ABSTRACT

This document outlines the 9 critical elements for improving water quality, specific to the Pipe Creek watershed in Fond du Lac County, Wisconsin

Created in 2018 by The Fond du Lac County Land and Water Conservation Department

THE PIPE CREEK WATERSHED 9 KEY ELEMENT

An ongoing collaboration for cleaner water

Chapters

Causes and Sources (Element 1)

A Brief Introduction

The Pipe Creek Watershed area is approximately 5,778 acres in size. It is located in East Central Wisconsin in Fond du Lac County and is located exclusively in the Township of Calumet. The Pipe Creek Watershed is part of the Upper Fox-Wolf Watershed Basin that drains to Lake Winnebago and is also located in the central part of the Lake Winnebago East Shore watershed. Pipe Creek drains westerly emptying into Lake Winnebago just west of the unincorporated town of Pipe. The watershed also includes the unnamed tributaries that drain directly to Lake Winnebago north of Pipe to the Fond du Lac County line.

The predominant land use in the watershed is agriculture (71%). Much of the native vegetation that was found before settlement has been cleared for cropland. Forest and wetlands account for 15% of the land use and residential development makes up 14% of the land use. The highest elevation in the watershed is 974 feet, with an elevation drop of approximately 228 feet in 2.5 miles to the lakeshore. Most of the shoreline of Lake Winnebago is developed with cottages and year round residences. The Niagara Escarpment formation, or ledge, is natural formation of Silurian dolomite limestone that runs mostly north and south through the middle of the watershed generally following the STH 151 corridor.

Two land features dominate the watershed: The rolling land in the eastern and southern parts of the watershed, and the more level lands found in the western part. The Niagara escarpment or "ledge" as it is known locally, predominates throughout this watershed. The soils within this watershed are characterized as heavy clay soils with poor infiltration and high fertility. Predominant land use in this watershed has been agriculture, with heavy residential development along the lake shore.

Purpose

The Lake Winnebago System is listed as impaired by the Wisconsin Department of Natural Resources (WDNR) due to excess phosphorus, sediment, total suspended solids, and mercury. Lake Winnebago often experiences blue green algal blooms which can be toxic to humans and wildlife. Due to the water quality impairments, the Wisconsin DNR is preparing a Total Maximum Daily Load (TMDL) plan for the entire Upper Fox – Wolf Basin. When complete, this plan will identify and quantify the sources and loadings causing the impairments. The TMDL plan will also include numerical targets for loading reductions from Point and Nonpoint sources.

Historically, the Pipe Creek Watershed has experienced considerable impairments due to sediment and nutrient runoff. Lakeshore homeowners have expressed concerns over increased runoff resulting in decreased water clarity along with increased weed growth and algal blooms.

Landowners also expressed observations of increased flooding along the lakeshore of Lake Winnebago over time due to changing hydrology throughout the entire watershed. The increased runoff from the landscape has also potentially been compounded by drainage changes under US HWY 151. These changes in hydrology over time have increased the amount of quantity of water flowing through traditional watercourses which ultimately is affecting water quality in the watershed and Lake Winnebago.

The purpose of this plan is to identify sources of loading affecting water quality of Pipe Creek and other unnamed tributaries in the watershed and develop an implementation strategy that follows the criteria established for approval of an EPA 9 Key Element Plan to reduce loading from the identified sources.

Summary of Watershed Assessment- State of Water Quality in Pipe Creek

A Targeted Watershed Assessment was conducted by the DNR during 2017 to establish baseline water quality information for the Pipe Creek Watershed. This type of assessment involves the collection of total phosphorus (TP), total suspended solids (TSS), and habitat data to establish a background of data for waterbodies, and then sites may be revisited to determine effectiveness of conservation efforts throughout the watershed. Pipe Creek holds particular importance for this type of assessment, as it has been determined to be part of one of the 10% highest sediment loading watersheds of the Upper Fox-Wolf Basin.

TSS and TP analysis was conducted at 6 locations throughout the watershed. According to preliminary results from the Assessment, all six locations had an average TP concentration exceeding 0.75 mg/L, which is the Wisconsin Administrative Code chapter NR 102.06(3)(b) water quality criteria (WQC) for creeks and rivers (Fig. 1). Average TSS levels across the six sites ranged from <2.0 mg/L to 119 mg/L. There is no state water quality standard for TSS. However, this data will prove useful for future comparison (Fig. 2). Aquatic macroinvertebrate surveys indicated impaired and degraded aquatic habitat throughout sampling locations.

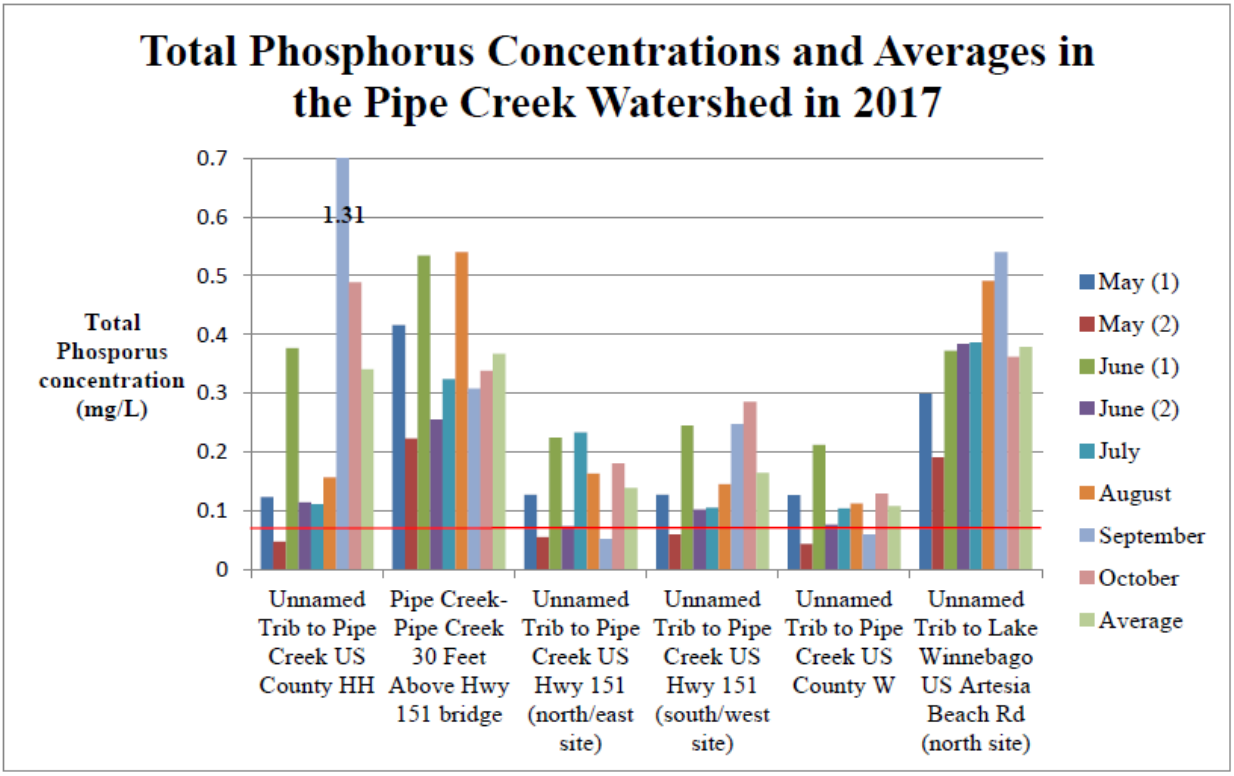


Chart 1: Total Phosphorus Concentrations and Averages of Samples Collected in the Pipe Creek Watershed in 2017 (with 0.075 mg/L WQC red line).

Figure 1. TP Concentrations in Pipe Creek Watershed from 2017 Targeted Watershed Assessment.

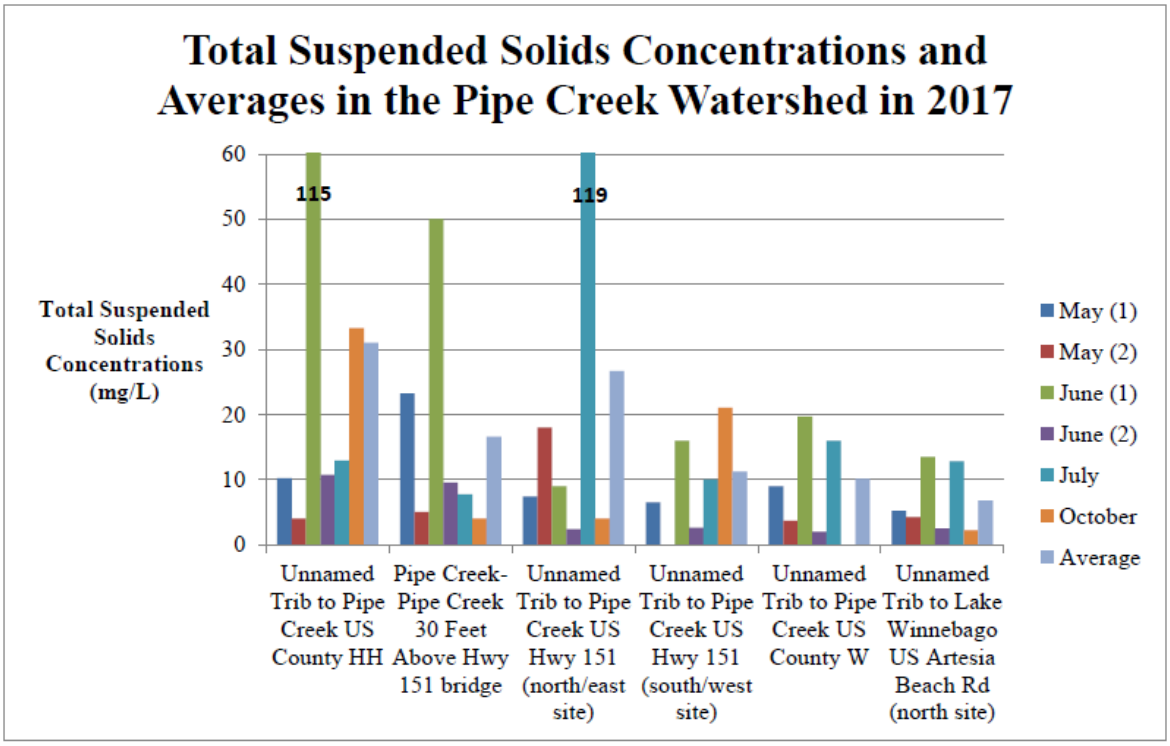


Chart 2: Total Suspended Solids Concentrations and Averages (mg/L) of Samples Collected in the Pipe Creek Watershed in 2017.

Figure 2. TSS Concentration data from the 2017 Targeted Watershed Assessment in Pipe Creek Watershed.

Identification of the Causes of Water Quality Impairment

The Big Picture

The cause of water quality impairment has been and will continue to be the relationship of humans and all of our constructs on the natural environment. The overarching cause of Lake Winnebago's and Pipe Creek's impairments are not a new phenomenon and they are certainly not unique to the area. Our inability to truly turn this train around is what puts us where we are today; writing yet another plan that contains the same issues to address and largely the same proposed solutions to address the issues. The causes of water quality impairment, largely, are a combination of agricultural runoff, streambank erosion, stormwater runoff from urban and residential areas, uncontrolled construction site runoff, and discharges from point sources. More importantly, the overarching cause of our water quality impairments is the continuance of all of those causes listed above. The continuance of this water quality impairment problem is reflected through our lack of action in changing the way we do things collectively and individually.

Pollutant Sources: Point and Non-Point Sources

Point source pollution is non-existent in this portion of the Pipe Creek watershed. Therefore, any contribution of water quality pollution from nutrient and sediment in this watershed is coming from non-point source pollution, which is the focus of this plan. The non-point source pollution in this area is attributed to the sediment and nutrient loading from agricultural practices, loss of native land use and wetlands, and streambank erosion.

Non-Point Source Contributions in the Pipe Creek Watershed

Agricultural Runoff

Agricultural runoff occurs when rainfall or snowmelt runs from an agricultural landscape into a receiving waterbody such as a ditch, stream or lake. It is not the land use of "agriculture" that inherently creates an agricultural runoff issue, but the specific management decisions on the agricultural land. Rainfall or snowmelt that occurs in combination with exposed soil and/or nutrient or manure application in a watershed such as the Pipe Creek watershed, can lead to soil and nutrient runoff in excess. As shown in the photos included in this plan, the Pipe Creek watershed is locally known as a "chocolate milk" runoff watershed. We know that the unclear runoff is coming from agricultural fields because we are out in the field regularly and have been able to examine what is going on in the watershed in real time. The sediment laden runoff has occurred at the starting point of sub watersheds at the top of fields within the Pipe Creek watershed before getting to a ditch or streambank. So, while we know that streambank and ditch bank erosion is also a prevalent problem in the watershed, we also know that in some cases the water is turbid prior to getting to the stream. Nutrients are bound to soil particles. When sediment runs off from fields there is also a risk of nutrient run off.

Our department had been focusing on the Pipe Creek watershed, working on a landowner-by-landowner basis since 2015. Because of this, we had walked a number of fields, and field verified problem areas by working with individuals for two years prior to knowing that we would be writing a 9 key element plan for this watershed. As we moved forward with plan development, we documented areas we already knew about, but knew that we wanted to conduct a more thorough and current spring walkover specifically for the plan. We chose to reach out to the 5 producers who own the majority of the land base in the area to request doing entire farm walkovers sometime between March and May of 2018. The department has a working relationship with all five landowners, so some fields were re-visited, while some fields were visited for the first time. Looking at all of the fields at the same time of year, for both evaluation of existing conservation practices as well as identification of new or existing

problem areas, was valuable for us as a department and valuable for the farmers too. The walkovers led to the farmers knowing which areas they should focus on improving in 2018. This ultimately led to one cost share agreement for critical area seeding for 2018, as well as the farmers working on fixing erosive areas on their own, followed by monitoring throughout 2018 to determine whether a conservation practice, plan, and cost sharing will be needed for 2019. When conducting the initial walkovers, we decided to loosely follow the UW Discovery farms manual on conducting field walkovers. We printed maps and walked fields. After walking a field or an area, we jotted down notes and drew gullies and rills on the maps. Back at the office, an erosion layer was created in ArcMap. For follow up, we had conversations with the farmer either during the walk over or after about which areas should be worked on if possible during the upcoming field season and which areas were problem areas with potential to become worse over time. We also drew attention to areas that looked good in terms of conservation, such as fields that had a rye cover crop and minimal erosion and established grassed waterways.

Erosion Estimates

A combination of field verification walks and 2017 ortho-imagery review in early Spring 2018 resulted in 77,290 total feet of soil erosion identified

- It is estimated that 50%, or 38,645′ is rill erosion or ephemeral concentrated flow paths
- It is estimated that 25%, or 19,322.5′ is gully erosion 0.5′ to 1′ deep
- It is estimated that 25% or 19,322.5′ is gully erosion 1′-2′ deep

(See next page for inventory map)

Pipe Creek Watershed Upland Erosion Inventory

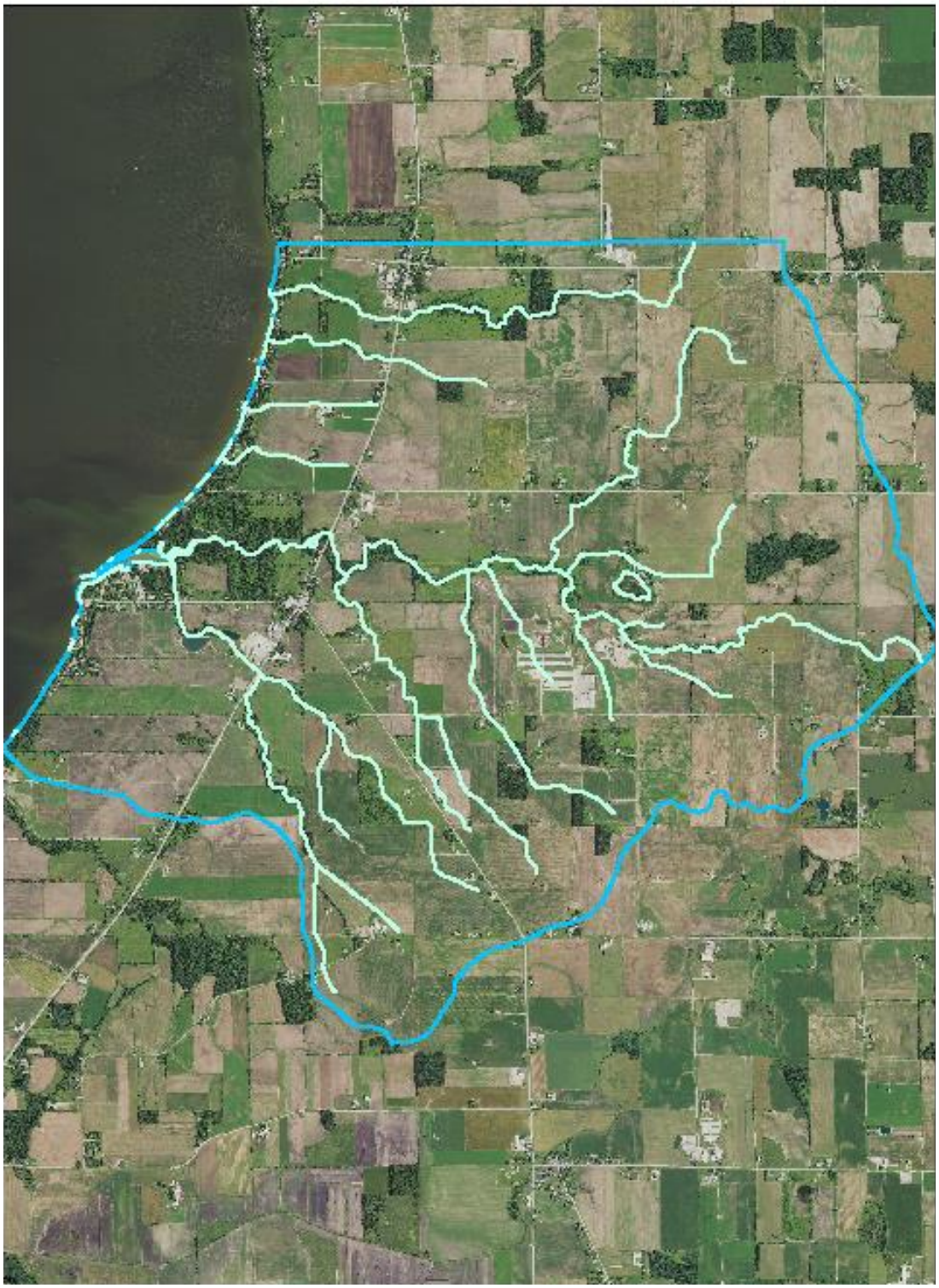
Streambank Erosion

There are 17 miles of stream in the Pipe Creek watershed. These consist of the main branch of Pipe Creek, as well as intermittent and perennial streams from the WI DNR 24k hydro layer. Of these 17 miles, 14.6 miles were inventoried over the course of our work in the watershed, with a final push to inventory more miles in

