SECTION 5.0 MEASURABLE GOALS

The following definitions were developed to establish a common language for communicating information:

- Measurable Goal: A statement of intended accomplishment for each priority issue. Goals are meant to be simply stated and achievable, can be quantitative or qualitative, long or short-term, and are meant to be measurable through the implementation of actions to attain a desired outcome.
- Short-Term Goal(s): Interim conditions to accomplish or make progress towards during the 10-year lifespan of this plan;
- Desired Future Condition~~Long-Term Goal~~(s): The ~~desired future condition~~long-term goal to accomplish, regardless of timeframe.

5.1 Establishing Measurable Goals

Short and long-term measurable goals are presented for each Tier 1 priority issue established in Section 4. A variety of information was used to develop goals, including:

- Percent reduction targets~~Goals~~ from the Watonwan River Watershed Restoration and Protection Strategies report (WRAPS) and the Watonwan River Watershed Groundwater Restoration and Protection ~~and Restoration~~ Strategies Report (GRAPS)~~;~~ (Appendix ~~K~~C);
- Results from the Prioritize, Target, and Measure Application (PTMApp);
- Input from Advisory and Policy Committee members; and
- The knowledge of local water and resource managers provided by the Steering Team.

5.2 Measurable Goals

Measurable goals for Tier 1 priority issues are organized into chapters by resource. Each resource chapter contains a cover page summarizing which resource concerns will be addressed, and if applicable, the planning region priority for the resource (Figures 5-1 through 5-3). Because the WRW is large and issues impact certain areas more than others, this plan prioritizes measurable goals for ~~each resource (~~surface water, groundwater, and habitat resources~~)~~ at the planning region scale. The weighting criteria for prioritization consist of a variety of geospatial data, data from PTMApp, input from the Steering Team and Advisory Committee, the WRAPS, and the GRAPS. Prioritization criteria and relation to measurable goals is shown in Appendix ~~C~~D.

Planning region resource prioritization is where planning partners aim to implement practices laid out in the target implementation plan outlined in Section 6 to address priority issues and make progress towards goals. In example, when working on surface water issues, implementation preference will go towards projects in higher priority surface water planning regions (i.e. South Fork Watonwan River planning region). Other considerations, such as funding opportunities, local government capacity, and landowner willingness are just as vital for determining where implementation will occur. Planning region resource prioritization sets a framework to focus on the prioritized planning regions but allows funding to lower prioritized areas if needed.

SURFACE WATER MEASURABLE GOALS

This chapter sets measurable goals for:

- ✓ Agricultural Drainage Systems
- ✓ Lakes
- ✓ Rivers and Streams
- ✓ Wetlands
- ✓ Surface Runoff and Flooding

Figure 5-1: Planning regions that are highest priority (shown by red) and lowest priority (shown by dark green) for surface water resources in the WRW.

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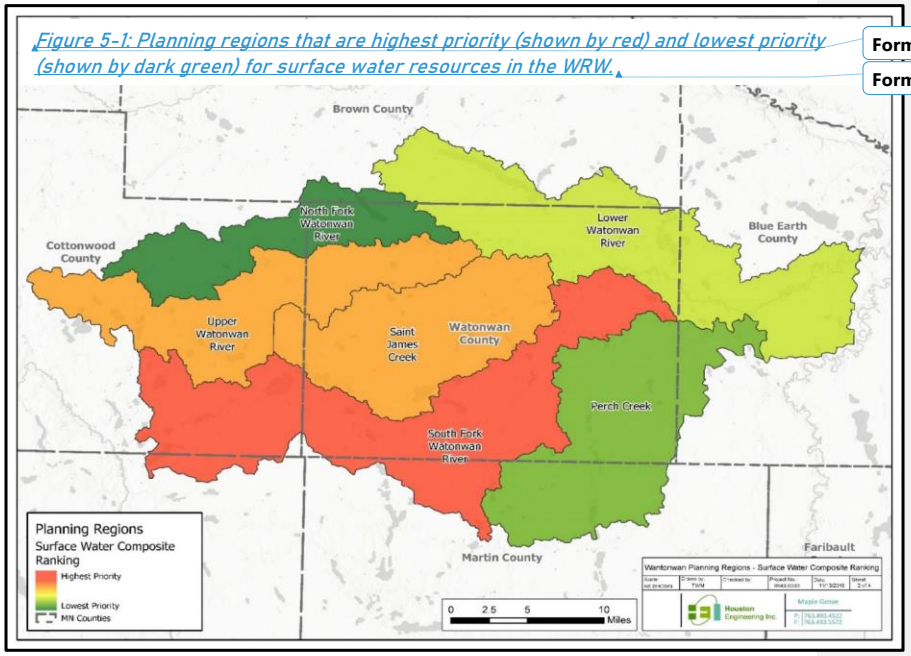


Surface water is the highest priority within the South Fork Watonwan River Planning Region.

RESOURCE CONCERN: AGRICULTURAL DRAINAGE SYSTEMS

✓ Issue SW 1.1: Level of multipurpose drainage management utility to reduce downstream peak flows and flooding, reduce erosion and sedimentation, and protect or improve water quality.

There is a need to improve water quality and flood resiliency within the watershed while maintaining adequate drainage for productive agricultural lands. The intent of this issue statement is to increase the level of multipurpose drainage management (MDM) practices within the watershed. This goal centers around ~~multipurpose drainage management~~ MDM as an opportunity to improve water quality and flood resiliency in tandem with the maintenance and repair of drainage ditch systems.

Prior to settlement, land in the WRW was covered by native prairie, big woods, lakes, marshes, rivers and streams. Now, agriculture is the predominant land use, with corn/soybean rotations accounting for 93% of cropped lands (Greater Blue Earth Basin Alliance, 2018). The land has been extensively tiled and ditched in attempt to support productive agricultural practices. In addition to land management changes, large storm events have become more prevalent in recent decades creating added management issues. Challenges in weather, land-use, and water resource management have developed from the attempt to balance the effect in surface water runoff, subsequent erosion, sedimentation, and floodplain management. Achievement of the goals below will also result in sediment (or TSS) and nutrient loading benefits.

Measurable Goals

Short-Term:

- ✓ SW 1.1a: Coordinate with the drainage authorities to implement multipurpose drainage management (MDM) on 10 public drainage systems to improve water quality and flood resiliency in tandem with the maintenance and repair of drainage systems.
- ✓ SW 1.1b: Develop an MDM plan and set 5-year and 10-year goals for anticipated future conditions.

Desired Future Condition~~Long-Term~~:

- ✓ ~~Extend short-term MDM implementation and annual outreach goal~~Implement MDM on 100% of drainage systems.

RESOURCE CONCERN: AGRICULTURAL DRAINAGE SYSTEMS

✓ Issue SW 1.2: Lack of conservation practices on drainage systems.

Through time, there has been significant alteration of the natural landscape ~~in order to~~to develop drainage systems (e.g., surface and subsurface drain tile, and drainage ditches) for supporting agricultural practices in the watershed. Because of these alterations, a greater degree of conservation implementation is needed across these systems to improve water quality and reduce system maintenance and repair costs.

This goal will identify drainage systems most in need of conservation and what type of conservation will be of most value and benefit.

Measurable Goals

Short-Term:

- ✓ SW 1.2a: Drainage systems that are in need of repair and would benefit from conservation practices are identified through coordination with partners.

Desired Future Condition~~Long-Term~~:

- ✓ Continue to identify systems that would benefit from conservation practices and implement beneficial conservation practices. ~~Extend short-term goals~~

RESOURCE CONCERN: LAKES

✓ Issue SW 2.1: Elevated nutrients and sediment in lakes.

According to the Watonwan River Watershed WRAPS, there are 35 lakes over 100 acres in the WRW. Of those 35, monitoring was conducted on 11 lakes for aquatic life (fishing) and 15 lakes for aquatic recreation (swimming). Five lakes are impaired for aquatic life (Hanska, Mountain, Bingham, Fish, and Long) and four lakes are impaired for aquatic recreation (Bigham, Eagle, Kansas, and Butterfield). Only one lake was found to support aquatic life (St. James), and two support aquatic recreation (Fish and St. James) (MPCA, 2020a).

Aquatic recreation impairments in lakes are identified by lake clarity and algae-fueling phosphorus. Aquatic life impairments in lakes are identified by the populations (numbers and types) and balance of fish and bugs within the waterbody. Nutrient and sediment loading into lakes creates responses in the biologic functions of the lake. Some of these reactions affect the amount of sunlight that enters the water and dissolved oxygen that is required for life.

There is a need to enhance shoreline health, provide education for lake communities, and provide technical and financial assistance to lakeshore owners to install best management practices that reduce nutrients and sediment loading to watershed lakes. These actions will be focused in areas that contribute to priority lakes (Table 5-1). These prioritized lakes align with the areas prioritized for restoration and protection efforts as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23), and by local partners as part of the 1W1P planning process.

Measurable goals to address nutrient and sediment loads in lakes are based off 10-year phosphorus reduction targets in the WRAPS (MPCA, 2020a). Sources of phosphorus for impaired lakes are presented in Table 13 of the Watershed River Watershed TMDL (MPCA, 2020b). This information can be used during implementation to track progress towards stated load reduction goals.

Table 5-1: Priority lakes for elevated nutrients and sediment.

