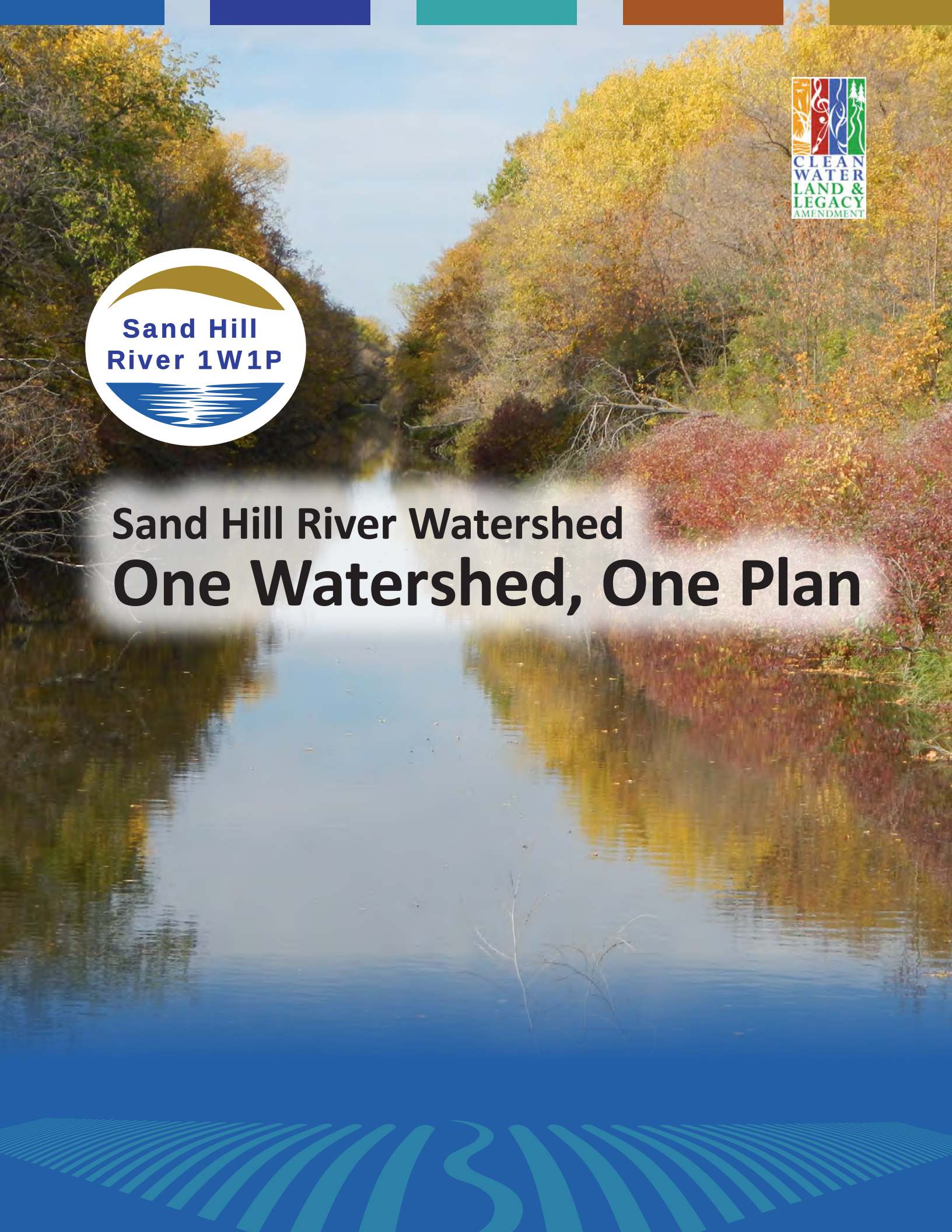

Sand Hill River Watershed

One Watershed, One Plan

Acknowledgements

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Plan Acronyms

1W1P	One Watershed, One Plan
ACEP	Agricultural Conservation Easement Program
AIS	Aquatic Invasive Species
AMC	Association of Minnesota Counties
BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
CEC	Contaminant of Emerging Concern
CIP	Capital Improvement Project
CIG	Conservation Innovation Grant
CMP	Chloride Management Plan
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSG	Cooperative Stream Gaging
CSP	Conservation Stewardship Program
CWMP	Comprehensive Watershed Management Plan
DNR	Minnesota Department of Natural Resources
DO	Dissolved Oxygen
DWSMA	Drinking Water Supply Management Area
DWSRF	Drinking Water State Revolving Fund
EQIP	Environmental Quality Incentive Program
FDRWG	Flood Damage Reduction Work Group
FMA	Flood Mitigation Assistance
FWP	Farmable Wetlands Program
GAM	Grants Administration Manual
GRP	Grasslands Reserve Program
GRTT	Glacial Ridge Local Technical Team
HMGP	Hazard Mitigation Grant Program
IWI	International Water Institute
LGU	Local Government Unit
LTFS	Long-Term Flow Reduction Strategy
MASWCD	Minnesota Association of SWCDs
MAWD	Minnesota Association of Watershed Districts
MIDS	Minimum Impact Design Standards
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MOA	Memorandum of Agreement
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRGB	Natural Resources Block Grant
NWS	National Weather Service

PCWP	Polk County Water Plan
PDM	Pre-Disaster Mitigation
PFA	Perfluoroalkyl Substances
PFC	Perfluorochemicals
PFOS	Perfluorooctane Sulfonic Acid
PHIP	Pheasant Habitat Improvement Program
PTMApp	Prioritize, Target, and Measure Application
RIM	Reinvest in Minnesota
RRBC	Red River Basin Commission
RRRA	Red River Retention Authority
RRVCSA	Red River Valley Conservation Service Area
RRWMB	Red River Watershed Management Board
SDS	State Disposal System
SFIA	Sustainable Forest Incentive Act
SHR1W1P	Sand Hill River One Watershed, One Plan
SHRW	Sand Hill River Watershed
SHRWD	Sand Hill River Watershed District
SID	Stressor Identification Report
SRF	State Revolving Fund
SSTS	Subsurface Sewage Treatment System
SWAG	Surface Water Assessment Grants
SWCD	Soil and Water Conservation District
SWPP	Source Water Protection Program
TMDL	Total Maximum Daily Load
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WBIF	Watershed-based Implementation Funding
WCA	Wetland Conservation Act
WMA	Wildlife Management Area
WMAR	Watershed Monitoring and Assessment Report
WMD	Water Management District
WPLMN	Watershed Pollutant Load Monitoring Network
WRAPS	Watershed Restoration and Protection Strategy
WRWD	Wild Rice Watershed District
WRP	Wetland Reserve Program

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Section 1

Executive Summary

Section 1. Executive Summary

Introduction

The Sand Hill River Watershed (SHRW) covers 570 square miles (364,800 acres) around the Sand Hill River in Northwestern Minnesota, which starts east of the Lake Agassiz beach ridges and flows west through the ridges into the flat Lake Agassiz basin, eventually joining the Red River of the North. The watershed is heavily used for agriculture and produces mainly soybeans and corn. Lakes east of the beach ridges provide recreational opportunities for residents.

This Comprehensive Watershed Management Plan, referred to hereafter as the Sand Hill River Watershed One Watershed One Plan (SHR1W1P), has been developed based on the Board of Soil and Water Resources (BWSR) One Watershed, One Plan Program (1W1P). State legislation §103B.101 and §103B.801 created the 1W1P framework through which watershed planning is encouraged to occur along watershed boundaries, bringing together local partners within the watershed to create one, comprehensive plan.

Local partners in planning include the Sand Hill River Watershed District (SHRWD), East and West Polk Soil and Water Conservation Districts (SWCDs), Polk County, Mahnomen SWCD, Mahnomen County, Norman SWCD, and Norman County. The SHR1W1P, which contains prioritized watershed issues, measurable 10-year goals, and a detailed implementation plan was developed over a year and a half by the committees listed below.

- Steering Committee: local government staff, BWSR, and consultant
- Advisory Committee: state agencies, federal agencies, and other local stakeholders
- Policy Committee: board members from member counties, SWCDs, and SHRWD

The committees composed the following vision statement to guide plan development:

Planning Regions

The watershed was divided into four planning regions to better target implementation actions to specific regions (Figure 1.1). The Sand Hill River begins in the Headwaters region, which includes part of the White Earth Reservation. The Lakes region has many lakes, which provide recreational opportunities to local and regional residents. The Sand Hill River moving through the Beach Ridge region becomes highly channelized, and it passes through Beltrami and Climax in the Valley region before meeting the Red River of the North.

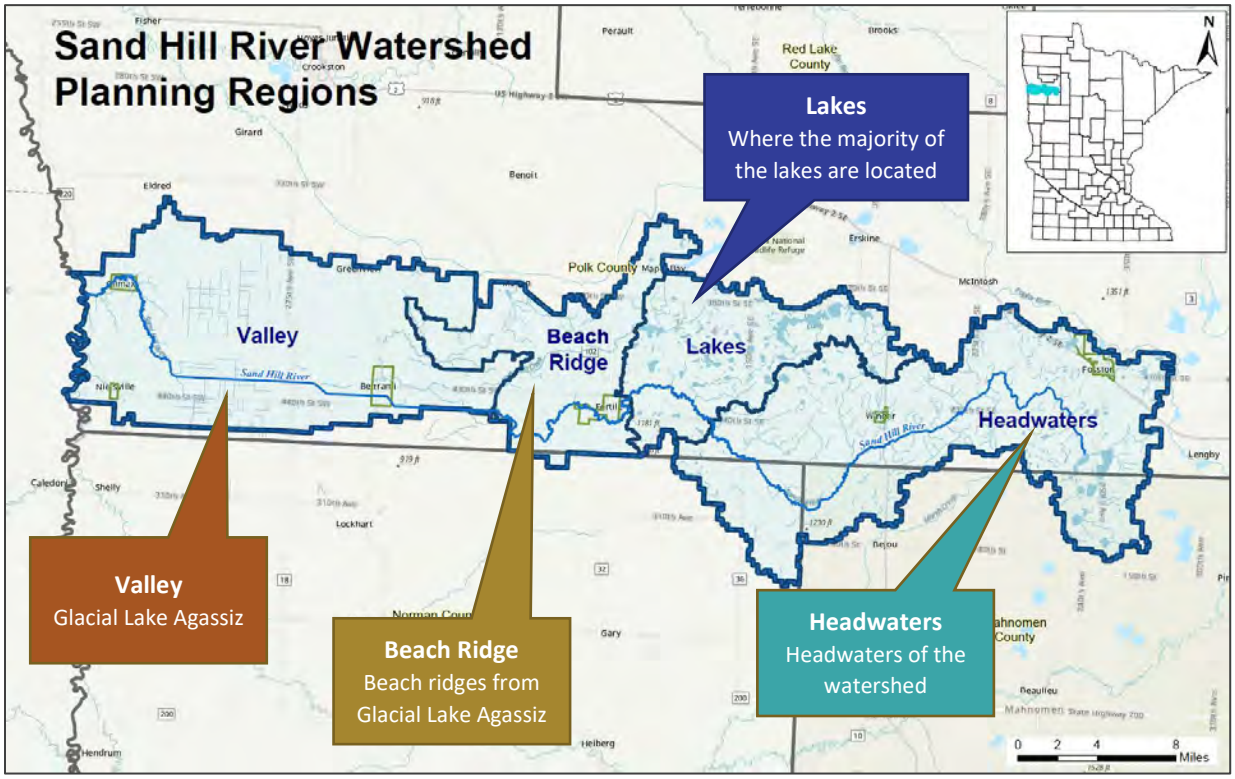


Figure 1.1. Planning Regions in the SHRW.

Priority Issues

All watershed issues facing the SHRW were compiled, then prioritized to narrow down the total number of issues this plan will address. Each issue was prioritized by planning region for targeted implementation. Goals in Section 4 were developed to address all high priority issues.

Public Meeting

The 1W1P process involves considering public opinion on what watershed issues are most urgent for residents. Public kick-off meetings were held in Climax, Fertile, and Fosston in 2022 to introduce residents to the watershed plan and receive feedback from locals on their perception of issues. Forty-five people completed a public survey (results in Appendix B). The top issues named by the public were soil erosion, flooding, habitat quality, and drainage. Each of these issues are included in the final list of watershed issues (Table 1.1).

Issues

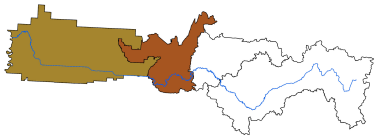
The 13 issues in Table 1.1 include an issue statement, the resource category affected, and a geographic prioritization. Funding and staff resources are finite, so issues have to be targeted to most effectively address them. High priority issues and planning regions will be the focus of implementation efforts during the 10-year plan. Medium priority issues will be addressed as time and funding allow, and the remaining issues and areas will be addressed as opportunities arise.

Planning Region Prioritization Key:

High Priority: Medium Priority: As Opportunities Arise:

Table 1.1. Issues table.

Resource Category	Issue statement	Planning Region Prioritization
Runoff & Flooding	**Flooding** and associated damages have economic, environmental, social, and health and safety implications.	
Water Quality	Overland **sediment loading** from wind and water erosion of cropland and upland impacts water quality.	
Water Quality	**Bacteria (*E. coli*) loading** impacts aquatic recreation and human health.	
Water Quality	**Unstable stream channels** increase sediment loading and reduce habitat quality.	
Runoff & Flooding	**Altered hydrology** causes variability of flows affecting timing, water quantity, water quality, aquatic habitat, and erosion.	
Drainage System Management	**Drainage system bank instability** affects agricultural productivity and increases erosion and sedimentation.	
Drainage System Management	**Maintenance of adequate drainage** of lands impacts crop productivity.	

Resource Category	Issue statement	Planning Region Prioritization
Quality & Quantity	**Groundwater** quality and sustainability needs protection.	
Water Quality	**Nutrient loading** contributes to elevated concentrations in lakes and streams, causing eutrophication.	
Soil Health	Decreased **soil health** can impact agricultural productivity and water holding capacity.	
Aquatic Habitat	**Stream habitat quality** is impacted by loss of riparian and in-stream habitat, inadequate buffer areas, and barriers to fish migration.	
Wetlands & Terrestrial Habitat	Loss of **upland and wetland habitat** impacts species richness and diversity, water storage, and water quality.	
Aquatic Habitat	**Aquatic Invasive species** (AIS) threaten ecosystems, water quality, and recreation.	

Measurable Goals

Measurable goals are a key component to quantifying plan progress and demonstrating change in a resource condition. Section 4 includes a description of the nine goals, each of which contains the following:

- Issue background
- Issue(s) addressed
- Geographic prioritization
- Short-term goal, goal metric, and data source
- Desired future condition
- Secondary benefits of making progress towards goal
- Potential actions to make progress towards goal
- Where on the landscape actions will be prioritized

Goals are summarized in the graphics on the following pages.

Reduce Overland Sediment

Short term goal: 5% reduction in each Planning Region.

Secondary benefits:
- ✓ Reduced nutrient loading
- ✓ Improved soil health
- ✓ Improved stream habitat

Increase Water Storage

Short term goal: 3,040 acre-feet of storage.

Secondary benefits:
- ✓ Decreased flooding
- ✓ Decreased streambank erosion
- ✓ Decreased sediment loading
- ✓ Decreased nutrient loading
- ✓ Improved stream habitat

Reduce Bacteria

Short term goal: 1 project to reduce bacteria per year (i.e., Subsurface Sewage Treatment System [SSTS] replacements, grazing management, manure management plans)

Secondary benefits:
- ✓ SSTS compliance
- ✓ Feedlot compliance
- ✓ Improved water quality

Stabilize Streams

Short term goal: Stabilize, enhance, or protect 1.5 miles of stream.

Secondary benefits:
- ✓ Reduced sediment
- ✓ Reduced phosphorus
- ✓ Improved aquatic habitat
- ✓ Improved riparian habitat

Stabilize Drainage Systems

Short term goal: stabilize or enhance 5 miles of drainage systems.

Secondary benefits:
- ✓ Reduced nutrient loading
- ✓ Reduced sediment loading
- ✓ Improved stream habitat

Protect Drinking Water

Short term goal: Seal 10 unused wells per year

Secondary benefits:
- ✓ Improved public health for communities and private residences

Reduce Nutrients

Lakes short term goal: 5% reduction in priority lakes.

Streams short term goal: % phosphorus reduction from the scenario determined for the sediment goals.

Secondary benefits:
- ✓ Improved aquatic habitat
- ✓ Improved aquatic recreation

Flood Damage Reduction

Short term goal: Community flood protection (levees, floodwalls) and farmstead ring dikes built to the 100-year flood plain.

Secondary benefits:
- ✓ Reduced sediment & nutrients
- ✓ Reduced streambank erosion
- ✓ Improved climate resiliency

Improve Soil Health

Short term goal: 5,000 acres of cropland treated with soil health practices.

Secondary benefits:
- ✓ Improved agricultural productivity
- ✓ Reduced nutrient loading
- ✓ Improved aquatic habitat
- ✓ Increased water storage
- ✓ Reduced overland sediment loss

Improve Habitat

Short term goal: Protect and/or restore 148 acres of wetland in Prairie Core Areas of the Minnesota Prairie Plan.

Secondary benefits:
- ✓ Added water storage
- ✓ Improved soil health
- ✓ Flood protection/reduced overland flow

Plan Implementation

A variety of actions including structural agricultural best management practices (BMPs), conservation practices, education and outreach actions, and capital improvement projects (CIP) will take place in the watershed over the course of the 10-year plan. Implementation actions are clearly laid out in tables in Section 5, which includes an action description, program, 10-year outcome, progress towards goal, goals addressed through action, local government unit (LGU) responsible, timeline, and estimated cost.

Examples of actions that will occur in the watershed include:

- Structural agricultural practices (grade stabilizations, grassed waterways, sediment basins, etc.)
- Non-structural agricultural practices (conservation tillage, cover/perennial crops, etc.)
- Bacteria management projects
- Lake enhancement projects
- Land retirement programs
- Ditch/stream stabilization projects
- Seal unused wells
- Well testing and soil health workshops

See Section 5 for the full implementation schedules.

Implementation will depend on landowner participation and cost share incentives will be provided. Implementation actions will occur through one of five programs, Projects and Practices, Capital Improvement Projects, Education and Outreach, Data Collection, Monitoring and Analysis, and Regulation and Enforcement. (Figure 1.2). Further detail on each of these programs is described in Section 7.

Figure 1.2. Implementation programs in the SHRW.

Additional funding will be needed to implement this plan. Funding Level 1 is the current, or baseline funding available in the watershed. Funding Level 2, the level at which this plan will operate, includes Watershed-Based Implementation Funding (WBIF) for SHR1W1P implementation, estimated to be $700,000 every biennium. WBIF will be allocated from BWSR upon approval of the SHR1W1P. The total cost of implementation is estimated to be $19,500,000 over the 10 years for plan partners, and $22,000,000 in other partner projects.

Table 1.2. Implementation Funding.

Funding Level	Description	Estimated Annual Average	Estimated Plan Total (10 years)
1	Baseline Funding for Current Programs	$1,600,000	$16,000,000
2	**Baseline + WBIF**	**$1,950,000**	**$19,500,000**
3	Partner/Other Funding, including Natural Resources Conservation Service (NRCS), US Fish and Wildlife Service (USFWS), Conservation Reserve Program (CRP), Lessard-Sams, Minnesota Pollution Control Agency (MPCA), Minnesota Department of Natural Resources (DNR), and the Red River Watershed Management Board (RRWMB).	**~$2,000,000**	**~$22,000,000**

The watershed partners have a good track record of accomplishing projects to improve water quality and protect habitat. With the Level 2 funding they will be able to accomplish a lot more. Overall plan benefits and real-world equivalents are illustrated in Figure 1.3.

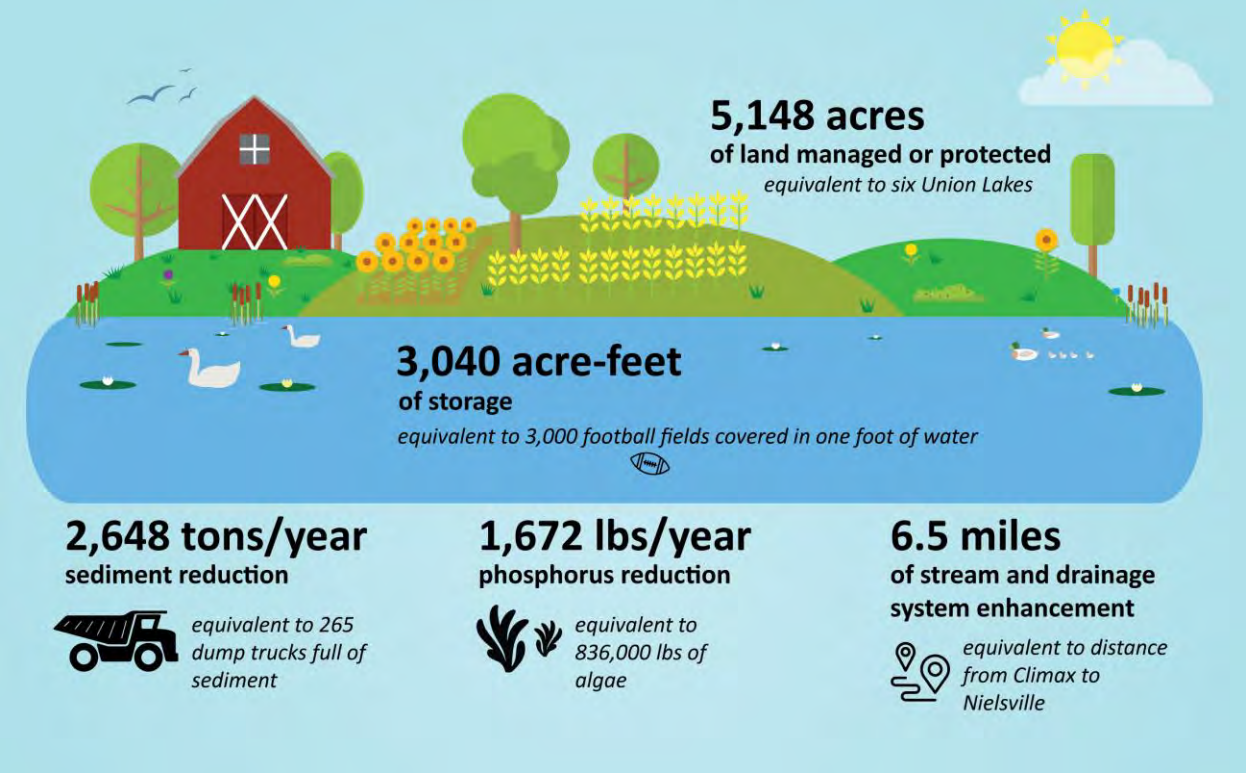


Figure 1.3. Overall plan benefits.

Planning partners (Figure 1.4) will work together to implement the actions described in Section 5 to make progress towards plan goals and improve the watershed's resources. Implementation will require increased staffing, coordination, and funding. The Implementation Team will collaborate to implement actions and improve the condition of the SHRW.

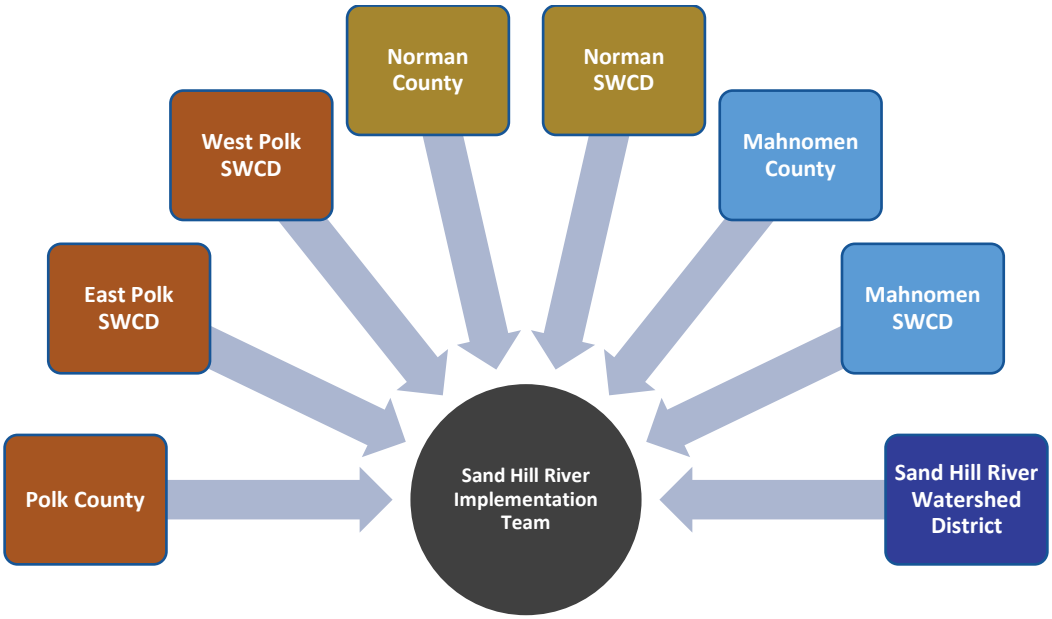


Figure 1.4. Implementation partners in the SHRW.

Section 2

Land and Water Resources Narrative

Section 2. Land and Water Resources Narrative

Overview

The SHRW is located in Northwestern Minnesota and is one of 17 Minnesota watersheds in the Red River of the North Basin. Spanning 570 square miles (364,800 acres), the SHRW is bordered by the Red Lake River and Clearwater River Watersheds to the north and Marsh River and Wild Rice River Watersheds to the south. The majority of the SHRW (79.4%) is located in Polk County, with 14.8% in Norman County, and 5.8% in Mahnomen County (Figure 2.1). There is also some White Earth Reservation land in the eastern end of the SHRW (Figure 2.1).

Local Watershed partners have joined together to create a Comprehensive Watershed Management Plan (CWMP) to be consistent with statute and ultimately with the resolutions to adopt and implement as a substitute for 103B, 103C or 103D plans. Partners include SHRWD, East and West Polk SWCDs, Polk County, Mahnomen SWCD, Mahnomen County, Norman SWCD, and Norman County.

Name Origin

The Ojibwe named it "**ga-papiqwutawangawi zibi**", or "the river of the sand hills, scattered here and there in places." In 1800, Alexander Henry, a fur trader, passed the mouth of the river which he called the Riviere aux Buttes de Sable. This French phrase translates into English as **river with hills of sand** (https://aelcfertile.org/).

Figure 2.1: SHRW map, showing the location of the watershed in Minnesota.

Geology and Soils

Sand Hills near Fertile, MN.
Credit: Agassiz Environmental Learning Center.

Glacial activity from thousands of years ago shaped the geomorphology of the SHRW and has created fertile soils that led to the current agricultural productivity. The SHRW is located in the Lake Agassiz Basin, with deep lacustrine sediment from glacial Lake Agassiz. Lake Agassiz was formed during the last retreat of glaciers in MN around 10,000 years ago and was larger than all the great lakes combined (MPCA, 2017). It left behind beach ridges and lake plain.

The lake plain topography on the western side of the watershed is very flat and was once the floor of glacial Lake Agassiz. The silty clay loam sediments of the lake plain form extremely fertile soils. The parent material of western soils is the lacustrine sediment with fine silty-clay and very fine clay (Polk County, 2017). Moving east across the watershed, the landscape transitions to rolling hills and north-south beach ridges that were once the fluctuating shoreline of Lake Agassiz. There, soil is clay and sandy loams mixed with sand and gravel with disjointed aquifers where water moves through the ridge to form springs at the bases. Soils are well drained on ridges and poorly drained in basins between ridges (MPCA, 2014b). The beach ridge region is prone to erosion with its steep slopes and light soil. Glacial moraine topography makes up the eastern most part of the watershed, with small lakes, wetlands, and rolling hills. Soils in this eastern section are dark, fine-loamy soils (Polk County, 2017). The soils and geology of the watershed place it in two ecoregions, the Lake Agassiz Plain and North Central Hardwoods Ecoregions (USDA).

The lake plain region of the watershed is prone to flooding given its negligible slope and low-capacity stream channels. More water drains into the lake plain region streams than the shallow streams have capacity to hold. Most floods affect agricultural land, but Beltrami, Nielsville, and Climax can be impacted by flooding as well (SHRWD, 2012). These three towns are in the heart of the agricultural land in the watershed.

Watershed History and Land Use

The area that is now considered the SHRW was first a home for Native Americans as long as 10,000 years ago. Around 2,000 years ago, the Woodland culture inhabited the Red River Valley, and was followed by the Plains Village culture 800-900 years ago (MSUM). Prior to European settlement, the landscape consisted of tall grass prairie and wetlands. Using the Marschner vegetation map, pre-European land cover in the watershed was 36% prairie, 27% wet prairie, 13% aspen and oak land, and 13% brush prairie (DNR, 2017).

The region was first explored by British and French fur traders. The railroad was built to the Red River of the North in 1871, after which many settlers moved into the area (MSUM). Prairie was converted to cropland, with rye, hay, and oats as the crops grown. Sugar beet and sunflower became popular crops in the 1970s, followed by a more recent production of soybean and corn (MPCA, 2014).

The natural flat topography with silt-clay lake washed till results in a poorly drained region. This in combination with land use and land management changes make the SHRW prone to severe flooding. The SHRW also has ditch systems, stream channelization, wetland drainage, and subsurface tiling, all of which impact water management decisions. A network of ditch systems was constructed in the 1900s to move water into the Red River of the North. Without the ditches, water would pool in crop fields and the watershed would not have been able to develop into the agricultural region it is today (Polk County, 2017). Currently, the National Land Cover Dataset (Figure 2.3) shows that watershed land cover is 78% crop cover, 9% wetlands, 4% forest, 4% developed, 2% surface water, and 2% other uses (barren, shrub, herbaceous, and pasture). A comparison of land use is shown in Figure 2.2.