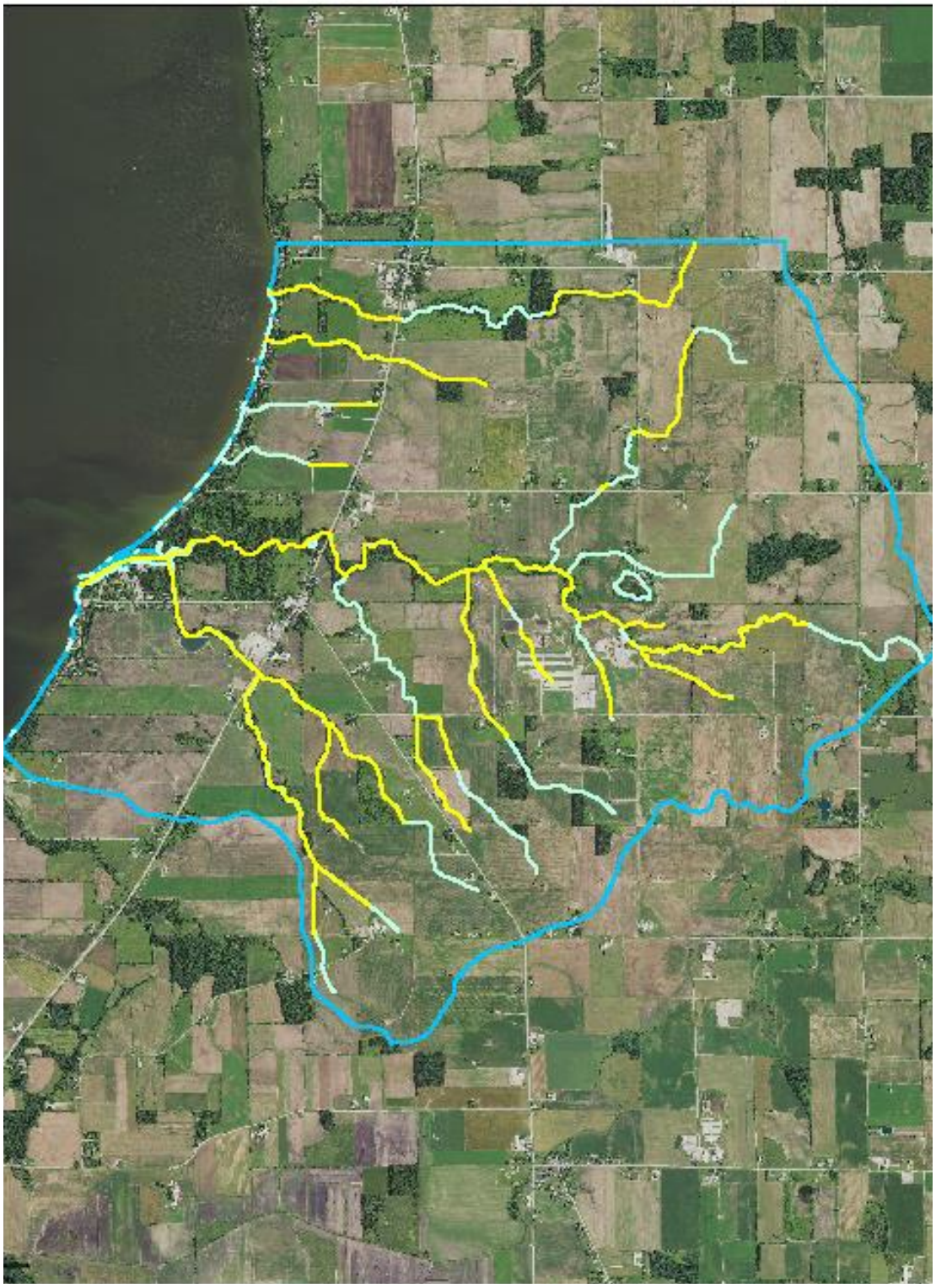
2018 in preparation for the 9 key element plan. Of those inventoried miles, eight miles were determined as in need or would benefit from streambank stabilization. A full-fledged feasibility study has not been performed on all eight miles, however, it is the department's professional opinion that the majority of the eight miles would be feasible to improve, pending funding and landowner cooperation.

Before a strong commitment to stream restoration is undertaken, it is our department's goal to address many of the upland and field level issues occurring that are exacerbating the streambank erosion problem. Flashiness within the streams occurs regularly with rainfall in the Pipe Creek watershed. The evidence is in the scoured banks, and the gullies that run parallel on either side of most of the ditches and tributaries. We as a department cannot control the weather, the amount of rain that falls or when, but it is our goal to help guide the landowners and farmers within the watershed to address infiltration problems, gullies, and land use decisions. If we can work together to implement soil health principles onto as many agricultural acres as possible, repair as many gullies as possible, convert marginal agricultural acres or farmed riparian areas back to natural habitat, as well as to strategically place temporary water storage throughout the watershed, then we can more effectively address streambank damage.

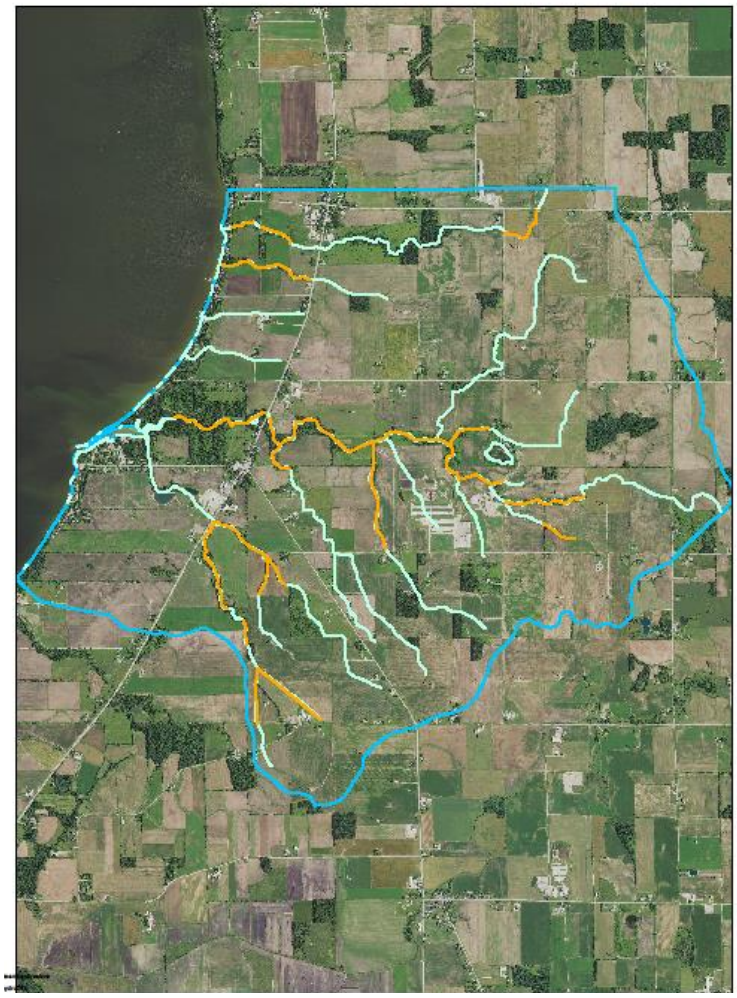
Pipe Creek Watershed Streams



Pipe Creek Watershed Streambank Inventory



Pipe Creek Watershed Streambank Sections Feasible for Restoration



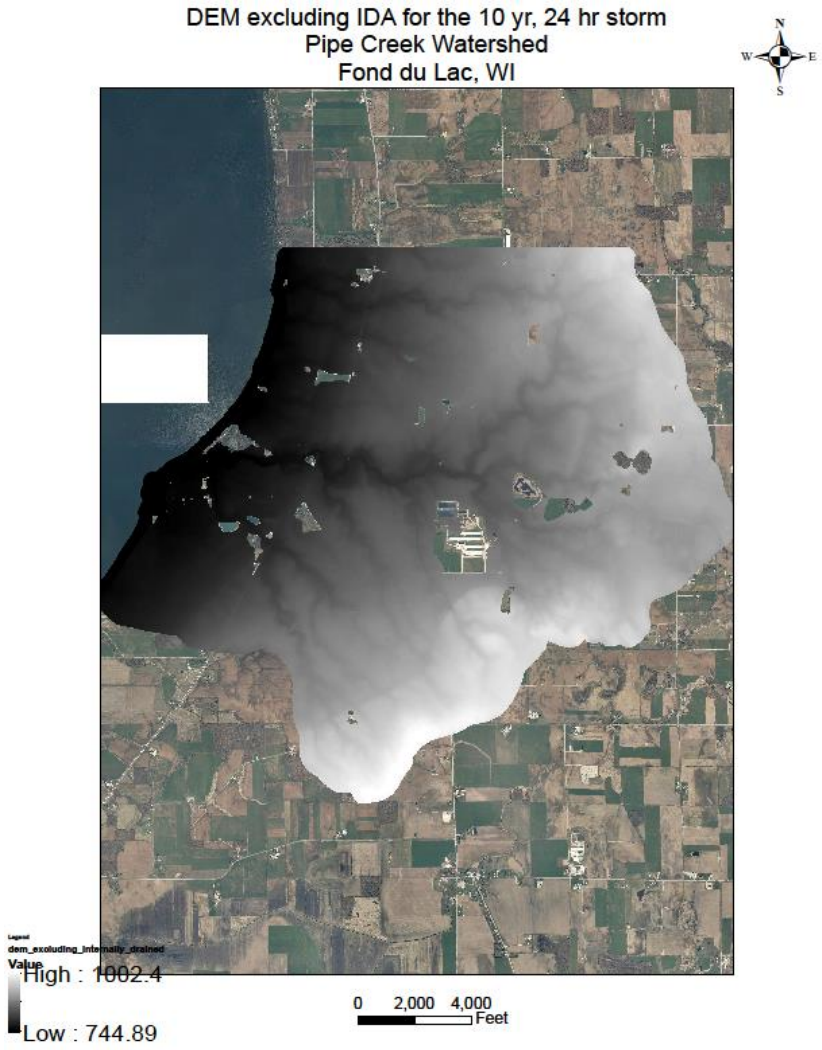
EVAAL Maps and explanations of different features

EVAAL stands for Erosion Vulnerability Assessment for Agricultural Lands. This is a modeling tool for ArcGIS that was created by WI DNR to assist watershed managers in prioritizing areas within a watershed which may be vulnerable to water erosion and increased nutrient export, potentially contributing to downstream surface water quality problems. Below are some of the maps and data EVAAL creates throughout different steps of the tool. Ultimately all of the steps and data created throughout the tool lead to an "Erosion Vulnerability Index" for the watershed. This index can be displayed by a boundary, such as a parcel or field, allowing the user to see and prioritize fields or parcels within a watershed which may be suffering from erosion issues. It is important to remember that this tool only highlights erosion potential, and the tool is meant to be used as a first step or prioritization mechanism for field verifying to see if erosion is truly taking place on the landscape. For example, if a field or parcel is high on the erosion vulnerability index but is well managed and steps have been taken by the land manager to mitigate that erosion potential, it is likely that

severe erosion may not be actually occurring. On the flip side, a field could rank low on the erosion vulnerability index but if it is managed poorly, could very easily still be suffering from erosion issues. True erosion issues can only be verified by making contact with the land manager and performing a field walk, but EVAAL serves a very good purpose in giving watershed managers a starting point or a way to prioritize when field walks over an entire watershed to identify problem areas is not feasible.

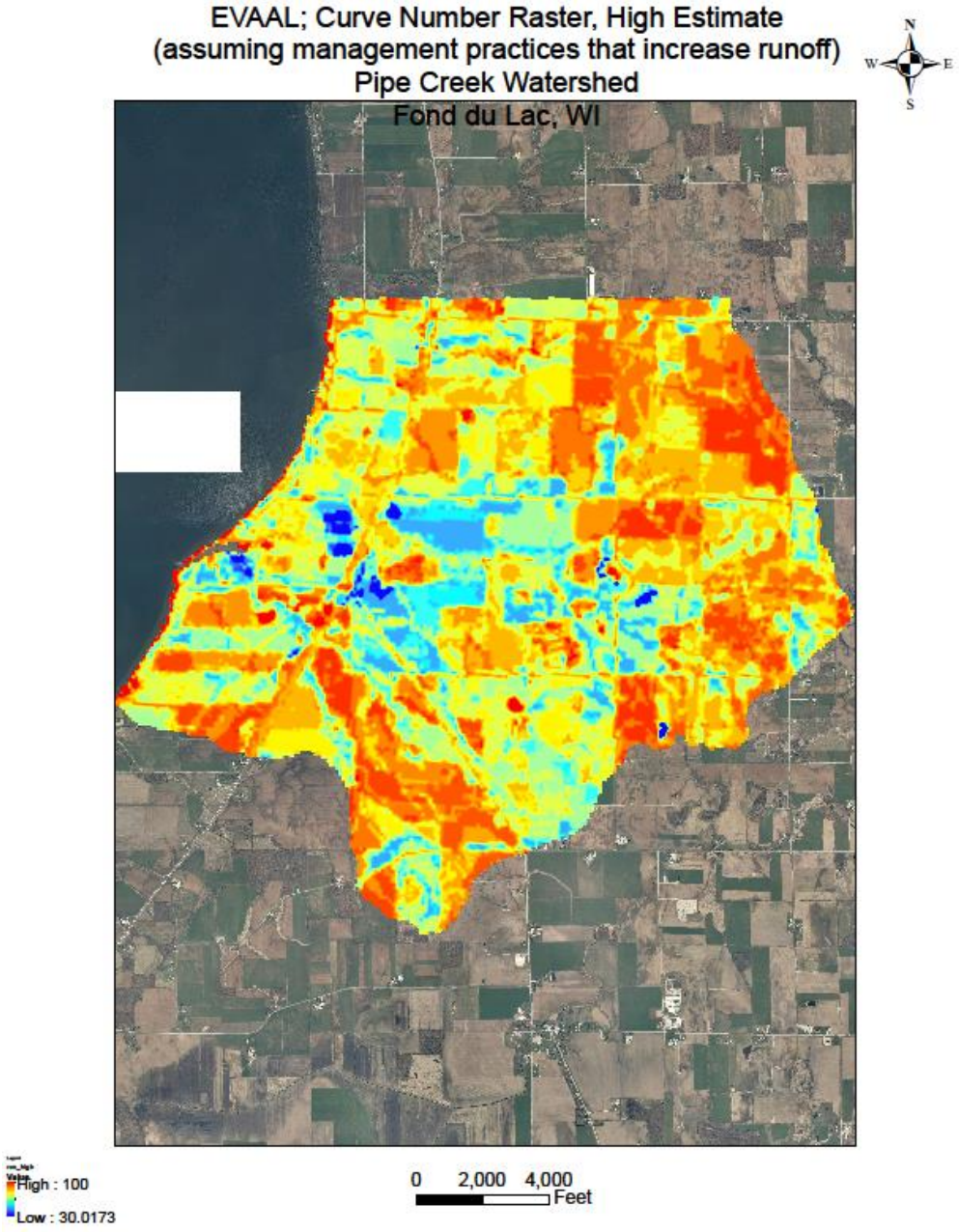
Internally Drained Areas

EVAAL has the capability to identify if an area on the landscape will store water or if the water will run off into a stream or lake. Areas which do not drain to surface waters are deprioritized within the tool as they are considered hydrologically disconnected from surface waters and not directly contributing to surface water quality issues.



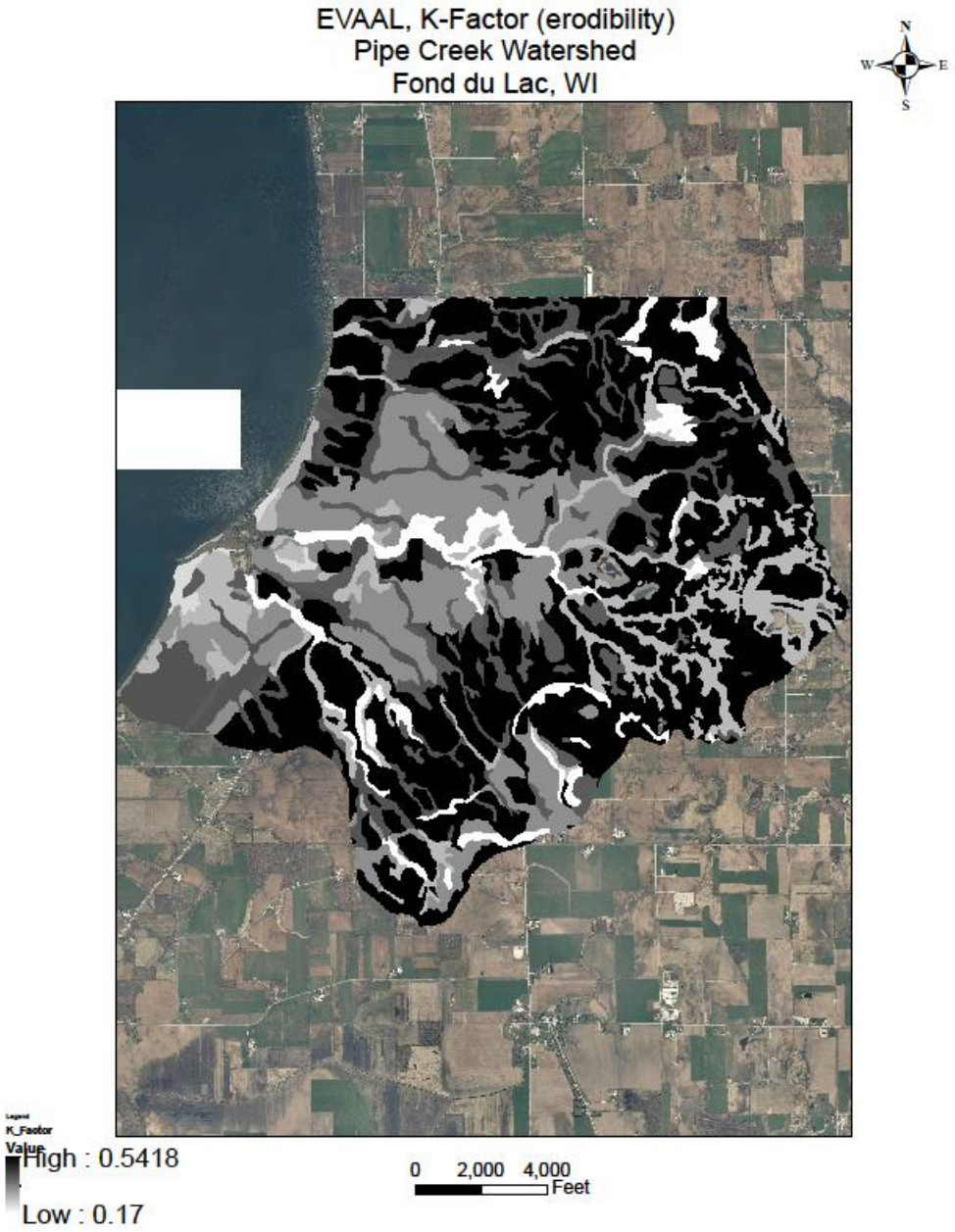
Curve Number Raster

The curve number is a way of estimating the amount of runoff. The curve number tool within EVAAL takes into consideration land use, cover, hydro soil group, and management. These factors are modeled within the tool based on available data and generalities. It is difficult to fully assess these factors without direct observation, so the tool allows for two outputs; a high estimate curve number and a low estimate curve number. It is up to the user's discretion whether the management within that particular watershed is facilitating infiltration (low estimate) or if it is hindering infiltration (high estimate).