Lake Name	Classification	Prioritization Criteria	Planning Region
Butterfield Lake	Restoration	• Tipping Point: Barely Impaired*	Saint James Creek
Fish Lake	Protection	• Protection of Supporting Waters* • High sensitivity to nutrient loading. Nutrient management and other BMPs are especially important in the watershed of this lake**	South Fork Watonwan River
Bingham Lake	Protection	• Additional development.**	South Fork Watonwan River
St. James Lake	Protection	• Protection of Supporting Waters* • Due to the small lake to watershed area, this system would likely respond well to a variety of agricultural and urban water quality BMPs.**	Saint James Creek
Kansas Lake	Restoration	• Dirtiest Waters*	Saint James Creek

Lake Name	Classification	Prioritization Criteria	Planning Region
		• Landuse zoning including Shoreline management would help assist the already established fishery from future degradation or development pressure.**	
Lake Hanska	Restoration	• Popular Recreational Water Bodies*	Lower Watonwan River
Fedji Lake	Restoration	• This lake may benefit from a Lake Management plan, including potential draw downs and vegetative management.**	Lower Watonwan River

** See WRAPS Table 23 for more information on prioritization criteria*
*** Prioritized based on local and partner input during the 1W1P planning process*

Measurable Goals

Short-Term:

- ✓ SW 2.1a: Restoration~~:~~ Achieve a 10% reduction in phosphorus load in lakes identified for restoration.
- ✓ SW 2.1b: Protection~~:~~ Achieve a no-net increase in phosphorus loading to lakes identified for protection.

Desired Future Condition~~Long-Term~~:

- ✓ Waterbodies achieve their water quality standards. ~~Extend short-term Restoration and Protection goals~~

RESOURCE CONCERN: LAKES

✓ Issue SW 2.2: Management of lake levels and associated watershed flow conveyance.

Lakes serve communities and enthusiasts as places of respite and recreation. Fluctuating water levels, decreased vegetative cover, declining native plant species composition, and increased impervious surfaces all contribute to decreasing water clarity and the quality of lake water and habitat.

There is a need in the WRW to increase dialog on lake level management. This plan intends to jointly collaborate with lakeshore residents and the DNR to pursue outreach efforts and informational materials. This effort will encourage further exploration on this topic with the public and plan partners ~~in order to~~to improve the quality and sustainability of lakes in the watershed.

Measurable Goals

Short-Term:

- ✓ SW 2.2a: Conduct 2 educational outreach efforts with the DNR to discuss lake ~~level~~ management.

Desired Future Condition~~Long-Term~~:

- ✓ ~~C~~Continue to conduct educational efforts to encourage the development of lake management plans with local partners. ~~ontinue to conduct educational outreach efforts~~

RESOURCE CONCERN: RIVERS AND STREAMS

✓ Issue SW 3.1: Elevated nutrients and sediment in rivers and streams.

Our rivers and streams are powerful and symbolic features on the landscape. Though nutrient and sediment transport is a natural process, excess nutrients and sediment in rivers and streams can impact aquatic life and recreation (e.g., swimming and fishing). The WRW has 79 stream reaches. At the time of developing this plan, 39 were monitored to assess the designated use of aquatic life, yielding 32 impairments. Similarly, 16 streams were monitored to assess the designated use of aquatic recreation, of which 15 were impaired (MPCA, 2020a).

Excess nutrients, especially nitrogen, can also impact the quality of surface water drinking water supplies. The City of Mankato and MDH have drafted a Source Water Assessment for public water supply which outlines some of the nitrate issues the drinking water supplier is facing. The Lower Watonwan River planning region has 16,872 acres within the Mankato Surface Water Drinking Water Supply Management Area. This contributes source water to the city Ranney well as it joins with the Blue Earth and Minnesota Rivers. Mankato Well 13, which is the Ranney well that is closest to the Blue Earth River, had nitrate concentrations at or above the drinking water maximum contaminant level (MCL) standard of 10 mg/L during two periods. The first period occurred during June of 2013, when raw water concentrations exceeded 12 mg/L, while nitrate in the Blue Earth River was between 10.9 and 21.7 mg/L. The second period coincided with the 2015-2016 high nitrate period. Well water nitrate was measured at 10 mg/L on December 2, 2015, before dropping below the MCL for most of the rest of the winter. Samples collected from April through July 2016 were found to be at or above the MCL, with the June 10 sample measuring 14 mg/L.

Nitrate concentration in Well 13 has remained below the MCL since, with a maximum concentration of 7.6 mg/L being observed in June of 2017. Post-treatment, or entry point, concentrations of nitrate have been kept below the MCL through blending. The city of Mankato is able to blend their shallow wells with nitrate-free well water from deeper aquifers to achieve high quality, low nitrate finished water. As a result, while Well 13 was pumping water high in nitrate in 2015-16, finished water did not exceed 5 mg/L.

During implementation, actions will be pursued to reduce nutrient and sediment delivery to WRW rivers and streams, aimed at protecting and restoring aquatic life, aquatic recreation, and drinking water quality. These actions will be preferentially focused to areas that contribute to priority rivers and streams (Table 5-2). These prioritized rivers and streams align with the areas prioritized for restoration and protection efforts as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23).

Table 5-2: Priority rivers and streams for elevated nutrients and sediment.

River or Stream Name	Prioritization Criteria*	Planning Region
Nitrogen		
Unnamed Creek reach 505	Restoration- Tipping Point: Barely Impaired	Upper Watonwan River
Watonwan River reach 501	Local and Partner Input**	Lower Watonwan River
Sediment		
North Fork of the Watonwan River	Restoration- Tipping Point: Barely Impaired	North Fork Watonwan River
Butterfield Creek	Restoration- Tipping Point: Barely Impaired	Saint James Creek
Watonwan River reach 563	Restoration- Tipping Point: Barely Impaired	Lower Watonwan River
St. James Creek	Restoration- Dirtiest Waters	Saint James Creek

** See WRAPS Table 23 for more information on prioritization criteria*
*** Prioritized based on local and partner input during the 1WIP planning process*

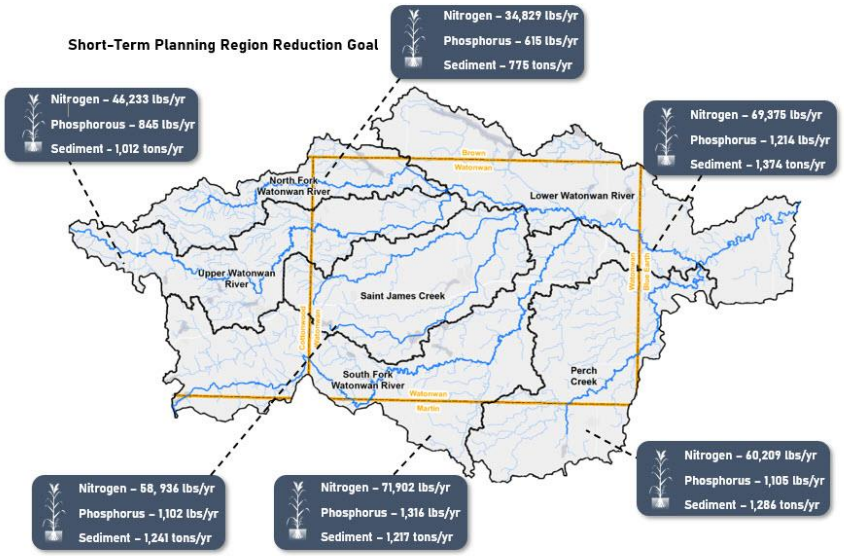
Nutrient and sediment load reduction goals were created for each planning region, shown in maps on the following page. Load reduction goals are based on application of WRAPS-defined percentage reduction targets~~goals~~ (MPCA, 2020a; Table 4) to calculated Prioritize, Target, and Measure Application (PTMApp) mass loads. Th~~is plan's~~e short-term ~~planning region~~load reduction goals ~~are~~ represent ~~the percent of PTMApp-calculated mass reduction to meet~~ the WRAPS 10-year target for that parameter, while the long-term goal applies the watershed wide reduction percentage target. During implementation, the group will evaluate methods to align the information from WRAPS monitoring and modeling with information derived from PTMApp.

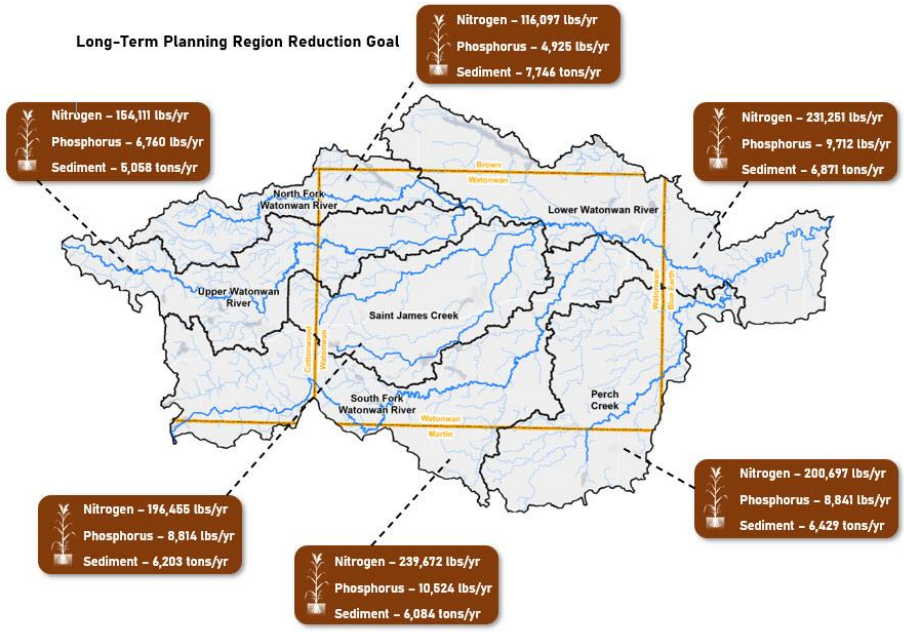
Table 5-3 below provides a comparison between PTMApp-calculated loads and Watershed Pollutant Load Monitoring Network (WPLMN) data outlined on pg. 77 of the Watonwan WRAPS. PTMApp-calculated watershed outlet loads are within the observed range of high-year and low-year WPLMN monitored values for sediment and total phosphorus. Total nitrogen load calculated by PTMApp is below the observed range high-year and low-year WPLMN monitored values, though close to the monitored load in 2009. Individual planning region loads, when summarized together, exceed the PTMApp-calculated total watershed outload. This is observed due to summation of planning region outlet loads not incorporating a load decay function that removes mass of parameter delivered based on distance traveled. More information on the theory and mechanics of PTMApp may be found in Appendix ~~O~~L.

