

Wild Rice - Marsh
River Watershed
One Watershed, One Plan

Funded by:





Wild Rice - Marsh River Watershed

One Watershed, One Plan

Acknowledgements

Project Partners

Clearwater County and SWCD
Becker County and SWCD
Mahnomen County and SWCD
Norman County and SWCD
Clay County and SWCD
Polk County and East and West Polk SWCDs
Wild Rice Watershed District



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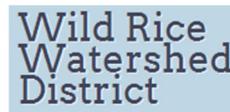


Norman County
In the Heart of the Red River Valley



West Polk Soil and
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District
CROOKSTON MN

East Polk Soil & Water Conservation District



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Wild Rice - Marsh River Watershed

One Watershed, One Plan

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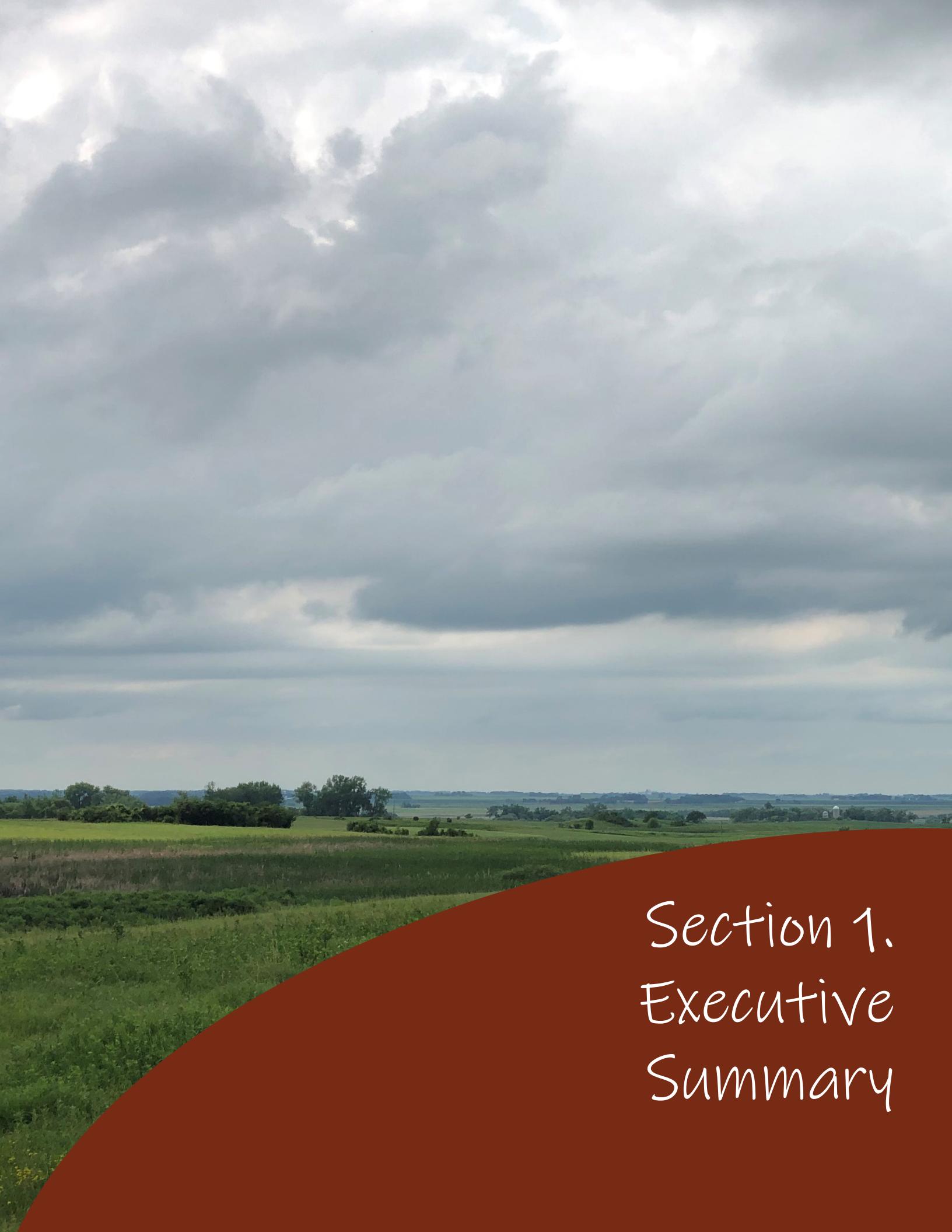
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Section 1. Executive Summary

Section 1. Executive Summary

The Wild Rice - Marsh River Watershed plan area includes two major watersheds, the Wild Rice and the Marsh River – Upper Red River of the North. The Marsh River includes areas of direct drainage to the Red River South and North of the Wild Rice River confluence with the Red River (Figure 1-1). The Wild Rice – Marsh Comprehensive Water Management Plan, locally referred to as the Wild Rice – Marsh One Watershed One Plan (WRM1W1P) was developed in 2019-2020 through the One Watershed, One Plan program administered by the Board of Water and Soil Resources (BWSR), Minnesota Statutes §103B.801. The purpose of the plan is to guide the watershed managers (local counties and soil and water conservation districts) as they work to protect and restore the watershed's resources.

The primary focus of the actions in this plan is to reduce erosion (sediment) and flood damage in the watershed by retaining water, reducing runoff, and managing the land. The secondary focus includes enhancing agricultural productivity and habitat. This focus is captured in the watershed's vision statement below.

Vision Statement

We embrace our ecological, economic and cultural diversity, and manage the watershed in a fashion that produces plentiful crops, fosters soil health, reduces flood damages, and protects the abundant lakes and rivers within its boundaries for all to enjoy.

Plan Area

The Plan Area spans portions of six counties in order of percentage in the watershed: Norman, Mahnomen, Clay, Becker, Clearwater, and Polk (Figures 1-1, 1-2). Major towns in the watershed include Ada, Halstad, Mahnomen, Twin Valley, White Earth, Waubun, Ulen, and Zerkle. The White Earth Nation spans much of the eastern side of the watershed, and the Wild Rice Watershed District covers the entire planning area.

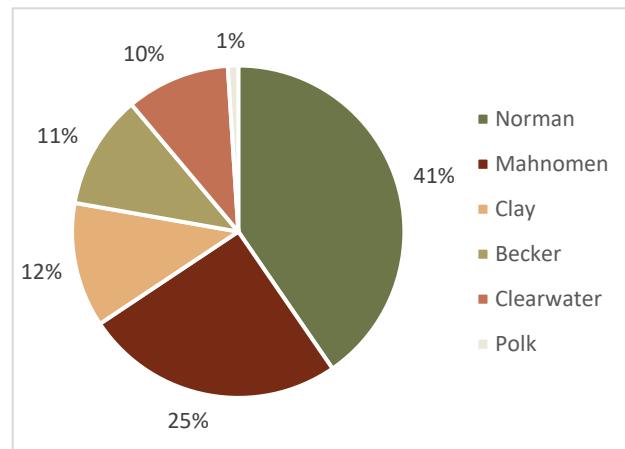


Figure 1-1. Percent of each county in the WRM Watershed.



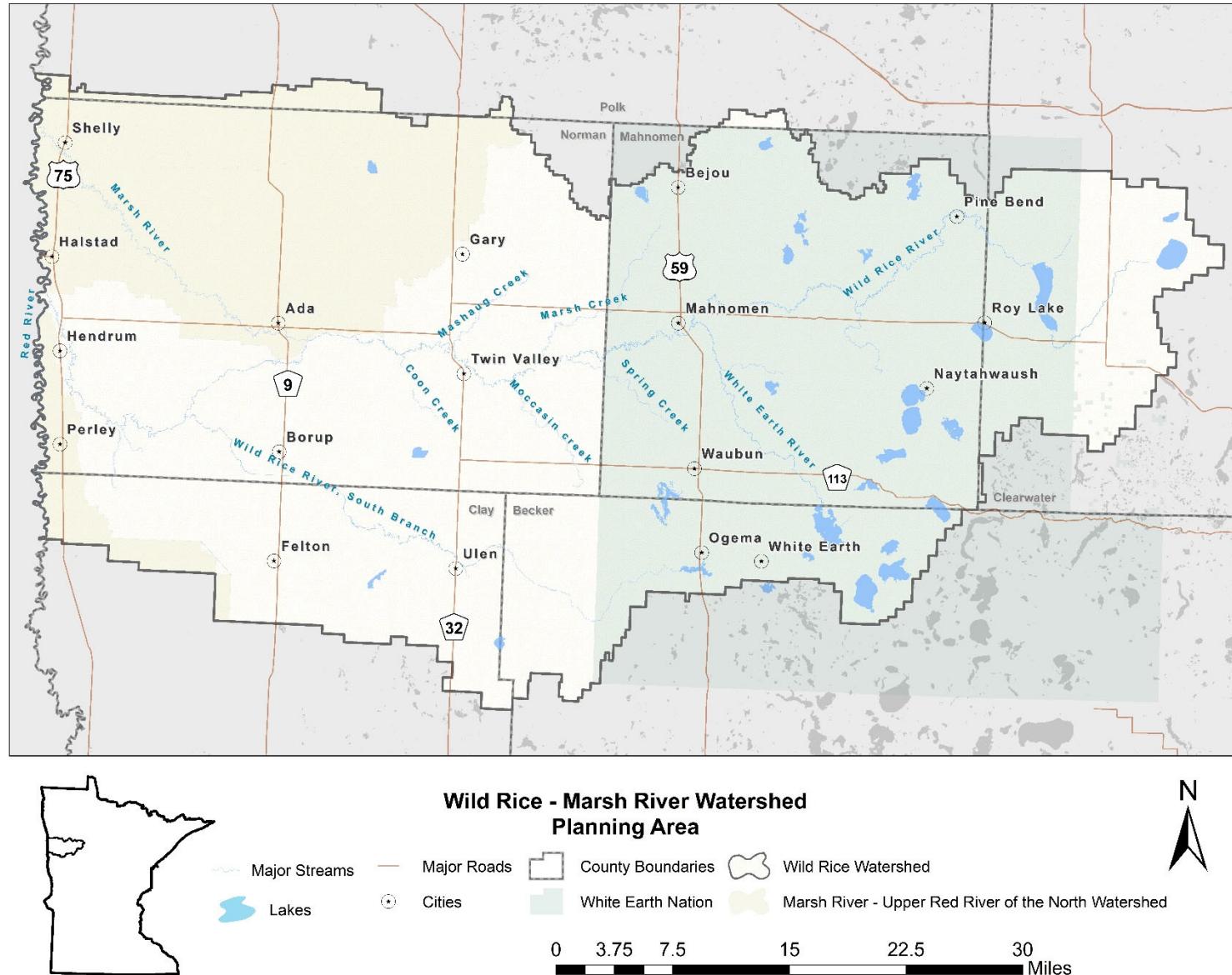


Figure 1-2. Planning area for the Wild Rice - Marsh One Watershed One Plan (WRM1W1P).

Purpose, Roles, and Responsibilities

The purpose of One Watershed, One Plan is to align water planning along watershed boundaries, not jurisdictional boundaries such as counties as was done in the past. Prior to this single plan, each of the six counties as well as the watershed district had water-related plans that covered portions of this watershed. Water is connected and ignores county boundaries, so to truly manage the resources on the whole, a watershed scale is most efficient and effective.

The Wild Rice – Marsh Comprehensive Water Management Plan (WRM1W1P) began with a memorandum of agreement (MOA) between all the entities in the watershed including Clearwater County, Clearwater Soil and Water Conservation District (SWCD), Becker County, Becker SWCD, Mahnomen County, Mahnomen SWCD, Norman County, Norman SWCD, Clay County, Clay SWCD, Polk County, West Polk SWCD, East Polk SWCD, and the Wild Rice Watershed District.

The One Watershed One Plan process uses existing authorities; therefore, a representative from each governmental unit in the MOA was appointed by each board to serve on the Policy Committee, which is the decision-making body for this plan. The Wild Rice Watershed District was the fiscal agent for this project.

The Steering Committee consisted of staff from each of the entities in the MOA, and generated the content in this plan. The Advisory Committee consisted of state agencies and local stakeholders, and contributed to plan content in an advisory role (Figure 1-3).

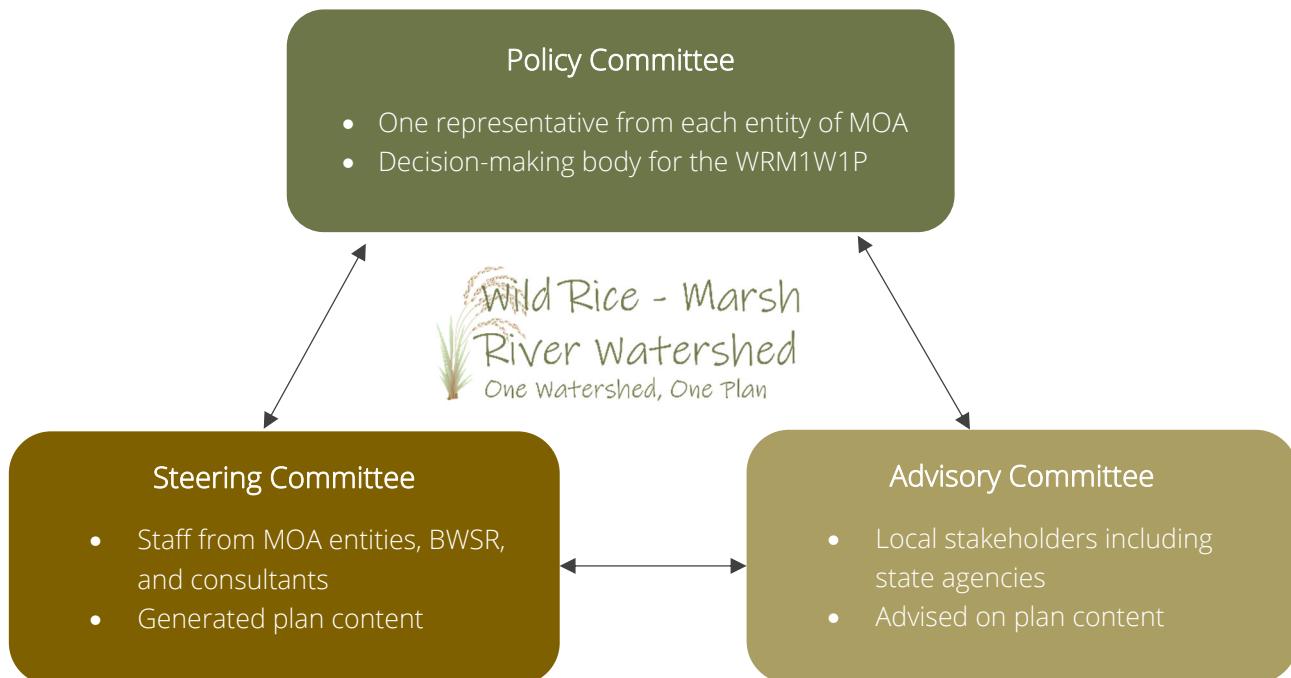


Figure 1-3. Committees formed for the WRM1W1P planning process.

Community Engagement

The MOA entities hosted a Public Open House in July of 2019 to receive input on local priorities for the plan. An online survey was also designed to obtain feedback from people that weren't able to attend the open house. The main focus of the public input process was to get feedback on the following items:

- What are their top-rated issues and opportunities they would like included in the plan?
- What resources would they like prioritized for protection and restoration?

Top Public Issues:

- Flooding
- Unstable and degrading drainage ditches
- Soil erosion
- Wetland protection and restoration

Top Public Resources:

- Wild Rice River
- Productive farmland
- Hunting and recreational land
- Lakes
- Wild Rice

Meeting participants and survey respondents were also asked to reflect on questions about the present and the future of the watershed (Figures 1-4 & 1-5). These responses were used by the Advisory Committee to form the watershed vision statement on page 1.

- Using just 4-5 words, when you think of the Wild Rice - Marsh Watershed, what comes to mind? (Figure 1-4)
- What would you like the Wild Rice – Marsh Watershed to look like in 50 years? (Figure 1-5)

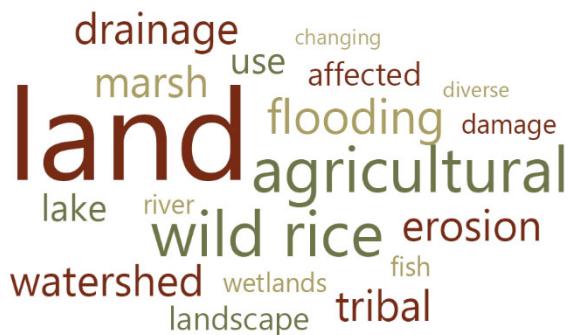


Figure 1-4. Word cloud summarizing the answers to the question, "Using just 4-5 words, when you think of the Wild Rice - Marsh Watershed, what comes to mind?"



Figure 1-5. Word cloud summarizing answers to the question: "What would you like the Wild Rice - Marsh Watershed to look like in 50 years?"



Planning Regions

The WRM Watershed is very different in land cover and resource quality from east to west as illustrated in Figure 1-6. Six smaller planning regions were defined for the plan to be able to focus on specific concerns in specific regions of the watershed (Figure 1-6). The Steering Committee determined the planning regions based on similar land use, drainage areas, and hydrologic boundaries. The Headwaters Planning Region has a protection focus for lakes and forests while the central transition zone of the Middle Wild Rice and Upper South Branch Wild Rice planning regions focus on restoration projects to reduce sediment, increase water storage and enhance habitat. The western Lake Agassiz Plain consists of the Marsh, Lower Wild Rice, and Red River Direct Drainage planning regions, and management focuses on drainage, flood damage reduction, and sediment reduction.

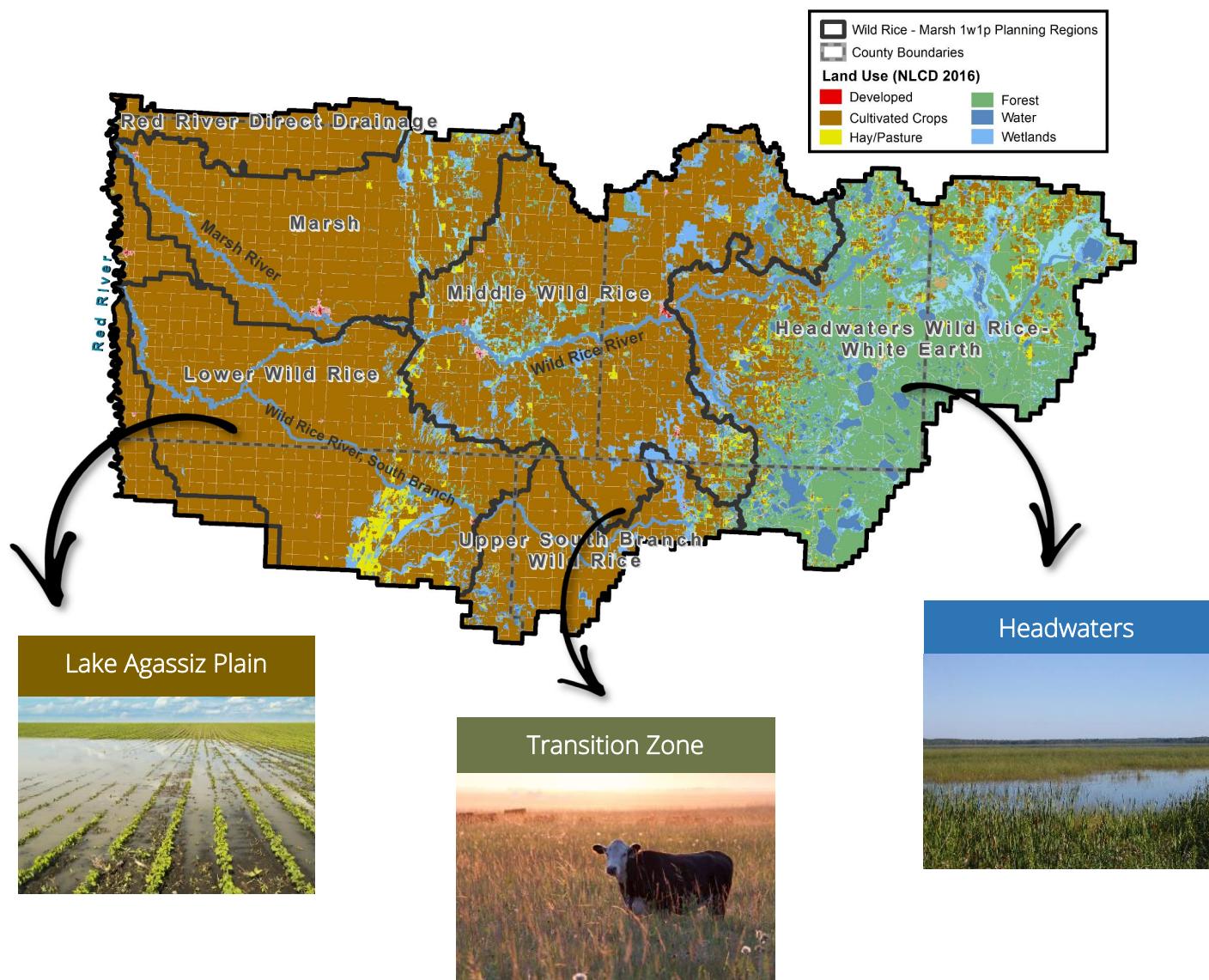


Figure 1-6. Planning regions in the WRM Watershed and their descriptions and land use.

Issue Prioritization

At the beginning of the planning process, thoughtful consideration of issues and resource concerns identified in the watershed are important for developing the priority issues and resources that will be addressed in the plan. The issues for the Wild Rice – Marsh Watershed were generated and prioritized with a variety of input from the general public, the Advisory Committee, State Agencies, and existing local and regional plans (Figure 1-7). These issues are further described in Section 3 of this plan.



Figure 1-7. Issue prioritization process for the WRM1W1P.

All of these efforts have resulted in the draft issues table in the following pages. The priority A and B issues had goals written for them in the next step of the planning process.

The 28 issues were organized into resource categories for ease of reference: surface water (lakes, streams, wetlands, drainage systems), land stewardship (resources including agricultural land, and land, water and habitat affected by flooding), groundwater (aquifer and drinking water), and habitat (forests, grasslands, aquatic habitat, unique features such as Wild Rice, calcareous fens, and beach ridges).

Priority A Issues

Priority A are the most important issues that will have the most effort and funding in the 10-year plan. Issues are prioritized by their importance in each planning region: high, medium, low. Priority A Issues had a "high" ranking in at least one planning region (Table 1-1).

Planning Region Prioritization Key:  = high priority;  = medium priority;  = low priority.

Table 1-1. Priority A issues for the Wild Rice - Marsh Watershed.

Category	Resource	Issue Statement	Planning Region Prioritization
	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.	
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.	
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.	
	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.	
	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.	
	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .	
	Wild Rice	Wild Rice needs continued protection for habitat, cultural, economic, and wildlife benefit.	



Priority B Issues

Priority B issues are important and they will be addressed as time, funding, and partnerships allow. They received a “medium” ranking in at least one planning region (Table 1-2).

Planning Region Prioritization Key:  = high priority;  = medium priority;  = low priority.

Table 1-2. Priority B issues for the Wild Rice - Marsh Watershed.

Category	Resource	Issue Statement	Planning Region Prioritization
	Drinking Water	Groundwater is vulnerable to contamination from numerous sources.	
	Forests, Grasslands	Terrestrial habitat , including forests and grasslands , is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.	
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.	
	Unique Features	Sensitive and ecologically significant resources such as beach ridge areas and calcareous fens need continued and increased protection from degradation.	
	Lakes	Development pressure on lakes affects riparian habitat, shoreline erosion and runoff.	
	Streams	Increased bacteria (E. coli) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.	
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.	



Measurable Goals

The issue statements were used in the development of the plan's goals. The goals guide what quantifiable changes to resource conditions this plan expects to accomplish in its ten-year lifespan. The WRM1W1P goals were developed by the Steering Committee with input from the Advisory Committee and approved by the Policy Committee.

The measurable goals in this plan are laid out in Section 4, and in most cases include specific goals per planning region and a map of where the goals will be targeted. The goals cover the four resource categories: surface water, land stewardship, habitat, and groundwater, and address all the Priority A and B issues of the plan.

Different data sets and models were used to determine the goal numbers. The Prioritize, Target, and Measure Application (PTMAApp) was used to define load reduction goals for sediment and phosphorus, and acre-feet goals for water storage. Minnesota Department of Health data was used for defining groundwater goals. The Minnesota Prairie Plan was used for grassland and wetland goals, local information from field surveys was used for stream restoration, stream habitat enhancement, and flood damage reduction, and GIS data were used for bacteria, lakes and forest goals.

The goals also prioritized where the work will be targeted. In a perfect world there is enough funding to accomplish everything everywhere. In reality, funding is limited, and targeting where to work first helps focus available funding in priority areas where improvements to the resource condition can be made. Measurable goals allow for the planning partners to track their progress during implementation. The goals for the WRM1W1P are listed in two levels: 1) Goals that address Priority A issues and 2) Goals that address Priority B issues.

Why does it matter?



Erosion is a natural process, but humans have sped up erosion rates by altering the landscape. Reducing wind and water erosion help keep productive soil on the landscape, improves water quality, improves fish habitat, decreases the need for drinking water treatment, and improves wetland quality and function.



Phosphorus is the main nutrient that feeds plants and algae in lakes and streams. Reducing phosphorus improves lake and stream water quality by reducing algal bloom frequency and growth of nuisance plants.



Across the Red River Basin, human alteration of the landscape has increased the precipitation runoff rate and volume, which can contribute to erosion and flooding. Increasing **water storage** in the watershed helps to slow the runoff, reduce flood damage, allow the sediment to settle out and water quality to improve.



Management of the land including forests and grasslands enhances habitat, reduces runoff and erosion, and helps with water infiltration into the ground. Management practices on agricultural lands can improve productivity, increase water storage, and reduce runoff and erosion.



Goals addressing Priority A issues

Goals addressing Priority A issues will have the most effort and funding put towards them during plan implementation (Table 1-3). Planning Region Prioritization Key:

 = high priority;  = medium priority;  = low priority.

Table 1-3. Goals addressing Priority A issues, planning region prioritization, and implementation actions

Category	Plan Goal	Where	How
	Reduce sediment delivery to streams, lakes, and drainage systems by 9,322 tons/year .		<ul style="list-style-type: none"> Water and sediment control basins Grade stabilizations Grassed waterways
	Reduce phosphorous delivery to streams, lakes, and drainage systems by 1,562 lbs/year .		<ul style="list-style-type: none"> Water and sediment control basins Grade stabilizations Grassed waterways
	Implement 5,823 acres of regenerative practices, such as cover crops , on cultivated crop land with the highest erosion potential to increase soil health.		<ul style="list-style-type: none"> Cover crops Crop rotations Reduced tillage Livestock incorporation
	Reduce runoff volume to address altered hydrology and reduce flood damage by increasing storage in the watershed by 10,750 acre-feet .		<ul style="list-style-type: none"> Regional storage projects Wetland restoration
	Reduce Flood Damages to Communities, Farmsteads and Farmland		<ul style="list-style-type: none"> Ring dikes Farmland protection Community levees Flood walls Acquisitions
	Stabilize 7 priority ditch miles and 4 ditch outlets .		<ul style="list-style-type: none"> Ditch stabilization Outlet stabilization Drainage management
	Stabilize 5 miles of streams to improve channel integrity .		<ul style="list-style-type: none"> Streambank stabilization Stream restoration
	Protect 250 acres of Wild Rice with easements.		<ul style="list-style-type: none"> Easements



Goals addressing Priority B issues

Goals addressing Priority B issues will be implemented as funding, opportunities and partnerships are available (Table 1-4).

Planning Region Prioritization Key:  = medium priority;  = low priority.

Table 1-4. Goals addressing Priority B issues, planning region prioritization, and implementation actions.

Category	Plan Goal	Where	How
 Habitat	Acquire 6,500 acres of stream corridor to enable future rehabilitation of the streams.		<ul style="list-style-type: none"> • Easements • Acquisitions
 Land Stewardship	Increase the amount of grass-based agriculture and perennial grassland vegetation by 2,102 acres as identified in the Minnesota Prairie Plan		<ul style="list-style-type: none"> • Prescribed grazing • Grazing Plans • CRP, CREP
 Habitat	Maintain forest cover by promoting forest management and protection on 2,400 acres .		<ul style="list-style-type: none"> • Forest Management Plans • Sustainable Forest Incentive Act (SFIA)
 Habitat	Implement 16 projects to enhance/restore or stabilize riparian shoreland on priority lakes.		<ul style="list-style-type: none"> • Shoreline restoration • Rain gardens
 Surface Water	Develop and implement 20 bacteria management projects to address sources of bacteria and make progress towards delisting impairments.		<ul style="list-style-type: none"> • Cattle exclusion and watering facility • Manure management • Septic system maintenance
 Groundwater	Protect groundwater by sealing on average 15 unused wells per year , protecting DWSMAs, and addressing emerging contaminants		<ul style="list-style-type: none"> • Well sealing • Drinking water screening



Implementation

This plan will be implemented to the degree that additional funding is acquired, and at a locally determined pace of progress. Outreach and incentives will be used to assist with voluntary implementation of plan actions on private lands.

The Targeted Implementation Schedule in Section 5 describes what work will be done, who will do it, when it will be done, and how much it will cost.

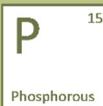
Three funding levels are provided in this plan. Funding Level 1 is the estimated total of current funding in the watershed. With the completion of One Watershed One Plan, the WRM Watershed will be able to receive Watershed-Based Implementation Funds from the Board of Soil and Water Resources (BWSR), which increases their available funding to Level 2. Level 2 is additive with Level 1, and the watershed partners plan to operate at Funding Level 2 throughout implementation. Level 3 is a way to recognize the contributions of partner groups in the watershed that are doing work in the watershed that can help make progress towards plan goals. Level 3 funding includes the Conservation Reserve Program (CRP), organizations such as The Nature Conservancy, and state agency projects such as surface and groundwater monitoring that are not contracted through the local governments.

Table 1-5. Funding Levels for the Wild Rice - Marsh River Watershed One Watershed, One Plan.

Funding Level	Name	Description
1	Current Funding	Current local funding (capacity, county ordinances, tax revenue).
2	Current Funding + Watershed-Based Implementation Funds	Current funding + Watershed-Based Implementation Funds (approximately \$685,000/year for the first biennium, 2021-2022).
3	Partner and Other Funding	This funding level recognizes that there are other organizations and agencies doing work in the watershed that can help make progress towards plan goals. Example: Conservation Reserve Program (CRP).

With current funding available plus the new watershed-based funding that will be acquired upon completion of this plan, planning partners aim to achieve the following improvements in the watershed (Table 1-6, Figure 1-8)). These improvements are also illustrated in Figures 1-9, 1-10.

Table 1-6. The amount of sediment and phosphorus reduction, storage, and land management and protection in the Level 2 Funding Scenario (sediment and phosphorus reductions are estimated from PTMApp).

Sediment	Phosphorus	Storage	Land Management or Protection
 <p>9,322 tons/year reduction (at catchment) Focused around rivers:<ul style="list-style-type: none">White Earth RiverMarsh CreekMiddle Wild Rice RiverUpper South Branch Wild Rice River</p>	 <p>1,562 lbs/year reduction (at catchment) Focused around rivers:<ul style="list-style-type: none">White Earth RiverMarsh CreekMiddle Wild Rice RiverUpper South Branch Wild Rice River</p>	 <p>16,000 acre-feet Focused around the transition zone (Dark Green, Fig. 1-8).</p>	 <p>17,075 acres Focused around the transition zone (Dark Green, Fig. 1-8):<ul style="list-style-type: none">Soil HealthGrasslandForestWetlandHabitat</p>

The highest priority area for reducing sediment, increasing water storage, and enhancing habitat are in the middle transition zone of the watershed (Figure 1-8).

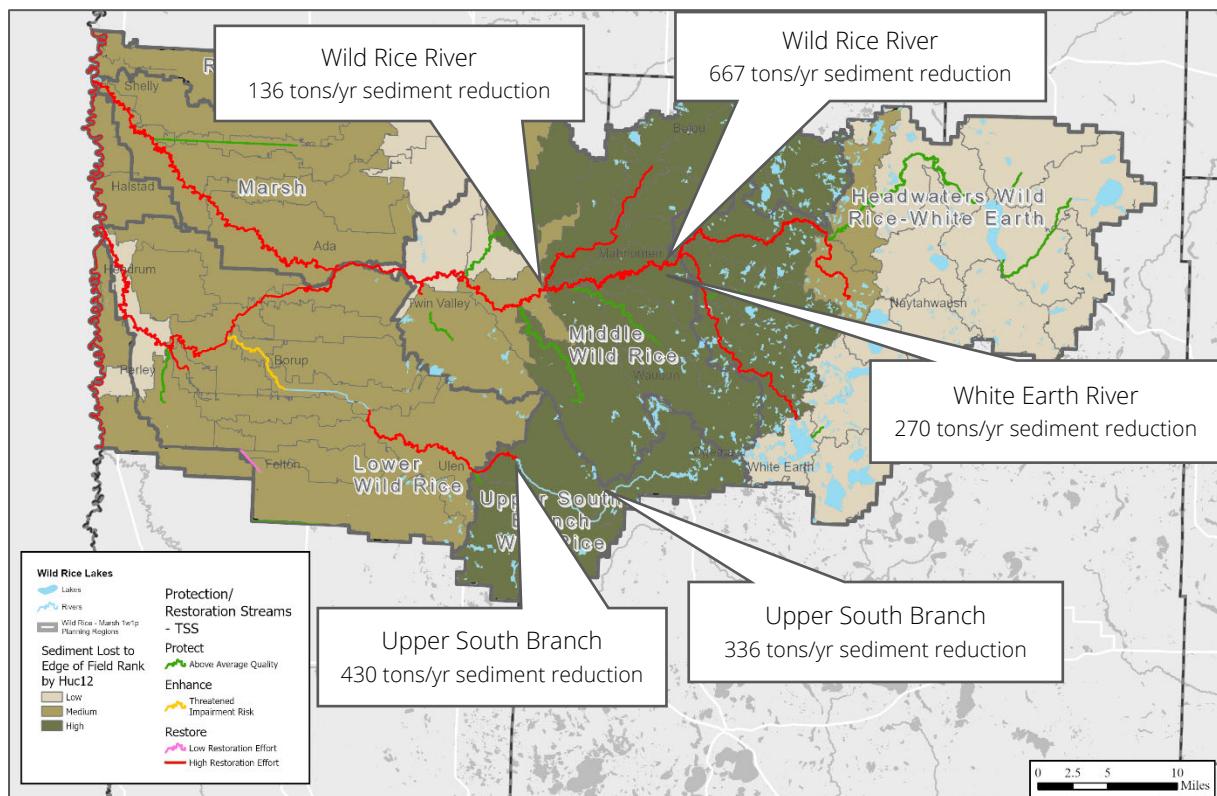


Figure 1-8. Map showing targeted sediment reductions for this plan using watershed-based implementation funding. The highest priority for sediment and phosphorus reduction, increasing storage, and habitat enhancement are in the middle dark green area of the watershed.



Figure 1-9. Infographic explaining the focus of the WRM1W1P.

The WRM1W1P will be implemented by existing programs distributed between five categories: Projects and Practices, Capital Improvements, Regulatory, Data Collection and Monitoring, and Outreach and Communication (Figure 1-10). These programs are explained in detail in Section 6 of the plan.

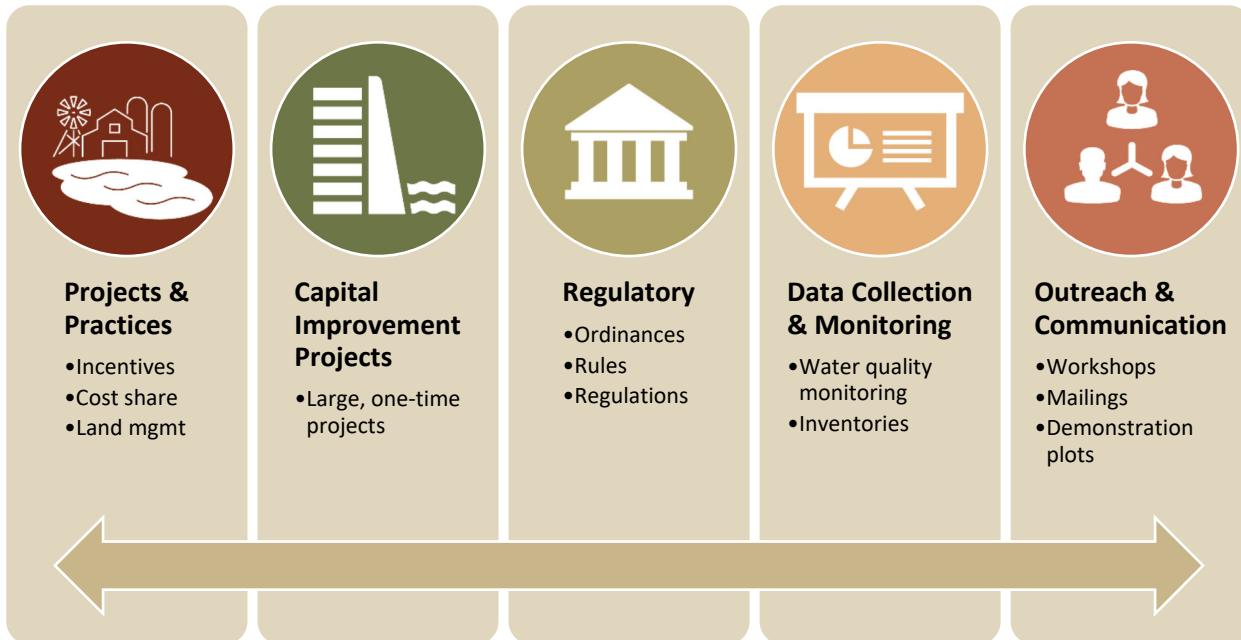


Figure 1-10. Plan Implementation Programs for the WRM1W1P.

Plan Administration and Coordination

Implementation of the WRM1W1P will require increased capacity of plan partners, including increased staffing, funding and coordination from current levels. Successful implementation will depend on continuing and building on partnerships in the watershed with landowners, planning partners, state agencies, and organizations. The details of the Administration of this plan are described in Section 7.

The WRM1W1P will be implemented by the Wild Rice – Marsh Watershed Partnership (WRMWP). The WRMWP is a coalition of the following partners:

- Clearwater County and SWCD
- Becker County and SWCD
- Mahnomen County and SWCD
- Norman County and SWCD
- Clay County and SWCD
- Polk County and East and West Polk SWCDs
- Wild Rice Watershed District

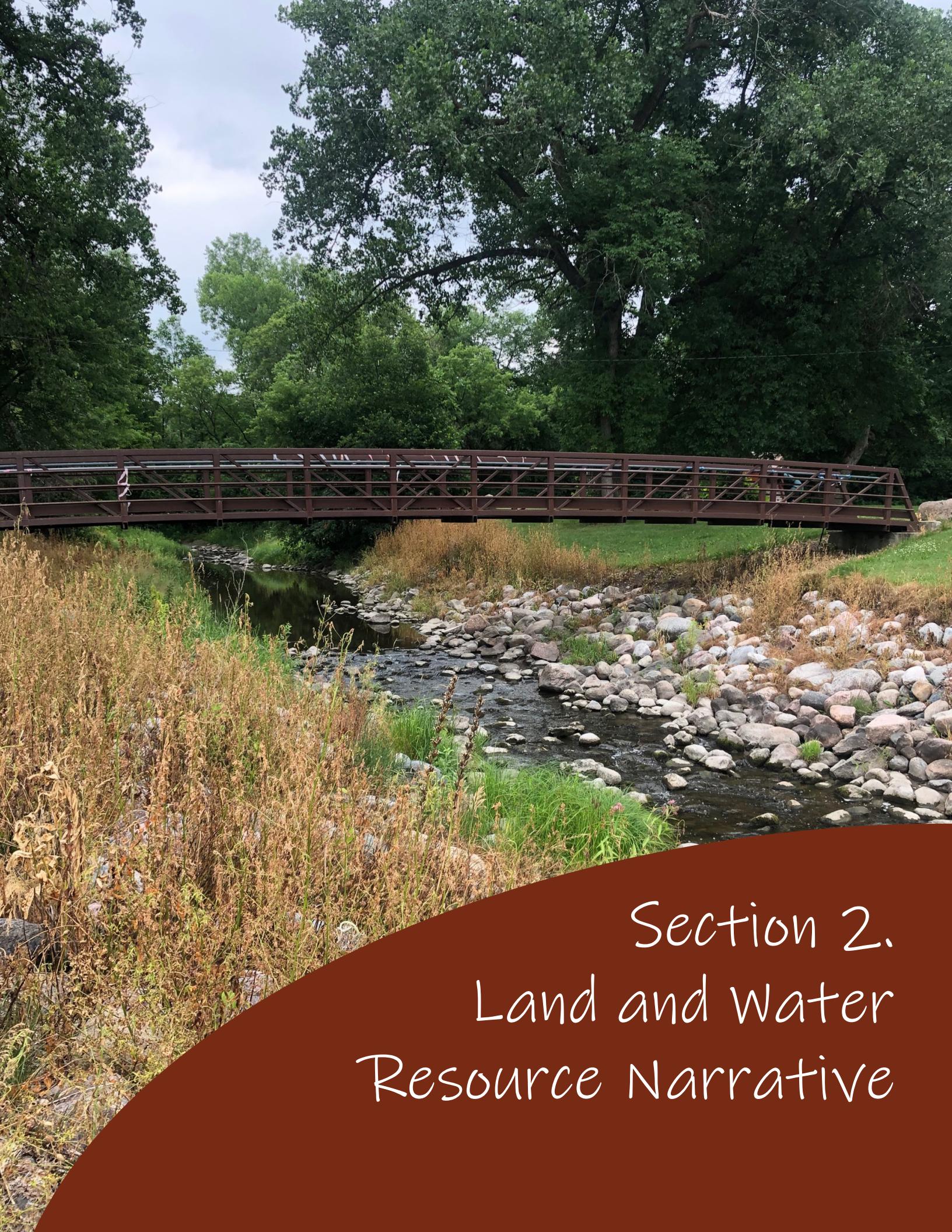
The Partnership previously entered into a formal agreement through an MOA for planning the One Watershed One Plan for the Wild Rice – Marsh Watersheds (Appendix J). The entities will draft a MOA for purposes of implementing this plan. The Policy Committee of the WRMWP oversees the plan implementation with the advice and consent of the individual County and SWCD boards under the umbrella of the implementation MOA.

Two committees will serve this plan during implementation:

- **Policy Committee:** Comprised of Policy Committee members from the planning process (one county commissioner and one SWCD board supervisor appointed from each of the participating counties in the watershed, plus a manager from the Wild Rice Watershed District). The Policy Committee is the decision-making body for implementation. They will approve the annual work plans, reports, grant applications and any amendments.
- **Advisory Committee:** Comprised of Steering Committee and Advisory Committee members from the planning process (local government staff and stakeholders including state agencies). The Advisory Committee will continue to meet, review and identify collaborative funding and project opportunities, complete the annual work plan, identify and apply for additional funding opportunities, update the Policy Committee on what projects are completed and where funding is spent, and implement the targeted implementation schedule.



Figure 1-11. Snider Lake.



Section 2. Land and Water Resource Narrative

Section 2. Land and Water Resource Narrative

The Wild Rice - Marsh River Watershed is a story of transitions. From high ground to low ground, forested to cultivated, lakes to streams, natural to altered water courses, this slice of geography is ecologically and economically diverse on an east-west axis.

Positioned in the middle of Minnesota's side of the Red River Basin, the Wild Rice - Marsh River Watershed drains approximately 1,998 square miles (1,278,720 acres) across six counties - Becker, Clay, Clearwater, Mahnomen, Norman, and Polk - before it joins the Red River of the North. Primary towns include Ada, Mahnomen, Twin Valley, White Earth, Waubun, and Zerkel (Figure 2-1).

The area defined for this planning effort is comprised of two distinct watersheds, the Wild Rice and the Marsh River – Upper Red River of the North. The Marsh River includes areas of direct drainage to the Red River south and north of the Wild Rice River confluence with the Red River (Figure 2-1).

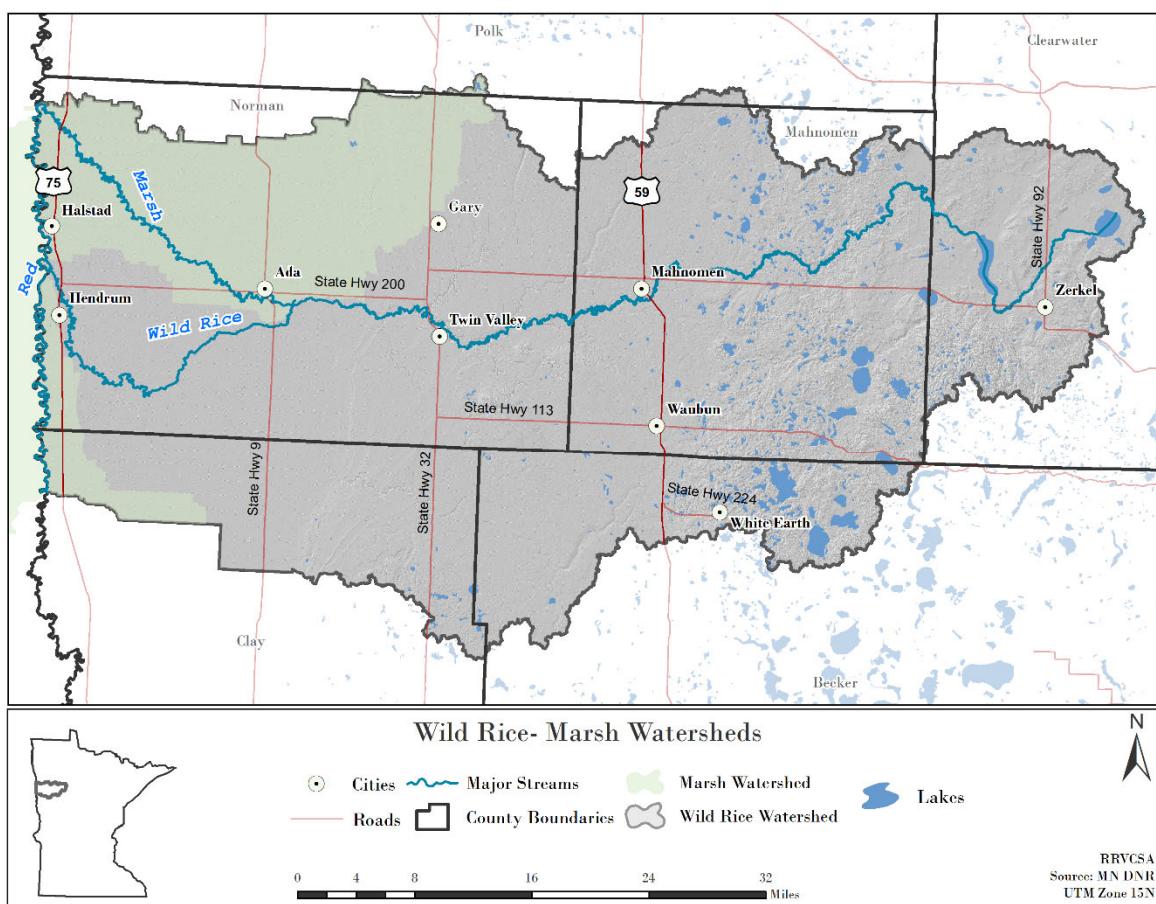


Figure 2-1. Wild Rice and Marsh River Watersheds.



Past

The east to west transition in the Wild Rice – Marsh River Watershed is a result of **glacial activity** in the area. Glaciers scoured Minnesota and North Dakota during the last ice age, leaving lakes, outwash and till in their wakes. Around 10,000 years ago the glaciers began to melt back, but an ice sheet still covering Canada blocked water drainage north to Hudson Bay. As a result, the melt water backed up, forming the 700-mile-long by 200-mile-wide Lake Agassiz covering what is now the Red River Valley (Figure 2-2). As the northern ice sheet retreated, Lake Agassiz drained north to Hudson Bay, but left behind Lake of the Woods and Lakes Winnipeg and Manitoba as remnants (NDGS).



Figure 2-2. Glacial Lake Agassiz.

The **soils** in the watershed bear the mark of glacial activity as well. The fine claylike silt that accumulated on the bottom of Lake Agassiz (Lacustrine) is responsible for the fertility of the Red River Valley today. The beaches of Lake Agassiz can still be seen as north/south transects of sandy soil in the middle of the transitional zone of the watershed (Till Plain, Figure 2-3). The makeup of soils determines what type of land uses are amenable to that landscape and also the rates of infiltration and erosion. Sandy soils are well drained and therefore runoff is minimal, whereas fine particles such as silt erode more easily.

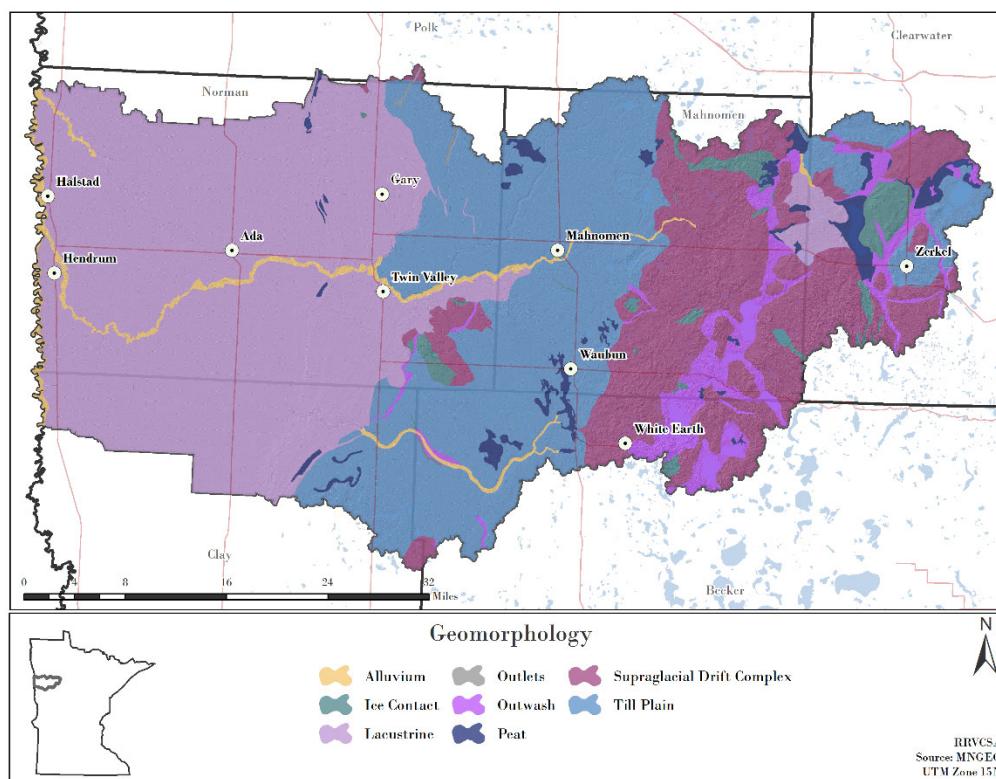


Figure 2-3. Soils in the Wild Rice - Marsh Watershed.

Before European settlement of the area, the land cover in the Wild Rice – Marsh Watershed transitioned from mixed forests in the east to prairie to the west. There were also numerous wetlands dotting as much as 40% the landscape (DNR WHAF). These wetlands are part of the Prairie Pothole Region, which has glacial depressions that fill with water in spring and form wetlands. The Prairie Pothole Region is important ecologically to North America because it is vital for migratory waterfowl and other wildlife, supporting breeding populations of numerous waterfowl species.

Present

The **climate** in the Wild Rice – Marsh Watershed is a temperate continental climate with cold winters and warm summers. The cold winters affect the surface water and the growing season. The lakes are ice-covered in the winter, and plants and cultivated crops can only grow from approximately May through October. Average annual precipitation is 25.2 inches and average temperature is 40.7 F (DNR WHAF).