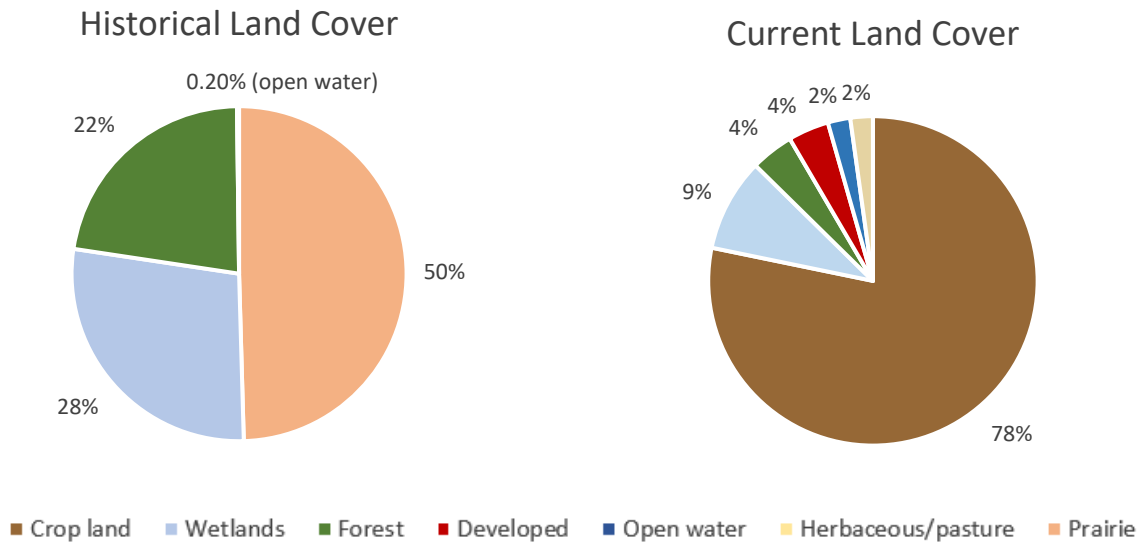


Figure 2.2. Historical and current land use in the watershed. The lack of open water in the historical land cover is due to the dominating presence of wetlands prior to the ditching of the Sand Hill River and its tributaries.

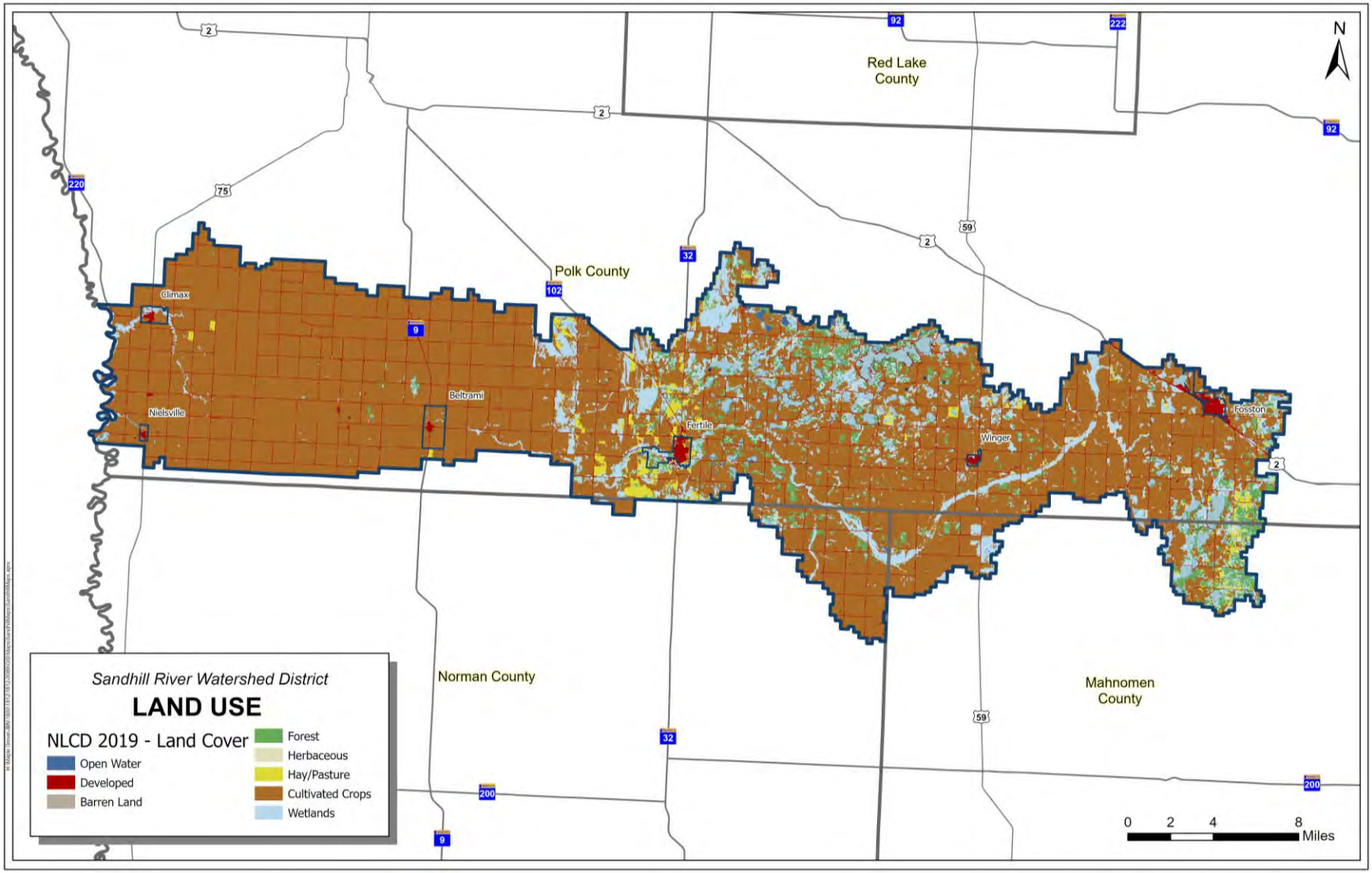


Figure 2.3: Current land cover in the watershed.

Climate

With its location in northwestern Minnesota, the SHRW experiences cold, snowy winters with hot summers. The average minimum temperature in the watershed is 30.2°F and the average maximum is 50.9°F. Average annual precipitation is 22.9 inches, with slightly more precipitation in the east than the west.

Climate has a huge effect on people living in the watershed, with drought, severe storms, and flooding impacting Minnesota. The average temperature has increased by 1.3°F since 1895 (DNR, 2019). The change in precipitation since 1993 is 3.4 inches (DNR, 2023). Farming is a way of life and an economic driver in this watershed, making the impacts of heat and variable rainfall particularly concerning due to the effects of these climate driven weather patterns on agricultural production.

Surface Waters and Wetlands

The SHRW is named for the Sand Hill River that traverses the watershed and flows 101 miles from its source at Sand Hill Lake past the towns of Winger, Fertile, Beltrami, and Nielsville to its confluence with the Red River of the North. Kittleson Creek joins the Sand Hill River between Fertile and Beltrami. After this confluence, the Sand Hill River becomes channelized for 18 miles where drainage systems from agricultural land deposit water into the river (MPCA, 2014b). The straightened portion of the river does not support quality aquatic habitat.

Sand Hill River in fall.
Credit: Wayne Goeken.

The Sand Hill River originally flowed north of Beltrami, where the channel became poorly defined, and water moved through marshland before reappearing in a main channel miles downstream. Drainage and flooding issues led to the US Army Corps of Engineers (USACE) straightening the river and partnering with the SHRWD to construct four drop control structures in the 1950s (MPCA, 2014b). The structures were able to reduce the flooding in the watershed, but recently increased awareness of the ecological and erosion problems caused by dams and impediments to flow have resulted in projects to allow fish migration pathways. In addition to the drop structures, the Sand Hill River had two dams, one at the Sand Hill Lake outlet and the other southeast of the City of Rindal on a Sand Hill River tributary. The drop structures were replaced with rock arch rapids in 2016, and the Sand Hill Lake Dam was removed and replaced with rock arch rapids in 2020 as part of a project to improve fish migration by the SHRWD and DNR (see photo Executive Summary section divider). Poissant Bridge was also removed, and pools and resting spots were created for fish.

There are numerous water control structures including Bear Park, Olson dam, and Kurass Lake. Union Lake is pumped to control water levels.

Wetlands are no longer a common feature in the SHRW. Currently, 9% of the watershed is wetlands. Historically, up to 42% of the watershed has been wetlands based on hydric soils (MPCA, 2014b). The drainage of wetlands, necessary for agricultural production, has disconnected the river from the floodplain and reduced storage capacity.

Stormwater runoff from the communities in the SHRW likely discharges directly into the Sand Hill River or its tributaries. A Municipal Separate Storm Sewer System (MS4) permit is required under the MPCA's National Pollutant Discharge Elimination System (NPDES) program to protect water resources from urban stormwater runoff from larger communities. In the SHRW, no municipalities require an MS4 permit regulating urban stormwater runoff discharges.

The western portion of the SHRW has no lakes, with the majority of lakes and wetlands in the eastern section of the watershed. Union, Sarah, Sand Hill, Cable, and Kittleson Lakes are recreationally important to the watershed (Polk County, 2017). The 16 lakes in the watershed provide opportunities for locals and tourists for fishing, boating, waterfowl hunting, and swimming. Many lakes are in closed basins or with poorly developed outlets. This led to the installation of a pump system in Union Lake after water levels rose over 6 feet and inundated properties (SHRWD, 2012).

Water Quality

There are water quality impairments in the watershed due to high levels of sediment, bacteria, and nutrients, low dissolved oxygen levels, and hampered fish and macroinvertebrate communities. Four of the 16 lakes in the watershed (over 10 acres in size) are currently listed as impaired by the MPCA for aquatic recreation (MPCA, 2017). Internal phosphorus loading is a growing concern within the watershed, along with nutrients delivered from the landscape.


Sand Hill River west of Fosston.

The landscape and hydrological alterations of the SHRW have led to many problems. Straightening the channel and the network of ditching systems has led to precipitation-fed flow characterized as flashy within the river, with high peak flows during rain events and spring runoff and very low flow in drier periods. Due to this channelization, the river channel has eroded, causing bank instability and slope failures which contribute to the excess sediment problems in the river. The historical loss of longitudinal connectivity along with drainage and channelization has led to problems like altered stream flow, higher water temperature, increased sediment transport, and impaired fish and macroinvertebrate assemblages (MPCA, 2014a).

Water quality impairments in the watershed are shown in Figure 2.4. All assessed stream segments of the Sand Hill River did not meet either aquatic life or recreational use standards (MPCA, 2014b). Low dissolved oxygen (DO), poor fish/macroinvertebrate assessments, and excess turbidity/total suspended solids resulted in the aquatic life impairments; and aquatic recreation impairments were all due to excess bacteria. Wind and water erosion, especially from the beach ridge area with steep slopes and light soils, contribute to the turbidity problem. The Sand Hill Ditch is above the standards for turbidity but is not currently listed as impaired. It is a priority for local partners to improve.

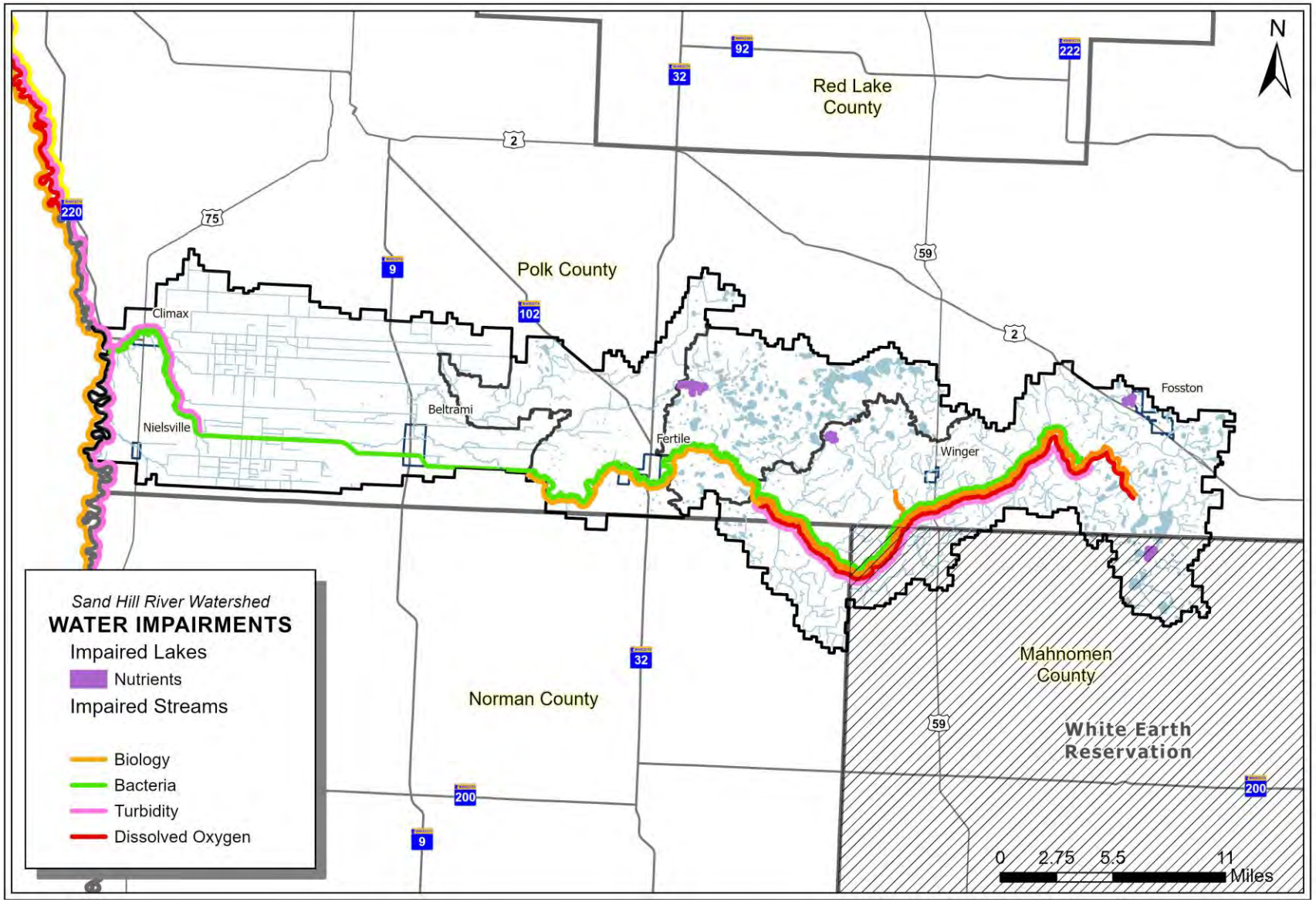


Figure 2.4: Water quality impairments in the watershed.

Groundwater

The SHRW has both a deep (cretaceous) and shallow (glacial drift) aquifers. Most of the glacial drift aquifer is unconfined, meaning there is no impervious layer above the aquifer. The glacial drift aquifer is dispersed underneath beach ridges and yield is generally greater in the south. Groundwater contamination is most likely in the beach ridge region, then the glacial moraine region, and least likely in the lake plain area (Polk County, 2017).

All the residents of the SHRW obtain their drinking water from groundwater sources. There are 866 known private wells, six community public water systems (12 wells), 17 transient non-community supply wells, and no non-transient non-community supply wells. Over 23% of the arsenic samples taken from wells in the planning area have levels of higher than the state standard of 10 micrograms per liter (µg/L). Arsenic occurs naturally in rocks and soil across Minnesota and can dissolve into groundwater. Consuming water with low levels of arsenic over a long time (chronic exposure) is associated with diabetes and increased risk of cancer (MDH). Approximately 21.1% of 19 wells in the category of <50 ft depth completed were exceeding 10 milligrams per liter (mg/L) Nitrate-N. Of the 641 results pulled for the watershed by MDH for all well depths, only 0.8% exceeded this SDWA standard (MDH 2022). High nitrate can indicate infiltration from land management practices.

Drinking Water Supply Management Areas (DWSMAs) in the watershed have low vulnerability in all except the city of Fertile which has moderate vulnerability (Figure 2.5). DWSMA boundaries establish a protection area through an extensive evaluation that determines the contribution area of a public water supply well, aquifer vulnerability and provide an opportunity to prioritize specific geographic areas for drinking water protection purposes. The low and moderate vulnerability of the DWSMAs in this watershed suggests a level of geologic protection that should safeguard public water supplies from rapid changes in water quality resulting from surface water recharge (MDH 2022).

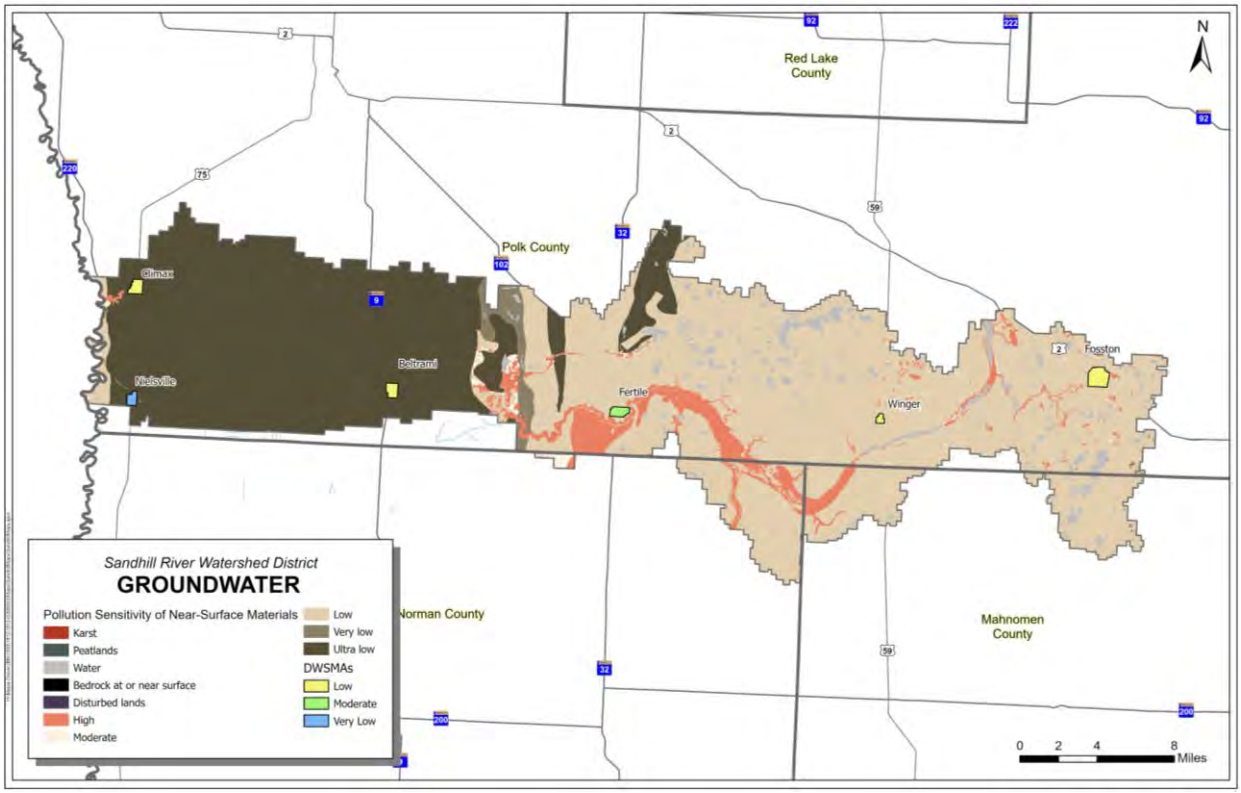


Figure 2.5: Pollution sensitivity of groundwater and DWSMAs in the watershed.

Habitat and Wildlife

The habitat in the SHRW has been greatly impacted by the land use and hydrology changes of the watershed. Habitat was removed and degraded when wetlands were drained and streams were channelized for agriculture. Increased sediment load in rivers and loss of meandering channels has led to a shift from historical macroinvertebrate communities to more pollution-tolerant taxa. Both habitat quantity and quality have been reduced by changes in hydrology and high sediment.

AIS are a concern in SHRW. Eurasian watermilfoil, curly-leaf pondweed, Chinese snails, and purple loosestrife have been found in Polk County. Union Lake has both Eurasian watermilfoil and curly-leaf pondweed. AIS that have been found nearby the watershed but not yet detected include starry stonewort, Chinese mystery snail, and faucet snail (Polk County, 2017).

Historically fish passage has been an issue due to the presence of four low head dams. These dams were modified in 2016 and the primary fish passage issues on the mainstem of the Sand Hill River have been resolved. Fish passage remains an issue at the Bear Park dam and on various culverts that may still reduce or prevent fish passage. Pollution-sensitive minnows such as Longnose Dace were found in the Sand Hill River at the lowest reach and above the Kittleson Creek confluence, indicating good water quality in some areas. Fish tissue samples found that PCBs are not of concern in this watershed, but high mercury concentrations led to an impairment (MPCA, 2014b).

A small northern corner of the watershed overlaps with the Glacial Ridge National Wildlife Refuge, the largest prairie and wetland restoration site in the country. The Glacial Lake Agassiz Beach Ridge region supports native prairie with rare species such as alkali cord grass, western prairie orchid, northern gentian, and hall's sedge (Polk County, 2017). There are also numerous Wildlife Management Areas (WMA), Aquatic Management Areas, Agassiz Dunes Scientific and Natural Area (SNA), and priority shallow lakes managed by the DNR for habitat (Figure 2.7).

Figure 2.6: The Northern Long-eared Bat (left) and Western Prairie Orchid (right). Photos from USFWS 2022.

USFWS states that 15 migratory bird species are present in the watershed, and lists the Gray Wolf, Northern Long-eared Bat, and Western Prairie Orchid as federally threatened species in this watershed (Figure 2.6, USFWS, 2022). Polk County contains the largest population of the Western Prairie Orchid in the world (Polk County, 2017). State listed endangered species are Pale Moonwort, Indian Ricegrass, and Gray Ragwort.

Polk County contains 21 calcareous fens, a type of wetland deemed an Outstanding Resource Value Water by Minnesota (Polk County, 2017). Calcareous fens are a state-protected resource, as they support a number of rare plant and animal species.

All these resources provide excellent opportunities for recreation in the watershed, including canoeing and kayaking on the Sand Hill River and recreating in lakes. The Agassiz Environmental Learning Center provides numerous activities for spending time in nature including birding, camping, hiking, kayaking, snowmobiling, and snowshoeing (https://aelcfertile.org).

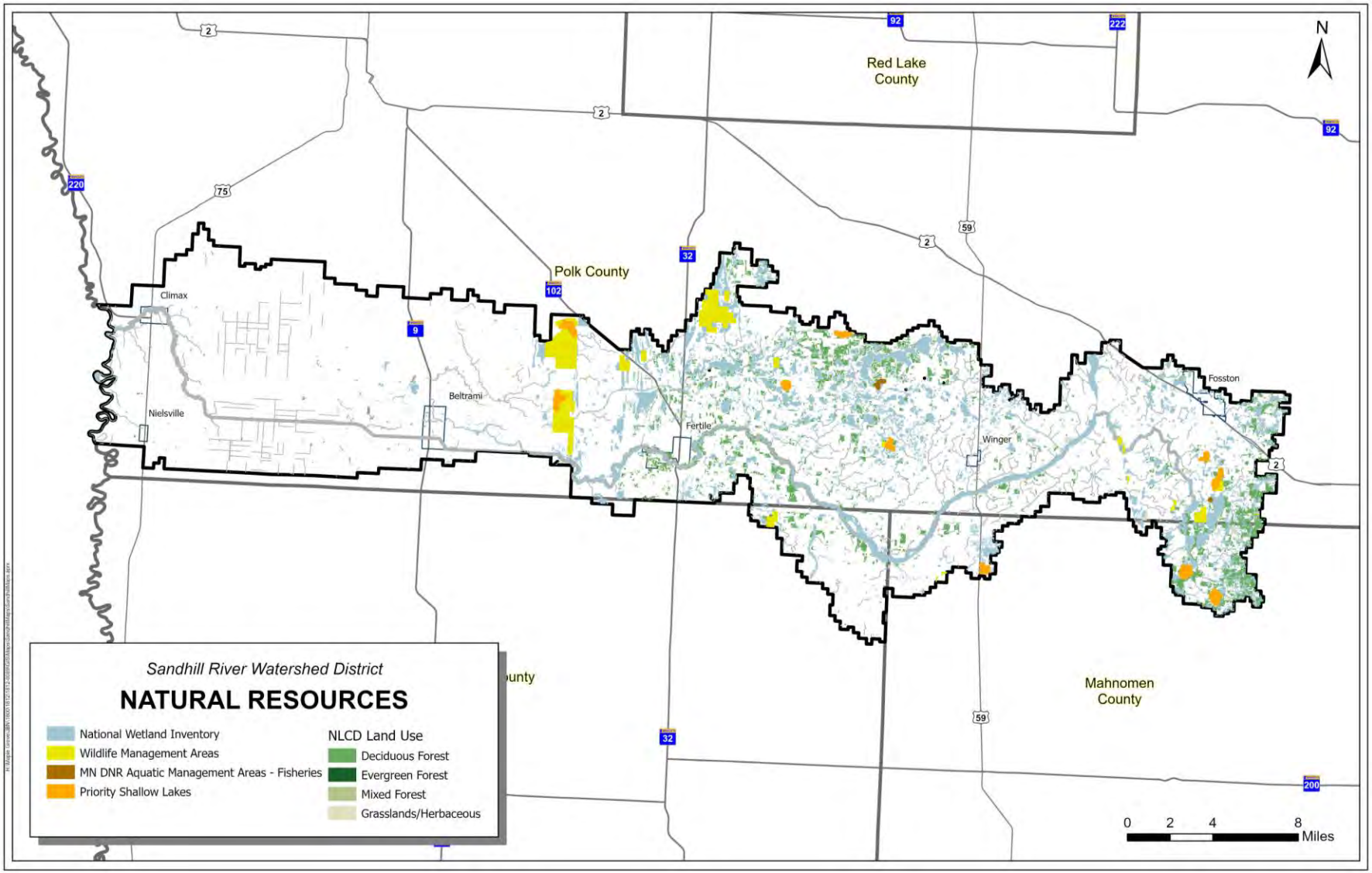


Figure 2.7. Natural resources and protected areas in the SHRW.

Socioeconomics

The watershed contains the cities of Beltrami, Climax, Fertile, Fosston, Winger, and Nielsville. Approximately 26,195 people live in the watershed, with a median age of 39. The majority of residents are white, with 6.4% Hispanic or Latino, 3.6% Native American, 2% Black, 0.9% Asian, and 1.9% other. Twelve percent (12%) of the population live under the poverty line, with income and education displayed in Figure 2.8 (U.S. Census, 2020).

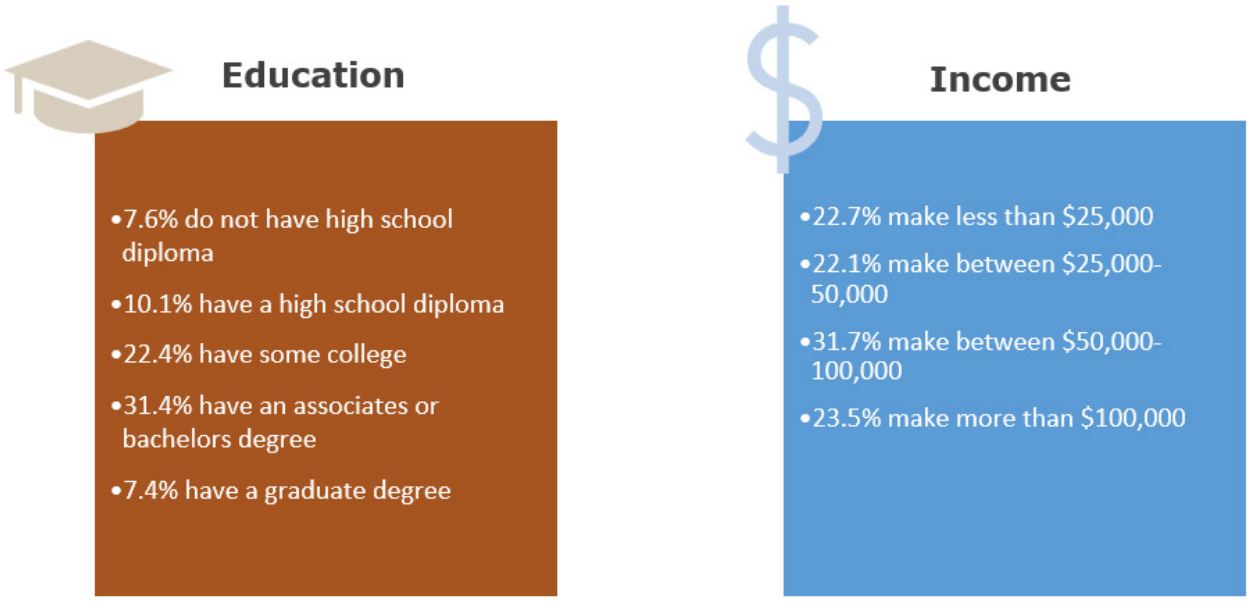


Figure 2.8: Education and Income statistics for the watershed.