Table 5-3: PTMApp-calculated watershed outlet load comparison to WPLMN observed data.

Parameter	PTMApp (load/yr)	WRAPS (WPLMN Annual Average (2007-2015))*	WRAPS (High Year, 2010, All Parameters)*	WRAPS (Low Year, 2009, All Parameters)*
Total Nitrogen (lbs)	1,618,862	13,103,682	17,962,902	2,041,375
Total Phosphorus (lbs)	87,852	205,959	512,585	68,052
Sediment (tons)	63,058	33,444	76,658	6,508

**Converted from Kilograms*


Short-Term Planning Region Reduction Goal
Nitrogen – 34,829 lbs/yr
Phosphorus – 615 lbs/yr
Sediment – 775 tons/yr
Nitrogen – 46,233 lbs/yr
Phosphorous – 845 lbs/yr
Sediment – 1,012 tons/yr
Nitrogen – 69,375 lbs/yr
Phosphorus – 1,214 lbs/yr
Sediment – 1,374 tons/yr
North Fork Watonwan River
Lower Watonwan River
Upper Watonwan River
Saint James Creek
South Fork Watonwan River
Perch Creek
Nitrogen – 60,209 lbs/yr
Phosphorus – 1,105 lbs/yr
Sediment – 1,286 tons/yr
Nitrogen – 58, 936 lbs/yr
Phosphorus – 1,102 lbs/yr
Sediment – 1,241 tons/yr
Nitrogen – 71,902 lbs/yr
Phosphorus – 1,316 lbs/yr
Sediment – 1,217 tons/yr


Long-Term Planning Region Reduction Goal
Nitrogen – 116,097 lbs/yr
Phosphorus – 4,925 lbs/yr
Sediment – 7,746 tons/yr
Nitrogen – 154,111 lbs/yr
Phosphorus – 6,760 lbs/yr
Sediment – 6,058 tons/yr
Nitrogen – 231,251 lbs/yr
Phosphorus – 9,712 lbs/yr
Sediment – 6,871 tons/yr
North Fork Watonwan River
Lower Watonwan River
Upper Watonwan River
Saint James Creek
South Fork Watonwan River
Perch Creek
Nitrogen – 200,697 lbs/yr
Phosphorus – 8,841 lbs/yr
Sediment – 6,429 tons/yr
Nitrogen – 196,455 lbs/yr
Phosphorus – 8,814 lbs/yr
Sediment – 6,203 tons/yr
Nitrogen – 239,672 lbs/yr
Phosphorus – 10,524 lbs/yr
Sediment – 6,084 tons/yr

Measurable Goals

Short-Term:

- SW 3.1a: Planning Region Scale (summarized in Short Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 15% reduction in nitrogen defined as the WRW WRAPS watershed-wide 10-yr target, determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 5% reduction in phosphorus defined as half of the WRW WRAPS watershed-wide 10-yr target, determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 4% reduction in TSS defined as the WRW WRAPS watershed-wide 10-yr target, determined by PTMApp Planning Region Outlet Load
- SW 3.1b: Reach-Specific Scale:
  - ✓ Restoration: Reduction in the number ~~length~~ of streams classified as impaired
  - ✓ Protection: No increase in parameter loading to stream reaches not classified as impaired
- ✓ SW 3.1c: Conduct 10 educational efforts to highlight existing nutrient management and watershed BMP incentive programs.

Desired Future Condition~~Long-Term~~:

- Planning Region Scale (summarized in Long Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 50% reduction in nitrogen defined as the WRW WRAPS watershed-wide targetgoal, determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 40% reduction in phosphorus defined as the WRW WRAPS watershed-wide targetgoal determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 20% reduction in TSS defined as the WRW WRAPS watershed-wide targetgoal, determined by PTMApp Planning Region Outlet Load
- Reach-Specific Scale:
- ~~Waterbodies achieve their water quality standards for sediments and nutrients. Restoration: Reduction in the length of streams classified as impaired~~
  - ✓ ~~Protection: No increase in parameter loading to stream reaches not classified as impaired~~
- ✓ ~~Extend short-term educational outreach goal~~

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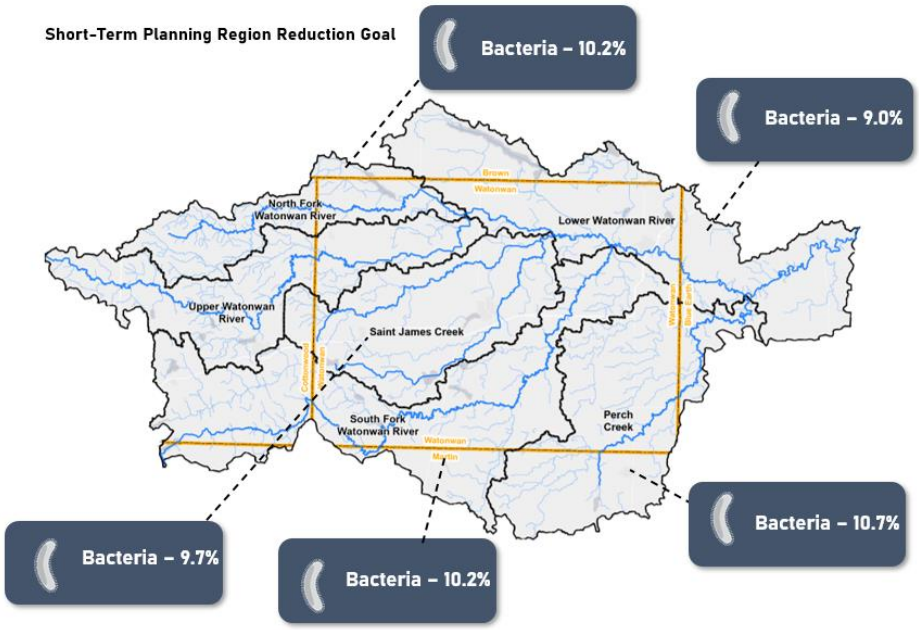
RESOURCE CONCERN: RIVERS AND STREAMS

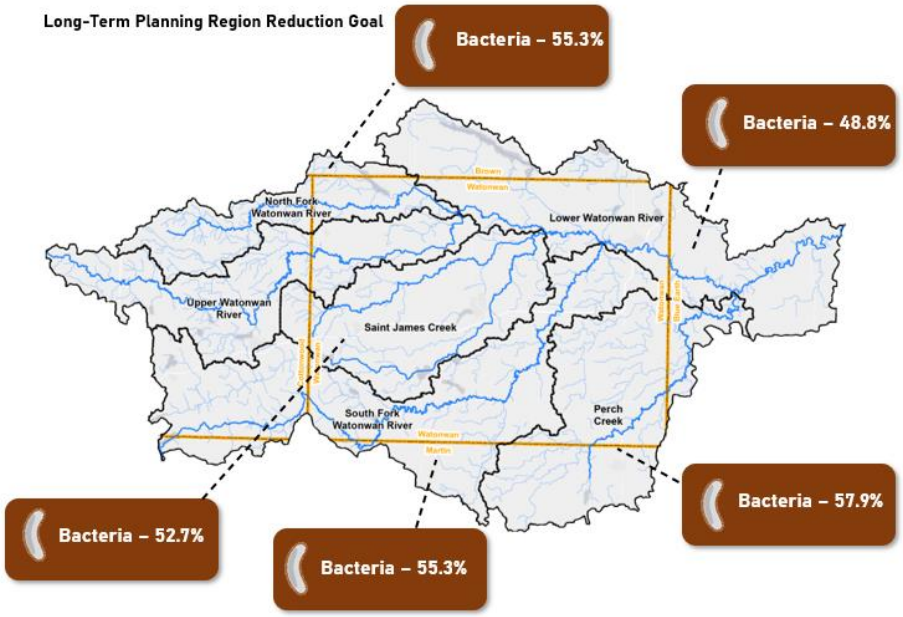
✓ Issue SW 3.2: Elevated bacteria levels in rivers and streams.

Fecal coliform and E. coli are often referred to as bacteria in water quality contexts. Elevated bacteria in waters are indicators of animal or human fecal matter, which may contain pathogens. Fecal matter can make aquatic recreation unsafe because contact with fecal matter can lead to potentially severe illnesses. Unlike most water quality impairments, fFecal bacteria are living organisms~~, unlike most other water quality parameters and b~~ Because bacteria can reproduce or die-off in the environment, bacteria in water is dynamic and can be more challenging to understand.

Of the 18 streams monitored for bacteria as a pollutant, 17 were identified impaired (MPCA, 2020a). Bacteria was identified to be an impairment in ten reaches of the Watonwan River, three reaches of St. James Creek, and ~~reaches of~~one reach each of Butterfield Creek, Perch Creek, Spring Branch Creek, and Judicial Ditch 1.

This goal applies WRAPS defined reduction percentages to the required percent reduction defined by the WRW Total Maximum Daily Load to meet water quality standards, summarized in the maps below (MPCA, 2020a, 2020b).