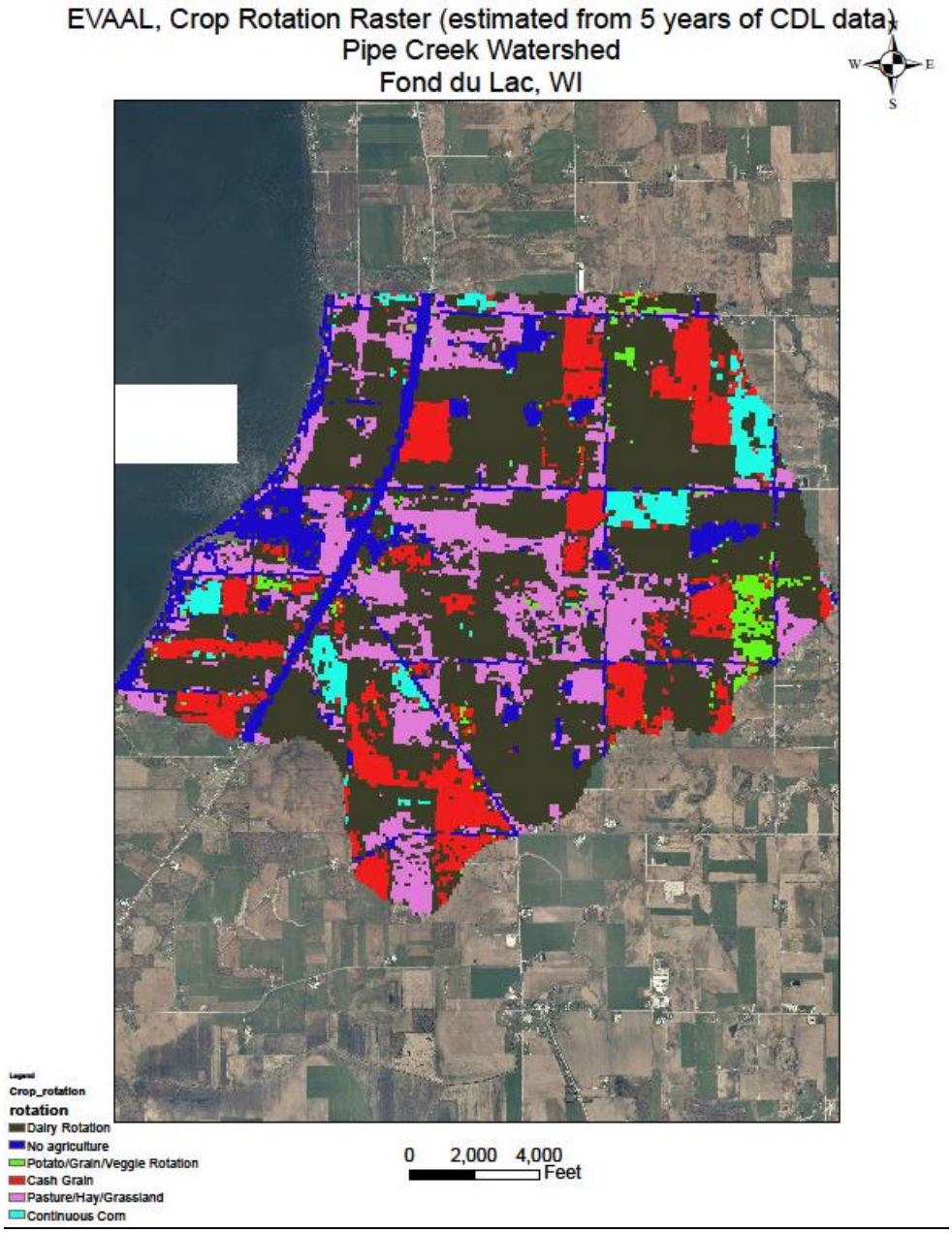
Soil Erodibility

The value for erodibility, or k factor comes from the USDA gSSURGO database. Within the ArcGIS tool, the soil map unit is a 2-D polygon representation of soil patterns. Each map unit is composed of one or more components, which represent a particular soil type, usually a series. Within components are horizons which represent the vertical, stratigraphic units of the soil profile. The K factor value used in the tool is the area weighted average of all of the components in the top horizon.



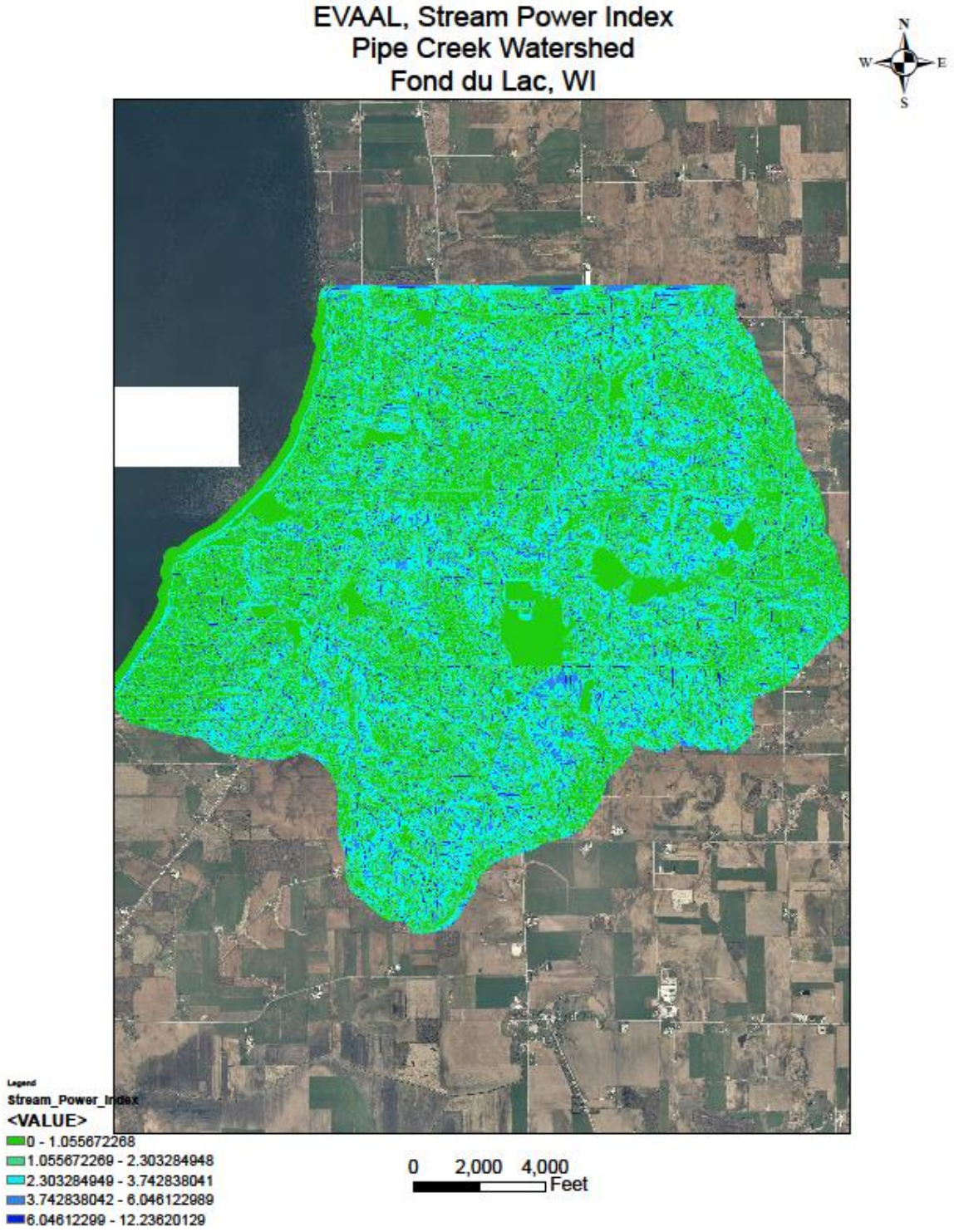
Crop Rotation

The EVAAL crop rotation layer is also derived from the gSSURGO database. The CDL or cropland data layer is directly downloaded through the tool. Then, years are specified to gather what the major rotations are within the watershed based on the data collected during those years. While this is a good way to gather estimates, with so much of this watershed actively participating in nutrient management, data gathered from those plans provides a much more accurate picture of the dominant crop rotations in the watershed.



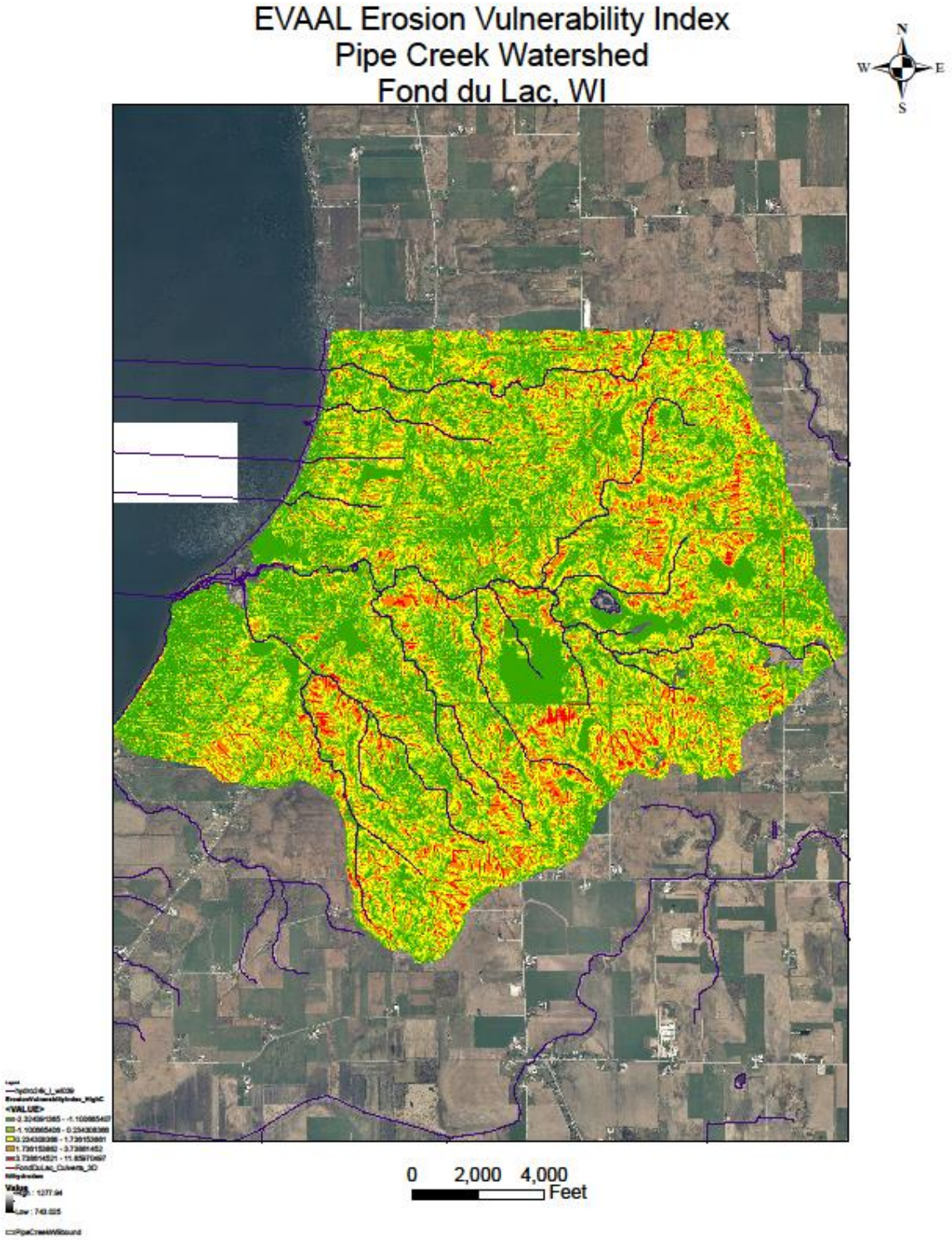
Stream Power Index

The stream power index is used to estimate areas that are susceptible to gully erosion. It highlights streamflow and overland flow paths within watersheds.



Erosion Vulnerability Index

The final step in the tool combines the susceptibility to gully erosion with the susceptibility to sheet and rill erosion to produce the erosion index.



Pollutant Load Reductions (Element 2)

Pollutant Load Estimates

Baseline Loading

The Wisconsin Department of Natural Resources is developing a Total Daily Maximum Load (TMDL), or pollutant budget, for the Upper Fox-Wolf Basin (UFWB), which encompasses the Pipe Creek Watershed. We are using the UFWB TMDL to guide us in developing our pollutant reduction goals in the Pipe Creek Watershed. The TMDL defines the amount of total phosphorus and sediment Lake Winnebago can receive in order to meet water quality standards. Included in TMDL reports are baseline loading estimates as well as load allocations for point and non-point sources.

Wisconsin DNR utilizes multiple tools to estimate baseline phosphorus and sediment loads. An important tool used is the Soil and Water Assessment Tool (SWAT). This tool estimates daily pollutant loads at the pour point of a watershed from various pieces of watershed and weather data and mathematical equations.

The Spreadsheet Tool for Estimating Phosphorus Loads (STEPL) was used to estimate phosphorus and sediment loads of different land uses in the Pipe Creek Watershed. STEPL is an edge of field model, therefore loading estimates are typically higher compared to loading estimates generated from the SWAT model. For our planning purposes, we will apply reach load reduction goals established in the UFWB to loading estimates generated by STEPL to determine reduction goals for the watershed.

According to STEPL, Pipe Creek receives 21,155 pounds of phosphorus and 5,767 tons of sediment each year (Table 1). Agriculture, including cropland management, gully formations on cropland, and feedlots, contributes the greatest proportion of phosphorus, accounting for 83% of phosphorus loading (Figure 1). Cropland and gullies contribute a combined 70% of sediment loading in the watershed (Figure 2). Streambank erosion is the next highest contributor of pollutants, accounting for 11% of phosphorus and 27% of sediment loading to the watershed.

Baseline load estimates include existing best management practices in the watershed. Nearly 85% of the cropland fields, or 3400 acres in the watershed are accounted for in existing nutrient management plans. Of the 3,400 acres included in nutrient management plans, 1,000 acres are being managed using cover crops and reduced tillage. Refer to Appendix I for more information on existing BMPs.

Table 1. Phosphorus and sediment load by land use source in Pipe Creek Watershed

Land Use Source	Phosphorus Load (lb/yr)	% of Phosphorus Load	Sediment Load (t/yr)	% of Sediment Load
Urban	1,213	5.7%	193	3.4%
Cropland	12,231	57.8%	2,439	42.3%
Pastureland	45	0.2%	5	0.1%
Forest	65	0.3%	5	0.1%
Feedlots	2,823	13.3%	0	0.0%
Grassy areas	12	0.1%	5	0.1%
Septic	30	0.1%	0	0.0%
Gully	2,395	11.3%	1,578	27.4%
Streambank	2,340	11.1%	1,542	26.7%
Total	21,155	100.0%	5,767	100.0%

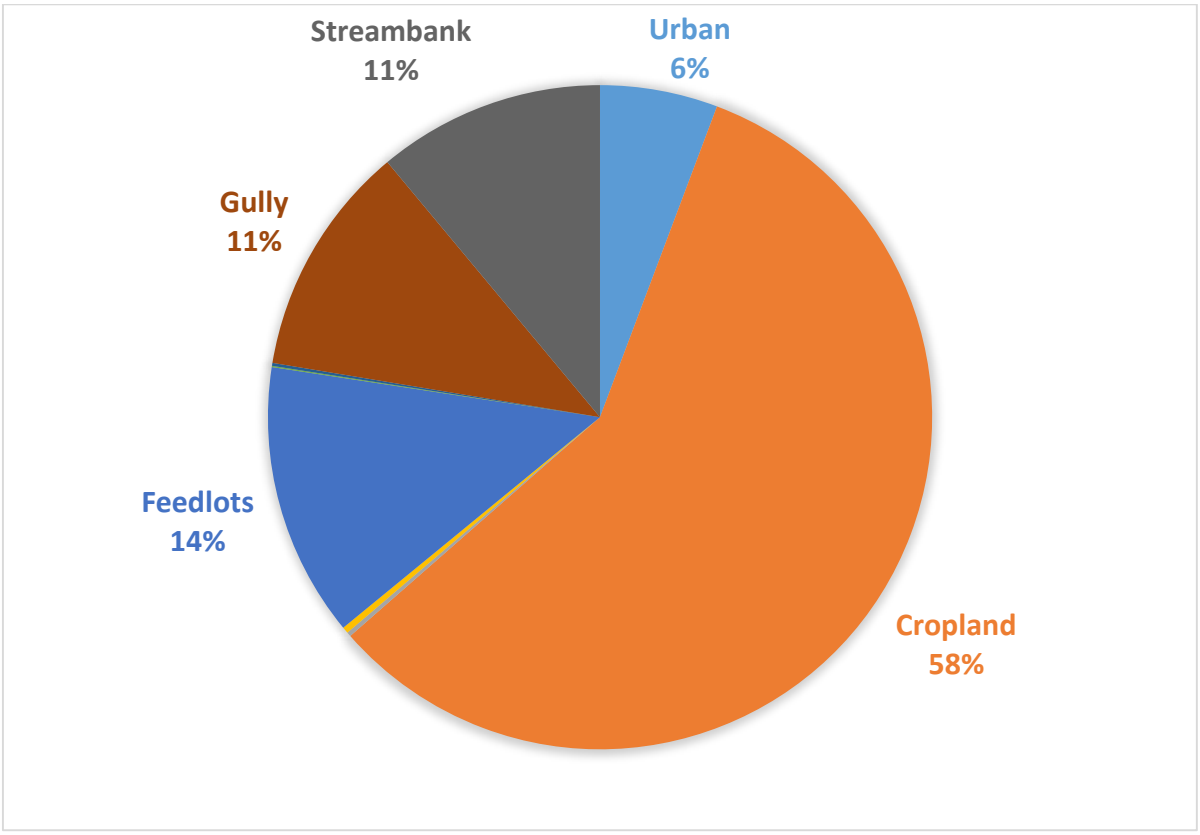


Figure 1. Percent phosphorus load by land use.

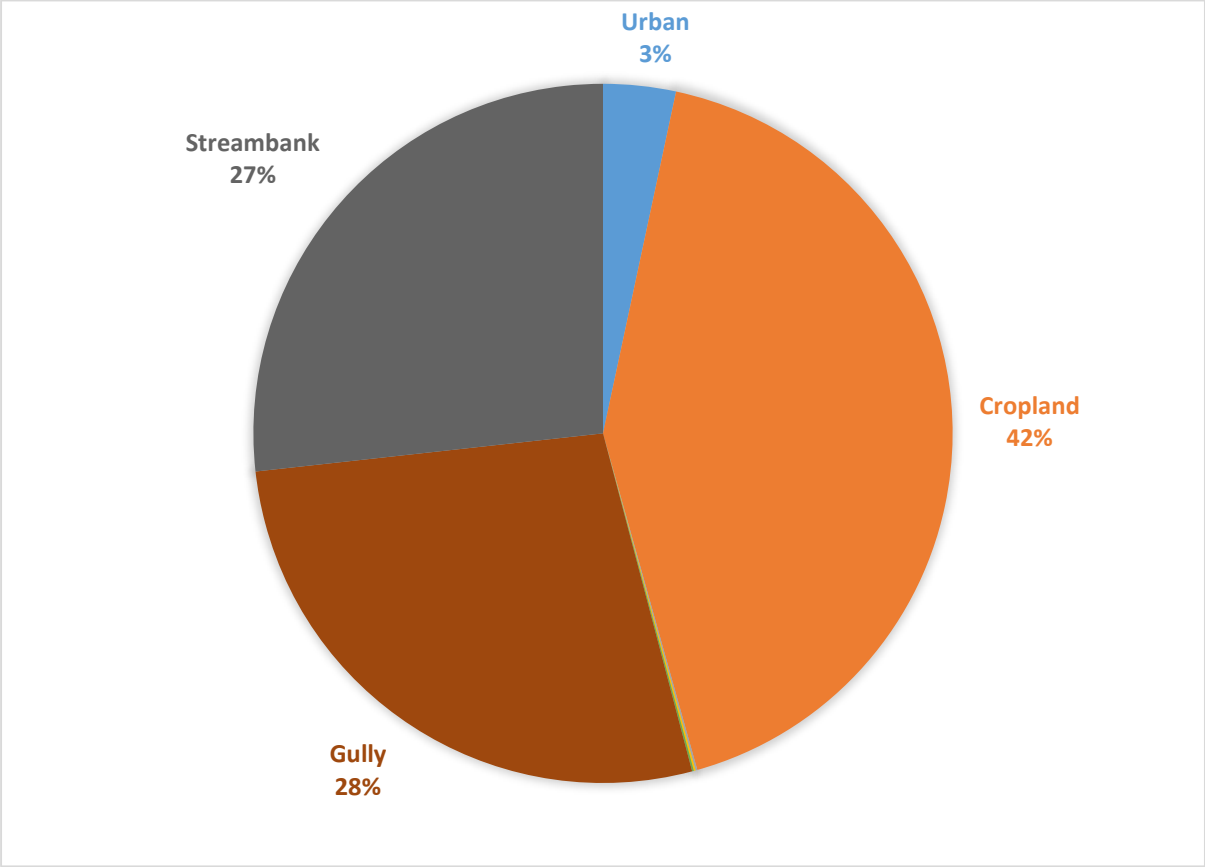


Figure 2. Percent sediment load by land use.