Conclusion

The SHRW is a home for over 25,000 people, many of which depend on the land for an agriculturally based economy. The glacial history of this region left the watershed with extremely fertile soils. Much of the topography is very flat, especially in the west. The flat landscape, extensive drainage for agriculture, and shifting weather patterns have all contributed to flooding problems. As such, flooding is a top concern for the watershed. Improving water quality impairments, including low DO, turbidity, poor fish assemblages, nutrients, bacteria, or sediment, are the focal water quality issues that were evaluated as part of the development of this plan.

Section 3

Priority Issues

Section 3. Priority Issues

Issues affecting natural resources within the watershed are identified and prioritized within this section. An **issue** is considered to be a problem or risk, and a **resource** is a natural feature on the landscape which can be grouped into categories for planning and management purposes. Not all issues affecting the SHRW can be addressed, consequently, issues were narrowed down with input from multiple sources. Once the final set of issues were selected, issues were grouped into three priority categories within planning regions, so as to best direct limited time, funding, and staff at specific issues in a targeted area.

Issue Identification

Issues were identified from numerous sources (Figure 3.1). At the beginning of the planning process, state agencies were invited to send in their concerns for the watershed; letters were received from Minnesota Department of Natural Resources (DNR), Board of Water and Soil Resources (BWSR), Minnesota Department of Health (MDH), Minnesota Department of Agriculture (MDA), and Minnesota Pollution Control Agency (MPCA). Existing reports and studies on the watershed were reviewed, and issues were gathered from the following reports.

- Polk County Comprehensive Water Plan
- SHRWD Water Management Plan
- MPCA reports
    - *Watershed Restoration and Protection Strategy (WRAPS)*
    - *Watershed Monitoring and Assessment Report (WMAR)*
    - *Biotic Stressor Identification Report (SID)*
    - *Total Maximum Daily Load (TMDL)*

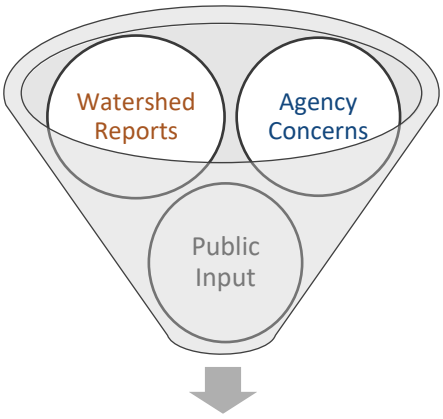


Figure 3.1. Sources compiled for developing watershed issues.

Once issues were compiled, themes throughout all the sources were developed, and further revised by the Steering Committee. Issues were split into four resource categories for ease of reference (Table 3.1). In fall of 2022, the issue statements were reviewed by the Advisory Committee and then approved by the Policy Committee.

Table 3.1. Resource Categories and subcategories in the SHRW.

Resource Categories	Surface Water	Groundwater	Agricultural Productivity	Natural Resources
Sub-categories	• Runoff & Flooding • Water Quality	• Quality • Quantity	• Drainage System Management • Soil Health	• Aquatic Habitat • Terrestrial Habitat • Wetlands

Public Input

The Steering and Policy Committees stressed the importance of including issues that matter to the people living in the watershed. Public input was gathered through public kickoff meetings held in Climax, Fertile, and Fosston, and a survey (Figure 3.2). At the public kickoff event, attendees were told what the 1W1P process is and given multiple ways to voice their concerns. They were each given three pennies to place in jars with different resource concerns. The results varied somewhat between meeting locations (Figure 3.3). A survey was given to meeting attendees, and a link to the survey was provided in postcards sent to watershed residents so members of the public that did not make it to the meeting could still comment on issues. The survey was completed by 45 people, with responses summarized in Appendix B. Top issues reported by the public included flooding, soil erosion, habitat quality, and drainage. All these issues were incorporated into the issues table on the following pages.

Figure 3.2. Public kick off events at (a) Climax, (b) Fertile, and (c) Fosston

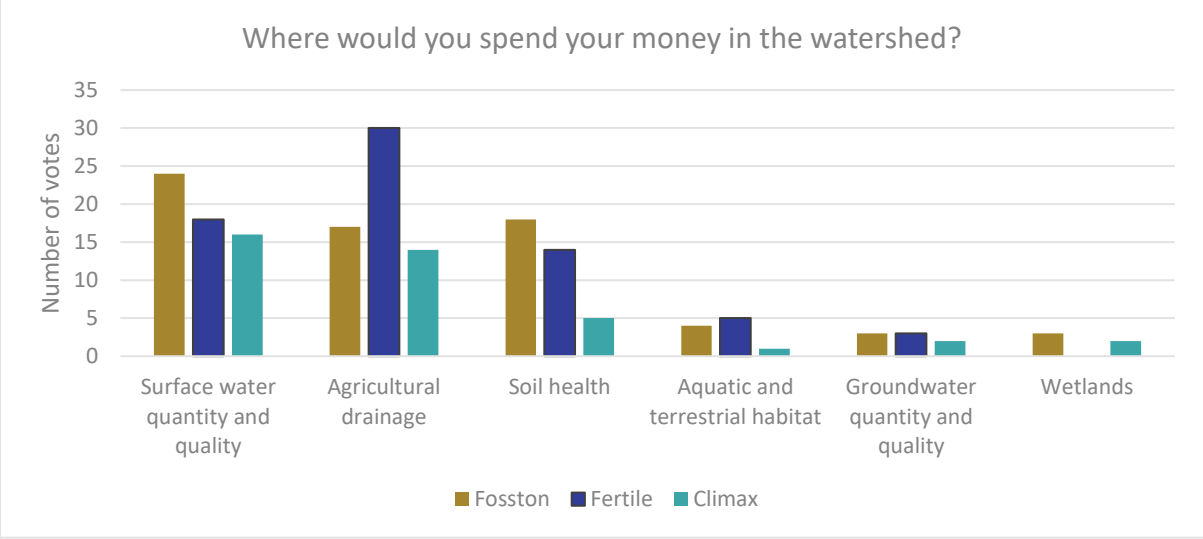


Figure 3.3. Penny jar voting results during the Public kick off events.

Issue Prioritization

Staffing and funding resources for addressing issues are limited, so prioritization helps determine where to focus resources over the next 10 years. In fall of 2022, the Steering Committee prioritized the issues by planning region to determine where to focus geographically.

Planning Regions

The watershed was split into four planning regions along subwatershed (HUC10) lines into the Valley, Beach Ridge, Lakes, and Headwaters (Figure 3.4).

The Steering Committee prioritized issues between planning regions using maps and local knowledge. Sources included the Impaired Waters List (303(d)), local ditch information, lakes of phosphorus sensitivity significance, Minnesota Prairie Plan, groundwater sensitivity, and the Minnesota Infested Waters List (AIS). Prioritization was then reviewed and revised by the Advisory Committee and approved by the Policy Committee.

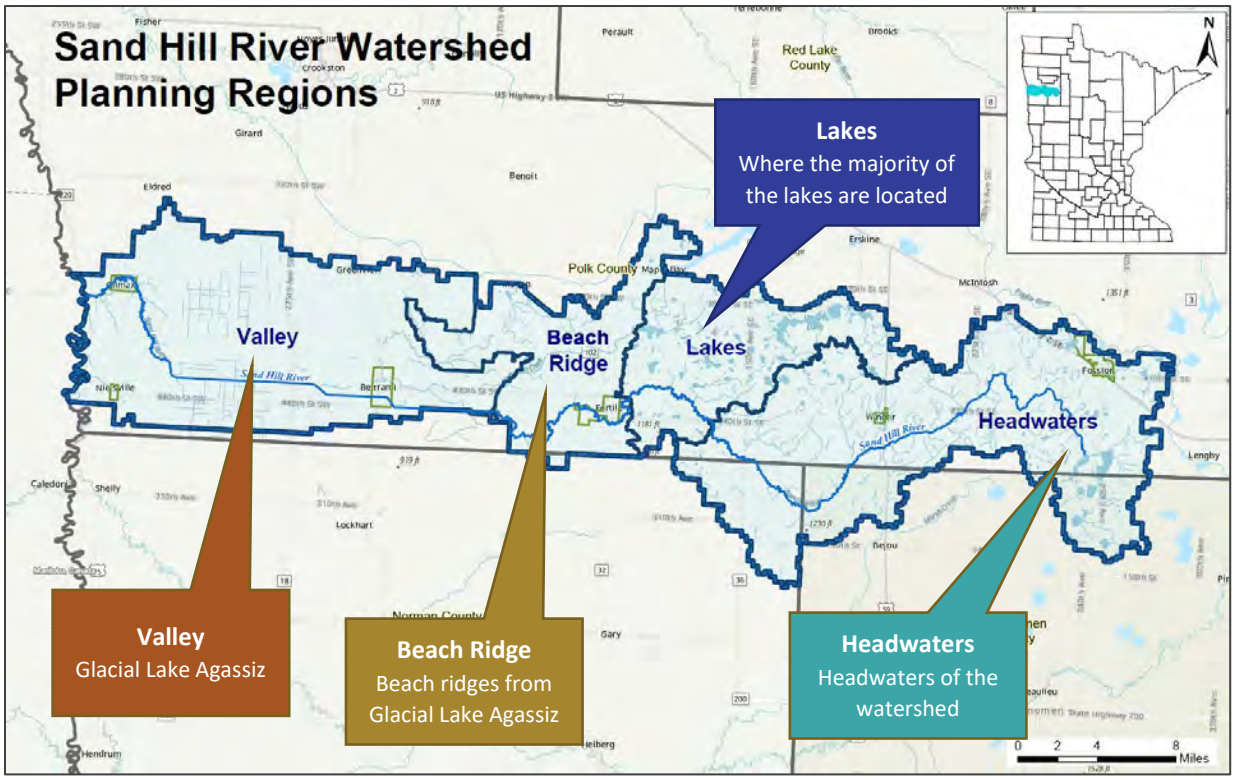


Figure 3.4. Planning Regions in the Sand Hill River Watershed.

Priority Issues

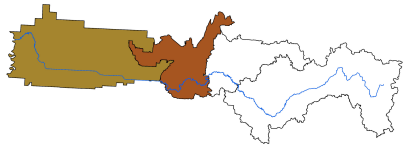
The issue statements developed by the Steering and Advisory committees are presented below. The main theme of the issue statement is in bold letters. The sources are indicated for each issue based on the sources key, and planning region prioritizations are shown on maps. High priority issues and planning regions will be the focus of implementation efforts during the 10-year plan. Medium priority issues will be addressed as time and funding allow, and the remaining issues and areas will be addressed as opportunities arise.

Planning Region Prioritization Key:

High Priority: Medium Priority: As Opportunities Arise:

Sources Key:
SHRWD =SHRWD Water Management Plan
PCWP = Polk County Water Plan
WRAPS = Watershed Restoration & Protection Strategy
WMAR = Watershed Monitoring & Assessment Report
SID = Stressor ID Report
BWSR = Priority Concern letter
MPCA = Priority Concern letter
DNR = Priority Concern letter
MDA= Priority Concern letter
MDH = Priority Concern letter
Public = Public open house and public survey

Resource Category	Issue statement	Sources	Planning Region Prioritization
Runoff & Flooding	**Flooding** and associated damages has economic, environmental, social, and health and safety implications.	SHRWD, PCWP, BWSR, MPCA, Public	
Water Quality	Overland **sediment loading** from wind and water erosion of cropland and upland impacts water quality.	SHRWD, PCWP, WRAPS, WMAR, SID, MPCA, BWSR, MDA, Public	
Water Quality	**Bacteria (*E. coli*) loading** impacts aquatic recreation and human health.	WRAPS, WMAR, MPCA, MDA	
Water Quality	**Unstable stream channels** increase sediment loading and reduce habitat quality.	SID, DNR	

Resource Category	Issue statement	Sources	Planning Region Prioritization
Runoff & Flooding	**Altered hydrology** causes variability of flows affecting timing, water quantity, water quality, aquatic habitat, and erosion.	SID, SHRWD, PCWP, WRAPS, WMAR, DNR, MPCA	
Drainage System Management	**Drainage system instability** affects agricultural productivity and increases erosion and sedimentation.	BWSR, MPCA, Public	
Drainage System Management	**Maintenance of adequate drainage** of lands impacts crop productivity.	DNR, MPCA, Public	
Quality & Quantity	**Groundwater** quality and sustainability needs protection.	MPCA, MDH, BWSR, MDA	
Water Quality	**Nutrient loading** contributes to elevated concentrations in lakes and streams, causing eutrophication.	WRAPS, WMAR, DNR, MPCA, BWSR, MDA	
Soil Health	Decreased **soil health** can impact agricultural productivity and water holding capacity.	DNR, BWSR, MPCA, MDA	

Resource Category	Issue statement	Sources	Planning Region Prioritization
Aquatic Habitat	**Stream habitat quality** is impacted by loss of riparian and in-stream habitat, inadequate buffer areas, and barriers to fish migration.	SHRWD, WRAPS, SID, DNR, MPCA	
Wetlands & Terrestrial Habitat	Loss of **upland and wetland habitat** impacts species richness and diversity, water storage, and water quality.	BWSR, DNR, Public	
Aquatic Habitat	**Aquatic Invasive species** threaten ecosystems, water quality, and recreation.	PCWP, BWSR	

Emerging Issues

Emerging issues are concerns in the watershed that lack detailed information but may affect the resources in the SHRW in the future. These issues are described in this section along with how the plan will address them.

Climate Variability

The average temperature in the watershed has been increasing by 0.24°F per decade (DNR, 2021). The increase in the variability of temperature is visible when looking at annual average temperatures since the 1800s- maximum and minimum annual averages have increasing variability in later decades then when compared to the early years.

Precipitation patterns are changing throughout Minnesota, with an increase in heavy rain events that are more likely to cause flooding damages (Figure 3.5). The SHRW receives an additional 3.4 inches per year currently than it did before 1993. There is also an increase in 1-2 inch and 2-3 inch events (DNR, 2023). Annual discharge from the watershed has doubled. Increased discharge means more water in the system, impacting stream morphology and hydrology.

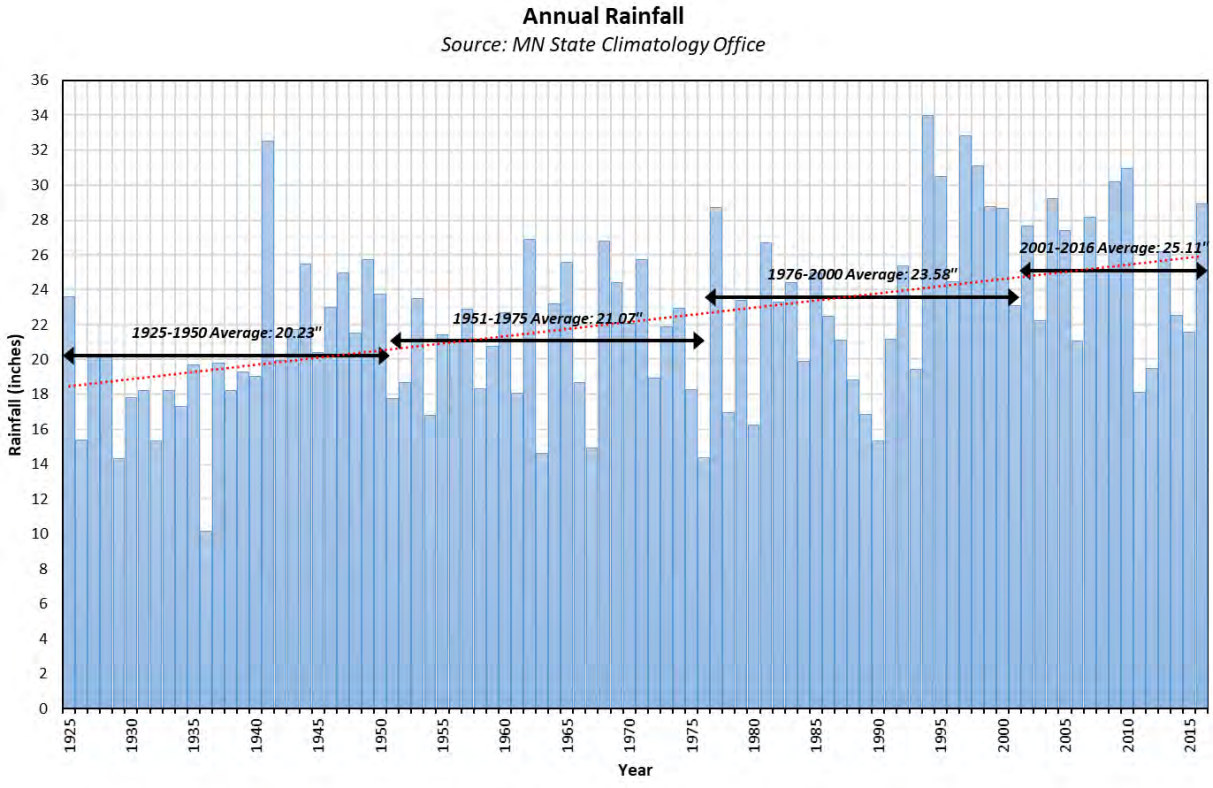


Figure 3.5. Annual Rainfall in Minnesota from the Minnesota State Climatology Office.

As the SHRW is heavily involved in agriculture and named flooding as a high priority issue, changes in temperature and precipitation should be understood to best prepare infrastructure, farmers, and local watershed organizations for variability.

Contaminants of Emerging Concern

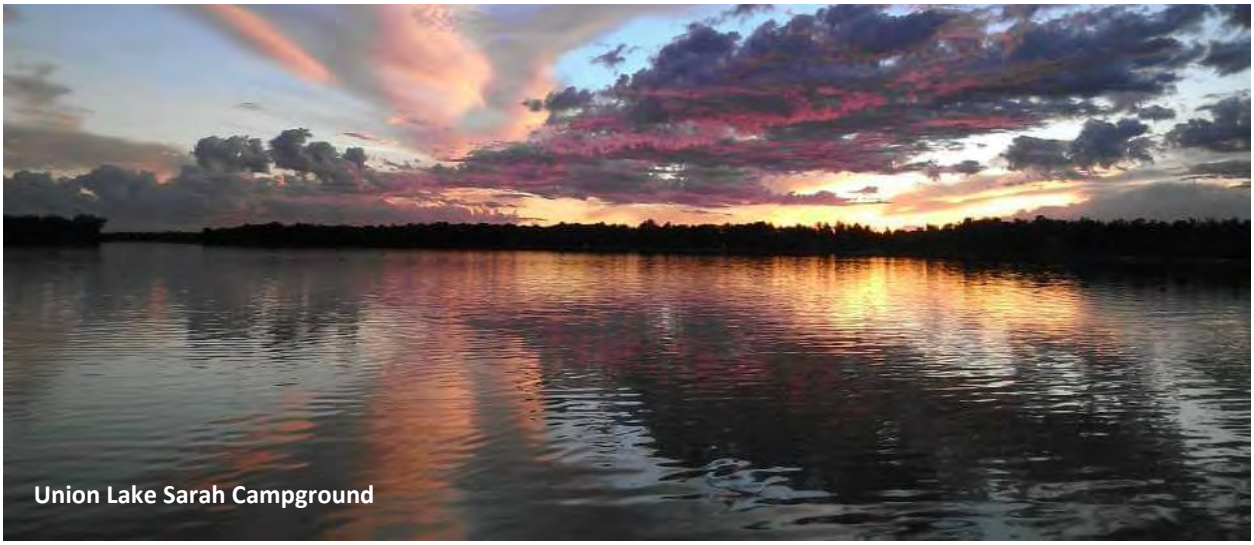
Contaminants of emerging concern (CECs) are a class of compounds that includes cleaning supplies, industrial chemicals, personal care products, medications, etc. These are of growing interest as thousands of chemicals have entered into the environment and the environmental and human health impacts are not clear.

CECs enter the environment through industrial discharge, stormwater runoff, cropland runoff, wastewater treatment plants (CECs pass through largely untreated), and septic systems. Many of these are not studied for toxic effects to plants, fish, and humans.

Of particular concern are Perfluoroalkyl Substances (PFAS), also known as Perfluorochemicals (PFCs), which are a widely used family of chemicals that do not break down in the environment on relevant timescales. PFASs have been used in fire-fighting foam, packaging, and many other industrial applications. A subset of the PFAS family of chemicals is Perfluorooctane sulfonic acid (PFOS), known to accumulate in aquatic life, including sportfish.

Also, antibiotics in wastewater are contributing to the public health threat of antibiotic resistance. A study of CECs in Minnesota lakes found antidepressants, antibiotics, nicotine products, detergents, DEET, and estrone hormone (MPCA,2021). The MDH monitors CEC in drinking water and communicates water quality threats to partners and the public through the CEC Initiative. See https://www.health.state.mn.us/communities/environment/risk/guidance/dwec/index.html for more information.

This plan will address CECs through education and outreach to the general public.



Union Lake Sarah Campground

Chloride

Chloride comes from multiple sources, including winter road salt application, water softener brine discharge, fertilizer application, industrial discharge, and others. The main contributors of chloride in surface waters come from the application of salt on roadways, wastewater treatment plants (residential softener salts and industrial discharge), and fertilizers.

Chloride concentration sources are influenced by population densities. The denser an area is, the more chloride concentration is related to road salt and wastewater treatment plant discharge. The less dense an area is, the more influenced chloride is from fertilizer application and dust-suppressants. This is an important distinction to make because reductions in chloride use will require different BMPs depending on chloride source.

In 2020, the Minnesota Pollution Control Agency published a document describing a first of its kind statewide chloride management plan (CMP). The CMP outlines a strategy that can help guide and inform organizations and individuals on how to better manage chloride and understand the risks and costs associated with chloride pollution. The CMP has noted that chloride concentrations have been increasing in all regions in the state, and the rate of increase is causing alarm. Once chloride has entered the environment, it is very difficult to remove and is generally considered cost probative because the water contaminated with chloride must be treated with reverse osmosis. With increased use of items that contain chloride, it will become increasingly important to mitigate the spread of chloride, so that it does not overwhelm an ecosystem and ruin the environmental resources we rely on and enjoy.

Sand Hill River

Section 4

Goals

Section 4. Measurable Goals

Measurable goals are set to make measurable change towards the priority issues. The ten goals in the following pages address all priority issues in Section 3, with many goals benefiting multiple watershed issues. A measurable goal consists of a clearly stated, quantifiable change in a resource condition within 10 years of plan implementation.

Goals are set on two time scales: a short-term goal, which is the focus of implementing this plan, and a desired future condition.

Short-Term Goal: Describes a quantifiable change in the condition of a resource expected to be reached in 10 years through the implementation of this plan.

Desired Future Condition: Describes the desired condition of a resource the planning partners would like to see at some point in the future, without a timeframe.

Goals were developed through compiling information from existing reports and local expertise from Steering, Advisory, and Policy Committee members. Data used to develop goals include local county and watershed district data, watershed-wide water quality data, PTMApp, TMDL, WRAPS, and SID reports, Long-term Flood Solutions Basinwide Flow Strategy, eLINK, Minnesota Nutrient Reduction Strategy, and the Minnesota Prairie Plan.

Each goal consists of two-page fact sheets with the following information:

- Issue background
- Issue(s) addressed
- Geographic prioritization
- Short-term goal, goal metric, and data source
- Desired future condition
- Secondary benefits of making progress towards goal
- Potential actions to make progress towards goal
- Where on the landscape actions will be prioritized

Resource Prioritization

For the goals that are based on water resource conditions, the categories in Table 4.1 were used to describe the results of water quality assessment through 2022.

Table 4.1. Resource prioritization categories based on water quality assessments.

Category	Description
Impaired	Parameter(s) included on the 303(d) Impaired Waters List.
High Impairment Risk	Parameter(s) suggest poor water quality that fails to meet standards but there is not enough data to officially list as impaired.
Potential Impairment Risk	Parameter(s) suggest below average water quality, but not poor enough or not enough data to officially list as impaired (“nearly” impaired).
Good Quality	Parameter(s) suggest good water quality with minimal impairment risk.
Insufficient Data	Not enough data or not assessed.

Goal: Flood Damage Reduction

Background

Flooding occurs when there is more water than soils can infiltrate and stream channels can hold. It is worsened by land use changes and altered hydrology. Historical drainage of wetlands for agriculture reduced the ability for soils to hold water, contributing to flooding. Drainage of fields and channelized streams cause 'flashy' streams, or variations between low flow and sudden peak flows.

The Red River of the North Basin has historically been a place with frequent flooding due to topography, the drop in elevation from upstream through the beaches to the Agassiz lakebed, altered watercourses, and drained wetlands. Flooding is an economic and environmental problem that damages infrastructure, agricultural fields, and poses a safety risk. Watersheds in the Red River of the North Basin have partnered to work towards reducing flooding along the Red River of the North.

In the past, dams and water control structures were placed along the Sand Hill River to control flooding. Obstructive dams for habitat have been removed and replaced by rock riffle structures to restore upstream fish passage and improve water quality, while also maintaining water and flood control features.

While flooding has historically been a problem in the SHRW, addressing this is essential as precipitation is increasing across Minnesota, and heavy rain events are becoming more common (DNR). Having a flood protection goal will build resiliency against flooding in the SHRW, protecting agricultural fields and cities against flood damage. In addition, culverts and ditches will need to be sized appropriately to handle the increased precipitation.

Short-term goal:

Community flood protection (levees, floodwalls) and farmstead ring dikes built to the 100-year flood plain. Climax is already protected, but Nielsville and Beltrami are not.

Metric:

Number of rural communities protected and number of farmstead ring dikes.

Data:

Local data.

Desired future condition:

Complete protection of rural communities and farms against flooding damage.

Secondary benefits from meeting goal

- ✓ Reduced sediment
- ✓ Reduced nutrients
- ✓ Reduced streambank erosion
- ✓ Improved stream habitat
- ✓ Improved water quality
- ✓ Improved climate resiliency
- ✓ Risk reduction

Issue addressed:

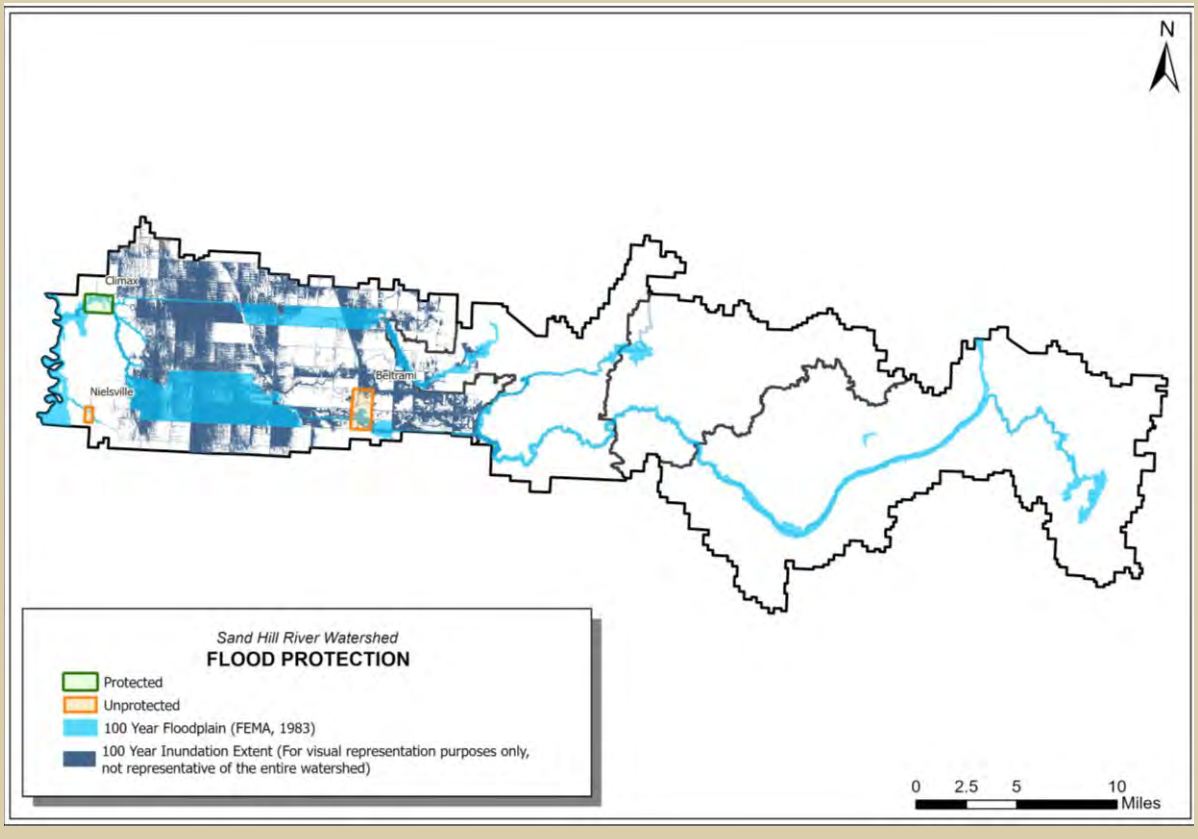
Flooding and associated damages has economic, environmental, social, and health and safety implications.

Geographic prioritization:

Actions to make progress towards goal:

- ✓ Flood damage reduction
- ✓ Farmstead ring dikes
- ✓ City of Neilsville flood protection project
- ✓ City of Beltrami flood protection project
- ✓ Infrastructure to prevent rural damages

Where actions will be prioritized:



Goal: Reduce Overland Sediment

Background

Wind and water erosion move soil off of the landscape and into streams, rivers, and lakes. The changing topography of the watershed from rolling hills to ridges to flat land has led to gully, sheet, and rill erosion.