Measurable Goals

Short-Term:

- SW 3.2a: Planning Region Scale (summarized in Short Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 12% reduction in stream bacteria defined as the WRW WRAPS watershed-wide 10yr target, determined by WRW TMDL total load reduction target.
- SW 3.2b: Reach-Specific Scale:
  - ✓ Restoration: Reduction in the number ~~length~~ of streams classified as impaired
  - ✓ Protection: Maintain or reduce stream bacteria in reaches not classified as impaired. ~~No increase in parameter loading to stream reaches not classified as impaired~~
- ✓ SW 3.2c: Conduct 10 educational efforts to highlight watershed livestock BMP and SSTS incentive programs

Desired Future Condition ~~Long-Term~~:

- Planning Region Scale (summarized in Long Term Planning Region Reduction map above):

- ✓ 65% reduction in stream bacteria target ~~goal~~

- ✓ ~~Restoration:~~ Waterbodies achieve their water quality standards. ~~Reduction in the length of streams classified as impaired~~

~~Protection: No increase in parameter loading to stream reaches not classified as impaired~~

~~Extend short-term educational outreach goal.~~

RESOURCE CONCERN: RIVERS AND STREAMS

✓ Issue SW 3.3: Loss of lateral and longitudinal floodplain access and connectivity.

Floodplains serve as the interface between the land and water with a variety of beneficial functions. Floodplains act as a buffer to limit delivery of sediment and nutrients to surface waters from runoff and provide natural protection by reducing downstream flooding during times of increased flows in water ways. They also serve as a means of connecting broader habitat environments, which enrich ecosystem diversity and resiliency.

Land use practices and land use management directly influence water flow across a landscape, which in turn can affect the floodplains. When floodplains are reduced or damaged, habitats can become fragmented. Altered watercourses (e.g., channelized or impounded) have limited lateral and longitudinal floodplain connectivity and do not allow the channel to effectively transport sediment.

This goal is focused on lateral connectivity for floodplain access and longitudinal connectivity for aquatic organism passage. There is a need to conduct an inventory to determine how existing infrastructure and water conveyance structures influence the natural connectivity of rivers and streams. Inventories will focus on prioritized river and stream reaches (Table 5-4). These resources align with the areas prioritized for addressing connectivity and fish passage barriers as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23).

Table 5-4: Priority rivers and streams for floodplain access and connectivity.

River or Stream Name	Prioritization Criteria*	Planning Region
South Fork of the Watonwan River	Connectivity/Fish Passage Barriers	South Fork Watonwan River
Butterfield Creek	Connectivity/Fish Passage Barriers	Saint James Creek
Perch Creek	Connectivity/Fish Passage Barriers	Perch Creek

* See WRAPS Table 23 for more information on prioritization criteria

Measurable Goals

- ✓ SW 3.3a:

Desired Future Condition~~Long-Term~~

- ~~✓~~

Continue to assess condition of watershed bridges and culverts.

RESOURCE CONCERN: RIVERS AND STREAMS

✓ Issue SW 3.4: Streambank, ravine, and bluff erosion.

Streambank, ravine, and bluff erosion have been shown to be large sources of excess sediment to surface waters in the WRW, and also contribute to phosphorus loading (MPCA, 2020a) This plan will target restoration and stabilization ~~efforts~~ practices to reduce the impacts of stream, ravine, and bluff erosion on surface waters. These practices may include rip rap, live stakes, hard armor, and rock riffles. Targeting methodology will be based on defined priority ~~resources, and~~resources and will rely on previous geomorphology studies that have been completed in the WRW, namely Watonwan River Watershed Hydrology, Connectivity, and Geomorphology Assessment Report (DNR, 2014).

M~~In addition, m~~anagement of woody debris within the stream channel is a concern in the watershed. L~~It should be noted that l~~ocal DNR and Shoreland Administrator should be consulted if debris that is a substantial hazard toward existing infrastructure is intended to be removed.

Measurable Goals

Short-Term:

- ✓ SW 3.4a: Implement 3 practices to restore and/or stabilize degraded stream reaches

Desired Future Condition~~Long-Term~~:

- ✓ Continue to assess, prioritize, and target feasible projects that address degraded stream reaches in the watershed ~~Extend short-term restoration/stabilization goal~~

RESOURCE CONCERN: WETLANDS

✓ Issue SW 4.1: Loss of wetland functions in watershed.

Wetlands serve many ecological and environmental purposes, including:

- establishing and maintaining healthy ecosystem functioning, especially aquatic and terrestrial habitat;
- improving groundwater quality and quantity;
- reducing overland sediment, nutrient, and bacterial runoff; and
- providing additional water storage, thereby reducing downstream flood risk.

Wetlands in the watershed have been decreased by roughly 92% (MPCA, 2016). Implementing and enforcing regulatory controls, targeting restoration and improvement to wetland basins, and providing education and technical assistance are some avenues this plan intends to explore to preserve, improve, and restore wetland functions. This measurable goal is centered on preserving and restoring existing quality wetland areas and restoring previously existing wetlands.

Measurable Goals

Short-Term:

- ✓ SW 4.1a: Restore and improve 500 acres of wetlands.
- ✓ SW 4.1b: Complete 1,000 contacts with local landowners to encourage enrollment in state and federal programs to preserve and restore wetlands.

Desired Future Condition~~Long Term~~:

- ✓ Continue outreach and promotion of wetland benefits.~~Extend short term goals~~

RESOURCE CONCERN: SURFACE RUNOFF AND FLOODING

✓ Issue SW 5.1: Land use changes leading to loss of vegetative cover and field residue.

The rich topsoil of the Upper Midwest U.S. is a globally significant resource. The WWPP plans to protect, enhance, and encourage the stewardship of the soils in this watershed, ensuring long-term economic vitality and benefit to local environmental resources. As a result, the WWPP will promote and implement effective and efficient vegetative cover best management practices (BMPs) by prioritizing and targeting areas to stabilize the landscape, enhance the soils, and benefit water quality.

Measurable Goals

Short-Term:

- ✓ SW 5.1a: Implement and maintain additional vegetative cover practices on 41,900 acres~~7.5%~~ of the total watershed land area.
- ✓ SW 5.1b: Conduct 20 educational efforts to highlight available technical and financial assistance to protect soil health and reduce peak-flow rates.

Desired Future Condition~~Long-Term~~:

- ✓ Continue to build upon the~~Extend~~ short term vegetative cover goal.
- ✓ Extend short term annual educational outreach goal.

RESOURCE CONCERN: SURFACE RUNOFF AND FLOODING

✓ Issue SW 5.2: Land use changes leading to the loss of natural storage.

Land use changes in urban and rural environments can lead to issues related to flooding, erosion, pollution, and habitat disruption and loss. This goal focuses on providing support to property owners and implementing landscape improvements to mitigate adverse impacts of land use changes. One means of mitigating impacts is by identifying prospective areas for water storage. Determining the runoff reduction goal was accomplished by generation of a Watonwan Watershed Hydrology technical memorandum (Appendix ~~M~~R). The methods outlined in this memo establish a watershed runoff reduction value needed return to historically projected flows. The WRAPS runoff reduction target (MPCA, WRAPS, Table 4) was applied to this value to determine final reduction goals.

Actions to add storage on the landscape will focus on prioritized river and stream reaches (Table 5-5). These rivers and streams were prioritized for addressing hydrologic alteration as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23).

Table 5-5: Priority rivers and streams for additional storage and hydrologic alteration.

River or Stream Name	Prioritization Criteria*	Planning Region
Perch Creek	Hydrologic Alteration	Perch Creek
Spring Branch Creek	Hydrologic Alteration	Perch Creek
Tributaries to Lake Hanska	Hydrologic Alteration	Lower Watonwan River
Upper Watonwan River	Hydrologic Alteration	Upper Watonwan River
Original Mountain Lake basin area	Hydrologic Alteration	Upper Watonwan River

* See WRAPS Table 23 for more information on prioritization criteria

Measurable Goals

Short-Term:

- ✓ SW 5.2a: Achieve 0.10 inches of water runoff reduction across the watershed, or 4,327 acre-feet of runoff reduction by implementation of targeted PTMApp practices across the watershed
- ✓ SW 5.2b: Achieve 4% watershed-wide reduction in peak and annual streamflow, defined as the 10-year target in the WRW WRAPS
- ✓ SW 5.2c: Conduct 20 educational efforts to highlight available technical and financial assistance to implement runoff reduction and rate-control BMPs

Desired Future Condition~~Long Term~~:

✓

✓

✓

RESOURCE CONCERN: SURFACE RUNOFF AND FLOODING

✓ Issue SW 5.3: Level of watershed and community resilience to extreme weather events.

Extreme weather events and the increasing variability of global weather trends presents a significant challenge to water resource managers. Indifferent of cause, there is a need to increase watershed and community resiliency. There is a need to increase collaboration within the watershed on Emergency Management and also develop a plan for managing larger and more variable (increased frequency and volume) extreme weather events. This plan will identify areas on the landscape to implement preventative measures to best manage extreme weather events and also build more resilience with community awareness so emergencies can be best managed into the future by utilizing local knowledge of known flood-prone areas, and FEMA designated floodplain maps.

Measurable Goals

Short-Term:

- ✓ SW 5.3a: Conduct 20 educational efforts about water quantity and community resilience to extreme weather events
- ✓ SW 5.3b: Conduct a bridge and culvert inventory to document the location, size, condition, and estimated cost of repair or upgrade

Desired Future Condition~~Long Term~~:

- ✓ Extend short-term educational outreach goal.
- ✓ Set infrastructure repair/replacement goals based on outcome of short-term inventory. Continue to assess condition of watershed bridges and culverts.

GROUNDWATER MEASURABLE GOALS

This section sets measurable goals for:

- ✓ Groundwater Quality
- ✓ Groundwater Quantity

Figure 5-2: Planning regions that are highest priority (shown by red) and lowest priority (shown by dark green) for groundwater resources in the WRW.

