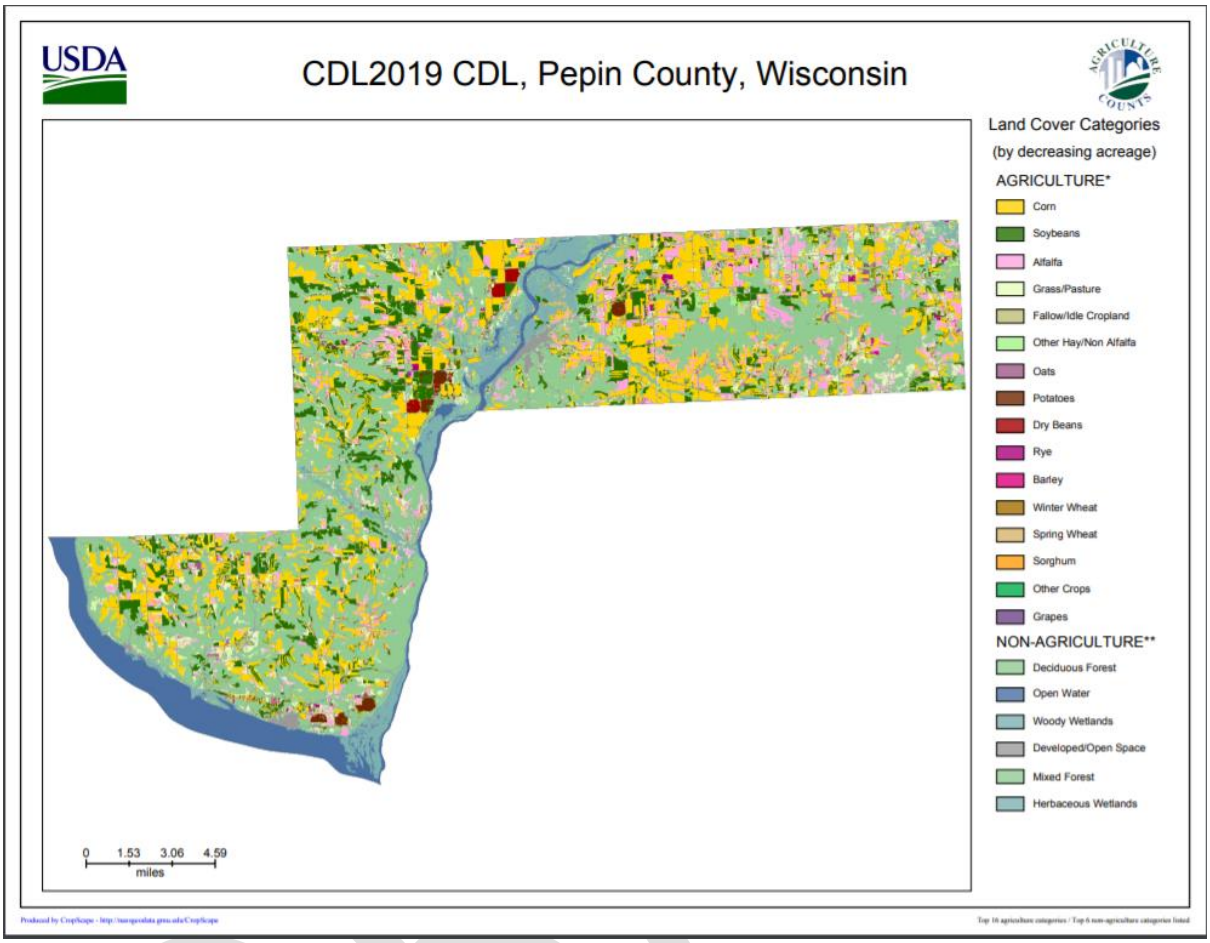


Figure 1: Land cover categories, crop data 2019. Source: CropScape by USDA-NASS

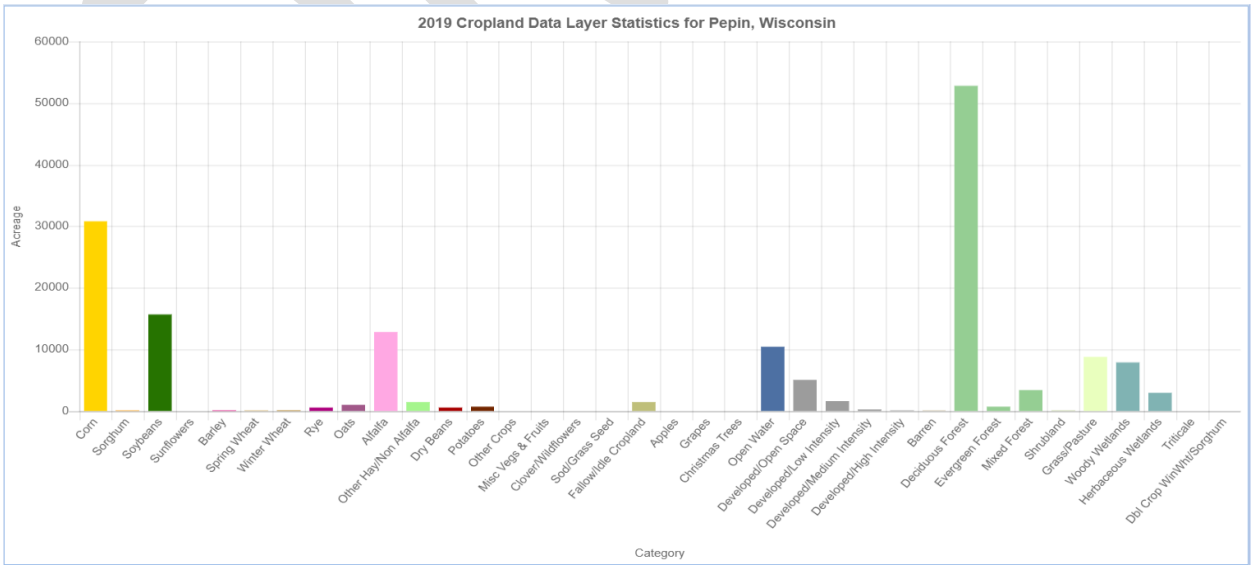


Figure 2: Cropland data layer statistics for Pepin County, WI. 2019.

Agricultural Demographics

Agriculture is the largest individual land use in Pepin County. According to the 2012 Agricultural Census, Pepin County has 63,018 acres of total cropland. Of that total cropland, 3,583 acres are irrigated. Pepin County cropland produces a variety of crops and as the agricultural industry has changed over time, the amount of those crops has changed as well. Corn grown for grain was harvested on 13,700 acres in 1971, compared to 21,800 acres in 2017. Corn grown for silage was harvested on 4,600 acres in 1977, compared to 6,860 acres in 2017. Soybeans were harvested on 3,500 acres in 1977, compared to 14,300 acres in 2016. Forage (alfalfa/hay) was harvested on 21,000 acres in 1977, compared to 7,600 acres in 2016. It is apparent that there has been a shift in the agricultural system within Pepin County to a more corn-soybean dominated system. According to the Wisconsin Corn Growers Association (2017), 50% of the corn harvested in Wisconsin is used for livestock feed, 37% used for ethanol, 10% used for direct exports and 3% used for human consumption.

In 1977, there were 9,900 head of milk cows in the county, compared to 8,650 head in 2017. While milk cow numbers have not drastically changed over time, those cows are being housed on fewer, larger livestock facilities than in the past. In 1997 there were 162 farms with milk cows compared to 54 farms with milk cows in 2017.

Historically, Pepin County has not inventoried animal facilities or the number of animal units on those farms. Using NASS, NRCS, FSA, and local knowledge the LCPD estimates that there are approximately 120 livestock facilities in the county. Of those 120 livestock facilities, it is estimated that there are between 9 and 20 facilities that are at 500 animal units or above. Those facilities are populated with cattle. Currently, there are two state permitted CAFOs. The majority of the facilities over 500 animal units are located in townships east of the Chippewa River. Pepin County has very few livestock facilities that consist of significant numbers of poultry, sheep, swine or other livestock species.

Population Demographics/Economics and Municipalities

Pepin County's population has remained relatively unchanged in recent history. In 1990, there were 7,107 people; in 2015, there were 7,290; and in 2018 there were 7,289 people living in the County. It is projected that the County's population will decline to 6,885 people by the year 2040. (Egan-Robertson 2013).

It cannot be overlooked that agriculture is one of the primary industries in Pepin County. Twenty-nine percent (29%) of the county's workforce is employed in the agricultural sector. Thirty-nine percent (39%) of the county's economic activity is agriculturally related and accounts for approximately $170 million in revenue to Pepin County (UW Extension 2014).

It is also important to acknowledge that the current commodity market for crop and livestock (dairy) products are burdensome for many producers. Resulting in a continued trend of farms going out of business and the land use being controlled by fewer farms or landowners.

Pepin County has eight Townships: Albany, Durand, Frankfort, Lima, Pepin, Stockholm, Waterville and Waubeek; one City: Durand; and two Villages: Pepin and Stockholm (Figure 3).

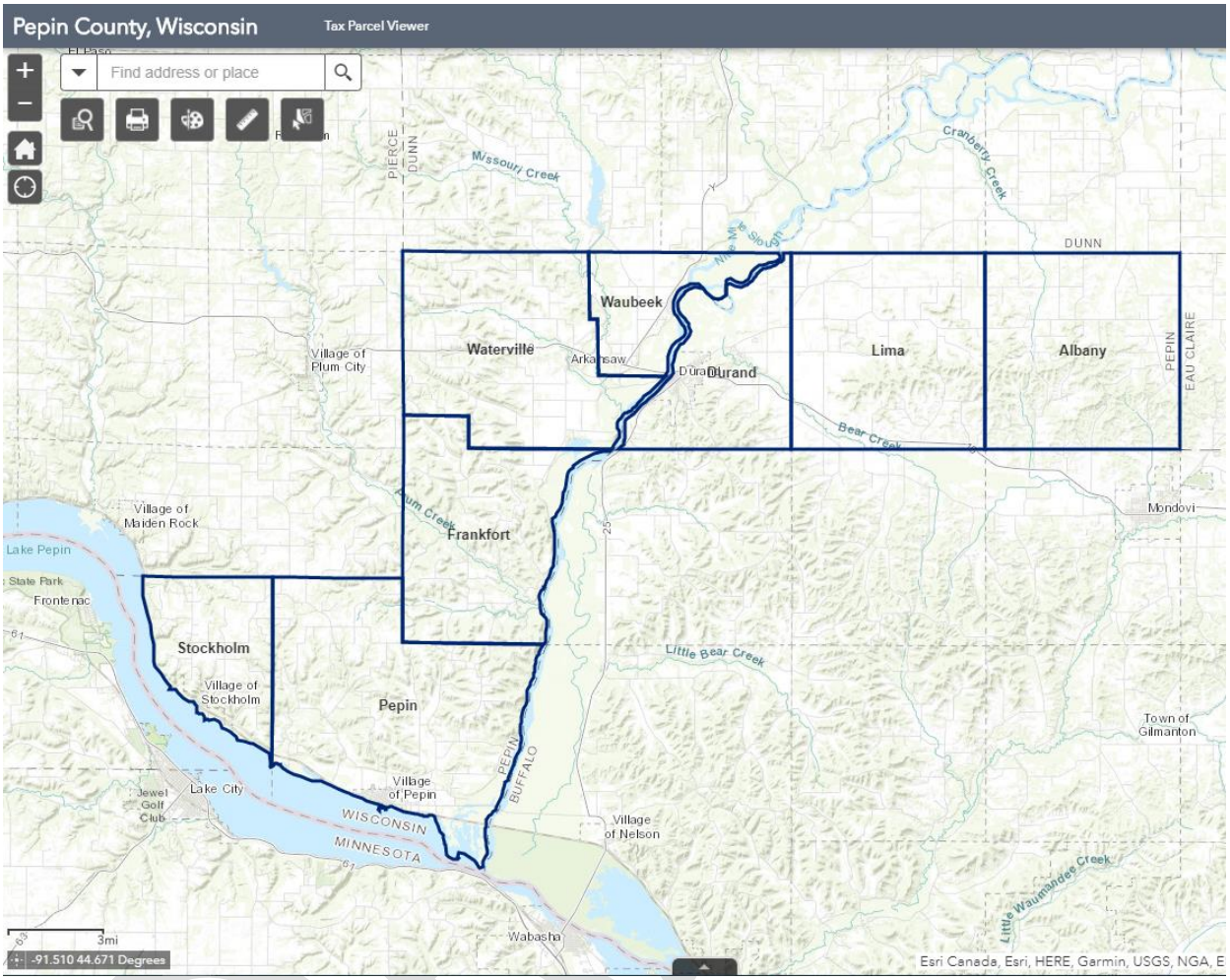


Figure 3: Pepin County Municipalities.

Natural Resources

Pepin County has a diverse landscape from sandy outwash plains to loess-capped bluffs. The relationship between geology, soils, and water is complex and has profound implications on the quality of the resources.

Groundwater/Geology

Pepin 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. 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.

Groundwater supplies all of the human consumption needs in Pepin County. About 44 percent of the county has bedrock within ten feet of the ground surface. Most of the water supply comes from drilled wells that terminate in sandstone and shale. The unconfined sand and gravel aquifers supply water for 20 percent of the wells in the county. A smaller percentage of wells are in dolostone. Much of Pepin County's topography is the result of sediment deposited by glacial meltwaters. The county's shallow groundwater resources are contained in these sediments on terraces and current floodplains of the Mississippi River valley and the Chippewa River valley. In some areas, these sediments exceed 30 meters in thickness. A map depicting the elevation of groundwater and the direction of flow can be seen in Figure 4. Additional geology and bedrock features can be found in the **Appendix D.**

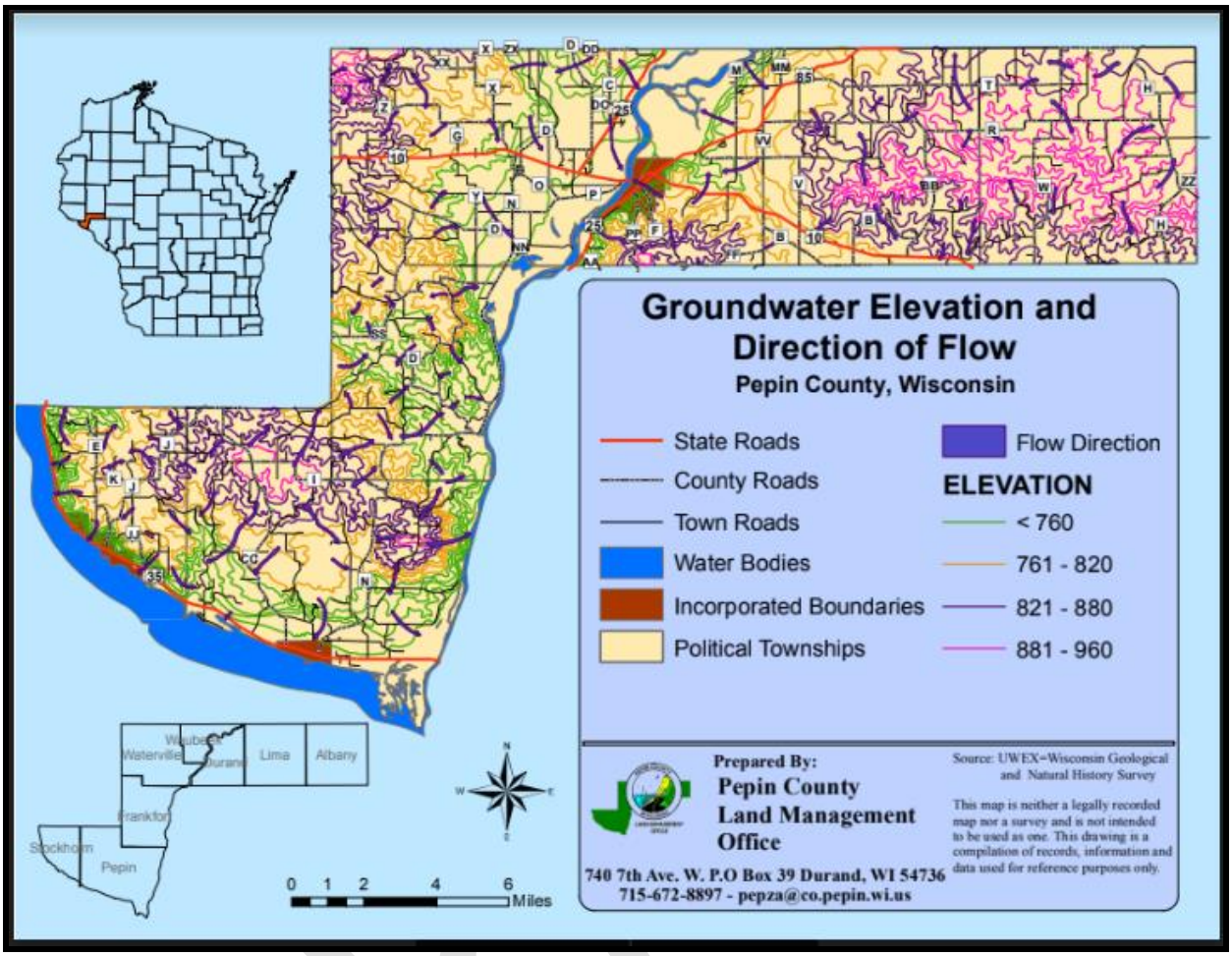


Figure 4: Groundwater Elevation and Direction of Flow in Pepin County, WI.

Groundwater contamination is usually the result of modern society's use of the land. Almost anything that can be spilled, dumped or spread on the ground has the potential for entering the groundwater. According to the State of the Chippewa River Basin Report (Wisconsin DNR 2001), agricultural and industrial practices, as well as urban/rural development, threaten a high quality and plentiful groundwater resource in the Lower Chippewa River Basin. In Wisconsin, 90% of the groundwater nitrate contamination is estimated to have originated from agriculture, 9% from septic systems, and 1% from other sources (WI Groundwater Coordinating Council 2018).

Groundwater resources in Pepin County are, in general, of good quality but a significant number of wells 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 drains to groundwater as nitrate. In other areas, private onsite wastewater systems (septic systems) can also be a source of nitrate to groundwater.

Twenty-two percent of private wells in Pepin County exceed the 10 mg/L nitrate-nitrogen drinking water standard. The extent of nitrate contamination is more noticeable in certain towns (Figure 5). This is more than twice the 8.2% of private wells that exceed the nitrate-nitrogen standard statewide (DATCP, 2018).

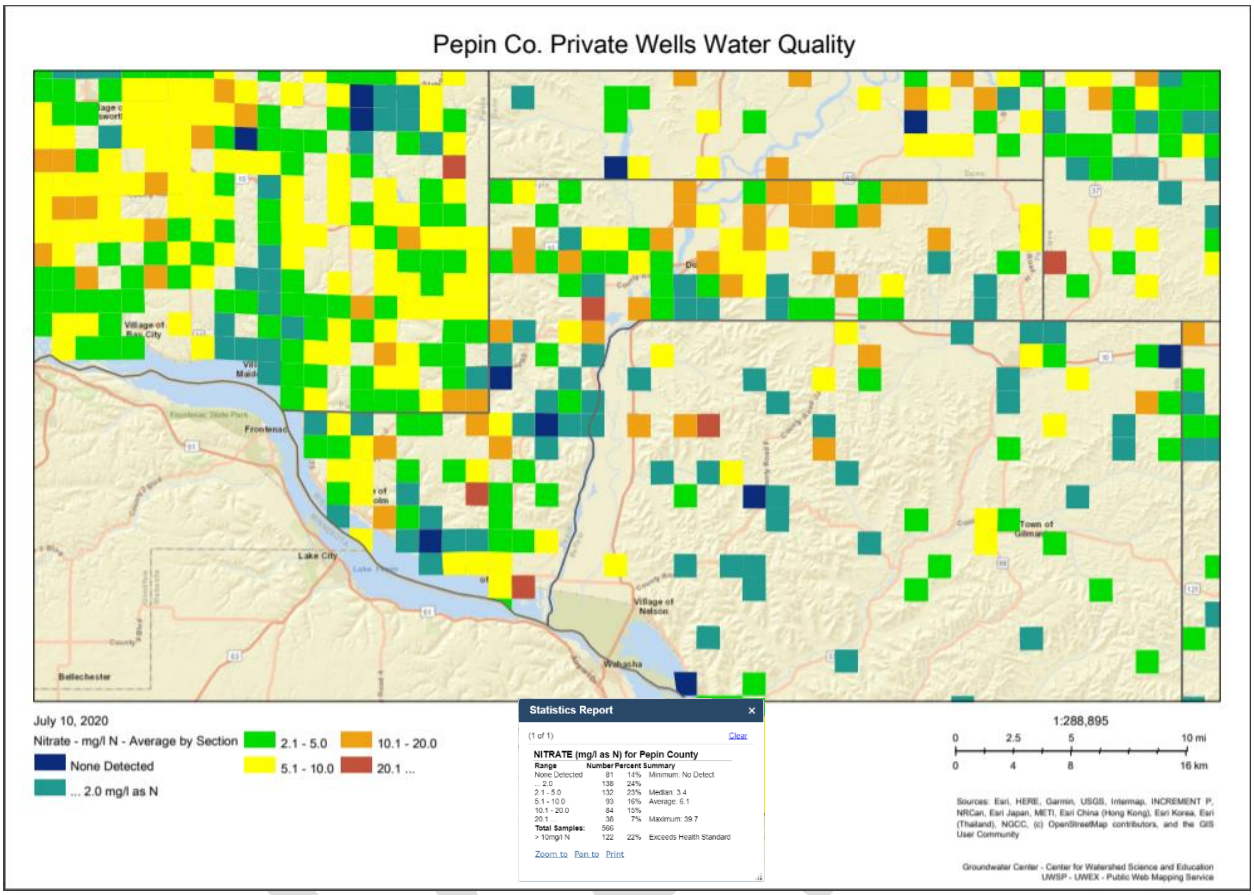


Figure 5: Average nitrate-nitrogen concentration by section for Pepin County and surrounding areas. Sections not colored contain insufficient data to summarize. Source: WI Well Water Viewer. 2020.

Approximately 61% of wells tested measured greater than 2 mg/L, which provides evidence that land-use activities are having a noticeable effect on private well water quality in Pepin County. Soil drainage properties combined with areas of concentrated agricultural land cover help to explain both the extent and magnitude of nitrate-nitrogen concentrations in Pepin County.

In 2008, the Pepin County Land Conservation Committee pursued an interest in a water-sampling program in order to evaluate the water quality throughout the county, as well as prioritize the efforts, goals, and objectives of land conservation. Well data gathered in 1990 was used to compare the monitoring results from 50 wells in 2008. The program was repeated in 2010 and 2015 to evaluate any changes in the county's water supply. An effort was made to monitor the same 50 wells as in 2008.

Figure 6 illustrates the trending county average for nitrate-nitrogen concentrations in the rural water supply. The average data was compiled from results from all wells sampled through the program in 1990, 2008, 2010 and 2015.

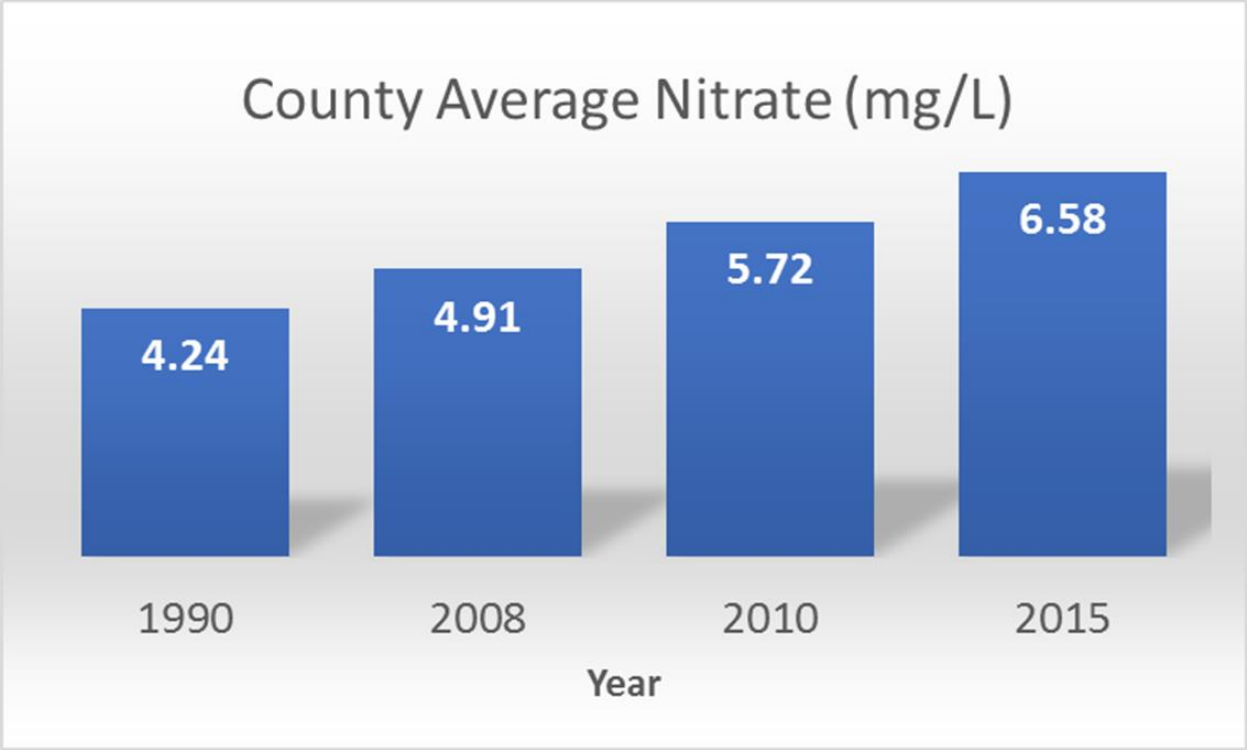


Figure 6: Average nitrate-nitrogen concentrations throughout Pepin County's groundwater (1990 – 2015). Source: Pepin County Land Conservation & Planning Department.

Pepin County is in the process of obtaining a more complete picture of the groundwater quality throughout the County. This is being done through a yearly cycle of homeowner well tests conducted by county staff in 1-2 townships per year. The goal is to obtain a water sample from a homeowner in every PLSS section of each township in order to provide the county with a more accurate depiction of the county's groundwater that is feasibly obtainable. While many variables were tested for, the two that are most prominent to agriculture are nitrates and diaminochlorotriazine (DACT). The Nitrate Levels map (Figure 7) includes data that was obtained by Pepin County between 2015 and 2019.

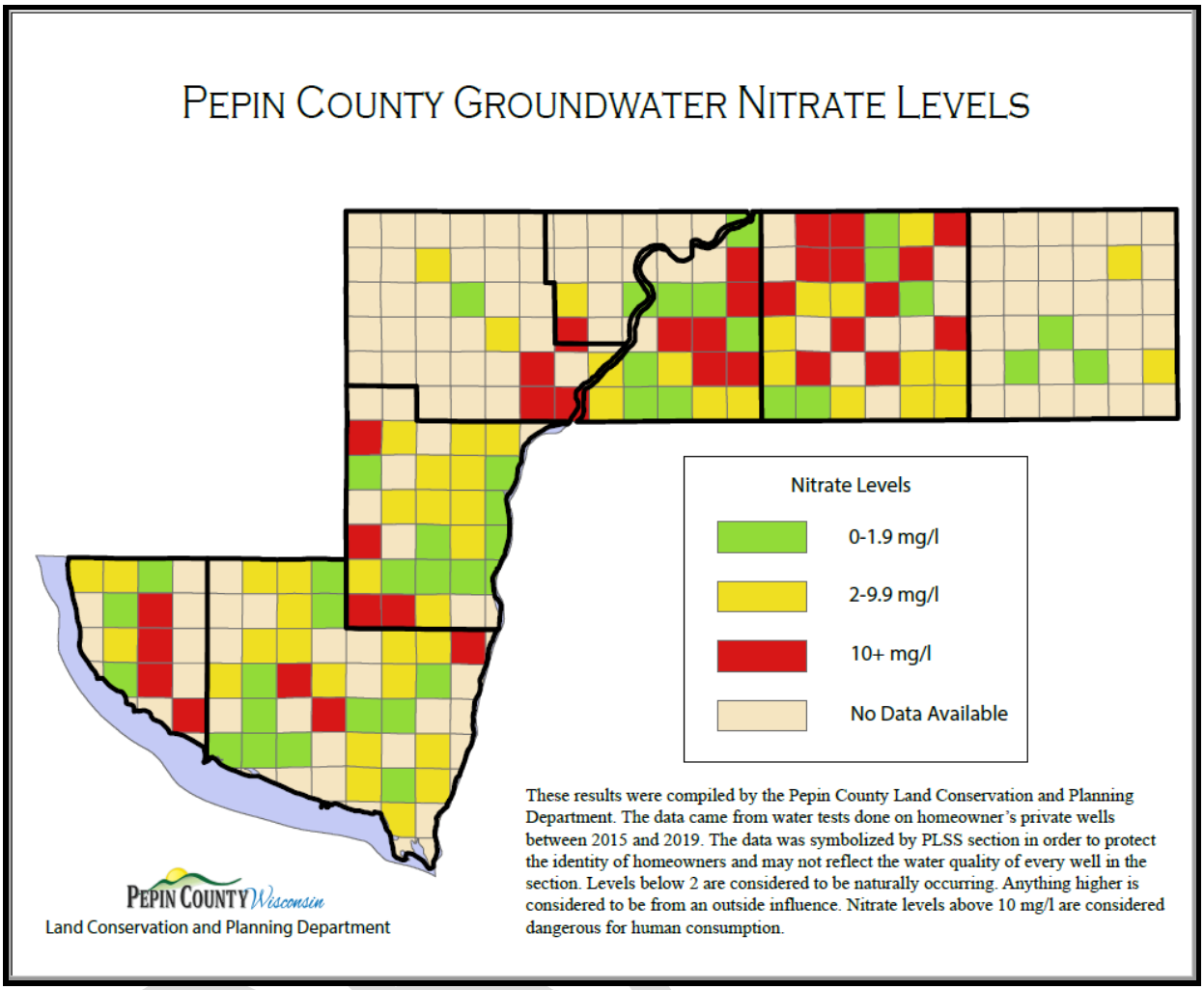


Figure 7: Nitrate levels in Pepin County groundwater displayed by section. Source: Pepin County Land Conservation & Planning Department.

As seen in the Nitrate Levels map (Figure 7), there are still many sections that need to be tested. However, the data gathered provides important insight regarding regional trends in groundwater quality. It is important to note that the well tested in each section does not necessarily indicate the groundwater quality for every well in the section, but the information is displayed in this manner in order to protect the well-owners' identities, as well as to generalize the information in a way that can be useful to researchers and for the general public. It can be seen in the Figures above that there are clusters of nitrates that are at levels over 10 mg/L nitrate-nitrogen, meaning they exceed the safe consumption level for humans. This poses a great risk to public health, especially in cases where people may be unaware of the potential health risks of consuming elevated nitrate-nitrogen concentrations in high quantities.

Private wells tested in 2017 were located in the townships of Frankfort, 27 samples and Stockholm, 10 samples. The average nitrate results of those samples were 4.2 mg/L and 7.8 mg/L respectively. The percentage of wells tested in Frankfort Township that exceeded the safe drinking water standard of 10 mg/L was 15% and for Stockholm Township was 40%. Private wells tested in 2018 were located in the townships of Durand, 21 samples and Lima, 29 samples.

The average nitrate results of those samples were 8.22 mg/L and 11.73 mg/L respectively. The percentage of wells tested in Durand Township that exceeded the safe drinking water standard of 10 mg/L was 33% and for Lima Township was 45%.

Nitrate Trends – Public water supply

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. These historical records can be used to assess how groundwater quality is changing in those areas where the wells are located. Wells with more than a 20 year record of nitrate-nitrogen concentrations was used to determine a long-term average trend for Pepin County nitrate-nitrogen concentrations. That information shows that nitrate-nitrogen concentrations in public water supplies have increased at a rate of 0.1 mg/L for the period from 1995-2018 with most of that increase occurring from 2005 to 2018.

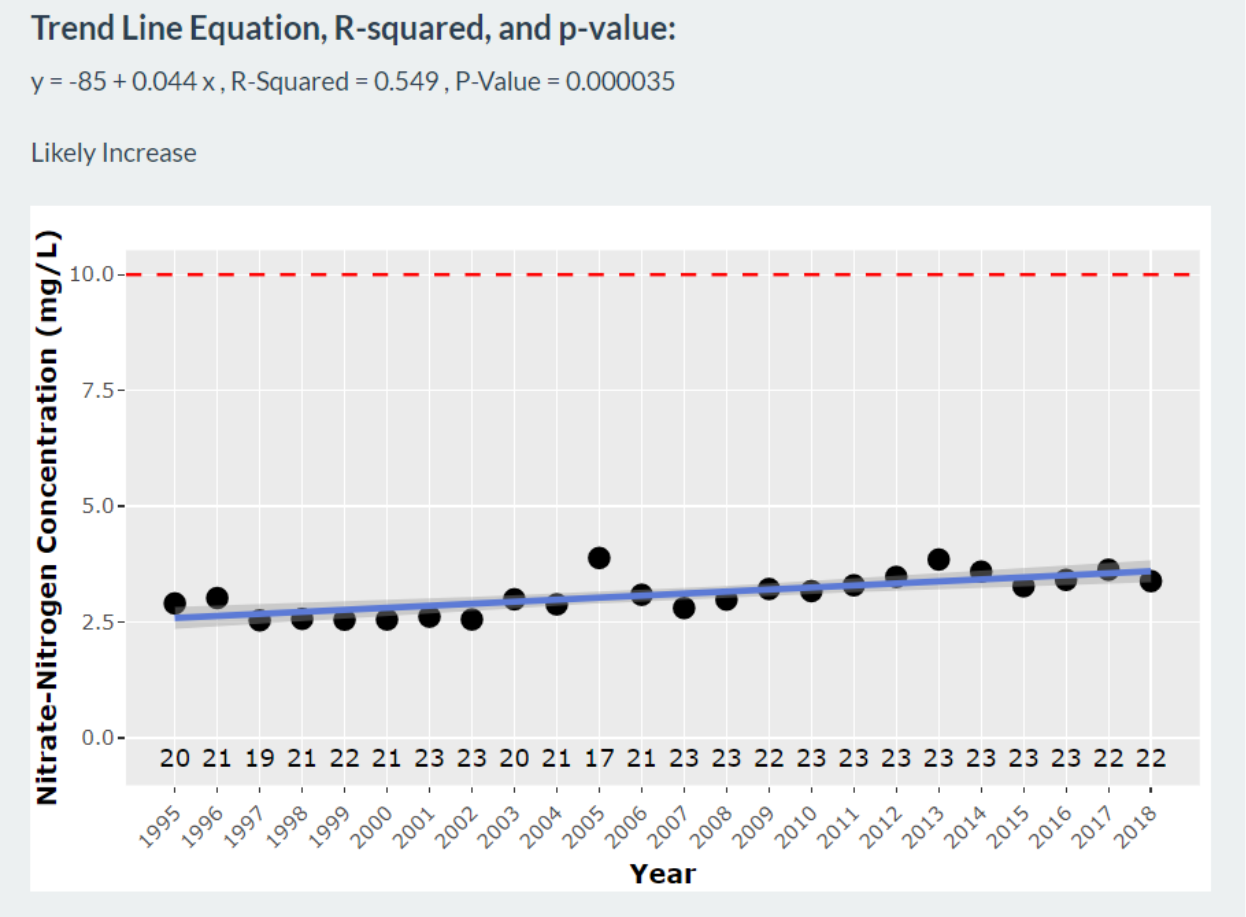


Figure 8: Average annual nitrate-nitrogen concentration all public water systems with more than 20 years of data. Number of wells used to calculate annual average shown on plot for each year. Likely increase signifies a p-value less than 0.05 and a rate of change equal or greater than 0.01 (0.1 mg/L for a 10 year period). Data Source: WI Groundwater Retrieval Network.

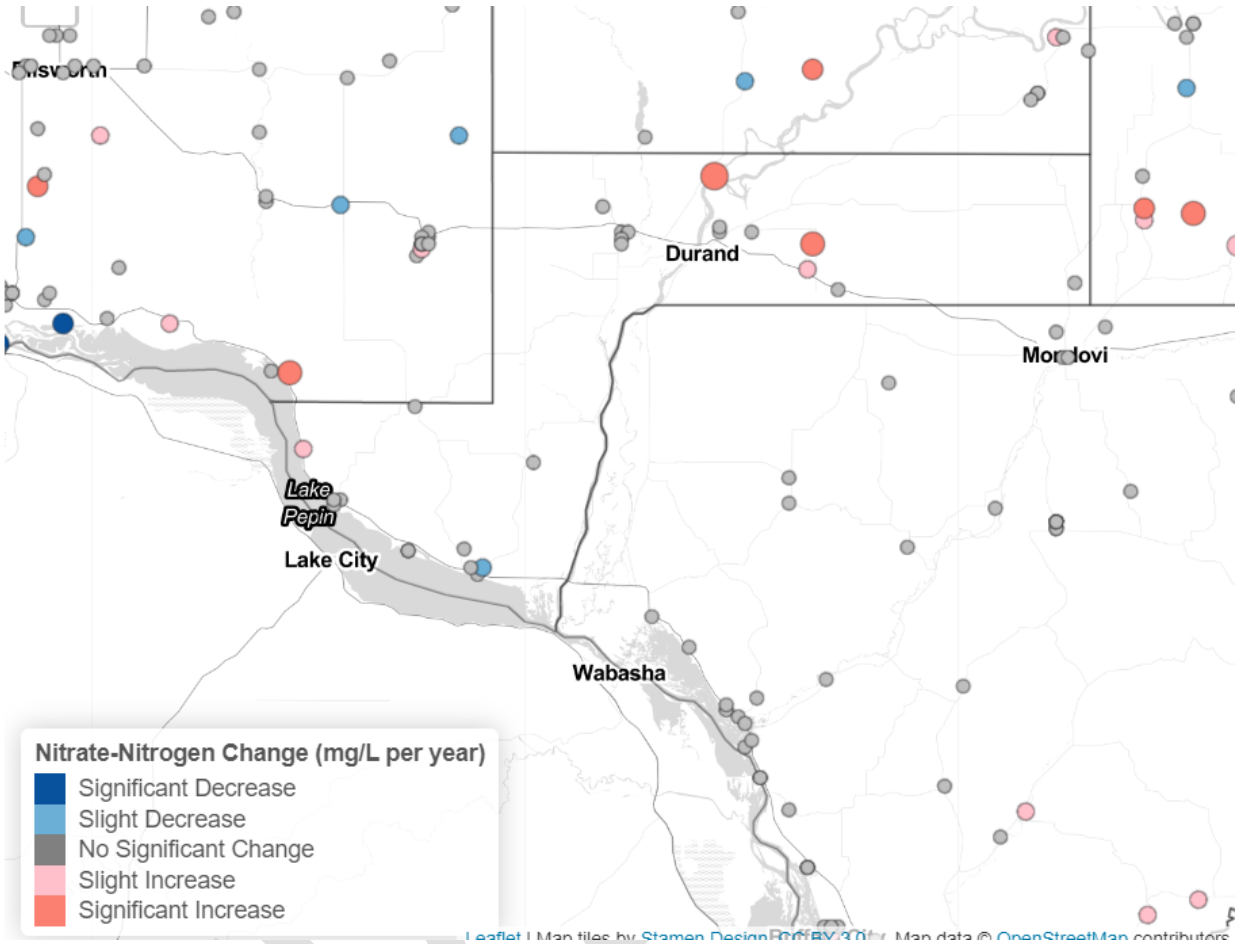


Figure 9: Map showing general location of public water supply wells. Color indicates whether there is a significant change and if so, the magnitude and direction of the change. Source: Nitrate in Wisconsin Public Water Systems. 2020.

Diaminochlorotriazine (DACT)

The DACT screening is a new addition to the well testing program in 2018 by the Land Conservation & Planning Department. The DACT screen is an approximate test that detects agricultural chemicals called "triazines". Triazines are a class of herbicides that include atrazine, simazine, and cyanazine. So far, the LCPD only has data for the townships of Lima and Durand (Figure 10). This map shows the specific PLSS sections where DACT was detected as present in the groundwater. None of the sections reach a level high enough to be deemed as unsafe to drink.

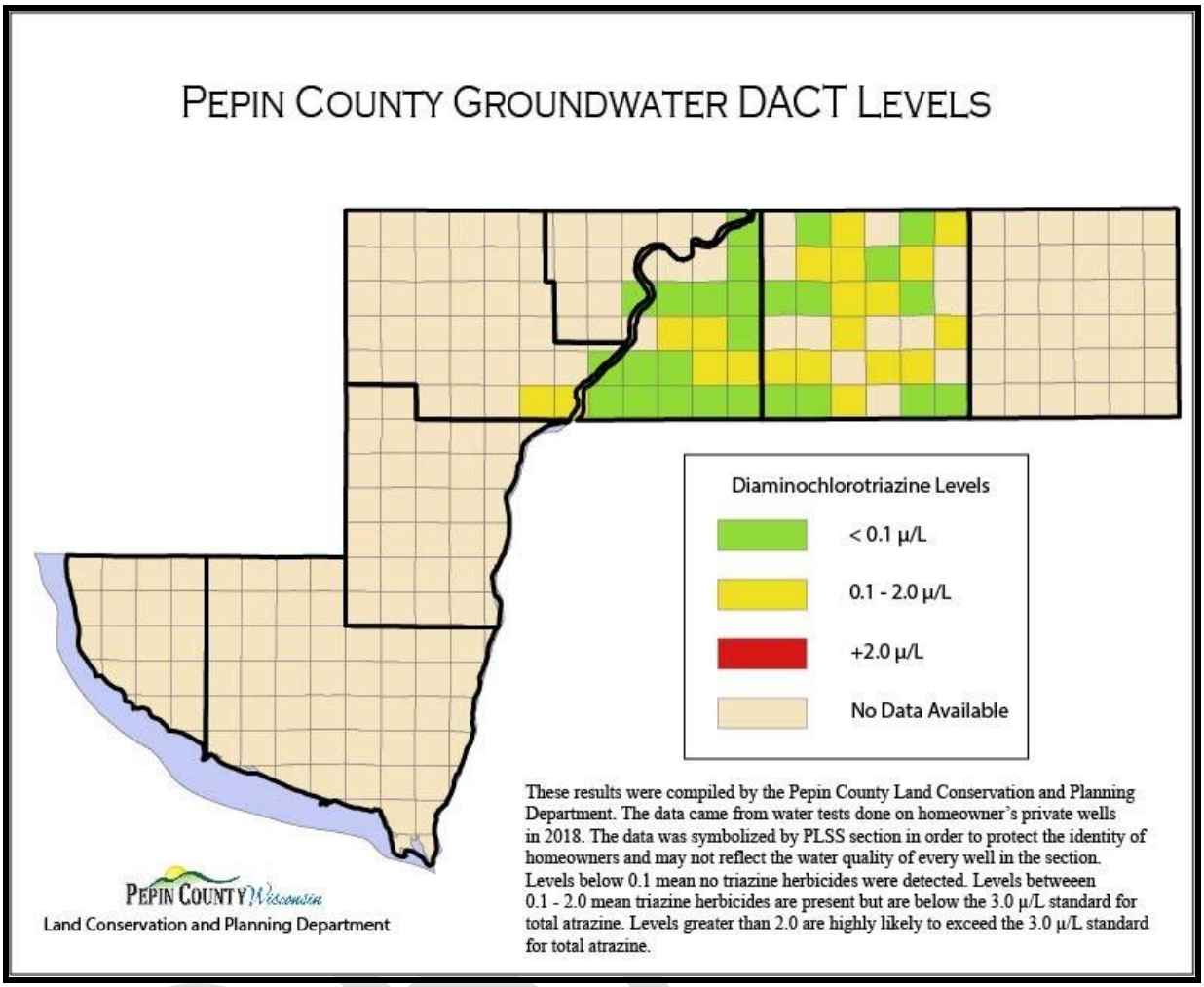


Figure 10: DACT levels in Pepin County groundwater displayed by section.