Land use changes contribute to sedimentation problems, as strong root systems in forested or prairie areas hold soil on the land better than exposed soil. When land is converted to agricultural fields, heavy rain and strong wind can move sediment off the ground and eventually into waterbodies. Excess sediment in streams and lakes degrades water quality and habitat for macroinvertebrates and fish.

The most downstream reach of the Sand Hill River and a portion of the upper reaches of the Sand Hill River are currently listed as impaired due to turbidity. In the SHRW, upland field erosion and in-channel bank erosion are the two largest sources of sediment

Actions to make progress towards goal:

- ✓ Non-structural practices
  - o Cover crops, conservation tillage, critical area planting
- ✓ Structural practices
  - o Water and Sediment Control Basins, Grade Stabilizations
- ✓ Riparian corridor buffers

Short-term goal:

Sediment reductions:

5% reduction in each Planning Region (Table 4.2)

Metric:

Tons of sediment/year

Data:

PTMApp and TMDL

Desired future condition:

16,949 tons/yr reduction (61%) at the watershed outlet (meet Sand Hill River TMDL)

Secondary benefits from meeting goal

- ✓ Improved stream habitat
- ✓ Improved riparian corridors
- ✓ Reduced nutrient loading
- ✓ Soil health

Issue addressed:

Overland **sediment loading** from wind and water erosion of cropland and upland impacts water quality.

Geographic prioritization:

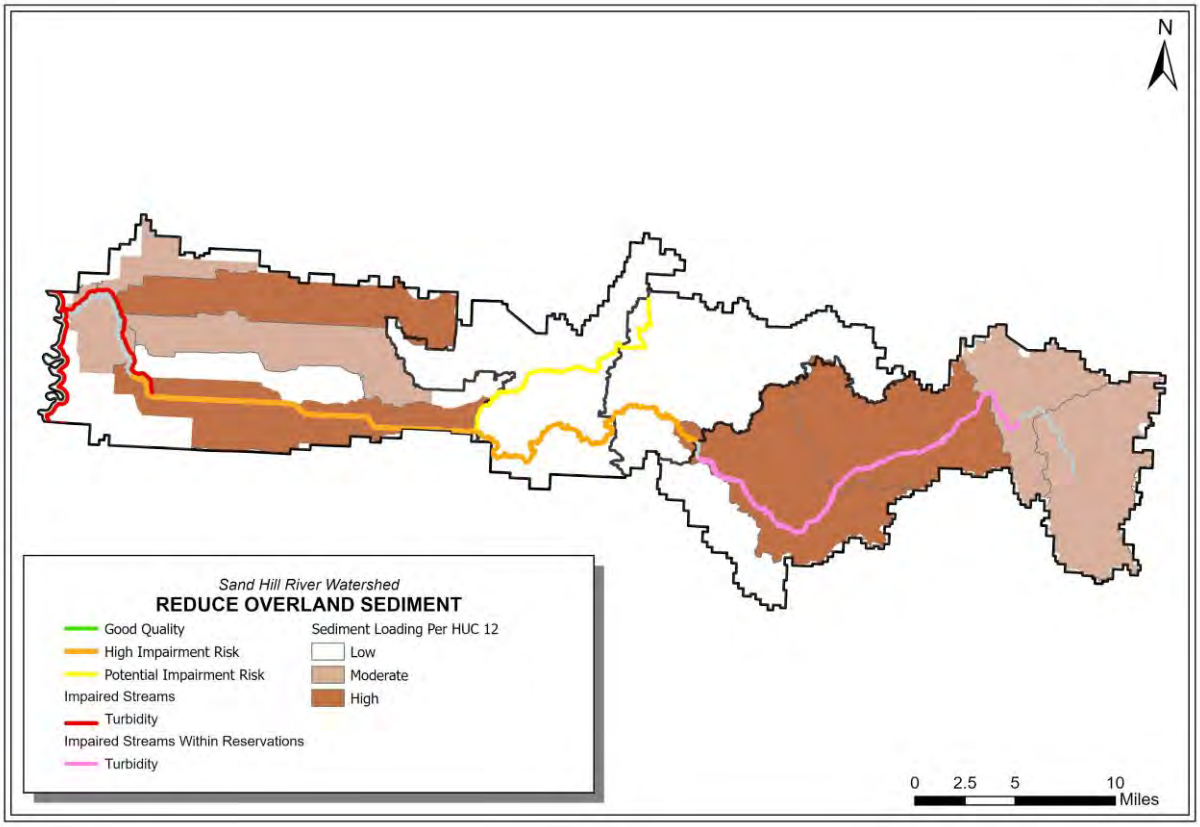
Planning regions with an impaired resource were assigned that resource goal. The long-term goal for the Valley Planning Region is the TMDL reduction for the red (impaired) reach by Climax. There is no approved TMDL for the pink reach in the map below because it is on the White Earth Reservation, so that long-term goal is 10% (Table 4.2).

The water quality data in the Sand Hill Ditch (orange in the Valley Planning Region below) indicate that it should be impaired, however it is not officially on the Impaired Waters List because it is an altered watercourse.

Table 4.2. Sediment goals (loads are from PTMApp).

Location	Sediment Load (tons/year)	Short-term Goal (tons/yr)	Long-term Goal (tons/yr)
Headwaters	13,289	664 (5%)	1,329 (10%)
Lakes	2,472	124 (5%)	247 (10%)
Sand Hill	9,427	471 (5%)	942 (10%)
Valley	27,785	1,389 (5%)	16,949 (61%)

Where actions will be prioritized:



Goal: Increase Water Storage

Background

Historically, Minnesota wetlands were drained and forests and prairies were cleared to make suitable agricultural land. Now, the importance of these land types in storing water are better understood and there is an effort to create more water storage on the landscape.

The SHRW has undergone extensive altered hydrology, including ditching, wetland drainage, stream channelization, and subsurface tiling. Altered hydrology increases peak flow of streams, stream flashiness, and flooding risk. The Red River Basin Commission has worked to increase water storage and build resiliency to flooding and developed the Long-term Flow Reduction Strategy (LTFS).

Increasing water storage mitigates flooding, as water is held in the soil, lakes, wetlands, and on the land instead of flowing over land. A reduction in the quantity of water and an increase in the time for water to reach a river or stream reduces the flashiness, stabilizing stream flow for improved streambank stability and aquatic habitat quality.

Projects to increase water storage can include capital improvement projects such as impoundments, restoring floodplains, and stream restoration. Identifying areas where wetlands can be restored would increase water retention. The Restorable Depressional Wetland Inventory shows there are over 5,000 acres of restorable wetlands in the watershed (WMAR).

Short-term goal:

3,040 acre-feet of storage (20% progress towards Altered Hydrology analysis).

Metric:

Acre-feet of storage

Data:

The altered hydrology analysis recommended 0.5 inches of storage across the watershed (15,200 acre-feet) to make up for historical losses.

Desired future condition:

Achieve storage goal determined in the LTFS Basinwide Flow Strategy (108,000 acre-feet).

Secondary benefits from meeting goal

- ✓ Decreased flooding
- ✓ Decreased streambank erosion
- ✓ Decreased sediment loading
- ✓ Decreased nutrient loading
- ✓ Improved stream habitat

Issue addressed:

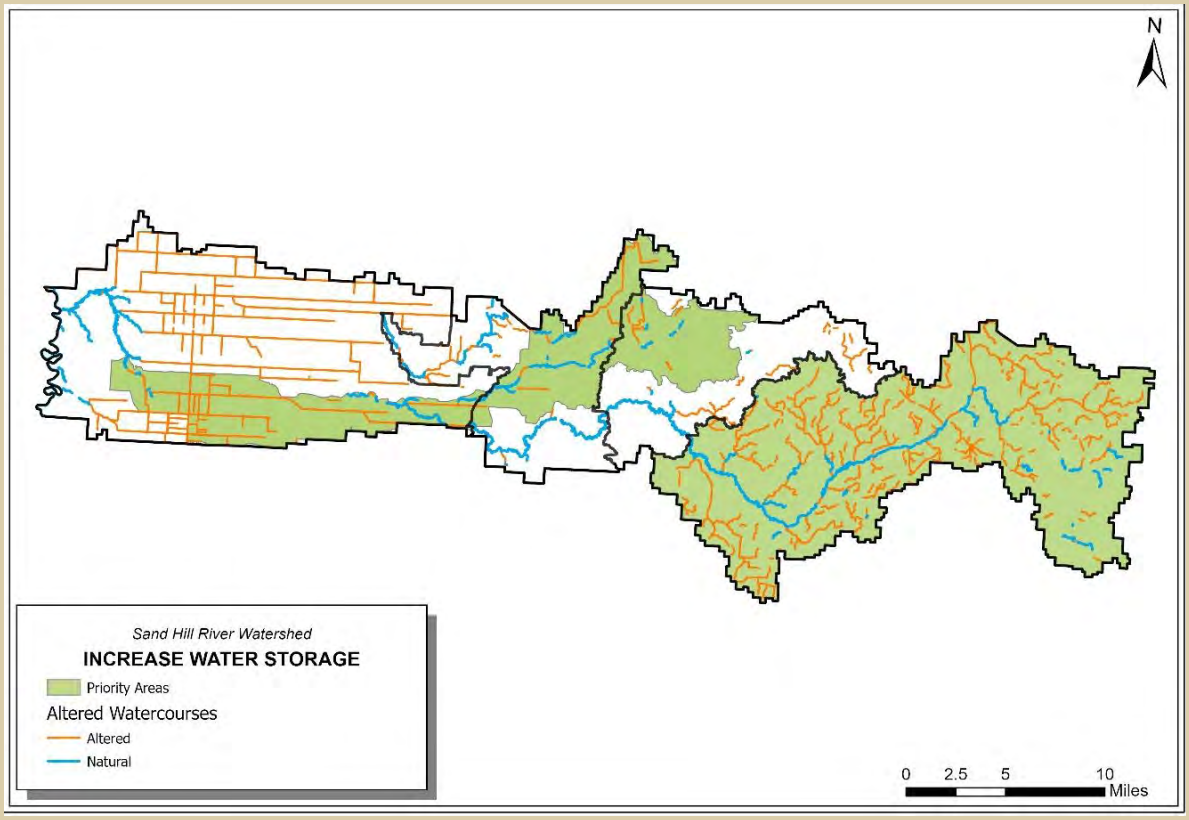
Altered hydrology causes variability of flows affecting timing, water quantity, water quality, aquatic habitat, and erosion.

Geographic prioritization:

Actions to make progress towards goal:

- ✓ Install flood control structures (impoundments, stormwater ponds)
- ✓ Stream restoration to improve sinuosity
- ✓ Floodplain/wetland restoration
- ✓ Implement soil health practices to increase storage
- ✓ Drainage water management
- ✓ Minimum Impact Design Standards (MIDS)

Where actions will be prioritized:



Goal: Reduce Bacteria

Background

E. coli is a type of fecal coliform bacteria that is found in human and animal waste. Since it is found in waste, it is used an indicator bacteria, meaning its presence is an indication of contamination by potentially disease-causing microbiota. Waters impaired due to *E. coli* can be unsafe for swimming and fishing.

Elevated bacteria counts were found along the Sand Hill River. All aquatic recreation impairments on the Sand Hill River are due to *E. coli.*

Potential sources of bacteria include feedlot runoff and livestock manure, SSTS, and wildlife near streams. In the SHRW, upstream contamination from feedlots is the most likely contributor to downstream *E. coli* exceedances. Livestock grazing near riparian areas is a moderate source of bacteria. Less likely sources of bacteria are failing SSTS systems and wildlife (MPCA 2017).

Projects to reduce bacteria include feedlot runoff controls, manure management plans, and grazing management plans. Vegetative buffers along streams also prevent runoff from carrying bacteria into streams. Noncompliant SSTS can be a source of bacteria to surface and ground water, so inspections and maintenance of existing systems and repairing or replacing noncompliant SSTS can reduce or eliminate these sources.

Short-term goal:

10 projects (one project to reduce bacteria per year, i.e., SSTS replacements, grazing management, manure management plans, waste pit closures, feedlot runoff controls)

Metric:

Number of projects in known problem areas

Data:

WRAPS/TMDL

Desired future condition:

No waters are impaired due to bacteria.

Secondary benefits from meeting goal

- ✓ SSTS compliance
- ✓ Feedlot compliance
- ✓ Improved water quality

Issue addressed:

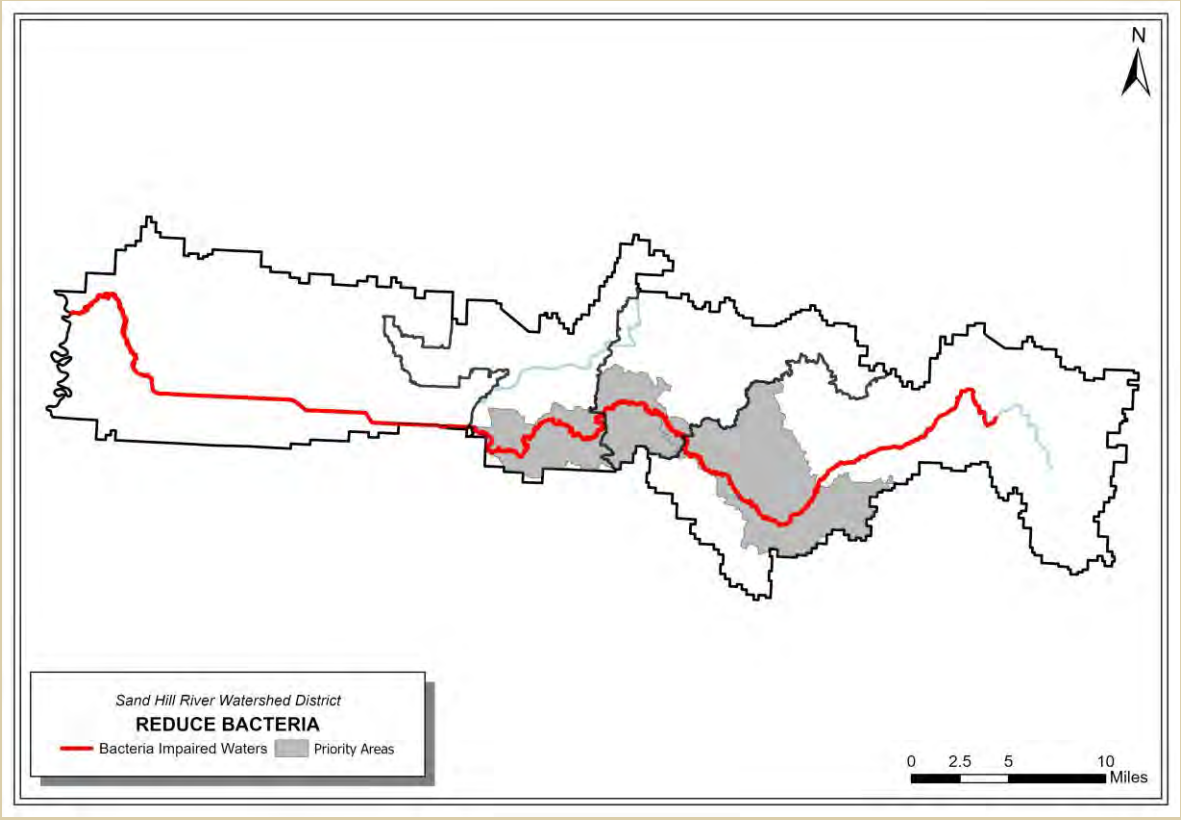
Bacteria (*E. coli*) loading impacts aquatic recreation and human health.

Geographic prioritization:

Actions to make progress towards goal:

- ✓ Manure management plans
- ✓ Feedlot BMPs
- ✓ Septic system upgrades
- ✓ Cattle grazing away from streams
- ✓ Riparian buffer along streambanks
- ✓ Ground truthing corridor along river

Where actions will be prioritized:



Goal: Stabilize Streams

Background

Streambank erosion can occur naturally but is accelerated by human activity. Channelization of streams decreases stream length which increases flow velocity. Water moving more quickly can incise the channel and destabilize banks, contributing to sediment and nutrient loading.

In-channel bank erosion contributes to turbidity impairments in the SHRW. Most stream channel erosion is occurring in the Sand Hills planning region, where stream channels have increased velocity due to elevation changes, improved drainage, and poor riparian habitat, resulting in headcutting and bank destabilization.

Altered hydrology has resulted in streambank instability due to high peak flows and increased velocity. Actions to address stream stabilization should both address the consequences of streambank erosion (projects to reduce sediment and failing banks) and projects to improve the issue in the future. This can include riparian buffers to slow overland flow and provide roots that stabilize banks. Restoring natural sinuosity in channels that have been altered reduces flow velocity that erodes streambanks and adds accessibility to the floodplains for water quality benefits.

Enhancing riparian buffers and improving stream sinuosity also improves riparian and aquatic habitat. Riparian vegetation can provide a corridor and habitat for species along the water body such as pollinators (bees, butterflies, and other insects), birds (songbirds, waterfowl, and shorebirds), frogs, turtles, and small mammals (otters, mink, muskrats).

Short-term goal:

2.5 miles (5% of total priority length)

Metric:

Miles of stream stabilized or riparian easements

Data:

MPCA SID; local data

Desired future condition:

Streambank stability, decreased velocity, riparian buffer, and restore natural sinuosity with in the stream channel

Secondary benefits from meeting goal

- ✓ Reduced sediment
- ✓ Reduced phosphorus
- ✓ Improved aquatic habitat
- ✓ Improved riparian habitat
- ✓ Improved habitat corridors

Issue addressed:

Unstable stream channels increase sediment loading and reduce habitat quality.

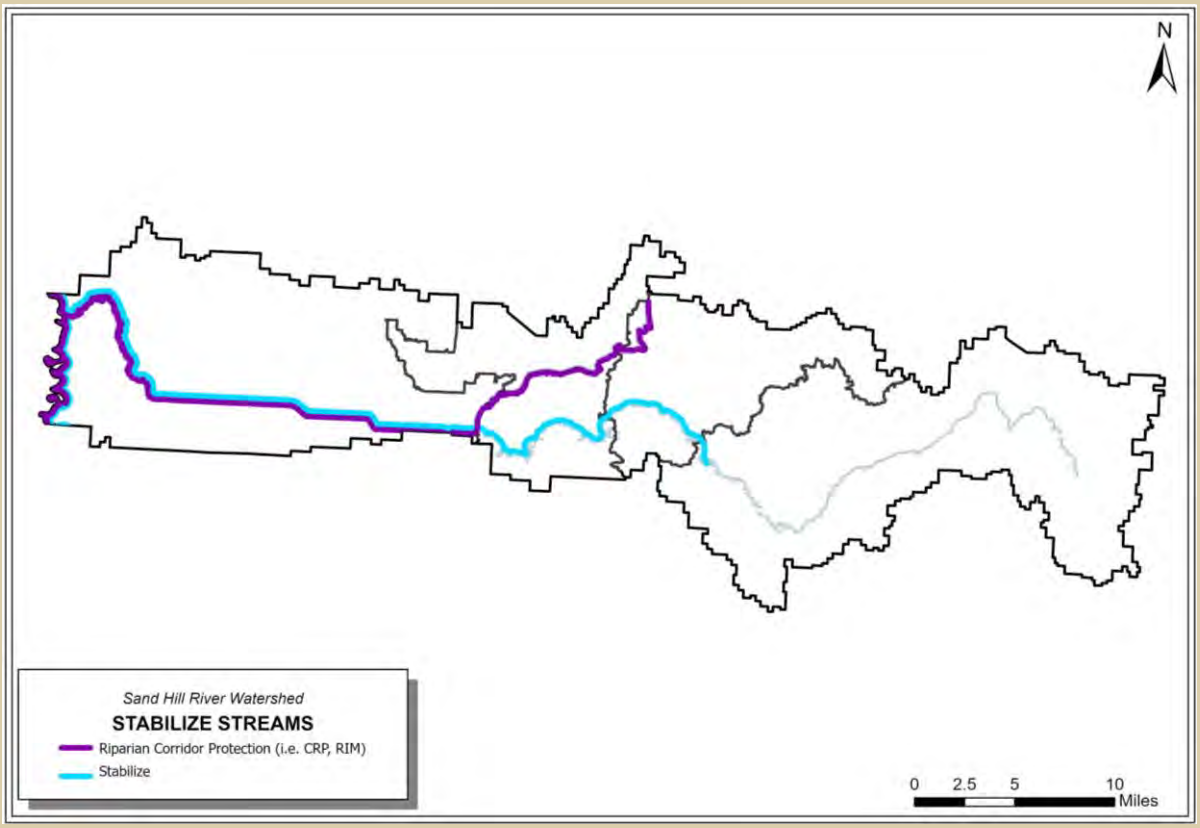
Geographic prioritization:

Actions to make progress towards goal:

- ✓ Riparian corridor buffers
- ✓ Grade stabilization projects
- ✓ Stream restoration projects
- ✓ Increasing water storage (wetland and floodplain restoration, impoundments, soil health practices)

Where actions will be prioritized:

These priority areas incorporate the MPCA Stream Protection Priorities.



Goal: Stabilize Drainage Systems

Background

Conversion of lands to agricultural production through drainage began over 120 years ago. The hydrology of the SHRW has been extensively altered, first with ditching and more recently with subsurface tile drainage. Ditches in the western region of the watershed follow natural hydrologic paths, but ditches in the east have connected previously separate catchments (MPCA 2017).

Old and unstable ditches are a source of sediment into the Sand Hill River and can transport nutrients from agricultural fields into the river. Ditches are managed by local counties and the SHRWD under the MN Statute Chapter 103E drainage law. On the western end of the watershed, there are also some ditches that end right before the Red River of the North and then gully to the river. This area is a priority under the Stream Stabilization goal for erosion control and RIM easements.

Similar to streambank restoration, ditch stabilization can be achieved through planting a riparian buffer along the ditch, transforming to a two-stage ditch or the installation of rock drops and riffles. Use of native vegetation creates habitat and produces stabilizing roots in the soil. Adequately sized ditches are important for stability, water quality and erosion/flooding.

It is important to note that progress towards this goal typically requires a landowner petition or an ongoing project in the area.

Short-term goal:

5 miles (50% of total high priority length)

Metric:

Miles of ditch stabilized; number of ditch outlets stabilized

Data:

Local data from county and SHRWD

Desired future condition:

Reduce needs for drainage system maintenance and have a stable outlet for the watershed.

Secondary benefits from meeting goal

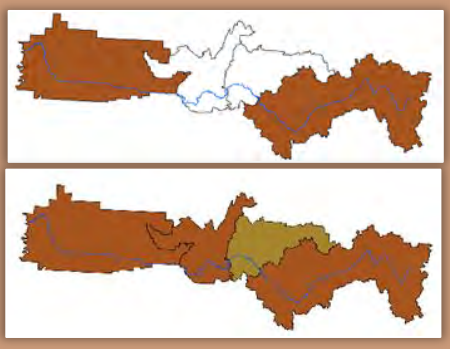
- ✓ Improved drainage
- ✓ Reduced nutrient loading
- ✓ Reduced sediment loading
- ✓ Improved stream habitat

Issues addressed:

Drainage system bank instability affects agricultural productivity and increases erosion and sedimentation.

Maintenance of adequate drainage of lands impacts crop productivity.

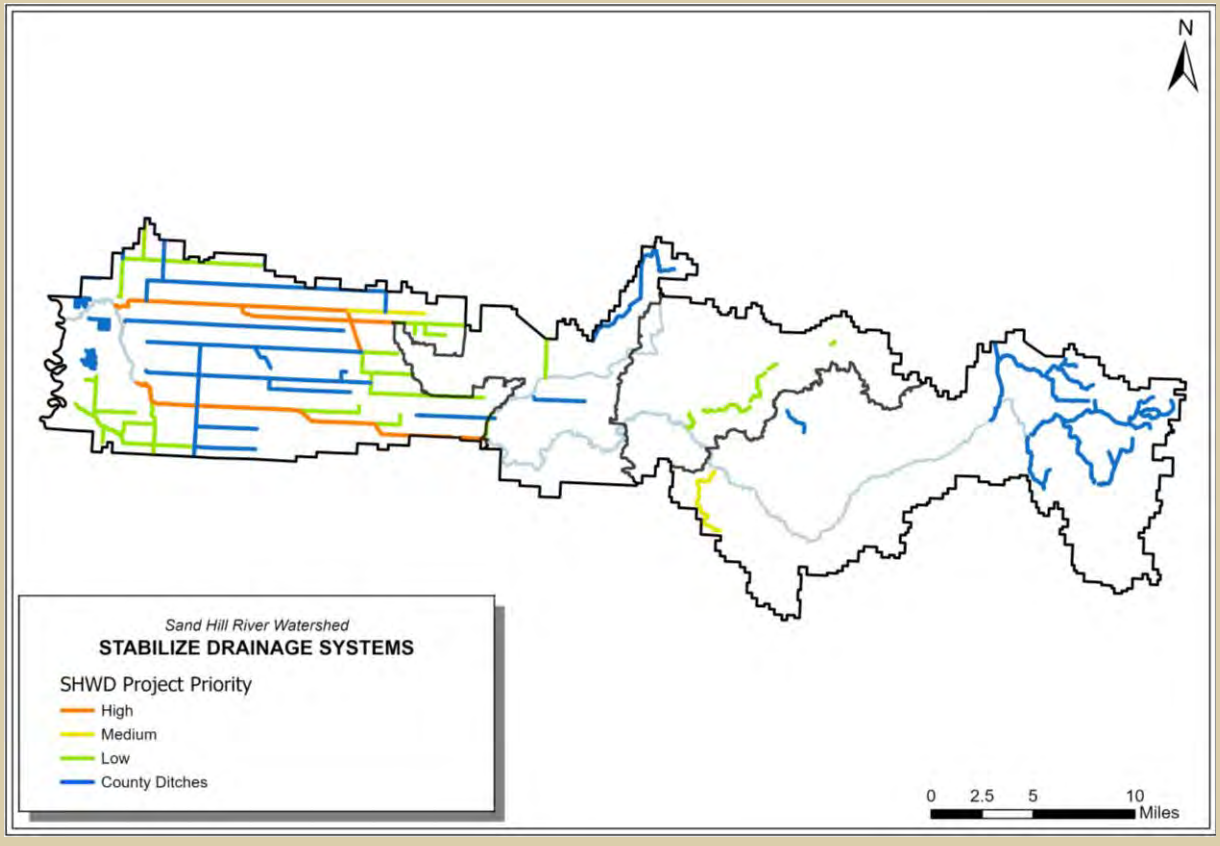
Geographic prioritization:



Actions to make progress towards goal:

- ✓ Multi-purpose drainage water management
- ✓ Ditch and grade stabilization projects
- ✓ Ditch riparian buffers
- ✓ Ditch maintenance

Where actions will be prioritized:



Goal: Protect Drinking Water

Background

All residents in the SHRW source their drinking water from groundwater, making its protection vital for the health of the population. Drinking Water Supply Management Areas (DWSMAs) in the watershed generally have low vulnerability to contamination, aside from the city of Fertile which has moderate vulnerability. Private wells generally have low vulnerability as well in this area except for shallow sand point wells, of which 21% show high nitrate levels (MDH 2023).

The geology of the region serves to protect groundwater from surface contamination. Unsealed abandoned wells are a conduit between the groundwater and surface through which contaminants can travel. Sealing unused wells protects groundwater from contaminants.

The MDA monitors agricultural regions for pesticides and nitrate. Pesticides were not found at concentrations above the Safe Drinking Water Act (SDWA) standards. Of the reports made available to MDH for 641 wells sampled and tested in the watershed (typically at the time of construction), <1% had nitrate results above the standard (MDH 2023).

Arsenic is naturally occurring in soils across Minnesota, and if consumed in drinking water is a risk for cancer. Well testing results in the watershed show that 23% of private wells tested were above the 10 ug/L standard and 42% of wells tested had between 5-10 ug/L arsenic (MDH 2023). MDH advises well owners to install an arsenic reduction unit if a well has high arsenic. Well testing kits are available at the SWCD offices.

Short-term goal:

Seal 10 unused wells per year

Metric:

Number of unused wells sealed

Data:

Used eLINK data to see the current pace of well sealing on average and then continued that into the future as the goal.

Desired future condition:

Protected drinking water quality and quantity for watershed residents.

Secondary benefits from meeting goal

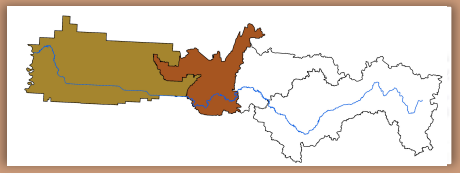
- ✓ Improved public health for both private and community drinking water sources
- ✓ Community development
- ✓ Public safety

East Grand Forks, downstream along the Red River of the North, sources its drinking water from the Red River of the North. Northern portions of the watershed are within the outer source water management area for Grand Forks. These areas are a priority for emergency response, including spills of hazardous materials.

Issue addressed:

Groundwater quality and sustainability needs protection.