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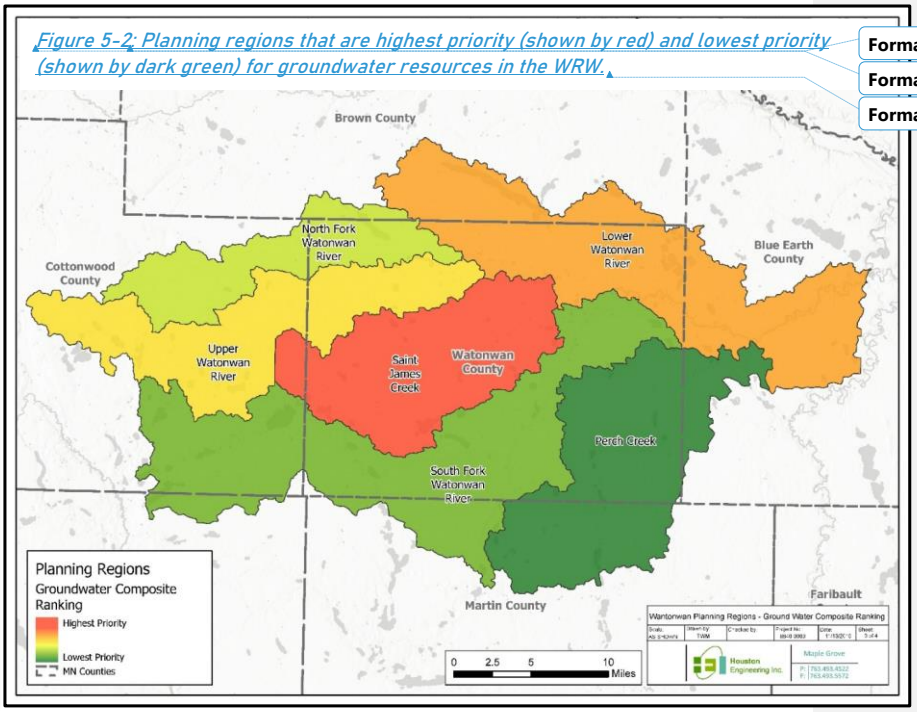
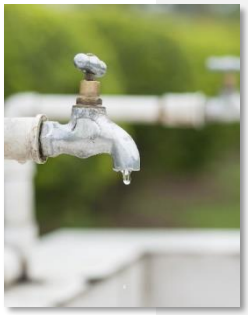


Groundwater is the highest priority within the Saint James Creek Planning Region.

RESOURCE CONCERN: GROUNDWATER QUALITY

✓ Issue GW 1.1: Elevated levels of nitrates in groundwater.



Groundwater accounts for all the region's drinking water. Protecting against elevated levels of nitrates in drinking water is one of the top concerns in the watershed. More information about nitrate vulnerable areas within the watershed ~~Further, fall fertilizer application restrictions are in place in some areas throughout the WRW. More~~ can be found at https://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan/mitigation/wrpr/wrprpart1/vulnerableareamap. Elevated levels of nitrates in drinking water can present a health risk - especially for babies. None of the newly constructed, private, or other drinking water supply wells sampled by the MDH had levels at or above the Safe Drinking Water Act standard of 10 mg/L, although shallow wells had over 70% of samples exceeding the natural background levels of 3 mg/L (MDH, 2018). Levels over natural background mean groundwater quality is being influenced by land use activities.

Increased awareness and action are needed to protect and maintain wells with low nitrate concentrations, and protect threatened wells showing nitrate levels nearing the drinking water standard. This plan intends to address these concerns, engage the communities and landowners, and implement measures as needed to secure positive outlook for groundwater resources into the future.

Implementation will be focused in priority areas (Table 5-6). These areas are a high priority for protecting groundwater due to the soils, geology, and other attributes, as summarized in the WRAPS (MPCA, 2020a; Table 23). Further, nitrate testing results (Figure 3-7, Section 3) and other available state geospatial data layers will be used to guide implementation decisions.

Table 5-6: Priority areas for nitrates in groundwater.

Area Name	Prioritization Criteria*	Planning Region
La Salle and Garden City Area (Mankato Ranney Wells)	Drinking water and Groundwater	Lower Watonwan River
North Fork Watonwan	Drinking water and Groundwater	North Fork Watonwan River
St. James Wellhead protection area	Drinking water and Groundwater	Saint James Creek

* See WRAPS Table 23 for more information on prioritization criteria

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Measurable Goals

Short-Term:

- ✓ GW 1.1a: Protection (in areas with nitrate concentration 0 - 4.9 mg/L) : Maintain and improve existing vegetative~~land~~ cover by discouraging or preventing ~~land~~ conversion to cultivated land; ~~and,~~ Contaminant source management on existing land uses (PTMApp Source Reduction, BMPs, SSTS management, and easements).
- ✓ GW 1.1b: Protection (in areas with nitrate concentration 5.0 - 9.9 mg/L)~~:~~: Contaminant source reduction or elimination; Shift land uses away from those that may leach excess nitrogen (Alternative management tools, upgrade failing STSS, easements).
- ✓ GW 1.1c: Hold 10 educational efforts to promote implementation of nutrient management practices.
- ✓ GW 1.1d: Hold 10 water testing clinics to determine nitrate concentrations in irrigation water and provide access to testing kits to irrigators.
- ✓ GW 1.1e: Hold 20 clinics to educate citizens on private well nitrogen levels.

Desired Future Condition~~Long-Term~~:

- ✓ Extend short-term protection goals
- ✓ Maintain zero drinking water wells tested for nitrates to be at or above the 10 mg/L standard [this goal is based on the GRAPS recording that no drinking water wells, at the time of the study, were found to exceed the 10 mg/L drinking water standard; GRAPS p59]
- ✓ Extend short-term annual educational outreach effort goals.

RESOURCE CONCERN: GROUNDWATER QUALITY

✓ Issue GW 1.2: Contaminants in groundwater.

Groundwater contamination is present in parts of the WRW. Some aquifers and wells used for public water supplies are very shallow and unprotected and can be easily contaminated by human activities, such as the application and/or use of fertilizer and pesticides. MDA uses two monitoring wells within Watonwan County to monitor for common detection pesticides. Pesticides have been detected in both wells, but not at concentrations above human-health based drinking water standards or reference values (MDAH, 2018). ~~Further, fall fertilizer application restrictions are in place in some areas throughout the WRW. More can be found at https://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan/mitigation/wrpr/wrprpart1/vulnerableareamap.~~

In contrast, some groundwater contamination is naturally occurring. Approximately 47% of tested drinking water wells have elevated levels of naturally occurring arsenic with approximately 16% exceeding the Safe Drinking Water Act (SDWA) standard of 10 µg/L (MDH, 2018).

These contaminants can affect both private wells and public water systems when levels exceed drinking water standards. Some of the public water systems have water quality issues in their untreated source water that requires either blending or treating the water to meet SDWA standards. Increased awareness and action are needed regarding the elevated levels of contaminants in groundwater resources. This plan intends to address these concerns, engage the communities and landowners, and implement measures as needed to secure positive outlook for groundwater resources into the future.

Measurable Goals

Short-Term:

- ~~✓~~ GW 1.2a: ~~Reduce the number of drinking water wells that have elevated levels of arsenic and exceed the Safe Drinking Water Act standard of 10 µg/L by 25%.~~
- ✓ Maintain zero wells with pesticide concentrations above human-health based drinking water standards or referenced values.
- ✓ GW 1.2b: Hold 20 educational efforts to inform the public of the potential threat of contaminants in groundwater and the importance of testing.

Desired Future Condition~~Long-Term~~:

- ✓

RESOURCE CONCERN: GROUNDWATER QUANTITY

✓ Issue GW 2.1: Groundwater use and loss of recharge.

Groundwater accounts for about 97% of the reported water use in the WRW. Most groundwater is used for public water supply. Agricultural irrigation is the second largest water user, followed by livestock watering and industrial processing. Maintaining a sustainable supply of groundwater resources serves to benefit communities in the watershed that use groundwater for these purposes, as well as natural features that are groundwater fed (calcareous fens, wetland complexes, groundwater-dominant lakes, native plant communities, and rare plant and animal species).

There is a need to broaden awareness of groundwater availability within the watershed. Water efficiency best management practices, public and landowner collaboration, and implementing on-the-ground practices that can encourage and improve groundwater recharge will be promoted as part of this plan. Resources such as the ~~,~~ University of Minnesota - Extension irrigation specialist may be utilized to support these efforts. Specific initial opportunities include promotion of the City of St. James wellhead protection area success, and leveraging the DNR Community-based Aquifer Management Partnership (CAMP) to raise awareness of WRW water supply issues.

Measurable Goals

Short-Term:

- ~~✓~~ GW 2.1a: ~~Improve water use efficiency on 25% of irrigated acres (urban, rural, industrial, etc.) that have high water use relative to other areas in the watershed.~~
- ✓ Implement 20 practices that promote aquifer recharge in DWSMA and Wellhead Protection Areas.
- ✓ GW 2.1b: Hold 10 educational efforts for the public to learn current successes and issues with groundwater use and groundwater recharge.