Load Reductions

The Draft UFWB TMDL calls for an 83% reduction in total phosphorus to meet water quality targets in the Lake Winnebago sub-basin, which would be a load reduction of 16,561 lbs. TP/year. When the final version of the UFWB TMDL is published, we will revisit the reduction goals set for the Lake Winnebago sub-basin and adjust our 10- year reduction strategy accordingly to better match the goals set in the TMDL. This sets us up for a long-term goal so that we can establish a more reasonable mid-term goal for the next 10 years. The remaining TP and sediment load reductions in the watershed (to meet the UFW TMDL) may be achieved during future ten-year plan efforts and by focusing on practices described in the plan on the remaining 1,400 cropland acres in the watershed. Additionally, the UFW TMDL information related to the watershed will be reviewed and used to help implement the plan as funding and staff are secured. See appendix for pollutant loading/map information from the DRAFT UFW TMDL.

STEPL was also used to calculate load reductions that could be achieved from implementing certain best management practices throughout the watershed.

An estimated reduction of 6,849 lbs. of P (32%) and 2,972 tons of sediment (52%) may be achieved by implementing a plan of best management practices (Table 2). Practices include a combination of: 1) upland practices including cover crops, reduced tillage, nutrient management planning, and prescribed grazing; 2) gully stabilization including waterways, critical area seeding, and water and sediment control basins (WASCBs); 3) streambank stabilization projects; and 4) vegetative buffers along critical crop/stream corridor interfaces.

Table 2. Load reductions from best management practices

Best Management Practice	Implemented Units	Load Reduction		% Reduction	
		P (lb/yr)	Sediment (t/yr)	P	Sediment
Cropland Practices (Combination of reduced/no till practices, cover crops, nutrient management planning, harvestable buffers and prescribed grazing)	3,665 acres	3,572	813	16.9%	14.1%
Gully Stabilization (Waterways, water and sediment control basins)	20,000 feet	1,304	859	6.2%	14.9%
Streambank Stabilization	30,000	1973	1300	9.3%	22.5%
Total		**6,849**	**2,972**	**32.4%**	**51.5%**

Legacy Phosphorus and Sediment

One challenge to restoring total phosphorus impaired waters is legacy phosphorus present in soil and in stream beds. Recently, scientists and watershed managers are finding that water quality is not responding as well as expected to implemented conservation practices. Legacy phosphorus could be a reason for this slow response to positive watershed conservation practices. Legacy phosphorus can be described as accumulated phosphorus within the watershed that continues to provide a source of

phosphorus to receiving waterbodies, regardless of phosphorus reducing practices throughout the watershed. Legacy phosphorus in soil occurs when phosphorus in soil builds up quicker than its removal from crop uptake. In streams, legacy phosphorus occurs because of sediment deposition of particulate phosphorus, sorption of dissolved phosphorus onto riverbed sediments or suspended sediments, or by incorporation into the water column. Given these factors, water quality within watersheds may not respond to implementation of conservation practices as quickly as expected due to remobilization of legacy phosphorus. If water quality monitoring confirms little or no response after substantial implementation of plan milestones, further analysis of legacy pollutant sources in the watershed may need to be completed and revision of this plan may be necessary. *

**Not written by Fond du Lac County LWCD. Paragraph provided by WI DNR for inclusion*

Management Measures (Element 3)

Practices Needed to Achieve Reductions

Cropland Practices

Reduced till

The practice of reduced till is the reduction of current tillage mechanism on a farming operation. This practice can potentially include less passes of machinery on a field, removal of fall or spring tillage from the rotation, or a decrease in the aggressiveness of the type of tillage (for example- chisel plow to strip or zone till). The benefits of reduced till are less soil disturbance, more residue/cover in place more of the year, and if the practice is well received and has a positive farm benefit, it could lead to the adoption of a further practice such as complete no till or covers.

No till

The practice of no till is just as it sounds: the absence of mechanical tillage of the soil as a preparation mechanism for planting crops. The crop is instead planted into the soil, through previous year's crop residue using a no till planter. The benefits of no till are a decrease in soil disturbance, crop residue in place on the field throughout the year, lower input costs, as well as other potential benefits such as increased infiltration and productivity and less compaction.

Cover crops

A cover crop is a secondary crop planted after the first crop is harvested. The purpose of a cover crop is to manage field erosion that would typically occur with an exposed field, as well as to promote soil fertility and health by providing a living root and diversity to the soil system before, after, and even during primary crop growth. The benefits of cover crops are reduced soil erosion, increased water infiltration, and improvements in soil quality.

Nutrient management planning

A nutrient management plan is a written or computer program generated document that outlines the history and projected future of a farm field/farm operation in terms of its crop rotation, tillage, nutrient applications, and soil nutrient data through grid soil sampling. It also shows locations of fields in proximity to water as well as slope and soil type, taking into account the "whole picture" of the field and larger farm as a way to manage nutrients and minimize effect of nutrients on water quality. The benefits of a well written and followed plan are precise application of nutrients in the right quantities at the right time, which reduces the risk of nutrient runoff to water bodies.

Rotational high intensity grazing

Rotational grazing as a conservation practice is the conversion of a conventionally farmed field to that of perennial pasture with animals being rotated through small paddocks. The benefits of this practice is

that there is dense, perennial cover year round which leads to a marked decrease in soil erosion from the land, along with increased infiltration and decreased chance for nutrient runoff because of the switch from a field with nutrient/manure application to a field directly in relationship with the animals and their manure.

Gully Stabilization

Grassed waterways

Grassed waterways are designed and constructed grass channels that are meant to repair existing gullies or concentrated flow paths in farm fields. The benefit of this practice is a decrease in soil erosion and nutrient runoff, as well as a decrease in water velocity through the channel and increased infiltration.

Water and sediment control basins

Water and sediment control basins are designed excavated or embankment ponds that temporarily store water in them to drop sediment (and nutrients attached to particles) out and send water through at a slower velocity than it was moving without the basin. These are typically placed on a concentrated flow channel and can be used to address gully erosion and sediment movement to water bodies. The benefits include repairing gullies, mitigating erosion (sediment and nutrient movement), and mimicking natural systems within a watershed by creating temporary storage of water in the upper reaches of watersheds which helps to address flashiness within stream corridors.

Critical area seeding

Critical area seeding is the less invasive and less costly option prior to a grassed waterway to fix gully erosion with vegetation. The gully is repaired through tillage, and a wide strip of grass is planted in its place to stabilize the area. The benefit of this practice is reduced soil erosion and nutrient transport to waterways.

Streambank Stabilization

Streambank stabilization is the repair of eroded or sloughing streambanks to a stable condition able to withstand the force of water against it. This can occur through grading, seeding, and erosion control matting, or by grading and placement of geotextile fabric and rock riprap. Additional practices that sometimes go with streambank stabilization are pollinator plantings or stream habitat enhancement. The benefits of this practice are to stop the active erosion of the bank into the receiving waterbody. Often this soil is very nutrient rich, so the practice also mitigates nutrient transport into the stream.

Vegetative Buffers

CREP

The CREP program is a USDA-FSA program that offers landowners rental rate payments to take marginal riparian land out of agricultural production and into permanent, perennial planting.

Harvestable buffers

Harvestable buffers as a practice/program is a newer concept that mimics the CREP program, but typically with a shorter contract length, a more premium payment, and more flexibility with management of the buffer which includes removal of the biomass for forage/hay.

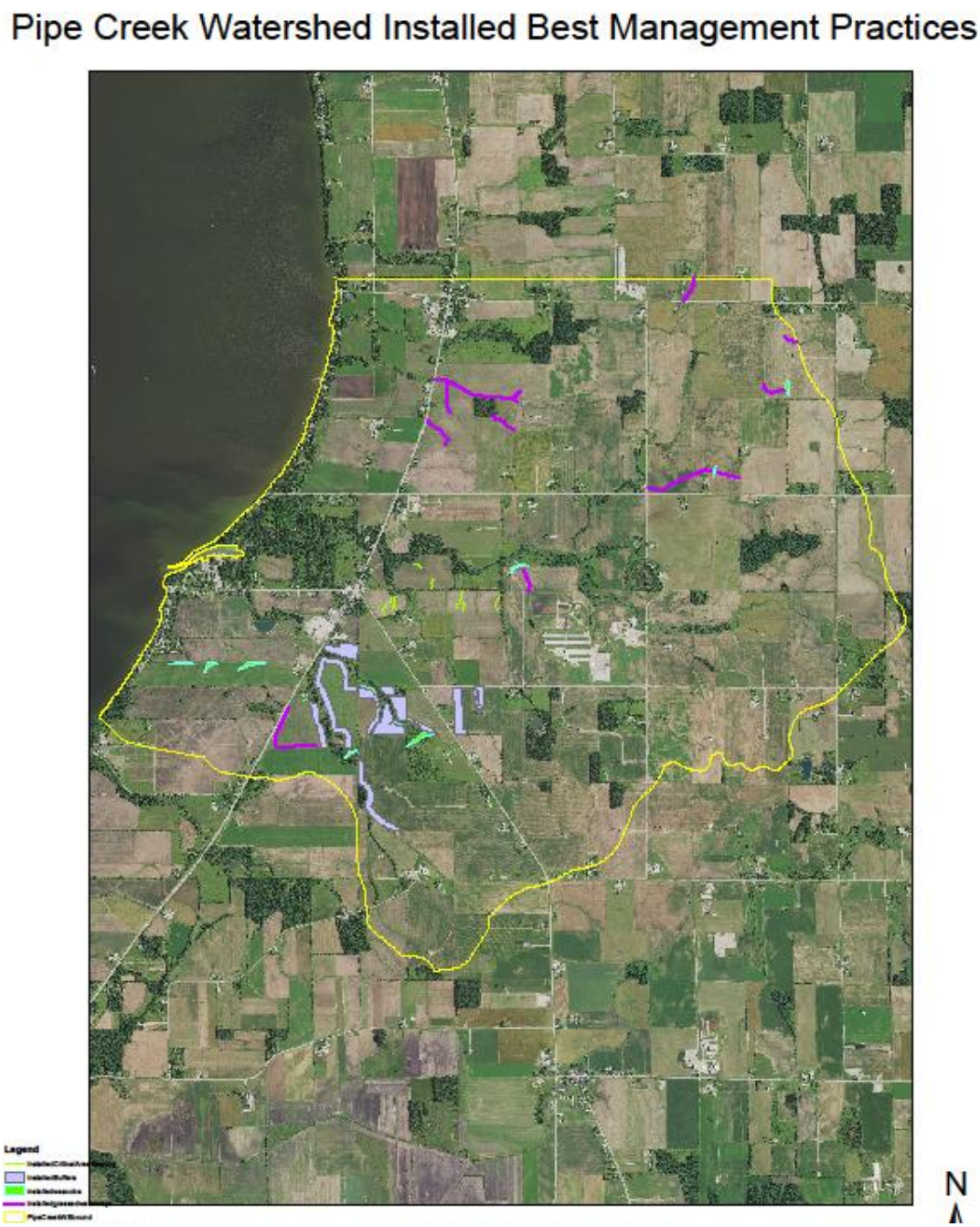
Prairie STRIPS

This program is a new program currently in its pilot stage that is overseen by the Sand County Foundation. Native strips of prairie are strategically placed and planted in farm fields (including along riparian areas and into upland areas of fields) to decrease soil erosion, nutrient transport and to increase the myriad of other benefits that come from native prairie plantings.

Completed Best Management Practices

Our department has installed soft and hard best management practices in this watershed, and the work is ongoing still. The Pipe Creek watershed suffers from severe gully erosion throughout, so our work within the watershed has been two-fold. We have advocated for and supported our farmers as they move toward more sustainable crop rotation, tillage, and use of cover crops. Most recently in their 2018 season, two producers have tried planting green. Fall of 2017 rye cover was planted on more acres than years previous. 2019 holds promise as producers in the watershed continue to increase no till and cover crop acres. We are noticing an increased dedication toward fixing soil erosion with soil health principles in this watershed.

While we know that ultimately the adoption of soft practices throughout the watershed is the key to fixing water quality issues, we also recognize that education and change is a process and want to make sure we, as a department, are able to help address priority areas, gullies, and the most severe locations throughout the watershed with a suite of hard practices. Grassed waterways, WASCOBs, and harvestable buffers have been some of the most needed and popular practices that our department has installed since starting work in the watershed. To date, we've installed over 7,000 linear feet of grassed waterway or critical area seeding, nine WASCOB's, and 61 acres of harvestable buffers. Beyond that, we have installed stream crossings, diversions, terraces, and rock lined outlets. We tried to prioritize gullies from worst to least severe, while also keeping in mind those farmers who were integrating soft practices into their operation where some of the smaller gullies on those fields would potentially be fixed through long term adoption of soft practice management changes.



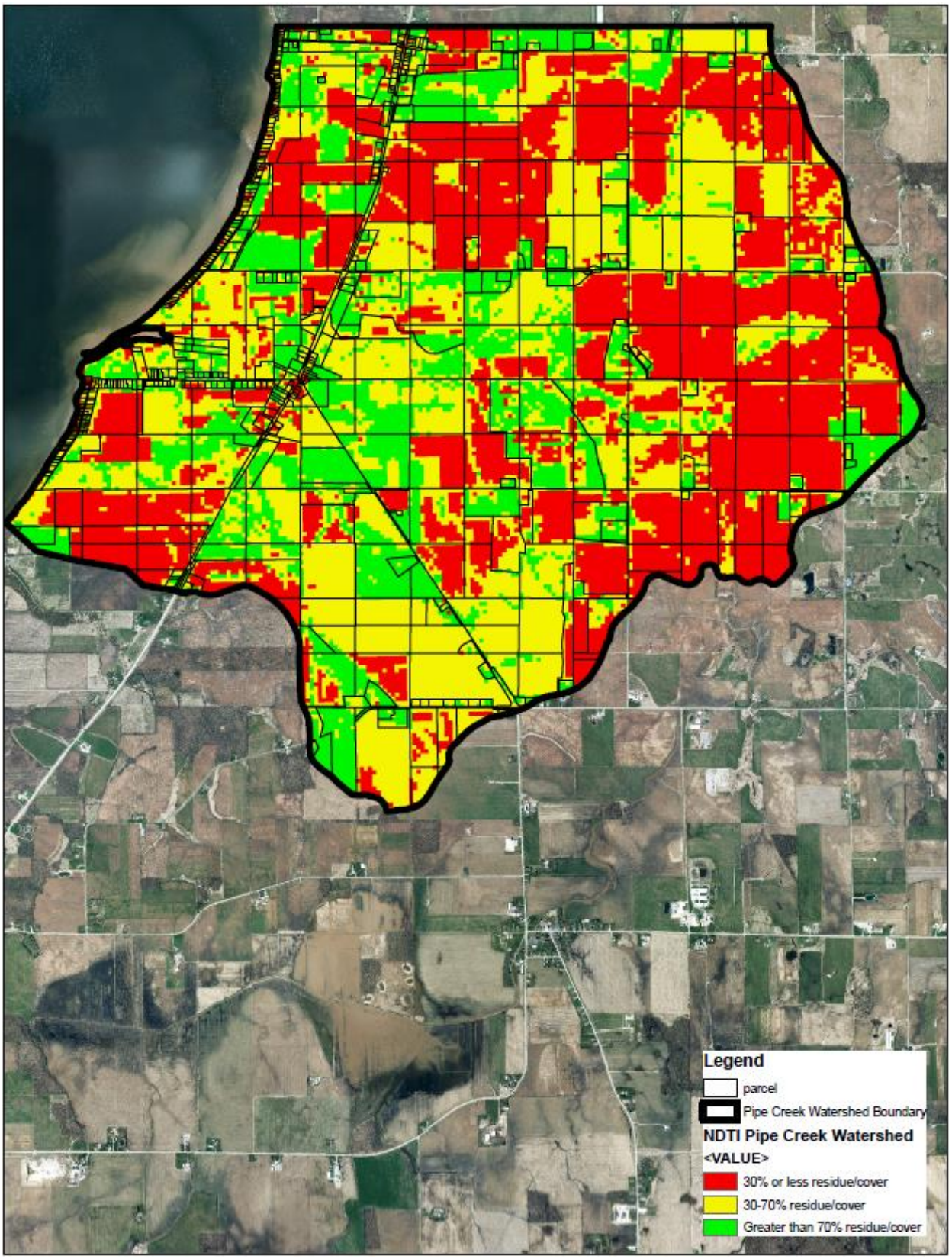
Estimates

It is difficult to accurately estimate the amount of practices that will be on the landscape in the future. However, our department does have a good idea of the practices that will be designed and cost shared within the near future based on our conversations with landowners and producers and our ongoing work with them. The landowners and farmers we are working with understand erosion is an issue and are working to fix problem areas on their own or in partnership with us. There are locations where grassed waterways, WASCOBs, and critical area stabilization will be occurring in 2019 and beyond.

There are also areas that are less severe (rills) that we are monitoring to see if structural practices are needed. Streambank stabilization is a practice the landowners are interested in looking into for their land, but it is not a practice that is very appealing to cost share at the traditional 70-30%. These types of projects are expensive, aren't always the easiest to access, and aren't as obvious a problem because they are usually hidden. In the future, we would love to do more streambank work in the watershed but we need to be able to cover the majority of the cost. The map below highlights project areas for 2019 that are in the planning stage currently.

NDTI

Satellite imagery can be used to calculate a normalized difference tillage index, which analyzes the amount of crop residue cover percentage. For the purpose of this plan and creating a crop residue cover map, we utilized 6 land sat 8 images for the months of April-June 2018 and September-November 2018. This tool can be used to track changes in crop residue levels throughout the watershed over time, specifically throughout implementation of best management practices as implementation of the watershed improvement plan continues or ramps up. This tool can also be used to identify fields that would be suited for reduced tillage and/or cover crop practices.



Milestone: Use the NDTI tool to determine crop residue levels within the watershed to help guide and/or evaluate plan implementation. This data could be shared at potential education and outreach events if desired or requested.

Technical & Financial Assistance, Sources & Authorities (Element 4)

Budget

Up to this point, we have been able to fund projects through a combination of state, county and federal funds, as well as utilization of grant monies secured from the great lakes commission. 2019 funding is slated to come from our county cost sharing program and SWRM dollars. It should be noted that starting in 2019, Fond du Lac County Land and Water Conservation Department will have access to "Multi Discharger Variance", or "MDV" funding from the City of Fond du Lac Wastewater Treatment Facility. As a variance to their permit requirements, they will pay Fond du Lac County LWCD directly to put conservation practices on the ground that reduce phosphorus loading into specific receiving waterbodies. At this point in time we do not know how much money will be received or exactly how we will be able to use it, but it is estimated that in 2019, roughly $100,000 dollars will be allocated towards conservation practices.

For projects beyond 2019, we anticipate the continuance of county and state cost sharing as well as MDV funding. After securing the MDV funds and creating a clear picture of where and how we will be able to use them, we will have a better idea of how much additional money we may need to secure to keep moving projects forward in the Pipe Creek watershed.

The creation of an approved 9 key element plan opens the door for federal 319/clean water act funding. The prospect of this funding opportunity is appealing to the Fond du Lac County Land and Water Conservation Department as another means to get conservation practices on the ground. Once a TMDL is approved, funding can be used in creative ways to solve water quality issues within watersheds. Currently, we have access to traditional federal programs and state programs, but practices that are funded through those sources need to be approved conservation practices. With state funding, more funding is targeted toward meeting minimum state requirements (NR 151 state statutes.) While this is necessary, it is not the end all to meeting lofty water quality goals. To meet goals determined by the TMDL and modeling, we must go above and beyond minimum state standards and this applies to funding and the practices we put on the landscape. Flexible and more abundant funding for cover cropping, grazing, buffers, and streambank practices are desirable in the Pipe Creek watershed and 319 funds would help greatly.

Utilizing our best estimates of conservation practice costs and amounts yet to be installed on the landscape in Pipe Creek, we anticipate needing just under $2,500,000 for project implementation, staffing, and other needs over a ten-year period, pending landowner cooperation and adequate funding options to make projects feasible to landowners and farmers. See below for a breakdown of our estimated budget.