As seen previously in this report, Figure 4, illustrates groundwater elevation and direction of flow, as well as where groundwater is close to the land surface. When the water is closer to the surface, it is easier for pollutants to leach into the groundwater, especially in areas with soils of high susceptibility to groundwater contamination. Understanding groundwater flow is helpful in determining potential sources of groundwater pollution. If multiple tests are done on the groundwater within the same watershed, at the same time, it is easier to pinpoint potential sources of pollution because the pollutants can be seen moving throughout the watershed.

Data considerations from the Wisconsin Well Water Viewer, Land Conservation & Planning Department, and the Wisconsin Groundwater Retrieval Network are necessary when evaluating Pepin County's groundwater quality.

High Capacity Wells and Impacts

The use of high capacity wells has always been present in Pepin County. Their use has increased within the last 10 years. The primary reason for their increased use is related to a reduction of risk in growing a crop. Being able to supply a growing crop with water as needed is an important insurance that there will be an adequate crop for harvest. Many of the high capacity wells are

used for irrigation of crops, and in some instances are used to supply water to large livestock facilities. With an increase in the use of irrigation on cropland, there are also concerns about the impact those wells have on groundwater quantity and quality. The combination of unique watershed characteristics, weather, and groundwater withdrawal have a detrimental effect in the Central Sands area of Wisconsin, specifically on the surface and groundwater quality (Small 2018). Some of these effects include but are not limited to lowered lake levels, streams without water, and impacts to private wells.

The use of irrigation also brings opportunities for supplying crops with nutrients when the crop needs them through fertigation. This practice, if managed properly, could be very beneficial to the overall supply and need of nutrients, particularly nitrogen, to a growing crop. However, there are consequences associated with the use of irrigation. Irrigated land in Pepin County is typically associated with soils that are highly permeable and usually have a low capacity to attenuate contaminants. A map of sections where irrigation is present can be seen in Figure 11. These areas are also accompanied by land uses in commercial row crop productions such as corn, corn silage, soybeans, potatoes, and kidney beans. Many of these crops require an intensive nutrient management program that includes commercial fertilizer and livestock manure. Concerns for groundwater contamination through leaching need to be considered when managing the water needs of these land uses.

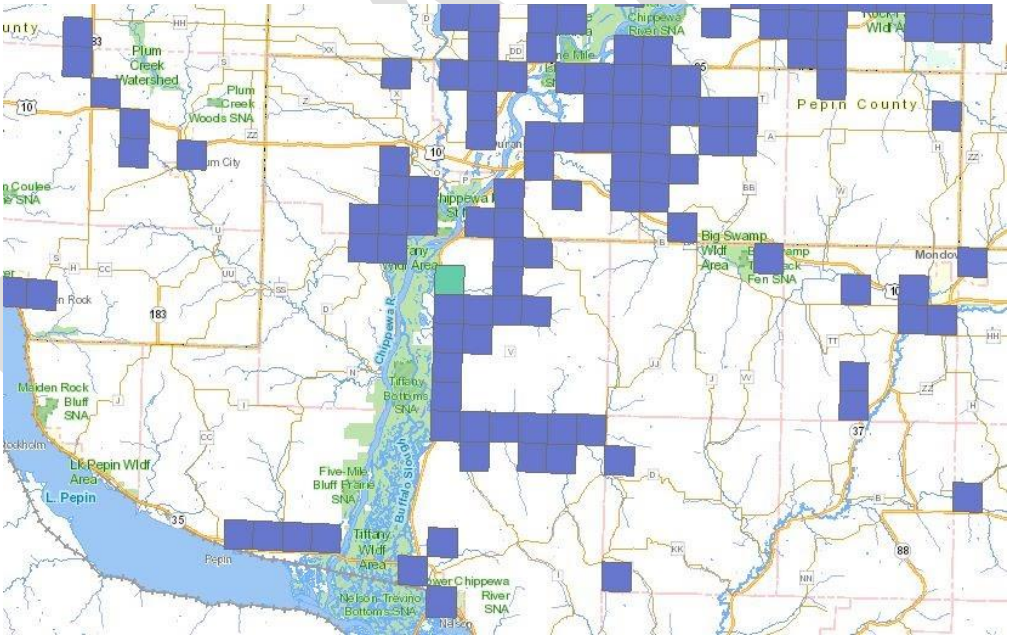


Figure 11: High Capacity Well Locations in Pepin County (Source: WI DNR).

Soils

Much of the land in Pepin County has at some time experienced significant erosion. The soils vary from silt loams to sandy loams. The largest soils association in Pepin County is the Pepin-Doreton- Churchtown, which covers approximately 36% of total land area. Sheet, rill and gully erosion are the main hazards. With the exception of the steep and stony land that is too steep for agriculture, the soils in this group are very productive if they are well managed. Based on the estimates contained in the "Pepin County Erosion Control Plan (1985)" and in previous

inventories, the county shows an average of 9-10 tons of soil loss per acre per year. In both 1999 and 2000 a soil transect survey was conducted in Pepin County to estimate current annual soil loss rates. The results of the 2000 survey showed the average soil loss per acre was 2.8 tons and 83.4 percent of cropland acres in the county were meeting the soil loss tolerance (T). A 2009 transect survey resulted with an average soils loss per acre of 2.4 tons per acre per year and 84.9% of cropland acres were meeting soil loss tolerance (T). Changes in the total cropland acreage impact the percentage of cropland meeting soil loss tolerance (T). The Transect Survey continues to assist us in determining our conservation priorities.

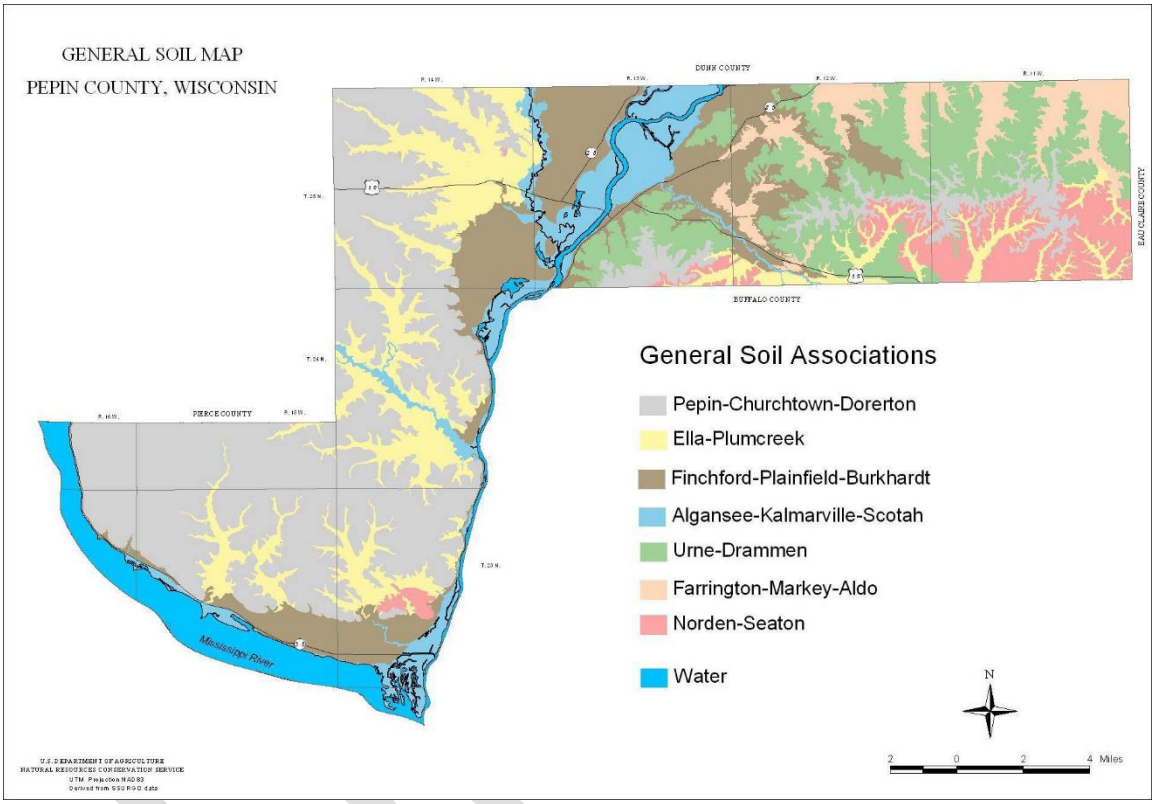


Figure 12: General Soil Association Map of Pepin County, WI.

Soil Erosion – Transect Survey

In many areas of the county, gully erosion consumes cropland because of the terrain. Slopes average 8-18%. Based on information from projects completed, the amount of soil lost to advancing gullies can be quite substantial (greater than 100 tons per year per gully), even though the actual number of acres affected is relatively few.

According to information contained in the **1985** Soil Erosion Plan the data is as follows:

Total cropland	74,200 acres
Cropland acres meeting T and under	53,211 acres
Cropland acres in excess of 2 T	20,989 acres
Highest erosion rate for single field	67 ton

According to information collected during the **2000** soil transect survey, the data has changed significantly:

Total cropland acres in production	63,650
Cropland acres at or below "T"	53,083
Cropland acres 1 "T" to 2 "T"	5,594
Cropland acres in excess of 2 "T"	4,351
Highest erosion rate for single field	20.4 ton

According to information collected in the **2009** soil transect survey, the data is very similar:

Total cropland acres in production	59,689
Cropland acres at or below "T"	50,656
Cropland acres 1 "T" to 2 "T"	4,231
Cropland acres in excess of 2 "T"	4,803
Highest average soil loss rate	28.9

Beginning in 2013, the Transect Survey was conducted using SNAP Plus (Nutrient Management Planning Software) to track and calculate soil erosion annually and over a designated period or cropping rotation. The 2013 – 2020 rotational average soil loss for Pepin County is 2.1 tons per acre per year. The annual soil loss for each year in that rotation is as follows:

Year	2013	2014	2015	2016	2017	2018	2019	2020
T/ac/yr	2.1	2.1	2.1	2.3	2.4	2.3	1.7	1.8

While the rotational average soil loss is below the average Tolerable level for all soils, and the annual soil loss indicates soil loss is improving, there are still localized areas within the County that are eroding at excessively higher rates than the tolerable amount for those specific soils. Further conservation measures are needed for those land uses. Those areas are considered for the implementation of this plan.

Wind erosion is also a problem on the sandy loam soils located in the central part of the county. Pepin County is located in what is classified by the Natural Resource Conservation Service, as the "Northern Mississippi Valley Loess Hills". The soils located in this area are sensitive soils, T value of four tons or less. The depth of the loess ranges from 30 to 100 inches. The damage from the wind erosion can result in losing topsoil, reduction in productivity, and if severe enough, can cut the plant tops and damage roots. There are several Pepin County townships susceptible to wind erosion, with approximately 1500-2000 acres.

According to the USDA Web Soil Survey, 77.6% of the soils in Pepin County fall into the category of "Very limited", indicating that the soil has one or more features that are unfavorable for [land spreading]. Some of those reasons include: slope, leaching, too acidic, depth to saturation zone, filtering capacity, droughty, and ponding. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected. Figure 13 illustrates the degree of groundwater contamination susceptibility around Pepin County.

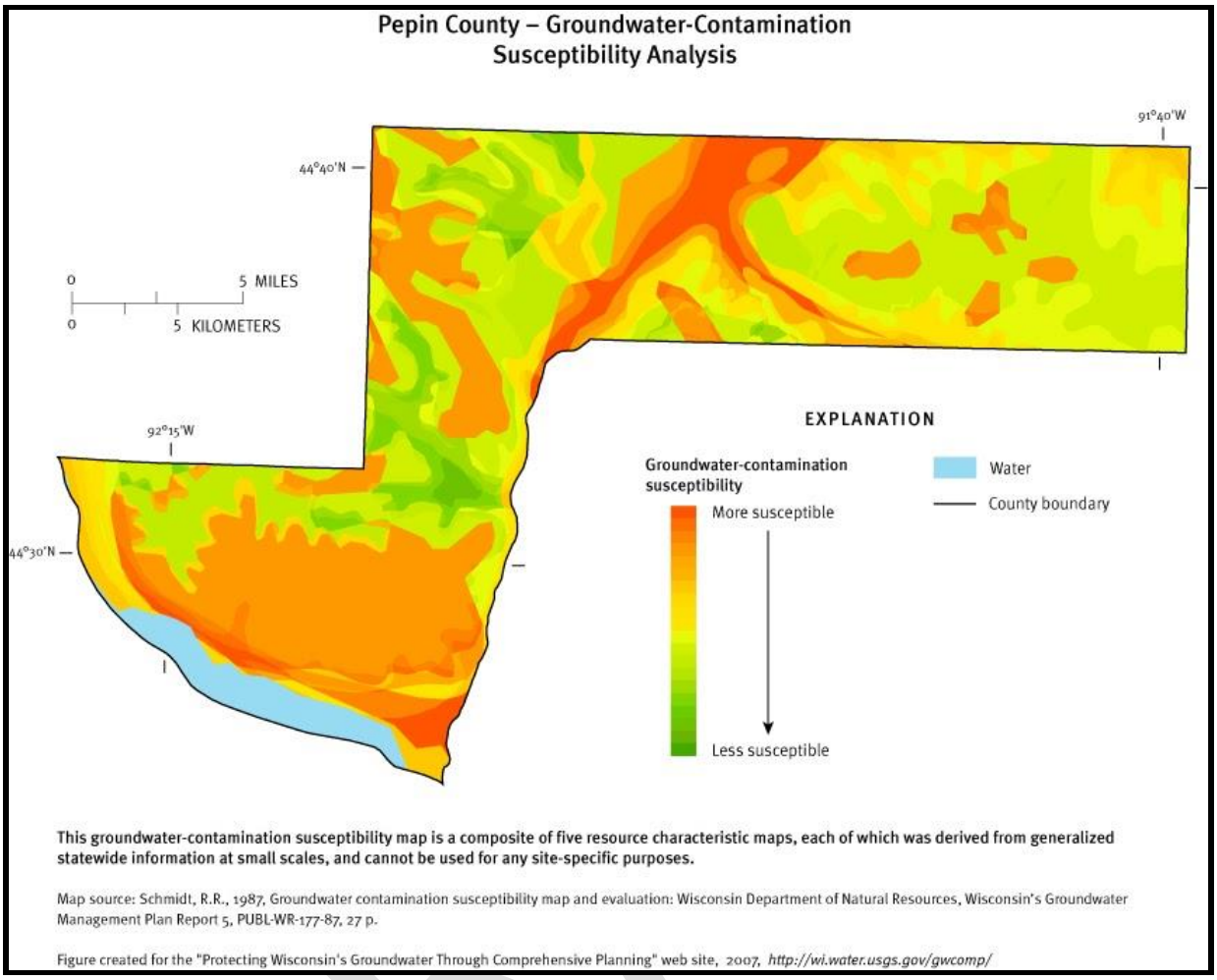


Figure 13: Groundwater Contamination Susceptibility Analysis.

Additionally, soil erosion runs off the landscape and eventually moves to nearby surface water, wetlands and other depressions. Which may cause loss of productive topsoil, loss of water holding capacity in wetlands, impacting flooding through sedimentation of surface water resources.

Surface Water

The total surface water area in Pepin County is 2,962 acres. Of this total, several small lakes cover 270 acres, and there are over 18 miles of trout streams. Lake Pepin is not included in this surface water acreage. Lake Pepin is a boundary water and covers approximately 10,384 acres. Pepin County is comprised of 15 different HUC-12 surface watersheds. Within each of these watersheds, there will be streams that are perennial flowing. The source of the water for these streams is primarily supplied by groundwater and runoff within the watershed. Surface water within Pepin County eventually flows to the Mississippi River.

Several waters of Pepin County are listed on the Department of Natural Resources 303 (D) list of impaired waters. These include Arkansaw Creek, Bear Creek, Cranberry Creek, Eau Galle River,

Fall Creek, Harvey Creek, Lake Pepin, Plum Creek, Porcupine Creek, Silver Birch Lake, the Mississippi River, and the Chippewa River. These impaired waterways are some of the most prominent waterways in Pepin County. The contamination may include, high Total Phosphorus, Mercury, PCBs, PFOs, and excessive sedimentation (Figure 14).

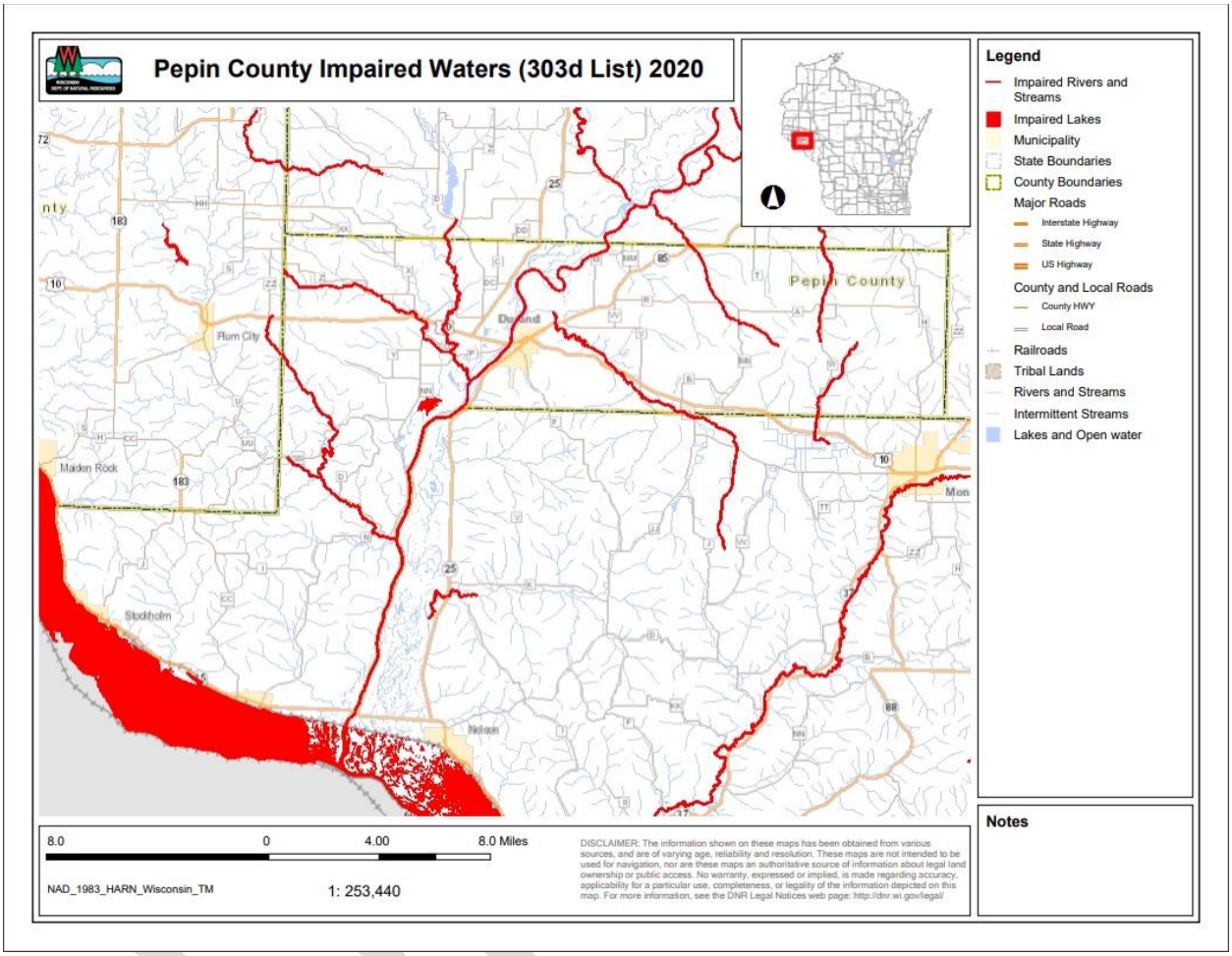


Figure 14: Impaired surface waters of Pepin County, 2020.

WDNR Impaired Waters List – Pepin County 2020

Official Name (Click for Details)	Start Mile	End Mile	Water Type	County	Pollutant	Impairment	Status
Arkansaw Creek	0	9.01	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Bear Creek	7.5	10	River	Buffalo, Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Bear Creek	1.5	7.5	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Bear Creek	0	1.5	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Bogus Creek	0	8.25	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Chippewa River	20.73	37.58	River	Dunn, Pepin	PCBs	PCBs Contaminated Fish Tissue	303d Listed
Chippewa River	0	20.73	River	Buffalo, Pepin	Mercury	NA	Pollutant Removed - Delisted 2008
Chippewa River	0	20.73	River	Buffalo, Pepin	PCBs	PCBs Contaminated Fish Tissue	303d Listed
Cranberry Creek	0	14.46	River	Dunn, Pepin	Total Phosphorus	High Phosphorus Levels	303d Listed
Duscham Creek	0	8	River	Dunn, Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Eau Galle River	0	8.83	River	Dunn, Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Fall Creek	0	8.24	River	Dunn, Pepin	Total Phosphorus	High Phosphorus Levels	303d Listed
Harvey Creek	7.09	10.68	River	Buffalo, Pepin	Unknown Pollutant	NA	Pollutant Removed - Delisted 2020
Harvey Creek	7.09	10.68	River	Buffalo, Pepin	Total Phosphorus	High Phosphorus Levels	303d Listed
Lake Pepin			Lake	Buffalo, Pepin, Pierce	Total Phosphorus	High Phosphorus Levels	303d Listed
Little Plum Creek	0	4.67	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Lost Creek	0	8	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Mississippi River	714.2	763.4	River	Buffalo, La Crosse, Pepin, Trempealeau	PFOS	PFOS Contaminated Fish Tissue	303d Listed
Mississippi River	714.2	763.4	River	Buffalo, La Crosse, Pepin, Trempealeau	Mercury	Impairment Unknown	303d Listed
Mississippi River	714.2	763.4	River	Buffalo, La Crosse, Pepin, Trempealeau	Total Phosphorus	Impairment Unknown	303d Listed
Mississippi River	763.4	811.5	River	Pepin, Pierce	PCBs	Impairment Unknown, PCBs Contaminated Fish Tissue	303d Listed
Mississippi River	763.4	811.5	River	Pepin, Pierce	Mercury	Impairment Unknown	303d Listed
Mississippi River	714.2	763.4	River	Buffalo, La Crosse, Pepin, Trempealeau	PCBs	Impairment Unknown, PCBs Contaminated Fish Tissue	303d Listed
Mississippi River	763.4	811.5	River	Pepin, Pierce	PFOS	PFOS Contaminated Fish Tissue	303d Listed
Mississippi River	763.4	811.5	River	Pepin, Pierce	Sediment/Total Suspended Solids	Degraded Submerged Aquatic Vegetation (SAV)	303d Listed
Mississippi River	763.4	811.5	River	Pepin, Pierce	Total Phosphorus	Degraded Biological Community	303d Listed
Plum Creek	0	7.23	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed
Porcupine Creek	0	10.11	River	Pepin, Pierce	Total Phosphorus	Impairment Unknown	303d Listed
Rock Creek	4.64	9.59	River	Dunn, Eau Claire, Pepin	Total Phosphorus	High Phosphorus Levels	303d Listed
Silver Birch Lake			Lake	Pepin	Total Phosphorus	Eutrophication, Excess Algal Growth, Elevated pH	303d Listed
Unnamed	0	8.09	River	Pepin	Total Phosphorus	Impairment Unknown	303d Listed

Source: WDNR Impaired Waters Search Tool – https://dnr.wi.gov/water/impairedSearch.aspx

The WI DNR has been testing the Chippewa and Mississippi Rivers for nitrates in the surface water and tracked trends over time. Figures 15 and 16 illustrate the steady increase in nitrates seen in the surface water of these two rivers. Nitrates move from groundwater to surface water and vice versa, therefore increases in either water type could cause an increase in nitrates in the source water.

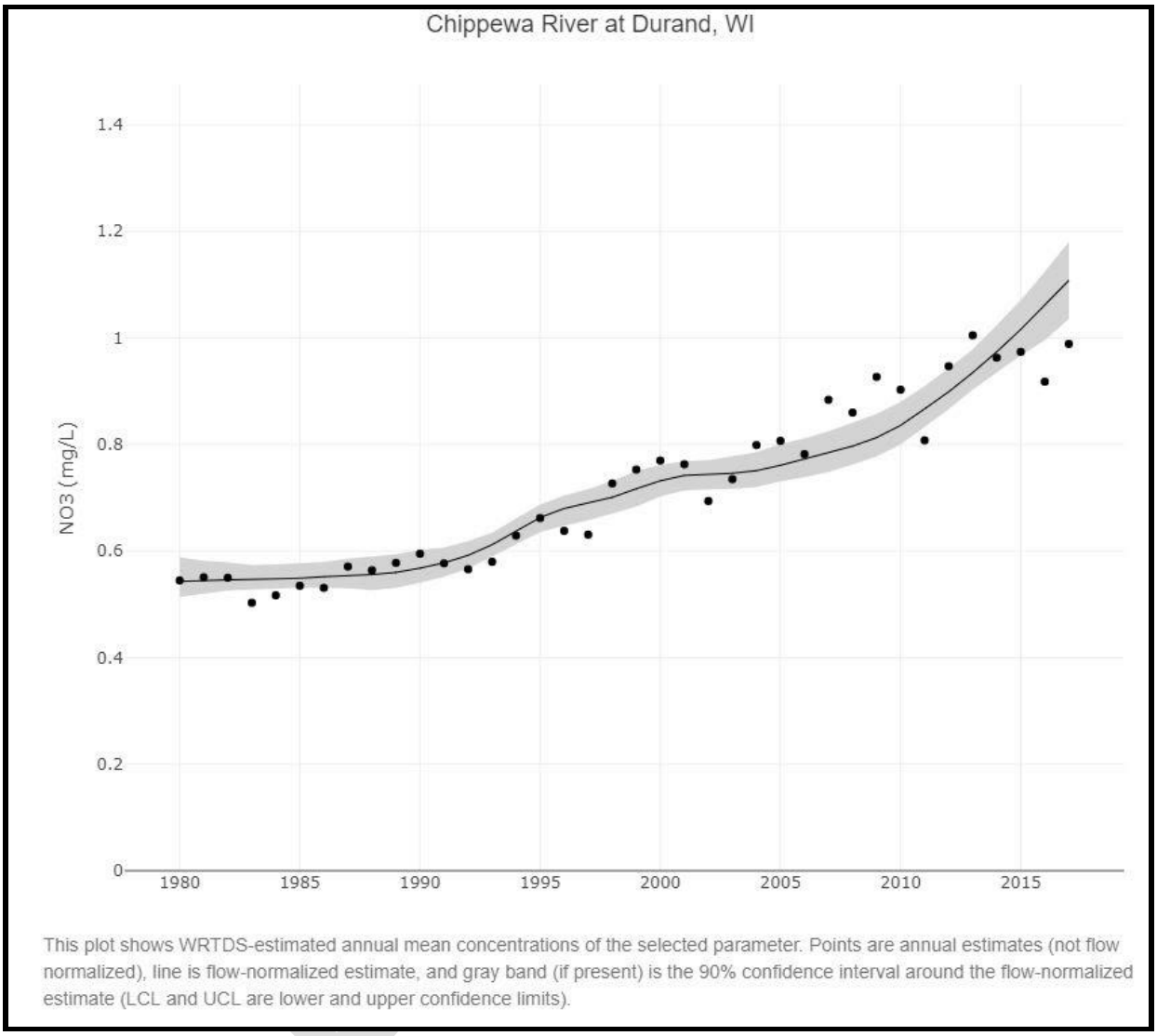


Figure 15: Nitrate levels in the Chippewa River at Durand, WI (Source: WI DNR).

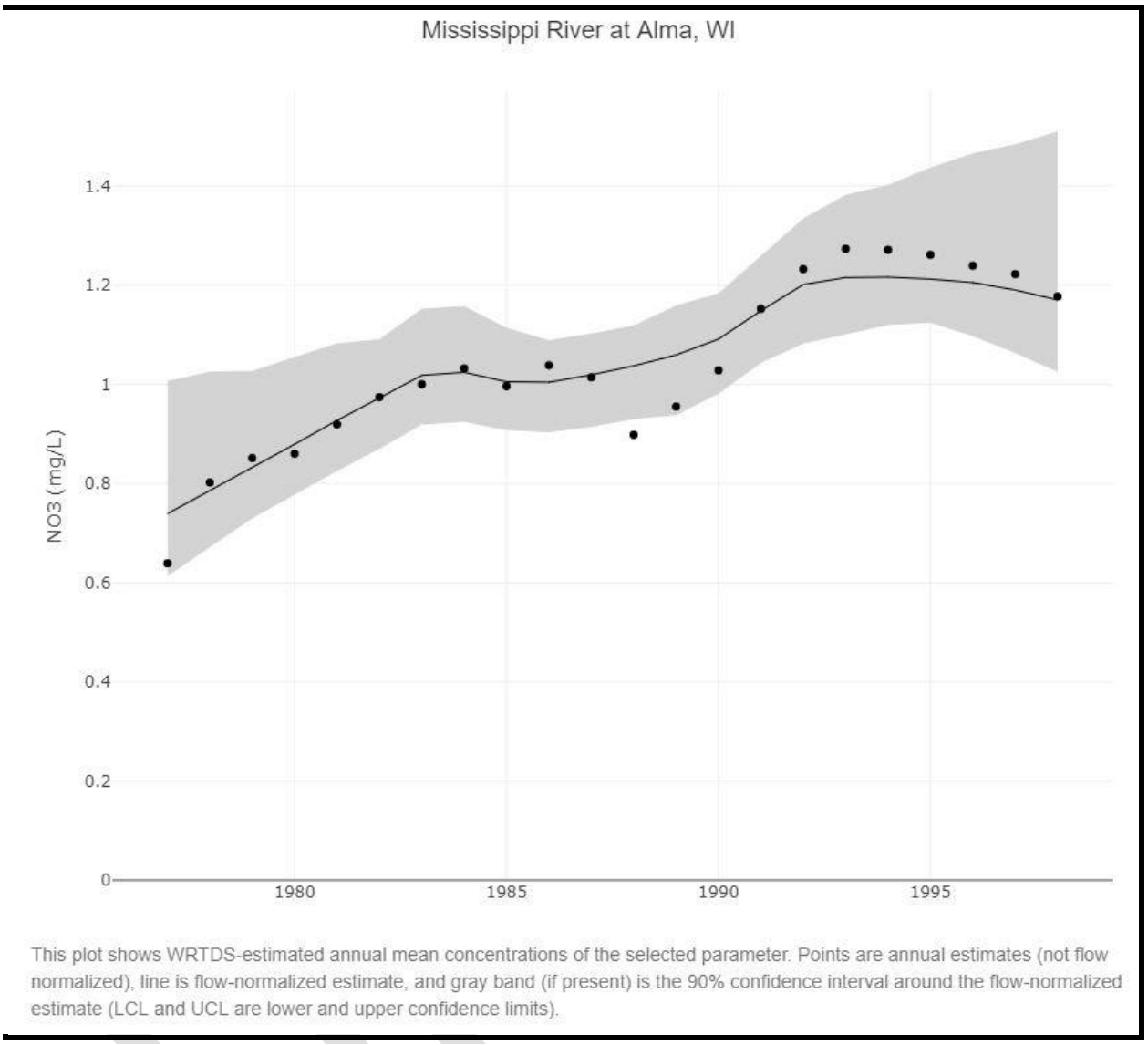


Figure 16: Nitrate levels in the Mississippi River at Alma, WI (Source: WI DNR).

Based on stream monitoring conducted by County staff from 2011 to present, there are watersheds that have higher nutrient content than other watersheds. This is based on observational research and may or may not be related to land use practices in the surrounding areas. Continued long-term monitoring may help better the understanding of the cause of these impacts. While the differences in nutrients may be apparent now, it is difficult to establish trends because this is a relatively new program and it cannot be determined if the nutrient contents seen are changing over time or if they are naturally occurring in these watersheds.

Total phosphorus and sediment are the prominent contamination issues of our local streams. The primary methods for these types of contamination are through soil erosion. Phosphorus typically has a lower leaching potential than nitrate and is typically found attached to soil particles. When those soil particles move off the landscape and runoff to surface water, the phosphorus is attached. Once in the surface water, phosphorus becomes more soluble and can have negative impacts on the surface water, resulting in harmful algal blooms (HABs). Harmful algal blooms

consist of blue-green algae, also known as Cyanobacteria. They are a group of photosynthetic bacteria that many people refer to as "pond scum." Concerns associated with blue-green algae include discolored water, reduced light penetration, taste and odor problems, dissolved oxygen depletion during die-off, and toxin production. These algae blooms can cause a negative impact on the aquatic ecosystem including, fish kills (Environmental Protection Agency).

Watersheds (HUC-10) (See Figure 17)

Bear Creek Watershed

The Bear Creek watershed contains typical steep topography characteristic of the "driftless" or non-glaciated area of the state. Because the most productive and level land is on the valley floor, most farming takes place immediately adjacent to streams. Portions of forested areas have been converted to agricultural uses. The Class II trout fishery is threatened by sedimentation, nutrient loading and increased water temperatures. Periodic flooding also has an effect on in-stream habitat. The Durand Sportsman Club, with assistance from the Land Conservation & Planning Department, and other state and federal agencies have installed riprap along some banks of the creek and conducted habitat restoration work.

Lowes and Rock Creek Watershed

Fall, Cranberry and Duscham Creeks are sub-watersheds in this major watershed. The portion of this watershed that is located in Pepin County is in agricultural use. The management practices needed in this watershed will be aimed to protect the trout streams from further degradation.

Fall Creek is noted as a native brook trout stream, but over the years has been threatened by cattle pasturing the stream banks, feedlot runoff and cropland erosion. This watershed received money from a Federal Water Quality Incentive Program appropriated through ACP in 1992. High nitrate levels in groundwater prompted Pepin County to pursue this project. This program was entirely voluntary and was used as an educational tool for other parts of the county. The goal of the project was to demonstrate how implementing best management practices such as nutrient management planning and conservation tillage can positively affect water quality and farming profitability.

Plum Creek Watershed

The streams in the Plum Creek Watershed have a branching drainage pattern with thalwegs aligned in a northwest-southeast direction. The water resources are a major concern in this watershed because there are two county parks and two lakes, which is the local attraction. A fish survey in 2001 showed Plum Creek as a Class II trout fishery. Sedimentation and nutrient enrichment has affected the water quality in this stream.

A conservation incentive program known as the Conservation Credit Program was implemented in the Plum Creek Watershed in 1995, 1996 and 1997. This program provided tax incentive to landowners who changed their conservation rotations, implemented nutrient management planning and maintained the stream on their land.

Pepin and Pierce County cooperated to sponsor a watershed project through the NRCS's Environmental Quality Incentive Program (EQIP). The entire watershed is split almost evenly between the two counties and was approved for $l.3 million over the course of five years. The major thrust of this project was to encourage nutrient management planning, total resource management, pasture management, gully erosion control, and stream bank protection. Successfully completed practices under this program will assisted Pepin County landowners in meeting the agricultural performance standards and prohibitions as described in NR 151 (July 2004). While this project expired years ago, continued implementation of NR151 standards are needed to maintain the previous work and protection for soil and water resources.

Silver Birch Lake is located within the Plum Creek Watershed. Silver Birch Lake is a highly productive shallow oxbow lake adjacent to the Chippewa River, southwest of Durand. Silver Birch Lake is an important recreational site and is used intensively by the public. The public for some time have expressed concerns about the condition of the lake. These concerns focused on the status of fish population and water quality, particularly algae and aquatic plant densities and wintertime oxygen conditions. Water quality of the lake is largely impacted by excessive nutrients reaching the water. A Lake Management Plan was developed in 1995. The conclusion of this plan indicated there was a need to do some exploration of nutrient loading into the lake waters; and secondly, consider wintertime aeration of the lake. With the assistance of Sportsman Clubs and Fish America, the aeration system was installed. Monitoring the dissolved oxygen is still being done. This lake is listed in the Department of Natural Resources 303 (D) list of impaired water bodies due to sedimentation and nutrient loading.

To address the nutrient loading a WQIP (Water Quality Incentive Program) was initiated. The primary water pollutant to be addressed was phosphorous loading, and the nitrate contamination of ground and surface water. Extensive well testing in the area revealed the existence of nitrates at levels above state health standards. The best management practices implemented were conservation tillage and nutrient/pest management planning and critical area planting. The natural resource concerns with Silver Birch Lake are very difficult to address because only a small amount of land (less than 1000 acres) drains directly into the lake. The major contributor to this lake is the Chippewa River when it floods, which makes management extremely difficult.

Further review and implementation of the Lake Management Plan is needed.

Eau Galle Watershed

Arkansaw Creek is a sub-watershed of the Eau Galle Watershed, and is nine miles long. This stream runs through the Village of Arkansaw. When this stream floods, large amounts of sediment are moved and the high flow scours the stream bank. Approximately 82% of land in this watershed is used for cropland. In recent years many best management practices such as grade stabilization structures, stream bank protection, grassed waterways and conservation tillage have be installed to reduce the total volume of runoff entering this stream. Arkansaw Creek is a class II trout stream.

Rush River Watershed

Bogus Creek, Lost Creek and Pine Creek are sub-watersheds within the Rush River Watershed. Agriculture is the major land use affecting surface waters in this watershed. Bogus Creek and Lost Creek have a moderate to high degree of problems as some barnyards are on or near the stream. The brook trout fishery would be expected to improve from control of non point sources of water pollution. Bogus Creek is a class I trout stream. Pine Creek is also a trout stream. Factors limiting this trout stream include bank erosion, stream bank grazing, and flooding. Controlling these problems would improve stream habitat and water quality, with the potential of supporting a Class I trout fishery.

Lower Buffalo River Watershed

The majority of land in this watershed lies in Buffalo County. There is only a portion located in the extreme east end of Pepin County. The primary land use is agriculture. There are three small creeks located in Pepin County; Brownlee Creek, Harvey Creek and Holmes Creek, which all flow into the Buffalo River. The water is clear, hard and alkaline. Sand is the primary bottom type followed in order of abundance by silt. Forage fish are present, as well as some muskrats, and occasionally beaver. There are several acres of adjoining wetlands near Harvey Creek.

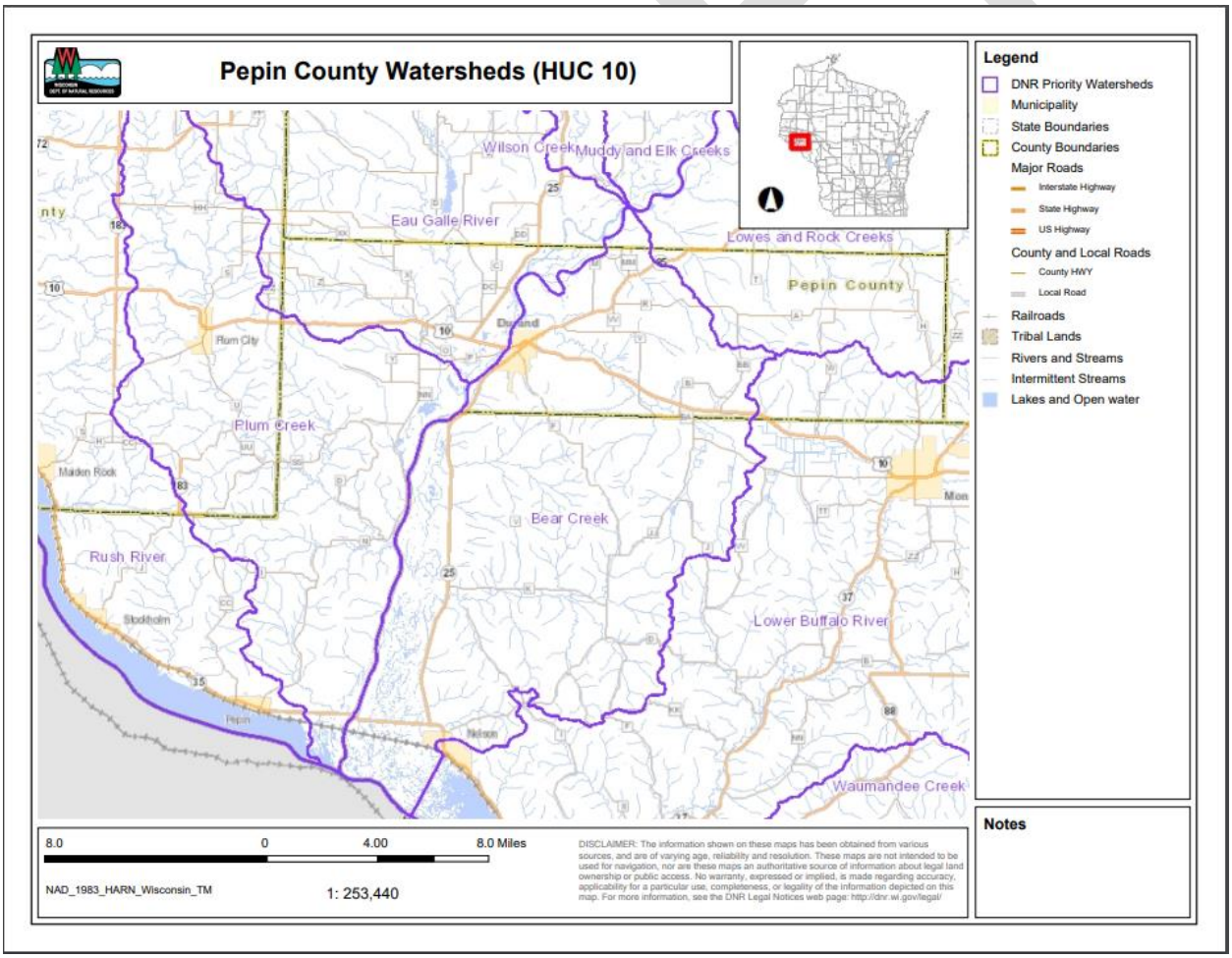


Figure 17: Pepin County watersheds (HUC 10).