Desired Future Condition~~Long-Term~~:

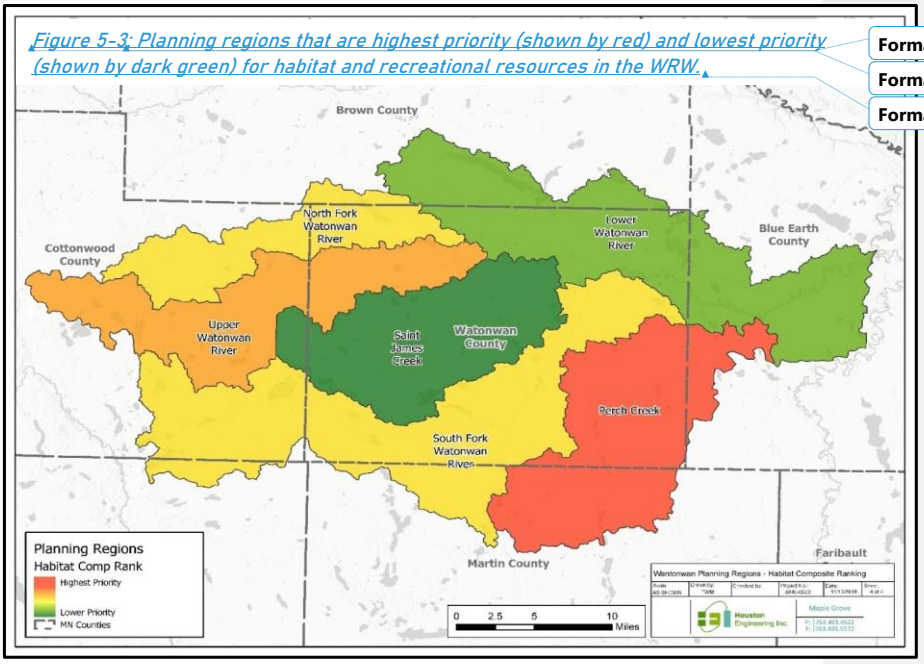
- ✓ All community members understand successes and issues with groundwaters use and recharge, and efficient water use systems are in use to balance aquifer withdrawal with recharge ~~Extension of short-term goals~~

HABITAT AND RECREATION MEASURABLE GOALS

This section sets measurable goals for:

- ✓ Aquatic Habitat
- ✓ Terrestrial Habitat
- ✓ Recreation

Figure 5-3: Planning regions that are highest priority (shown by red) and lowest priority (shown by dark green) for habitat and recreational resources in the WRW.



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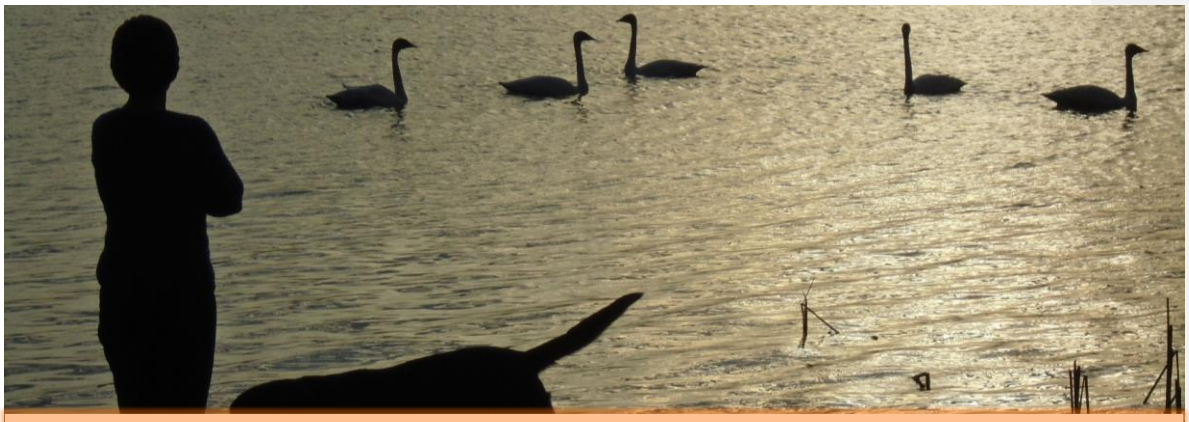


Habitat and recreation are the highest priority within the Perch Creek Planning Region.

RESOURCE CONCERN: AQUATIC HABITAT

✓ Issue HR 1.1: Aquatic and riparian habitat loss from development and flow variability.

Riparian habitat areas provide many ecosystem services including flood control, erosion control, and reduction of nutrient delivery into adjacent waterbodies. Healthy vegetated aquatic habitat (those without excessive invasive species, and good species diversity) also provide a sort of armoring for those areas that interface a waterbody and land's surface. Degraded riparian and aquatic habitat impact aquatic life by reducing ability to feed, shelter, and reproduce, which results in altered behavior, increased mortality, and decreased populations.

There are 30 biologically impaired stream reaches in the watershed that do not support standards for aquatic life. Degraded habitat was identified as a stressor in all 30 of these reaches (MPCA, 2020a). Many of the bio-impaired stream reaches showed some issues with land use and riparian vegetation. Without adequate riparian vegetation, issues such as excessive flow – which causes stream instability and sediment issues - are magnified because the stream lacks the strength to resist erosion.

There is a need in the watershed to better manage water conveyance and flow variability. By managing the hydraulic regimes and reducing flashiness, aquatic and riparian habitats will experience less severe adverse impacts during extreme precipitation events or spring runoff. This plan intends to take account of infrastructure in the waterways, promote landscape best management practices, and encourage and promote developing a more stable hydraulic regime across the watershed, especially in areas with prioritized wildlife habitat (Table 5-7) (MPCA, 2020a; Table 23).

Table 5-7: Priority areas for wildlife habitat.

Area Name	Prioritization Criteria	Planning Region
Bat Lake	Wildlife Habitat- "Outstanding" biological significance class with higher quality aquatic plant assemblages*	Upper Watonwan River
Arnolds Lake WMA	Local and Partner Input**	Upper Watonwan River
Delft WMA	Local and Partner Input**	Upper Watonwan River
Little Swan WMA	Local and Partner Input**	Upper Watonwan River
Mountain Lake WMA	Local and Partner Input**	Upper Watonwan River
Voss WMA	Local and Partner Input**	Upper Watonwan River
Red Rock Rural Water System - Lake Augusta WPA	Local and Partner Input**	Upper Watonwan River
Mountain Lake WPA	Local and Partner Input**	Upper Watonwan River; South Fork Watonwan River
Bingham Lake	Wildlife Habitat- Opportunities to improve waterfowl production*	South Fork Watonwan River
Banks WMA	Local and Partner Input**	South Fork Watonwan River
Bennett WMA	Local and Partner Input**	South Fork Watonwan River
Carpenter WMA	Local and Partner Input**	South Fork Watonwan River
Fossum WMA: Berdell Unit	Local and Partner Input**	South Fork Watonwan River

Area Name	Prioritization Criteria	Planning Region
Fossum WMA: Bottin Tract	Local and Partner Input**	South Fork Watonwan River
Fossum WMA: Thorn Unit	Local and Partner Input**	South Fork Watonwan River
Regehr WMA	Local and Partner Input**	South Fork Watonwan River
Tierney WMA	Local and Partner Input**	South Fork Watonwan River
Turtle WMA	Local and Partner Input**	South Fork Watonwan River
W. R. Taylor Memorial WMA	Local and Partner Input**	South Fork Watonwan River
Willow Creek WMA	Local and Partner Input**	South Fork Watonwan River
Windom WPA	Local and Partner Input**	South Fork Watonwan River
Wood Lake WMA	Local and Partner Input**	North Fork Watonwan River
Rock Ridge WMA	Local and Partner Input**	North Fork Watonwan River
Mulligan Slough WMA	Local and Partner Input**	North Fork Watonwan River
Darfur WPA	Local and Partner Input**	North Fork Watonwan River, Upper Watonwan River
Kansas Lake	Wildlife Habitat- Opportunities to improve waterfowl production*	Saint James Creek
Curry WMA	Local and Partner Input**	Saint James Creek
Ewy Lake WMA	Local and Partner Input**	Saint James Creek
Rosendale WMA	Local and Partner Input**	Saint James Creek
Sulem Lake WMA	Local and Partner Input**	Saint James Creek
Saint James	Local and Partner Input**	Saint James Creek
Perch Creek	Wildlife Habitat- Blanding's Turtle habitat*	Perch Creek
Unnamed Wetland	Wildlife Habitat- "Moderate" biological significance class with diverse bird life*	Perch Creek
Armbrust WMA	Local and Partner Input**	Perch Creek
Case Lake WMA	Local and Partner Input**	Perch Creek
Exceder WMA	Local and Partner Input**	Perch Creek
Gleam WMA	Local and Partner Input**	Perch Creek
Lewisville WMA	Local and Partner Input**	Perch Creek
Perch Creek WMA	Local and Partner Input**	Perch Creek
W. R. Taylor Memorial WMA	Local and Partner Input**	Perch Creek
Truman WPA	Local and Partner Input**	Perch Creek
Lake Hanska	Wildlife Habitat- Designated wildlife lake; Opportunities to improve waterfowl production*	Lower Watonwan River
Linden Lake	Wildlife Habitat- "Moderate" biological significance class with diverse bird life*	Lower Watonwan River
Fedji Lake	Wildlife Habitat- Opportunities to improve waterfowl production*	Lower Watonwan River
Emerson WMA	Local and Partner Input**	Lower Watonwan River
Lake Hanska WMA	Local and Partner Input**	Lower Watonwan River

Area Name	Prioritization Criteria	Planning Region
Younger Brothers WMA: North West Unit	Local and Partner Input**	Lower Watonwan River
Younger Brothers WMA: South East Unit	Local and Partner Input**	Lower Watonwan River
Southeast Hanska WMA	Local and Partner Input**	Lower Watonwan River
Bergdahl WMA	Local and Partner Input**	Lower Watonwan River
William A. Groebner WMA	Local and Partner Input**	Lower Watonwan River
Albin WMA	Local and Partner Input**	Lower Watonwan River
Madelia WPA	Local and Partner Input**	Lower Watonwan River
La Salle WPA	Local and Partner Input**	Lower Watonwan River

** See WRAPS Table 23 for more information on prioritization criteria*
*** Prioritized based on local and partner input during the IWIP planning process*

Measurable Goals

Short-Term:

- ✓ HR 1.1a: Across the watershed, meet a 12% increase in MPCA Stream Habitat Assessment score, defined as the 10-year target in the WRW WRAPS.
- ✓ HR 1.1b: Complete culvert/fish barrier inventory.

