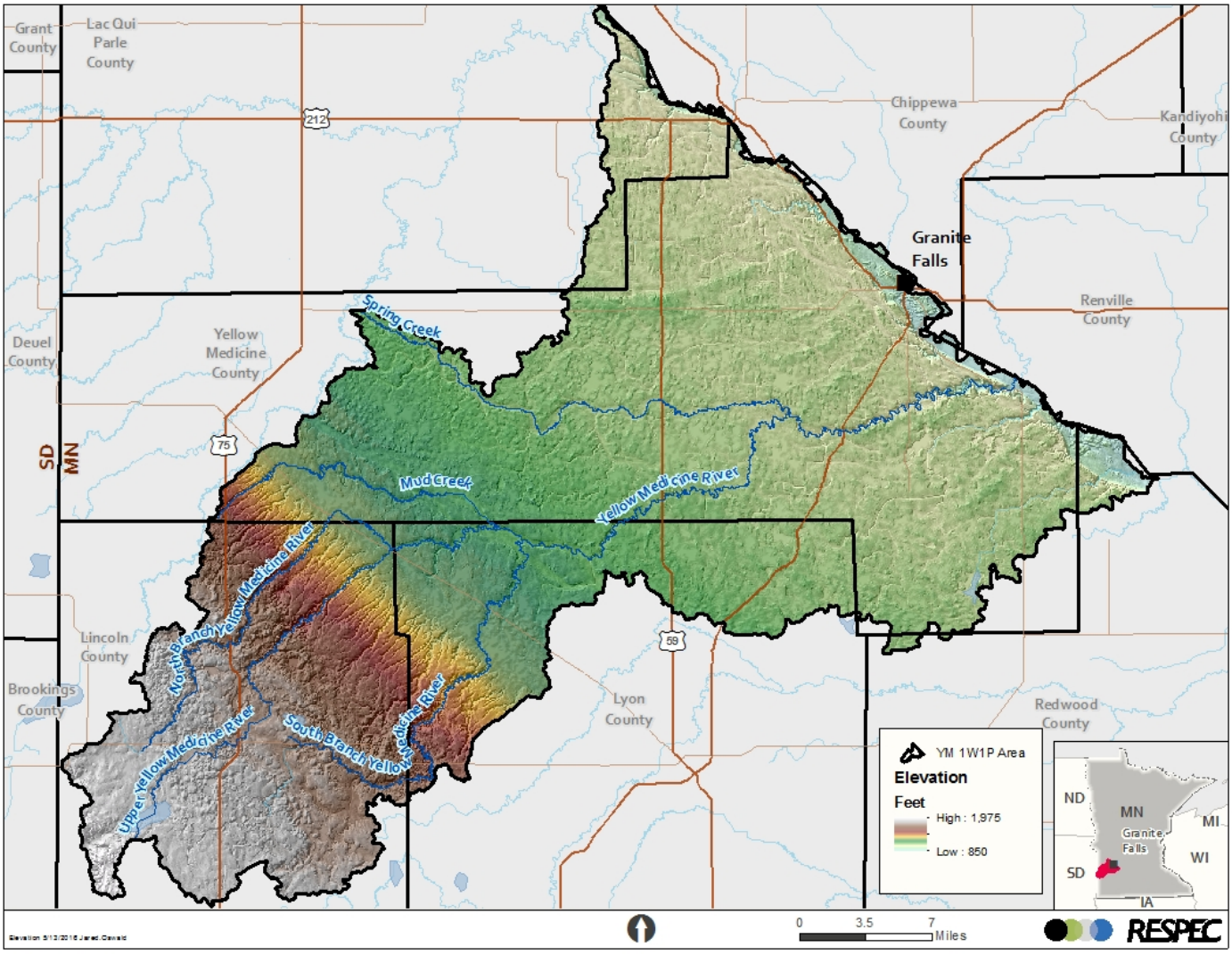
YELLOW MEDICINE
ONE WATERSHED ONE PLAN
2017–2026



prepared for

The Landowners, Citizens,
and Local Governments of
the Yellow Medicine
One Watershed One Plan

September 2016

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Clean Water, Land & Legacy Amendment

YELLOW MEDICINE
ONE WATERSHED ONE PLAN

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Yellow Medicine River Watershed District

September 2016

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The mission of the following organizations is to work together with citizens to restore and protect the water resources of the Yellow Medicine Watershed.

Local Governments

Area II Minnesota River Basin Projects
Lac qui Parle Soil and Water Conservation District
Lac qui Parle County
Lincoln Soil and Water Conservation District
Lincoln County
Lyon Soil and Water Conservation District
Lyon County
Yellow Medicine County
Yellow Medicine River Watershed District
Yellow Medicine Soil and Water Conservation District

State Agencies

Minnesota Board of Soil and Water Resources
Minnesota Department of Agriculture
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Pollution Control Agency

Citizen Representation

Citizens-at-Large
City Government
Corn and Soybean Growers
Lincoln Water Task Force
Livestock Producers
Local Sportsmen's Club
Upper Sioux Community (invited)
Yellow Medicine Water Task Force

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EXECUTIVE SUMMARY

The Yellow Medicine One Watershed One Plan (1W1P) was developed as one of five pilot "One Watershed One Plan" projects in Minnesota as a result of legislation passed in 2012 that authorized the Minnesota Board of Water and Soil Resources (BWSR) to align local planning on watershed boundaries.

The nine-county partnership of Area II Minnesota River Basin Projects (Area II) has been working cooperatively since its inception in 1978 to address water quality and quantity issues in southwestern Minnesota. The soil and water conservation districts (SWCDs) within Area II recognized the need to increase coordination and provide greater assurances for meeting resources management goals and measurable outcomes. Because four of the five counties in the Yellow Medicine Watershed had plans that were expiring as early as 2016 and a Watershed Restoration and Protection Strategy (WRAPS) was being completed for the watershed, SWCD members determined that the 1W1P pilot project was consistent with their goals and that the Yellow Medicine Watershed was the best candidate for the pilot project. Area II members envision that this pilot project will be adopted throughout the rest of the Area II planning area and a regional approach for watershed-based management will be embraced.

Ten local governments entered into a Memorandum of Agreement (MOA) to develop the YM1W1P and include representatives from Area II, Lincoln County and SWCD, Lac qui Parle County and SWCD, Lyon County and SWCD, Yellow Medicine County and SWCD, and the Yellow Medicine River Watershed District (YMRWD). The mission of these organizations, along with the state agencies that cooperated in developing this plan, is to work together with citizens to restore and protect the water resources of the Yellow Medicine Watershed.

The Yellow Medicine plan boundary, as approved by the BWSR, drains approximately 665,073 acres of primarily highly productive agricultural land in southwest Minnesota and includes nearly 1,700 miles of streams and ditches as well as 16,000 acres of lakes. The boundary for this project includes drainage to the Yellow Medicine River and several tributaries that drain directly to the Minnesota River. A defining feature in the project area is the Coteau des Prairies, which is a plateau that was left untouched by the glaciers that scraped and flattened much of the rest of Minnesota. The southeast portion of the Coteau des Prairies, partially located in the southwest of the Yellow Medicine Watershed, comprises one of the distinct regions in Minnesota, known as the Buffalo Ridge. From the Coteau region, the watershed drains to the northeast with 1,125 feet of elevation change to the lower region, called the Flatland region. The Transitional region in between these two regions is where the elevation changes are the greatest, at approximately 45 feet per mile. The drainage from the Coteau through the steep elevation change causes erosion in the Transitional region and flooding in the Flatlands. The topography in the Minnesota River Valley region is extreme with elevation changes of approximately 57 feet per mile. These four regions—Coteau, Transition, Flatland, and Minnesota River Valley—were established as management zones for the YM1W1P to better address the unique characteristics and resource challenges of each area. In addition to establishing the four management zones, priority subwatersheds were selected to focus implementation efforts and maximize results. These subwatersheds were determined by using a combination of information generated from a calibrated Hydrologic Simulation Program-Fortran (HSPF) model and other

factors including likelihood of success. The priority subwatersheds will change throughout the 10-year plan as progress is made and new opportunities arise.

This plan addresses three priority concerns: (1) mitigate altered hydrology and minimize flooding; (2) minimize the transport of sediment, excess nutrients, and bacteria; and (3) protect and preserve groundwater quantity and quality. These priorities were established as the result of an extensive process in which stakeholders identified their priority concerns and the potential threats to the resource if these three goals were not addressed. In addition, prioritizing implementation efforts was determined to be based on projects that offer multiple benefits and that are cost effective. It was also determined that implementation efforts that address mitigating altered hydrology and minimizing flooding will address the other priorities as well.

The YM1W1P measurable goals are based on those established in the Yellow Medicine WRAPS report (*https://www.pca.state.mn.us/water/watersheds/minnesota-river-yellow-medicine-river*) after those goals were reviewed and revised. The HSPF Scenario Application Manager (SAM) tool was used to evaluate draft implementation plans that were developed by the Plan Work Group (PWG). Using this tool, the PWG could evaluate various implementation plan scenarios on the basis of cost and ability to meet measurable goals. This evaluation led to adjustments to the WRAPS goals and represents a viable implementation plan that is expected to meet or exceed measurable goals for minimizing flooding in addition to reducing the transport of sediment, nutrients, and bacteria. The measurable goals established for protecting and preserving groundwater quantity and quality largely address continuing well-sealing efforts and filling in data gaps by developing a geologic atlas that will be used to revise implementation activities.

The implementation actions identified in the plan include the best management practices (BMPs) that were evaluated using SAM, which contains a suite of BMPs typically implemented in this watershed. The plan is flexible in that adjustments to the BMPs selected for implementation can be evaluated using SAM to ensure measurable goals will be obtained. Other actions and programs include acquiring monitoring and study data, conducting an education and outreach program to targeted audiences, implementing regulatory and land use management programs, and developing and implementing capital improvement projects that focus on retaining water on the land to reduce flooding and minimize pollutant transport.

The execution of all of the plan elements will be based on a signed MOA that emphasizes shared responsibility for all elements. The PWG, which consists of staff representatives from each of the MOA members, will continue the long history of successful collaboration by coordinating the implementation plan activities and collaborating on the pursuit of grants and funding for implementing all aspects of the plan. The MOA members will hold a biennial summit with Advisory Committee and PWG members providing recommendations for changes to the plan, which may include governance, implementation, or funding concerns.

1.0 INTRODUCTION

1.1 GENERAL DESCRIPTION OF THE AREA COVERED BY THE PLAN

The Yellow Medicine One Watershed One Plan (YM1W1P) boundary drains approximately 665,073 acres in southwest Minnesota and includes nearly 1,700 miles of streams and ditches as well as 16,000 acres of lakes. This entire area is unique as it is part of the Coteau des Prairies, which is a plateau that was left untouched by the glaciers that cut, eroded, and flattened much of the rest of Minnesota. The entire Coteau is approximately 200 miles long, 100 miles wide, and up to approximately 1,000 feet thick, rising from the prairie flatlands in eastern South Dakota, southwestern Minnesota, and northwestern Iowa. The southeast portion of the Coteau, which is partially located in the Yellow Medicine River Watershed, comprises one of the distinct regions in Minnesota known as the Buffalo Ridge.

Four distinct management zones that were based on elevation changes will be referenced throughout this plan, as illustrated in Figure 1-1. Drainage to the Yellow Medicine River generally flows from the "Coteau" zone in the southwest (highest elevation of 1,975 feet in Drammen Township, Lincoln County) through a "Transitional" zone on to the glaciated "Flatland" zone and, lastly, into the "Minnesota River Valley" zone in the northeast (lowest elevation of 850 feet, where the Minnesota River flows out of the planning boundary). The elevation change equates to 1,125 feet of fall. Several tributaries within the defined watershed boundary that drain directly to the Minnesota River, these include Stony Run Creek, Hazel Creek, Boiling Spring Creek, County Ditches 12 and 39 and Judicial Ditches 10 and 23. The elevation change from the upper portion of the Coteau zone to the lower portion of the Minnesota River Valley zone of the watershed is displayed in Figure 1-2. In general, slopes are moderate in the Coteau zone (approximately 20 feet per mile), steep in the Transition zone (approximately 45 feet per mile), relatively flat in the Flatland zone (approximately 5 feet per mile), and extreme in the Minnesota River Valley zone (approximately 57 feet per mile). Area topography is important because areas with high elevation changes are more susceptible to erosion, particularly when limited native vegetation exists on the landscape. It is important to note that the YM1W1P boundary encompasses a larger area than that of the Yellow Medicine River Watershed District, which is illustrated in Figure 1-3.

The condition of water quality within the lakes and streams of the watershed (hereinafter refers to the One Watershed One Plan boundary) has been impacted by European settlement. The 2011 National Land Cover Dataset of the watershed shows the area is comprised of nearly 79 percent cultivated crops, 9 percent pasture/hay and grassland/herbaceous, 5 percent developed open space (urban areas), and 4 percent emergent herbaceous wetlands with the remainder being mainly open water and deciduous forest, as depicted in Figure 1-4. The watershed also contains approximately 150,000 feedlot animal units, 2,000 wildlife units, almost 15,000 in human population, and a dozen wastewater treatment plants. One example of the impact of European settlement is the conversion of land to agricultural production that changed the watershed from approximately 17 percent wetlands to 4 percent, or a loss of approximately 76 percent of the wetland area [Minnesota Pollution Control Agency, 2015].

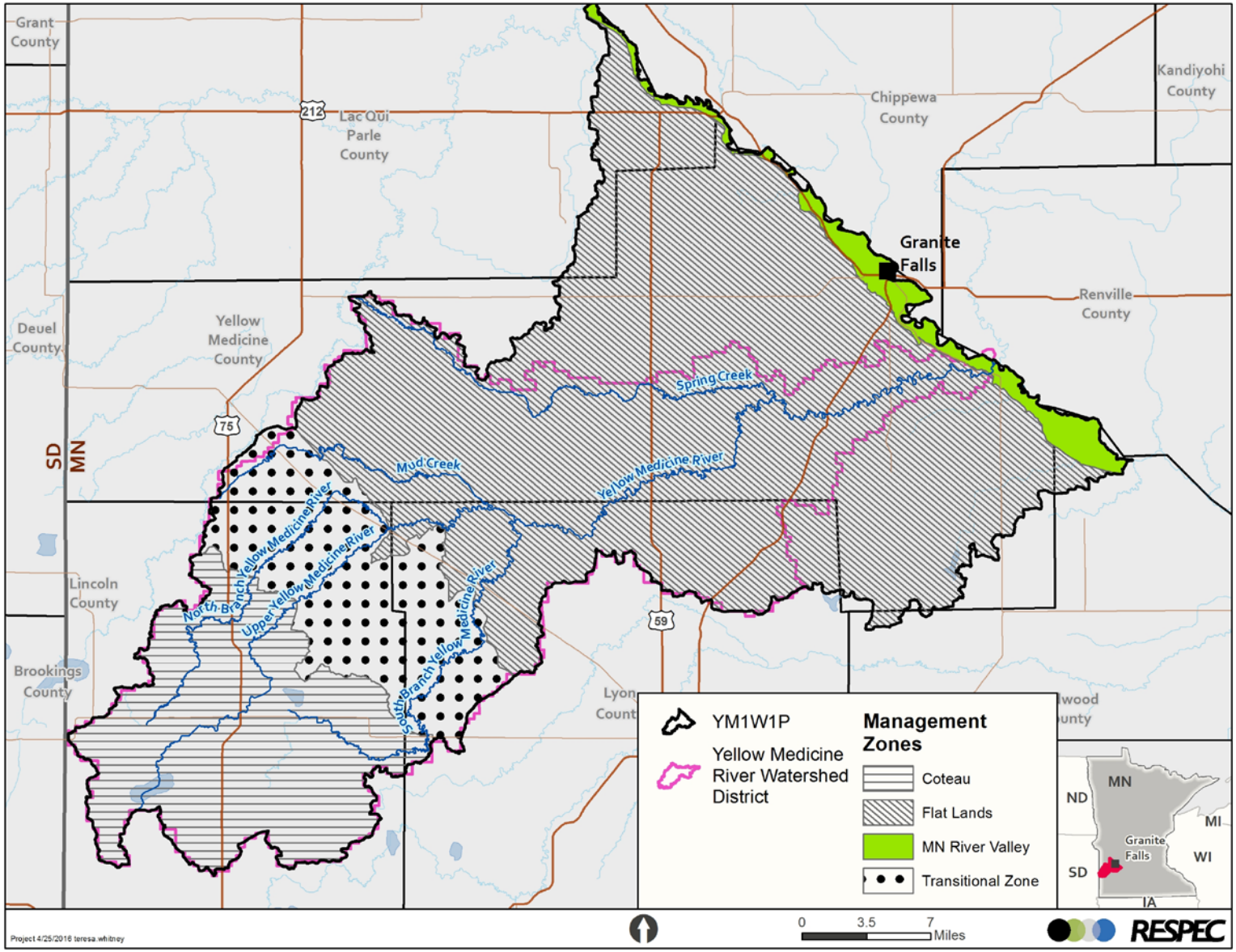

Figure 1-1. Map of the YM1W1P Boundary.

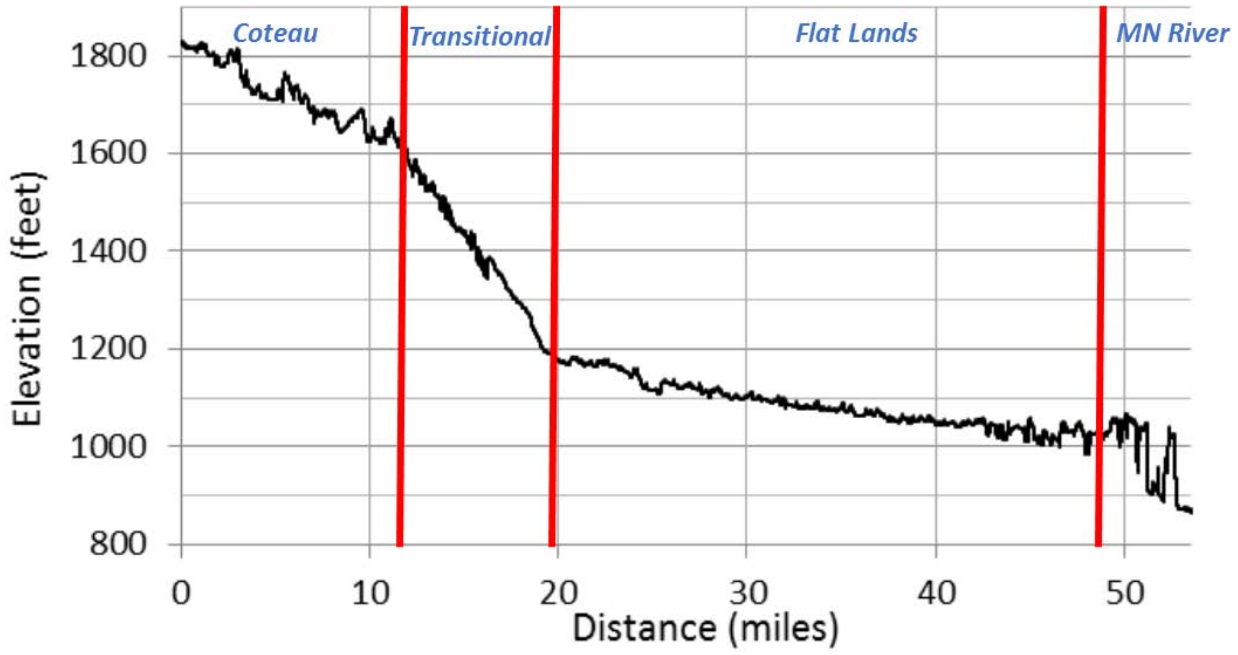

Figure 1-2. Profile of Elevation Change Within the Associated Management Zones in the YM1W1P Boundary [Minnesota Pollution Control Agency, 2015].

The watershed surface is dominated by fine-loamy soils, as illustrated in Figure 1-5. The inherent nature of this soil type is that it is highly susceptible to erosion, especially in areas of high slopes or reduced vegetation. In addition to being highly erodible, the soils are poorly drained especially in the Flatland zone of the watershed. To make the soils suitable for crop production, a significant portion of the watershed has been artificially drained. This practice has been shown to increase the volume of watershed runoff and, in turn, accelerate the transport of constituents (e.g., nutrients) to adjacent waterbodies [Skaggs, 1994]. A comprehensive summary of land and water resources within the project area is provided in Appendix C.

1.2 ONE WATERSHED ONE PLAN PRIMER

Managing Minnesota's extensive water resources is a primary focus of Minnesota's state agencies and local governments. The need for comprehensive water resources management is evident by legislation allowing for soil and water conservation districts (SWCDs) to be created in 1938. SWCDs established a long-standing relationship with the Natural Resources Conservation Service (NRCS) and its predecessor, the Soil Conservation Service (SCS), in response to the dustbowl of the 1930s. NRCS is a branch of the United States Department of Agriculture (USDA), which provides leadership to help people conserve, improve, and sustain natural resources. Adding to the need to improve watershed management, legislation was passed in 1957 to allow creating watershed districts, which are special-purpose units of government. In 1985, the Minnesota Comprehensive Local Water Management Act was passed. This act required that Comprehensive Local Water Management Plans be developed, be approved by BWSR, and be adopted at the local level to receive state funding for water management activities. Throughout the last few decades, water resource management has become more sophisticated, threats to water resources have increased, and public concern for water sustainability has grown. The passage of

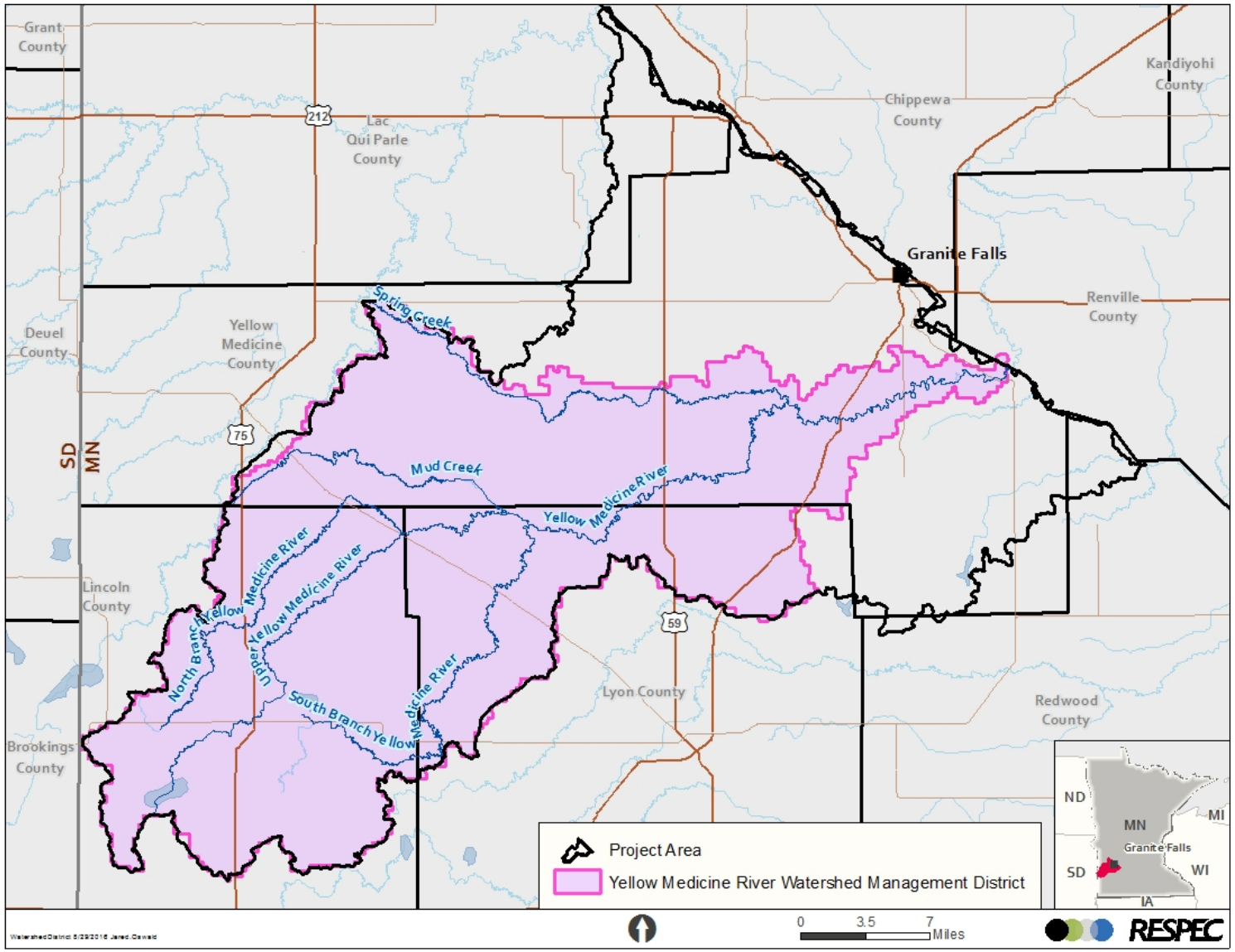

Figure 1-3. The YM1W1P Boundary as it Compares to the YMRWD Boundary.

the Clean Water, Land, and Legacy Amendment (Legacy Amendment) in 2008 provided additional funds for habitat and clean water activities while demands for transparency, efficiency, and accountability in funding, programs, and outcomes has increased, as is evident by the Clean Water Accountability Act (Minnesota Statute 114D) passed in 2013.

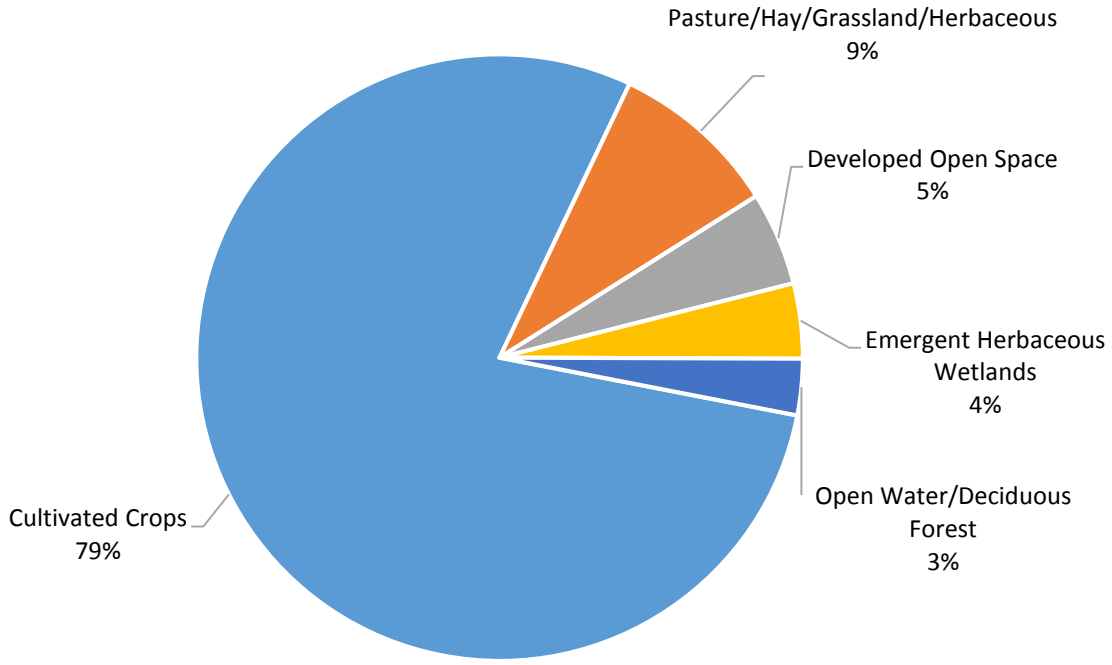

Figure 1-4. 2011 National Land Cover Database Distribution of Land Uses in the YM1W1P Boundary.

Upon the approval of the Legacy Amendment and the influx of additional funds into local water management and implementation, greater coordination was needed at the local level. Additionally, mounting pressure was building at the Minnesota Legislature to ensure accountability and results for local watershed management. The Local Government Roundtable (LGR), which consists of members representing the Association of Minnesota Counties, Minnesota Association of Watershed Districts, and Minnesota Association of Soil and Water Conservation Districts, was established in 2010 to develop recommendations to meet this challenge. A primary focus of the LGR was to develop recommendations for the local governments charged with water management responsibilities to organize and coordinate focused implementation activities on a watershed scale. The LGR recommendations were delivered in 2011 and legislation was passed in 2012 (Minnesota Statutes § 103B.101, Subd. 14) that supported the LGR recommendations and authorized that the Board of Water and Soil Resources (BWSR);

> *…may adopt resolutions, policies, or orders that allow a comprehensive plan, local water management plan, or watershed management plan, developed or amended, approved and adopted, according to Chapter 103B, 103C, or 103D* ***to serve as substitutes for one another or be replaced with a comprehensive watershed management plan*** *(also known as One Watershed One Plan)* [emphasis added].

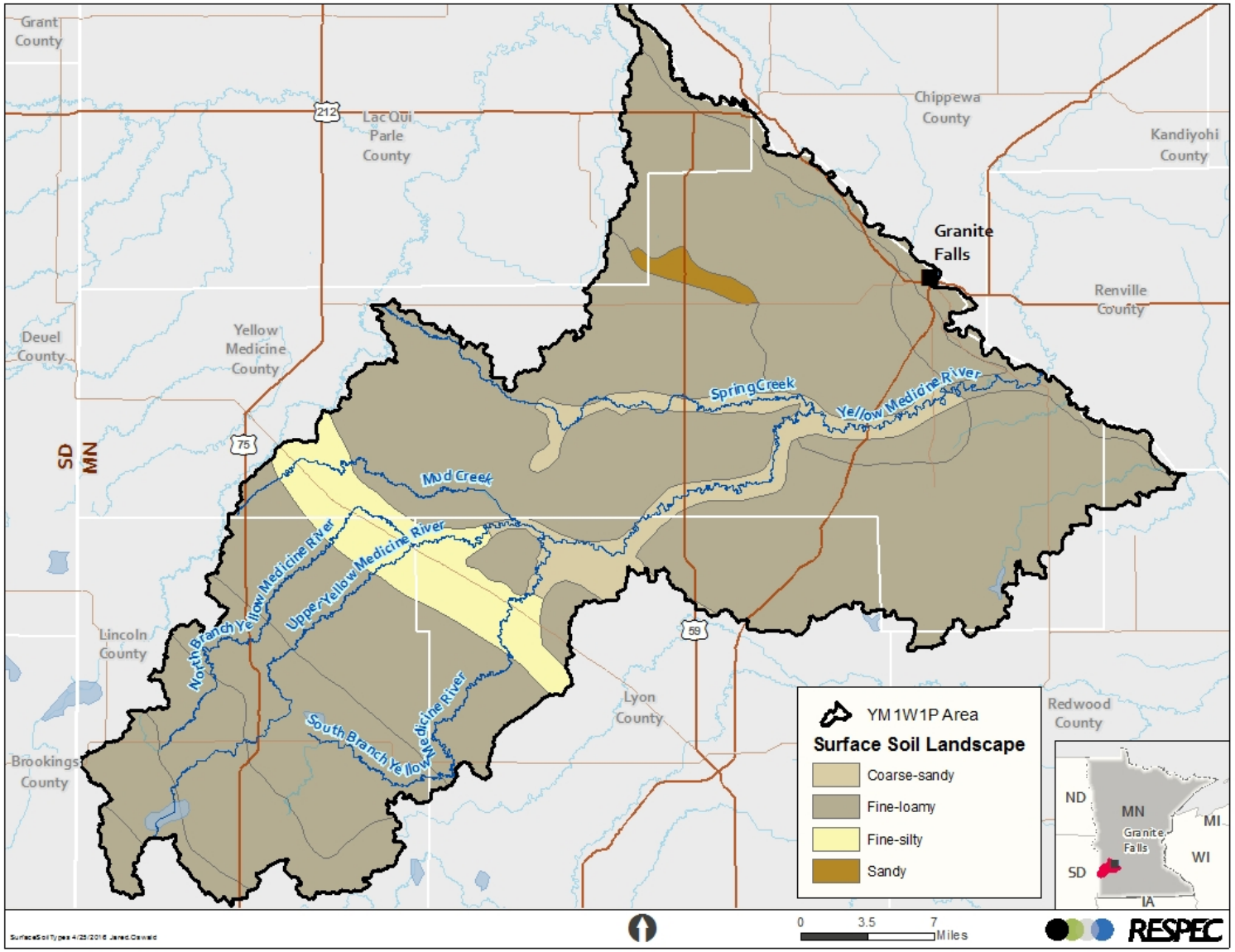

Figure 1-5. Surface Soil Texture Found Within the YM1W1P Boundary.

BWSR's vision for 1W1P is "to align local water planning on major watershed boundaries with state strategies toward prioritized, targeted and measurable implementation plans—the next logical step in the evolution of water planning in Minnesota."

The 2013 Clean Water Fund appropriation provided BWSR with the funding and authority to provide assistance and grants to local governments to transition to the 1W1P approach. With this enabling authority and funding, BWSR initiated the 1W1P pilot project. Five applications from watershed partnerships throughout the state using various approaches for planning were selected for the pilot project. BWSR will evaluate the tools and approaches used in each plan to guide future 1W1P efforts.

1.3 PLANNING PARTNERSHIP AND ROLES

The nine-county partnership of Area II Minnesota River Basin Projects (Area II), which was created in 1978, has been working cooperatively since its inception to address water quality and quantity issues in southwestern Minnesota. Since its formation, the group has successfully secured grants, completed joint studies, and implemented projects that have crossed jurisdictional boundaries. The member counties within Area II are Brown, Cottonwood, Lac qui Parle, Lincoln, Lyon, Murray, Pipestone, Redwood, and Yellow Medicine. The group also includes three watershed-based organizations: Lac qui Parle-Yellow Bank Watershed District (LQP-YB WD), Yellow Medicine River Watershed District (YMRWD), and Redwood-Cottonwood Rivers Control Area (RCRCA). Together, because of the unique but shared watershed management challenges, the partners within the three watershed areas anticipate implementing a "regional approach" to the 1W1P program with the Yellow Medicine Watershed providing the foundation of the regional approach.

The SWCDs within Area II recognized the need to increase coordination, reduce potential duplication of activities, and provide greater assurances for meeting goals and measurable outcomes. As such, the SWCDs determined that participating in the state's 1W1P pilot project was consistent with their goals and, furthermore, that the Yellow Medicine Watershed was the best candidate watershed within the planning area for the pilot project. Several planning efforts were already underway in the Yellow Medicine Watershed, including a Watershed Restoration and Protection Strategy (WRAPS) project, and four of the five counties (Lincoln, Lyon, Redwood, and Yellow Medicine) in the watershed had Comprehensive Local Water Management Plans (CLWMPs) expiring as early as 2016, as noted in Table 1-1.

A YM1W1P planning team was established and worked collaboratively to develop and submit a response to a BWSR-generated Request for Interest. Upon BWSR nomination and funding approval in June 2014, the collaborative arrangement was formalized through a Memorandum of Agreement (MOA) executed in September 2014 (Appendix D) and subsequent bylaws that were approved in November 2014 (Appendix E). The MOA was entered into by the following local governments and organizations:

- Area II Minnesota River Basin Projects, Inc.
- Lac qui Parle County
- Lac qui Parle Soil and Water Conservation District
- Lincoln County

- Lincoln Soil and Water Conservation District
- Lyon County
- Lyon Soil and Water Conservation District
- Yellow Medicine County
- Yellow Medicine Soil and Water Conservation District
- Yellow Medicine River Watershed District.

Table 1-1. Status of the Water Plans in the YM1W1P Boundary

% in 1W1P Boundary	Local Government Unit / Entity Name	Plan Name	Plan Start	Plan Expiration	Amendments
6	Lac qui Parle County	Lac qui Parle County Local Water Management Plan	2014	2023	Scheduled for 2019
	Lac qui Parle SWCD	Lac qui Parle County Local Water Management Plan	2014	2023	Scheduled for 2019
48	Lincoln County	Lincoln County Water Management Plan	2009	2016	2010 Amendment
	Lincoln SWCD	Lincoln County Water Management Plan	2009	2016	2010 Amendment
23	Lyon County	Lyon County Local Comprehensive Water Management Plan	2009	2018	2011 Amendment and December 31, 2018
	Lyon SWCD	Lyon County Local Comprehensive Water Management Plan	2009	2018	2011 Amendment and December 31, 2018
< 5	Redwood County	Redwood County Local Comprehensive Water Management Plan	2005	2020	2010 Amendment and 2016 Amendment
	Redwood SWCD	Redwood County Local Comprehensive Water Management Plan	2005	2020	2010 Amendment and 2016 Amendment
72	Yellow Medicine County	Yellow Medicine County Comprehensive Local Water Plan	2010	2016	2010 Amendment
	Yellow Medicine SWCD	Yellow Medicine County Comprehensive Local Water Plan	2010	2016	2010 Amendment
100	YMRWD	Yellow Medicine River Watershed District Plan	2009	2019	Not required

A small portion of the watershed is in Redwood County, which elected not to participate because of the small geographic area the county has in the YM1W1P boundary. Participation in the 1W1P is not required if less than 5 percent of the jurisdictional land area of the local government is within the planning area.

Upon approval and execution of the formal agreements, the Policy Committee, Advisory Committee, and Planning Work Group were established with the rules outlined below. The governance structure outlined in the formal agreement is provided in Figure 1-6.

- **Policy Committee.** The responsibilities of the Policy Committee included making final decisions about the content of the plan and its submittal. Policy Committee membership is provided in Appendix F.
- **Advisory Committee(s).** The purpose of an Advisory Committee was to make recommendations on the plan and plan implementation to the Policy Committee, including identifying priorities. Advisory Committee membership is provided in Appendix G. This committee had subsets of Citizens and Technical, which combined, comprised the full Advisory Committee.
- **Planning Work Group (PWG).** The PWG was a subcommittee of the Advisory Committee and consisted of staff representatives of the local governments that were signers of the MOA. This workgroup was established for the purposes of logistical and day-to-day (not policy) decision making in the planning process. The PWG was responsible for overall guidance for developing the plan content, including the priorities, implementation plan, implementation programs, and funding. The PWG provided oversight to all content development and plan review. PWG membership is presented in Appendix G.

Figure 1-6. Governance Structure of the YM1W1P Memorandum of Agreement.

Area II served as the coordinator and fiscal agent for the YM1W1P project. Minutes for all of the meetings can be found online (www.area2.org) or by contacting Area II directly by postal mail (1424 East College Drive, Suite 300, Marshall, MN 56258), telephone (507.537.6369), or email (*area2@starpoint.net*).

1.4 PURPOSE AND EXTENT OF THE PLAN

BWSR provided three different plan types for the pilot project: (1) water quality implementation plan, (2) priority concerns watershed implementation plan, and (3) comprehensive watershed management plan. Each plan type represented an increase in planning effort and complexity. The YM1W1P is a comprehensive watershed management plan and, as such, is the most extensive of all the planning options with correspondingly high standards. This plan is intended to address flooding, water quality and quantity issues, groundwater protection and implementation actions, programs, and funding necessary to address these issues and measurable goals. The plan uses existing planning tools, data, and information as well as new prioritization, targeting, and measuring tools.

The vision of the YM1W1P is to evolve from managing resources on political boundaries to focusing on the watershed as a unique resource to be managed comprehensively. As a result, cohesive planning and implementation will provide greater assurances that water quality and natural resource management goals will be attainable.

Because this plan will replace and operate as a Comprehensive Local Water Plan governed by Minnesota Statute 103B, all statutory requirements for noticing and approval have to be met. Official notification was required to adhere to the requirements for comprehensive watershed planning. Public notices were published in each local government's designated legal newspaper. The official 60-day public notice and comment period began on January 26, 2015. The comment period was extended and ended April 20, 2015. In total, eight comment letters were received and extensive comments were obtained at the public meetings. The comment letters and a summary of comments received at the public meetings are summarized in Appendix H. The summary of these comments are contained in Chapter 2.0, Analysis and Prioritization.

In addition to the required notice and comment period, one of BWSR's 1W1P guiding principles is that the process *"must involve a broad range of stakeholders to ensure an integrated approach to watershed management."* As such, the Policy Committee hosted public meetings during the formal comment period to kick off the planning process and obtain feedback from citizens regarding issues, goals, and priorities. Public meeting notices were directly mailed to 4,292 residences. The University of Minnesota Extension Watershed Educators and RESPEC planned and facilitated the public meetings. The dates and attendance for the kick-off meetings were as follows:

- March 10, 2015 – 37 people in attendance
- March 11, 2015 – 36 people in attendance
- April 13, 2015 – 74 people in attendance.

1.5 PLAN APPROVAL AND ADOPTION

After completing the draft plan, the formal review process begins and must be conducted in accordance with Minnesota Statute 103B.315 (1990 as revised in 2003). The Policy Committee must approve the draft and initiate the formal notice, comment period, and process. The draft document must be submitted to the plan review authorities who have 60 days to submit comments to both the Policy Committee and to

BWSR. The Policy Committee will schedule and hold a public hearing no sooner than 14 days after the 60-day review period ends. After the public hearing, the Policy Committee must submit the draft final plan, along with a summary of all comments received, the response to each comment, and additional public hearing details to BWSR. BWSR must complete its review and approval within 90 days after receiving the plan. Once BWSR has approved the plan, it must be adopted by the local governments that are signers of the MOA.

2.0 ANALYSIS AND PRIORITIZATION OF ISSUES

This chapter summarizes the process the YM1W1P partners engaged in that led to establishing consensus on priority resources and concerns, including consideration of emerging issues.

2.1 AGGREGATION OF BACKGROUND INFORMATION

The process began with aggregating existing information to identify similarities, differences and gaps to develop a framework for the prioritization process. The documents reviewed included studies of local resources, local plans, and state plans. The complete list of plans reviewed is located in Appendix I. In addition, RESPEC met with representatives from the SWCD and environmental office staff in each county, Area II, and the YMRWD to conduct a focus group interview on priorities. The initial review of implementation efforts outlined in local plans determined a significant consistency in regard to reducing flooding issues, addressing water quality concerns, and protecting groundwater. Other activities that were identified, but to a lesser degree, included improving recreational opportunities on lakes, increasing habitat and the biodiversity of plants and animals, and maintaining educational programs for K-12 students as well as adults. The key gaps identified included emerging contaminants, invasive species, and adapting to climate change.

2.2 PUBLIC MEETINGS AND COMMENTS

The University of Minnesota (U of M) Extension Service conducted a Community Readiness Survey to determine the degree to which the local governmental units were prepared to collaborate on watershed management. This survey examined six domains of readiness. The Yellow Medicine Watershed had the highest overall score compared to the other 1W1P pilot projects. The results of this survey are provided in Appendix J. Using this as background information, the U of M Extension Service Watershed Education Program Educators facilitated two of the three public kick-off meetings, with the third meeting facilitated by Ms. Emily Javens of RESPEC. Over 150 people attended the meetings. Participants were provided with background information about the newest generation of water planning being 1W1P and how the Yellow Medicine Watershed was chosen as a pilot project. The Watershed Game was played by the attendees at each meeting. The game helps people to understand the connection between land use and water quality by role-playing perspectives from urban, industrial, agricultural, and residential views. The game requires trained facilitators, the Watershed Educators, and Minnesota Department of Natural Resources (DNR) Hydrologists Lucas Youngsma and Garry Bennett to guide the discussion. Attendees were then asked to provide input in developing the priorities by answering three questions:

1. What do you value the most about the water resources in the Yellow Medicine River Watershed?
2. What water resources need to be protected or enhanced?
3. What steps are you personally willing to take to protect or enhance water resources in the Yellow Medicine River Watershed?

All of the comments received at the stakeholder meetings, along with letters submitted by cities and state agencies, were later synthesized into several categories by priority resource, beneficial use, and specific

concerns, as outlined in Table 2-1. The following entities submitted comment letters during the public comment period:

- City of Minneota
- City of Porter
- City of Taunton
- Minnesota Board of Water and Soil Resources (BWSR)
- Minnesota Department of Agriculture (MDA)
- Minnesota Department of Health (MDH)
- Minnesota Department of Natural Resources (DNR)
- Minnesota Pollution Control Agency (MPCA).

These comment letters are contained in Appendix H.

2.3 PRIORITY VALUES, CONCERNS, AND GOALS

Early in the process of prioritizing issues, the Advisory Committee painted a picture of what an ideal watershed would look like. The following vision and values emerged from that discussion:

- **Vision and Values: What would exist under ideal conditions in the watershed?**
  - Clean rivers and lakes that were considered swimmable and fishable
  - Adequate supplies of safe drinking water
  - Happy people
  - Robust land values
  - Healthy and diverse ecosystems on land and in the water
  - Plentiful fishing and hunting opportunities
  - Productive land with healthy soils
  - Minimal damages from flooding
  - Legacy of sustainability and resiliency.

While building a vision for the watershed, ideas were brought up that the Advisory Committee believed should be kept in mind when putting together an implementation plan. Those ideas are:

- Remember to think about climate change when designing projects
- Contemplate any unintended consequences that may result from our efforts
- Make sure we know the source of a problem before we try to solve it
- Give value to projects that provide multiple benefits
- Integrate this plan and coordinate between government authorities
- Work to eliminate gaps in official controls
- Think innovatively
- Maximize technological advances
- Think “downstream.”

Table 2-1. Summary Table of Priority Resources and Concerns Identified by Stakeholders

Resource	Threatened Use	Priority Concern
Agricultural Land	Crop Production	Crop (and land) losses caused by bank erosion (ditch and stream)
Agricultural Land	Crop Production	Crop losses related to blockages in drainage system and backup flooding
Agricultural Land	Crop Production	Reduced productivity because of declining soil health
Agricultural Land	Crop Production	Reduced productivity because of soil erosion by runoff and/or wind
Habitat Areas/Forests	Habitat–Terrestrial	Declining high-quality habitat areas for diverse wildlife
Pastures/Grasslands	Habitat–Terrestrial	Losses of this type of terrain
Pastures/Grasslands	Livestock Production	Overgrazing
Wetlands	Flood Storage	Reduction in flood storage because of altered hydrology–agriculture and urban landscapes
Wetlands	Habitat	Reduction in wetlands habitat areas
Urban and Developed Areas	Housing/Infrastructure	Infrastructure losses because of flooding
Groundwater	Drinking Water/Irrigation	Groundwater contamination
Groundwater	Drinking Water/Irrigation	Groundwater depletion because of overuse and altered hydrology
Lakes	Recreation	Decreased recreational opportunities because of excess nutrients in water (habitat issues also)
Lakes	Recreation	Decreased recreational opportunities because of parasites in the water
Lakes	Habitat–Aquatic	Decreased habitat diversity because of invasive species (less fishing/recreation also)
Lakes	Food Consumption	Decreased fish consumption because of unsafe levels of mercury in fish tissue
Lakes	Recreation/Habitat–Aquatic	Excess nutrients
Rivers/Streams	Recreation	Decreased recreation because of unsafe levels of bacteria/pesticides present (*E. coli* and bacteria)
Rivers/Streams	Flood Control	Insufficient capacity to efficiently carry runoff/flood volumes and sediment
Rivers/Streams	Habitat–Aquatic	Unsuitable habitat because of turbid water (muddy, nutrient rich)—water quality
Rivers/Streams	Habitat–Aquatic	Unsuitable habitat because of inconsistent base flow (creeks running dry)—volume
Rivers/Streams	Recreation/Habitat–Aquatic	Excess nutrients

Once a clear vision was developed for the watershed, the Advisory Committee developed a formula for numerically ranking the concerns that arose during the stakeholder events, were submitted in letters, or already existed in local water plans. The Advisory Committee members also had an opportunity to give feedback on the importance of each concern through a voting process. Each committee member was given five stickers and they voted for what they believed to be the most important concerns facing the

watershed today by placing the stickers on orange cards, one for each concern, as shown in Figure 2-1. The committee decided to weight the comments, votes, and water plan priorities as follows:

- 37 percent Advisory Committee voting
- 7 percent for each County Water Plan and YMRWD Management Plan
- 8 percent BWSR comment letter
- 5 percent citizen comments
- 3 percent city comment letters
- 3 percent for each of the MDA, MDH, DNR, and MPCA comment letters.