Lake Pepin

The Mississippi River flows in a southeasterly direction along the southwestern side of Pepin County. Above the confluence of the Mississippi River and the Chippewa River, Lake Pepin was formed from the Mississippi River. Following the thread of the main channel, there are 16.6 miles of the Mississippi River along the border of Pepin County. All of Pepin County lies in the Upper Mississippi River Drainage, and eventually all the drainage water finds its way to Lake Pepin or the Mississippi River. Depths of the river vary from 20 to 35 feet. This lake is used intensely for the transportation of commerce and for recreational purposes by both Wisconsin and Minnesota residents. This part of the Mississippi River is listed on the Minnesota and Wisconsin Department of Natural Resources 303(D) list of impaired water bodies.

Thompson Lake

This is a spring lake located in the Chippewa River floodplain. The water is hard, alkaline, light brown colored, and low in transparency. The sport fishery is made up of largemouth bass, northern pike, white crappie, yellow perch, black crappie and yellow bass. In addition carp, shad and numerous other forage fish species are present. Muskrats and beaver can be seen. Nesting mallard and teal, migrating ducks, coot and geese use the lake. There are about 240 acres of adjoining wetland.

Watersheds (HUC 12) (See Figure 18)

Major (HUC10) watersheds described above, can be broken down further into smaller watersheds known as HUC12 watersheds. Pepin County will utilize this watershed scale to develop the implementation strategy for this plan. Prioritization of these HUC 12 watersheds will be discussed later in this plan.

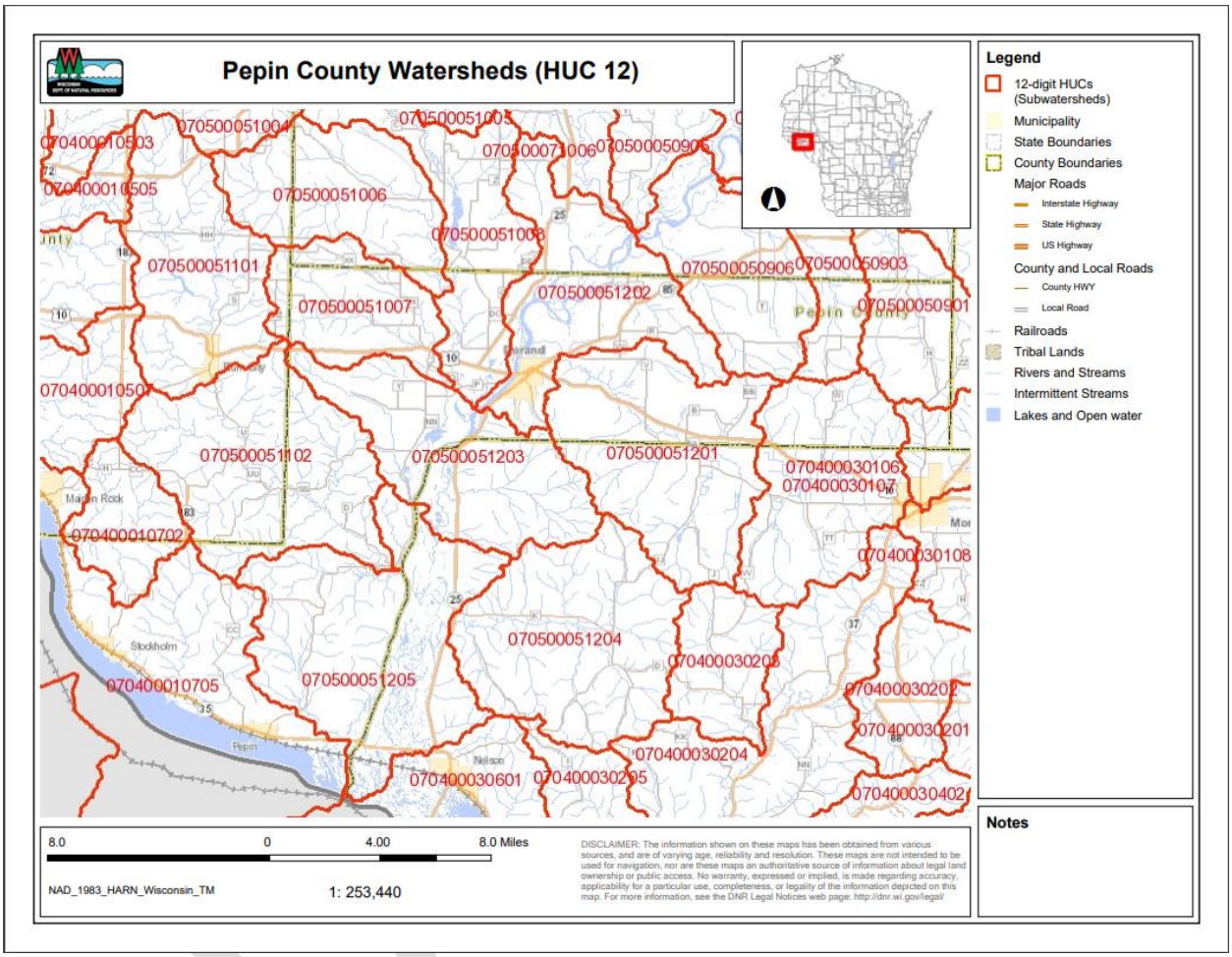


Figure 18: Pepin County Watersheds (HUC12).

Soil Erosion – HUC12 Watershed ranking

The County Transect Survey has been used to identify the HUC12 watersheds with the highest soil loss over an 8-year cropping rotation (2013 – 2020). The following watersheds are ranked, highest to lowest in soil loss:

HUC12 Code	HUC12 Name	Avg. T Tons/ac/yr	Rotational Soil loss T/ac/yr	2020 avg. soil loss T/ac/yr
70400010702	Pine Creek	4.9	4.6	5.0
70500051008	Eau Galle River	2.9	2.4	1.9
70400030106	Peeso Creek	4.0	3.3	2.5
70400010705	Lake Pepin	4.5	3.8	2.7
70500051203	Spring Creek – Chippewa River	3.4	2.3	1.3
70500051102	Porcupine Creek – Plum Creek	4.4	2.9	2.4
70500051205	Little Plum Creek – Chippewa River	4.7	2.7	2.7
70500051007	Arkansaw Creek	4.8	2.0	1.8
70500050901	Rock Creek	4.4	1.7	1.2
70500051201	Bear Creek	4.6	1.3	1.1
70400030107	Harvey Creek	4.3	0.9	0.7
70500051006	Missouri Creek	5.0	1.4	1.1
70500051202	City of Durand – Chippewa River	4.4	0.7	0.7
70500050906	Duscham Creek – Chippewa River (incl. Fall Creek)	4.3	0.5	0.6
70500050903	Cranberry Creek	4.5	0.7	0.3

Table 1: Transect Survey Soil Loss Data Summary by HUC12 watershed 2013-2020.

Surface water nutrient concentrations – HUC12 watershed ranking

Since 2011, the LCPD has participated in the Water Action Volunteer program provided by the WDNR and Extension. As a part of this program, total phosphorus and total nitrogen has been monitored on streams within each HUC12 watershed. Each stream is on a 4-5 year monitoring rotation. This monitoring rotation will continue as a part of the monitoring efforts identified in this plan. The results of past monitoring activities have been reviewed and utilized to rank the HUC12 watersheds based on the water quality standards of total phosphorus and total nitrogen. The following HUC12 watersheds have been ranked with the highest nutrient concentrations listed first:

HUC12 Code	HUC12 Name
70400030107	Harvey Creek
70500050906	Duscham Creek – Chippewa River (incl. Fall Creek)
70500051201	Bear Creek
70500051007	Arkansaw Creek
70500051205	Little Plum Creek – Chippewa River

70500051008	Eau Galle River
70500051102	Porcupine Creek – Plum Creek
70500050903	Cranberry Creek
70500050901	Rock Creek
70500051202	City of Durand – Chippewa River
70500051203	Spring Creek – Chippewa River
70400010705	Lake Pepin
70500051006	Missouri Creek
70400010702	Pine Creek
70400030106	Peeso Creek

Table 2: Watersheds ranked highest to lowest priority based on Total phosphorus and Total nitrogen concentration criteria 2015-2019.

Groundwater nitrate-nitrogen concentration – HUC12 watershed ranking

Private well samples collected by the LCPD from 2015 – 2019 and wells sample data for community wells in Pepin County was used to identify the HUC12 watersheds with greatest nitrate-nitrogen concentration concerns. This ranking was created base on the number of wells sampled that exceed the 10 mg/L enforcement standard (ES) and the number of wells that exceed the 2.0 mg/L preventative action limit (PAL) for nitrate-nitrogen. Those results were then weighted by multiplying the ES times 5 and the PAL times 2. The higher the score the higher the ranking.

HUC12 Code	HUC12 Name	# Wells >10.0 mg/L	% Wells >10.0 mg/L	# Wells >2.0 mg/L	% Wells >2.0 mg/L
70500051201	Bear Creek	7	35	15	75
70500051202	City of Durand – Chippewa R.	8	47	11	65
70400010705	Lake Pepin	4	15	18	69
70500051205	Little Plum Creek – Chippewa R.	4	15	17	63
70500051102	Porcupine Creek – Plum Creek	3	23	9	69
70500051203	Spring Creek – Chippewa R.	3	38	8	100
70500050906	Duscham Creek – Chippewa R.	4	50	5	63
70500051008	Eau Galle River	2	66	3	100
70500051007	Arkansaw Creek	1	33	2	67
70400010702	Pine Creek	1	33	2	67
70500050901	Rock Creek	0	0	2	100
70400030107	Harvey Creek	0	0	2	40
70400030106	Peeso Creek	0	0	0	0
70500050903	Cranberry Creek	0	0	0	0
70500051006	Missouri Creek	0	0	0	0

Table 3: Nitrate-nitrogen concentrations by HUC12 watershed.

Woodlands

There is approximately 54,700 acres of forested land in Pepin County. Of this total about 54,200 acres are considered commercial forest. The majority of the 500 acres of non-commercial forestland lies in the Chippewa River corridor and is reserved from harvesting due to environmental or endangered resource concerns. Nearly 91% of the forested land, approximately 50,000 acres, is privately owned. Ownership of the remaining 4,700 acres is divided between the state and county. The largest portion of this area is the Tiffany Wildlife Area. Other areas include; Nine Mile Island State Natural Area, Lake Pepin Wildlife Area, Arkansaw Creek Park and Holden/Silver Birch County Park.

Hardwoods cover 94% of the forested land in Pepin County. Oak is the dominant cover type and comprises 59% of the acreage. Other species such as sugar maple, basswood, and upland ashes; bottomland hardwoods, such as cottonwood, willow, silver maple, and hackberry account for 35%, with the remaining balance of 6% with confers. Plantations of Norway pine and white pine account for the majority of this acreage. Remnant stands of natural white pine, primarily along the Eau Galle and Chippewa Rivers, and native cedars along the steep west and south facing slopes above Lake Pepin. We do have one stand of native tamarack, the sole representative of lowland conifer forest in the county.

Many acres of trees have been planted in the County during the last few years as a result of the Conservation Reserve Program and the annual county tree sales program.

At the present time Pepin County has 19,445 acres enrolled in the Managed Forest Law and the Forest Crop Law programs. There are 20 tree farms in the county. Good forest stewardship manages the forestry environment for all of its resources and becomes a critical link between environmental quality and economic stability. Good stewardship increases timber productivity, improves water quality, reduces soil erosion, increases recreational opportunities, enhances wildlife habitat and improves land values.

Wetlands

Pepin County has approximately 20% of its land area as wetlands. In l994, the Pepin County Zoning Department, in coordination with the Wisconsin Department of Natural Resources, drafted and adopted a Shoreland-Wetland Protection Ordinance. In essence this ordinance is directed at wetlands within l,000 feet of lakes, ponds or flowages, or within 300 feet of navigable streams. It is in the interest of this ordinance to protect wetlands which serve the county by buffering flood waters, enhancing wildlife habitat and helping to control the off-site effects of erosion by acting as a sedimentation basin.

Landowners are encouraged to enroll their wetland areas in the Wetland Reserve Program. Currently the Natural Resource Conservation Service has 32 Wetland Reserve contracts which total 1,969 acres.

Wildlife

Pepin County has numerous species of rare and endangered plants and animals, many of which can be found in the Tiffany Wildlife Area. 3,400 acres of the Tiffany Wildlife Area lies west of the Chippewa River in Pepin County. This area extends from Silver Birch along the Chippewa River to Lake Pepin. Within the Tiffany area, and other sensitive areas in the County, we find several plants, plant communities, insects, mammals, birds, fish and snakes that are listed by the Department of Natural Resources as endangered species. The rough wooded land in the county provides excellent habitat for wildlife. Grouse, turkeys, pheasants, deer and many varieties of songbirds are a common site.

The Wetland Reserve and Conservation Reserve Program have converted many acres back into native grasses and forbs. Over the years, more than 4,000 acres of land has been taken out of crop production and planted to various cover types to enhance wildlife habitat.

Landowners have also used the WHIP (Wildlife Habitat Incentive Program) as a funding source to enhance wildlife habitat.

The Conservation Reserve Enhancement Program has also been used to protect valuable resources. To date, 48 sites totaling 504.8 acres have been enrolled into the program with 2 sites totaling 38.4 acres enrolled into perpetual easements.

Climate Change

While the causes of climate change, continue to be debated, there is evidence that our climate is changing. Acknowledging the host of concerns related to increasing temperatures and precipitation may have more noticeable impacts locally. The upper Midwest precipitation trends from 1910 to 2012 show that 8 out of 10 of the wettest years for daily precipitation have occurred since 1978. Pepin County's annual average precipitation change from 1950 to 2006 has increased between 5.5 and 7 inches per year. Projected change in greater than 2-inch rain events will increase between 3 - 4 days per decade, meaning that large storms become more frequent, with heavier precipitation. The impacts vary widely from increased flooding, increased soil erosion, and stormwater runoff, as well as increased concern for groundwater contamination and drinking water supplies. Increases in precipitation may also increase the recharge of groundwater which could result in groundwater flooding or a rising water table. A rising water table can result in groundwater contamination. In thinking about the future of Pepin County, climate change is and will continue to have an impact on our public health, groundwater, surface water, and air quality. Current land uses and potential land use changes need to be considered for their potential impact to a changing climate as well as the management strategies to handle the effects of a changing climate.

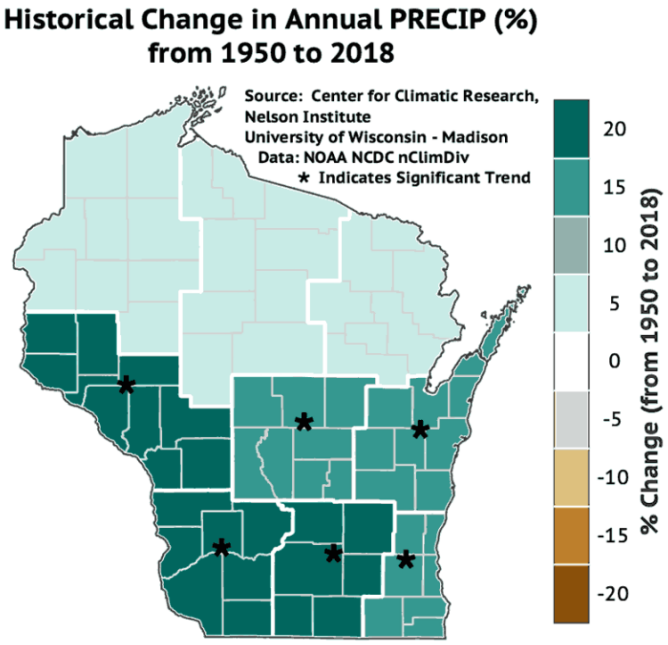


Figure 19: Historical Change in Annual Precipitation from 1950 to 2018. Source WICCI 2020.

Chapter 3 - Regulations, Standards, and Prohibitions

Pepin County Zoning Codes and Ordinances

Pepin County currently does not have County-wide Zoning. Therefore, the townships of Durand, Frankfort, Stockholm, Waubeek and Waterville, have adopted their own local zoning ordinances. Pepin County does administer Shoreland/Wetland, Floodplain, Highway Setbacks, Telecommunications (towers), and Sanitary Codes in applicable areas within the County.

Pepin County Farmland Preservation Plan / Working Lands Initiative

This plan was adopted in 1979, and the Conservation Standards in 1986. The Conservation Standards were revised to include the Agricultural Performance Standards and Prohibitions as described in NR 151. In 2003 there were 217 Farmland Preservation Program participants, with a total of 30,118.6 acres enrolled. In 2009, the Farmland Preservation Program was revised under the Working Lands Initiative, which allowed for tax credits under Agricultural Enterprise Areas and/or Exclusive Agricultural Zoning. There are currently (2020) 9 effective Farmland Preservation Agreements in place under the pre-2009 program, with a total of 1,871 acres enrolled. The Pepin County Standard requires that all participants are in compliance with the Agriculture Performance Standards. Compliance checks are currently completed at least once before each agreement expires or every four years. Through local township zoning, the Town of Waterville is the lone township that adopted a zoning code consistent with the Farmland Preservation standards set in State code. As a result, 19 landowners are now participating in the new Farmland Preservation Zoning program and are receiving increased tax credits on 3,165

acres. In order to qualify for the increased tax credits, landowners must be in compliance with the Agriculture Performance Standards and Prohibitions as described in NR151. Compliance status reviews are conducted at least once every four years. Non-compliance determinations will require the development of a schedule to get back into compliance. Landowners with parcels not in compliance will not be eligible for the tax credits.

Pepin County Manure Storage Ordinance

The Pepin County Land Conservation Committee, along with the Zoning Committee, created the Manure Storage Ordinance in 1987, and amended said document in 1992. The original ordinance only required those who installed or altered any earthen animal waste storage facility to meet SCS technical standards and to obtain a permit for installation/alteration of the pit. In l992, the ordinance was amended to include steel and/or concrete animal waste storage facilities. This ordinance was again amended in 2004 to reflect the agricultural performance standards and prohibitions as described in ATCP 50 and to update siting requirements. This ordinance was again amended in 2017 to assist in interpretation and administration, including updated standards. The purpose of this ordinance is to regulate the location, design, construction, installation, alteration, abandonment, and use of manure storage facilities, in order to prevent water pollution and thereby protect the health of Pepin County residents and transients; prevent the spread of disease; and promote the prosperity and general welfare of the citizens of Pepin County. This ordinance applies to new structures and transfer systems, substantially altered existing structures and closures or abandoned structures.

Bluffland Ordinance

The County Board and Townships of Stockholm and Pepin have recognized that uncontrolled use of the bluff lands of the Mississippi River within the County could adversely affect the environment, public health, safety and impair the tax base of the county. Having recognized these facts, in 1993 the County Board of Supervisors passed a Bluff Land Ordinance to further the maintenance of safe and healthful conditions; prevent groundwater contamination and soil erosion; control building sites; placement of structures and land uses; protect unique wildlife habitat and natural aesthetics of county bluff areas that overlook the Mississippi River.

Non-Metallic Mining Reclamation Ordinance

The Pepin County Board amended the Non-metallic Mining Reclamation Ordinance in October, 2007. This amendment was to update changes in state statutes. Pepin County recognizes the importance and need for non-metallic mining operations and also recognizes the importance of proper reclamation to those sites once mining has ceased. There are currently 16 sites with a reclamation permit. The sites are non-metallic mining for limestone, sand and gravel.

Stormwater Discharge Permit – Wis. Adm. Code NR 216

Under subchapter III of NR 216, Wis. Adm. Code, a notice of intent shall be filed with the DNR by any landowner who disturbs one or more acres of land. This disturbance can create a point source discharge of storm water from the construction site to waters of the state and is therefore regulated by DNR. Agriculture is exempt from this requirement for activities such as planting,

growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or yarding of livestock as well as sod farms and tree nurseries. Agriculture is not exempt from the requirement to submit a notice of intent for one or more acres of land disturbance for the construction of structures such as barns, manure storage facilities or barnyard runoff control systems. (See s.NR216.42(2), Wis. Adm. Code.) Furthermore, construction of an agricultural building of facility must follow an erosion and sediment control plan consistent with s.NR 216.46, Wis. Adm. Code and including meeting the performance standards of s.NR 151.11, Wis. Adm. Code.

An agriculture building or facility is not required to meet the post-construction performance standards of NR 151.12, Wis. Adm. Code. (07/31/08 MAL)

Chapter 4 – Citizen/Water Advisory Group Resource Issues and Concerns

1. Soil Erosion
    a. Reducing soil erosion on cropland.
    b. Heavy rain event erosion.
2. Composting
    a. Livestock manure management through method of composting
3. Nutrient Management Planning
4. Groundwater Quality
5. Climate Change
    a. Heavy rain event erosion.
    b. Greenhouse gas emissions
6. Surface water Quality
    a. Reducing streambank erosion
7. Protect Natural Habitat
    a. Protecting natural springs, wetlands, and springs. Preserving and conserving natural habitat areas such as prairies, wetlands and floodplain forests.
8. Staffing Resources
9. Zoning/Regulations
    a. Changing Federal standards, such as EPA deregulation.
    b. Adoption of countywide zoning to help facilitate and provide more tools for land use management.
10. Education
    a. Continued and increased education on all topics related to natural resource issues and concerns. More awareness of water quality challenges. More awareness of best management practices being implemented.
11. Public Health
    a. Groundwater quality and the impact it has on the community's public health.
12. County parks

See **Appendix B** for a list of all resource concerns identified by the Water Advisory Group.

Chapter 5 - Goals and Objectives

The Pepin County Water Advisory Group (2017-2019) was used as the LWRM plan advisory committee. They provided input in identifying critical resource concerns in Pepin County. A complete list of the specific responses can be found in **Appendix B.** In general, the identified resource concerns by the WAG could be put into categories that reflect the existing Goals of the County's 2011-2020 LWRM Plan. The four areas of resource concern that appeared to be most important were: soil erosion, manure and nutrient management, groundwater quality, and climate change. Additionally, it is also appropriate to include the citizen input as a result of the public survey conducted in development of the 2018 Moratorium on Large-scale Livestock Facilities Report. To address land use and nonpoint pollution in Pepin County, the survey identified the following resource areas: more education, better enforcement of existing regulations, and increase protection of sensitive soil types. Goals and strategies have been established to address these resource and implementation concerns.

In review and comparison of these identified concerns and the goal categories of the 2011-2020 LWRM Plan, it is appropriate to utilize the existing goals as they reflect these resource issues.

- **To protect and enhance the quality and quantity of our water resources.** This goal will address proper land application and use of nutrients available through livestock waste, commercial fertilizers, and other soil amendments. Strategies and activities under this goal will address resource concerns for surface and groundwater quality, proper manure management and handling, and proper use of other chemicals in residential and agricultural areas. Water quality is a very important resource for consumption and recreational use. All of the drinking water in Pepin County comes from the groundwater supply. Protecting this resource is very important to sustain a healthy public resource. Recreational use of the surface water within Pepin County is also very important to the residents as well as visitors to the County. Protecting this resource is very important for fish and wildlife habitat, natural drainage of the landscape, flood event management and the agricultural and recreational economies of the County.

- **To preserve and maintain our valuable soil resources.** Agriculture is the "backbone" of the economy in Pepin County. If the soil structure is not maintained, the economy of the county could be adversely affected. Careful management, supported by strategically placed appropriate best management practices, will preserve and maintain this valuable resource. Additionally, healthy soils also have the ability to improve water and nutrient holding capacity, improve infiltration, improve soil structure and stability, and sequester carbon. Healthy soils have a direct impact on ground and surface water quality as well has mitigation of climate change effects.

- **To promote a positive conservation ethic.** Education is a consistent message that is identified by citizens, policy makers and the advisory meetings, whether it is educating the public on nutrient management, groundwater quality and quantity, wildlife habitat, or other natural resources. An underlying component of each goal, strategy and activity will be education of our natural resources and best management practices. Successful education of our natural resource issues and solutions must be built upon community

relationships and understanding of perspectives. Improved outreach to citizens via multiple media platforms will be necessary. Continued partnerships with Producer Led Groups will be key to building relationships and understanding perspectives to modify the systems of which our natural resources and economy are subject to. Continuation of youth education and outreach is also necessary to build community relationships and provide opportunity for systems change in generations to come.

- **To protect and enhance diverse wildlife habitat.** Diversity within the landscape supports and promotes general health in Pepin County. Best management practices that support healthy soils and quality water resources extends to promoting a healthy wildlife population. Additionally, best management practices to curb or eliminate the spread of invasive species also effect the diversity of the landscape. Therefore, diversity also impacts the recreation needs of our community and its visitors. Public and Private land management activities that support clean water, healthy soils, natural habitats, wetlands, floodplains, woodlands, and other recreation opportunities will be incorporated into activities used to implement the LWRM plan.

- **To mitigate, reverse and respond to changes in our climate.** Evidence shows an increasing trend of warmer temperatures and greater precipitation. In some areas we are seeing those subtle impacts. Incorporating the topic of climate change into all aspects of the implementation strategy for this plan will be necessary. Further education on the topic is necessary for staff, policy makers, and the general public. Land use management strategies to manage carbon, reduce greenhouse gas emissions and respond to increase precipitation will be necessary.

A detailed annual work plan has been developed to identify the specific objectives and activities planned to work toward achieving the goals identified. Annual updates to the work plan will be necessary to stay current with local, regional, and statewide trends and needs. While annual work plans may be modified, they shall be developed with the above goals as the guiding principles (Contact the LCPD for details of the annual work plan).

Chapter 6 – NR151 Performance Standard Implementation and Nutrient Reduction Strategies

Wisconsin's rules to control polluted runoff from farms, as well as other sources, went into effect October 1, 2002 and were modified in 2012 and again in 2018. The State legislature passed the NR 151 rules to help protect Wisconsin's lakes, streams and groundwater. WDNR Administrative Rule NR 151 sets performance standards and prohibitions for Wisconsin farms and cropland. It also set urban performance standards to control construction site erosion, manage runoff from streets and roads and manage fertilizer use on large turf areas. DATCP Administrative Rule ATCP 50 identifies conservation practices that farmers must follow to meet the NR 151 performance standards. The LCPD will continue to utilize different methods to continue to implement NR 151. Nutrient Management Plan (NMP) development and utilization is a requirement in NR 151. Implementing NMPs can also help meet the sheet, rill and wind erosion and phosphorus-index performance standards for cropland required in NR151. Current NMP coverage of Pepin County's agricultural lands, is estimated at 44% (DATCP 2019). The LCPD will continue to utilize the 28 Farmland Preservation Program participants as one method of NR151 implementation. Further implementation will be conducted following a priority farm and watershed approach.

Implementation Process

The Land Conservation & Planning Department (LCPD) will take the lead role in the implementation of NR151. Cooperation with the Wisconsin Department of Natural Resources (WDNR) and other agencies will continue towards a practical implementation process. The LCPD will encourage and accept a voluntary approach to compliance with all applicable standards. Building relationships with landowners to facilitate the implementation of needed conservation practices, without enforcement will be the primary approach by the LCPD. For circumstances where compliance cannot be achieved using a voluntary approach or where the voluntary approach has failed to maintain compliance, the LCPD will be forced to utilize the authorities granted through the applicable standards and codes to seek enforcement in order to obtain compliance. Regulatory and enforcement activities will be completed following NR 151.090 and NR151.095, ATCP 50, Pepin County Manure Storage Ordinance (Chapter 13) and conservation standards associated with the Farmland Preservation Program. It is anticipated that enforcement action will take place following a pro-active effort intended to bring landowners into compliance. Pepin County does not have an official Memorandum of Understanding (MOU) with WDNR for enforcement of NR 151, however, in the event Pepin County is not able to achieve compliance through a voluntary, cooperative landowner participation, or by local ordinance enforcement, DNR will be utilized to ensure compliance with NR 151.

The NR 151 implementation processes and strategies described above are dependent on receiving adequate funds to cover both staff resources and, when required by NR 151, offering cost-sharing resources in addition to cooperation from affected landowners. The majority of the financial resources needed will likely be provided by WDNR and DATCP.

There are several conservation practices that are available and applicable to Pepin County. These practices can be installed voluntarily, at the landowner's expense, or, more typically through County, State or Federal cost-share funds with the landowner. The following conservation practices are the most common in achieving compliance with conservation standards and are incorporated into Administrative Code ATCP 50:

- Cover Crops (ATCP 50.68)
- Critical Area Stabilization (ATCP 50.69)
- Grade Stabilization Structures (ATCP 50.73)
- Manure Storage System Closure (ATCP 50.63)
- Nutrient Management (ATCP 50.78)
- Riparian Buffers (ATCP 50.83)
- Streambank and Shoreline Protection (ATCP 50.88)
- Waterway Systems (ATCP 50.96)
- Well Decommissioning (ATCP 50.97)

See **Appendix E** for a complete list of conservation practices in ATCP 50.

In an effort to utilize limited staffing and cost-share resources, the 15 HUC12 watersheds have been prioritized based on resource concern. The following criteria were utilized in the development of a priority watershed designation:

- WDNR's Outstanding Resource Water (ORW) or Exceptional Resource Water (ERW) present within watershed.
- Number of public and private drinking water supplies with elevated nitrate-nitrogen concentration (higher # of contaminated wells = higher rank)
- Impaired waters as listed by WDNR
- Other stream monitoring data collected by LCPD through the Water Action Volunteer Program (WAV).
- Soil loss, in Tons/acre/year as determined by an 8-year watershed average of the Soil Transect data.
- Number of manure storage systems
- Acres under Farmland Preservation Program

Watershed were evaluated and ranked based on the above information (see **Figure 20** and **Appendix F**). Staff and cost-share resources for the implementation of NR151 will be utilized in the higher ranking watersheds first. Consideration for voluntary compliance and the installation of conservation practices in all watersheds will also be a priority for the LCPD. Within each watershed, a priority farm approach will be utilized to further direct NR151 Implementation. (See Table 4).

HUC12 Code	HUC12 Name	HUC12 Rank
70500051201	Bear Creek	1
70500051205	Little Plum Creek-Chippewa River	2
70400010705	Lake Pepin	3
70500051008	Lake Eau Galle-Eau Galle River	4
70500051007	Arkansaw Creek	5
70500051202	City of Durand-Chippewa River	6
70500051203	Spring Creek-Chippewa River	7
70500050906	Duscham Creek-Chippewa River	8
70500051102	Porcupine Creek-Plum Creek	9
70400030107	Harvey Creek	10
70400010702	Pine Creek	11
70500050901	Rock Creek	12
70500050903	Cranberry Creek	13
70400030106	Peeso Creek	14
70500051006	Missouri Creek	15

Table 4: Prioritized HUC12 watersheds within Pepin County, 2020.

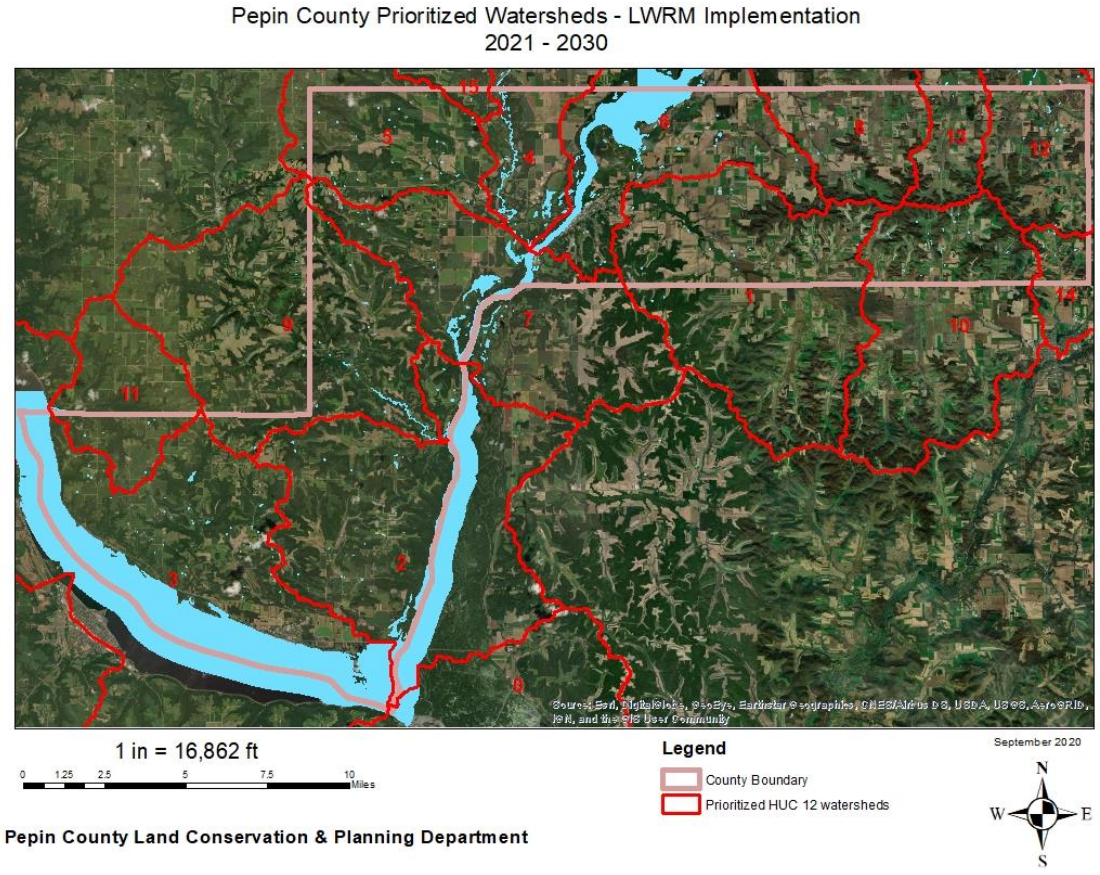


Figure 20: Prioritized HUC12 watersheds for LWRM Plan implementation 2021-2030. (See Appendix F)

Priority Farms

For the purposes of this plan and its implementation strategy, a "Priority Farm" will be defined as a farm that meets one of the criteria below and having one or more issues of non-compliance with the Agriculture Performance Standards and Prohibitions as described in NR151.

- Farms with Soils Susceptible to Groundwater Contamination (SSTGWC), within a Water Quality Management Area (WQMA) or other identified sensitive feature.
- Farms within a watershed with surface water listed on the 303d list of impaired waters by WDNR (see Figure 13).
- Farms in a PLSS section with a significant number of wells with elevated levels of nitrate-nitrogen groundwater contamination or high groundwater contamination susceptibility (see Figures 4, 6, 8).
- Farms with cropland eroding at 2 "T" or greater.
- Farms operating under Manure Storage Ordinance permit, Farmland Preservation Program, or NR151 Certificate of Compliance (COC).

Information and Education Activities

Every effort will be made to inform Pepin County landowners about the required agricultural performance standards and prohibitions. Conservation department staff will provide landowners with an overview of the regulatory requirements when working with them on any programs administered by the conservation department. Educational material regarding the standards will be provided to department staff from DNR and DATCP fact sheets or other material available to staff. The primary goal will focus on establishing a voluntary approach to meeting compliance.

When implementing soil and water conservation practices, staff will work with landowners to assure that the practices being constructed will help the landowner achieve compliance. They will also inform landowners why compliance is necessary and the expectations of maintenance of the practice being implemented.

It will also be through these processes that the Land Conservation & Planning Department will take the opportunity to discuss total resource conservation with the landowners and provide technical assistance where needed. Total resource conservation will strive to address all resource concerns identified by the LWRM plan. These opportunities will allow staff to cover all areas of one's property whether it is water resource quality and quantity, soil resources, wildlife habitat, forest management, flood control, climate change impacts, long term land use and other resource concerns identified by the landowner.

The LCPD will also continue to embrace and expand their social media presence. Social media and other virtual platforms have proven to be an effective form of communication. The LCPD will seek those opportunities to provide information and education to its followers and the greater social networks of which they are a part of. In addition to monthly meetings of the Land Conservation, Planning / Extension committee, the LCPD will utilize social media to inform the public of the activities conducted to conserve and protect our natural resources.

Partnerships

Continuous cooperation and partnership with USDA-NRCS, USDA-FSA, WDNR, Extension and other local organizations are important to the success of this plan and for the natural resources of Pepin County. Specifically, partnerships with local Producer Led/Farmer Led watershed groups. In 2020, Pepin County partnered with its first Producer Led Group in the County, the Bear Creek/Chippewa Farmer Groundwater Group. While in its infancy, this group is demonstrating valuable, in-field, best management practices to improve groundwater quality and long term productivity of their operations. Pepin County will continue to partner with this group and any other new groups to advance the goals of this plan with individuals and groups farming the land.

Additional Water Quality Objectives

As a result of the prioritization of Pepin County's HUC12 watersheds, the LCPD will continue to collect water quality, soil erosion, and land use data to better define the watersheds that need additional support. The LCPD also intends to evaluate the use of the Erosion Vulnerability Assessment for Agricultural Lands tool (EVAAL), and the Agricultural Conservation Planning Framework (ACPF) tool to further define the areas within each HUC12 watershed where conservation practices would have the greatest impact on the soil and water resources. These Geographic Information System (GIS) tools are likely to provide us with more information to further evaluate the development of a Total Maximum Daily Load (TMDL) and a Nine Key Element Watershed Plan (9KE) for specific HUC12's in the County. The LCPD will also explore and evaluate the feasibility of its participation in the Multi Discharge Phosphorus Variance (MDV) program to see what role it can play in the success of this plan and other water quality goals. Further evaluation of these programs is needed to better understand the impact they will have on the surface water and groundwater resources, the staffing capacity of the LCPD, and the local support available to ensure a successful outcome of those planning goals.

The potential for further research and evaluation of the impact to Pepin County's groundwater resources will also continue. Partnerships with the University of Wisconsin Extension and other researchers will continue to evolve and determine appropriate land use activities that have the greatest impact to restoring and protecting groundwater quality.

After consultation with WDNR, the following two water quality objectives will be part of this plan for the next ten years (2021 – 2030). Specific actions to meet these objectives are discussed throughout this plan and will be further described in greater detail within annual work plans submitted to DATCP:

(1) By 2030, leaching reduced, or have no additional increase in, the number of sections with 10 mg/L nitrate-nitrogen drinking water wells within Durand, Lima, Frankfort, Stockholm and Pepin townships. Further baseline testing will continue during the fall of 2020 for the townships of Waterville and Waubeek; and for Albany township in 2021. By 2030, leaching reduced, or have no additional increase in, the number of

sections with 10 mg/L nitrate-nitrogen drinking water wells following the baseline data collection in the townships of Waterville, Waubeek, and Albany.

(2) By 2030, focus Pepin County LCPD programs and soil and water conservation practices within two HUC 12 watersheds with total phosphorus (TP) impaired waters (i.e. Bear Creek, Plum Creek, Lake Pepin, Arkansaw Creek, Fall Creek, Duscham Creek, Harvey Creek, Rock Creek, Cranberry Creek, or Eau Galle River) over a period of five years, to achieve measurable TP reductions and/or meet TP criteria (0.075 mg/L median concentration).

Chapter 7 - Monitoring and Evaluation

A comprehensive system of measurement, which shows efforts are making a difference, is essential to any conservation program. When evaluating a specific program, a system of qualitative and quantitative measurements must be used to determine a program's effectiveness. This approach needs to take into account a variety of factors; including overall protection of the targeted resource, quality of service to the customer, and fiscal responsibility.

Evaluations of programs must be completed for a variety of groups which include state and federal agencies, county board members, special interest groups, landowners and businesses. Although priorities may vary among the different groups, the end result is the resources of Pepin County must be protected and enhanced in a fiscally responsible manner. Implementation of this plan relies on adequate local, state and federal funding to realize many of our conservation objectives. Pepin County LCPD utilizes several tools to evaluate overall conservation efforts in the county.

A Work Plan has been developed by the LCPD to guide the implementation of this plan and to monitor and evaluate our progress. Each year the work plan will be evaluated and updated based on the previous year's outcomes and in consideration of other challenges and opportunities that may present to Pepin County.

Tracking of installed practices and plans must be completed to show agencies and legislators what is getting done for the dollars invested. Current tracking procedures utilize simple spreadsheets and GIS mapping. Pepin County LCPD is in the process of establishing NR151 and FPP modules within the GCS Permit Tracking System. This software is GIS based and connected to the tax parcel layers, allowing for accurate tracking of compliance on a geo-spatial system as well as transfer of property ownership or property subdivision.

Water quality monitoring completed by the WDNR in addition to the water quality monitoring data collected by the LCPD will be reviewed to track changes in surface water and groundwater resources to establish any trends, especially after best management practices have been installed.

The LCPD will continue to utilize the annual transect survey to evaluate soil loss trends within the HUC12 watersheds, changes in crop rotation and residue management systems, as well as

other supporting conservation practices such as contour farming and contour strip cropping. The survey can also help track other major land use changes.

Further monitoring and evaluation will be conducted through the submittal of Nutrient Management Plans and the acres where they are implemented. Continued increase of coverage is expected, with a goal of achieving 75% coverage within 10 years. However, simply having a plan will not benefit the land user or the natural resources. Efforts to ensure the nutrient management plans are effectively implemented will also be a focus of the efforts.

Finally, the LCPD will explore and evaluate the potential for TMDL, 9KE, EVAAL, ACPF watershed planning programs and tools to better assist in prioritization of LCPD actions and monitoring the effectiveness of those actions.

Chapter 8 – Proposed 5 Year Administrative Schedule

As a part of this planning document, the LCPD has prepared an Annual Work Plan for the 2021-2030 planning period. Within the Annual Work Plan, anticipated and needed staff time and expenses were estimated for the implementation of this plan. Limitations to plan implementation are likely due to funding and staffing capacity or resources. Fluctuations in the anticipated staff time and costs are likely. Within the Annual Work Plan, anticipated and needed cost-share funds have been calculated. Limitations to plan implementation are also likely due to fluctuations in cost-share funds available. The LCPD will continue to work with its partner agencies, NRCS, DNR and DATCP to secure cost-share funding for the implementation of this plan. The Annual Work Plan will be updated each calendar year to reflect the previous year's accomplishments and any adjustments needed in the up coming planning year.

Chapter 9 – Public Hearing and Future Follow-Up

October 12, 2020 – Public Hearing prior to Land Conservation & Planning /Extension Committee meeting.

December 2020 – Wisconsin Land and Water Conservation Board meeting.

December 2020 – Pepin County Board of Supervisor's meeting.