Estimated 10 Year Plan Implementation Budget		
Best Management Practice	**Implemented Units**	**Plan BMP Cost**
Cropland Practices (Combination of reduced/no till practices, cover crops, nutrient management planning, and prescribed grazing)	3,665 acres	$600,144
Gully Stabilization (Waterways, water and sediment control basins, diversions, terraces)	20,000 feet	$255,000
Streambank Stabilization	30,000 feet	$1,444,500
Vegetative buffers	50 acres	$150,000
Soil Health Programming	1000 Acres	$650,000
Livestock Runoff/Waste Storage Practices	4	250,000
Prescribed grazing	1 system (400) acres	$15,000
BMP Sub-total		**$3,364,644**

New and Innovative Practices	**Plan Cost[1]**
Potentially funded practices could include: Tile-drainage Water Management , Prairie Filter Strips, Gypsum Soil Amendment, Phosphorus Removal Structures.	$500,000
New Practices Sub-total	**$500,000**

Staffing and Equipment	**Annual Hours**	**Plan implementation Estimate[2]**
Conservation Technician	520	$226,480
Soil conservation Technician	520	$165,596
Program Assistant	130	$30,494
Equipment		$10,000
Staffing Sub-Total		**$422,570**

Information and Education	**Events**	**Plan I & E cost**
Annual Soil Health/Demo Field Day Workshop	10	$20,000
I & E Sub-Total		**$20,000**

$4,307,214

[1] Cost of new technologies or management methods is not yet known.
[2] Annual Staffing Estimate (includes 3% annual COL and Benefit adjustment)

Table 3. Cost-Estimate for Water Quality Monitoring

Water Quality Monitoring Cost by Monitoring Milestones, Pipe Creek	Total Cost
Year 3: monitoring and assessment similar to first Targeted Watershed Assessment Report for Pipe Creek	$7,000
Year 6: monitoring and assessment similar to first Targeted Watershed Assessment Report for Pipe Creek	$7,000
Year 10: monitoring and assessment similar to first Targeted Watershed Assessment Report for Pipe Creek	$7,000
Total Cost :	$21,000

Partners, Programs, and Potential Funding Sources

Without partnership, conservation work would be a lot more difficult if not impossible. We recognize the following organizations, departments, and programs as partners and we recognize the following funding sources as ways to further our work in conservation.

United States Environmental Protection Agency (USEPA) Programs

- Great Lakes Restoration Initiative (GLRI)
    - The Great Lakes Restoration Initiative accelerates efforts to protect and restore the largest system of fresh surface water in the world – the Great Lakes.

United States Department of Agriculture (USDA) Programs

- Environmental Quality Incentives Program (EQIP).
    - Provides cost-sharing for a variety of conservation practices (see BMP definitions in appendix) to address erosion and nutrient management issues.
- Wildlife Habitat Incentives Program (WHIP).
    - Provides cost-sharing for fish and wildlife habitat improvement practices.
- Conservation Stewardship Program (CSP)
    - CSP offers incentive payments to farmers for conservation practices that they have already been doing on their land.
- Conservation Reserve Program (CRP).
    - Provides incentives to set aside land for conservation purposes.
- Conservation Reserve Enhancement Program (CREP).
    - A multi-agency effort (DATCP, FSA, NRCS, and Fond du Lac County) that provides incentives to create buffers along streams and waterways.
- Wetlands Reserve Program (WRP).
    - Provides cost-sharing to restore wetlands previously altered for agricultural use.

US Fish and Wildlife Service (USF&W) Programs

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

United States Geological Survey (USGS)

- The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life. As the Nation's largest water, earth, and biological science and civilian mapping agency, the U.S. Geological Survey (USGS) collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems.

Pheasants Forever (PF)

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

Ducks Unlimited (DU)

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

Great Lakes Commission

- The Great Lakes Commission is an interstate compact agency that promotes the orderly, integrated and comprehensive development, use and conservation of the water and related natural resources of the Great Lakes basin and St. Lawrence River. Its members include the eight Great Lakes states with associate member status for the Canadian provinces of Ontario and Québec. Each jurisdiction appoints a delegation of three to five members comprised of senior agency officials, legislators and/or appointees of the governor or premier. The Commission was established by joint legislative action of the Great Lakes states in 1955 (the Great Lakes Basin Compact) and granted congressional consent in 1968. A Declaration of Partnership established associate membership for the provinces in 1999.

Fish America Foundation

- The FishAmerica Foundation is the conservation and research foundation of the American Sportfishing Association—keeping our nation's fish and waters healthy. FishAmerica provides grants to non-profits, conservation minded groups to enhance fish populations, restore fisheries habitat, improve water quality and advance fisheries research to improve sportfishing opportunities and success.

Wisconsin Department of Natural Resources (DNR) Programs

- Targeted Resource Management Program (TRM).
    - Counties can apply for grants through this program to offer cost sharing on a variety of conservation practices to address nonpoint source runoff.
- Multi-Discharger Variance Program (MDV)
    - The multi-discharger variance (MDV) for phosphorus extends the timeline for complying with low-level phosphorus limits. In exchange, point sources commit to step-wise reductions of phosphorus within their effluent as well as helping to address

nonpoint sources of phosphorus from farm fields, cities or natural areas to implement projects designed to improve water quality. The MDV is similar to an individual variance. County participation in the MDV is completely voluntary. If counties participate, they agree to comply with the requirements of the program to the best of their ability. By participating in the MDV, counties will have access to additional financial resources for nonpoint source pollution control activities, including funds to supplement staff costs.

- Surface Water Grants
    - Offers financial assistance to help with planning and protection of surface waters.
- Lake Management Planning Grants
    - Pays for developing management plans to protect and restore lakes and their watersheds. Often, these plans turn into projects funded with Lake Protection grants. There are two categories of lake management planning grants: small-scale and large-scale.
- Lake Protection Grants
    - Lake Protection Grants assist eligible applicants with implementation of lake protection and restoration projects that protect or improve water quality, habitat or the elements of lake ecosystems.

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

- Soil and Water Resource Management (SWRM)
    - This program provides grants to counties to hire staff and to cost-share the installation of conservation practices on private land. Counties are required to have an approved Land & Water Resource Management Plan that identifies land and water resource concerns in the county. The includes an implementation strategy to address resource concerns that are identified.
- Farmland Preservation Program (FPP).
    - This program provides income tax relief to participants to protect farmland by complying with the State of Wisconsin NR151 manure management and agricultural performance standards.
- Producer-Led Watershed Protection Grants
    - Producer-Led Watershed Protection Grants are awarded by the Wisconsin Department of Agriculture, Trade and Consumer Protection. The grants will go to projects that focus on ways to prevent and reduce runoff from farm fields and that work to increase farm participation in these voluntary efforts. Each application must come from a group of at least 5 farmers in the same watershed, collaborating with conservation agencies, institutions or nonprofit organizations.

- Nutrient Management Farmer Education Grants
    - The Wisconsin Department of Agriculture, Trade and Consumer Protection provides Nutrient Management Farmer Education (NMFE) grants to local organizations to teach farmers to develop their own nutrient management plans.

Wisconsin Land + Water Conservation Association (WLWCA)

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

University of Wisconsin Cooperative Extension (UWEX)

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

Fox-Wolf Watershed Alliance (FWWA)

- Fox-Wolf Watershed Alliance is an independent nonprofit organization that identifies issues and advocates effective policies and actions that protect, restore, and sustain the water resources of the Fox-Wolf River Basin. The FWWA is the organization that is housing the coordinator position for the Winnebago Waterways program. coordinate between the lake counties to obtain grant funding and work on lake management planning.

Sand County Foundation

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

Fond du Lac County Land & Water Conservation Department

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

Fond du Lac County Code Enforcement Department

- The fond du Lac County Code Enforcement Office administers the Floodplain Zoning Ordinance, the Private Onsite Wastewater Treatment System (POWTS), the Shoreland Zoning Ordinance, Well Abandonment Ordinance, and the Non-Metallic Reclamation Ordinance.

Fond du Lac County Land Information Department

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

Fond du Lac County Parks & Planning Department

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

Fond du Lac County Health Department

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

Local Townships

- Most zoning within the county is governed by the individual townships. Working closely with local townships and officials can be a very effective way to spread information and education about conservation opportunities.

Lake Winnebago Quality Improvement Association (LWQIA)

- The Lake Winnebago Quality Improvement Association is a non-profit organization striving to improve the water quality of Lake Winnebago, for the betterment of the lake's natural habitat as well as for public recreational use. The association takes action on lake quality issues through education, communication, and social fund raising meetings for members and guests, and promotes cooperation among governmental units, interested organizations, and the public.

The NR 151 implementation strategy for the Pipe Creek Watershed

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

Implementation of NR 151 Soil and Water Conservation Standards has been ongoing in the Pipe Creek Watershed as part of Fond du Lac County's more broad NR 151 implementation strategy that utilizes multiple approaches for achieving compliance with standards. Compliance with NR 151 performance standards in the Pipe Creek Watershed is currently estimated at 80% or more. Fond du Lac County LWCD has utilized volunteer cooperation, incentive programs such as the Farmland Preservation Program Tax Credit and Soil & Water Resource Management Grant cost sharing, NR243 CAFO permits requirements, and county ordinances to achieve the current compliance levels.

Presently, Fond du Lac County requires compliance with NR151 livestock standards through the county's Chapter 14 Animal Waste and Utilization Ordinance (Manure Storage Ordinance). Fond du Lac County also implements Non-Agricultural Performance Standards through the county's Chapter 27 Construction Site Erosion Control and Post-Construction Stormwater Management Ordinance. Most of the cropland in the watershed area has a 590 nutrient management plan, so to that extent the LWCD will focus outreach efforts to individual landowners that do not have nutrient management plans for evaluation of compliance with performance standards.

NR 151 AGRICULTURAL PERFORMANCE STANDARDS

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

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

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

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

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

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

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

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

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

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

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

NR 151.075 Silurian Bedrock Performance Standards- All crop producers and livestock producers that mechanically apply manure directly or through contract or other agreement to cropland or pasture areas that meet the definition of Silurian bedrock under s. NR 151.015 (17) must apply manure and/or fertilizers according to this standard.

NR 151.08 Manure Management Prohibitions:

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

NR 151.10 NON–AGRICULTURAL PERFORMANCE STANDARDS

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

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

NR 151.13 - Developed urban area performance standard.

NR 151.14 - Non–municipal property fertilizer performance standard.

NR 151.20 TRANSPORTATION FACILITY PERFORMANCE STANDARDS

NR 151.23 - Construction site performance standard

NR 151.24 - Post–construction performance standard

NR 151.25 - Developed urban area performance

NR 151 COMPLIANCE REVIEW & NOTIFICATION PROCESS

Record Reviews

A records inventory shall be used initially to determine current compliance to the performance standards. Existing conservation plan information developed for FPP, LWRM & Watershed participant

files as well as data gathered for barnyard, manure storage, and streambank inventories shall be used as a starting point.

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

Initial Notification

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

On Site Evaluations

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

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

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

Compliant Sites

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

Non-Compliant Sites

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

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

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

Appeal of Compliance Determinations

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

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

requirement, decision or determination appealed, in whole or in part; or deny the appeal for lack of justification.

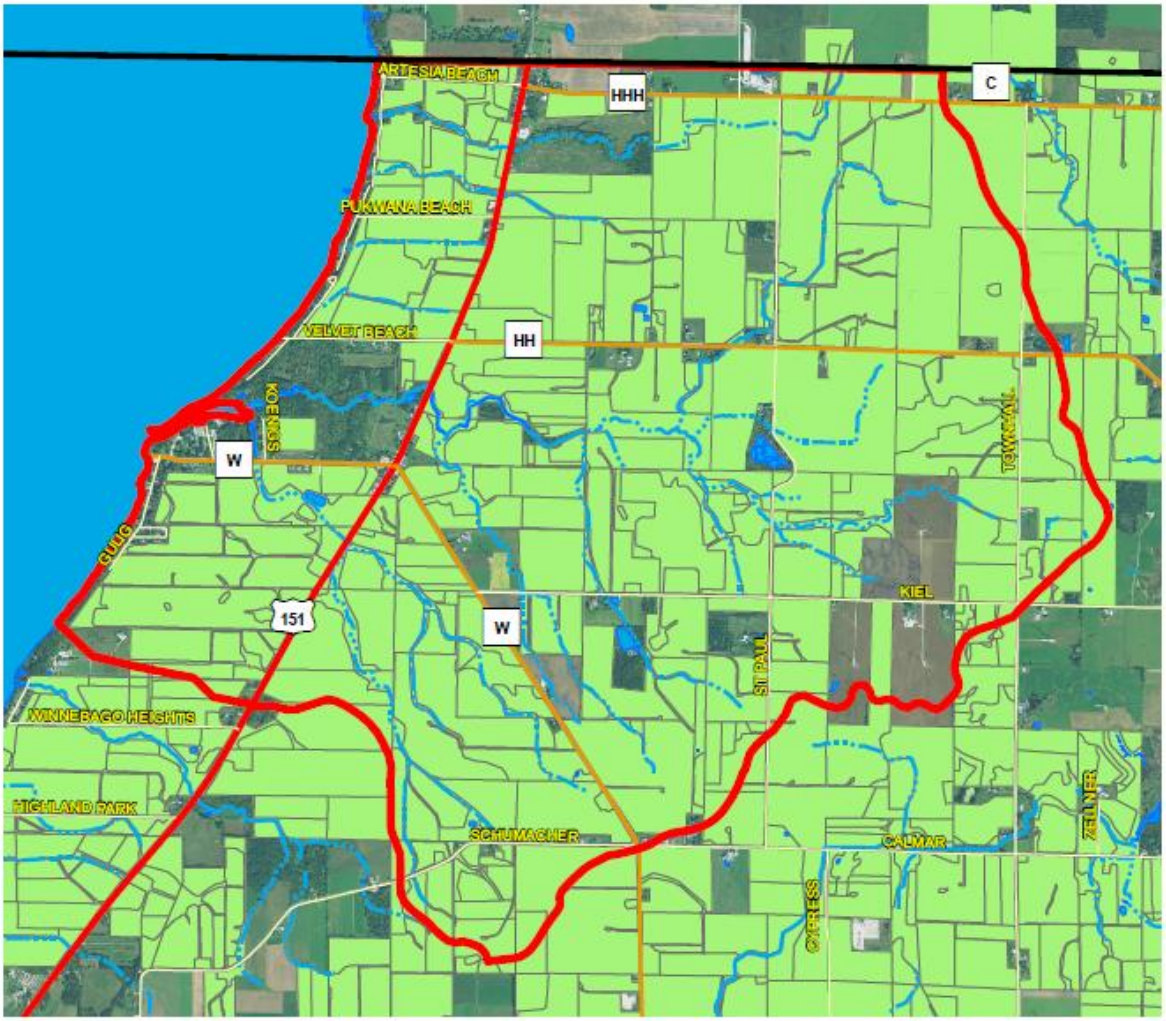
Enforcement of State Performance Standards

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

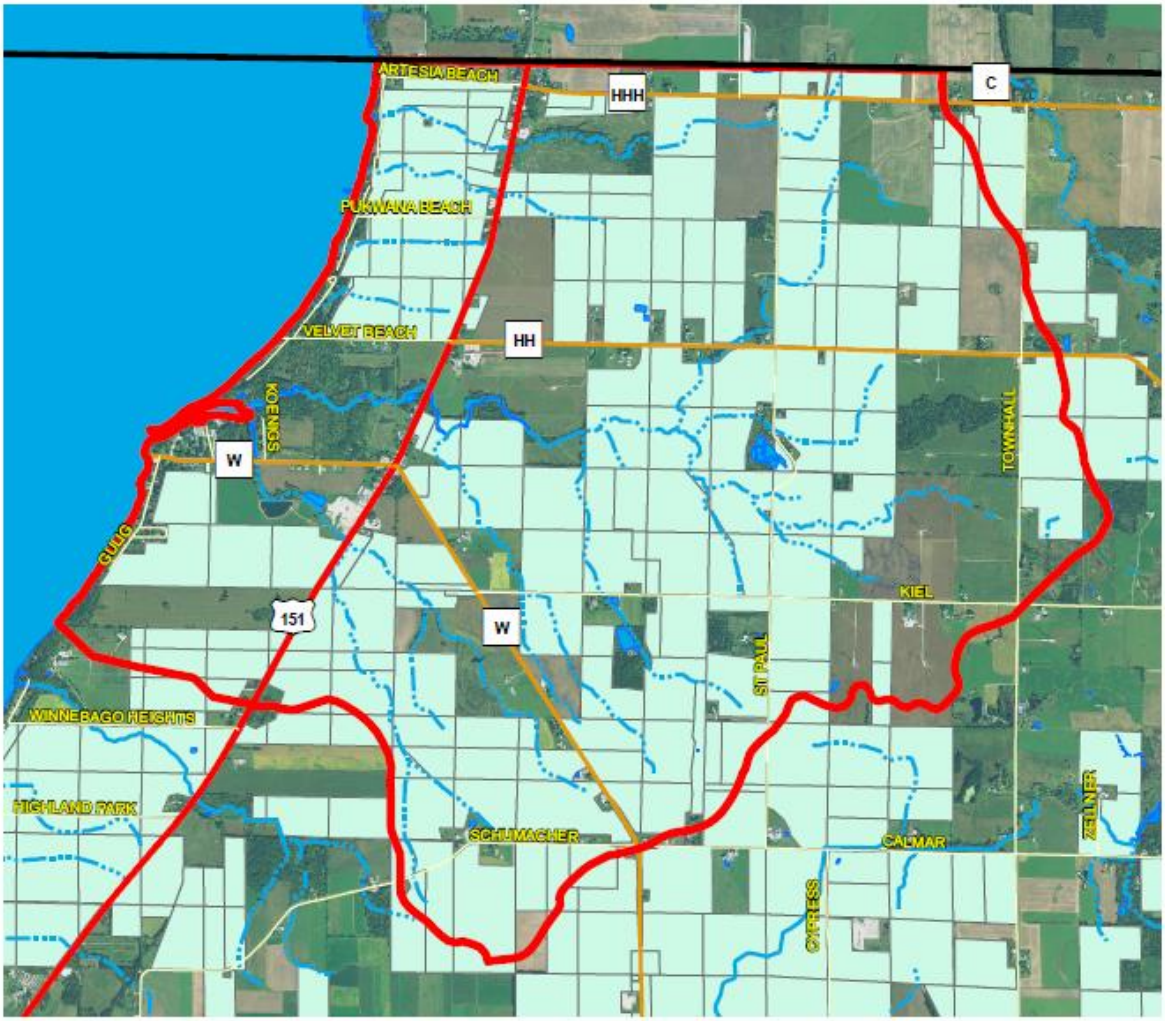
(1) Has cost sharing & technical assistance been offered?
(2) Will the landowner agree to an implementation schedule?
(3) Has a cost share agreement been signed with no installation of BMP's within the installation period?
(4) Are there extenuating circumstances that prohibit the landowner from complying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

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

Pipe Creek Watershed
Nutrient Management Plans
Fond du Lac County, WI



Pipe Creek Watershed
Farmland Preservation Program
Fond du Lac County, WI



Information and Education (Element 5)

In the Pipe Creek watershed, our department has active working relationships with many of the landowners and farmers. We also serve as a contact and resource for many of the residential and lakeshore homeowners in the watershed. Because of this, we are in a constantly evolving information and education component on the individual level with many different people who work, live, and own land in the watershed. Moving forward, we would like to implement a more strategic and comprehensive information and education plan to help expedite water quality improvements within the Pipe Creek Watershed. Ideally, we will use this plan as a template to improve upon as we move forward with implementation in other watersheds in Fond du Lac County.

So far, the most important thing we've done in the watershed is forming relationships with producers and landowners. We've shown up and have made ourselves available as a resource to the farmers and landowners. This is shown through the initial participation of many people in the watershed with our program, and more importantly the participation and conservation practice adoption that is continuing through today.