Desired Future Condition~~Long-Term~~:

- ✓ Meet a 35% increase in MPCA Stream Habitat Assessment score, defined as the watershed-wide target in the WRW WRAPS.

RESOURCE CONCERN: AQUATIC HABITAT

✓ Issue HR 1.2: Aquatic habitat loss from bank erosion and channel instability in creeks, streams, and rivers.

There are 30 biologically impaired stream reaches in the watershed that do not support standards for aquatic life. Degraded habitat was identified as a stressor in all 30 of these reaches. Many of the bio-impaired stream reaches showed some issues with channel instability and excess sediment. Without adequate riparian vegetation, issues such as excessive flow – which causes stream instability and sediment issues - are magnified because the stream lacks the strength to resist erosion.

The Watonwan River Watershed Hydrology, Connectivity, and Geomorphology Assessment Report estimates bank erosion rates from Madelia to confluence with Blue Earth River (DNR, 2014). This information can be used as a starting point to identify and prioritize locations to address bank and channel instability. River reaches in the table below (Table 5-8) will also be considered for prioritization to align with WRAPS efforts.

Table 5-8: Priority rivers and streams for aquatic habitat from bank erosion and channel instability.

River Reach	Prioritization Criteria*	Planning Region
Unnamed Creek reach 505	Tipping Point: Barely Impaired	Upper Watonwan River
Watonwan River reach 563	Tipping Point: Barely Impaired	Lower Watonwan River

* See WRAPS Table 23 for more information on prioritization criteria

Measurable Goals

Short-Term:

- ✓ HR 1.2a: Work with DNR to prioritize locations to address bank and channel instability.

Desired Future Condition~~Long-Term~~:

- ✓ Set stabilization goals based upon outcomes from the prioritization exercise.

RESOURCE CONCERN: AQUATIC HABITAT

✓ Issue HR 1.3: Aquatic invasive and nuisance species and their impacts.

Invasive and nuisance species are those species that are not native to a certain area and therefore cause disruption in the natural balance of the habitat and the food chain. Invasive species jeopardize the quality and quantity of species diversity in aquatic environments. Aquatic invasive and nuisance species can limit or reduce the habitat area available for those species to thrive.

There is a need to develop a way to monitor and decrease aquatic invasive species infestations and develop more resilient aquatic and riparian habitats within the watershed. When riparian and aquatic habitats are disrupted by land management practices or from excessive erosion and sedimentation, native species may not survive. In such areas, there is increased potential for invasive species to take over. At times, these riparian and aquatic habitats do not have the chance to recover in between natural events such as flooding or excessive stormwater runoff. This plan intends to examine invasive species control measures, provide education and outreach activities in the watershed, and to increase natural habitat resilience against aquatic invasive and nuisance species.

Measurable Goals

Short-Term:

- ✓ HR 1.3a: Restoration~~:~~ Manage existing AIS infestations to address existing degradation of aquatic habitat.
- ✓ HR 1.3b: Protection~~:~~ Work to prevent introduction and spread~~minimize the spread~~ of aquatic invasive species, including (but not limited to) invasive carp, Eurasian Watermilfoil, Purple Loosestrife, Zebra Mussels, and Spiny Water Fleas (which have not been recorded in the WRW).

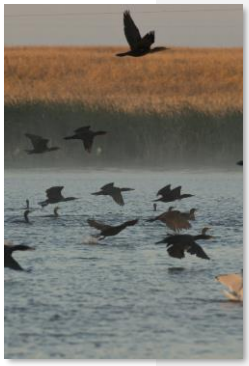
Desired Future Condition~~Long-Term~~:

- ✓ Extension of short-term Restoration and Protection goals.
- ✓ Consolidate existing information and develop AIS infestation susceptibility indices.

RESOURCE CONCERN: TERRESTRIAL HABITAT

✓ Issue HR 2.1: Terrestrial habitat fragmentation and loss.

Connectivity of natural terrestrial habitats correspond with greater species diversity, and stronger ecosystem resilience; simultaneously, greater ecosystem services capacity for an environment. Fragmentation occurs when buffers, riparian areas, and larger habitat areas are divided or removed by various land use practices. This creates challenges for wildlife to maintain themselves on small swatches of land.



There is a need to increase terrestrial habitat corridor restoration to decrease habitat fragmentation in the WRW to protect and enhance species such as the Blanding's turtle and several other species listed in Table 3.6 in Section 3. Local ordinances, zoning regulations, and local planning efforts, such as the Blue Earth County Greenprint effort, can assist in habitat conservation and restoration. The Greenprint platform also models aquatic habitat priorities, allowing for the determination of multi-benefit habitat priority areas that will be a focal point of habitat restoration efforts. This plan intends to increase educational activities and create more contiguous terrestrial habitats throughout the watershed, prioritizing areas identified by the Minnesota Wildlife Action Plan.

Measurable Goals

Short-Term:

- ✓ HR 2.1a: Complete 20 habitat projects to restore habitat corridors and decrease habitat fragmentation.

Desired Future Condition~~Long-Term~~:

- ✓ E~~x~~Establish ecosystem resiliency to preserve terrestrial habitat.

✓ ~~tension of short-term goal~~

RESOURCE CONCERN: TERRESTRIAL HABITAT

✓ Issue HR 2.2: Terrestrial invasive and nuisance species and their impacts.

The WRW is located within the Minnesota River Prairie Ecological Subsection, which is home to 52 federal- or state-listed endangered, threatened, or special concern species. Invasive species and competition are a problem for these listed species. There is a need to restore terrestrial habitats and protect them from the invasion and spread of terrestrial invasive and nuisance species. More information about terrestrial invasive species can be found at https://www.mda.state.mn.us/pest-information.

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Digital geospatial data is a tool that will be used to assist in tracking and monitoring management of native and invasive species and their habitats. This plan intends to practice existing regulatory controls including that for invasive species control: Minn. Stat. 84D and Minn. R. 6216, and for Noxious Weed control: Minn. Stat. 18.76-18.91. Land management practices and education and outreach activities are also planned as part of plan implementation.

Measurable Goals

Short-Term:

- ✓ HR 2.2a: Restoration –: Manage existing terrestrial and nuisance species to address existing degradation of terrestrial habitat.
- ✓ HR 2.2b: Protection –: Work to minimize the spread of terrestrial invasive species, including (but not limited) to: Emerald Ash Borer, Canada Thistle, Purple Loosestrife, and Palmer Amaranth.

Desired Future Condition~~Long Term~~:

- ✓ Extension of short-term Restoration and Protection goals.
- ✓ Update/ utilize state database for existing and emerging species of concern in upland habitat.

RESOURCE CONCERN: RECREATION

- ✓ Issue HR 3.1: The lack of recreational access and connectivity to natural resources and communities within the watershed.

Citizens within and beyond the WRW value access to its recreational opportunities centered around the natural environment and enjoying the outdoors, including camping, fishing, hunting, canoeing, kayaking, hiking, and birding. There are lakes with public boat access, waterfowl production areas, wildlife and management areas, river access points, walk in access points, and public parks.

A priority of this plan is increase public access within the WRW to outdoor recreation opportunities. This plan intends to implement measures to identify, maintain, and improve public accesses, trails, and roads; enhance educational qualities of natural areas; and prioritize and promote public access to recreational and natural areas.

Measurable Goals

Short-Term:

- ✓ HR 3.1a: Maintain and improve existing public accesses, trails and roads.

Desired Future Condition~~Long-Term~~:

- ✓ Increase number of legal and controlled public access along streams, rivers, and lakes, while not disturbing priority habitat areas.

LOCAL KNOWLEDGE BASE GOALS

This section sets measurable goals for:

- ✓ Public Awareness

Enhancing the Local Knowledge Base is critical to the successful implementation of the WRCWMP.

RESOURCE CONCERN: PUBLIC AWARENESS

✓ Issue LKB 1.1: Level of landowner awareness and understanding of Best Management Practices (BMPs) for environmental conservation.

In 2017-2018, WRW citizens and local conservation partners came together to identify strategies that might lead to more conservation adoption across the watershed. One of the strategies identified was the need for one-on-one meetings and site visits across the watershed to build relationships and trust. A second strategy was the need for increased awareness about available conservation programs and the economics of BMPs to make farming "easier and less stressful" (Watonwan River Watershed Network, 2018).

This plan builds on these strategies to engage with the public, build relationships, and create a regular forum for open, honest conversations about land management practices and how they can mutually benefit water resources and bottom lines. One avenue for this is through comprehensive site visits. A comprehensive site visit can be conducted on any site in the watershed and can be inclusive of Minnesota Agricultural Water Quality Certification Program (MAWQCP), promotion of nutrient management and 4 Rs, and more. The group will continue to pursue new comprehensive programs for use in this plan.

Measurable Goals

Short-Term:

- ✓ LKB 1.1a: Conduct 100 comprehensive site visits to promote and foster implementation of water quality BMPs and encourage comprehensive conservation recommendations.
- ✓ LKB 1.1b: Increase landowner awareness through 10 BMP educational outreach efforts.

Desired Future Condition~~Long Term~~:

- ✓ Extend short term property visit and outreach goal.
- ✓ Conduct 100 comprehensive site visits to promote and foster implementation of water quality BMPs.

RESOURCE CONCERN: PUBLIC AWARENESS

- ✓ Issue LKB 1.2: Level of awareness and knowledge of the resource issues and potential implementation roadblocks.

The WWPP seeks to protect and improve the quality of land and water resources and positively impact its local communities. There is a need to intentionally invite the public into the realm of the resource issues within the watershed and discuss what "fixing" those issues entails, including the benefits and roadblocks to implementing the actions set forth in this plan (Section 6).

Measurable Goals

Short-Term:

- ✓ LKB 1.2a: Conduct 10 outreach efforts to discuss watershed plan implementation to increase in awareness and knowledge of the plan and to identify potential implementation roadblocks.