Chapter 10 - Conclusion

Pepin County, with its diversity of soils, slopes, and land use within its watersheds, presents opportunities and challenges to conserving our natural resources for current and future generations. In many areas, highly permeable soils that may be shallow to water table are associated with degraded water quality. Those areas tend to have land uses of an ever-increasing agricultural intensity. The landscape continues to be pushed to produce the highest yields, resulting in a negative impact on the soil and the water that we all rely on. To some perspectives, resource concerns may be viewed as consequences associated with "the cost of doing business" or an "expected and accepted" reality of producing food.

While monitoring data of surface water and groundwater may fluctuate from year to year or from sampling time to sampling time, the overall trend is that nutrient contamination in our groundwater and surface water is increasing. Determining the age and source of the contamination can be very difficult and it should be evaluated on a case-by-case basis. For example, to determine the source and age of nitrate contamination in a private well, one must consider the following factors, to include but not limited to: the time of year the sample was taken, the depth of the well, the depth of well casing, the soil type, the depth to bedrock and depth to static water level, groundwater flow direction, land use surrounding the well, and septic system location. All of these variables must be considered when determining the contamination source.

A goal of slowing, stopping or reversing these water quality trends may take some time before those desired results are realized. Even if we removed all foreign sources of nitrogen from the environment now, it may take many years to decades to see the desired result of safe drinking water. And some wells may even see a rise in nitrate concentrations as the groundwater continues to move through the watershed before we see a reversing trend.

Nitrate concentrations in groundwater above 1 mg/L are typically human-induced (Masarik 2017). That is, human activities on the landscape such as rural development and agriculture are the contributors to those higher concentrations. Given that the predominant land use in Pepin County is agriculture, our focus tends to be and should be with the agricultural sector.

A shift in the agricultural system from a grass/perennial vegetation based diverse crop rotation, to a corn-based system has contributed to the economic and environmental change within Pepin County in both positive and negative ways. Efforts to keep our soils covered and not lay barren to the forces of our climate, diversify our crop rotations with a variety of crops, minimize tillage or disturbance of our soils, and maintain a living root in the soil year-round should be encouraged and pursued by the Pepin County community. These efforts are important in maintaining a vibrant economic engine for the County and to improve the water quality that we all depend on for life.

APPENDIX – A

Glossary of Acronyms

CRP	Conservation Reserve Program
CREP	Conservation Reserve Enhancement Program
DATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection
DNR	Department of Natural Resources
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency, USDA
FPP	Farmland Preservation Program
LCC	Land Conservation & Planning, Extension Committee
LCPD	Land Conservation & Planning Department
LWRM	Land and Water Resource Management Plan
NPM	Nutrient and Pest Management
NR151	Administrative Rule for Nonpoint Source Pollution Abatement
NRCS	Natural Resource Conservation Service
"T"	Soil Loss Tolerance - This represents the rate of soil erosion which may occur without the long term productivity of the soil being diminished.
Thalweg	A line following the lowest part of a valley whether under water or not.
TMDL	Total Maximum Daily Load
TRM	Total runoff management
USDA	United States Department of Agriculture
RUSLE 2	Method of estimating average soil loss caused by sheet and rill erosion
UWEX	University of Wisconsin Extension Service
WLI	Working Lands Initiative
WQIP	Water Quality Incentive Program
WQMA	Water Quality Management Area
WRP	Wetland Reserve Program
WHIP	Wildlife Habitat Incentive Program

APPENDIX – B

Resource concerns identified by the March 25, 2019 and April 29, 2019 meetings of the Water Advisory Group:

- Organic matter in soils
- Climate change
- Greenhouse gases (3)
- Decreasing the use of synthetic fertilizers
- More 590 Nutrient Management Plans
- Nutrient Management
- Nitrogen Use Efficiency
- Discourage manure stacking
- Groundwater (3)
- Nitrate monitoring
- More staff needed to go into depth with programs
- Staffing resources, coop with other counties, organizations, volunteers
- Composting test site
- Composting (4)
- Composting to solve water nitrates
- Pasturing animals in flood plain
- Stream bank erosion
- Decrease soil erosion “T” values
- Heavy rain event erosion
- Surface water (2)
- Soil erosion (2)
- Enhance county park
- Adopt county wide zoning
- Changing Federal Standards – EPA deregulation
- Preserving/conserving natural habitat i.e. prairies, wetlands, floodplain forests
- Protecting streams and wetlands
- Protecting natural springs
- Health concerns
- Education

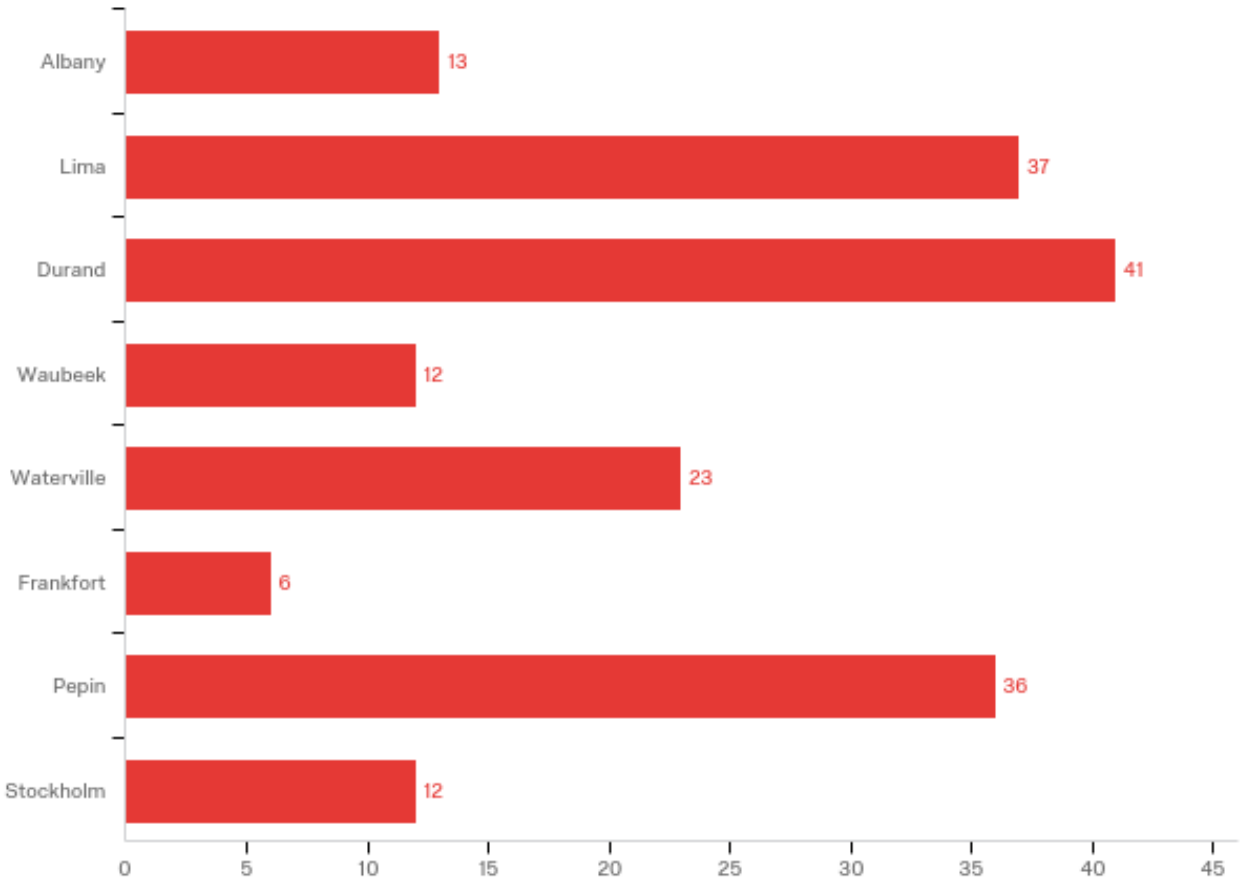
APPENDIX – C

Livestock Moratorium – Public Survey results

Results

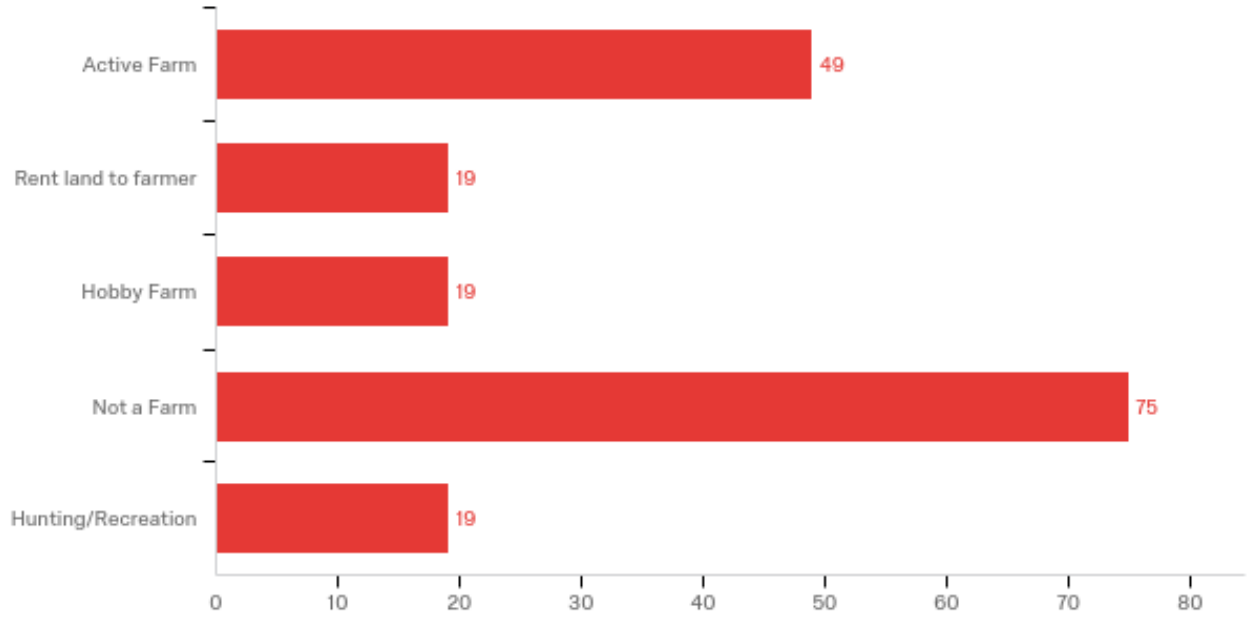
Large-Scale Livestock Facility Moratorium Survey

Q2.1 - In which Township is the majority of the land you own located?



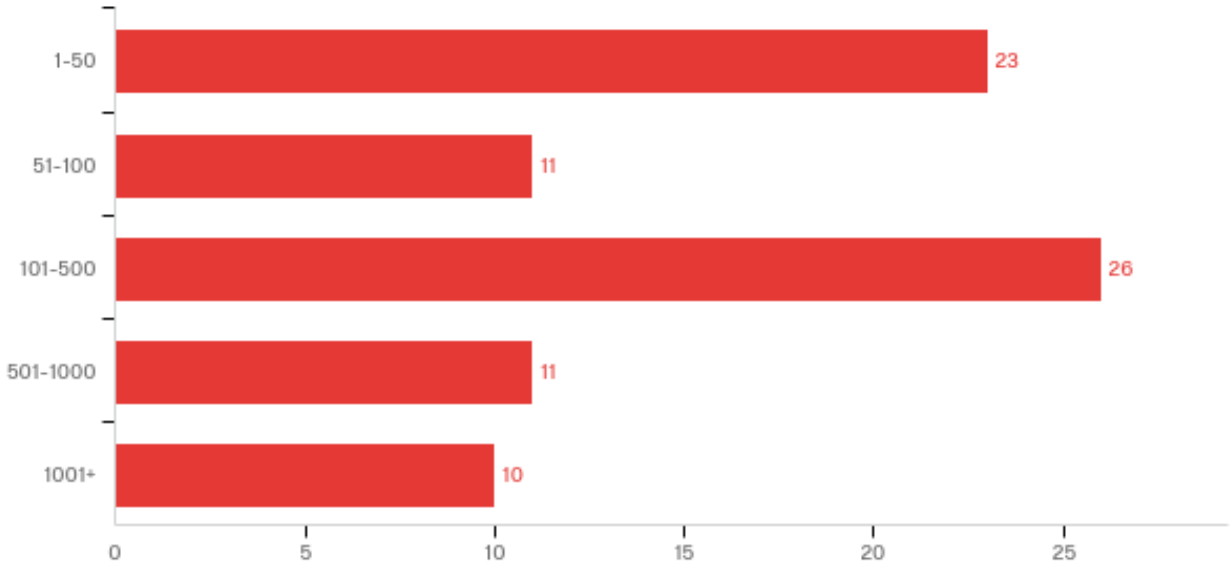
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	In which Township is the majority of the land you own located?	1.00	8.00	4.21	2.19	4.79	180

Q2.2 - Which of the following best describes your land use?



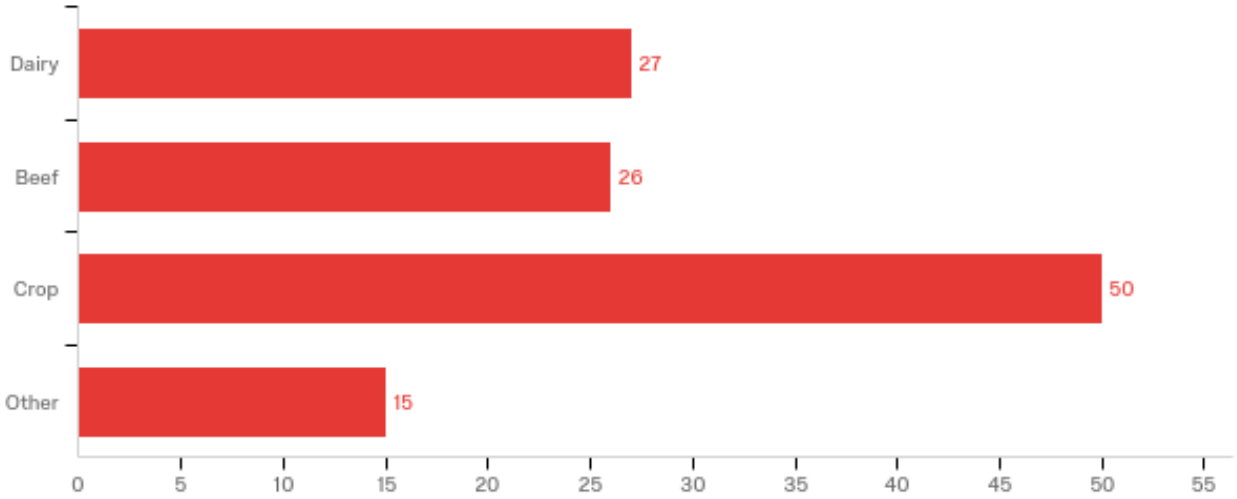
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Which of the following best describes your land use?	1.00	5.00	2.98	1.42	2.02	181

Q2.3 - How many total acres do you farm?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many total acres do you farm?	1.00	5.00	2.68	1.34	1.80	81

Q2.4 - Which type of agricultural production describes your operation? (select all that apply)



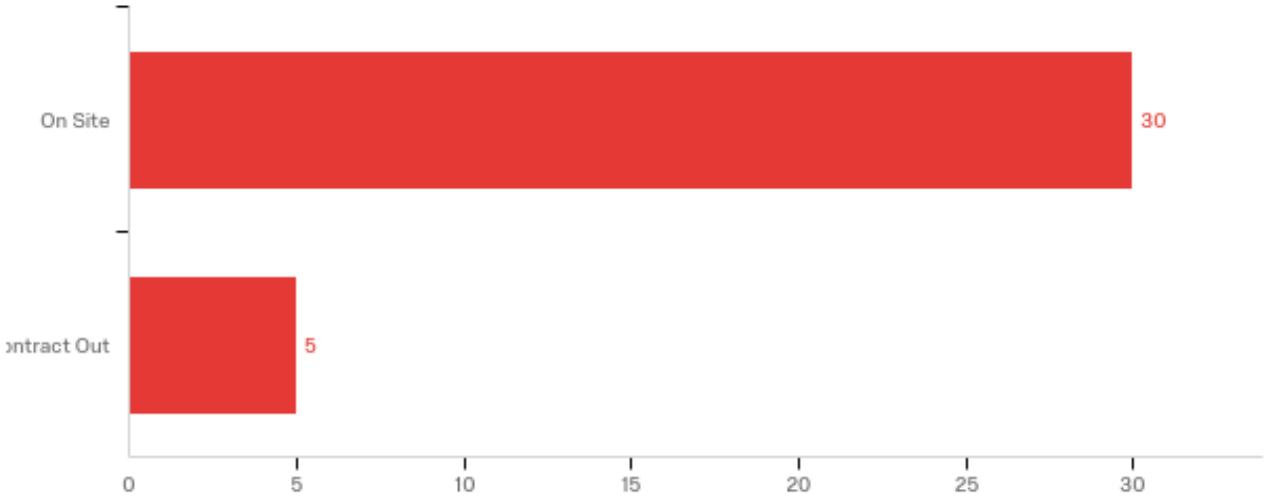
Q2.5 - Please indicate the average number of DAIRY animals on site for each group below: (Beef will be answered in a separate question)

Calves (0 - 400 pounds)	Heifers (400 - 1200 pounds)	Mature Cows (Milking or Dry)
100	0	600
18	22	40
35	45	67
25	70	100
300	500	700
60	200	500
40	125	200
15	20	35
200	100	150
2	4	72
50	150	250
250	750	1050
50	50	100
0	13	31
30	100	260
400	200	1100
10	35	50
30	140	180
80		550
10	2	44

Q2.6 - Please indicate the average number of BEEF animals on site for each group below:

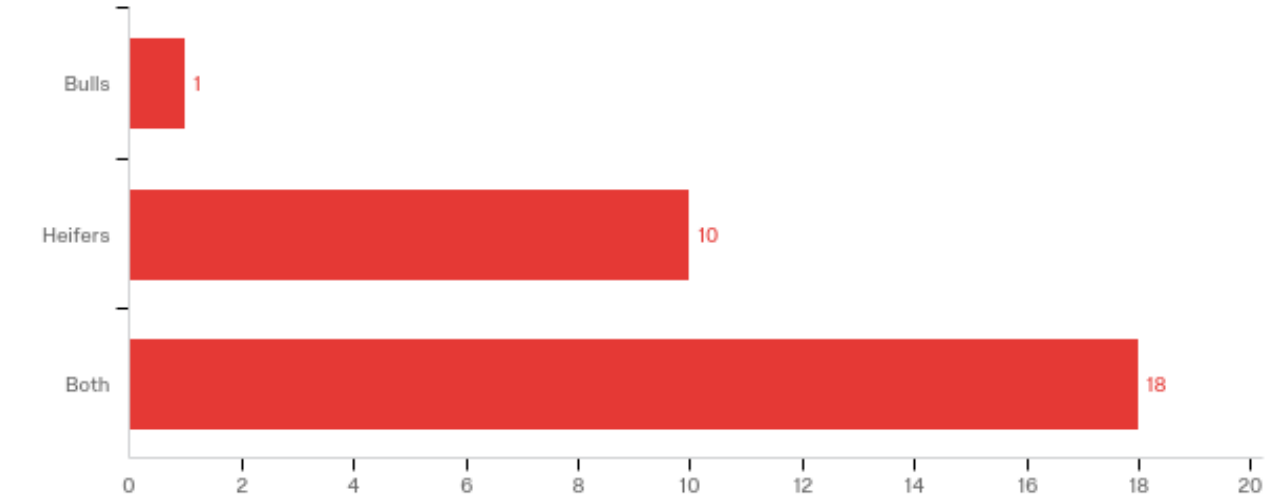
Calves (0 - 400 pounds)	Cows or Steers (400 + pounds)	Bulls
12	27	3
30	35	2
30	35	2
0	0	0
20	20	
33	90	3
10	50	
30	40	
5	10	0
50	150	
15	25	
0	100	0
	12	
2		
18	27	0
20	25	1
8	16	0
15	20	0
100	200	
2	4	0

Q2.7 - Do you raise your own youngstock on site or contract out to other custom growers?



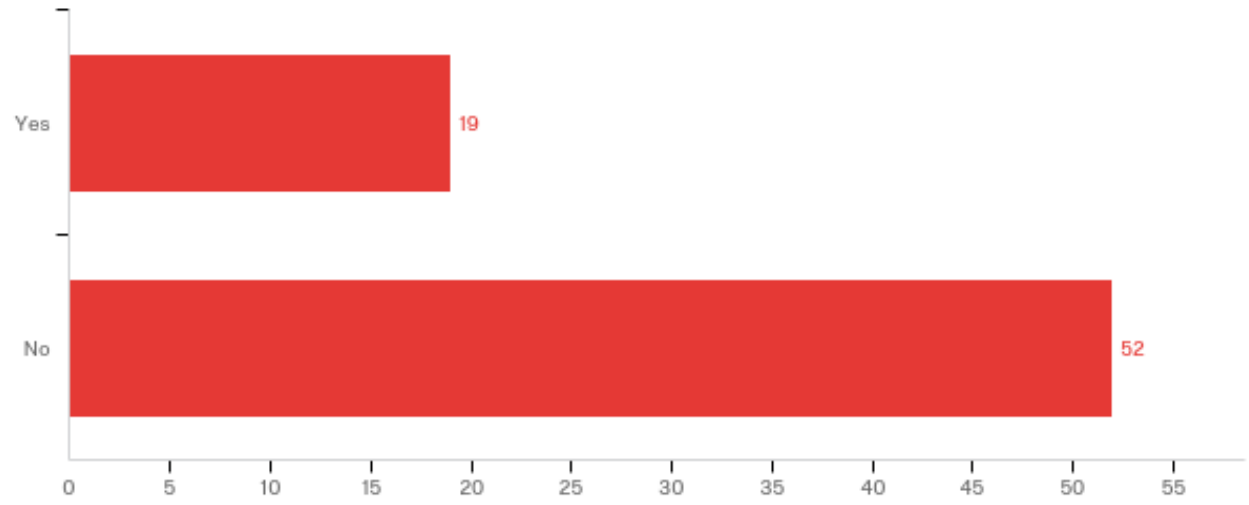
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you raise your own youngstock on site or contract out to other custom growers?	1.00	2.00	1.14	0.35	0.12	35

Q2.8 - Do you raise Bull calves or Heifer calves?



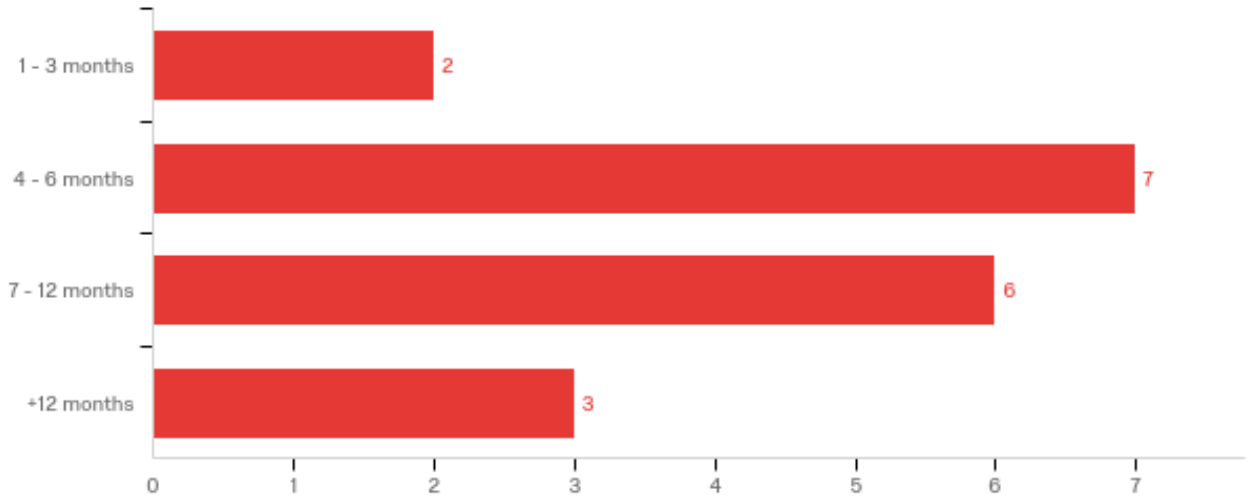
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you raise Bull calves or Heifer calves?	1.00	3.00	2.59	0.56	0.31	29

Q2.9 - Do you have a manure storage facility?



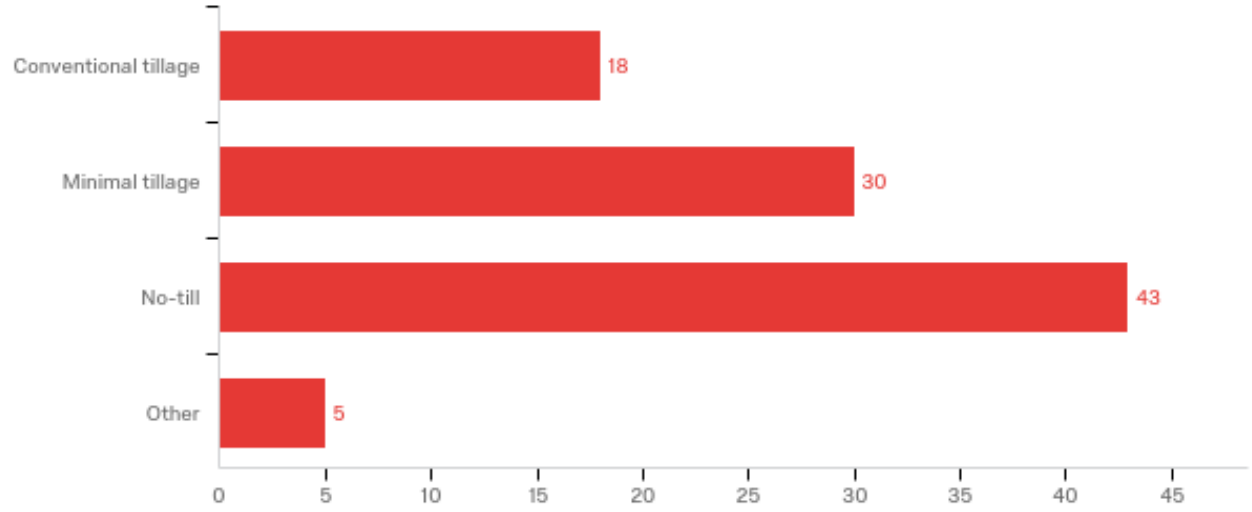
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you have a manure storage facility?	1.00	2.00	1.73	0.44	0.20	71

Q2.10 - If you have a manure storage facility, how many months of storage do you have?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If you have a manure storage facility, how many months of storage do you have?	1.00	4.00	2.56	0.90	0.80	18

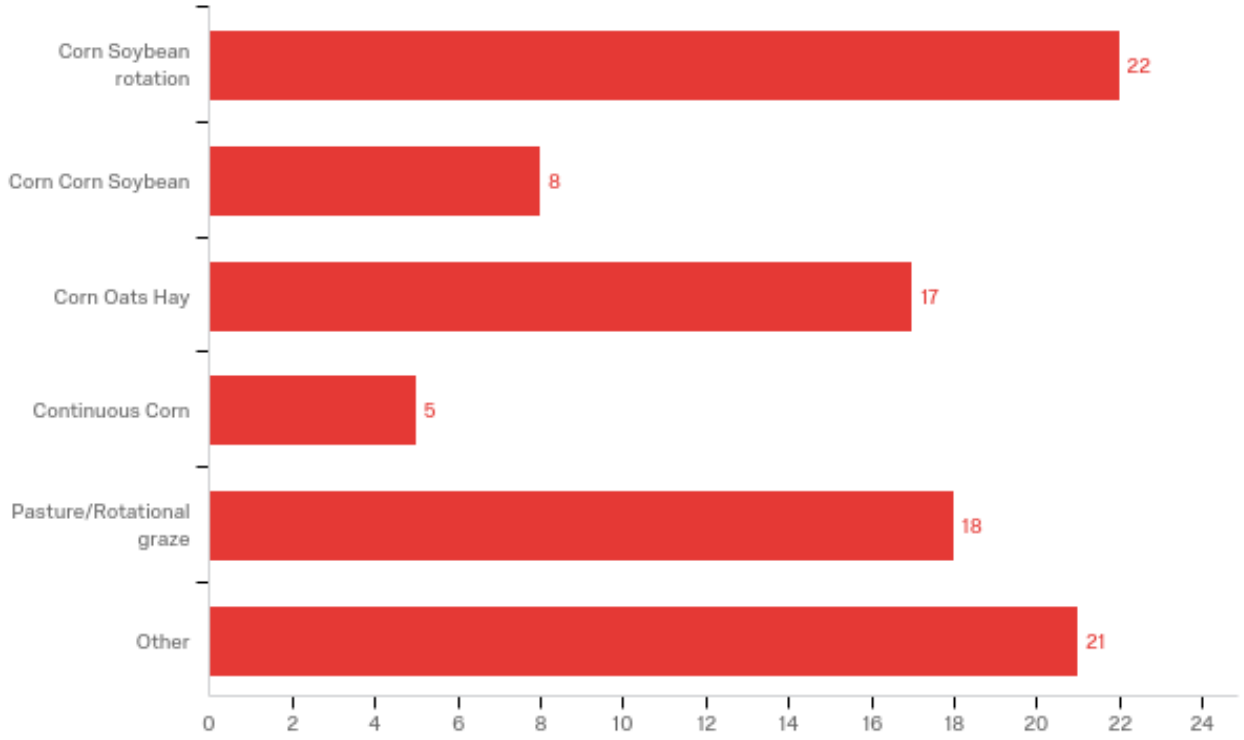
Q2.11 - Which of the following best describes your tillage practices? (select all that apply)



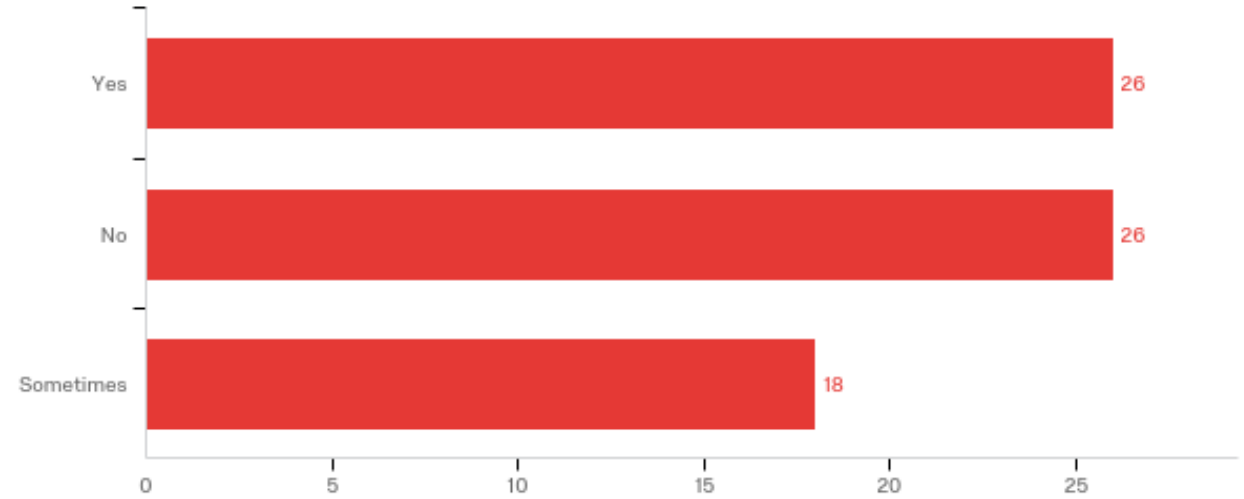
Other

Other - Text
All open acres are in pasture
Permanent pasture
only have pasture

Q2.12 - Which of the following best describes your cropping practices? (select all that apply)

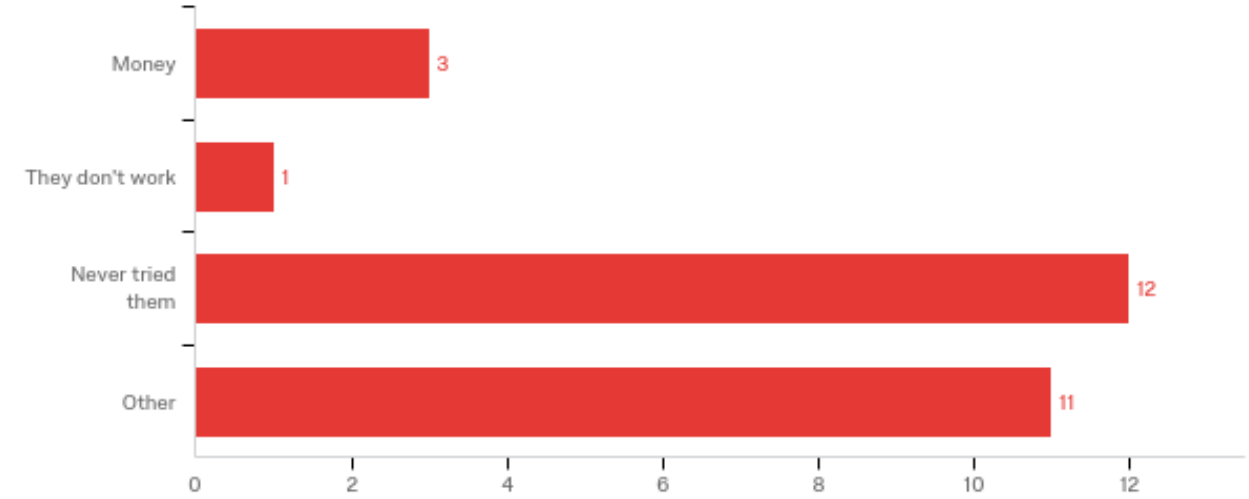


Q2.13 - Do you utilize cover crops in your rotation?

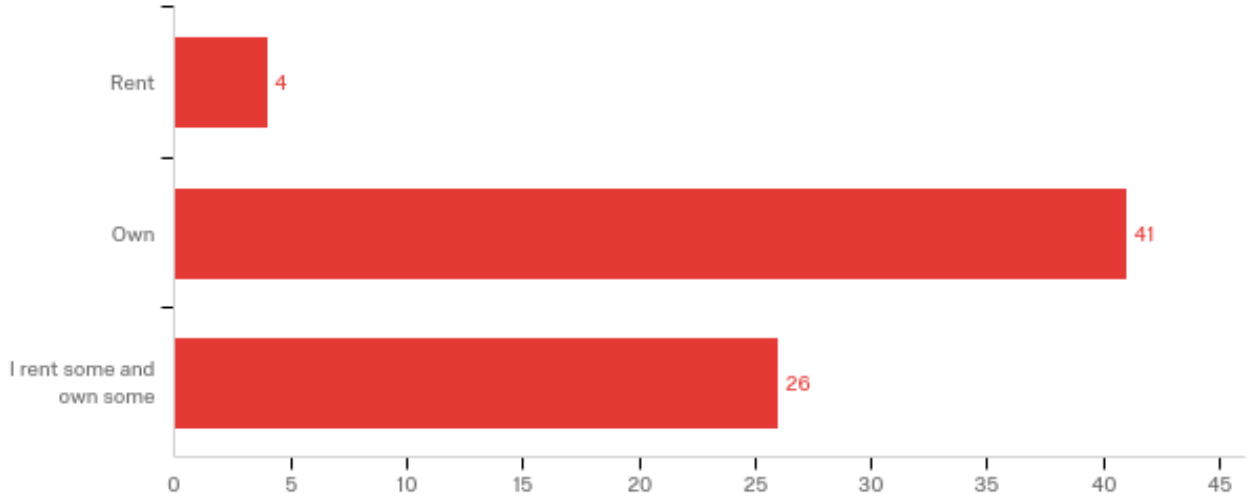


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you utilize cover crops in your rotation?	1.00	3.00	1.89	0.78	0.62	70

Q2.14 - What is your reason for not including cover crops in your rotation? Select all that apply.

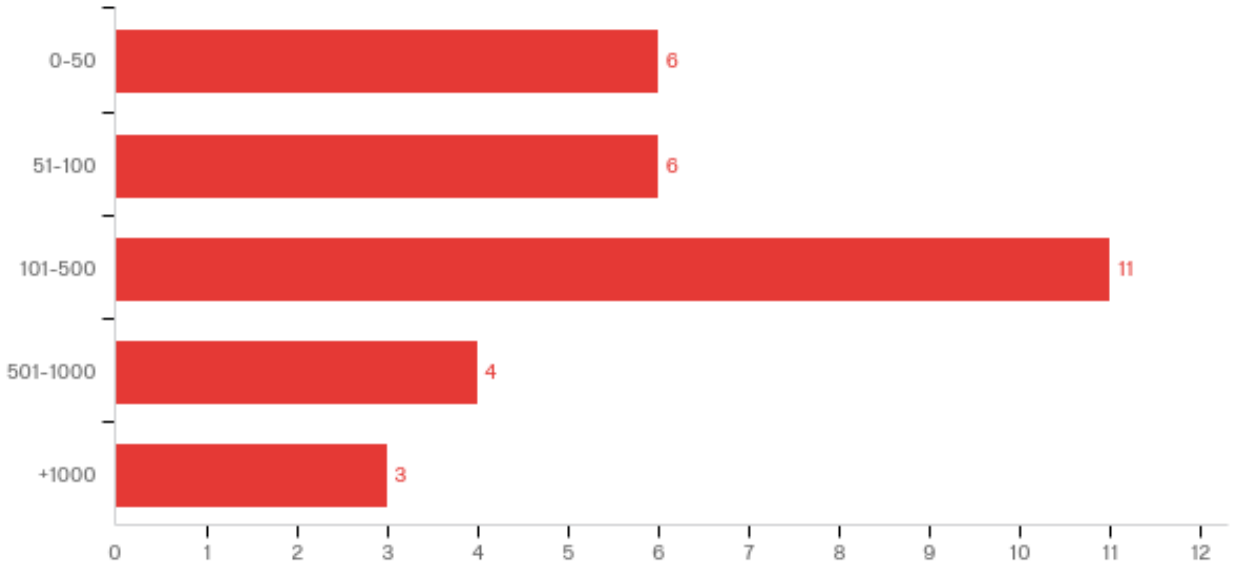


Q2.15 - Do you rent the land that you farm or own it?



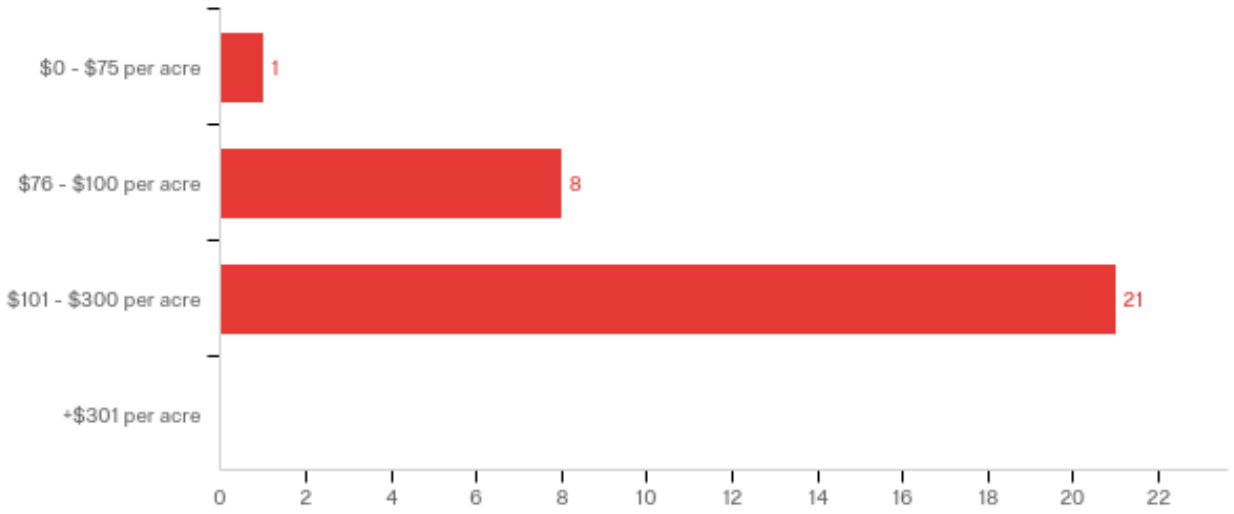
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you rent the land that you farm or own it?	1.00	3.00	2.31	0.57	0.33	71

Q2.16 - How much land do you rent? (acres)



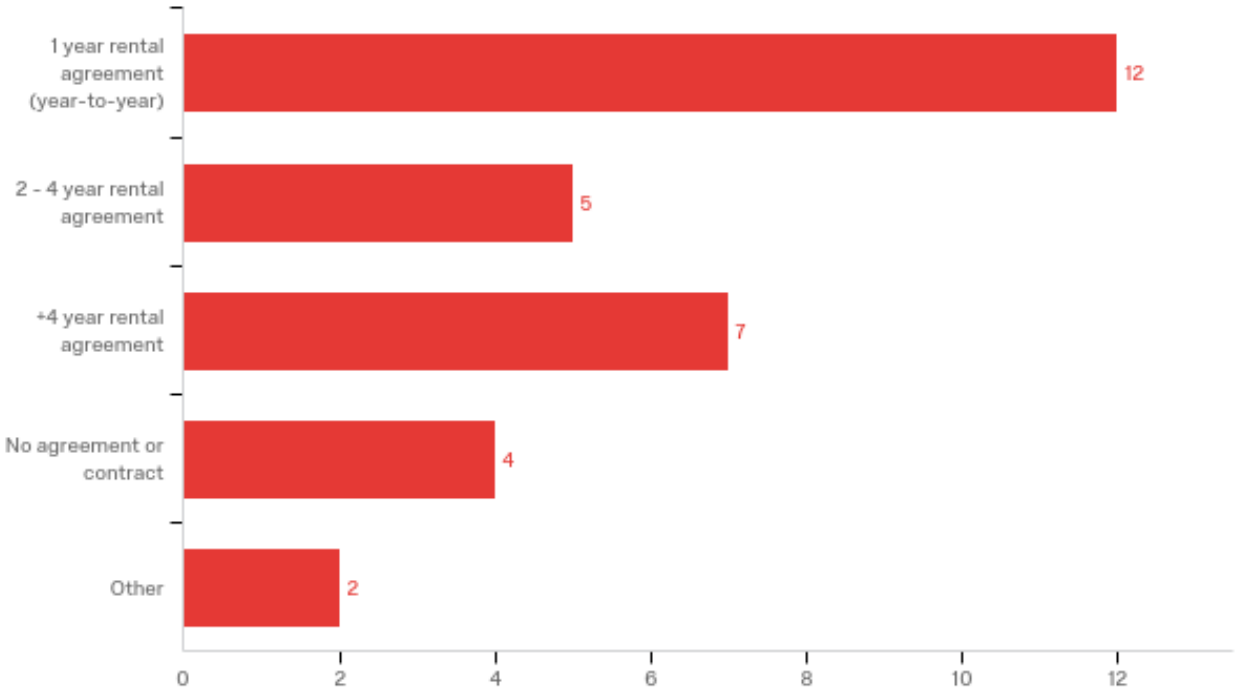
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How much land do you rent? (acres)	1.00	5.00	2.73	1.21	1.46	30

Q2.17 - What is the average rental rate per acre you pay for cropland?