The Wild Rice River cuts a generally east to west course from its headwaters at Upper Rice Lake 168 miles to its confluence with the Red River of the North. The headwaters start in the Northern Lakes and Forests Ecoregion, and consists of forests and hilly terrain, with many lakes and wetlands scattered on the landscape. These lakes are characterized by good water quality and habitat, and the landscape generally remains in its natural state. Major tributaries in this ecoregion include Mosquito Creek and Roy Creek. The Wild Rice River also passes through Lower Rice Lake, a 2,000-acre lake abundant with Wild Rice.

As the Wild Rice River flows west it enters a transitional zone in the North Central Hardwoods Ecoregion. Here the elevation begins to drop and land use transitions from forests to cultivated crops. Some large lakes are present in this mosaic of land uses, and more alteration of the natural landscape has occurred, along with lakeshore development. The White Earth River is a major tributary that flows north from White Earth Lake to meet the Wild Rice River.

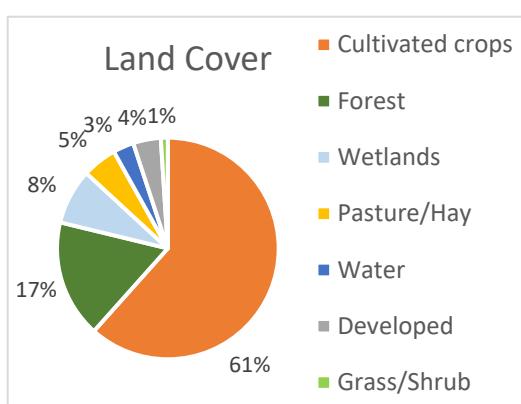


Figure 2-4. Land cover in the Wild Rice-Marsh Watershed (NLCD 2016).

As the Wild Rice River leaves this transitional zone, the elevation levels out into the flat Lake Agassiz Plain. Here, the land use is dominated by cultivated crops (Figures 2-4, 2-5). The crops grown are mainly corn, soybeans and small grains, with some sugarbeets in the northwest. Just east of Ada, the Marsh River breaks away on a northerly course and joins the Red River near Shelly, MN. The Wild Rice River continues on its westerly course and joins the Red River south of Halstad, MN.



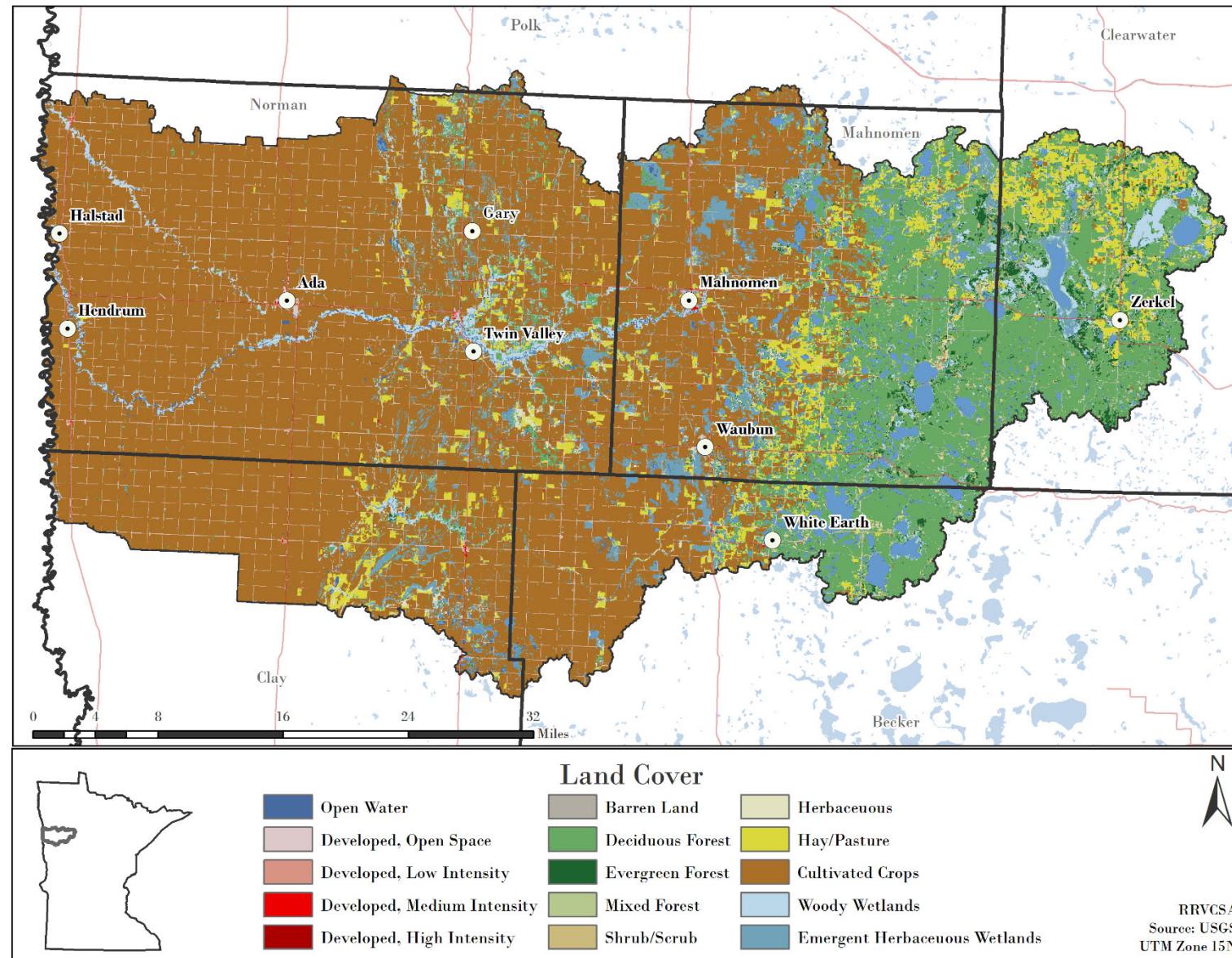


Figure 2-5. Land cover in the Wild Rice - Marsh Watershed (NLCD 2016).



The Wild Rice – Marsh Watershed has abundant surface water resources, including lakes, streams, and wetlands. There are some **lakes** with outstanding water quality in the Wild Rice River Watershed (Table 2-1). The DNR has developed lake classifications to help describe and prioritize lakes with unique qualities:

- **Outstanding Biological Significance (Bio. Sig.):** The presence of unique species of aquatic plants, fish, birds, or amphibians.
- **Phosphorus Sensitivity:** The lake's sensitivity to phosphorus as determined by the DNR. Sensitivity means that added phosphorus would affect the clarity in these lakes the most (Radomski 2018). There are three categories of sensitivity: high, higher, and highest.
- **Cisco Refuge Lake:** Lakes with cold-water fisheries and the presence of Cisco (tullibee). These lakes are classified as deep and clear enough that they will still provide suitable cold-water fish habitat even after climate change.
- **Wild Rice Lake:** Designated Wild Rice Lakes (DNR).

Of the lakes tested, only Roy and Tulaby are showing a declining trend in transparency and only Tulaby and Rockstad are impaired for eutrophication (MPCA 2017a, MPCA 2019, Figure 2-8). The remaining lakes can be prioritized for protection strategies to maintain their excellent water quality.

Table 2-1. Selected large lakes in the Wild Rice River Watershed with outstanding qualities.

Lake	Surface Area (acres)	Depth Classification	Transparency Trend	Trophic State	Qualities
Upper Rice	1,338	Shallow Lake	Insufficient data	48 - Mesotrophic	Outstanding Bio. Sig. Wild Rice Lake
Roy	679	Deep Lake	Degrading (1989-2019)	53 - Eutrophic	Highest Phosphorus Sensitivity Wild Rice Lake
South Twin	1,101	Deep Lake	Stable (1997-2019)	45 - Mesotrophic	Cisco Refuge Lake, Higher Phosphorus Sensitivity
Strawberry	1,445	Deep Lake	Stable (2000-2019)	41 - Mesotrophic	Higher Phosphorus Sensitivity
White Earth	1,980	Deep Lake	Improving (1978-2019)	38 - Oligotrophic	Cisco Refuge Lake, Outstanding Bio. Sig.; Lake Sturgeon reintroduced
Lower Rice	2,018	Shallow Lake	Insufficient data	58 - Eutrophic	Outstanding Bio. Sig. Wild Rice Lake



Lake sturgeon once inhabited the Red River and its tributaries and lakes, but their populations were decimated as a result of habitat alterations, dam construction and sediment. In the 2000s, sturgeon were introduced to White Earth Lake and other surrounding lakes by the White Earth Department of Natural Resources and are now thriving again.

Forests, wetlands and lake-rich areas are quality **habitat** for fish and wildlife and enjoyable terrain for recreation. Boating, fishing, and waterfowl, small game and deer hunting are regular pastimes in the area. There are many publicly owned designated wildlife management areas to protect these riches (Figure 2-11). The Minnesota Biological Survey has designated 32 square miles as outstanding (areas that contain the rarest species of plants and animals and the most ecologically intact or functional landscape) and 116 square miles of high biological significance (good occurrences of rare species of plants and animals and important functional landscapes).

The Wild Rice – Marsh Watershed has a large **stream** network that weaves through the landscape as it makes its way to the Red River. There are twice the number of intermittent streams as there are perennial streams.

Rivers and streams have seasonally variable patterns in their flows of water, nutrients and sediments. Nature has its own built in methods for storing water (wetlands) and draining excess rainwater from the landscape (intermittent streams). When humans began farming in the Red River Valley, they began draining the water off the landscape more quickly to increase acreage for farming. These practices include ditches, culverts and dams, and are referred to as altered watercourses (Figure 2-7). When water is drained more quickly it also causes more nutrients and sediment to move into the streams and rivers. This sediment can affect habitat quality for fish and wildlife, including covering habitat structures such as rubble and woody debris and causing unstable dissolved oxygen and increased turbidity. Monitoring data illustrates these changes in the many listed stream impairments (Figure 2-8).



Photo credit: Annette Drewes

Figure 2-6. Upper Rice Lake.

Stream Miles in the Wild Rice – Marsh River Watershed

- 876 miles of intermittent stream
- 637 miles of intermittent drainage ditch
- 476 miles of perennial stream
- 50 miles of perennial drainage ditch

Source: DNR 2003



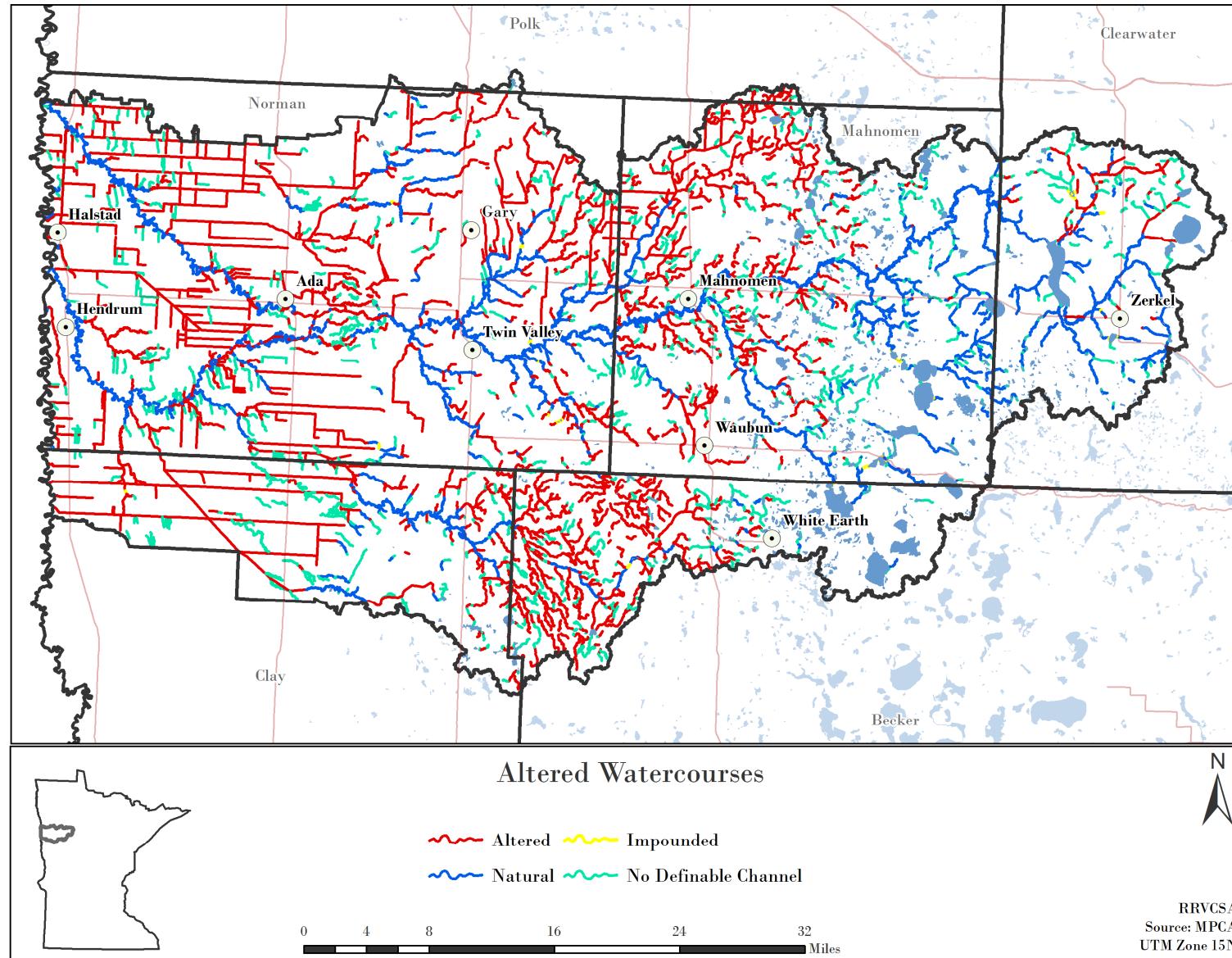
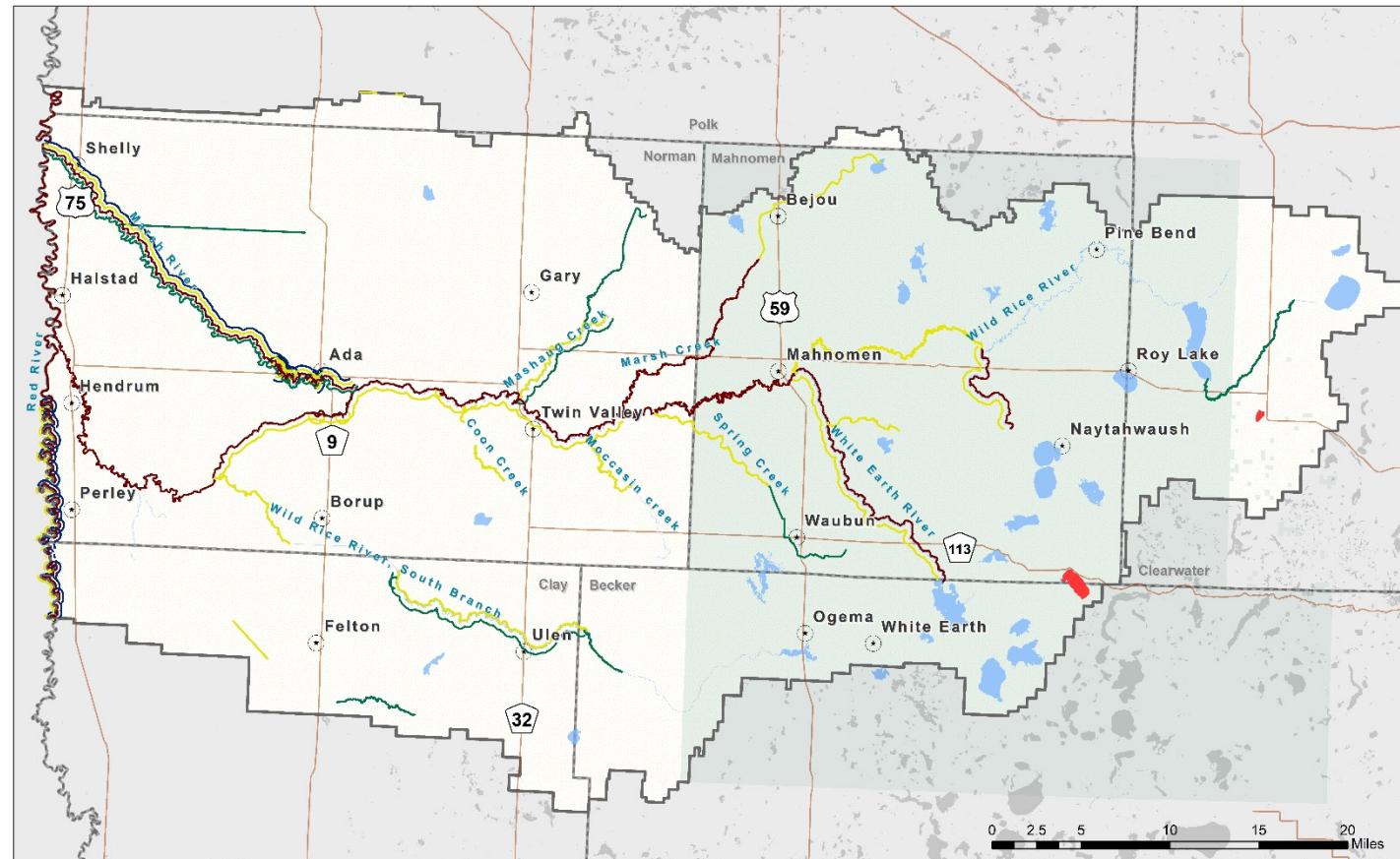


Figure 2-7. Altered watercourses in the Wild Rice - Marsh Watershed.





Wild Rice - Marsh River Watershed Draft 2020 Impaired Waters List



Major Streams		County Boundaries		Impairments			
	Major Roads		White Earth Nation		Nutrients (TP)		Bacteria (FC, E. coli)
					Sediment (TSS, T)		Dissolved Oxygen
					Biological (F-IBI, M-IBI)		



Figure 2-8. Impaired waters in the Wild Rice - Marsh River Watershed (MPCA 2017a, MPCA 2017b).



In 2014, the Minnesota Pollution Control Agency (MPCA) embarked on the Intensive Watershed Monitoring effort for the Wild Rice River Watershed and the Marsh River Watershed, as part of the **Watershed Restoration and Protection Strategy (WRAPS)** projects. This monitoring effort consisted of assessing existing data and collecting new data, including biological data (fish and aquatic macroinvertebrates). This assessment resulted in the identification of many new impairments in waterbodies that do not meet state standards for water quality (Figure 2-8, Table 2-2).

Stressors are sources that are impacting or threatening the fish and aquatic macroinvertebrate communities. In the Wild Rice WRAPS, the greatest stressor was altered flow regime, in which periods of high flow contribute to high turbidity and sediment loading and low flow contributes to elevated water temperatures and resulting low dissolved oxygen. The majority of these impairments occur in the western half of the basin within the Lake Agassiz Plain that has been heavily drained to facilitate row crop agriculture. This planning process can work to find ways to improve these impaired water bodies.

Groundwater dynamics in the Wild Rice – Marsh River Watershed are also a relic of glacial activity. The Lake Agassiz plain has very low groundwater pollution sensitivity, while the far eastern side of the watershed

Table 2-2. Impairment descriptions in the Wild Rice - Marsh River Watershed (Figure 2-8, MPCA 2017a, MPCA 2017b).

Impairment	Description
M-IBI	Shows if the stream is healthy for invertebrates (insects, crayfish, etc)
F-IBI	Shows if the stream is healthy for fish.
Dissolved Oxygen (DO)	Fish and aquatic invertebrates need oxygen to survive. Unstable dissolved oxygen levels affect the suitability of the stream for these organisms.
<i>E.coli</i> , Fecal Coliform (FC)	<i>E.coli</i> and FC bacteria come from warm-blooded animals. High levels indicate fecal contamination in the water which can be harmful to humans who have direct contact with the water.
Turbidity/Total Suspended Solids (T/TSS)	Turbidity and TSS are measures of how cloudy the water is from sediment. Sediment can come from land and streambank erosion.

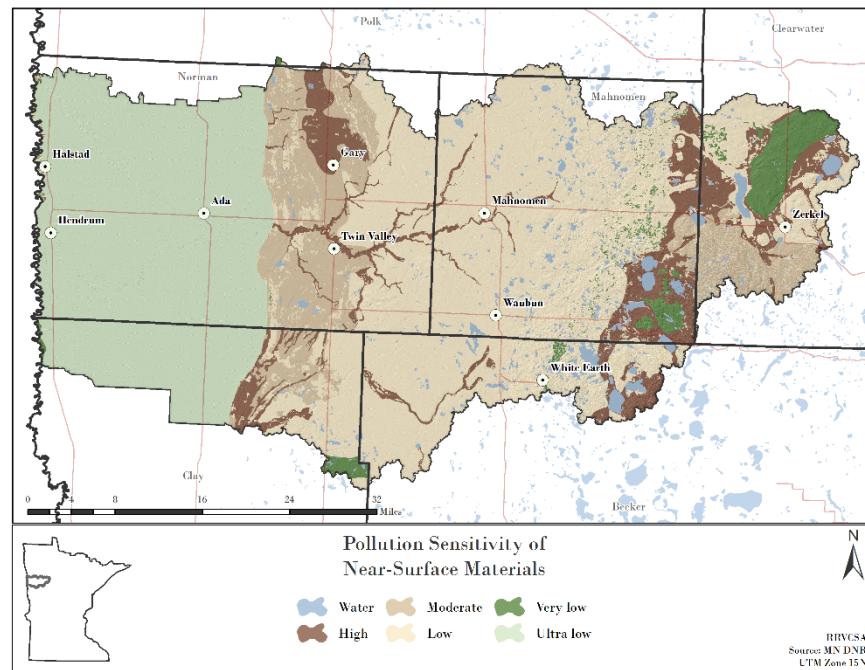


Figure 2-9. Groundwater sensitivity to pollution in the Wild Rice River Watershed (DNR WHAF).



is highly sensitive. Since the eastern side of this watershed is mainly forested, groundwater quality is not a priority concern. There are six Drinking Water Supply Areas (DWSMAs) in the watershed but they are all classified as having low vulnerability (DNR WHAF).

From 1994-2013 ground water withdrawals have been increasing, largely driven by agricultural irrigation, so groundwater quantity could be an emerging concern.

Land ownership in the Wild Rice – Marsh Watershed is a mixture of private, public and tribal land (Figure 2-10). The White Earth Reservation, established in 1867 by treaty, covers a large portion of the eastern half of the watershed (Figure 2-8). The state land consists of numerous wildlife management areas scattered throughout the watershed (Figure 2-11).

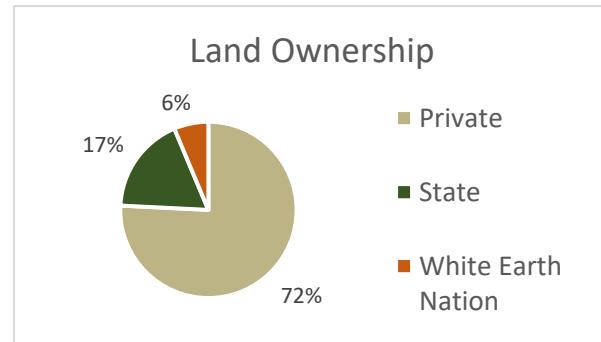


Figure 2-10. Land ownership in the Wild Rice Watershed.

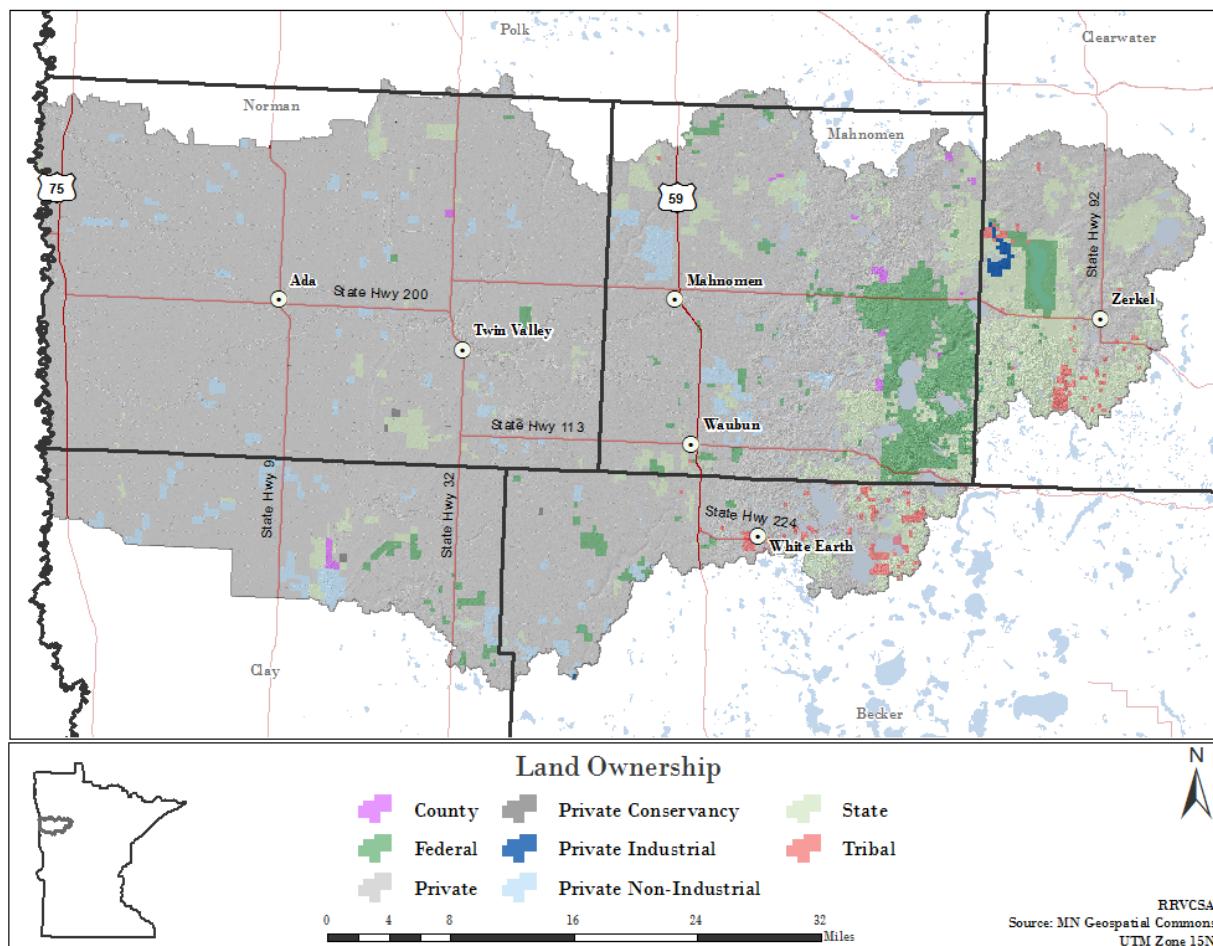


Figure 2-11. Map of land ownership in the Wild Rice - Marsh River Watershed.



Historical increases in altered watercourses and drainage of wetlands has also contributed to more frequent and more severe **flooding** in the watershed and downstream in the Red River, which can have negative economic and environmental consequences.

Because of its history of flooding, the Red River Basin has worked to coordinate flood damage reduction on a basin-wide scale.

The main options for reducing runoff and flooding described in the Red River Basin Flood Damage Reduction Framework (Technical Paper No 11) include the following projects. Depending on the situation and location, nearly all methods have been deployed to some extent in the Wild Rice – Marsh Watershed.

1. **Reduce flood volume** – includes practices such as wetland restoration, cropland best management practices and conversion of land use to perennial grassland or forest (increases evapotranspiration).
2. **Increase conveyance capacity** – includes practices such as ditch maintenance, agricultural drainage, diversions, setting back existing levees and increasing road crossing capacity.
3. **Increase temporary flood storage** – includes practices such as impoundments, wetland restoration, culvert sizing and levees.
4. **Protection/avoidance** – includes practices such as urban, farmstead and agricultural levees, evacuation of the floodplain and flood-proofing.

The Wild Rice Watershed District was originally formed to reduce flood damage in the watershed, and now also manages water quality and natural resources. Flood damage reduction and protection projects have primarily included ring dikes around rural residences, community flood protection, improving public infrastructure and drainage systems, urban stormwater management, and increasing temporary flood storage. The Watershed District works together with the White Earth Band of Ojibwe and Soil and Water Conservation Districts to manage the abundant water resources in the watershed.

The main **economy** in the watershed is cultivated crops, with corn, soybeans and sugar beets most common. These crops are important to the nation's food source. The population in the watershed has not changed much over time and is currently 17,121 people (Figure 2-13). Most of the new development pressure is focused around the lakeshore in the eastern half of the watershed.



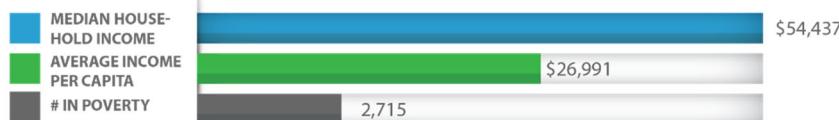
Figure 2-12. Flooded farm field.



2017 US CENSUS AMERICAN COMMUNITY SURVEY WEIGHTED BY % BLOCK GROUP IN PLANNING REGION



MEDIAN AGE: 41
UNDER 18: 4,596
OVER 65: 3,018



2017 CENSUS OF AGRICULTURE WEIGHTED BY % OF EACH COUNTY IN PLANNING REGION



CATTLE: 276
POULTRY: 61

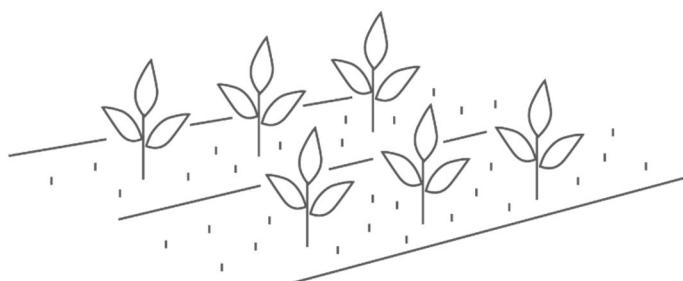


Figure 2-13. Socioeconomic information for the Wild Rice Marsh Watershed.



Future

Along with the transitions over the landscape, there have also been transitions occurring over time in the Wild Rice – Marsh Watershed. The main changes that have occurred since pre-settlement times include:

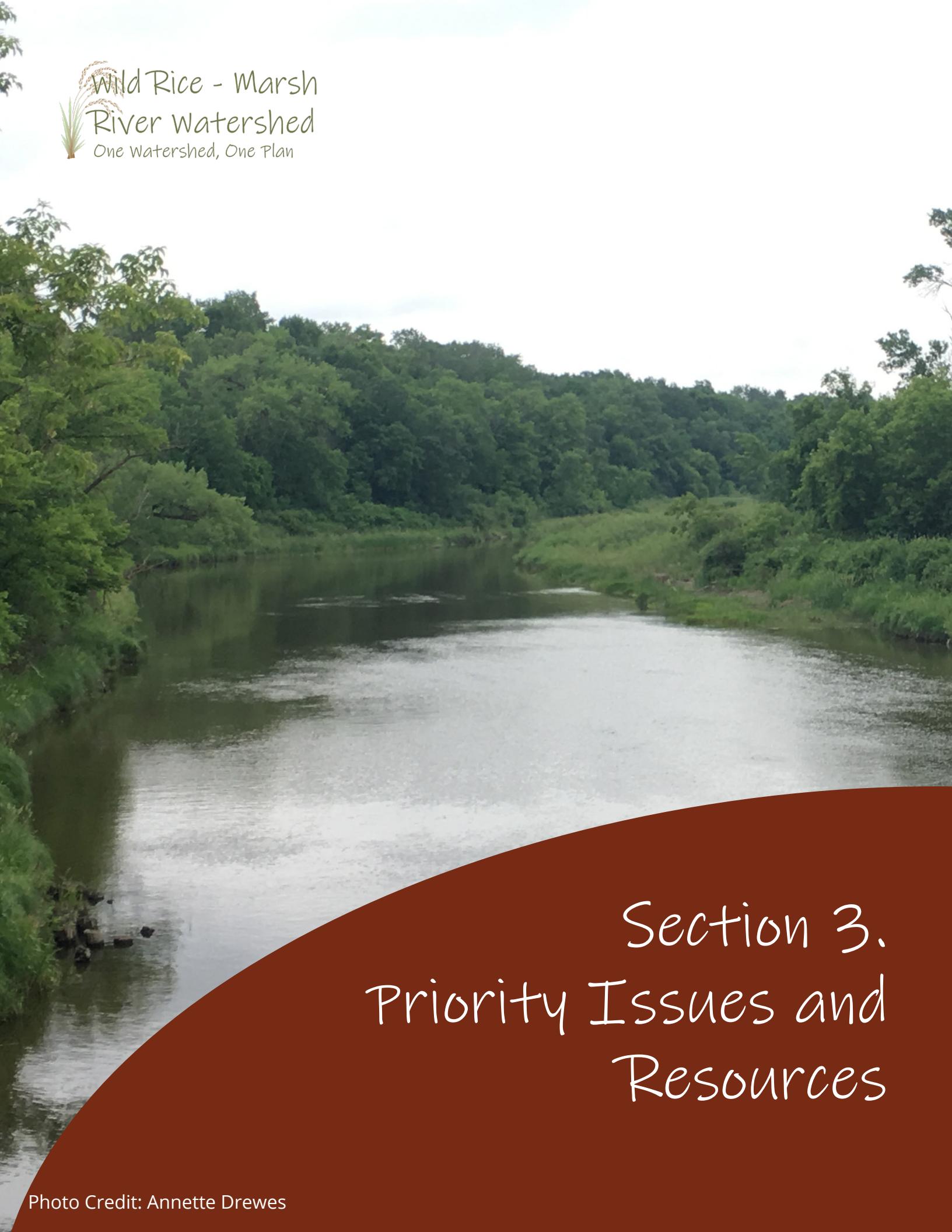
- **Loss of wetlands** - In a comparison of hydric soils (soils that were historically saturated with water) and current wetlands, the wetlands have decreased from 881 square miles to 222 square miles (DNR WHAF), which amount to a 75% decrease in wetland coverage. A decrease in wetlands can contribute to flooding as there is less water being stored on the landscape.
- **Altered hydrology** – With row crop agriculture comes a tendency to drain water off the landscape more quickly than it does naturally, which has resulted in severe physical alteration (channelization, ditching, and impoundments) of the original waterbodies. This altered hydrology can increase the frequency and severity of flooding, increase the sediment and nutrients in streams and decrease habitat quality for aquatic organisms.
- **Lakeshore development** – Humans are drawn to water, and beautiful lakes are an attraction for human settlement. With increased settlement can come a tendency to alter the shoreline and build impervious surfaces. These changes can increase the nutrient and sediment runoff into the lake, affecting water quality and habitat for fish and aquatic organisms.

With an eye on the past and a foot in the future, the Wild Rice – Marsh River Watershed can be managed in a fashion that produces abundant crops, fosters soil health, reduces seasonal flooding, and protects the abundant lakes and rivers within its boundaries for all to enjoy.



Figure 2-14. Looking west from Highway 59.





Section 3. Priority Issues and Resources

Section 3. Priority Issues and Resources

An issue is a problem, risk, or opportunity related to a resource's condition. A resource is a feature on the landscape such as a lake, stream, productive soil, or forests. This planning process is meant to prioritize which resources are most important to the local area and what issues might be affecting them. The next sections of this plan (Section 4. Measurable Goals, Section 5. Targeted Implementation Schedule) address what can be done regarding these issues in order to protect or restore these resources.

To determine the priority issues in the Wild Rice – Marsh (WRM) Watershed, the first step was to gather existing local plans, data and reports. Using these references and additional brainstorming, the Steering Committee and Advisory Committee went through multiple discussions of issues and resource concerns identified in the watershed, which resulted in 51 issues. The Steering Committee then discussed removing issues about outreach, funding, coordination and capacity as those will be addressed in plan actions. This left issues that only address resources. The Advisory and Policy Committees agreed, which resulted in a final list of 28 issues (Figure 3-1).



Figure 3-1. Issue prioritization process in the WRM Watershed.



The 28 issues were organized into resource categories for ease of reference: surface water, land stewardship, groundwater, and habitat (Table 3-1).

Table 3-1. Resource categories in the WRM Watershed.

	Surface water resources include lakes, streams, wetlands, and drainage systems.
	Land stewardship resources include agricultural land and the combination of land, water, and habitat affected by flooding.
	Groundwater resources include the aquifer and drinking water.
	Habitat resources include terrestrial resources such as forests and grasslands, aquatic resources such as fish and macroinvertebrate habitat, and unique features such as wild rice, calcareous fens, and beach ridges.

Issue Prioritization

These 28 issues needed further prioritization to target efforts in the watershed where they are most needed. In July of 2019, the Steering Committee organized a public kick-off event. At this event, large maps of the watershed were hung on the wall, and participants were given the opportunity to mark locations of their priorities on the maps. In conjunction with the public kick-off, a survey was developed to gather priorities from those present at the event and allow those that were not able to attend the event to provide their input. The survey was emailed to key people in the watershed including the Policy Committee, county boards, SWCD boards, and watershed residents. It was also posted on the Wild Rice Watershed District's web page. The purpose of the survey was to gain the following information from participants:

- **What are their top-rated issues and opportunities they would like included in the plan?**
- **What resources would they like prioritized for protection and restoration?**

The highest priority issues from the survey were flooding, unstable and degraded drainage ditches, soil erosion, and wetland protection. The highest priority resources were productive farmland, hunting and recreational land, lakes, wild rice and the Wild Rice River.



In the survey, respondents were also asked:

- Using just 4-5 words, when you think of the Wild Rice - Marsh Watershed, what comes to mind?

The responses were summarized in the word cloud below (Figure 3-2). These responses relate to many of the identified issues in the plan and were also used in the watershed's vision statement (Section 1. Executive Summary). A full summary of the public survey results can be found in Appendix C.

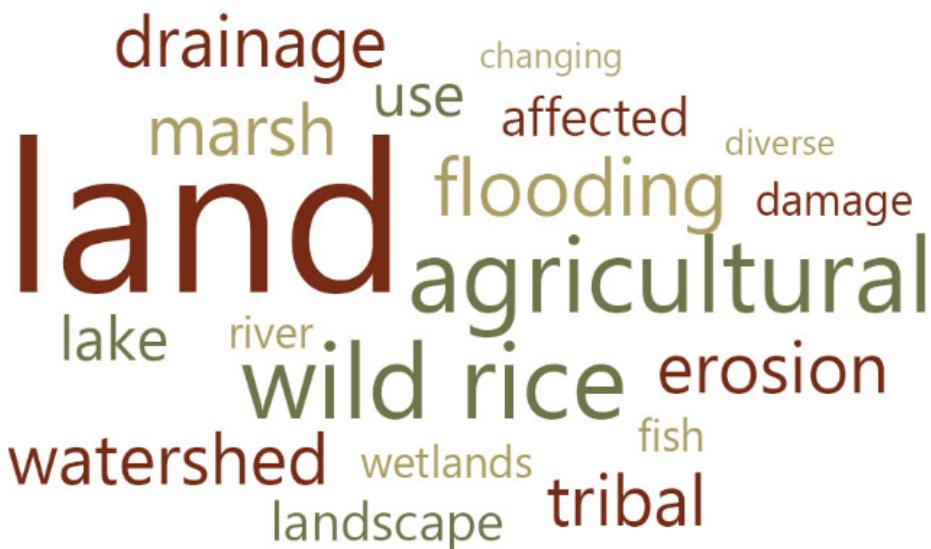


Figure 3-2. Word cloud responses from the public survey about what comes to mind when thinking of the WRM Watershed.

Using the feedback from the public survey, the state agency priorities summarized in their 60-day letters, and the existing plans, data and reports, the Steering Committee and Advisory Committee prioritized the issues into three categories: A, B, and C (Figure 3-1). At this time, they also combined some issues, which narrowed the list from 28 to 18 issues (Figure 3-1). The priority A and B issues have goals written for them (Section 4. Measurable Goals). Priority A issues are the first priority for effort and funding in this plan. Priority B issues are the second priority and will be addressed as time and funding allow. Priority C issues are not a priority in this plan because they are either addressed by another plan or funding source, are an emerging issue, or are low priority. Priority A, B, and C issues are summarized in the following pages.



Priority A Issues

Priority A issues will be the primary focus for funding and effort in this 10-year plan.

Resource Category	Resource Affected	Issue Statement
	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.
	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment loading to streams and drainage systems.
	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.
	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .
	Wild Rice	Wild rice needs continued protection for habitat, cultural, economic, and wildlife benefit.



Priority B Issues

Priority B issues are important, and will be addressed as time, funding, and partnerships allow.

Resource Category	Resource Affected	Issue Statement
	Drinking Water	Groundwater is vulnerable to contamination from numerous sources.
	Forests, Grasslands	Terrestrial habitat , including forests and grasslands, is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
	Unique Features	Sensitive and ecologically significant resources such as beach ridge areas and calcareous fens need continued and increased protection from degradation.
	Lakes	Development pressure on lakes affects riparian habitat, shoreline erosion and runoff.
	Streams	Increased bacteria (E. coli) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.



Priority C Issues

Priority C issues were identified in the planning process but will not be a priority in the 10-year plan. This is because they are either a low priority, an emerging issue, or are already addressed in other existing plans.

- Increased **nitrogen** loading contributing to elevated concentrations in waterbodies. [*low priority*]
- Groundwater **sustainability** is vulnerable to overuse and loss of recharge. [*emerging issue*]
- **Aquatic Invasive Species (AIS)** impacts on habitat, recreation, and economic development. [*already addressed by the county AIS plans and AIS funding*].
- Increased **access** to public land and public waters. [*low priority*]



Figure 3-3. Photos from the Public Kick-off event held July 22, 2019.



Issue Prioritization by Planning Region

The WRM Watershed is very different in land use and resource quality from east to west. Smaller planning regions were created for the plan to be able to focus on specific concerns in specific regions of the watershed (Figure 3-4). The Steering Committee determined the planning region boundaries based on similar land use, drainage areas, and hydrologic boundaries. For example, the Headwaters Planning Region has a protection focus on lakes and forests while the central beach ridge areas of the Middle Wild Rice and Upper South Branch Wild Rice planning regions focus on restoration projects to reduce sediment.

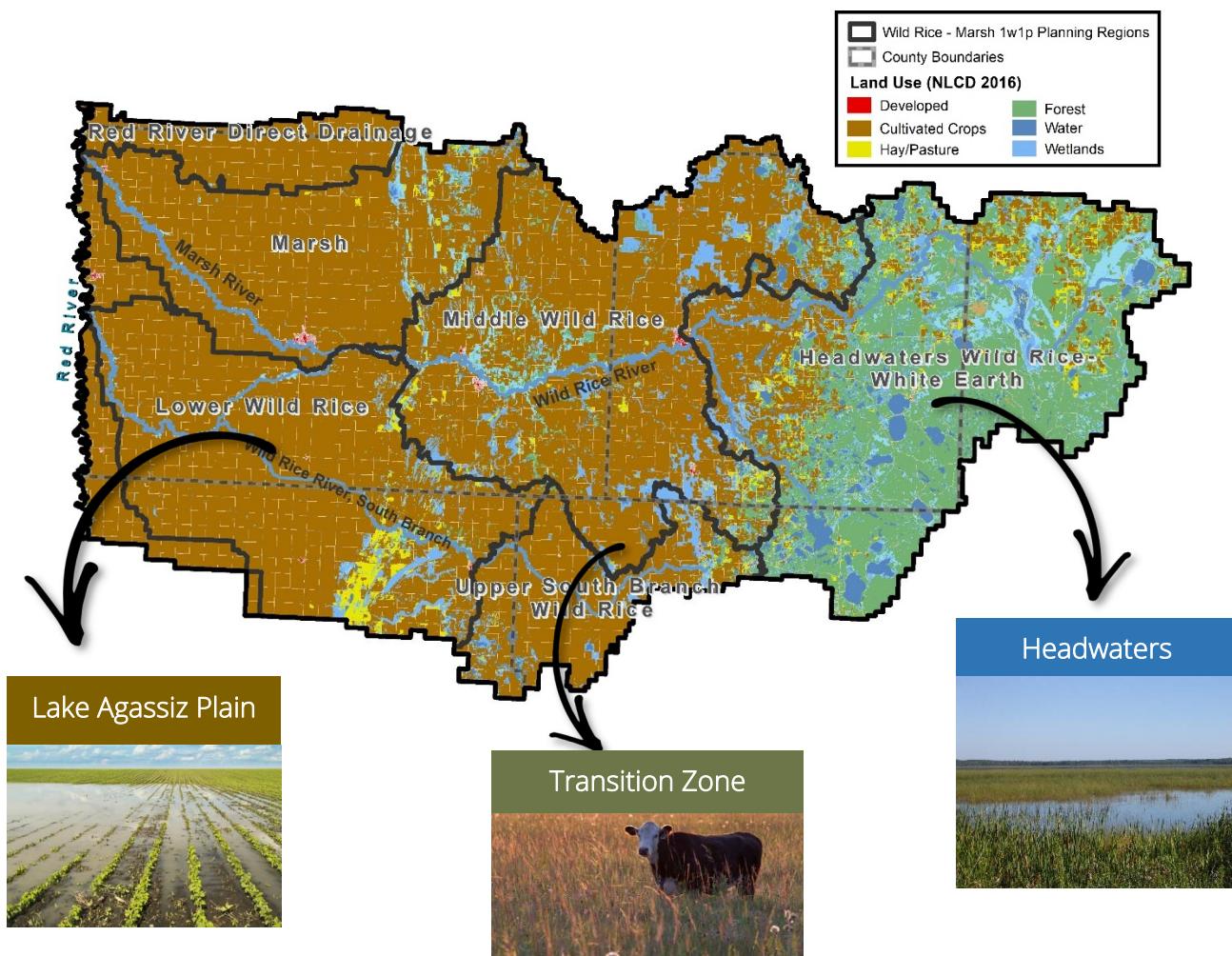


Figure 3-4. Planning Regions in the WRM1W1P on top of land use (NLCD 2016).

At their June 2019 meeting, the Advisory Committee assigned applicable priority issues to each planning region using existing maps, data and the Watershed Restoration and Protection Strategy (WRAPS). Priority issues were determined to be either high or medium priority within the specific planning region. These priorities were presented to the Policy Committee and approved.



Resource Prioritization by Planning Region

At their September meeting, the Advisory Committee discussed priority resources in each planning region, and resources were prioritized as protection or restoration. These priorities were approved by the Policy Committee.



For surface water, restoration indicates a stream that is impaired or has a high potential for impairment as determined by statistical analysis in Appendix D.

Protection indicates a stream that is not impaired or at a high potential for impairment. Lakes were prioritized separately in Table 3-3 based on their shoreline development classification, wild rice priority, and impairments for nutrients. Segments of ditches that are currently experiencing bank failures or downcutting were prioritized for restoration by the counties and WRWD.



Agricultural lands were prioritized by determining where there is the most wind and water erosion. To determine these locations, the critical sediment loss data were analyzed from PTMApp, which is the sediment mass delivered to the catchment outlet (tons/acre/year). Using these data in combination with some statistical analysis and a wind erosion analysis from Becker SWCD, the top 25% of land units are shown where the most sediment erosion is occurring within the watershed. These areas are targeted for restoration.



Privately owned forestlands were prioritized by a GIS analysis that determines where the highest risk of conversion to non-forested land uses is located (Becker SWCD).

These areas are targeted for protection, which consists of forest management plans and the Sustainable Forest Incentive Act (SFIA). Grasslands were prioritized using the Minnesota Prairie Plan. These areas are targeted for protection with grazing management plans, CRP, and CREP. Sensitive land features such as beach ridges and calcareous fens were prioritized by determining their locations in GIS and are targeted for protection. Wild Rice was prioritized in areas where it is important for harvest. The DNR and the White Earth Nation provided input on priority lakes. These areas are prioritized for protection with easements.



Groundwater was prioritized using Minnesota Department of Health Data that show where it is the most sensitive. These most sensitive areas are prioritized for protection.

During the planning process, the Steering Committee expressed their preference to have issues, resources, and actions in this plan specific to each planning region. This way, they can focus on the planning region(s) that falls within their jurisdictional boundary. Therefore, in the following pages, the priority issues and resources are summarized specific to each planning region. There is some repetition between planning regions, especially in the western third of the watershed, but the intent is that the pages about each planning region can stand alone.



Headwaters Planning Region



The Headwaters Planning Region has multiple lakes and wetlands, native wild rice, and a low population density. It spans Clearwater, Becker and Mahnomen counties and contains the towns of Naytahwaush, Roy Lake and Pine Bend. The western half of this region is contained within the White Earth Nation. Much of the land is publicly owned, open water, or wetlands; therefore, development pressure is moderate. There are some pasture operations scattered throughout the planning region, and the western end of the planning region is mainly agricultural lands.

Priority Issues

High Priority Issues

Category	Resource	Issue Statement
	Wild Rice	Wild rice needs continued protection for habitat, cultural, economic, and wildlife benefit.
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.

Medium Priority Issues:

	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.



	Forests, Grasslands	Terrestrial habitat, including forests and grasslands, is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
	Lakes	Development pressure on lakes affects riparian habitat, shoreline erosion and runoff.
	Streams	Increased bacteria (<i>E. coli</i>) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.

Priority Resources

Overall, the land and water resources in the Headwaters Planning Region are in excellent condition. The streams in the Headwaters of the Wild Rice River are forested, and streams flow between lakes that have wild rice. Wild rice lakes that are significant for harvest were prioritized for protection in this plan with input from the White Earth Natural Resources Department and the DNR. There is one stream listed as impaired in the 2020 Draft Impaired Waters List for fish IBI (F-IBI), the Wild Rice River upstream of Lower Rice Lake (bold, Table 3-2). This impairment is due to a barrier to fish passage (MPCA 2018a). There is future potential for TSS and *E.coli* impairments in some stream reaches that are also targeted for restoration. The remaining streams can be the focus of protection (Table 3-2).

Wetlands are a medium priority issue for the Headwaters Planning Region. Wetlands are integral to water storage and filtration, habitat, and maintaining lake water levels and are sited for continued protection and restoration in the Headwaters Planning Region.



Figure 3-5. White Earth River.



What happens on land affects both the land and the water. Land use changes are putting pressures on terrestrial habitat including the forests, grasslands, and aquatic habitat in this planning region. Forests and grasslands provide continuous vegetative cover to the landscape, providing habitat for numerous birds, pollinators, and other animals, and reducing erosion into lakes and streams. The management focus is to protect what is in good condition and restore what has been impacted.

Table 3-2. Priority resources in the Headwaters Planning Region and Management Focus.

Color on Fig. 3-8	Resource	Management Focus	Description of Priorities
	Streams	Restoration*	<ul style="list-style-type: none"> Wild Rice River, Unnamed Creek to Lower Rice Lake (F-IBI) White Earth River, White Earth Lake to Wild Rice River (TSS) Wild Rice River, Twin Lake Creek to White Earth River (TSS) Twin Lake Creek (E.coli, TSS) Whiskey Creek (E.coli, TSS) Mosquito Creek (TP)
	Streams	Protection	<ul style="list-style-type: none"> Wild Rice River, Lower Rice Lake to Twin Lake Creek Tulaby Creek Gull Creek
	Lakes	Protection and Restoration	See Table 3-3.
	Wild Rice	Protection	Lower Wild Rice, Upper Wild Rice, Mud, Big Rat, Roy lakes, see Table 3-3.
	Wetlands	Protection	Wetlands are protected by the Wetland Conservation Act.
	Agricultural Land	Restoration	Areas with the highest potential for wind and water erosion are identified and targeted for soil health practices.
	Forest Land	Protection	Areas with the highest risk of forest loss are identified and targeted for forest management and protection (see page 92 in Goals Section).
	Grassland	Protection	Areas prioritized in the Minnesota Prairie Plan are targeted for grazing management plans (see page 90 in Goals Section).