We wish to continue building upon this growing momentum by providing supporting information and education as a component to our presence in the watershed. *Future goals for information and education in this watershed are as follows*:

1. Listening to our audience before we attempt to inform and/or educate. It is important that we as educators and informers remember that we have just as much to be educated and informed on, about the intricacies of rural life, farming techniques, and local watershed history prior to attempts to educate. If the audience respects the teacher and has the capacity for hearing the message the teacher is trying to convey, then it is more likely the audience will be open and receptive to information and education. Otherwise, no matter how good the information or education, it may not be well received.
2. Second, incorporating critical thinking lessons into information and education, but doing so with finesse. It is not our wish to bombard or overwhelm people with ideas that are uncomfortable, but ideally we will make attempts to incorporate critical thinking into our teaching opportunities in a way that the audience is receptive to.
3. Create specific calls to action that are concrete and doable. Spark the innate desire of many individuals to learn how to do something and produce results independently.

4. Serve as catalysts and connectors. If we don't have the answers, but people are asking the questions, connect them to the information they are seeking.
5. Move away from information and education that focuses on rules, regulations, minimums, and states standards and move toward open-ended conversations about ways to move forward and topics that interest people and hold their attention. We know that often discussions about uninspiring topics are not the catalyst to invoke change or spur action toward a common goal. Appeal to people, and capture attention.

Because this watershed has farmers and landowners, as well as lakeshore homeowners and residential landowners, our information and education strategy should not be one size fits all. We need to provide appropriate information and education to each audience, respectively. *Our targeted audiences and messages for each audience are as follows:*

- Farmers:
    - Increase public awareness for all of the positive things you (individually) and you (collectively) have done and continue to do for the environment.
    - Connect with leaders in your field about what they are doing, how it's working, and how it can be emulated on other farms
    - Information on what is currently available in terms of programs/opportunities but more importantly where they are lacking and what can be done to craft innovative programs and opportunities that would be useful to farmers.
    - Messaging geared toward showing farmers profitable and doable conservation; fully integrated/embedded farm-specific conservation
    - Opening up our department to opinions and suggestions about how we can do our job more effectively. What conservation practices farmers like and want to do and how we can make those align with our goals as an agency
- Agricultural landowners who are not farmers:
    - You can and should have a say in how your land is run
        - Conservation-minded tenants
        - Conservation-minded contracts/rental agreements
    - Education about your watershed and conservation opportunities
    - How can you play a role, and what role do you want to play?
    - Messaging focusing on specific calls to action
    - As an owner of the land, you are responsible for the stewardship and care of your land

- Lakeshore homeowners/general public:
    - Messaging focusing on calls to action
    - This is what our agency has done, is doing, wants to do. This is what we know the farmers in your watershed have done and are doing. Do you see gaps? What can we be doing differently?
    - What can you do, however small, to make a difference? Flip the switch from dwelling about problems that others are creating to finding solutions that you/they can contribute

How to deliver these messages? *Package the message for various audiences & distribution*:

- farmers
    - One-on-one contacts
    - Farmer led group formation meetings
    - Group meetings/updates with watershed producers
    - Workshops, field days
    - Simple how to/DIY for conservation practices
    - Recipe for cover crop success/implementation
    - Demo farms
    - Signs indicating conservation practices/soil health practices
    - Hold meeting or workshop designed for farmers to give input to our department of what we can do better or differently
- General Public
    - Transparency via information posted on county website
    - Public meetings focusing on discussion of plan and progress
    - How to/DIY for ways to get involved and make an impact on their property
- Landowners of Agricultural land; non-farmer
    - Create educational materials geared toward the non-farmer agricultural landowner
    - One-on-one contacts
    - Educational field days geared toward landowners and their options for participation in conservation programs
    - Farmland Preservation Program with specific attention on catering to the non-farmer landowner and things they can do on their land- walking their land to identify problem

areas/conservation solutions with them, explanations of cost share opportunities, and how to include conservation practices and their permanency into rental agreements.

Evaluation of the information and education program:

We believe the evaluation of an information and education program can be fairly simple. If the answer to the following questions are "yes", then our department is doing something right and should continue to follow that path. If the answer to any of the following questions is "no", then we need to re-evaluate and assess whether our current program is in need of a new model:

1. Do we have steady or increased participation in conservation programs and practice implementation?
2. Do we have steady or increased participation in informational sessions or educational opportunities?
3. Is there steady or increased public involvement in watershed stewardship?
4. Are members of our target audience seeking us out for informational and educational needs?

Table 1. 9-Key Element Plan: Information & Education Implementation Activities

Activity	Timeline (in years)			Cost	Implementation
	0-3	4-7	8-10		
Issue a post-project survey to measure project success			75 surveys	TBD	LWCD
Project kick-off meeting to introduce project	1 meeting			TBD	LWCD, DNR
Create and distribute different fact sheets/handouts/educational materials for farmers, landowners, and residential/shoreline homeowners in watershed	Created on an as identified/as needed basis	Created on an as identified/as needed basis	Created on an as identified/as needed basis	TBD	LWCD, potentially FWWA
Biennial "Progress to Date" meeting	1 meeting	2 meetings	2 meetings	TBD	LWCD, DNR
Project wrap up meeting			1 meeting	TBD	LWCD, DNR
Plan and/or partner to hold Field Days for soil health with farmers in this watershed	1 field day	1 field day	1 field day	TBD	Potentially LWCD, NRCS, FWWA
Conduct one-on-one meetings to educate about or encourage soil and water conservation practices (could be with farmers, landowners, or residential/shoreline)	20 meetings	20 meetings	20 meetings	TBD	LWCD

Goals, Timeline, and Monitoring (Elements 6-9)

Goals and Timeline

This document outlines a 10-year plan for implementation of water quality goals in the Pipe Creek Watershed. We'll break our 10-year plan into 3, 6 and 10-year milestones, with practice implementation and percent reductions achieved from those practices serving as our goals. Figure 3 breaks down these numbers according to our timeline in more detail. Our 10-year reduction goal for the watershed is 32% reduction in the amount of P, and 52% reduction in sediment reaching Pipe Creek and eventually Lake Winnebago.

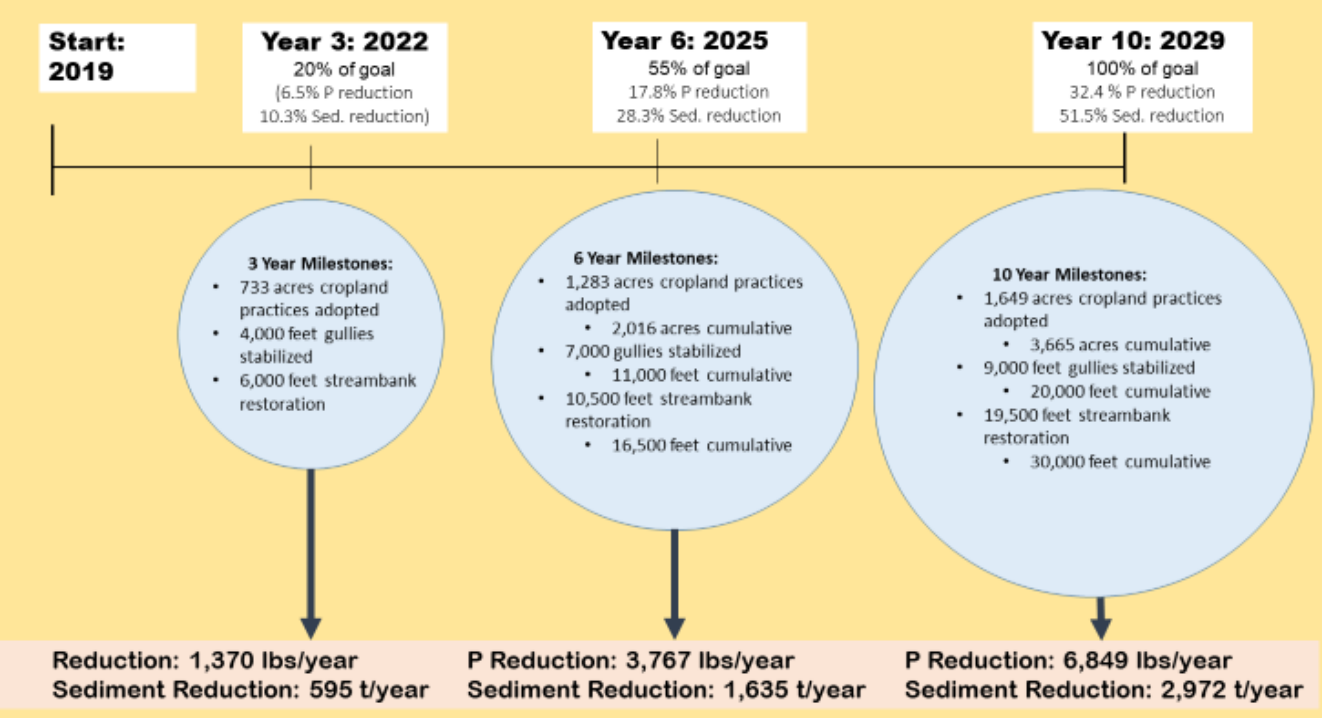


Figure 3. Ten-year timeline of implementation goals for the Pipe Creek Watershed Plan.

We propose a step-wise implementation program. By year three, we aim to achieve roughly a 6.5% reduction (20% of our 10-year goal) in P and 10% reduction in sediment loading in the watershed, equating to reductions of 1,370 lbs. P and 595 tons sediment reaching Pipe Creek per year. By year six, we're planning to have reached 55% of our goal, or approximately 18% less P and 28% less sediment loading to the watershed. That leaves 45% of our goal to be reached between years six and 10 of the project.

Conservation Progress Reports

We will track our progress through detailed reports of practices and structures that are adopted and implemented throughout the watershed. Reports will include the project area location, the practices

implemented, reductions achieved from implementation, and cost-share assistance received to execute the project. These reports will be shared with the DNR on an annual basis.

In addition, as grants are secured we anticipate needing to track, measure progress, and report certain criteria as required by those funding sources. Any submittals and requirements from grants or funding sources will be shared with WI DNR as a way to measure progress during implementation of the 9 key element plan. Appendix 3 shows a plethora of different reports taken from another 9 key element plan and shared with us by the WI DNR during this plan's review process. As requested, needed, or required, we may utilize those pre-made reports for tracking progress and disseminating information with parties' requesting information.

Monitoring

In addition to the annual conservation progress reports, which will track our implementation throughout the watershed, we will also partner with DNR to conduct water quality monitoring. DNR biologist Dave Bolha conducted the aforementioned Targeted Watershed Assessment in Chapter 1 in the Pipe Creek Watershed, which provided a baseline for parameters including: Total Phosphorus, Total Suspended Solids, qualitative habitat, fish, and aquatic macroinvertebrate information. We will work with DNR to conduct a similar assessment at our three, six, and 10 year goals. Collecting water quality data will provide better context to the efficacy of conservation practices implemented throughout the watershed. We have received commitment from our local water quality biologist with the DNR to the following items over the next 10 years:

**This information reflects what WQ monitoring actions WDNR staff can commit to for the plans ten-year schedule:*

- *Chemistry monitoring (TP and TSS) at 3,6, and 10-year milestones ($4000/year).*
- *Duplicating the 2017 targeted watershed assessment (fish, bugs, habitat) once during years 5-10 of plan ($7,000). The specific year for completing the TWA will be determined, after consultation with WDNR staff and evaluating how many plan milestones related to soil conservation practices have been implemented in the watershed.*

**From WI DNR & 9 key element plan review*

The water quality monitoring and milestones table for TP (below), shows the current TP values for each monitored stream reach (see figures 1 & 2 below for locations of sampling and legend), the target value for stream health set by the EPA of 0.075, and the milestones set for each reach based on the percentage P reduction we modelled over the 10-year period of practice implementation. It is unclear how load reduction models truly correlate to actual levels of phosphorus detected in streams through monitoring, so it should be noted that these milestones are set based on our projected reductions through a model and may or may not correlate to real life in stream reductions. Practice implementation through the 10-year period at the level we modelled is heavily dependent on increased and prolonged, sustainable funding sources and adequate staff to implement these practices.

Table 1. Water Quality Monitoring Indicators & Interim Milestones, TP

Monitoring recommendations	Indicators	Current Value Median	Target Value	Interim Milestones		
				Short Term (3 yrs.)	Medium Term (7 yrs.)	Long Term (10 yrs.)
Unnamed Trib to Pipe Creek US County HH Station ID: 10047730	2016-2018 Median TP (mg/L)	0.3408	0.075	0.26	0.18	0.11
Pipe Creek- Pipe Creek 30 feet above HWY 151 Bridge Station ID: 10016803	2016-2018 Median TP (mg/L)	0.3673	0.075	0.28	0.20	0.12
Unnamed Trib to Pipe Creek US Hwy 151 (north/east site) Station ID: 10047731	2016-2018 Median TP (mg/L)	0.1384	0.075	0.10	0.07	0.04
Unnamed Trib to Pipe Creek US HWY 151 (south/west site) Station ID: 10047729	2016-2018 Median TP (mg/L)	0.1645	0.075	0.12	0.09	0.05
Unnamed Trib to Pipe Creek US County W Station ID: 10047728	2016-2018 Median TP (mg/L)	0.1078	0.075	0.08	0.06	0.03
Unnamed Trib to Lake Winnebago US Artesia Beach Road (north site) Station ID: 10047732	2016-2018 Median TP (mg/L)	0.3781	0.075	0.29	0.21	0.12

Table 2. Water Quality Monitoring Indicators & Interim Milestones, TSS

Monitoring recommendations	Indicators	Current Value Median	Target Value	Interim Milestones		
				Short Term (3 yrs.)	Medium Term (7 yrs.)	Long Term (10 yrs.)
Unnamed Trib to Pipe Creek US County HH Station ID: 10047730	2018 Median TSS (mg/L)	31	TBD	TBD	TBD	TBD
Pipe Creek- Pipe Creek 30 feet above HWY 151 Bridge Station ID: 10016803	2018 Median TSS (mg/L)	16.6	TBD	TBD	TBD	TBD
Unnamed Trib to Pipe Creek US Hwy 151 (north/east site) Station ID: 10047731	2018 Median TSS (mg/L)	26.6	TBD	TBD	TBD	TBD
Unnamed Trib to Pipe Creek US HWY 151 (south/west site) Station ID: 10047729	2018 Median TSS (mg/L)	11.2	TBD	TBD	TBD	TBD
Unnamed Trib to Pipe Creek US County W Station ID: 10047728	2018 Median TSS (mg/L)	10.1	TBD	TBD	TBD	TBD
Unnamed Trib to Lake Winnebago US Artesia Beach Road (north site) Station ID: 10047732	2018 Median TSS (mg/L)	6.74	TBD	TBD	TBD	TBD

Figure 1: Sampling location map

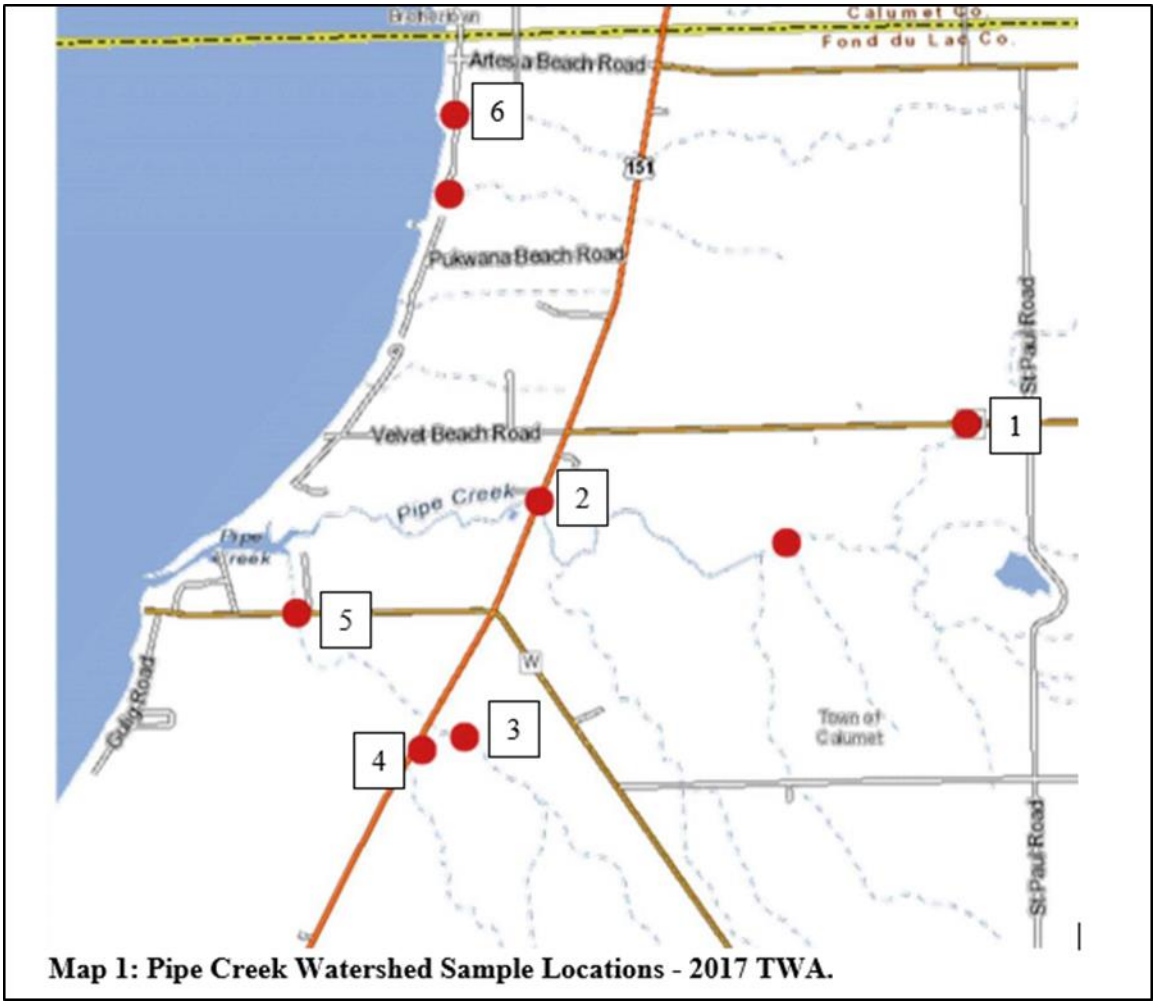


Figure 2: legend

Station Number	SWIMS Station ID	Site Name	Surface Water WBIC
1	10047730	Unnamed Trib to Pipe Creek US County HH	5025714
2	10016803	Pipe Creek- Pipe Creek 30 Feet Above Hwy 151 bridge	132800
3	10047731	Unnamed Trib to Pipe Creek US Hwy 151 (north/east site)	5026041
4	10047729	Unnamed Trib to Pipe Creek US Hwy 151 (south/west site)	3000189
5	10047728	Unnamed Trib to Pipe Creek US County W	3000189
6	10047732	Unnamed Trib to Lake Winnebago US Artesia Beach Rd (north site)	5025580

Water Quality Monitoring Evaluation

Once practices are implemented and follow up monitoring occurs, it is important to evaluate what other changes in the watershed have gone on other than implementation of best management practices in order to accurately evaluate water quality monitoring results. If phosphorus and/or sediment amounts in the watershed do not decrease with increased implementation of practices, it could be that other changes have occurred simulteaneosuly to mask those improvements. We are including the progress evaluation chart provided to us by WI DNR as a tool that could be used after implementation and follow up monitoring if needed or requested. The items in bold on the evaluation (Items 1-3, 6-9) are items our department could provide during the evaluation given adequate funding and staff resources. The other items will need to be provided by WI DNR or other parties.