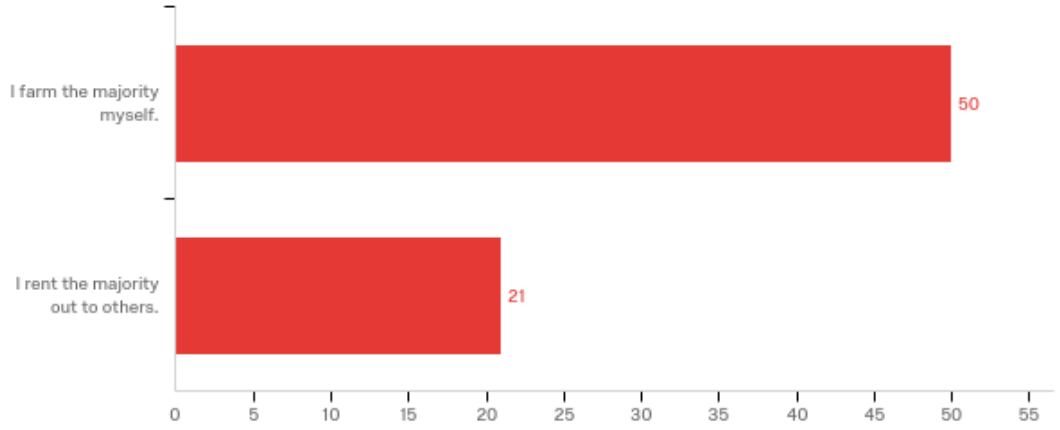
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is the average rental rate per acre you pay for cropland?	1.00	3.00	2.67	0.54	0.29	30

Q2.18 - How long is your rental agreement/contract?



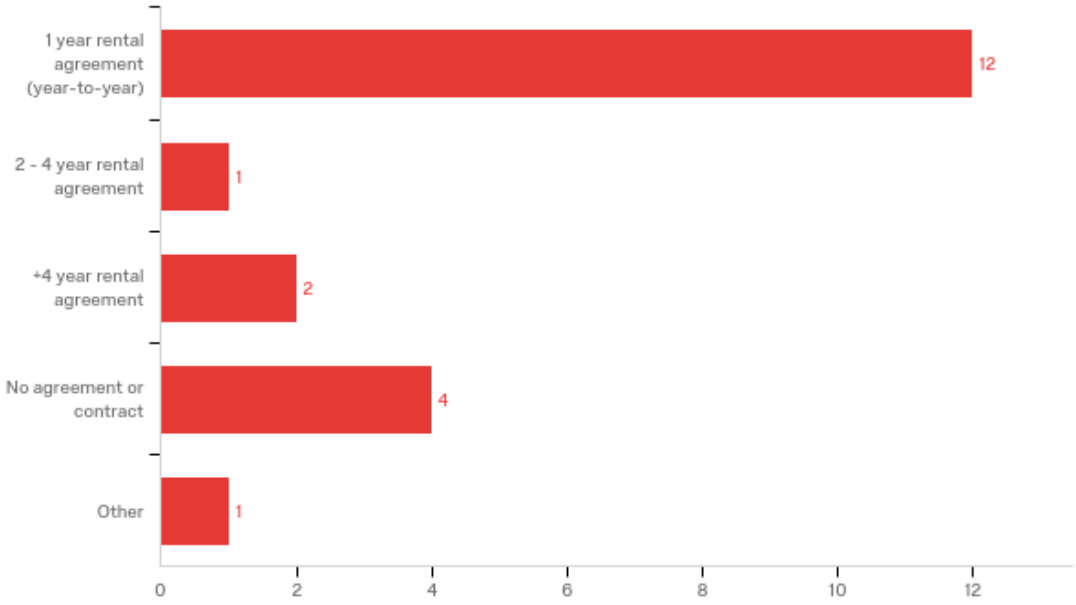
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How long is your rental agreement/contract? - Selected Choice	1.00	5.00	2.30	1.29	1.68	30

Q2.19 - Do you farm the majority of your owned farmland yourself or rent it out?



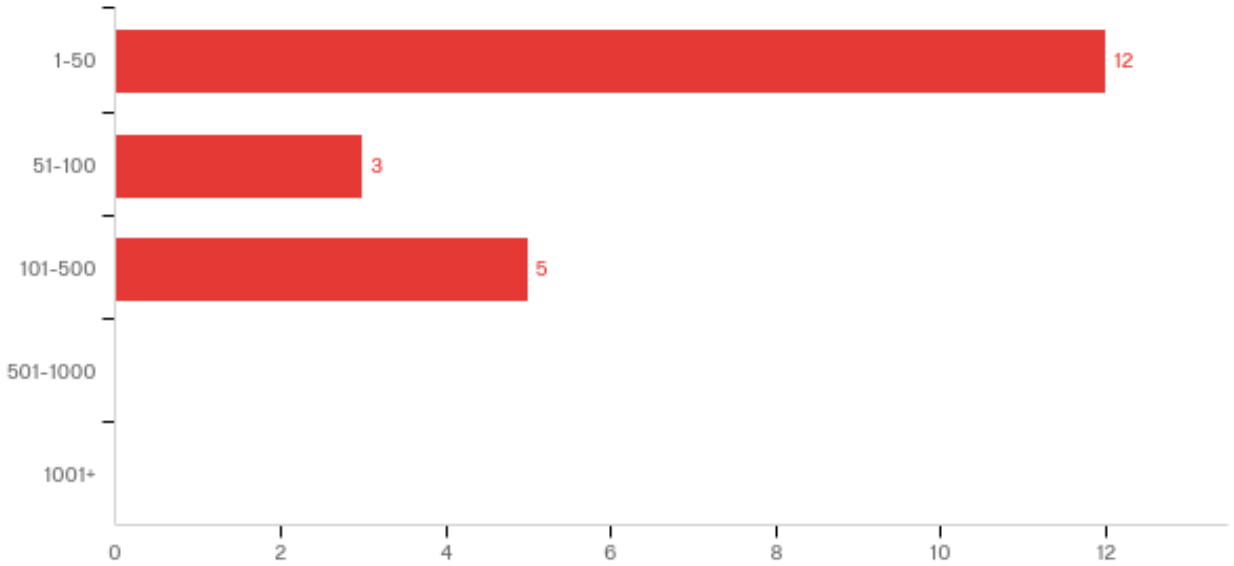
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you farm the majority of your owned farmland yourself or rent it out?	1.00	2.00	1.30	0.46	0.21	71

Q2.20 - How long is the rental agreement with your tenants?



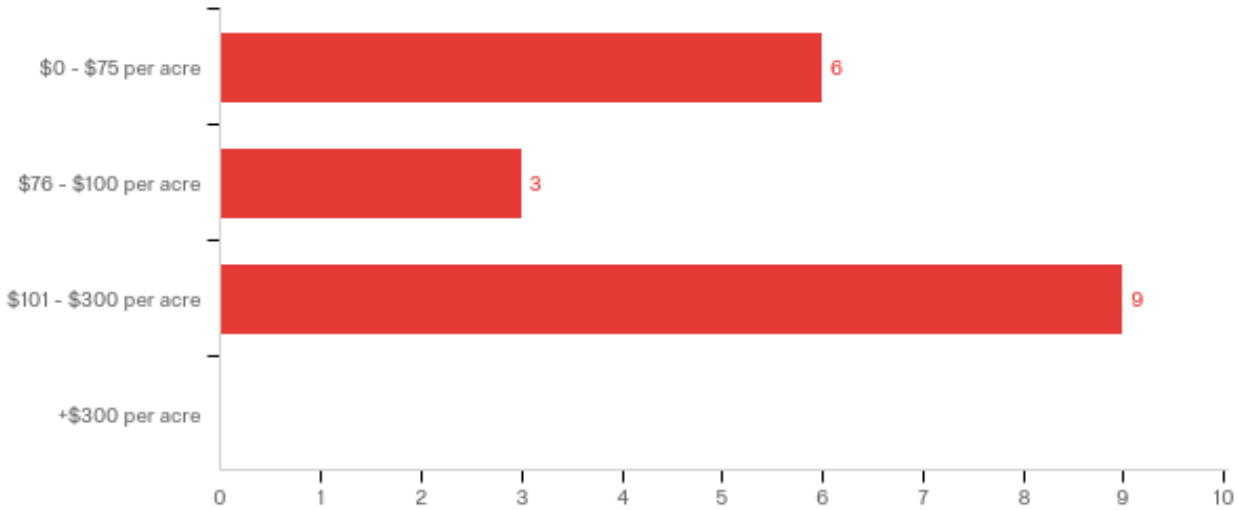
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How long is the rental agreement with your tenants? - Selected Choice	1.00	5.00	2.05	1.40	1.95	20

Q2.21 - How much of your farmland is leased or rented out (in acres)?



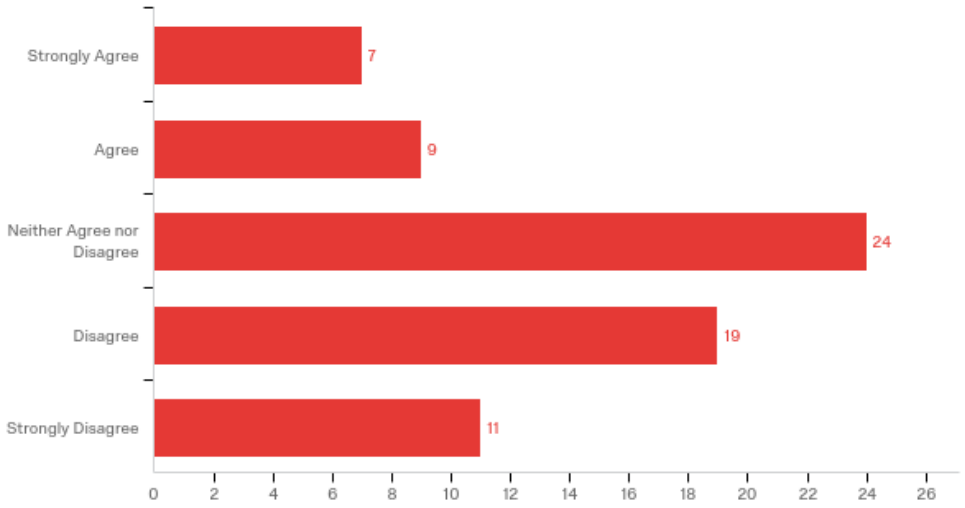
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How much of your farmland is leased or rented out (in acres)?	1.00	3.00	1.65	0.85	0.73	20

Q2.22 - What is the average rental rate per acre you charge for cropland?



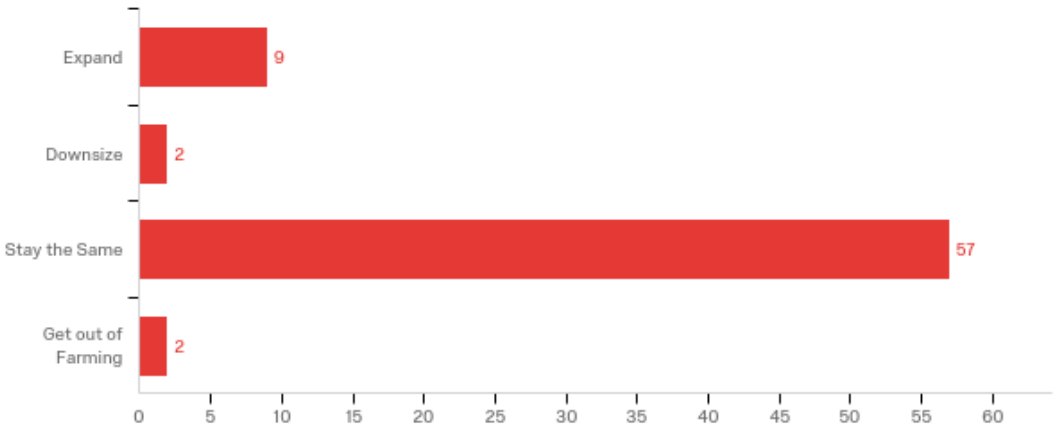
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is the average rental rate per acre you charge for cropland?	1.00	3.00	2.17	0.90	0.81	18

Q2.23 - How do you feel about this statement? Finding suitable land to spread manure on is difficult.



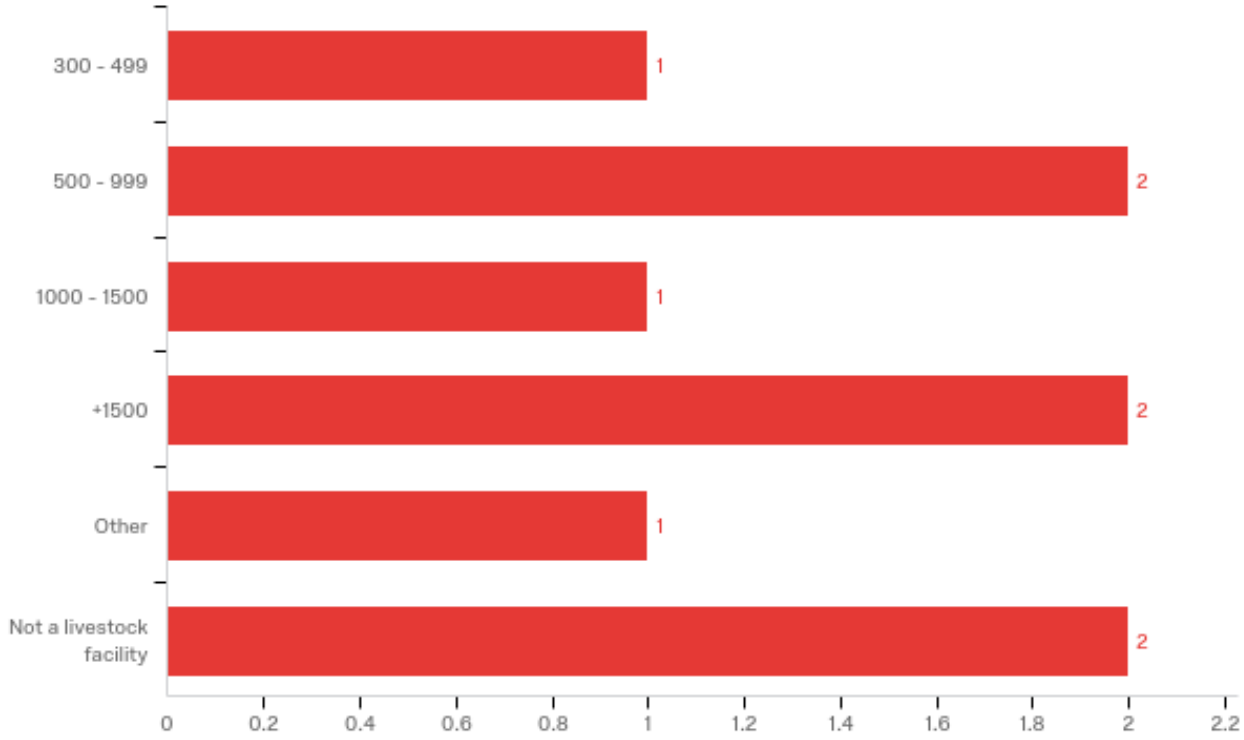
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How do you feel about this statement? Finding suitable land to spread manure on is difficult.	1.00	5.00	3.26	1.17	1.36	70

Q2.24 - What best describes your farm operation plans for the next 5 years?



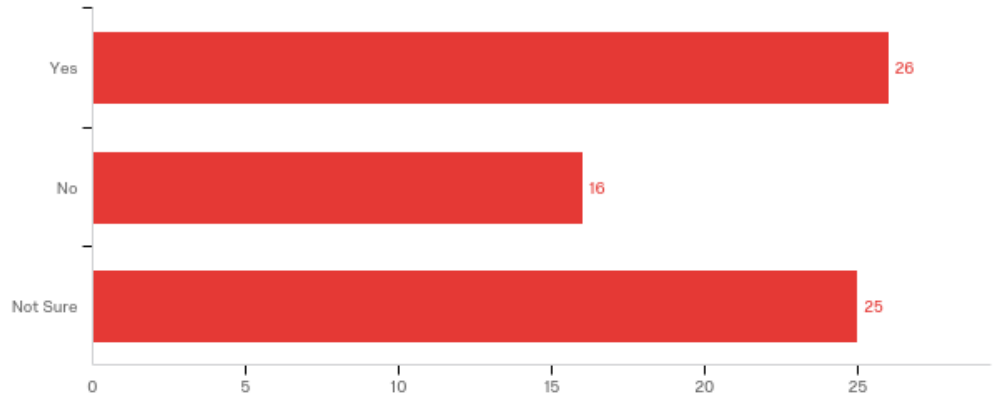
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What best describes your farm operation plans for the next 5 years?	1.00	4.00	2.74	0.71	0.51	70

Q2.25 - If you are a livestock facility, how many total animal units do you expect to have after expansion? (1 animal unit = 1,000 pounds of animal)



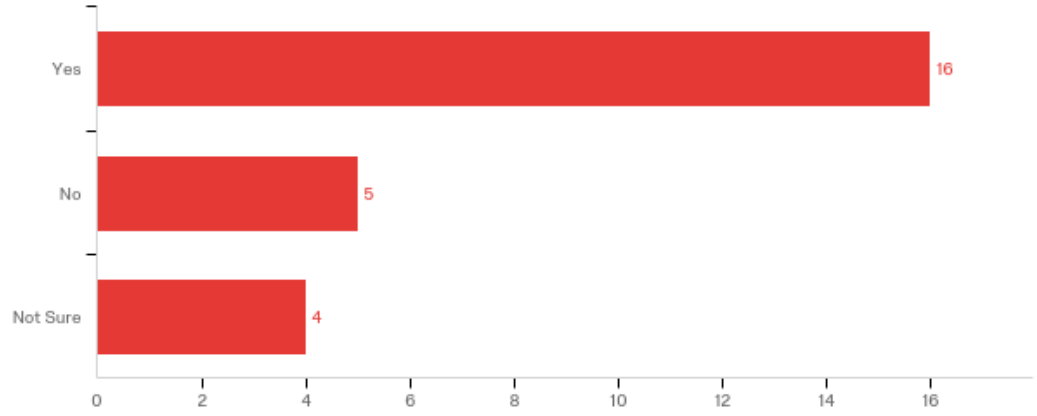
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If you are a livestock facility, how many total animal units do you expect to have after expansion? (1 animal unit = 1,000 pounds of animal) - Selected Choice	1.00	6.00	3.67	1.70	2.89	9

Q2.26 - Do you have a cropland/pastureland nutrient management plan for your farm that meets the 590 Standard?



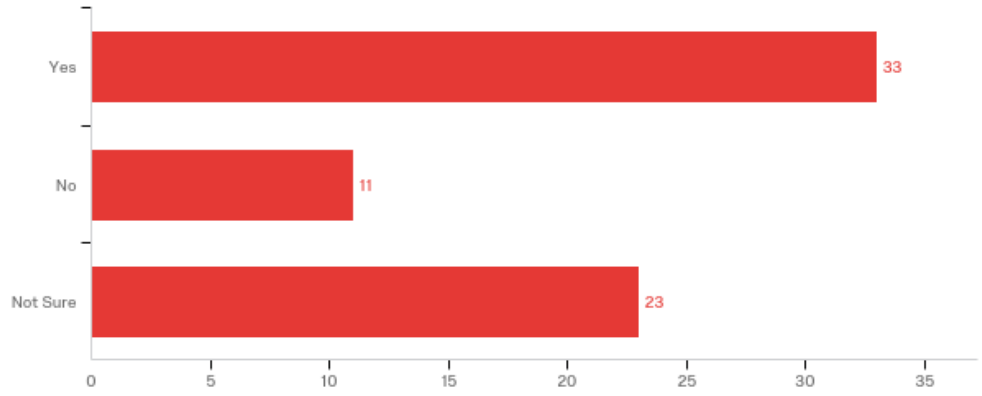
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you have a cropland/pastureland nutrient management plan for your farm that meets the 590 Standard?	1.00	3.00	1.99	0.87	0.76	67

Q2.27 - Has that plan been updated in the last year?



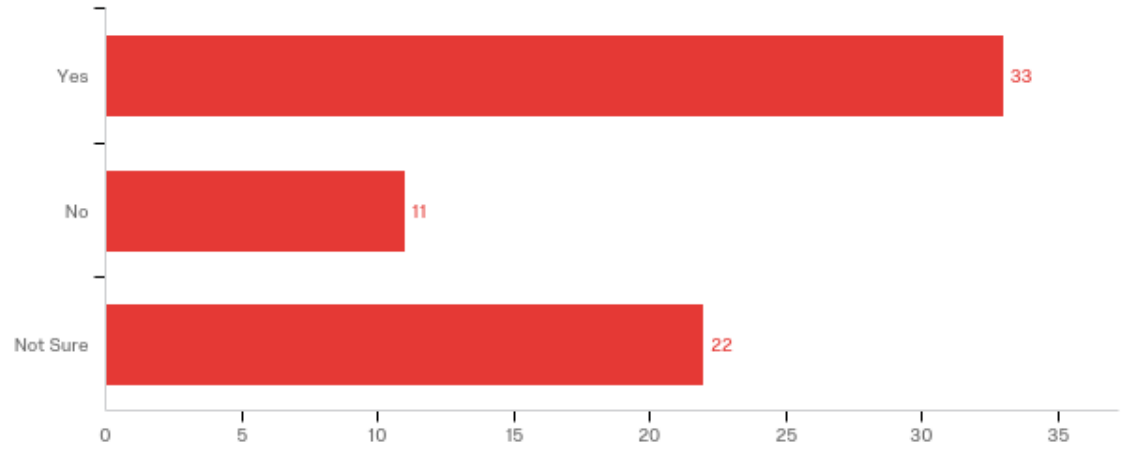
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Has that plan been updated in the last year?	1.00	3.00	1.52	0.75	0.57	25

Q2.28 - Do you follow University of Wisconsin recommendations for nutrient requirements of crops?



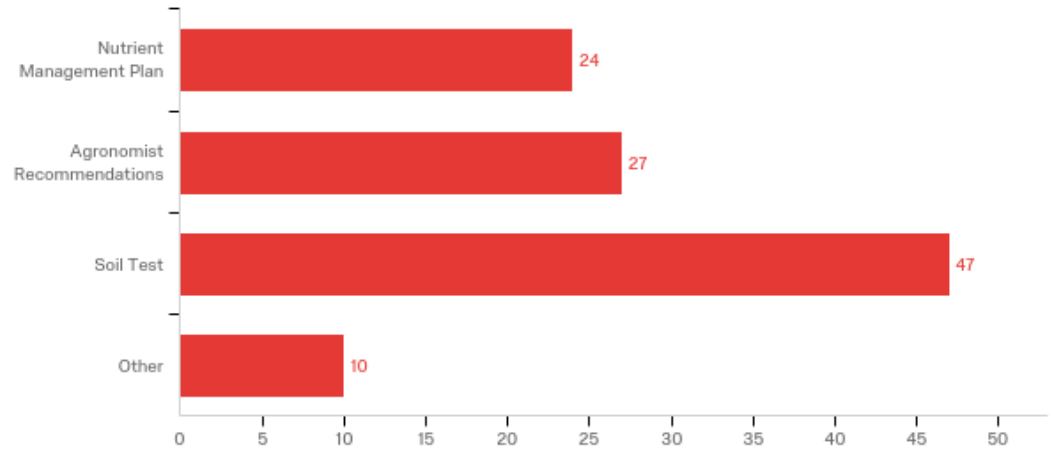
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you follow University of Wisconsin recommendations for nutrient requirements of crops?	1.00	3.00	1.85	0.90	0.81	67

Q2.29 - Do you credit carry over nitrogen in your nutrient management planning and nutrient applications?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you credit carry over nitrogen in your nutrient management planning and nutrient applications?	1.00	3.00	1.83	0.90	0.81	66

Q2.30 - How do you determine the amount and type of nutrients you need to meet your crop production needs? Check all that apply.

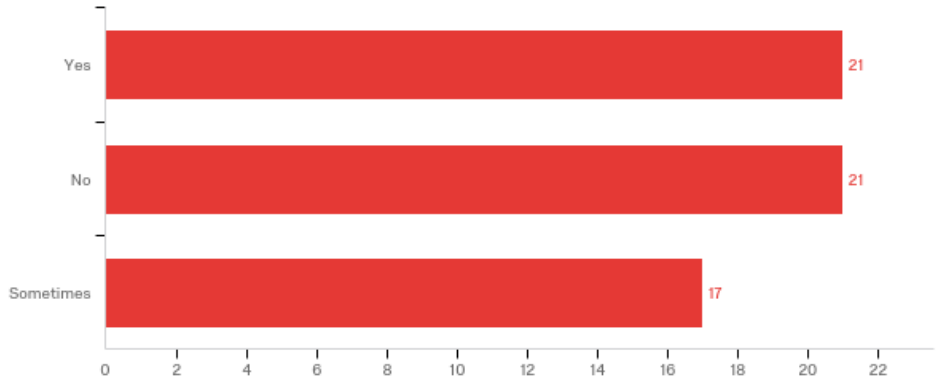


#	Answer	%	Count
1	Nutrient Management Plan	22.22%	24
2	Agronomist Recommendations	25.00%	27
3	Soil Test	43.52%	47
4	Other	9.26%	10
	Total	100%	108

Q2.30 - Other

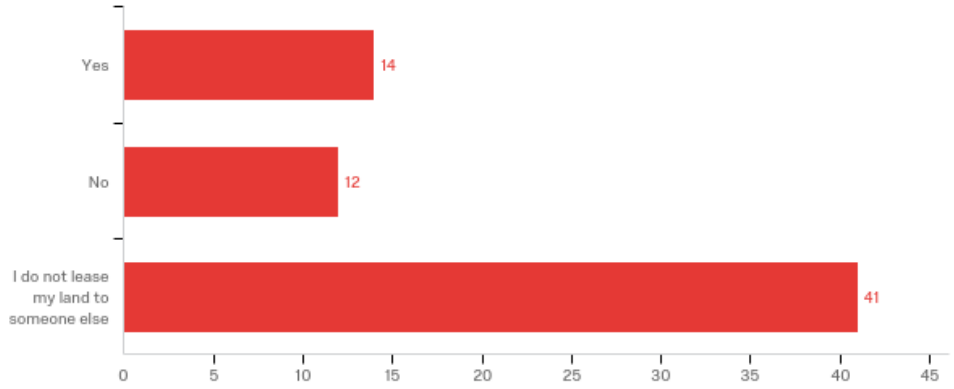
visual field showings
Leave up to renter
Since we rent out all the farm land, I don't know
Pioneer Encirca Program
NA
Don't do it. No need to.
Not sure what renter does.

Q2.31 - If you have access to livestock manure for your operation, do you still apply commercial fertilizer on the same acreage in the same year?



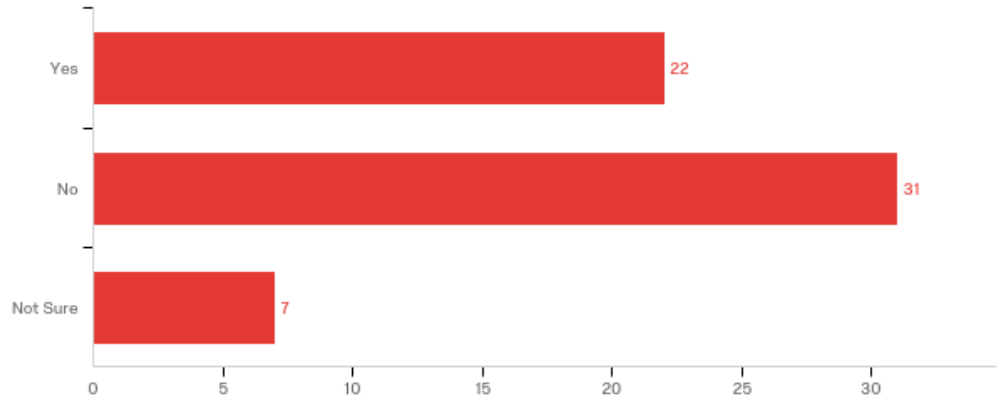
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If you have access to livestock manure for your operation, do you still apply commercial fertilizer on the same acreage in the same year?	1.00	3.00	1.93	0.80	0.64	59

Q2.32 - If you lease or rent your farmland to someone else, do you know what cropping and nutrient management practices are used on your land?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If you lease or rent your farmland to someone else, do you know what cropping and nutrient management practices are used on your land?	1.00	3.00	2.40	0.81	0.66	67

Q2.33 - Does your rental agreement require certain conservation standards/practices?

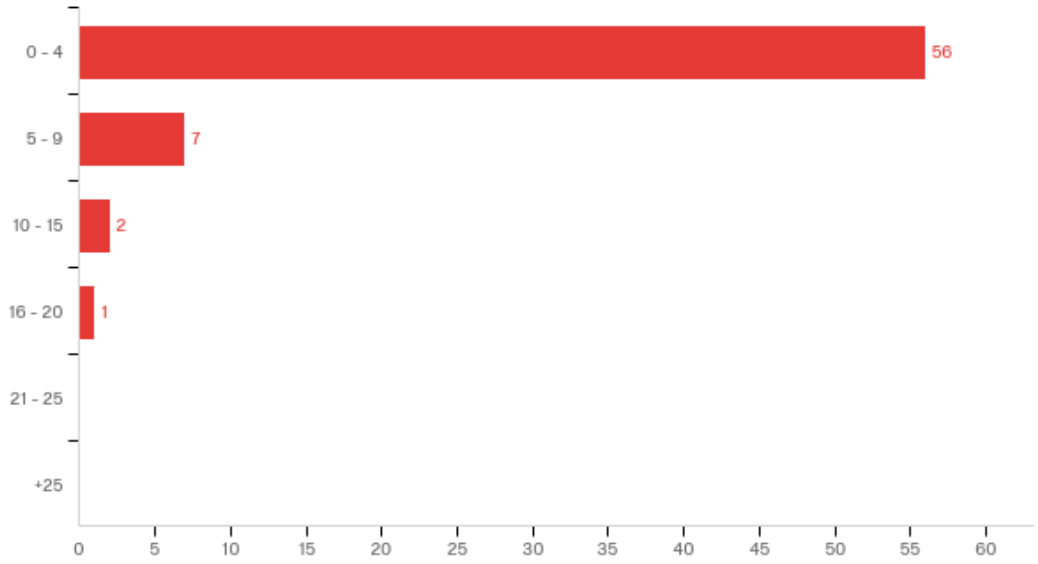


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your rental agreement require certain conservation standards/practices?	1.00	3.00	1.75	0.65	0.42	60

Q2.34 - What are the conservation standards/practices required by your rental agreement?

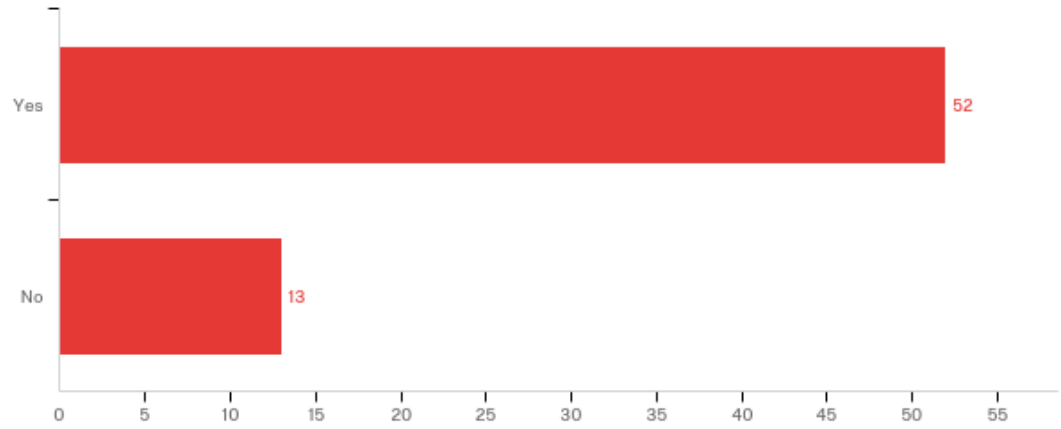
What are the conservation standards/practices required by your rental agreement?
Water runs, headlands,
Following 590
Maintain water runs
Keep nutrient levels up and don’t rut the fields up or cause compaction
none required
Grass waterways, no till, minimum till
no-tillage and leave grassed waterways
Cover crops, holding nutrient value of soil, no till
Strip farming
Erosion control. Waterways
Don't have a copy of the lease right now
minimal tillage
Strip farming

Q2.35 - On your farm, how many people do you employ other than yourself?



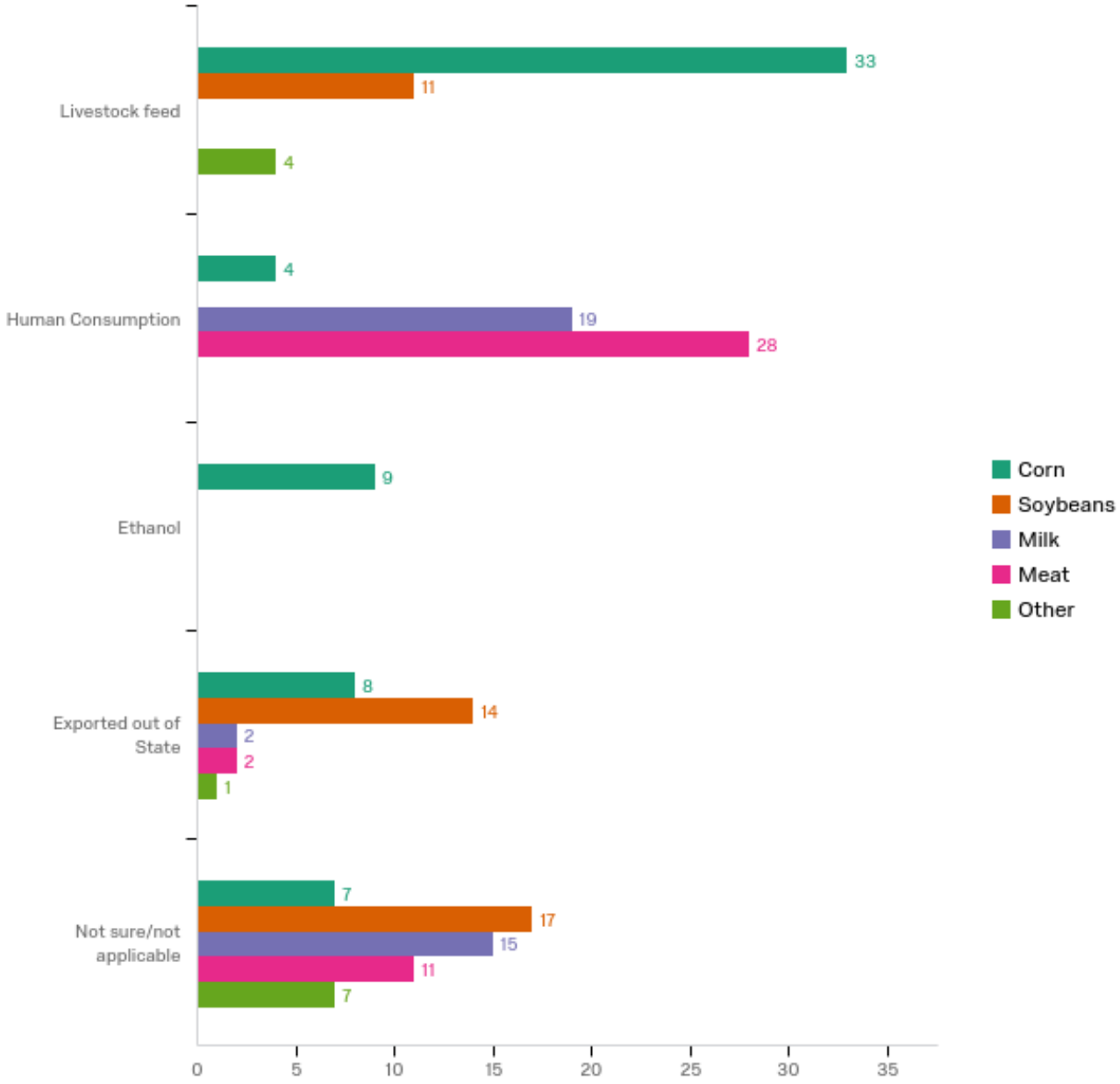
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	On your farm, how many people do you employ other than yourself?	1.00	5.00	1.23	0.65	0.42	66

Q2.36 - Do you know the end use of the products you produce?