Figure 2-1. Advisory Committee Prioritization Exercise.

The Advisory Committee divided into groups to review all of the comment letters, recorded citizen comments, and the water plans. Each group was required to assign values as to where the letters or water plans assign their priorities, as seen in Figure 2-2. The decisions were then tabulated and the results are shown in Table 2-2.

Upon synthesis of the data, three priorities captured the majority of the concerns. The Advisory Committee recommended these priorities to the Policy Committee for approval. The Policy Committee agreed with the recommendations and approved the three priority concerns; (1) mitigate altered

hydrology and minimize flooding; (2) minimize the transport of sediment, excess nutrients, and bacteria; and (3) protect and preserve groundwater quantity and quality. The miscellaneous concerns listed in Table 2-2 were not deemed high enough of a concern to focus efforts on them; however, the Advisory Group wanted to include those concerns be considered additional benefits for projects when applicable. The highest priority projects should be those that have multiple benefits and do not address just one issue. The top three concerns should be considered equally important; however, restoring altered hydrology is considered the top priority, because many of the implementation strategies that address this priority concern will result in improvements to reducing sediment, nutrient, and bacteria transport as well as protecting and preserving groundwater.

Figure 2-2. Lincoln County Members Ranking the Priorities Identified in the Lincoln County Water Plan With the Priorities That Emerged From the One Watershed One Plan Prioritization Process.

2.4 MULTIPLE BENEFITS

Throughout the process, three priority concerns were identified to help guide the partners as they shift managing water resources in the future. Prioritization of the limited government funding available will be based on projects that offer multiple benefits with cost effectiveness in the targeted areas. These goals are at the heart of restoring the natural resources in the watershed. When selecting projects for implementation, multiple benefits are to be weighed with the following priority concerns receiving the highest consideration:

- Mitigate altered hydrology and minimize flooding
- Minimize the transport of sediment, excess nutrients, and bacteria
- Protect and preserve groundwater quantity and quality.

Table 2-2. Priority Concerns

Mitigate Altered Hydrology and Minimize Flooding
Reduction in flood storage because of altered hydrology–agriculture and urban landscapes
Reduced crop productivity because of declining soil health
Reduction in wetland habitat areas
Infrastructure losses caused by flooding
Crop (and land) losses caused by bank erosion (ditch and stream)
Insufficient capacity in ditches and streams to efficiently carry runoff/flood volumes
Unsuitable aquatic habitat because of inconsistent base flow (creeks running dry)
Minimize the Transport of Sediment, Excess Nutrients, and Bacteria
Reduced crop productivity because of soil erosion by runoff and/or wind
Unsuitable aquatic habitat because of turbid water (muddy, nutrient rich)
Decreased recreational opportunities because of excess nutrients in water
Decreased recreation because of unsafe levels of bacteria/pesticides present (*E. coli* and fecal)
Protect and Preserve Groundwater Quantity and Quality
Groundwater depletion because of overuse and altered hydrology
Groundwater contamination
Miscellaneous Concerns
Declining high-quality habitat areas for diverse wildlife
Excessive vegetation in lakes (mainly Lake Shaokatan)
Crop losses related to blockages in drainage system
Losses of grassland habitat
Decreased habitat diversity because of invasive species (less fishing/recreation also)
Overgrazing
Decreased recreational opportunities because of parasites in the water
Decreased fish consumption because of unsafe levels of mercury in fish tissue
Lack of crop diversity

2.5 SUBWATERSHED PRIORITIZATION

With limited available funding and aggressive goals, the approach to planning was to select priority subwatersheds within each management zone in the watershed to focus on financial and staffing resources. The management zones, displayed in Figure 2-3, were identified using information generated from a calibrated HSPF model and other factors, including the likelihood of success based on current understanding of attitudes and past conservation successes in the area. The priority subwatersheds in each management zone are identified in Figure 2-4 and include the Upper Yellow Medicine River and North Branch Yellow Medicine River in the Coteau management zone, Mud Creek in the Transitional management zone, and the Stony Run Creek, Judicial Ditch 23, and headwaters of Judicial Ditches 10 and 24YM&L in the Flatlands management zone. Figure 2-5 indicates the priority subwatersheds without management zones.

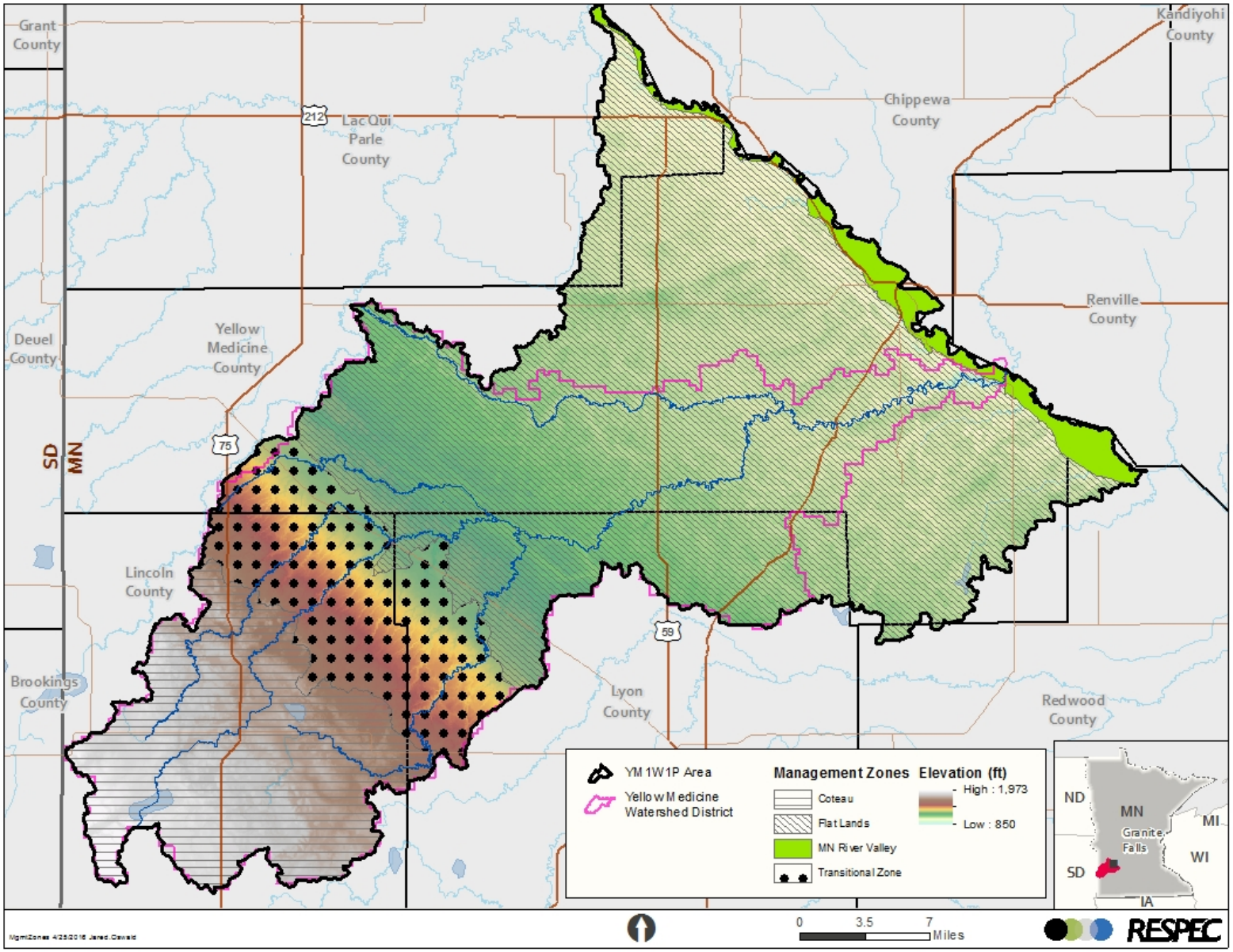

Figure 2-3. Management Zones Within the YM1W1P Boundary.

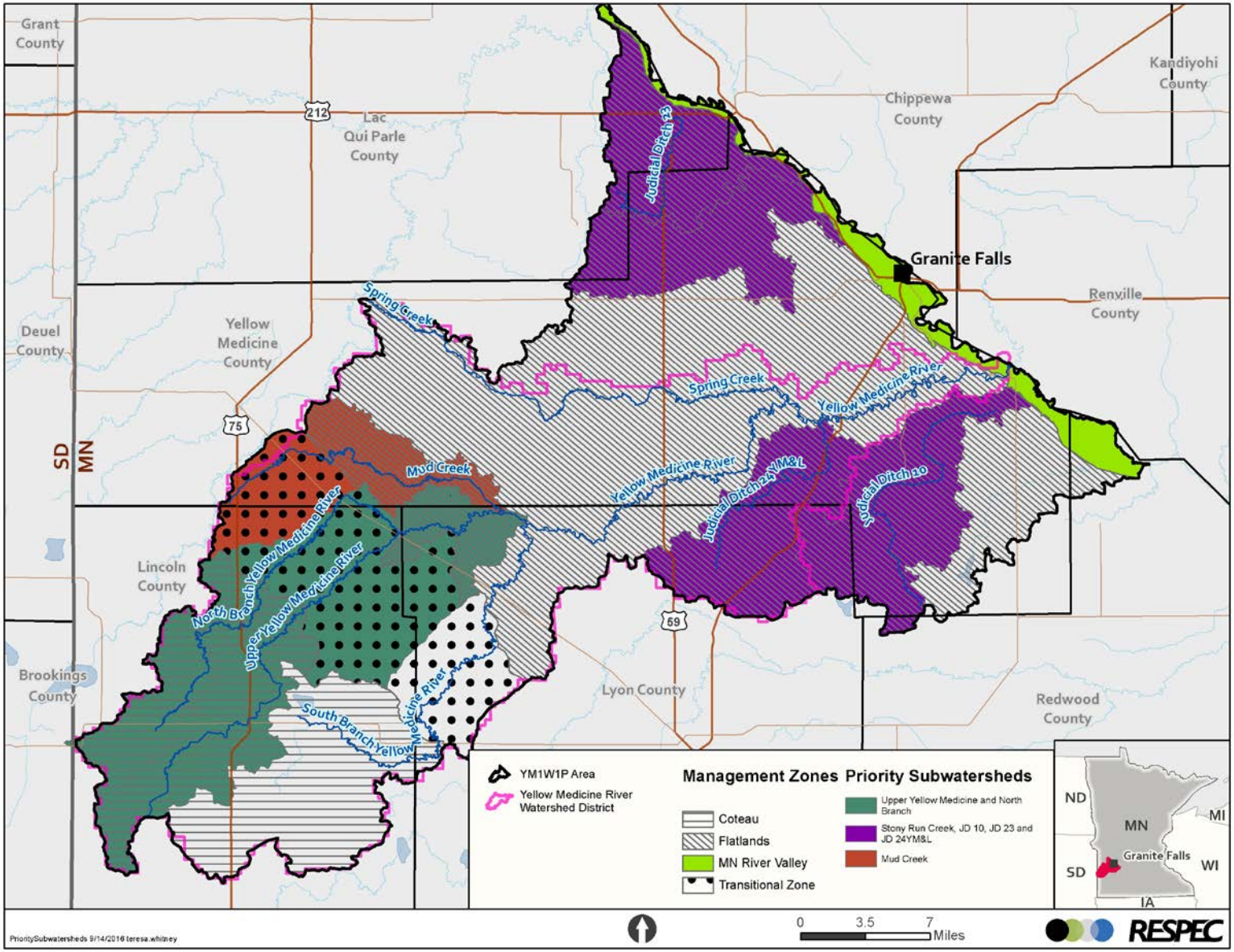

Figure 2-4. Management Zones With Priority Subwatersheds Selected for Implementation.

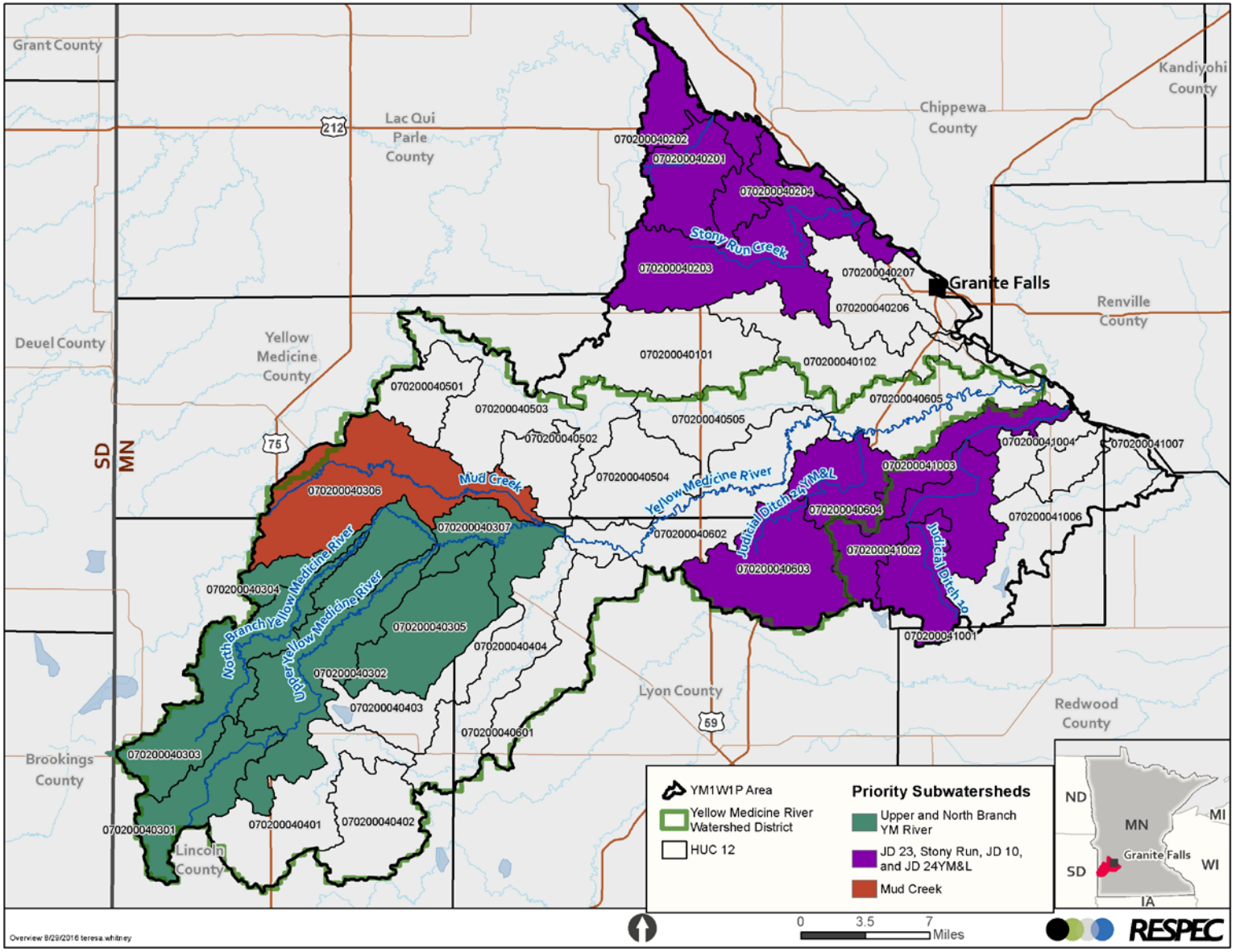

Figure 2-5. Priority Subwatersheds Selected for Implementation.

The YM1W1P PWG leveraged the existing HSPF model developed within the watershed to aid in identifying priority areas and practices within the individual management zones as well as quantifying the estimated progress toward water quality goals if practices were implemented. Specifically, the PWG used a tool called the Scenario Application Manager (SAM) software. SAM software, displayed in Figure 2-6, consists of a GIS system for site selection, HSPF watershed model application to simulate fate and transport of pollutants, and a Best Management Practice (BMP) database. The tool's value is in its simplification of a complex hydrologic and water quality model to estimate the significant nutrient sources in a watershed.

The first step for the PWG was to use HSPF-SAM software to understand the subwatersheds within the project area that are driving water quality impairments. The software allows the user to run a "base" condition assessment, which provides calibrated hydrology and water quality results. These calibrated results for each subwatershed were then analyzed for contributions to impacts to water quality concentration and loading as well as flow. As an example, the SAM "base" condition results for total phosphorous loading contributions is displayed in Figure 2-7.

The comprehensive results for impact to overall flow and water quality visualized with the SAM software, as well as local knowledge about public perception and success of past conservation initiatives, were used to select the priority subwatersheds within each of the watershed management zones.

2.5.1 Future Targeted Subwatersheds

Throughout the life of this 10-year comprehensive watershed management plan and as goals for each current priority subwatershed are met, the YM1W1P Partnership will evaluate subsequent priority subwatersheds to focus their activities on. The partnership will engage in a prioritization exercise using HSPF-SAM and other tools and criteria to evaluate the subwatershed areas that have the potential to meet plan goals through implementation activities. Additionally, the partnership will leverage initiatives in subwatersheds currently not deemed priorities to take advantage of those initiatives. In this way, the partnership has the flexibility to adjust the implementation plan to accommodate changes that will provide greater opportunities to meet the plan's measurable goals.

2.6 EMERGING ISSUES

This plan is based on existing knowledge and evaluation of existing concerns; however, emerging issues may require a shift in focus or could influence the implementation plan priorities. Several of these concerns are explored further in the following sections and are not intended to be a comprehensive assessment. In addition to the concerns identified below, changes in farm policies; potential funding sources; economics at local, state, and regional levels; as well as emerging technologies in resource management could potentially impact the priorities and implementation plan. The YM1W1P partners will monitor emerging natural resource concerns and will be able to quickly adapt to a new concern if needed.

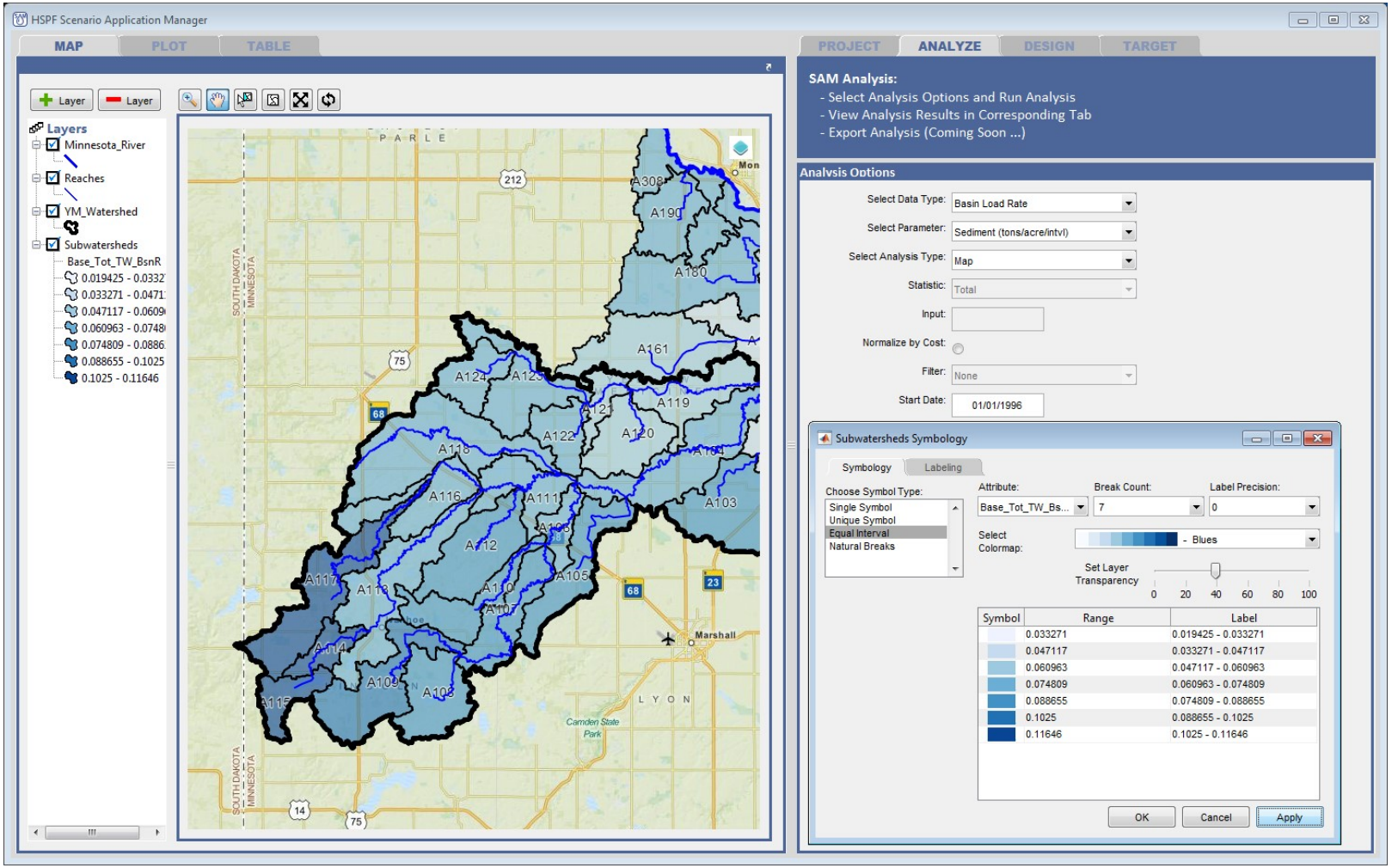

Figure 2-6. Screenshot of the SAM Graphical User Interface (GUI).

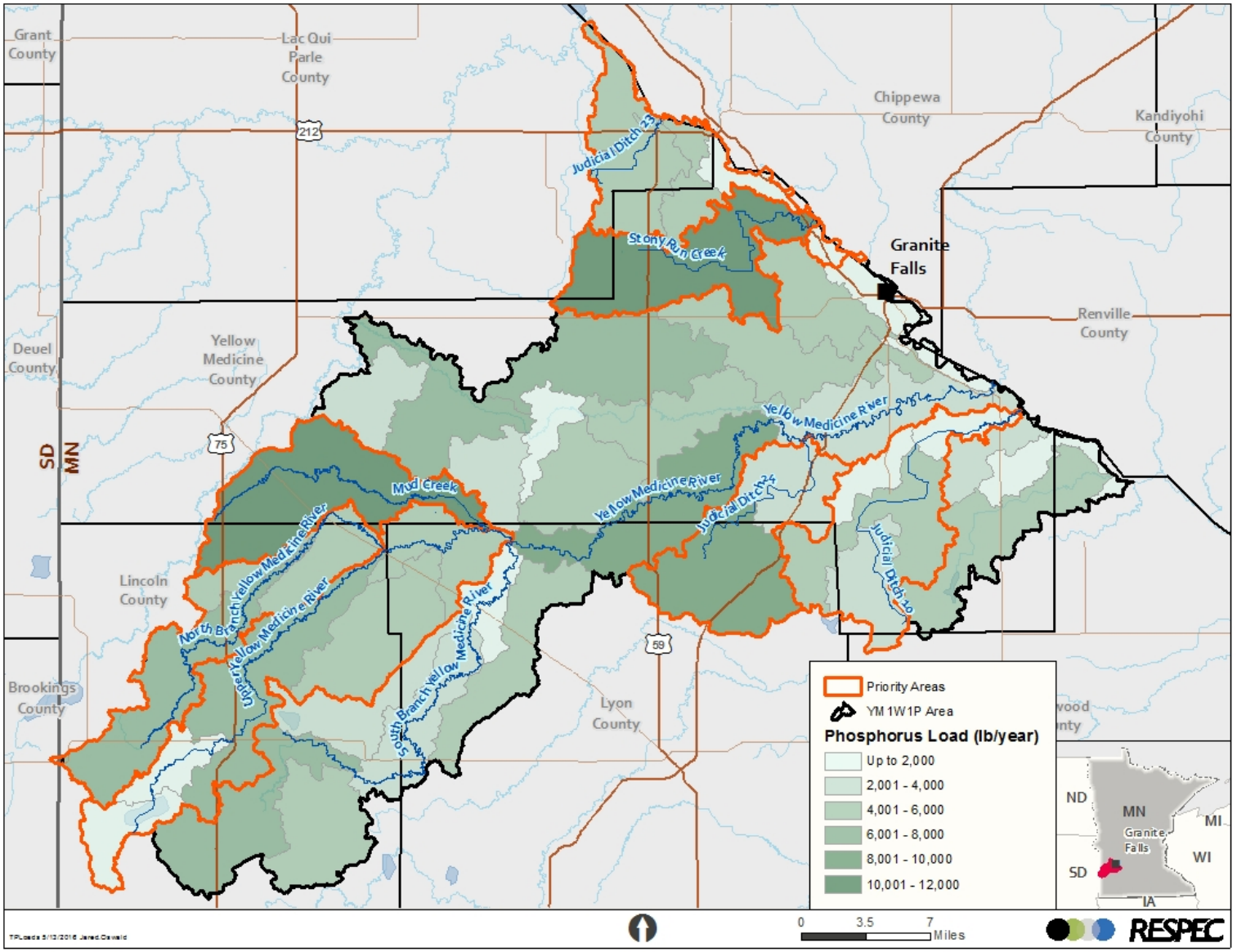

Figure 2-7. Total Phosphorus Yield Estimated From the Yellow Medicine Watershed HSPF Model.

2.6.1 Climate Change

Data indicate temperatures and precipitation patterns are increasingly changing, including intensity, frequency, and duration of precipitation events as well as increased length between precipitation events. These precipitation patterns will influence the way agriculture, the major industry, and land use of the watershed require and use surface water and groundwater in the future.

Historically, engineers have used the Weather Bureau Technical Paper No. 40 (TP-40) standards from 1961 for estimating precipitation/frequency and durations for the United States. In 2013, the National Oceanic and Atmospheric Administration updated TP-40 and published the Atlas 14 Volume 8 for Minnesota. Atlas 14 supersedes TP-40's precipitation-frequency atlas because of its higher gridded resolution (scale of 1 kilometer [km]), increase in weather station data, incorporation of geographic features, and roughly 50 years more of interpreted data. Rainfall depths for high-frequency, 24-hour storms remain relatively similar with some decrease in precipitation for Granite Falls, Minnesota (see Table 2-3). For recurrence intervals of 50 to 100 years, the Atlas 14 increases rainfall depth by 10–20 percent. Atlas 14 will be used to design BMPs mitigating the impact of the estimated increase in rainfall depth and runoff volume.

Table 2-3. Comparison of Technical Paper No. 40 (1961) to Atlas 14 (2013) for Granite Falls, Minnesota

Recurrence Intervals (Years)	TP 40 (in)[(a)]	Atlas 14 (in)	Percent Change
2	2.6	2.66	2.3
5	3.4	3.33	–2.1
10	4	3.96	–1.0
50	5.2	5.84	12.3
100	5.7	6.8	19.3

(a) Interpolated values from isopleths.

2.6.2 Irrigation

Within the Yellow Medicine River Watershed, heavy soils that retain soil moisture and ample precipitation throughout the growing season are typically able to meet crop water requirements, such that supplementing water through irrigation historically has not been necessary. In fact, the heavy soils have made drainage necessary to remove soil moisture from the soil profile; a more common practice than irrigation. However, irrigation is an increasing trend across southern Minnesota. Currently, the DNR has seven active permits for agricultural irrigation within the YM1W1P boundary, with one new application being reviewed at the time of plan development. The active permit locations are depicted in Figure 2-8. The majority of the irrigated cropland is located in the Flatlands management zone with five of the seven permits drawing from groundwater aquifers ranging in depth from 65 feet to 170 feet and with the other two permits appropriating from surface water sources. In addition to the seven active

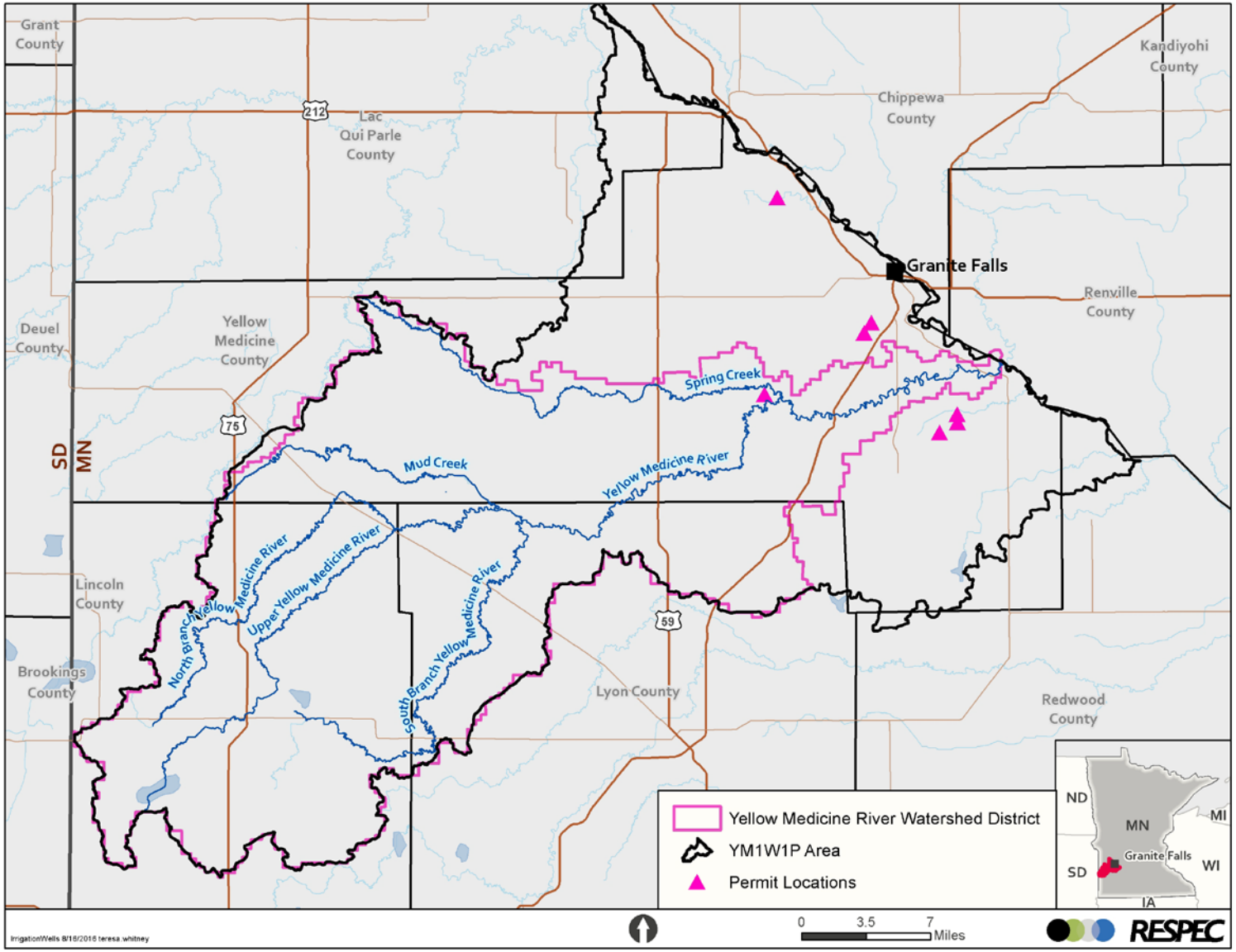

Figure 2-8. Irrigation Wells Located Within the YM1W1P Watershed Boundary.

permits, there have been 32 permits for major crop irrigation within the plan boundary are no longer active. These historic permits mainly originated during drought conditions.

Crop productivity has increased significantly in recent years, with numerous studies identifying timeliness and quantity of water availability as being a potentially limiting parameter to further increased crop yields. Future predictions that indicate the changing climate may reduce the availability of surface water and increase evapotranspiration during the critical phases of crop development (primarily in July and August) may make water availability a larger factor affecting crop yield. The desire to manipulate available crop water could lead producers to explore different management strategies to limit the associated risk; this may include developing additional irrigation wells. Another consideration may be enhanced management of drainage water, including installing controlled drainage or storing excess drainage water for use in times of deficit.

2.6.3 Invasive Species

Aquatic invasive species are not currently infesting any waters in the Yellow Medicine Watershed, but are an issue of concern in the future. Invasive carp continue to make their way up the Mississippi River, and aquatic vegetation and zebra mussels continue to infect new lakes throughout Minnesota. The state is making an effort to stop the spread and treat infected waterbodies, but it is a responsibility of the local units of government to be aware of the possible issues and prepare accordingly.

Invasive species are not a priority concern for the Yellow Medicine Watershed at this time. Preventing aquatic invasive species from entering the watershed is the best management approach for reducing potential risks of infested waters. Once waters are infested, the cost of managing the issue greatly increases along with a risk that the waterbodies will not return to pre-infested quality. Of particular concern is the crossover flooding between watersheds that may facilitate transport of invasives. Funding for locally-led prevention efforts has been recently appropriated from the legislature. This threat should be monitored and managed accordingly to best protect the waters from this costly issue.

2.6.4 Aging Infrastructure

Much of the infrastructure, including roads, bridges, drainage systems, utilities, and railroads, is aging. This has the potential to impact the priority concerns and implementation in two ways. First, an opportunity exists to improve water resource management options with adequate planning and cooperation when the aging infrastructure is to be replaced or upgraded. Second, these infrastructure systems could possibly fail because of age and potentially be in a state of disrepair. Failure of major infrastructure may cause an immediate change in priority of efforts based on the level of impact to natural resources and the ability to implement conservation programs.

3.0 YELLOW MEDICINE 1W1P MEASURABLE GOALS

3.1 PRIORITY CONCERNS

Throughout the process, three priority concerns were selectively identified to help guide the partners as they shift managing water resources in the future. The limited government funding available will be prioritized based on projects or activities that offer multiple benefits with cost effectiveness in the targeted areas. These priority concerns are progress toward protecting and restoring the natural resources in the watershed. When selecting projects for implementation, multiple benefits are to be weighed with the following priority concerns:

- Mitigate altered hydrology and minimize flooding
- Minimize the transport of sediment, excess nutrients, and bacteria
- Protect and preserve groundwater quantity and quality.

Each of these priority concerns is discussed in the following text.

3.1.1 Mitigate Altered Hydrology and Minimize Flooding

Altered hydrology has had significant impacts to the Yellow Medicine Watershed. Disturbances to the natural water pathways are the most commonly identified stressor to aquatic life in the watershed with both high and low flow conditions being identified as problematic [Watershed Restoration and Protection Strategy, 2015]. These disturbances can be attributed to both agricultural impacts such as tiling and drainage activities, as well as urban impacts from concentrated stormwater runoff. The strategy for addressing this priority concern includes two primary aspects: (1) mitigating adverse effects from existing drainage impacts through implementing practices and projects and (2) preventing additional impacts through regulatory controls and better planning of drainage activities. These two approaches combined is the number one strategy to improving and maintaining watershed health, restoring fishable and swimmable status, reducing flooding, and preserving stream resources.

3.1.2 Minimize the Transport of Sediment, Excess Nutrients, and Bacteria

Implementing projects that affect altered hydrology may have a large effect on sediment and pollutant delivery. Additional upland or land use management approaches will improve water quality by limiting sediment, nutrients, and bacteria from moving toward our lakes, rivers, and streams. Stormwater and snowmelt runoff and the associated pollutants and contaminants that are contained in the runoff contribute to downstream pollution, decrease hydraulic capacity, and diminish stream and lake habitat. Subsurface flow into streams and wetlands may also contain increased levels of nutrients caused by artificial drainage, failing manure storage structures, and potential leaching and surface discharge from septic systems. Holding water on the land, providing infiltration, and allowing for solids to settle are the main strategies for addressing this priority concern. No measurable goal for bacteria reduction could be developed at this time as *E. coli* is not included in the MPCA's HSPF model for this watershed.

3.1.3 Protect and Preserve Groundwater Quantity and Quality

Without access to clean and abundant groundwater, residents will undergo significant change to their quality of life. Groundwater resources are critical for promoting economic development potential and

should be protected to have a thriving regional economy. The project partners found that continuing to promote protection of the groundwater quality and quantity is essential to long-range planning.

At the time of plan development, current results indicated that community public water suppliers have low vulnerability to potential contamination. The MDH collects water quality results from public water supply wells. A review of communities in the Yellow Medicine Watershed shows that the aquifers (Quaternary Buried Artesian and Cretaceous Regolith) that these wells pump from are not exhibiting contaminations from human-made activities. This is validated by the absence of tritium, nitrate, phosphate, and low chloride/bromide ratios. Some arsenic, which is naturally occurring, is present.

The low vulnerability status of community public water suppliers indicates that generally only wells, other types of boreholes, excavations that may reach the aquifer, and certain types of Environmental Protection Agency (EPA) Class V wells are likely to impact the community wells. The locations of private wells in relation to groundwater susceptibility is illustrated in Figure 3-1. The amount of knowledge about groundwater and drinking water is somewhat limited; therefore, the implementation plan includes acquiring data, such as the hydrogeologic atlas, and developing a greater sense of understanding of these resources and concerns.

Subsurface water flow that infiltrates into groundwater may also contain increased levels of nutrients caused by artificial drainage, failing manure storage structures, and potential leaching from septic systems. The Nitrogen Fertilizer Management Plan (NFMP) outlines how the Minnesota Department of Agriculture (MDA) addresses elevated nitrate levels in groundwater from nitrogen fertilizer use. The NFMP has four components: prevention, monitoring, assessment, and mitigation. The goal of the MDA's Township Testing Program is to monitor nitrate levels in private drinking water wells, with a measurable goal of maintaining fewer than 10 percent of wells in identified townships testing below the drinking water standard of 10 milligrams per liter (mg/L) nitrate-nitrogen. The program is focused on townships around the state where groundwater nitrate contamination is more likely to occur. For the YM1W1P, these townships are as follows: Westerheim, Lyon County; Swedes Forest, Redwood County; and Normania, Yellow Medicine County. These townships have vulnerable groundwater areas and significant row-crop acres. Between 2014 and 2019, MDA will offer free nitrate tests to approximately 70,000 private well owners statewide (within 250 to 300 townships). The number of nitrate samples tested will depend on the distribution of private wells within the selected townships and participation of private well owners.

3.2 MEASURABLE GOALS

Before work was completed in this plan, the MPCA and local government agencies studied the water quality of the lakes and streams in the watershed and quantified the pollutant and flow reductions that would be needed for all lakes and streams to meet water quality standards. Goals and timelines were established and reported in the Yellow Medicine WRAPS report. These goals were reviewed, revised, and approved by the Policy Committee for adoption into the YM1W1P for the first 10-year cycle. If met, the goals summarized in Table 3-1 would restore all of the waterbodies in the watershed to a state that meets the 10-year target goals for aquatic recreation and habitat. A water quality monitoring program will be required to track progress on a regular basis. Monitoring is one tool to assess progress.

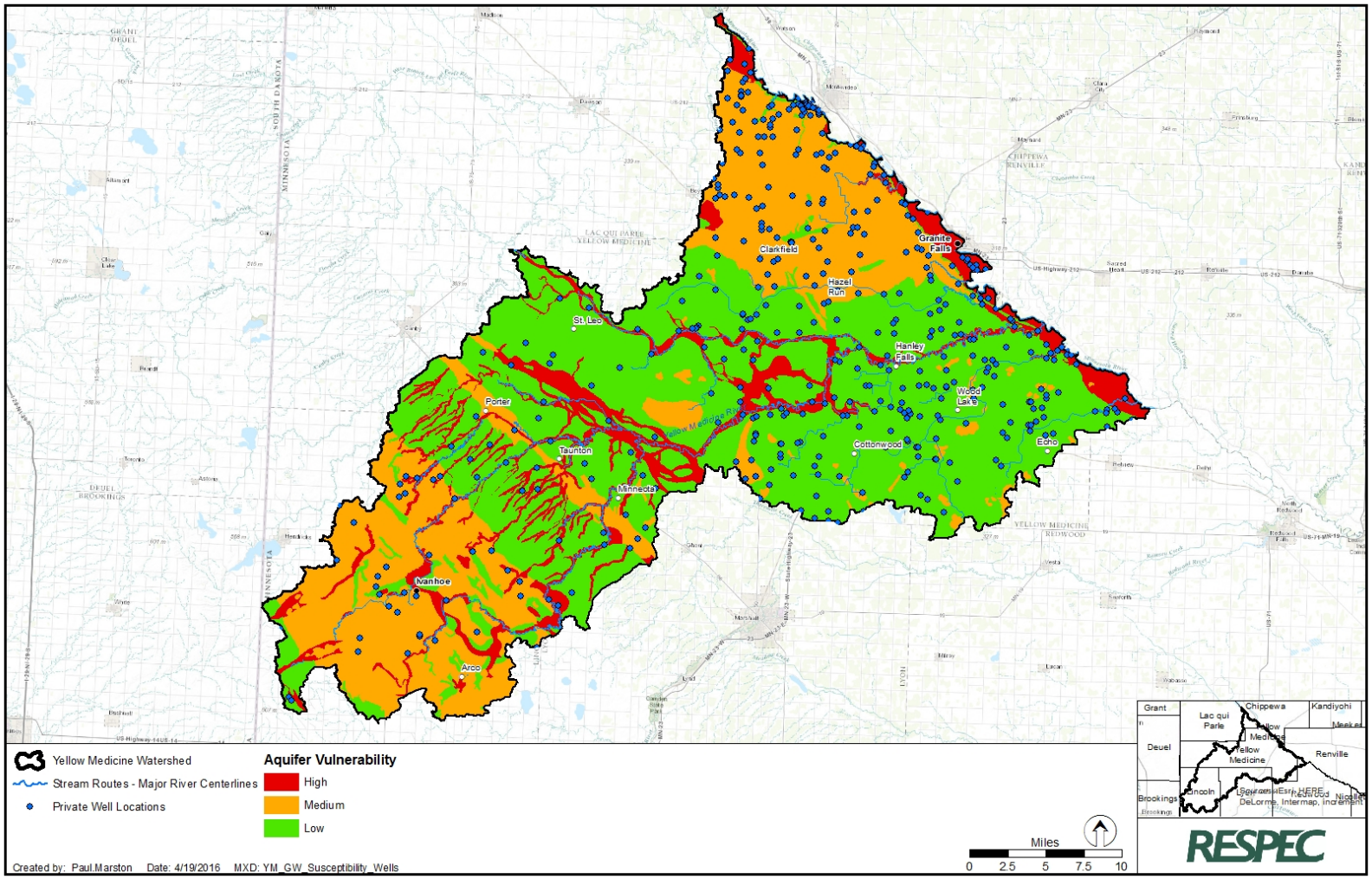

Figure 3-1. Aquifer Vulnerability and Private Well Locations.

The current monitoring plan is discussed in Section 5.8.2 and Table 5-10. Recommendations for tracking progress toward goals are located in Appendix K.

Table 3-1. Measurable Goals Approved by the YM1W1P Policy Committee

Priority Concerns	Identified Issue and Concern	2017–2026 1W1P Measurable Goals
Mitigate altered hydrology and minimize flooding	Flood reduction; Stream health	Add 1,000 acre-feet of new stormwater storage[(a)]
		No net increase in highest annual peak flows[(b)]
		3% increase in dry season base flow[(b)]
Minimize the transport of sediment, excess nutrients, and bacteria	Excess sediment	10% decrease in total suspended solids (TSS) loads[(a)]
	Excess phosphorus	10% decrease in total phosphorus (TP) loads[(b)]
	Excess nitrogen	8% decrease in total nitrogen (TN) loads[(b)]
Protect and preserve groundwater quantity and quality	Potential groundwater contamination	Seal 25 unused wells per year Begin hydrogeologic atlas process Maintain fewer than 10% of private wells failing to meet 10 mg/L nitrate water quality standard

(a) Measuring progress towards the YM1W1P goal of creating an additional 1,000 acre-feet of storage in the watershed, will be based on the following criteria:

1) Additional temporary storage capacity engineered into a project that is above the permanent/normal pooling elevation created by a water control structure and below the emergency spillway elevation, where the overall drawdown time for the structure is greater than 48 hours for a 10-year summer rainfall event.
2) For dry dams, 100% of the storage capacity up to the emergency spillway elevation, where the overall drawdown time is greater than 48 hours for a 10-year summer rainfall event.

(b) As measured by SAM at the mouth of the Yellow Medicine River at its confluence with the Minnesota River.

3.3 ZONE MANAGEMENT

The Yellow Medicine Watershed has very unique characteristics in different areas. To manage the watershed of this scale, planning for protecting and restoring surface waters will occur along four different geographic and topographic zones; therefore, management strategies may be unique for each zone. The following management zones are displayed in Figure 2-3:

- **Coteau:** the headwaters of the Yellow Medicine River with the highest elevation in the watershed of 1,975 located just above Lake Shaokatan
- **Transitional:** the area of rapid changes estimated at 45 feet per mile in elevation between the unglaciated Coteau and glaciated Flatlands
- **Flatlands:** the glaciated, relatively flat, floodplain area of the Yellow Medicine River
- **Minnesota River Valley**: the break between the glaciated Flatlands and the Minnesota River, which has extremely steep slopes with elevation drops of approximately 57 feet per mile.

3.3.1 Coteau Management Zone

The unglaciated Coteau management zone is located in the uppermost portion of the watershed with elevations ranging from 1,975 feet mean sea level (msl) to approximately 1,650 feet msl. Land use in this management zone is predominantly cropland with some grassland. Lake Shaokatan is located in the Upper Branch Yellow Medicine River subwatershed, which has a landscape characterized by rolling hills and contains deep, buffered ravines. The North Branch Yellow Medicine River subwatershed starts in the Coteau and extends into the Transitional zone where it has an elevation drop of 710 feet. The Coteau portion of this subwatershed is characterized by highly manipulated hydrology supporting a thriving agricultural economy. The impacts of highly altered drainage and the steep elevation change causes the flooding experienced in the Flatland zone. The Upper Branch Yellow Medicine River and North Branch Yellow Medicine River subwatersheds are two areas of focus for the Coteau management zone.