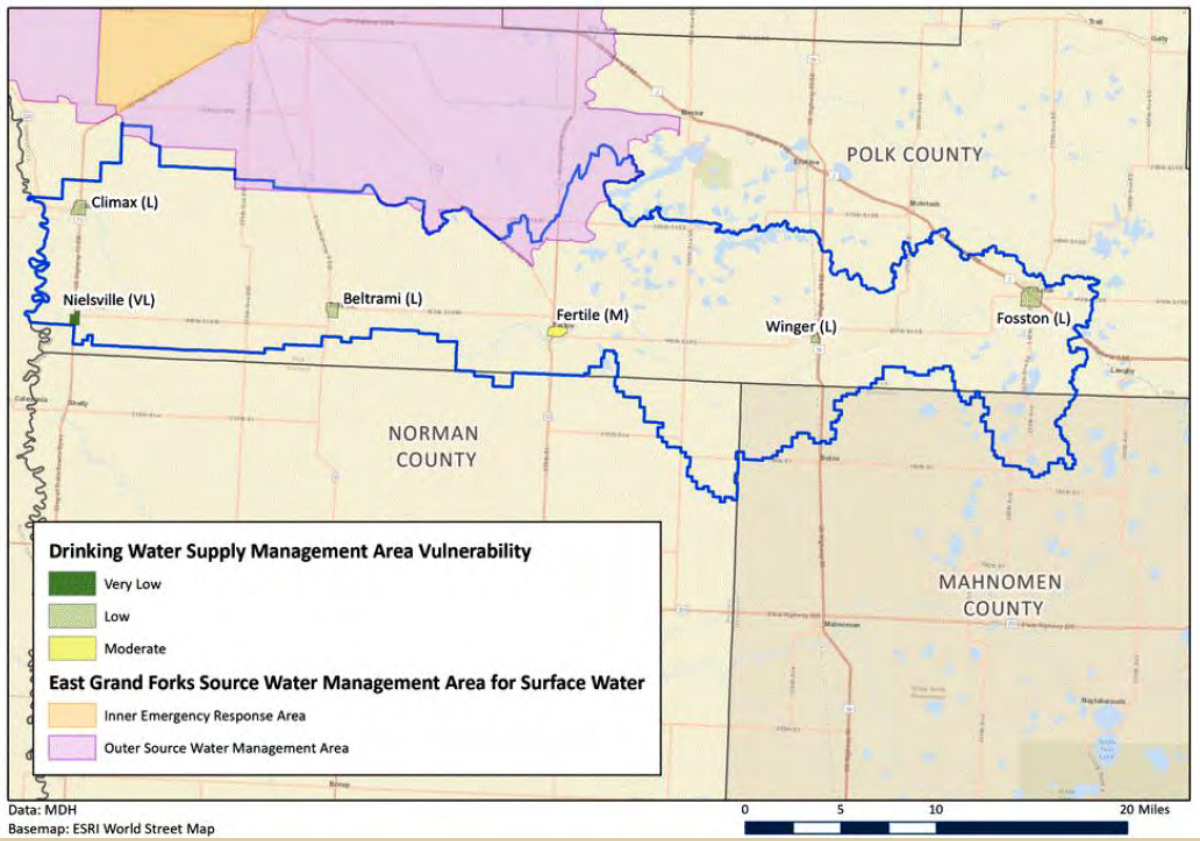
Geographic prioritization:



Actions to make progress towards goal:

- ✓ Well testing clinics
- ✓ Well testing kits available at SWCDs
- ✓ Sealing unused wells
- ✓ Drinking water quality educational event
- ✓ Outreach on water quantity conservation

Where actions will be prioritized:



Goal: Reduce Nutrients

Background

Nutrients such as phosphorus and nitrogen are naturally occurring and important for aquatic ecosystems. However, human activity has greatly increased the concentration of nutrients in freshwater which causes problems for aquatic life and recreation.

Excess nutrients impair water quality and impact the aquatic food web. Phosphorus is a limiting nutrient in freshwater, meaning small increases in phosphorus can cause algal blooms. Eutrophic lakes are undesirable for swimming, fishing, and other recreational activities because in the summer months they turn green from algae and some algal blooms produce toxins. Therefore, phosphorus is currently a greater concern than nitrogen for this watershed. However, nitrogen reductions are still a local goal for downstream resources.

The largest contributors of excess nutrients in the watershed are agricultural runoff carrying fertilizer and manure and livestock grazing in riparian areas. Failing septic systems, lawn fertilizers, and poor shoreline buffers also contribute nutrients.

In the SHRW, four lakes are impaired due to nutrients: Uff, Kittleson, Ketchum, and Maltrud (officially unnamed). Kittleson Lake was previously found to be narrowly exceeding standards and was listed as impaired, but recent data suggest it is now meeting standards. Halvorson Lake, and more recently Lake Sarah, have been found to be near the impairment standard and therefore they have a high impairment risk ("nearly" impaired). Uff, Halvorson, Ketchum, and Maltrud lakes are not a high priority in this plan because they have no public access, and little to no residents.

Short-term goal:

Lakes: 5% reduction in priority lakes.

Streams: % phosphorus reduction from the scenario determined for the sediment goals (Table 4.3).

Metric:

Lbs/year of phosphorus

Data:

PTMApp

Desired future condition:

TMDL reductions for impaired lakes met (Table 4.3).

MN Nutrient Reduction Strategy goals for Lake Winnipeg met: 50% reduction in TP and TN from 1998 to 2001 period.

Secondary benefits from meeting goal

- ✓ Improved aquatic habitat
- ✓ Improved aquatic recreation
- ✓ Reductions in the Red River of the North, which is a drinking water source for East Grand

Issue addressed:

Nutrient loading contributes to elevated concentrations in lakes and streams, causing eutrophication.

Geographic prioritization:

Actions to make progress towards goal:

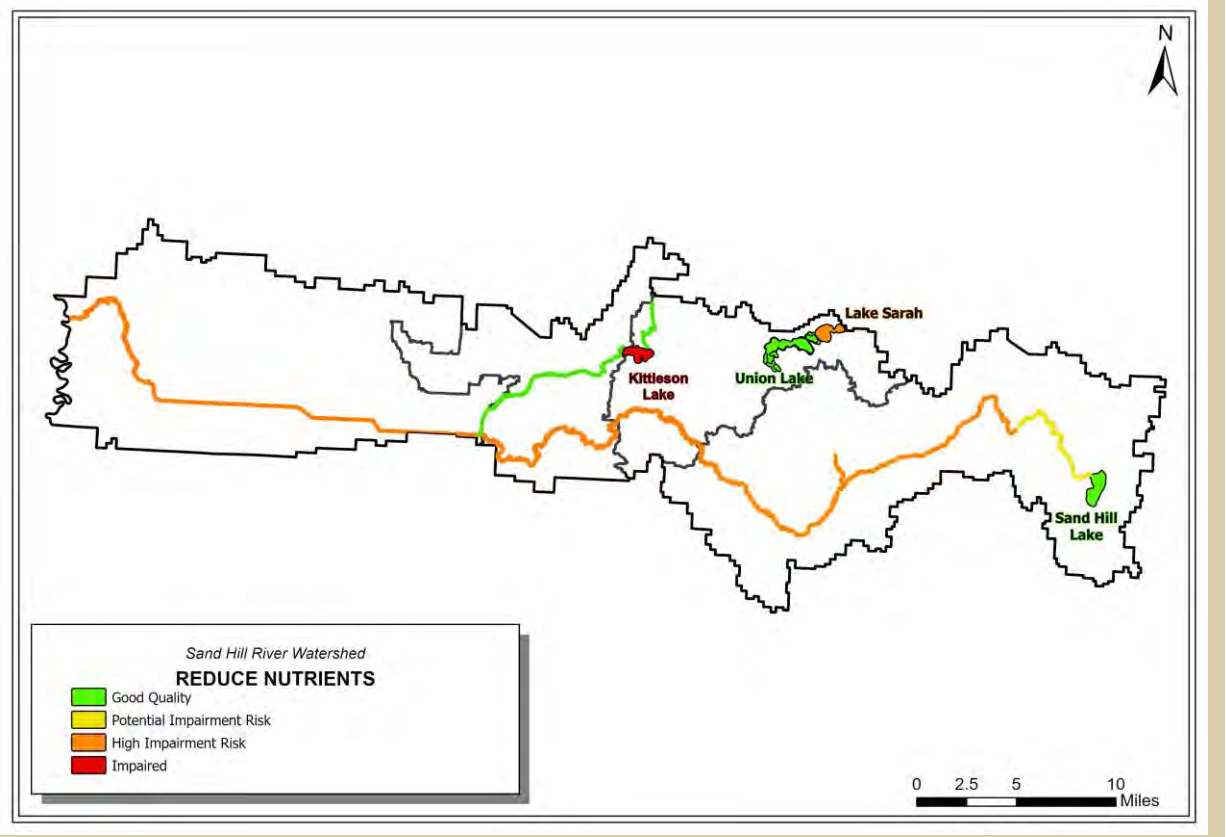
- ✓ Agricultural BMPs
- ✓ Rain gardens
- ✓ Shoreland buffers
- ✓ SSTS maintenance

Table 4.3. Phosphorus goals for priority lakes and Planning Regions. Planning Region goals are based on the PTMApp scenario for reducing sediment.

Location	Category	TP Load (lbs/yr)	Short-term Goal (lbs/yr)	Long-term Goal (lbs/yr)
Kittelson Lake	Impaired	1,126	56 (5%)	799 (71%)
Sand Hill Lake	Good Quality	690	35 (5%)	69 (10%)
Union Lake	Good Quality	658	33 (5%)	66 (10%)
Sarah Lake	High Impairment Risk	670	34 (5%)	67 (10%)
Headwaters	High Impairment Risk	15,748	282 (2%)	1,575 (10%)
Lakes	High Impairment Risk	1,926	95 (5%)	193 (10%)
Beach Ridge	High Impairment Risk	17,526	420 (2%)	1,753 (10%)
Valley	High Impairment Risk	34,694	717 (2%)	3,469 (10%)

Phosphorus loads derived from PTMApp. Short-term goal is 5% of load. Long-term goal is 10% of the load for unimpaired water bodies, and the TMDL reduction for impaired water bodies.

Where actions will be prioritized:



Goal: Improve Soil Health

Background

Soil health is the ability of soil to function as a living ecosystem that has the capacity to store water, cycle nutrients, filter pollutants, and grow plants. Soil function is made possible by the diverse community of microorganisms in the soil.

Agricultural actions to promote soil health include keeping soil perennially vegetated, minimizing tillage, keeping live roots in the soil, having diverse crop rotations, and integrating livestock on the land (Minnesota Sustainable Farming Association, 2016).

Healthy soils lose less topsoil to erosion. Implementing soil health practices in the SHRW would help decrease soil loss from agricultural fields. Farmers can work with UMN extension offices or local SWCDs to help implement soil health practices.

Short-term goal:

5,000 acres treated with soil health practices (500/yr annual pace of progress)

Metric:

Acres of soil health practices (cover crop, conservation tillage, etc.)

Data:

PTMApp, wind erosion analysis

Desired future condition:

Soil health practices on 10% of agricultural lands.

Secondary benefits from meeting goal

- ✓ Improved agricultural productivity
- ✓ Reduced nutrient loading
- ✓ Improved aquatic habitat
- ✓ Increased water storage
- ✓ Reduced overland sediment loss

Issue addressed:

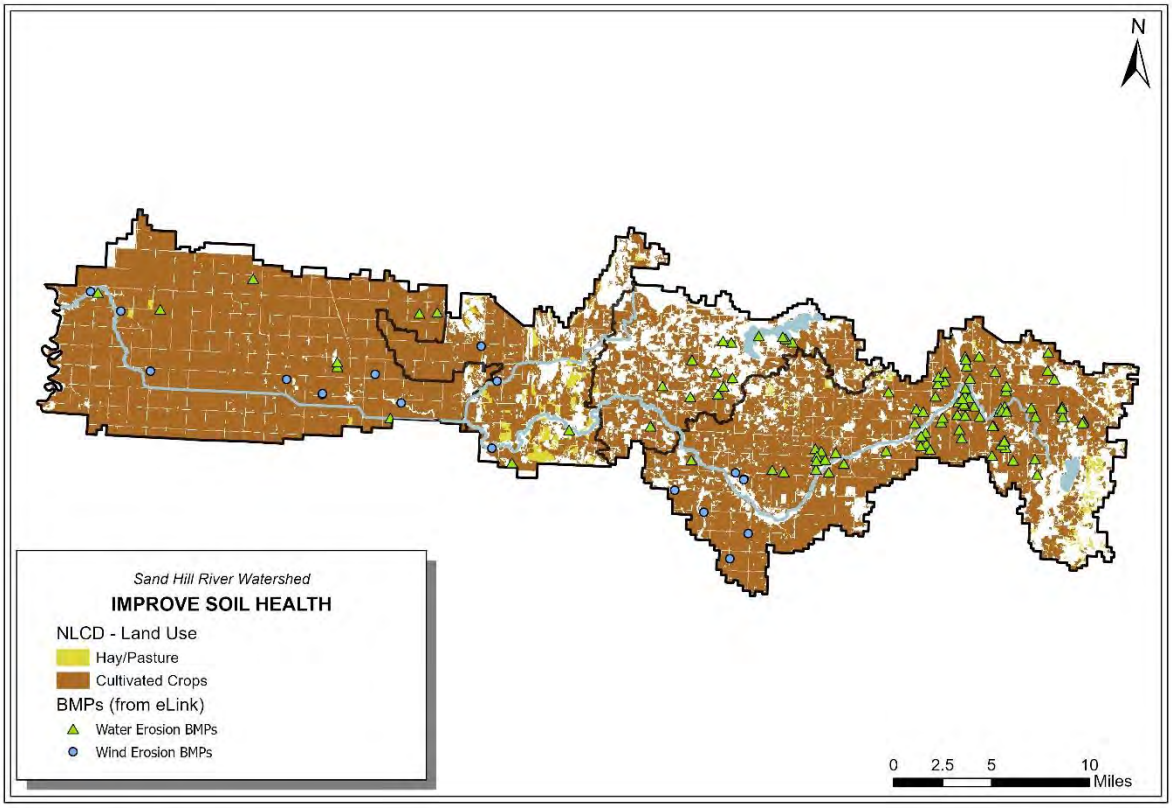
Decreased **soil health** can impact agricultural productivity and water holding capacity.

Geographic prioritization:

Actions to make progress towards goal:

- ✓ Conservation tillage
- ✓ Cover crops
- ✓ Education and outreach to promote soil health practices

Where actions will be prioritized:



Goal: Improve Habitat

Background

Historically, much of the Sand Hill River Watershed was tall grass prairie. Now, the majority of the land use in the watershed is cropland.

The Minnesota Prairie Conservation Plan has priorities for native prairie to cover most of the Sand Hills Planning Region, and prairie corridors to cross the Headwaters and Lakes Planning Regions. These priorities also line up with the state's Wildlife Action Plan. Conversion of land back to prairie and grassland would provide multiple benefits, including a habitat for wildlife, decreased soil loss, and increased water storage.

The desired future condition is to expand the acres of wetland in the watershed according to the Minnesota Prairie Conservation Plan goal, and to protect 10% of each square mile in a Prairie Corridor. This ensures migration of wildlife between prairie core areas, reducing habitat fragmentation that impacts wildlife. The SHRW has already reached the grassland protection goal set in the Prairie Plan.

Actions to make progress towards goal:

- ✓ Native plantings
- ✓ Conservation easements
- ✓ Forage/biomass planting
- ✓ Enrolling land into land retirement programs (CRP, Wetland Reserve Program (WRP))

Short-term goal:

Protect and/or restore 148 acres of wetland in Prairie Core Areas (Table 4.4).

Metric:

Acres restored, improved, maintained

Data:

Minnesota Prairie Conservation Plan

Desired future condition:

Protect and/or restore 2,947 acres of wetland in Prairie Core Areas.

Protect 10% of each square mile in a Prairie Corridor (permanent or land retirement programs such as CRP or Reinvest in Minnesota (RIM) easements).

Secondary benefits from meeting goal

- ✓ Added water storage
- ✓ Improved soil health
- ✓ Flood protection/reduced overland flow

Issue addressed:

Loss of **upland and wetland habitat** impacts species richness and diversity, water storage, and water quality.

Geographic prioritization:

Table 4.4. Habitat protection goals for wetlands and grasslands

Planning region	Prairie Core Area (Acres)	Core Name	Short-term Goal: Wetland	Long-term Goal: Wetland	Short-term Goal: Grassland	Long-term Goal: Grassland
Headwaters	3,585	Wambach Santee	7 acres	128 acres	0 acres (protection goal met)	0 acres (protection goal met)
Lakes Sand Hills Valley	571 32,061 2,552	Glacial Ridge	141 acres	2,819 acres	0 acres (protection goal met)	0 acres (protection goal met)
Watershed	38,769				Protect 10% of each square mile in Corridors	Protect 10% of each square mile in Corridors

The Prairie Core areas are also priorities for the working lands watershed restoration program, which provides incentives for landowners to plant perennial and cover crops that would improve water quality at a watershed scale.

Where actions will be prioritized:

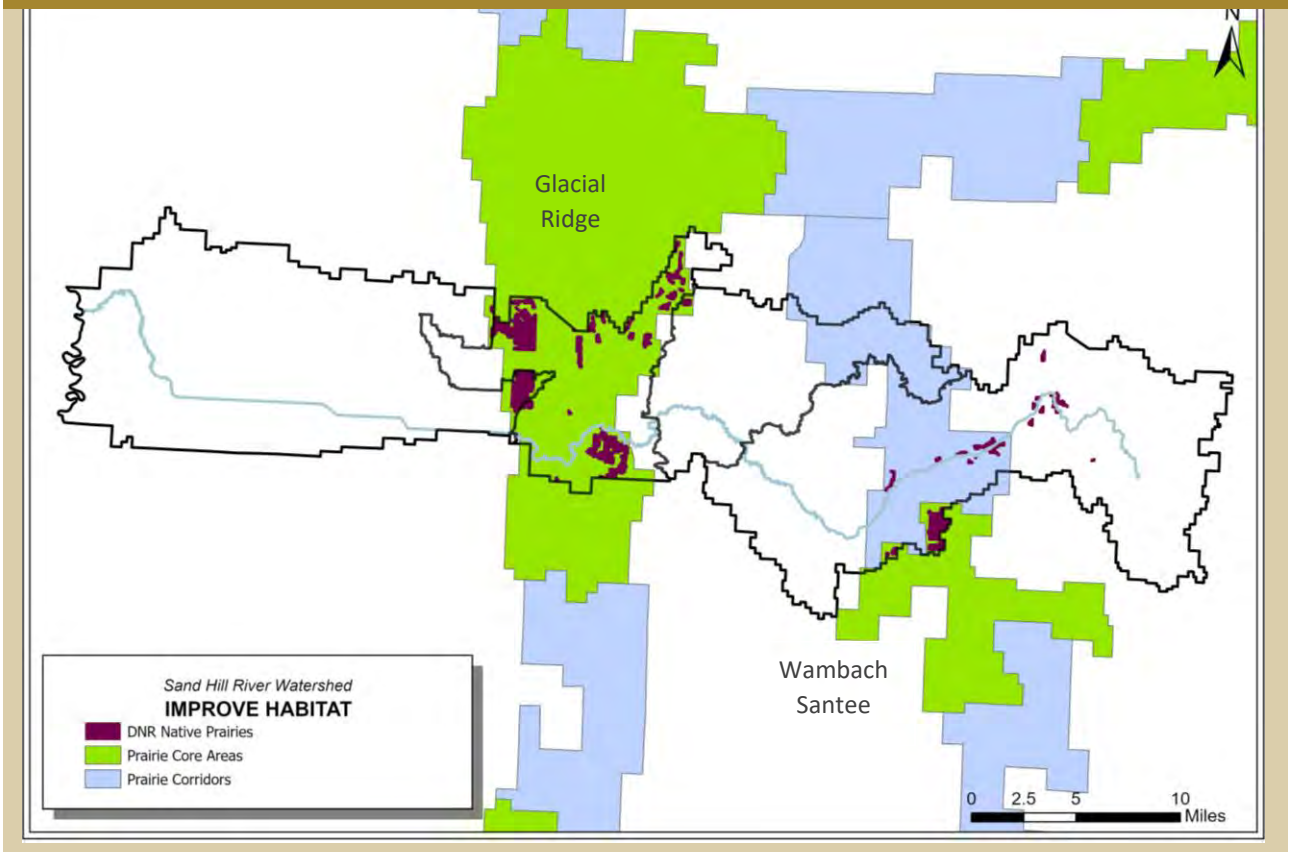


Photo credit: Wayne Goeken

Section 5

Targeted Implementation Table

Section 5. Targeted Implementation Schedule

The Targeted Implementation Schedule is the culmination of the planning process, bringing together the work done in selecting priority issues, setting goals, and determining planning region needs. It identifies the entities responsible for implementing actions, along with the funding source, budget, and timeline to carry out that action.

The actions in the Targeted Implementation Schedule were developed by gathering information from existing water plans, the WRAPS, and what is currently being implemented in the watershed.

Ongoing Watershed Work

Implementing actions to improve watershed issues is not new in the SHRW. The MPCA has tracked BMPs installed by SWCDs and the NRCS through the Healthier Watersheds Tool (https://www.pca.state.mn.us/business-with-us/healthier-watersheds-tracking-the-actions-taken) . Some common practices in the SHRW are shown in Figure 5.1.

Soil Health practices including residue and tillage management, cover crops, and conservation crop rotation.

Structural Agricultural practices including grade stabilization, filter strips, sediment basins.

Flood damage reduction practices including community and farmland protection, streambank protection, and habitat improvement.

Drainage system maintenance including drainage system bank stabilization and cleaning.

Figure 5.1. Common practices in the SHRW.

Farm Field in the Watershed

Plan Implementation

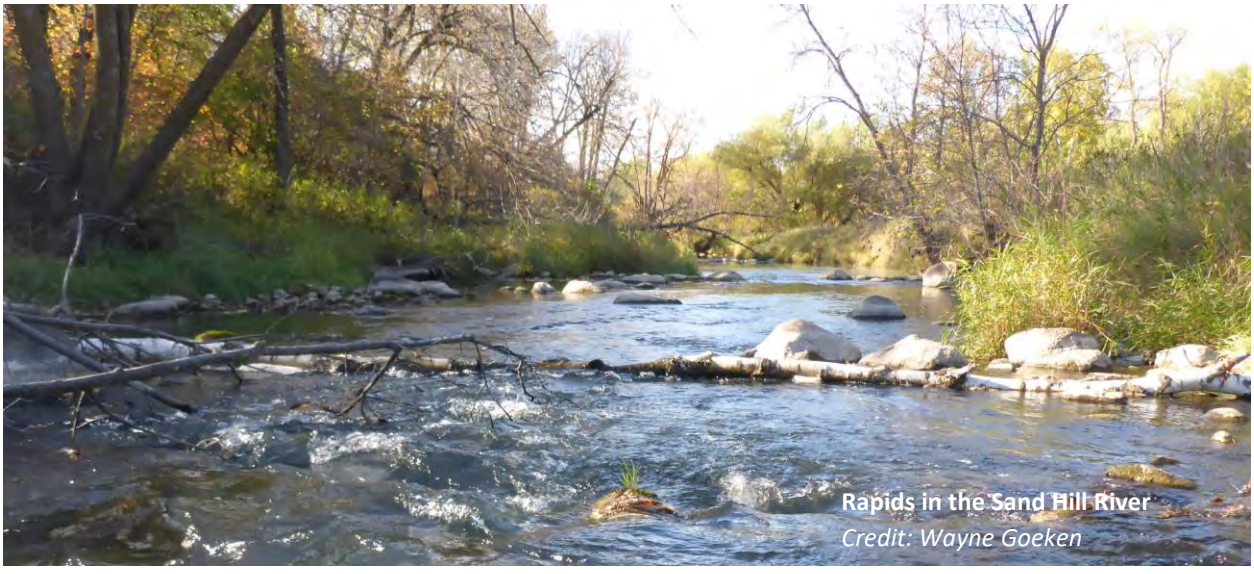
Funding

Each action in the Targeted Implementation Schedule has an estimated cost associated with it. The existing baseline funding dedicated to natural resource issues in the watershed is referred to as Level 1 funding (Table 5.1). Once the SHR1W1P is approved, the LGUs are eligible for WBIF. WBIF is non-competitive funding from BWSR (estimated at ~ $500,000 per biennium) sourced from the Clean Water Fund of the Clean Water Land & Legacy Amendment. Level 2 funding includes the baseline funding as well as WBIF funds.

Level 3 is partner funding and funding that occurs outside of the local government units such as federal funding (i.e., CRP, Environmental Quality Incentives Program [EQIP]), state programs (SFIA), and grants (i.e., Lessard Sams Outdoor Heritage Fund, Section 319). There is likely much more project funding occurring in the watershed addition to these totals as it is difficult to document projects by all entities, including private landowners and lake associations. These are all just estimates and the costs for implementation will be more specific in each biennial work plan. Further detail on plan funding is described in Section 7.

Table 5.1. Funding levels in the SHR1W1P.

Funding Level	Description	Estimated Annual Average	Estimated Plan Total (10 years)
1	Baseline Funding for Current Programs	$1,600,000	$16,000,000
2	**Baseline + Watershed-Based Implementation Funding**	**$1,950,000**	**$19,500,000**
3	Partner/Other Funding (NRCS, USFWS, CRP, Lessard-Sams, MPCA, DNR, RRWMB)	**~$2,000,000**	**~$22,000,000**



Rapids in the Sand Hill River
Credit: Wayne Goeken

Programs

Each action falls into one of the five implementation programs, which is the category through which actions and funding are grouped. Programs include Projects & Practices, Capital Improvement Projects, Education & Outreach, Data Collection, Monitoring, & Analysis, and Regulation & Enforcement (Figure 5.2). These are described in detail in Section 6.

Figure 5.2. Implementation programs in the SHR1W1P.

Targeting Actions

To spend implementation dollars most effectively, the planning group wanted information on where issues are in the watershed. Figure 5.3 shows priority areas from multiple goals stacked together, which can provide an opportunity for actions that target specific regions. Overall, the planning group plans to work along the Sand Hill River corridor and around Union, Sarah, and Sand Hill lakes.

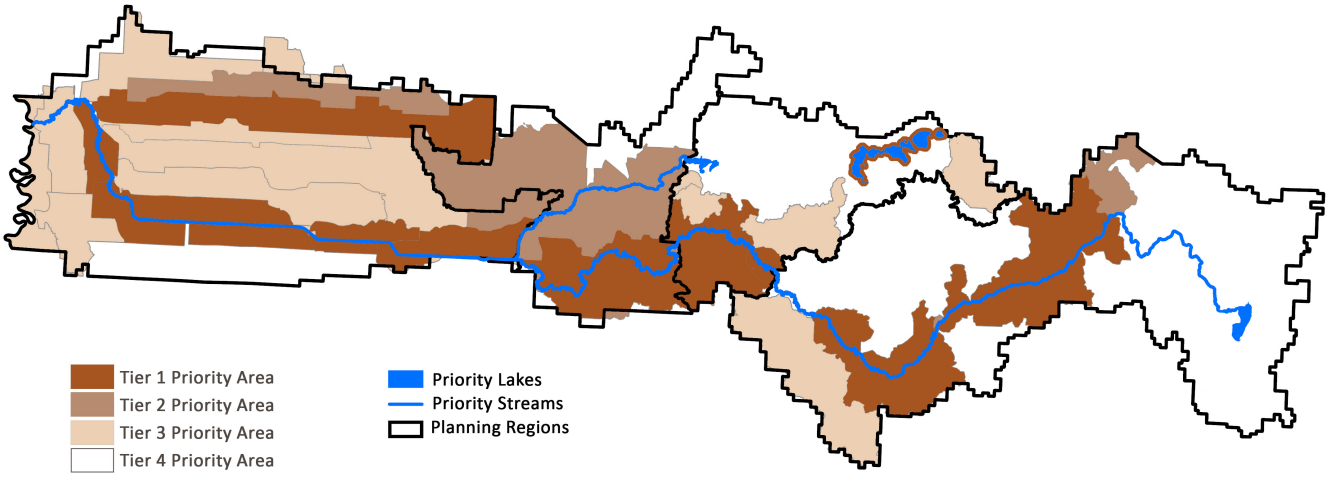


Figure 5.3. Sand Hill River Priority areas map.

For agricultural BMPs and conservation practices, the Prioritize, Target, and Measure Application (PTMApp) tool was used to determine which conservation practices should be implemented to reduce sediment and nutrients most effectively and where on the landscape these should go. PTMApp estimates load reduction at field-edge and planning region outlets from implementing the modeled BMP scenario and provides an associated cost. These quantitative outputs can help implementation partners understand the potential for a given action to make progress towards a nutrient, sediment, or water storage goal. The outcomes and progress numbers in the action tables are from the ideal scenario modeled by PTMApp. To see the detailed PTMApp implementation scenarios see Appendix C.

The actions, cost, and timelines in the targeted implementation schedule were developed based on best estimates and current knowledge. Given that the actions will be carried out over ten years, the targeted implementation schedule is meant to serve as a guide throughout implementation, with knowledge that achieving each action as written may not occur.

Prioritization of actions sets up the partnership for success, for example, if a project is not feasible due to landowner participation or an increase in budget needed for a practice, the next priority project can be implemented. Many factors may ultimately impact if and where implementation actions occur, including:

- Voluntary participation by landowners and residents
- New data or information on resource conditions
- Field verification of practices and locations
- New emerging practices
- An increase in estimated cost to implement an action
- Effectiveness of education and outreach initiatives

Targeted Implementation Schedule

The following pages have Targeted Implementation Schedules with details about each action. There is a table for each planning region, a capital improvements action table, and a watershed-wide action table. Creating planning region-specific action tables enables a more targeted geographic approach to issues that were identified as a priority in certain planning regions in Section 3. Some actions will be done on a watershed-wide scale and not on a planning region basis. Action in the Education & Outreach, Data Collection, Monitoring, & Analysis, Capital Improvement Projects, and Regulatory & Enforcement programs are all in the watershed-wide table.