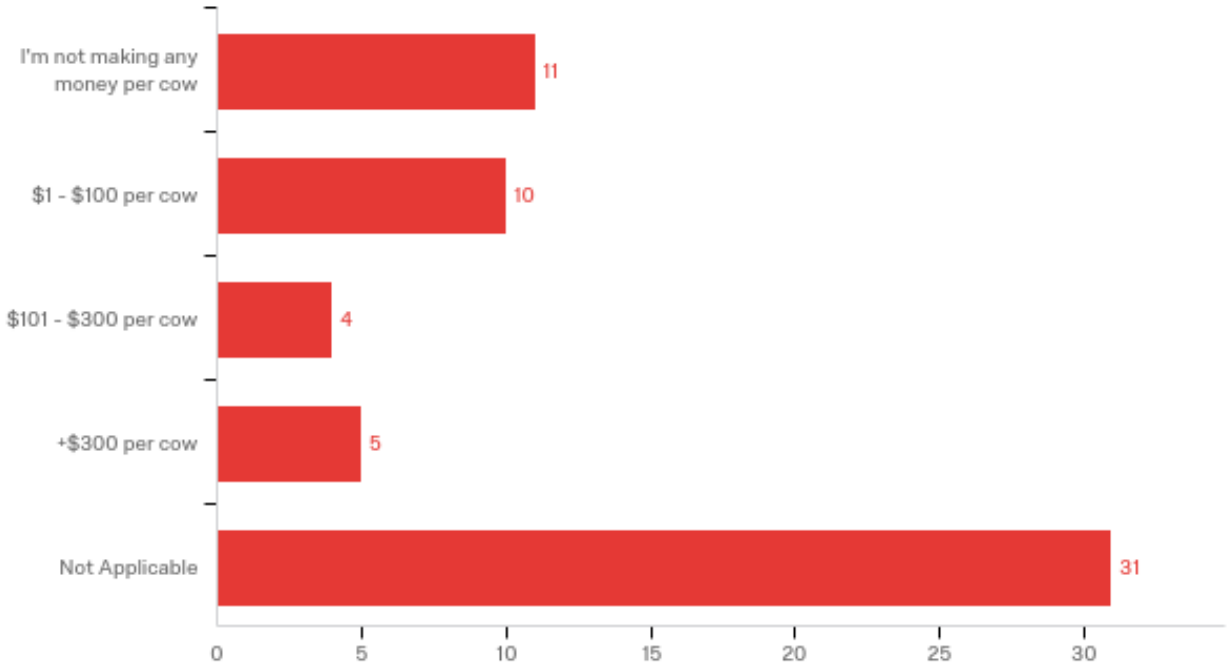


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you know the end use of the products you produce?	1.00	2.00	1.20	0.40	0.16	65

Q2.37 - Please indicate the end use of the products you produce: (check all that apply)

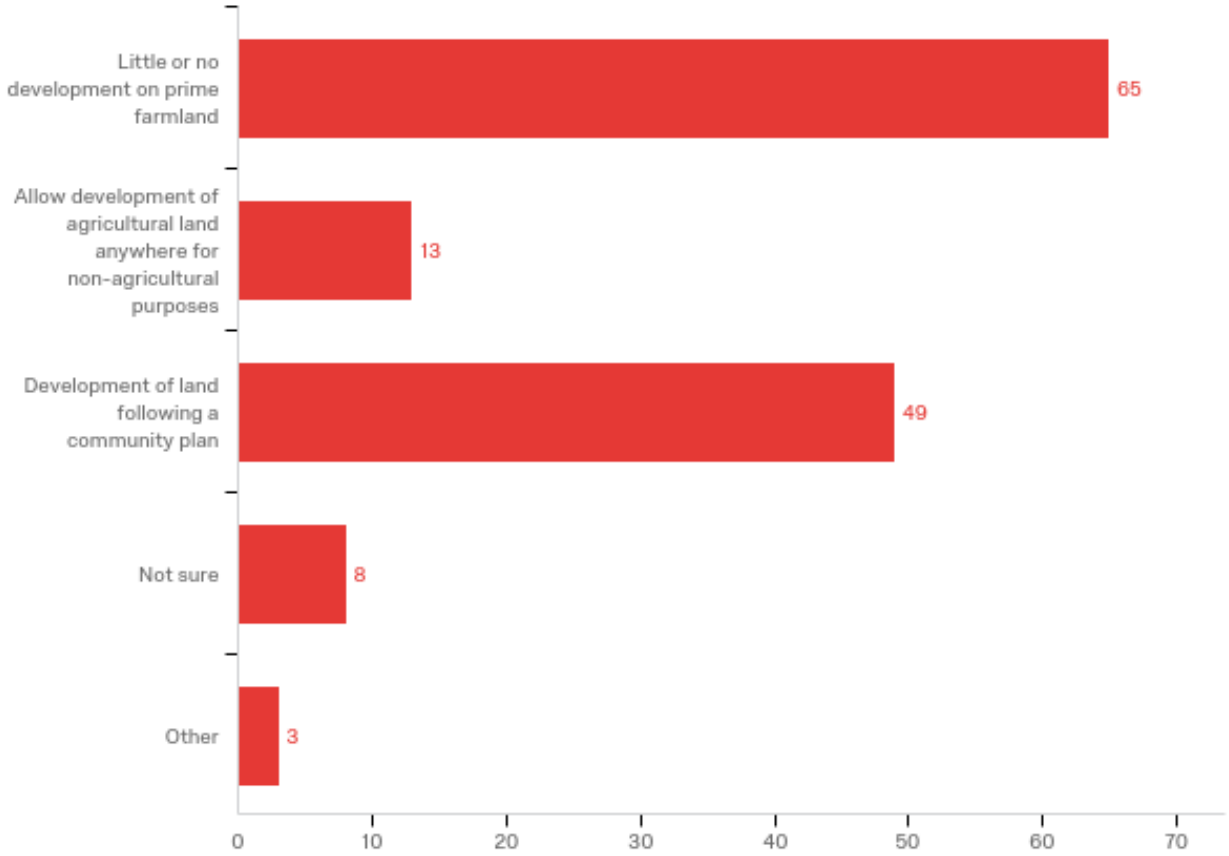


Q2.38 - For Livestock Producers, what is your net return per cow?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	For Livestock Producers, what is your net return per cow?	1.00	5.00	3.57	1.63	2.67	61

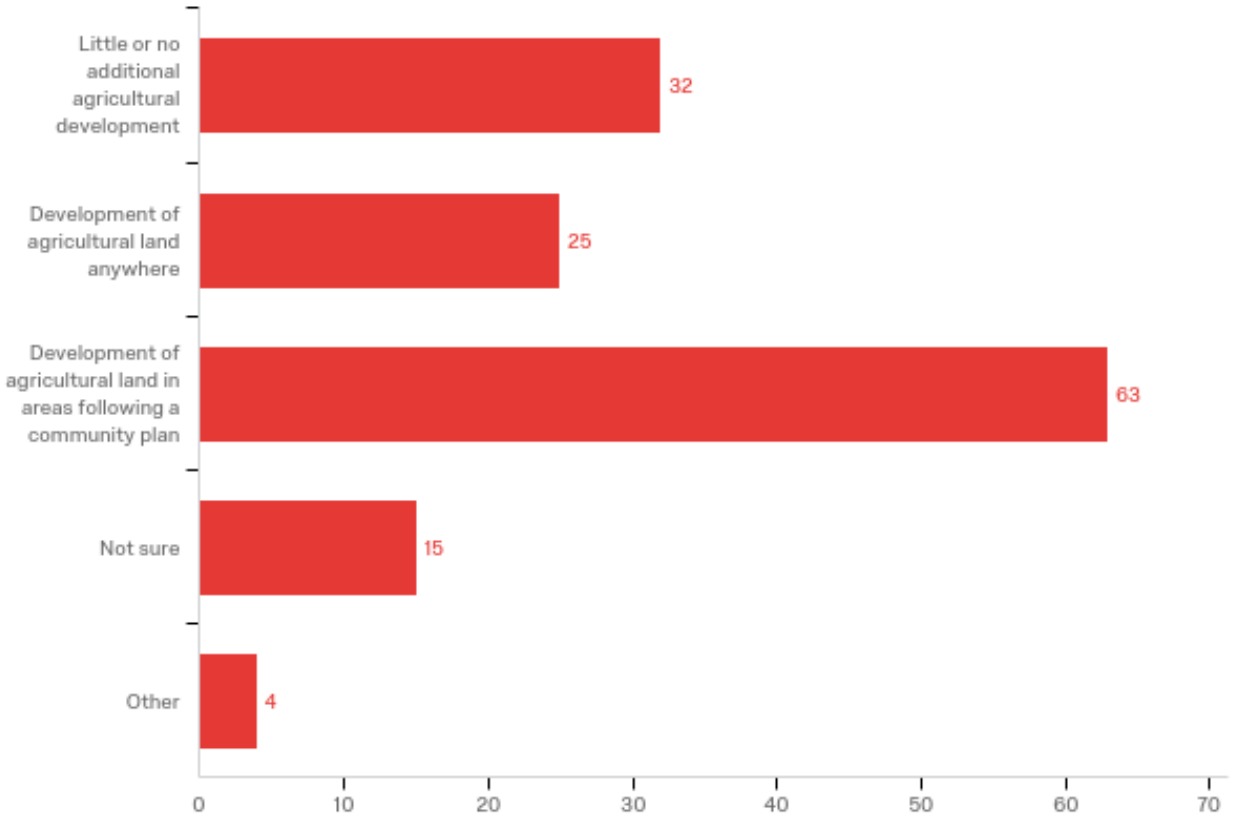
Q3.1 - How would you like to see future non-agricultural development in rural areas?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How would you like to see future non-agricultural development in rural areas? - Selected Choice	1.00	5.00	2.07	1.12	1.25	138

Answer	%	Count
All development subject to public approval	50.00%	1
No more vacation homes	50.00%	1
Total	100%	2

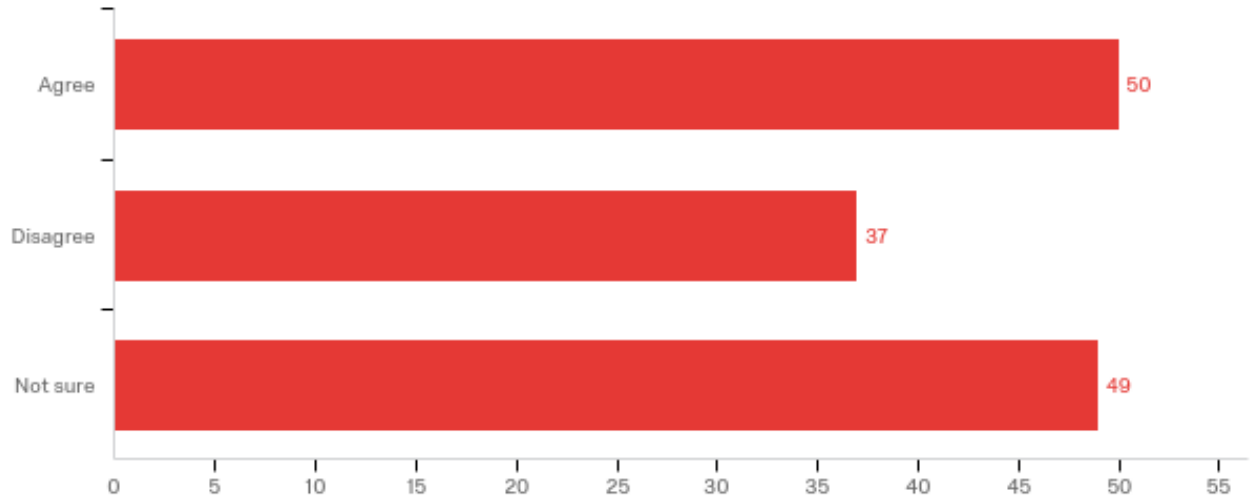
Q3.2 - How would you like to see future agricultural development in rural areas?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How would you like to see future agricultural development in rural areas? - Selected Choice	1.00	5.00	2.53	1.05	1.10	139

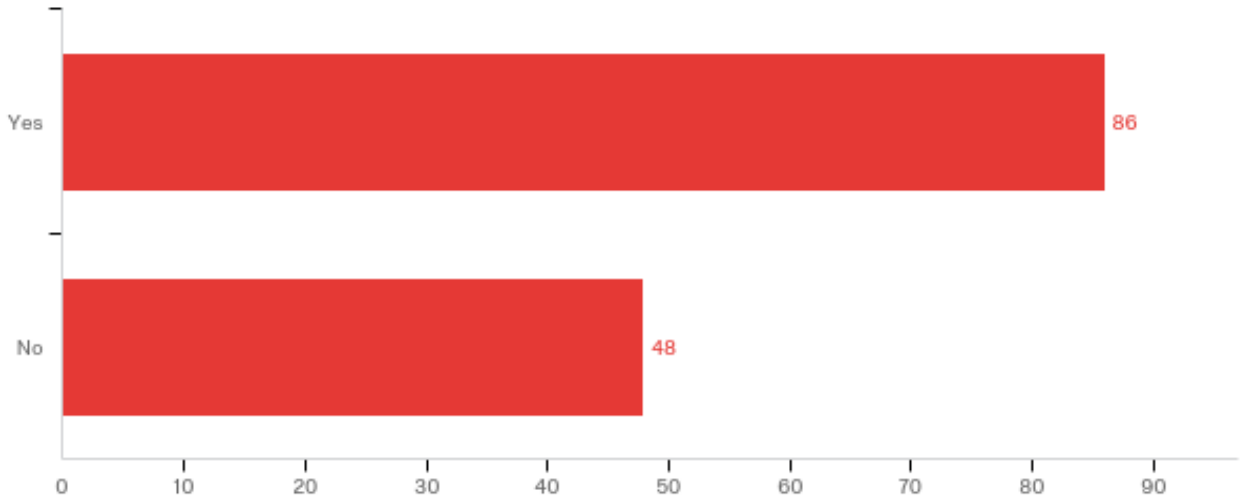
Answer	%	Count
Agriculture development based on DNR/state regulation	25.00%	1
Ecologically responsible development where feasible along with restoration where ecologically inappropriate	25.00%	1
Encourage small family farms	25.00%	1
moratorium of CAFOs, organic practices implemented by farmers big & small, moratorium on water usage by high capacity wells, increase usage of alt energy for farm practices, moratorium on animal waste runoff, manure composting mandatory	25.00%	1
Total	100%	4

Q3.3 - Do you agree or disagree with the following statement? I could currently find productive farmland to rent or buy in Pepin County.



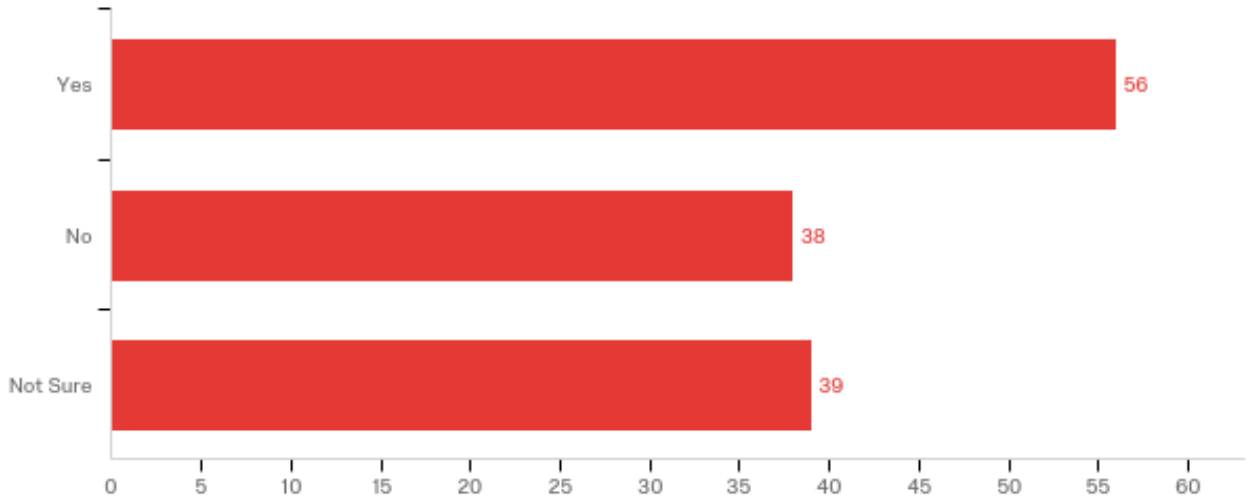
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you agree or disagree with the following statement? I could currently find productive farmland to rent or buy in Pepin County.	1.00	3.00	1.99	0.85	0.73	136

Q3.4 - Are you familiar with the Agricultural Performance Standards and Prohibitions (NR151, i.e. All cropland and pastureland must meet tolerable soil loss "T", must apply nutrients according to a 590 Nutrient Management Plan, No tillage within 5 feet of surface water, No overflow of manure storage structures, No direct runoff of manure to waters of the state, etc.)?



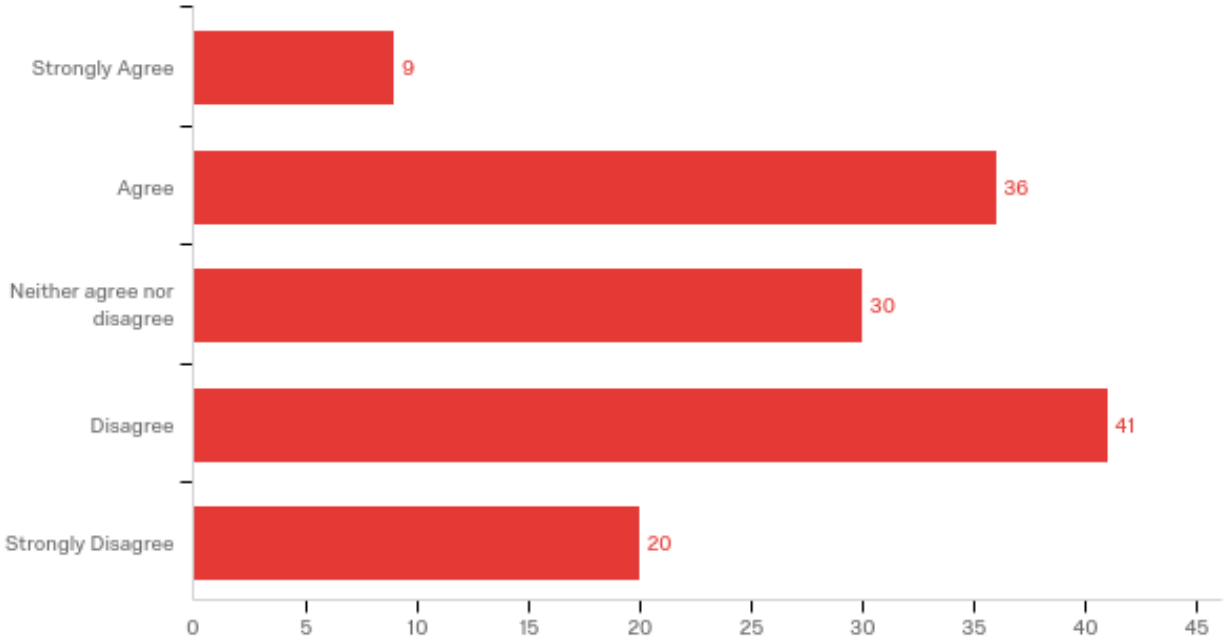
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you familiar with the Agricultural Performance Standards and Prohibitions (NR151, i.e. All cropland and pastureland must meet tolerable soil loss “T”, must apply nutrients according to a 590 Nutrient Management Plan, No tillage within 5 feet of surface water, No overflow of manure storage structures, No direct runoff of manure to waters of the state, etc.)?	1.00	2.00	1.36	0.48	0.23	134

Q3.5 - Do you think cost-share assistance should be required to be offered to farmers to implement the Agricultural Performance Standards and Prohibitions (NR151)?



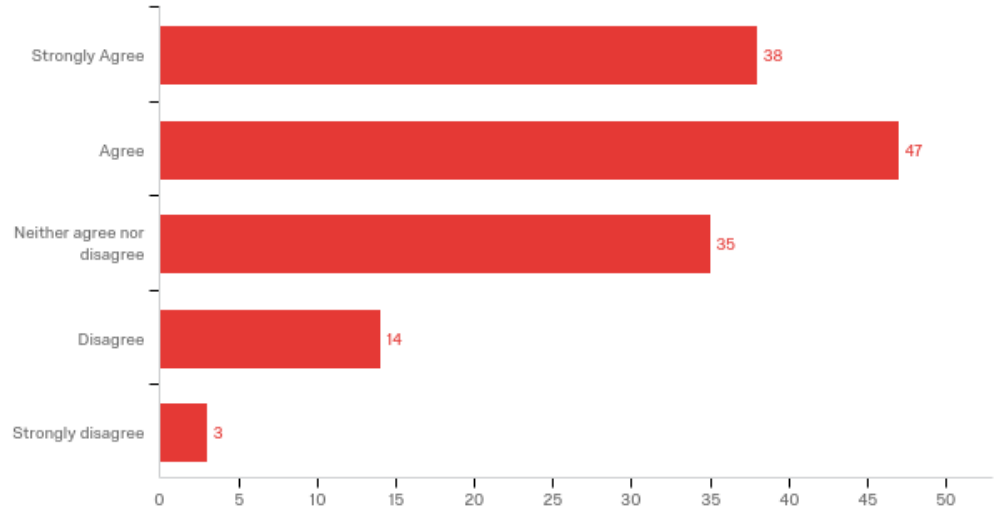
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you think cost-share assistance should be required to be offered to farmers to implement the Agricultural Performance Standards and Prohibitions (NR151)?	1.00	3.00	1.87	0.84	0.70	133

Q3.6 - The current road infrastructure is adequate for agricultural needs in Pepin County for the next 5 years.



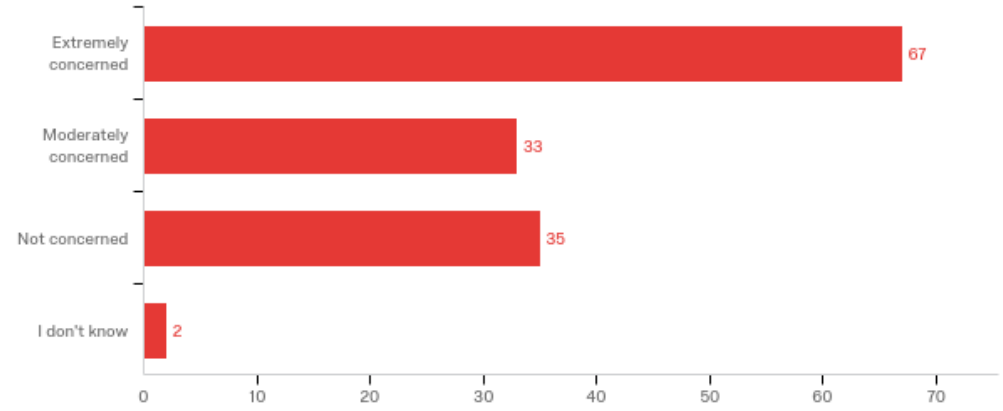
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The current road infrastructure is adequate for agricultural needs in Pepin County for the next 5 years.	1.00	5.00	3.20	1.17	1.38	136

Q3.7 - Conflict between farm and nearby non-farm uses is a major concern.



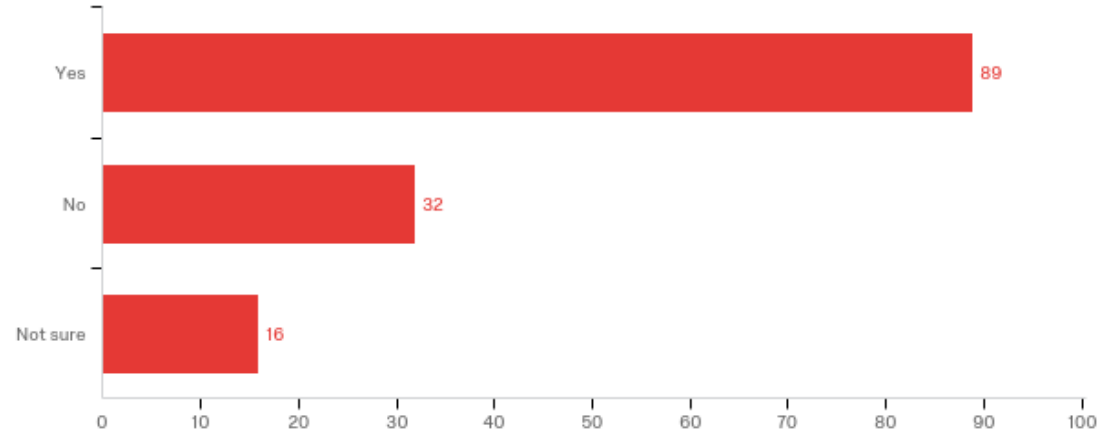
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Conflict between farm and nearby non-farm uses is a major concern.	1.00	5.00	2.25	1.04	1.08	137

Q3.8 - How concerned are you about the possibility of larger livestock operations moving into Pepin County?



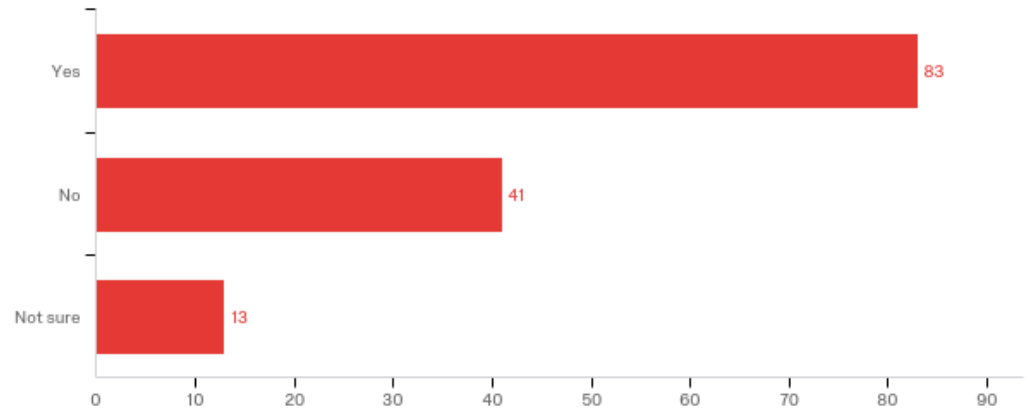
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How concerned are you about the possibility of larger livestock operations moving into Pepin County?	1.00	4.00	1.80	0.87	0.76	137

Q3.9 - Do you feel there needs to be more enforcement of existing regulations for livestock and cropland operations?



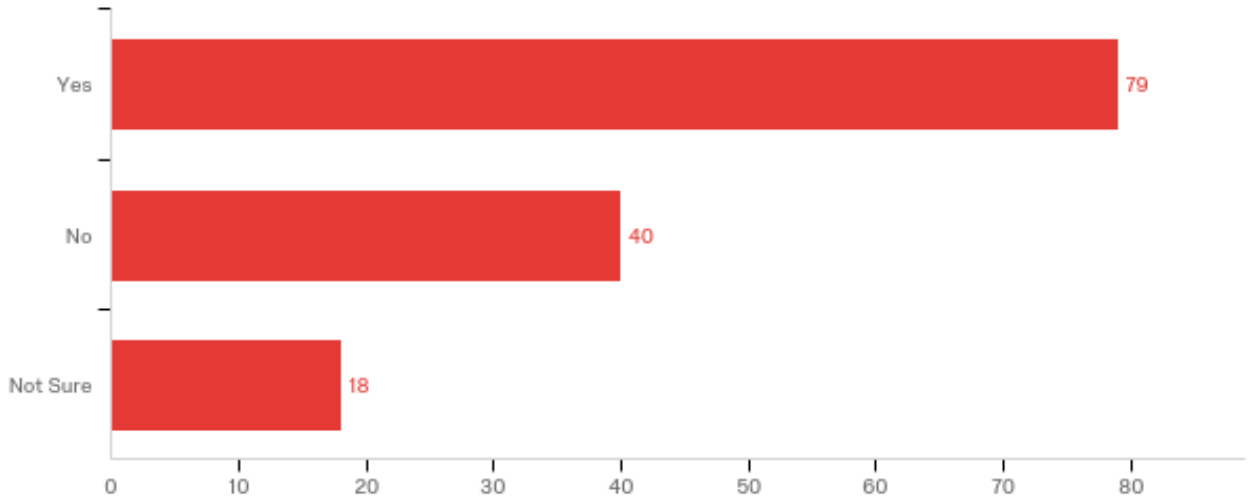
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you feel there needs to be more enforcement of existing regulations for livestock and cropland operations?	1.00	3.00	1.47	0.69	0.48	137

Q3.10 - Do you feel that more regulation is needed of livestock operations within the County to control environmental pollution and public health concerns?



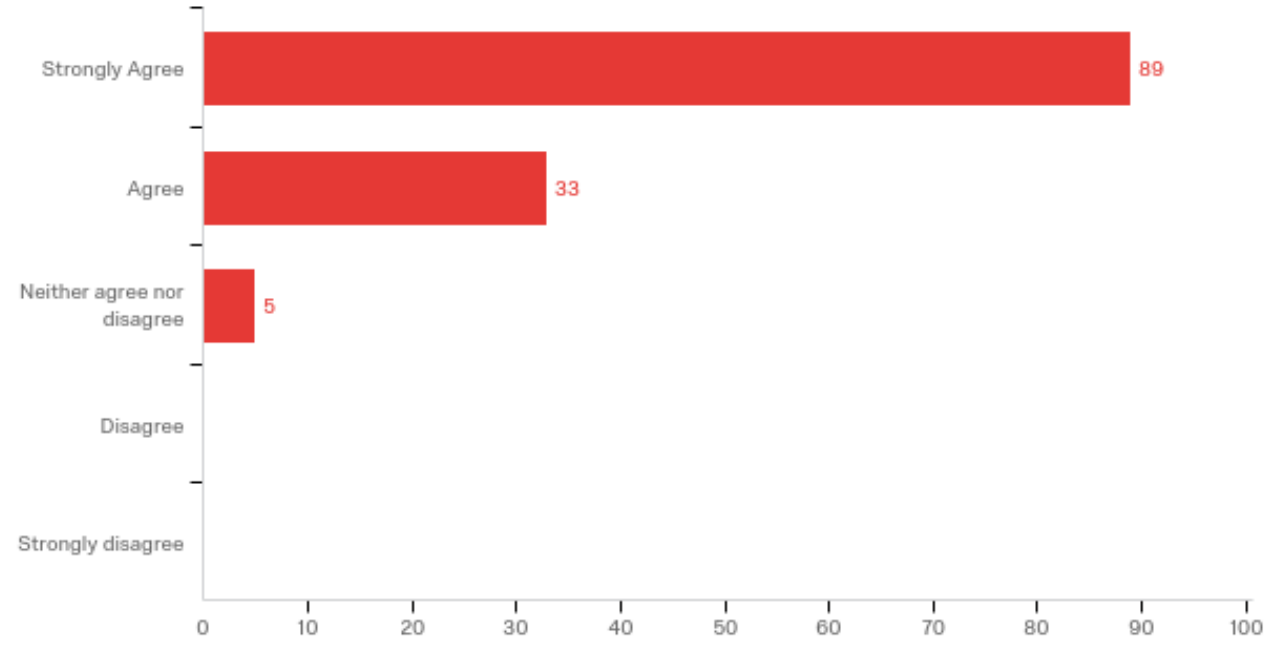
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you feel that more regulation is needed of livestock operations within the County to control environmental pollution and public health concerns?	1.00	3.00	1.49	0.66	0.44	137

Q3.11 - Do you feel that more regulation is needed of cropland operations within the County to control environmental pollution and public health concerns?



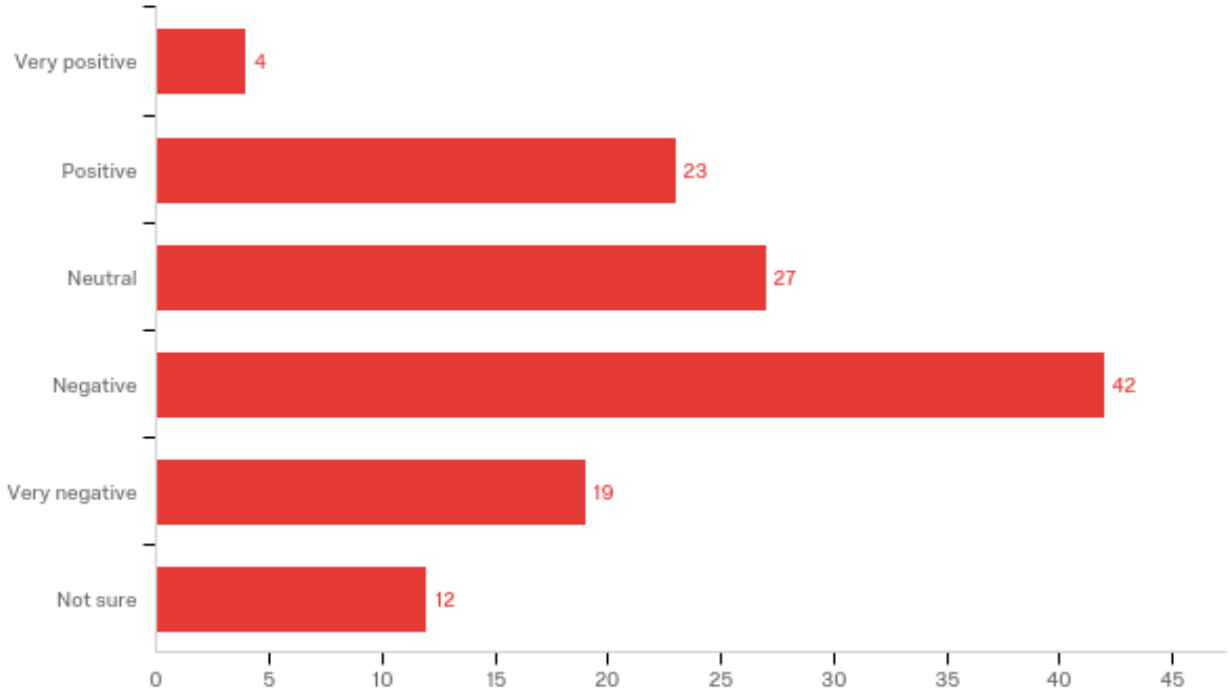
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you feel that more regulation is needed of cropland operations within the County to control environmental pollution and public health concerns?	1.00	3.00	1.55	0.71	0.51	137

Q4.1 - How do you feel about the following statement? Pepin County stream quality is important to me, whether or not I use them.



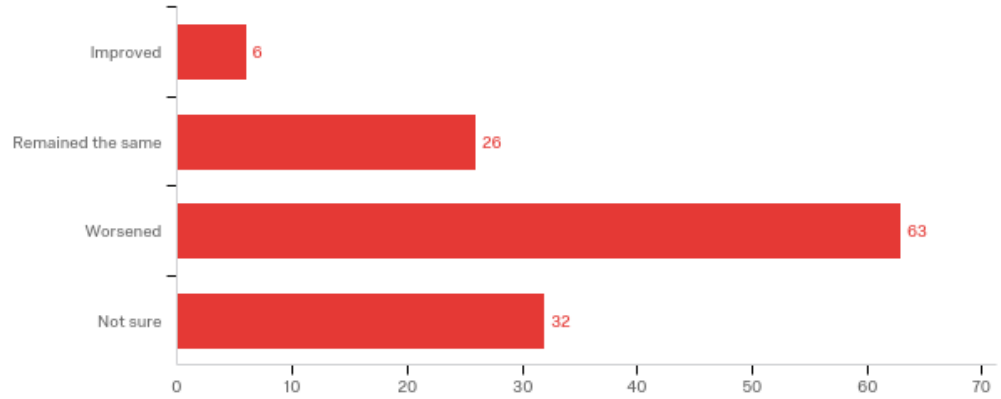
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How do you feel about the following statement? Pepin County stream quality is important to me, whether or not I use them.	1.00	3.00	1.34	0.55	0.30	127

Q4.2 - In your opinion, what is the general surface water quality outlook for Pepin County?



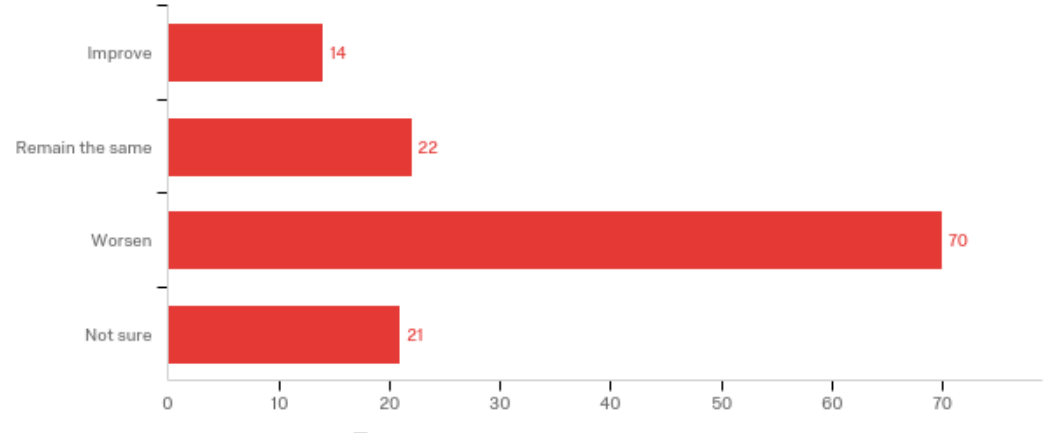
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	In your opinion, what is the general surface water quality outlook for Pepin County?	1.00	6.00	3.67	1.28	1.64	127

Q4.3 - Over the past 10 years, surface water quality has

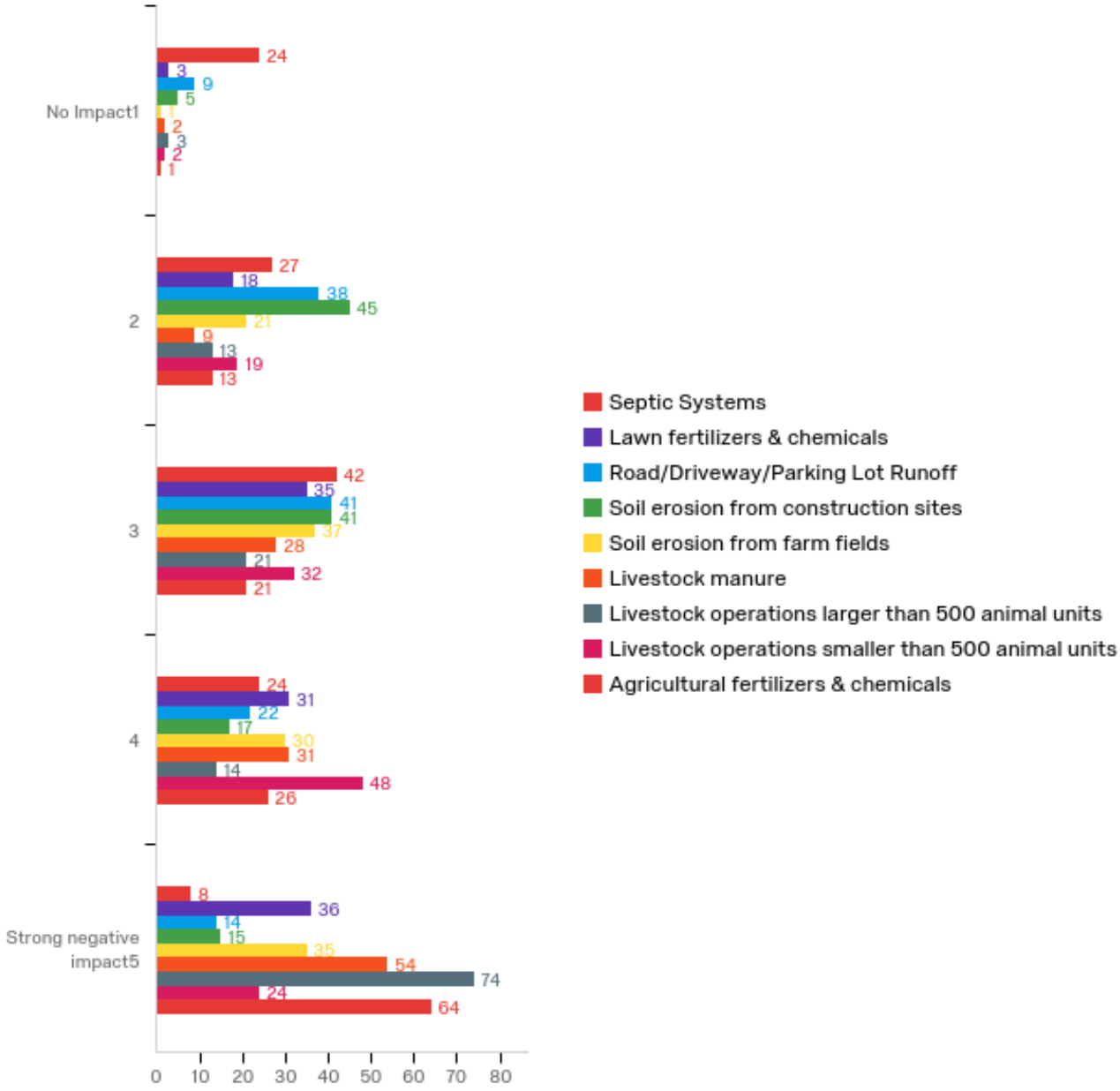


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Over the past 10 years, surface water quality has	1.00	4.00	2.95	0.80	0.64	127

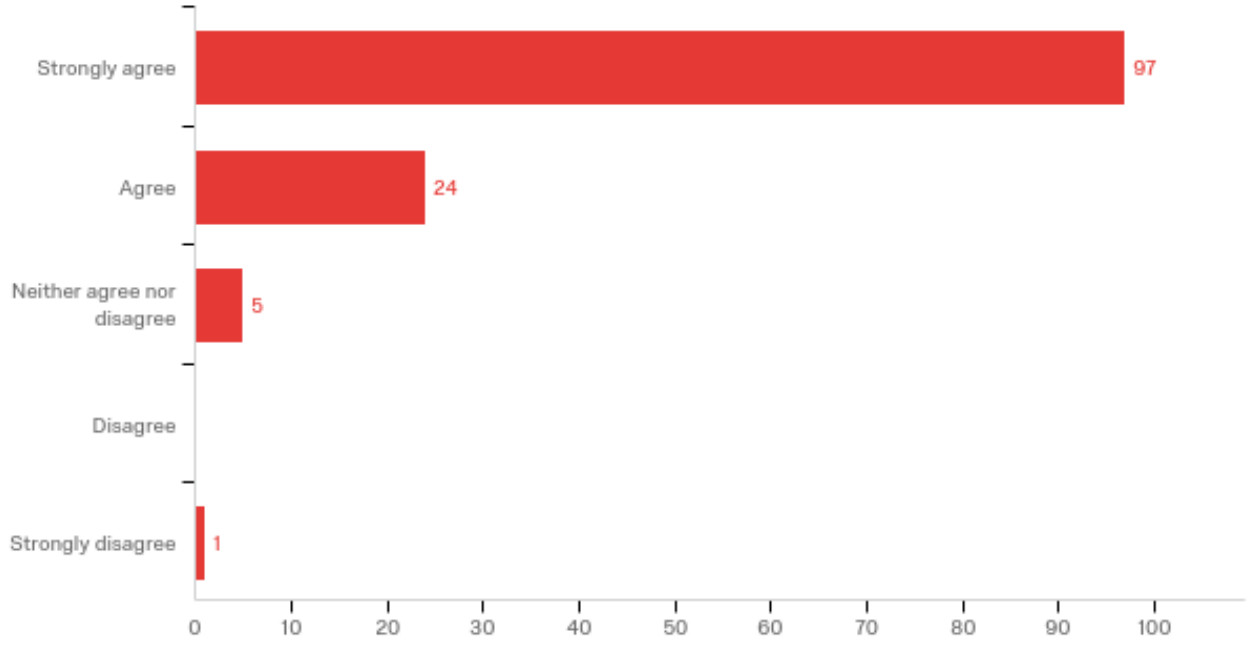
Q4.4 - Over the next 10 years, I anticipate surface water quality will



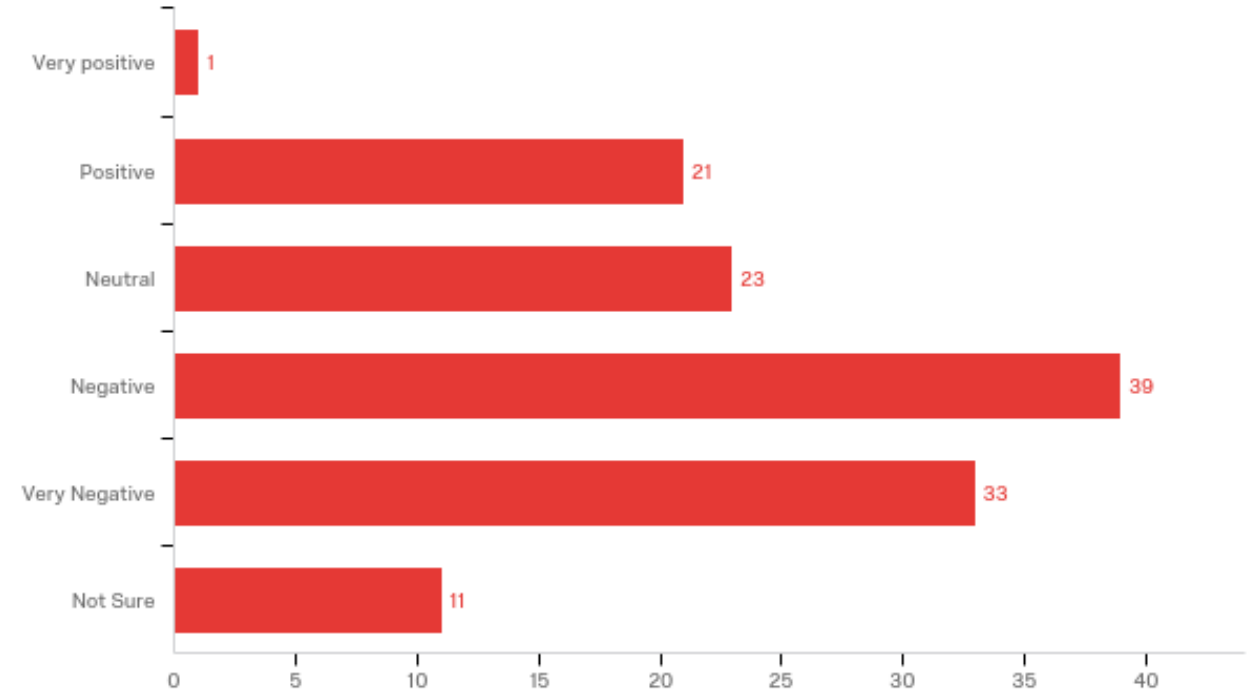
Q4.5 - In your opinion, how much of a NEGATIVE impact does each of the following have on the quality of Pepin County surface water?



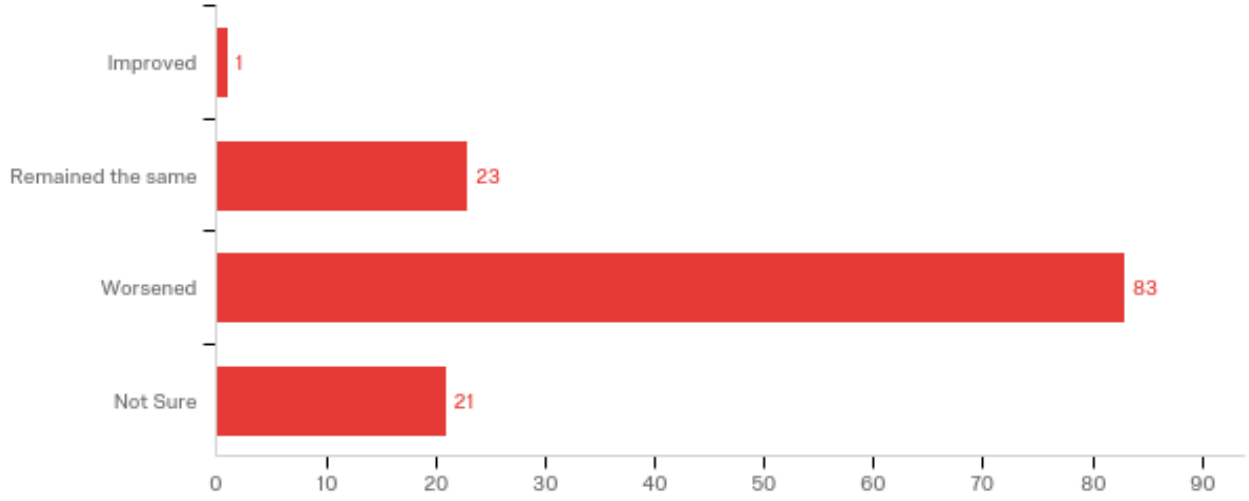
Q4.6 - How do you feel about the following statement? Pepin County groundwater quality is important to me because it supplies my drinking water.