3.3.2 Transitional Management Zone

The Transitional management zone lies between the upper Coteau and the lower Flatlands and is characterized by relatively high slopes as the watershed transitions from the unglaciated to glaciated area. The streams and tributaries flow nearly parallel and are closely situated, which leads to significant runoff from snowmelt and heavy rains. With the dramatic elevation change in this zone, downstream flooding and significant erosion result. As such, many floodwater retention projects are located here to temporarily hold the water on the landscape and reduce the flow in the watercourses. Mud Creek was selected as one of the top priorities for the Transitional zone as crossover flooding occurs from the Lac qui Parle River to the Yellow Medicine River at this location. Implementing BMPs in the Mud Creek Watershed is challenging because the upstream topography does not provide obvious retention areas. Any future work performed upstream in the Lac qui Parle Watershed would be beneficial to reducing crossover flows and the subsequent damage.

3.3.3 Flatlands Management Zone

The Flatlands management zone is the glaciated portion of the watershed adjacent to the Minnesota River. The soils in this management zone are poorly drained. To make the soils suitable for crop production, a significant portion of the land area has been artificially drained. In this management zone of the watershed, project partners will start in the headwaters areas of Judicial Ditches 10 and 24YM&L. Two other priority areas include the subwatershed areas of Stony Run Creek and Judicial Ditch 23.

3.3.4 Minnesota River Valley Management Zone

No specific priority areas were identified in this watershed management zone as part of the YM1W1P; however, the entire Minnesota River Valley is a critically important priority for the health of the Minnesota River. The YM1W1P is directing focus on areas further upstream in the watershed. Protection of this resource will include restoration activities above the knick zone.

4.0 TARGETED IMPLEMENTATION PLAN

4.1 MEASUREABLE GOALS AND OBJECTIVES TO ADDRESS PRIORTY CONCERNS

The action items identified in this Targeted Implementation Plan are expected to meet the 10-year measurable goals provided that practices are targeted, designed, constructed, and maintained with applicable standards. The Targeted Implementation Plan is arranged according to incentive program and capital improvement program practices for each of the three priority concerns.

The priority concerns should be considered equally important; however, **Mitigate Altered Hydrology and Minimize Flooding** is considered the top priority because many of the implementation strategies that address this priority concern will result in improvements to reducing sediment, nutrient, and bacteria transport, and preserving and protecting groundwater quantity and quality.

4.1.1 Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding

Measurable Goals

- Add 1,000 acre-feet of new stormwater storage
- No net increase in highest annual peak flows
- 3 percent increase in dry season base flow

Objective 1: Implement BMPs. Implement BMPs to mitigate altered hydrology in the Coteau, Transitional, and Flatland management zones. Keep stormwater in place as long as possible while balancing the need to prevent damage to infrastructure and crops.

Objective 2: Capital Improvement Projects. Review, determine, and implement capital improvement projects, including regional wetlands restorations, flood retention impoundments, culvert modifications at road crossings, land acquisitions of flood prone areas, and projects that reconnect the floodplain to the rivers. Prevent additional impacts by identifying and implementing projects that provide significant benefits (often on a regional scale, rather than field scale) and requiring feasibility studies before design and construction.

Objective 3: Studies, Data Acquisition, and Data Management. Acquire data necessary to gain a greater understanding of the resources, threats, trends and status to better target practices for planning and implementing watershed activities.

Objective 4: Land Use and Regulatory Control. Prevent additional impacts through regulatory controls and better planning and permitting of drainage activities.

4.1.2 Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria

Measurable Goals

- 10 percent decrease in Total Suspended Solids (TSS) loads
- 10 percent decrease in Total Phosphorus (TP) loads
- 8 percent decrease in Total Nitrogen (TN) loads.

Objective 1: Implement BMPs. Implement BMPS to minimize the transport of sediment, nutrients, and bacteria in the Coteau, Transitional, and Flatlands management zones. The associated pollutants and contaminants that are contained in the runoff from stormwater and snowmelt contribute to downstream pollution, decrease hydraulic capacity, and diminish stream and lake habitat. Holding water on the land, providing infiltration, and allowing for solids to settle are strategies to help meet this priority concern.

Objective 2: Capital Improvement Projects. Select projects to minimize the transport of sediment, nutrients, and bacteria including large-scale water quality projects and stream stabilization projects.

Objective 3: Studies, Data Acquisition, and Data Management. Acquire data necessary to gain a greater understanding of the resources, threats, trends, and status to better target practices for planning and implementing watershed activities.

4.1.3 Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality

Measurable Goals

- Seal 25 unused wells per year,
- Begin hydrogeologic atlas process,
- Maintain fewer than 10% of private wells failing to meet 10 mg/L nitrate water quality standard.

Objective 1: Protection of Groundwater. Assure long-term quality and quantity of groundwater by protecting groundwater supplies, encouraging recharge, and maintaining base flow contributions to groundwater dependent natural resources.

Objective 2: Studies, Data Acquisition, and Data Management. Acquire data necessary to gain a greater understanding of the resources, threats, trends, and status to better target practices for planning and implementing watershed activities.

This chapter establishes the implementation program to address priority concerns by watershed. Action items describe specific measures that the partners intend to implement in cooperation with appropriate local, state, and federal agencies and other organizations. The action items were reached by consensus and are not necessarily in order of rank for the 10-year period. The practices are based on NRCS Environmental Quality Incentive Programs (EQIP) cost-share and incentive program rates unless otherwise noted. Cost Share indicates approximately 50 percent of the total cost and does not include easements cost. Landowner contribution/commitment for structural practices is generally figured at 25 percent of the practice cost and is not included in the Table 4-1. Landowner contribution/commitment for incentives is recognized in the table. Total cost-share/incentive amounts listed for each action item are based on an estimated cost per acre or BMP listed in each action item of the implementation plan. The costs to achieve the listed action items are only estimates and are subject to review. Payment rates will be reevaluated each year for accuracy and progress toward completion of the goal.

The priority concerns should be considered equally important; however, **Mitigate Altered Hydrology and Minimize Flooding** is considered the top priority because many of the action items that address this priority concern will result in improvements to reducing sediment, nutrient, and bacteria transport as

well as protecting and preserving groundwater. The action items that benefit the other priority concerns are not repeated in those sections.

The cumulative impact of this Targeted Implementation Plan will reduce the variability in the quality and quantity of the Yellow Medicine River by increasing base flows and reducing peak flows (flooding), sediment erosion, and pollutant loads along the flow network.

4.1.4 Targeted Implementation Plan

Figure 4-1 is an example of the work to locate potential locations for priority BMPs currently being completed by project partners through the Terrain Analysis grant. Completion of the analysis is scheduled for December 2016.

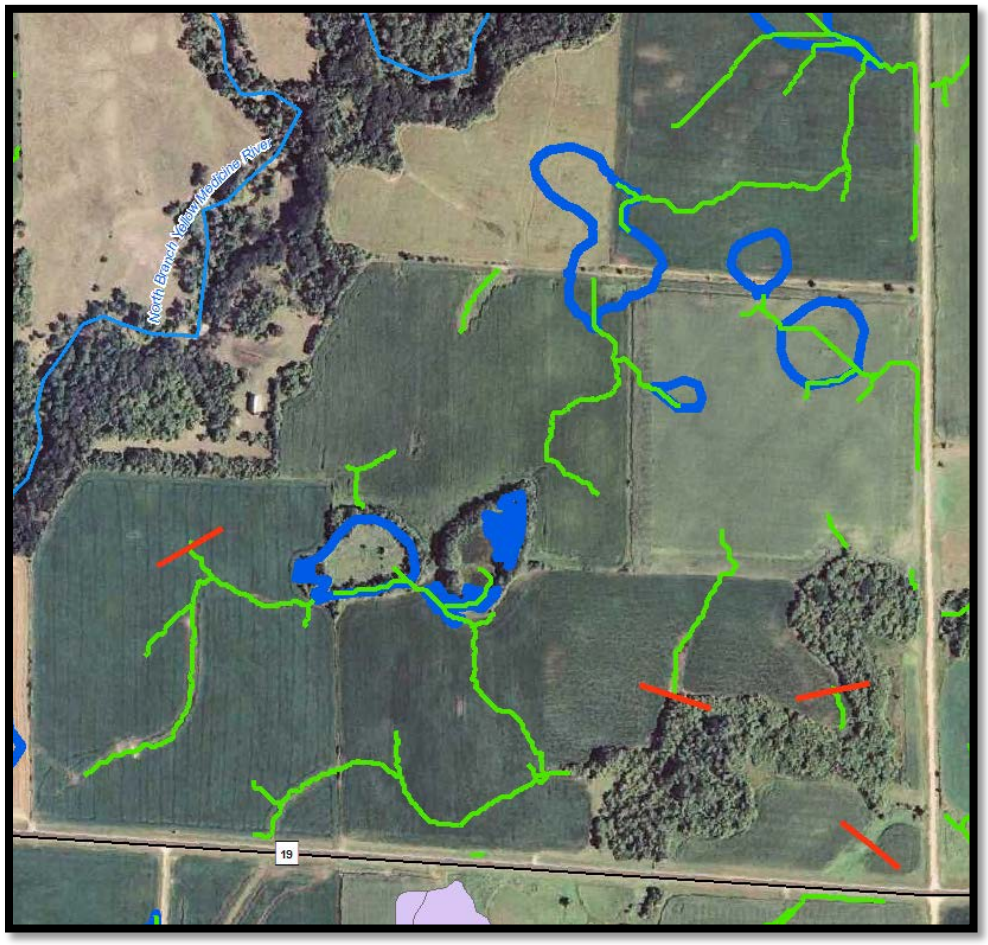

Figure 4-1. Terrain Analysis Project Output Sample.

The Figure 4-1 shows the locations for best management practices. Grassed waterways are shown in green, water and sediment control basins in red, and depressional areas/potential wetland restorations are shown in blue.

The tables that follow outline the targeted areas, timeline, responsible party, and estimated costs as well as funding sources for each action item. The action items are arranged by priority concern.

- **Priority Concern 1:** Mitigate Altered Hydrology and Minimize Flooding action items are outlined in Table 4-1.
- **Priority Concern 2**: Minimize Transport of Sediment, Excess Nutrients, and Bacteria action items are outlined in Table 4-2.
- **Priority Concern 3:** Protect and Preserve Groundwater Quantity and Quality action items are outlined in Table 4-3.

Additionally, Operation and Maintenance (O&M) action items are listed in Table 4-4, Existing Regulatory Controls action items are contained in Table 4-5, Outreach and Education action items are outlined in Table 4-6, and Resource Monitoring action items are identified in Table 4-7.

Table 4-1. Priority Concern 1 Measureable Goals and Objectives (Page 1 of 6)

PRIORITY CONCERN 1: MITIGATE ALTERED HYDROLOGY AND MINIMIZE FLOODING

Measurable Goals:

- Add 1,000 acre-feet of new stormwater storage
- No net increase in highest annual peak flows
- 3% increase in dry season base flow

Acronyms:

Area II = Area II MN River Basin Projects
BWSR = Board of Water and Soil Resources
CWF = Clean Water Fund
DNR = Department of Natural Resources
FEMA = Federal Emergency Management Agency
FSA = Farm Service Agency
LCCMR = Legislative and Citizen Commission on Minnesota Resources
LSOHC = Lessard-Sams Outdoor Heritage Council
MDA = MN Department of Agriculture
MGS = MN Geological Survey
MNDOT = MN Department of Transportation
MPCA = MN Pollution Control Agency
NPOs = Non-Profit Organizations
NRCS = Natural Resources Cons. Service
SWCD = Soil & Water Conservation District
SWPTSA = SW Prairie Technical Service Area
USACE = US Army Corps of Engineers
USFWS = US Fish and Wildlife Service
WLI = Working Lands Initiative
YMRWD = YM River Watershed District

Management Zone / Watershed	Action	Responsibility	Time Frame	Cost-Share / Funding Source
Objective 1: Implement BMPs. Implement BMPS to mitigate altered hydrology in the Coteau, Transitional, and Flatland Management Zones. Keep stormwater in place as long as possible while balancing the need to prevent damage to infrastructure and crops.				
Coteau Upper Yellow Medicine River Subwatershed	Treat 2% of cropland with wetland restorations; treating 497 acres with 43 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$238,628 BWSR, DNR, FSA, NPOs, NRCS, USFWS, Drainage Authority
	Implement controlled drainage on 1% of row cropland; treating 248 acres with 25 BMPs at 10 acres per BMP.	SWCDs, NRCS, SWPTSA	2017–2026	$44,388 BWSR, NRCS
	Treat 2.5% of cropland with concentrated flow practices; implement 62 practices (such as WSCBs, waterways, and terraces) treating 10 acres/BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$215,234 BWSR, NRCS, YMRWD
	Increase reduced tillage practices in 10% of the cropland by treating 2,484 acres on an annual basis.	SWCDs, NRCS	2017–2026	$373,089 Local, BWSR, NRCS, YMRWD, Owners
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 4,968 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,504,280 Local, BWSR, MDA, NRCS, Landowners
Coteau North Branch Yellow Medicine River Subwatershed	Treat 2% of cropland with wetland restorations; treating 587 acres with 51 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$281,747 BWSR, DNR, FSA, NPOs, NRCS, USFWS, Drainage Authority
	Treat 2.5% of cropland with concentrated flow practices; implement 73 practices (such as WSCBs, waterways, terraces); treating 10 acres per BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$254,126 BWSR, NRCS, YMRWD

Table 4-1. Priority Concern 1 Measureable Goals and Objectives (Page 2 of 6)

Management Zone / Watershed	Action	Responsibility	Time Frame	Cost-Share / Funding Source
Coteau North Branch Yellow Medicine River Subwatershed	Implement controlled drainage on 1% of row cropland; treating 293 acres with 29 BMPs.	SWCDs, NRCS, SWPTSA	2017–2026	$52,409 BWSR, NRCS
	Increase reduced tillage practices in 10% of the cropland acres, treating 2,933 acres annually on an annual basis.	SWCDs, NRCS	2017–2026	$440,505 Local, BWSR, NRCS, YMRWD,
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 5,866 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,776,098 Local, BWSR, NRCS, MDA, Owners
Transitional Mud Creek	Treat 2% of cropland with wetland restorations; treating 571 acres with 49 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$274,392 BWSR, NRCS, USFWS, NPOs, DNR,
	Implement controlled drainage on 1% of row cropland; treating 286 acres with 29 BMPs.	SWCDs, NRCS, SWPTSA	2017–2026	$51,041 BWSR, NRCS
	Treat 2.5% of cropland with concentrated flow practices; implement 72 practices (such as WSCBs, waterways, terraces); treating 10 acres per BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$247,492 BWSR, NRCS, YMRWD
	Increase reduced tillage practices in 10% of the cropland acres, treating 2,856 acres annually on an annual basis.	SWCDs, NRCS	2017–2026	$429,006 Local, BWSR, NRCS, YMRWD,
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 5,713 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,729,733 Local, BWSR, NRCS, MDA, Owners
Flatlands Judicial Ditch 24YM&L	Treat 2% of cropland with wetland restorations; treating 710 acres with 61 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$340,924 BWSR, NRCS, USFWS, NPOs, DNR,
	Implement controlled drainage on 1% of row cropland; treating 355 acres with 36 BMPs.	SWCDs, NRCS, SWPTSA	2017–2026	$63,417 BWSR, NRCS
	Treat 2.5% of cropland with concentrated flow practices, implement 89 practices (such as WSCBs, waterways, terraces); treating 10 acres per BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$307,502 BWSR, NRCS, YMRWD
	Increase reduced tillage practices in 10% of the cropland acres by treating 3,549 acres on an annual basis.	SWCDs, NRCS	2017–2026	$533,027 Local, BWSR, NRCS, YMRWD,
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 7,098 acres on an annual basis.	SWCDs, NRCS	2017–2026	$2,149,141 Local, BWSR, NRCS, MDA, Owners
Flatlands Yellow Medicine County Judicial Ditch 10 Subwatershed	Treat 2% of cropland with wetland restorations; treating 800 acres with 69 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$384,651 BWSR, NRCS, USFWS, NPOs, DNR,
	Implement controlled drainage on 1% of row cropland, treat 400 acres with 40 BMPs.	SWCDs, NRCS, SWPTSA	2017–2026	$71,550 BWSR, NRCS

Table 4-1. Priority Concern 1 Measureable Goals and Objectives (Page 3 of 6)

Management Zone / Watershed	Action	Responsibility	Time Frame	Cost-Share / Funding Source
Flatlands Yellow Medicine County Judicial Ditch 10 Subwatershed	Treat 2.5% of cropland with concentrated flow practices; implement 100 practices (such as WSCBs, waterways, terraces); treating 10 acres per BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$364,941 BWSR, NRCS, YMRWD
	Increase reduced tillage practices in 10% of the cropland acres by treating 4,004 acres on an annual basis.	SWCDs, NRCS	2017–2026	$601,392 Local, BWSR, NRCS, YMRWD, Landowners
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 8,008 acre on an annual basis.	SWCDs, NRCS	2017–2026	$2,424,786 Local, BWSR, NRCS, MDA, Owners
Flatlands Lac qui Parle County; Judicial Ditch 23 Subwatershed	Treat 2% of cropland with wetland restorations; treating 525 acres with 45 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$295,570 BWSR, NRCS, USFWS, NPOs, DNR, FSA, Drainage Authority
	Implement controlled drainage on 1% of row cropland; treating 262 acres or 26 BMPs.	SWCDs, NRCS, SWPTSA	2017–2026	$46,884 BWSR, NRCS
	Treat 2.5% of cropland with concentrated flow practices; implement 66 practices (such as WSCBs, waterways, terraces); treating 10 acres per BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$227,334 BWSR, NRCS
	Increase reduced tillage practices in 10% of the cropland acres by treating 2,624 acres on an annual basis.	SWCDs, NRCS	2017–2026	$394,063 Local, BWSR, NRCS, YMRWD, Landowners
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 5,247 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,588,846 Local, BWSR, NRCS, MDA, Owners
Flatlands Lac qui Parle County; Stony Run Creek Subwatershed	Treat 2% of cropland with wetland restorations; treating 615 acres with 53 BMPs at 11.5 acres per BMP.	SWCDs, YMRWD, Area II, Counties, NRCS, SWPTSA	2017–2026	$295,570 BWSR, NRCS, USFWS, NPOs, DNR, FSA, Drainage Authority
	Implement controlled drainage on 1% of row cropland; treating 308 acres or 30 BMPs.	SWCDs, NRCS, SWPTSA	2017–2026	$54,980 BWSR, NRCS
	Treat 2.5% of cropland with concentrated flow practices; implement 77 practices (such as WSCBs, waterways, terraces); treating 10 acres per BMP.	SWCDs, Area II, NRCS, SWPTSA	2017–2026	$266,593 BWSR, NRCS, YMRWD
	Increase reduced tillage practices in 10% of the cropland acres by treating 3,077 acres on an annual basis.	SWCDs, NRCS	2017–2026	$462,116 Local, BWSR, NRCS, YMRWD, Landowners
	Add cover crops to 20% of corn/soybean fields in this subwatershed by treating 6,153 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,863,321 Local, BWSR, NRCS, MDA, Owners

Table 4-1. Priority Concern 1 Measureable Goals and Objectives (Page 4 of 6)

Management Zone / Watershed	Action	Responsibility	Time Frame	Cost-Share / Funding Source
Watershed-Wide	Identify and promote adopting conservation practices during 100% of ditch repairs, lateral and improvement projects by providing literature on sustainable alternative repair options.	Drainage Authorities	2017–2026	$15,000 Ditch Funds
Watershed-Wide	Promote the Minnesota Agricultural Water Quality Certification Program with news articles, radio ads, one-on-one contacts and other methods which result in five applications per year watershed-wide.	SWCDs, MDA	2017–2026	$15,000 MDA
Watershed-Wide	Implement 15 low-interest loans per year for SSTS and feedlot upgrades, as well as water quality practices (such as conservation tillage equipment and conservation practices).	SWCDs, Counties	2017–2026	$2,000,000 MDA, MCPA, CWF, Counties
Watershed-Wide	Convert 450 acres of row-crop to perennial cover in environmentally sensitive areas. First priority will be given to perpetual protection programs.	SWCDs, NRCS, BWSR, FSA, DNR, USFWS, NPOs	2017–2026	$3,150,000 FSA, BWSR, NRCS, DNR, USFWS, NPOs
Objective 2: Capital-Improvement Projects. Review, determine, and implement capital-improvement projects and studies on projects, including regional wetlands restorations, flood-retention impoundments, culvert modifications at road crossings, land acquisitions of flood-prone areas, and projects that reconnect the floodplain to the rivers. Prevent additional impacts by identifying and implementing projects that provide significant benefits (often on a regional scale, rather than field scale) and requiring feasibility studies before design and construction.				
Watershed	**Action**	**Responsibility**	**Time Frame**	**Cost-Share / Funding Source**
Watershed-Wide	Analyze the seven priority subwatersheds for potential locations and feasibility of flood-retention projects or regional wetland restorations that increase stormwater storage. Results will be inventoried and shared with partners.	Area II, YMRWD	2017–2021	$600,000 State of MN, Counties, YMRWD
Watershed-Wide	Construct or restore one grade stabilization structure per year.	Area II, SWCDs, YMRWD	2017–2026	$750,000 Bonding, NRCS, BWSR, SWCDs, YMRWD
Watershed-Wide	Review 100% of new ditch, lateral, and improvement projects, during early coordination, for opportunities for large-scale, multipurpose drainage projects that mitigate the impacts of altered hydrology. Determine project identification, feasibility and preliminary designs, and cost estimation.	Drainage Authorities, Area II, SWCDs, DNR	2017–2026	$450,000 Drainage Authorities, Area II, SWCDs, DNR
Watershed-Wide	Establish a wetland bank of at least 10 acres in size within in the watershed.	Area II, Cities, Counties, SWCDs, YMRWD, Drainage Authorities	2017–2026	$300,000 Wetland Bank Owner

Table 4-1. Priority Concern 1 Measureable Goals and Objectives (Page 5 of 6)

Watershed	Action	Responsibility	Time Frame	Cost-Share/ Funding Source
Watershed-Wide	Construction of and/or purchase of permanent easements for three large-scale, multipurpose drainage projects that would mitigate the impacts to altered hydrology.	Drainage Authorities, Area II, SWCDs, DNR, BWSR, NRCS, USFWS	2017–2026	$1,200,000 Drainage Authorities, Area II, SWCDs, DNR, BWSR, NRCS, USFWS
Watershed-Wide	Annual review of 5-year Road Improvement Plans of partner counties to identify locations where culvert modifications can be incorporated.	Area II, DNR, Road Authorities	2017–2026	$25,000 State of MN, Counties
Watershed-Wide	Pursue two floodplain reconnection projects as identified through the terrain analysis in each of the five prioritized subwatersheds: Upper Yellow Medicine River, North Branch Yellow Medicine River, Lower-North Branch Yellow Medicine River, Stony Creek, Cottonwood Lake, and JD17.	DNR, SWCDs, YMRWD, Drainage Authorities	2017–2026	$20,000 DNR, SWCDs, YMRWD, Drainage Authorities
Objective 3: Studies, Data Acquisition and Data Management. Acquire data necessary to gain a greater understanding of the resources, threats, trends and status to better target practices for planning and implementing watershed activities.				
Watershed-Wide	Designate approximately 100 staff hours to assist with the future development of a Hydrologic and Hydraulic Model.	Area II, YMRWD, SWCDs, Counties, DNR, MPCA	2017–2026	$5,000 Area II, YMRWD, SWCDs, Counties, DNR, MPCA
Watershed-Wide	Designate approximately 400 staff hours to assist with the future development of a Comprehensive GIS and Map Development.	Area II, YMRWD, SWCDs, Counties, DNR, MPCA	2017–2026	$20,000 Area II, YMRWD, SWCDs, Counties, DNR, MPCA
Watershed-Wide	Designate approximately 400 staff hours to assist with the future development of a Culvert Inventory.	Road Authorities, Counties, Drainage Authorities	2017–2026	$20,000 Road Authorities, Counties, Drainage Authorities
Watershed-Wide	Designate approximately 200 staff hours to assist with the future development of a Stream Classification and Stability Studies.	DNR, SWCDs, YMRWD, Drainage Authorities	2017–2026	$10,000 DNR, SWCDs, YMRWD, Drainage Authorities

Table 4-1. Priority Concern 1 Measureable Goals and Objectives (Page 6 of 6)

Watershed	Action	Responsibility	Time Frame	Cost-Share/ Funding Source
Objective 4: Land Use and Regulatory Controls. Prevent additional impacts through regulatory controls and better planning of drainage activities				
Watershed-Wide	Drainage authorities will meet at least quarterly or as needed in an effort to: • Achieve greater coordination and consistency across all drainage authorities as well as increased regulatory controls. • Examine existing standards and gaps, determine the most appropriate standards, and adopt those standards throughout the watershed. • Increase communication well in advance of drainage activities that will provide greater opportunity for coordination and to increase the potential for mitigation efforts and multiple benefits to be obtained in the project. • Implement mitigation incentives as part of the approval process.	Drainage Authorities	2017–2026	$40,000 Drainage Authorities

Table 4-2. Priority Concern 2 Measureable Goals and Objectives (Page 1 of 4)

PRIORITY CONCERN 2: MINIMIZE THE TRANSPORT OF SEDIMENT, EXCESS NUTRIENTS, AND BACTERIA

Measurable Goals:

- 10% decrease in TSS loads
- 10% decrease in TP loads
- 8% decrease in TN loads

Acronyms:

Area II = Area II MN River Basin Projects
BWSR = Board of Water and Soil Resources
CWF = Clean Water Fund
DNR = Department of Natural Resources
FEMA = Federal Emergency Management Agency
FSA = Farm Service Agency
LCCMR = Legislative and Citizen Commission on Minnesota Resources
LSOHC = Lessard-Sams Outdoor Heritage Council
MDA = MN Department of Agriculture
MGS = MN Geological Survey
MNDOT = MN Department of Transportation
MPCA = MN Pollution Control Agency
NPOs = Non-Profit Organizations
NRCS = Natural Resources Cons. Service
SWCD = Soil & Water Conservation District
SWPTSA = SW Prairie Technical Service Area
USACE = US Army Corps of Engineers
USFWS = US Fish and Wildlife Service
WLI = Working Lands Initiative
YMRWD = YM River Watershed District

Watershed	Action	Responsibility	Time Frame	Cost-Share/ Funding Source
Objective 1: Implement BMPs. BMPs minimize the transport of sediment, nutrients, and bacteria in the Coteau, Transitional and Flatlands management zones. The associated pollutants and contaminants that are contained in the runoff from stormwater and snowmelt contribute to downstream pollution, decrease hydraulic capacity, and diminish stream and lake habitat. Holding water on the land, providing infiltration, and allowing for solids to settle are strategies to help meet this priority concern.				
Coteau Upper Yellow Medicine River Subwatershed	Implement targeted nutrient rates on 35% of agriculture land targeting 8,694 acres on an annual basis.	SWCDs, NRCS, Counties, Crop Consultants	2017–2026	$1,296,249 MDA, MPCA, BWSR, NRCS
	Replace 50-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$25,000 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 310 buffer-acres will treat 24,840 upland acres.	SWCDs	2017–2018	$620,988 Drainage Authorities, BWSR, CWF, SWCDs, YMRWD
	Convert 2% of cropland to grassland, treating 497 acres. The best opportunity to do this is on highly erodible land (HEL). First priority will be given to perpetual programs.	SWCDs, NRCS, FSA	2017–2026	$993,580 SWCDs, FSA
Coteau North Branch Yellow Medicine River Subwatershed	Implement targeted nutrient rates on 35% of agriculture land targeting 10,265 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,530,476 MDA, MPCA, BWSR, NRCS
	Replace 59-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$29,500 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 367 buffer-acres will treat 29,328 upland acres.	SWCDs	2017–2026	733,198 Drainage Authorities, CWF, SWCDs, BWSR, YMRWD

Table 4-2. Priority Concern 2 Measureable Goals and Objectives (Page 2 of 4)

Watershed	Action	Responsibility	Time Frame	Cost-Share/ Funding Source
Coteau North Branch Yellow Medicine River Subwatershed	Convert 2% of cropland to grassland, treating 587 acres. The best opportunity to do this is on HEL. First priority will be given to perpetual programs.	SWCDs, NRCS	2017–2026	$1,173,116 SWCDs, FSA
Transitional; Mud Creek	Implement targeted nutrient rates on 35% of agriculture land targeting 9,997 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,490,524 MDA, MPCA, BWSR, NRCS
	Replace 57-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per alternative intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$28,500 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate that 357 buffer-acres will treat 28,562 upland acres.	SWCDs	2017–2018	$714,058 Drainage Authorities, CWF, SWCDs, BWSR, YMRWD
	Convert 2% of cropland to grassland, treating 571 acres. The best opportunity to do this is on HEL. First priority will be given to perpetual programs.	SWCDs, NRCS	2017–2026	$1,142,492 SWCDs, FSA
Flatlands; Judicial Ditch 24YM&L	Implement targeted nutrient rates on 35% of agriculture land targeting 12,421 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,851,931 MDA, MPCA, BWSR, NRCS
	Replace 71-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per alternative intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$35,000 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 444 buffer-acres will treat 35,488 upland acres.	SWCDs	2017–2018	$887,195 SWCDs, FSA
	Convert 2% of cropland to grassland, treating 710 acres. The best opportunity to do this is on HEL. First priority will be given to perpetual programs.	SWCDs, NRCS	2017–2026	$1,419,512 SWCDs, FSA

Table 4-2. Priority Concern 2 Measureable Goals and Objectives (Page 3 of 4)

Watershed	Action	Responsibility	Time Frame	Cost-Share/ Funding Source
Flatlands; Yellow Medicine Co., Judicial Ditch 10 subwatershed	Implement targeted nutrient rates on 35% of agriculture land targeting 14,014 acres on an annual basis.	SWCDs, NRCS	2017–2026	$2,089,456 MDA, MPCA, BWSR, NRCS
	Replace 80-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per alternative intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$40,000 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 500 buffer-acres that will treat 40,039 upland acres.	SWCDs	2017–2018	$1,000,985 Drainage Authorities, CWF, SWCDs, BWSR, YMRWD
	Convert 2% of cropland to grassland, treating 801 acres. The best opportunity to do this is on HEL. First priority will be given to perpetual programs.	SWCDs, NRCS	2017–2026	$1,601,576 SWCDs, FSA
Flatlands; Lac qui Parle Co.; Judicial Ditch 23 Subwatershed	Implement targeted nutrient rates on 35% of agriculture land targeting 9,183 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,369,120 MDA, MPCA, BWSR, NRCS
	Replace 52-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per alternative intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$26,000 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 328 buffer-acres will treat 26,236 upland acres.	SWCDs	2017–2018	$655,898 Drainage Authorities, CWF, SWCDs, BWSR, YMRWD
	Convert 2% of cropland to grassland, treating 525 acres. The best opportunity to do this is on HEL. First priority will be given to perpetual protection programs.	SWCDs, NRCS	2017–2026	$1,049,436 SWCDs, FSA
Flatlands; Lac qui Parle Co.; Stony Run Creek Subwatershed	Implement targeted nutrient rates on 35% of agriculture land targeting 10,768 acres on an annual basis.	SWCDs, NRCS	2017–2026	$1,605,560 MDA, MPCA, BWSR, NRCS
	Replace 62-open tile intakes with Alternative Tile Intakes on 2% of fields. Cost-share will be 75% not to exceed $500 per alternative intake replaced. This cost is not based on NRCS-EQIP cost-share rates.	SWCDs	2017–2026	$31,000 BWSR, CWF
	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 385 buffer-acres will treat 30,767 upland acres.	SWCDs	2017–2018	$769,168 Drainage Authorities, CWF, SWCDs, BWSR, YMRWD
	Convert 2% of cropland to grassland, treating 615 acres. The best opportunity to do this is on HEL. First priority will be given to perpetual protection programs.	SWCDs, NRCS	2017–2026	$1,230,668 SWCDs, FSA

Table 4-2. Priority Concern 2 Measureable Goals and Objectives (Page 4 of 4)

Watershed	Action	Responsibility	Time Frame	Cost-Share/ Funding Source
Watershed-Wide	Expend 100% of funding available through the Working Lands Initiative/Prairie Coteau and MN River Valley Local Technical Teams to protect and restore prairie grasslands and wetlands in the Prairie Core, Corridor areas and other priority areas.	SWCDs, DNR, NRCS, USFWS, BWSR, NPOs	2017–2026	$625,000 DNR, FSA, NRCS, USFWS, BWSR, NPOs
Watershed-Wide	Reduce soil erosion caused by wind through SWCD tree programs, living snow fences, field windbreaks, and farmstead shelterbelts by installing 15,000 feet per year including weed control, matting, and preparation.	SWCDs, MNDOT, Road Authorities, NRCS, FSA, DNR, NPOs	2017–2026	$10,000 DNR, MNDOT, NRCS, NPOs, FSA, BWSR
Watershed-Wide	Work with landowners to achieve 100% compliance on the Buffer Law. Estimate 3,850 buffer-acres will treat 308,029 upland acres in the nonpriority subwatersheds.	SWCDs	2017–2018	$7,700,725 Drainage Authorities, CWF, SWCDs, BWSR, YMRWD
Watershed-Wide	Work with landowners to buffer 250 acres along watercourses locally identified as “Other Waters” through voluntary participation in easement programs and other measures when funds become available such as CREP, CRP, and RIM	SWCDs, NRCS, BWSR, FSA	2017–2026	$2,000,000 FSA, BWSR, NRCS
Watershed-Wide	Seek funding through special grants and appropriations for the restoration of lakes in the watershed that are identified as water quality impaired.	Counties, SWCDs, YMRWD	2019–2026	$10,000 Counties, SWCDs, YMRWD
Objective 2: Capital-Improvement Projects. Select projects to minimize the transport of sediment, nutrients, and bacteria including large-scale water quality projects and stream-stabilization projects.				
Watershed-Wide	Use information gathered from geomorphological assessments to prioritize and construct three projects for repair or restoration in the priority subwatersheds.	YMRWD, DNR	2018–2026	$750,000 State of MN, BWSR, CWF, YMRWD, DNR, USFWS
Objective 3: Studies Data Acquisition, and Data Management. Acquire data necessary to gain a greater understanding of the resources, threats, trends, and status to better target practices for planning and implementing watershed activities.				
Watershed-Wide	Complete or update Level 3 feedlot inventories watershed-wide.	Counties	2021–2026	$100,000 Counties, MPCA, CWF
Watershed-Wide	Develop inventory of compliant septic systems based on existing permit data to identify and prioritize inventory needs. Funding may be sought to complete the inventory.	Counties	2018–2026	$16,000 Counties, MPCA, CWF
Watershed-Wide	Complete a geomorphological assessment of one priority subwatershed each year using Rosgen or Bank Erosion Hazard Index (BEHI) techniques.	YMRWD, DNR	2017–2026	$175,000 YMRWD, DNR

Table 4-3. Priority Concern 3 Measureable Goals and Objectives (Page 1 of 2)

PRIORITY CONCERN 3: PROTECT AND PRESERVE GROUNDWATER QUANTITY AND QUALITY

Measurable Goals:

- Seal 25 unused wells per year
- Begin Hydrogeologic Atlas process
- Maintain fewer than 10% of private wells failing to meet 10 mg/L nitrate water quality standard

Acronyms:

BWSR = Board of Water and Soil Resources
DNR = Department of Natural Resources
LCCMR = Legislative and Citizen Commission on Minnesota Resources
MDA = MN Department of Agriculture
MDH = MN Department of Health
MPCA = MN Pollution Control Agency
MGS = MN Geological Survey
MNDOT = MN Department of Transportation
NRCS = Natural Resources Cons. Service
SWCD = Soil & Water Conservation District
USACE = US Army Corps of Engineers
YMRWD = YM River Watershed District

Watershed	Action	Responsibility	Time Frame	Cost-Share / Funding Source
Objective 1: Protection of Groundwater. Ensure long-term quality and quantity of groundwater supplies by protecting groundwater supplies, encouraging recharge, and maintaining base flow contributions to groundwater-dependent natural resources.				
Watershed-Wide	Promote cost-share programs to seal 25 unused wells per year, promoting $500 cost-share per well sealed.	SWCDs, Counties	2017–2026	$125,000 MDH, BWSR, NRCS, Counties
Watershed-Wide	Designate approximately 500 hours of existing staff time to assist the communities of Clarkfield, Cottonwood, Hanley Falls, Wood Lake and the City of Marshall (3 wells in Sandnes Township, Yellow Medicine County) in the wellhead protection planning process by attending meetings and plan review.	SWCDs, YMRWD, Cities, MDH, Counties	2019–2026	$25,000 SWCDs, YMRWD, Cities, MDH, Counties
Watershed-Wide	For townships with 10% of wells failing to meet 10 mg/L nitrate level, plan partners will coordinate with MDA to achieve adoption of the Nitrogen Fertilizer Management Plan.	MDA, SWCDs, Counties, YMRWD	2017–2026	$25,000 MDA, MDH, SWCDs, Counties, YMRWD
Watershed-Wide	Review and comment on all proposed land uses and planning and zoning decisions that result in source-water protection, particularly of vulnerable public-water supplies, when notified.	Counties, Cities, SWCDs	2017–2026	$5,000 Counties, Cities, SWCDs
Watershed-Wide	Review all groundwater appropriation permits for potential negative impacts to surface water, natural resources, and nearby wells.	SWCDs, Counties, YMRWD, Cities, DNR, MDH	2017–2026	$15,000 MDH, SWCDs, Counties, YMRWD, Cities, DNR

Table 4-3. Priority Concern 3 Measureable Goals and Objectives (Page 2 of 2)

Watershed	Action	Responsibility	Time Frame	Cost-Share / Funding Source
Objective 2: Studies, Data Acquisition, and Data Management. Acquire data necessary to gain a greater understanding of the resources, threats, trends, and status to better target practices for planning and implementing watershed activities.				
Watershed-Wide	Each county will request the completion of a hydrogeologic atlas in the watershed.	Counties, DNR, MGS, SWCD	2017–2026	$400,000 LCCMR
Watershed-Wide	Develop a groundwater monitoring plan that collects and evaluates water quality and quantity from private and public wells.	SWCDs, Counties, DNR, YMRWD, Cities, MDA, MDH	2021–2026	$10,000 SWCDs, Counties, DNR, YMRWD, Cities, MDA, MDH
Watershed-Wide	Develop inventory of unsealed wells using well-sealing records, rural water connections, and abandoned farm sites.	MDH, DNR, Counties, YMRWD, Lincoln-Pipestone Rural Water	2018	$10,000 MDH, DNR, Counties, YMRWD

Table 4-4. Operation and Maintenance on Existing or Newly Created BMPs for Three Priority Concerns

Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding
Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria
Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality

Acronyms:

Area II = Area II MN River Basin Projects
BWSR = Board of Water and Soil Resources
DNR = Department of Natural Resources
LGU = Local Government Unit
NRCS = Natural Resources Cons. Service
SWCD = Soil & Water Conservation District
SWPTSA = Southwest Prairie Technical Service Area
WCA = Wetland Conservation Act
YMRWD = YM River Watershed District

Note: *Landowners maintain cost-shared BMPs, meet obligations of the easement and O&M Plans for the lifetime of the contract/practice. For descriptions and additional information, see Section 5.6.*

Watershed	Action	Responsibility	Time Frame	Cost / Funding Source
Watershed-Wide	Develop O&M Plans for each BMP and Capital-Improvement Project installed.	SWCDs, Area II, YMRWD, NRCS, SWPTSA	2017–2026	$10,000 SWCDs, Area II, YMRWD, NRCS, SWPTSA
Watershed-Wide	Inspect wetland banks annually, for a minimum of 5 years, until the credits are approved.	Wetland Bank Owners, WCA LGUs, BWSR	2017–2026	$12,500 Wetland Bank Owner, WCA LGUs, BWSR
Watershed-Wide	Inspect all cost-shared BMPs for O&M compliance during years 1, 3, and 9 and communicate findings with the landowner.	SWCDs	2017–2026	$50,000 SWCDs
Watershed-Wide	Inspect easements for the first 5 years, then once every 3 years.	SWCDs	2017–2026	$70,000 SWCDs
Watershed-Wide	Inspect and maintain drainage systems a minimum of once every 3 years.	Drainage Authorities	2017–2026	$250,000 Drainage Authorities
Watershed-Wide	Inspect flood retention projects on an annual basis and after a significant flooding event.	Area II, YMRWD, SWCDs, NRCS	2017–2026	$7,500 Area II, YMRWD, SWCDs, NRCS
Watershed-Wide	Inspect culvert modification projects annually and after significant flood events.	YMRWD, Area II, Road Authority	2017–2026	$25,000 YMRWD, Area II, Road Authority
Watershed-Wide	Address issues raised by DNR Inspections of dams and drawdown structures conducted every 8 years.	DNR, Area II, YMRWD, Counties	2017–2026	$25,000 DNR, Area II, YMRWD, Counties
Watershed-Wide	Remove debris from the water courses that is causing excessive erosion, flooding, or impeding recreation without altering the channel cross-section, increasing streambank erosion, or impacting aquatic habitat.	YMRWD, Road Authorities	2017–2026	$150,000 YMRWD, Road Authorities
Watershed-Wide	Implement Beaver Control Program by removing one beaver dam per year which is causing flooding to infrastructure or farmland.	YMRWD	2017–2026	$100,000 YMRWD

Table 4-5. Existing Regulatory Controls for Three Priority Concerns

Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding
Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria
Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality

Acronyms:

Area II = Area II MN River Basin Projects
BWSR = Board of Water and Soil Resources
DNR = Department of Natural Resources
FEMA = Fed. Emergency Management Agency
LGU = Local Government Unit
MPCA = MN Pollution Control Agency
NRCS = Natural Resources Cons. Service
SWCD = Soil & Water Conservation District
USACE = US Army Corps of Engineers
WCA = Wetland Conservation Act
YMRWD = YM River Watershed District

Note: *For descriptions and additional information, see Section 5.7*

Watershed	Action	Responsibility	Time Frame	Cost / Funding Source
Continue to implement and submit required reports for the following:				
Watershed-Wide	Implement Wetland Conservation Act (WCA)	WCA LGUs, BWSR, SWCDs, DNR, USACE	2017–2026	$265,260 BWSR, LGUs
	Implement Shoreland Ordinance	Counties, DNR, Cities	2017–2026	$80,200 Counties, BWSR
	Implement Floodplain Ordinance	Counties, DNR, Cities, FEMA	2017–2026	$20,000 Counties, Cities
	Implement Subsurface Sewage Treatment System (SSTS) Program	Counties, MPCA	2017–2026	$163,870 Counties, MPCA
	Implement Feedlot Program	Counties, MPCA	2017–2026	$733,958 Counties, MPCA
	Implement Solid Waste Ordinance	Counties	2017–2026	$137,154 Counties, MPCA
	Implement Aquatic Invasive Species Program	Counties, SWCDs, DNR	2017–2026	$663,550 Counties, DNR
	Soil Erosion Law	SWCDs, Counties, BWSR	2017–2026	$100,000 SWCDs, Counties, BWSR
	Implement Buffer Law	SWCDs, Counties, BWSR, YMRWD, Drainage Authorities	2017–2026	$100,000 SWCDs, Counties, BWSR, YMRWD, Drainage Authorities

Table 4-6. Education and Outreach for Three Priority Concerns (Page 1 of 2)

Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding
Priority Concern 2: Minimize the Transport Of Sediment, Excess Nutrients, and Bacteria
Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality

Note: *For descriptions and additional information see Section 5.9.*

Acronyms:

CWF = Clean Water Fund
DNR = Department of Natural Resources
FSA = Farm Service Agency
MDA = MN Department of Agriculture
NRCS = Natural Resources Cons. Service
LSOHC = Lessard-Sams Outdoor Heritage Council
SWCD = Soil & Water Conservation District
USFWS = US Fish & Wildlife
WLI = Working Lands Initiative

Watershed	Action	Responsibility	Time Frame	Cost / Funding Source
Watershed-Wide	Partners will meet quarterly to develop an effective outreach, engagement, and education program structured around the watershed goals.	1W1P Partners	2018	$25,000 1W1P Partners
	Employ a wide range of outreach and engagement activities: • Provide information via newsletters, booths at county fairs and other events, presentations, news releases, live weekly radio program, Environmental Fair, aquatic invasive species awareness, and more. These programs will continue but will be refined to better address watershed goals.			
	• Develop consistent "state-of-the-watershed" reports that are targeted to various audiences.			
	• Implement activities across a broad spectrum of public participation opportunities. Simple, regular public participation activities used to create awareness, such as photograph contests, will be conducted.			
	• Opportunities to increase the level of public participation, such as open houses and consensus building, will be explored throughout the life of the plan.		2019–2026	$250,000 1W1P Partners, CWF, other grants as become available
	• Tracking web hits, attendance, and program enrollment offers some evidence of activity level but is not qualitative in nature. However, obtaining anecdotal evidence or feedback in the form of focus groups and other polling activities can help evaluate public perception on program success.			