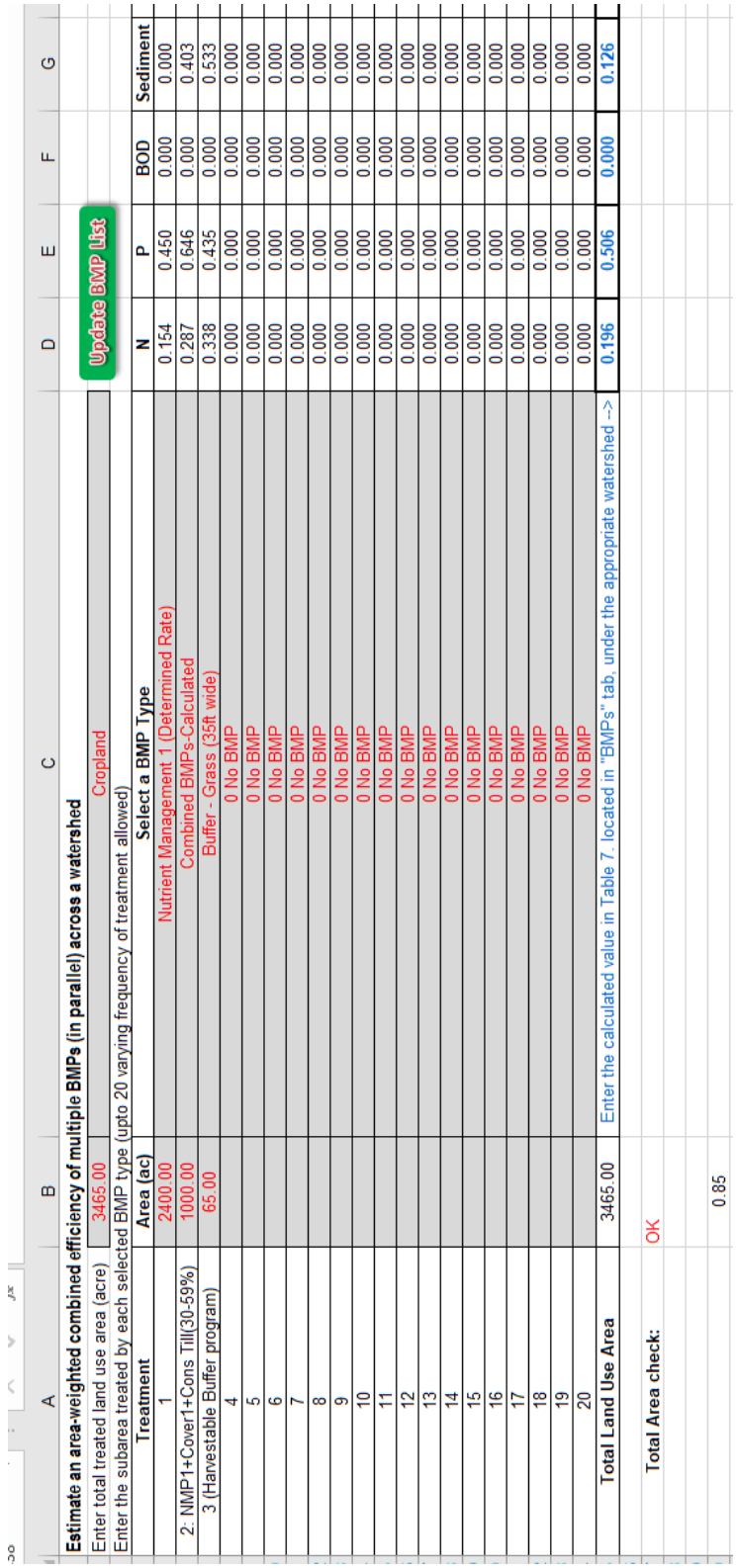
Criteria for evaluation when both water quality/aquatic habitat monitoring and practice implementation are complete:

1. **Changes in land-use or crop rotations within the same watershed where practices are implemented.**
    a. **Increase in cattle numbers, corn silage acres, and/or urban areas can negatively impact stream quality and water quality efforts**
2. **Location in watershed where land-use changes or crop rotations occur.**
    a. **Where are these changes occurring in relation to implemented practices?**
3. **Watershed size, location where practices are implemented and location of monitoring sites.**
4. Climate, precipitation and soil conditions that occurred before and during monitoring periods.
    a. Climate and weather patterns can significantly affect growing season, soil conditions, and water quality.
5. Frequency and timing of monitoring.
6. **Percent of watershed area (acres) or facilities (number) meeting NR151 performance standards and prohibitions.**
7. **Percent of watershed area (acres) or facilities (number) that maintain implemented practices over time.**
8. **Extent of gully erosion on crop fields within watershed over time.**
    a. **How many are maintained in perennial vegetation versus plowed under each year?**
9. **Stability of bank sediments and how much this sediment may be contributing P and TSS to the stream.**
10. How “Legacy’ sediments already within the stream and watershed may be contributing P and sediment loads to stream?
11. Presence and extent of drain tiles in watershed area in relation to monitoring locations.
    a. Do these drainage systems contribute significant P and sediment loads to receiving streams?
12. Does monitored stream meet IBI and habitat criteria, but does not meet TMDL water quality criteria?
13. Are targets reasonable?
    a. Load reductions predicted by models could be overly optimistic.

Appendix I: STEPL Model Justifications

Baseline Conditions

At the time of this plan being written, there are already conservation practices being employed across the landscape in the Pipe Creek Watershed. Nearly 85% of the cropland fields, or 3400 acres in the watershed are accounted for in existing nutrient management plans. Of the 3,400 acres covered by nutrient management plans, 1,000 acres are being managed using cover crops and reduced tillage (Figure 1). Tillage practices are still causing considerable disturbance, thefore the lower residue conservation tillage (30-59% residue cover) practice efficiency was used in the model. Similarly, cover crops that are being planted at this time are getting established late in the fall and are not being managed using more long-term coverage, low disturbance approaches (i.e. planting green or using early seeding technology), therefore Cover Crop 1 efficiency values were used (Figure 2). Also included in the baseline model are 65 acres of grass buffers that were implemented via the county harvestable buffer program.



Estimate an area-weighted combined efficiency of multiple BMPs (in parallel) across a watershed

Update BMP List

Enter total treated land use area (acre) 3465.00 Cropland

Enter the subarea treated by each selected BMP type (upto 20 varying frequency of treatment allowed)

Treatment	Area (ac)	Select a BMP Type	N	P	BOD	Sediment
1	2400.00	Nutrient Management 1 (Determined Rate)	0.154	0.450	0.000	0.000
2: NMP1+Cover1+Cons Till(30-59%)	1000.00	Combined BMPs-Calculated	0.287	0.646	0.000	0.403
3 (Harvestable Buffer program)	65.00	Buffer - Grass (35ft wide)	0.338	0.435	0.000	0.533
4		0 No BMP	0.000	0.000	0.000	0.000
5		0 No BMP	0.000	0.000	0.000	0.000
6		0 No BMP	0.000	0.000	0.000	0.000
7		0 No BMP	0.000	0.000	0.000	0.000
8		0 No BMP	0.000	0.000	0.000	0.000
9		0 No BMP	0.000	0.000	0.000	0.000
10		0 No BMP	0.000	0.000	0.000	0.000
11		0 No BMP	0.000	0.000	0.000	0.000
12		0 No BMP	0.000	0.000	0.000	0.000
13		0 No BMP	0.000	0.000	0.000	0.000
14		0 No BMP	0.000	0.000	0.000	0.000
15		0 No BMP	0.000	0.000	0.000	0.000
16		0 No BMP	0.000	0.000	0.000	0.000
17		0 No BMP	0.000	0.000	0.000	0.000
18		0 No BMP	0.000	0.000	0.000	0.000
19		0 No BMP	0.000	0.000	0.000	0.000
20		0 No BMP	0.000	0.000	0.000	0.000
Total Land Use Area	3465.00	Enter the calculated value in Table 7 located in "BMPs" tab, under the appropriate watershed -->	0.196	0.506	0.000	0.126

Total Area check: OK

0.85

Figure 1. Combined BMP Efficiency screen in STEPL model illustrating baseline condition inputs.

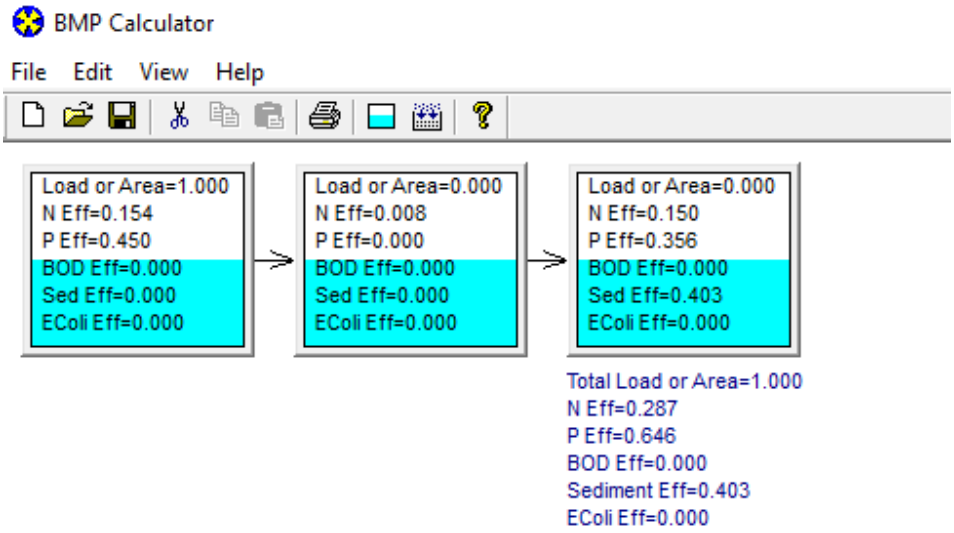
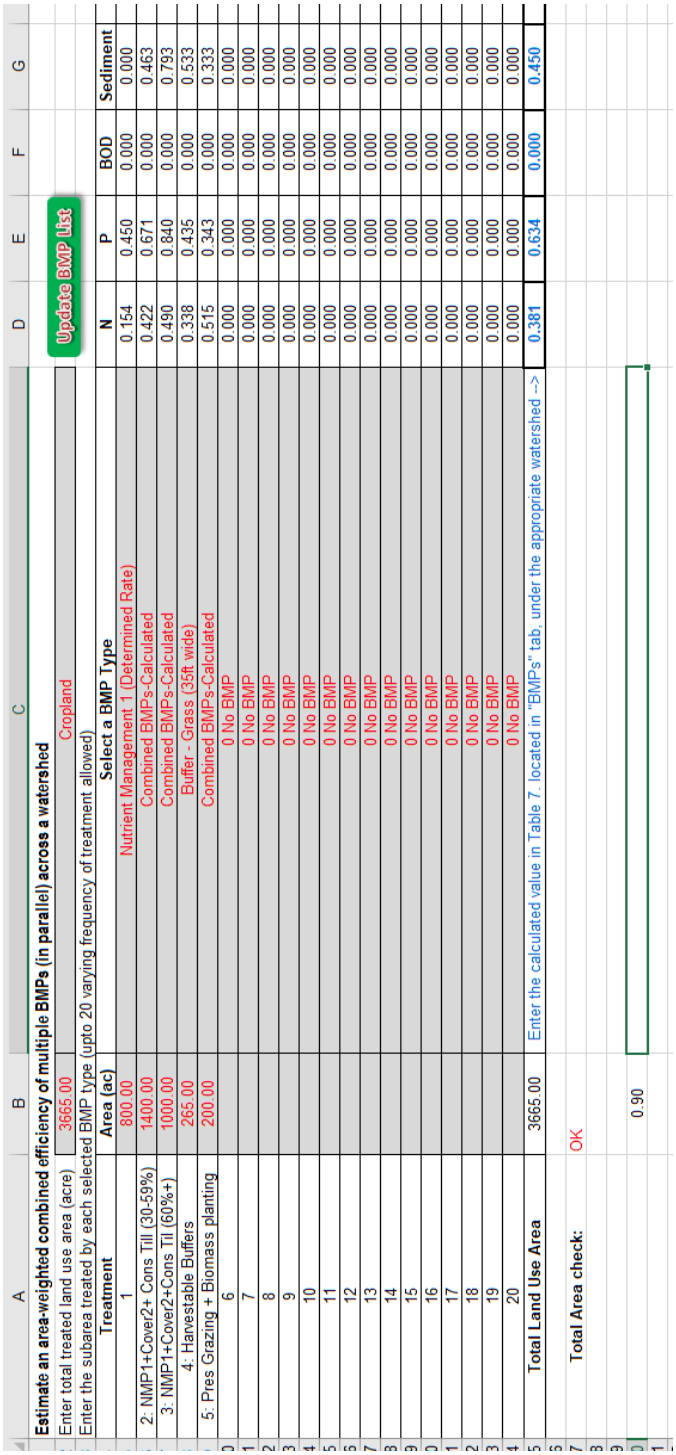


Figure 2. BMP calculator screen for Practice NMP1 + Cover1 + Cons. Tillage (30-59% residue)

Cropping Practices to be Adopted

Due to the high percentage of NR 151 implementation on the cropland in this watershed, we are only increasing the total number of acres expected for BMP implementation by 200 acres. We aim to get 200 more new acres enrolled in nutrient management plans as part of NR 151 implementation. Of the 3400 acres already under NMPs, we plan for implementation of more conservation cropping practices, mainly cover crops and reduced/no till. Expanding the harvestable buffer program and converting 200 acres of cropland to management-intensive rotational grazing will also contribute to reduction goals for this plan.



Estimate an area-weighted combined efficiency of multiple BMPs (in parallel) across a watershed

Enter total treated land use area (acre) 3665.00 Cropland Update BMP List

Enter the subarea treated by each selected BMP type (upto 20 varying frequency of treatment allowed)

Treatment	Area (ac)	Select a BMP Type	N	P	BOD	Sediment
1	800.00	Nutrient Management 1 (Determined Rate)	0.154	0.450	0.000	0.000
2: NMP1+Cover2+ Cons Till (30-59%)	1400.00	Combined BMPs-Calculated	0.422	0.671	0.000	0.463
3: NMP1+Cover2+Cons Til (60%+)	1000.00	Combined BMPs-Calculated	0.490	0.840	0.000	0.793
4: Harvestable Buffers	265.00	Buffer - Grass (35ft wide)	0.338	0.435	0.000	0.533
5: Pres Grazing + Biomass planting	200.00	Combined BMPs-Calculated	0.515	0.343	0.000	0.333
6		0 No BMP	0.000	0.000	0.000	0.000
7		0 No BMP	0.000	0.000	0.000	0.000
8		0 No BMP	0.000	0.000	0.000	0.000
9		0 No BMP	0.000	0.000	0.000	0.000
10		0 No BMP	0.000	0.000	0.000	0.000
11		0 No BMP	0.000	0.000	0.000	0.000
12		0 No BMP	0.000	0.000	0.000	0.000
13		0 No BMP	0.000	0.000	0.000	0.000
14		0 No BMP	0.000	0.000	0.000	0.000
15		0 No BMP	0.000	0.000	0.000	0.000
16		0 No BMP	0.000	0.000	0.000	0.000
17		0 No BMP	0.000	0.000	0.000	0.000
18		0 No BMP	0.000	0.000	0.000	0.000
19		0 No BMP	0.000	0.000	0.000	0.000
20		0 No BMP	0.000	0.000	0.000	0.000
Total Land Use Area	3665.00	Enter the calculated value in Table 7, located in "BMPs" tab, under the appropriate watershed -->	0.381	0.634	0.000	0.450

Total Area check: OK

0.90

Figure 3. Combined BMP Efficiency screen in STEPL model illlustrating cropland practices to be implemented.

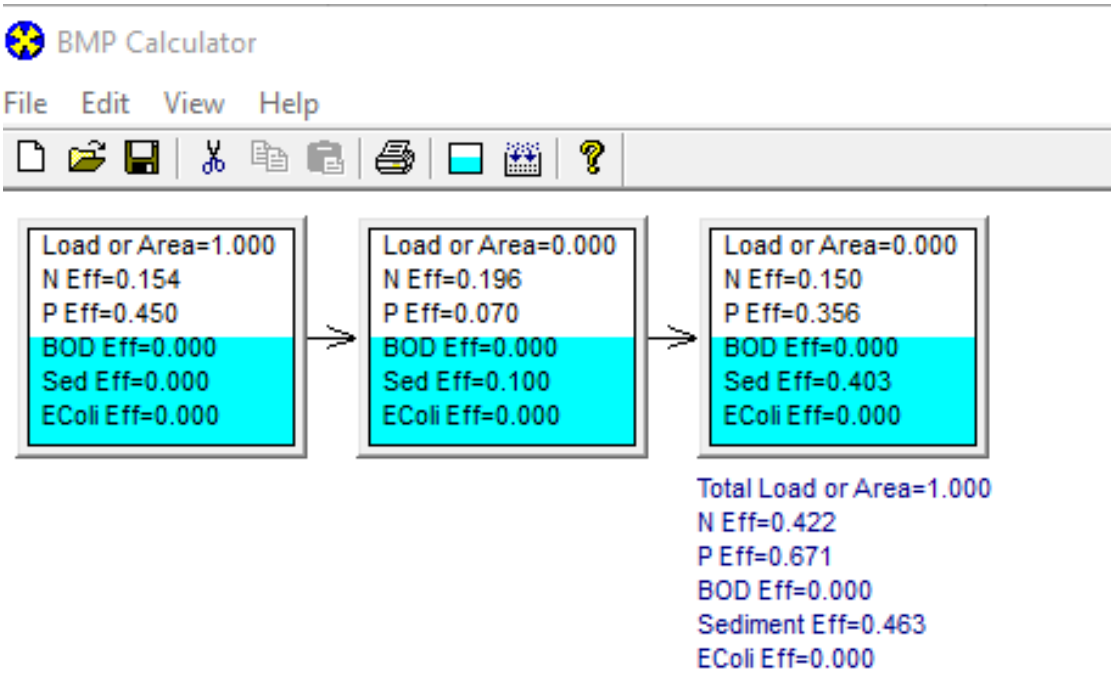


Figure 4. BMP calculator screen for Practice NMP1 + Cover2 + Cons. Tillage (30-59% residue).

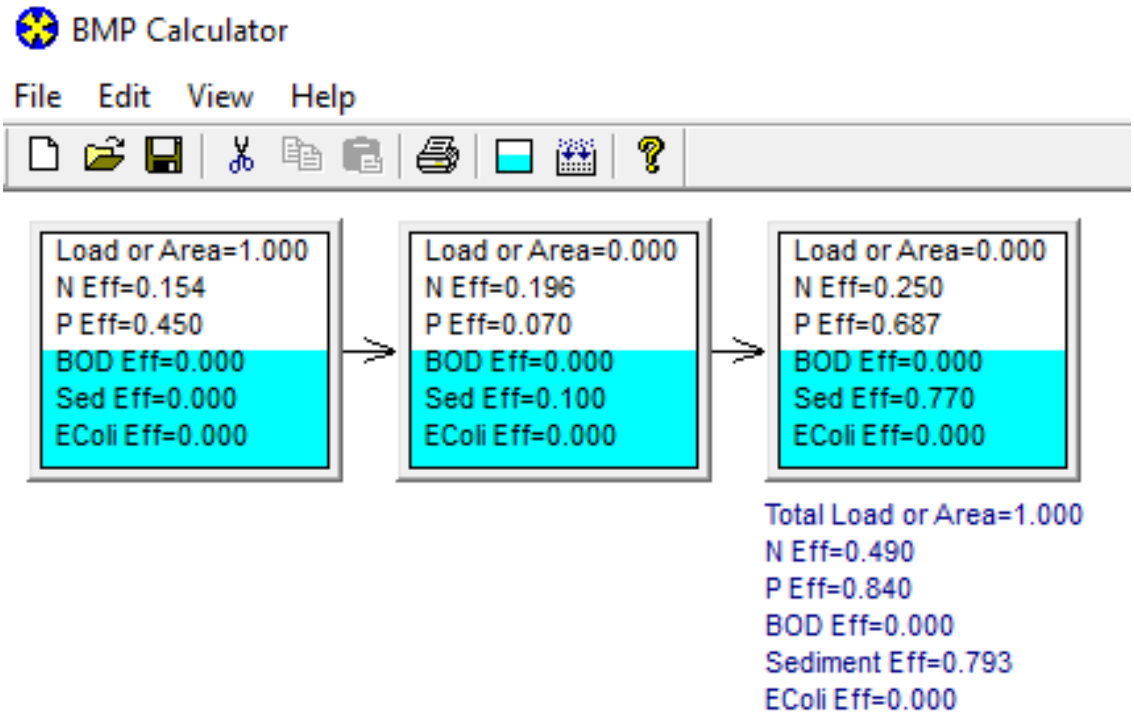


Figure 5. BMP calculator screen for Practice NMP1 + Cover2 + Cons. Tillage (60%+ residue).