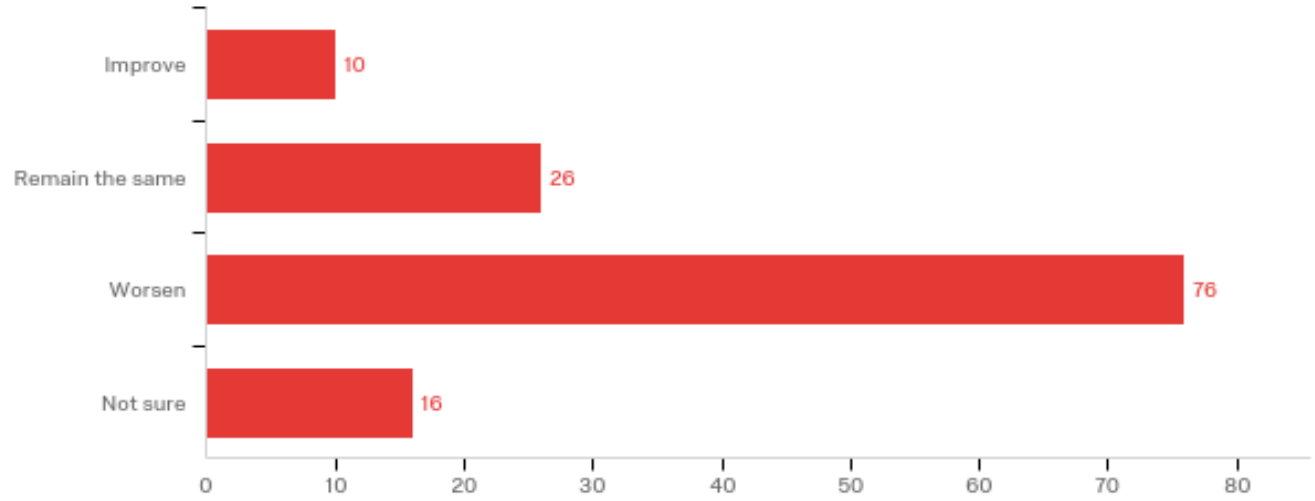
Q4.7 - In your opinion, what is the general groundwater quality outlook for Pepin County?



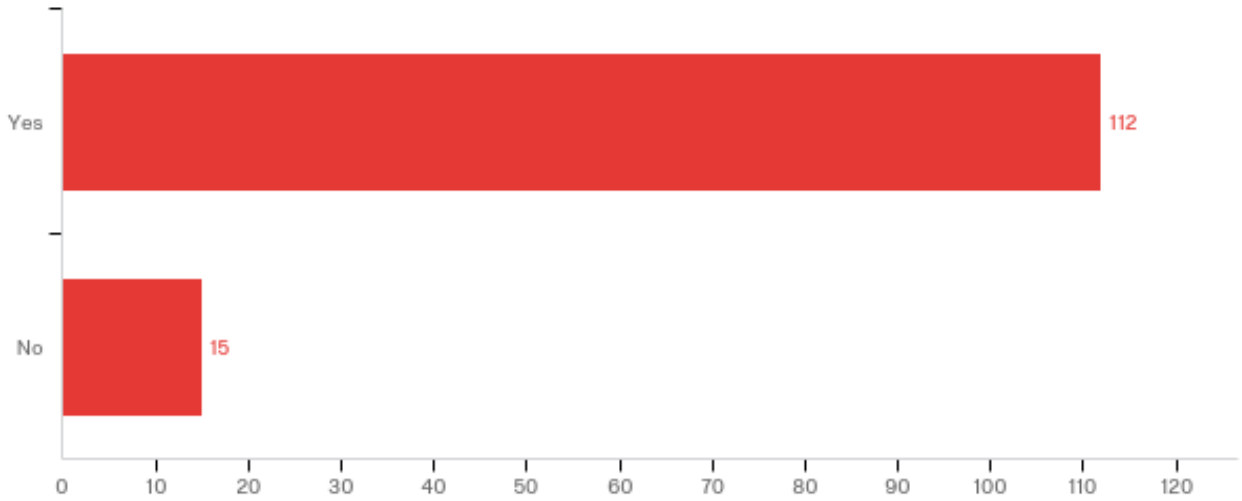
Q4.8 - Over the past 10 years, groundwater quality in the county has



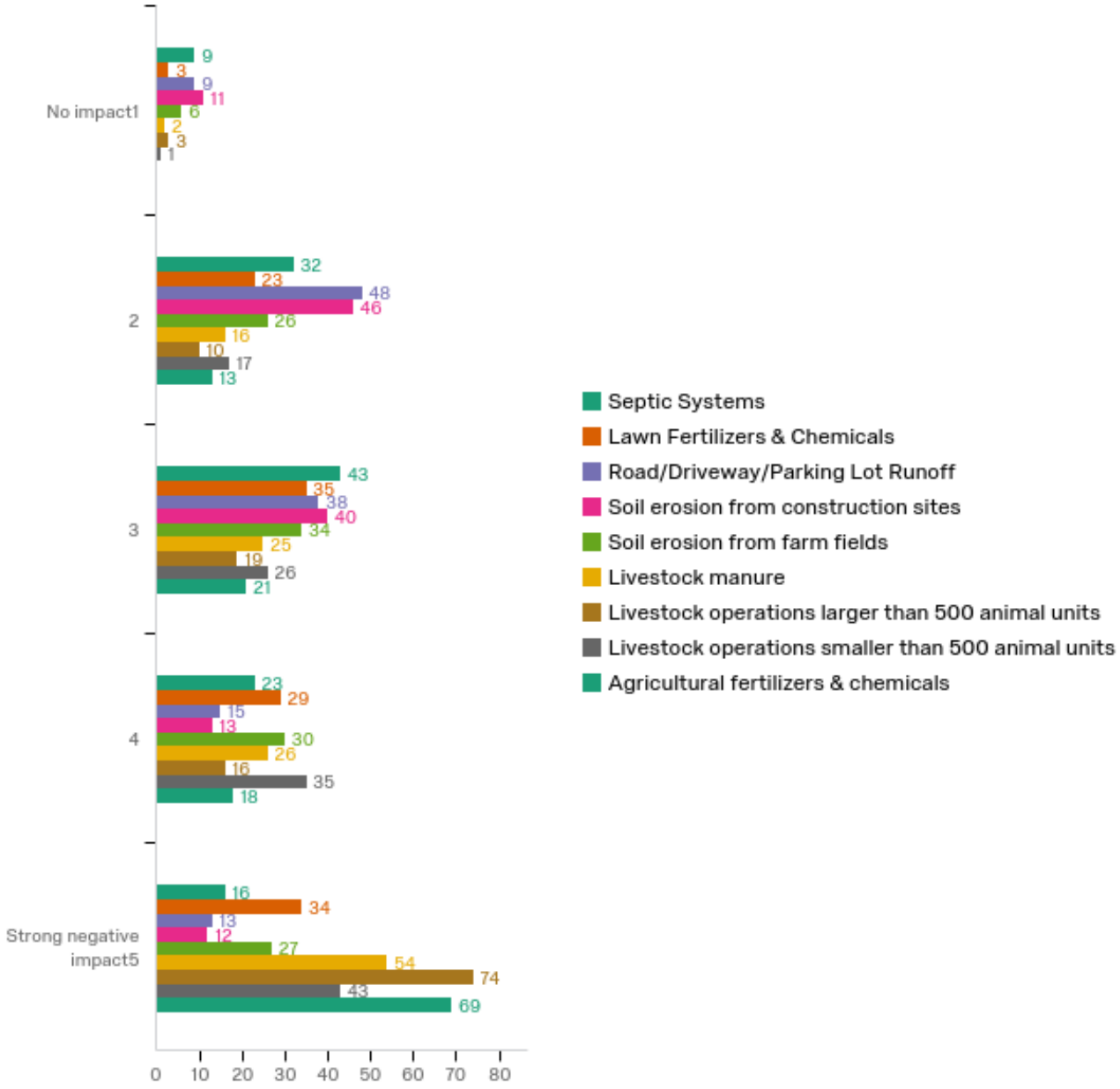
Q4.9 - Over the next 10 years, I anticipate the groundwater quality in the county will



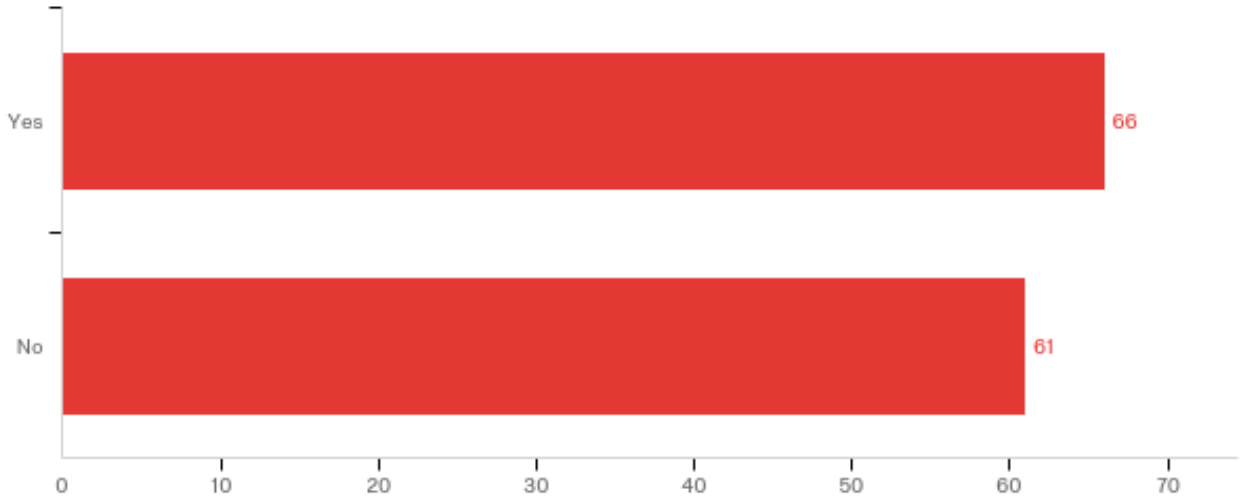
Q4.10 - Are you aware that there are elevated nitrate levels in Pepin County's groundwater?



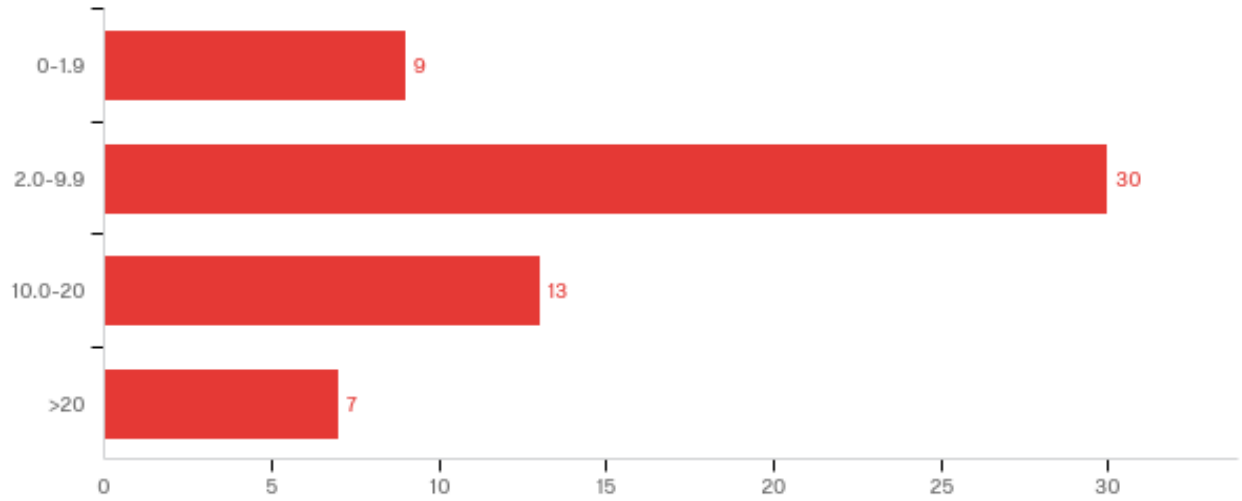
Q4.11 - In your opinion, how much of a NEGATIVE impact does each of the following have on the quality of Pepin County groundwater?



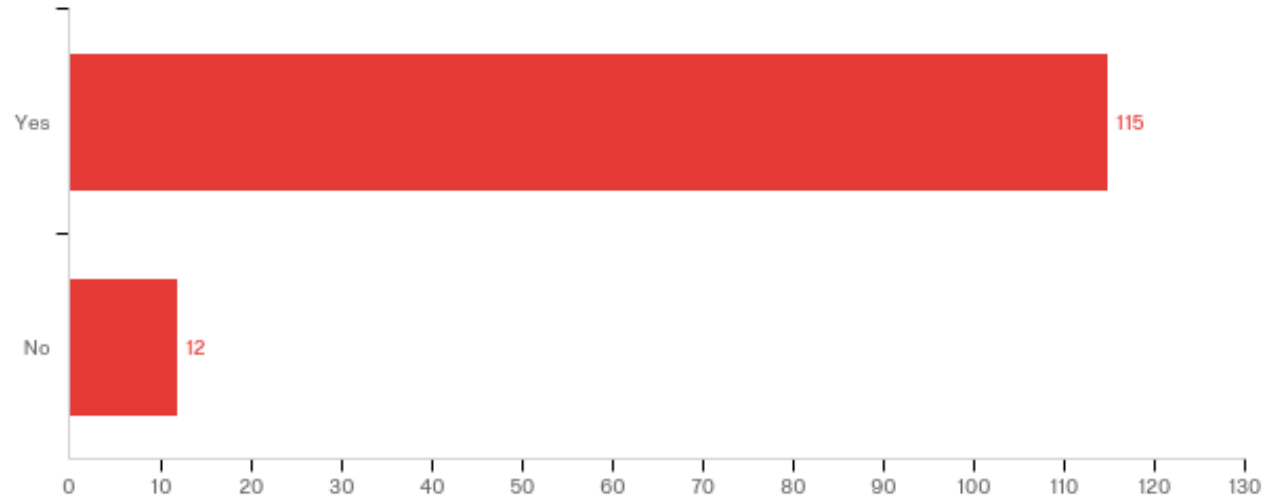
Q4.12 - Have you tested your drinking water for nitrate in the past 2 years?



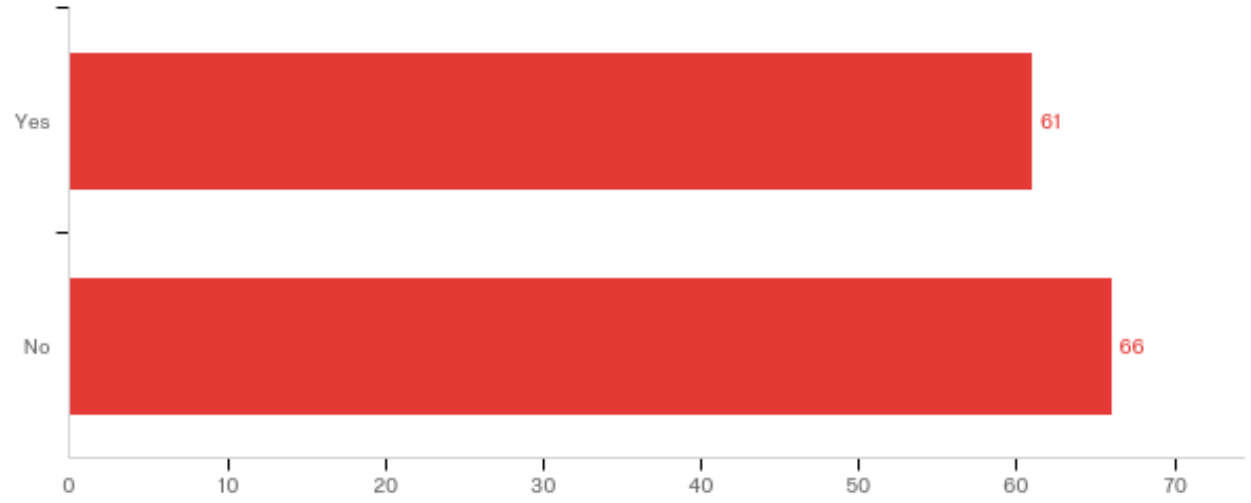
Q4.13 - What was your nitrate level in mg/L?



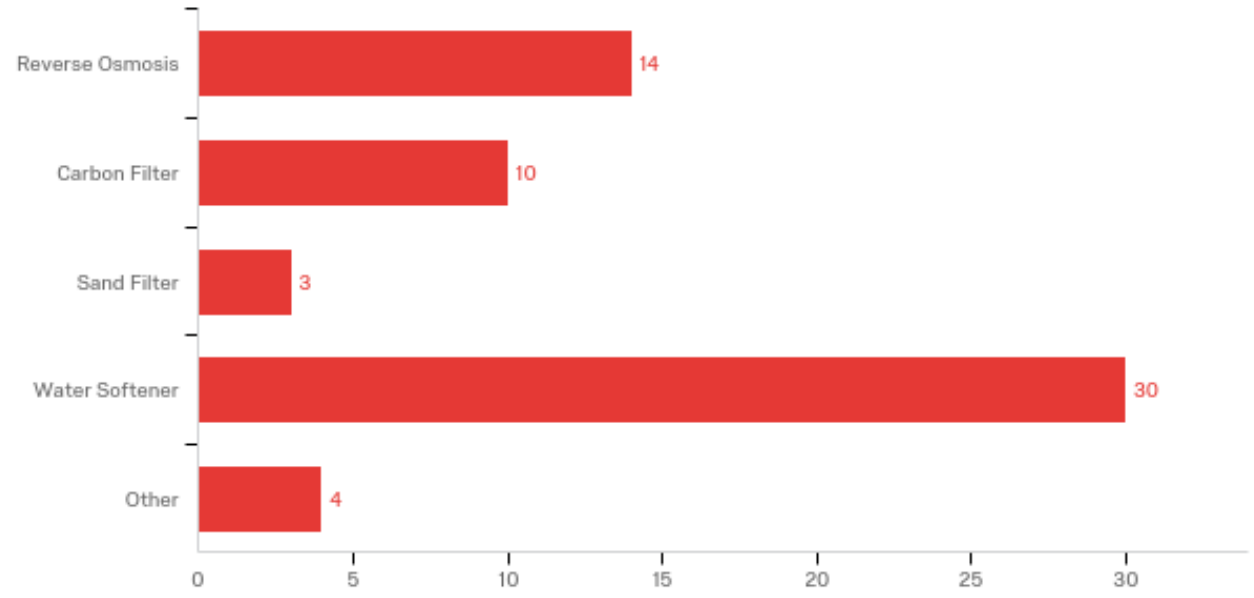
Q4.14 - Are you aware of the known and potential public health risks of elevated nitrate levels in your drinking water?



Q4.15 - Do you have a drinking water treatment system for your drinking water? (i.e. reverse osmosis, carbon filter, sand filter, water softener, etc.)

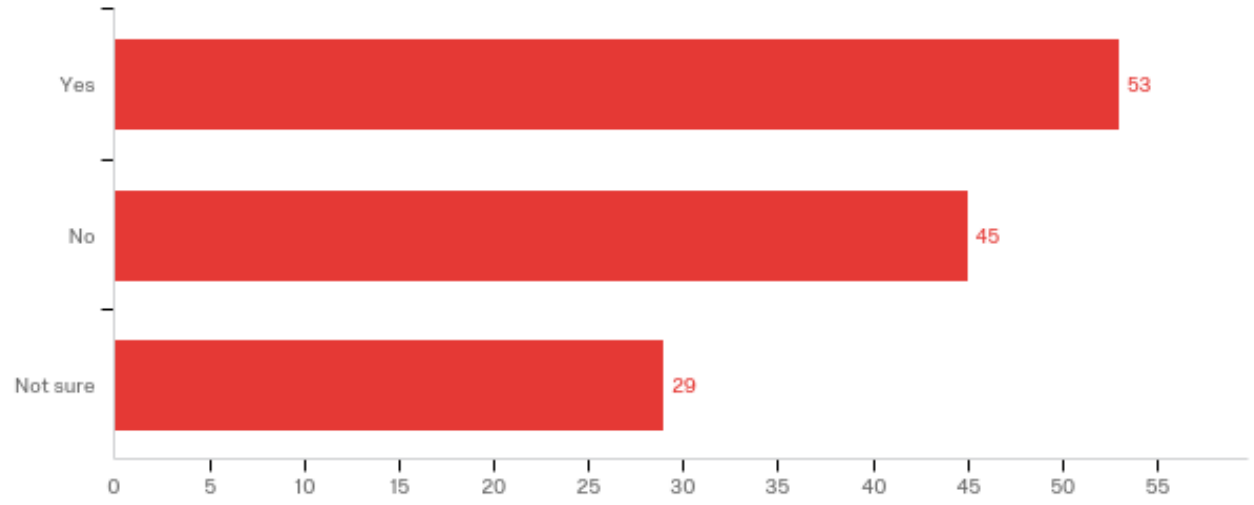


Q4.16 - What type of drinking water treatment system do you have?

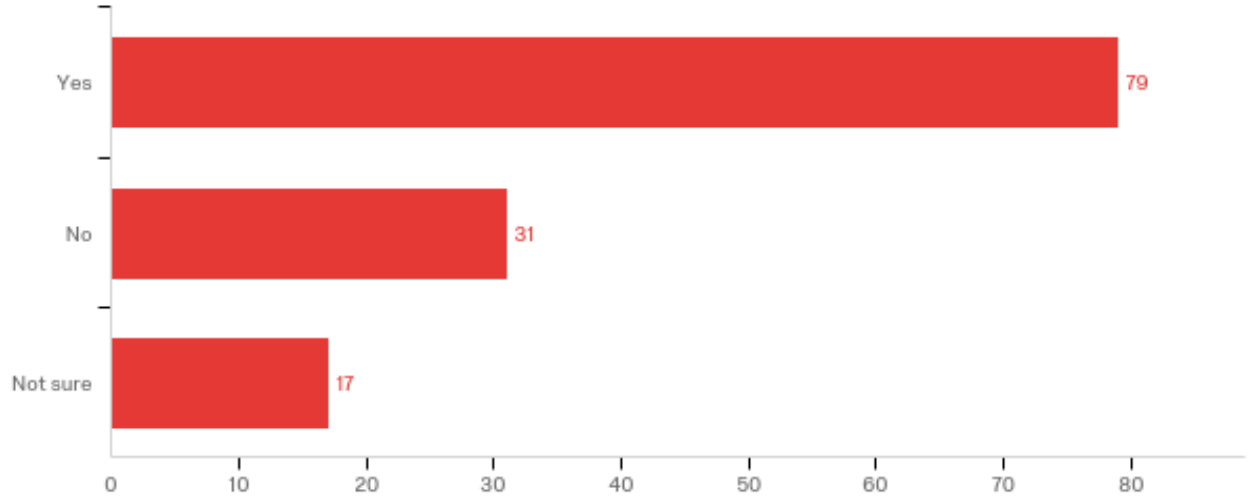


Other -
Get water from off site
city
Buying bottled water for drinking and cooking
Colligan water delivered to home

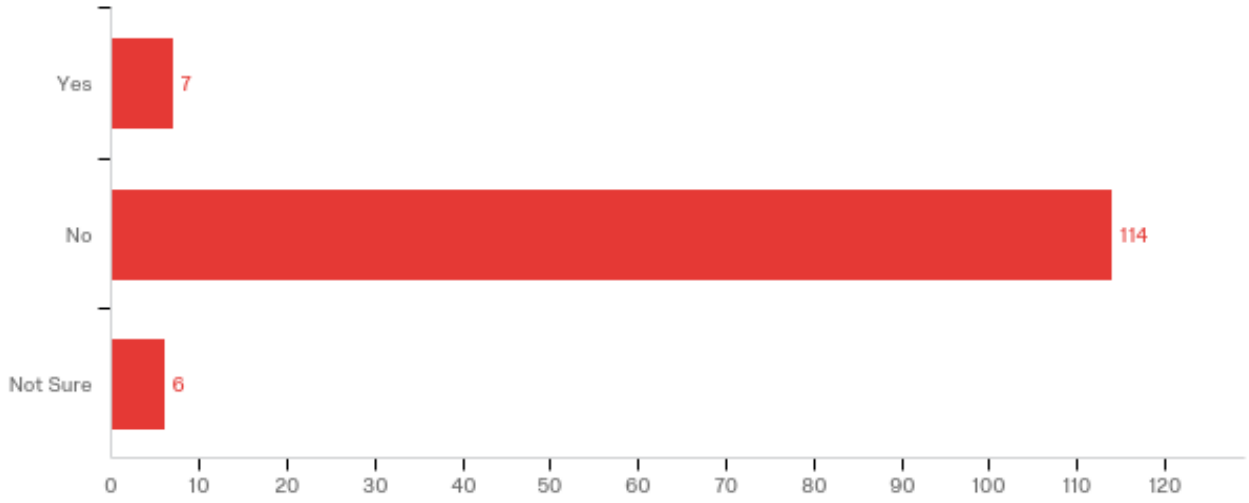
Q4.17 - Do you feel there needs to be more enforcement of existing regulations regarding septic systems?



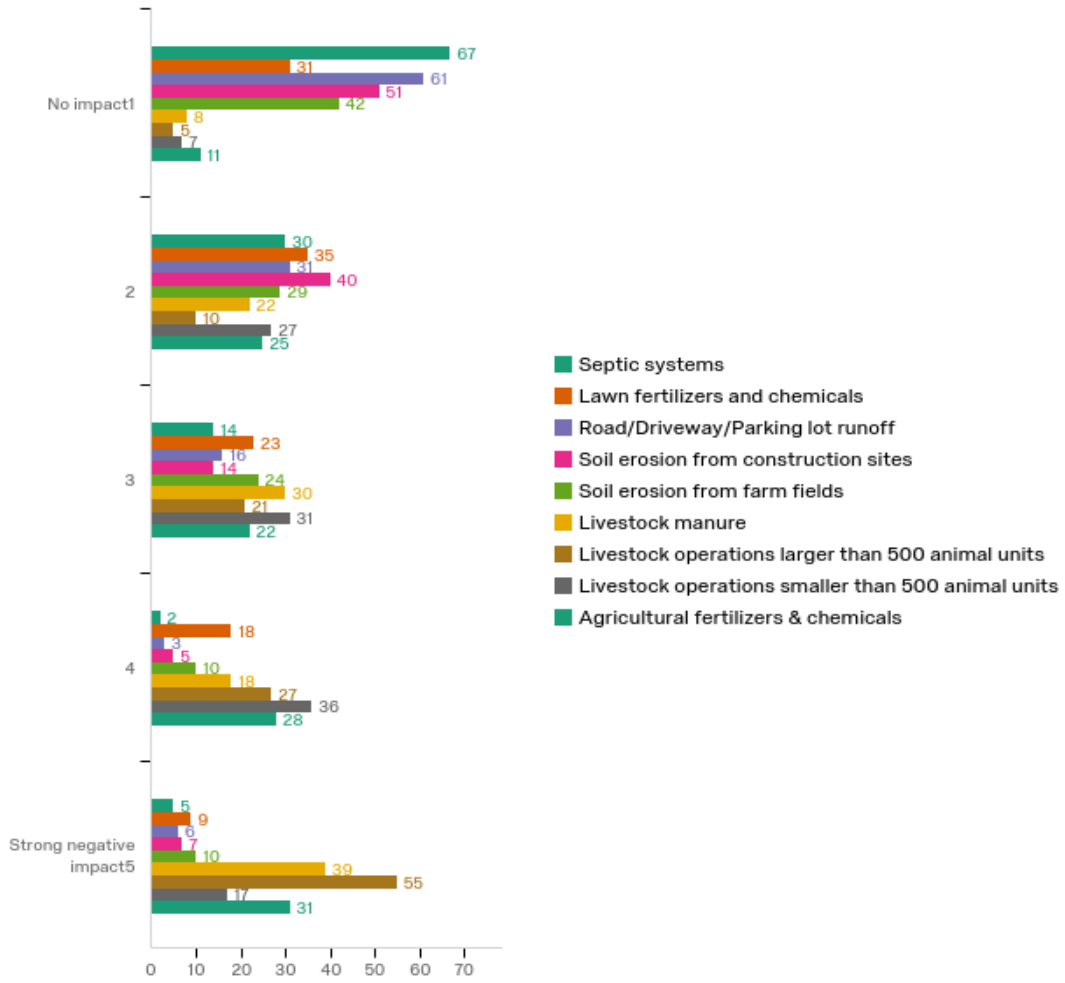
4.18 - Do you think Pepin County needs other ordinances or regulations dealing with land use or nonpoint pollution (examples; soil erosion, manure spreading, water contamination)?



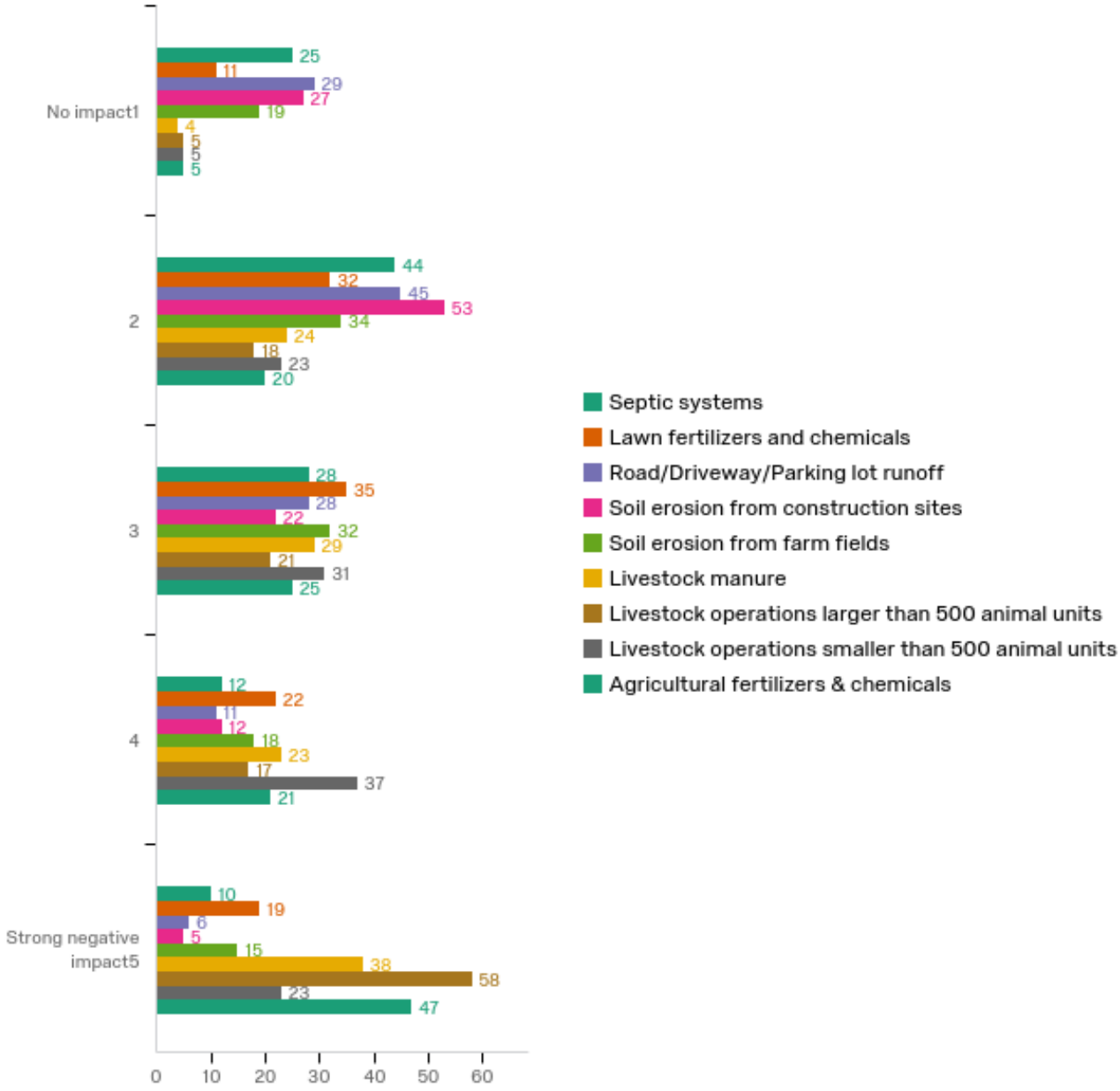
Q4.19 - Do you feel poor drinking water quality should be expected/accepted in Pepin County?



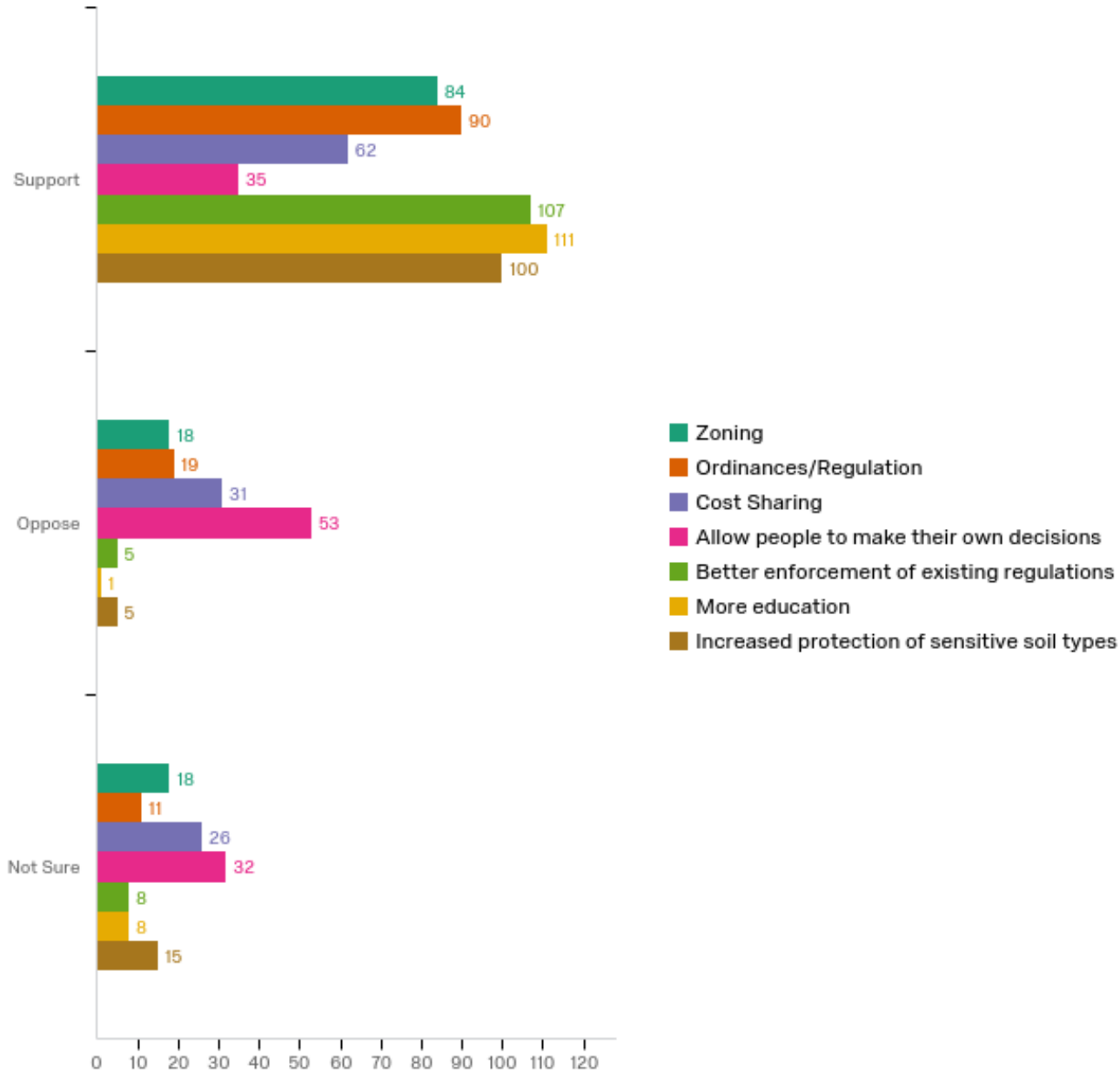
Q5.1 - In your opinion, how much of a NEGATIVE impact does each of the following have on the air quality of Pepin County?



Q5.2 - In your opinion, how much of a NEGATIVE impact does each of the following have on the public health of Pepin County?



Q5.3 - Do you support or oppose the following actions to address land use and nonpoint pollution in Pepin County? (Examples: soil erosion, manure spreading, water contamination)



Q5.4 - Any additional comments, not addressed already in the survey, that you would like to make regarding the natural resources of Pepin County?

Any additional comments, not addressed already in the survey, that you would like to make regarding the natural resources of Pepin County?
If the nitrate problem is not addressed, lawsuits will begin for failure to act on a public health crisis. Manure spread near streams and drain tiles and sensitive soils should not be tolerated and will be addressed by the county or courts and MEA!
I support protecting our drinking water 100%; whatever is necessary to do so. I would like to see land owners have the freedom to do what they want when it comes to selling (development).
You used 1 animal unit as 1,000 lb. animal. Is this the correct weight? I thought that at one time 1 animal unit was equal to 1200 lbs. Not many 1000 lb. dairy cows, even 1200 lbs. more likely 1400 lbs.
The results of nearly all previous local land use planning surveys found most people "like it (Pepin County) the way it is." Clean water & clean air are part of "the way it is" here & we must help keep it that way.
When testing for nitrate- test when there is a lot of growth, July-august, and also when there is little growth, feb-march.
We must have County wide moratoriums to protect our water, water quality, soil, minerals, air and alternative energy resources from being exploited and polluted.
Limit non-ag development in agriculture neighborhoods.
Leave the farmers alone
We need local enforcement of environmental issues... we have well testing above the EPA ENFORCEMENT level of 10ppm. What has been done. No one is held accountable for those wells testing above the 10ppm. What is the county going to do to ensure me clean drinking water? Is the county going to continue to allow the polluters to conduct business as usual? What have you done in the past to polluters? The pit in Lima that over ran will they just get a permit for a bigger pit? Permits are granted to permit pollution. I want a permit to protect our groundwater. I want a permit to protect our air. I want a permit to protect our surface water. Something is wrong when the county permits pollution. Our choices are continuing to permit to pollute or a moratorium. This should not be left to the public as a popular opinion poll. Do your jobs. Protect our resources. WATER IS LIFE
More regulatory authority should be given to the Zoning, Land Conservation, and Health Departments so that violators can be held accountable at the local level because the DNR does little to enforce existing laws and regulations. Over application of nutrients (both agricultural and residential) is negatively impacting the groundwater and is something that can be addressed if landowners/farmers were actually willing to do something about it. Farms need to be treated like any other business in terms of providing worker and public safety measures, in the payment of fees/taxes, and be fined or held accountable when they violate the law. Farms need to pay their fair share for the use of roads. Implements of husbandry should be required to pay some sort of fee to help pay for the upkeep of the roads. Farmers receive government handouts/incentives even when they don't follow any laws/regulations such as NR151 or ATCP 50. This type of practice does nothing to protect the environment and basically rewards farmers for doing "bad work".
How can manure be spread next to a waterway without buffer strips. Why is there no enforcement action taken? Why do they still get gov payments? What will the county do when the lawsuit starts

and who will pay for it? Failure to act on a known problem will be a easy win. County and others will pay. This issue is a public health threat and will be solved in the courtroom.

Corn yields can reach 500 bushel but not without 400- 500lbs. of nitrogen. We know corn roots go at least three feet deep. So, corn always runs out of nitrogen because nobody puts more than about 300lbs of nitrogen on. So, groundwater contamination from farmers can only be very minimal. That contamination would mostly come from runoff since a corn root is going three feet deep to find more nitrogen. Also, if we prohibit big dairy from expanding. Our dairies will disappear in Pepin county. Is that what we really want? I love our small dairy community, but it is changing. I would rather see some big dairy than no dairy in our area. Nobody regulates how big any other business gets. We need to keep watching what the big dairies are doing to make sure they are not causing a problem. Right now, there is no concrete evidence that big dairies are causing a problem in our county. This is a free country and people own the land. Let them do what they want unless we have concrete evidence that it is going to cause a problem. Freedom don't take it away!!! We will push business out of our county and into a neighboring county.

Farmers should be held accountable for high nitrate in Pepin co. Need more enforcement and regulation with manure spreading. Regulate and stop the expansion of large dairy operations.

Enforce the rules, Mandatory Buffer strips, Grass waterways

I think we are located in a spot that the Chippewa river water shed slows which is filled with hundreds of miles of treated sewage from very large cities north comes and is able to settle out in the slowing of the river in our area... this is causing some higher readings I think in local areas around it possibly because the river is flowing at record low numbers so it can't be flushed away this is more of a problem than the farmers in the area that have been doing the same practices or have been improving for many years. We all need to be able to make a living and eat in this country more rules and regulations on farms are not the answer to our problems.

Water is life....no water, no life.

Living next door to a large livestock operation makes it impossible to leave our windows open any time of the year due to the extremely strong smell coming from the manure pit. Ten years ago, I was told I would get used to it. How long does it take? And will I ever be able to sell my property because of the stink.

It's important to regulate in a sensible manner. You can put regulation out there with no common sense, it doesn't do any good. I really dislike larger farmers with bad management. Maybe have so many cattle per acre rule.

There was no mention of high capacity wells and their effects. My well water has changed for the worse in recent years. I had to add an in-line water filter in my house. My washing machine pump failed twice because of "chunks" in my water. I'm not sure if it is due to the irrigation or the large livestock operations in the area or maybe it's both?

It is BECAUSE of large scale farms, that we, as a small family farm have been forced to sell out!

As a farmer that has been forced to get more efficient and bigger to survive I feel until everyone understands what implications there are to over applying manure or fertilizer including household fertilizer there will be no fix to our problems.

Nitrate levels are alarming in Pepin co & wetlands are being farmed with manure directly impacting the groundwater. too much manure being spread on sandy soils.

How about you try enforcing the laws we already have before the conservation dept goes and passes more regulations. This attack on the dairy industry is unwarranted. What about the never-ending line of fertilizer trucks I see driving down the highway every year in late spring.

ground water in Pepin co is being destroyed and little to no enforcement taken. home values are lowered near cafo properties and who wants to live where your drinking water is poisoned? Is the milk produced with excess nitrates safe to drink?