The following information is contained for each action:

- **Action**: A description of the action that will make progress towards goals
- **Targeting approach**: The data source or targeted area used to implement the action
- **10-year outcomes**: The quantifiable goal for that action in 10 years
- **Progress towards goal**: The unit/measurement progress will be measured by
- **Goals addressed**: A filled in circle indicates a goal is directly addressed by the action, a hollow circle indicates the action indirectly/partially makes progress towards a goal
- **Responsible entity**: The lead entity responsible for implementation is bolded, partner entities are listed
- **Timeline**: A checkmark is given for every biennium the action is planned to take place
- **Estimated cost**: This is the estimated cost of the action over 10 years

Headwaters Planning Region Projects & Practices Implementation Table

Action	Targeting Approach (Figure 5.4)	10-Year Outcomes	Progress Towards Goal	Goals Addressed: Flood Damage Reduction	Increase Water Storage	Reduce Sediment	Reduce Nutrients	Reduce Bacteria	Improve Soil Health	Stabilize Streams	Stabilize Drainage Systems	Protect Drinking Water	Improve Habitat	Responsibility (Bold = Lead)	Timeline: 2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Total 10-Year Estimated Cost
																				
Structural Agricultural Practices *Grade stabilizations, sediment basins, grassed waterways, filter strips, etc.*	PTMApp Data	Treat at least 1,456 acres	341 tons sediment/yr 166 lbs TP/yr 2,869 lbs TN/yr	☐	☐	■	■	☐	☐	☐	☐	☐	☐	**SWCDs,** MDA, SHRWD, NRCS, BWSR	☑	☑	☑	☑	☑	$617,600
Non-structural Agricultural Practices *Cover crops, conservation tillage, perennial crops, prescribed grazing, etc.*	PTMApp Data	Treat at least 978 acres	178 tons sediment/yr 116 lbs TP/yr 2,341 lbs TN/yr			■	■		■			☐		**SWCDs,** NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$293,400
Bacteria Management Projects *Manure management plans, waste pit closures, cattle fencing and water source, etc.*	*E.coli* impairments	Five projects	Five projects that reduce bacteria				☐	■						**SWCDs, MPCA,** NRCS, BWSR		☑	☑	☑		$100,000
Lake Enhancement Projects *Shoreline restoration, rain gardens, etc.*	Priority Lakes	Five projects	Five projects that reduce phosphorus			☐	■							**SWCs,** DNR, MPCA, BWSR	☑	☑	☑	☑	☑	$37,500
Riparian easements and acquisitions	Local data, Sand Hill River	0.25 miles protected	0.25 miles	☐	☐	☐	☐	☐		■			■	**SHRWD, BWSR,** SWCD, DNR		☑	☑	☑	☑	$30,000
Land Retirement Programs *CRP, CREP, RIM, WRP, etc.*	Watershed-wide	Maintain current	Acres towards Prairie Plan		☐	☐	☐		☐	☐	☐	☐	■	**FSA**, NRCS, SWCDs, SHRWD	☑	☑	☑	☑	☑	$5,316,000
														Total Level 2 Projects and Practices						**$1,078,500**
														Total Level 3 Projects and Practices						**$5,316,000**

■ *Direct progress towards goals*
☐ *Indirect progress towards goals*

Headwaters Planning Region Targeting Map

Projects in the implementation table above will be targeted to the areas shown in this map. The map legend matches the actions in the Targeting Approach column in the implementation table. Structural and non-structural agricultural practices give the best pollutant reduction benefits in the "Best" highlighted areas (based on PTMApp).

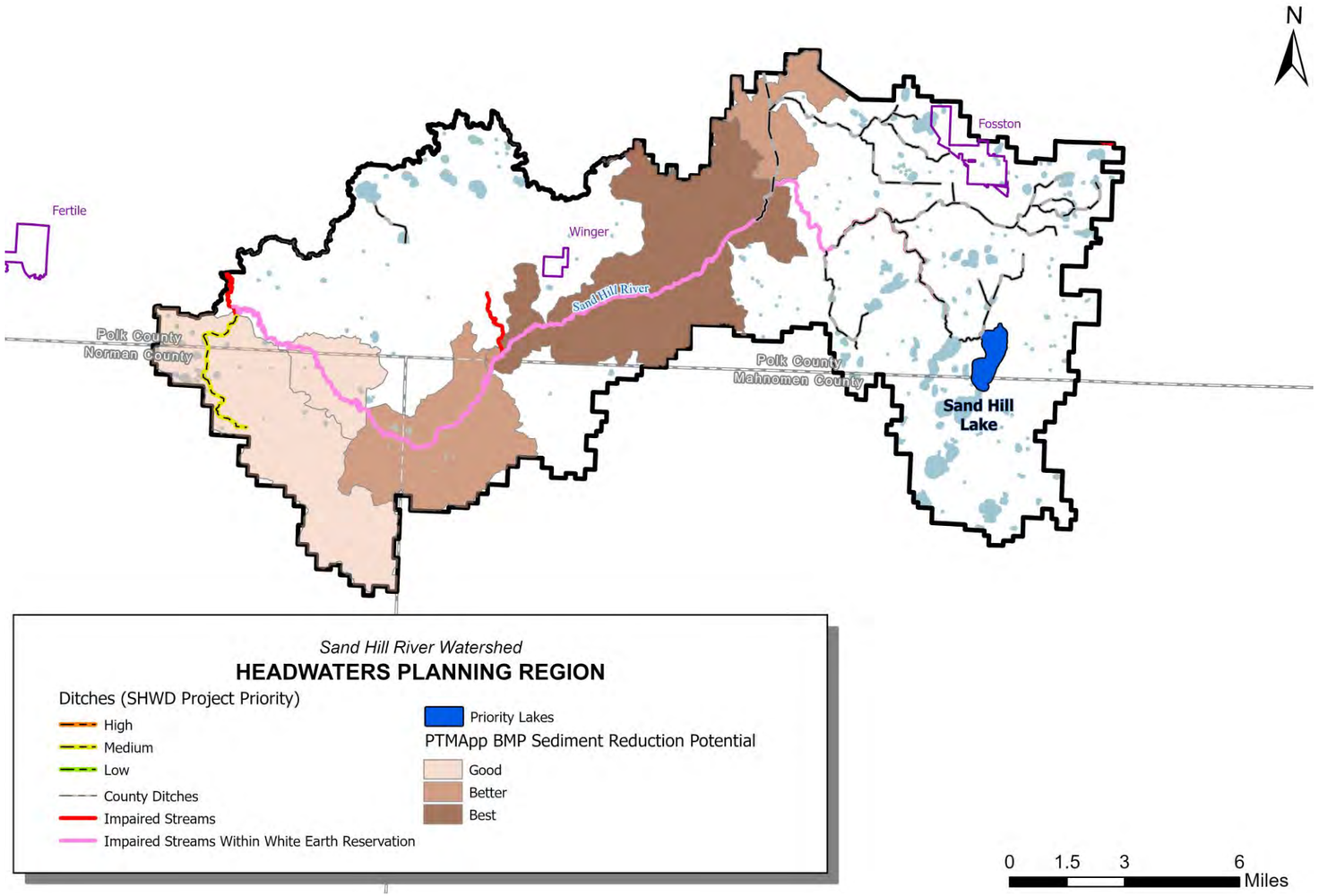


Figure 5.4. Targeting map for the Headwaters Planning Region.

Where to Work

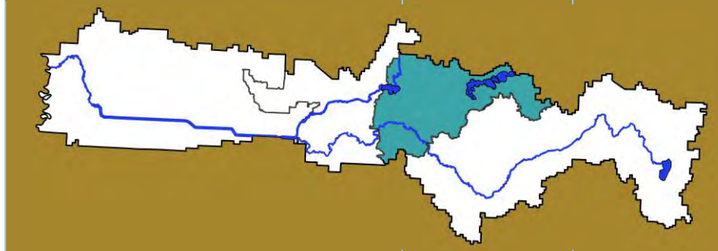
Targeting implementation means to focus several different types of projects in a specific area identified as a priority in the plan. For example, choosing one subwatershed and implementing structural agricultural BMPs, non-structural agricultural BMPs, ditch stabilization, side water inlets, and riparian easements can make a real difference in habitat and water quality at that location.

In the Headwaters region, priority areas include working along the Sand Hill River and Sand Hill Lake.

Ditch, stream, and lake priorities are color-coded in Figure 5.4. Agricultural BMPs are shown by the shaded subwatersheds below. Working in all these shaded subwatersheds gives sediment reductions to the Planning Region outlet based on the PTMApp implementation scenario (Appendix C). To get the best sediment reductions, local partners can contact landowners in the "Best" areas first to provide cost share for implementing these BMPs.

GOOD	Where agricultural best management practices such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **GOOD** sediment reductions (data from PTMApp, Appendix C).
BETTER	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **BETTER** sediment reductions (data from PTMApp, Appendix C).
BEST	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give the **BEST** sediment reductions (data from PTMApp, Appendix C).

Lakes Planning Region Projects & Practices Implementation Table



Action	Targeting Approach (Figure 5.5)	10-Year Outcomes	Progress Towards Goal	Goals Addressed: Flood Damage Reduction	Increase Water Storage	Reduce Sediment	Reduce Nutrients	Reduce Bacteria	Improve Soil Health	Stabilize Streams	Stabilize Drainage Systems	Protect Drinking Water	Improve Habitat	Responsibility (Bold = Lead)	Timeline: 2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Total 10-Year Estimated Cost
Structural Agricultural Practices *Grade stabilizations, sediment basins, grassed waterways, filter strips, etc.*	PTMApp Data	Treat at least 1,884 acres	158 tons sediment/yr 64 lbs TP/yr 1,074 lbs TN/yr	☐	☐	■	■	☐	☐	☐	☐	☐	☐	**SWCDs,** SHRWD, NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$617,500
Non-structural Agricultural Practices *Cover crops, conservation tillage, perennial crops, prescribed grazing, etc.*	PTMApp Data	Treat at least 998 acres	59 tons sediment/yr 31 lbs TP/yr 658 lbs TN/yr	☐		■	■		■			☐		**SWCDs,** NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$299,400
Bacteria Management Projects *Manure management plans, waste pit closures, cattle fencing and water source, etc.*	*E.coli* impairments	Five projects	Five projects that reduce bacteria				☐	■						**SWCDs, MPCA,** NRCS, BWSR		☑	☑	☑		$100,000
Lake Enhancement Projects *Shoreline restoration, rain gardens, etc.*	Priority Lakes	Five projects	Five projects that reduce phosphorus			☐	■							**SWCDs, Lake Associations,** DNR, MPCA, BWSR	☑	☑	☑	☑	☑	$37,500
Feasibility Study for In-Lake Treatment *Phosphorus budget, lake modeling, sediment sampling, alum feasibility*	Priority Lakes, especially Lake Sarah	One study	Leads to a project to reduce phosphorus				■							**Lake Associations, MPCA, SWCDs,** SHRWD			☑	☑		$100,000
Riparian easements and acquisitions	Local data, Sand Hill River or Kittleson Creek	0.25 miles protected	0.25 miles	☐	☐	☐	☐	☐		■			■	**SHRWD, BWSR,** SWCD, DNR		☑	☑	☑	☑	$30,000
Land Retirement Programs *CRP, CREP, RIM, WRP, etc.*	Watershed-wide	Maintain current	Acres towards Prairie Plan		☐	☐	☐		☐	☐	☐	☐	■	**FSA**, NRCS, SWCDs, SHRWD	☑	☑	☑	☑	☑	$5,316,000
														Total Level 2 Projects and Practices						**$1,184,400**
														Total Level 3 Projects and Practices						**$5,316,000**

■ *Direct progress towards goals*
☐ *Indirect progress towards goals*

Lakes Planning Region Targeting Map

Projects in the implementation table above will be targeted to the areas shown in this map. The map legend matches the actions in the Targeting Approach column in the implementation table. Structural and non-structural agricultural practices give the best pollutant reduction benefits in the "Best" highlighted areas (based on PTMApp)

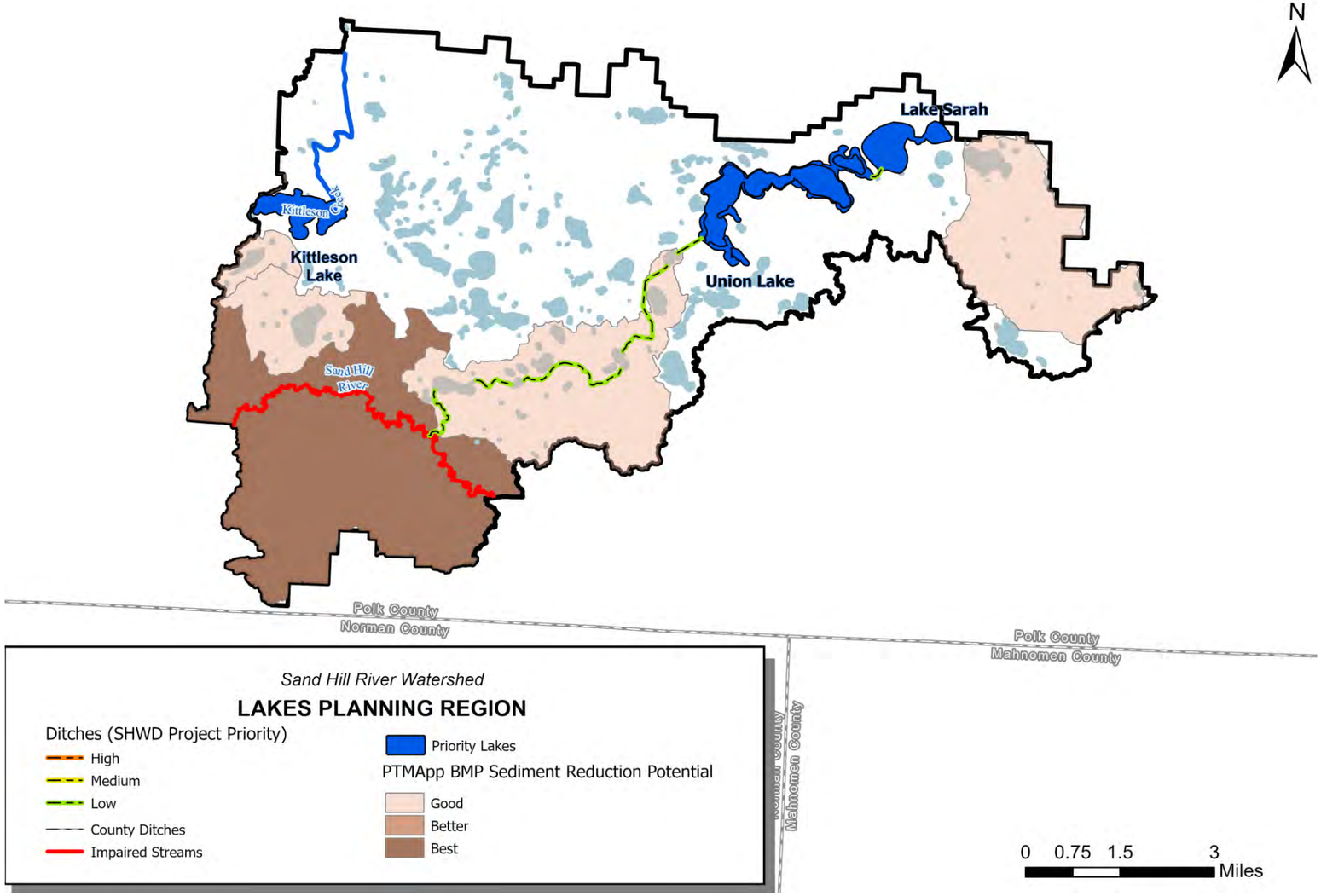


Figure 5.5. Targeting map for the Lakes Planning Region.

Where to Work

Targeting implementation means to focus several different types of projects in a specific area identified as a priority in the plan. For example, choosing one subwatershed and implementing structural agricultural BMPs, non-structural agricultural BMPs, ditch stabilization, side water inlets, and riparian easements can make a real difference in habitat and water quality at that location.

In the Lakes region, priority areas include working along the Sand Hill River and around Kittleson Lake, Union Lake, and Lake Sarah.

Ditch, stream, and lake priorities are color-coded in Figure 5.5. Agricultural BMPs are shown by the shaded subwatersheds below. Working in all these shaded subwatersheds gives sediment reductions to the Planning Region outlet based on the PTMApp implementation scenario (Appendix C). To get the best sediment reductions, local partners can contact landowners in the "Best" areas first to provide cost share for implementing these BMPs.

GOOD	Where agricultural best management practices such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **GOOD** sediment reductions (data from PTMApp, Appendix C).
BETTER	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **BETTER** sediment reductions (data from PTMApp, Appendix C).
BEST	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give the **BEST** sediment reductions (data from PTMApp, Appendix C).

Beach Ridge Projects & Practices Implementation Table

Action	Targeting Approach (Figure 5.6)	10-Year Outcomes	Progress Towards Goal	Goals Addressed: Flood Damage Reduction	Increase Water Storage	Reduce Sediment	Reduce Nutrients	Reduce Bacteria	Improve Soil Health	Stabilize Streams	Stabilize Drainage Systems	Protect Drinking Water	Improve Habitat	Responsibility (Bold = Lead)	Timeline: 2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Total 10-Year Estimated Cost
																				
Structural Agricultural Practices *Grade stabilizations, sediment basins, grassed waterways, filter strips, etc.*	PTMApp Data	Treat at least 1,521 acres	561 tons sediment/yr 223 lbs TP/yr 3,428 lbs TN/yr	☐	☐	■	■	☐	☐	☐	☐	☐	☐	**SWCDs,** SHRWD, NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$614,500
Non-structural Agricultural Practices *Cover crops, conservation tillage, perennial crops, prescribed grazing, etc.*	PTMApp Data	Treat at least 992 acres	449 tons sediment/yr 197 lbs TP/yr 3,989 lbs TN/yr	☐		■	■		■			☐		**SWCDs,** NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$297,600
Riparian easements and acquisitions	Local data, Sand Hill River and/or Kittelson Creek	One mile protected	One mile	☐	☐	☐	☐	☐		■			■	**SHRWD, BWSR,** SWCD, DNR		☑	☑	☑	☑	$60,700
Land Retirement Programs *CRP, CREP, RIM, WRP, etc.*	Watershed-wide	Maintain current	Acres towards Prairie Plan		☐	☐	☐		☐	☐	☐	☐	■	**FSA**, NRCS, SWCDs, SHRWD	☑	☑	☑	☑	☑	$5,316,000
														Total Level 2 Projects and Practices						**$972,800**
														Total Level 3 Projects and Practices						**$5,316,000**

■ *Direct progress towards goals*
☐ *Indirect progress towards goals*

Beach Ridge Targeting Map

Projects in the implementation table above will be targeted to the areas shown in this map. The map legend matches the actions in the Targeting Approach column in the implementation table. Structural and non-structural agricultural practices give the best pollutant reduction benefits in the “Best” highlighted areas (based on PTMApp)

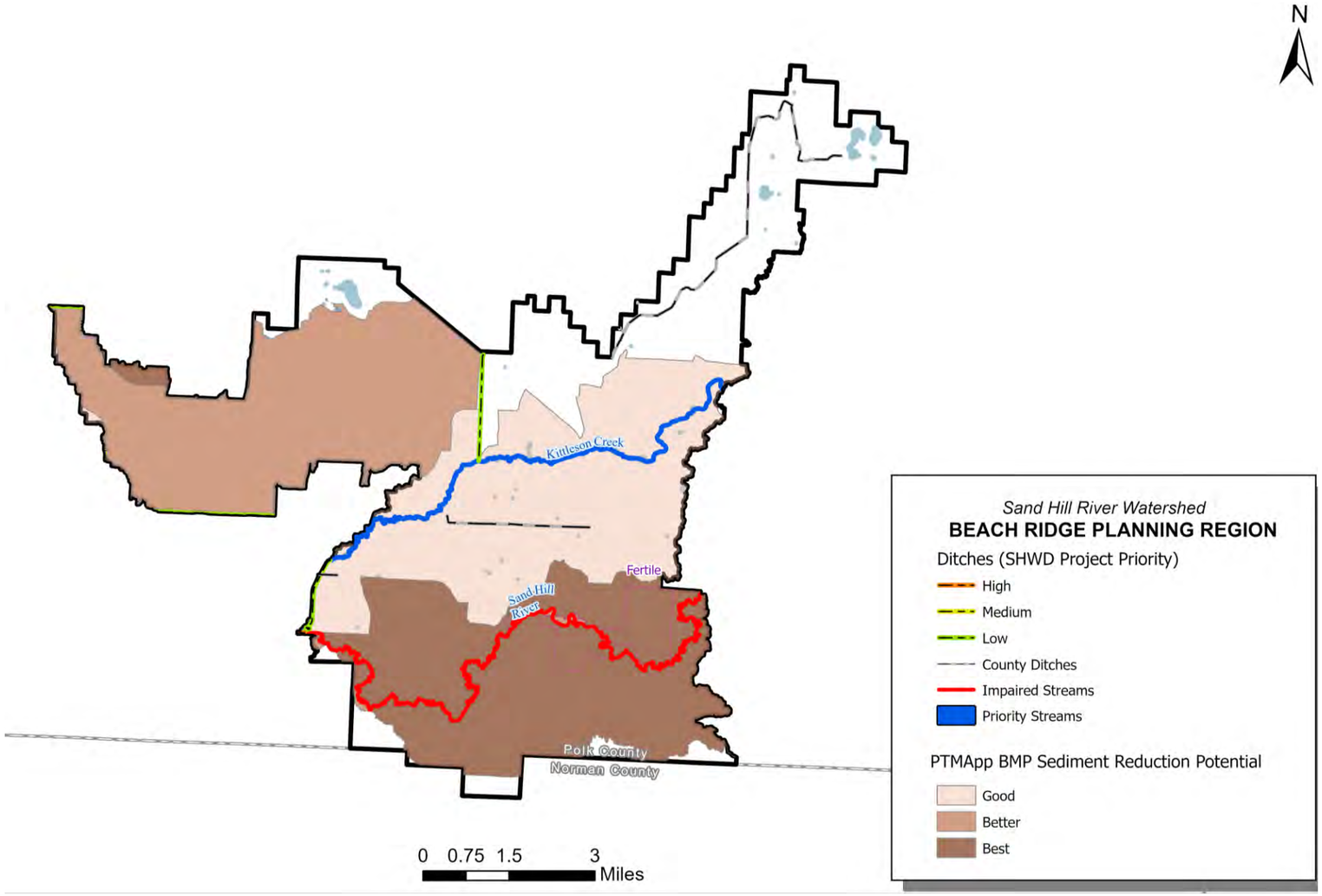


Figure 5.6. Targeting map for the Beach Ridge Planning Region.

Where to Work

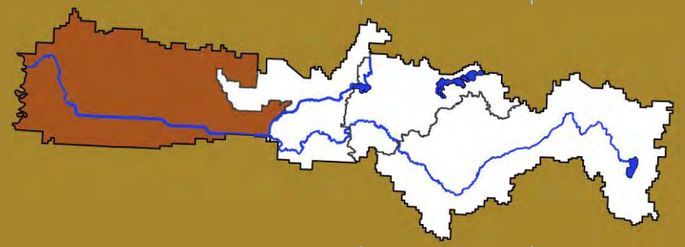
Targeting implementation means to focus several different types of projects in a specific area identified as a priority in the plan. For example, choosing one subwatershed and implementing structural agricultural BMPs, non-structural agricultural BMPs, ditch stabilization, side water inlets, and riparian easements can make a real difference in habitat and water quality at that location.

The Beach Ridge Planning region has two priority streams, Kittleson Creek and the Sand Hill River.

Ditch and stream priorities are color-coded in Figure 5.6. Agricultural BMPs are shown by the shaded subwatersheds below. Working in all these shaded subwatersheds gives sediment reductions to the Planning Region outlet based on the PTMApp implementation scenario (Appendix C). To get the best sediment reductions, local partners can contact landowners in the “Best” areas first to provide cost share for implementing these BMPs.

GOOD	Where agricultural best management practices such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **GOOD** sediment reductions (data from PTMApp, Appendix C).
BETTER	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **BETTER** sediment reductions (data from PTMApp, Appendix C).
BEST	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give the **BEST** sediment reductions (data from PTMApp, Appendix C).

Valley Planning Region Projects & Practices Implementation Table

Action	Targeting Approach (*Figure 5.7*)	10-Year Outcomes	Progress Towards Goal	Goals Addressed: Flood Damage Reduction	Increase Water Storage	Reduce Sediment	Reduce Nutrients	Reduce Bacteria	Improve Soil Health	Stabilize Streams	Stabilize Drainage Systems	Protect Drinking Water	Improve Habitat	Responsibility (Bold = Lead)	Timeline: 2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Total 10-Year Estimated Cost
																				
Structural Agricultural Practices *Grade stabilizations, sediment basins, grassed waterways, filter strips, etc.*	PTMApp Data	Treat at least 2,363 acres	829 tons sediment/yr 398 lbs TP/yr 5,860 lbs TN/yr	☐	☐	■	■	☐	☐	☐	☐	☐	☐	**SWCDs,** SHRWD, NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$1,240,500
Non-structural Agricultural Practices *Cover crops, conservation tillage, perennial crops, prescribed grazing, etc.*	PTMApp Data	Treat at least 1,996 acres	788 tons sediment/yr 319 lbs TP/yr 6,452 lbs TN/yr	☐		■	■		■			☐		**SWCDs,** NRCS, BWSR, MDA	☑	☑	☑	☑	☑	$598,800
Riparian easements and acquisitions	Local data	One mile of the Sand Hill River protected	One mile	☐	☐	☐	☐	☐		■			■	**SHRWD, BWSR,** SWCD, DNR		☑	☑	☑	☑	$60,700
Land Retirement Programs *CRP, CREP, RIM, WRP, etc.*	Watershed-wide	Maintain current	Acres towards Prairie Plan		☐	☐	☐		☐	☐	☐	☐	■	**FSA**, NRCS, SWCDs, SHRWD	☑	☑	☑	☑	☑	$5,316,000
														Total Level 2 Projects and Practices						**$1,900,000**
														Total Level 3 Projects and Practices						**$5,316,000**

■ *Direct progress towards goals*
☐ *Indirect progress towards goals*

Valley Planning Region Targeting Map

Projects in the implementation table above will be targeted to the areas shown in this map. The map legend matches the actions in the Targeting Approach column in the implementation table. Structural and non-structural agricultural practices give the best pollutant reduction benefits in the “Best” highlighted areas (based on PTMApp)

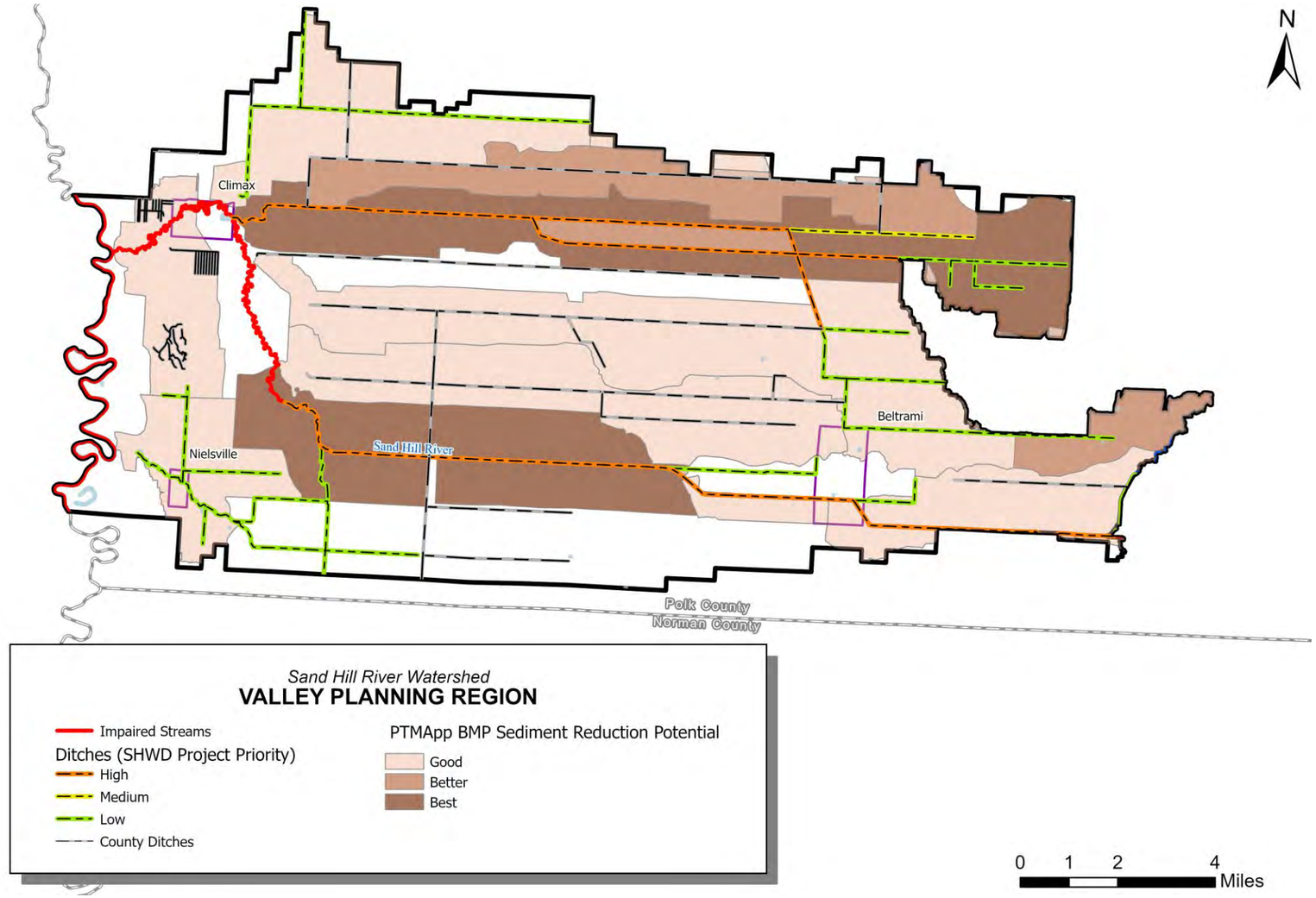


Figure 5.7. Targeting map for the Valley Planning Region.