Table 4-6. Education and Outreach for Three Priority Concerns (Page 2 of 2)

Watershed	Action	Responsibility	Time Frame	Cost / Funding Source
	• Develop and implement three educational programs and trainings aimed at targeted audiences with curriculums that enhance the participant's skills, awareness, knowledge, and abilities to manage resources.			
	• Establish internship programs that bring additional capacity to the watershed while increasing the skills and on-the-ground training for soon-to-be or recent college and technical school graduates.		2019–2026	$250,000 1W1P Partners, CWF, other grants as become available
	• Promote water conservation practices through newsletter, utility bill inserts, and education to K-12 students by partnering with Cities, rural water systems, and schools.			
	• Raise awareness on the importance of the upland and in-lake processes that impact water quality for all of the lakes in the 1W1P area by using Lake Shaokatan as a case study.			
	• Educate landowners, both rural and urban, on appropriate applications and proper disposal of agricultural and lawn chemicals/fertilizers.			
Watershed-Wide	Assist landowners with vegetation management information, cost-share, and habitat management plans for prescribed burning, haying and grazing, invasive species management and installation of winter cover practices that also enhance wildlife habitat.	SWCD, NRCS, FSA, DNR, WLI, USFWS	2017–2026	$1,000,000 SWCD, NRCS, FSA, DNR, WLI, USFWS, LSOHC

Table 4-7. Resource Monitoring for Three Priority Concerns

Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding
Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria
Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality

Acronyms:
DNR = Department of Natural Resources
EPA = Environmental Protection Agency
MDA = MN Dept. of Agriculture
MPCA = MN Pollution Control Agency
NRCS = Natural Resources Cons. Service
SWCD = Soil & Water Conservation District
YMRWD = YM River Watershed District

Note: *For descriptions and additional information see Section 5.8.2.*

Watershed	Action	Responsibility	Time Frame	Cost / Funding Source
Coteau Upper Yellow Medicine Subwatershed	Accelerate existing monitoring by seeking funding through special grants and appropriations for water quality monitoring of Lake Shaokatan for TSS, TP, TN, and DO to ensure that the lake continues to meet water quality standards.	County, SWCD, YMRWD	2019–2026	$100,000 County, SWCD, YMRWD, DNR, MPCA
Watershed-Wide	A summary of current monitoring programs is provided in Table 5-10: • Rain Gage • Private Well Testing • Tillage Transect Survey • Observation Wells • Lake Level Monitoring	SWCDs, Counties, MDA, Volunteers, DNR	2017–2026	$100,000 SWCDs, Counties, MDA, volunteers, DNR
Watershed-Wide	Continue to coordinate and participate with WRAPS 10-year monitoring cycle.	1W1P Partners	2021–2026	$150,000 1W1P Partners
Watershed-Wide	Implement the monitoring plan to assess overall watershed health. Acquire funding for necessary equipment, testing and staffing.	SWCDs, Counties, YMRWD	2017–2026	$1,000,000 DNR, MPCA, Counties, YMRWD, EPA
Watershed-Wide	Seek funding through special grants and appropriation for the monitoring of lakes in the watershed that are identified as water quality impaired.	SWCDs, Counties, YMRWD	2019–2026	$30,000 County, SWCDs, YMRWD, DNR, MPCA
Watershed-Wide	Develop a comprehensive monitoring plan.	1W1P Partners, YMRWD (lead), MPCA, DNR, MDA	2017-2018	In-kind MPCA, DNR, MDA, YMRWD, SWCDs, Counties

5.0 IMPLEMENTATION PLAN PROGRAMS

5.1 IMPLEMENTATION PROGRAMS

This portion of the plan outlines key components to support and implement the targeted implementation plan. These components include incentive programs, cost-share programs, capital improvement projects, regulatory and enforcement programs, and outreach and engagement programs.

5.2 INCENTIVE PROGRAMS

Incentive programs are formal programs used to promote specific actions or behaviors. Various mechanisms can be used for conducting incentive programs, including financial assistance or providing benefits for enrolling in programs.

Other incentive program to consider:

- **Rebate programs** may incentivize upgrading equipment to improve efficiencies, such as precision agricultural technologies or water conservation equipment.
- **Income tax credits** for property owners in priority watersheds or those with the greatest pollution potential. BMP, precision agriculture, or conservation tillage equipment Tax Credit Program eligible with SWCD-approved conservation plan *(State of Minnesota level initiative).*
- **Property tax exemptions** for restricting land use, such as only haying/grazing uses in highly erosive areas or for designating certain uses, such as expanding flood storage.

5.2.1 Financial Assistance

A cost-share program is where the costs of systems or practices for erosion control, sedimentation control, or water quality improvements that are designed to protect and improve soil and water resources are shared with the landowner. A multitude of cost-share programs are available at the local, state, and federal level that assist landowners/occupiers in paying for a BMP. Structural practices that may be eligible include sediment control structures or controlled drainage practices. Nonstructural practices that may be eligible include implementing cover crops or nutrient management practices.

Financial incentives may be used to encourage landowners to install or adopt land management practices that improve or protect water quality. Incentive payments and enhanced protection measures should be reasonable and justifiable, supported by grant recipient policy, consistent with prevailing local conditions, and must be accomplished using established standards. They also may include purchasing easements or fee title acquisition of lands for the purpose of implementing permanent conservation programs either on private lands or turning the land over to a conservation agency or nonprofit organizations. A Minnesota Conservation Reserve and Enhancement Program (CREP) initiative is expected to provide significant federal and state funding over a five year period. This program can fund many of the practices and projects contained within this plan. The Yellow Medicine Watershed Plan Area is included in the high priority area for the Minnesota Nutrient Reduction Strategy, as well as containing several prairie corridors that are listed in the Minnesota Prairie Conservation Plan. These programs are non-regulatory (not wetland banking/mitigation) in nature.

To ensure that goals are met given limited funding sources, developing a ranking process to score the projects is important. The highest scoring projects will be funded first. The ranking criteria will be unique

for each priority concern and program area and will be evaluated and updated on a regular basis, with a minimum update of once every biennial planning cycle.

5.2.2 Other Incentives

Programs may be offered that provide benefits to such an extent that individuals are incentivized to take the necessary actions to receive those program benefits. One example is the Minnesota Agricultural Water Quality Certification program. Through this program, certified producers receive regulatory certainty, recognition that their farm protects water quality, and priority for technical and financial assistance. This program is administered through the MDA and implemented through county SWCDs.

Low interest loan programs may be offered for subsurface sewage treatment system, or feedlot upgrades as well as for a variety of water quality practices.

5.3 AGRICULTURAL BEST MANAGEMENT PRACTICE SELECTION

During this pilot project, SAM software was used to calculate the impacts of adding field-scale BMPs in priority subwatersheds to the Yellow Medicine River as well as the projected costs to incentivize BMP adoption. SAM software, displayed in Figure 2-5, consists of a GIS system for site selection, HSPF watershed model application to simulate fate and transport of pollutants, and a BMP database. The calculations and acreages provided in the targeted implementation plan and the estimated achievement tables presented in this chapter are based on the HSPF model data and GIS layers. Therefore, minor differences in results may be obtained through other analysis. The practices selected were aligned with the 2016 listed NRCS Environmental Quality Incentives Program (EQIP) practices within SAM software because of their familiarity with the conservation community and established cost-share rates to adequately incentivize the practice. The effectiveness of the individual BMPs at reducing on-site pollutant loadings was gathered from multiple sources, including the *Agricultural BMP Handbook for Minnesota*, Watershed Nitrogen Reduction Planning Tool (NBMP), Watershed Phosphorus Reduction Planning Tool (PBMP), and estimates developed specifically within the Yellow Medicine Watershed. The NBMP and PBMP reduction planning tools, developed by the University of Minnesota, are spreadsheets that estimate nitrogen and phosphorus reductions from implementing selected BMPs. Because multiple literature values for loading reductions were presented within the *Agricultural BMP Handbook for Minnesota* for the different BMPs, an average of those reported values was used. The BMP database contains literature values of the practice's effectiveness in reducing pollutants or altering flow as well as the cost-per-unit treated assumed to be necessary to encourage voluntary adoption.

The tool's value is in its simplification of a complex hydrologic and water quality model to estimate the significant nutrient sources in a watershed. It allows watershed stakeholders to incorporate their knowledge and expertise of BMP implementation into model simulations without needing extensive knowledge of the HSPF model. The simulation results can then be assessed numerically and graphically within the user interface itself or exported to other software for further analysis. SAM software also provides an estimate of the cost of the BMP incentives using 2016 NRCS-EQIP rates.

To facilitate determining the most effective placement of each BMP on the landscape, GIS analysis will be conducted using digital elevation maps (DEMs) based on hydroconditioned Light Detection and Ranging (LiDAR) maps. These refined GIS data layers will be used to conduct terrain analysis to begin targeting

BMP placement. Note that actual BMP placement within the priority subwatersheds will ultimately be facilitated by watershed technicians working hand-in-hand with local landowners during grant/project development. Criteria will be developed and an evaluation worksheet formatted to determine project feasibility and funding recommendations. The following criteria may be considered:

- Extent and ability to meet primary goals
- Extent and ability to achieve multiple benefits
- Rare, threatened, and high quality resources
- Positive and negative impacts to groundwater quantity and quality
- Funding availability
- Annual operation and maintenance costs.

5.3.1 Mitigate Altered Hydrology and Minimize Flooding

The practices most effective in mitigating altered hydrology are those that keep stormwater or snowmelt runoff in place as long as possible while balancing the need to prevent damage to infrastructure and crops. The most suitable field-scale practices to mitigate altered hydrology include wetland restorations, controlled drainage, concentrated flow practices, cover crops, and increased residue management.

The following goals were established for voluntary adoption of BMPs in the priority subwatersheds to mitigate altered hydrology.

BMP Implementation Goals at a Glance

The partners will promote cost-share and incentive programs to implement the following practices in the priority subwatersheds:

- Treat 2% (4,305 treated acres) of agricultural land with **wetland restorations**
- Treat 2.5% (5,381 treated acres) of agricultural land with **concentrated flow practices**
- Add **controlled drainage structures** (2,152 treated acres) to existing tile lines on 1% of agricultural land
- Add **cover crops** to 20% (43,051 treated acres) of the corn and soybean fields
- Adopt **reduced tillage practices** on 10% (21,526 treated acres) of the agricultural land

Appropriate Drainage Authorities (counties and/or watershed district) will:

- Work to **promote adopting conservation practices** during ditch repair and improvement projects.

The costs for implementing these projects will most likely be shared between landowners and cost-share and incentive programs. If the requests for cost-share assistance exceed the amount of available funds, a ranking process will be developed to score the projects and the highest scoring projects will be funded first. The impacts of implementing the practices selected were calculated using HSPF-SAM software at the Yellow Medicine River Outlet at the Minnesota River and are shown in Table 5-1.

Table 5-1. Estimated Achievement of Goals as a Result of Implementing Practices to Mitigate Altered Hydrology and Minimize Flooding

Parameter	Achievement	Achievement (load/year)	10-Year Goal	10-Year Goal (load/year)	Ultimate Watershed Goal[a]
Base flow	< 1% increase	539 acre-feet/year	3% increase	2,495 acre-feet/year	3% increase
Sediment	5% reduction	1,641 tons/year	10% reduction	3,036 tons/year	20% reduction
Phosphorus	5% reduction	3,968 lbs/year	10% reduction	8,388 lbs/year	35% reduction
Nitrogen	4% reduction	77,568 lbs/year	8% reduction	160,936 lbs/year	25% reduction

(a) Ultimate watershed goals are derived from the 2016 Yellow Medicine WRAPS.

5.3.2 Minimize the Transport of Sediment, Excess Nutrients, and Bacteria

The field-scale practices selected as most effective by the Yellow Medicine PWG in minimizing the transport of sediment and nutrients include nutrient management, manure management, buffer strips, alternative tile intakes, and row crop to grassland conversions. All of these practices are suitable for all areas in the watershed.

The following goals were established for voluntary adoption of BMPs in the priority subwatersheds to mitigate the transport of sediment, excess nutrients, and bacteria.

BMP Implementation Goals at a Glance

The partners will promote cost-share and incentive programs to implement the following practices at the specified adoption rates in the priority subwatersheds:

- Increase adoption of the University of Minnesota Extension **targeted nutrient application rates*** on 35% (75,341 treated acres) of agricultural land
- Replace 431 open tile inlets with **alternative tile inlets** on 2% (4,305 treated acres) of the fields
- Work with landowners to achieve 100% compliance with the **2015 Buffer Laws**
- Complete **row crop to grassland conversion** on 2% (4,305 treated acres) of highly erodible areas

Appropriate Drainage Authorities (counties and/or watershed district) will:

- Work with the SWCDs to **promote adopting conservation practices** during ditch repair and improvement projects.

**The efficiency for reducing the transport of nitrogen as a result of adopting the University of Minnesota application rates was set to 25% in the SAM model. This value was the average of the range presented in Table 4-9 of the WRAPS report, page 59.*

The costs for implementing these projects will most likely be shared between landowners and cost-share and/or incentive programs. If the requests for cost-share assistance exceed the amount of available funds, a ranking process will need to be developed to score the projects based on estimated environmental benefit/cost ratio with the highest scoring projects being funded first. The impacts of implementing the practices selected were calculated using HSPF-SAM software at the Yellow Medicine River Outlet at the Minnesota River and are described in Table 5-2.

Table 5-2. Estimated Achievement of Goals as a Result of Implementing Practices to Minimize the Transport of Sediment, Excess Nutrients, and Bacteria

Parameter	Achievement	Achievement (load/year)	10-Year Goal	10-Year Goal (load/year)	Ultimate Watershed Goal[(a)]
Base flow	< 1% increase	246 acre-feet/year	3% increase	2,495 acre-feet/year	3% increase
Sediment	12% reduction	3,721 tons/year	10% reduction	3,036 tons/year	20% reduction
Phosphorus	10% reduction	8,290 lbs/year	10% reduction	8,388 lbs/year	35% reduction
Nitrogen	5% reduction	110,420 lbs/year	8% reduction	160,936 lbs/year	25% reduction

(a) Ultimate watershed goals are derived from the 2016 Yellow Medicine WRAPS.

5.3.3 Combined Results and Timeline

Results from implementing the practices described in the first two priority concerns in the priority subwatersheds are shown in Table 5-3. The practices result in meeting or exceeding the 10-year goal for base flow and water quality improvements set by the PWG.

Table 5-3. Combined Achievements of Implementing BMPs for Priority Concern 1 and Priority Concern 2

Parameter	Achievement	Achievement (load/year)	10-Year Goal	10-Year Goal (load/year)	Ultimate Watershed Goal[(a)]
Base flow	1% increase	1,356 acre-feet/year	3% increase	2,495 acre-feet/year	3% increase
Sediment	19% reduction	5,828 tons/year	10% reduction	3,036 tons/year	20% reduction
Phosphorus	16% reduction	13,745 lbs/year	10% reduction	8,388 lbs/year	35% reduction
Nitrogen	12% reduction	235,264 lbs/year	8% reduction	160,936 lbs/year	25% reduction

(a) Ultimate watershed goals are derived from the 2016 Yellow Medicine WRAPS.

Because buffers will be required (Laws of Minnesota 2015, 1st Special Session, Chapter 4, Article 4) throughout the entire watershed and not just in the priority areas, an analysis was completed to determine the impact from buffers only and is provided in Table 5-4. Implementing a 50-foot buffer to suitable row crop acres throughout the watershed is estimated to have a minimal impact to base flow but significant impacts to sediment loading (25 percent).

Table 5-4. Achievements of Implementing Buffers Throughout the Watershed

Parameter	Achievement	Achievement (load/year)	10-Year Goal	10-Year Goal (load/year)	Ultimate Watershed Goal[(a)]
Base flow	< 1% increase	226 acre-feet/year	3% increase	2,495 acre-feet/year	3% increase
Sediment	25% reduction	7,677 tons/year	10% reduction	3,036 tons/year	20% reduction
Phosphorus	9% reduction	7,961 lbs/year	10% reduction	8,388 lbs/year	35% reduction
Nitrogen	3% reduction	60,996 lbs/year	8% reduction	160,936 lbs/year	25% reduction

(a) Ultimate watershed goals are derived from the 2016 Yellow Medicine WRAPS.

The combination of buffer implementation as described above and the BMPs outlined for the first two priority concerns (Mitigate Altered Hydrology and Minimize Flooding; Minimize the Transport of Sediment, Excess Nutrients, and Bacteria) in the priority subwatersheds has the impacts listed in Table 5-5. By implementing this suite of BMPs, 10-year goals are estimated to be met for all parameters, and the ultimate goal will be met for sediment reduction. The collective effort to implement these BMPs will focus on buffers and concentrated flow practices starting in the first year. Practices that will receive extra emphasis will be determined at the biennial summit, based on available funding and trends.

Table 5-5. Combined Achievements of Implementing Practices Identified in Priority Concern 1 and Priority Concern 2 Along With Implementing Buffers Throughout the YM1W1P Boundary

Parameter	Achievement	Achievement (load/year)	10-Year Goal	10-Year Goal (load/year)	Ultimate Watershed Goal[(a)]
Base flow	1% increase	1,466 acre-feet/year	3% increase	2,495 acre-feet/year	3% increase
Sediment	33% reduction	9,919 tons/year	10% reduction	3,036 tons/year	20% reduction
Phosphorus	21% reduction	17,960 lbs/year	10% reduction	8,388 lbs/year	35% reduction
Nitrogen	13% reduction	268,689 lbs/year	8% reduction	160,936 lbs/year	25% reduction

(a) Ultimate watershed goals are derived from the 2016 Yellow Medicine WRAPS.

5.3.4 Protect and Preserve Groundwater Quantity and Quality

The drinking water for the many residents in the Yellow Medicine River Watershed is provided by the Lincoln-Pipestone Rural Water supply system. Residents also obtain water from community public water supplies and private wells. At the time of plan development, the Yellow Medicine River Watershed currently has no approved wellhead protection areas; however, three wells have been installed for the city of Marshall, near Hanley Falls, Minnesota, which is completing a Wellhead Protection Plan. The communities of Clarkfield, Cottonwood, Hanley Falls, and Wood Lake will undergo the wellhead protection planning process within the 10 years of this plan.

Unused wells pose a risk for pollutants reaching the groundwater. Well sealing will be actively promoted through cost-share programs because unused wells are the primary known risk to contaminating the groundwater. Sealing unused wells is an eligible practice for funding through five programs: (1) State Cost-Share Fund through BWSR, (2) EQIP through NRCS, (3) Natural Resources Block Grant (NRBG) through BWSR, (4) the Municipal Well Sealing Program through MDH, and (5) county funding. Program eligibility and maximum cost-share rates can vary from year to year and program to program, so those interested in sealing a well should contact the appropriate agency to inquire about the current availability of funds and eligibility requirements.

BMP Implementation Goals at a Glance

The partners will promote cost-share and incentive programs to implement the following practices at the specified adoption rates across the watershed:

- Collectively seal 25 unused wells per year
- Begin the hydrogeologic atlas process
- Maintain fewer than 10% of private wells failing to meet 10 mg/L nitrate water quality standard

5.4 CAPITAL IMPROVEMENT PROJECTS

For the purposes of this plan, capital improvement projects are those projects that are larger scaled, more expensive, and have a longer effective life than the projects typically funded through agricultural incentive and cost-share programs. A capital project exceeds $100,000 in cost and has an expected life greater than 25 years. Some capital projects may be slightly under the $100,000 cost threshold yet meet the other requirements. These projects require O&M plans for the life of the project including inspection plans to ensure the project's effectiveness. These projects are often completed in cooperation with multiple entities and are good candidates for state or federal grant funding. Early coordination with permitting agencies is encouraged. The types of projects identified in this section are intended to provide significant benefits, often on a regional scale, rather than a field scale, and require feasibility studies before design and construction.

The YMRWD does not have a capital improvement plan (CIP) nor does any other local government in the watershed. Capital improvement projects in the development stage are listed below. A Public Law 87-639 Study [US Department of Agriculture Soil Conservation Service and US Army Corps of Engineers, 1987] was completed in February 1989 to aid in solving the significant and complex flooding problems within Area II. At that time, none of the flood damage reduction measures identified were found to be feasible for federal funding according to National Economic Development guidelines. The study also included an evaluation of alternatives for reducing erosion. Accelerating soil conservation programs was recommended. Local governments were encouraged to continue floodwater retention efforts as local governments can construct projects more cost effectively than the federal government. Four of the 10 sites identified in the Public Law 87-639 Study have been constructed as well as a flood control levee constructed by the US Army Corps of Engineers (USACE) under the Section 205 Small Projects Program to protect the City of Minneota.

5.4.1 Potential Capital Improvement Projects

The following projects are being developed and are not listed in any particular order.

5.4.1.1 *Lake Stay 3 Dam (2016)*

This dam is located 6 miles east of Ivanhoe, Minnesota, in Section 3, Range 44W, Township 111N in Lincoln County. The proposed embankment will be 26 feet high to create a normal pool of approximately 1.0 acre with 17 feet maximum depth. The estimated construction costs including easement are $75,730.30. The reservoir, owned and maintained by the property owner, will provide floodwater retention and wildlife benefits and will not be open to the public for recreational or hunting purposes. This project would provide 11.6 acre-feet of floodwater storage to count toward the 1,000 acre-feet measurable goal.

5.4.1.2 *Lincoln County Ditch 37 Off-Channel Storage (2016)*

This project is located 4 miles west of Ivanhoe, Minnesota, in Section 36, Range 46W, Township 112N in Lincoln County. The proposed project includes abandoning approximately 5,680 feet of the county tile system that will be diverted into two restored wetland basins by a pumping station. The 67 acres of restored wetlands were made possible by secured Reinvest in Minnesota (RIM) and Conservation Reserve

Enhancement Program (CREP) easements totaling $350,357[1]. The estimated construction costs are $192,770. By incorporating this off-channel storage project into the ditch system, a savings of at least $100,000 will be seen by the ditch system. Maintenance of the ditch and the pumping station will be provided by the ditch system with the individual landowners maintaining the restored wetland basins. The project will provide floodwater retention and wildlife benefits and will not be open to the public for recreational or hunting purposes. The project is a cooperative effort between Lincoln County, the landowners, Area II, BWSR, and the DNR. This project would provide 138.0 acre-feet of floodwater storage to count toward the 1,000 acre-feet measurable goal.

5.4.1.3 *Nordland 20 Dams (2016)*

These two smaller dams are located 5 miles south and 3 miles west of Minneota, Minnesota, in Section 20, Range 43W, Township 112N in Lyon County. The projects are currently in the design phase and are expected to meet the definition of a capital improvement project. These projects are estimated to provide approximately 14.7 acre-feet of floodwater storage to count toward the 1,000 acre-feet measurable goal.

5.4.1.4 *Marble 23 Dam (2017)*

This proposed dam is located 8 miles north of Ivanhoe, Minnesota, in the NW¼ of the NW¼ Section 23, Range 45W, Township 113N in Lincoln County. The project is currently in the preliminary design phase, is awaiting survey, and is expected to meet the definition of a capital improvement project.

5.4.2 Capital Improvement Projects to Mitigate Altered Hydrology and Minimize Flooding

Capital improvements that have the potential to mitigate altered hydrology include regional wetland restorations, flood retention impoundments, culvert modifications at road crossings, land acquisitions of flood prone areas, and projects that reconnect the floodplain to the rivers.

The flow reduction potential of these projects will be determined on a case-by-case basis during the feasibility study of each individual project. Project identification will be the focus in years 1 and 2, feasibility in years 3 and 4, and construction in years 5 and 6. The estimated costs for these projects are represented in the implementation plan.

5.4.3 Capital Improvement Projects to Minimize the Transport of Sediment, Excess Nutrients, and Bacteria

The capital improvement projects that can minimize the transport of sediment and nutrients include enrolling land in permanent easement programs, floodwater retention, and large stream stabilization projects. The pollutant reduction/potential of these projects will be determined on a case-by-case basis during the feasibility study of each individual project. Project identification will be the focus in years 1 and 2, feasibility in years 3 and 4, and construction in years 5 and 6. The estimated costs for these projects are represented in the targeted implementation plan.

[1] The CRP payment is not included in the total.

Capital Improvement Project Goals at a Glance

Appropriate Drainage Authorities (counties and/or watershed district) will:

- Review the project area of new ditch, lateral, and improvement projects for opportunities for **large-scale, multipurpose drainage projects** and **wetland restorations** that would mitigate the impacts of increased drainage.
- Assist in establishing **wetland banks** within the watershed.

Area II Minnesota River Basin Projects will:

- Review the priority subwatersheds for potential locations and feasibility of **flood retention projects** or **regional wetland restorations**.
- Seek bonding funds to construct projects that will retain floodwaters.
- Assist in establishing **wetland banks** within the watershed.

YMRWD will:

- Work with road authorities and Area II to identify locations where **culvert modifications** can provide mitigation for altered hydrology
- Assist in establishing **wetland banks** within the watershed.

Cities and counties will:

- Identify land that is subject to flooding and determine whether or not **land acquisitions** would be appropriate.
- Assist in establishing **wetland banks** within the watershed.

DNR will:

- Identify projects where **floodplain reconnection projects** would be beneficial and work with the SWCDs to pursue landowner interest.

SWCDs will:

- Work to increase the number of acres in **permanent land easement programs** when funds become available.
- Assist in establishing **wetland banks** within in the watershed.

5.4.4 Capital Improvement Projects to Protect and Preserve Groundwater Quantity and Quality

Several of the capital improvement projects described in previous sections will also have positive effects on groundwater. Those benefits will be calculated on a case-by-case basis and contribute to the desired multiple benefits of proposed projects. The main source of information needed for feasibility studies is the geologic makeup under the watershed; the process can take many years once started.

Potential project types to consider in developing capital improvement plans with multiple benefits are provided in Table 5-6; this list is not meant to be all-inclusive. Projects can be initiated by various units of government within the YM1W1P boundary according to their authorities.

Table 5-6. Evaluating Capital Improvement Projects for Multiple Benefits Example

	Wetlands (restored or created)	Land Conversion to Permanent Cover	Wet Dams	Dry Dams	Off-Stream Storage	Channel Restoration	Extended Buffer Strips	Culvert Down-Sizing
Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding								
Reduce flood volume, intensity, and frequency	•	•	•	•	•	◇	◇	◇
Increase base flow	•	•	•					
Improve stream habitat/ecology	◇	◇	◇	◇		•	◇	◇
Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria	•	•	•	•	◇	•	•	◇
Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality	•	◇	•					

Symbol	Effectiveness
•	High
◇	Low/Medium

Table 5-6 compiled upon the professional judgment of expertise of Lee Rosen, PE and Geoff Kramer, EIT – RESPEC.

Information gaps that are intended to be filled through the studies, research, and data acquisition components of this plan will increase the knowledge and ability to implement capital improvements to meet the goals of this plan. The goals for each potential project will be determined on a case-by-case basis during the feasibility study. Project identification will be the focus in years 1 and 2, feasibility in years 3 and 4, and construction in years 5 and 6. Specific partners, roles, and responsibilities will be developed through the project initiation and feasibility stages.

Capital Improvement Project Goals at a Glance

Soil and Water Conservation Districts will:

- Work with private landowners to put vulnerable land into **easement programs** such as the CRP, CREP, and RIM.

YMRWD and/or the DNR will:

- Perform a **geomorphological assessment** of the mainstem and tributaries of one priority subwatershed each year by using techniques such as the Rosgen or the Bank Erosion Hazard Index (BEHI) approaches.
- Provide recommendations for stream sections in need of repair or restoration and distribute to the **plan and technical committees**.
  - The technical committee will review the recommendations and work with the PWG to determine the next steps in regard to assigning agencies to contact landowners and conduct more in-depth analysis for **feasibility**.

The YM1W1P will develop a criteria and evaluation worksheet to determine funding recommendations. The following criteria may be considered:

- Extent and ability to meet primary goals
- Extent and ability to achieve multiple benefits
- Rare, threatened, and high quality resources
- Positive and negative impacts to groundwater quantity and quality
- Funding availability
- Annual operation costs
- Long-term maintenance costs
- Overall net value over a defined cost period (e.g., 30 years).

5.5 PREVIOUS CAPITAL IMPROVEMENT PROJECTS

5.5.1 Limestone 11 Dam Restoration (2015)

This dam was originally constructed in the early 1980s with design and funding assistance from the Soil Conservation Service. The structure is located 6.5 miles south and 2.5 miles west of Minneota, Minnesota, in Section 11, Range 44W, Township 112N in Lincoln County. Reinforced concrete culverts are used in Area II's dam restoration projects. Over the years, the corrugated metal culvert rusted and eventually washed out of the embankment. The restored embankment stands 23 feet high to create a normal pool of

2.4 acres with 12 feet maximum depth. The construction costs including easement were $58,569.09. The reservoir, owned and maintained by the property owner, provides floodwater retention and wildlife benefits and is not open to the public for recreational or hunting purposes.

5.5.2 Nordland 15 Dam (2013)

This dam is located 4 miles south and 2 miles west of Minneota, Minnesota, in Section 15, Range 43W, Township 112N in Lyon County. The embankment stands 15 feet high to create a normal pool of 1.3 acres with 8 feet maximum depth. The construction costs including easement were $85,192.81. The reservoir, owned and maintained by the property owner provides floodwater retention and wildlife benefits and is not open to the public for recreational or hunting purposes.

5.5.3 Limestone 1 Road Retention (2012)

This water retention structure included cooperation from four separate landowners, three townships, and two counties (Lincoln/Lyon) and is located 4.5 miles west and 1 mile south of Minneota, Minnesota. The retention project is located in Section 1, Range 44W, Township 112N with an adjoining bridge downsizing between Section 36, Range 44W, Township 113N, and Section 31, Range 43W, Township 113N. The cost of the project was $156,158.57. In addition to floodwater retention, road-safety issues were resolved by raising the roadways and reshaping a troublesome hill for snow removal.

5.5.4 Island Lake 4 Dam (2009)

This dam is located 10 miles west of Marshall, Minnesota, in Section 4, Range 43W, Township 111N in Lyon County. The embankment stands 41.0 feet high creating a normal pool of 6.2 acres with 34 feet maximum depth. Construction costs including easement were $170,872.60. The reservoir, owned and maintained by the property owner, provides floodwater retention, wildlife benefits, and fishing/ recreation, and is not open to the public for recreational or hunting purposes.

5.5.5 Alta Vista 36 Road Retention/Fier Project (2006)

The flood damage reduction project was constructed in coordination with the Lincoln/Lyon County road improvement and the Lincoln County bridge replacement on Lincoln County Highway 18 and Lyon County Highway 10, west of Minneota, Minnesota, in Section 36, Range 44W, Township 113N in Lincoln County, 5 miles west of Minneota, Minnesota. The project was designed to control the runoff from a 5,120-acre watershed, increase the height of the roadway by 16 feet, and create a floodwater storage area of 44.8 acres. The cost of the retention project was $658,603.34 and was funded by a collaboration of sources, including the Minnesota Department of Transportation (MNDOT) Local Road Improvement Funds, State of Minnesota Bonding, Lincoln County MNDOT State Aid Funds, Lincoln County in-kind, YMRWD, and Lyon County.

5.5.6 Anderson Lake (1987)

This reservoir is located in Section 6, Range 45W, Township 111N approximately 2 miles west and 0.5 mile south of Ivanhoe, Minnesota, in Lincoln County. The embankment stands 18 feet high to create a normal pool of 240 acres with 2 feet normal depth. A flood pool of 350 acres develops with the

14,080-acre drainage area. The construction costs were $60,000 and the project is owned and maintained by DNR who is responsible for inspections. The reservoir provides floodwater retention, wetland restoration, wildlife benefits and is open to the public.

5.5.7 Sonstegaard-Telste Reservoir (1983)

This reservoir is located 5 miles south and ½ mile west of Minneota, Minnesota, in Section 27, Range 43W, Township 112N in Lyon County. The embankment stands 42.5 feet high to create a normal pool of 15.4 acres with 20.1 feet maximum depth. The construction costs including easement were $369,600. The reservoir is owned and maintained by the YMRWD with annual inspections conducted by the YMRWD, Area II, Lyon SWCD, and NRCS. The reservoir provides floodwater retention as well as wildlife benefits, is located on private property, and is not open to the public.

5.5.8 Fales-VanHyfte Reservoir/Lake John (1981)

This reservoir is located 3 miles west of Porter, Minnesota, in Section 36, Range 45W, Township 114N in Yellow Medicine County. The embankment stands 45.0 feet high to create a normal pool of 19.8 acres with 19.8 feet maximum depth. The construction costs including easement were $433,800. The reservoir is owned and maintained by the YMRWD with annual inspections conducted by the YMRWD, Area II, Yellow Medicine SWCD, and NRCS. The reservoir provides floodwater retention, wildlife benefits, and fishing/recreation as it is open to the public for recreational or hunting purposes.

5.5.9 Hauschild-Thange Reservoir (1980)

This reservoir is located 7 miles east and 2 miles north of Ivanhoe, Minnesota, in Section 25, Range 44W, Township 112N in Lincoln County. The embankment stands 52.2 feet high to create a normal pool of 27.0 acres with 19.3 feet maximum depth. The construction costs including easement were $433,800. The reservoir is owned and maintained by the YMRWD with annual inspections conducted by the YMRWD, Area II, Lincoln SWCD, and NRCS. The reservoir provides floodwater retention as well as wildlife benefits, is located upon private property, and is not open to the public for recreational or hunting purposes.

5.5.10 Dillon-Syltie-Boulton Dam/Porter Dam (1974)

This reservoir is located 1.5 miles south of Porter, Minnesota, in Section 9, Range 44W, Township 113N in Yellow Medicine County. The embankment stands 32 feet high to create a normal pool of 19 acres with 18 feet maximum depth. The construction costs including easement were $89,600. The reservoir is owned and maintained by the YMRWD with annual inspections conducted by the YMRWD, Area II, Lincoln SWCD, and NRCS. The reservoir provides floodwater retention, wildlife benefits, and fishing/recreation as it is open to the public for recreational or hunting purposes.

5.6 OPERATION AND MAINTENANCE (O&M) PLANS

After construction has been completed, regular inspections and maintenance are important to keep the project functioning at its design capacity and life expectancy. O&M plans must be prepared before construction. The plan should include expected activities, timing of activities, and an inspection schedule. Information should also be developed on the procedure to be followed in the event that the inspection determines maintenance is required or if required maintenance has not been performed, including

potential penalties or enforcement actions. Minnesota State Rules 8400.1700 and 8400.1750 outline program requirements for projects funded through state cost-share programs.

O&M Plans at a Glance

Landowners will:

- Maintain **cost-shared BMPs** for the lifetime of the contract.
- Meet obligations of easement and O & M plans.
- Inspect **wetland banks** annually for a minimum of 5 years, until the credits are approved.

SWCDs will:

- Inspect **cost-shared BMPs** during years 1, 3, and 9 and communicate their findings with the landowner.
- Inspect **Clean Water Fund projects** during years 1, 3, and 9 and communicate their findings with the landowner.
- Inspect **RIM easements** annually for the first 5 years and then once every 3 years.

NRCS will:

- Inspect **EQIP cost-shared BMPs** during year 1 after initial construction.

Drainage Authorities will:

- Inspect and maintain **drainage systems** on an annual basis.

Area II and the YMRWD will:

- Inspect **flood retention projects** on an annual basis and after a significant flooding event.

YMRWD, Area II, and/or Road Authority will:

- Inspect **culvert modification projects** annually and after significant flood events. Road authority may transfer inspection responsibility to YMRWD once the culvert is less than 10-foot bridge span.

Cities will:

- Inspect and maintain their **stormwater facilities** as needed.

DNR will:

- Inspect dams and drawdown structures every 8 years.

Inspections should be conducted on a regular basis and after significant weather events throughout the life of the practice to confirm that the O&M plan is being followed and that the practice is still performing as designed. Site inspections should include a written record, photographs, and a report regarding the status of the practice and outline repairs or maintenance required. Inspection records should be kept throughout the life of the practice to verify maintenance activities. BWSR's recommended inspection plans are as follows:

- Conservation practice with a minimum effective life of 10 years: the end of years 1, 3, and 9 following the certified completion

- Capital improvement projects having a minimum effective life of 25 years: the end of years 1, 8, 17, and 24 following certified completion is a recommended minimum.

In the event that easement encroachments or maintenance requirements are not corrected within the designated time frame, the authorities vested in local government units as well as state and funding agencies will be used to compel compliance.

5.7 REGULATORY CONTROLS AND ENFORCEMENT

Implementing the practices and projects outlined in Chapter 4.0 will achieve the goals of the plan if no additional, future impacts occurred in the watershed. However, future impacts will occur and, therefore, mitigating these impacts is critical. Additionally, uncertainty in climate factors, water availability, and economics require that appropriate planning take place to reduce the potential of harmful impacts that can currently be anticipated by these uncertainties. Because of these factors, regulatory controls are a critical tool for managing the Yellow Medicine Watershed. This plan calls for increasing local regulatory controls as well as increased coordination of regulatory activities to reduce impacts from altered drainage, increased groundwater demands, and harmful land management practices. A summary of these recommendations is provided in Table 5-7.

5.7.1 Recommendations

Opportunities exist for the authorities that oversee those systems to manage the systems in a way that balances agricultural needs with ecological and environmental needs. The BMPs planned for in Chapter 4.0 can reduce the impacts from existing land management practices. Only by implementing appropriate regulatory controls will further impacts be prevented. Key aspects of a successful regulatory program include consistency of regulatory requirements and enforcement of those controls. This is particularly difficult in a watershed with a complex network of public drainage systems, as indicated in Table 5-8. Therefore, greater coordination and consistency across all drainage authorities in the watershed is needed as well as increased regulatory controls.

To achieve greater consistency and set standards for drainage activities that reduce impacts, a coordinated effort will be undertaken to examine existing standards and gaps, determine the most appropriate standards, and for drainage authorities to adopt those standards throughout the watershed. Increased communication well in advance of drainage activities will provide greater opportunity for coordination and increase the potential for mitigation efforts and multiple benefits to be obtained. Additionally, drainage authorities may consider mitigation incentives as part of their approval process.

Groundwater is a highly sensitive resource in that if contaminated, the impact is likely permanent. Additionally, groundwater availability is dependent on aquifer levels and has limited recharge capacity. Regulatory control measures that seek to reduce pollution potential and reduce withdrawals are the best protection against these threats. Additionally, land use controls that provide the ability to align the appropriate land uses with groundwater vulnerability should be considered, particularly when the geologic atlas and wellhead protection plans are completed.

Table 5-7. Future Local Regulatory Control Considerations and Initiatives (Page 1 of 2)

Regulatory Control Considerations and Initiatives	County	SWCD	Drainage Authority	Watershed District
Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding				
Provide notification to all federal, state, and local partners before conducting maintenance to obtain recommendations for mitigating altered hydrology (in addition to existing documentation)			X	
Establish additional criteria in engineer's reports and petition for outletting into drainage systems, including:			X	
Documentation of efforts related to leveraging outside funds authorized by § 103E.011, Subp 5			X	
Engineering reports fully justify the use of the recommended drainage coefficient, balancing production and environmental impacts			X	
Determine existing flows and implement a no net increase in flow requirement			X	
Engineering reports consider the improvement in the context of the entire watershed and thoroughly cover efforts to implement Minnesota Statute § 103E.015			X	
Require a pre-petition meeting between petitioners and the DNR, SWCD, watershed district, BWSR, MPCA, NRCS, and attorneys to facilitate early communication, manage expectations, identify early issues, and alter the petition if needed.	X		X	X
Establish ongoing agreements establishing the intent to partner. BWSR grants require an intent to partner			X	
Require mitigation efforts before authorizing requests to outlet into drainage system			X	
Establish consistency in tile permit requirements and standards throughout the watershed			X	
Determine existing flows and implement a no net increase in flow requirement			X	X
Require mitigation to be considered and identified with all tiling permits			X	
Require that all new tile systems discharge into stable outlets that meet minimum established criteria			X	
When channel-excavation projects are being undertaken, consideration must be given to practices that reduce velocity and sediment transport			X	
Establish consistent framework for mitigation requirements throughout the watershed			X	

Table 5-7. Future Local Regulatory Control Considerations and Initiatives (Page 2 of 2)

Regulatory Control Considerations and Initiatives	County	SWCD	Drainage Authority	Watershed District
Review controls for dewatering of quarries, mines, and open pits. Make recommendations improving management through regulatory controls, possibly reuse opportunities			X	
Examine and improve controls on shoreland buffers along wetlands not currently covered by existing shoreland protection measures			X	
Establish a no net increase in volume or flow controls on new development in the watershed			X	
Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria				
Establish and implement soil-erosion and soil-loss programs	X	X		X
Priority Concern 3: Protect and Preserve Groundwater Quantity and Quality				
Prohibit poor nutrient (manure and fertilizer) application practices in highly vulnerable groundwater areas	X			X
Implement zoning and comprehensive planning considerations that limit or reduce risk in Drinking Water Supply Management Areas (DWSMAs) and areas of high aquifer vulnerability as identified in Wellhead Protection Plans	X			X
Prioritize water use and require a Conditional Use Permit for large volume appropriations that require a conservation plan, flow meters, and annual reporting on use	X			

5.7.2 Influencing State Policy

YM1W1P partners belong to their respective associations: Minnesota Association of Watershed Districts (MAWD), Minnesota Association of Soil and Water Conservation Districts (MASWCD) and Association of Minnesota Counties (AMC). Each association has a resolution and policy process and platform. At the biennial summit, partners will review issues of significant importance, and brainstorm potential policies to improve regulatory support.

5.7.3 Existing Regulatory Controls

Local units of government, including counties, cities, and townships, are responsible for regulating land use controls and implementing various state programs, such as the shoreland program. The YMRWD also has permitting and regulatory authorities that can compel compliance to established standards. These rules and regulations are included in Appendix L. Although watershed districts in Minnesota do not implement land use controls, they do have the ability to "control the use and development of land in the floodplain and the greenbelt and open space areas of the watershed district" (Minnesota Statute Chapter 103D.335, Subd 19). Table 5-9 provides a summary of current local regulatory controls.

In addition to the local controls, federal and state laws, regulations, and rules are in place that relate to watershed and natural resource management. A summary of the regulatory controls most related to watershed management is provided in the following descriptions.