*Impaired reaches are indicated in bold (2020 Draft Impaired Waters List). The remaining reaches labeled "Restoration" have a high potential for impairments based on a water quality sample statistical analysis. Full analysis results can be found in Appendix D.



The lakes in the Headwaters Planning Region have relatively lower development and disturbance than in other neighboring watersheds (Otter Tail, Crow Wing, and Mississippi Headwaters). The lakes were divided into different categories for management based on the issues they face (Table 3-3).

Table 3-3. Lake prioritization.

24 Lakes in the Headwaters Planning Region			
Natural Environment (12 lakes)		Recreational Development (12 lakes)	
<p>Natural Environment Lakes usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winter kill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep.</p>			
Wild Rice Priority	Other	Impaired	Not Impaired
Lower Wild Rice	Bass (Mahnomen)	Tulaby	White Earth
Upper Wild Rice	Lone	Rockstad	Strawberry
Mud	McKenzie		Island
Big Rat	Waptus		Sargent
	Bass (Becker)		North Twin
	Fish Hook		South Twin
	Jackson		Snider
	Fish		Roy*
			McCraney
			Minerva
Color in Fig. 3-6	Color in Fig. 3-6	Color in Fig. 3-6	Color in Fig. 3-6
These lakes will be targeted for Wild Rice Easements.	These lakes have some protections with Natural Environment status.	Tulaby Lake will be targeted for phosphorus reduction. Rockstad Lake is small and shallow and a lower priority.	These lakes will be targeted for shoreline restoration projects.

*Roy Lake is prioritized for both wild rice protection and shoreline restoration. It is a Recreational Development Lake.



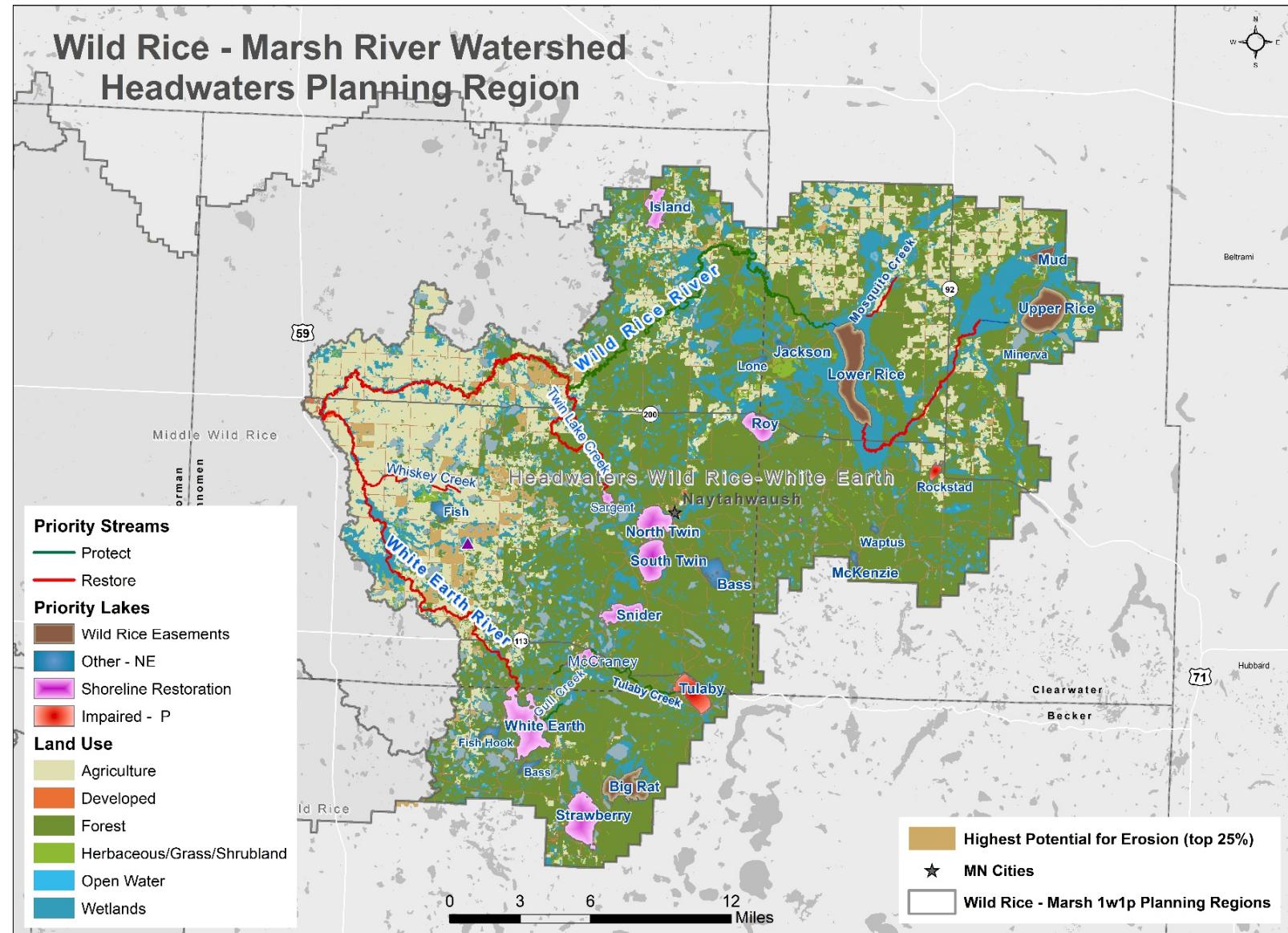


Figure 3-6. Headwaters Planning Region land use and priority resources. Specific resource conditions are described in Table 3-2, 3-3.



Middle Wild Rice Planning Region



The Middle Wild Rice Planning Region is a transition zone between the lakes and forests in the east and the agricultural lands to the west. There are many unique landscape features such as the Lake Agassiz beach ridges, native prairie, and calcareous fens. It contains the cities of Gary, Twin Valley, Mahnomen, Waubun and Bejou and Mahnomen, Becker, and Norman counties. Most of the eastern half of the planning region falls within the White Earth Nation. There are a wide variety of issues identified for this planning region.

Priority Issues

High Priority Issues

Category	Resource	Issue Statement
	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.
	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.
	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .



Medium Priority Issues

	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.
	Drinking Water	Groundwater is vulnerable to contamination from numerous sources.
	Forests, Grasslands	Terrestrial habitat , including forests and grasslands , is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
	Unique Features	Sensitive and ecologically significant resources such as beach ridge areas and calcareous fens need continued and increased protection from degradation.
	Streams	Increased bacteria (<i>E. coli</i>) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.

Priority Resources

Agricultural land and related drainage systems and rivers and streams are resources identified as high priority in this planning region. The Lake Agassiz Plains ecoregion begins near the western edge of the Headwaters Planning Region and extends toward the Red River, providing fertile soils for corn, soybeans, small grains, and sugarbeet crops in the Middle Wild Rice Planning Region. Accordingly, the maintenance of soil health is of primary importance here, to improve and protect agricultural productivity, water-holding capacity, and stream health. Flooding is a medium priority issue in this region. With many miles of floodplain adjacent to numerous streams, increasing the health of agricultural crop land can play an important role in water retention for flood prevention.

The Wild Rice and Marsh Watersheds were assessed in 2014-2015, and there are some streams listed as impaired (bold, Table 3-4) (MPCA 2017a, MPCA 2017b). The north portion of Marsh Creek shows the potential for future impairment. Mashaug Creek, Marsh Creek, and the Middle Wild Rice River are prioritized for streambank stabilization. Beaulieu, Aspinwall, and Chief lakes are mainly surrounded by agriculture, have some protections with Natural Environment shoreline classification, and are subject to the buffer law.

Table 3-4. Priority resources in the Middle Wild Rice Planning Region.

Color in Fig. 3-7	Resource	Management Focus	Description of Priorities
	Streams	Restoration*	<ul style="list-style-type: none"> Marsh Creek, north portion (<i>E.coli</i>, TP, Stream Channel Integrity) Marsh Creek, south portion (Turbidity) Wild Rice River, White Earth River to Marsh Creek (TSS, Stream Channel Integrity) Mashaug Creek (<i>E.coli</i>, M-IBI, F-IBI) Coon Creek (<i>E.coli</i>) Unnamed/Moccasin Creek (<i>E.coli</i>, TP, Stream Channel Integrity) Garden Slough, Headwaters to Mashaug Creek (F-IBI) Wild Rice River, Marsh Creek to Unnamed Creek (<i>E.coli</i>, Turbidity) Spring Creek (<i>E.coli</i>)
	Lakes	Protection	Chief, Beaulieu, and Aspinwall have buffer law requirements.
	Drainage systems	Restoration	Sections of these ditches are prioritized for stabilization: <ul style="list-style-type: none"> Norman County Ditch 9 Norman County Ditch 8 Norman County Ditch 29
	Unique Features	Protection	Beach ridges and calcareous fens are targeted for protection.
	Wetlands	Protection	Wetlands are protected by the Wetland Conservation Act.
	Agricultural Land	Restoration	Top 25% of areas with the highest potential for wind and water erosion are identified and targeted for soil health practices.
	Grassland	Protection	Areas prioritized in the Minnesota Prairie Plan are targeted for grazing management plans (see page 90 in Goals Section).
	Drinking Water	Protection	Areas with high susceptibility to contamination are prioritized for well sealing and protection.

*Impaired reaches are indicated in bold; F-IBI = Fish IBI and M-IBI = Macroinvertebrate IBI (2020 Draft Impaired Waters List). The remaining reaches labeled "Restoration" have a high potential for impairments based on a water quality sample statistical analysis. Full analysis results can be found in Appendix D. Corridor Habitat and Stream Channel Stability were priorities in certain stream reaches and are addressed with goals in Section 4.

The Middle Wild Rice Planning Region is also home to land and terrestrial habitat such as native prairie and grasslands. Since the Middle Wild Rice Planning Region falls within the glacial Lake Agassiz beach ridges and transition zone from forests to prairie, there are many unique habitat resources such as calcareous fens and prairie potholes. Another sensitive resource in this area is groundwater; the western half of this planning region is highly susceptible to contamination (Figure 3-7).



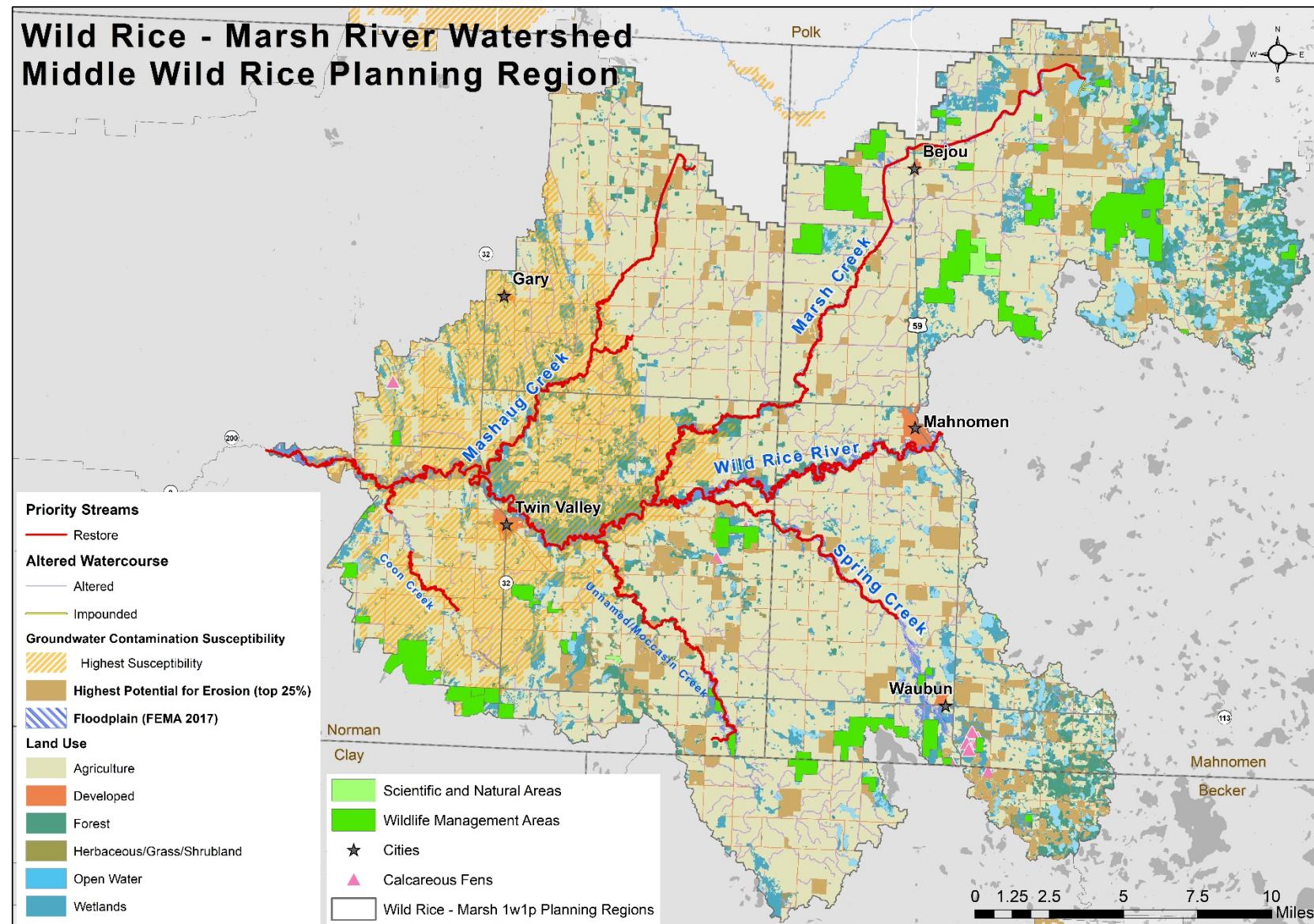


Figure 3-7. Land use and priority resources in the Middle Wild Rice Planning Region. Specific resource conditions are described in Table 3-4.



Upper South Branch Wild Rice Planning Region



The Upper South Branch Wild Rice is an agricultural planning region with concentrations of shallow lakes and wetlands in the lower western and upper eastern corners. Calcareous fens extend into the wetlands in the west, offering unique habitat to the area. It sits mostly within Becker County, with small areas in Mahnomen, Norman, and Clay counties. Towns in the area include White Earth and Ogemaw.

Priority Issues

High Priority Issues

Category	Resource	Issue Statement
	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.
	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.



Medium Priority Issues

Category	Resource	Issue Statement
	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .
	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.
	Forests, Grasslands	Terrestrial habitat , including forests and grasslands , is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
	Unique Features	Sensitive and ecologically significant resources such as beach ridge areas and calcareous fens need continued and increased protection from degradation.
	Streams	Increased bacteria (E. coli) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.

Priority Resources

Priority resources in the Upper South Branch Planning Region include agricultural land, lakes, wetlands, and the South Branch of the Wild Rice River. Surface water and land stewardship concerns reflect the economic history of the watershed.

The South Branch of the Wild Rice River and its associated planning region are host to a collection of ecologically significant resources such as calcareous fens in the north eastern wetlands. Several Wildlife Management Areas (WMAs) and Scientific Natural Areas (SNAs) support the conservation of these resources in addition to native prairies and grasslands that dot the region. The Minnesota Prairie Plan has identified core and corridor areas that are a high priority for keeping continuous vegetation on the landscape to provide habitat for numerous species including birds, migrating waterfowl, pollinators, and other animals.

The middle section of the South Branch Wild Rice River is impaired for fish IBI (F-IBI) and prioritized for restoration (bold, Table 3-5, Figure 3-9). The headwaters is prioritized for protection.

Table 3-5. Priority Resources in the Upper South Branch Planning Region.

Color in Fig 3-9	Resource	Management Focus	Description of Priorities
Red	Streams	Restoration*	<ul style="list-style-type: none"> South Branch Wild Rice River, western portion (F-IBI) Stiner Creek, Unnamed Creek to South Branch Wild Rice River (TP)
Teal	Streams	Protection	South Branch Wild Rice River, Headwaters
Cyan	Lakes	Protection	Tilde and Rustad have buffer law requirements.
Pink	Unique Features	Protection	Beach ridges and calcareous fens are targeted for protection.
Cyan	Wetlands	Protection	Wetlands are protected by the Wetland Conservation Act.
Brown	Agricultural Land	Restoration	Top 25% of areas with the highest potential for wind and water erosion are identified and targeted for soil health practices.
Green	Grassland	Protection	Areas prioritized in the Minnesota Prairie Plan are targeted for grazing management plans (see page 90 in Goals Section).

*Impaired reaches are indicated in bold; F-IBI = Fish IBI (2020 Draft Impaired Waters List). The remaining reaches labeled "Restoration" have a high potential for impairments based on a water quality sample statistical analysis. Full analysis results can be found in Appendix D.



Figure 3-8. Prairie Pothole region in Northwest Minnesota.

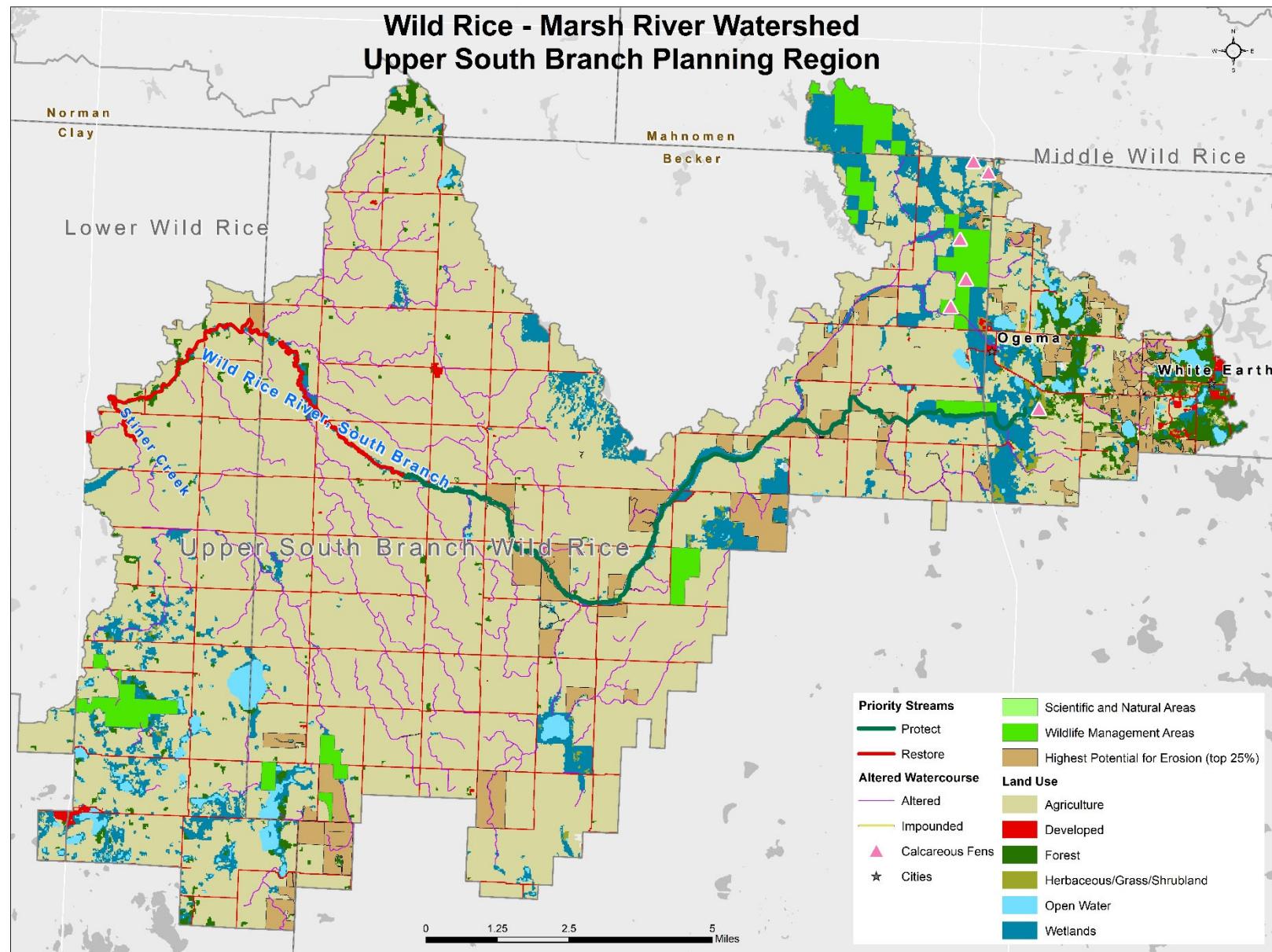


Figure 3-9. Land use and priority resources in the Upper South Branch Planning Region. Specific resource conditions are described in Table 3-5.

Lower Wild Rice River Planning Region



The Lower Wild Rice River Planning Region is dominated by agricultural lands with sparse wetlands in the far eastern portion and some associated calcareous fen habitat. The South Branch of the Wild Rice River runs northwest here after it diverges from the mainstem of the Wild Rice, which empties into the Red River on the western side of this planning region. Hendrum, Felton, Borup, and Ulen are notable population centers in this region that spans Clay and Norman counties. Residents here are concerned about increased flooding, erosion and sediment, riparian health and stream channel integrity resulting from altered hydrology and land use changes.

Priority Issues

High Priority Issues

Category	Resource	Issue Statement
	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.
	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.



	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.
	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .

Medium Priority Issues

Category	Resource	Issue Statement
	Drinking Water	Groundwater is vulnerable to contamination from numerous sources.
	Forests, Grasslands	Terrestrial habitat , including forests and grasslands , is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
	Unique Features	Sensitive and ecologically significant resources such as beach ridge areas and calcareous fens need continued and increased protection from degradation.
	Streams	Increased bacteria (<i>E. coli</i>) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.

Priority Resources

Land stewardship is a high priority in the Lower Wild Rice River Planning Region, along with changes to streams associated with the effects of agricultural production. Agriculture and the people living in the surrounding communities are the lifeblood of the area. Varying land use practices in the watershed have led to an altered hydrological system with large networks of tile drainage and ditches. Altered hydrology can cause increases in erosion and channel instability, reductions in water quality and wetland storage and filtration, and reduced



terrestrial habitat. Much of the area is prone to flooding, and flood damage to communities and farmsteads is a major concern.

Noteworthy stream resources include the South Branch Wild Rice River, which joins the Wild Rice River and then empties into the Red River. There are some *E.coli*, IBI, and turbidity impairments, as indicated in bold in Table 3-6. A large portion of the South Branch Wild Rice river is also prioritized for stream channel stabilization and stream corridor habitat improvement.

Table 3-6. Priority resources in the Lower Wild Rice Planning Region.

Color in Fig 3-10	Resource	Management Focus	Description of Priorities
Red	Streams	Restoration*	<ul style="list-style-type: none"> Wild Rice River, Unnamed Creek to South Branch Wild Rice River (<i>E.coli</i>, Turbidity, Stream Corridor Habitat, Stream Channel Stability) County Ditch 45 (<i>E.coli</i>) Felton Creek/County Ditch 45 (F-IBI, M-IBI) South Branch Wild Rice River, Unnamed Creek to Unnamed Creek (<i>E.coli</i>, M-IBI) South Branch Wild Rice River, T-246 to Wild Rice River (<i>E.coli</i>, Stream Corridor Habitat) Wild Rice River, South Branch to Red River (Turbidity, Stream Corridor Habitat)
Light Blue	Drainage systems	Restoration	Sections of these ditches are prioritized for stabilization: <ul style="list-style-type: none"> Clay County Ditch 4 Clay County Ditch 14 South Branch/Felton Ditch
Pink	Unique Features	Protection	Beach ridges and calcareous fens are targeted for protection.
Cyan	Wetlands	Protection	Wetlands are protected by the Wetland Conservation Act.
Orange	Agricultural Land	Restoration	Top 25% of areas with the highest potential for wind and water erosion are identified and targeted for soil health practices.
Dark Green	Grassland	Protection	Areas prioritized in the Minnesota Prairie Plan are targeted for grazing management plans (see page 90 in Goals Section).
Yellow	Drinking Water	Protection	Areas with high susceptibility to contamination are prioritized for well sealing and protection.

*Impaired reaches and corresponding parameters are indicated in bold; F-IBI = Fish IBI and M-IBI = Macroinvertebrate IBI (2020 Draft Impaired Waters List). Stream Corridor Habitat and Stream Channel Stability were priorities in certain stream reaches and are addressed with goals in Section 4.

This area is rich in natural history, with former prairies, some unique features including beach ridges and calcareous fens, and wetlands in the southeast. Clay and Norman County host several wildlife management areas (WMAs) including Felton and Twin Valley and scientific and natural areas (SNAs) such as Felton SNA which protect the native prairie.



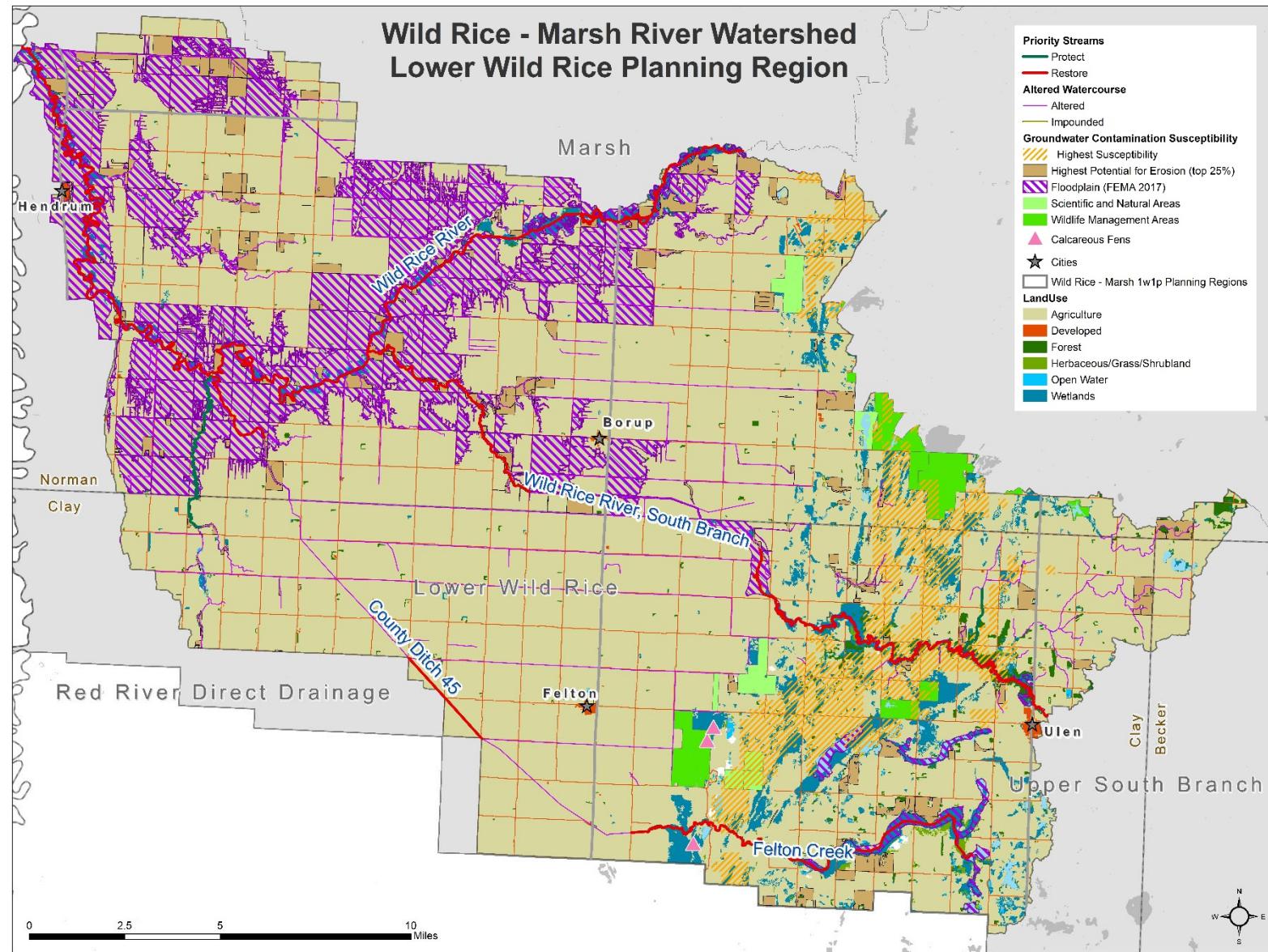


Figure 3-10. Lower Wild Rice River Planning Region land use and priority resources. Specific resource conditions are described in Table 3-6.



Marsh River Planning Region



The Marsh River is an intermittent stream that was channelized to connect to the Wild Rice River so loggers could float their product to buyers on the Red River. Much like neighboring planning regions, the Marsh River is at risk of erosion, flooding, and *E. coli* bacteria in the stream. The economy of the Marsh River Planning Region is dependent on its agricultural lands and two cities, Shelly, and Ada. The counties in this region are Norman and Polk.

Priority Issues

High Priority Issues		
Category	Resource	Issue Statement
	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.
	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.
	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.
	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.



Medium Priority Issues

Category	Resource	Issue Statement
	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .
	Drinking Water	Groundwater is vulnerable to contamination from numerous sources.
	Forests, Grasslands	Terrestrial habitat , including forests and grasslands , is degraded or at risk of degradation, which impacts species richness, diversity and ecologically sensitive resources as well as water quality.
	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
	Unique Features	Sensitive and ecologically significant resources such as beach ridge areas and calcareous fens need continued and increased protection from degradation.
	Streams	Increased bacteria (<i>E. coli</i>) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.
	Wetlands	Wetlands are in continued need of protection and restoration which helps with precipitation storage, maintaining lake water levels, and habitat.

Priority Resources

The Marsh River Planning Region has former prairies, some wetlands, and unique features including beach ridges and calcareous fens. The eastern section of this planning region is located in the beach ridges and sand deltas of the Lake Agassiz Plain. Much of this same area is at higher risk for groundwater contamination.

The eastern third of the region has a high potential for wind erosion. This sediment can affect clean and healthy water resources but can be improved through integrated land management. The Marsh Planning Region is agricultural and family farms are threatened from flooding from the Red and Marsh rivers.

Drainage systems include ditches, culverts, and tile drainage systems used on many farms to remove excess water from the fields. Large portions of the watershed have been hydrologically



altered in order to maintain our valuable agricultural resources. This altered hydrology, along with increased phosphorous and sediment loading, is a high priority issue for drainage systems in the region. As a result, several ditches are prioritized for stabilization here to minimize erosion and improve stream stability, water quality, and aquatic habitat.

The main stream in this planning region is the Marsh River, which is impaired for turbidity, *E.coli*, dissolved oxygen, fish IBI, and macroinvertebrate IBI (Table 3.7, Figure 3-11).

Table 3-7. Priority resources in the Marsh River Planning Region.

Color in Fig. 3-11	Resource	Management Focus	Description of Priorities
Red	Streams	Restoration*	<ul style="list-style-type: none"> • Marsh River (<i>E. coli</i>, Turbidity, DO, F-IBI, M-IBI) • County Ditch 11 (F-IBI)
Light Blue	Drainage systems	Restoration	<p>Sections of these ditches are prioritized for stabilization:</p> <ul style="list-style-type: none"> • Norman County Ditch 18 • Norman County Ditch 22 • Norman County Ditch 25 • Norman County Ditch 38 • Norman County Ditch 45 • Norman County Ditch 69 • Judicial Ditch 5; Laterals 1 and 2
Pink	Unique Features	Protection	Beach ridges and calcareous fens are targeted for protection.
Blue	Wetlands	Protection	Wetlands are protected by the Wetland Conservation Act.
Brown	Agricultural Land	Restoration	Areas with the highest potential for wind and water erosion are identified and targeted for soil health practices.
Green	Grassland	Protection	Areas prioritized in the Minnesota Prairie Plan are targeted for grazing management plans.
Yellow	Drinking Water	Protection	Areas with high susceptibility to contamination are prioritized for well sealing and protection.

*Impaired reaches and corresponding parameters are indicated in bold; F-IBI = Fish IBI and M-IBI =

Macroinvertebrate IBI (2020 Draft Impaired Waters List).



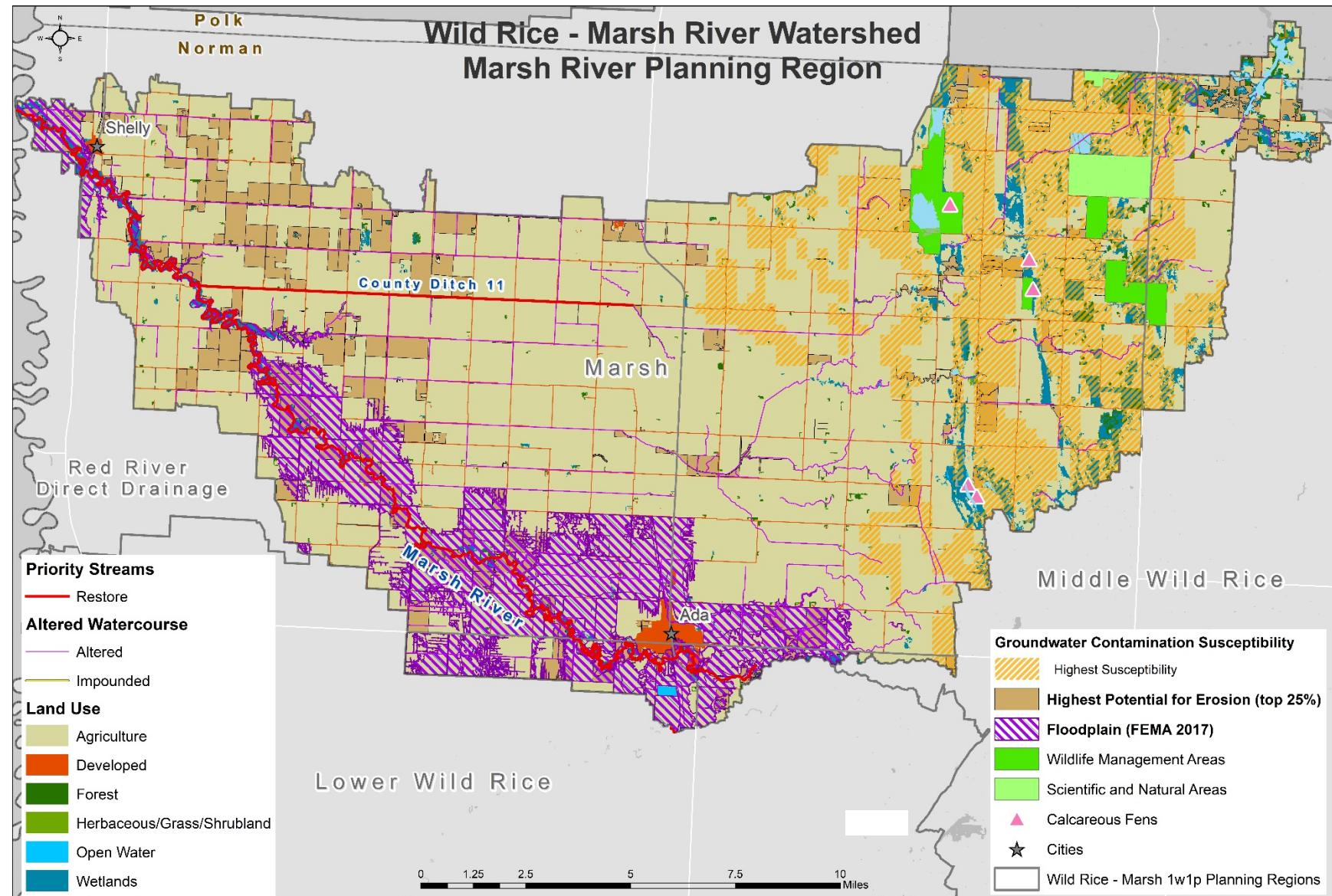


Figure 3-11. Marsh River Planning Region land use and priority resources. Specific resource conditions are described in Table 3-7.



Red River Direct Drainage Planning Region



The Red River Direct Drainage Planning Region was identified as a separate planning region due to its direct contributions to the Red River of the North. It falls within Polk, Norman, and Clay counties. The issues in this region are related to this drainage and to the water quality and hydrology of the river. Flooding, phosphorous and *E. coli* concentrations, sediment from erosion, channel stability, and aquatic habitat are all of concern here for the residents of Perley, Hendrum, and Halstad alongside farmers.

Priority Issues

High Priority Issues

Category	Resource	Issue Statement
 Land Stewardship	Land, water, habitat	Flooding and associated damages has economic, environmental, social, and health and safety implications.
 Surface Water	Rivers, Streams, Lakes	Increased phosphorus loading contributes to elevated concentrations in lakes and streams, causing eutrophication.
 Surface Water	Rivers, Streams, Drainage Systems	Wind and water erosion of cropland and upland delivers sediment to streams and drainage systems.
 Surface Water	Rivers, Streams, Drainage Systems	Altered hydrology associated with a change in the water quantity, timing, and variability of flow in water courses, impacts stream geomorphology and is a stressor for aquatic life.



Medium Priority Issues

Category	Resource	Issue Statement
 Land Stewardship	Agricultural land	Decreased soil health can impact agricultural productivity and water-holding capacity.
 Surface Water	Rivers, Streams, Drainage Systems	Riparian instability impacts stream, riverbank and drainage system channel integrity .
 Habitat	Aquatic Habitat	Insufficient protection of high-quality stream systems, and reduced connectivity and degradation of stream habitat quality impacts fish and other aquatic species.
 Surface Water	Streams	Increased bacteria (E. coli) loading contributes to elevated concentrations in waterbodies, which can impact aquatic recreation.

Priority Resources

The priority resources in the Red River Planning Region are its agricultural lands, drainage systems, and the Red River. Much of this planning region lies in the 100-year floodplain and would benefit from measures that increase riparian stability and soil health, improve stream flow variability, and decrease bacteria and sediment loading. Aquatic habitat is an additional medium priority resource that can be improved through restorative actions. The Red River is impaired for turbidity, with a fecal coliform impairment south of its junction with the Wild Rice River (Table 3-8, Figure 3-12).

Table 3-8. Priority resources in the Red River Direct Drainage Planning Region.

Color in Fig. 3-12	Resource	Management Focus	Description of Priorities
	Streams	Restoration	<ul style="list-style-type: none"> Red River, Buffalo River to Elm River (FC, Turbidity, DO) Red River, Elm River to Marsh River (Turbidity)
	Drainage systems	Restoration	Sections of these ditches are prioritized for stabilization: <ul style="list-style-type: none"> Norman County Ditch 62 Clay County Ditch 14
	Agricultural Land	Restoration	Top 25% of areas with the highest potential for wind and water erosion are identified and targeted for soil health practices.

*Impaired reaches and corresponding parameters are indicated in bold (2020 Draft Impaired Waters List).



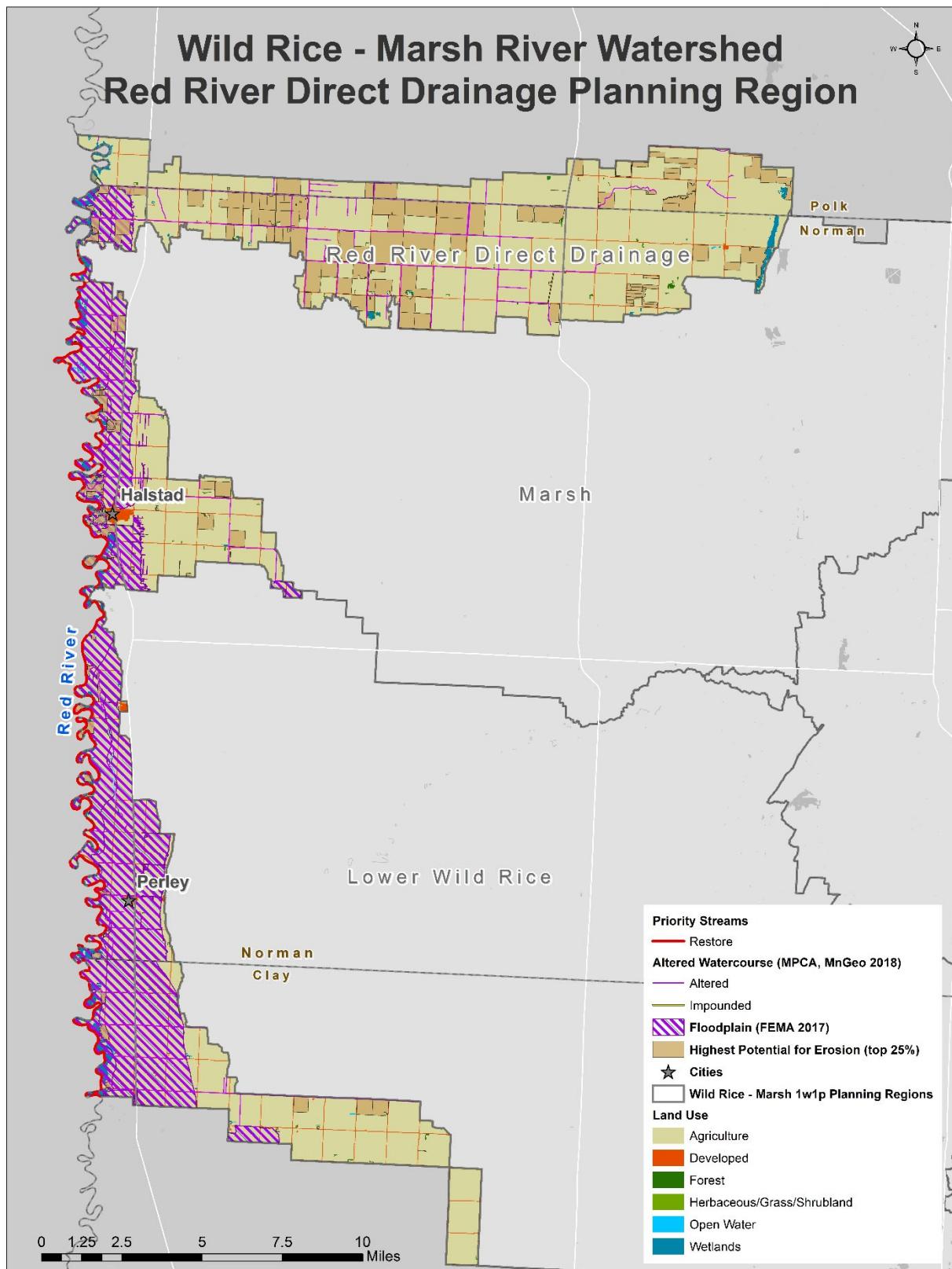


Figure 3-12. Red River Direct Drainage Planning Region land use and priority resources. Specific resource conditions are described in Table 3-8.



Emerging Issues

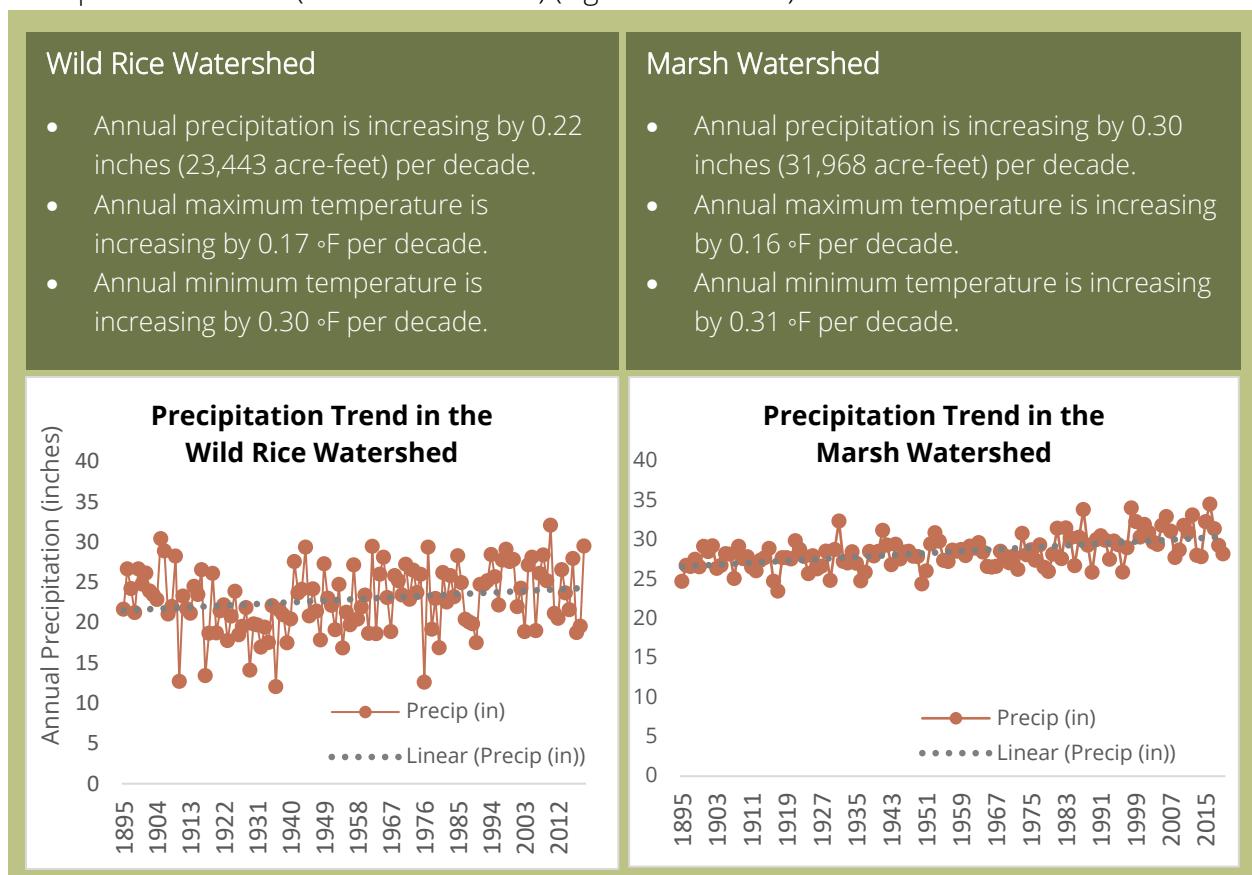
Emerging issues are those that lack detailed information but may affect the resources in the WRM Watershed in the future. These issues are described in this section along with how the plan will address it. Emerging issues can be environmental or political.

Climate Change

Minnesota's climate is already changing and will continue to do so in the future; therefore, it should be considered in a long-term planning effort, as encouraged in the BWSR Climate Change Trends and Action Plan. The changes most visible so far include:

- **Warming during winter and at night.** Minnesota has warmed by 2.9°F between 1895 and 2017.
- **Increased precipitation and heavier downpours.** Long-term observation sites have seen increases in 1-inch rains, 3-inch rains, and the size of the heaviest rainfall of the year.

The Wild Rice and Marsh Watershed data show increasing trends in precipitation and temperature as well (DNR Climate Data) (Figure 3-13 a & b).



Figures 3-13 a and b. Annual precipitation trend for the Wild Rice Watershed, 1895-2019, and Marsh Watershed, 1895-2019 (DNR Climate Data).





Photo Credit: Tara Jensen

Figure 3-14. The Wild Rice River at Twin Valley in winter.

Warmer temperatures and increased precipitation can affect water quality, agricultural production, flood damage, and habitat suitability for native fish, wildlife, plant, and tree species. Warmer winters can allow for northern encroachment of invasive species such as the Emerald ash borer, crop diseases, and pests such as corn rootworm. Warmer winters can also shorten the duration of ice cover in lakes and rivers. Earlier snowmelt runoff and ice melt can cause stream flows to peak sooner in the spring, leading to baseflow conditions earlier in the year.

The pairing of earlier snow melt with heavier spring rainfall can increase the magnitude and frequency of spring flooding. Increased precipitation can overwhelm rural stormwater systems, such as ditches, that are conveyance systems for larger rain events. This also leads to more runoff from the landscape into lakes and streams, having the potential to impact crop yields and water quality.

To address the potential implications of climate change in the watershed, the activities implemented in this plan aim to include both mitigation (practices that mitigate the effects of climate change by storing carbon in the soil) and adaptation (enhancing the resiliency of the watershed to future changes) (BWSR 2019). Plan goals related to flood damage reduction, water storage, streambank stability, and soil health are described in Section 4.

Emerging Contaminants

A contaminant is defined as a substance in a place where it does not belong. Water quality studies and monitoring in Minnesota have found contaminants from products or sources we never expected in places we never expected, like lakes, rivers, groundwater, and drinking water. These contaminants include pharmaceuticals, estrogenic compounds, pesticides, Teflon, perfluorooctanoic acid (PFOA), PFCs in fire-fighting foam, microplastics, and many others. These contaminants are an emerging concern in drinking water and surface water. There is a growing concern that these contaminants, even at low concentrations or mixtures of them, may adversely affect fish, wildlife, ecosystems and human health. The Groundwater Protection goal in this plan (Section 4) includes addressing any emerging contaminants in the future. The Minnesota Department of Health has a Contaminants of Emerging Concern program that can be found on their web page:

<https://www.health.state.mn.us/communities/environment/risk/guidance/dwec/index.html>



Invasive Species

Invasive species are animal and plant species that are not native to Minnesota and cause ecological and economic damage. Both aquatic and terrestrial invasive species continue to be an issue in Minnesota. As of October 2020, there are just a few infestations in the Wild Rice - Marsh Watershed:

- **South Twin Lake (Mahnomen County)** has zebra mussels
- **McCraney Lake (Mahnomen County)** has faucet snails.
- **Tilde Lake (Clay County)** has red swamp crayfish.
- There are a few wetlands and ponds (Norman and Becker Counties), mainly used for leech rearing, that have faucet snails.



Photo Credit: Becker SWCD

Figure 3-15. Native plants in the watershed.

Becker, Clay, Clearwater, Mahnomen, Norman, and Polk counties and the White Earth Natural Resources Department all have aquatic invasive species programs involved in many prevention activities such as lake access inspections, monitoring, billboards, I-LIDS monitoring cameras, and public service announcements.

Because these programs are already in place and have their own dedicated funding source, aquatic invasive species are a Priority C issue in the WRM1W1P. See the websites below for more details on their programs:

- **Becker:** https://www.co.becker.mn.us/dept/soil_water/ais.aspx
- **Clay:** <https://claycountymn.gov/272/Soil-Water-Conservation-District>
- **Clearwater:** <https://clearwaterswcd.com/aquatic-invasive-species>
- **Mahnomen:** <https://sites.google.com/site/mahnomencountyswcd/programs/ais?authuser=0>
- **Norman:** <http://www.normancountyswcd.org/aquatic-invasive-species.html>
- **Polk:** <http://www.co.polk.mn.us/264/Polk-County-Aquatic-Invasive-Species-Tas>
- **White Earth:** https://whiteearth.com/divisions/natural_resources

Terrestrial invasive species are not always considered when addressing watershed health, but they can also impact the watershed. They can cause damage to perennial vegetative cover; harm the natural heritage of wetlands, prairies, and forests; and decrease the ability to enjoy recreational pursuits such as hunting, bird watching, and hiking. Invasive plants such as buckthorn, garlic mustard, spotted knapweed, or noxious weeds can decrease the biological diversity of beneficial native plants, harm soils, and harm wildlife. The local SWCDs, townships, and cities manage terrestrial invasive species with the County Ag Inspector through the Minnesota Noxious Weed Law (MN Statutes 18.75-18.91), which defines a noxious weed as an annual, biennial, or perennial plant that the Commissioner of Agriculture designates to be

injurious to public health, the environment, public roads, crops, livestock, or other property. Learn more about each county's program here:

- **Becker:** https://www.co.becker.mn.us/dept/soil_water/ag_inspector.aspx
- **Clay:** <https://claycountymn.gov/154/Agricultural-Inspector>
- **Clearwater:** <https://www.co.clearwater.mn.us/?SEC=9A55A05A-AE3A-458C-8CDE-6D7BEBF205B4>
- **Mahnomen:** <https://co.mahnomen.mn.us/>
- **Norman:** https://www.co.norman.mn.us/departments/agricultural_services/agricultural_inspector/index.php
- **Polk:** <https://www.co.polk.mn.us/325/Ag-Drainage>

Hazardous Spills

Hazardous spills from pipelines and rail have the potential to threaten surface water and groundwater. There are a couple significant gas transmission pipelines that cross through the WRM Watershed. These pipelines are buried underground. In addition to pipelines, Bakken Crude Oil is shipped from western North Dakota through the WRM Watershed to the east. Though volumes have gone down since the Bakken oil boom of 2006-2015, the potential for spills remains a concern.