I want a vibrant future for Pepin co. This will take effort from ALL. We are not in a bad place to live right now, but if nothing is done CAFO operations will damage all areas of health for residents and wild life alike. Hold animal unit numbers to a safe thresh hold.

PROTECT OUR DRINKING WATER

Removal of shelter belts or windbreaker from between farm fields. Too many are being removed so that irrigators and the extra few bushels of grain can be earned. These began for a reason.

I would love to see the day when Pepin county becomes the first county in the USA to 100% chemical free/ organic. We are a small county and we could be the first to show the nation that it can be done and the positive impacts both environmentally as well as economically. With a diversified organic farm economy Pepin county could be a model for positive change for our hard working yet under paid farmers and our beautiful countryside. Thanks

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It is all too little, too late I am afraid. Profits in all aspects of farming are already forcing farmers out of business, so spending more money to produce the same worthless unprofitable product is ideocracy at its finest!!

I feel that in most all areas of the country, not only in Pepin county that there is poor regulation of some of the laws regarding crop/animal farming. The laws are adequate but need enforcing. Another part of the survey that was misleading is asking about the different types of pollutants to the water/air and how it affects the community. I believe that there are good septic systems and bad septic systems. There are bad small farmers and good small farmers. There are bad large farms and good large farmers. Also, good cash crop farmers and bad crop farmers. Hence blaming one group will do little good if trying to fix water quality.

The people that yell the loudest, usually aren't right.

Manure pits...manure pits that leak...manure pits that over flow...manure pits that spill...manure pits that pollute the air...we need to regulate these somehow and hold the polluters responsible. Have something instead of these pits/ponds/lagoons...another way to get rid of the manure. I personally would like to see more prairies in the county... I would like to see more of the marshes that were here ages ago restored...both would act as a filter for our water in this county. More diversity of plants... Less application of pesticides and herbicides. Less fertilizer applied to our soils. I would love to see the microbiology of our soils improved. Would love to see COMPOSTING as an alternative to the manure pits.

If county zoning is discussed it will need to be in cooperation with the townships. Some townships have had their own zoning and now all of a sudden, the county wants to do it well after problems arise? Also, some of the organizers of this water and air quality debate should ask themselves or other people should ask them, why can your beef cattle herd graze, crap and walk and everything in the Chippewa river and you want to target larger dairy farms for pollution of our air and water. Ask the people with their cattle near or in the river where does all their crap go when it floods? Pretty hypocritical if you ask me. We are a dairy county and we also need to be able to work and support them also.

I feel strongly that all contributors to water quality, air quality etc. be treated the same. We should not be singling out livestock facilities or just large livestock facilities. If livestock is a contributor to poor water and air quality then we should have the same rules and regulations for everyone owning

livestock, not just large operations. We should also look at other contributors such as private septic systems, crop farms, etc.

The variety of soil types and geology within the county should be addressed in any zoning or regulations adopted. Minimize disruptive activities on potential karst areas, bluffs and steep slopes. The current and frequent farm crisis demands that any solutions provide a win win solution for farmers through cost sharing, infrastructure development, education, and subsidies.

Would like help correcting beach erosion due to high water in Lake Pepin over the past 40 + years. Need Pepin County's help in working with The Core of Engineers to correct and repair damaged beach.

A lot of people in the county cannot afford to update their septic systems. The government should pay for most of it.

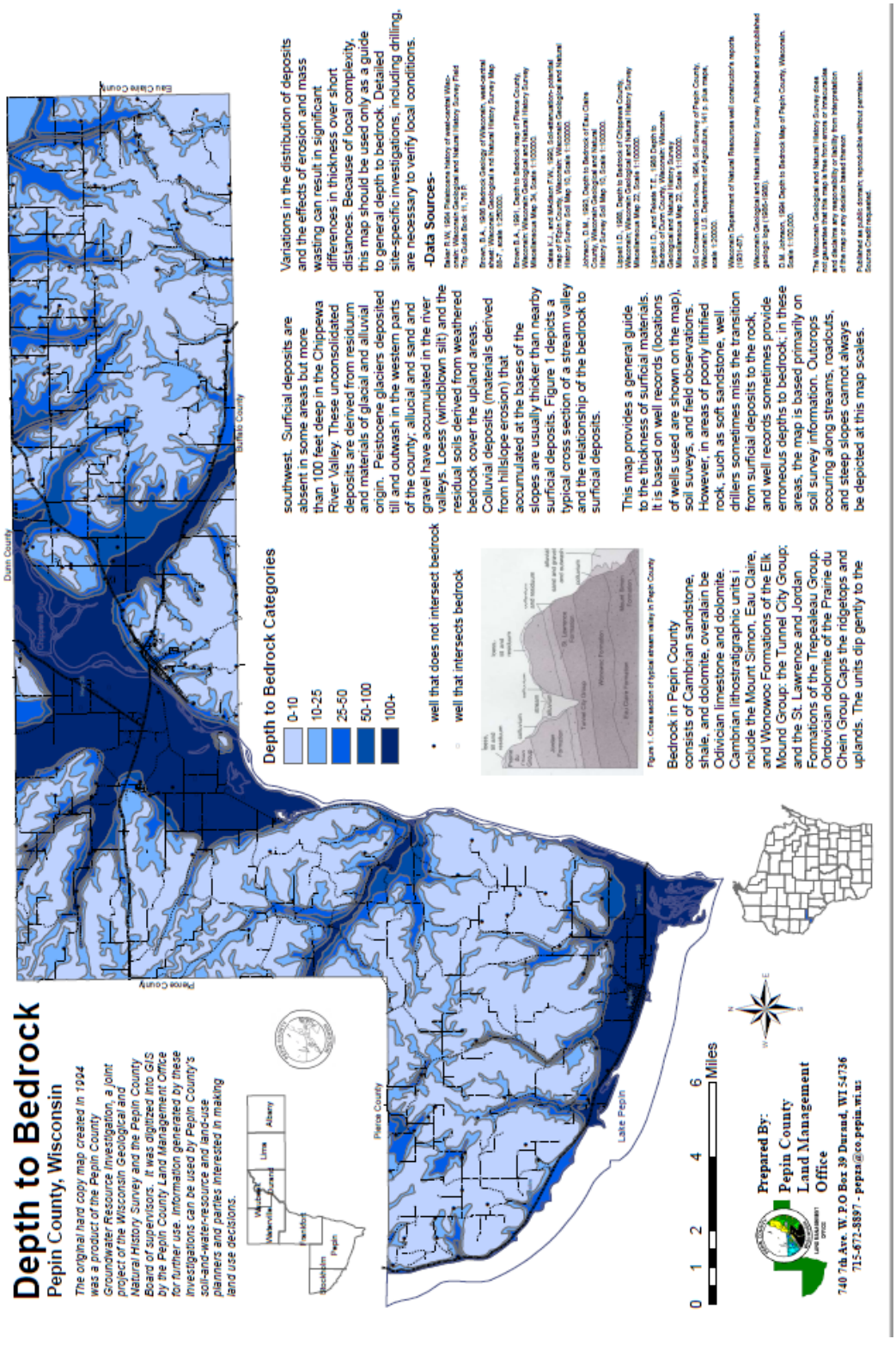
Cows shouldn't be allowed in the waterways

It would be nice to be able to address some of these issues with more subtlety, sometimes in the context of best practices. I also don't appreciate being labeled right off the bat by category, i.e. as a type of landowner. I believe that whether one is a farmer, hunter, hobby farmer, or non-farmer, should be beside the point. Clean air and water benefits everyone.

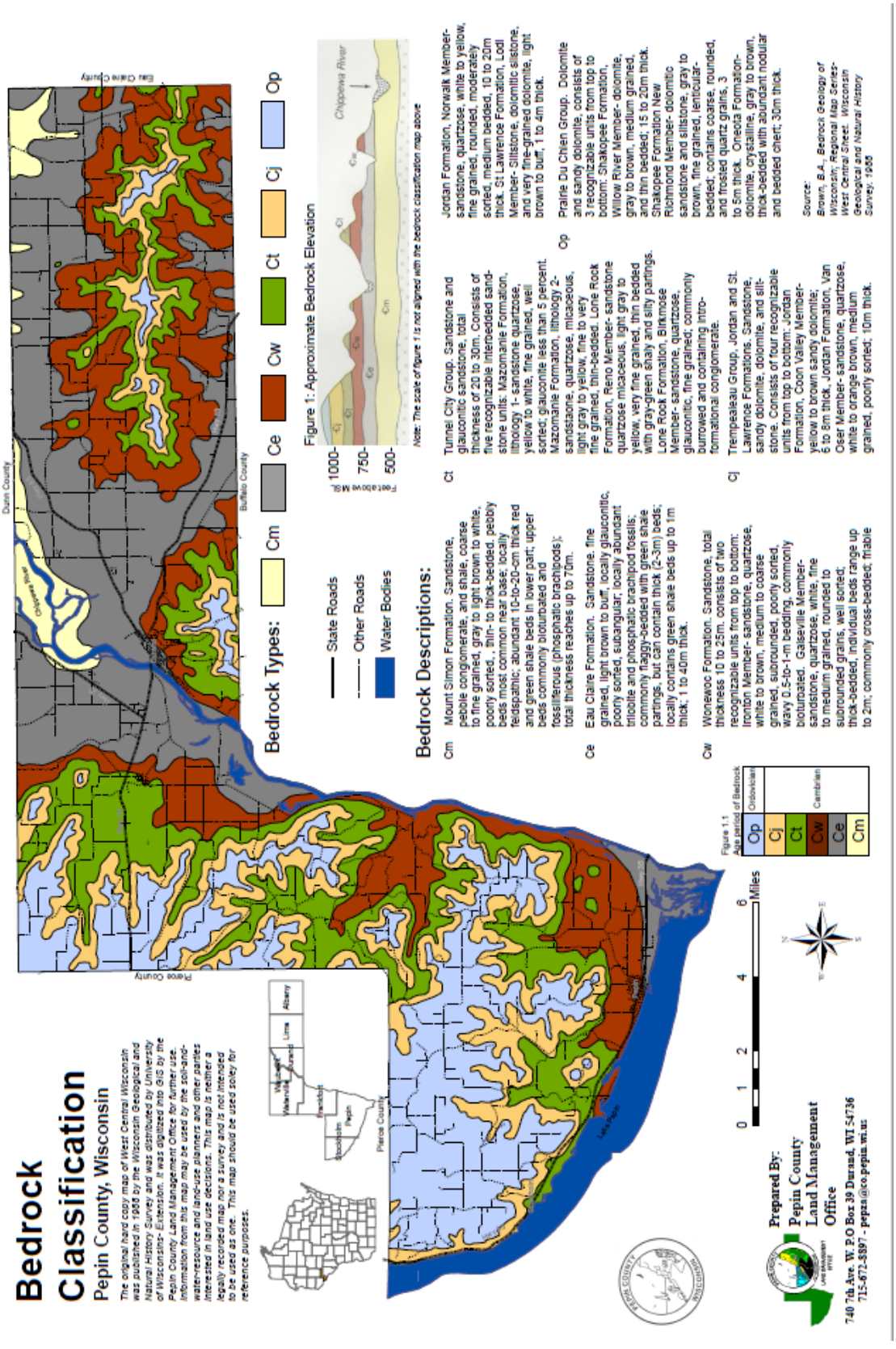
More concerned about all the irrigation systems going in that could lower the water table. What are you doing about that?

APPENDIX – D

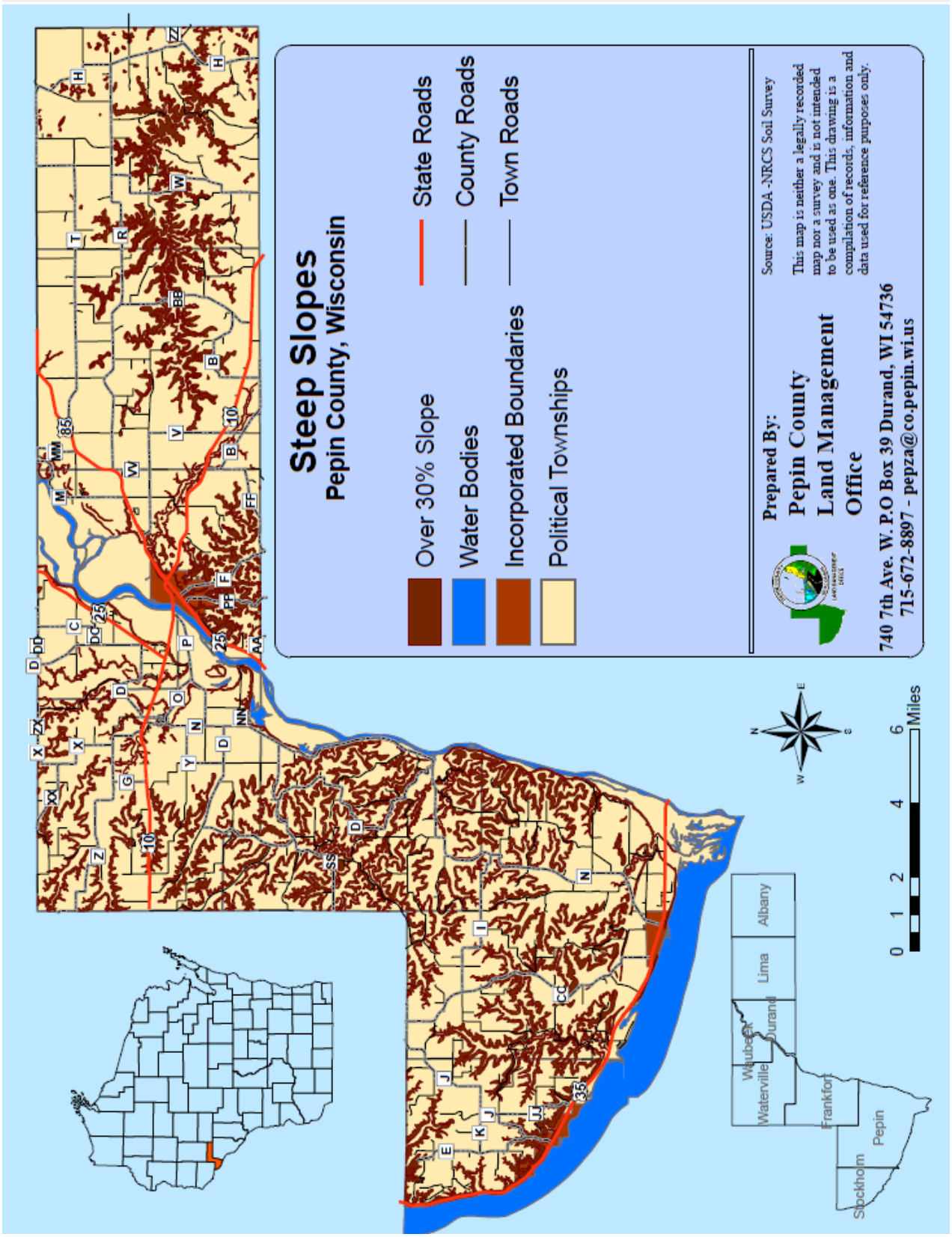
Depth to Bedrock Map



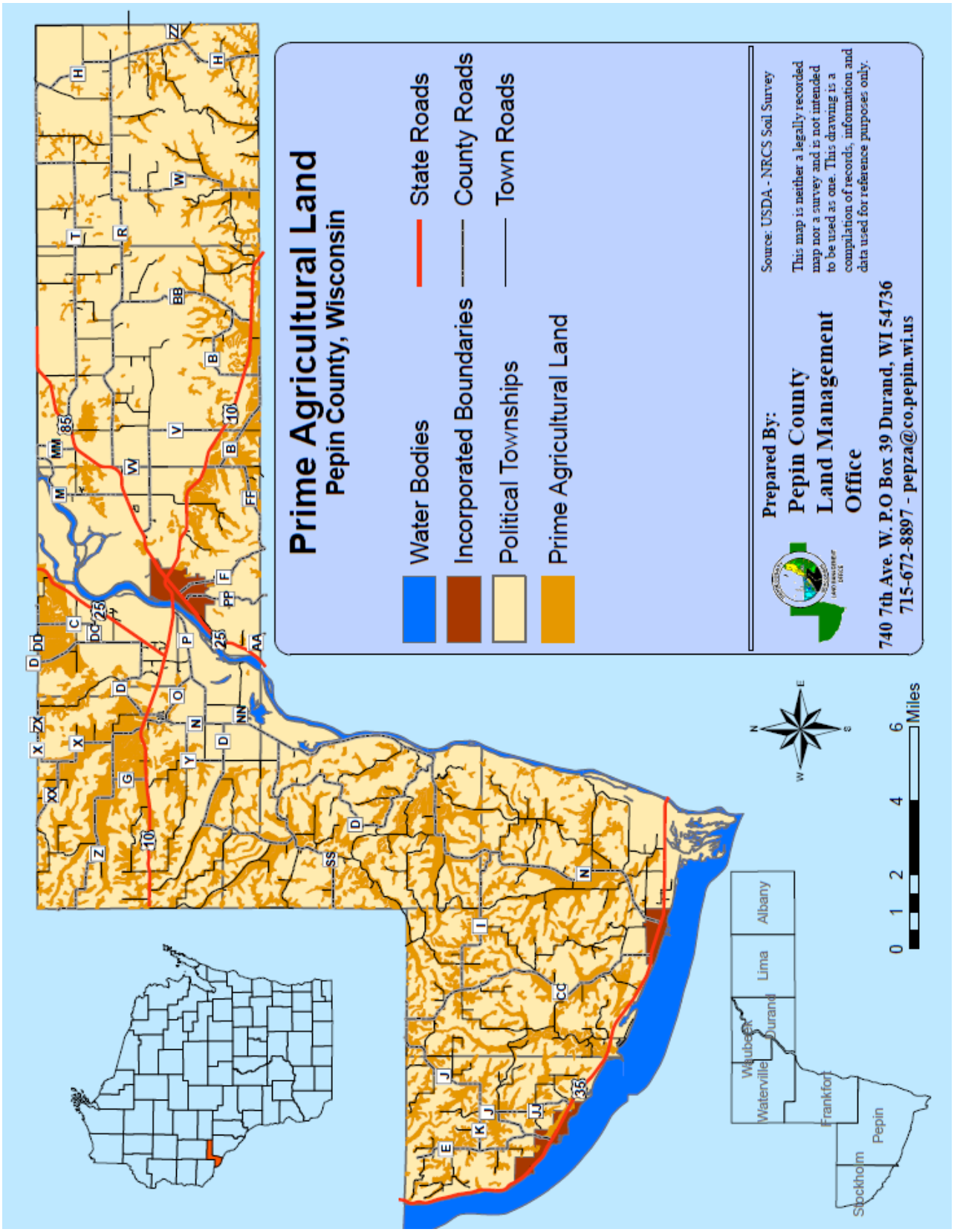
Bedrock Classification



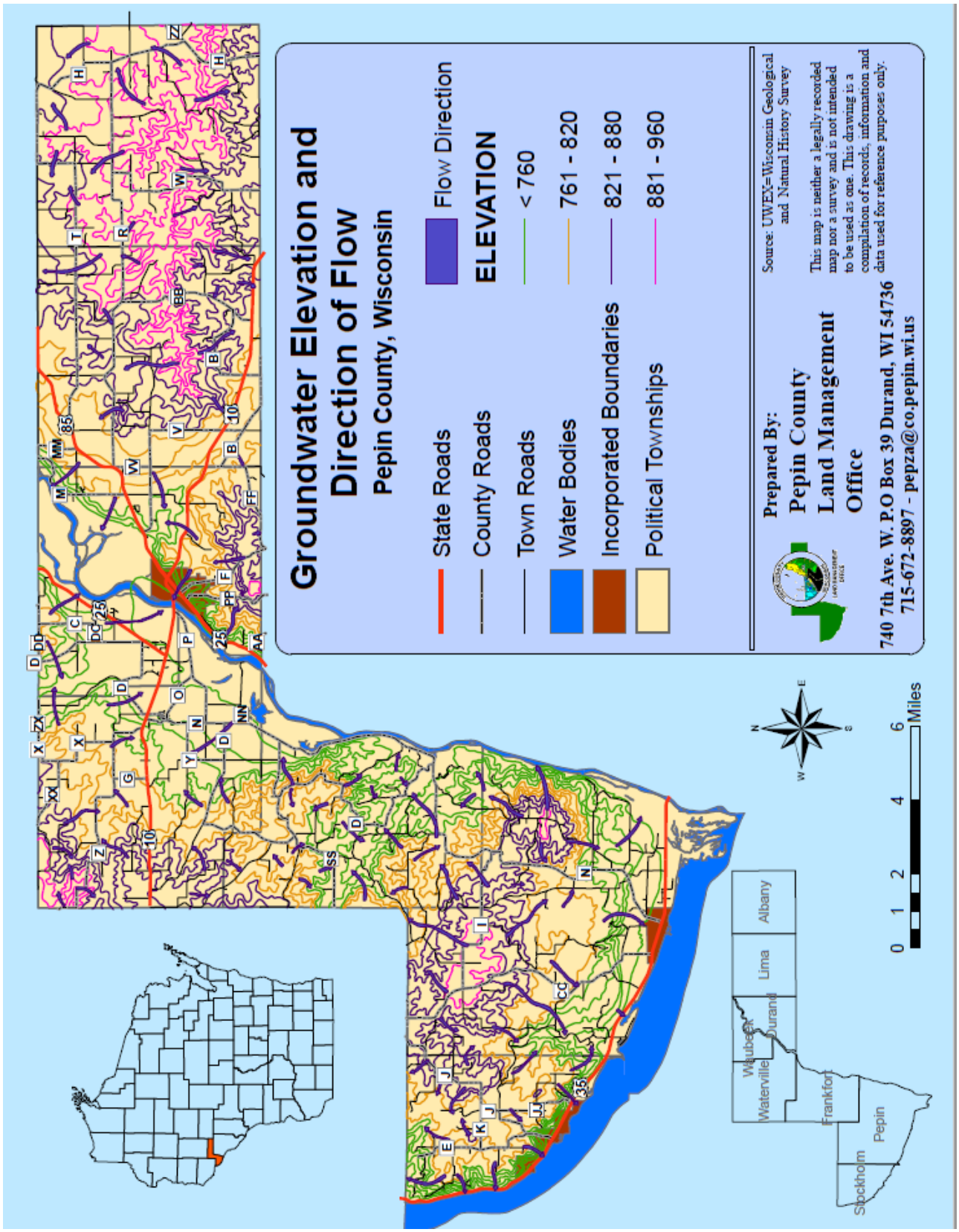
Steep Slopes



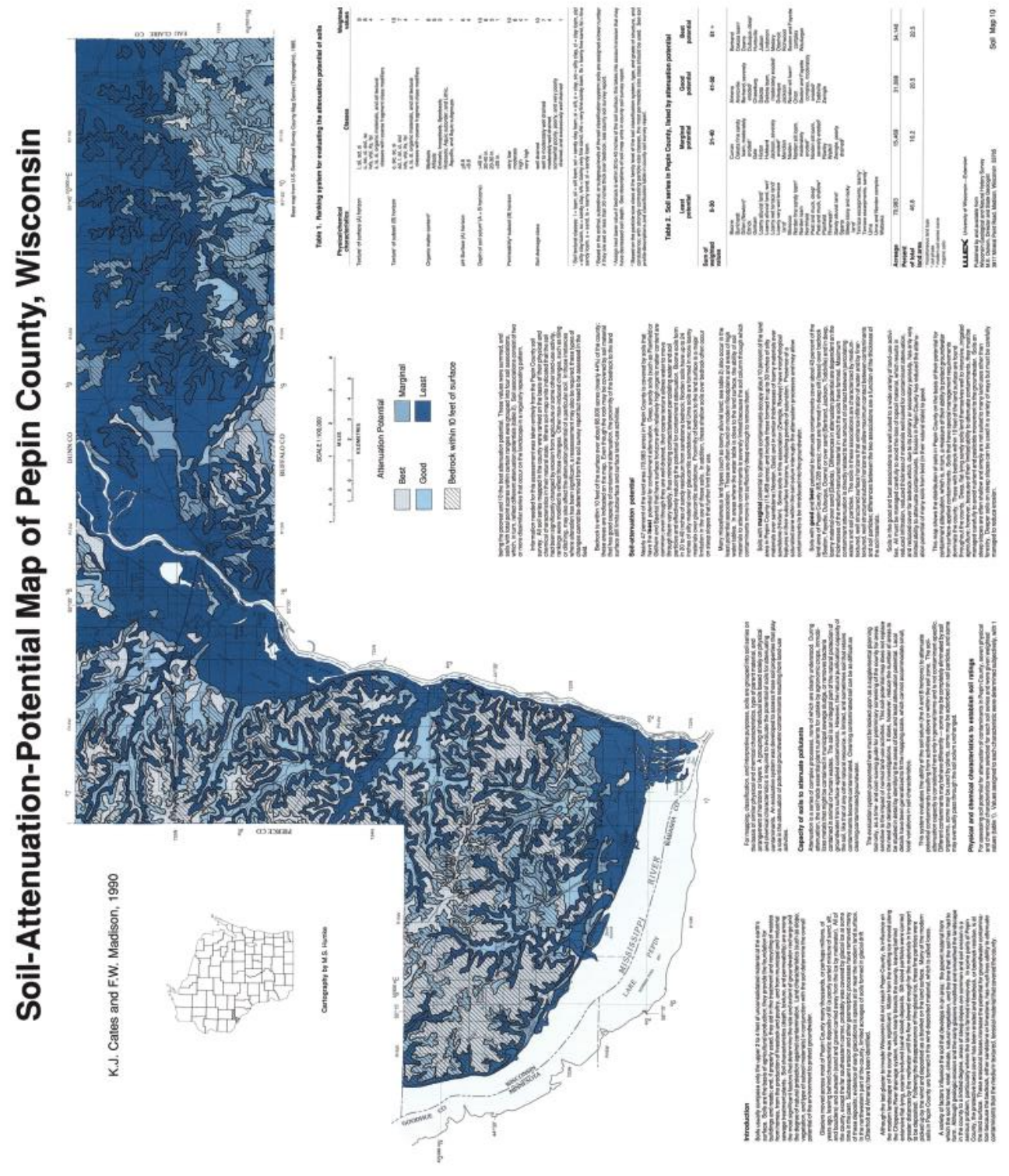
Prime Ag Land



Groundwater Depth and Direction of Flow

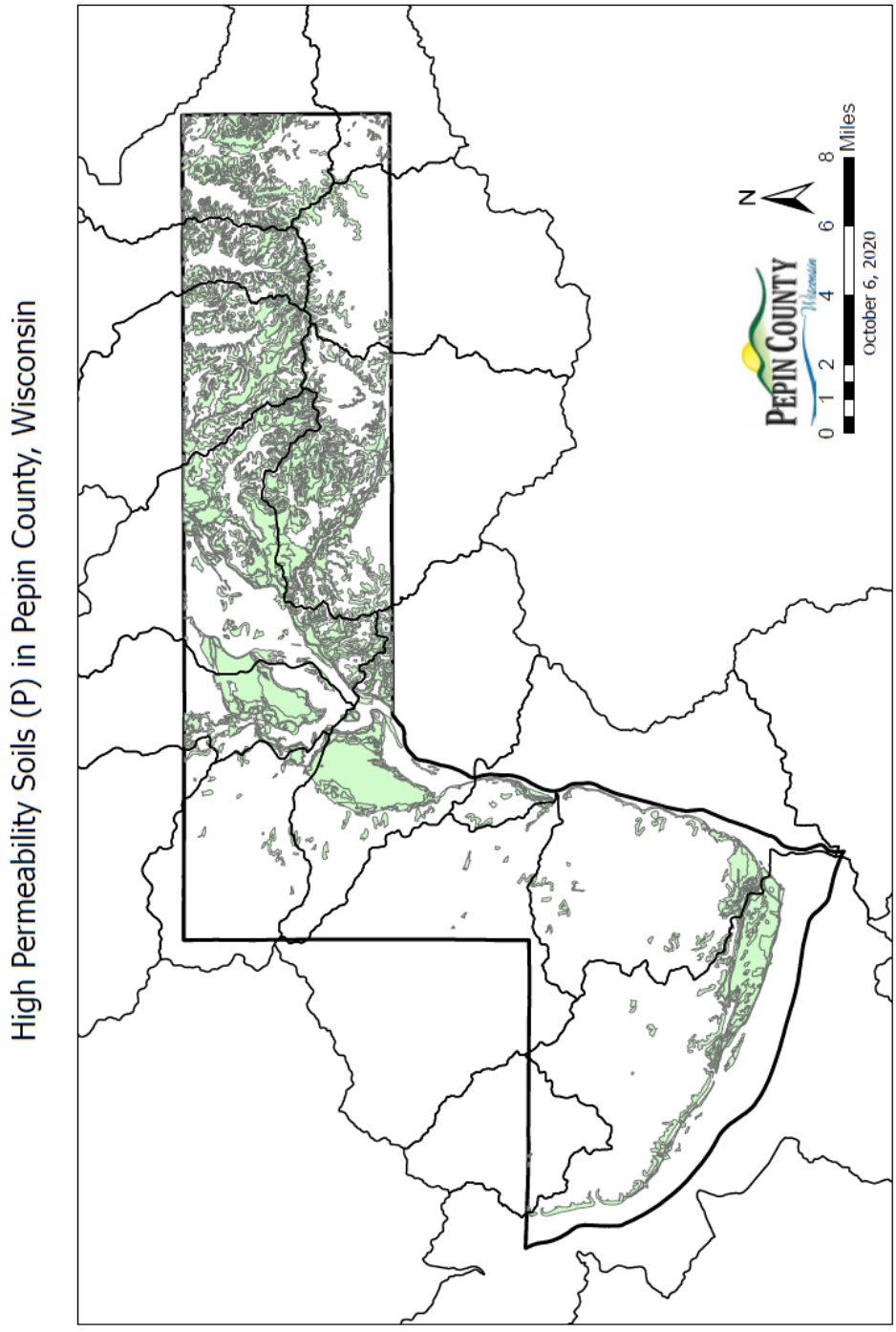


Pepin County Soil Attenuation Potential Map

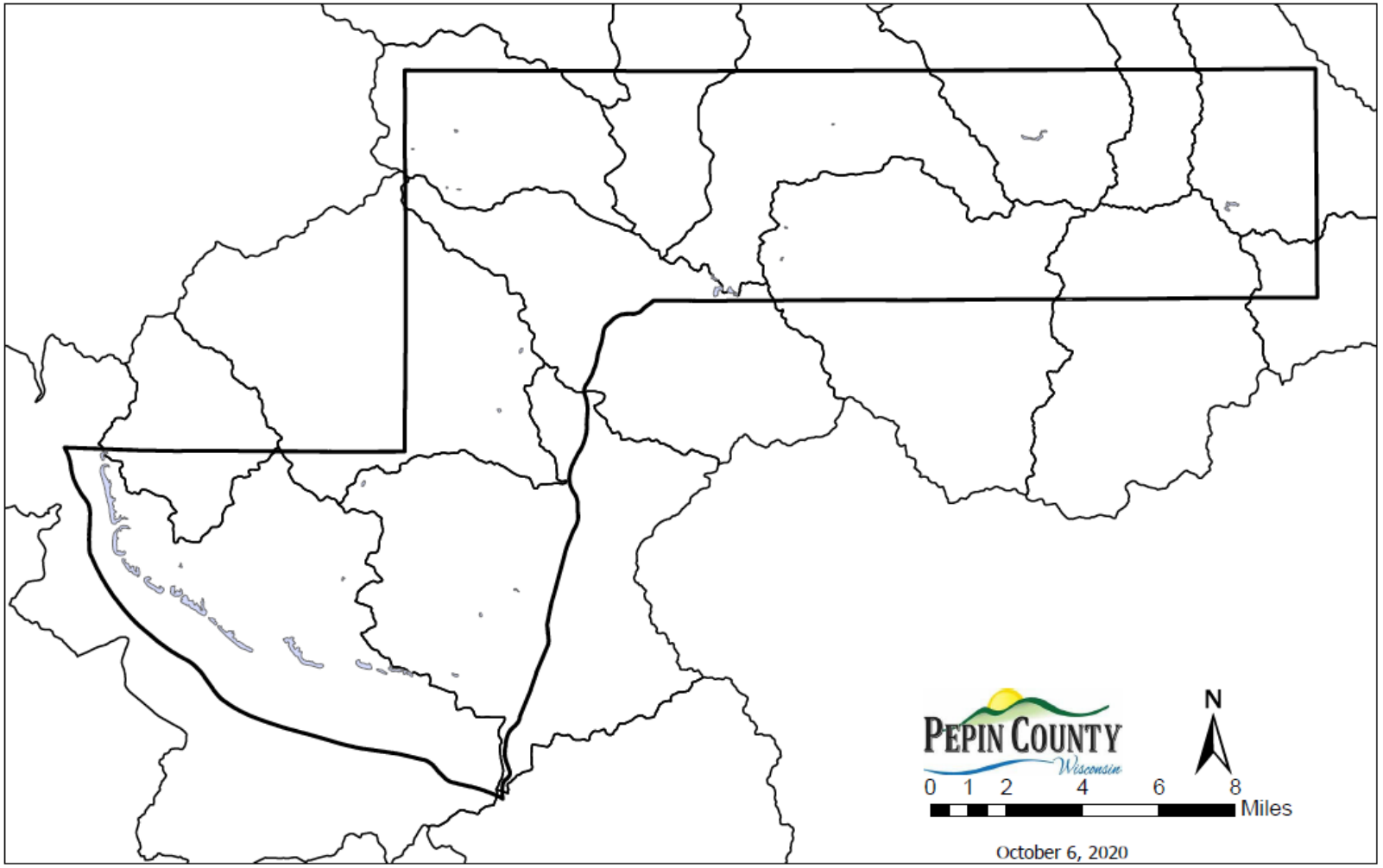


Soil Map Units with Nitrogen Application Restrictions Due to Potential for Nitrate Leaching to Groundwater, July 2016 – (Conservation Practice Standard 590 Technical Note Appendix 1)

The following three (3) maps illustrate soil map units identified as N restricted soils. These soil map units have a high probability of having one or more characteristics that make the soil susceptible to leaching. The characteristics are identified by a code: P = High permeability soils; R = Rock soils; W = Wet soils.

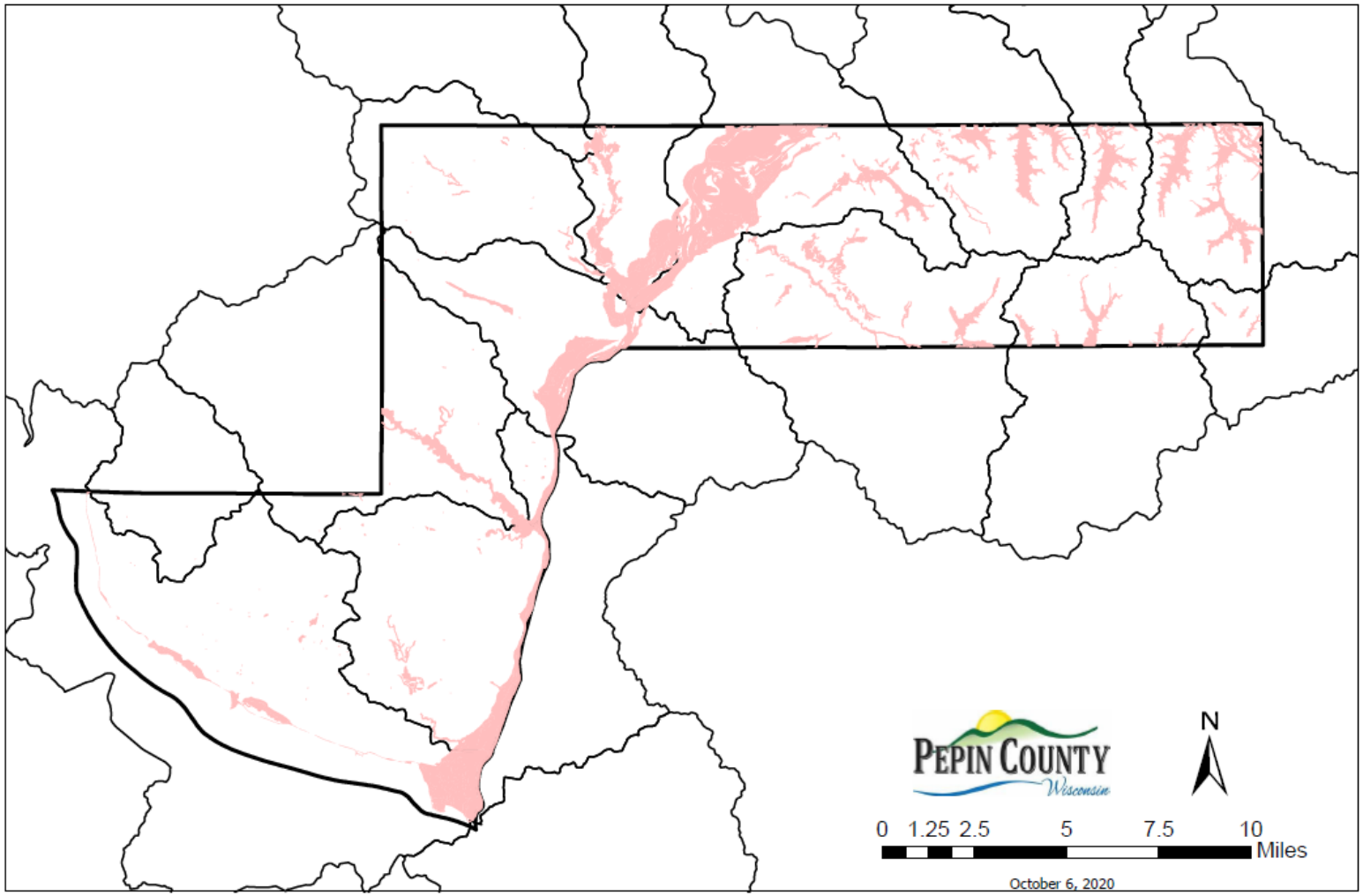


Rock Soils (R) in Pepin County, Wisconsin



Rock Soils (R) have less than or equal to 20 inches to bedrock. Bedrock is a general term for the solid rock (lithic) or unconsolidated material (paralithic) that underlies the soil or is exposed at the surface. If R soils are field verified and the depth is more than 20 inches to bedrock, then the soil is not considered restricted for bedrock.

Wet Soils (W) in Pepin County, Wisconsin



Wet Soils (W) have an Apparent Water Table within 12 inches of the surface at any time of the year. The apparent water table is a continuous saturated zone in the soil to a depth of at least 6 feet without an unsaturated zone below it. A W soil is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions. These soils can be non-hydric, saturated, or soggy for short periods in the spring after periods of rain or flooding and usually occur in low areas of the landscape.

APPENDIX – E

Conservation Practices identified in Wisconsin Administrative Code ATCP 50.
https://docs.legis.wisconsin.gov/code/admin_code/atcp/020/50

ATCP 50.62 Manure storage systems.

ATCP 50.63 Manure storage system closure.

ATCP 50.64 Barnyard runoff control systems.

ATCP 50.65 Access road.

ATCP 50.66 Trails and walkways.

ATCP 50.67 Contour farming.

ATCP 50.68 Cover crop.

ATCP 50.69 Critical area stabilization.

ATCP 50.70 Diversions.

ATCP 50.705 Feed storage runoff control systems.

ATCP 50.71 Field windbreaks.

ATCP 50.72 Filter strips.

ATCP 50.73 Grade stabilization structures.

ATCP 50.75 Livestock fencing.

ATCP 50.76 Livestock watering facilities.

ATCP 50.77 Milking center waste control systems.

ATCP 50.78 Nutrient management.

ATCP 50.79 Pesticide management.

ATCP 50.80 Prescribed grazing.

ATCP 50.81 Relocating or abandoning animal feeding operations.

ATCP 50.82 Residue management.

ATCP 50.83 Riparian buffers.

ATCP 50.84 Roofs.

ATCP 50.85 Roof runoff systems.

ATCP 50.86 Sediment basins.

ATCP 50.87 Sinkhole treatment.

ATCP 50.88 Streambank or shoreline protection.

ATCP 50.885 Stream Crossing.

ATCP 50.89 Stripcropping.

ATCP 50.90 Subsurface drains.

ATCP 50.91 Terrace systems.

ATCP 50.92 Underground outlets.

ATCP 50.93 Waste transfer systems.

ATCP 50.94 Wastewater treatment strips.

ATCP 50.95 Water and sediment control basins.

ATCP 50.96 Waterway systems.

ATCP 50.97 Well decommissioning.

ATCP 50.98 Wetland development or restoration.

APPENDIX – F

HUC12 Watershed ranking criteria

HUC12 Code	HUC12 Name	2013 - 2020 Soil Transect Soil Loss Rank 1= lowest soil loss	PNW-ASNRI (Priority Navigable Waters - Area Special Natural Resource Interest (DNR Trout streams) 0=No, 1=Yes	FPP rank/# acres. Rank 0 = no acres. Rank 7 = highest acres	# of Manure Storage permits/ active/in active	SSTGWC Rank (amount of SSTGWC soils in watershed) Higher amount = higher rank	Impaired Waters (0=No, 1=Yes)	Stream Monitoring Rank (Ttl P, Ttl N) Higher rank = higher nutrient content in stream	rank based on # wells samples >10 (x5pts); >2 (x2pts) = higer score/higher rank (include TN systems)	Overall Score	Priority Rank
70500051201	Bear Creek	6	1	5	6	14	1	13	15	61	1
70500051205	Little Plum Creek-Chippewa River	9	1	4	3	9	0	11	12	49	2
70400010705	Lake Pepin	12	1	2	2	13	1	4	13	48	3
70500051008	Lake Eau Galle-Eau Galle River	14	0	3	1	11	1	10	8	48	4
70500051007	Arkansaw Creek	8	1	7	3	8	1	12	7	47	5
70500051202	City of Durand-Chippewa River	3	0	1	5	15	1	6	14	45	6
70500051203	Spring Creek-Chippewa River	11	0	6	2	10	1	5	10	45	7
70500050906	Duscham Creek-Chippewa River	2	1	0	2	12	1	14	9	41	8
70500051102	Porcupine Creek-Plum Creek	10	1	0	0	7	1	9	11	39	9
70400030107	Harvey Creek	5	0	0	4	3	1	15	4	32	10
70400010702	Pine Creek	15	0	0	1	2	0	2	6	26	11
70500050901	Rock Creek	7	0	0	0	4	0	7	5	23	12
70500050903	Cranberry Creek	1	0	0	2	6	1	8	2	20	13
70400030106	Peeso Creek	13	0	0	0	1	0	1	3	18	14
70500051006	Missouri Creek	4	0	0	1	5	0	3	1	14	15

HUC12 Priority Watershed Ranking Map