Table 5-8. Drainage Authorities and Drainage Systems Under Their Management in the Yellow Medicine Watershed (Page 1 of 4)

Ditch System	County	WD	HUC 12	HUC 12 Name	Maintenance	New System or Improvement
YMR HUC 10: **County Ditch No. 9** (07020004-01)						
CD-9	YM	None	7020004-01-01	Upper County Ditch No 9	YM County	YM County
CD-15B	YM	None	7020004-01-02	Lower County Ditch No 9	YM County	YM County
JD-13	YM	None	7020004-01-02	Lower County Ditch No 9	YM County	YM County
CD-9	YM	None	7020004-01-02	Lower County Ditch No 9	YM County	YM County
YMR HUC 10: **Stony Run Creek** (07020004-02)						
JD-23	LqP, YM	None	7020004-02-01	Judicial Ditch No 23	LqP-YB WD	LqP-YB WD
CD-90	LqP	None	7020004-02-02	County Ditch No 90-Minnesota River	LqP-YB WD	LqP-YB WD
JD-26	LqP, YM	None	7020004-02-02	County Ditch No 90-Minnesota River	YM County	YM County
CD-36	YM	None	7020004-02-03	Stony Run Creek	YM County	YM County
JD-21	LqP, YM	None	7020004-02-03	Stony Run Creek	YM County	YM County
None	LqP, YM	None	7020004-02-04	Brafees Creek-Minnesota River	N/A	YM County or LqP-YB WD
CD-6A	YM	None	7020004-02-06	County Ditch No 39	YM County	YM County
CD-39	YM	None	7020004-02-06	County Ditch No 39	YM County	YM County
None	YM	None	7020004-02-07	City of Granite Falls-Minnesota River	YM County	YM County
YMR HUC 10: **Upper Yellow Medicine River** (07020004-03)						
PD-4	Lincoln	YMRWD	7020004-03-01	Lake Shaokatan-Yellow Medicine River	Lincoln County	YMRWD
JD-22	Lincoln	YMRWD	7020004-03-01	Lake Shaokatan-Yellow Medicine River	Lincoln County	YMRWD
CD-37	Lincoln	YMRWD	7020004-03-01	Lake Shaokatan-Yellow Medicine River	Lincoln County	YMRWD
PD-6	Lincoln	YMRWD	7020004-03-02	County Ditch No 37-Yellow Medicine River	Lincoln County	YMRWD
CD-37	Lincoln	YMRWD	7020004-03-02	County Ditch No 37-Yellow Medicine River	Lincoln County	YMRWD
PD-3	Lincoln	YMRWD	7020004-03-03	Upper North Branch Yellow Medicine River	Lincoln County	YMRWD
CD-8	Lincoln	YMRWD	7020004-03-03	Upper North Branch Yellow Medicine River	Lincoln County	YMRWD
CD-37	Lincoln	YMRWD	7020004-03-03	Upper North Branch Yellow Medicine River	Lincoln County	YMRWD
CD-39	Lincoln	YMRWD	7020004-03-03	Upper North Branch Yellow Medicine River	Lincoln County	YMRWD
CD-45	Lincoln	YMRWD	7020004-03-04	Lower North Branch Yellow Medicine River	Lincoln County	YMRWD

Table 5-8. Drainage Authorities and Drainage Systems Under Their Management in the Yellow Medicine Watershed (Page 2 of 4)

Ditch System	County	WD	HUC 12	HUC 12 Name	Maintenance	New System or Improvement
CD-36	Lincoln	YMRWD	7020004-03-05	City of Taunton	Lincoln County	YMRWD
CD-38	Lincoln	YMRWD	7020004-03-05	City of Taunton	Lincoln County	YMRWD
WD-5	YM	YMRWD	7020004-03-06	Mud Creek	YMRWD	YMRWD
CD-23	YM	YMRWD	7020004-03-06	Mud Creek	YM County	YMRWD
CD-49	Lincoln	YMRWD	7020004-03-06	Mud Creek	Lincoln County	YMRWD
WD-1	YM	YMRWD	7020004-03-06	Mud Creek	YMRWD	YMRWD
None	Lyon, YM	YMRWD	7020004-03-07	Congers Marsh-Yellow Medicine River	N/A	YMRWD
YMR HUC 10: **South Branch Yellow Medicine** (7020004-04)						
WD-17	Lincoln	YMRWD	7020004-04-01	Upper South Branch Yellow Medicine River	YMRWD	YMRWD
CD-35	Lincoln	YMRWD	7020004-04-01	Upper South Branch Yellow Medicine River	Lincoln County	YMRWD
CD-10	Lincoln	YMRWD	7020004-04-01	Upper South Branch Yellow Medicine River	Lincoln County	YMRWD
WD-8	Lincoln	YMRWD	7020004-04-02	Lake Stay	YMRWD	YMRWD
CD-18	Lincoln	YMRWD	7020004-04-02	Lake Stay	Lincoln County	YMRWD
CD-50	Lincoln	YMRWD	7020004-04-02	Lake Stay	Lincoln County	YMRWD
JD-29	Lincoln	YMRWD	7020004-04-02	Lake Stay	Lincoln County	YMRWD
CD-41	Lincoln	YMRWD	7020004-04-03	Hawks Nest Lake	Lincoln County	YMRWD
WD-7	Lyon	YMRWD	7020004-04-04	Lower South Branch Yellow Medicine River	YMRWD	YMRWD
CD-33	Lyon	YMRWD	7020004-04-04	Lower South Branch Yellow Medicine River	Lyon County	YMRWD
CD-34	Lyon	YMRWD	7020004-04-04	Lower South Branch Yellow Medicine River	Lyon County	YMRWD
YMR HUC 10: **Spring Creek** (7020004-05)						
CD-25	YM	YMRWD	7020004-05-01	County Ditch No 25	YM County	YMRWD
CD-48	YM	YMRWD	7020004-05-02	County Ditch No 48	YM County	YMRWD
WD-1	YM	YMRWD	7020004-05-03	Upper Spring Creek	YMRWD	YMRWD
WD-4	YM	YMRWD	7020004-05-03	Upper Spring Creek	YMRWD	YMRWD
WD-18	YM	YMRWD	7020004-05-03	Upper Spring Creek	YMRWD	YMRWD
CD-20	YM	YMRWD	7020004-05-03	Upper Spring Creek	YM County	YMRWD

Table 5-8. Drainage Authorities and Drainage Systems Under Their Management in the Yellow Medicine Watershed (Page 3 of 4)

Ditch System	County	WD	HUC 12	HUC 12 Name	Maintenance	New System or Improvement
CD-21	YM	YMRWD	7020004-05-04	Judicial Ditch No 20	YM County	YMRWD
JD-20	YM, Lyon	YMRWD	7020004-05-04	Judicial Ditch No 20	YM County	YMRWD
CD-45	YM	YMRWD	7020004-05-04	Judicial Ditch No 20	YM County	YMRWD
CD-53	YM	YMRWD	7020004-05-04	Judicial Ditch No 20	YM County	YMRWD
JD-14	YM, Lyon	YMRWD	7020004-05-04	Judicial Ditch No 20	YM County	YMRWD
WD-2	YM	YMRWD	7020004-05-05	Lower Spring Creek	YMRWD	YMRWD
CD-11	YM	YMRWD	7020004-05-05	Lower Spring Creek	YM County	YMRWD
CD-13	YM	YMRWD	7020004-05-05	Lower Spring Creek	YM County	YMRWD
CD-26	YM	YMRWD	7020004-05-05	Lower Spring Creek	YM County	YMRWD
CD-37	YM	YMRWD	7020004-05-05	Lower Spring Creek	YM County	YMRWD
CD-44	YM	YMRWD	7020004-05-05	Lower Spring Creek	YM County	YMRWD
JD-5	YM	YMRWD	7020004-05-05	Lower Spring Creek	YM County	YMRWD
YMR HUC 10: **Lower Yellow Medicine** (7020004-06)						
CD-37	Lyon	YMRWD	7020004-06-01	Judicial Ditch No 7	Lyon County	YMRWD
JD-7	Lyon	YMRWD	7020004-06-01	Judicial Ditch No 7	Lyon County	YMRWD
WD-16	Yellow Med	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	YMRWD	YMRWD
CD-42	Lyon	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	Lyon County	YMRWD
CD-41	Lyon	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	Lyon County	YMRWD
CD-38	Lyon	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	Lyon County	YMRWD
CD-67	Lyon	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	Lyon County	YMRWD
JD-24	Lyon, YM	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	Lyon County	YMRWD
JD-16	Lyon, YM	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	Lyon County	YMRWD
JD-12	Lyon, YM	YMRWD	7020004-06-02	Spellman Lake-Yellow Medicine River	YM County	YMRWD
JD-2	Lyon	YMRWD	7020004-06-03	Cottonwood Lake	Lyon County	YMRWD
CD-11	Lyon	YMRWD	7020004-06-03	Cottonwood Lake	Lyon County	YMRWD
CD-69	Lyon	YMRWD	7020004-06-03	Cottonwood Lake	Lyon County	YMRWD

Table 5-8. Drainage Authorities and Drainage Systems Under Their Management in the Yellow Medicine Watershed (Page 4 of 4)

Ditch System	County	WD	HUC 12	HUC 12 Name	Maintenance	New System or Improvement
CD-55	Lyon	YMRWD	7020004-06-03	Cottonwood Lake	Lyon County	YMRWD
CD-4	Lyon	YMRWD	7020004-06-03	Cottonwood Lake	Lyon County	YMRWD
CD-3	YM	YMRWD	7020004-06-04	Judicial Ditch No 17	YM County	YMRWD
JD-3	Lyon, YM	YMRWD	7020004-06-04	Judicial Ditch No 17	YM County	YMRWD
JD-17	Lyon, YM	YMRWD	7020004-06-04	Judicial Ditch No 17	YM County	YMRWD
JD-18	Lyon, YM	YMRWD	7020004-06-04	Judicial Ditch No 17	YM County	YMRWD
JD-24	Lyon, YM	YMRWD	7020004-06-04	Judicial Ditch No 17	Lyon County	YMRWD
JD-9	Yellow Med	YMRWD	7020004-06-05	Yellow Medicine River	YM County	YMRWD
CD-14A	Yellow Med	YMRWD	7020004-06-05	Yellow Medicine River	YM County	YMRWD
CD-15A	Yellow Med	YMRWD	7020004-06-05	Yellow Medicine River	YM County	YMRWD
CD-49	Yellow Med	YMRWD	7020004-06-05	Yellow Medicine River	YM County	YMRWD
YMR HUC 10: **Wood Lake Creek** (07020004-10)						
JD-10	Lyon, YM	None	7020004-10-01	Upper Judicial Ditch No 10	YM County	YM County
CD-31	YM	None	7020004-10-02	Middle Judicial Ditch No 10	YM County	YM County
JD-10	Lyon, YM	None	7020004-10-02	Middle Judicial Ditch No 10	YM County	YM County
JD-10	YM	None	7020004-10-03	Lower Judicial Ditch No 10	YM County	YM County
CD-47	YM	None	7020004-10-04	County Ditch No 104-Minnesota River	YM County	YM County
CD-52	YM	None	7020004-10-04	County Ditch No 104-Minnesota River	YM County	YM County
CD-61	YM	None	7020004-10-04	County Ditch No 104-Minnesota River	YM County	YM County
CD-1B	YM	None	7020004-10-06	Boiling Spring Creek	YM County	YM County
CD-46	YM	None	7020004-10-06	Boiling Spring Creek	YM County	YM County
CD-54	YM	None	7020004-10-06	Boiling Spring Creek	YM County	YM County
CD-2	YM	None	7020004-10-07	County Ditch No 2-Minnesota River	YM County	YM County
CD-58	YM	None	7020004-10-07	County Ditch No 2-Minnesota River	YM County	YM County

Table 5-9. Summary of Current Local Regulatory Controls (Page 1 of 2)

Regulatory Concern	Lyon County	Lincoln County	Yellow Medicine County	Lac qui Parle County	Yellow Medicine River Watershed District
Shoreland	Zoning Ordinance, adopted April 1, 2015; Article 17	Comprehensive Development Ordinance No. 40, amended 2009. Section IV; Subd. 100.0 through 800.0	Land-Use Ordinance, amended and adopted October 8, 2013; Section III: Subd. 1.0 to 7.0	Land-Use Ordinance, amended and adopted September 5, 2000; Sections 22.01 through 22.09	**Rule 4.01 Subd 4:** Permit required for the disposal of snow within shore impact zone; **Rule 4.01 Subd 9**: Permit required for the draining or alteration of natural waterway or lake including bed, banks, or shores; **Rule 4.01 Subd 12:** Permit required for construction, alteration, repair, or replacement of a bridge, culvert, or drain laid in, to, or across any natural drainageway.
Floodplain	Zoning Ordinance, adopted April 1, 2015; Article 6	Comprehensive Development Ordinance No .40, amended 2009. Section III; Subd. 100.0 through 1301.0	Land-Use Ordinance, amended and adopted October 8, 2013; Section II: Subd. 1.0 to 13.0	Land-Use Ordinance, amended and adopted September 5, 2000; Sections 20.01 through 21.13	
Subsurface Sewage Treatment Systems	Zoning Ordinance, adopted April 1, 2015; Article 24	Comprehensive Development Ordinance No.40, amended 2009. Section XIV; Subd. 100.0 through 1500.00	Land-Use Ordinance, amended and adopted October 8, 2013; Section XIV: Subd. 1.0 to 16.0	Land-Use Ordinance, amended and adopted September 5, 2000; Sections 20.01 through 20.11	
Land Use	Zoning Ordinance, adopted April 1, 2015; Agricultural District – Article 8; Suburban Residence District. Urban Expansion District – Article 10; Highway Commercial District – Article 11; Rural Residential District – Article 12. Unincorporated Village District – Article 13; Planned unit Development District – Article 14	Comprehensive Development Ordinance No .40, amended 2009. Zoning - Section II: Subd. 100.0 through 600.0; Business and Industrial Districts - Section VII: Subd. 100.00 through 601.0: Urban Expansion Management District: Section V: Subd. 100.0 through 800.0; Rural Preservation Management District: Section VI: Subd. 100.0 through 700.0	Land-Use Ordinance, amended and adopted October 8, 2013; Rural Preservation - Section VI: Subd. 1.0 to 6.0.; Minnesota River Management District - Section IV: Subd. 1.0 through 4.0; Urban Expansion Management District -Section V: Subd. 1.0 through 7.0; Industry District - Section IX Subd 1.0 through 6.0	Land-Use Ordinance, amended and adopted September 5, 2000; Agricultural District Sections 16.01 through 16.04; Urban Expansion District Section 17.01 through 17.05; Commercial-Industrial District Sections 18.01 through 18.07	**Rule 4.01 Subd 2:** Permit required for the installation of agricultural best management practices that require land alteration; **Rule 4.01 Subd 3:** Permit required for new surface tile intakes or catch basins; **Rule 4.01 Subd 10-11:** Permit required for construction, alteration, repair, removal or abandonment of a dike, reservoir, or impoundment of water.
Mining	A Conditional Use Permit is required for anything exceeding excavation of 100 cubic yards or excavations including impounding water for agricultural purposes	Not a specific section pertaining to mining, but such activities are a conditional use subject to permitting in several zoning districts	Land-Use Ordinance, amended and adopted October 8, 2013; Section XXI: Subd. 1.0 to 11.0.		**Rule 4.01 Subd 14:** Permit required for any action adversely affecting surface or groundwater quality or quantity.
Feedlots	Zoning Ordinance, adopted April 1, 2015; Article 19	Comprehensive Development Ordinance No. 40, amended 2009. Section VIII; Subd. 100.0 through 701.0	Land-Use Ordinance, amended and adopted October 8, 2013; Section VII: Subd. 1.0 to 12.0	Land-Use Ordinance, amended and adopted September 5, 2000; Sections 23.01 through 23.12	**Rule 4.01 Subd 13:** Permit required for new or expanded feedlots within a shore impact zone.
Irrigation Wells					**Rule 4.01 Subd 14:** Permit required for any action adversely affecting surface or groundwater quality or quantity.
Wetland Conservation Act	SWCD is authority and administrator for entire county including cities	SWCD is authority and administrator for entire county including cities	SWCD is authority and administrator for entire county including cities	Lac qui Parle-Yellow Bank Watershed District is the WCA LGU in Lac qui Parle County	**Rule 4.01 Subd 9:** Permit required for the draining or alteration of wetlands.
Stormwater	Article 16 – Subd. 15.16				**Rule 4.01 Subd 5:** Permit required for the creation of over one acre of impervious surface.
Soil Loss and Erosion	Only contained in various stormwater and site development provisions. None related to agricultural land uses	SWCD administers the Soil Loss Law	SWCD administers the Soil Loss Law	SWCD administers the Soil Loss Law	

Table 5-9. Existing Local Regulatory Controls (Page 2 of 2)

Regulatory Control	Lyon County	Lincoln County	Yellow Medicine County	Lac qui Parle County	Yellow Medicine River Watershed District
Buffers	SWCD administers the Buffer Law	SWCD administers the Buffer Law	SWCD administers the Buffer Law. It has not been determined if the county, watershed district, or the state will regulate.	SWCD administers the Buffer Law. It has not been determined if the county, watershed district, or the state will regulate.	
Private Wells	Setbacks are required for various activities. Construction must be according to Minnesota Well Construction Code. Class V Injection wells are required to meet special disclosures and plans. Land-Use Permits are required before installing a new well.	Setbacks to wells are requested for animal waste application. Class V Injection wells are required to meet special disclosures and plans. Land-Use Permits are required before installing a new well.	Setbacks are required from wells to feedlots, manure storage areas, animal waste application and septic systems.		**Rule 4.01 Subd 14:** Permit required for any action adversely affecting groundwater quality or quantity.
Drainage	Setbacks to Judicial and County Ditches and Tiles are required for various activities.	County Drainage Policy and Rules adopted on May 17, 2011	County Ditch Inspector enforces the 103E statute. Setbacks to Judicial and County Ditches and tiles are required for various activities.	Lac qui Parle Watershed District issues drainage permits in Lac qui Parle County	**Rule 4.01 Subd 1:** Permit required for installation of new or improved public and private drainage system, excluding normal maintenance; **Rule 4.01 Subd 6:** Permit required for the delivery of water from one watershed to another by artificial means; **Rule 4.01 Subd 7:** Permit required for any activity affecting the flow of water in any public drainage system from land not assessed into said drainage system; **Rule 4.01 Subd 8:** Permit required for alteration, removal or reconstruction of public or private drainage system; **Rule 4.01 Subd 12:** Permit required for construction, alteration, repair, or replacement of a bridge, culvert, or drain laid in, to, or across any natural drainageway.

5.7.3.1 *Wetland Management*

Wetlands have regulatory controls regarding discharge of dredged or fill materials into waters of the United States including wetlands. The USACE and the EPA share responsibilities for implementing Section 404 of the Clean Water Act, which governs these discharges. Section 401 of the Clean Water Act requires certification of water quality compliance measures. This certification is a requirement of various federal permit programs and is implemented at the state level by the MPCA. USDA implements the Federal Farm Bill policies regarding draining or filling wetlands for farm program participation. Minnesota also has the Wetland Conservation Act (WCA) that is intended to result in "no-net loss" of wetlands through various mitigation, replacement, and permitting activities. BWSR administers the program however, the program is implemented through local government.

Regulations: Minnesota Statute portions of 103B and 103G; Minnesota State Rule Chapter 8420

5.7.3.2 *Floodplain Management*

The Federal Emergency Management Agency (FEMA) administers federal floodplain management, mapping, insurance, and flood-assistance programs. At the state level, the DNR oversees the state program and administers the National Flood Insurance program for the state. Local zoning regulations identify permitted land use in the floodway, flood fringe, and floodplain. At the time of the plan development, Lac qui Parle County and Lyon County FEMA maps have been completed and Yellow Medicine County is in preliminary status. Lincoln County has a FEMA map completed in 1973 and there are no plans to update this map.

5.7.3.3 *Shoreland Management*

The state of Minnesota has standards that are identified in rule and are overseen by the DNR. Local governments are required to adopt land-use controls that protect shorelands along rivers and lakes. Ordinances may be more restrictive if the local government units choose. Not all shoreland ordinances are implemented the same.

Regulations: Minnesota Statute 103F and Minnesota Rules 6120.2500 – 3900

5.7.3.4 *Buffer Management*

Buffers have been required on public waters and public drainage systems when certain triggers or thresholds are met. New legislation was approved in 2015 that accelerates adopting buffers on all public water and public drainage systems and provides for enforcing noncompliance. The law requires buffer of perennial vegetation an average of 50 feet with a minimum of 30 feet on public waters and 16.5 feet on public ditches. Flexibility is provided as long as other practices provide the same water quality benefit as a buffer. Exceptions are allowed for areas covered by roads, buildings, or other structures; areas that are enrolled in CRP; public water accesses; and municipalities that are in compliance with federal and state stormwater requirements. BWSR is the regulatory authority of this program, which will be implemented at the local level. Other waters will be provided by July 1, 2017, and incorporated into the plan at a later date.

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

5.7.3.5 *Point-Source Pollution Regulations*

Mandates regulating point sources of pollution were a major component of the Clean Water Act that was passed in 1972. The EPA is responsible for regulating point sources through the National Pollutant Discharge Elimination System (NPDES). The MPCA implements NPDES permits, such as stormwater (construction, industrial and MS4), concentrated animal feeding operations (CAFOs), and municipal and industrial wastewater discharges. Specific information on NPDES permits and process can be found online (*https://www.pca.state.mn.us/water/water-permits-and-forms*).

Regulations: Minnesota Statutes 115 and 116, as amended, and MN Rules Chapters 7001, 7050, 7060 and 7090; Minnesota Rules Chapters 7050 and 7052

5.7.3.6 *Subsurface Sewage Treatment Systems*

The goal of the Subsurface Sewage Treatment System (SSTS) program is to protect the public health and the environment through adequate dispersal and treatment of domestic sewage from dwellings or other establishments that generate volumes less than 10,000 gallons per day. SSTS requirements are adopted and enforced locally. Requests for assistance or complaints should first be directed to the local unit of government (county, city, township). Some counties in the YM1W1P planning area may have grants available for SSTS upgrades for those that meet limited income qualifications.

Regulations: Minnesota Statutes 115.55 and 115.56, Minnesota Rules Chapters 7080, 7081, 7082, 7083.

5.7.3.7 *Waste Management*

Waste management permitting and regulatory programs are implemented by the MPCA. These programs include hazardous waste, storage tanks, and solid waste. Local land use and zoning controls may regulate whether or not waste storage and handling facilities are a compatible use. All waste from areas within the watershed is disposed of at the Lyon County Landfill. Household hazardous waste facility locations for each county are as follows: Lac qui Parle, Kandiyohi County Regional Household Waste Facility in Willmar, Lincoln County, Ivanhoe; Lyon County, Marshall; and Yellow Medicine County, Clarkfield.

Regulations: Minnesota Statutes 115.55, Minnesota Rules Chapters 7001, 7035, 7045, 7150, 7151, 9215, 9220.

5.7.3.8 *Groundwater/Surface Water Use*

A water use (appropriation) permit from the DNR Division of Ecological Water Resources is required for all users who withdraw more than 10,000 gallons of water per day or 1 million gallons per year. The DNR is required to manage water resources to ensure an adequate supply is available to meet long-range seasonal requirements for domestic, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes. SWCDs and Planning and Zoning Offices are offered the opportunity to comment on these permit applications.

Minnesota Statute 103G for appropriation; 103H, 1989 Groundwater Act

5.7.3.9 *Invasive Species*

The DNR has regulatory authority over aquatic plants and animals as well as terrestrial vertebrates. The MDA has regulatory authority over terrestrial plants (noxious weeds) and plant pests. Each county has an agriculture inspector whose responsibility is to ensure that all laws and rules related to noxious weeds are enforced. A counterpart law does not exist for aquatic plants and animals or terrestrial vertebrates.

5.7.3.10 *Feedlots*

The MPCA administers the feedlot regulations in Minnesota. Additionally, counties in the state may be delegated by the MPCA to administer the program for feedlots that are not required to have a state or federal permit (see Point Source Pollution Regulations in Section 5.6.3.5). Each county in the YM1W1P area is a delegated county and, as such, manages its own program. Each program must include permitting, inspection, and registration. Each county will maintain delegated authority during the plan implementation.

Minnesota Rules Chapter 7020

5.7.3.11 *Public Waters*

The DNR administers the Public Waters Permit Work Permit program, which regulates activities below the Ordinary High Water Level (OHWL) in public waters and wetlands. Many activities are required to be permitted before work commences. These activities may include excavation, dredging, filling, installing structures, and shore protection measures.

Minnesota Statute 103G.245

5.8 POTENTIAL RESEARCH, STUDIES, DATA ACQUISITON, AND DATA MANAGEMENT

The YM1W1P partners are committed to undertaking studies and acquiring the data necessary to gain a greater understanding of the resources, threats, trends, and status. Throughout the planning process, data and knowledge gaps were identified as was the need to coordinate shared data and information in more efficient and effective ways. Surface water monitoring recommendations are provided in Appendix K.

5.8.1 Studies and Inventories

Although studies have been completed on various aspects of the watershed, additional data are necessary to target practices identified in the implementation plan. Additionally, data have been acquired which can be used for developing more comprehensive analysis. For example, septic system data exist, but have not been assembled into an inventory. Developing a more complete understanding of the status of the resource is necessary to adequately address resource planning and watershed goals. Several studies and inventories are intended to be conducted to fill the data and knowledge gaps. Some of these studies are foundational to developing subsequent information that will provide the necessary information for planning and implementing watershed activities. Examples of these studies and inventories are provided below.

5.8.1.1 *Hydrogeologic Atlas*

Currently, very little is known about the groundwater availability and the properties of the groundwater underlying the Yellow Medicine Watershed. To facilitate effective planning and protection measures, additional data are needed. The Minnesota County Hydrogeologic Atlas program is a collaborative effort between the Minnesota DNR and the Minnesota Geological Survey (MGS). Counties must request the study and upon doing so, the state will contribute 80 to 85 percent of the total project cost. Counties are required to contribute the remaining project costs with cash or in-kind contributions. As of the writing of this plan, Lyon, Lincoln, and Lac qui Parle Counties have requested the study. When the studies are completed, essential information for managing and protecting groundwater resources will be provided. Potential

management applications that the YM1W1P Partnership envision with the data and information obtained through these studies include informing land use decisions, and prioritizing monitoring, permitting, well sealing, and well construction activities.

5.8.1.2 *Watershed Hydrologic and Hydraulic Model*

A hydrologic and hydraulic (H&H) model of the watershed will be needed to evaluate and investigate possible solutions for Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding and Priority Concern 2: Minimize the Transport of Sediment, Excess Nutrients, and Bacteria. A completed model will provide the information necessary to analyze the timing, characteristics, and flooding of rainfall and snowmelt events. By doing so, this model can be used for planning flood storage, culvert sizing, and other practices and projects. Additionally, the model will allow for additional investigation such as a time of concentration analysis, understanding and prediction of flood timing and impacts with various threshold and intensities, flood hydrographs, runoff curve numbers, and other planning tools. This model will require a significant investment and therefore will require outside funding sources. The best available data will be used until that funding is secured. The existing HSPF model is useful for evaluating water quality and quantity on a watershed basis, but other models are more appropriate for field scale level hydrologic, hydraulic, and water quality modeling.

5.8.1.3 *Comprehensive GIS and Map Development*

The YMRWD obtained a grant from BWSR and has contracted with the Water Resource Center at the Minnesota State University Mankato facility to produce a hydrologic conditioned Digital Elevation Model (DEM) of the Yellow Medicine Watershed through GIS Arc Maps and LiDAR. This dataset will assist in evaluating potential BMP placement locations by using terrain analysis techniques such as the Compound Topographic Index (CTI), which is used for locating potential restorable wetlands, and Stream Power Index (SPI), which is used to determine areas susceptible to erosion caused by channelized flow, Additionally, the Agricultural Conservation Planning Framework (ACPF) prioritization tool is being developed for the watershed for BMP and project prioritization. Upon completion of the GIS layers, a comprehensive suite of maps should be developed.

5.8.1.4 *Culvert Inventory*

Although LiDAR and hydro-conditioning of DEMs are already underway, a greater understanding of each culvert's attributes, including size and condition, is needed. A complete culvert inventory can be used to increase the accuracy of the DEMs as well as the hydrologic and water quality models used in planning. This will provide for more effective targeting, planning, design, and results for transportation improvements, flood mitigation and water quality projects. Lyon County is currently developing this inventory using GIS staff and county resources.

5.8.1.5 *Stream Classification and Stability Studies*

A greater understanding of the stream characteristics, mechanisms, and stability of the YM1W1P is important. Comprehensive stream classification using Rosgen or an equivalent methodology will provide a thorough and detailed description of the stream channel, bed material, sinuosity, and other characteristics. The data collected through this study will be used to predict stream channel stability, erosion risk, sediment transport capacity, and many other elements that will be key for planning watershed projects involving stream restoration.

5.8.1.6 *Level 3 Feedlot Inventory*

A Level 3 Feedlot Inventory should be conducted in watershed areas that have not already had one completed. Those areas that have a Level 3 inventory that is more than 5 years old should have the inventory updated. The Level 3 inventories are an intensive, on-site inventory and inspection of the feedlots in the watershed. The data gathered through this inventory will be used to determine the status and potential needed repairs to reduce bacteria, nitrogen, and phosphorus entering surface water. The Minnesota Feedlot Annualized Runoff Model (MinnFARM) will be used to evaluate the impact of open lot runoff from feedlots. The model does not evaluate feed storage areas and pastures and is not applicable to total confinements. Compliance inspections collect the majority of the Level 3 inventory information with delegated counties completing Level 3 inventories through routine inspections. This information will assist in establishing a prioritization index of feedlot pollution for each feedlot and will be used to rank available grant funds.

5.8.1.7 *Septic System Compliance Surveys and Inspections*

SSTS, otherwise known as septic systems, can pose a threat to both surface water and groundwater. To determine compliance and the potential risk of septic systems, the YM1W1P partners may seek funding to undergo SSTS compliance surveys and inspections. These efforts may be focused in areas that are determined to be the most vulnerable to groundwater contamination or surface water threat based on GIS mapping. By completing these activities, implementation funding can be prioritized to those systems that pose the biggest threat.

5.8.1.8 *Synoptic and/or Diagnostic Studies*

Several intensive monitoring and assessment projects have been undertaken for the Yellow Medicine Watershed as a whole and for specific resources, such as Lake Shaokatan. These studies are a comprehensive description of the resource, are diagnostic in nature, and provide a set of conclusions and recommendations for implementation. Such studies will continue to be undertaken as conditions, resource concerns, and funding warrant. While diagnostic studies are a comprehensive assessment of the resource, a synoptic study is undertaken to understand the behavior of the resource. The study involves collecting samples from many locations during a short period of time (typically a few hours). The results from synoptic studies provide an understanding of the distribution, pattern, and movement of water flow as well as pollutants such as sediment, phosphorus, and nitrogen.

5.8.1.9 *Refining BMPs and Reducing Agricultural Fertilizer Inputs*

Refining existing BMPs and methods for reducing agricultural fertilizer inputs is a knowledge gap identified in the agricultural and water quality communities. The Nitrogen Management Initiative (NMI) as developed by MDA helps farmers and crop advisors in evaluating alternative nutrient management practices. Reducing fertilizer application rates, changing the timing of fertilizer application, and use of a nitrogen stabilizing product are some of the practices included in NMI. More information can be found online (*http://www.mda.state.mn.us/nmi*).

5.8.1.10 *Potentially Undisturbed Lands*

An assessment of known tillage history and land disturbance has accurately identified the location of lands with the highest probability of being truly native (virgin) sod. The data provided by this assessment, indicated in Figure 5-1, can be used to help identify lands worthy of protection. Acquisition of this newly

released dataset, when combined with other GIS data layers, will aid in evaluating protection efforts and BMP placement.

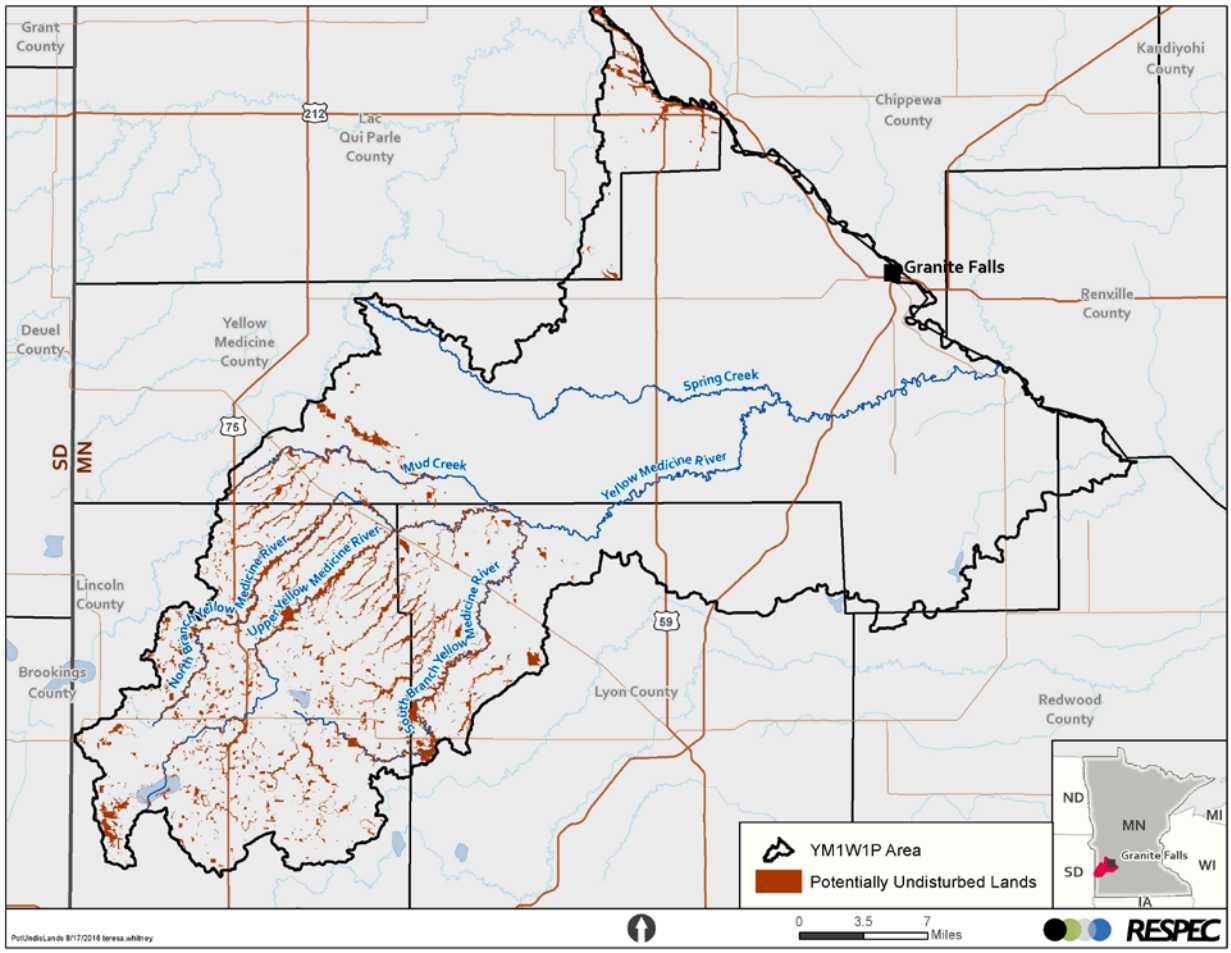

Figure 5-1. Location of Potentially Undisturbed Lands.

5.8.2 Resource Monitoring

Yellow Medicine River surface water and atmospheric monitoring efforts have been shared among various entities. Several local, state, and federal agencies collect valuable watershed information, beginning with weather data collected by a variety of volunteers and airports, and data storage and analysis provided by the DNR Climatology Office, the National Weather Service (NWS), and others. Other agency-sponsored monitoring has been provided by the MPCA's milestone and condition monitoring programs and the DNR/MPCA cooperative stream gaging program. The cooperative stream gaging program houses gages that are jointly operated and/or supported by the US Geological Survey (USGS). In addition to surface water and meteorological monitoring, various programs are in place to monitor groundwater, tillage practices, and nitrates in private wells. A summary of current monitoring programs is provided in Table 5-10.

Table 5-10. Current Monitoring Plans (Page 1 of 2)

Inventory/ Monitoring Program	Location	Frequency	Lead	Local Coordinator
Land Management				
Tillage Transect Survey	Watershed	Every 5 years	BWSR	None required
SSTS Monitoring	Lincoln	Annually	Lincoln County P&Z	
Surface Water				
Stream Flow Monitoring/WPLMN	Three Stations: Yellow Medicine River Near Granite Falls + Near Hanley Falls, Spring Creek Near Hanley Falls	Continuous water levels converted to flows	DNR/MPCA Cooperative Program	YMRWD
Stream Water Quality	Watershed-wide	Once every 10 years (TSS), total volatile solids (TVS), *E.coli*, Chlorophyll *a* (Chl-*a*), TP, Ortho-Phosphate (OP), Nitrate+nitrite, TKN, ammonia, pH, dissolved oxygen (DO), conductivity, temperature, sulfates, calcium, magnesium, transparency)	MPCA	YMRWD
Stream Biota	Watershed-wide	Once every 10 years Fisheries and macroinvertebrate, Index of biological integrities (IBIs), habitat, fish contaminants	MPCA/DNR	YMRWD
Stream Survey	TBD	Once every 10 years	DNR	YMRWD
Lake Water Quality	Watershed-wide	Once every 10 years (TP, Chl-a, Secchi)	MPCA	YMRWD
Lake Water Biota	Watershed-wide	Once every 10 years DNR IBI being developed	MPCA/DNR	YMRWD
Citizen Monitoring	TBD	Annually May to September, lake transparency (Secchi)	MPCA	YMRWD
Meteorological				
Weather Stations	Granite Falls, Minneota, Canby, Dawson, Montevideo	Continuous	DNR, MWCC (Climate Divisions 4 and 7)	DNR
Rain Gage	Various Locations	Continuous	SWCD Coordinates volunteers + DNR MN gage	NA
Groundwater				
Groundwater Levels	Various Locations	Continuous	DNR/SWCDs	DNR
Groundwater Quality	Public Water Supply Wells	Annually	MDH/Public Water Supplies	MDH

Table 5-10. Current Monitoring Plans (Page 2 of 2)

Inventory/ Monitoring Program	Location	Frequency	Lead	Local Coordinator
Township Private Well Nitrate Testing	Townships: Westerheim, Lyon County; Swedes Forest, Redwood County; and Normania, Yellow Medicine County	Once per well initially; follow-up as recommended by MDA	MDA	N/A
Private Well Clinics	Various locations	Every other year; Nitrates, lead, bacteria	Yellow Medicine County Water Plan; Lac qui Parle County Water Plan	N/A

The current monitoring programs will be sufficient to monitor long-term progress toward goals; however, additional monitoring will be needed to determine short-term progress (considered as anything less than 10 years). Additionally, the current monitoring plan does not address diagnostic studies that may be needed on a subwatershed or specific resource basis or to understand how the watershed "behaves" to plan for particular resource management studies. This would include a synaptic study on a 24-hour, 100-year storm event to learn of flow characteristics through the watershed. These types of activities are considered studies and are discussed in more detail in Appendix K - Monitoring Plan Recommendations.

5.8.3 Data Management, Analysis, and Technology Tools

Currently, all data are reported and tracked independently and no local repository exists for data and information on activities in the watershed. Additionally, no centralized, local data analysis exists. The YM1W1P partners intend to centralize all watershed reporting, tracking, and analysis with the YMRWD being best suited to perform this function. To that end, the partners will support the YMRWD in establishing a comprehensive data storage and retrieval system. Data will be submitted to the system as it is collected and then validated for quality control purposes.

To evaluate progress over time, standardized reports will be developed on key parameters that indicate watershed health. Statistical data analysis will be performed on a regular basis to identify trends, progress, and potential issues. Regular reports will be issued that compare progress toward goals.

5.9 OUTREACH AND EDUCATION PROGRAM

Public outreach (including both information and education) is an integral part of the YM1W1P goals. The success of this plan relies on individuals to change their behavior and adopt practices that reduce their impact to watershed resources. Success also relies on local government authorities adopting policies that will result in better protection, mitigation of future impacts, and management of watershed resources. To create both of these outcomes, an effective outreach and education program will be developed. The YM1W1P will employ a wide range of outreach and engagement activities that are structured around the watershed goals. The outreach and engagement program activities are not separate from, but instead are intended to support, the watershed plan goals. Additionally, the outreach and engagement program is

more than outputs and activities. The program consists of deliberate and planned activities that contain cohesive messages that support watershed goals using the process described in the following sections.

This plan includes both outreach and public engagement activities. Outreach activities are typically prepared and delivered to various targeted audiences. These activities are structured, communication is typically one-way (delivered), and the content is predetermined. Practitioners deliver outreach and education programs. On the other hand, public engagement is typically two-way communication and allows participants to direct or influence the conversation. The public engagement activities are planned and facilitated similar to outreach activities, but the audience is an active participant who delivers messages back to the facilitator. Public engagement may even provide a means for the practitioner to use a public group as a consulted or decision-making body. The range of activities with increasing levels of engagement is depicted in Figure 5-2.

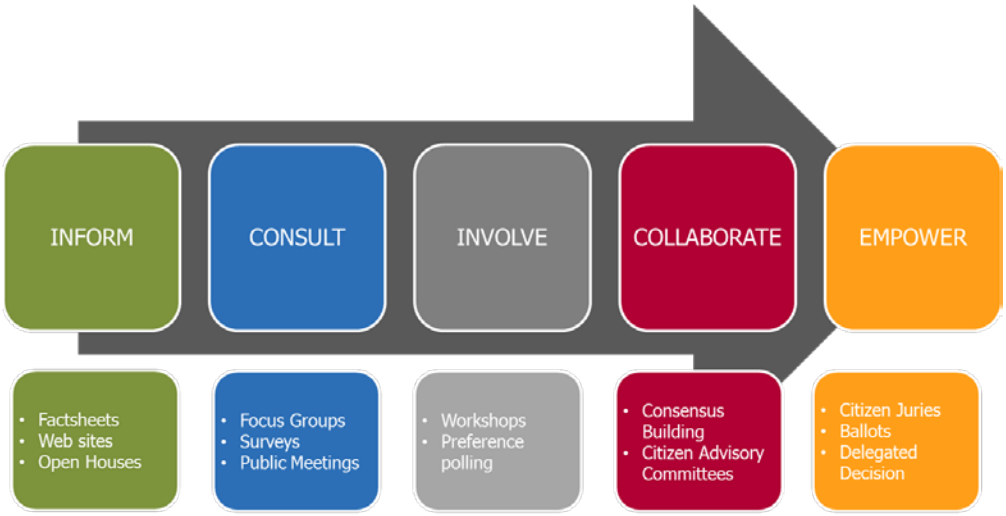

Figure 5-2. Increasing Levels of Public Engagement.

5.9.1 Outreach Strategies

The watershed partners have a long history of providing outreach and education activities using various strategies. Most of these activities are targeted to youth through various programs such as environmental fairs. The collaborative works together as well as individually to provide information via means such as newsletters, booths at county fairs and other events, presentations, news releases, live weekly radio program, and aquatic invasive species awareness. These programs will continue but will be refined to better address watershed goals.

The outreach and engagement program is intended to initiate awareness with the public and then effectively move from awareness to developing knowledge, understanding, and creating a desire for behavior change. The last step in the pathway involves providing the information necessary for the individual to engage in behavior change. The most effective programs have the most fully developed communication and outreach plans that link messages to targeted audiences by using the most

appropriate tactic for delivery. These elements are discussed in the sections below, along with examples provided in Table 5-11.

Table 5-11. Examples of Linking Audiences, Messages, and Tactics to Goals

Plan Goal	Mitigating Altered Hydrology and Minimizing Flooding
Measurable Goal: 3% Increase in Dry Season Base Flow	
Target Audience	**Drainage Authorities**
Potential Messages	Increasing volumes, sediment, and maintenance costs
	Maintaining healthy base flow is critical for water quality and habitat
	Consistency in permitting requirements supports flood-reduction goals and provides clarity to permittees
	Permitting programs can provide flexibility and incentives for implementing BMPs while meeting drainage needs
Potential Outreach Tactics	Presentations
	Workshops
	Factsheets
Target Audience	**Agricultural Producers**
Potential Messages	Increasing volumes, sediment, and how much you pay to maintain the system
	Financial and technical assistance is available for BMPs
	Importance of maintaining soil moisture
	BMPs can be sized to fit nearly anywhere on-system or off-system
Potential Outreach Tactics	Presentations
	Workshops
	Field days
	Direct mailing
	Promotional materials

5.9.2 Target Audiences

Primary targeted audiences will be defined for each outreach and engagement initiative. Determining the primary audience is the first step in planning outreach activities, and ensuring that the right message reaches the right audience is critical. A thorough assessment and identification of the targeted audience will keep the messages focused; improve the campaign effectiveness; and reduce costs from larger, unfocused outreach campaigns. The following is a list of various types of audiences:

- General public
- Landowners, including absentee landowners
- Watershed resources technical staff
- Land use decision makers
- Elected and appointed officials

- Agriculture community: producers, crop advisors, equipment dealers, tiling companies, and other related groups
- Funders
- Cities and townships
- Irrigators
- Developers
- Educators, schools, university
- Residents/homeowners
- Recreational users/visitors
- Community groups, civic groups, special interest groups.

5.9.3 Potential Messages

Messaging developed for the outreach program will be centered on generating awareness about the resource program availability, progress toward goals, and complementary practices that citizens and residents can take to address resource goals. Messages may involve conservation of water resources, such as appropriate lawn and garden watering practices, or on conservation practice funding, such as when a new grant is received for conservation drainage. Messages may also include topics of concern such as prevention of the spread of invasive species. The outreach and education program will be the primary mechanism for the PWG to report on outcomes and to provide accountability to local constituents as well as funding and program partners. As such the PWG will develop consistent "state-of-the-watershed" reports that are targeted to various audiences.

5.9.4 Outreach Tactics

Outreach messages can be delivered by a wide variety of tactics. The level of effort, costs, and potential impact should be tailored for each outreach campaign. Each outreach plan must evaluate the target audience, identify the key message, and then select the key tactic for delivering that message. The following list, although not all-inclusive, are various methods for outreach messages:

- **Broadcast media**: Television, websites, video/documentaries, story maps, radio, blogs, list-serves
- **Social media:** Twitter, Instagram, Facebook, YouTube
- **Face-to-Face:** Open houses, presentations, county fairs, hearings, field days, one-on-one, canoe trips
- **Marketing:** billboards, newsletters, direct mailing, utility bill inserts, weekly shoppers, newsletters, promotional materials.

The partners will take advantage of opportunistic events to further outreach program needs. Note that tactics that reach a large audience are often the most economical, such as inserts in weekly shoppers. However, such tactics might also not be as effective as more targeted tactics because the messages are usually not refined and, therefore, not necessarily relevant to the wide audience. Targeted tactics to specific audiences are typically more costly but can be more effective because the messages are more

strategic and relevant. An example of a targeted tactic is partnering with a local seed cooperative to announce cover crop cost-share funding. In many cases, the message will be more general in nature, such as conservation messages for lawn and garden watering BMPs, and a nonspecific tactic is most appropriate.

5.9.5 Public Participation

Actively engaging the public increases a sense of community pride and natural resource stewardship. The YM1W1P acknowledges the importance of engaging citizens and will implement activities across a broad spectrum of public participation opportunities. Simple, regular public participation activities used to create awareness, such as photograph contests, will be conducted. Opportunities to increase the level of public participation, such as open houses and consensus building, will be explored throughout the life of the plan.

5.9.6 Outreach and Public Participation Best Practices

To ensure and evaluate program success, the following best practices are recommended:

- **Brand establishment:** Developing an identifying symbol, tagline, and "look" that will be associated with the YM1W1P is important. A brand is more than identification. Effective brands generate perceptions which, when effective, link to the product; in this case, being the watershed and how they feel about it.
- **Developing core messages:** This is a diverse watershed with multiple units of government involved in implementation activities. Consistently communicating the core elements of the plan by the YM1W1P partners is important.
- **Consistency in programming:** Once public awareness is created, it must be sustained to be effective. A minimum of a 12-month programming calendar is recommended. The calendar should include timely messages and a variety of activities that reach multiple audiences using multiple tactics.
- **Program evaluation:** Evaluating the impact and outcomes of outreach and engagement activities is difficult. Qualitative or quantitative evaluation techniques can be employed without significant time and financial investment. Tracking web hits, attendance, and program enrollment offers some evidence of activity level but is not qualitative in nature. However, obtaining anecdotal evidence or feedback in the form of focus groups and other polling activities can help evaluate public perception on program success.

5.9.7 Formal Education Programs

Education and training are different from outreach and participation activities in that the goal of training and education is applying newly acquired knowledge and skills to an activity. One of the hallmarks of education and training programs are developing learner objectives and an evaluation to ensure that learner objectives are met. The YM1W1P includes developing and implementing educational programs and trainings for targeted audiences with curriculums that enhance the participant's skills, awareness,

knowledge, and abilities to manage resources. Examples of targeted audiences and potential curriculum topics include the following:

- **Drainage authorities:** tiling permit evaluation, drainage law
- **Contractors**: SSTS rules and updates, BMP planning and installation, permitting and rules
- **Elected and appointed officials**: Surface and groundwater protection/restoration, watershed management
- **Planning and zoning officials:** Nonpoint Education for Municipal Officials (NEMO)
- **Agricultural producers:** drainage water management technologies, nutrient management, irrigation management
- **Volunteer monitoring programs:** protocols and quality assurance/quality control practices for surface water monitoring
- **Middle and senior high school students:** watershed management, surface water monitoring, stream surveys, groundwater resource education.

5.9.8 Capacity Building

In addition to providing educational programming, ensuring that staff continue to sharpen their skills; acquire new skills; and keep current with the newest science, technology, research and management strategies is critical. The YM1W1P partners will pursue opportunities that provide individuals with educational opportunities as well as opportunities that increase capacity of the partnership, such as bringing education programs to the watershed. Finally, the partnership will establish internship programs that bring additional capacity to the watershed while increasing the skills and on-the-ground training for soon-to-be or recent college and technical school graduates.

6.0 PLAN ADMINISTRATION AND COORDINATION

6.1 FORMAL AGREEMENTS

The YM1W1P Partnership that was executed via an MOA will be extended beyond the initial planning process. The Planning Work Group will be renamed the Plan Work Group (PWG) and will meet annually to review progress and modify this plan as needed. Proposed amendments will be brought forward at the biennial summit. Amendments will be submitted to each MOA participant for approval before being adopted.

6.2 DECISION-MAKING AND STAFFING/PLAN ADMINISTRATION AND COORDINATION

Extensive coordination within the Yellow Medicine Watershed by watershed partners has resulted in a successful implementation track record. The successes of the past have built the momentum to develop this watershed plan. Therefore, before determining the structure for administering the plan, the partners established the following principles for establishing the decision-making structure.

- **Shared responsibility:** The plan will embrace a history of collaboration by empowering staff to continue to coordinate the prioritization of actions and implementation activities.
- **Commitment to strong local governance:** Existing local governments have structures in place to address the working elements of the plan.
- **Reducing bureaucracy:** Governance of the plan will be organized through developing an agreement of shared intentions and commitment and not through creating a new entity.

Based on these principles, the watershed plan will be implemented through a newly established MOA. The Policy and Advisory Committees as they currently exist will sunset and then continue in a similar format under the newly established MOA. This method for ensuring information exchange will meet the statutory requirements for this plan.

The requirements will be met by convening a biennial summit (once every other year) with the organizational membership of the YM1W1P Policy Committee and Advisory Committee as well as others as needed. At this biennial summit, the PWG will report on progress, provide an evaluation of accomplishments, and develop recommendations on any potential changes that need to be taken to better address the goals of the plan. Funding status and opportunities and current governance including whether or not alternative governance structures should be explored will also be discussed. A diagram of the decision-making structure and authorities is provided in Figure 6-1.

The PWG will continue to meet, at a minimum of once per year. This group will be responsible for developing a biennial (2-year) implementation plan. Additional committees, such as technical, educational, or topic specific, may be established based on the priorities identified in the biennial plan. Reporting on the progress to meeting YM1W1P watershed goals will be coordinated by one single entity; for instance, the YMRWD, or as assigned.