Tile Drainage

Tile drainage allows farmers to remove excess water from soil below its surface. Tile has many benefits for agricultural producers including increasing production, ease of field access, extended growing season and decreased plant stress. Tile drainage can have positive and negative effects on water quality and water quantity depending on a variety of site-specific conditions (RLWD 2009). Therefore, the Red River Retention Authority and Red River Watershed Management Board have recommended guidelines for tile drainage systems in the Red River Basin. The Red River Basin Natural Resources Framework Plan (2005) has goals to maintain drainage systems to enhance productivity while minimizing environmental and flooding impacts. More information is needed in the WRM Watershed regarding the prevalence of tile drainage systems and their impacts on water resources.

Farm Law Legislation

Changes to international and national legislation have large ramifications on the types, magnitude and profitability of crops produced in Minnesota. Types and productivity of crops are particularly prone to the impact of legislative changes to crop insurance support and crop subsidies. In addition to type of crops grown, the US Farm Bill funds numerous programs, including



Photo Credit: Becker SWCD

Figure 3-16. Farm fields in the watershed.



voluntary conservation programs that currently are helping more than 500,000 farmers and ranchers conserve soil and improve air and water quality. The current Farm Bill was enacted into law in December 2018 and expires in 2023. Each time the Farm Bill comes up for renewal it is subject to changing the structure and dedicated funding for programs. This plan recognizes the impact that farm legislation can have on local agricultural production, the producer's economic sustainability, and the funding of conservation programs.

Loss of Conservation Reserve Program Land

The Conservation Reserve Program (CRP) is a land conservation program administered by the Farm Service Agency of the United States Department of Agriculture. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. Thanks to voluntary participation by farmers and landowners, CRP has improved water quality, reduced soil erosion, and increased habitat for endangered and threatened species.

Currently (2019) there are 13,372 acres of CRP in the Wild Rice Watershed and 3,688 acres of CRP in the Marsh Watershed. Nationwide, the amount of land in CRP is down by 26% since 2013 (MAFWA). Farmers are planting crops in these areas again because of high commodity prices (corn, soy, wheat, and other crops). Less CRP land can result in decreased habitat and water quality. This plan aims to maintain the current level of participating CRP acres in the watershed and add more acres where possible.

Tiered Aquatic Life Use (TALU) Framework

Minnesota adopted changes to water quality standards (MN Rule Chapters 7050 and 7052) that establish a tiered aquatic life use (TALU) framework for assessing rivers and streams. This new assessment allows for different standards to be applied to waterbodies in different conditions. Waterbodies with pristine conditions are held to a higher standard than waterbodies that have been channelized and modified by humans.



Figure 3-17. The Wild Rice River at Twin Valley in the summer.



The TALU framework categorizes Class 2 (aquatic life) rivers and streams into three tiers:

- **Exceptional Use:** High quality waters with fish and invertebrate communities at or near undisturbed conditions.
- **General Use:** Water with good fish and invertebrate communities that meet or should meet minimum goals.
- **Modified use:** Water with legally altered habitat that prevents fish and invertebrate communities from meeting minimum goals.

The Wild Rice and Marsh watersheds will begin an intensive monitoring cycle in 2025 and will be assessed for aquatic life use based on the three TALU tiers. This plan will take into consideration any changes from this assessment in its five-year plan update.

Groundwater Sustainability

Groundwater sustainability is a Priority C issue in this plan. Due to the ability of the clay soils of the Agassiz plain to hold moisture, the area is not dependent upon irrigation for crop production like the sandy watersheds to the east (Otter Tail, Redeye, Crow Wing). A drought frequency investigation for the Red River Valley predicts a strong probability of an extreme drought event occurring before 2050 (Meridian Environmental Technology, Inc. 2004). A prolonged drought event could have a pronounced impact on agricultural productivity, leading to a greater reliance on groundwater as a source of irrigation. It is not expected that the WRM Watershed groundwater will be impacted by irrigation soon. However, this does remain an area of emerging concern.



Figure 3-18. Farm fields in the middle of the watershed.

Changes to the Definitions of Waters of the United States under the Clean Water Act

The Clean Water Act (CWA), which became law in 1972, is the primary federal mechanism by which streams, lakes, and wetlands are protected from degradation in the United States. The United States Army Corps of Engineers (USACE) first defined the Waters of the United States (WOTUS) in 1986. Subsequent court decisions reshaped the WOTUS definition leading to a



revised definition in 2015. The USACE signed a new definition of WOTUS in January 2020 that significantly reduces the number of streams and wetlands protected under the CWA. Specifically, it removed waters like ephemeral streams and isolated wetlands that are not connected to a river or stream. Individual states can set their own regulations to define WOTUS and regulate those as they see fit. In Minnesota, WOTUS is closer to the 2015 definition, including a broader range of waterbodies. Any future changes to the definition of WOTUS could have an impact on the legal obligations of and federal funding available to states to implement the CWA.

Planning partners in the WRM Watershed will continue to monitor proposed changes to the WOTUS definitions and take appropriate steps to ensure the plan follows federal and state regulations under administration of the CWA.

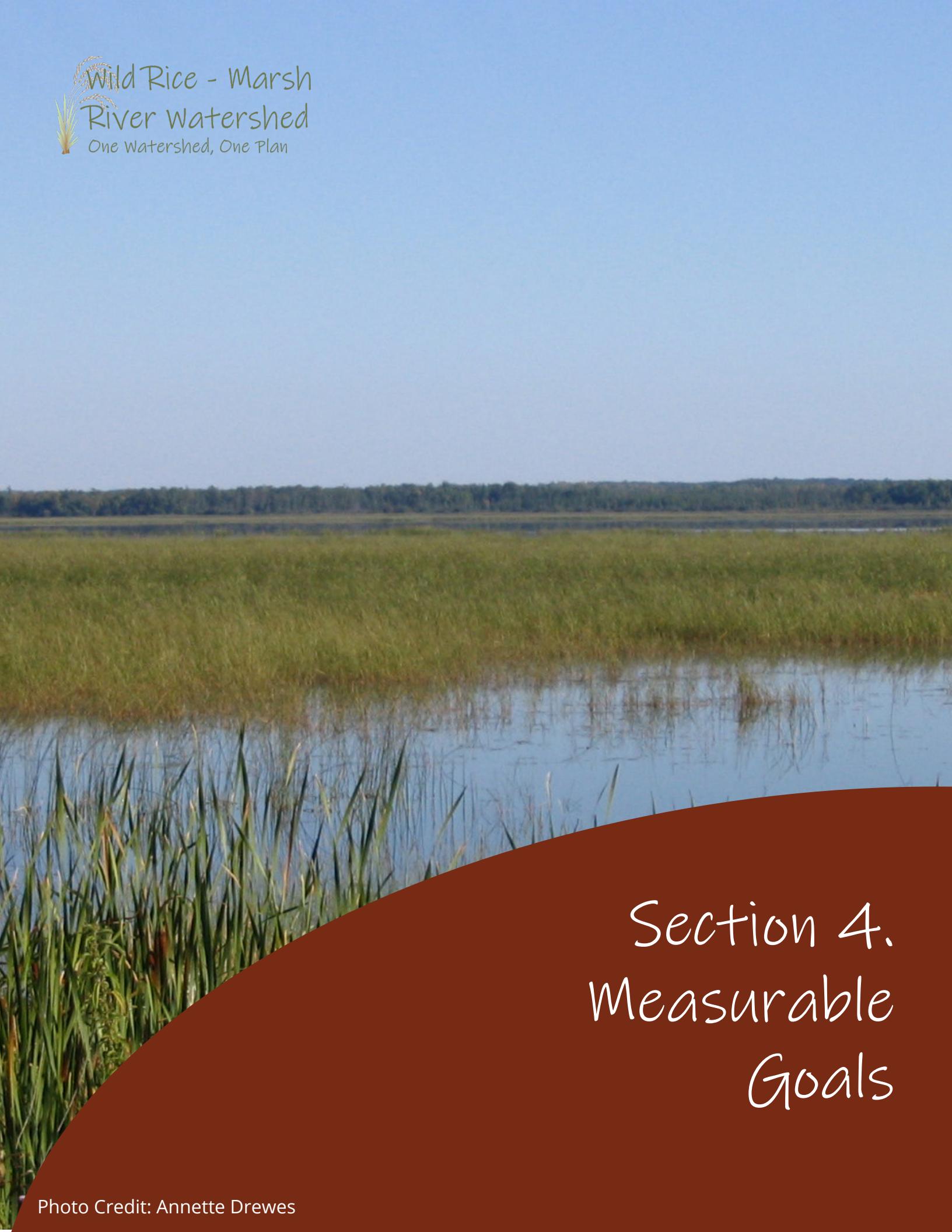
Funding for Plan Implementation

Achieving plan goals will require additional funding than current levels. Therefore, watershed-based implementation funding on an annual basis is needed. Watershed partners will also submit applications for competitive grants. If these funding mechanisms are reduced in the future, it will impact the ability of watershed partners to implement the full targeted implementation schedule (Section 5).



Figure 3-19. The South Branch of the Wild Rice River near Ulen, MN.





Section 4. Measurable Goals

Section 4. Measurable Goals

Goals describe what measurable change is desired in the priority resources and how progress will be tracked. In this section, goals are laid out with the following descriptions:

- **Description:** Background and justification for the goal.
- **Issues Addressed:** Which priority issues the goal addresses (Section 3).
- **Goal Metrics:** How progress will be measured.
- **Prioritization:** Which resources are prioritized.
- **Map:** Visual illustration of where the goal will be targeted.

The Steering Committee drafted 14 goals that will guide the implementation of this plan. The goals were reviewed by the Advisory Committee, and then approved by the Policy Committee. They cover the four resource categories: surface water, land stewardship, habitat, and groundwater, and address all the priority issues of the plan (Section 3).

Different data sets and models were used to determine the goal numbers. The Prioritize, Target, and Measure Application (PTMAApp) was used to define load reduction goals for sediment and phosphorus, and acre-feet goals for water storage. Minnesota Department of Health data was used for defining groundwater goals. The Minnesota Prairie Plan was used for grassland and wetland goals, and GIS data were used for lakes and forest goals.

Detailed information on actions and costs to reach these goals is described in Section 5 of this plan.



Measurable Goal: Sediment Reduction

Reduce sediment delivery to streams, lakes and drainage systems.

Description

Erosion is the process (such as water flow or wind) that removes soil, rock or dissolved material. In terms of water, eroded sediment flows downhill to a stream or lake and then downstream. Erosion is a natural process, but humans have sped up erosion rates by altering the landscape. Bare soil is most susceptible to erosion, so having continuous vegetation on the landscape is one of the most effective ways to reduce sediment transport. The sediment delivery goals for this plan are based on percentages determined from modeling during the Watershed Restoration and Protection Strategy (WRAPS) process.



Figure 4-1. Sediment loading was determined a high priority in the watershed.

Issues Addressed

Sediment loading • Stream Habitat Quality • Phosphorus Loading

Goal Metrics

Tons of sediment.

- Short-term Goal: based on the PTMApp scenario for Level 2 funding which includes current funding + watershed-based implementation funding.
- Long-term Goal: 45% reduction in the Wild Rice Watershed and 29% reduction in the Marsh Watershed (draft WRAPS 2020).

Existing loads for each Planning Region were determined with PTMApp. The short-term goal is shown for both the Planning Region (PR) outlet and the catchment (at the BMP).

Planning Region	Load at PR Outlet (tons/yr)	Short-term Goal at PR Outlet (tons/yr):	Short-term Goal at Catchment (tons/yr):	Long-Term Goal (WRAPS) (tons/yr):
Headwaters	14,626	667	2,689	6,581
Middle Wild Rice*	14,137	197	2,223	6,362
Upper South Branch	16,153	430	2,484	7,269
Lower Wild Rice	14,483	154	1,216	6,517
Marsh	7,424	46	500	2,153
Red River Direct Drainage*	7,704	28	210	2,234

*Load delivery to Priority Resource Point calculated using only catchments within Planning Region (remainder of Planning regions have defined Priority Resource Point Outlets).

Prioritization

Priority streams are determined from the Protection and Restoration analysis (Appendix D) (Figure 4-2).



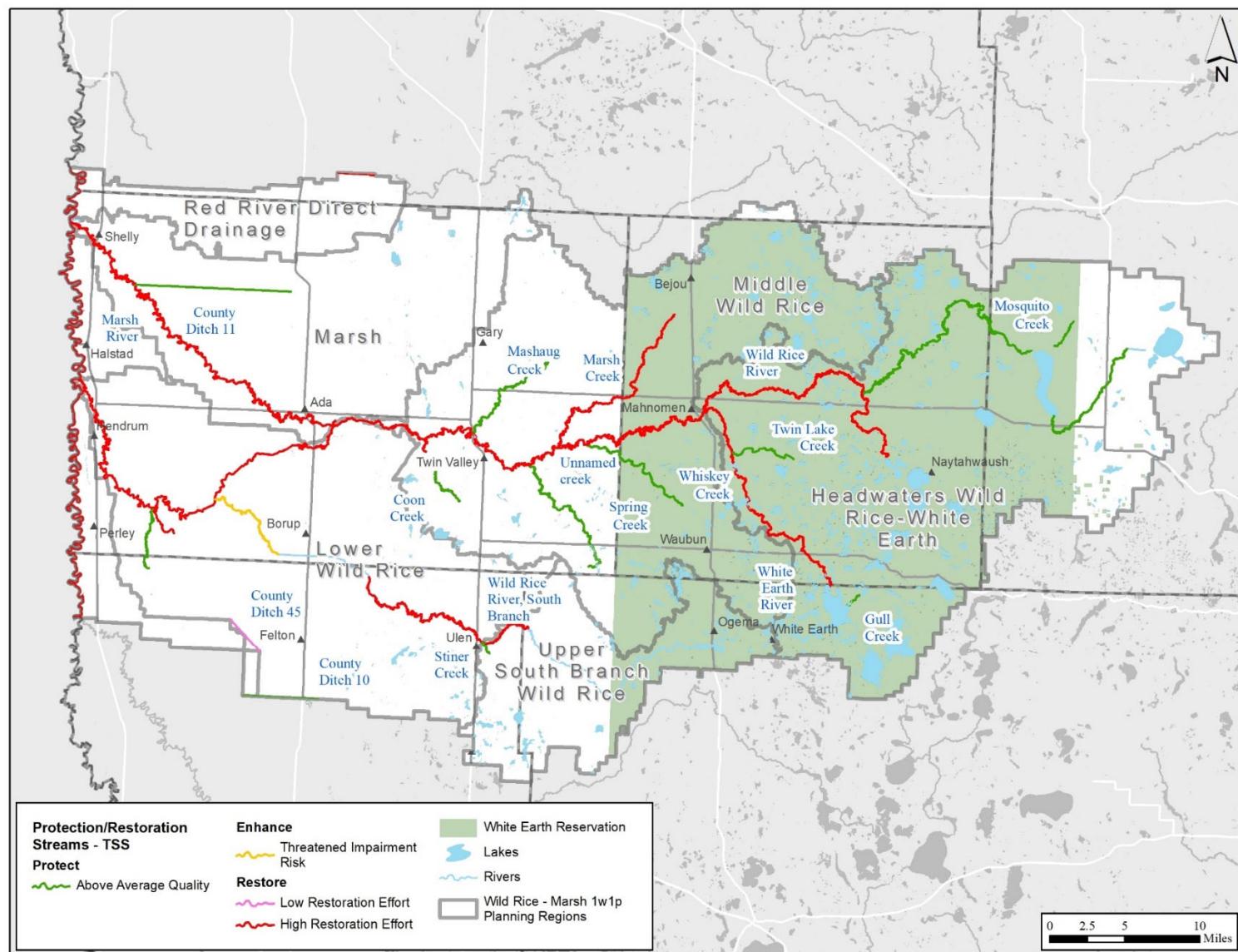


Figure 4-2. Sediment priorities in the Wild Rice Marsh Watershed (Appendix D).



Measurable Goal: Phosphorous Reduction

Reduce phosphorous delivery to streams, lakes and drainage systems.

Description

Phosphorus is an essential element for plant life, but when there is too much of it in water it can cause algae blooms and eutrophication. Soil erosion is a major contributor of phosphorus to streams and lakes. Phosphorus can be reduced by preventing and capturing runoff before it enters a waterbody, and by establishing perennial vegetation on the landscape. The phosphorus delivery goals for this plan are based on percentages determined from modeling during the Watershed Restoration and Protection Strategy (WRAPS) process.

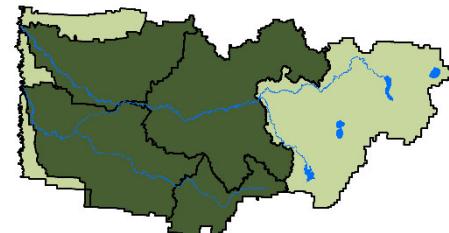


Figure 4-3. Phosphorus loading was determined a high priority in the western two thirds of the watershed and a medium priority for the Headwaters Planning Region.

Issues Addressed

Phosphorus Loading • Sediment loading • Stream Habitat Quality

Goal Metrics

Pounds of phosphorous.

- Short-term Goal: based on the PTMApp scenario for Level 2 funding which includes current funding + watershed-based implementation funding.
- Long-term Goal: 10% reduction in both the Wild Rice Watershed and Marsh Watersheds (draft WRAPS 2020).

Existing loads for each Planning Region were determined with PTMApp. The short-term goal is shown for both the Planning Region (PR) outlet and the catchment (at the BMP). Phosphorus loading and goals for Tulaby Lake were determined using the Lakes of Phosphorus Sensitivity Significance (LPSS, DNR).

Planning Region or Lake	PTMApp TP Load at PR Outlet (lbs/yr)	Short-term Goal at PR Outlet (lbs/yr):	Short-term Goal at Catchment (lbs/yr):	Long-term Goal (WRAPS) (lbs/yr)
Headwaters	13,437	242	370	1,344
Middle Wild Rice*	43,630	153	332	4,363
Upper South Branch	18,002	233	389	1,800
Lower Wild Rice	46,956	103	216	4,696
Marsh	28,384	74	171	2,838
Red River Direct Drainage*	19,483	47	84	1,948
Tulaby Lake	773 (LPSS)		39 lbs reduction (5%)	116 lbs reduction (15%)

*Load delivery to Priority Resource Point calculated using only catchments within Planning Region (remainder of Planning regions have defined Priority Resource Point Outlets)

Prioritization

Priority streams are determined from the Protection and Restoration analysis (Appendix D) (Figure 4-4).



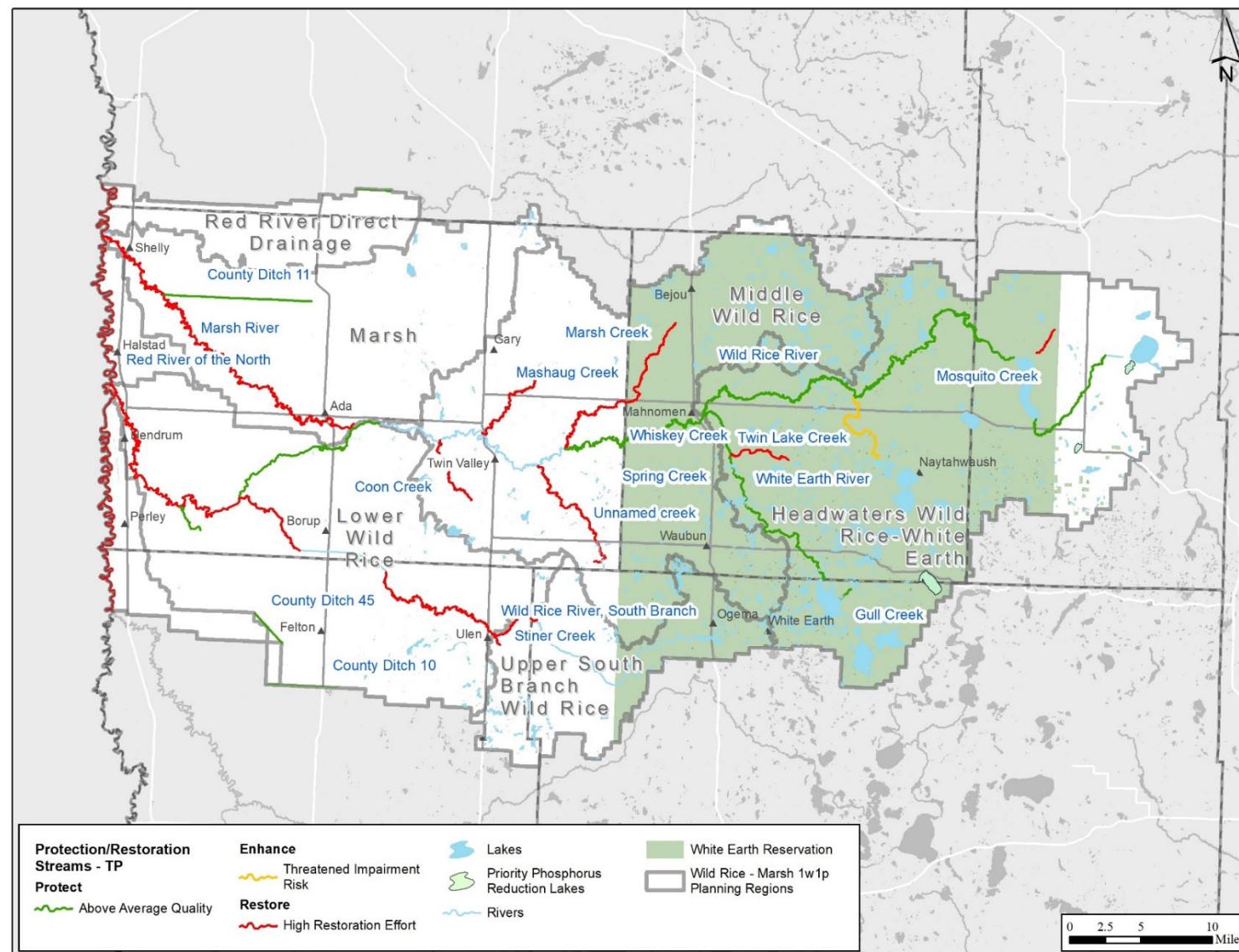


Figure 4-4. Priority lakes and streams for phosphorus reduction (Appendix D).



Measurable Goal: Soil Health

Implement regenerative practices, such as cover crops, reduced tillage, and livestock incorporation on cultivated crop land with the highest erosion potential to increase soil health.

Description

Soil health is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans. Regenerative practices such as cover crops, reduced tillage and livestock incorporation improve the amount of soil organic matter, soil structure, carbon storage, and water and nutrient holding capacity. Watershed partners will provide technical and financial assistance to farmers interested in implementing these practices.

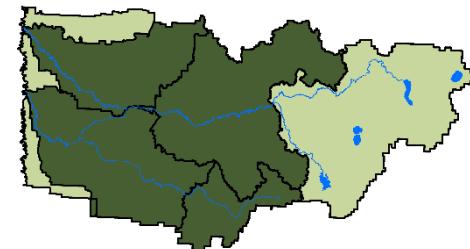


Figure 4-5. Issues addressed by soil health were determined a high priority for the western two thirds of the watershed and a medium priority in the Headwaters Planning Region.

Issues Addressed

Soil Health • Sediment Loading • Phosphorus Loading • Flooding

Goal Metrics

Acres of practices.

- Short-term Goal: Implement 5,823 acres of regenerative practices, representing acreage possible to implement with Level 2 funding which includes current funding + watershed-based implementation funding.
- Long-term Goal: Implement regenerative practices in the top 25% of acres with the highest wind and water erosion potential by planning region.

Planning Region	Headwaters	Middle Wild Rice	Upper South Branch Wild Rice	Lower Wild Rice	Marsh	Red River Direct Drainage
<i>Short-term Goal</i>	2,019 acres	1,109 acres	1,319 acres	807 acres	446 acres	123 acres
<i>Long-term Goal</i>	6,355 acres	26,016 acres	5,362 acres	10,317 acres	18,714 acres	13,830 acres

Prioritization

Areas to target for management practices first were the top 25% of parcels with the highest wind and water erosion potential (long-term goal) (Figure 4-6).



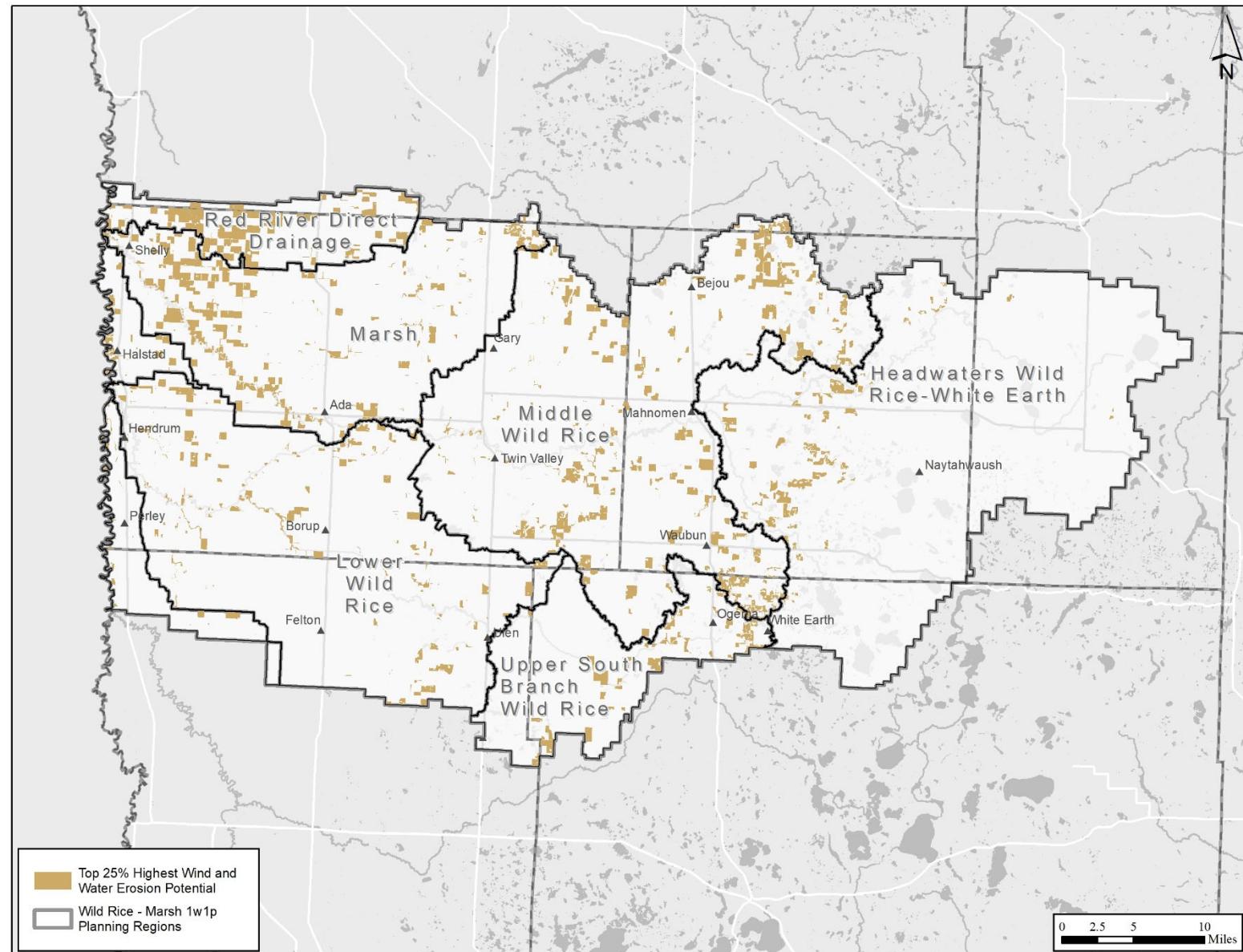


Figure 4-6. The top 25% of acres per planning region with the most water and wind erosion potential.



Measurable Goal: Altered Hydrology/Storage

Reduce runoff volume to address altered hydrology and reduce flood damage by increasing storage in the watershed.

Description

Altered hydrology is commonly thought to be characterized by increases in peak discharge and runoff volume for a range of precipitation events, as compared to some historic or benchmark condition. Aquatic habitat loss, increased streambank erosion, and increased sediment levels are some of the suggested consequences of altered hydrology. The Red River Basin has a long history of working together on numerous studies to increase storage and decrease the impact of altered hydrology, including the Long-term Flow Reduction Strategy (LTFS). The Wild Rice Watershed District Expanded Distributed Detention Strategy determines the flow reduction needed in the Wild Rice and Marsh Watersheds to meet the overall basin goal in the LTFS. Methods for returning the hydrology of the watershed back towards past conditions include adding storage (retention of water on the landscape) and restoring floodplains and stream sinuosity. In addition, areas determined to be non-contributing (PTMApp) can be protected from drainage in the future.

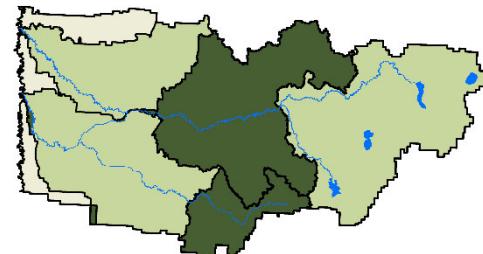


Figure 4-7. Adding water storage was determined a high priority issue for the middle the watershed.

Issues Addressed

Flooding • Sediment Loading • Phosphorus Loading • Channel Integrity • Stream Habitat Quality

Goal Metrics

Acre-feet of storage.

- Short-term Goal: Achieve 25% of the altered hydrology analysis goal within the priority areas (10,750 acre-feet). The Altered Hydrology analysis resulted in an average storage goal of 0.4 inches across the watershed (approximately 43,000 acre-feet) (Appendix E).
- Long-term Goal: Achieve storage goals from WRWD Expanded Distributed Detention Strategy aimed at providing the WRWD contribution to the Red River Basin Commission's 20% flow reduction goals specified in the LTFS Basinwide Flow Reduction Strategy (300,000 acre-feet).

Prioritization

Areas for increased storage are prioritized from the Wild Rice Watershed District Expanded Distributed Detention Strategy, 2013. Specific locations are provided in the report, but they generally are targeted in the eastern two thirds of the watershed.



Measurable Goal: Flood Damage Reduction

Reduce Flood Damages to Communities, Farmsteads and Farmland

Description

Flooding in the Wild Rice Watershed can disrupt resident's lives and cause economic and environmental damage. The Wild Rice Watershed District has been working with the Red River Basin Commission to determine long-term strategies for flood damage reduction. This goal focuses on the continuing work to protect communities, farmsteads and farmland from flooding.

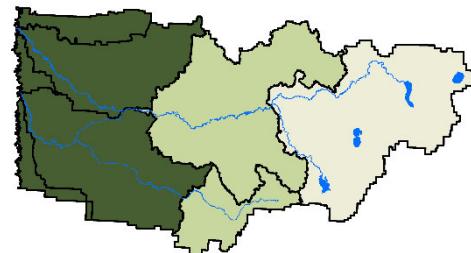


Figure 4-8. Flood damage reduction was a high priority for the western third of the watershed, a medium priority in the middle and a low priority in the Headwaters.

Issues Addressed

Flooding

Goals

These flooding goals are considered short-term goals. Long-term goals are complete protection.

Communities

- Promote and assist with the construction of community levees and/or floodwalls built to the flood of record plus uncertainty (3 feet) or the 100-year flood plus uncertainty, whichever is greater. Currently known flood prone communities within the watershed include Borup, Perley, and Shelly (Figure 4-9).

Farmsteads

- Promote the acquisition and permanent removal of flood-prone structures and establishment of greenways within the 100-year floodway, where structural measures cannot accomplish the recommended flood protection levels or are not economically feasible (Figure 4-10). Currently information estimates that 14 properties meet these criteria.
- Promote and assist with the construction of ring dikes built to a minimum of 2 feet of freeboard over the flood of record, or 1 foot above the administrative 100-year flood, whichever is greater, for all flood prone properties within the watershed (Figure 4-10). Currently information based on LiDAR and latest adopted floodplain mapping estimates that 76 additional properties meet these criteria.

Farmland Goal

- Provide protection against a ten-year summer storm event for intensively farmed agricultural land as outlined in the 1998 Red River Basin Flood Damage Reduction Work Group Mediation Agreement. The ten-year summer storm event is defined as 3.57 inches of rainfall in a 24-hour period, or 6.39 inches of rainfall in a ten-day period in a minor watershed (10 mi² or less).



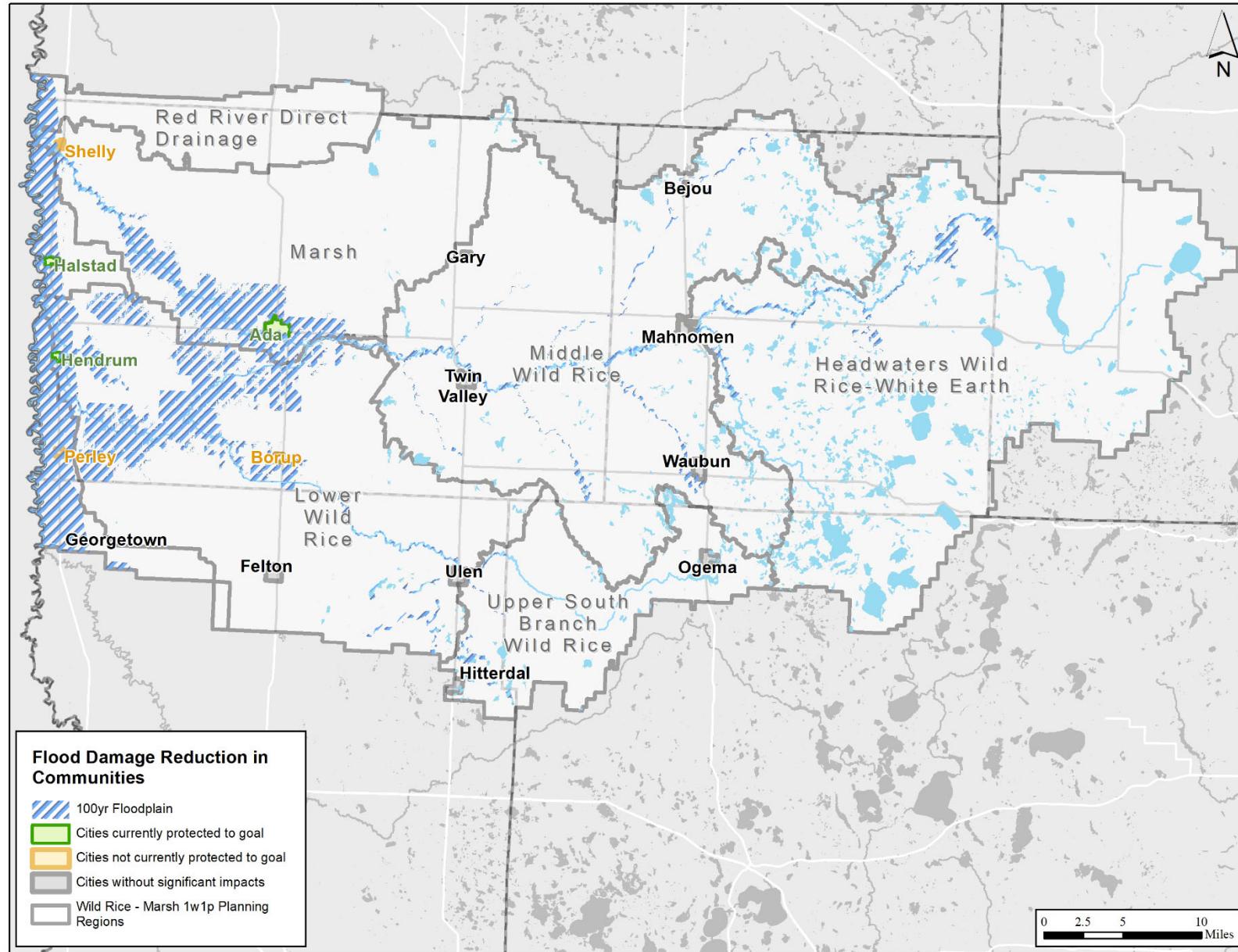


Figure 4-9. Community Flood Protection priorities.



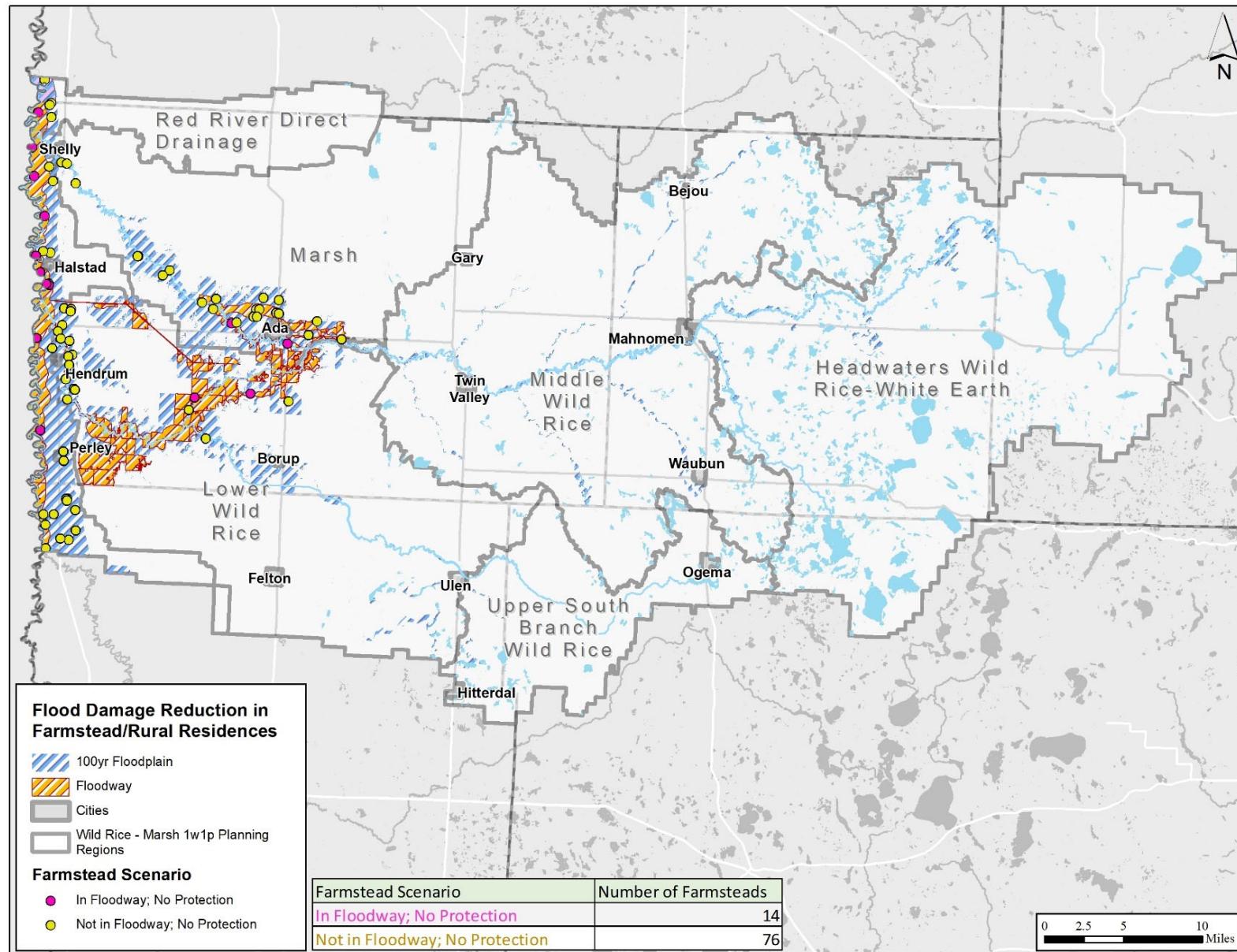


Figure 4-10. Farmstead and rural residences in the floodplain and level of protection. LiDAR was used to determine the location of existing ring dikes and where they are needed.



Measurable Goal: Ditch Stabilization

Stabilization of Ditch Banks and Outlets

Description

Much of the western end of the Wild Rice and Marsh Watersheds were once covered by glacial Lake Agassiz. After glaciation, this low-lying area had productive soils, but was very wet for farming. Surface ditches were installed in the 1800s to mid-1900s to drain agricultural land, and it has been some of the most productive land in the nation. These ditch systems are governed by Minn. Stat. Chapter 103E Drainage Law and administered by the county or watershed district drainage authority.



Figure 4-11. Ditch stabilization was determined a priority in the western half of the watershed.

Proper ditch maintenance can minimize erosion and issues with stream stability, water quality and aquatic habitat. This goal addresses stabilization of priority ditches in the watershed.

Issues Addressed

Channel Integrity • Altered Hydrology • Phosphorus Loading • Sediment Loading

Goal Metrics

Miles of ditches stabilized and number of outlets stabilized.

- **Short-term Goal: Stabilize 7 priority ditch miles and 4 ditch outlets, making 20% progress towards long-term goal (Figure 4-12)**
 - Norman County: 4 miles
 - Wild Rice Watershed District: 3 miles
 - Mahnomen County: Complete stability inventory to determine priority areas
- **Long-term Goal: Stabilize 133 priority ditch miles (Figure 4-12)**

Prioritization

Ditches were prioritized by the Watershed District and Norman County based on the need for stabilization. Priorities were defined as segments of ditches that are currently experiencing bank failures or downcutting.



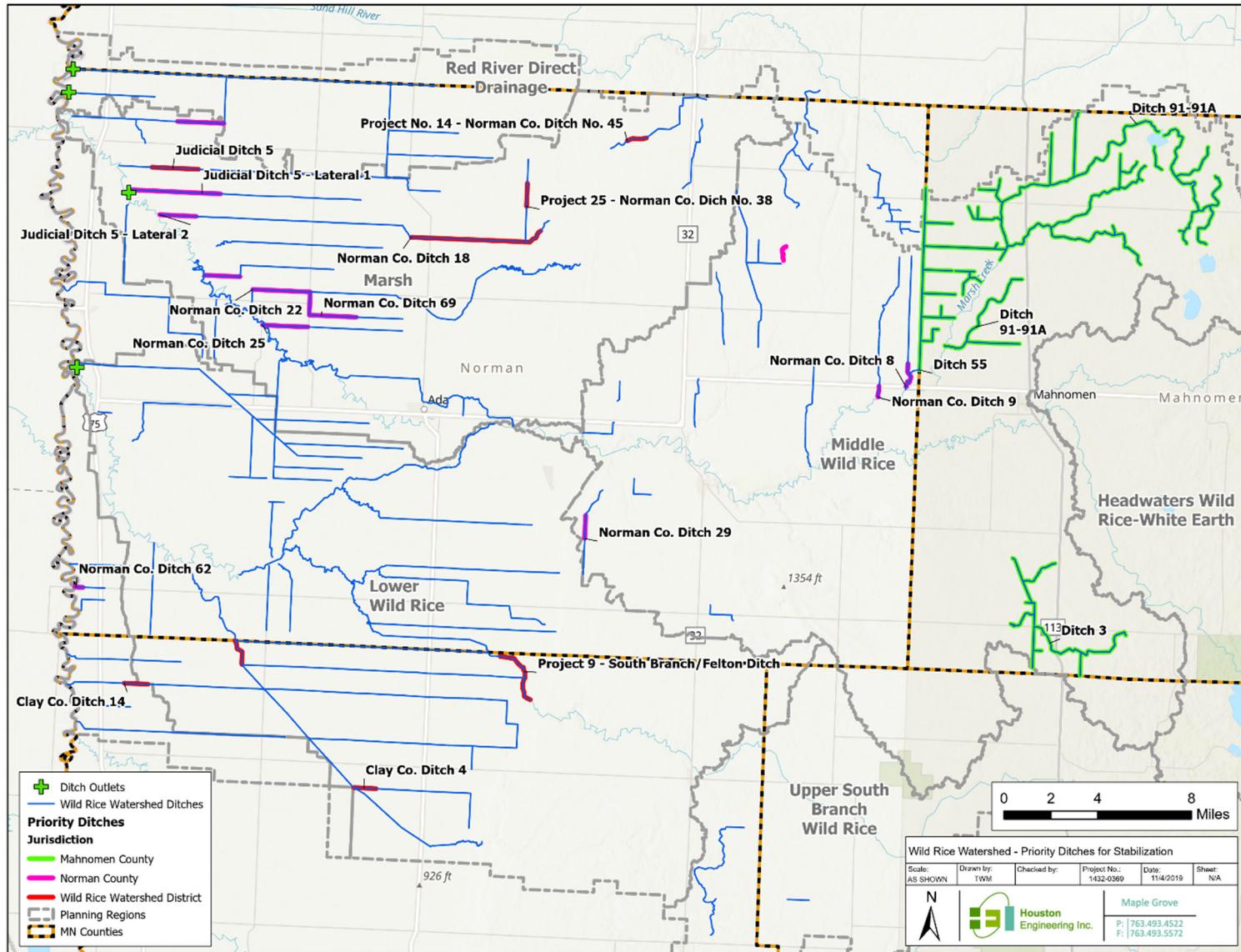


Figure 4-12. Priority ditches for stabilization.



Measurable Goal: Stream Channel Integrity

Restore and/or stabilize streams to improve stream channel integrity

Background

Stability of a stream channel can be determined by many factors including stream flow velocity, intensity of peak discharges, and the density of riparian vegetation. When the force of water flowing through a stream is more than the strength of the stream bank, erosion and slumping can occur.

In-stream habitat quality has also been shown to be closely tied to stream stability, with geomorphically stable reaches supporting better habitat than unstable reaches. (Sullivan et al 2004).

The Wild Rice Watershed partners have completed numerous projects to restore or stabilize stream channels in the past. Additional future projects are summarized in this plan.



Figure 4-13. Stream channel integrity was determined a high priority for the middle of the watershed, a medium priority for the Marsh and Red River Direct Drainage, and a low priority for the Headwaters.

Issues Addressed

Channel Integrity • Sediment Loading • Phosphorus Loading • Flooding

Goal Metrics

Stream miles either restored or otherwise stabilized.

- **Short-term Goal: Stabilize 5 miles of streams, making 10% progress towards long-term goal.**
- **Long-term Goal: Stabilize 53 miles of streams throughout watershed.**

Prioritization

Stream reaches are prioritized that have the most identified stream bank erosion (Figure 4-14). Specific stream reaches include:

Middle Wild Rice River
Mashaug Creek
Marsh Creek
Moccasin Creek
Wild Rice River South Branch



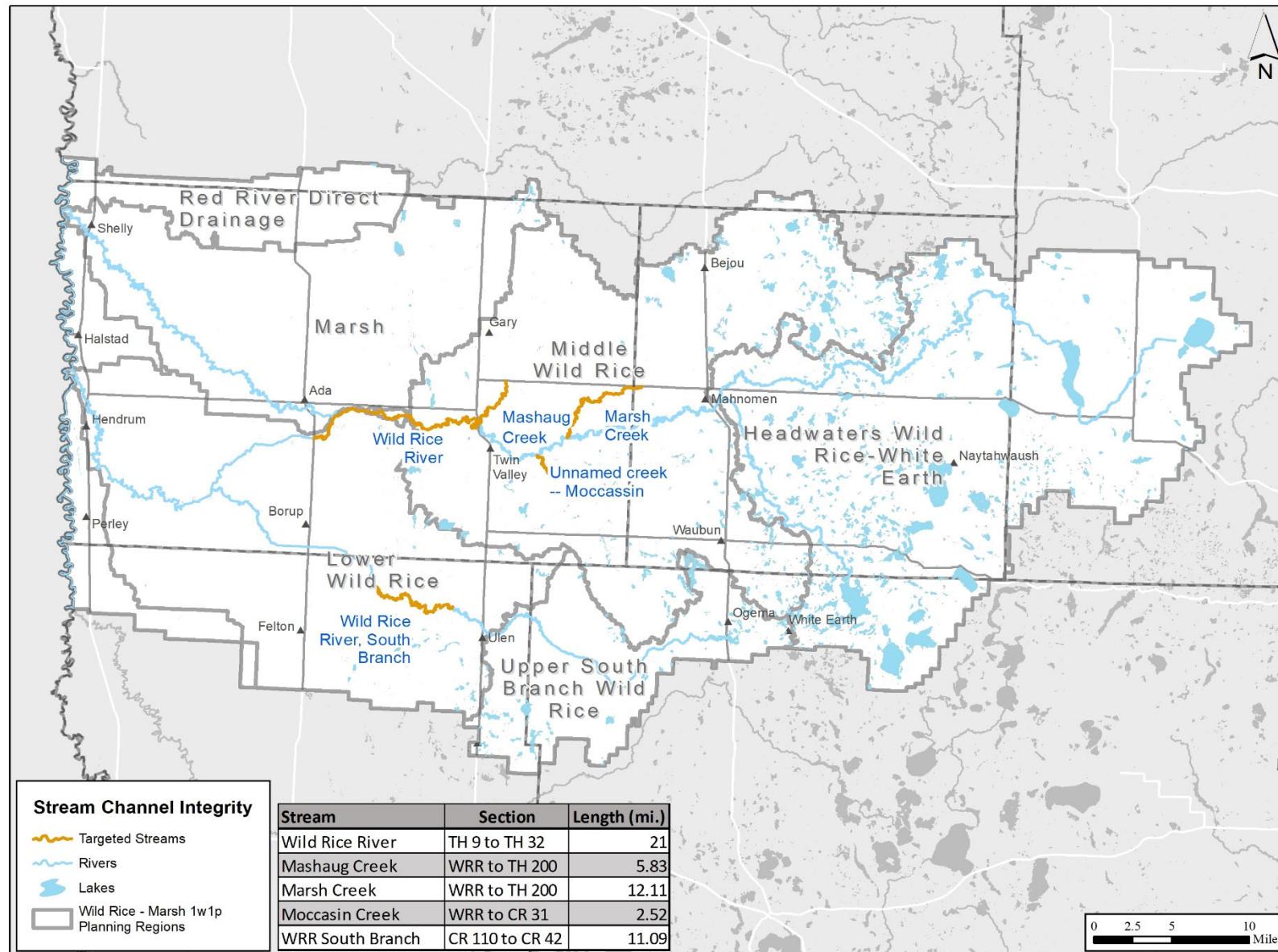


Figure 4-14. Prioritized stream reaches for stream bank stabilization.



Measurable Goal: Stream Corridor Habitat

Enhance stream corridor habitat quality through a combination of additional protections of high-quality stream systems, riparian enhancement, or increasing the connectivity to provide benefit to fish and other aquatic and terrestrial species

Background

Stream corridors are complex ecosystems comprised of stream channels, riparian vegetation and the plants and animals within them. In an unaltered stream system, the corridor contains a flood plain, natural sinuosity, and vegetated riparian areas. This goal aims to enhance aquatic habitat and address the biological impairments in the watershed.

Issues Addressed

Stream Habitat Quality



Figure 4-15. Stream habitat quality was a medium priority across the middle of the watershed.

Goal Metrics

Acres of riparian corridor acquired, which enables the future enhancement of habitat and connectivity.

- Short-term Goal: Acquire 6,500 acres of stream corridor to enable future rehabilitation of the streams.
- Long-term Goal: Enhance 54 miles of stream to improve habitat and connectivity.

Prioritization

Stream reaches are prioritized that have 1) IBI Impairments and 2) are planned for future enhancement projects, including projects along the Lower Wild Rice and South Branch Wild Rice Rivers.