Where to Work

Targeting implementation means to focus several different types of projects in a specific area identified as a priority in the plan. For example, choosing one subwatershed and implementing structural agricultural BMPs, non-structural agricultural BMPs, ditch stabilization, side water inlets, and riparian easements can make a real difference in habitat and water quality at that location.

The Valley Planning region has priority ditches, high impairment risk in the Sand Hill ditch, and an impaired reach from Climax to the Red River of the North. The Red River of the North is also a priority for erosion control and RIM easements.

Ditch and stream priorities are color-coded in Figure 5.7. Agricultural BMPs are shown by the shaded subwatersheds below. Working in all these shaded subwatersheds gives sediment reductions to the Planning Region outlet based on the PTMApp implementation scenario (Appendix C). To get the best sediment reductions, local partners can contact landowners in the “Best” areas first to provide cost share for implementing these BMPs.

GOOD	Where agricultural best management practices such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **GOOD** sediment reductions (data from PTMApp, Appendix C).
BETTER	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give **BETTER** sediment reductions (data from PTMApp, Appendix C).
BEST	Where agricultural BMPs such as water and sediment control basins, grade stabilizations, cover crops, reduced till, and crop rotations give the **BEST** sediment reductions (data from PTMApp, Appendix C).

Capital Improvement Projects Implementation Table

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 50% of the WBIF (~$125,000/year) to support implementation of these projects. Please see Table 6.1 in Section 6 for specific project ideas developed during the planning process. Drainage system priorities are shown on Figures 5.4-5.7.

				Goals Addressed											Timeline					
Action	**Targeting Approach**	**10-Year Outcomes**	**Progress Towards Goal**	**Flood Damage Reduction**	**Increase Water Storage**	**Reduce Sediment**	**Reduce Nutrients**	**Reduce Bacteria**	**Improve Soil Health**	**Stabilize Streams**	**Stabilize Drainage Systems**	**Protect Drinking Water**	**Improve Habitat**	**Responsibility (Bold = Lead)**	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Total 10-Year Estimated Cost**
Ditch Stabilization *Bank stabilization, rock structures to stabilize channel bottom, resloping*	Local data	12 miles	12 miles	■	□	■	■			□	■		■	**Counties**, **SHRWD,** SWCDs	☑	☑	☑	☑	☑	$26,000,000
Stream Stabilization Projects *Bank stabilization, rock structures to stabilize channel bottom, resloping*	Local data	1.5 miles stabilized	1.5 miles	■	□	■	■			■			■	**SWCDs**, **SHRWD**, DNR, MPCA, BWSR, USACE, NRCS		☑	☑	☑	☑	$75,000
Community Flood Damage Reduction	Unprotected towns	Two towns	Full protection	■										**SHRWD,** USACE				☑	☑	$12,000,000
Ring Dikes *Establish ring dikes for flood-prone properties within the 100-year flood plain*	Properties in the 100-year flood plain	Two ring dikes	Ring dikes where needed	■										**SHRWD**, Landowners		☑	☑	☑	☑	$200,000
Water Retention Projects	Local data	Complete two projects	3,040 acre-feet	■	■	■	■			□	□		■	**SHRWD**, SWCDs, Cities, NRCS		☑	☑	☑	☑	$7,000,000
Multi-purpose Drainage Water Management	Local data	Complete two projects	Progress towards goals marked with ■	■	□	■	■			□	■			**SHRWD**, **Counties**, NRCS		☑	☑	☑	☑	$250,000
Petitioned Ditch Projects	Local data	Maintenance as petitioned	Length towards the Drainage System stabilization goal	□	□	□	□	□		□	■			**SHRWD, Counties**	☑	☑	☑	☑	☑	As petitioned

■ *Direct progress towards goals*
□ *Indirect progress towards goals*

Watershed-wide Implementation Table

				Goals Addressed											Timeline					
Program	Action	10-Year Outcomes	Progress Towards Goal	Flood Damage Reduction	Increase Water Storage	Reduce Sediment	Reduce Nutrients	Reduce Bacteria	Improve Soil Health	Stabilize Streams	Stabilize Drainage Systems	Protect Drinking Water	Improve Habitat	Responsibility (Bold = Lead)	2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Total 10-Year Estimated Cost
Projects & Practices	**Replace noncompliant SSTS**	Replace two systems/year	Indirect progress				■	■				□		**County,** SWCD, SHRWD	☑	☑	☑	☑	☑	$240,000
	Seal Unused Wells	10 wells/year	100 wells									■		**SWCDs, MDH**	☑	☑	☑	☑	☑	$100,000
	Protect DWSMAs	5 acres of Ag BMPs or protection	Indirect progress			□	□					■	□	**Cities,** SWCD, MDH		☑	☑	☑	☑	$12,000
	AIS management *Follow County plans for management and prevention of AIS*												■	**Counties, SWCDs,** SHRWD, DNR, Lake Associations	☑	☑	☑	☑	☑	$655,000
	Work with Road Authorities *Improve connectivity with properly fitting culverts at road crossings, water quality BMPs along road projects*	At least one meeting per year	Indirect progress	■	□	□	□	□		□	□		□	**Counties, MnDOT, Townships,** SWCDs, SHRWD	☑	☑	☑	☑	☑	$40,000
	Windbreaks and Tree Planting	At least one windbreak per year	Indirect progress			□	□		□				□	**SWCDs, NRCS,** BWSR	☑	☑	☑	☑	☑	$100,000
	Noxious Weed Management	Continue current program	Indirect progress						□				□	**Counties, SWCDs**	☑	☑	☑	☑	☑	$100,000
	Partner with Public Water Suppliers *Wellhead Protection Plan Development*	Plan for each public water supply	Indirect progress									■		**Cities, MDH**	☑	☑	☑	☑	☑	Level 3
Data Collection & Monitoring Analysis	**Continue water quality monitoring with state partners** *Lakes, streams, groundwater*	Complete Cycle 2 WRAPS, Continue monitoring priority resources	Indirect progress			□	□	□		□	□	□	□	**MPCA,** SHRWD, SWCDs, DNR, MDH, IWI, River Watch	☑	☑	☑	☑	☑	$100,000 $100,000
	Complete Geologic Atlas	Complete for watershed	Indirect progress									□		**UMN,** SWCDs, DNR	☑	☑	☑	☑	☑	Level 3
	Assess stream reaches and drainage systems for instability and prioritize for stabilization	Stability data sets on all major streams and ditches	Indirect progress	□	□	□	□			■	■			**SHRWD, SWCDs, County, DNR**, BWSR	☑	☑	☑	☑	☑	$100,000

■ *Direct progress towards goals*
□ *Indirect progress towards goals*

Program	Action	10-Year Outcomes	Progress Towards Goal	Goals Addressed: Flood Damage Reduction	Increase Water Storage	Reduce Sediment	Reduce Nutrients	Reduce Bacteria	Improve Soil Health	Stabilize Streams	Stabilize Drainage Systems	Protect Drinking Water	Improve Habitat	Responsibility (Bold = Lead)	Timeline: 2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Total 10-Year Estimated Cost
Education & Outreach	**Well testing** *Arsenic and nitrate testing clinics for private drinking water*	At least one clinic per year (10 clinics)	Direct progress									☐		**SWCDs,** MDH	☑	☑	☑	☑	☑	$200,000
	MN Agricultural Water Quality Certification (MAWQC) *Enroll farms*	At least one farm per year (10 farms)	Indirect progress		☐	☐	☐	☐	■			☐	☐	**MDA,** SWCDs	☑	☑	☑	☑	☑	
	Youth Environmental Education *Reach out to youth through events such as the county fair, 4-H, science fair judging, ag-in-the-classroom, etc.*	Continue current programs	Indirect progress	☐	☐	☐	☐	☐	☐				☐	**SWCDs, SHRWD**, UMN Extension	☑	☑	☑	☑	☑	
	Soil Health Outreach *Promote soil health through demonstration sites and workshops, tours*	At least one workshop per year (10 workshops)	Indirect progress			☐	☐		■					**SWCDs,** MDA, UMN Extension, NRCS	☑	☑	☑	☑	☑	
	Outreach to landowners *Expiring CRP contracts, tours of projects*	Contact 10 landowners per year (100 landowners)	Indirect progress										■	**NRCS**, FSA, SWCDs	☑	☑	☑	☑	☑	
	Lake Outreach Program *To work with the public and landowners on shoreland to improve and protect lake water quality, tours of projects*	At least one workshop per year (10 workshops)	Indirect progress				■						☐	**SWCDs,** Lake Associations, DNR, UMN Extension	☑	☑	☑	☑	☑	
Regulation & Enforcement	**Review Drainage System Management** *Identify priority ditches, look for areas to collaborate*	Coordinated approach to better management of drainage systems	Indirect progress			☐	☐			☐	■			**Counties, SHRWD**	☑	☑	☑	☑	☑	$4,000,000
	Regulatory Programs *Enforce ordinances and rules to protect water quality and habitat*	Continue current program and update SHRWD Rules	Indirect progress	☐		☐	☐	☐	☐	☐	☐	☐	☐	**Counties, SHRWD, SWCDs**, MDH, MDA, MPCA, DNR, BWSR	☑	☑	☑	☑	☑	
																		Total Level 2		**$9,792,000**
																		Total Level 3		**$7,550,000**

■ *Direct progress towards goals*
☐ *Indirect progress towards goals*

Implementation Summary

The total cost of implementation is split amongst 6 programs (see Figure 5.2). Figure 5.8 shows the distribution of Level 1 (baseline) and WBIF. Most WBIF will go towards Projects & Practices and Capital Improvement Projects. The total cost of implementing the plan is estimated to be $19,500,000 over 10 years.

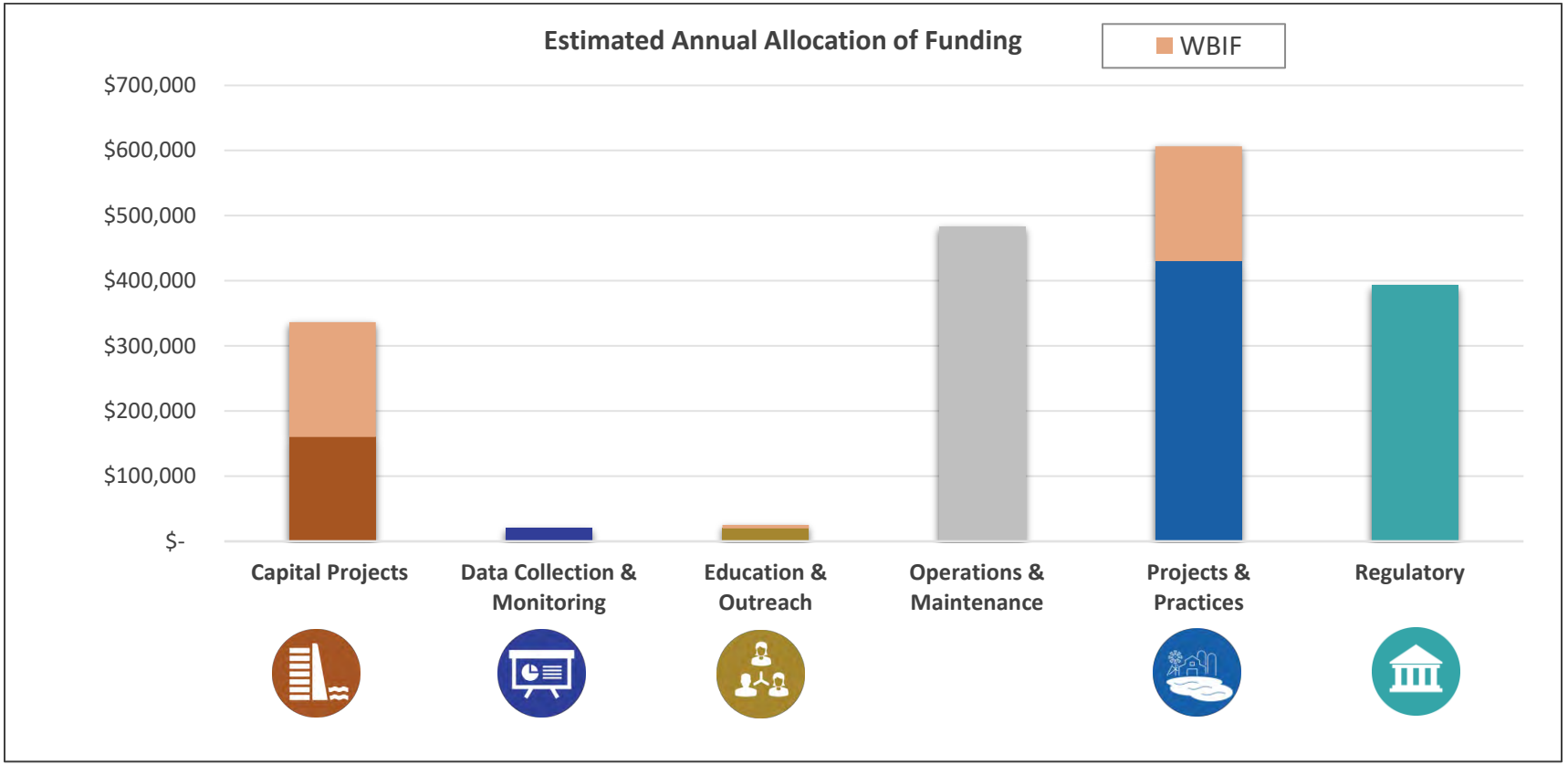


Figure 5.8. Implementation programs funding and where WBIF will be allocated.

Photo credit: Wayne Goeken

Section 6

Plan Programs

Section 6. Implementation Programs

Implementation programs are the funding mechanism to implement actions in the targeted implementation schedule. This section describes the common implementation programs established within the plan area. In total, there are five main programs: Projects and Practices, Capital Improvement Projects, Regulation and Enforcement, Data Collection, Monitoring, and Analysis, and Education and Outreach (Figure 6.1).

Figure 6.1 Implementation Programs for the SHRW.

Equity and Resiliency

Environmental justice/Health equity is the term used to describe the effort to ensure the benefits of air, land, and water resources and the contamination of natural resources are equally spread throughout the population and not adversely impacting one group of people. Indigenous, low income, and communities of color have often felt the largest impacts of environmental degradation and pollution. Equitable watershed planning involves understanding how environmental injustices have affected marginalized populations and considering the impact of watershed actions across communities during implementation. Decisions such as who gets the benefits of funding and where actions will occur should be evaluated through a lens of equity.

Resilience is the ability of a system to experience change but not be affected. Resilience can be both social and ecological (MGLP, 2021). Social resilience is organization and regulation. For example, having a Watershed District builds social framework to implement large projects. Ecological resilience includes landscape diversity, water retention, and fixing past hydrological alterations. For example, large water

Figure 6.2 Examples of building social and ecological resilience in this plan.

retention projects provide resilience to increasing precipitation trends. This plan includes actions and programs that build both social and ecological resilience (Figure 6.2). Throughout this plan section, opportunities for building resiliency and equity are noted in the peach-colored box like below.

Opportunity for building resiliency

Opportunity for building equity

Projects and Practices

The Projects and Practices Implementation Program funds projects and practices on the landscape. As shown on the next few pages, this implementation program is broken into a variety of subprograms. These programs will be administered by the SWCDs and SHRWD in the watershed.

Opportunity for building resiliency

Actions implemented through the Projects & Practices program deal with the relationship between people and the land. A focus on installing projects and implementing conservation practices that are long-lasting and improve the watershed's ability to withstand weather events help build watershed resiliency.

Cost-Share Programs

Cost-share programs share the cost of installing a project with the landowner(s). Examples that meet plan goals are the implementation of soil health practices such as cover crops and no till, or non-farm practices such as forest enhancement.

Cost-share programs can also be used for structural practices. Implementing fencing and water sources for grazing cattle away from streams, grassed waterways, grade stabilizations, outlet stabilizations, and well sealing are applicable examples that meet the goals of this plan.

Land Protection and Retirement Programs

Permanent land protection and temporary land retirement programs are implemented to protect the land from land use change. These programs can be implemented in sensitive and marginal areas to provide habitat and limit nutrient and sediment runoff. Some examples of these programs are included the list below.

- Conservation Easements
- RIM Wild Rice Conservation Easement Program
- RIM Grassland Reserve Easement Program
- Land Acquisition
- CRP
- WRP

Low-Interest Loans

Low-Interest Loans (AgBMP Loan Program, MPCA Clean Water Partnership) may be made available for agricultural BMPs, septic system replacement, community wastewater treatment systems, and other projects that meet eligibility criteria for funding.

Opportunity for building equity

Financial assistance for low-income communities or households are available for replacing septic systems.

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.

Opportunity for building resiliency

Forest management can help create a more resilient watershed by sequestering carbon in forests, and increasing water storage which reduces flooding.

Forest Stewardship Plans

Forest owners can manage their woods through Forest Stewardship Plans in coordination with the Minnesota DNR's Forest Stewardship Program. 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.

Sustainable Forest Incentive Act (SFIA)

The SFIA provides annual incentive payments for the landowner recording an agreement which removes some rights of the land (e.g., development and farming). In return, they follow the covenant to keep forestlands forested for a set period: either 8, 20, or 50 years.

Operations and Maintenance

Regular on-site inspections and maintenance are required to occur for projects funded through BWSR grants following installation. This ensures the projects continue to function and is consistent with the BWSR Grants Administration Manual (GAM). These details, along with records such as notes and photos should be included with each project's Operations and Maintenance Plan. BWSR's recommended inspection plans, according to the GAM, include the following conservation practices with a minimum effective lifespan of 10 years, with recommended inspections at the end of years 1, 3, and 9 after the certified completion.

Capital Improvement Projects

A CIP is 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.

Section 5 outlines general proposed capital improvement project types within the plan area, and **Error! Reference source not found.** outlines a list of possible projects. Additional discussions will occur among plan participants to develop the specific process for implementing capital improvements with base funding. Specifically, members of the Policy Committee or the SHRW 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.

CIPs completed through this plan will be operated and maintained by the owner of the project for the lifespan of the project.

Opportunity for building resiliency

CIPs can help create a more resilient watershed to storm events by building projects to withstand greater precipitation events predicted in the future.

As highlighted throughout this plan, public drainage systems are prevalent across much of the plan area. Because of this, planning partners 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 reduction, increased storage, and ditch bank stabilization. Based on this two-way engagement, drainage authorities could access implementation funds to adopt drainage actions in the targeted implementation schedule (Section 5) during 103D and 103E processes and procedures when the opportunity arises within the planning area, for actions that would not otherwise be funded by drainage proceedings.

Rock arch rapids in the Sand Hill River

Table 6.1. Proposed and ongoing CIPs in the SHRW. Projects with Clean Water components are indicated with " ***WBIF****" and could be eligible for Watershed-Based Implementation Funding.*

Project Name	Description	Planning Region	Targeted Resource	Lead Entity, Partners	Years (Start & End)	Estimated Cost
Sand Hill Ditch Stabilization & Ecosystem Restoration	Construct a two stage channel along the Sand Hill Ditch to stabilize side slopes, provide riparian habitat, and public recreation. Project is currently in the preliminary planning stage.	Valley	Channelized portions of the Sand Hill River	SHRWD	2022-2027	$25M **WBIF**
Kittleson Creek Watershed Project	Develop a multipurpose project to address flooding and erosion concerns within the Kittleson Creek Watershed. Project has not been developed.	Beach Ridge	Kittleson Creek	SHRWD, DNR	2023-2025	Unknown **WBIF**
Legal Ditch System Optimization	Consolidation of WD ditch systems and provide an additional outlet from the Sand Hill River to the Red River of the North. Project is currently in the preliminary stage. SHRWD is working with landowners and Polk County to determine a preferred project. The project would incorporate side inlet pipes along any channel improvements.	Valley	SHRWD Project 17; SHRWD Project 20; County Ditch 119; County Ditch 9; County Ditch 80; County Ditch 90; County Ditch 46; County Ditch 53; County Ditch 73	SHRWD; Polk County	2023-2028	Unknown **WBIF**
Upper Reaches of Norman/Polk Ditch	The SHRWD is working collaboratively with the Wild Rice Watershed District (WRWD) to develop solutions to flooding and erosion along the SHRWD southern boundary and in the upper reaches of the Norman/Polk Ditch. The Project Team was initiated in 2023.	Valley and Beach Ridge	Sand Hill River; Norman/Polk Ditch (WRWD)	WRWD; SHRWD	2023-2028	Unknown **WBIF**

Project Name	Description	Planning Region	Targeted Resource	Lead Entity, Partners	Years (Start & End)	Estimated Cost
SHRWD Project 17 Outlet Stabilization Project	Stabilize the outlet of SHRWD Project 17 from channel erosion and bank failure. BWSR Grant awarded in 2021 for implementation. Currently in design phase.	Valley	SHRWD Project 17	SHRWD	2021-2024	$300k **WBIF**
Maple Creek Watershed Project	Develop a multipurpose project to address flooding and erosion concerns within the Maple Creek Watershed. Project has not been developed.	Beach Ridge	Maple Creek	SHRWD, SWCD	2023-?	Unknown **WBIF**
Sand Hill River Restoration	Significant channel erosion has occurred along the Sand Hill River near Polk County Road 44. Develop a project that would restore the Sand Hill River and reduce future channel erosion.	Beach Ridge	Sand Hill River	SWCD, SHRWD, DNR	2023-?	Unknown **WBIF**
Nature Center Erosion	Bank stabilization along the Sand Hill River near the Nature Center (Fertile, MN). Project is on hold waiting on funding.	Beach Ridge	Sand Hill River	To be determined	2023-?	Unknown **WBIF**
SHRWD Project 12 Outlet Stabilization	Erosion at the outlet of SHRWD Project 12 has recently been observed. Develop a project to address the erosion at this location. Project has not been initiated.	Valley	SHRWD Project 12	SHRWD	2023-?	Unknown **WBIF**
Legal Ditch System Bank Stabilization	Address ditch bank stabilization on SHRWD ditch systems as funding is available.	All	All Ditch Systems	SHRWD, County	On-going	Unknown **WBIF**
Legal Ditch System Side Inlet Retrofits	Retrofit ditch systems under the jurisdiction of the SHRWD with side water inlet pipes.	All	All Ditch Systems	SHRWD, County	On-going	Unknown **WBIF**

Project Name	Description	Planning Region	Targeted Resource	Lead Entity, Partners	Years (Start & End)	Estimated Cost
City of Neilsville, MN Flood Control	Provide 100-year flood protection for the community of Neilsville, MN. Preliminary design is complete and waiting on funding for final design and construction.	Valley	Red River of the North & SHRWD Project 24	SHRWD; City of Neilsville, MN	2023-2025 (funding dependent)	$6M
City of Beltrami, MN Flood Control	Provide 100-year flood protection for the community of Beltrami, MN. Design concepts have been developed by the SHRWD. To date, City Council has not been interesting in moving forward.	Valley	Sand Hill River	SHRWD; City of Beltrami, MN	2023-? (Depends in City priorities)	Unknown
Rural Ring Dike Program	Provide technical assistance and construction cost share to interested rural landowners as requested.	Valley	Sand Hill River; Red River of the North; Legal Ditch Systems	SHRWD; Landowners; MN; NRCS	On-going	Unknown
Bear Park Storage Expansion	Increase flood storage provided by the existing Bear Park Dam (SHRWD Project 1) to reduce flood flows in the Valley region of the Watershed. The project is currently on hold.	All	Sand Hill River	SHRWD	2018-?	$10M **WBIF**
Winger Dam	Add flood storage to reduce flood flows along the Sand Hill River, build climate resiliency, and watershed contributions to the Red River of the North main stem. Project is currently on hold.	All	Sand Hill River	SHRWD	2018-?	$10M+ **WBIF**
Garden Slough	Add flood storage to reduce flood flows along the Sand Hill River, and watershed contributions to the Red River of the North main stem. Project is currently on hold.	All	Sand Hill River; Garden Slough	SHRWD	2018-?	Unknown **WBIF**

Project Name	Description	Planning Region	Targeted Resource	Lead Entity, Partners	Years (Start & End)	Estimated Cost
Vesledahl Wetland Water Management	Work with landowners on water management issues adjacent to and through the Vesledahl Wetland banking site.	Headwaters	Vesledahl Wetland banking site	SHRWD; landowners	On-going	Unknown
Legal Drainage Systems	Maintain, improve, establish drainage through 103E Drainage Law.	All	Drainage Systems	SHRWD, County	On-going	Unknown **WBIF**
Water Management Projects	SHRWD will work with project sponsors on a case-by-case basis to build climate resiliency and meet Red River of the North Basin goals. Project examples include but not limited to retention, diversion, and drainage management.	All		SHRWD	On-going	Unknown **WBIF**
Union Lake Erosion Control	Controls the erosion going into Union Lake.	Lakes	Union Lake	SHRWD, LID, SWCD	On-going	Unknown **WBIF**
Union/Sarah Outlet Project	Management of lake water levels.	Lakes	Union and Sarah Lakes	SHRWD	On-going	Unknown
Brady-Kroenig Dam Stabilization	Stabilization and repair of eroding dam.	Headwaters	Sand Hill River	SWCD, NRCS, DNR, to be determined	On-going	Unknown **WBIF**

CIP Operations and Maintenance

Entities within the plan area are participants 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 are included in the GAM. Ditch projects and Watershed District projects funded by other sources are not subject to the GAM. CIPs with a minimum effective life of 25 years will have recommended inspections at the end of years 1, 8, 17, and 24 after certified completion.

Regulation and Enforcement

Many plan projects will be addressed in part through the administration of statutory responsibilities and local ordinances. In many cases, local ordinances have been adopted in counties and cities to conform to or exceed the standards and requirements of the state statutes. LGUs or counties will remain responsible for implementing these programs.

The SHRWD has rule making authority per MN Statute 103D.201 and permitting authority per 103D.315. These rules were adopted in 2014 and are likely to periodically change during the life of this plan. The SHRWD rules are available by reference in Appendix D. Current rules can also been viewed at the SHRWD website (http://sandhillwatershed.org/Rules.html).

Counties and the watershed district will aim to meet approximately once a year to discuss ordinances and counties will notify each other of any proposed ordinance amendments.

Opportunity for building equity

Partners will keep environmental justice in mind when reviewing and enforcing ordinances.

Aggregate Management

Counties manage the extraction and development of aggregate resources through local zoning and ordinances. The MPCA has regulatory authority for industrial stormwater and wastewater. Aggregate extraction facilities must obtain a NPDES/State Disposal System (SDS) permit from the MPCA for stormwater and wastewater discharges.

Aquatic Invasive Species

AIS cause ecological and economic damages to water resources. The DNR has regulatory authority over invasive aquatic plants and animals. Permits are required by the public for transporting lake water, invasive species, and for treating invasive species. In Polk County, the county oversees AIS programs, whereas in Mahnomen and Norman, the SWCD fills that role.

Bluffland Protection

MN State Statute (Section 103F.201) requires that local municipalities and counties with shorelands within their jurisdictional boundaries manage development of shoreland areas. These ordinances reduce the negative impacts of development. Many counties specifically target bluffland areas due to their disproportionate impact on sediment erosion from unstable bluffs.

- **Regulations: Minnesota Statute 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. SHRW counties and SHRWD administer the Buffer Law under specific local ordinances.

- **Regulations: Minnesota Statutes 103B and 103F.48 Subd. 4**

Construction Erosion Control

Construction erosion control is the practice of reducing and preventing the movement of sediment from a site during construction projects. Projects disturbing an acre or more of land require a NPDES Permit from the MPCA. The SHRWD also regulates construction erosion control through their rules.

- **Regulations: Minnesota Rule, 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 MPCA administers the program, but local counties often accept delegation of this authority. Polk and Norman Counties has accepted this delegation, whereas Mahnomen County is not a delegated feedlot county. Instead, the MPCA implements rules in Mahnomen.

- **Regulations: Minnesota Rules, Chapter 7020**

Floodplain Management

Floodplain zoning regulations guide development in the floodplain consistent with the flood threats 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 currently 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 ordinances by Norman and Mahnomen Counties and SHRWD rules. The DNR has oversight on the floodplain management rules.

- **Regulations: Minnesota Statutes 103F, 104, 394**

Groundwater Use

The DNR administers groundwater appropriation permits for all users who withdraw more than 10,000 gallons of water per day or one million gallons per year. SWCDs, 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 management 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. Local emergency management departments are deployed in each of the contributing counties within the SHR1W1P boundary.

- **Regulations: Minnesota Statute 12**

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.

- **Regulations: Minnesota Statute 18**

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 SHRWD has a system of rules and regulations for the management of water within the district, and a list of regulations for different drainage systems (Appendix E).

- **Regulations: Minnesota Statute 103E**

Shoreland Management

The Minnesota Legislature 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 shoreland ordinance by SHRW Counties. The DNR has oversight on the shoreland management rules.

- **Regulations: Minnesota Statute 103F and Minnesota Rules, Chapter 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. 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. Each County has a solid waste ordinance that is administered by the county.