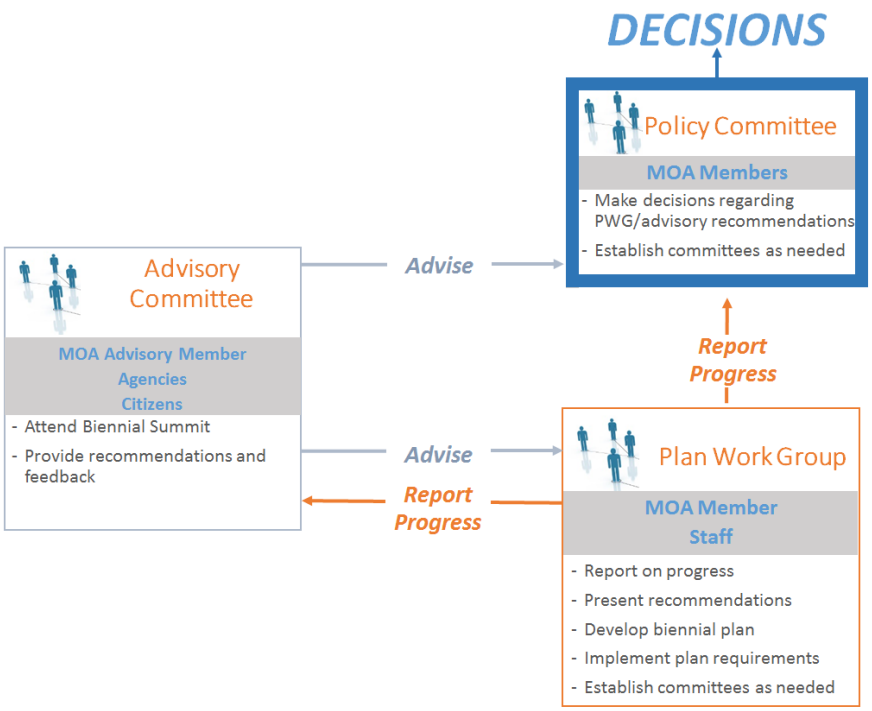

Figure 6-1. Diagram of Decision-Making Authorities and Process.

6.3 COORDINATION OF SHARED SERVICES

At the time of the plan development, no formal agreements were developed for sharing services. The YM1W1P Partnership recognizes the need for and the benefit of obtaining efficiencies in implementing this plan, including reporting, managing data, coordinating collaborative activities, administering the plan, and implementing the individual components of the plan. The PWG will evaluate staffing levels necessary to implement all components of the plan and focus on staff planning during the grant development process. The PWG will analyze potential areas of staff overlap, duplication of efforts, and gaps in staffing necessary to implement the plan. A comprehensive staffing plan will be developed that outlines and provides for opportunities to improve efficiencies while providing adequate staffing resources to ensure goals are achieved. Potential opportunities include reporting on progress in meeting YM1W1P watershed goals, fiscal reporting for collaborative grants, monitoring, conducting education and engagement events, and implementing capital improvement projects.

6.4 COLLABORATION WITH OTHER UNITS OF GOVERNMENT

The YM1W1P Partnership will actively seek opportunities for early coordination and collaboration with other units of government including cities and townships to federal agencies. Governmental units that are not part of the formal MOA will be invited to participate in implementation activities where those activities are relevant to their own goals or implementation measures. Cities and townships, although not required participants, will be critical to addressing the three goals. Specific program areas that will require their participation include source water protection and stormwater management. Collaboration with state agencies such as BWSR, the MPCA, and DNR are critical for executing the programs and goals of the plan. Federal government partners, including the NRCS, Farm Service Agency (FSA), and US Fish

and Wildlife Service (USFWS) are not required participants, but their programs and staff expertise are necessary components to fulfilling plan goals. If opportunities arise where one unit of government would like to share services, an agreement will be developed to formalize the collaborative arrangement.

6.5 COLLABORATION WITH NONGOVERNMENTAL ENTITIES

The goals and actions of this plan rely on more than just governmental entities. The YM1W1P Partnership is committed to working with nongovernmental entities including civic groups, nonprofit entities, for-profit businesses, volunteers, individuals, and foundations. A concerted effort will be made to engage with these entities on all activities related to the goals and programs in this plan. Potential partners will be invited to the biennial summit and will be sought out for relationships that support the plan initiatives.

6.6 WORK PLANNING

To have a cohesive implementation of the plan that is well coordinated by all of the MOA entities, comprehensive work planning will be completed on a biennial basis with annual adjustments made as needed to accommodate unforeseen or opportunistic situations. The YM1W1P PWG will develop the biennial work plan before the biennial summit. The work plan will be presented to the Advisory and Policy Committees at the biennial summit and will require Policy Committee approval before implementation. The biennial work plan will be based on progress made toward goals and new initiatives aimed at either maintaining or accelerating progress in targeted watersheds. Staff and financial resource availability will be considered. Feedback and guidance received at the biennial summit will be integrated into the biennial work plan. The biennial work plan will be developed for YM1W1P with an indication of each local government's responsibilities for executing the plan. The individual local government responsibilities will be adopted and implemented separately by each local government.

A major driver of the biennial work plan approach and the approval process is to develop the recommendations for BWSR's Biennial Budget Request (BBR). The biennial work plan will be developed based on the targeted implementation plan as well as other initiatives and programs that support efforts to achieve plan goals. Figure 6-2 is a schematic illustrating how implementation efforts will be targeted following completion of the Terrain Analysis by MSU-Mankato. This information is central to the decision making.

6.7 ASSESSMENT AND EVALUATION

6.7.1 Annual Evaluation

Each year, the PWG will evaluate progress toward goals and will coordinate the evaluation process. The results from the partners will be combined and evaluated at an annual work session when adjustments may be made to accommodate staffing, resource, or program changes and challenges. Additionally, each local government is committed to submitting the required statutory and policy, plans and reports, as identified in Level 1 Performance Review and Assistance Program (PRAP.)

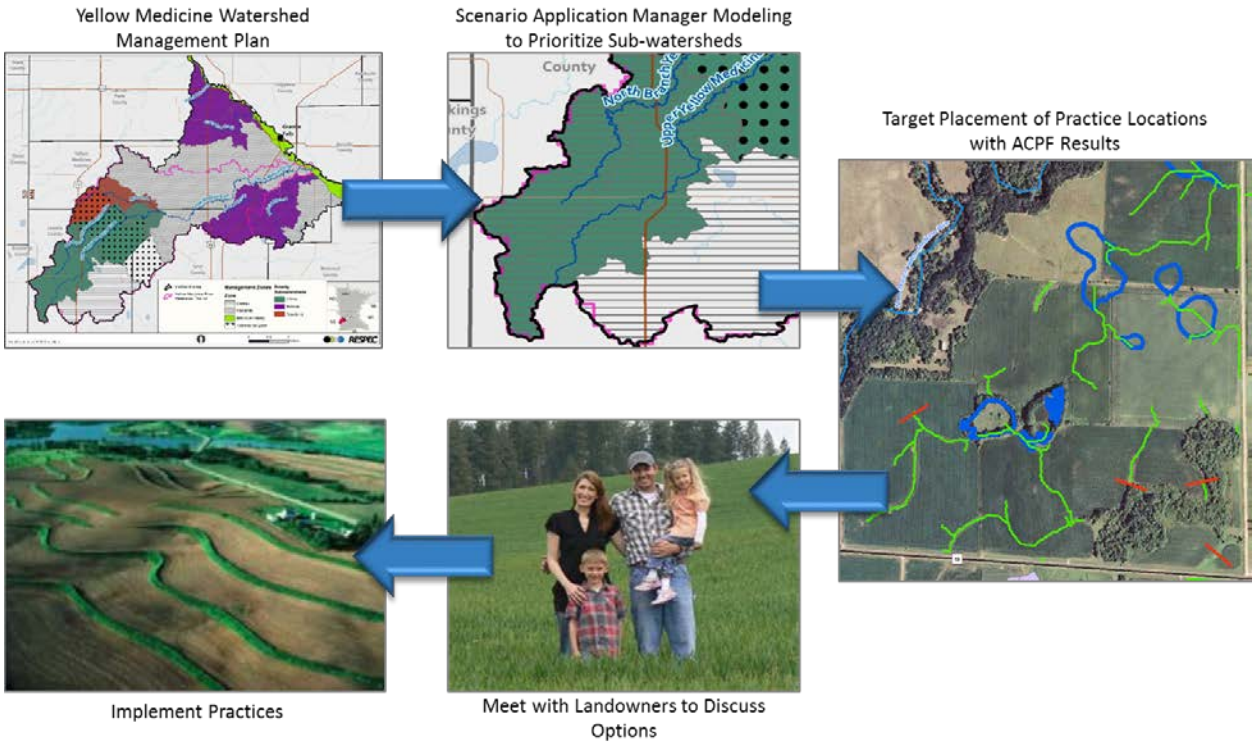

Figure 6-2. Using Terrain Analysis and the ACPF Tool for Targeting Implementation Efforts.

6.7.2 Biennial Evaluation

The biennial evaluation will consist of an enhanced evaluation of progress toward the watershed goals. The YM1W1P work plan will adopt reporting forms for each targeted implementation plan activity. An example of a potential reporting form is provided in Table 6-1. The PWG will coordinate the evaluation process. The results reported by the partners will be combined and evaluated at an annual work session with this progress reported to the Advisory and Policy Committees at the biennial summit. Additionally, the PWG will prepare and present implementation recommendations for the next biennium.

6.7.3 Five-Year Evaluation

A thorough assessment of progress toward goals will be made every 5 years. The PWG will coordinate activity reporting as described above. Progress toward measurable goals will be assessed by using available evaluation tools. The 5-year evaluation will be a critical examination of progress as well as potential barriers or challenges to progress. Upon completion of the 5-year evaluation, the PWG will determine whether or not a plan update is recommended. Recommendations will be provided to the Advisory Committee and the Policy Committee at the following biennial summit.

6.7.4 Reporting

Each local government is committed to completing all of their reporting requirements. Reporting on outcomes and the status of the YM1W1P as well as individual watershed resources will be primarily conducted through the plan outreach and education programs as outlined in Chapter 5.0.

Table 6-1. Sample Reporting Form

Seal Unused Wells Category: Cost-Share and Incentive Programs					
Description	In an effort to stop contaminants from entering groundwater resources through unused and unsealed wells, project partners will help residents find cost-share funding for sealing their abandoned wells.				
Priority Issue	Preserve Groundwater Quality				
Targeting	Watershed-wide, but top priority will be those wells located in areas with a high vulnerability to groundwater contamination if the requests for funding exceed the funds available.				
Measure	The number of wells sealed on an annual basis.				
Schedule	Baseline: All counties operated cost-share programs for sealing unused wells in 2015.				
	2017–2026: All counties will continue to operate cost-share programs for this practice as long as funds are available through state and federal cost-share programs.				
Cost	The average cost to seal a residential well is $800–$1,200. Cost-share programs have historically paid 30 to 50% of the cost to seal the well up to a value ranging from $300–$500. Cost-share maximums are set annually by each SWCD Board. The cost to seal community wells can be far greater and vary due to depth and diameter.				
Funding	Funding options for cost-share programs include: • Natural Resource Block Grant (funded by BWSR and matched by the county) • State Cost-Share Program (funded by BWSR) • EQIP (funded by NRCS) • Municipal Well Sealing Program (funded by MDH)				
Responsible Government Units					
Recordkeeping	**Year**	**Yellow Medicine**	**Lincoln**	**Lyon**	**Lac qui Parle**
Number of wells sealed in the Yellow Medicine River Watershed by county	GOAL	5/year	5/year	1/year	0/year
	2017				
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				

6.8 PLAN AMENDMENTS

This plan is in effect through 2026. During that time, new data will be generated that provides a better understanding of watershed issues and solutions. Administrative authorities, state policies, and resource concerns may also change. New information, significant changes to the projects, programs or funding in the plan, or the potential impact of emerging concerns and issues may require revisions and updates to the plan. In the event that revisions are required or requested, the YM1W1P Policy Committee members will initiate a plan amendment process consistent with Minnesota Statute 103B and Minnesota Rule 8410.0140 (as revised).

The activities described in this plan are more of a descriptive nature than a prescriptive nature and are meant to allow flexibility in implementation. For example, cover crops are a defined activity in the implementation plan and schedule. Other BMPs may be used instead of cover crops if they provide the same or very similar level of benefit. Therefore, 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 consistent with achieving the plan goals. This includes changes to the costs of all activities except those of capital improvement projects.

Plan amendments can be proposed by any partner. The PWG will intentionally consider potential changes that warrant a plan amendment before each biennial summit. Potential changes and a call for additional recommendations to be considered will be discussed at the biennial summit.

The YM1W1P Policy Committee will follow procedures outlined in Minnesota Statute 103B.314 Subd 6 for all plan amendments:

1. Submit a petition to the BWSR Board and send copies of the proposed amendment and the date of the public hearing to the entities defined in 103B.305 for 60-day review.
2. Respond in writing to concerns and questions submitted.

   Hold the public hearing.
3. Submit the amendment to the state review agencies and BWSR for a 45-day review.
4. Upon BWSR board approval, the amendment becomes part of the comprehensive local water management plan.

6.9 FUNDING

The following sections discuss funding needs, current local funding, and potential funding sources.

6.9.1 Capital Improvement Plan Funding and Timeline

Approaching implementation of a large scale project or program affords some economies of scale in acquiring and implementing funds for BMPs that are conducted as part of a project rather than implementing BMPs on an individual basis. Capital improvement projects can be multifaceted and involve either one large complex of activities, such as stream restorations that include on-stream and off-stream storage components, or it could be a plan to provide flood storage through restoring noncontributing drained wetlands distributed throughout a targeted subwatershed. Capital improvement projects typically take a 5- to 7-year time frame from concept development through completion. The concept plan and feasibility study must often be completed before engineering and construction are funded. Table 6-2 provides a schematic of potential capital improvement projects, costs, and timeline.

6.9.2 Current Local Funding

Current local funding is outlined in Table 6-3. This funding indicates the level of commitment each local government will provide for plan implementation.

Table 6-2. Potential Capital Improvement Plan Project List

Project/Phase	Cost	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding Objective 1: Reduce Flood Volume Strategy: Increasing Off-Stream Storage, Wetland Restoration, Culvert Sizing, Acquiring Easements											
Concept/Feasibility	50,000										
Design/Permit	150,000										
Construction	500,000										
Closeout	10,000										
Easements											
Priority Concern 2: Minimize Transport of Sediment, Excess Nutrients, and Bacteria Objective: Capture Nutrients to Reduce Downstream Transport Strategy: Stream Restoration, Wetland Restorations, Acquiring Permanent Easements											
Concept/Feasibility	50,000										
Design/Permit	150,000										
Construction	500,000										
Closeout	10,000										
Easements											
Priority Concern 1: Mitigate Altered Hydrology and Minimize Flooding Objective 2: Increase Base Flow Strategy: Wetland Restorations and Wet Grade Stabilizations, Acquiring Permanent Easements											
Concept/Feasibility	50,000										
Design/Permit	150,000										
Construction	500,000										
Closeout	10,000										
Easements											

Table 6-3. 2015 Available Local Funding

FUNDING CATEGORY	Lyon County ($)	Lincoln County ($)	Yellow Medicine County ($)	Lac qui Parle County ($)	Yellow Medicine River Watershed District ($)	Area II MN River Basin Projects ($)
NRBG Local Match:						
Wetland Conservation Act	2,028	4,301	6,407	527		
SSTS	4,297	9,114		1,116		
SSTS Incentives		1,225				
SSTS Upgrades		17,150				
Local Water Management	3,162	1,644	4,492	2,250		
Shoreland	632	1,299	1,919	160		
Feedlots	6,570	21,805	13,779	1,020		
Aquatic Invasive Species	12,880	34,670	29,200	24,000		
Solid Waste (Score Grant, HHW Funding, Local Match) × county% in watershed	84,175	43,793	5,005	4,181		
Other Local Funds (Pheasants Forever, Ducks Unlimited, and sportsmens clubs)		13,990	1,387			
SWCD Local Funds		30,000	13,469	420		
County SWCD Allotment	46,359	58,800	82,051	6,000		
State of Minnesota:						
Bonding						240,000
Administrative Grant						33,600
Staffing – County and WD	46,359	8,820	29,807	4,800	90,000	
Local Match – WD and Area II	4,815				55,000	20,880
Beaver Control					10,000	
Landowner Contributions	25% share of project costs	25% share of project costs	25% share of project costs	25% share of project costs	25% share of project costs	25% share of project costs

6.9.3 Potential Local Funding

The current local funding levels provided above will not be adequate to implement the plan. Therefore, additional local money will be needed for successful plan implementation. Additionally, existing program funding will be evaluated to determine if realignment under the planned implementation activities will allow for greater leverage and therefore an increased ability to meet plan goals. There are various state laws that have provisions for both counties and watershed districts to generate additional revenue under the provisions of 103B and 103D as outlined in Table 6-4. These opportunities will be explored as appropriate but it is important to note that there is a very limited tax base within the watershed and therefore it is not possible to generate a large amount of local revenue.

6.9.3.1 *County*

Water Planning Authority for Special Projects (Minnesota Statute 103B.355): Counties have authority to levy funds for priority projects and to assist SWCDS and watershed districts (WDs) with program implementation.

Road Authorities: Counties can provide limited local funding to assist with the local share of road retention and other floodwater-retention projects.

6.9.3.2 *Watershed District*

Basic Water Management Projects (Minnesota Statute 103D.605 and 103D.611): Initiated by the watershed district board or petitioned and special projects also petitioned or board initiated. The watershed district boundary does not cover the entire watershed, so appropriate planning must take place ensure that the activities outlined in this plan and funded through the watershed district do not negate certain portions of the watershed from receiving benefits from those programs. Watershed districts may bond and incur debt.

Watershed District Special-Purpose Project (Minnesota Statute 103D.601): Via petition, watershed districts can set up special taxing districts to conduct larger, Capital Improvement Projects (CIP). The costs to affected parties must be less than $750,000. In the plan, special-purpose district(s) can be identified where there is an anticipation of potential capital improvement projects being implemented in the next 10 years.

General Fund (Minnesota Statute 103D.905, Subd. 3): This fund pays for the general administrative expenses and construction or implementation of projects that are for the common benefit shared by all property owner in the watershed. The general fund levy may not exceed 0.048 percent of the taxable market value or $250,000, whichever is less.

Survey and Data Acquisition Fund (Minnesota Statute 103D.905, Subd. 8): The purpose of this fund is to pay for the costs of making necessary surveys and acquiring data. This fund is collected with an ad valorem levy that can only be collected once every 5 years and is set at 0.02418 percent of the taxable market value or $50,000, whichever is less. The balance of this fund cannot exceed $50,000. This fund may only be established by the watershed district if other funds are not available to the watershed district for these purposes.

Table 6-4. Statute 103B and 103D Water Management Revenue Options (Adapted From BWSR)

103 Fiscal Authorities and Programmatic Activities	County, City, Township	Additional for Watershed Districts					Drainage Authorities
	103B.245 Special Taxing District (Allows subarea taxation)	**103D.729, 103D.730, 444.075 (Subd. a)** Water Management District/Stormwater Utility	**103D.905 (Subd. 3)** General Fund (Capped @ $250,000)	**103D.905 (Subd. 3)** Basic Water Management Project	**103D.905 (Subd. 8)** Survey and Data Acquisition	**103D.345** Permits	**103E.011 (Subd. 5)** External Funding
Administration		X	X				
Management Plans	X		X				
Monitoring and Data Collection		X	X		X		
Special Studies and Research		X	X		X		
Regulation and Permits			X			X	
Projects and Programs	X	X	X	X			X
Capital Improvements in Plan	X	X	X	X			X

6.9.3.3 *Drainage Authorities*

Drainage System Costs (Minnesota Statute 103E.601): Funding of all costs related to construction, maintenance, and improvement of drainage systems is apportioned to property owners within the drainage system on the basis of the benefits received from the improved drainage.

External Sources of Funding (Minnesota Statute 103E.011, Subd. 5): A drainage authority can accept and use funds from sources other than assessments from benefitted land owners for the purposes of flood control, wetland restoration, or water quality improvements. Additionally, 103E.015, Subd. 1a requires drainage authorities to investigate potential use of external funding for the purposes identified in 103E.011, Subd. 5.

6.9.3.4 *Cities*

Stormwater Utility Fee (Minnesota Statute 444.075): Municipalities (home rule charter or statutory city that is not in an orderly annexation process) are authorized to collect stormwater utility fees to build, repair, operate, and maintain stormwater management systems. Stormwater utility fees must be set using reasonable calculations based on runoff volume or pollution quantities, property classification, or an equitable basis.

6.9.4 State Funding

The state of Minnesota has the responsibility to fund watershed management programs through various capacities, programs, and agencies. The Nonpoint Priority Funding Plan (NPFP) outlines a criteria-based process to prioritize Clean Water Fund investments. These high-level state priority criteria include:

1. Restore those waters that are closest to meeting state water quality standards,
2. Protect those high-quality unimpaired waters at greatest risk of becoming impaired, and
3. Restore and protect water resources for public use and public health, including drinking water.

Funding for capital improvement projects and flood reduction projects may be obtained through legislative appropriations directly or through state agency programs that have bond funds available, such as the Flood Damage Reduction Program and RIM. Grants are also available from BWSR, the MPCA, DNR, MDH, and MDA to fund programs, practices, and projects. Grants are also available through legislative commissions, such as the Lessard-Sams Outdoor Heritage Council which funds habitat projects, and the Legislative and Citizens Commission on Minnesota Resources Environmental Trust Fund, which funds research and innovation funds. State revolving fund loans can be obtained from the MPCA and MDA. Potential state funding sources and the YM1W1P goals program that may be funded by sources are outlined in Table 6-5.

6.9.5 Federal Funding

The federal funding portion of the plan is anticipated to be the largest source of implementation and program funds and can provide up to 50 percent of conservation practice costs. Federal agencies expected to partner and from which funds will be sought include NRCS, FSA, EPA, USACE, USFWS, and

Table 6-5. State and Federal Funding Sources (Page 1 of 2)

Source	Program / Fund Name	Type of Assistance	Form of Assistance	Priority Concerns			Programs		
				Altered Hydrology	Pollutant Transport	Groundwater	Research and Studies	Data Acquisition and Management	Education and Outreach
BWSR	Clean Water Fund	Financial	Grant	X	X	X		X	
BWSR	RIM	Financial	Easement	X	X	X			
BWSR	NRBG	Financial	Grant	X	X	X	X	X	X
BWSR	Erosion Control	Financial	Grant		X				
DNR	Conservation Partners Legacy	Financial	Grant	X	X				
DNR	Flood Hazard Mitigation	Financial	Grant	X					
MPCA	Clean Water Partnership	Financial	Grant	X	X	X			
MPCA	State Revolving Fund	Financial	Loan	X	X	X			
MPCA	Surface Water Assessment Grant	Financial	Grant					X	
MPCA	Watershed Pollutant Load Monitoring Network (WPLMN)	Technical	Monitoring				X	X	
MDH	Source-Water Protection Grant	Financial	Grant			X	X		
MDH	Public Water Supplier Testing	Technical	Monitoring			X		X	
MDA	Ag BMP Loan Program	Financial	Loan	X	X	X			
MDA	Ag Water Quality Certification Program	Financial	Cost-share	X	X				
MDA	Nitrogen Fertilizer Management Plan	Technical	Testing					X	
LSOHC	Outdoor Heritage Funds	Financial	Grant	X	X	X			
LCCMR	Environmental Trust Fund	Financial	Grant	X	X	X	X	X	X

Table 6-5. State and Federal Funding Sources (Page 2 of 2)

Source	Program / Fund Name	Type of Assistance	Form of Assistance	Priority Concerns			Programs		
				Altered Hydrology	Pollutant Transport	Groundwater	Research and Studies	Data Acquisition and Management	Education and Outreach
Legislature	Bonding	Financial	Bond	X	X				
FSA	CRP	Financial	Incentive	X	X	X			
FSA	CREP	Financial	Incentive	X	X	X			
NRCS	CIG	Financial	Grant	X	X	X	X		
NRCS	EQIP	Financial	Cost-share and Incentives	X	X	X			
NRCS	Conservation Stewardship Program	Financial	Cost-share and Incentives	X	X	X			
NRCS	Regional Conservation Prevention Program (RCPP)	Financial	Cost-share and Incentives	X	X	X			
USGS	Stream Gaging Network	Technical	Monitoring				X	X	
USACE	Planning Assistance	Technical	Planning	X	X				
FEMA	Disaster Assistance	Financial	Grant	X					
EPA	Section 319	Financial	Grant	X	X	X			

USGS. The CREP program, administered by the FSA, is likely to substantially fund BMP implementation as well as various programs offered by NRCS. Flood reduction programs may involve partnering with USACE. FEMA and USGS will likely provide support for data acquisition and monitoring programs while USFWS may provide land retirement program funds. Finally, YM1W1P partners will seek out grants that further knowledge and implementation strategies such as the Conservation Innovation Grant (CIG) and the Regional Conservation Partnership Program (RCPP) offered through NRCS.

6.9.6 Nonregulatory Ecosystem Service Programs

Most ecosystem service trading programs are currently facilitated through regulatory permits and programs, such as wetland banking. However, demand is increasing to provide ecosystem service grants that are not regulatory in scope. Funding initiatives that may be available might focus on increasing or protecting habitat for particular species, such as endangered or threatened species, or for increasing or protecting habitat for a particular ecosystem, such as increasing habitat for pollinators. Funders of these programs could come from federal, state, nonprofits, or foundations.

6.9.7 Other Funding Sources

Foundations, nonprofit organizations, and private contributions including landowners and corporate entities will be sought for plan implementation activities. Local foundations may fund education, civic engagement, and other local priority efforts. Several conservation organizations are very active in Minnesota, such as Pheasants Forever, Ducks Unlimited, and The Nature Conservancy. These organizations acquire funding of their own and may have project dollars and technical assistance that can be leveraged. Finally, major cooperators and funding sources are private landowners who typically contribute 25 percent of project costs and may donate land, services, or equipment for projects or programs.

6.9.8 Collaborative Grants

The PWG will develop grant applications and seek funding from various governmental and nongovernmental agencies based on the biennial plan. Individual entities will continue to submit grant applications for their existing programs and activities. However, grants that focus exclusively on implementing the activities of this plan will be developed and submitted by the PWG

7.0 REFERENCES

Minnesota Pollution Control Agency, 2015. *Yellow Medicine River & Surrounding Direct MN River Tributaries Watershed Restoration & Protection Strategies Report,* prepared by the Minnesota Pollution Control Agency, St. Paul, MN (draft).

Skaggs, R. W., M. A. Breve, and J. W. Gilliam. 1994. "Hydrologic and Water Quality Impacts of Agricultural Drainage." *Critical Reviews in Environmental Science and Technology*, Vol. 24, No. 1, pp. 1-32.

US Department of Agriculture Soil Conservation Service and US Army Corps of Engineers, 1987. *Upper Minnesota River Subbasins Study (Public Law 87-639 Draft Interim Feasibility Report: Yellow Medicine Subbasin*, prepared by the US Department of Agriculture Soil Conservation Service, Washington, DC, and US Army Corps of Engineers, St. Paul District, St. Paul, MN.

APPENDIX A
ACRONYMS

APPENDIX A - ACRONYMS

1W1P	One Watershed One Plan
Area II	Area II Minnesota River Basin Projects
ACPF	Agricultural Conservation Planning Framework
AMC	Association of Minnesota Counties
BBR	Biennial Budget Request
BEHI	Bank Erosion Hazard Index
BMP	Best Management Practice
BWSR	Board of Waters and Soil Resources
CAFO	Concentrated animal feeding operations
CIG	Conservation Innovation Grant
CIP	Capital Improvement Plan
CLWMP	Comprehensive Local Water Management Plans
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CTI	Compound Topographic Index
DEM	Digital elevation maps
DNR	Department of Natural Resources
DO	Dissolved oxygen
DWSMA	Drinking Water Supply Management Areas
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
GIS	Geographic Information System
H&H	Hydrologic and hydraulic
HEL	Highly erodible land
HSPF	Hydrologic Simulation Program-Fortran
HUC	Hydrologic Unit Code
IBI	Index of biological integrities
LCCMR	Legislative and Citizen Commission on Minnesota Resources
LGR	Local Government Roundtable
LiDAR	Light Detection and Ranging
LSOHC	Lessard-Sams Outdoor Heritage Council
MASWCD	Minnesota Association of Soil and Water Conservation Districts
MAWD	Minnesota Association of Watershed Districts
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MGS	Minnesota Geological Survey
MinnFARM	Minnesota Feedlot Annualized Runoff Model
MNDOT	Minnesota Department of Transportation
MOA	Memorandum of Agreement

MPCA	Minnesota Pollution Control Agency
NBMP	Watershed Nitrogen Reduction Planning Tool
NEMO	Nonpoint Education for Municipal Officials
NFMP	Nitrogen Fertilizer Management Plan
NPDES	National Pollutant Discharge Elimination System
NPFP	Nonpoint Priority Funding Plan
NRBG	Natural Resources Block Grant
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
O&M	Operation and maintenance
OHWL	Ordinary High Water Level
OP	Ortho-Phosphate
PBMP	Watershed Phosphorus Reduction Planning Tool
PRAP	Performance Review and Assistance Program
PWG	Planning Work Group / Plan Work Group
RCPP	Regional Conservation Partnership Program
RCRCA	Redwood-Cottonwood Rivers Control Area
RIM	Reinvest in Minnesota
SAM	Scenario Application Manager
SCS	Soil Conservation Service
SPI	Stream power index
SSTS	Subsurface Sewage Treatment System
SWCD	Soil and water conservation districts
TMDL	Total Maximum Daily Load
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
TVS	Total volatile solids
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WD	Watershed district
WRAPS	Watershed Restoration and Protection Strategy
WSCB	Water and Sediment Control Basin
YMRWD	Yellow Medicine River Watershed District

APPENDIX B
GLOSSARY

APPENDIX B - GLOSSARY

Cost-share	The cost of systems or practices for erosion control, sedimentation control, or water quality improvements that are designed to protect and improve soil and water resources are shared with the landowner.
Incentive	Used to encourage landowners to install or adopt land management practices that improve or protect water quality. Incentive payments and enhanced protection measures should be reasonable and justifiable, supported by grant recipient policy, consistent with prevailing local conditions, and must be accomplished using established standards.
Knick Zone	Steep, highly dynamic, incising river area.
Legacy Amendment	In 2008, Minnesota's voters passed the Clean Water, Land and Legacy Amendment (Legacy Amendment) to the Minnesota Constitution to: protect drinking water sources; to protect, enhance, and restore wetlands, prairies, forests, and fish, game, and wildlife habitat; to preserve arts and cultural heritage; to support parks and trails; and to protect, enhance, and restore lakes, rivers, streams, and groundwater. The Legacy Amendment increases the state sales tax by three-eighths of one percent beginning on July 1, 2009 and continuing until 2034. The additional sales tax revenue is distributed into four funds as follows: 33% to the clean water fund; 33% to the outdoor heritage fund; 19.75% to the arts and cultural heritage fund; and 14.25% to the parks and trails fund.
Public Law 87-639 Study	A joint study by USACE and SCS, recommended by the 1977 Minnesota River Basin Study Report.
Rosgen	A river classification system that includes geomorphic characterization, morphological description, determines the stream state and condition and includes verification measures.
Secchi	An opaque disk, typically white, used to gauge the transparency of water by measuring the depth (*Secchi depth*) at which the disk ceases to be visible from the surface

APPENDIX C
LAND AND WATER RESOURCES INVENTORY

APPENDIX C - LAND AND WATER RESOURCES

C.1 PRECIPITATION

Precipitation is important to monitor because it is the source of much of the water in streams and lakes. Beyond the amount of regional precipitation, looking at the relationship between precipitation and flows allows for further analysis of the local hydrology and impacts that changing precipitation can have throughout the Yellow Medicine One Watershed One Plan (YM1W1P) boundary. Factors such as the runoff ratio (the percentage of precipitation that ends up as river flow), evapotranspiration (ET), and the relationship between long-term trends in flows and precipitation have been used for this analysis.

The YM1W1P boundary is located in the southwestern part of the state, which sees relatively average precipitation amounts in comparison to the rest of the state. The total annual precipitation varies slightly by location within the YM1W1P boundary, as illustrated in Figure C-1. The average annual precipitation from 1981 to 2010 varied from 27 to 28 inches per year (inches/year) throughout a significant portion of the watershed, with a small area in the flat lands region receiving 25 to 26 inches/year.

Over the past 80 years, minimal changes in precipitation have occurred; however, there have been significant increases in the runoff ratio and flow. The increase in flow is primarily because of drainage changes that are summarized in *Twentieth Century Agricultural Drainage Creates More Erosive Rivers* [Schottler et al., 2013]. Other factors that have influenced increased flows include wetland loss, and decreased/shifted ET from land use changes. Further detail on the hydrologic conditions and trends are available in the *Yellow Medicine River Hydrologic Analysis* [Minnesota Department of Natural Resources, 2015a].

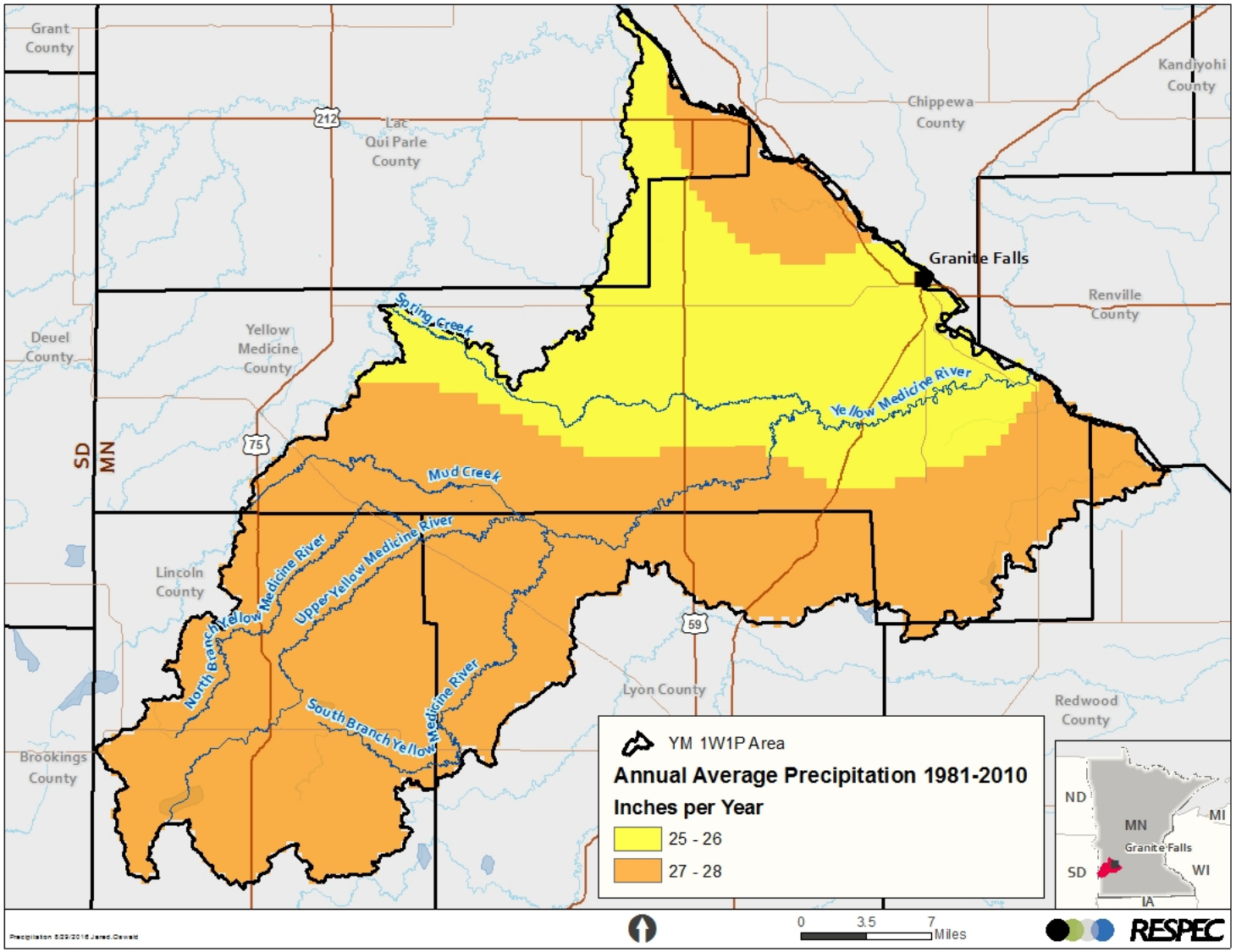

Figure C-1. Annual Average Precipitation From 1981 to 2010 Within the YM1W1P Boundary.

C.2 WATER RESOURCES

This section provides an overview of the variety of water resources present in the YM1W1P boundary and includes information on the amount of resources available, where they are located, the quality of the resource, point source contributions to the surface waters, and recreation areas present within the watershed. All of these factors are important when looking at the overall status of water resources in the YM1W1P boundary.

C.2.1 SURFACE WATER RESOURCES

The following sections provide an overview of the surface-water resources within the Yellow Medicine River Watershed (YMRW).

C.2.1.1 *Streams*

Based on the USGS National Hydrography Dataset (NHD), there are approximately 1,740 miles of streams in the YM1W1P boundary that drain to the Minnesota River, as shown in Figure C-2. Of these streams, 463 miles are channelized/ditched, 910 miles are intermittent natural streams, 243 miles are perennial natural streams, 20 miles of connectors, and 104 miles are artificial paths with includes the Minnesota River. This indicates that the watershed is heavily channelized/altered. Major reaches in the watershed include the Yellow Medicine River, Spring Creek, Wood Lake Creek, and Boiling Spring Creek. Table C-1 lists stream and ditches with length in miles.

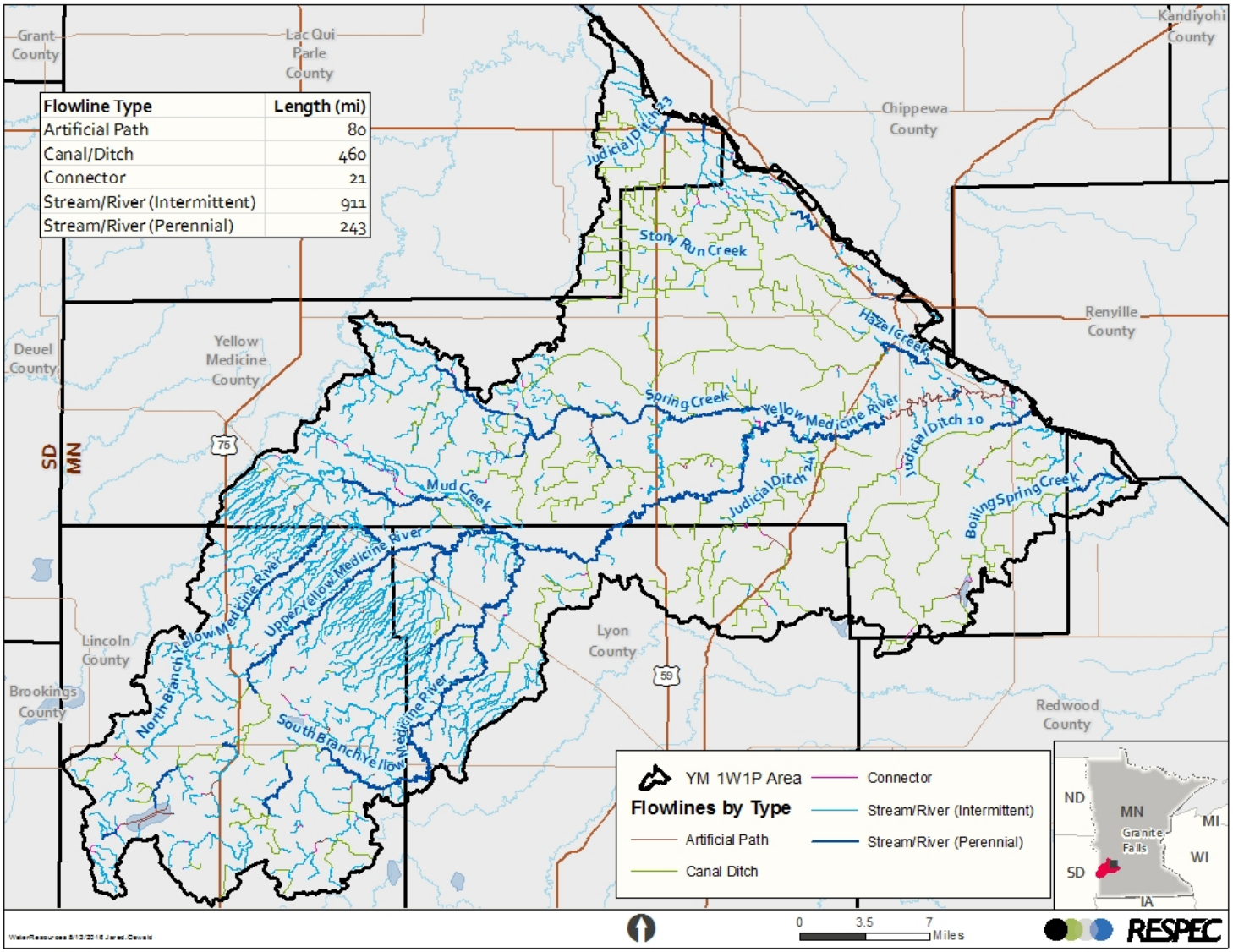

Figure C-2. Channel Type Within the YM1W1P Boundary.

Table C-1. Streams Within the YM1W1P Boundary Including Stream Length

Stream Name	Length (miles)	Stream Name	Length (miles)
Yellow Medicine River	62.1	Wood Lake Creek	4.7
Minnesota River	59.3	County Ditch 35D	3.8
South Branch Yellow Medicine River	74.1	County Ditch 8 (Lyon Co)	3.2
Upper Yellow Medicine River	47.0	County Ditch 36	3.1
Spring Creek	41.2	County Ditch 3	2.9
North Branch Yellow Medicine River	38.9	County Ditch 14	2.9
Mud Creek	30.8	County Ditch 55	2.9
County Ditch 9	25.9	Judicial Ditch 21	2.8
Judicial Ditch 10	19.3	County Ditch 2	2.8
Stony Run Creek	18.8	County Ditch 44	2.7
Boiling Spring Creek	16.4	Judicial Ditch 12	2.5
Judicial Dit6ch 24YM&L	16.1	Judicial Ditch 29	2.5
Judicial Ditch 23	11.3	County Ditch 41	2.4
County Ditch 37	9.7	County Ditch 4 (Lincoln Co)	2.2
Judicial Ditch 7	8.4	County Ditch 46	2.1
Hazel Creek	7.4	Judicial Ditch 2	2.0
Judicial Ditch 20	6.7	County Ditch 34	2.0
County Ditch 39	6.4	County Ditch 49	1.7
County Ditch 6A	6.2	County Ditch 25	0.7
County Ditch 90	5.8	Judicial Ditch 18	0.5
County Ditch 35C	5.3	Judicial Ditch 22	0.5
County Ditch 87	5.1	Judicial Ditch 17	0.3
County Ditch 8 (Lyon Co)	5.1	All Unnamed Streams	1,178.0
County Ditch 45	5.0		
County Ditch 4 (Lyon Co)	4.8	Total Stream Miles	1,740.0

C.2.1.2 *Lakes*

Based on the Minnesota Department of Natural Resources Hydrography dataset, there are 1,030 lakes and ponds and 2 reservoirs in the project area in the YM1W1P boundary that cover approximately 8,830 acres. Of this total, 343 lakes are located in the Coteau zone, 357 lakes are located in the Flatlands zone, 164 lakes in the MN River Valley zone and 166 lakes in the Transitional zone (Figure C-3). Many of these waterbodies are very small and unnamed. Large lakes 100 acres in size or more are shown in Table C-2 and labeled in Figure C-3.

Lake Shaokatan, a 995-acre lake in Lincoln County, is an example of successful restoration within the watershed. The lake has a long history of severe algae blooms, low oxygen levels, and periodic fish kills. A Clean Water Partnership effort initiated in 1991 was sponsored by the Yellow Medicine River Watershed District in cooperation with the Minnesota Pollution Control Agency (MPCA) and other local, state, and federal partners. By 1994, improvements to animal feedlots, wetland areas, and septic systems in the lake's drainage area resulted in a 58 percent reduction in phosphorus loading to the lake and in associated nuisance algae blooms. In spite of these and other restoration efforts, the MPCA officially listed the lake as impaired in 2002, which led to the completion of a Total Maximum Daily Load (TMDL) study and further best management practice (BMP) implementation. In 2008, the MPCA included Lake Shaokatan in its Sustaining Lakes In a Changing Environment (SLICE) intensive monitoring program. The results from this monitoring have shown restoration efforts are paying off as 2013 and 2014 monitoring data has indicated dramatic improvements in phosphorus and chlorophyll-*a* concentrations, water clarity, and the presence of rooted plants. Additionally, Oak Lake in Lincoln County meets water quality standards and also warrants protection efforts.

The YM1W1P boundary landscape has changed greatly since European settlement, which greatly altered the amount of wetlands present throughout the watershed. As mentioned previously, roughly 17 percent of the watershed was covered in wetlands before settlement. Since the landscape has shifted, 13 percent of the YM1W1P boundary was drained to leave 4 percent of the watershed covered in wetlands. Most wetland loss has occurred in the Flatlands zone [MPCA, 2015a].

The area density of wetlands within the Hydrologic Unit Code (HUC) 12 boundaries of the watershed ranges from 129 to 1,241 wetlands per HUC, as displayed in Figure C-4. A total of 5,946 wetlands remain in the watershed and cover approximately 26,900 acres [US Fish and Wildlife Service, 2016]. The most prevalent type of wetland is part of the Palustrine system, which lacks flowing water and covers roughly 76 percent of the total wetlands area found in the watershed. Lacustrine system wetlands (adjacent to a lake) comprise approximately 20 percent of the total wetlands area. Riverine system wetlands (within a river system) comprise approximately 3 percent of the total wetlands area.