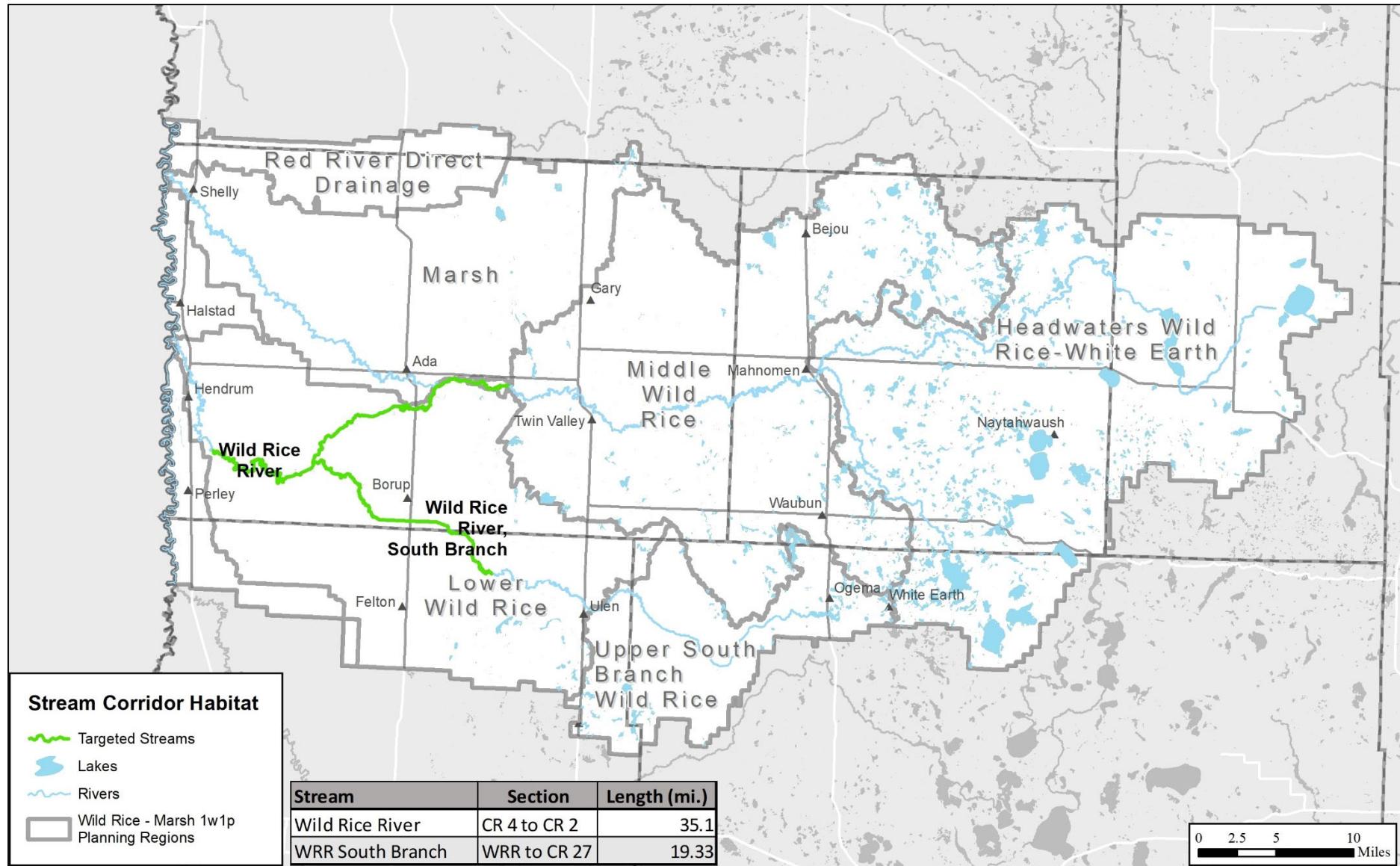


Figure 4-16. Priority areas for stream corridor enhancement.



Measurable Goal: Grassland Management

Increase the amount of grass-based agriculture and perennial grassland vegetation as identified in the Minnesota Prairie Plan.

Background

Tallgrass prairie once covered much of the middle of the Wild Rice and Marsh Watersheds. This diverse ecosystem provides multiple benefits to a watershed such as habitat for fish, wildlife, and pollinators, water storage, and native plants.

Currently, this area is dominated by agricultural practices, but increasing the implementation of conservation practices such as sustainable grass-based agriculture (such as grazing and haying) can make these areas more wildlife “friendly”. Improving the functioning of these landscapes will also contribute to clean water, habitat, recreational opportunities and thriving rural communities. The Minnesota Prairie Plan separates habitat into two main categories: Corridor Areas and Core Areas as defined below. The corridor areas are meant to provide pathways or steppingstones for wildlife between the larger prairie core areas. The core areas are meant to provide large expanses of functioning prairie/grassland system. Grazing management, wetland restoration, CRP and CREP can be targeted in Core and Corridor areas to align local goals with the Minnesota Prairie Plan.

Grazing Management

- Short-term Goal: Add grazing management plans to 50% of pastureland acres and CRP/CREP to marginal cropland within the Core and Corridor Areas in high priority planning regions.
- Long-term Goal: Add grazing management plans to all the pastureland and CRP/CREP to marginal cropland within the Core and Corridor Areas.

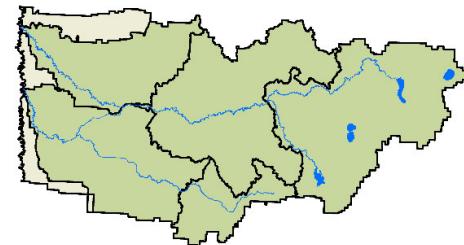


Figure 4-17. Grassland management was determined a medium priority in most of the watershed.

Planning Region	Priority for implementation	Pasture acres within the Core and Corridor Areas (Figure 4-20)		Short-term Goal (10-years)
		Corridor Areas	Core Areas	
Headwaters	High	682	341	341 acres (50%)
Middle Wild Rice	High	1,903	951	951 acres (50%)
Upper South Branch	High	630	315	315 acres (50%)
Lower Wild Rice	Medium	8,045	402	402 acres (5%)
Marsh	Medium	931	93	93 acres (5%)
Red River Direct Drainage*	Low	0	0	0



Grassland and Wetland Habitat Protection and Restoration

The Minnesota Prairie Plan outlines goals for adding grassland and wetland habitat to the core areas: Agassiz Beach Ridge, Wambach Santee, Glacial Ridge, and Waubun (Figure 4-18).

- Short-term Goal: Make 5% progress towards Minnesota Prairie Plan goals for grassland and wetland protection.
- Long-term Goal: Meet goals of the Minnesota Prairie Plan with area partners.

Prairie Core Area (Figure 4-18)	Core Area Acreage in the WRM watershed	Long-term Goal: Grassland Habitat Shortfall in the watershed from Prairie Plan Goal	Short-term Goal: Grassland Habitat (5% of long-term)	Long-term Goal: Wetland Habitat shortfall in the watershed from Prairie Plan Goal	Short-term Goal Wetland Habitat (5% of long-term)
Agassiz Beach Ridges	58,281	0 acres	0 acres	9,343 acres	467 acres
Wambach Santee	31,893	2,302 acres	115 acres	3,396 acres	170 acres
Glacial Ridge	20,193	0 acres	0 acres	3,226 acres	161 acres
Waubun	45,259	34 acres	2 acres	2,784 acres	139 acres



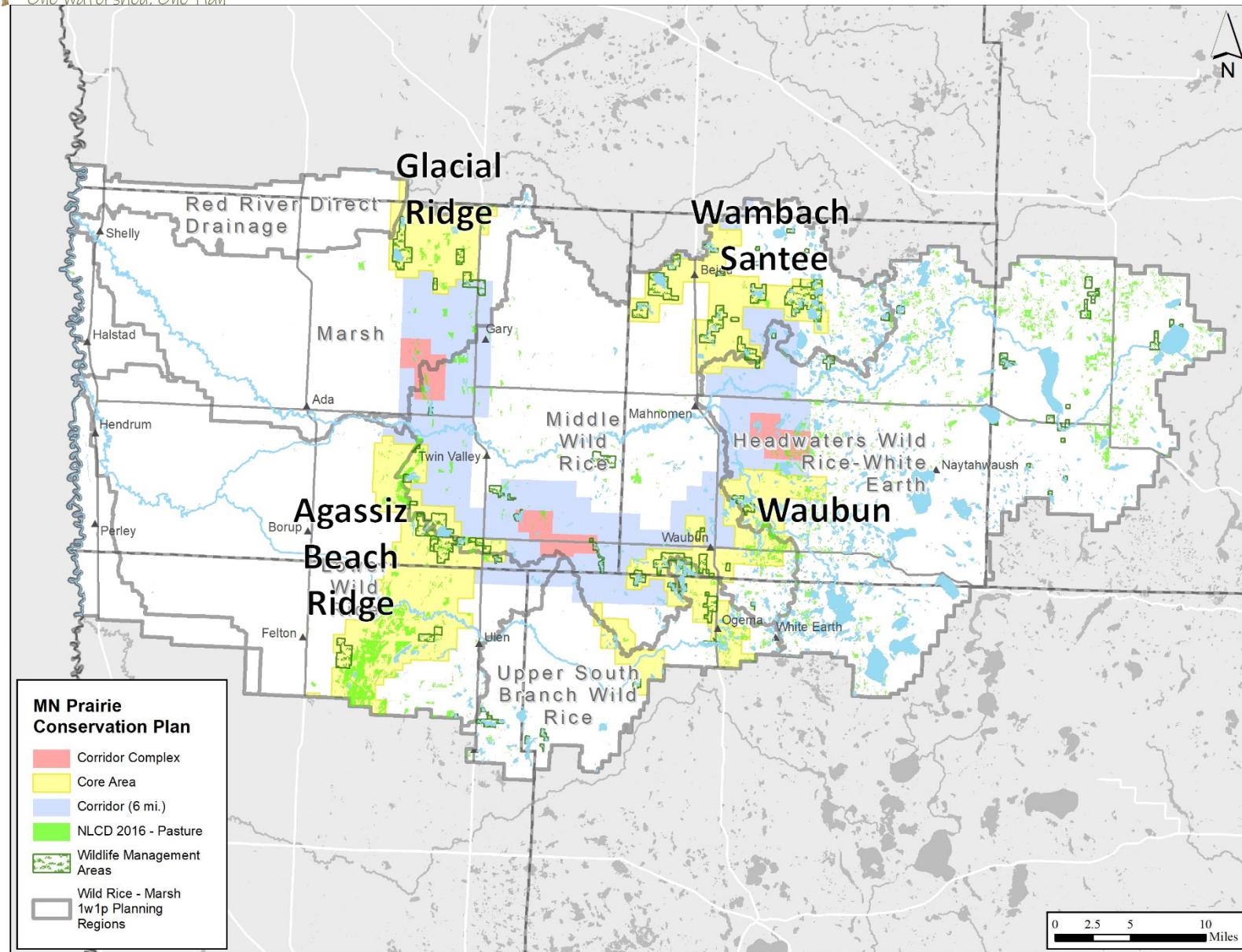


Figure 4-18. Minnesota Prairie Plan areas and opportunities to add grazing management (highlighted in light green).



In addition to the prairie plan related priorities, the Steering Committee also worked with the MN Board of Water and Soils Resources to establish a wetland restoration priority map (Figure 4-19). This map establishes wetland restoration priorities based on multiple benefits (e.g. water storage, sediment reduction, habitat). The steering committee established the relative weighting of different function in this analysis. This priority map is consistent with the State's Compensation Planning Framework which establishes priority areas within wetland bank service areas.

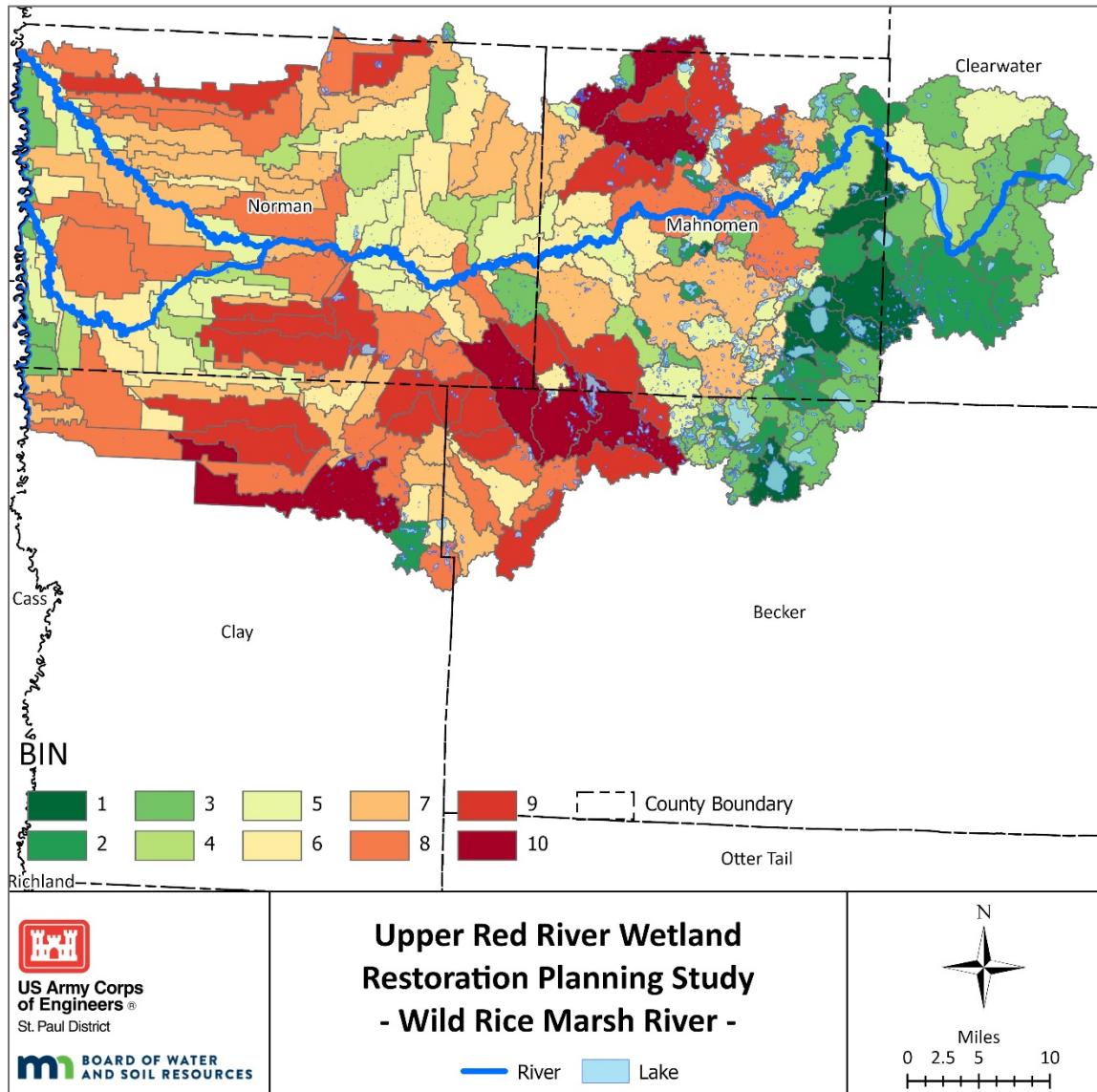


Figure 4-19. Weighted catchment prioritization for priority areas for wetland banking.

Measurable Goal: Forest Management

Maintain forest cover by promoting forest management.

Background

Forests are vital to life on earth. Besides providing habitat for animals and livelihoods for humans, forests also offer watershed protection, prevent soil erosion, infiltrate precipitation, and mitigate a warming climate.

The Headwaters Planning Region of the Wild Rice Watershed is in the Northern Lakes and Forests Ecoregion and is home to both evergreen and hardwood forests. This plan aims to maintain current forest cover and promote sustainable forest management.

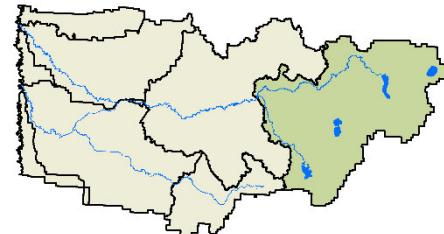


Figure 4-20. Forest management was determined a medium priority goal for the Headwaters Planning Region.

Issues Addressed

Terrestrial Habitat • Sediment Loading • Phosphorus Loading • Flooding/Storage

Goal Metrics

Acres of forest management (Forest Stewardship Plans, Sustainable Forest Incentive Act [SFIA], Class 2c Forest Management Incentives).

- Short-term Goal: Manage 2,400 acres of forest in the highest priority area (Figure 4-21).
- Long-term Goal: Maintain the current 24,312 acres of forests in the highest priority area (Figure 4-21)

Prioritization

Areas for forest management were prioritized by focusing on marginal areas that have a risk of conversion to non-forest land uses. Priority Areas are in the eastern end of the watershed in Clearwater County (Figure 4-21).



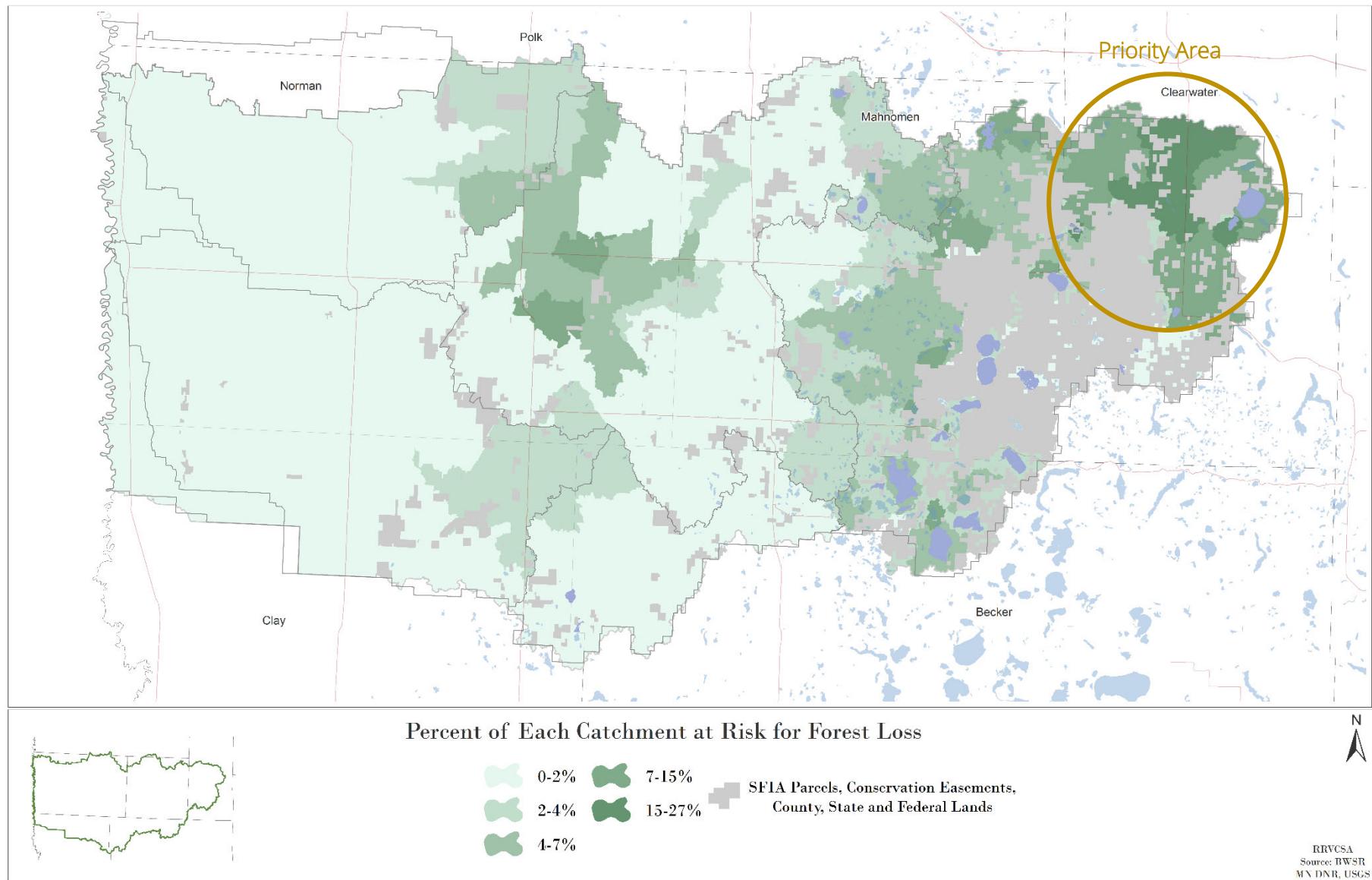


Figure 4-21. Forest management priority areas are privately owned forests with the highest risk of conversion to other land uses.



Measurable Goal: Lake Riparian Stabilization

Implement projects to enhance/restore or stabilize riparian shoreland on priority lakes.

Background

The Wild Rice Watershed has many beautiful lakes, and humans are drawn to water. As these lakes became developed, their shorelines were often cleared of native vegetation and trees that serve an important purpose in maintaining lake water quality and fish and wildlife habitat.

The Wild Rice Watershed partners have completed numerous projects to restore or stabilize riparian shoreland over the last decade. This goal aims to continue this work and maintain the water quality and fish and wildlife habitat in the watershed.

Issues Addressed

Development pressure on lakes • Phosphorus loading

Goal Metrics

Number of shoreline restoration projects.

- Short-term Goal: Implement 16 shoreline restoration projects on priority lakes (Figure 4-23)
- Long-term Goal: All shoreline in a natural state

Prioritization

Lakes are prioritized that 1) are classified as Recreational Development Lakes and 2) have the most concentrated development from looking at the parcel maps. Priority Lakes include:

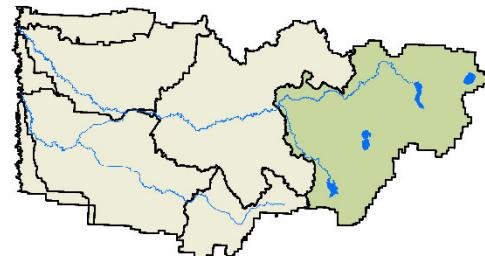
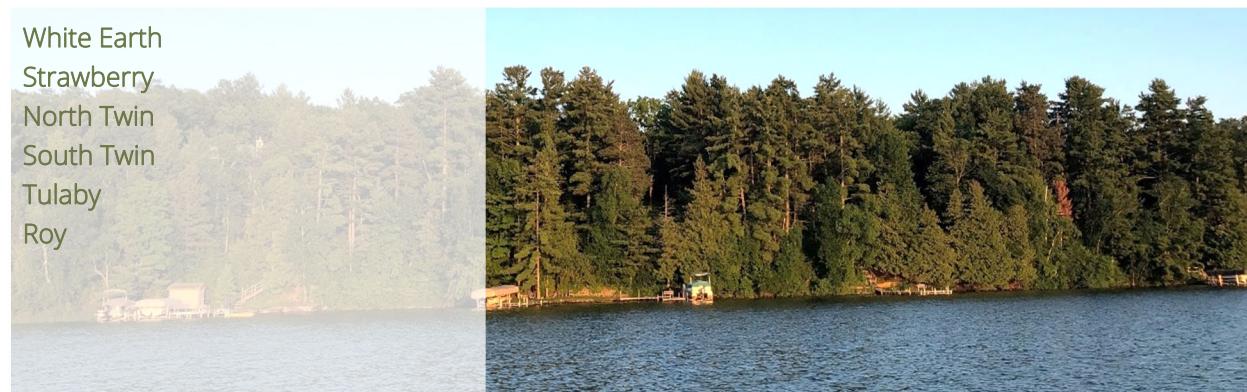


Figure 4-22. Lake riparian stabilization was determined a medium priority issue for the Headwaters Planning Region.



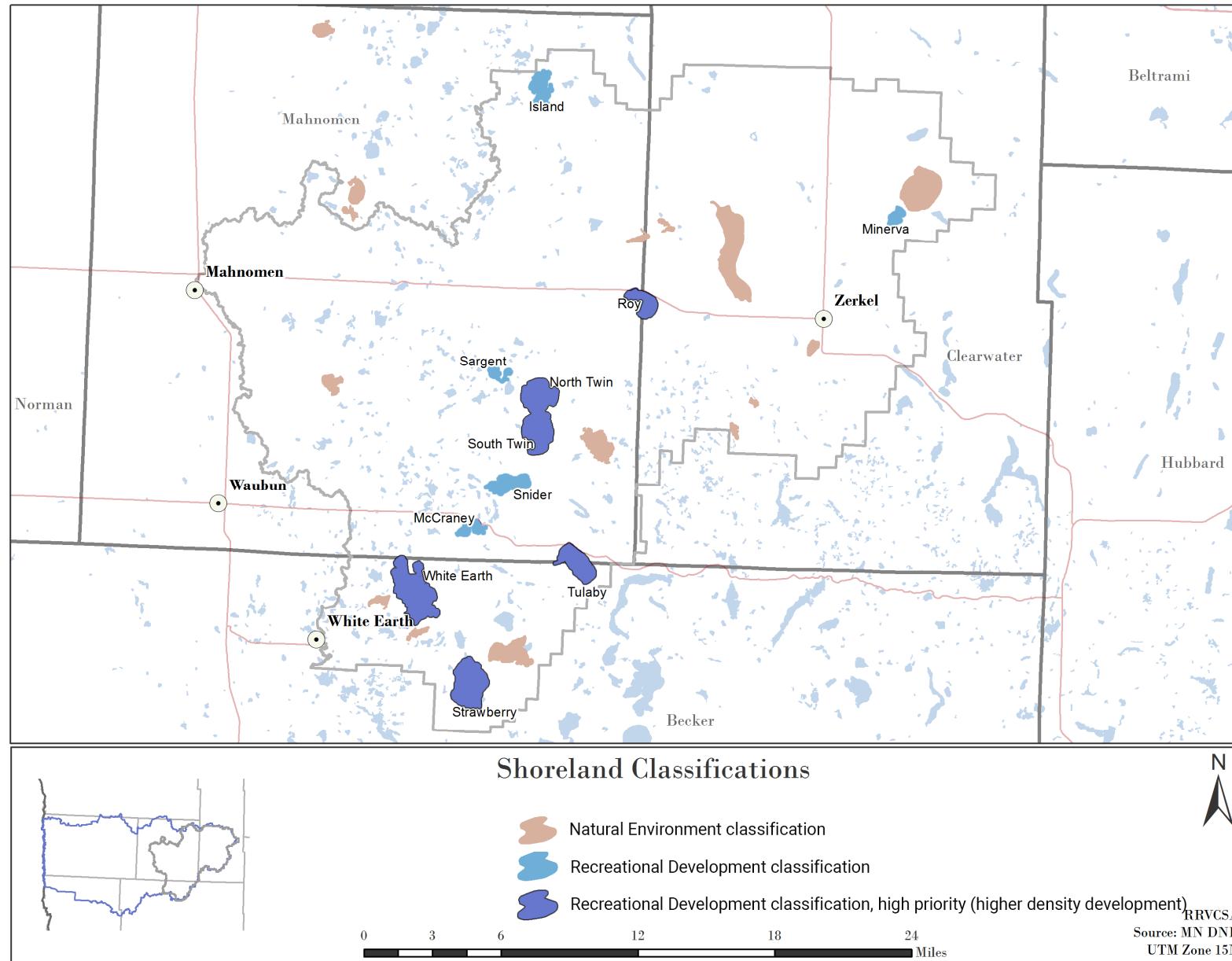


Figure 4-23. DNR Shoreline Classifications, which shows priority lakes for shoreline restoration projects.



Measurable Goal: Bacteria Reduction

Develop and implement bacteria management projects (i.e., manure management, fencing, SSTS compliance) to address sources of bacteria and make progress towards delisting impairments.

Background

Bacteria is everywhere. Some bacteria, such as *E. coli*, originate in the guts of warm-blooded organisms such as humans, birds and livestock and can indicate a source of fecal contamination. Higher levels of *E. coli* can be found where animals congregate such as birds under bridges, flocks of waterfowl, and animal feedlots. The MPCA sets water quality standards for the amount of *E. coli* in a waterbody, and waterbodies exceeding that standard are listed on the Impaired Waters List. These impaired waters can be the focus of bacteria management projects in this plan. Bacteria management projects include manure management, fencing livestock away from streams, and septic system compliance.

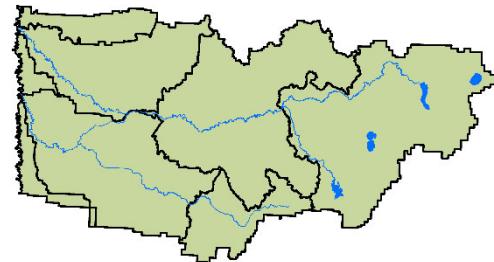


Figure 4-24. *E. coli* was determined an issue in numerous areas of the watershed based on the impairments

Issues

E. coli impairments

Goal Metrics

Number of projects implemented.

- Short-term Goal: Implement 20 bacteria management projects in priority areas (Figure 4-25).
- Long-term Goal: Implement bacteria management projects at all potential bacteria loading sites.

Prioritization

Where to implement bacteria management projects is guided by the locations of impaired streams.

Priority streams for projects include:

Wild Rice River

Marsh Creek

Marsh River

South Branch Wild Rice River

Spring Creek

Whiskey Creek

White Earth River

Twin Lakes Creek

Coon Creek



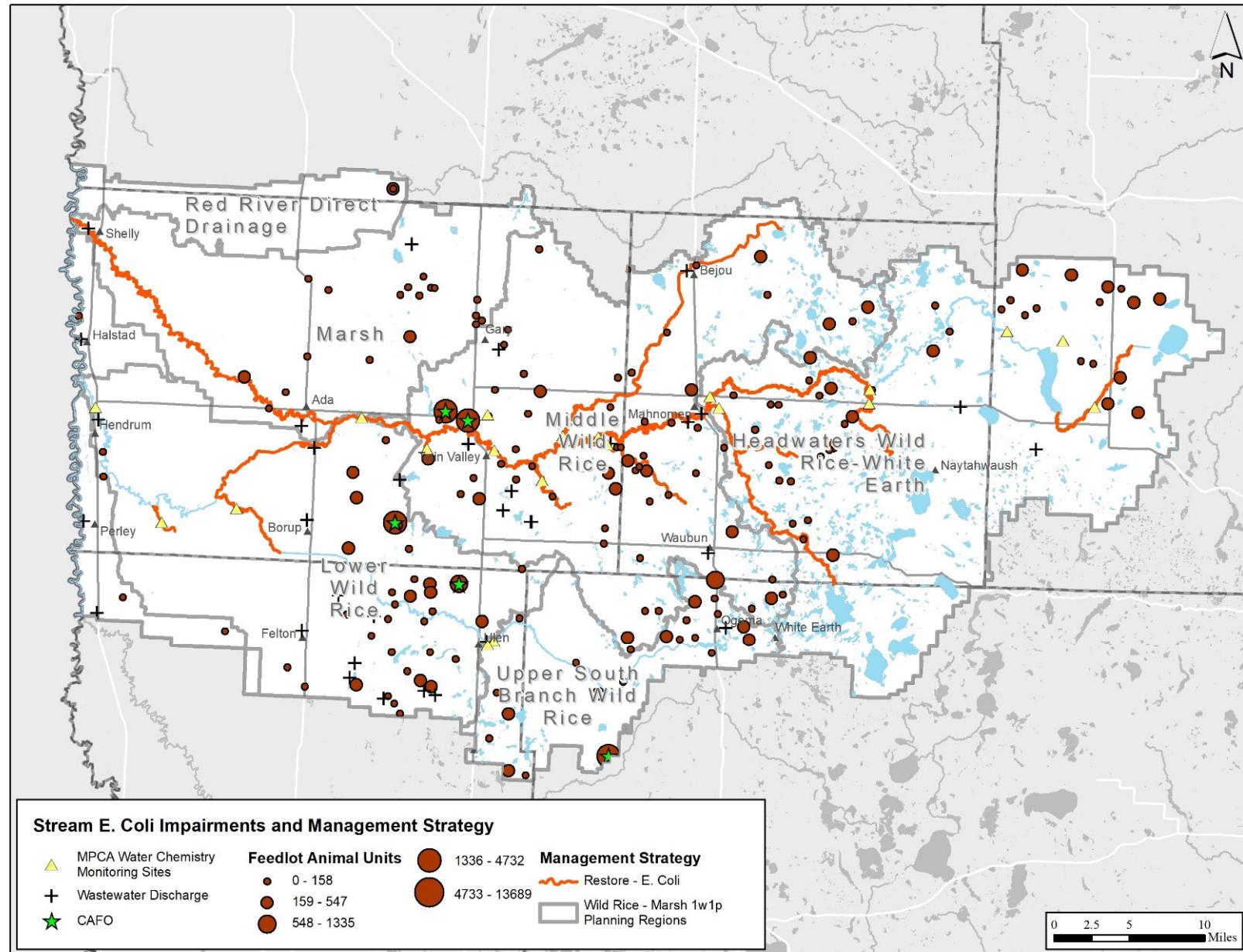


Figure 4-25. Bacteria impairments and the locations of monitoring sites and animal units.



Measurable Goal: Groundwater Protection

Protect groundwater by sealing unused wells, protecting DWSMAs, and addressing emerging contaminants.

Background

Groundwater is a hidden resource, but an essential drinking water source in the Wild Rice – Marsh Watershed. There are numerous potential contaminants to groundwater including nitrate, arsenic, and pesticides.

Unused, unsealed wells can provide a conduit for contaminants from the land surface to reach the sources of drinking water. This activity is particularly important for abandoned wells that penetrate a confining layer above a source aquifer.

Drinking Water Supply Management Areas (DWSMAs) are an established protection area that determines the contribution area of a public water supply well. The DWSMAs in the Wild Rice – Marsh Watershed are classified as low vulnerability, so the management focus would be to continue protection.



Figure 4-26. Groundwater contamination was determined a medium priority issue in the middle of the watershed based on the Minnesota Department of Health data.

Issues Addressed

Groundwater contamination

Goal Metrics

Number of wells sealed per year.

- Short-term Goal: Seal 15 unused wells per year in priority areas (Figure 4-27).
- Long-term Goal: Continue to seal wells, protect DWSMAs and address any emerging contaminants.

Prioritization

The well-sealing goal is an average of the number of wells sealed in the watershed over the past 10 years. Priority areas for well sealing are the high sensitivity areas illustrated in Figure 4-27.



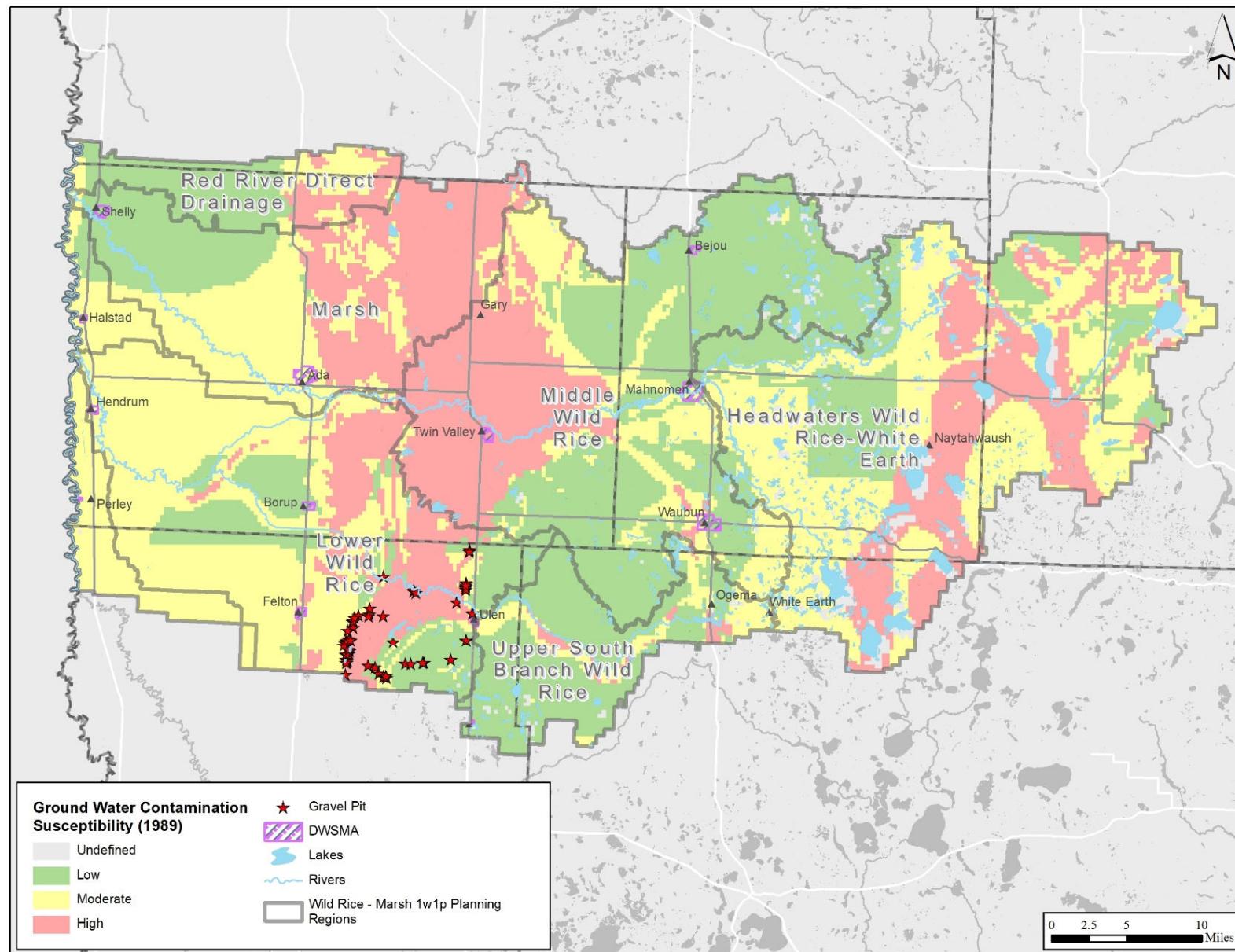


Figure 4-27. Groundwater contamination susceptibility in the Wild Rice - Marsh River Watershed.



Measurable Goal: Wild Rice / Manoomin Protection

Protect Wild Rice with easements.

Description

Wild Rice, called Manoomin in the Ojibwe language, is native to the lakes and rivers in the Wild Rice Watershed. Harvesting wild rice is a cultural tradition that goes back centuries and is still practiced today, much in the same way it was done before Europeans set foot in North America. Wild rice is also an important food source for birds and wildlife. There are some challenges to wild rice growth such as warmer temperatures, changing water levels, contaminants, diseases and invasive species. This goal aims to protect wild rice beds by adding *Reinvest in Minnesota* (RIM) easements. Easements limit the use of the land in order to protect its conservation value. There is currently one wild rice easement in the watershed.



Figure 4-28. Wild Rice was determined a high priority for the Headwaters Planning Region.

Issues Addressed

Wild Rice protection

Goal Metrics

Acres of RIM wild rice easements added.

- Short-term Goal: Add 250 acres of easements near priority wild rice lakes (10% progress to long-term goal).
- Long-term Goal: Protect the 2,513 acres near wild rice lakes without existing protections (public or tribal land).

Prioritization

Lakes are prioritized for protection by their significance for wild rice production and harvest. Priority lakes include the ones listed below. Lower Wild Rice Lake is listed as a priority, but the White Earth Nation already controls all the land around the lake so in essence it is already protected (Figure 4-29).

Lower Wild Rice Lake
Upper Wild Rice Lake
Mud Lake
Big Rat Lake
Roy Lake



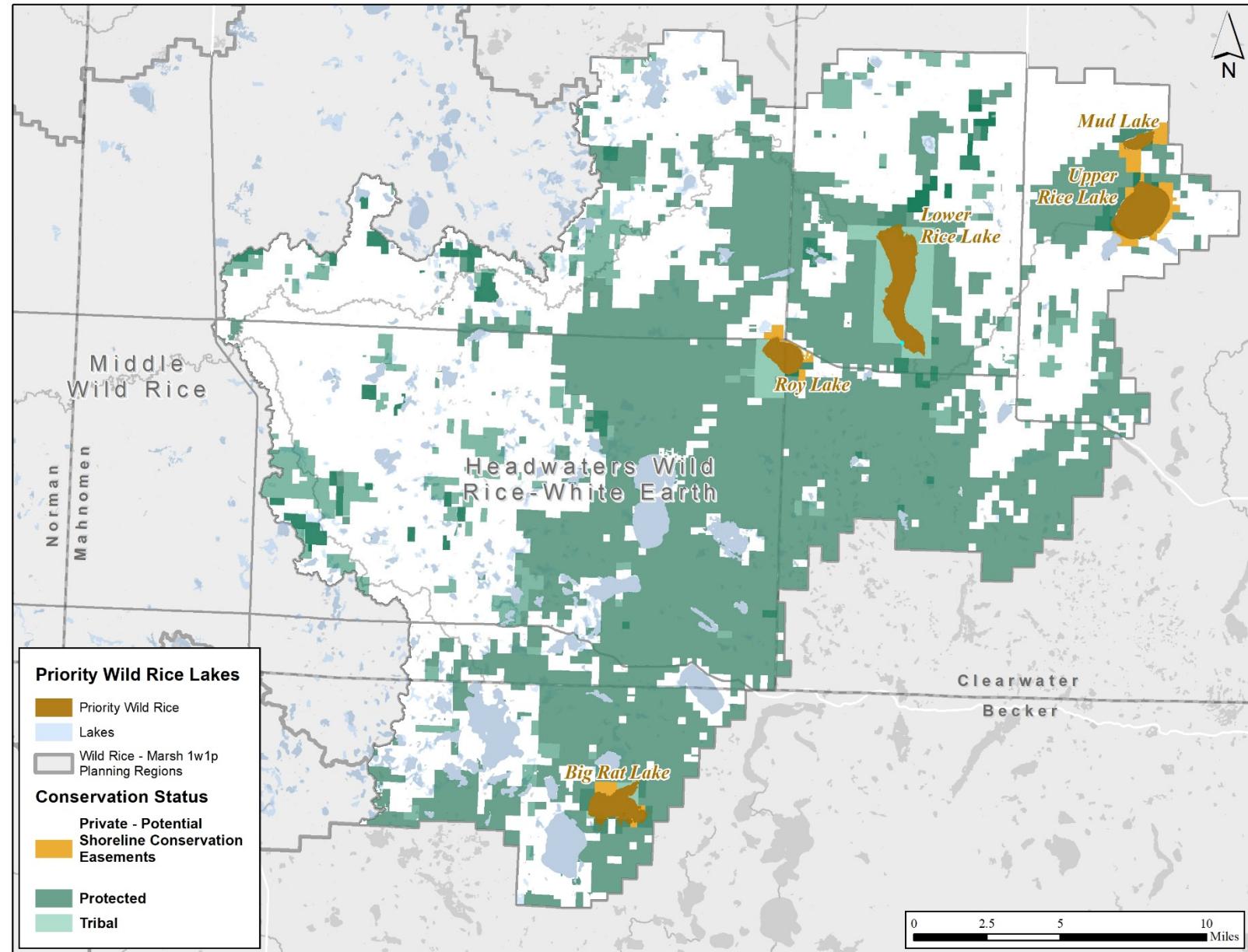
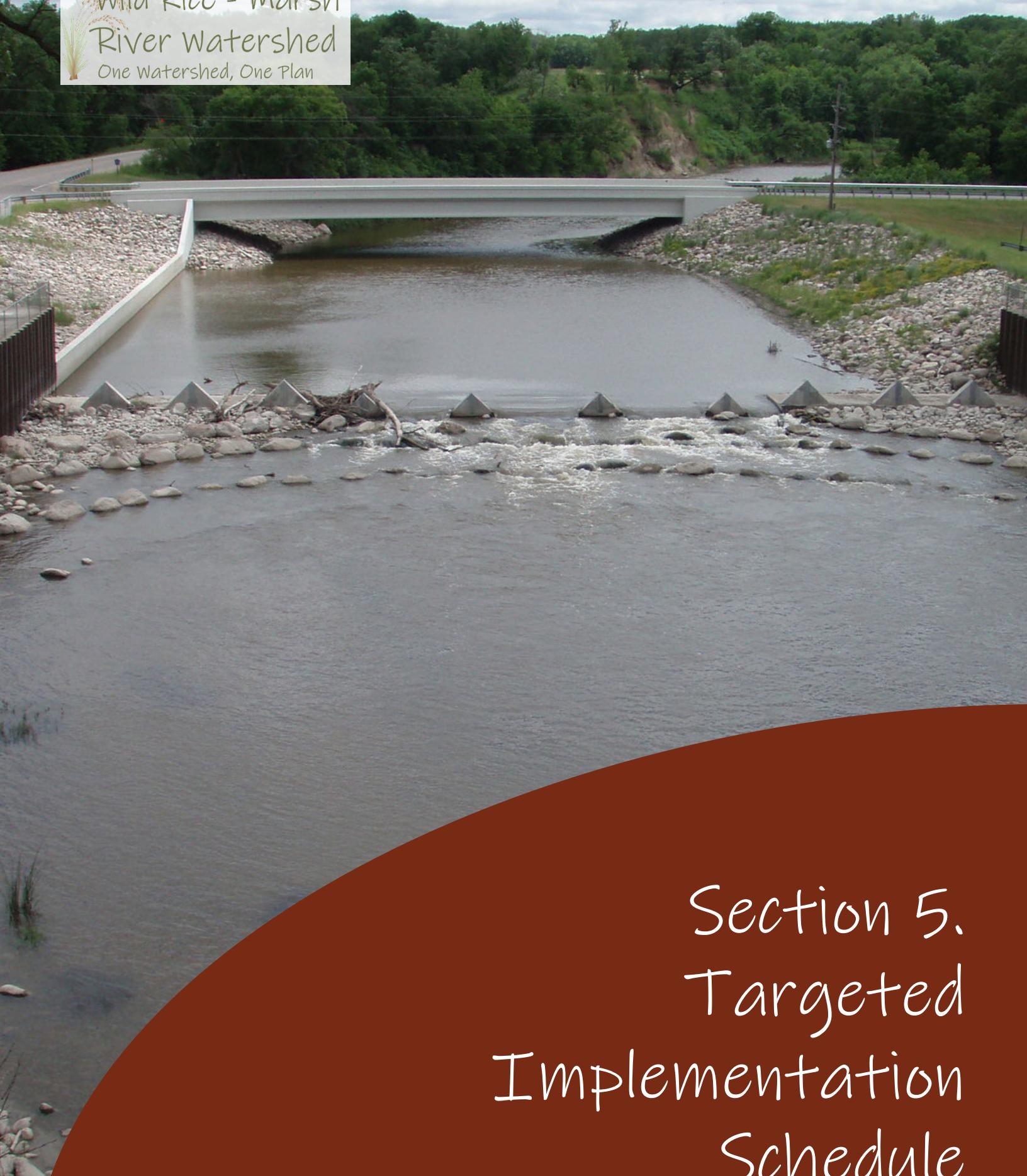


Figure 4-29. Priority wild rice lakes in the Wild Rice Watershed and targeted opportunities for easements.





Section 5. Targeted Implementation Schedule

Section 5. Targeted Implementation Schedule

The main goal of this plan is to guide projects in the watershed for the next ten years in a way to affect positive and meaningful change in water resource conditions. The targeted implementation schedule spells out the what, who, when and where of these projects.

Making progress towards achieving plan goals is largely dependent on funding. Increased funding leads to additional action implementation. This plan organizes actions into three funding levels (Table 5-1).

Table 5-1. Funding Levels for the Wild Rice - Marsh River Watershed One Watershed, One Plan.

Funding Level	Name	Description
1	Current Funding	Actions in this level are already being implemented. This level assumes plan funding is similar in magnitude to current funding focused on water issues within the plan area.
2	Current Funding + Watershed-Based Implementation Funds	This level assumes plan funding is like current funding focused on water issues within the plan area, plus estimated watershed-based implementation dollars (approximately \$685,000/year).
3	Partner and Other Funding	This funding level recognizes that there are other organizations and agencies doing work in the watershed that can help make progress towards plan goals. This level contains additional implementation activities identified during the plan development process that are the responsibility of agencies and organizations better suited in the watershed.

Actions were determined by considering actions in existing local plans and reviewing current data on the most common land and water management practices implemented in the watershed (see page 107). The targeted implementation schedule identifies who will complete each action, including plan partners, state agencies, federal agencies, and non-governmental organizations (NGOs). It is important to identify actions that other groups will complete, as it recognizes the work of others and clarifies roles. The targeted implementation schedule has been adjusted to reflect the anticipated combined local, state, federal, and NGO fiscal and technical commitments. Execution of these types of actions will require considerable coordination and cooperation.



Implementation Programs

Implementation programs are the funding mechanism to implement actions in the targeted implementation schedule. Some actions are implemented at a watershed-wide scale because they are applicable to the entire plan area. Other actions are targeted to a planning region scale to reflect changing issues and priorities from one planning region to the next. For more details on each of these implementation programs, see Section 6. Plan Implementation Programs.

Projects and Practices



- Incentives
- Cost share
- Soil health
- Pasture management
- Well sealing
- Forest plans

Scale: Planning Region

Capital Improvement Projects



- Large, one-time projects
- >\$250,000

Scale: Watershed Wide

Regulatory



- Ordinances
- Rules
- Regulations

Scale: Watershed Wide

Data Collection and Monitoring



- Water quality monitoring
- Culvert inventories

Scale: Watershed Wide

Outreach



- Demonstration plots
- Workshops
- Mailings

Scale: Watershed Wide

Figure 5-1. Implementation Programs in the WRM1W1P.



Prioritizing Where to Work

In a perfect world, there is enough funding to do all potential projects everywhere. In reality, funding is limited, and this plan aims to put the most effort and funding towards the areas that need it most.

To prioritize where to work, the Steering Committee considered numerous criteria:

1. Where is the most sediment loading? (Identified by PTMApp, Figure 5-2);
2. Where have the most BMPs been installed? These data show where the watershed partners are currently working. (Figure 5-5); and
3. Where are sediment impairments? (Figure 5-2).

After looking at these items on the map, the Steering Committee decided to focus the funding based on the most sediment loading to the outlet of each planning region (Figure 5-2). The Total Suspended Solids impairments were included on the map and help to show where to work.

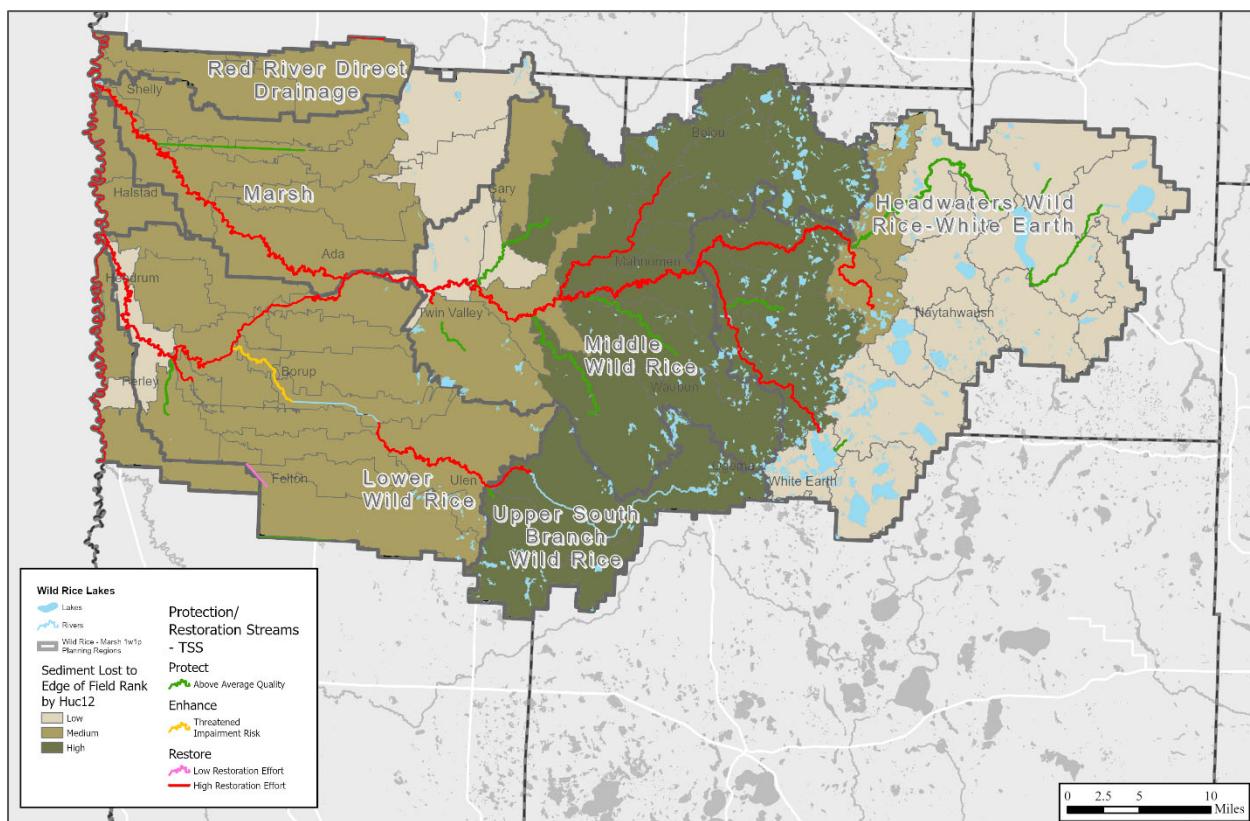


Figure 5-2. Sediment loading per HUC12 Subwatershed split into three categories: high, medium, and low.