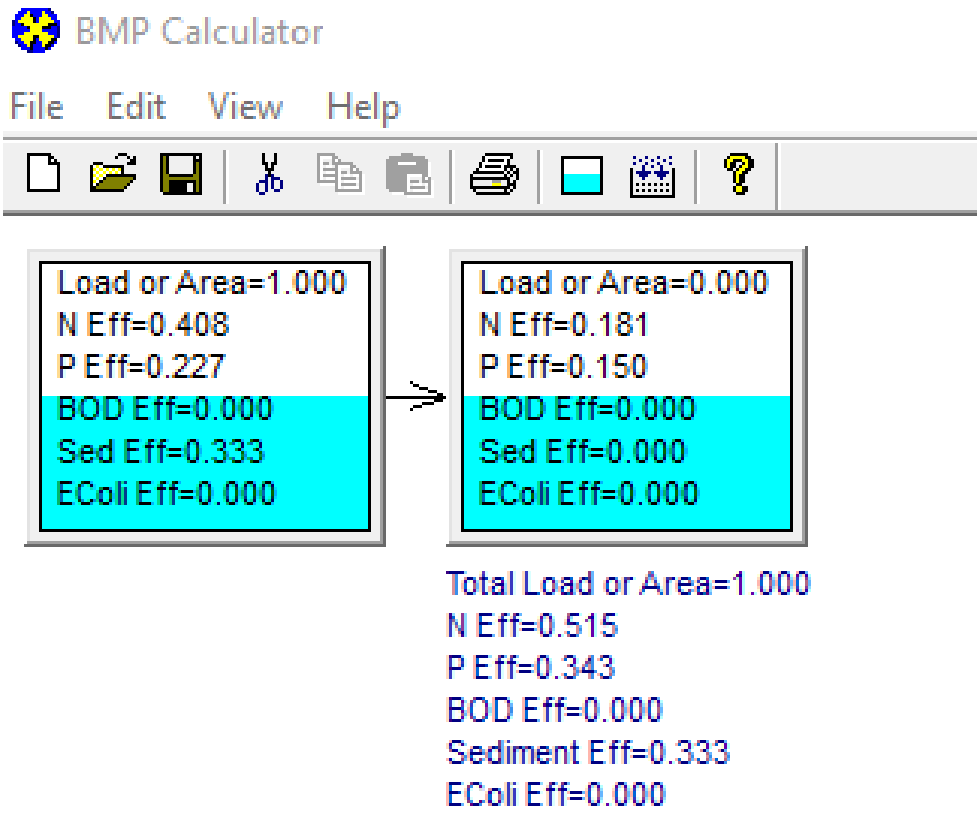
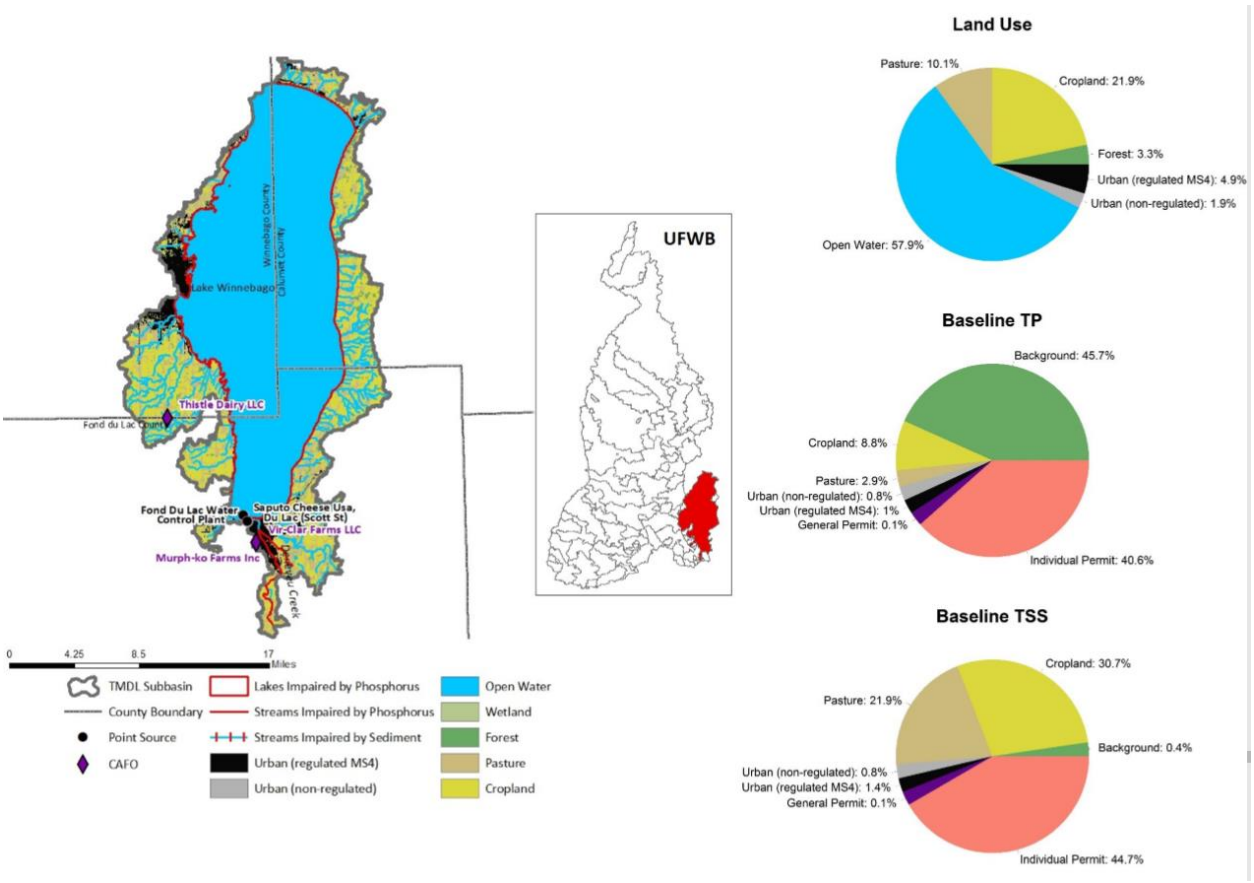


Figure 6. BMP calculator screen for Practice Prescribed Grazing and Biomass Planting.

Appendix 2: DRAFT UFW TMDL Information

TMDL Subbasin 75 – Lake Winnebago



UFW TMDL DRAFT Report - Appendix G – Baseline TP and TSS Loads

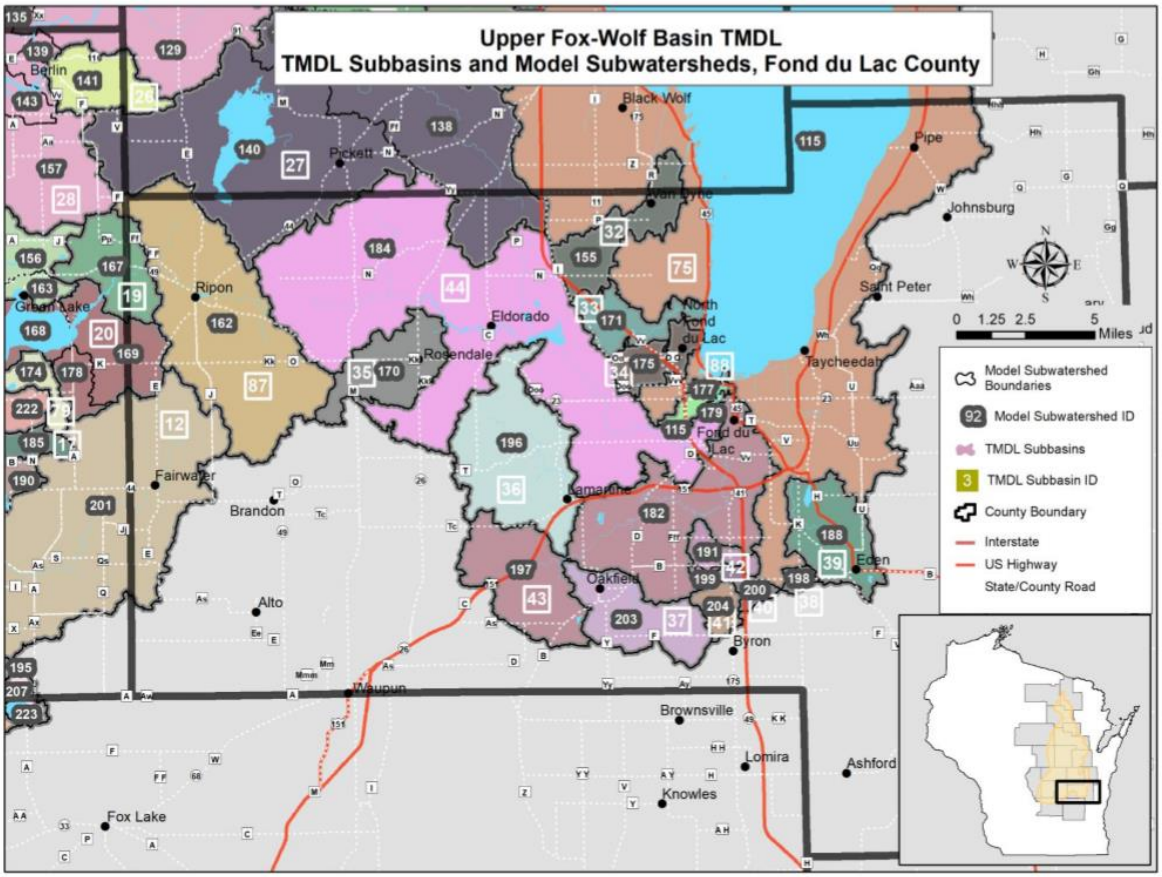
Table 1. Baseline total phosphorus loads (TP, in pounds per year) by source category for each TMDL subbasin. Loads for TMDL subbasins 55, 56, 58, 59, 80, and 81 (marked with an asterisk, *) do not include TP loads from point and nonpoint sources on tribal lands in each subbasin. Baseline TP loads for sources on tribal lands are reported separately in Table 2.

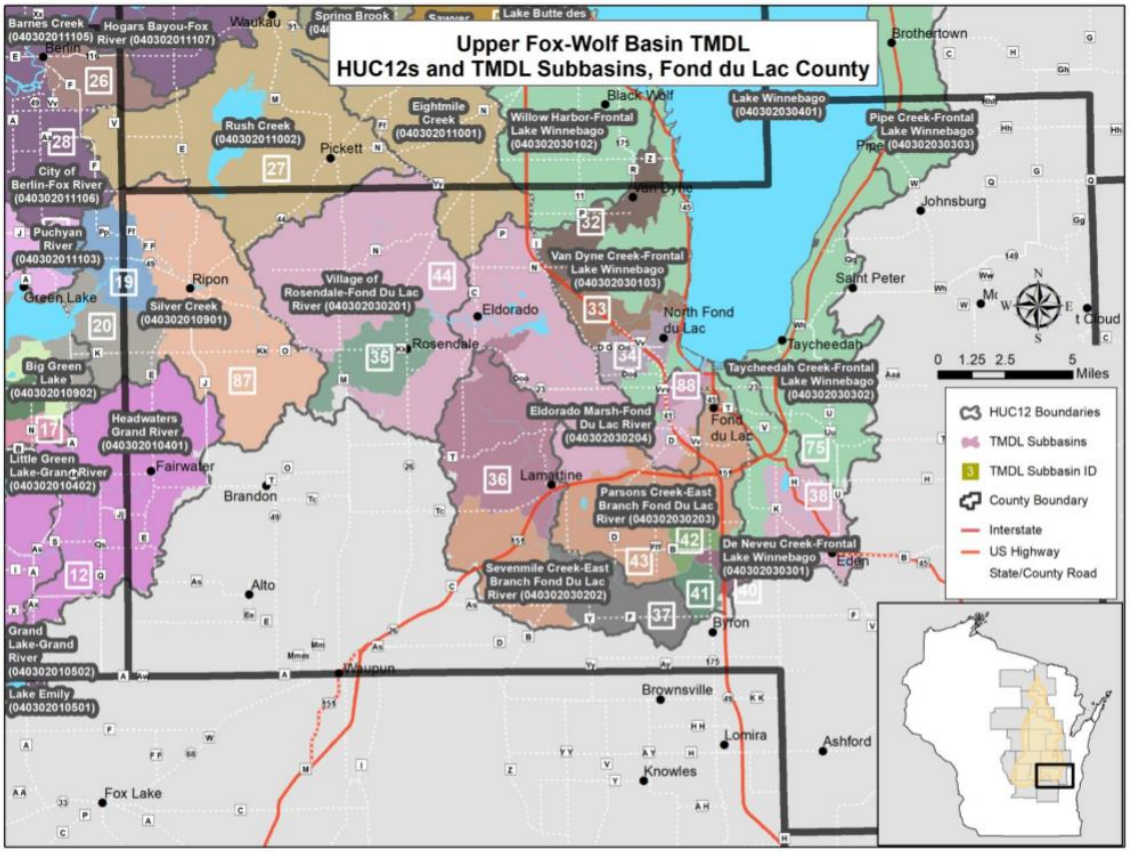
TMDL Subbasin ID and Name		Background TP	Agricultural Nonpoint TP	Non-Regulated Urban TP	General Permits TP	Regulated MS4 Urban TP	Individual Permits TP	Total TP
75	Lake Winnebago	38,074	9,814	695	69	724	33,839	83,215

Table 3. Baseline sediment loads (as total suspended solids [TSS], in pounds per year) by source category for each TMDL subbasin. Loads for TMDL subbasins 55, 56, 58, 59, 80, and 81 (marked with an asterisk, *) do not include TSS loads from point and nonpoint sources on tribal lands in each subbasin. Baseline TSS loads for sources on tribal lands are reported separately in Table 4.

TMDL Subbasin ID and Name		Background TSS	Agricultural Nonpoint TSS	Non-Regulated Urban TSS	General Permits TSS	Regulated MS4 Urban TSS	Individual Permits TSS	Total TSS
75	Lake Winnebago	8,471	1,196,893	18,583	1,858	24,872	1,015,649	2,266,327

UFW TMDL DRAFT Report - Appendix J: TMDL Subbasins, Subwatersheds, HUC 12 boundaries and Edge of Field Targets





9 SNAPPLUS YIELD TARGETS

Table 1. Agricultural total phosphorus (TP) and total suspended solids (TSS) yield target for TMDL Subbasins. Targets are comparable to outputs from SnapPlus and correspond to attainment of TMDL agricultural load allocations. The targets are calculated from baseline yields for each TMDL Subbasin and percent reductions for the TMDL Subbasin. Cells with '-' indicate model subbasins that lack sufficient agricultural area to establish a baseline load.

TMDL Subbasin	TP			TSS		
	Baseline (lbs./ac/yr)	% Reduction	Target (lbs./ac/yr)	Baseline (tons/ac/yr)	% Reduction	Target (tons/ac/yr)
75	2.59	83%	0.44	1.88	0%	1.88

Table 2. Agricultural total phosphorus (TP) and total suspended solids (TSS) yield targets for Model Subwatersheds. Targets are comparable to outputs from SnapPlus and correspond to attainment of TMDL agricultural load allocations. The targets are calculated from baseline yields for each Model Subwatershed and percent reductions for the TMDL Subbasin that the Model Subwatershed is located in. Cells with '-' indicate model subbasins that lack sufficient agricultural area to establish a baseline load.

Model Subwatershed	TMDL Subbasin	TP			TSS		
		Baseline (lbs./ac/yr)	% Reduction	Target (lbs./ac/yr)	Baseline (tons/ac/yr)	% Reduction	Target (tons/ac/yr)
115	75	2.59	83%	0.44	1.88	0%	1.88

Table 3. Agricultural total phosphorus (TP) and total suspended solids (TSS) yield targets for HUC12s. Targets are comparable to outputs from SnapPlus and correspond to attainment of TMDL agricultural load allocations. The targets are calculated from baseline yields for each HUC12 and percent reductions each TMDL Subbasin that intersects the HUC12. The TMDL subbasins that are listed are those that have at least 10% of their area within the HUC12 in which they are nested, or 10% of the overall HUC12 area.

HUC12	TMDL Subbasin	TP			TSS		
		Baseline (lbs./ac/yr)	% Reduction	Target (lbs./ac/yr)	Baseline (tons/ac/yr)	% Reduction	Target (tons/ac/yr)
040302010303	10	2.00	83%	0.34	1.94	47%	1.04

Appendix 3: Examples of Progress Reports from Ahnapee River 9 key Element Plan

*We may modify or utilize some of these report layouts for grant reporting, 9 key element plan progress reporting, or progress updates as required by funding sources, WI DNR, or EPA

Information and education

Report to Include:

1. Number of landowners/operators in the watershed plan area
2. Number of eligible landowners/operators in the watershed plan area
3. Number of landowners/operators contacted
4. Number of cost-share agreements signed
5. Number and type of information and education activities held
    a. Agency/agencies involved in activity
    b. Number of individuals invited
    c. Number of attendees
    d. Measurable results
6. Number of informational flyers/brochures distributed
7. Number of one-on-one contacts made with landowners
8. Percent change in attendance at information and education activities held
9. Comments or suggestions for future activities

Tracking Installed best management practices

Report to Include:

1. BMPs mapped in ArcGIS and in landowners Conservation Plans through Took-kit
2. Pollution reductions will be evaluated using STEPL and Snap-Plus for upland practices and the BARNY model for barnyard practices
3. Installation dates, design specifications, operation and maintenance periods, practice inspections, estimated load reductions and cost share sources/amounts will also be tracked in a GIS and/or Excel database
4. All implemented practices and corresponding reductions will be referenced back to the Northeast Lakeshore TMDL

The methods outlined in the US EPA technical memo, "Adjusting for Depreciation of Land Treatment When Planning Watershed Projects" will be used when evaluating BMP effectiveness and identifying factors that may affect BMP performance levels and implementation. For additional information on BMP deprecation see https://www.epa.gov/sites/production/files/2015-10/documents/tech_memo_1_oct15.pdf

Pollutant reduction evaluation for BMPs installed

Report to Include:

1. Planned and completed BMPs
2. Pollutant load reductions and percent of goal planned and achieved
3. Cost-share funding source of planned and installed BMPs
4. Number of compliance checks for management plans
5. Number of compliance checks for practices that include operation and maintenance plans

6. Number of new and alternative technologies and management measures assessed for feasibility, used, and incorporated into plan
7. Changes in land-use or land management in watershed that may impact BMP effectiveness
8. Variations in weather that may have influenced implementation of BMPs or effectiveness of installed BMPs.

Water Quality Monitoring

Report to Include:

1. TP, TSS, and TN monitoring results (as they become available through either DNR and/or WAV) from all three sampling locations within the watershed
2. Macroinvertebrate Index of Biotic Integrity monitoring results

Administrative Review

Report to Include:

1. Status of grants
2. Status of project administration including data management, staff training, and BMP monitoring
3. Status of NMPs
4. Number of cost-share agreements
5. Total amount ($) on cost-share agreements
6. Total amount reimbursed to landowner(s)
7. Staff salary and fringe benefits expenditures
8. Staff travel expenditures
9. Information and education expenditures
10. Equipment, materials, and supply expenses
11. Professional services and staff support costs
12. Total expenditures for the county
13. Total amount paid for installation of BMP's and amount encumbered for cost-share agreements

Minimum Progress Criteria for Revisiting Plan Milestones

This plan contains several milestones that will be carefully tracked and monitored to determine if sufficient progress is being made to meet plan goals/pollutant reductions.

The following criteria will be used to determine when plan milestones and reduction goals should be revised due to minimal progress achieved:

1. Less than 25% of planned cropland practices or estimated load reductions are met by year 3
2. Less than 25% of funding is available/awarded to implement plan by year 3
3. Less than 25% of funding for conservation staff is awarded/available by year 3
4. Conservation staff shortages occur and technical assistance resources are limited for two years between years 1-5