Table C-2. Lakes Over 100 Acres Within the Yellow Medicine One Watershed One Plan Boundary With Lake Area and County

Lake Name	Area (acres)	County
Shaokatan	996.28	Lincoln
Wood	484.68	Yellow Medicine
Curtis	433.51	Yellow Medicine
Cottonwood	382.60	Lyon
Hawksnest	298.64	Lincoln
Lady Slipper	286.15	Lyon
Perch	251.40	Lincoln
Unnamed	225.53	Yellow Medicine
Stay	221.20	Lincoln
Steep Bank	198.50	Lincoln
Spellman	166.01	Yellow Medicine
Tyson	165.08	Yellow Medicine
Spellman	166.01	Yellow Medicine
Curtis	155.54	Lincoln
Sham	148.63	Lyon
West Stay (north)	148.41	Lincoln
Unnamed	148.18	Yellow Medicine
Popowski	142.56	Lincoln
South Ash	141.10	Lincoln
Miedd	125.63	Yellow Medicine
Burton	120.23	Yellow Medicine
West Stay (south)	117.16	Lincoln
Oak	108.28	Lincoln
Highbank	109.84	Yellow Medicine

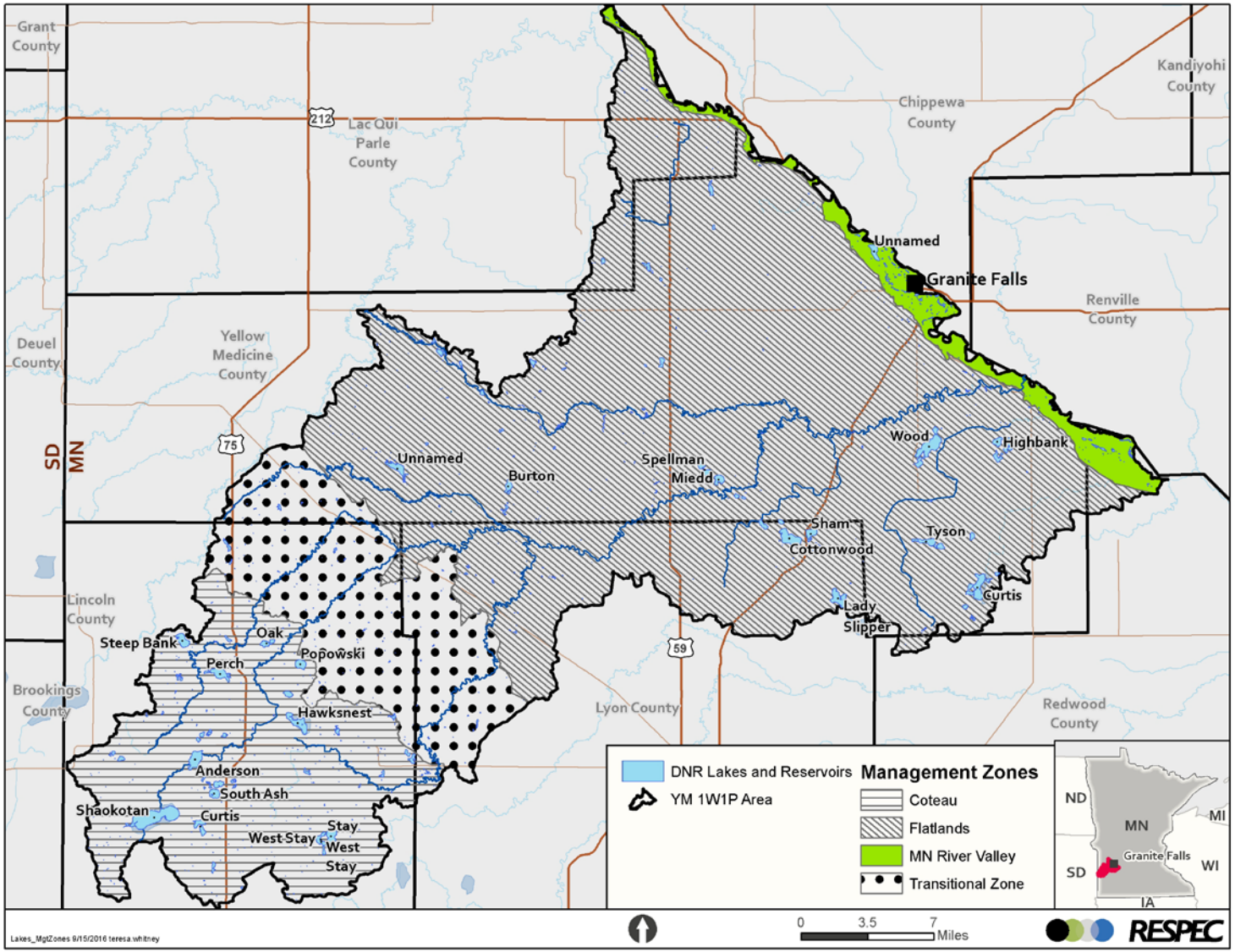

Figure C-3. Location of Lakes Within the YM1W1P Boundary.

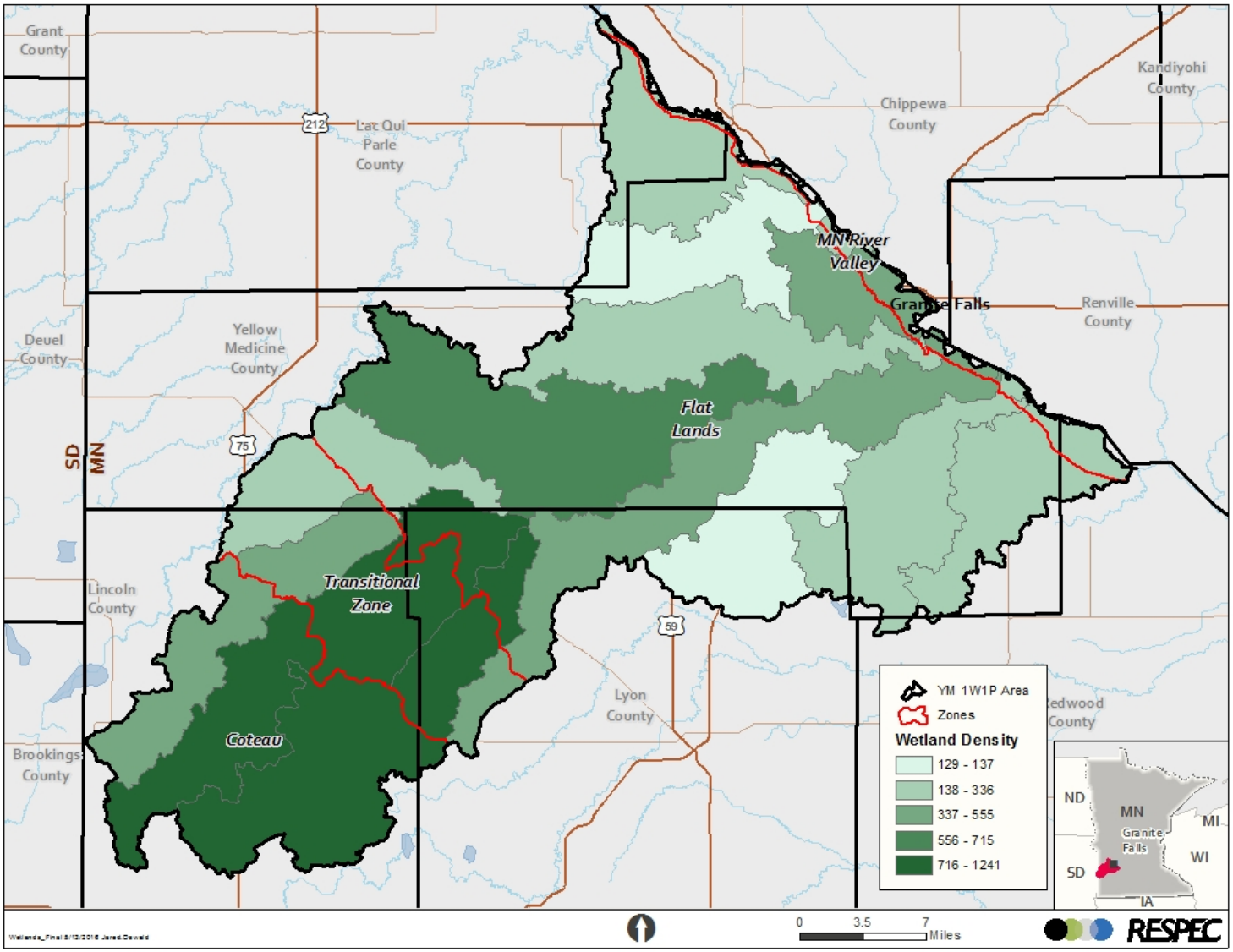

Figure C-4. Wetland Density of HUC 12 Subwatersheds in the YM1W1P Boundary.

C.2.1.3 *Public Waters/Ditches*

The watershed is heavily channelized with roughly 27 percent of streams being altered. Approximately 250 miles of public ditches are within the watershed and make up over 50 percent of the total number of ditches in the YM1W1P boundary, as illustrated in Figure C-5.

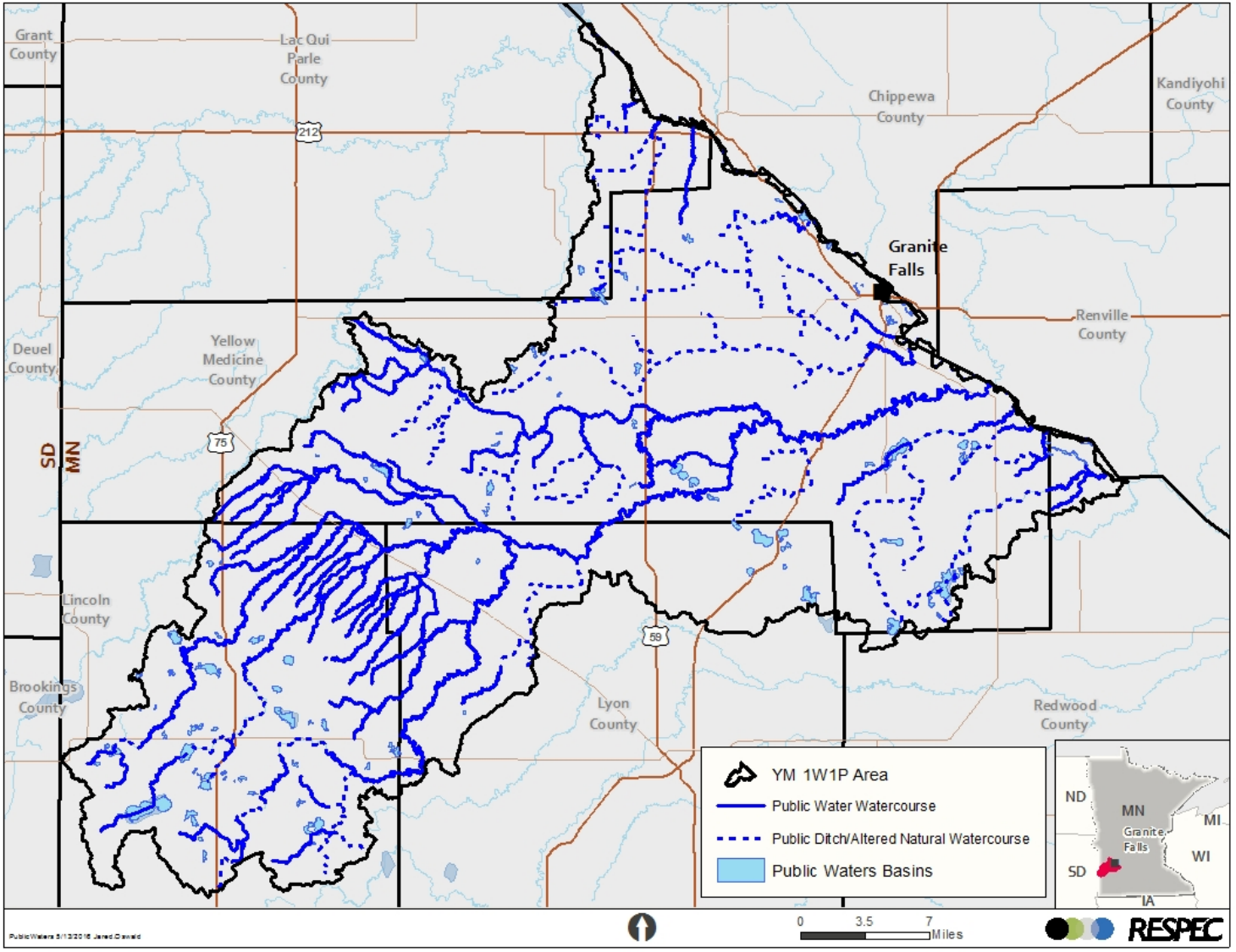

Figure C-5. Public Waters and Public Ditches Within the YM1W1P Boundary [Minnesota Department of Natural Resources, 2015].

C.2.2 Groundwater Resources

Groundwater is the primary source of drinking water in the YM1W1P boundary. Wellhead protection planning has indicated that groundwater is indirectly influenced by surface water in the watershed. Therefore, public water supplies have a low vulnerability to contamination from surface water. Regardless, the potential for contamination via wells, either unused or abandoned, still exist. Therefore, maintaining a large quantity of high quality groundwater supplies is important, especially with such high alterations to the local hydrology and its impacts on groundwater recharge. Figure C-6 displays the mean groundwater recharge within the YM1W1P boundary.

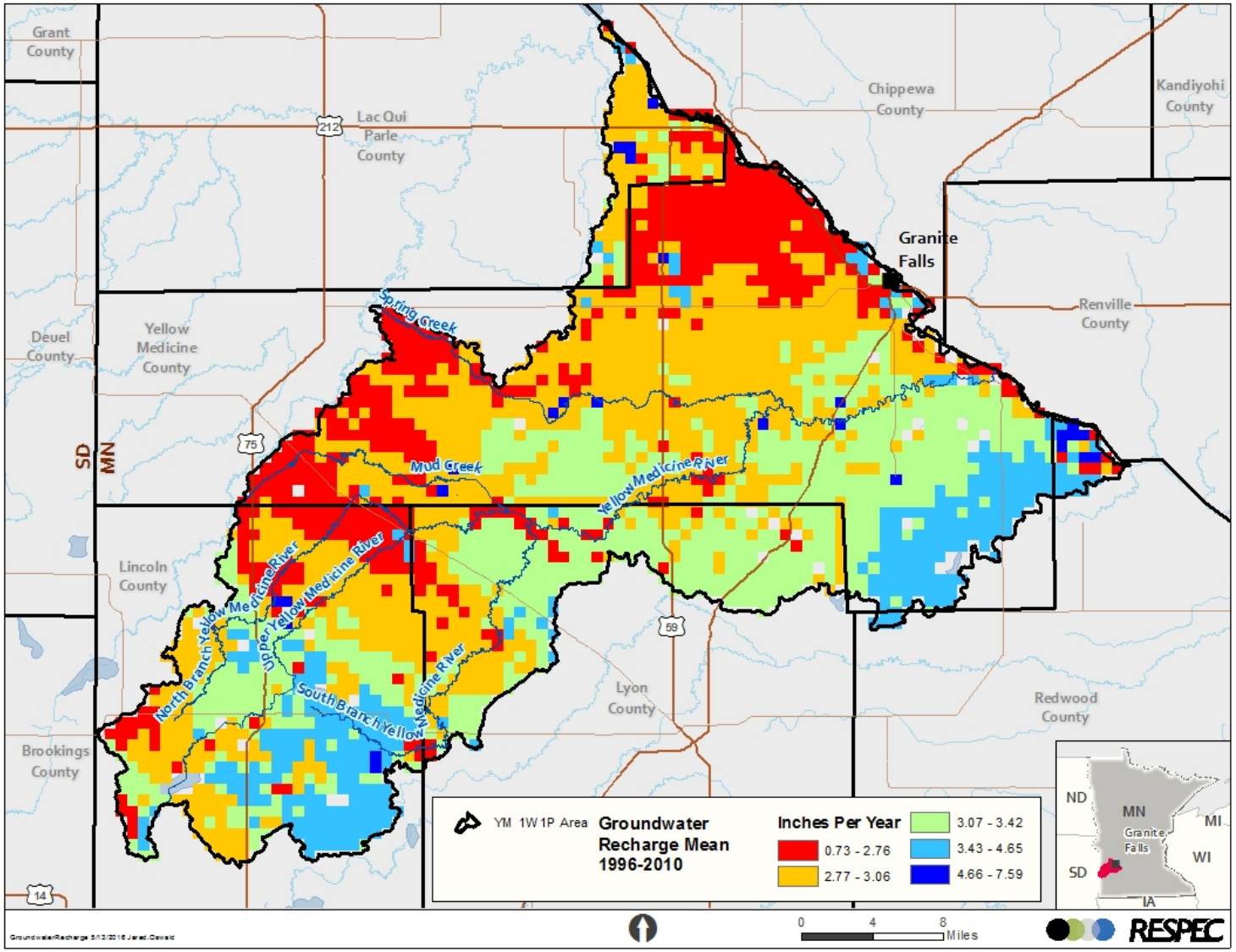

Figure C-6. Mean Groundwater Recharge Within the YM1W1P Boundary [Smith and Westenbroek, 2015].

C.2.3 Water Quality and Quantity

Water quality monitoring was conducted across the YM1W1P boundary to assess the overall quality of water resources. The location of various active (last sample collected on or after 2014) water quality monitoring sites as illustrated in Figure C-7. Based on this comprehensive monitoring, 16 streams were impaired for aquatic recreation, 9 streams were impaired for aquatic life, and 8 lakes were impaired for aquatic recreation.

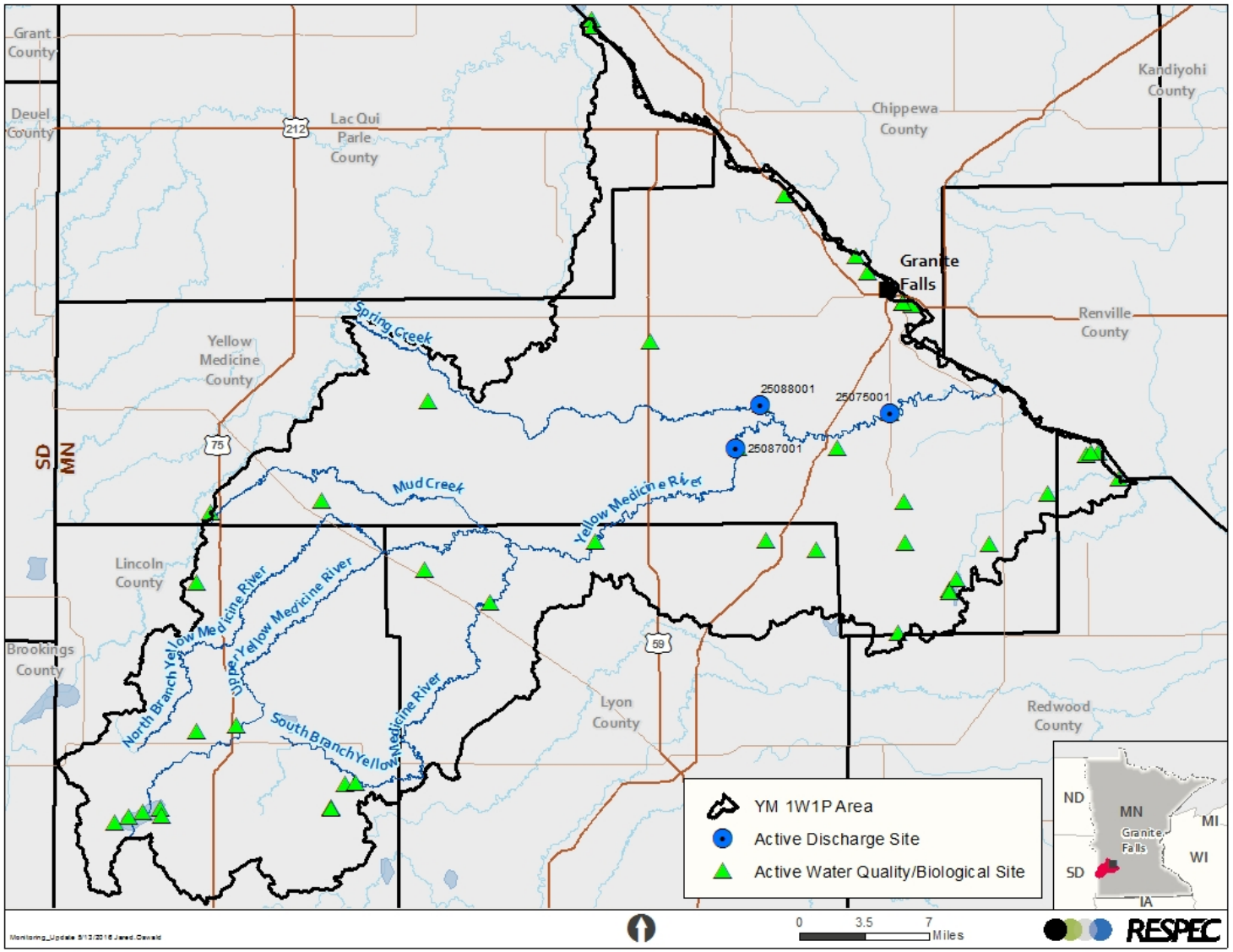

Figure C-7. Active Discharge and Water Quality Monitoring Sites Within the YM1W1P Boundary Including Permitted Facilities.

C.2.3.1 *Streams*

Water quality was assessed throughout the YM1W1P boundary to determine what streams are impaired, how many streams are impaired, where these impairments occur, and what causes the impairments. Two sets of guidelines were used to determine the overall quality of streams in the watershed. The first analyzed what streams were capable of supporting aquatic recreation; the second analyzed whether or not the streams could support aquatic life.

A total of 114 stream reaches lie within the watershed. Of these reaches, 18 were monitored for aquatic recreation assessment. The conclusions from this assessment found that 16 stream reaches were impaired, 1 was supporting, and 1 was inconclusive. Information on what is required to meet the aquatic recreation standard of Minnesota can be found online (*https://www.revisor.mn.gov/rules/?id=7050.0222#rule.7050.0222.1.A*). A total of 40 reaches, were monitored for aquatic life assessment as displayed in Table C-3. Of these 40 reaches, 14 were impaired for at least 1 stressor, 2 were supporting, 8 were inconclusive, and 16 were channelized. Channelized reaches will not be assessed until tiered aquatic-life-use framework is adopted and used to set standards for modified streams [Minnesota Pollution Control Agency, 2015b]. The location of the streams assessed for aquatic life and their beneficial-use designation is depicted in Figure C-8.

The aquatic life assessment is conducted by completing a stressor identification report that looks at the local fish and macroinvertebrate communities and collected water quality data to determine whether or not the various pollutants are affecting the local biology. The connection between a stressor and the biology (i.e., stressor response) is used to determine that streams are stressed. Stressors include dissolved oxygen (DO) concentrations, total suspended solids (TSS) concentrations, total phosphorus (TP) concentrations, total nitrogen (TN) concentrations, altered hydrology, and habitat. Some of these stressors have state-mandated standards, but to tie them to local biology and deem a reach impaired for aquatic life, a response needs to be shown by the local biology. To get a more in-depth understanding of this process, read the *Yellow Medicine River Watershed Biotic Stressor Identification report* [Minnesota Pollution Control Agency, 2013]. The identified stressors include altered hydrology, high phosphorus, lack of habitat, low DO, high turbidity, and high nitrates.

A look at stream impairments based on aquatic recreation and aquatic life provides a high-level understanding of the water quality status throughout the watershed. In addition, looking into each of the individual parameters used to determine the impairments across the watershed is beneficial. The individual parameters that will be discussed include DO, phosphorus, nitrogen, fecal bacteria, TSS, altered hydrology, and habitat.

Table C-3. Beneficial Use and Associated Parameters and Stressors Assessment for YM1W1P Streams (Page 1 of 2)

AUID (last 3 digits)	Stream	Reach Description	Aquatic Life											Aquatic Recreation	
			Assessment	Parameters				Stressors						Assessment	Par
				F-IBI	M-IBI	DO	TSS	Q	P	N	DO	Habitat	TSS		Bacteria
538	Spring Creek	Headwaters to Yellow Medicine R	Imp	x	if	I	I							Imp	x
622	Judicial Ditch 17	CD 3 to Yellow Medicine R	IF	na	na	if	●							Imp	x
502	Yellow Medicine River	Spring Cr to Minnesota R	Imp	●	●	●	x							Sup	☐
513	Yellow Medicine River	S Br Yellow Medicine R to Spring Cr	Imp	if	if	if	x							Imp	x
503	Yellow Medicine River, South Branch (County Ditch 35)	Headwaters to Yellow Medicine R	Imp	●	●	if	x							Imp	x
550	Judicial Ditch 29	T111 R44W S16, south line to S Br Yellow Medicine R	IF	na	na	if	●							Imp	x
595	Unnamed creek	Headwaters to Unnamed cr	Imp	x	I	if	●	x	if	if	x	x	if	Imp	x
597	Unnamed creek	Unnamed cr to Unnamed cr	IF			if	●							Imp	x
599	Unnamed creek	Unnamed cr to S Br Yellow Medicine R	IF			if	p							Imp	x
600	Unnamed creek	CD 34 to CD 35	NA	na	na									Imp	x
543	Mud Creek	Headwaters to T114 R43W S35, south line	Imp	●	x	if	x	x	x	x	x	x	x	Imp	x
542	Yellow Medicine River, North Branch	CD 8 to Yellow Medicine R	Imp	I	x	if	x	x	x	●	●	●	x	IF	if
564	Unnamed creek	Unnamed cr to Unnamed cr	Imp	●	x			x	if	if	if	●	if		
545	Unnamed creek	Headwaters to Yellow Medicine R	NA	na	na									Imp	x
584	Yellow Medicine River	Headwaters to Mud Cr	Imp	I	●	if	x							Imp	x
694	Unnamed creek	Ash Lk to Yellow Medicine R	Imp	x	x			x	if	if	x	x	if		
536	Hazel Creek	Unnamed cr to Minnesota R	IF	●	if	if	●							Imp	x
707	Unnamed creek	Headwaters to CD 9	NA	na	na										
551	County Ditch 12	HeaDwaters to T113 R36W S8		I											
552	County Ditch 12	T113 R 36W S5 to MN River	IF												
604	Echo Creek	Unnamed to MN River	Sup	☐											
673	Judicial Ditch 23	Unnamed to Unnamed	NA	NA	NA										
674	Judicial Ditch 23	Unnamed to MN River	Sup	●	●										
710	Unnamed creek	Unnamed to MN River	NA	na	na										
711	County Ditch 90	Unnamed to Unnamed	NA	na	na										

Table C-3. Beneficial Use and Associated Parameters and Stressors Assessment for YM1W1P Streams (Page 2 of 2)

AUID (last 3 digits)	Stream	Reach Description	Aquatic Life											Aquatic Recreation	
			Assessment	Parameters				Stressors						Assessment	Par
				F-IBI	M-IBI	DO	TSS	Q	P	N	DO	Habitat	TSS		Bacteria
713	County Ditch 39	CD 6A to Minnesota R	Imp	x	x			x	x	x	if	•	if		
714	County Ditch 6A	Unnamed to CD39	NA	na	na										
535	Stony Run Creek	T116 R40W S30, west line to Minnesota R	IF	na	na	if	•							Imp	x
580	Stony Run Creek	Headwaters to T116 R41W S25	NA	na	na										
708	County Ditch 36	Unnamed to JD21	NA	na	na										
709	Unnamed creek	Unnamed to JD21	NA	na	na										
554	Boiling Spring Creek	Unnamed ditch to T114	NA	na	na										
555	Boiling Spring Creek	T114 R37W S20, west line to Minnesota R	IF	•	•	if	I							Imp	x
620	Boiling Spring Creek	Headwaters to T113	NA	na	na										
717	County Ditch 2	Unnamed cr to Minnesota R	Imp	x				x	x	if	if	•	if		
718	Unnamed creek	Lone Tree Lk to Minnesota R	Imp	x	x			x	x	if	x	x	if		
518	Judicial Ditch 10	Headwaters to Wood Lake Cr	NA	na	na										
546	Judicial Ditch 10 (Wood Lake Creek)	Timm Lk to Wood Lk outlet	NA	na	na										
547	Judicial Ditch 10 (Wood Lake Creek)	Wood Lk outlet to Minnesota R	Imp	x	x	if	I	if	x	x	x	x	x	Imp	x
737	County Ditch 31	Headwaters to JD10	NA	na	na										

Legend for beneficial Use Assessment:

Imp	Impaired	NA	Not Assessed	IF	Insufficient Data	Sup	Supporting

Legend for Parameter/Stressor Assessment

x	Failing Standard/Stressing	If	Insufficient Data	Na	Data Collected but not Accessamble Until Standards for Channelized Streams are Developed	I	Insufficient Data But Likely Failing Standard	•	Supporting Standard/ Not Stressing

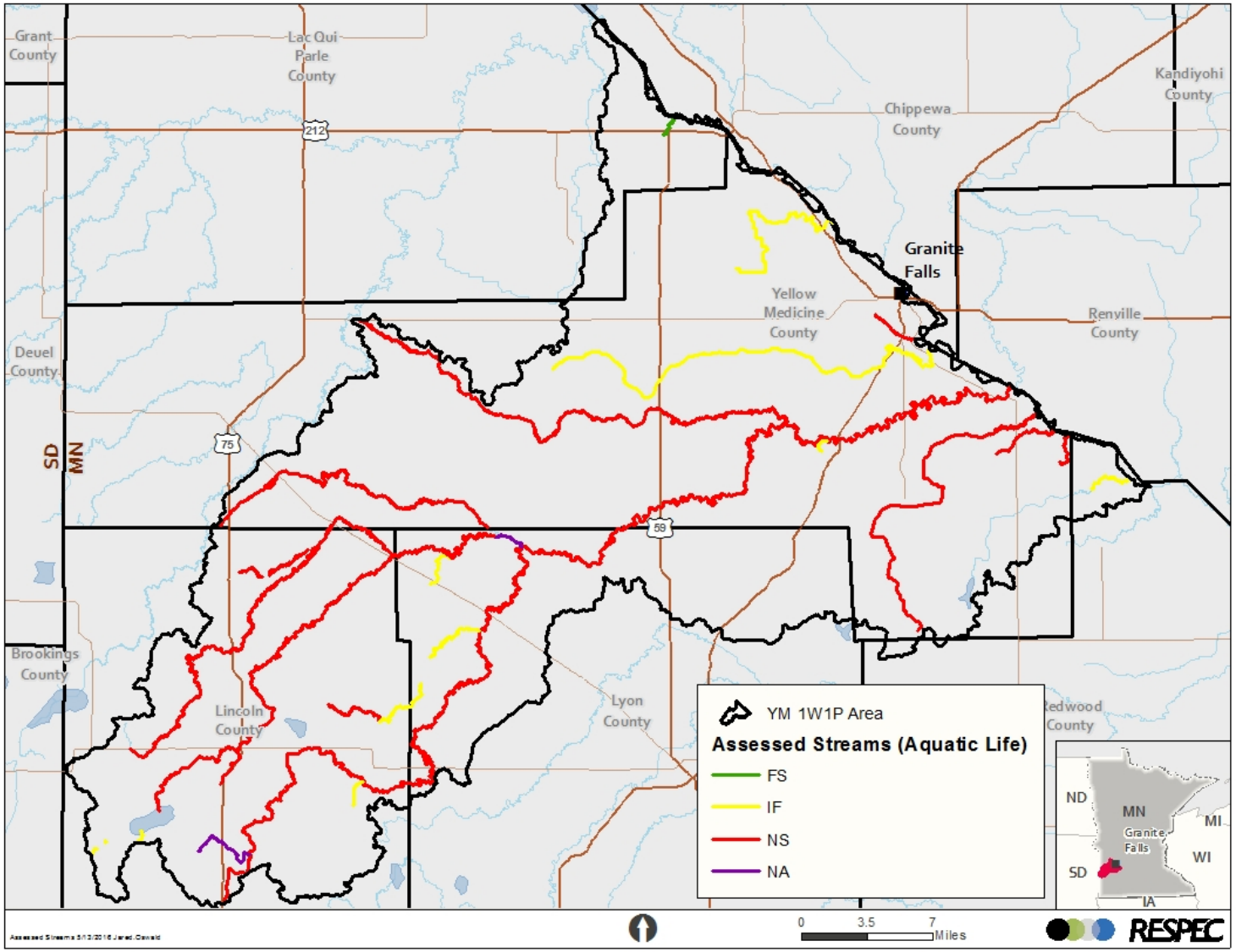

Figure C-8. Designation of Streams Assessed for Aquatic Life in the YM1W1P Boundary (FS = Fully Supporting, IF = Insufficient Data, NS = Not Supporting, NA = Not Assessed) [MPCA, 2015b].

Dissolved Oxygen. DO is important because it impacts aquatic life by affecting respiration of fish and macroinvertebrates. Limited respiration contributes to stress and disease and can ultimately cause death to the aquatic biology. Low DO in waterbodies is caused by excessive phosphorus use or slow oxygenation processes; a result of increases in algal-fueled processes that are a consequence of excess nutrients. Low oxygen is caused by high water temperatures and little aeration or turbulence. Widened channels that are shallow and lack cover are prone to low DO because these effects can be exacerbated.

The state of Minnesota has a minimum DO standard of 5 milligrams per liter (mg/L) and a standard of 4.5 mg/L for diurnal fluctuations. A total of 21 streams have available DO data. Low DO was identified as a stressor in five of the nine bio-impaired stream reaches. Two stream reaches meet DO water quality standards, and several stream reaches require more data to make an assessment.

Phosphorus. Of the 9 bio-impaired reaches, 6 were stressed by phosphorus, and the other 3 were inconclusive. After adopting new eutrophication standards, many rivers are expected to become impaired by phosphorus with concentrations that exceed the standard. The Yellow Medicine River outlet has a flow weighted mean TP concentration of 0.23 mg/L from 2008 to 2011 that exceeds the river eutrophication standard of 0.15 mg/L. [Minnesota Pollution Control Agency, 2015a]. Based on a numeric estimate of phosphorus sources conducted by the WRAPS team, crop-surface runoff was the largest source of nonpoint phosphorus in the YMRW. HSPF was used to estimate the subwatershed TP in pounds per acre (lbs/acre), as displayed in Figure C-9. A majority of phosphorus loading is originating from the Flatlands zone.

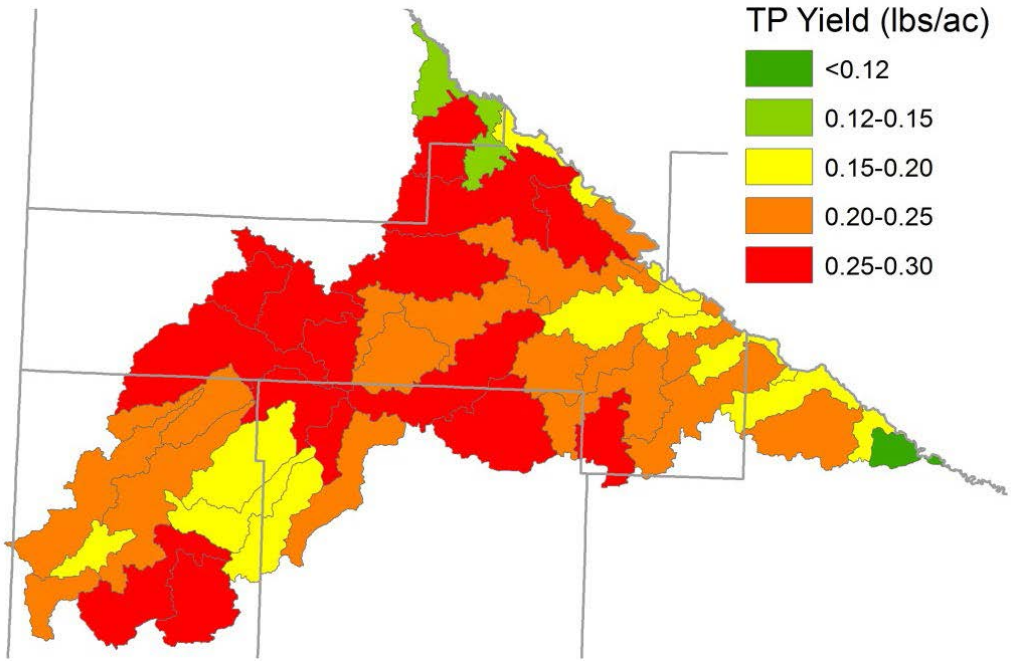

Figure C-9. Modeled Total Phosphorus Loading Originating From the Yellow Medicine River Watershed [Minnesota Pollution Control Agency, 2015].

Nitrogen. Of the 9 bio-impaired stream reaches, 3 were stressed from high nitrogen, 1 was not impacted by nitrogen, and 5 were inconclusive. High nitrogen could be more widespread than indicated because it is only monitored when a biological impairment is identified. Like phosphorus, when new river eutrophication standards are applied, many rivers are expected to become impaired by high nitrogen levels. The Yellow Medicine River outlet has a flow weighted mean TN concentration of 6.4 mg/L from 2008 to 2011 that exceeds the river eutrophication standard of 4.9 mg/L. [Minnesota Pollution Control Agency, 2015a]. HSPF was used to estimate the subwatershed TN loading in pounds per acre (lbs/acre), as displayed in Figure C-10. As with phosphorus, a majority of the nitrogen loading originates from the Flatlands zone.

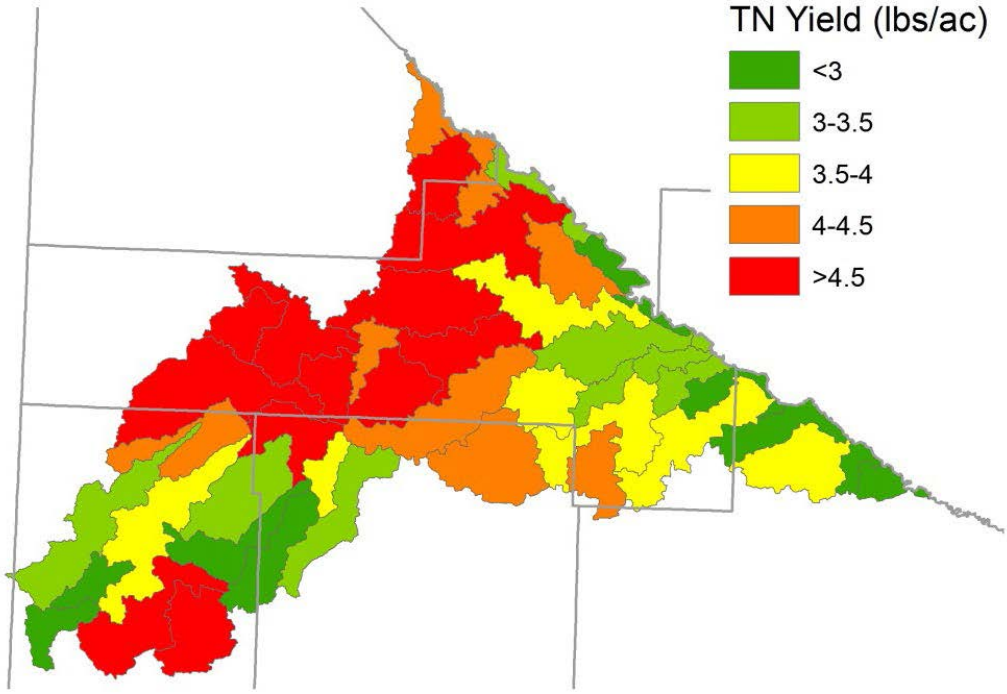

Figure C-10. Modeled Total Nitrogen Loading Originating From the Yellow Medicine River Watershed [Minnesota Pollution Control Agency, 2015].

Bacteria. Fecal bacteria is a watershed-wide issue with 16 stream reaches being identified as polluted by fecal bacteria, while only 1 reach was found to meet the standards. Additionally, 1 was inconclusive. To meet the fecal bacteria standard in the state of Minnesota, *E. coli* needs to have a monthly geometric mean that does not exceed 125 colony-forming units per 100 milliliters (cfu/100 mL), and a maximum of 1,260 cfu/100 mL cannot be exceeded by 10 percent of the samples collected per month. The largest fecal bacteria source is crop surface runoff, where manure has not yet been incorporated. Following unincorporated manure was overgrazed pastures, feedlots and stockpiles, failing septic systems and waste water treatment plants, crop surface where manure has been incorporated, and other sources.

Sediment. Sediment is a watershed-wide issue with 6 stream reaches being directly impaired by sediment because the concentration exceeds the state standard [Minnesota Pollution Control Agency, 2015a]. A total of 3 of the 9 bio-impaired stream reaches are stressed by sediment. A total of 6 streams that were monitored met the sediment standards, and the remaining 6 bio-impaired reaches lacked data to draw any conclusions. The Yellow Medicine River outlet has a flow weighted mean TSS concentration of 77 mg/L from 2008 to 2012 that exceeds the standard of 65 mg/L. A large source of suspended sediments in streams is from nonpoint source runoff with less than 0.1 percent of the total sediment load coming from point sources. The single largest sediment source is crop surface runoff. Following sediment from crop surface runoff was channel erosion, ravine erosion, and developed areas. Figure C-11 displays the TSS yield in lbs/acre estimated using the HSPF model. The majority of the high sediment yielding areas are located within the Coteau and transitional management zones because of the higher slopes encountered in these areas.

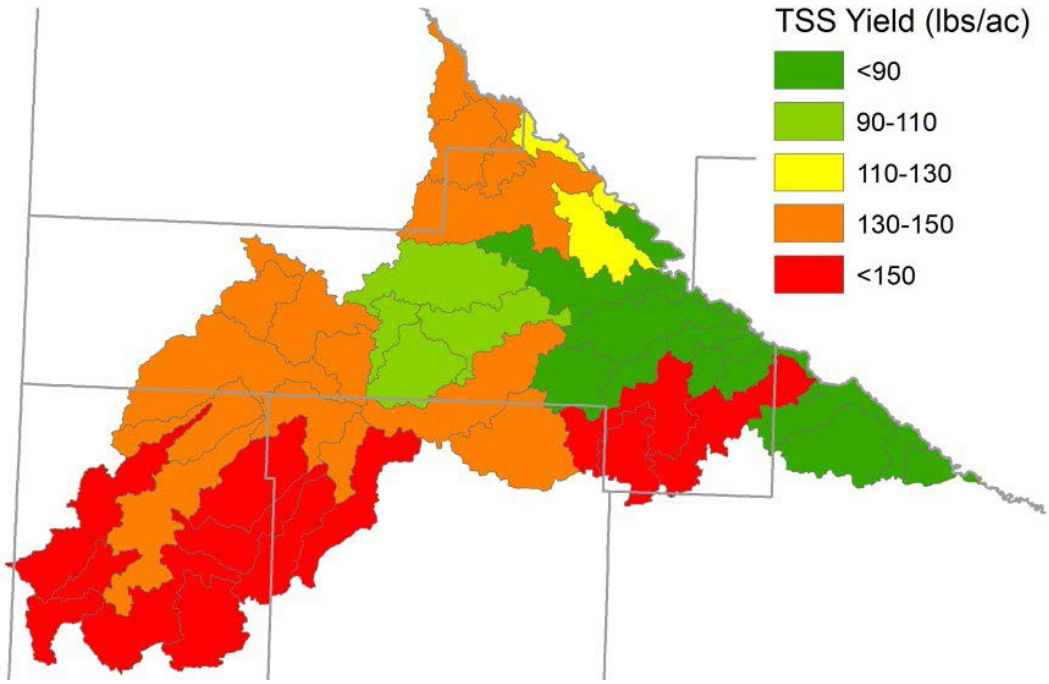

Figure C-11. Average Annual TSS Yield Within the Yellow Medicine River Watershed [Minnesota Pollution Control Agency, 2015].

Hydrology. Altered hydrology is the most widespread stressor to aquatic life in the YM1W1P boundary with eight of the nine impaired reaches being stressed by altered hydrology. The effects of high and low flow conditions were the driver of these impairments. Like nitrogen, altered hydrology is only investigated on bio-impaired stream reaches; therefore, altered hydrology is impacting a large portion of the watershed.

GIS was used to estimate areas where higher levels of hydrologic alterations occurred within the watershed, as presented in Figure C-12. Factors used to conduct this analysis include the percent of land area that is estimated to be tile drained, the percent of stream length that has been channelized/ artificially straightened, the percent of watershed area where wetlands were drained, the percent of land in nonperennial vegetation, the percent of land covered by impervious surfaces, and the percent of stream length affected by road crossings [MPCA, 2015].

Continuous flow data have been recorded at the US Geological Survey (USGS) gage at Granite Falls since the late 1930s. A trendline of the average annual flows indicate a positive trend in flows, shown in Figure C-13. Figure C-14 displays a similar trend in peak annual flows. In general, an increase in peak flows has been correlated to a negative impact on TSS and habitat.

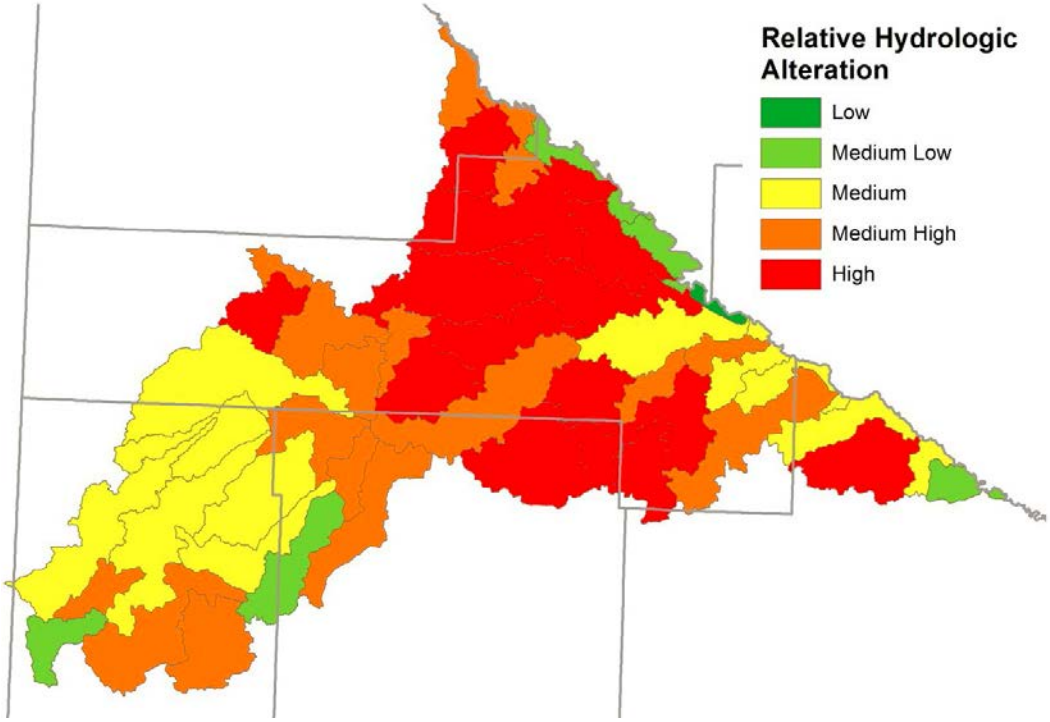

Figure C-12. GIS Analysis of Relative Hydrologic Alteration [Minnesota Pollution Control Agency, 2015].