The Steering Committee recommended the funding available (Level 2: Current + Watershed-Based Implementation Funding) be split between planning regions based on their overall sediment contribution to the outlet of the planning region (Figure 5-3).

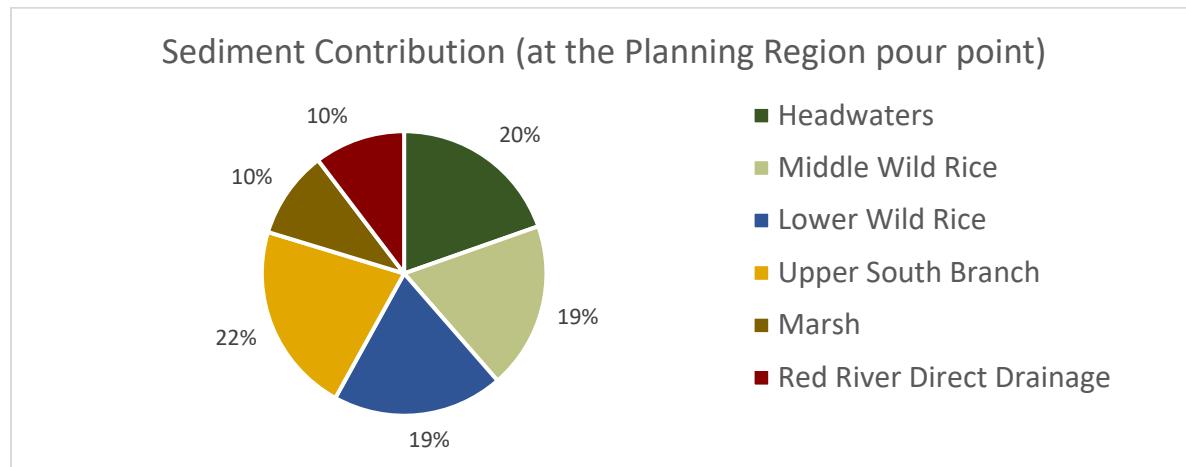


Figure 5-3. Sediment contribution to the pour point of each planning region.

Common practices that watershed partners use to reduce sediment include: sediment basins, grade stabilizations, side water inlets, cover crops, reduced tillage, and crop rotation (Table 5-2, Figures 5-4 & 5-5). The Steering Committee estimated how much of each type of practice they would do in each planning region with the funding available (Level 2. Current + Watershed-Based Implementation Funding). PTMApp was used to target where each practice resulted in the best sediment reduction, determine how many practices could be implemented, and the cost of each practice. For more on PTMApp decisions and methods for this plan, see Appendix B.



Figure 5-4. An example of reduced tillage in the WRM Watershed.



Known Stewardship

There are already numerous best management practices occurring in the watershed including state-funded practices, federal-funded practices, Conservation Reserve Program (CRP), and the Minnesota Ag Water Quality Certification Program (Figure 5-4, Table 5-2).



Figure 5-5. Known stewardship practices in the watershed including the Conservation Reserve Program (CRP), Minnesota Ag Water Quality Certifications, and Best Management Practices (eLINK).

Table 5-2. Common practices in the watershed (NRCS data, 2015-2019).

NRCS Practice Name	Number of practices
Conservation Crop Rotation	574
Cover Crop	403
Nutrient Management	374
Underground Outlet	182
Residue and Tillage Management, Reduced Till	149
Water and Sediment Control Basin (WASCOB)	115
Upland Wildlife Habitat Management	90
Access Control	78
Filter Strip	56
Conservation Cover	54
Wetland Restoration	53
Forage and Biomass Planting	51
Forest Management Plan	49
Prescribed Grazing	49



Targeting Practices

The Steering Committee thoroughly discussed the targeting scale to use in the plan. They wanted it to be focused on priority areas, but not show specific parcels or field-scale practice locations because the way the plan is implemented does not always perfectly match the PTMApp implementation scenario. The full implementation scenario with field scale targeting maps can be found in Appendix B.

The Steering Committee decided to target practices for implementation based on four-mile catchments, based on the hydroconditioning and flowlines to each planning region outlet. These four-mile catchments were targeted per goal and color coded in the implementation table. See an example in Figure 5-6.

The PTMApp practices for the sediment and phosphorus goals were split into three different levels (quantiles) based on the median benefit of the practices (BMPs) in that four-mile catchment. The catchments with the highest benefits are the targeted areas for where to implement these practices first. The median benefits and costs are provided in a table for each category (Highest, High, Medium) and can be added up to reach the goal. The target catchments for the sediment and phosphorus goals are also the "Highest" BMP Sediment Reduction catchments for PTMApp projects (dark orange, Figure 5-6).

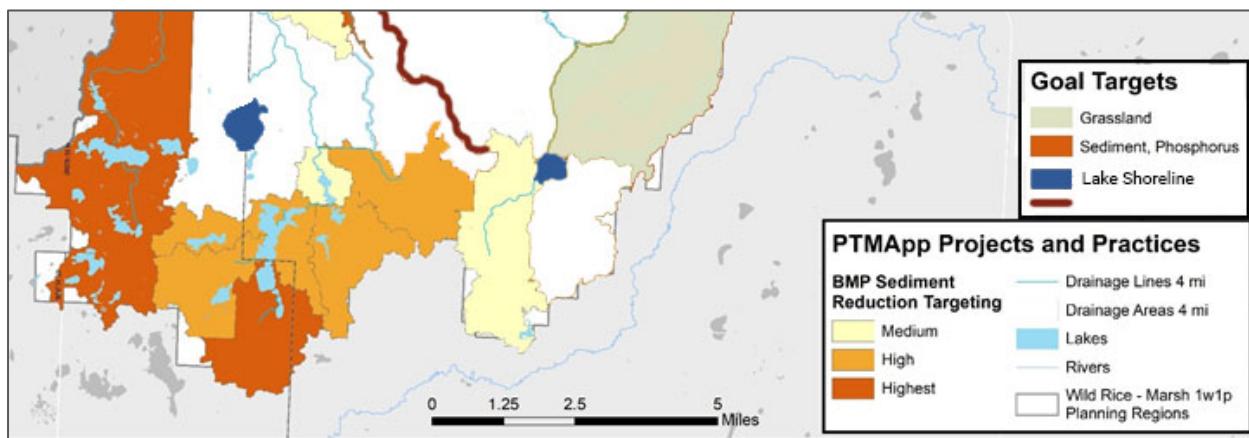


Figure 5-6. Example map showing the 4-mile catchments and priorities for implementing each goal.

A variety of factors will ultimately determine where implementation occurs, including but not limited to:

- Voluntary participation by landowners and residents;
- Field verification of practice type and location;
- Amount of funding available for implementation;
- New data on resource conditions;
- Practices/projects ready to implement; and
- Effectiveness of education and outreach and research initiatives



Headwaters Planning Region



Planning Region Overview

The Headwaters Planning Region is largely forested with a low population density. This lake-rich planning region contains multiple surface water resources, including wild rice lakes, wetlands, the headwaters of the Wild Rice River, and the White Earth River. The planning region outlets where the White Earth River joins the Wild Rice River (orange dot).

Funding

Funding will be used to implement practices to:

- Control erosion and runoff contributing sediment in streams
- Increase easement protections for wild rice lakes
- Control bacteria loads in streams
- Maintain forested lands with plans and covenants
- Reduce nutrient delivery and shoreline erosion impacting lakes
- Protect wetlands, sensitive areas, and calcareous fens



Headwaters Projects and Practices Actions Table

The numbers and total costs in this table refer to the Level 2 Funding Scenario (Current + WBIF).

Action	Targeted Resources (see color coding in Figure 5-7)	10-Year Output at Catchment Level (Short-term Goal)	Measurable Goals								Timeline						Total 10-Year Cost Level 2 (Current+WBIF)			
			Sediment	Phosphorus	Storage	Soil Health	Bacteria	Grassland Management	Forest Management	Lakeshore Stabilization	Wild Rice	Drinking Water Protection	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30	Annual Cost	
Storage & Protection Practices (PTMApp) (i.e. Sediment Basins; Grade Stabilizations, Wetlands; Farm Ponds; Side Water Inlets)		266 parcels (27 contacted/yr) 2,689 tons sediment/yr 370 lbs phosphorus/yr 33 acre-feet storage/yr	●	●	○								SWCDs, WRWD, NRCS, BWSR	●	●	●	●	●	\$70,200	\$702,000
Soil Health & Nutrient Management Practices (i.e. cover crops, reduced tillage, nutrient management, crop rotation) Cost is based on a 3-year cost share.		2,019 acres	○	○	○	●							SWCDs, WRWD, NRCS, BWSR	●	●	●	●	●	\$54,600	\$546,000
Forest Stewardship Plans and SFIA		2,400 acres, 20 plans	○	○					●			○	SWCDs, DNR, BWSR, NRCS	●	●	●	●	●	\$1,200	\$12,000
Well Sealing		5/year									●		SWCDs, MDH, NRCS	●	●	●	●	●	\$5,000	\$50,000
Wild Rice Easements		251 acres									●		SWCDs, Tribe, BWSR	●	●	●	●	●	\$8,200	\$82,000
Lake Shoreline Restoration		16 projects								●			SWCDs, DNR, BWSR	●	●	●	●	●	\$8,000	\$80,000
Prescribed grazing		341 acres, 3 plans						●					SWCDs, TNC, BWSR, NRCS	●	●	●	●	●	\$2,800	\$28,000
Land Retirement Programs (CRP, CREP)		Maintain current						●					SWCDs, WRWD, NRCS, TNC, DNR, BWSR	●	●	●	●	●	\$523,400	\$5,234,000
Bacteria Reduction projects (Livestock exclusion and watering facility, pit closures, waste storage facility, SSTS maintenance and replacement)		8 projects	○	○		●							SWCDs, NRCS, BWSR	●	●	●	●	●	\$6,000	\$60,000
Total Level 1 Funding Scenario (Current):																		\$60,000	\$600,000	
Total Level 2 Funding Scenario (Current + WBIF):																		\$156,000	\$1,560,000	
Total Level 3 Funding (Partner Projects):																		\$523,400	\$5,234,000	

- Primary Goal this action will address
- Secondary Goal this action will address

Headwaters Planning Region

Targeted Catchments and Priority Resources

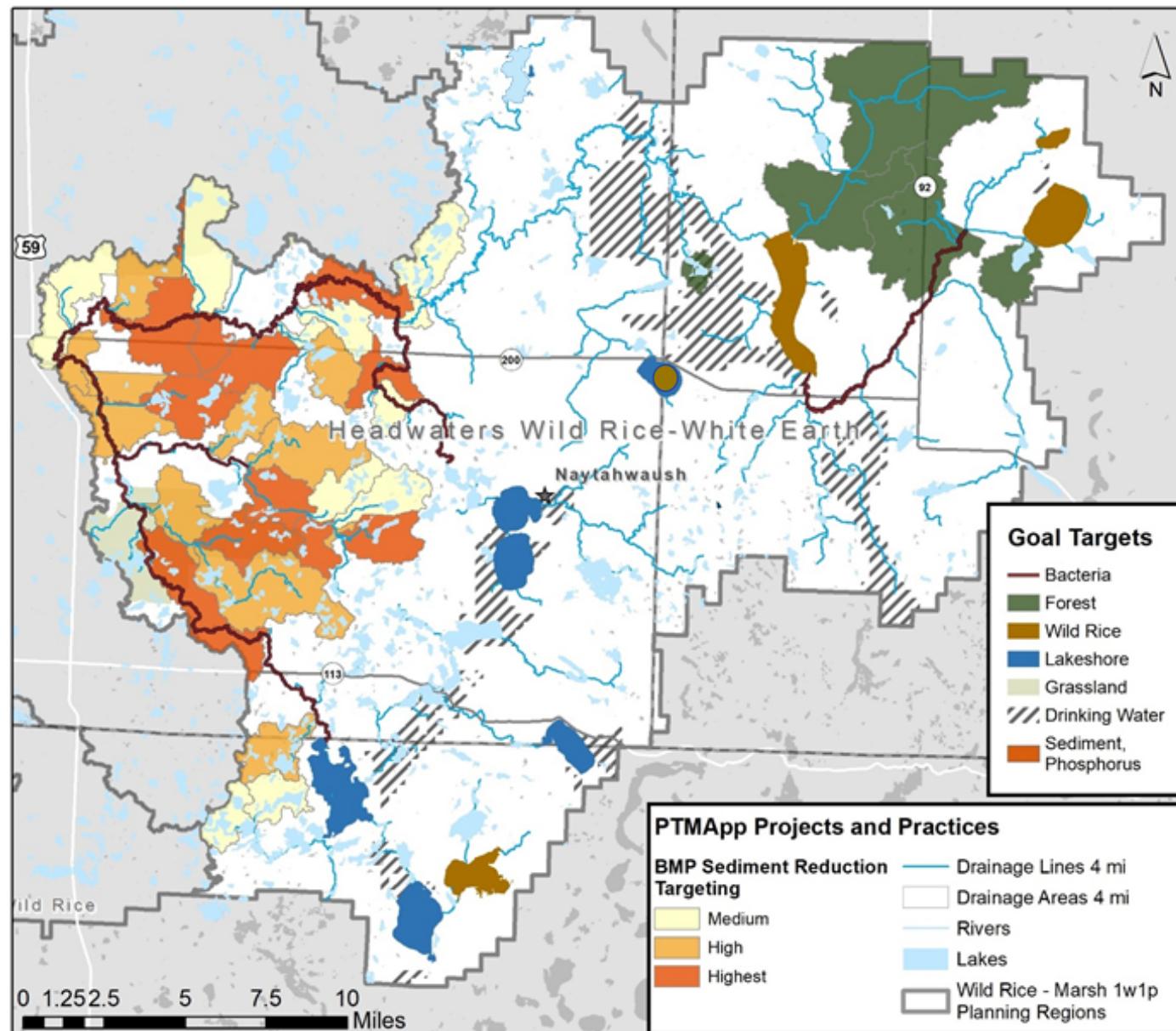


Figure 5-7. Targeted areas for implementation in the Headwaters Planning Region based on the goals. For sediment and phosphorus, the "Highest" catchments are the first priority for implementation because they have the highest sediment benefit.

Benefits Calculator

Shown in the Benefits Calculator below are the median estimated benefits from PTMApp practices in the Headwaters Planning Region at the catchment level to reduce sediment and phosphorus loading and increase storage. Work should preferentially begin with the catchments with the "highest" sediment benefits targets.

This calculator can be used to reach the sediment load reduction goal in many ways. For example, the sediment goal (2,689 tons) can be reached by implementing 62 sediment basin systems in 10 years in the "Highest" catchments or 15 sediment basin systems, 15 grade stabilizations and 16 soil health projects in 10 years in the "Highest" catchments, or any combination in between. This information allows for flexibility in implementation.

	Practice Type	Sediment (tons/yr)	Phosphorus (lbs/yr)	Storage (acre/feet)	Cost†
HIGHEST	Sediment Basin System*	43	10	4	\$70,986
	Grade Stabilization	44	1	-	\$20,296
	Soil Health**	84	11	-	\$9,552
HIGH	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin System *	32	9	4	\$71,036
	Grade Stabilization	18	5	-	\$121,300
MEDIUM	Practice Type	66	7	-	\$6,524
	Sediment Basin System *	26	7	3	\$45,820
	Grade Stabilization	4	1	-	\$22,878
	Soil Health**	57	8	-	\$6,834

*A sediment system project can contain more than one basin

**Soil Health practices include cover crops, reduced tillage, nutrient management, and crop rotation.

†Cost is based on the EQIP rate x 2, and includes technician time and the full cost of the practice (not just the EOIP cost share).

Middle Wild Rice Planning Region



Planning Region Overview

The Middle Wild Rice Planning Region contains multiple surface water resources, including the Wild Rice River, Marsh and Spring creeks, and Beaulieu, Aspinwall, and Chief lakes. This Planning Region is a transition zone between the lakes and forests in the east and the agricultural lands to the west. The planning region outlets just prior to where the Marsh River begins (orange dot).

Funding

Funding will be used to implement practices to:

- Control erosion and runoff contributing sediment in streams
- Provide additional flood storage and protect at-risk communities, including Twin Valley, Waubun, and Mahnomen
- Restore and stabilize streams for channel integrity
- Seal abandoned wells for drinking water protection
- Protect wetlands, prairies, beach ridge areas, and calcareous fens





Middle Wild Rice Projects and Practices Actions Table

The numbers and total costs in this table refer to the Level 2 Funding Scenario (Current + WBIF).

Action	Targeted Resources (Figure 5-8)	10-Year Output at Catchment Level (Short-term Goal)	Sediment	Phosphorus	Storage	Ditch Stabilization	Soil Health	Bacteria	Grassland Management	Forest Management	Drinking Water Protection	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30	Annual Cost	Total 10-Year Cost Level 2 (Current+WBIF)
Storage, Filtration & Protection Practices (i.e. Sediment Basins, Grade Stabilizations, Grassed Waterways, Filter Strips, Wetlands)		507 parcels (51 contacted/yr) 2,223 tons sediment/yr 332 lbs phosphorus/yr 31 acre-feet storage/yr	●	●	○							SWCDs, WRWD, NRCS	●	●	●	●	●	\$103,700	\$1,037,000
Soil Health and Nutrient Management Practices (i.e. cover crops, reduced tillage, nutrient management, crop rotation) Total costs are based on a 3-year cost share.		2,602 acres	○	○	○		●					SWCDs, WRWD, NRCS, BWSR	●	●	●	●	●	\$14,800	\$148,000
Well Sealing		5 wells/year									●	SWCDs, MDH, NRCS	●	●	●	●	●	\$5,000	\$50,000
Prescribed Grazing		951 acres, 9 plans						●				SWCDs, TNC, BWSR, NRCS	●	●	●	●	●	\$9,000	\$90,000
Land Retirement Programs (CRP, CREP)		Maintain current						●				SWCDs, WRWD, NRCS, TNC, DNR, BWSR	●	●	●	●	●	\$478,800	\$4,788,000
Bacteria Reduction projects (Livestock exclusion and watering facility, pit closures, waste storage facility, SSTS maintenance and replacement)		8 projects	○	○			●					SWCDs, Counties, NRCS, BWSR	●	●	●	●	●	\$6,000	\$60,000
Total Level 1 Funding Scenario (Current):																		\$57,000	\$570,000
Total Level 2 Funding Scenario (Baseline + WBIF):																		\$138,500	\$1,385,000
Total Level 3 Funding (Partner Projects):																		\$478,800	\$4,788,000

- Primary Goal this action will address
- Secondary Goal this action will address

Middle Wild Rice Planning Region

Targeted Catchments and Priority Resources

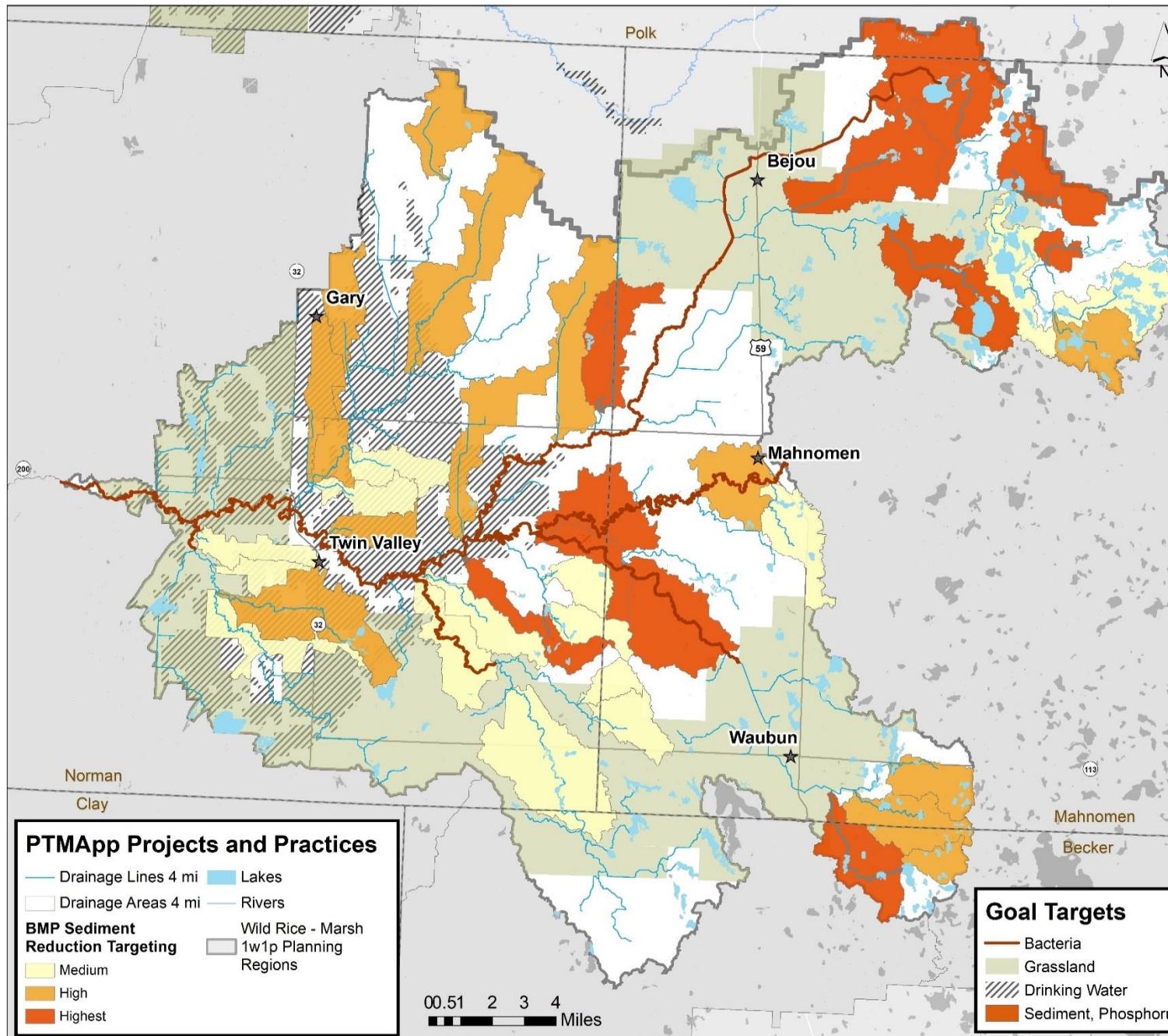


Figure 5-8. Targeted areas for implementation in the Middle Wild Rice Planning Region based on the goals. For sediment and phosphorus, the "Highest" catchments are the first priority for implementation because they have the highest sediment benefit.

Benefits Calculator

Shown in the Benefits Calculator below are the median estimated benefits from PTMApp practices in the Middle Wild Rice Planning Region at the catchment level to reduce sediment and phosphorus loading and increase storage. Work should preferentially begin with the catchments with the "highest" sediment benefits targets.

This calculator can be used to reach the sediment load reduction goal in many ways. For example, the sediment goal (2,223 tons) can be reached by implementing 24 sediment basin systems in 10 years in the "Highest" catchments or 10 sediment basin systems, 9 grade stabilizations and 8 soil health projects in 10 years in the "Highest" catchments, or any combination in between. This information allows for flexibility in implementation.

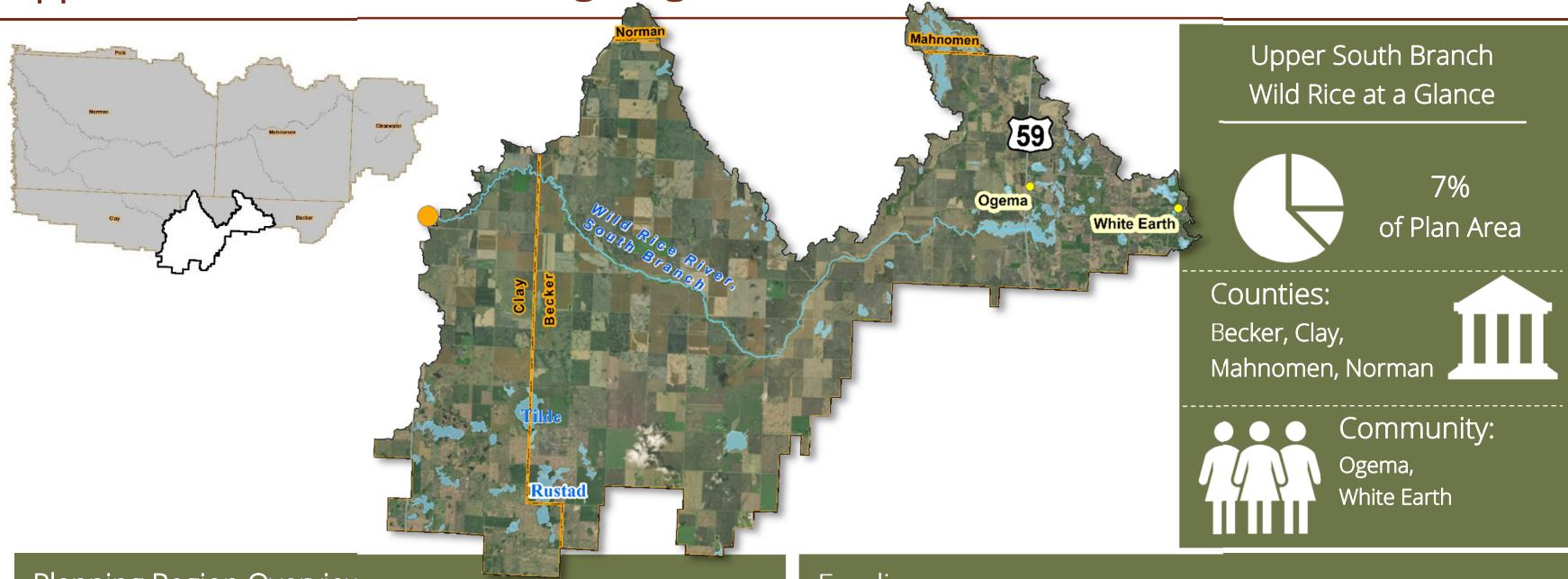
	Practice Type	Sediment (tons/yr)	Phosphorus (lbs/yr)	Storage (acre/feet)	Cost†
HIGHEST	Sediment Basin System *	90	9	6	\$99,692
	Grade Stabilization	74	5	-	\$120,352
	Grassed Waterway/Filtration	20	1	-	\$7,708
	Soil Health**	88	11	-	\$9,368
HIGH	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin System *	65	14	4	\$72,102
	Grade Stabilization	-	-	-	-
	Grassed Waterway/Filtration	14	1	-	\$4,920
MEDIUM	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin System *	51	8	3	\$53,294
	Grade Stabilization	13	0	-	\$9,488
	Grassed Waterway/Filtration	11	2	-	\$5,588
	Soil Health**	64	10	-	\$9,090

*A sediment basin system can contain more than one basin.

**Soil Health practices include cover crops, reduced tillage, nutrient management, and crop rotation.

†Cost is based on the EQIP rate x 2 and includes technician time and the full cost of the practice (not just the EQIP cost share).

Upper South Branch Planning Region



Planning Region Overview

The Upper South Branch Planning Region is mainly agricultural with concentrations of shallow lakes and wetlands in the lower western and upper eastern corners. Specific surface water resources include the South Branch of the Wild Rice River and Tilde and Rustad lakes. The planning region outlets near Ulen where it is joined by Stiner Creek (orange dot).

Funding

Funding will be used to implement practices to:

- Control erosion and runoff contributing sediment in streams and ditches
- Increase agricultural productivity through soil health and nutrient management practices
- Improve prairie habitat through prescribed grazing and land retirement programs
- Protect wetlands, beach ridge areas, and calcareous fens



Upper South Branch Projects and Practices Actions Table

The numbers and total costs in this table refer to the Level 2 Funding Scenario (Current + WBIF).

Action	Targeted Resources (see color coding in Figure 5-9)	10-Year Output at Catchment Level (Short-term Goal)	Measurable Goals					Timeline					Total 10-Year Cost Level 2 (Current+WBIF)		
			Sediment	Phosphorus	Storage	Soil Health	Grassland Management	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30		
Storage, Filtration & Protection Practices (i.e. Sediment Basins, Grade Stabilizations, Grassed Waterways, Filter Strips, Wetlands)		520 parcels (52 contacted/yr) 2,484 tons sediment/yr 389 lbs phosphorus/yr 59 acre-feet storage/yr	●	●	○			SWCDs, WRWD, NRCS	●	●	●	●	●	\$137,200	\$1,372,000
Soil Health and Nutrient Management Practices (i.e. cover crops, reduced tillage, nutrient management, crop rotation) Total cost is based on a 3-year cost-share.		1,319 acres	○	○	○	●		SWCDs, WRWD, NRCS, BWSR	●	●	●	●	●	\$34,300	\$343,000
Prescribed Grazing		315 acres, 3 plans	○	○			●	SWCDs, TNC, BWSR, NRCS	●	●	●	●	●	\$2,800	\$28,000
Land Retirement Programs (CRP, CREP)		Maintain current	○	○			●	WRWD, NRCS, TNC, DNR, BWSR	●	●	●	●	●	\$132,000	\$1,320,000
												Total Level 1 Funding Scenario (Current):	\$66,000	\$660,000	
												Total Level 2 Funding Scenario (Baseline + WBIF):	\$174,300	\$1,743,000	
												Total Level 3 Funding (Partner Projects):	\$132,000	\$1,320,000	

- Primary Goal this action will address
- Secondary Goal this action will address

Upper South Branch Planning Region

Targeted Catchments and Priority Resources

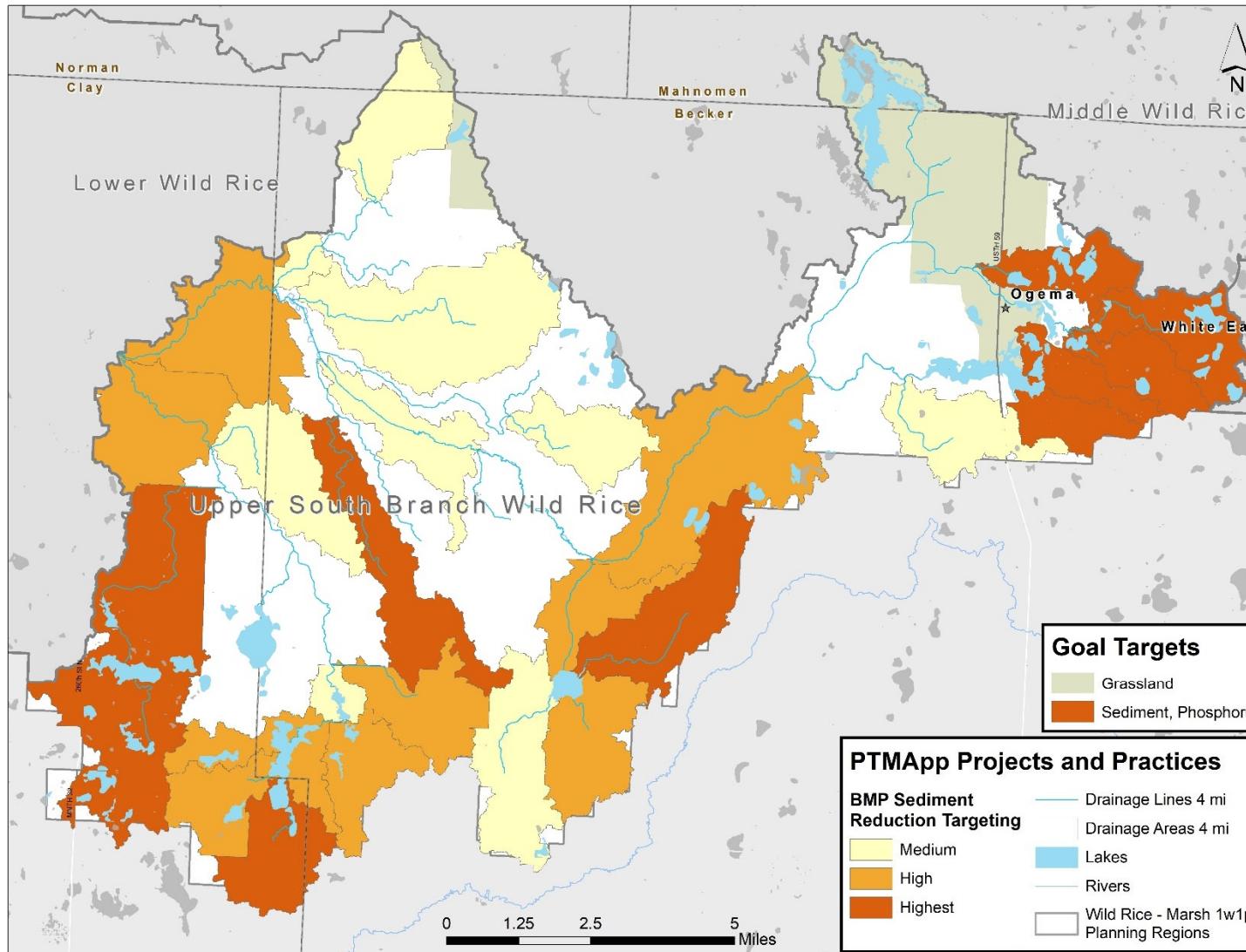


Figure 5-9. Targeted areas for implementation in the Upper South Branch Planning Region based on the goals. For sediment and phosphorus, the "Highest" catchments are the first priority for implementation because they have the highest sediment benefit.

Benefits Calculator

Shown in the Benefits Calculator below are the median estimated benefits from PTMApp practices in the Upper South Branch Planning Region at the catchment level to reduce sediment and phosphorus loading and increase storage. Work should preferentially begin with the catchments with the "highest" sediment benefits targets.

This calculator can be used to reach the sediment load reduction goal in many ways. For example, the sediment goal (2,484 tons) can be reached by implementing 55 sediment basin systems in 10 years in the "Highest" catchments or 15 sediment basin systems, 15 grade stabilizations and 14 soil health projects in 10 years in the "Highest" catchments, or any combination in between. This information allows for flexibility in implementation.

	Practice Type	Sediment (tons/yr)	Phosphorus (lbs/yr)	Storage (acre/feet)	Cost†
HIGHEST	Sediment Basin System *	45	13	6	\$97,732
	Grade Stabilization	42	5	-	\$20,620
	Grassed Waterway/Filtration	16	1	-	\$7,936
	Soil Health**	83	13	-	\$11,163
HIGH	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin System *	34	9	3	\$60,766
	Grade Stabilization	30	4	-	\$23,662
	Grassed Waterway/Filtration	12	1	-	\$7,632
MEDIUM	Soil Health**	66	10	-	\$9,096
	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin System *	32	10	3	\$59,598
	Grade Stabilization	27	6	-	\$19,400
	Grassed Waterway/Filtration	10	1	-	\$7,090
	Soil Health**	59	12	-	\$10,500

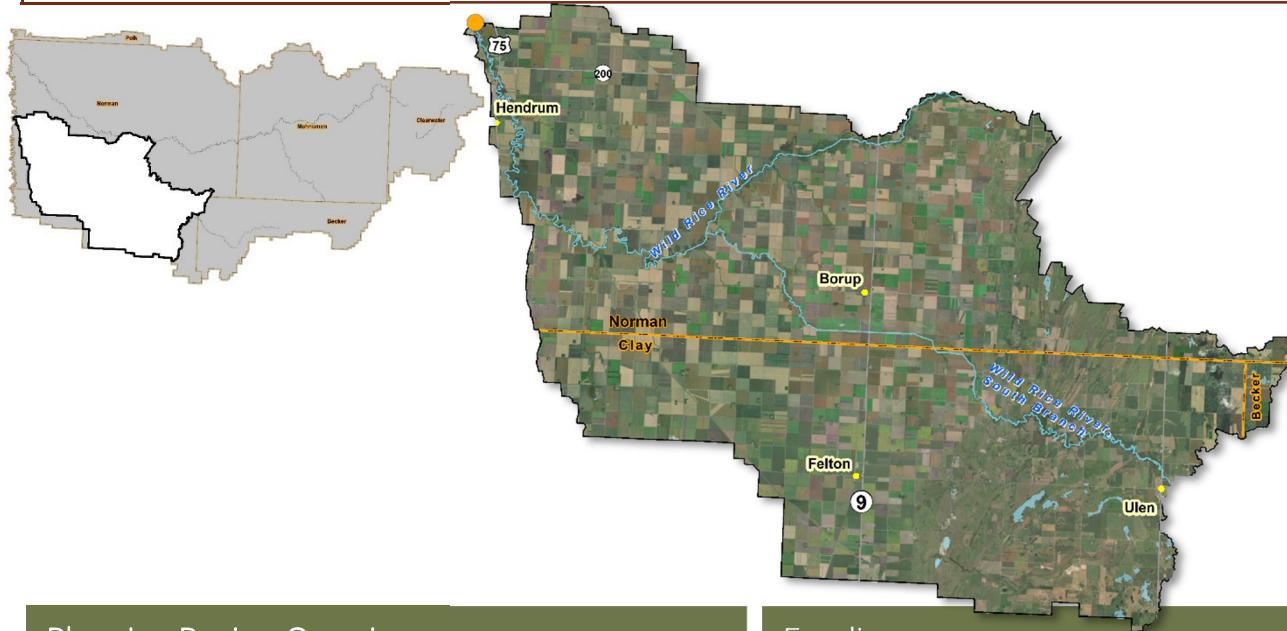
*A sediment basin System can contain more than one basin

**Soil Health practices include cover crops, reduced tillage, nutrient management, and crop rotation.

†Cost is based on the EQIP rate x 2 and includes technician time and the full cost of the practice (not just



Lower Wild Rice Planning Region



Lower Wild Rice at a Glance



20%
of Plan Area

Counties:
Norman, Clay,
Becker



Community:
Hendrum, Borup,
Felton, Ulen

Planning Region Overview

The Lower Wild Rice River Planning Region is dominated by agricultural lands with sparse wetlands in the far eastern portion and some associated calcareous fen habitat. The South Branch of the Wild Rice River runs northwest here after it diverges from the mainstem of the Wild Rice, which outlets into the Red River on the western side of this planning region (orange dot).

Funding

Funding will be used to implement practices to:

- Control erosion and runoff contributing sediment in streams and ditches
- Provide additional flood storage and protect at-risk communities, including Borup and farmlands to the northwest
- Restore and stabilize streams for channel integrity and habitat quality
- Improve prairie habitat through prescribed grazing and land retirement programs
- Seal abandoned wells for drinking water protection





Lower Wild Rice Projects and Practices Action Table

The numbers and total costs in this table refer to the Level 2 Funding Scenario (Current + WBIF).

Action	Targeted Resources (see color coding in Figure 5-10)	10-Year Output at Catchment Level (Short-term Goal)	Measurable Goals						Timeline						Total 10-Year Cost Level 2 (Current+WBIF)		
			Sediment	Phosphorus	Storage	Soil Health	Bacteria	Grassland Management	Drinking Water Protection	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30	Annual Cost	
Storage, Filtration & Protection Practices (i.e. Sediment Basins, Grade Stabilizations, Grassed Waterways, Filter Strips, Wetlands)	Orange	474 parcels (47 contacted/yr) 1,216 tons sediment/yr 216 lbs phosphorus/yr 11 acre-feet storage/yr	●	●	○					SWCDs, WRWD, NRCS, BWSR	●	●	●	●	●	\$103,700	\$1,037,000
Soil Health and Nutrient Management Practices (i.e. cover crops, reduced tillage, nutrient management, crop rotation) Total costs are based on a 3-year cost share.	Orange	1,032 acres	○	○	○	●				SWCDs, WRWD, NRCS, BWSR	●	●	●	●	●	\$22,200	\$222,000
Well Sealing	Grey	2 wells/year							●	SWCDs, MDH, NRCS	●	●	●	●	●	\$2,000	\$20,000
Prescribed Grazing	Light Green	402 acres, 4 plans	○	○				●		SWCDs, TNC, BWSR, NRCS	●	●	●	●	●	\$11,500	\$115,000
Land Retirement Programs (CRP, CREP)	Light Green	Maintain current	○	○				●		WRWD, NRCS, TNC, DNR, BWSR	●	●	●	●	●	\$381,200	\$3,812,000
Bacteria Reduction projects (Livestock exclusion and watering facility, pit closures, waste storage facility, SSTS maintenance and replacement)	Dark Red	2 projects	○	○			●			SWCDs, NRCS, BWSR	●	●	●	●	●	\$1,500	\$15,000
													Total Level 1 Funding Scenario (Current):		\$57,000	\$570,000	
													Total Level 2 Funding Scenario (Baseline + WBIF):		\$140,800	\$1,408,000	
													Total Level 3 Funding (Partner Projects):		\$381,200	\$3,812,000	

- Primary Goal this action will address
- Secondary Goal this action will address

Lower Wild Rice Planning Region

Targeted Catchments and Priority Resources

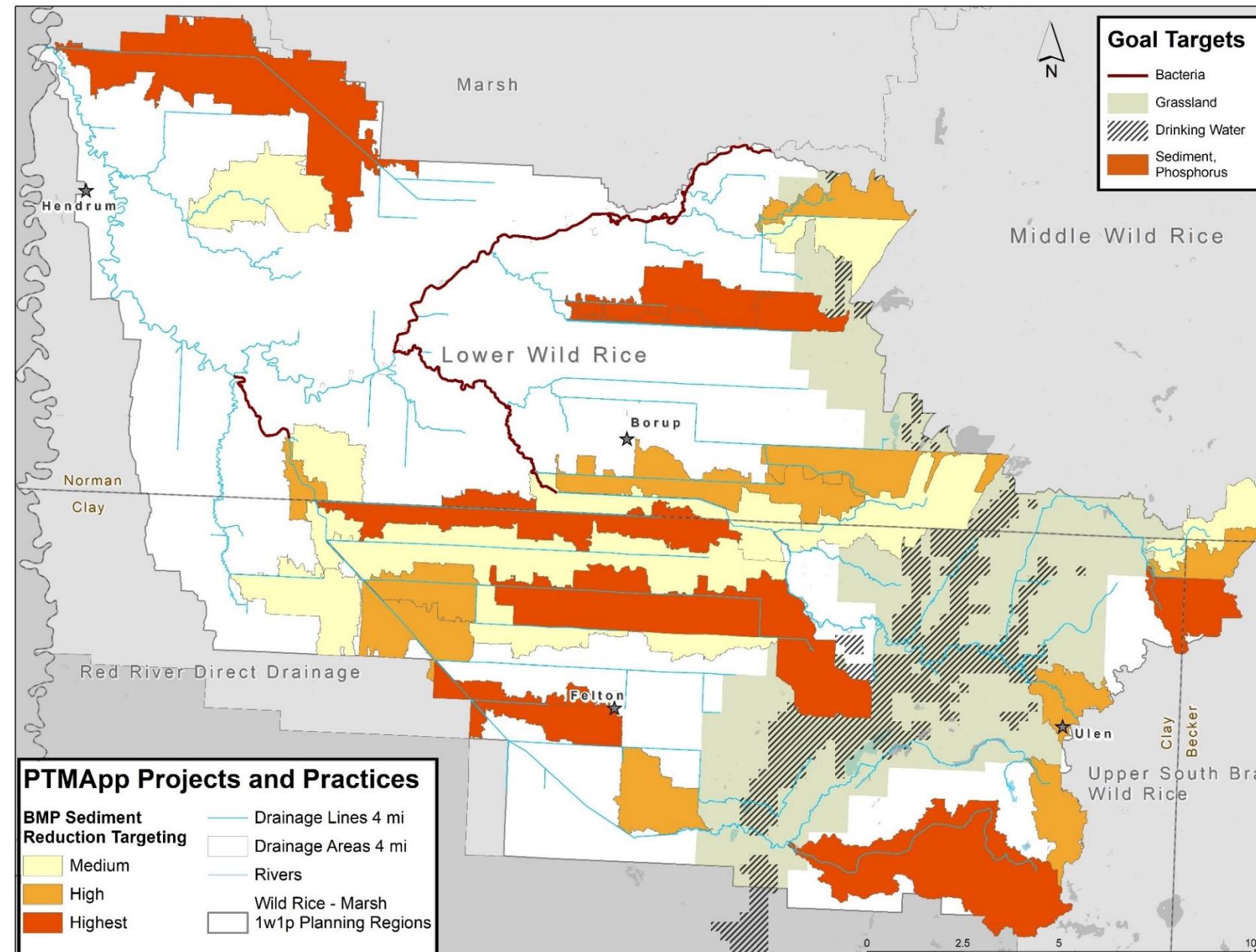


Figure 5-10. Targeted areas for implementation in the Lower Wild Rice Planning Region based on the goals. For sediment and phosphorus, the "Highest" catchments are the first priority for implementation because they have the highest sediment benefit.

Benefits Calculator

Shown in the Benefits Calculator below are the median estimated benefits from PTMApp practices in the Lower Wild Rice Planning Region at the catchment level to reduce sediment and phosphorus loading and increase storage. Work should preferentially begin with the catchments with the "highest" sediment benefits targets.

This calculator can be used to reach the sediment load reduction goal in many ways. For example, the sediment goal (1,216 tons) can be reached by implementing 24 sediment basin systems in 10 years in the "Highest" catchments or 5 sediment basin systems, 9 grade stabilizations and 10 soil health projects in 10 years in the "Highest" catchments, or any combination in between. This information allows for flexibility in implementation.

	Practice Type	Sediment (tons/yr)	Phosphorus (lbs/yr)	Storage (acre/feet)	Cost†
HIGHEST	Sediment Basin Project*	50	6	3	\$44,892
	Grade Stabilization	55	5	-	\$115,606
	Grassed Waterway/Filtration	16	2	-	\$5,465
	Soil Health**	49	11	-	\$9,399
HIGH	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin Project*	42	8	3	\$57,876
	Grade Stabilization	20	3	-	\$57,540
	Grassed Waterway/Filtration	12	2	-	\$7,983
MEDIUM	Soil Health**	47	2	-	\$1,500
	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin Project*	29	7	1	\$24,540
	Grade Stabilization	4	1	-	\$36,085
	Grassed Waterway/Filtration	10	1	-	\$9,237
	Soil Health**	43	15	-	\$13,041

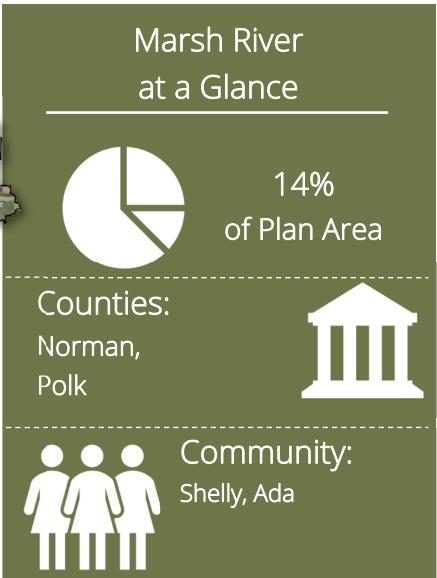
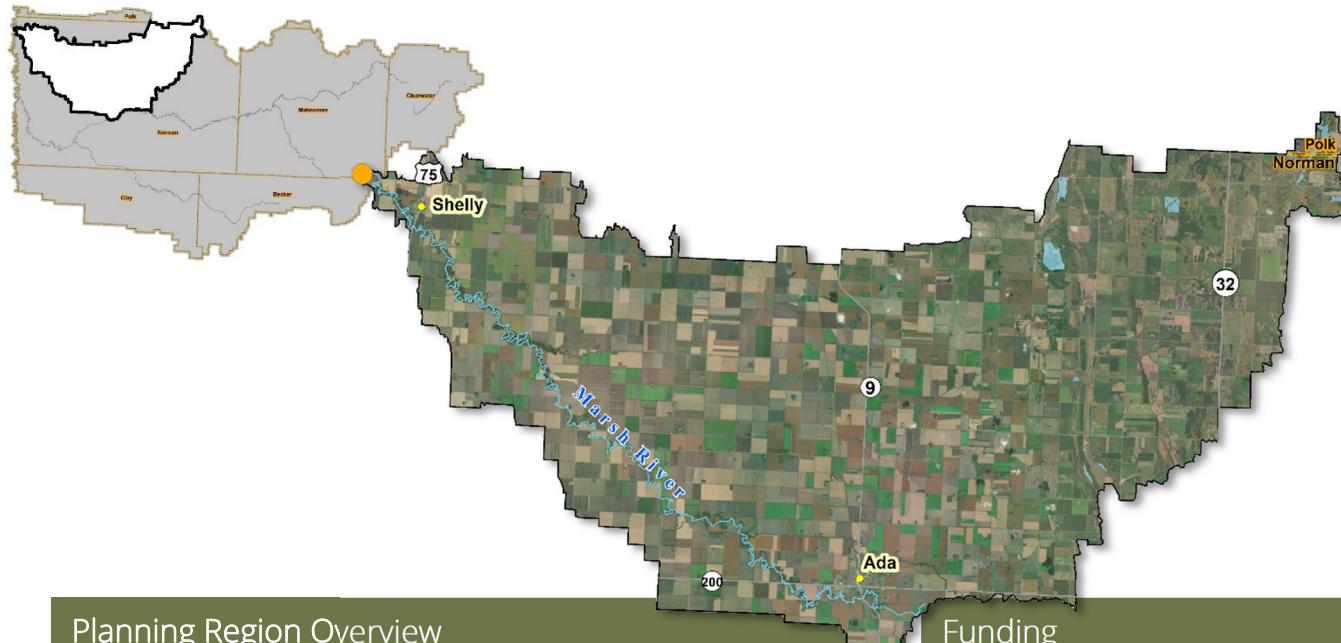
*A sediment basin System can contain more than one basin

**Soil Health practices include cover crops, reduced tillage, nutrient management, and crop rotation.

†Cost is based on the EQIP rate x 2 and includes technician time and the full cost of the practice (not just the EQIP cost share)



Marsh Planning Region



Planning Region Overview

The Marsh River Planning Region is in the Marsh River – Upper Red River of the North Watershed. The planning region contains multiple surface water resources such as the Marsh River and the county drainage system. The planning region outlets where the Marsh empties into the Red River (orange dot).

Funding

Funding will be used to implement practices to:

- Control erosion and runoff contributing sediment in streams and ditches
- Provide additional flood storage and protect at-risk communities, including Ada and Shelly
- Increase agricultural productivity through soil health and nutrient management practices
- Improve prairie habitat through prescribed grazing and land retirement programs
- Seal abandoned wells for drinking water protection

Marsh Planning Region Projects and Practices Actions Table

The numbers and total costs in this table refer to the Level 2 Funding Scenario (Current + WBIF).