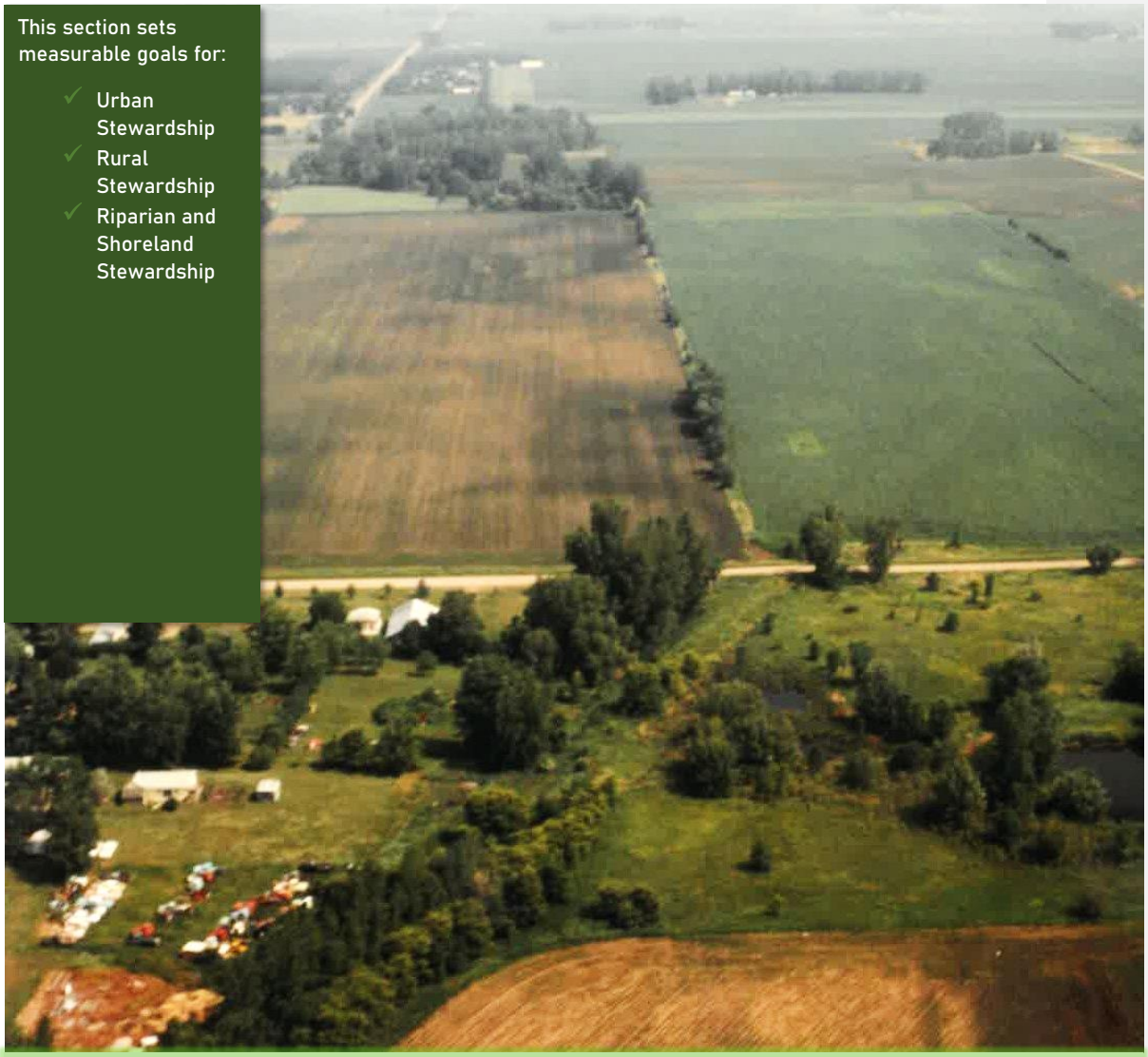
Desired Future Condition~~Long-Term~~:

- ✓ Extend short term goal.

LAND STEWARDSHIP GOALS

This section sets measurable goals for:

- ✓ Urban Stewardship
- ✓ Rural Stewardship
- ✓ Riparian and Shoreland Stewardship



Stewardship of natural resources is essential to the recreation and economic vitality of the WRW.

RESOURCE CONCERN: URBAN STEWARDSHIP

- ✓ Issue LS 1.1: The impact of impervious surface on stormwater runoff and associated impacts on surface water.

Stormwater runoff should be managed in areas with impervious surfaces. There are no Municipal Separate Storm Sewer System (MS4) program communities within the Watonwan River Watershed. Low impact development and conservation design techniques are encouraged in developing areas of the watershed.

There is a need to work with communities on a regular basis to educate and share ways that urban environments affect stormwater runoff and water quality. By means of annual outreach and encouraging residents to adopt urban conservation and water reuse projects it is intended that this will improve stormwater runoff and land and water resiliency within the WRCWMP.

Measurable Goals

Short-Term:

- ✓ LS 1.1a: Install urban stormwater BMPs in 10 communities to address peak flow rates, sediment, and nutrient loading.
- ✓ LS 1.1b: Promote green space in urban areas by hosting 10 outreach efforts.

Desired Future Condition~~Long-Term~~:

- ✓ Address peak flow rates, sediment, and nutrient loading through urban BMPs in all applicable areas.~~Extend short term goal~~

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RESOURCE CONCERN: RURAL STEWARDSHIP

✓ Issue LS 2.1: The need to increase soil health and its impact on agricultural productivity and natural resources.

Soil health influences farmer's yield, monetary and environmental costs of applying inputs to fields, and the longevity and resiliency of agricultural lands. Healthy soils support higher yields, reduce runoff, retain nutrients and sediment on the landscape and support robust micro-biotic communities. This is vital to agriculture and the livelihood of individual landowners/farmers, and communities that rely on agriculture. Soil health matters to everyone, including consumers.

Ridge Till in the Watonwan Watershed

Managing for healthy soils has been gaining momentum in the WRW. In 2017-2018, local landowner and operator interviews revealed an openness to learn more about soil health practices (Watonwan River Watershed Network, 2018). This plan builds on that momentum to identify, prioritize, and implement soil health practices (e.g. cover crops, nutrient management, conservation tillage) and provide technical and financial support to property owners.

Measurable Goals

Short-Term:

✓ LS 2.1a: Implement 5 soil health practices per Planning Region in high priority areas.

Desired Future Condition~~Long Term~~:

✓ ~~Extend~~ Across all planning regions, implement soil health practices for all priority areas.

~~✓ short term goal~~

RESOURCE CONCERN: RURAL STEWARDSHIP

- ✓ Issue LS 2.2: Subsurface Sewage Treatment Systems (SSTS) and their potential to contaminate groundwater and degrade surface water.

Subsurface sewage treatment systems (SSTSs) have the potential to adversely impact surface and groundwater resources. There is a need in the watershed to increase awareness of these systems and their potential effects on contaminating surface and groundwater. This plan follows Minnesota Rules Chapter 7080-7083 and local ordinances to help staff manage SSTSs by providing financial assistance for those whose systems which need to be replaced and/or repaired. ~~This will help protect surface and groundwater quality.~~

A system that is not protective is considered an imminent threat to public health or safety. Each county estimates the number of imminent public health threat systems annually. Counties will report an estimate of how many of these systems are in the watershed. The number per year will be used to track progress towards the short-term goal. This will help protect surface and groundwater quality.

Measurable Goals

Short-Term:

- ✓ LS 2.2a: Address at least 50% of estimated imminent public health threat systems.

Desired Future Condition~~Long Term~~:

- ✓ Address 100% of estimated imminent public health threat systems.

RESOURCE CONCERN: RURAL STEWARDSHIP

✓ Issue LS 2.3: Addressing inadequate manure management.

Livestock manure can be a positive agricultural attribute when managed and utilized as a beneficial use. There is a need to encourage and support livestock producers to be innovative, efficient, and effective on manure management to protect water resources and encourage soil health practices. Actions within this plan encourage livestock producers to develop and regularly update Manure Management Plans, and implement nutrient and manure management best management practices (BMPs). Annual outreach activities will be offered to open a forum about existing manure management ordinances, associated best management practices, and to open a circle for farmers to discuss what works and what can be done better.

Measurable Goals

Short-Term:

- ✓ LS 2.3a: Identify and address 10 targeted surface water/riparian areas where manure management has adversely affected surface water and where improvements can be made.
- ✓ LS 2.3b: Conduct 10 outreach efforts to inform producers of existing manure management ordinances and associated BMPs.

Desired Future Condition~~Long Term~~:

- ✓ Address all surface water/riparian areas where manure management has adversely affected surface water and where improvements can be made. ~~Extend short term goals~~

RESOURCE CONCERN: RIPARIAN AND SHORELAND STEWARDSHIP

✓ Issue LS 3.1: Level of riparian and shoreland natural resource management.

When natural riparian and shoreland areas are eroded, minimalized, or unsupported, a myriad of water quality issues may arise. There is a need to develop a more robust discussion, support, and action to address problem areas in the Watonwan Watershed.

This plan intends to generate discussion between watershed partners that enforce ordinances and permit programs to provide consistency, effectiveness, and efficiency. This plan will develop a platform to provide financial and technical support to property owners for implementing shoreland best management practices (BMPs) and provide outreach to property owners about riparian and shoreland health and BMPs.

Measurable Goals

Short-Term:

- ✓ LS 3.1a: Improve and increase riparian and shoreland natural resources management through coordinated efforts, as measured through the number of DNR Score Your Shore assessments completed and percentage of scores improved.

Desired Future Condition~~Long-term~~:

- ✓ Complete DNR Score Your Shore assessments and implement conservation practices to improve riparian and shoreland stability. ~~Extend short term goal~~