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

Subsurface Sewage Treatment Systems

The SSTS Program is administered by the MPCA to protect the public health and environment. SSTS Ordinances are adopted and enforced at the county level to meet state requirements. Polk, Norman, and Mahnomen Counties administer Minnesota Rules Chapter 7080 through 7083 for SSTSs through local ordinances.

- **Regulations: Minnesota Rules, chapters 7080 through 7083**

Well Code

The MDH administers the well code, which includes well construction standards to protect groundwater resources and requirements to seal unused wells.

- **Regulations: Minnesota Rules 4725**

Wellhead Protection

The Minnesota Department of Health (MDH) administers the state wellhead protection rule that sets standards for wellhead protection planning. A map identifying wellhead protection areas and DWSMAs can be found at: https://mdh.maps.arcgis.com/apps/View/index.html?appid=5051b7d910234421b0728c40a1433baa.

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

Wetland Conservation Act

The Minnesota Legislature passed the Wetland Conservation Act (WCA) of 1991 to achieve the following outcomes for wetlands:

- no net loss
- increase the quantity, quality, and biological diversity
- avoid direct or indirect impacts

LGUs are responsible for administering, regulating, and educating landowners on WCA. In Polk, Norman, and Mahnomen Counties, the SWCDs serve as the WCA LGU.

- **Regulations: Minnesota Rules, Chapter 8420**

Comprehensive or Land Use Plans

Counties and municipalities within the SHRW are responsible for land use planning, which is administered through local zoning ordinances. One main difference between zoning in counties in this planning area is that Polk County has county-wide zoning and Norman and Mahnomen counties do not. 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 SHRW

that have comprehensive and/or land use plans are provided in Table 6.2 below. Please note this is not intended to be all-inclusive.

Table 6.2. Comprehensive, Water, and Land Use Management Plans adopted within the SHR1W1P planning area.

Local Governmental Unit	Comprehensive or Land Use Management Plan (Year Adopted/Revised)
Polk County	Polk County Sustainable Development Comprehensive Plan (1997)
Polk County	Polk County Water Plan (2012)
Norman County	Norman County Comprehensive Development Plan (1970)
Norman County	Norman County Water Plan (2017)
Mahnomen County	Mahnomen County Local Water Management Plan (2008)
Sand Hill River Watershed District	Watershed Management Plan (2012)

Data Collection and Monitoring

The Data Collection and Monitoring Implementation Program funds actions which close data gaps to allow for targeted, science-based implementation strategies. The program also funds ongoing efforts aimed at the development and assembly of data and information. The total cost at the local level is estimated at $20,000 per year (Section 6). Monitoring done by state and federal agencies is a Level 3 cost.

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 two WPLMN site in the SHRW:

- Sand Hill River at Climax (MPCA ID S002-099; USGS ID 05069000, DNR ID 61039001)
- Sand Hill River near Fertile (MPCA ID S003-136, DNR ID 61006002)

The DNR Cooperative Stream Gaging (CSG) database is a shared repository of monitoring data between the DNR, MPCA, United States Geological Survey (USGS), and National Weather Service (NWS). The monitoring sites from the CSG database include:

- Sand Hill River at Climax, MN (DNR ID 61039001)
- Sand Hill River at Beltrami, MN (DNR ID 61026001)
- Sand Hill River near Fertile, MN (DNR ID 61006002)

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. For example, the MPCA plans to assess the SHRW once every 10 years, including the winter of 2024 using data from 2014-2023.

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 (monitored by SWCDs). 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.

Data Gaps

Some specific data gaps discussed during the planning effort include the items below. These items could be investigated during plan implementation.

- Identify additional locations for ditch and streambank stabilization.
- Complete the Geologic Atlas for the watershed
- Continue water quality monitoring with state partners

Education and Outreach

The Education and Outreach Implementation Program funds actions to increase engagement and education to make progress toward plan goals. The program is operated through sharing of services and the total local cost is estimated at $20,000 per year (Section 6). 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:

- BMP handouts
- Ditch landowner meetings
- Mailings: post cards, flyers for special events
- Newsletters
- Open houses for large projects
- County Fair Booth
- Well testing clinics
- Municipal training (hazardous waste, chloride, etc.)

This program is also dedicated to engaging youth in natural resource management. These example activities center around educating youth on the importance of natural landscape and the environmental issues that impact it. School programs include:

  - Envirothon
  - 4-H
  - Arbor Day Trees – possible in future
  - County Fairs

There are also virtual educational opportunities. Many local government staff use social media (e.g., Facebook, Twitter, and YouTube) to educate and inform the public on local resource issues and upcoming events. These platforms serve to communicate important watershed information easily and effectively in a timely manner.

Opportunity for building resiliency

Resiliency is not only thought of in terms of natural resources, people and organizations also help build resiliency. Investing in environmental education for watershed residents and youth builds a community that will support implementation efforts.

Achieving Plan Goals

Figure 6.3 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. Annually, the numbers about practices implemented will be tracked. At the mid-year point in the plan (5 years), the planning group will compare the work activities completed to the work activities in the plan to evaluate progress. At the 10-year point, the results will be evaluated by measuring changes in resource condition with monitoring data and models. All throughout the process, results will be shared with stakeholders and the public to maintain support for watershed activities.

Figure 6.3. Tracking methods during implementation.

Photo credit: Wayne Goeken

Section 7

Plan Administration

Section 7. Plan Administration and Coordination

The Plan Administration and Coordination section 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 SHR1W1P will be implemented through a memorandum of agreement (MOA) (Figure 7.1).

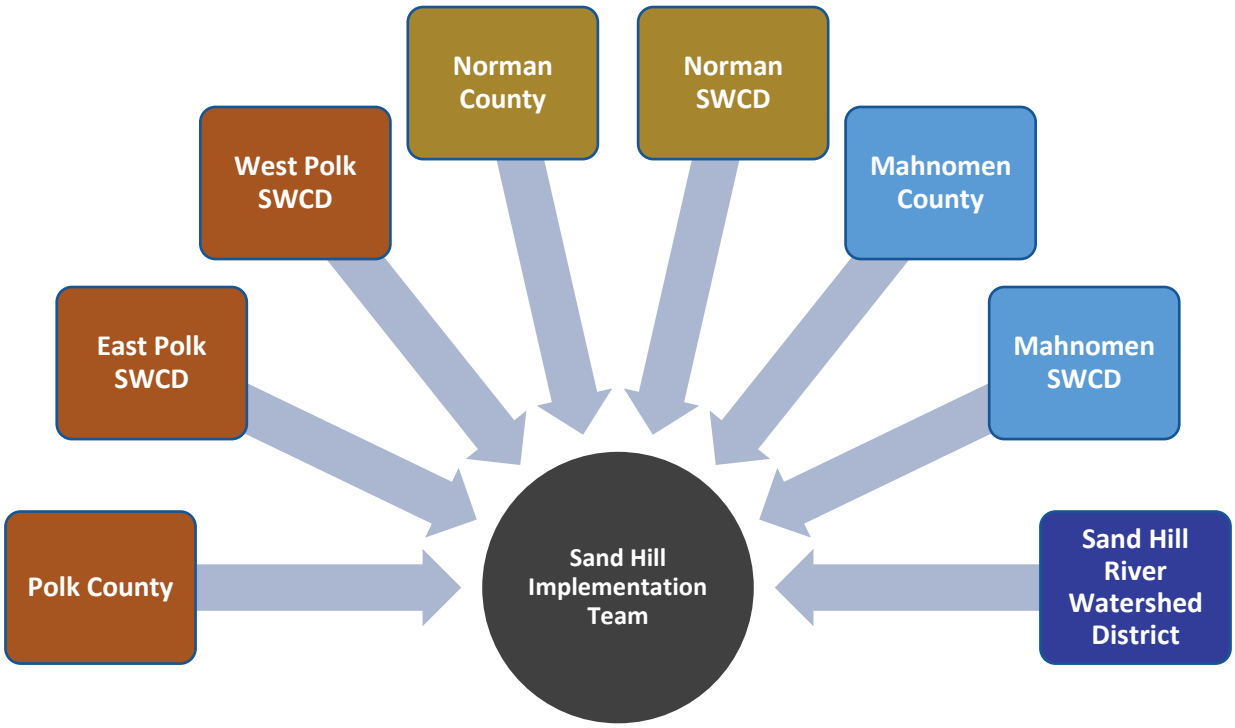


Figure 7.1 Members of the memorandum of agreement for the implementation of the SHR1W1P.

Decision-Making and Staffing

Implementation of the SHR1W1P 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.

Three committees will serve this plan during implementation:

1. Policy Committee: Comprised of Policy Committee members from the planning process (one board member from each county, SWCD, and the SHRWD).
2. Advisory Committee: Comprised of SHRW Steering Committee and Advisory Committee members from the planning process (local stakeholders including state and federal agencies).
3. Steering Committee: Comprised of SWCD and SHRWD Staff and the BWSR Board Conservationist.

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 as outlined in the formal agreement. Responsibilities for annual work planning and serving as the fiscal agent can be revisited by the SHRW Implementation Team in the future if needed.

Table 7.1 Anticipated roles for SHR1W1P Implementation.

Committee Name	Primary Implementation Roles/Functions
Policy Committee	• 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 • Approve grant applications
Advisory Committee	• Meet annually or as needed • Review and provide input for the annual work plan • Review and identify collaborative funding opportunities • Recommendations to Steering Committee on program adjustments • Assist with execution of the targeted implementation schedule
Steering Committee	• Meet monthly or as needed to review projects • Review the status of available implementation funds from plan participants • Review annual fiscal reports • Review annual reports submitted to BWSR • Prepare plan amendments • Prepare the biennial work plan • Prepare and submit grant applications/funding requests • Research opportunities for collaborative grants • Implement the targeted implementation schedule
Local Fiscal/Administrative Agent and Coordinator	• Convene committee meetings • Report on how funds were used • Compile annual results for annual assessment

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 planning partners will pursue opportunities for collaboration with fellow planning partners to gain administrative and program efficiencies, pursue collaborative grants, and provide technical assistance. The planning partners 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. Setting up the MOA for plan implementation means that partners can collaborate on applying for grants and other funding.

There are already some shared services between planning partners.

East Polk and West Polk SWCD share a feedlot officer.

Collaboration with Other Units of Government

The SHRW Implementation Team will continue coordination with other governmental units. This cooperation and coordination occur at the local, state, federal, international and or tribal level. At the state/federal level, coordination between the Partnership and agencies such as BWSR, US Army Corps of Engineers (USACE), 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 SHRWD 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), Wellhead Protection for city DWSMAS (MRWA and MDH), and WRAPS (MPCA). Collaboration with Tribal Nations can occur on projects, monitoring, and outreach. Any potential project collaborations would be subject to Tribal Council approval. The SHRW Implementation Team may also collaborate with MNDOT and other transportation authorities on water quality enhancements during road projects.

The local governments collaborate with their counterparts through statewide organizations including those listed below.

Minnesota Watersheds (MW)

Minnesota Association of SWCDs (MASWCD)

Association of Minnesota Counties (AMC)

The Red River of the North Basin already has a high level of collaboration on a basin-wide scale as outlined below. The SHRW 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 of the North Basin

Due to the long history of flooding in the Red River of the North 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.

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 Watershed Management Board (RRWMB)

The RRWMB's jurisdiction and authority encompasses the area managed by the individual watershed districts that have membership on the board. SHRWD is not a member of the board but does partner where they align.

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 facilitation implementation and construction of retention in the Red River of the North Valley.

Flood Damage Reduction Work Group (FDRWG)

The FDRWG administers a 1998 Mediation Agreement on flood damage reduction and natural resource enhancement. Co-Chaired by the DNR and RRWMB, the FDRWG provides guidance, funding and oversight to watershed districts and their project teams for collaborative development of flood resiliency projects in Minnesota's portion of the Red River of the North Basin. The FDRWG also

provides recommendations for funding these projects from bond funds administered statewide by DNR's Flood Hazard Mitigation program.

Red River Valley Conservation Service Area (RRVCSA)

The RRVCSA is a collaboration of Minnesota SWCDs in the Red River of the North Valley to provide engineering assistance to private landowners, via SWCDs, for a variety of non-point water quality management practices.

International Water Institute (IWI)

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

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 includes 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 SHRW Implementation Team expects to continue and build upon 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, Ducks Unlimited, Sportsman's Clubs, local co-ops, University of Minnesota Extension, civic groups, private businesses, individuals, and foundations.

Agassiz Environmental Learning Center partners on watershed education for youth.

Glacial Ridge Local Technical Team (GRLTT) through the MN Prairie Conservation Plan collaborate on grassland habitat and restoration projects.

Funding

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

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 SHRW. Level 1 funding includes local, state, and federal funding, as explained in the following sections.

Level 2 funding is Level 1 funding plus the WBIF, state funding through the Clean Water Land and Legacy Amendment, which will be available upon completion of this plan. WBIF is estimated at $350,000 per year ($700,000 per biennium).

Level 3 funding summarizes partner projects and other funding sources that help make progress to plan goals. The number in Table 7.2 for Level 3 is likely an underestimate because it doesn't include any expenditures from landowners or completed without state funding.

Throughout the implementation of the SHR1W1P, the SHRW Implementation Team expects to operate at Level 2 funding. The total for each level is summarized in Table 7.2.

Table 7.2 Estimated implementation funding for the SHR1W1P.

Funding Level	Description	Estimated Annual Average	Estimated Plan Total (10 years)
1	Baseline Funding for Current Programs	$1,600,000	$16,000,000
2	**Baseline + WBIF**	**$1,950,000**	**$19,500,000**
3	Partner/Other Funding (NRCS, USFWS, CRP, Lessard-Sams, MPCA, DNR, RRWMB)	**~$2,000,000**	**~$22,000,000**

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 E). Watershed districts can establish water management districts (WMD) to fund projects under current law (103D). These WMDs must be included in watershed plans adopted by watershed districts.

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.

Water Management Districts

This funding option can only be used to collect charges to pay costs for projects initiated under MINN. STAT. Chapters 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730. The mechanisms and principles of MINN.STAT. Chapter 444.075 must be followed for the development of water management district charges established through MINN.STAT. Chapter 103D.729. This information and the descriptions below are documented by BWSR (available online: https://bwsr.state.mn.us/water-management-districts).

To use this funding method, Minnesota law (MS 103D.729) requires that the area to be included in the WMD be described, the amount to be charged identified, the methods used to determine the charges be described, and the length of time the WMD is expected to remain in force specified. These steps are being completed through this plan, but the WMDs will not be "turned on" until a project is ordered.

Description of WMDs

This section describes the pathways by which SHRWD would proceed in establishing a WMD. This plan establishes the four planning regions as WMDs (**Figure 7.2**). SHRWD may create different WMDs under future plan amendments.

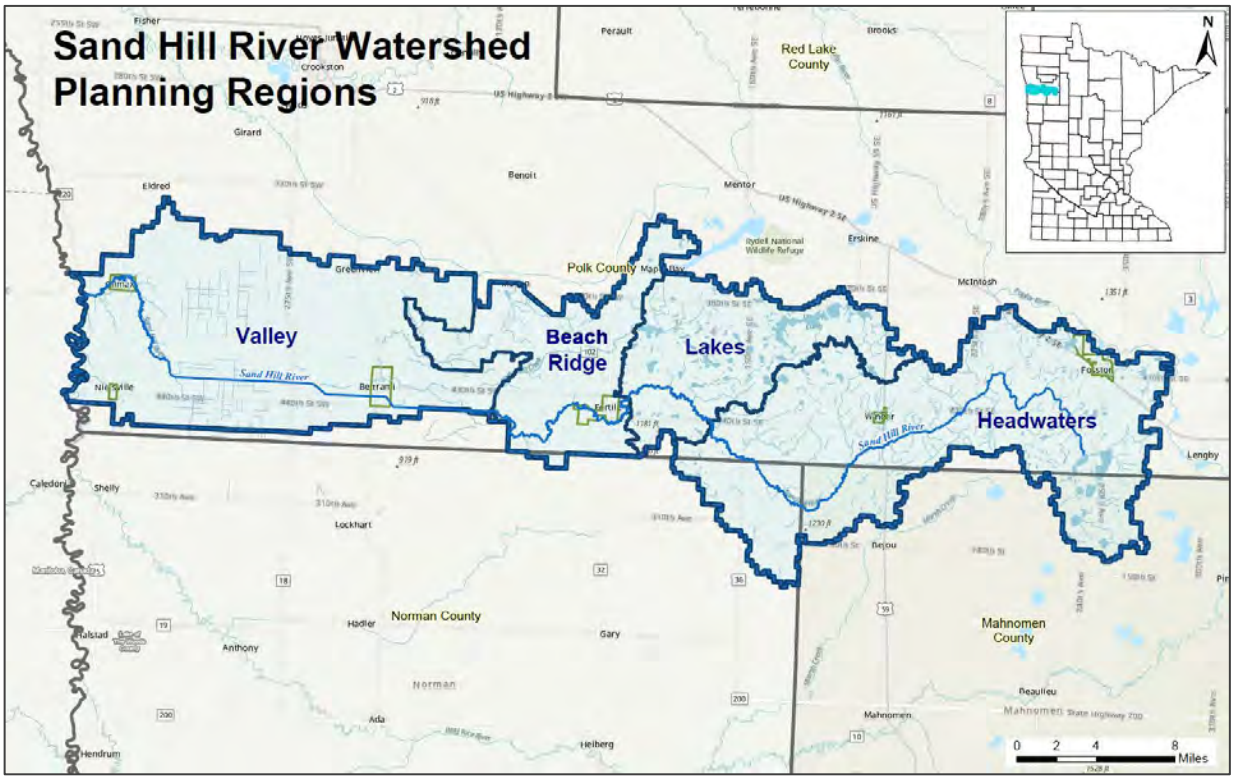


Figure 7.2 Planning regions in the SHRW.

Duration of Existence of WMDs

The SHRWD anticipates that the WMDs will provide funding to assist with the implementation of a variety of runoff, bank stabilization, flood damage reduction, and/or water quality related projects. The duration of the WMD would be in perpetuity.

Use of Funds

The primary use of funds collected from charges within WMDs will support projects that help achieve the goals of this CWMP, which benefits residents within a WMD.

Annual Charge Amount

The maximum WMD revenue limit within each WMD is based on 0.10% of the taxable market value within each WMD. This value will change each year as property values increase or decrease over time.

Method to Determine Charges

The methods proposed to establish the charges will be based upon the proportion of the total annual runoff volume and/or solids load contributed by a parcel or may be based on the drainage area of the parcel within a WMD.

Option 1: The runoff volume method will:

- Use soils and land use data to determine the existing curve number for each parcel within a WMD;
- Use the curve number for each parcel and the annual average precipitation depth to compute the annual runoff volume for each parcel;
- Sum the annual average runoff volumes for all parcels within a WMD to determine the total annual runoff volume; and
- Compute the percentage of the annual runoff volume from each parcel as the ratio of the annual average runoff volume from the parcel and the total annual average runoff volume for the WMD (i.e., the "runoff ratio").

Option 2: The solids load contribution method will:

- Use the Revised Universal Soil Loss Equation and a sediment delivery ratio representing the portion of the solids and sediment reaching a watercourse to compute the annual average sediment and solids load for each parcel;
- Sum the annual average solids and sediment loads for all parcels within a WMD to determine the total annual average sediment and solids load; and
- Compute the percentage of the annual average sediment and solids load from each parcel as the ratio of the annual average sediment and solids load from the parcel and the total annual average sediment and solids load for the WMD (i.e., the "sediment ratio").

Option 3: The combination runoff volume and solids load method will:

- Consider both runoff volume and solids load contribution and would follow the methodologies listed above for both solids contribution and runoff volume;
- Add the runoff ratio and/or the sediment ratio to compute the charge ratio for each parcel within the WMD. The amount charged to a specific parcel is the sum of the runoff ratio and the sediment ratio for the parcel divided by the sum of the runoff ratio and the sediment ratio for all parcels within the WMD; and
- Apply the charge ratio to the total amount of revenue needed for the WMD to carry out the stormwater related projects, programs, and activities described by the plan to achieve the stormwater related goals within that WMD.

Option 4: The drainage area method will:

- Determine the drainage area of each parcel of land within the planning region;
- Compute the charge based on the charge ratio which is determined by taking the drainage area of that parcel within the planning region divided by the total area of the planning region; and
- Apply the charge ratio to the total amount of revenue needed for the WMD to carry out the stormwater related projects and programs described by the plan to achieve the stormwater related goals within that WMD.
- Selection of the appropriate process of determining charges will be established and further refined in Step 3 of the process described in the next section.

How to Establish a Project in the WMD

The following steps can be completed any time during the 10-year watershed district plan cycle.

1. Watershed district establishes project(s) in the water management district following appropriate statute (MINN.STAT. Chapters 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730).
    a. Projects implemented must be ordered by the Watershed District managers.
    b. Order for project must specify funding method(s).
    c. Watershed district must notify counties, cities, and towns within the affected area at least 10 days prior to a hearing or decision on projects implemented under this section of statute.
2. Watershed district refines methodology for computing charges based on final project scope.
3. Watershed district determines and sets charges for all properties within the water management district after identifying scope of the project and deciding method(s) of funding the project.
4. Watershed district develops collection mechanism:
    a. Request county to collect.
    b. Contract with private vendor (e.g., electric cooperative).
    c. Billing and collection by watershed district.
5. Watershed district establishes a separate revenue fund for proceeds collected from the fee or stormwater utility charges.

Local Appeal Procedure

Because WMDs established under this plan are proposed to be perpetual, the following local appeal procedure is established from the resolution adopting the plan establishing a WMD:

1. Upon receipt of the order of BWSR approving the plan establishing a WMD, the WD shall publish notice of its resolution adopting the plan in a newspaper in general circulation in the SHR1W1P area.
2. Any landowner affected by the WMD may, within 30 days of first publication of notice of the resolution, appeal the establishment of the WMD to the WD by filing a letter stating the basis for the appeal.
3. Within 30 days of receiving a letter of appeal, the WD shall hold a hearing on the appeal, giving the appellant an opportunity to be heard and to present evidence why the WMD should not be established. The hearing shall be noticed as required for a special meeting under statutes chapter 103D.
4. The hearing shall be recorded in order to preserve a record for further review. The record of the appeal shall include the recording, any documentary evidence provided by the appellant, and all records related to the establishment of the WMD.
5. Within 30 days of the hearing, the WD shall adopt and mail findings and an order on the appeal to the appellant and the BWSR.
6. Further appeal, if any, shall be as provided in Statutes Chapter 103D and existing authorities and procedures of the BWSR Board.

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.

The SHRW Implementation Team can 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 SHRW as one or more non-competitive WBIF 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 EQIP, 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 BMPs, while the FSA may provide land-retirement program funds such as CRP (Table 7.3).

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 as well as increased capacity.

Plan participants may pursue grant opportunities collaboratively through the SHRW Implementation Team or individually to fund implementation of the targeted implementation schedule. Within the targeted implementation schedule, actions are assigned implementation programs. Table 7.3 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.

Table 7.3 Implementation programs and related funding sources for the SHRW. Note: List is not all-inclusive.

Program/Grant		Primary Assistance Type	Projects & Practices	Capital Projects	Data Collection & Monitoring	Education & Outreach
Federal Programs/Grants						
NRCS	Conservation Innovation Grant (CIG)	Financial	•			
	CSP	Financial	•			
	EQIP	Financial	•			
	Agricultural Conservation Easement Program (ACEP)	Easement	•			
FSA	CRP	Easement	•	•		
	Conservation Reserve Enhancement Program (CREP)	Easement	•	•		
	Farmable Wetlands Program (FWP)	Easement	•			
	Grasslands Reserve Program (GRP)	Easement	•			
	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	•			
	Drinking Water State Revolving Fund (DWSRF)	Loan	•			
	Section 319 Grant Program	Financial	•		•	•
State Programs/Grants						
OHF	Lessard-Sams Outdoor Heritage Fund	Financial	•	•	•	•

Program/Grant		Primary Assistance Type	Projects & Practices	Capital Projects	Data Collection & Monitoring	Education & Outreach
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	•			•
	RIM	Financial	•	•		•
MPCA	Surface Water Assessment Grants (SWAG)	Financial			•	•
	Clean Water Partnership	Loan	•		•	
	Clean Water Revolving Fund (SRF or CWRF)	Financial	•	•		
	Water Infrastructure Fund	Financial	•	•		
	Point Source Implementation Grants	Financial	•	•		
MDH	Source Water Protection Grant Program	Financial	•		•	•
MDA	Agriculture BMP Loan Program	Financial	•			
	Minnesota Agricultural Water Quality Certification Program	Financial	•			•
PFASC WTP	Public Facilities Authority Small Community Wastewater Treatment 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	•	•	•	•

Grant Programs to Make Progress Towards Goals

Water Quality and Storage

The Water Quality and Storage Grant Program is a program through BWSR, through which municipalities, SWCDS, or joint powers with a water management plan may receive funding for water storage projects.

- Could be used to address the 'increase water storage' goal

Climate Resiliency

MPCA has climate-planning grants for communities to improve stormwater or wastewater system resilience, reduce flood risk, and adapt community services, ordinances, or spaces.

- Could be used to address the 'flood damage reduction' goal

RIM

BWSR expanded the RIM conservation easement program to create a subset of the program that specifically is for easements that contribute to 1W1P plan goals.

- Could be used to address the 'improve habitat' and 'stabilize streams' goals

Soil Health

BWSR has up to $3.5 million in Clean Water Funds to support soil health practices for SWCDs, watershed districts, municipalities, and counties.

- Could be used to address the 'improve soil health' goal

Work Planning

Local Work Plan

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

State Funding Request

The SHRW Steering Committee will collaboratively develop, review, and submit a biennial watershed-based funding request from this plan to BWSR. This request will be submitted to and ultimately approved by the SHRW 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 SHRW Steering Committee will provide the SHRW Policy Committee with an annual update on the progress of the plan's implementation, with input from the Advisory Committee. For example, any new projects will be tracked against their goal metrics such as miles of ditch stabilization, 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 SHW Steering Committee will review the SHR1W1P 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, SHRWD, and partners such as state agencies and non-governmental organizations. This feedback will be presented to the SHRW 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 midpoint evaluation. Plan partners intend to pursue watershed-based funding to meet goals and plan implementation schedules.

Midpoint Evaluation

This plan has a ten-year life cycle beginning in 2024. 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 2029-2030 and at every 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

LGUs have several annual reporting requirements. A number of these reporting requirements will remain a responsibility of the LGUs. The Plan Coordinator, with the assistance of the SHRW Steering Committee, will be responsible for reporting related to grants and programs developed collaboratively and administered under this plan. In addition to annual reports, the SHRW Steering Committee, with input from the Advisory Committee, may also develop a Watershed Update. This update 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 Watershed Update will be developed through the annual evaluation process.

The fiscal agent is responsible for submitting all required reports and completing annual reporting requirements for SHR1W1P as required by state law and policy. The SHRW Steering Committee will assist in developing the required reports and roles and responsibilities will be defined in the MOA Bylaws.

Plan Amendments

This plan extends through 2033 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 CIPs.

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, SWCD, or WD, but only the SHRW Policy Committee can initiate the amendment process. All recommended plan amendments must be submitted to the SHRW 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 SHRW 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 SHRW 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 SHRW Policy Committee or the 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 illustrated in Figure 7.3.

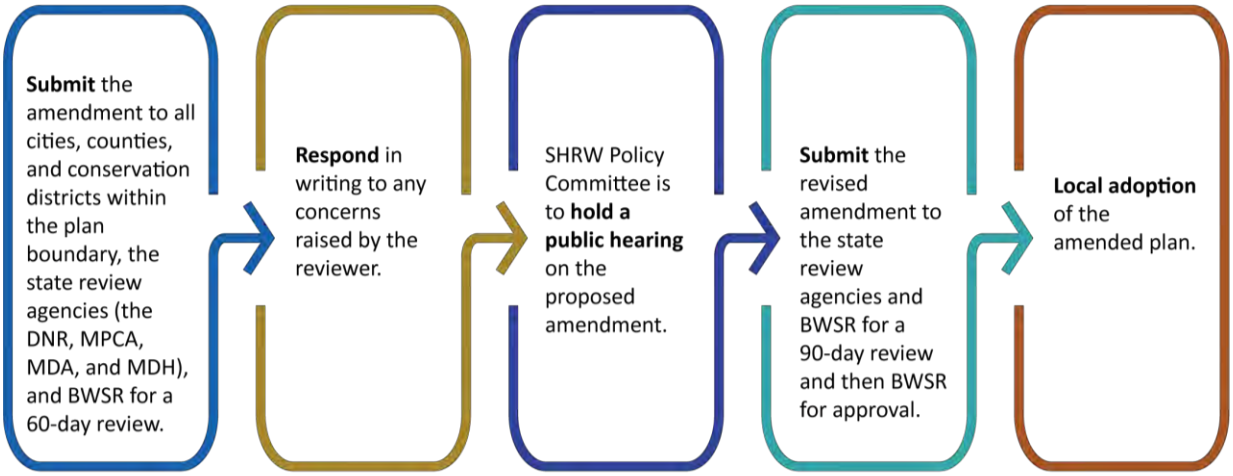


Figure 7.3 Plan amendment process.

At the discretion of the SHRW 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 CIP 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 SHRW 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.

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 SHRW Implementation Team 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.

Formal Agreements

The SHR1W1P will be implemented through a newly formed governmental unit for watershed plan implementation - a Joint Powers Collaboration/MOA between Polk, Norman, and Mahnomen Counties, East and West Polk, Norman, and Mahnomen SWCDs, and the Sand Hill River Watershed District (Figure 7.1, Appendix F).