Action	Targeted Resources (see color coding in Figure 5.11)	10-Year Output at Catchment Level (Short-term Goal)	Measurable Goals						Timeline						Annual Cost	Total 10-Year Cost Level 2 (Current+WBIF)
			Sediment	Phosphorus	Storage	Soil Health	Bacteria	Grassland Management	Drinking Water Protection	2021-22	2023-24	2025-26	2027-28	2029-30		
Storage, Filtration & Protection Practices (i.e. Sediment Basins, Grade Stabilizations, Grassed Waterways, Filter Strips, Wetlands)		355 parcels (33 contacted/yr) 500 tons sediment/yr 171 lbs phosphorus/yr 17 acre-feet storage/yr	●	●	○					SWCDs, WRWD, NRCS	●	●	●	●	\$54,600	\$546,000
Soil Health and Nutrient Management Practices (i.e. cover crops, reduced tillage, nutrient management, crop rotation) Costs are based on a 3-year cost-share.		1,871 acres	○	○	○	●				SWCDs, WRWD, NRCS, BWSR	●	●	●	●	\$11,700	\$117,000
Well Sealing		3/year						●		SWCDs, MDH, NRCS	●	●	●	●	\$3,000	\$30,000
Grazing Management Plans		93 acres	○	○			●			SWCDs, TNC, BWSR, NRCS	●	●	●	●	\$2,600	\$26,000
Land Retirement Programs (CRP, CREP)		Maintain current	○	○			●			WRWD, NRCS, TNC, DNR, BWSR	●	●	●	●	\$264,000	\$2,640,000
Bacteria Reduction projects (Livestock exclusion and watering facility, pit closures, waste storage facility, SSTS maintenance and replacement)		2 projects	○	○			●			SWCDs, NRCS, BWSR	●	●	●	●	\$1,500	\$15,000
													Total Level 1 Funding Scenario (Current):		\$30,000	\$300,000
													Total Level 2 Funding Scenario (Baseline + WBIF):		\$73,400	\$734,000
													Total Level 3 Funding (Partner Projects):		\$264,000	\$2,640,000

● Primary Goal this action will address

○ Secondary Goal this action will address

Marsh Planning Region

Targeted Catchments and Priority Resources

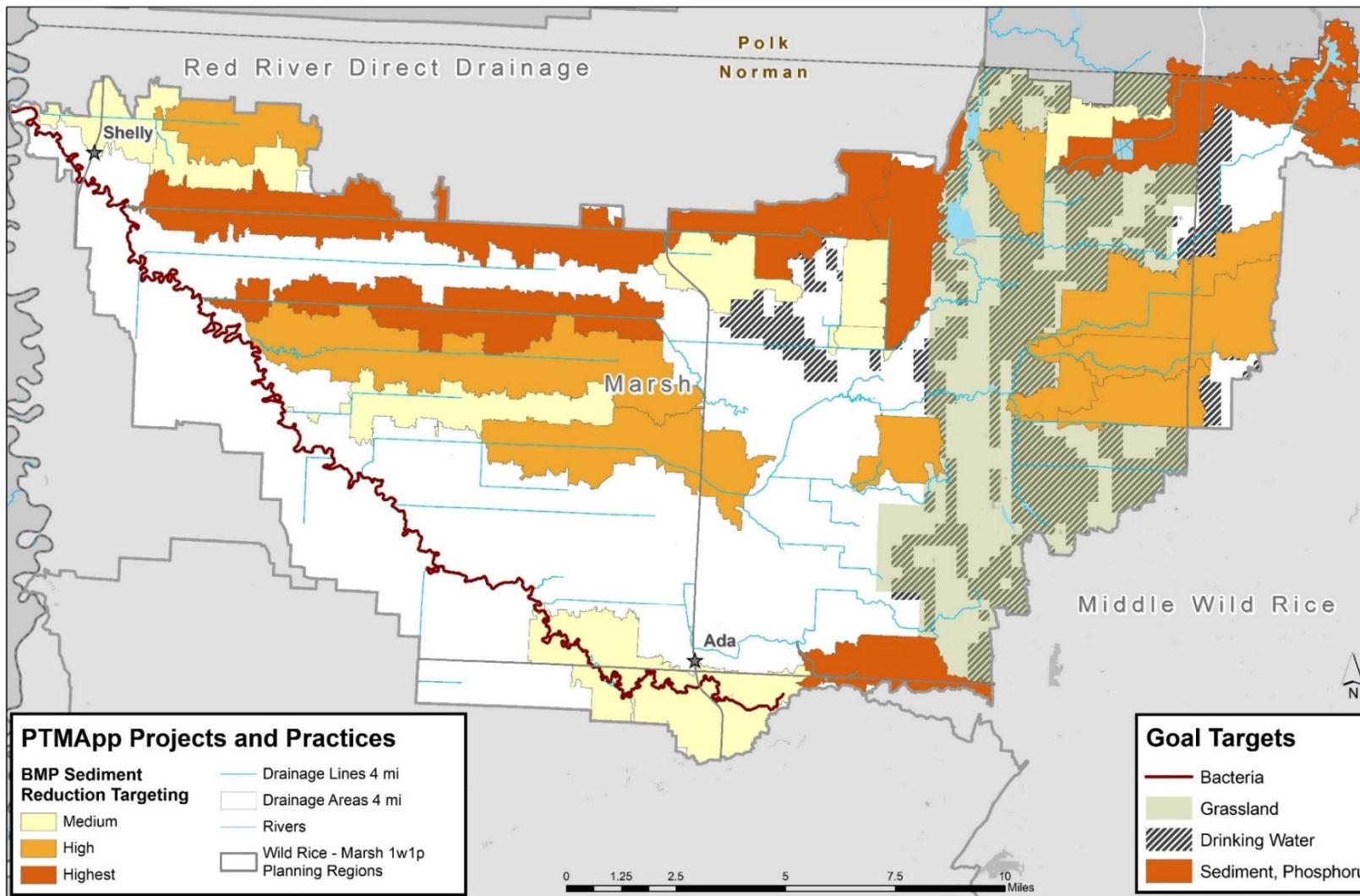


Figure 5-11. Targeted areas for implementation in the Marsh Planning Region based on the goals. For sediment and phosphorus, the "Highest" catchments are the first priority for implementation because they have the highest sediment benefit.

Benefits Calculator

Shown in the Benefits Calculator below are the median estimated benefits from PTMApp practices in the Marsh Planning Region at the catchment level to reduce sediment and phosphorus loading and increase storage. Work should preferentially begin with the catchments with the "highest" sediment benefits targets.

This calculator can be used to reach the sediment load reduction goal in many ways. For example, the sediment goal (500 tons) can be reached by implementing 45 grade stabilizations in 10 years in the "Highest" catchments or 22 grade stabilizations, 12 grassed waterways and 5 soil health projects in 10 years in the "Highest" catchments, or any combination in between. This information allows for flexibility in implementation.

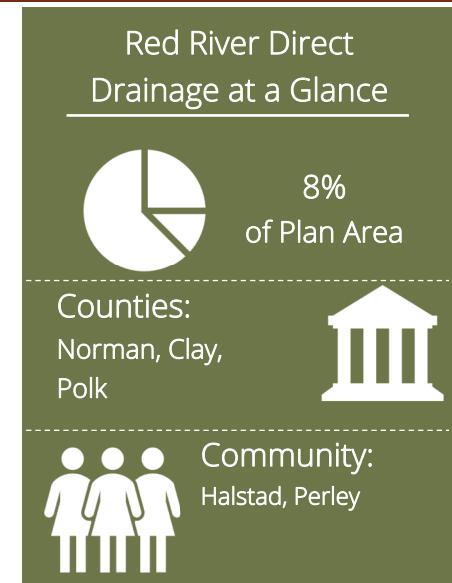
	Practice Type	Sediment (tons/yr)	Phosphorus (lbs/yr)	Storage (acre/feet)	Cost [†]
HIGHEST	Sediment Basin Project*	26	7	3	\$52,390
	Grade Stabilization	11	5	-	\$114,236
	Grassed Waterway/Filtration	10	3	-	\$984
	Soil Health**	43	15	-	\$13,594
HIGH	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin Project*	16	2	1	\$25,878
	Grade Stabilization	11	5	-	\$124,384
	Grassed Waterway/Filtration	9	3	-	\$2,472
MEDIUM	Soil Health**	42	16	-	\$14,693
	Practice Type	Sediment	Phosphorus	Storage	Cost
	Sediment Basin Project*	7	2	1	\$20,564
	Grade Stabilization	8	0	-	\$6,326
	Grassed Waterway/Filtration	8	3	-	\$2,436
	Soil Health**	39	14	-	\$12,084

*A sediment basin System can contain more than one basin

**Soil Health practices include cover crops, reduced tillage, nutrient management, and crop rotation.

†Cost is based on the EQIP rate x 2 and includes technician time and the full cost of the practice (not just the EQIP cost share).

Red River Planning Region



Planning Region Overview

The Red River Direct Drainage Planning Region is considered as part of the Marsh River – Upper Red River of the North Watershed. The surface water resources in this planning region include the Red River of the North and the drainage systems constructed to manage water in the fertile agricultural fields. The issues in this region are related to this drainage and to the water quality and hydrology of the river. The Red River Planning Region does not have an outlet, as its land area drains directly into the Red River.

Funding

Funding will be used to implement practices to:

- Control erosion and runoff contributing sediment in streams and ditches
- Provide additional flood storage and protect at-risk communities, including Halstad and Perley
- Increase agricultural productivity through soil health and nutrient management practices
- Seal abandoned wells for drinking water protection





Red River Direct Drainage Projects and Practices Actions Table

The numbers and total costs in this table refer to the Level 2 Funding Scenario (Current + WBIF).

Action	Targeted Resources (see color coding in Figure 5.12)	10-Year Output at Catchment Level (Short-term Goal)	Measurable Goals						Timeline						Total 10-Year Cost Level 2 (Current+WBIF)	
			Sediment	Phosphorus	Storage	Soil Health	Bacteria	Grassland Management	Drinking Water Protection	2021-22	2023-24	2025-26	2027-28	2029-30	Annual Cost	
Storage, Filtration & Protection Practices (i.e. Sediment Basins, Grade Stabilizations, Grassed Waterways, Filter Strips)	Orange	137 parcels (14 contacted/yr) 210 tons sediment/yr 84 lbs phosphorus/yr	●	●	○					SWCDs, WRWD, NRCS	●	●	●	●	\$54,600	\$546,000
Soil Health and Nutrient Management Practices (i.e. cover crops, reduced tillage, nutrient management, crop rotation) Costs are based on a 3-year cost-share.	Orange	123 acres	○	○	○	●				SWCDs, WRWD, NRCS, BWSR	●	●	●	●	\$11,700	\$117,000
Well Sealing	Grey	2/year							●	SWCDs, MDH, NRCS	●	●	●	●	\$2,000	\$20,000
Bacteria Reduction projects (Livestock exclusion and watering facility, pit closures, waste storage facility, SSTS maintenance and replacement)	Red	2 projects	○	○			●			SWCDs, NRCS, BWSR	●	●	●	●	\$1,500	\$15,000
Total Level 1 Funding Scenario (Current):															\$30,000	\$300,000
Total Level 2 Funding Scenario (Baseline + WBIF):															\$69,800	\$698,000
Total Level 3 Funding (Partner Projects):															\$0	\$0

- Primary Goal this action will address
- Secondary Goal this action will address

Red River Planning Region

Targeted Catchments and Priority Resources

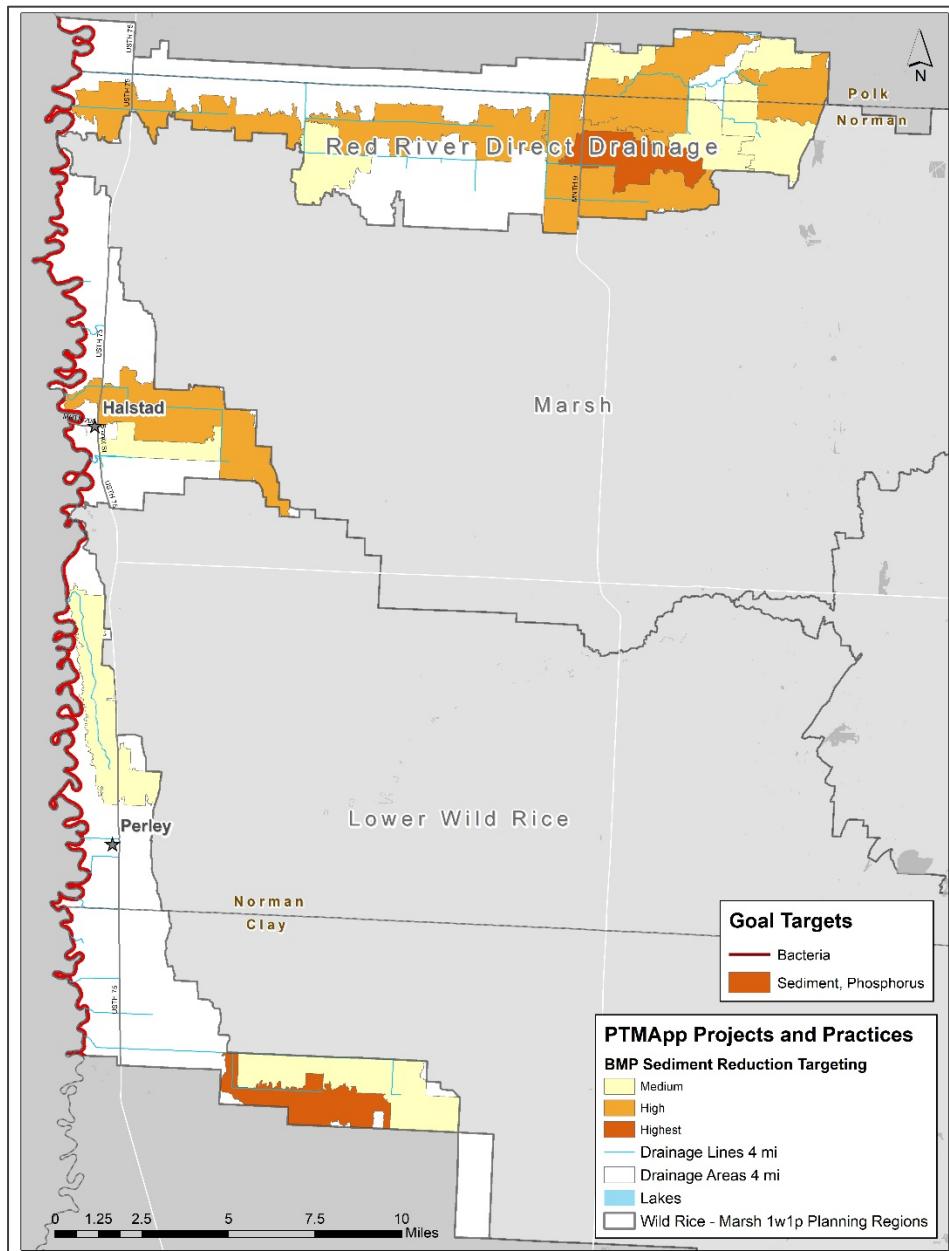


Figure 5-12. Targeted areas for implementation in the Marsh Planning Region based on the goals. For sediment and phosphorus, the "Highest" catchments are the first priority for implementation because they have the highest sediment benefit.

Benefits Calculator

Shown in the Benefits Calculator below are the median estimated benefits from PTMAp practices in the Red River Planning Region at the catchment level to reduce sediment and phosphorus loading and increase storage. Work should preferentially begin with the catchments with the "highest" sediment benefits targets.

This calculator can be used to reach the sediment load reduction goal in many ways. For example, the sediment goal (210 tons) can be reached by implementing 21 grade stabilization systems in 10 years in the "Highest" catchments or 11 grade stabilizations and 10 soil health projects in 10 years in the "Highest" catchments, or any combination in between. This information allows for flexibility in implementation.

	Practice Type	Sediment (tons/yr)	Phosphorus (lbs/yr)	Storage (acre/feet)	Cost†
HIGHEST	Grade Stabilization	10	4	-	\$87,430
	Grassed Waterway	10	2	-	\$3,046
	Soil Health**	35	17	-	\$15,134
HIGH	Practice Type	Sediment	Phosphorus	Storage	Cost
	Grade Stabilization	10	4	-	\$92,992
	Grassed Waterway	8	4	-	\$1,816
MEDIUM	Soil Health**	-	-	-	-
	Practice Type	Sediment	Phosphorus	Storage	Cost
	Grade Stabilization	10	5	-	\$93,150
	Grassed Waterway	8	4	-	\$2,144
	Soil Health**	-	-	-	-

**Soil Health practices include cover crops, reduced tillage, nutrient management, and crop rotation.

†Cost is based on the EQIP rate x 2 and includes technician time and the full cost of the practice (not just the EQIP cost share).



Capital Improvement Projects

The Capital Improvement Projects Action Table summarizes actions for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features. Capital improvements require external funding. These actions will be implemented watershed-wide, as project footprints and benefits span planning region boundaries. They will be implemented through the Capital Improvement Projects Implementation Program, described further in Section 6. The Planning Partners intend to use approximately 30% of the watershed-based implementation funds (WBIF) (~\$200,000/year) to support implementation of these projects. Projects where WBIF can be used are indicated with [WBIF](#) in the table below.

Project	Targeted Resources (see color coding in Figure 5.12-5.13)	Estimated 10-Year Output	Measurable Goals							Timeline							10-Year Cost (% of Total Cost)	Total Cost	
			Sediment	Phosphorus	Storage	Flood Damage Reduction	Ditch Stabilization	Stream Channel Integrity	Stream Corridor Habitat	Grassland Management	Responsibility (Bold = Lead)	Years, Start-End	2021-22	2023-24	2025-26	2027-28	2029-30		
Green Meadow Subwatershed Project Flood damage reduction and natural resource enhancement project that was identified through the Regional Conservation Partnership Program (RCPP) Planning Effort completed by the WRWD.	Marsh River	Approximately 6,800 ac-ft of flood storage. Land Acquisition, Design, Permitting, and Construction.	●	●	●	●	●	●	●	●	WRWD, RRWMB, State of MN.	2021-2031	●	●	●	●	●	75%	\$11M
Moccasin Creek Subwatershed Project Flood damage reduction and natural resource enhancement project that was identified through the Regional Conservation Partnership Program (RCPP) Planning Effort completed by the WRWD.	Moccasin Creek	Approximately 7,600 ac-ft of flood storage. Land Acquisition, Design, Permitting, and Construction.	●	●	●	●	●	●	●	●	WRWD, RRWMB, State of MN.	2021-2031	●	●	●	●	●	75%	\$9.5M
South Branch Wild Rice River Subwatershed Project Flood damage reduction and natural resource enhancement project that was identified through the Regional Conservation Partnership Program (RCPP) Planning Effort completed by the WRWD.	South Branch Wild Rice River	Approximately 23 miles of stream stabilization and corridor restoration. Land Acquisition, Design, Permitting, and Construction.	●	●	●	●	●	●	●	●	WRWD, RRWMB, State of MN.	2021-2031	●	●	●	●	●	50% WBIF	\$34M
Goose Prairie WMA Enhancement Project Flood damage reduction and natural resource enhancement project to improve and enhance the existing Goose Prairie WMA operations.	Goose Prairie WMA	Approximately 1,500 ac-ft of flood storage. Land Acquisition, Design, Permitting, and Construction.	●	●	●	●	●	●	●	●	WRWD, MNDNR, RRWMB; LSOHC; State of Minnesota; USFWS	2020-2023	●	●				100%	\$2M+
Lower Wild Rice Corridor Habitat Restoration Program Flood damage reduction and natural resource enhancement project to restore a natural corridor area along the Lower Reach of the Wild Rice River. This project will reduce the risks of flood damages to agricultural land and improve fish and wildlife habitat.	Lower Wild Rice River	6,500 acres acquired and approximately 35 miles of stream stabilization and corridor restoration. Land Acquisition, Design, Permitting, and Construction.	●	●	●	●	●	●	●	●	WRWD, SWCD, MNDNR, BWSR, LSOHC, RRWMB	2020-2031	●	●	●	●	●	25% WBIF	\$50M+



Project	Targeted Resources (see color coding in Figure 5.12-5.13)	Estimated 10-Year Output	Measurable Goals							Timeline						10-Year Cost (% of Total Cost)	Total Cost		
			Sediment	Phosphorus	Storage	Flood Damage Reduction	Ditch Stabilization	Stream Channel Integrity	Stream Corridor Habitat	Grassland Management	Responsibility (Bold = Lead)	Years, Start-End	2021-22	2023-24	2025-26	2027-28			
Perley Community Levee Improvements - Phase 2	Perley	Complete Phase 2 and obtain FEMA Accreditation for Levee System				●					WRWD, Perley, Norman County, MNDOT, RRWMB, and State of MN	2021-2025	●	●	●		100%	\$2.5M+	
Streambank Stabilization	Goal Map	Stabilize approximately 5 miles of streams	○	○	○			●			WRWD, MNDNR,	2021-2031		●	●	●	●	100% WBIF	\$5M
Ring Dikes	See Goal map, page 82	20 Additional Ring Dikes for flood-prone properties in the 100-year floodplain.				●					WRWD, MNDNR, RRWMB, Landowners	2021-2031	●	●	●	●	100%	\$2.5M	
Ditch Stabilization – Wild Rice Watershed	• JD 5 • NC Ditch 45 • NC Ditch 38 • Felton Ditch • CC Ditch 4 • CC Ditch 14	Stabilize approximately 3 miles of priority ditches and 4 ditch outlets.	○	○			●				WRWD	2021-2031	●	●	●	●	100% WBIF	\$2.5M	
Ditch Stabilization – Norman County	• JD 5 lateral 1 & 2 • NC Ditch 8 • NC Ditch 9 • NC Ditch 22 • NC Ditch 69 • NC Ditch 25 • NC Ditch 29 • NC Ditch 62	Stabilize approximately 4 miles of priority ditches	○	○			●				Norman County	2021-2031	●	●	●	●	100% WBIF	\$0.5M	
Ditch Stabilization – Mahnomen County	• MC Ditch 91 • MC Ditch 55 • MC Ditch 3	Complete stability inventory	○	○			●				Mahnomen County	2021-2031	●	●	●	●	100%	\$50,000	

● Primary Goal

○ Secondary Goal

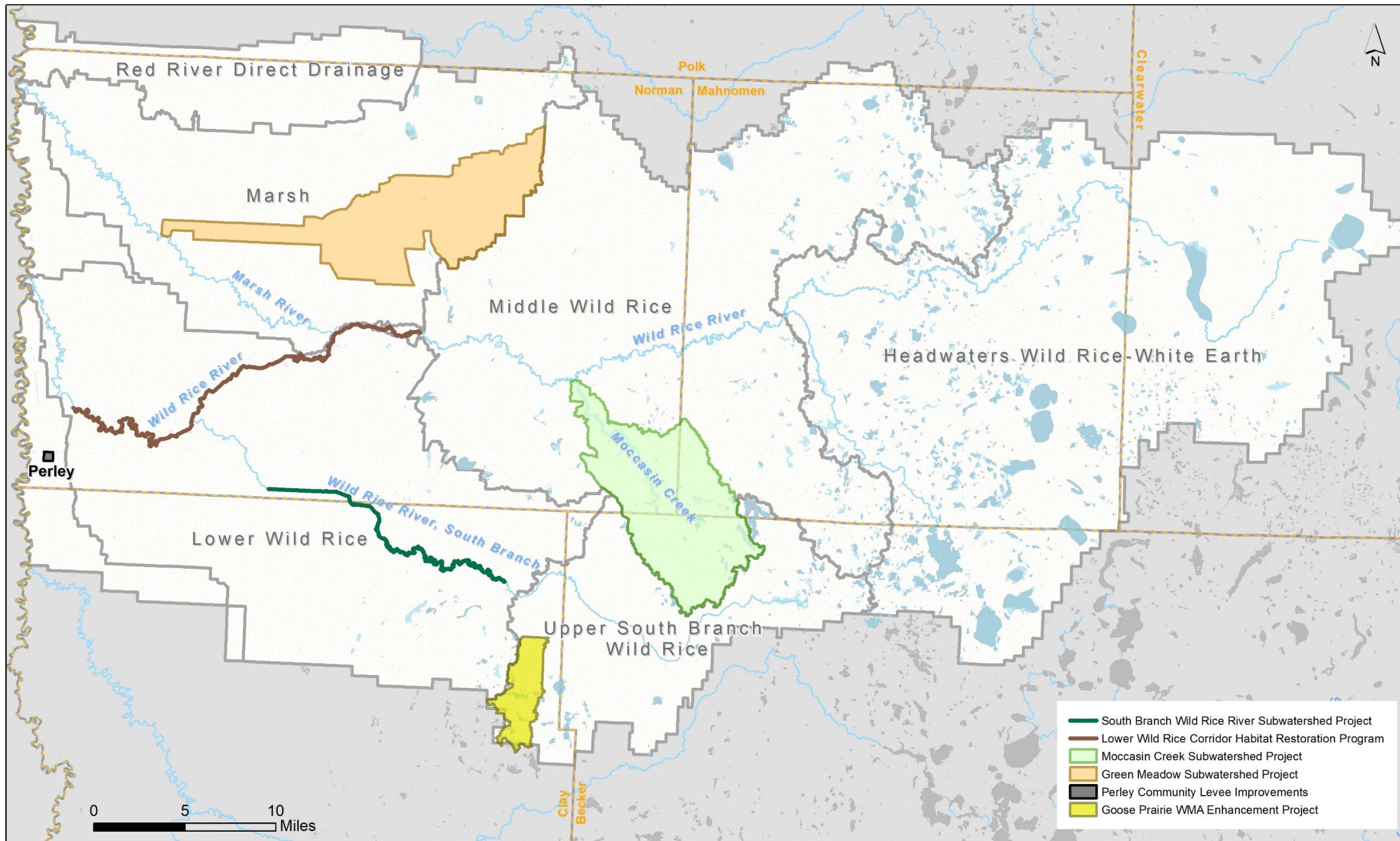


Figure 5-13. Capital Improvement Projects planned in the WRM Watershed.



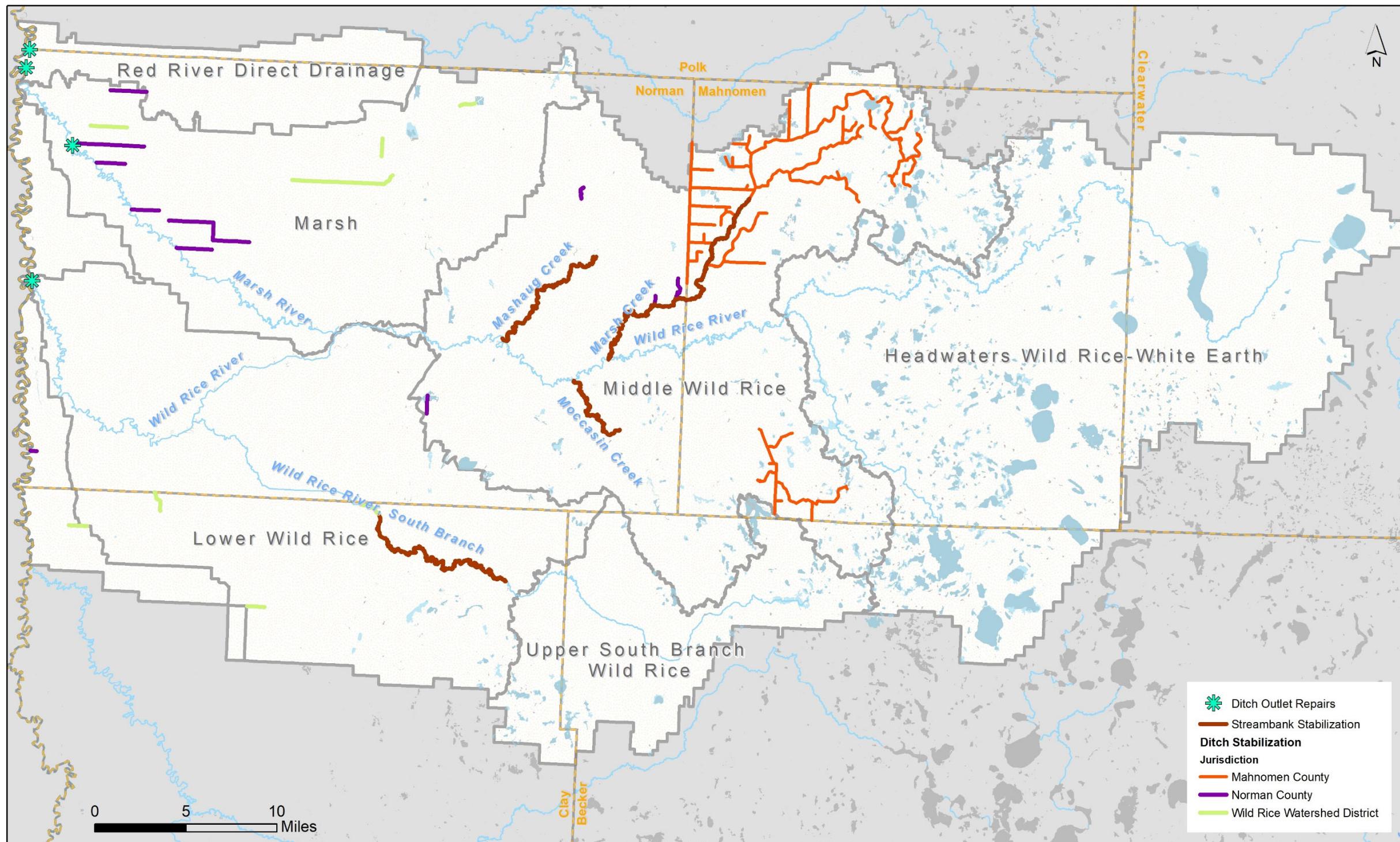


Figure 5-14. Ditch and stream Improvement Projects planned in the WRM Watershed.



Watershed Wide Regulation and Enforcement Actions Table



Action	10-Year Output	Short-term Measurable Goals												Timeline							
		Sediment	Phosphorus	Storage	Soil Health	Forest Management	Wild Rice	Grassland Management	Drinking Water Protection	E.coli	Ditch Stabilization	Flood Damage Reduction	Lake Shore Stabilization	Stream Channel Integrity	Stream Corridor Habitat	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30
Develop local policies for effectively managing beaver dams.	Existing	○	○	○												WRWD, Counties	●	●	●	●	●
Ensure compliance with the state buffer law requirements.	Existing	○	○	○						○	○					SWCDs/Counties, BWSR	●	●	●	●	●
Administer floodplain ordinances to ensure compliance with the NFIP and minimize damages from flooding.	Existing											○				Counties/Cities, DNR, WRWD	●	●	●	●	●
Ensure compliance with the Minnesota shoreland statutory requirements and local ordinances.	Existing		○									○				Counties, SWCD, DNR, BWSR	●	●	●	●	●
Implement and enforce applicable county ordinances and the Wetland Conservation Act (WCA) to retain wetland quantity, function, and value.	Existing			○				○								Counties, BWSR	●	●	●	●	●
Continue to comply with Wetland Conservation Compliance provisions (USDA Swampbuster) to maintain wetland function.	Existing			○												SWCD/County, BWSR, WRWD	●	●	●	●	●
Implement Minnesota Rules Ch. 7080 and local ordinances related to septic systems.	Existing		○						○	○						Counties, SWCD, MPCA	●	●	●	●	●
Develop and implement a loan program for septic system upgrades through counties.	Existing		○						○	○						Counties, WRWD, SWCDs	●	●	●	●	●
Host annual meeting of participating counties to discuss and coordinate local planning and zoning ordinances or state statutory administration roles.	Existing	○	○	○	○	○	○	○	○	○	○	○	○	○		Counties, WRWD, SWCDs, NRCS	●	●	●	●	●
Develop policies to streamline local permitting processes.	Existing	○	○	○	○	○	○	○	○	○	○	○	○	○		WRWD, Counties, SWCDs	●	●	●	●	●
Administer Minnesota Rules Chapter 7020 and local ordinances for managing feedlots to protect surface and groundwater quality.	Existing	○	○						○	○						Counties/MPCA, SWCDs	●	●	●	●	●
Continue efforts to emphasize the significance of factors such as lot width, near-shore disturbance and building setbacks on environmental lakes in ordinance review and development.	Existing						○					○				Counties, SWCDs, DNR	●	●	●	●	●
Ensure NPDES permit compliance for point sources in the watershed.	Existing	○	○							○						MPCA, Counties	●	●	●	●	●

- Primary Goal this action will address
- Secondary Goal this action will address

Total 10-Year Level 2 Funding (Baseline + WBIF):

\$1,120,000

Watershed Wide Data Collection and Monitoring Actions Table



Action	Targeted Resources	10-Year Output	Short-term Measurable Goals								Timeline					Total 10-Year Cost			
			Sediment	Phosphorus	Storage	Soil Health	Wild Rice	Grassland Management	Drinking Water Protection	E.coli	Flood Damage Reduction	Lake Shore Stabilization	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30	
Continue Watershed Pollutant Load Monitoring Network for water quality.	• Wild Rice River @ Hendrum (S002-102) • Marsh River nr Shelly • Wild Rice River nr Mahnomen (S007-619) • Wild Rice River @ Twin Valley (S001-155) • S. Branch Wild Rice River nr Felton (S003-309)	Ongoing	○	○						○			MPCA, SWCDs	●	●	●	●	●	\$400,000*
Continue USGS Gage sites for water quantity.	Same as above but different codes (W59007001, E60112001, E30124001, E60088001, H60029001)	Ongoing			○								USGS, DNR	●	●	●	●	●	Level 3, cost unavailable
Continue the White Earth Natural Resource Department water quality monitoring program including lakes, streams, AIS, and macroinvertebrates.	waters within the White Earth Nation	Ongoing	○	○			○			○		○	White Earth Natural Resources Department	●	●	●	●	●	Level 3, cost unavailable
Continue groundwater monitoring wells for water quantity.	11 observation wells and 6 water level piezometers in the watershed	Ongoing							○				Cooperative Groundwater Monitoring (MDH, DNR, SWCDs)	●	●	●	●	●	\$30,000
Continue Discovery Farms monitoring.	Not applicable	Ongoing	○	○		○							MAWRC, MDA, U of MN, Norman SWCD	●	●	●	●	●	\$30,000
Continue Citizens Lake Monitoring Program and Clearwater County Lake Monitoring Program.	Headwaters Planning Region	Ongoing		○									Lake Associations, COLA, Clearwater SWCD, MPCA	●	●	●	●	●	\$40,000
Collaborate with planning partners and agencies to track progress towards goals during implementation.	Watershed-wide	Meet 1W1P Goals	○	○	○						○		SWCDs, WRWD, BWSR, DNR, MPCA, MDH, MDA	●	●	●	●	●	\$20,000
<ul style="list-style-type: none"> ● Primary Goal this action will address ○ Secondary Goal this action will address 															Total Level 1 Funding Scenario (Current):			\$120,000	
															Total 10-Year Level 2 Funding (Baseline + WBIF):			\$120,000	
															Total Level 3 Funding (Partner Projects):			\$400,000	

Watershed Wide Communication and Outreach Actions Table



Action	Planning Region Targeting	10-Year Output	Short-term Measurable Goals												Timeline					Total 10-Year Cost Level 2 (Current+W BIF)		
			Sediment	Phosphorus	Storage	Soil Health	Grassland Management	E. coli	Stream Channel Integrity	Stream Corridor Habitat	Forest Management	Drinking Water Protection	Ditch Stabilization	Flood Damage Reduction	Lakeshore Stabilization	Wild Rice	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	
Develop and implement a coordinated education and outreach plan among watershed partners to promote consistent strategies, materials, and messaging.	Watershed-wide	1 program	○	○	○	○	○	○	○	○	○	○	○	○	○	Planning Team, Advisory Committee, White Earth Natural Resources Department, NRCS	●	●	●	●	●	\$25,000
Continue general education and outreach activities by jurisdictional area.	Watershed-wide	Annual Implementation	○	○	○	○	○	○	○	○	○	○	○	○	○	SWCDs/WRWD, NRCS, White Earth Natural Resources Department, others	●	●	●	●	●	\$125,000
Set up and participate in existing environmental education programs for youth such as the Envirothon, county fairs, conservation days, ag-in-the-classroom, Northwest Minnesota Soil Contest, Water Fest, tree planting, conservation camps for kids, FFA, 4-H.	Watershed-wide	Annual Program Implementation	○	○	○	○	○	○	○	○	○	○	○	○	○	SWCDs, Extension, White Earth Natural Resources Department, NRCS	●	●	●	●	●	\$10,000
Increase participation in the MN Agricultural Water Quality Certification Program (MAWQCP).	Watershed-wide	1 producer/year	○	○	○	○	○	○								SWCDs, MDA, NRCS, White Earth Natural Resources Department	●	●	●	●	●	\$100,000*
Host soil health forums featuring local soil health test plots for educational purposes.	Watershed-wide	1 forum/year	○	○		○										SWCDs, BWSR, NRCS, White Earth Natural Resources Department	●	●	●	●	●	\$10,000
Promote and showcase soil health demonstration sites using conservation farming practices (tillage management, cover crops, etc.).	Watershed-wide	1 forum/year	○	○		○										MAWRC, MDA, U of MN, SWCDs, NRCS, White Earth Natural Resources Department	●	●	●	●	●	\$10,000

Table continued on next page...

Action	Planning Region Targeting	10-Year Output	Short-term Measurable Goals										Timeline					Total 10-Year Cost Level 2 (Current+W BIF)				
			Sediment	Phosphorus	Storage	Soil Health	Grassland Management	E.coli	Stream Channel Integrity	Stream Corridor Habitat	Forest Management	Drinking Water Protection	Ditch Stabilization	Flood Damage Reduction	Lakeshore Stabilization	Wild Rice	Responsibility (Bold = Lead)	2021-22	2023-24	2025-26	2027-28	2029-30
Educate and encourage landowners to conduct proper septic system maintenance at a minimum of every three years.	Watershed-wide	5 outreach contacts/year	○				○									SWCDs, Counties, MPCA, White Earth Natural Resources Department	●	●	●	●	●	\$10,000
Conduct outreach to the general public and local elected officials on environmental contaminants, including salt, fertilizers, pesticides, household waste, prescription drugs, and legacy contaminants (e.g. mercury and PCBs).	Watershed-wide	Complete watershed outreach strategy								○			○	○	○	SWCDs, Counties, Cities, White Earth Natural Resources Department	●	●	●	●	●	\$10,000
Develop and implement a lake outreach program to better understand issues and inform the public on management measures to protect or improve lake water quality.	Headwaters	1 program							○				○	○		SWCDs, COLA, Lake Associations, DNR, Extension, White Earth Natural Resources Department	●	●	●	●	●	\$10,000
Conduct arsenic and nitrate testing clinics for private drinking water.	Headwaters Middle Wild Rice Lower Wild Rice Marsh	1 clinic/county/year									○					SWCDs, MDH, Cities, White Earth Natural Resources Department	●	●	●	●	●	\$10,000
Total Level 1 Funding Scenario (Current):																		\$148,180				
Total 10-Year Level 2 Funding (Baseline + WBIF):																		\$220,000				
Total Level 3 Funding (Partner Projects):																		\$100,000				

- Primary Goal this action will address
- Secondary Goal this action will address

Cost of Implementing the Plan

This plan will be implemented to the degree that additional funding is acquired, and at a locally determined pace of progress. Implementation of this plan is voluntary, and outreach and incentives will be used to assist with voluntary implementation on private lands.

Three funding levels are provided in this plan:

Table 5.1 Funding Levels for the Wild Rice - Marsh River Watershed One Watershed, One Plan.

Funding Level	Name	Description
1	Current Funding	Current local funding (capacity, county ordinances, tax revenue, etc.).
2	Current Funding + Watershed-Based Implementation Funds	Current funding + Watershed-Based Implementation Funds (approximately \$685,000/year for 2021-2022).
3	Partner and Other Funding	This funding level recognizes that there are other organizations and agencies doing work in the watershed that can help make progress towards plan goals. Example: Conservation Reserve Program (CRP), MPCA surface water monitoring and DNR groundwater monitoring.



Below are the estimated costs for implementing actions in the plan for Funding Levels 1, 2, and 3. Costs are also included for the operations and maintenance of natural and artificial waterways at or near their current expenditure level. This plan assumes local, state, and/or federal fiscal support of regulation and enforcement remains unchanged and includes funding for plan administration costs.

	Funding Level 1 Baseline Budget		Funding Level 2 Baseline + WS Funding		Funding Level 3 Partner Projects	
	Est. Annual Cost	Est. 10-Year Cost	Est. Annual Cost	Est. 10-Year Cost	Est. Annual Cost	Est. 10-Year Cost
Implementation Program*						
Projects and Practices	\$300,000	\$3,000,000	\$780,000	\$7,800,000	\$1,800,000	\$18,000,000
Education and Outreach	\$15,000	\$150,000	\$22,000	\$220,000	\$10,000	\$100,000
Data Collection and Monitoring	\$12,000	\$120,000	\$12,000	\$120,000	\$40,000	\$400,000
Regulation and Enforcement	\$112,000	\$1,120,000	\$112,000	\$1,120,000		
Capital Projects	\$501,000	\$5,010,000	\$707,000	\$7,070,000		
Additional Expenses						
Operations and Maintenance	\$744,000	\$7,440,000	\$744,000	\$7,440,000		
Total	\$1,684,000	\$16,840,000	\$2,377,000	\$23,770,000	\$1,850,000	\$18,500,000

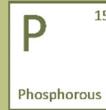
**Plan administration and technical assistance are included in all program costs, and is expected to be up to 10% of overall plan cost*



Plan Outcomes

With current funding available plus the new watershed-based funding that will be acquired upon completion of this plan, planning partners aim to achieve the following improvements in the watershed (Table 5-3, Figure 5-15).

Table 5-3. The amount of sediment and phosphorus reduction, storage, and land management and protection in the Level 2 Funding Scenario.

Sediment	Phosphorus	Storage	Land Management or Protection
			
9,322 tons/year reduction (at catchment)	1,562 lbs/year reduction (at catchment)	16,000 acre-feet	17,075 acres
Focused around rivers: <ul style="list-style-type: none"> • White Earth River • Marsh Creek • Middle Wild Rice River • Upper South Branch Wild Rice River 	Focused around rivers: <ul style="list-style-type: none"> • White Earth River • Marsh Creek • Middle Wild Rice River • Upper South Branch Wild Rice River 	Focused around the transition zone (Dark Green, Fig. 5-15).	Focused around the transition zone (Dark Green, Fig. 5-15): <ul style="list-style-type: none"> • Soil Health • Grassland • Forest • Wetland • Habitat

The highest priority area for reducing sediment, increasing water storage, and enhancing habitat are in the middle transition zone of the watershed (Figure 5-15).



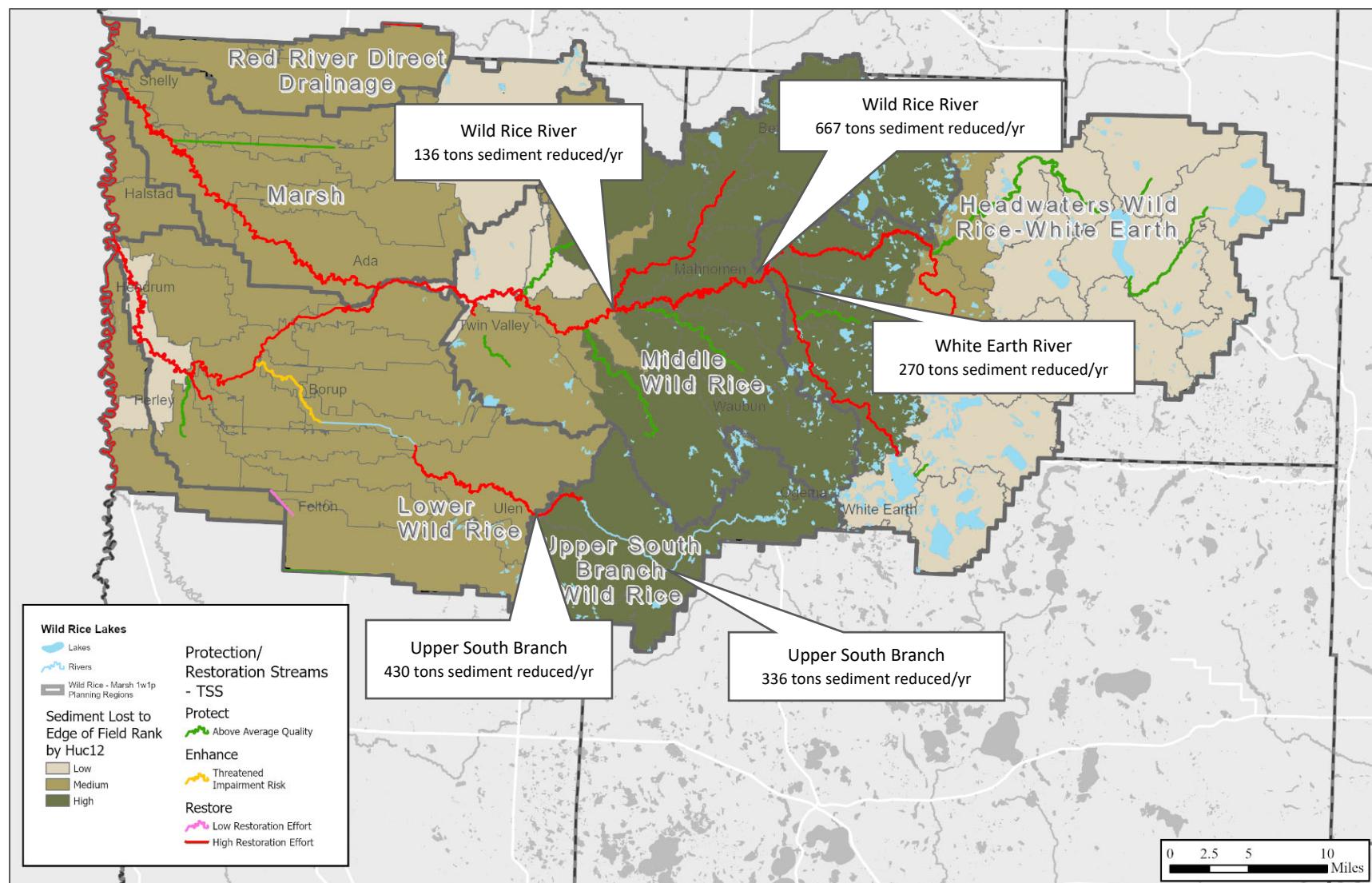


Figure 5-15. Map showing targeted phosphorus reductions for this plan using watershed-based implementation funding. Each arrow points towards a priority resource point in PTMApp where reductions were measured. The highest priority for phosphorus reduction, increasing storage, and habitat enhancement are in the middle dark green area of the watershed.





Section 6. Plan Implementation Programs

Section 6. Implementation Programs

Implementation programs are the funding mechanism to implement actions in the targeted implementation schedule. This plan establishes common implementation programs within the plan area and describes them conceptually in this section. There are five main programs: Projects and Practices, Capital Improvements, Regulatory, Data Collection and Monitoring, and Outreach and Communication (Figure 6-1).



Figure 6-1. Implementation programs for the WRM1W1P.



Figure 6-2. Frozen cornfields in the watershed along Hwy 9.

Projects and Practices Implementation Program

Dollars used to implement projects and practices on the landscape are funded by the Projects and Practices Implementation Program. This implementation is broken into a variety of subprograms, as shown on the next few pages. These programs are typically administered by the SWCDs in the watershed and apply to most of the plan goals.



Applicable Plan Goals (Section 4):

- Sediment Reduction
- Phosphorus Reduction
- Soil Health Improvement
- Storage Improvement
- Wild Rice Protection
- Stream Habitat Enhancement
- Grassland Management
- Forest Management
- Lake Shoreline Stabilization
- Bacteria Reduction
- Drinking Water Protection



Figure 6-3. Photo of a wetland and farm in the WRM Watershed along Highway 9.

Cost Share Programs

Cost-share programs or projects are those where the cost of installing a project is shared with the landowner(s). Implementing soil health practices such as cover crops and reduced tillage or forest enhancement are applicable examples that meet plan goals.

Cost-share programs can also be used for structural practices. Implementing fencing and water sources for grazing cattle away from streams, water and sediment control basins, grade stabilizations, shoreline restorations on lakeshore, and well sealing are applicable examples that meet the goals of this plan.



Land Protection

- **Conservation Easements**

Conservation easements are voluntary, legal agreements between a landowner and governmental or nonprofit organization, whereby land use and development are limited on a property while conserving natural values that reside upon that landscape. The easements are individually tailored agreements with an organization such as the BWSR, DNR, Minnesota Land Trust, or the Nature Conservancy.

- **Reinvest in Minnesota (RIM) Wild Rice Conservation Easement Program**

The RIM Wild Rice Conservation Easement Program protects wild rice lakes through permanent conservation easements on privately owned lands in Minnesota's Northern Forest region. This program is available in Becker and Clearwater counties.

- **Reinvest in Minnesota (RIM) Grassland Reserve Easement Program**

RIM Grassland Reserve easements protect current grasslands or buffer native prairie within wildlife habitat complexes through permanent conservation easements on privately owned lands. This project aims to enroll and protect remnant prairie grasslands by focusing on Minnesota Prairie Plan-identified landscapes. This program has been popular in the Wild Rice - Marsh Watershed.

- **Minnesota Conservation Reserve Enhancement Program (CREP)**

Minnesota CREP is a voluntary, federal-state funded natural resource conservation program that targets environmentally sensitive land in southern and western Minnesota. This is accomplished through permanent protection by establishing conservation practices via payments to farmers and agricultural landowners. Landowners enroll in the federally-funded Conservation Reserve Program (CRP) for 14-15 years. The same land is also enrolled into a state-funded perpetual conservation easement through the Reinvest in Minnesota (RIM) Reserve program. This program is available in Becker and Clay counties.

- **Land Acquisition**

For areas with unique and important resources that meet state goals, the DNR, United States Fish and Wildlife Service (USFWS), counties, cities, townships, and other entities may purchase and manage the land. Examples include Aquatic Management Areas that are used for fish spawning habitat and Wildlife Management Areas that are used for small game hunting and waterfowl migration.



Land Retirement Programs

- **Conservation Reserve Program (CRP)**

CRP is administered by the Farm Service Agency (FSA) of the USDA. It is a voluntary program that contracts with agricultural producers so that environmentally sensitive agricultural land is not farmed or ranched, but instead devoted to conservation benefits. CRP participants establish long-term, resource-conserving plant species to control soil erosion, improve water quality and develop wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance. Contract duration is 10-15 years.

- **Wetlands Reserve Program (WRP)**

The Wetlands Reserve Program (WRP) is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The NRCS provides technical and financial support to help landowners with their wetland restoration efforts. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.

Lands eligible for WRP are wetlands farmed under natural conditions; farmed wetlands; prior converted cropland; farmed wetland pasture; certain lands that have the potential to become a wetland as a result of flooding; rangeland, pasture, or forest production lands where the hydrology has been significantly degraded and can be restored; riparian areas which link protected wetlands; lands adjacent to protected wetlands that contribute significantly to wetland functions and values; and wetlands previously restored under a local, State, or Federal Program that need long-term protection.

Low-Interest Loans

Low-interest loans may be made available for septic system replacement, small community wastewater treatment systems, agricultural best management practices, and other projects that meet eligibility criteria for funding.

Private Forest Management

There are many different options for managing forests on privately-owned lands. These can range from permanent protection to management plans described in this section.

- **Forest Stewardship Plans**

Forest owners can manage their woods through Woodland Stewardship Plans in coordination with the Minnesota Department of Natural Resources' (DNR) Forest Stewardship Program. Forest goals can be developed in coordination with trained foresters to create wildlife habitat, increase natural beauty, enhance environmental benefits, or harvest timber. Plans must be prepared by a DNR-approved plan writer, which may include SWCD staff and private foresters.



- **Forest 2C Designation**

Landowners with DNR-registered Woodland Stewardship Plans are eligible for 2C Classification, which is a state program that provides a reduced tax rate to forested property of 20 acres or more. This is an annual program.

- **The Sustainable Forest Incentive Act (SFIA)**

The SFIA provides annual incentive payments for the landowner recording a covenant taking away some of the rights of the land (development and farming, for example). Private landowners can receive a payment for each acre of qualifying forest land they enroll in SFIA. In return, they follow the covenant for a set period of time: either 8, 20, or 50 years. Data on current enrollees shows that landowners who start with an 8-year covenant commonly move up to a 50-year covenant (DNR).

Operations and Maintenance

After projects are installed, regular on-site inspections and maintenance to ensure the project's continued function and success is required by the BWSR Grants Administration Manual. These details, along with records including notes and photos should be included with each project's Operations and Maintenance Plan. BWSR's recommended inspection plans, according to the Grants Administration Manual, include the following:

Conservation practice with a minimum effective life of 10 years:

- The ends of Years 1, 3, and 9 after the certified completion are recommended.



Capital Improvement Implementation Program

A capital improvement project is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features. Capital improvements are beyond the "normal" financial means of the Partnership and therefore require external funding.



Applicable Plan Goals (Section 4):

- Sediment Reduction
- Phosphorus Reduction
- Storage Improvement
- Flood Damage Reduction
- Ditch Stabilization
- Stream Channel Integrity
- Stream Habitat Enhancement



Figure 6-4. Moccasin Creek Impoundment, an example of a Capital Improvement Project in the WRM Watershed.

Section 5 shows proposed capital improvements within the plan area. Additional discussions are needed among plan participants to develop the specific process for implementing capital improvements with base funding. Specifically, members of the Policy Committee or the Steering Committee's individual and representative Boards are expected to discuss the means and methods for funding new capital improvements with potential funding partners before an implementation timeline can be established.

Capital improvement projects completed through this plan will be operated and maintained by the owner of the project for the lifespan of the project as specified in Section 5.

As highlighted throughout this plan, public drainage systems are prevalent throughout much of the plan area. As such, the Partnership will engage drainage authorities about plan efforts and goals. Drainage authorities will be highly encouraged to coordinate and be involved during implementation of the targeted implementation schedule to make progress towards



measurable goals, including sediment delivery, private and public flood risk reduction, and ditch stability. Based on this two-way engagement, drainage authorities could access implementation funds to adopt drainage actions in the targeted implementation schedule (Section 5) during 103 D and 103E processes and procedures when the opportunity arises within the planning area.

Operations and Maintenance

Entities within the plan area are engaged in the inspection, operation, and maintenance of capital projects, stormwater infrastructure, public works, facilities, natural and artificial watercourses, and legal drainage systems. Operation and maintenance of natural watercourses, legal ditches, impoundments, and small dams will continue under regular operations and maintenance plans of the entities with jurisdiction over these systems. These details, along with records including notes and photos should be included with each project's Operations and Maintenance Plan. BWSR's recommended inspection plans for projects funded through BWSR grants, according to the Grants Administration Manual (GAM), include the following requirements below. Ditch projects and Watershed District projects funded by other sources are not subject to the GAM.

Capital-improvement projects with a minimum effective life of 25 years:

- The ends of Years 1, 8, 17, and 24 after certified completion is a recommended minimum.



Figure 6-5. Ring dike in the Wild Rice Watershed District.



Regulation and Enforcement Implementation Program

Many plan issues can be addressed in part through the administration of statutory responsibilities and local ordinances. In many cases, local ordinances have been adopted to conform to (or exceed) the standards and requirements of the state statutes. The responsibility for implementing these programs will remain with the respective counties or appointed LGUs. The WRWD has rule making authority per MS 103D.341 and permitting authority per 103D.345. Current rules were adopted in 2017 and could periodically change per life of this plan. The 2017 WRWD Rules are available by reference in Appendix G. To review current rules, please see the WRWD website (www.wildricewatershed.org).



Counties and the watershed district will meet approximately once a year to discuss ordinances and counties will notify each other of any proposed ordinance amendments. A full comparison of how local ordinances are used to administer statutory responsibilities is provided in Appendix H.

Applicable Plan Goals (Section 4):

- Sediment Reduction
- Phosphorus Reduction
- Ditch Stabilization
- Bacteria Reduction
- Lake Shoreline Stability



Figure 6-6. An example of regulation and enforcement is the Minnesota Buffer Law, 103F.48.

Aggregate Management

Individual counties manage the development of and extraction of aggregate resources through local zoning and ordinances. County government will remain responsible for this process.

Aquatic Invasive Species

Aquatic invasive species can cause ecological and economic damage to water resources. The DNR has regulatory authority over aquatic plants and animals. Permits are required by the general public for transporting lake water, invasive species, and for treating invasive species. In Polk County, the county oversees aquatic invasive species programs, whereas in Becker, Clay, Clearwater, Mahnomen, and Norman counties, the SWCDs fill that role.

Bluffland Protection

MN State Statute (Section 103F.201) requires that local municipalities and counties with shoreland within their jurisdictional boundaries manage development of shoreland areas using ordinances to reduce the negative impacts of development. Many counties specifically target bluffland areas due to their disproportionate impact on sediment erosion when the bluff becomes unstable. Becker, Clearwater, Clay counties address bluffland protections as part of either or both of their shoreland or zoning ordinances.

- [Regulations: Minnesota State Statute \(Section 103F.201\)](#)

Buffers

The Riparian Protection and Water Quality Practices statute (Minnesota Statue Section 103F.48, commonly referred to as the Buffer Law) requires a 50-foot average continuous buffer of perennial vegetation with a 30-foot minimum width along all public waters and a 16.5-foot minimum width continuous buffer of perennial vegetation along all public drainage systems.

Becker, Clearwater, Clay, Mahnomen, Norman, and Polk counties administer the Buffer Law under specific local ordinances. Public drainage systems within the WRWD are administered by the WRWD through their Drainage Rule (Section 5).

In most situations, landowners have the option of working with their SWCD to determine if other alternative practices aimed at protecting water quality can be used in lieu of (or in combination with) a buffer.

- [Regulations: Minnesota Statutes 103B and 103F.48 Subd. 4](#)

Construction Erosion Control

Temporary construction erosion control is the practice of preventing and/or reducing the movement of sediment from a site during construction. Projects disturbing one acre or more of land will require a National Pollutant Discharge Elimination System (NPDES) Permit from the MPCA. Becker and Clay counties have regulations within their local zoning ordinances that address construction erosion control. The WRWD regulates construction erosion control through their Rules.

- [Regulations: Minnesota Rules, chapter 7090](#)



Feedlots

Feedlot rules, regulations, and programs were established under MN Rules 7020 to govern the collection, transportation, storage, processing, and land application of animal manure and other livestock operation wastes. The program is administered through the MPCA, but local counties may accept delegation of this authority. Becker, Clay, Norman and Polk Counties have accepted this delegation, whereas Clearwater and Mahnomen Counties have not.

- [Regulations: Minnesota Rules Chapter 7020](#)

Floodplain Management

Floodplain zoning regulations are intended to guide development in the floodplain consistent with the magnitude of the flood threat to minimize loss of life and property, disruption of commerce and governmental services, extraordinary public expenditure for public protection and relief, and interruption of transportation and communication. The DNR and FEMA are in the process of updating floodplain maps on a county basis. Current flood maps can be found on the DNR website at https://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/access-flood-maps.html. Floodplain zoning regulations are enforced through local zoning ordinances by Becker, Clay, Mahnomen, and Norman counties and Wild Rice Watershed District Rules.

- [Regulations: Minnesota Statutes 103F, 104, 394](#)

Groundwater Protection Rule

The MDA administers the Groundwater Protection Rule, which went into effect on June 24, 2019. The rule has two parts: Part 1 restricts the application of nitrogen fertilizer in the fall and on frozen soils; Part 2 responds to public water supply wells and elevated nitrate. Parts 1 applies to the eastern part of the WRM Watershed in Clearwater and Becker Counties.

- [Regulations: Minnesota Statute 14.16](#)

Groundwater Use

The DNR administers groundwater appropriation permits for all users who withdraw more than 10,000 gallons of water per day or 1 million gallons per year. SWCD, Counties, and municipalities cooperate with the state and are offered the opportunity to comment on landowners' permit applications.

- [Regulations: Minnesota Statute 103G for appropriation; 103H, 1989 Groundwater Act](#)

Hazard Management

Hazard mitigation may be defined as any action taken to eliminate or reduce the future risk to human life and property from natural- and human-caused hazards. Extreme weather events and infrastructure resilience also play a part in hazard management. These requirements direct the state to administer cost-sharing. Hazard mitigation local emergency management departments are deployed in each of the contributing counties within the 1W1P boundary.

- [Regulations: Minnesota Statute, Chapter 12](#)



Public Drainage Systems

Drainage authority is granted to counties and watershed districts through MN Statute Chapter 103E to establish, construct, and in perpetuity maintain public drainage systems. County boards serve as the drainage authorities for public drainage systems in Norman and Mahnomen Counties. The WRWD is the drainage authority for all of Clay County and part of Norman County. The WRWD has a system of rules and regulations for the management of water within the district, and a list of actions which require a permit to proceed with work in any public drainage system in the WRWD (Appendix G).

- **Regulations: Minnesota State Statute (Section 103E)**

Noxious Weed Law

Noxious weeds affect the natural, native balance of ecological functions. The Noxious Weed Law in Minnesota is administered by the MDA through SWCDs. The State maintains noxious weed lists of those species to eradicate, control, restrict, and specially regulated plants. Becker County also maintains its own additional noxious weed list, as approved by the MDA.

- **Regulations: Minnesota Statutes 18.75-18.91**

Shoreland Management

The Minnesota Legislature has delegated responsibility to LGUs to regulate the subdivision, use, and development of shorelands along public waters to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. This statute is administered and enforced as a local zoning ordinance for all participating counties, and as a rule for the WRM Watershed.

- **Regulations: Minnesota Statute 103F and Minnesota Rules 6120.2500-3900**

Solid Waste Management

Minnesota's Waste Management Act has been in place since 1980 and establishes criteria for the management of all types of solid waste including mixed municipal solid waste, construction and demolition waste, and industrial waste. In order to receive annual grant funding to assist in implementing waste management programs, each county must have a MPCA approved Solid Waste Management Plan. All counties in the plan area have approved plans. Counties can also adopt Solid Waste Ordinances to use as a supplement in enforcing MPCA Rules. Becker, Clearwater, Clay, Mahnomen, Norman and Polk Counties have a solid waste ordinance that is administered by the County.

- **Regulations: Minnesota Statute 115A, 400**



Subsurface Sewage Treatment Systems (SSTS)

The Subsurface Sewage Treatment System (SSTS) Program is administered by the MPCA in order to protect the public health and environment. SSTS Ordinances are adopted and enforced at the county level to meet state requirements. Becker, Clearwater, Clay, Mahnomen, Norman and Polk counties administer Minnesota Rules Chapter 7080 through 7083 for SSTSs through local ordinances.

- **Regulations: Minnesota Rules Chapter 7080 through 7083**

Wetland Conservation Act

The Minnesota Legislature passed the Wetland Conservation Act (WCA) of 1991 to achieve no net loss of, increase the quantity, quality, and biological diversity of, and avoid direct or indirect impacts to Minnesota's wetlands. LGUs are responsible for administering, regulating, and educating landowners on WCA. The County serves as the WCA LGU for Clearwater County. In Becker, Clay, Mahnomen, Norman and Polk counties, the SWCD serves as the WCA LGU.

- **Regulations: Minnesota Rule 8420**

Wellhead Protection

The Minnesota Department of Health (MDH) administers the state wellhead protection rule that sets standards for wellhead protection planning. Municipalities within the watersheds have completed or will be completing wellhead protection plans. The most recent listing of completed wellhead protection plans can be obtained from MDH (see Appendix H for cities with WPPs).

- **Regulations: Minnesota Rules, Chapter 4720.5100 – 4720.5590**



Figure 6-7. White Earth River. Photo credit: Annette Drewes.



Comprehensive or Land Use Plans

Counties and municipalities within the Wild Rice – Marsh River Watershed are responsible for land use planning, which is administered through local zoning ordinances. Comprehensive or land use plans have been adopted by the local governmental units within the watershed. From a regulatory perspective, management of lands and resources may overlap with the local government entities listed below. Therefore, meeting goals and strategies of local planning may also involve other governmental or non-governmental entities. Local government units within the Wild Rice – Marsh River Watershed that have comprehensive and/or land use plans are provided in Table 6-1. Please note this is not intended to be all-inclusive.

Table 6-1. Comprehensive and Land Use Management Plans adopted within the Wild Rice – Marsh River 1W1P planning area.

Local Governmental Unit (LGU)	Comprehensive or Land Use Management Plan (Year adopted / Revised)
Mahnomen County	Mahnomen County Local Water Management Plan (2008)
Clearwater County	Clearwater County Comprehensive Plan (adopted 1999) Clearwater County Local Water Management Plan (2010)
Becker County	Becker County Comprehensive Plan (adopted 1970/revised 2003) Becker County Local Water Management Plan (2017)
Norman County	Norman County Comprehensive Development Plan (adopted 1970) Norman County Water Plan (2017)
Clay County	Clay County Community-Based Comprehensive Plan (adopted 1980/ updated 2001) Clay County Local Water Management Plan (2017)
Polk County	Polk County Sustainable Development Comprehensive Plan (adopted 1997/updated 2008) Polk County Water Plan (2012)
White Earth Nation	White Earth Strategic Plan (adopted 2001)
City of Mahnomen	City of Mahnomen Comprehensive Plan (adopted 2009)
City of Ada	City of Ada Comprehensive Plan (adopted 2016)
City of Gary	City of Gary Comprehensive Plan (adopted 2015)
Wild Rice Watershed District	WRWD Watershed Management Plan (2003)



Figure 6-8. Projects implemented in the Wild Rice Marsh Watershed.



Inventories and Monitoring Implementation Program

The Data Collection and Monitoring Implementation Program funds actions which close data gaps to allow for tailored, science-based implementation strategies. The program also funds ongoing efforts aimed at the development and assembly of data and information.



Ongoing surface water monitoring programs are led by local and state entities. The MPCA's Watershed Pollutant Load Monitoring Network (WPLMN) provides continuous monitoring of water quality conditions, with five WPLMN sites:

- Wild Rice River @ Hendrum (S002-102)
- Marsh River nr Shelly (S002-124)
- Wild Rice River nr Mahnomen (S007-619)
- Wild Rice River @ Twin Valley (S001-155)
- South Branch Wild Rice River near Felton (S003-309)

There are also five United States Army Corps of Engineers stream gauge sites located within the plan area and one DNR Gage:

- Wild Rice River @ Hendrum (05064000)
- Marsh River nr Shelly (05067500)
- Wild Rice River @ Twin Valley (05062500)
- South Branch Wild Rice River near Felton (05063398)
- Red River of the North @ Halstad (05064500)
- DNR: Wild Rice River @ Ada (60099001)

Results from these networks and other ongoing tracking and monitoring programs can be used to document measurable water quality and quantity changes resulting from implementation.

Citizen volunteers monitor many sites in the watershed, especially lakes, including Strawberry, White Earth, Roy, Tulaby, Bass and McCraney lakes. The Clearwater Soil and Water Conservation District conducts lake monitoring on lakes in Clearwater County. In addition, the White Earth Natural Resource Department monitors lakes and streams for water quality, aquatic invasive species, and biological health (macroinvertebrates).

Ongoing monitoring efforts also track groundwater supply quantity and quality trends. Current programs include Public Water Supplier Monitoring, MPCA's Ambient Groundwater Monitoring Program, DNR high capacity permitting program, and the DNR Observation Well Network. These programs have provided valuable information but are not yet extensive enough to fully assess the state of groundwater in the region.

During implementation, the Data Collection and Monitoring Implementation Program will build on the data and information processes already established by plan participants. The Data Collection and Monitoring Implementation Program will be collaborative (especially where efforts cross administrative boundaries), with Partnership entities sharing services wherever possible.



Outreach Implementation Program

The Education and Outreach Implementation Program funds actions to increase engagement and understanding to make progress toward plan goals. The program is operated through sharing of services. Expectations are that a common set of template education and outreach materials will be developed for use across the watersheds but delivered by the staff within each county and/or planning region. Engaging landowners is critical for understanding issues impacting residents and solutions that are viable. Activities designed for engaging landowners include the following items below. These activities will continue and be built upon as part of the Education and Outreach Program.



- Farm tours
- Soil demonstration plots
- Field days
- Community education meetings (e.g. Minnesota Agricultural Water Quality Certification meetings and weed management workshops).

This program is also dedicated to engaging area youth in natural resource management, building upon current efforts. These example activities center around educating youth on the importance of natural landscape and the environmental issues that impact it.

- River Watch
- Water Fest
- Conservation Day
- Family Fun Night at the Lake
- Envirothon
- FFA, 4-H



Figure 6-9. Northwest Minnesota Water Festival, Norman SWCD.

In addition, this program will continue to support general public education and outreach. Actions may include development of educational materials, newsletters, coordination of volunteer activities, and public meetings to raise awareness and gain a better understanding of the consequences of individual decisions on water management. Also included are general media campaigns, citizen and LGU surveys, and municipal training.

There are also virtual educational opportunities. Many local government staff use social media (e.g. Facebook, Twitter, and YouTube) to educate and inform the general public on local resource issues and upcoming events. E-mail, website updates, newsletters, news articles, and other releases are also a priority for communicating water quality, quantity, and conservation issues with local citizens. These platforms serve to easily and effectively communicate important watershed information in a timely manner.



Achieving Plan Goals

The primary focus of this plan is to reduce erosion (sediment) and flooding in the watershed by retaining water, reducing runoff, and managing the land. Secondary goals of these activities include flood damage reduction, agricultural productivity, and habitat enhancement. Figure 6-10 below summarizes the different levels of measuring progress and how it will be implemented in this plan. Projects will be tracked during plan implementation using a system set up for the watershed.

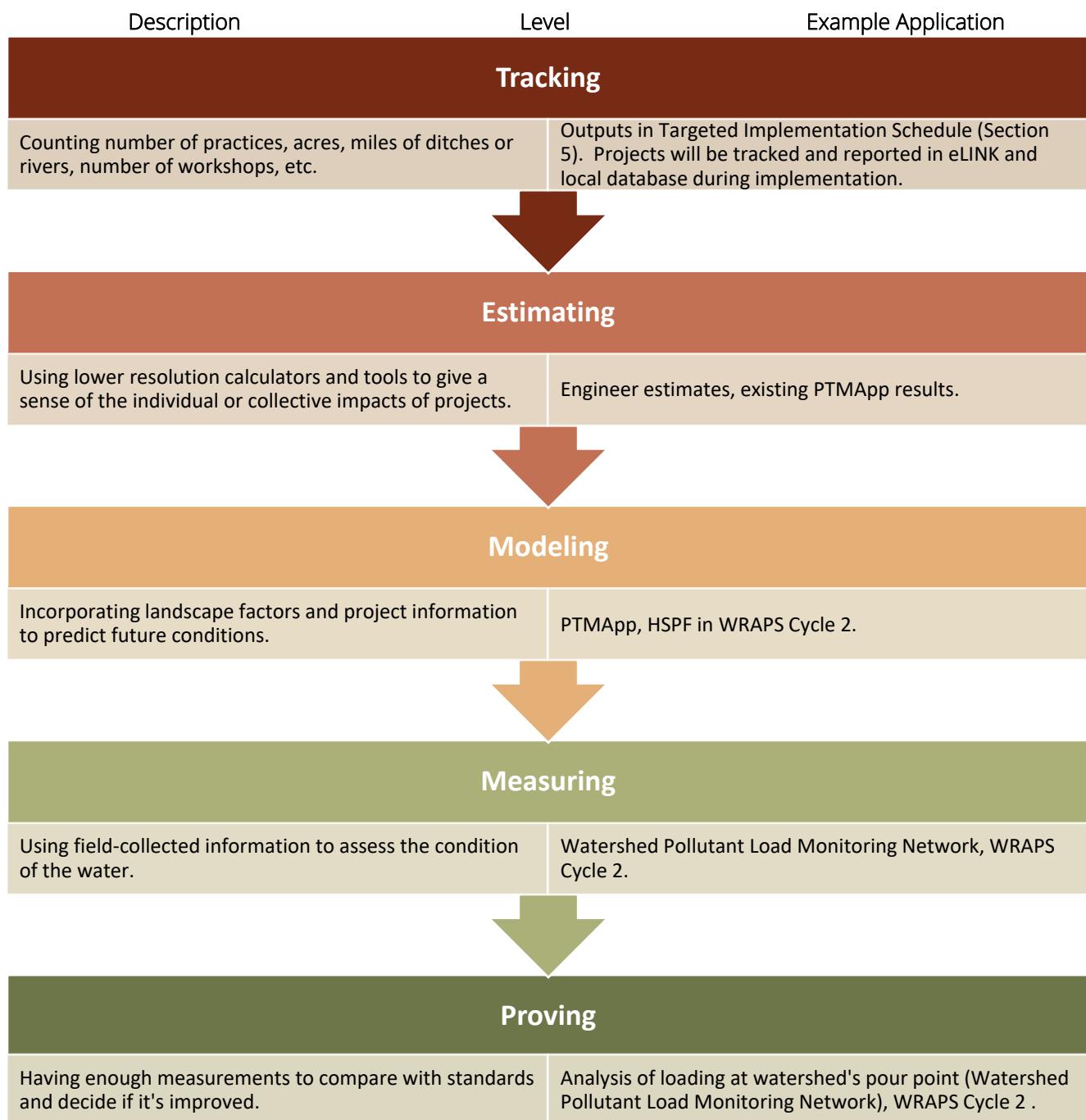
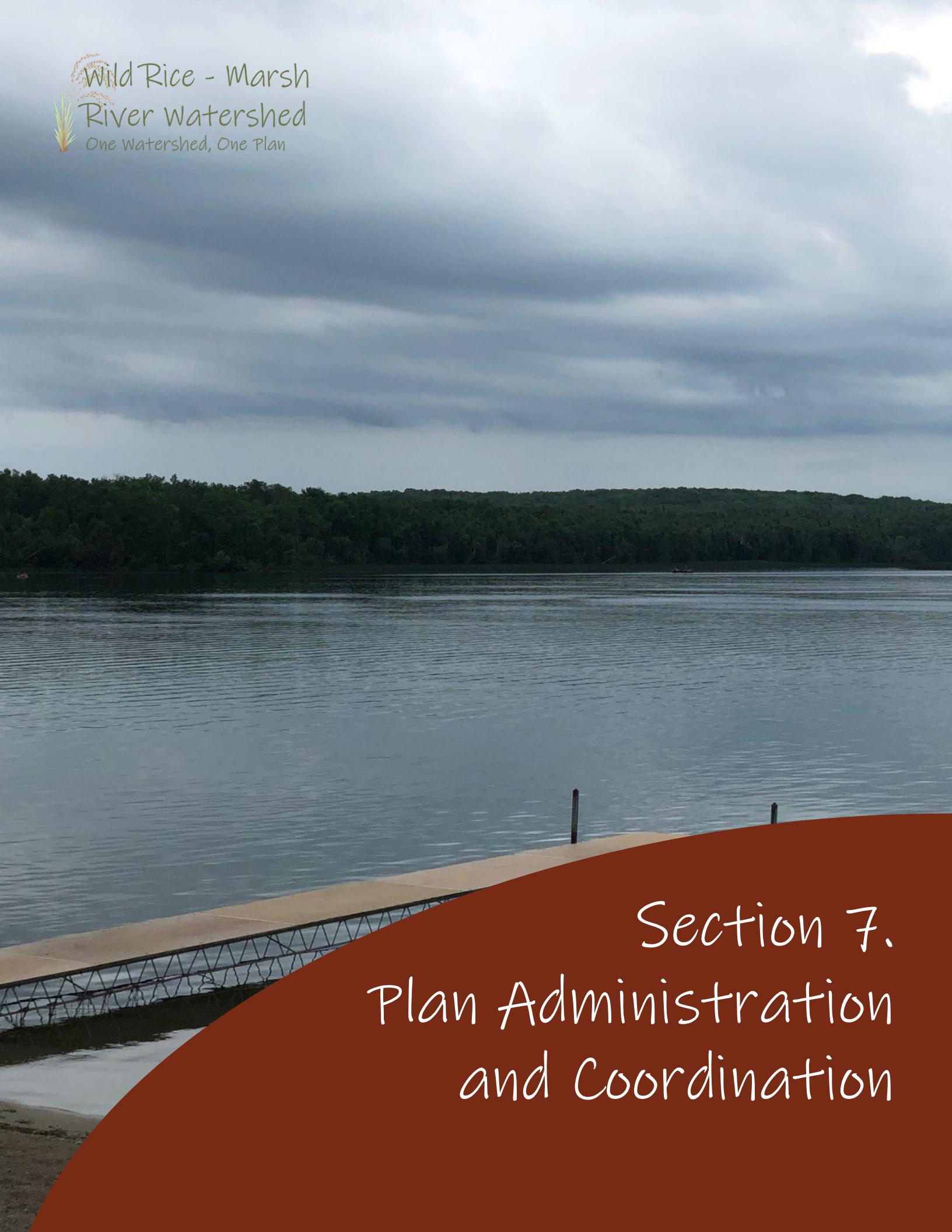
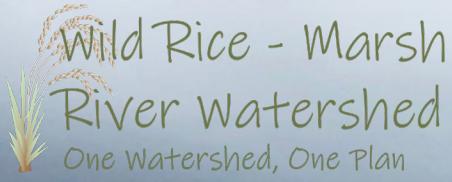


Figure 6-10. Ways to track progress of the projects in the watershed and their resulting improvements in resource conditions.

A photograph of a calm lake with a dense forest lining the opposite shore under a heavy, overcast sky. The foreground is a paved walkway with a metal railing, curving towards the right.

Section 7. Plan Administration and Coordination

Section 7. Plan Administration and Coordination

Plan Administration and Coordination describes how the plan will be implemented, how the watershed partners will work together, how the funding will move between them, and who will handle the administrative duties. The WRM1W1P will be implemented through a Memorandum of Agreement (MOA) between the following entities:

- Clearwater County and SWCD
- Becker County and SWCD
- Mahnomen County and SWCD
- Norman County and SWCD
- Clay County and SWCD
- Polk County and East and West Polk SWCDs
- Wild Rice Watershed District

The Implementation MOA will be very similar to the Planning MOA (Appendix J), with refinements clarifying roles for implementing the plan.

Decision-Making and Staffing

Implementation of the WRM1W1P will require increased capacity of plan partners, including increased staffing, funding and coordination from current levels. Successful implementation will depend on continuing and building on partnerships in the watershed with landowners, planning partners, state agencies, and organizations. The group implementing the plan will collectively be referred to as the Wild Rice – Marsh Watershed Partnership (WRMWP).

Three committees will serve this plan during implementation:

- **Policy Committee:** Comprised of Policy Committee members from the planning process (one county commissioner and one SWCD board supervisor appointed from each of the participating counties in the watershed, plus a manager from the Wild Rice Watershed District).
- **Advisory Committee:** Comprised of Steering Committee and Advisory Committee members from the planning process (local stakeholders including state agencies).

Table 7-1 outlines the probable roles and functions of these committees during implementation. Expectations are that the roles of each committee will shift and change focus during implementation. Fiscal and administrative duties will be assigned to a member LGU through a Policy Committee decision as outlined in the formal agreement. Responsibilities for annual work planning and serving as the fiscal agent will be revisited by the Advisory Committee on an annual basis.



Table 7-1. Anticipated roles for Wild Rice - Marsh 1W1P Implementation. The group will collectively be referred to as the Wild Rice - Marsh Watershed Partnership (WRMWP).

Committee Name	Primary Implementation Roles/Functions
Policy Committee	<ul style="list-style-type: none"> • Meet twice a year or as needed • Review the implementation funds from plan participants • Approve the annual work plan • Approve annual fiscal reports • Approve annual reports submitted to BWSR • Annual review and confirmation of Advisory Committee priority issue recommendations • Direction to Advisory Committee on addressing emerging issues • Approve plan amendments • Implement county ordinances and state statutory responsibilities separately from plan implementation • Approve grant applications • Approve annual assessment
Advisory Committee	<ul style="list-style-type: none"> • Meet annually or as needed • Review the status of available implementation funds from plan participants • Review opportunities for collaborative grants • Review annual fiscal reports • Prepare the annual work plan • Review annual reports submitted to BWSR • Biennial review and confirmation of priority issues • Evaluate and recommend response to emerging issues • Prepare plan amendments • Implement the targeted implementation schedule
Local Fiscal/Administrative Agent	<ul style="list-style-type: none"> • Convene committee meetings • Prepare and submit grant applications/funding requests • Compile annual results for annual assessment



Figure 7-1. Upper Wild Rice Lake.



Collaboration

Collaboration Between Planning Partners

The benefits of successful collaboration between planning partners include consistent implementation of actions watershed-wide, increased likelihood of funding, and resource efficiencies gained. The WRMWP will pursue opportunities for collaboration with fellow planning partners to gain administrative and program efficiencies, pursue collaborative grants, and provide technical assistance. The WRMWP will also review similarities and differences in local regulatory administration to identify local successes and identify changes needed in the future to make progress towards goals outlined in this plan. The planning partners already collaborate on technical services in the Red River Valley Conservation Service Area.

Collaboration in the Red River Valley Conservation Service Area



Purpose:

To provide engineering assistance to private landowners, via soil and water conservation districts, for a variety of non-point water quality management practices.

Program Description:

This program was established in 1994 in conjunction with the Agricultural Best Management Practices and Clean Water Partnership Loan Programs and established an engineering assistance program for SWCD's to provide engineering assistance to landowners for conservation practices. Eight joint powers groups of soil and water conservation districts were created statewide in early 1995 to employ professional engineer and technician teams to provide technical assistance in cooperation with member soil and water conservation districts. The associated joint powers boards are composed of a supervisor from each of the member soil and water conservation districts. One of the member soil and water conservation districts serves as the host district and manager for the engineer and technician team employed by the joint powers boards. The Becker SWCD and East Polk SWCD serve in this capacity for the RRVCSA.

Non-point Engineering Assistance teams provide technical assistance through member soil and water conservation districts and in cooperation with the Natural Resources Conservation Service and other local, state, and federal agencies. The Board of Water and Soil Resources provides policy, training, administrative, and technical consultation to the joint powers boards and their staff.



Collaboration with Other Units of Government

The Partnership will continue coordination with other governmental units. This cooperation and coordination occur both at the local level and at the state/federal level. At the state/federal level, coordination between the Partnership and agencies such as BWSR, US Army Corps of Engineers, DNR, MDH, and the MPCA occur through legislative and permit requirements. Local coordination between the Partnership and comparable units of government such as municipalities, city councils, township boards, county boards, and the Wild Rice Watershed District board are a practical necessity to facilitate watershed-wide activities. Examples of collaborative programs in the watershed include EQIP (NRCS), CRP (FSA), Minnesota Agriculture Water Quality Certification (MDA), Farm Bill Biologist (MDA), Wellhead Protection for city DWMSMAS (MRWA and MDH), Minnesota Forest Resource Council and WRAPS (MPCA).

The Partnership will exercise intergovernmental coordination and cooperation as an absolute necessity for it to perform its required functions. The Red River Basin already has a high level of collaboration on a basin-wide scale as outlined below. The Partnership will continue to foster an environment that enhances coordination and cooperation to the maximum extent possible throughout the implementation of this plan.

Collaboration within the Red River Basin

Due to the long history of flooding in the Red River Basin, there has been a significant effort to collaborate basin-wide on projects including studies, flood damage reduction, retention, and administration. This collaboration crosses state lines with North Dakota and International borders with Canada.



International Water Institute (IWI)

The IWI is a non-profit organization that works with basin partners on research, monitoring and outreach.

Red River Basin Commission (RRBC)

The RRBC is a charitable, not-for-profit organization designed to help facilitate a cooperative approach to water management within the Basin and is a well-established forum for identifying, developing, and implementing solutions to cross-boundary issues. The RRBC is comprised of local, state, provincial, and First Nation government representation, the environmental community, and at-large members.

Red River Management Board (RRMB)

The RRMB's jurisdiction and authority encompasses the area managed by the individual watershed districts that have membership on the board. The Wild Rice Watershed District is a member of the RRMB.

Red River Retention Authority (RRRA)

The RRRA is comprised of members of the Red River Joint Water Resource District, a North Dakota political subdivision, and the Red River Watershed Management Board, a Minnesota political subdivision. The primary objective of the RRRA is to ensure joint, comprehensive, and strategic coordination of retention projects in the Red River of the North watershed and facilitate implementation and construction of retention in the Red River Valley.



Collaboration with Others

Local support and partnerships will drive the success of final outcomes of the actions prescribed for implementing this plan. Because this plan's focus is voluntary land stewardship practices, collaborations with landowners in the watershed is of utmost importance. There are many actions in the plan that describe working with individual landowners on providing cost share and technical assistance for implementing land stewardship practices.

The WRMWP expects to continue and build on existing collaboration with others, including non-governmental organizations, while implementing this plan. Many of these existing collaborations are aimed to increase habitat and recreational opportunities within the plan area, while providing education and outreach opportunities. Partners for these collaborations include, but are not limited to, lake associations, Becker Coalition of Lake Associations (COLA), River Watch, International Water Institute, The Nature Conservancy, Ducks Unlimited, MN Deer Hunters Association, Pheasants Forever, Pheasants Forevermore, Sportsman's Clubs, National Wild Turkey Federation, local co-ops, University of Minnesota Extension, civic groups, private businesses, individuals, and foundations.

Funding

This section describes how the plan will be funded and how that funding will be used. The majority of the plan funds (91%) will be used for implementing projects on the landscape through the Projects and Practices Program and the Capital Improvements Program (Figure 7-2). These two programs also include the technical assistance and administration required to implement them.

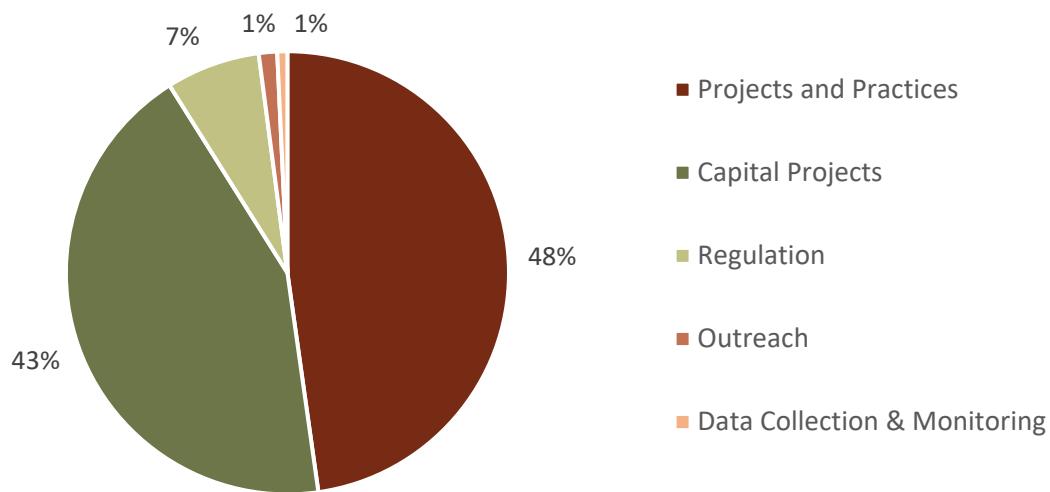


Figure 7-2. Percentage of funding for each implementation program.



The current funding level (Level 1) is based on the estimated annual revenue and expenditures for plan participants combined and allocated to the plan area based on the percentage of each county's land area in the Wild Rice – Marsh Watershed. Level 1 funding includes local, state, and federal funding, as explained in the following sections. Level 2 funding is Level 1 funding plus the new watershed-based funding (state funding) that will be available upon completion of this plan. Level 3 funding summarizes projects that help make progress to plan goals, but that are not administered by planning partners (counties and SWCDs). Level 3 funding mostly consists of the Conservation Reserve Program (CRP).

Throughout the implementation of WRM1W1P, the Partnership expects to operate at Level 2 funding. The totals for each level are summarized in Table 7-2).

Table 7-2. Estimated implementation funding for the WRM1W1P.

Funding Level	Description	Estimated Annual Average	Estimated Plan Total (10 years)
Level 1	Continue Current Programs	\$1,684,000	\$16,840,000
Level 2	Current Programs + Watershed-Based Implementation Funding	\$2,377,000	\$23,770,000
Level 3	Partner funding (CRP)	\$1,850,000	\$18,500,000
Total		\$4,227,000*	\$42,270,000*

*This total does not include Level 1 because Level 2 is additive with Level 1.

Local Funding

Local revenue is defined as money derived from either the local property tax base or in-kind services of any personnel funded from the local tax base. Examples include local levy, county allocations, and local match dollars (see Local Funding Authorities in Appendix I). Watershed districts can also establish water management districts (WMD) to fund projects under current law (103D). To initiate a WMD, Minnesota law (MS 103D) requires a watershed district plan amendment and outlines the procedures to follow including identification of the area, the amount to be charged, the methods used to determine the charges, and the length of time the WMD is expected to remain in force. The WRWD historically has not established any WMDs. In the future, if the WRWD decides to establish WMDs a plan amendment will be required following the plan amendment procedures established in this plan (page 171) and based on the procedures set forth in 103D.729.

Local funds will be used for locally focused programs where opportunities for state and federal funding are lacking because of misalignment of a program's purpose with state or federal objectives. These funds will also be used for matching grants.

State Funding

State funding includes all funds derived from the State tax base. Examples of state funding includes conservation delivery, state cost share, Natural Resources Block Grants, Clean Water Funds, and SWCD Local Capacity Building Grants.

Leadership from the state agencies that are tasked with protection and restoration of Minnesota's water resources came together and agreed on a set of high-level state priorities that align their programs and activities working to reduce nonpoint source pollution. The resulting Nonpoint Priority Funding Plan outlines a criteria-based process to prioritize Clean Water Fund investments. These high-level state priority criteria include:

- Restoring those waters that are closest to meeting state water quality standards
- Protecting those high-quality unimpaired waters at the greatest risk of becoming impaired
- Restoring and protecting water resources for public use and public health, including drinking water

The Planning Partnership will apply as an entity for collaborative grants, which may be competitive or non-competitive. The assumption is that future base support for implementation will be provided to the WRM Watershed as one or more non-competitive watershed-based implementation funding grants (Level 2). Where the purpose of an implementation program aligns with the objectives of various state, local, non-profit, or private programs, these dollars will be used to help fund the implementation programs described by this plan.

Federal Funding

Federal funding includes all funds derived from the Federal tax base. For example, this includes programs such as the Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), and Conservation Stewardship Program (CSP).

Partnerships with federal agencies are an important resource for ensuring implementation success. An opportunity may exist to leverage state dollars through some form of federal cost-share program. Where the purpose of an implementation program aligns with the objectives of various federal agencies, federal dollars will be used to help fund the implementation programs described by this plan. For example, the NRCS will likely provide support for agricultural best management practices, while the FSA may provide land-retirement program funds such as CRP (Table 7-4).



Figure 7-3. North Twin Lake.



Additional Funding Sources

Current programs and funding (Level 1) will not be enough to implement the full targeted implementation schedule. As such, the success of implementing the plan will depend on collaboratively sought competitive state, federal, and private grant dollars and increased capacity.

Plan participants may pursue grant opportunities collaboratively or individually to fund implementation of the targeted implementation schedule. Within the targeted implementation schedule, actions are assigned implementation programs. Table 7-4 shows the most used state and federal grants for executing the actions described by this plan cross-referenced to plan implementation programs, thereby showing potential sources of revenue for implementation.

Several non-governmental funding sources may also provide technical assistance and fiscal resources to implement the targeted implementation schedule. This plan should be provided to all non-governmental organizations as a means of exploring opportunities to fund specific aspects of the targeted implementation schedule.

Private sector companies, including those specifically engaged in agribusiness, are often overlooked as a potential source of funding for implementation. Some agribusiness companies are providing technical or financial implementation support because they are interested in agricultural sustainability. This plan could be used to explore whether the resource benefits arising from implementation have monetary value and therefore, provide access to funding from the private sector.



Figure 7-4. Marsh Creek and Mashaug Creek in the Middle Wild Rice Planning Region.



Table 7-3. Implementation programs and related funding sources for the WRM Watershed. Note: List is not all-inclusive.

Program / Grant	Primary Assistance Type	Projects & Practices	Capital Improvement Projects	Data Collection & Monitoring	Education & Outreach
Federal Programs / Grants					
NRCS	Conservation Innovation Grant (CIG)	Financial	●		
	Conservation Stewardship Program (CSP)	Financial	●		
	Environmental Quality Incentives Program (EQIP)	Financial	●		
	Agricultural Conservation Easement Program (ACEP)	Easement	●		
FSA	Conservation Reserve Program (CRP)	Easement	●	●	
	Conservation Reserve Enhancement Program (CREP)	Easement	●	●	
	Farmable Wetlands Program (FWP)	Easement	●		
	Grasslands Reserve Program (GRP)	Easement	●		
	Wetland Reserve Program (WRP)	Easement	●	●	
FSA/ USDA/ NRWA	Source Water Protection Program (SWPP)	Technical			●
USFWS	Partners for Fish and Wildlife Program	Financial/ Technical	●		
FEMA	Hazard Mitigation Grant Program (HMGP)	Financial	●	●	
	Pre-Disaster Mitigation (PDM)	Financial	●	●	
	Flood Mitigation Assistance (FMA)	Financial	●	●	
	Risk Mapping, Assessment, and Planning	Technical	●	●	
EPA	Water Pollution Control Program Grants (Section 106)	Financial			●
	State Revolving Fund (SRF)	Loan	●		

Program / Grant		Primary Assistance Type	Projects & Practices	Capital Improvement Projects	Data Collection & Monitoring	Education & Outreach
	Drinking Water State Revolving Fund (DWSRF)	Loan	●			
	Section 319 Grant Program	Financial	●		●	
State Programs / Grants						
OHF	Lessard Sams Outdoor Heritage Fund	Financial	●	●	●	●
DNR	Aquatic Invasive Species Control Grant Program	Financial/ Technical	●			
	Conservation Partners Legacy Grant Program	Financial	●	●		
	Pheasant Habitat Improvement Program (PHIP)	Financial	●			
	Flood Hazard Mitigation Grant Assistance	Financial	●	●	●	●
	Forest Stewardship Program	Technical	●			
	Aquatic Management Area Program	Acquisitions	●			
	Wetland Tax Exemption Program	Financial	●			
BWSR	Clean Water Fund Grants	Financial	●	●	●	
	Erosion Control and Management Program	Financial	●			
	SWCD Capacity Funding	Financial	●		●	●
	Natural Resources Block Grant (NRBG)	Financial	●			
	Reinvest in Minnesota (RIM)	Financial	●	●		
MPCA	Surface Water Assessment Grants (SWAG)	Financial			●	●
	Clean Water Partnership	Loan	●			
MDH	Source Water Protection Grant Program	Financial	●		●	●

Program / Grant		Primary Assistance Type	Projects & Practices	Capital Improvement Projects	Data Collection & Monitoring	Education & Outreach
	Public and Private Well Sealing Grant Program	Financial	●		●	
MDA	Agriculture Best Management Practices (BMP) Loan Program	Financial	●			
	Minnesota Agricultural Water Quality Certification Program	Financial	●			●
Other Funding Sources						
Red River Watershed Management Board		Financial/Technical	●	●	●	●
Ducks Unlimited		Financial/Technical	●	●	●	●
Trout Unlimited		Financial/Technical	●	●	●	●
Muskies, Inc		Financial/Technical	●	●	●	●
The Nature Conservancy		Financial	●	●	●	●
Minnesota Land Trust		Financial	●	●	●	●

Work Planning

Local Work Plan

Annual work planning is envisioned to align the priority issues, availability of funds, and roles and responsibilities for implementation. An annual work plan will be developed by the Advisory Committee based on the targeted implementation schedule and any adjustments made through self-assessments. The annual work plan will then be presented to the Policy Committee, who will ultimately be responsible for approval. The intent of these annual work plans will be to maintain collaborative progress toward completing the targeted implementation schedule.

State Funding Request

The Advisory Committee will collaboratively develop, review, and submit a watershed-based funding request from this plan to BWSR. This request will be submitted to and ultimately approved by the Policy Committee, prior to submittal to BWSR. The request will be developed based on the targeted implementation schedule and any adjustments made through self-assessments.

Assessment, Evaluation, and Reporting

Accomplishment Assessment

The Advisory Committee, will provide the Policy Committee with an annual update on the progress of the plan's implementation. For example, any new projects will be tracked against their goal metrics such as acres of forest management, number of bacteria reduction projects, and tons of sediment reduced. A tracking system will be used to measure progress and will serve as a platform for plan constituents. Tracking these metrics will also make them available for supporting future work plan development, progress evaluation, and reporting.

Partnership Assessment

Biennially, the Advisory Committee will review the WRM1W1P goals and progress toward implementation, including fulfillment of committee purposes and roles, efficiencies in service delivery, collaboration with other units of government, and success in securing funding. During this review process, feedback will be solicited from the Advisory Committee, SWCD and county boards, and partners such as state agencies and non-governmental organizations. This feedback will be presented to the Policy Committee to set the coming biennium's priorities for achieving the plan's goals and to decide on the direction for grant submittals. Also, this feedback will be documented and incorporated into the five-year evaluation. The WRM1W1P partners intend to pursue watershed-based funding to meet goals and plan implementation schedules.



Five-year Evaluation

This plan has a ten-year life cycle beginning in 2021. To meet statutory requirements, this plan will be updated and/or revised every 10 years. Over the course of the plan life cycle, progress towards reaching goals and completing the implementation schedule may vary. In addition, new issues may emerge and/or new monitoring data, models, or research may become available. As such, in 2026-27 and at every 5-year midpoint of a plan life cycle, an evaluation will be undertaken to determine if the current course of actions is sufficient to reach the goals of the plan, or if a change in the course of actions is necessary.

Reporting

Local Government Units (LGUs) have several annual reporting requirements. A number of these reporting requirements will remain a responsibility of the LGUs. However, reporting related to grants and programs developed collaboratively and administered under this plan will be reported by the Advisory Committee. In addition to annual reports, the Advisory Committee may also develop a State of the Watershed Report. This report will document progress toward reaching goals and completing the targeted implementation schedule and will describe any new emerging issues or priorities. The information needed to annually update the State of the Watershed Report will be developed through the annual evaluation process.

The fiscal agent is responsible for submitting all required reports and completing annual reporting requirements for WRM1W1P as required by state law and policy. The Advisory Committees will assist in developing the required reports and roles and responsibilities will be defined in the MOA Bylaws.



Figure 7-5. South Twin Lake.



Plan Amendments

This plan extends through 2031 per the BWSR order approving it. Activities described in this plan are voluntary, not prescriptive, and are meant to allow flexibility in implementation. An amendment will not be required for addition, substitution, or deletion of any of the actions, initiatives, and projects if those changes will still produce outcomes that are consistent with achieving the plan goals. This provision for flexibility includes changes to the activities except for those of capital improvement projects (CIPs) and WMDs.

Revision of the plan may be needed through an amendment prior to the plan update if significant changes emerge in the priorities, goals, policies, administrative procedures, or plan implementation programs. Revisions may also be needed if issues emerge that are not addressed in the plan.

Plan amendments may be proposed by any agency, person, city, county, or Watershed District to the Policy Committee, but only the Policy Committee can initiate the amendment process. All recommended plan amendments must be submitted to the Policy Committee along with a statement of the problem and need, the rationale for the amendment, and an estimate of the cost to complete the amendment. However, the existing authorities of each LGU within the WRM Watershed is still maintained. As such, CIPs need only be approved by a local board to be amended to the plan if implementation of the CIP is funded by the local board, with notification to the Policy Committee. CIPs implemented with funding from the plan must follow the means and methods for funding new capital improvements as developed by members of the Policy Committee or the Steering Committee's individual and representative Boards.

Plan participants recognize the large work effort required to manage water-related issues. The plan provides the framework to implement this work by identifying priority issues, measurable goals, and action items. No amendment will be required for the following situations:

- Any activity implemented through the “normal” statutory authorities of an LGU, unless the activity is deemed contrary to the intent and purpose of this plan;
- The estimated cost of a non-capital improvement project action item is different than the cost shown within this plan;
- The addition or deletion of action items, programs, initiatives or projects, as long as these are generally consistent with the goals this plan, are not capital improvement projects as defined by this plan (nor is contemplated by an implementation program), and will be proposed, discussed and adopted as part of the annual budgeting process which involves public input.

If a plan amendment is needed, the plan amendment process, which is the same as the plan review process, is as follows:

- Submit the amendment to all cities, counties, and conservation districts within the plan boundary, the state review agencies (the MnDNR, MPCA, Minnesota Department of Agriculture, and MDH), and BWSR for a 60-day review;
- Respond in writing to any concerns raised by the reviewers;



- Policy Committee is to hold a public hearing on the proposed amendment;
- Submit the revised amendment to the state review agencies and BWSR for a 45-day review; and
- The Policy Committee must submit the final revised amendment to BWSR for approval.

At the discretion of the Policy Committee, drafts of proposed plan amendments may be sent to all plan review authorities for input before beginning the formal review process. Examples of situations where a plan amendment may be required include:

- Addition of a capital improvement project that is not described by the plan;
- Establishment of a water management district(s) to collect revenues and pay for projects initiated through MS 103D. To use this funding method, MS 103D.729 requires that the Steering Committee (or equivalent) prepare an amendment to its plan;
- Addition of new programs or other initiatives that have the potential to create significant financial impacts or controversy, when inconsistent with the issues, goals, and policies.

Plan amendments will be prepared in a format consistent with 103B.314 subd. 6. Unless the entire plan is re-printed, all adopted amendments must be printed in the form of replacement pages for the plan, each page of which must:

- Show deleted text as stricken and new text as underlined for draft amendments being considered;
- Be renumbered as appropriate; and
- Include the effective date of the amendment.

The Policy Committee will maintain a distribution list for copies of the plan and within 30 days of adopting an amendment distribute copies of the amendment to the distribution list. Generally, electronic copies of the amendment will be provided, or documents made available for public access on all participating entity's websites. Printed copies will be made available upon written request and printed at the cost of the requester.

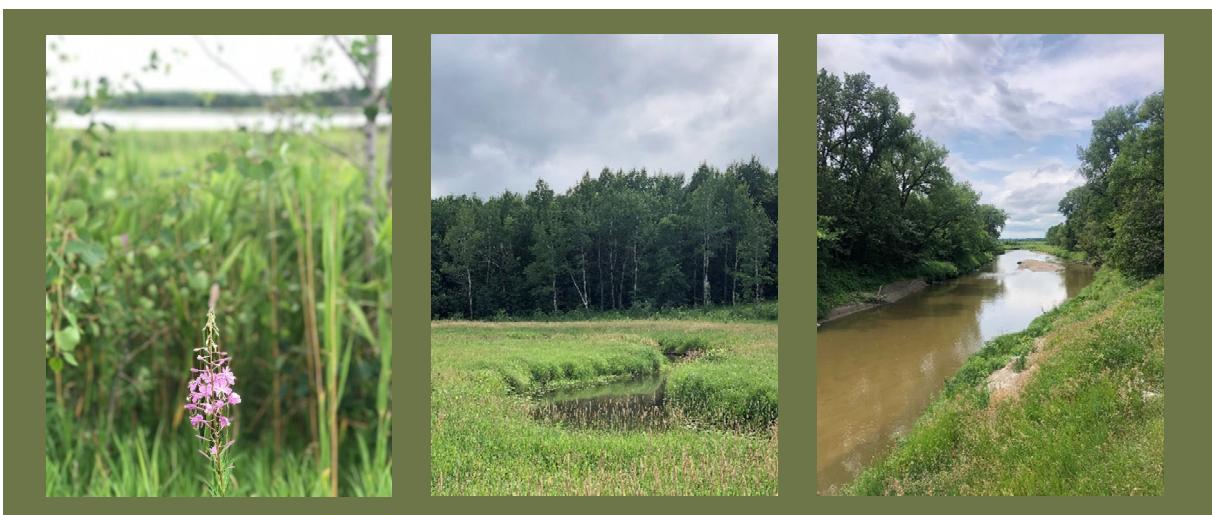


Figure 7-6. Snider Lake, White Earth River, and the Wild Rice River.



Formal Agreements

The WRM1W1P will be implemented by the Wild Rice – Marsh Watershed Partnership (WRMWP). The WRMWP is a coalition of the following partners:

- Clearwater County and SWCD
- Becker County and SWCD
- Mahnomen County and SWCD
- Norman County and SWCD
- Clay County and SWCD
- Polk County and East and West Polk SWCDs
- Wild Rice Watershed District

The Partnership previously entered into a formal agreement through a Memorandum of Agreement (MOA) for planning the One Watershed One Plan for the Wild Rice – Marsh Watersheds (Appendix J). The entities will draft a MOA for purposes of implementing this plan. The Policy Committee of the WRMWP oversees the plan implementation with the advice and consent of the individual County and SWCD boards under the umbrella of the implementation MOA.