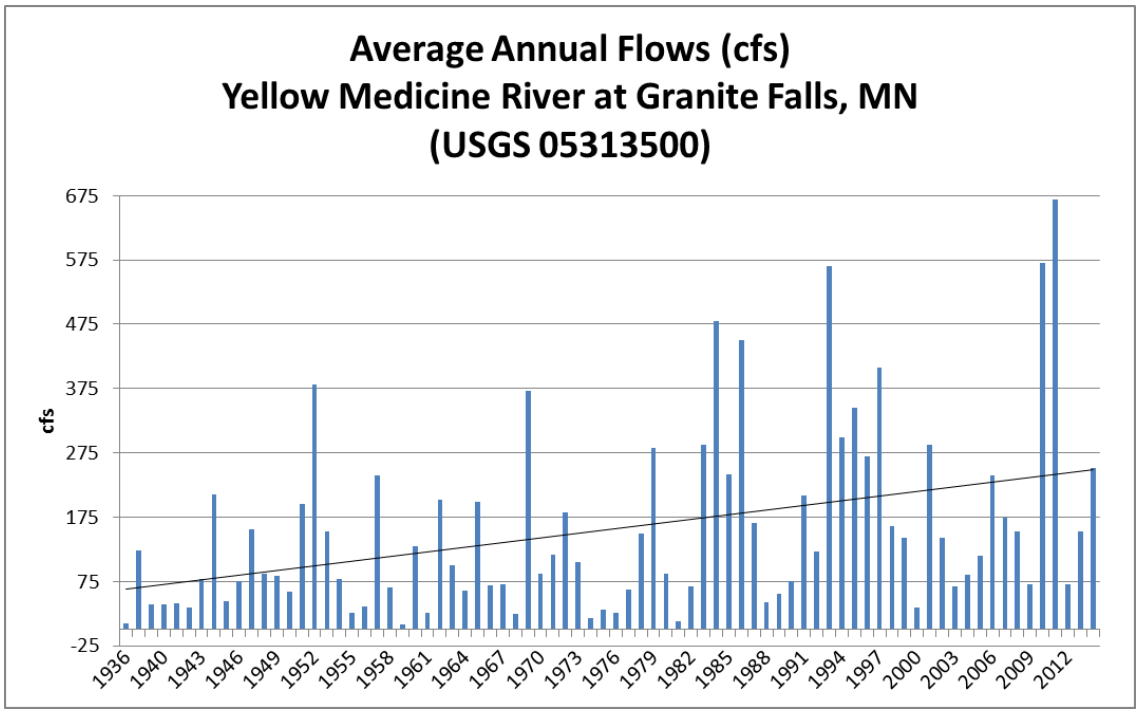

Figure C-13. Trend of Average Annual Flows on the Yellow Medicine River at Granite Falls, Minnesota (USGS 05313500).

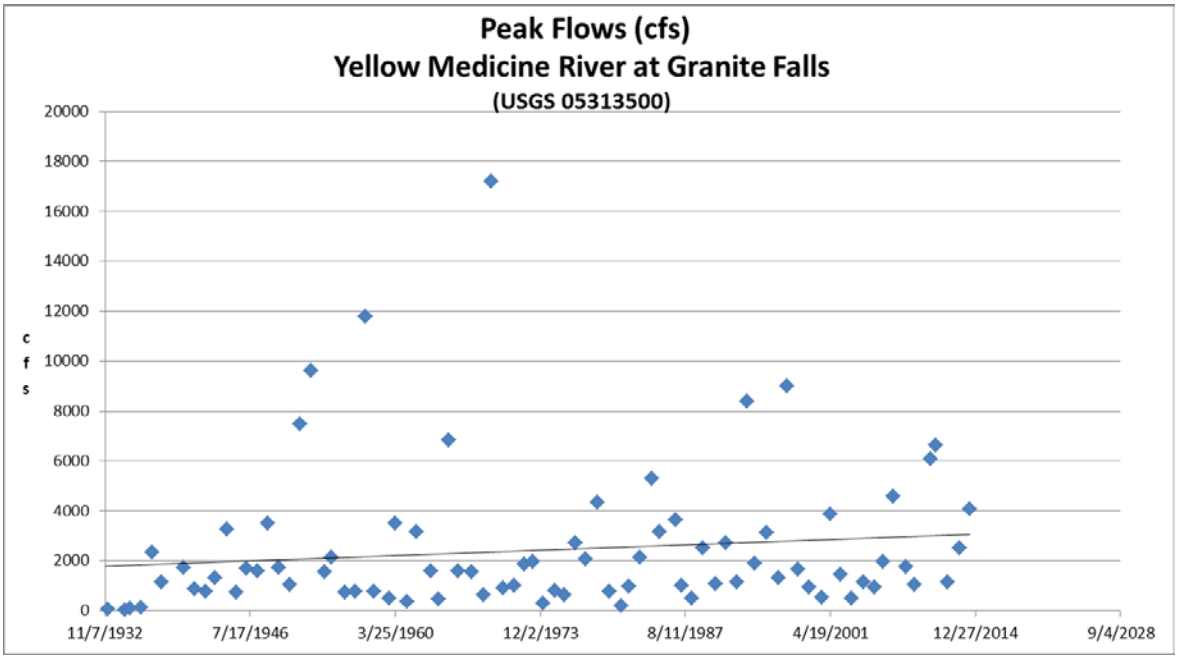

Figure C-14. Trend of Average Annual Peak Flows on the Yellow Medicine River at Granite Falls, Minnesota (USGS 05313500).

C.2.3.2 *Lakes*

Several lakes have undergone water quality monitoring to check for the adequacy of the lake to meet the intended lake use. Pollutants that are used to gage whether or not a lake meets the water quality standard for recreation include water clarity and algae-fueling phosphorus. A total of 81 lakes covering over 16,000 acres in the watershed. Of the 81 lakes, 23 were monitored for aquatic recreation. Of the 23 assessed lakes, 8 were impaired, 1 was supporting (Oak Lake), and 14 were inconclusive. Presently, lakes are not assessed for aquatic life. A summary of the results for the assessed lakes is presented in Table C-4, and the location of the assessed lakes is illustrated in Figure C-15.

Table C-4. Status of Lakes Assessed for Aquatic Recreation in the YM1W1P Boundary

Lake Name	Lake ID	County	Aquatic Recreation Assessment	Phosphorus Assessment
Oak	41-0062-00	Lincoln	✓	✓
Anderson	41-0054-00	Lincoln	IF	IF
Biggs	41-0084-00	Lincoln	IF	IF
Conger's Slough	42-0099-00	Lyon	IF	IF
Gislason	41-0024-00	Lincoln	IF	IF
Hawksnest	41-0045-00	Lincoln	IF	IF
Miedd	87-0061-00	Yellow Medicine	IF	IF
North Ash	41-0055-00	Lincoln	IF	IF
South Ash	41-0057-00	Lincoln	IF	IF
Spellman	87-0060-00	Yellow Medicine	IF	IF
Stokke	87-0067-00	Yellow Medicine	IF	IF
Timm	87-0017-00	Yellow Medicine	IF	IF
Tyson	87-0019-00	Yellow Medicine	IF	IF
Unnamed	87-0098-00	Yellow Medicine	IF	IF
Widmark Marsh	41-0096-00	Lincoln	IF	IF
Cottonwood	42-0014-00	Lyon	NS	x
Curtis	87-0016-00	Yellow Medicine	NS	x
Lady Slipper	42-0020-00	Lyon	NS	x
Perch	41-0067-00	Lincoln	NS	x
Shaokatan	41-0089-00	Lincoln	NS	x
Stay	41-0034-00	Lincoln	NS	x
Steep Bank	41-0082-00	Lincoln	NS	x
Wood	87-0030-00	Yellow Medicine	NS	x

✓	Supporting/not a stressor
IF	Inconclusive (need more data)
NS	Not Supporting
x	Impaired/Stressor

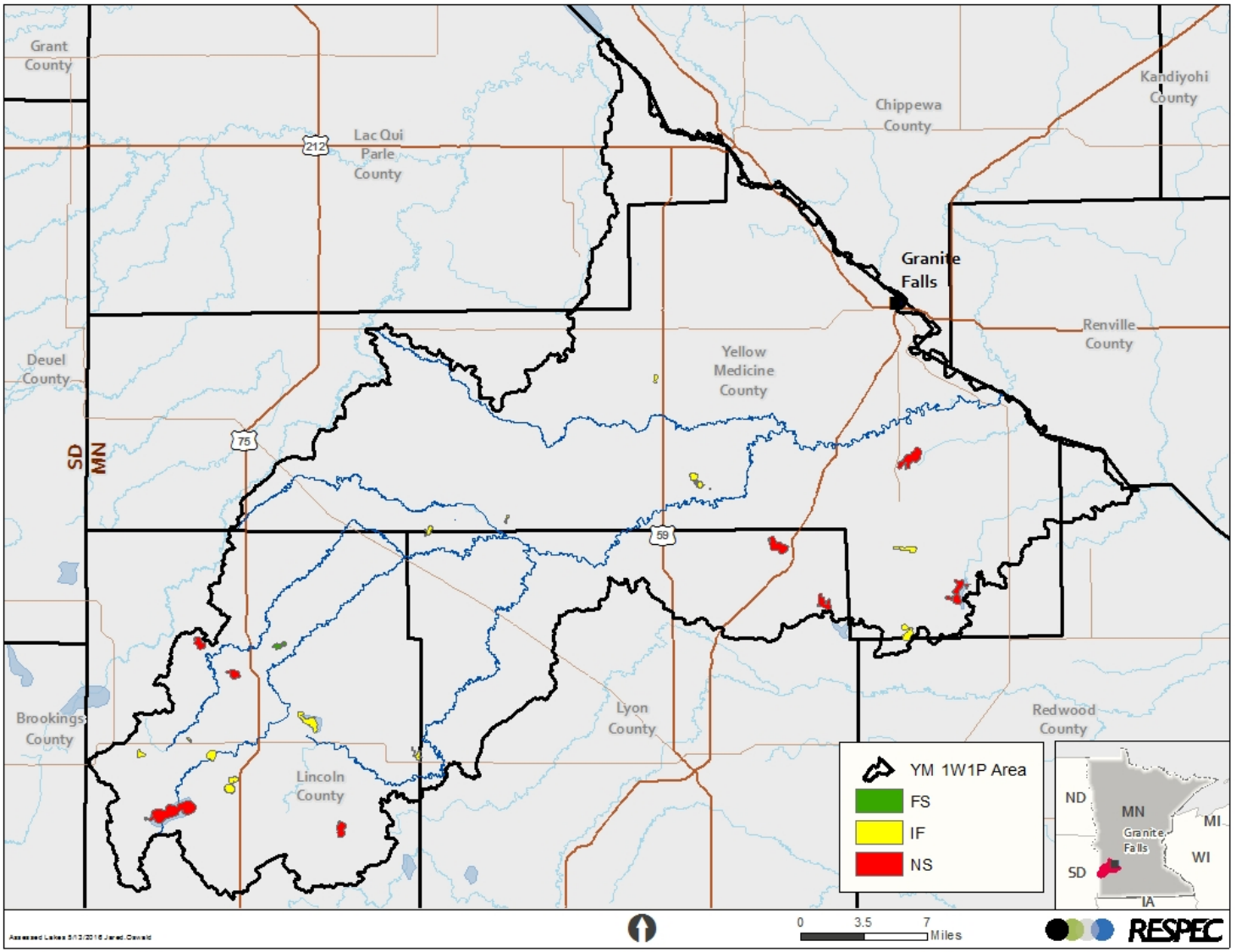

Figure C-15. Designation of Lakes Assessed in the YM1W1P Boundary (FS = Fully Supporting, IF = Insufficient Data, NS = Not Supporting) [Minnesota Pollution Control Agency, 2015].

Phosphorus samples were collected at each of the 23 assessed lakes. Table C-4 indicates that 8 lakes are impaired by phosphorus, 1 is supporting, and 14 are inconclusive. Phosphorus is important because it impacts aquatic life by changing food chain dynamics, impacting fish growth and development, decreasing DO, and increasing algae. Phosphorus negatively impacts aquatic recreation in lakes by providing nutrients that spur algae growth, which results in undesirable or even dangerous swimming conditions. Phosphorus sources within the lake mimic that of streams with a majority of the external loading originating from cropland. Figure C-16 displays the relative sensitivity of lakes in the watershed to Phosphorous pollution.

Several lakes in the watershed have been tagged by the Minnesota Department of Natural Resources as biologically significant. The lakes and their biological-diversity rating and impairment standing are summarized in Table C-5 and displayed in Figure C-17.

Table C-5. Biological Diversity Rating for Biologically Significant Lakes Within the YM1W1P Boundary

Biological Diversity Rating	Lake	Lake ID	Impaired for Aquatic Recreation
Outstanding	Gislason	41-0024	
	Hawksnest	41-0045	
High	Steep bank	41-0082	X
	Porter Reservoir	41-0156	
	Timm	87-0017	
Moderate	Biggs	41-0084	
	Curtis	87-0016	X
	Perch	41-0067	
	Oak	41-0062	
	Popowski	41-0044	
	Lone Tree	87-0013	

The primary measure to determine a lake's rating for biological significance is based on unique plant or animal presence [Minnesota Department of Natural Resources, 2015]. A rating of "Outstanding" is based on finding high aquatic plant richness, high floristic quality, presence of endangered or threatened plant species, presence of wild rice, exceptional fishery and the presence of threatened or endangered birds. A "High" rating differs from "Outstanding" in that not all qualities are found, but a majority are. A "Moderate" rating is based on high aquatic plant richness, high floristic quality, or a population of threatened or endangered plant species as well as one fish species of concern and presence of at least one endangered or threatened bird species. More detailed information on the ratings and how they are determined is avalable online.

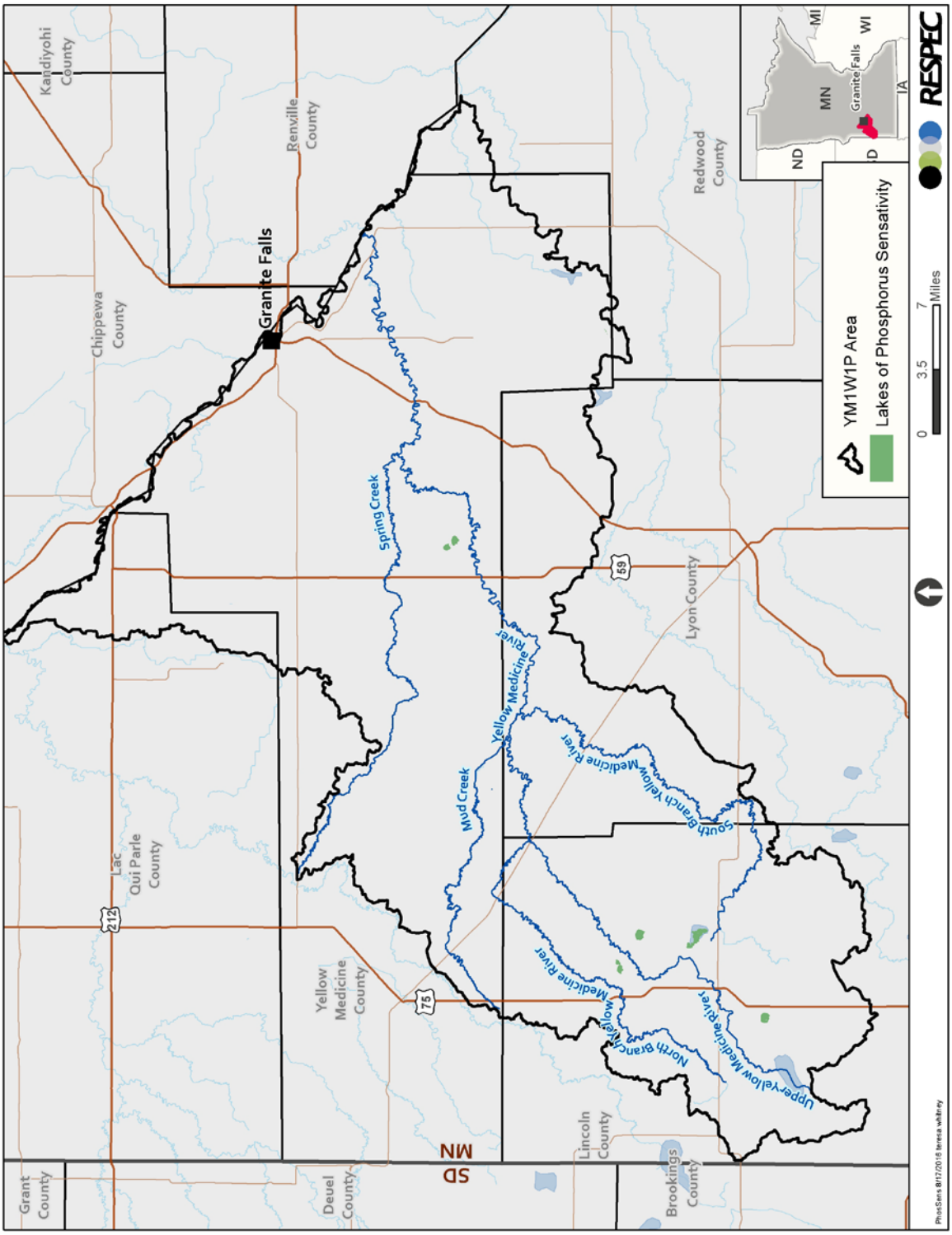

Figure C-16. Lakes With Phosphorus Sensitivity.

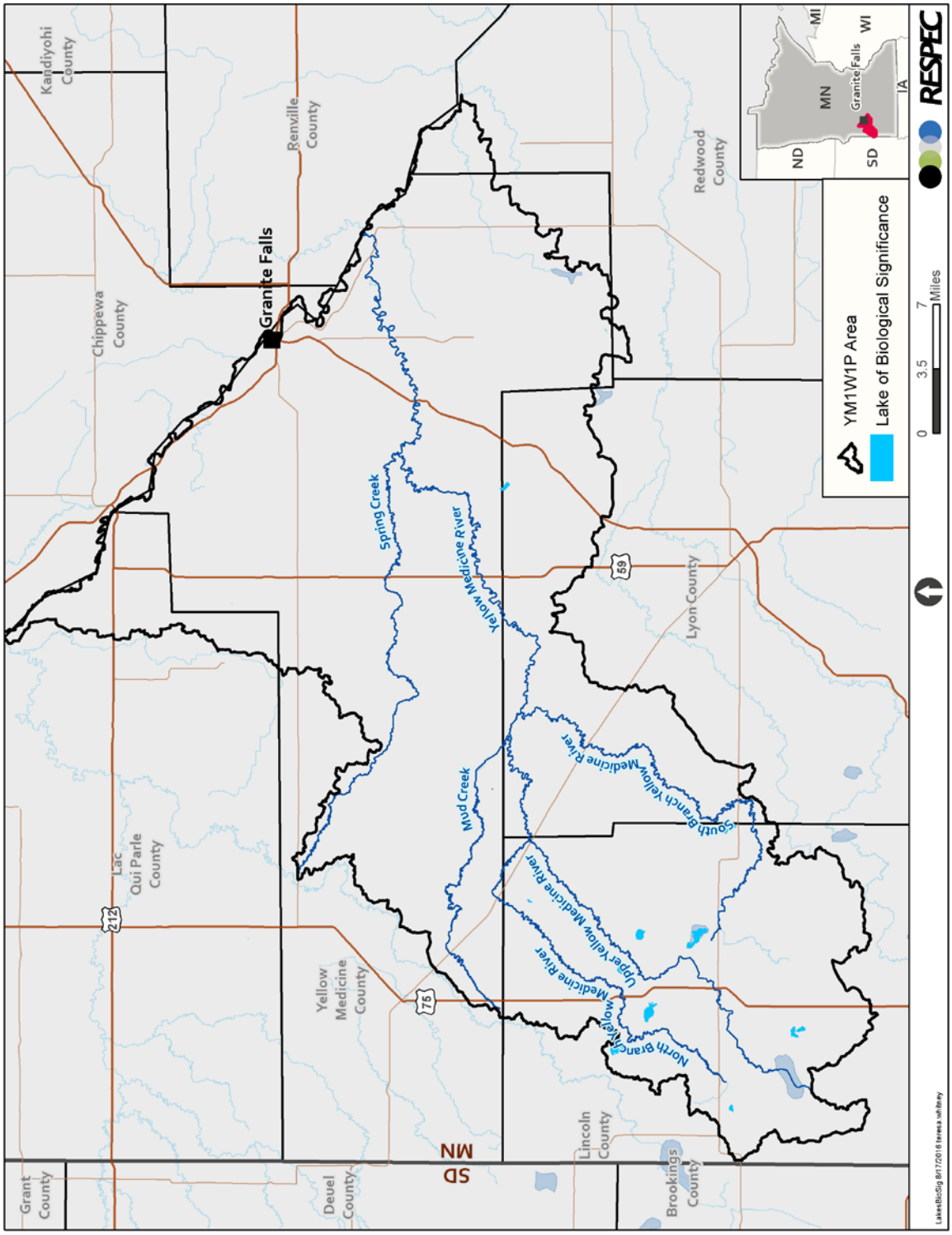

Figure C-17. Lakes of Biological Significance.

C.2.3.3 *Point Sources*

From 2008 to 2011, 1.6 percent of phosphorus was from point sources. From 2008 to 2012, 0.3 percent of nitrogen was from point sources [Minnesota Pollution Control Agency, 2015a]. Data from 2000 to 2013 show point sources contributed approximately 3,000 to 6,000 kilograms (kg) of annual TP, approximately 12,000 to 22,000 kg of annual TN, and approximately 32,000 to 65,000 kg annual TSS annually in the watershed.

C.2.4 Stormwater Systems

There are no Municipal Separate Storm Sewer System (MS4) permits have been issued within the YM1W1P boundary. However, there are several small municipalities in the watershed adjacent to streams have a direct impact to their overall health.

C.2.5 Water-Based Recreation Areas

Water recreation opportunities are available across the various management zones throughout the YM1W1P boundary. Popular activities include boating, fishing, and canoeing. Locations of access points for these various activities are illustrated in Figure C-18.

C.3 HABITAT

C.3.1 Fish Habitat

Habitat is a stressor in 5 of the 9 bio-impaired stream reaches in the YMRW and is sufficient in the remaining 4 reaches. Habitat was assessed watershed-wide by methodology developed by the Minnesota Pollution Control Agency, 2014] that indicates habitat is a widespread issue throughout the watershed. The scores ranged from 17 to 81 with an average score of 48. An average score of 48 is a "fair" rating and indicates watershed-wide needs in regard to habitat. Excess sedimentation, channel instability, limited depth variability, and sparse in-stream cover are the leading causes for the impaired habitat.

C.3.2 Vegetation and Wildlife Habitat

The YM1W1P boundary is located in the native-prairie landscape of Minnesota. This particular landscape has been subjected to significant land use changes that have altered the native habitats for vegetation and wildlife. As a part of the Clean Water, Land and Legacy Amendment passed by voters in 2008, funding for conservation and restoration of Minnesota's prairie lands has been prioritized through 2034. With the collaboration of various conservation partners, a 25-year strategy plan (*The Minnesota Prairie Conservation Plan* [Minnesota Working Group, 2011]) has been developed to guide efforts in to restore Minnesota's native prairie landscape.

The prairie landscape provides vital habitat for a variety of plant and animal species. The goal of the conservation plan is to address the major consequences of land use changes that have occurred and to restore prairies to a level that meets the needs of the native plants and wildlife species. Major issues that are currently present include habitat fragmentation, loss of plant and animal species, degradation of soil and water resources, and an increase in invasive species [Minnesota Working Group, 2011].

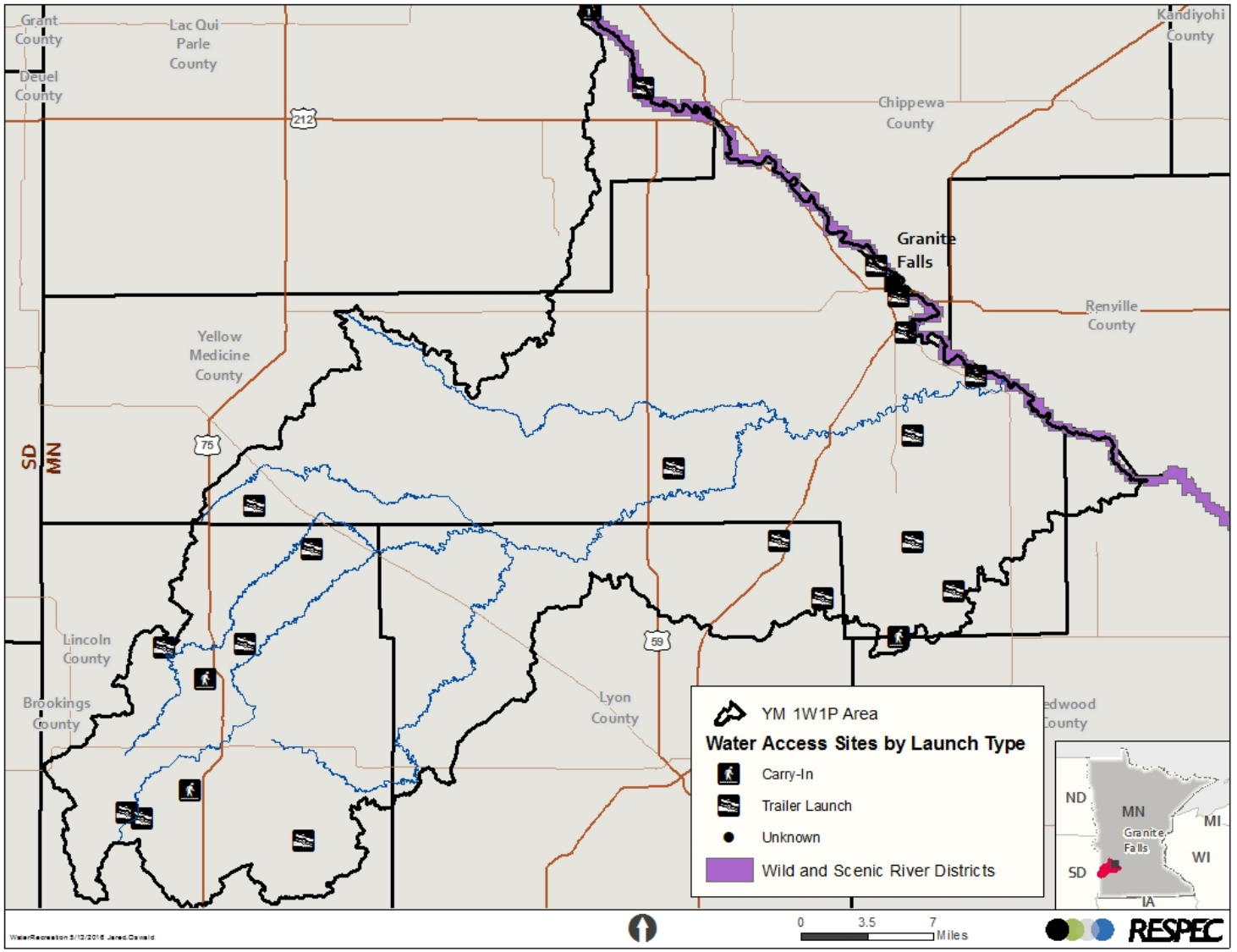

Figure C-18. Location of Water Recreation Access Points Within the YM1W1P Boundary.

Three steps exist as a part of the prairie conservation plan to help conserve and restore the state's prairie habitats. The first step is for core areas (areas with a high percentage of native prairie, other grasslands, wetlands, and shallow lakes) to have a minimum of 40 percent grassland, 20 percent wetland, with the remaining 40 percent in cropland or other land uses. The second step is to design corridor complexes within corridors. Corridors are 6-mile-wide linear stretches of habitat that connect core areas to each other. Corridor complexes are 9-square-mile habitat complexes established every 6 miles within these corridors. The goal for corridor complexes is to reach a land use that includes 40 percent grassland and 20 percent wetland. The third step and final aspect of the plan is to maintain 10 percent of each land type association in perennial native vegetation for the remaining portion of the prairie region. The location of the core areas, corridors, and corridor complexes within the YM1W1P boundary are shown in Figure C-19.

Currently, numerous areas within the YM1W1P boundary are either wildlife management areas that are protected and determined at the state level along with federally protected land and private conservation areas. Figure C-20 depicts where state wildlife management areas are located within the watershed, and Figure C-21 illustrates the location of all protected land in the watershed under federal, state, or private ownership.

C.4 EXISTING LAND USES AND PROPOSED DEVELOPMENT

In the YM1W1P boundary, only 5 percent of the land is currently developed. The largest city, Minneota, has a population of just over 1,300. With such a small percentage of developed area, a relatively small impact on the water quality in the watershed has been observed. Future development plans should be considered and BMPs should be followed, but development in the near term, will most likely not be an insignificant driver in regard to watershed water quality.

C.5 REFERENCES

Minnesota Department of Natural Resources, 2015. *Yellow Medicine River Hydrologic Analysis*, prepared for the Minnesota Department of Environment, St. Paul, MN.

Minnesota Pollution Control Agency, 2015a. *Yellow Medicine River & Surrounding Direct MN River Tributaries Watershed Restoration & Protection Strategies Report*, prepared by the Minnesota Pollution Control Agency, St. Paul, MN (draft).

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Minnesota Pollution Control Agency, 2013. *Yellow Medicine River Watershed Biotic Stressor Identification*, prepared by the Minnesota Pollution Control Agency, St. Paul, MN, *https://www.pca.state.mn.us/sites/default/files/wq-ws5-07020004.pdf.*

Minnesota Working Group, 2011. *Minnesota Prairie Conservation Plan*, prepared by the Minnesota Working Group, Minneapolis, MN, *http://files.dnr.state.mn.us/eco/mcbs/mn_prairie_conservation_plan.pdf*

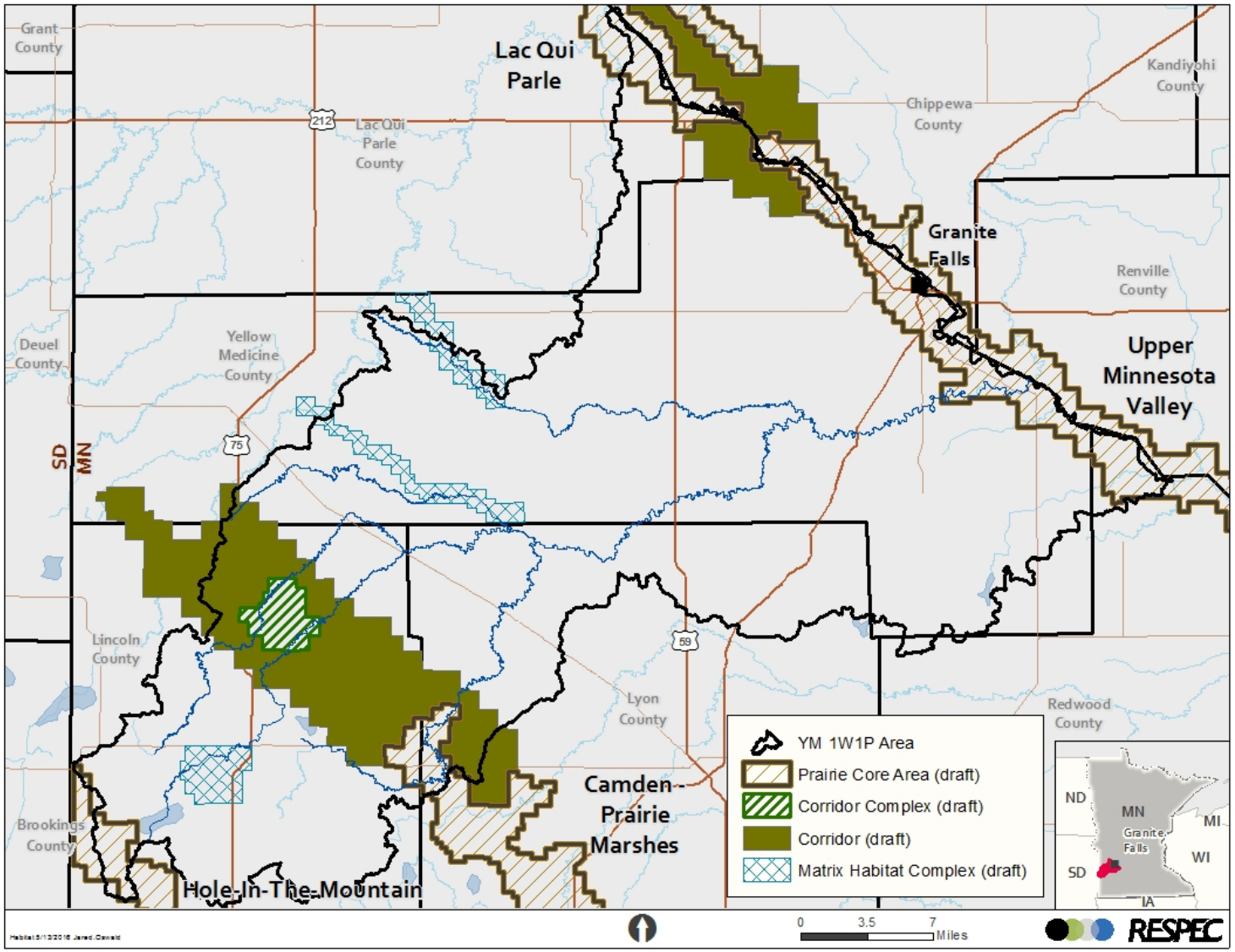


Figure C-19. Conservation Habitat Planning Areas Within the YM1W1P Boundary.

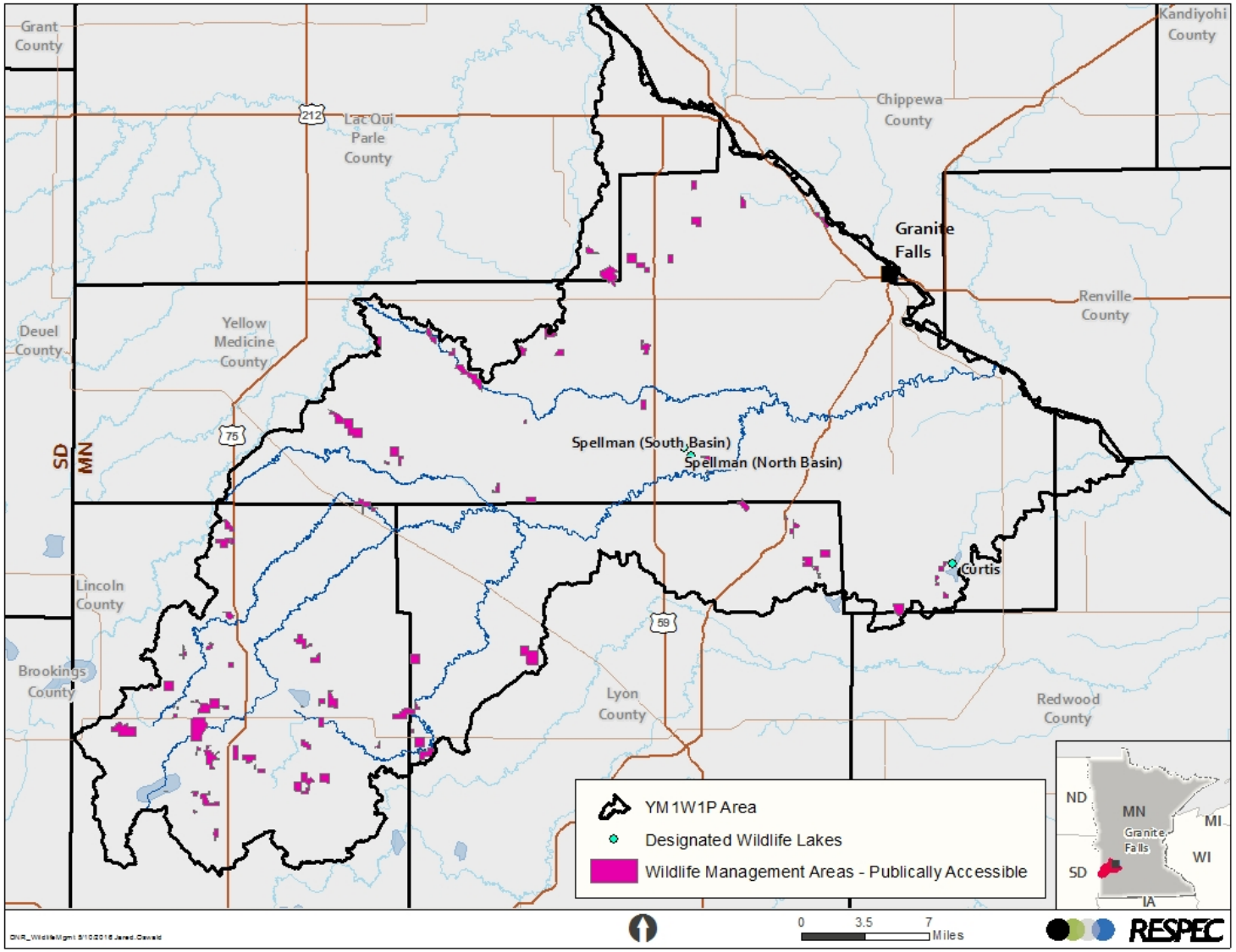


Figure C-20. Minnesota DNR Wildlife Management Areas Within the YM1W1P Boundary.

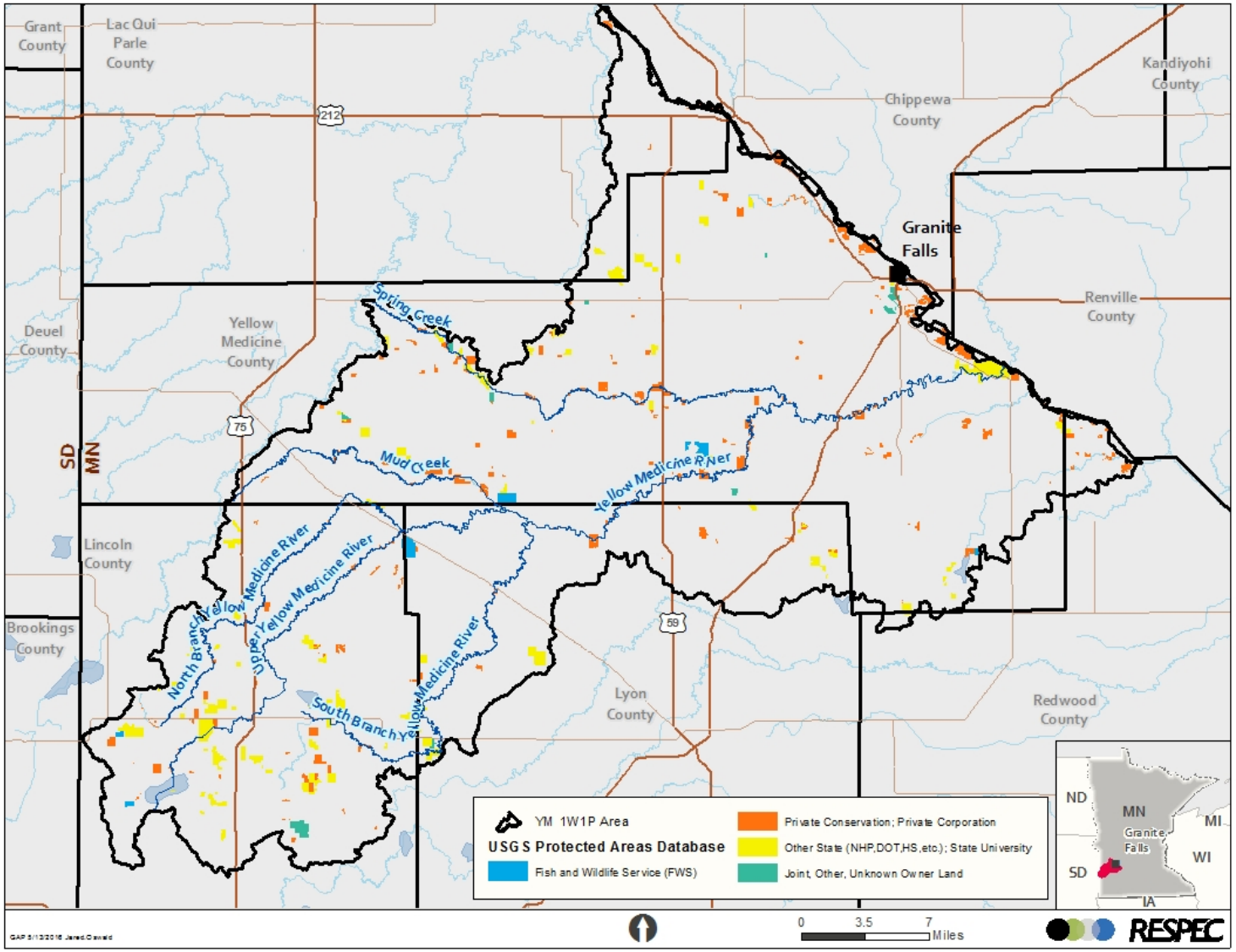


Figure C-21. Protected Areas Within the YM1W1P Boundary.

Schottler, S. P., J. Ulrich, P. Belmont, R. Moore, J. W. Lauer, D. R. Engstrom, and J. E. Almendinger, 2013. "Twentieth Century Agricultural Drainage Creates More Erosive Rivers," *Hydrological Processes*, Vol. 28, No. 4.

Smith, E. A. and S. M. Westenbroek, 2015. *Potential Groundwater Recharge for the State of Minnesota Using the Soil-Water-Balance Model*, 1196–2010, Scientific Investigations Report 2015–5038,prepared by the US Geological Survey, Reston, VA, and the Minnesota Pollution Control Agency, St. Paul, MN.

US Fish and Wildlife Service, 2016. *National Wetlands Inventory*, prepared by the US Fish and Wildlife Service, Falls Church, VA, available online at *http://www.fws.gov/wetlands/*

APPENDIX D
MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement, hereinafter referred to as Agreement, is made and entered into between:

The County of Lac qui Parle, by and through the Board of Commissioners, and
The County of Lincoln, by and through the Board of Commissioners, and
The County of Lyon, by and through the Board of Commissioners, and
The County of Yellow Medicine, by and through the Board of Commissioners, and
The Lac qui Parle Soil and Water Conservation District (SWCD), by and through the Board of Supervisors,
The Lincoln SWCD, by and through the Board of Supervisors, and
The Lyon SWCD, by and through the Board of Supervisors, and
The Yellow Medicine SWCD, by and through the Board of Supervisors, and
The Yellow Medicine River Watershed District, by and through the Board of Managers, and
Area II Minnesota River Basin Projects, Inc. (Area II), by and through the Board of Directors.

WHEREAS, the Counties of this Agreement are political subdivisions of the State of Minnesota, with authority to carry out environmental programs and landuse controls, pursuant to Minnesota Statutes Chapter 375 and as otherwise provided by law; and

WHEREAS, the Soil and Water Conservation Districts of this Agreement are political subdivisions of the State of Minnesota, with statutory authority to carry out erosion control and other soil and water conservation programs, pursuant to Minnesota Statutes Chapter 103C and as otherwise provided by law; and

WHEREAS, the Yellow Medicine River Watershed District is a political subdivision of the State of Minnesota, with statutory authority to carry out conservation of the natural resources of the state by land use controls, flood control, and other conservation projects for the protection of the public health and welfare and the provident use of the natural resources, pursuant to Minnesota Statutes Chapter 103B, 103D and as otherwise provided by law; and

WHEREAS, Area II Minnesota River Basin Projects, Inc. is a political subdivision of the State of Minnesota, with statutory authority to carry out conservation of natural resources with floodwater retention and retardation, pursuant to Minnesota Statutes Chapter 103F.171-103F.187 and as otherwise provided by law; and

WHEREAS, the parties to this Agreement have a common interest and statutory authority to prepare, adopt, and assure implementation of a comprehensive watershed management plan in the Yellow Medicine River Watershed to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages caused by floods, preserve wildlife, protect the tax base, and protect public lands and waters; and

WHEREAS, with matters that relate to coordination of water management authorities pursuant to MS 103B, 103C, and 103D with public drainage systems pursuant to MS 103E, this Agreement does not change the rights or obligations of the public drainage system authorities.

NOW, THEREFORE, the parties hereto agree as follows:

1. **Purpose**: The parties to this Agreement recognize the importance of partnerships to plan and implement protection and restoration efforts for the Yellow Medicine River Watershed. Parties signing this agreement will be collectively referred to as the Yellow Medicine ONE WATERSHED, ONE PLAN Partnership.

2. **Term:** This Agreement is effective upon signature of all parties in consideration of the Board of Water and Soil Resources Participation Requirements for *One Watershed, One Plan*, notwithstanding the dates of the signatures of the parties, the term of this Agreement shall be from October 1, 2014 through June 30, 2016, unless earlier terminated by law or according to the provisions of this Agreement.

3. **Adding Additional Parties:** A qualifying party desiring to become an added member of this Agreement shall indicate its intent by adoption of a board resolution prior to January 1, 2015. The party agrees to abide by the terms and conditions of the Agreement; including but not limited to the bylaws, policies and procedures adopted by the policy committee.

4. **General Provisions**:

    a. **Compliance with Laws/Standards:** The parties agree to abide by all Federal, State or local laws; statutes, ordinances, rules and regulations now in effect or hereafter adopted pertaining to this Agreement or to the facilities, programs and staff for which the Agreement is responsible.

    b. **Indemnification:** Each party to this Agreement shall be liable for the acts of its officers, employees or agents and the results thereof to the extent authorized or limited by law and shall not be responsible for the acts of the other party, its officers, employees or agents. The provisions of the Municipal Tort Claims Act, Minnesota Statute Chapter 466 and other applicable laws govern liability of the parties. To the full extent permitted by law, actions by the parties, their respective officers, employees and agents, pursuant to this Agreement are intended to be and shall be construed as a "cooperative activity" and it is the intent of the parties that they shall be deemed a "single governmental unit" for the purpose of liability, as set forth in Minnesota Statutes Section 471.59, Subd. 1a(a), provided further that for purposes of that statute it is the intent of each party that this Agreement does not create any liability or exposure of one party for the acts or omissions of the other party.

    c. **Records Retention:** The parties agree that records created pursuant to the terms of this Agreement will be retained in a manner that meets their respective entity's records retention schedules that have been reviewed and approved by the State in accordance with Minn. Stat. §138.17.

    d. **Timeliness:** The parties agree to perform obligations under this Agreement in a timely manner and keep each other informed about any delays that may occur.

    e. **Termination:** The parties anticipate that this Agreement will remain in full force and effect through the term of the grant agreement with BWSR and until canceled by all parties or until

June 30, 2016 consistent with the term of the grant agreement, unless otherwise terminated in accordance with law or other provisions of this Agreement.

5. **Administration:**

   a. **Development of the Plan.** The parties agree to designate one representative, who must be an elected or appointed member of the governing board, to a policy committee for development of the watershed-based plan. The policy committee will meet monthly or as needed. Each representative shall have one vote. The policy committee will establish bylaws by December 31, 2014.

   The parties agree to designate one or more representatives to an advisory committee for development of the watershed-based plan. The advisory committee will meet monthly or as needed to make recommendations on the content of the plan.

   The members of the Planning Work Group Committee shall be present at all policy committee meetings to serve in the advisory role.

   b. **Submittal of the Plan.** The policy committee will recommend the plan to the parties of this Agreement. The policy committee will be responsible for initiating a formal review process for the watershed-based plan conforming to Minnesota Statutes 103B and 103D including the required public hearing. Upon completion of local review and comment, and approval of the plan for submittal by each party, the policy committee will submit the watershed-based plan to the Board of Water and Soil Resources for review and approval.

   c. **Adoption of the Plan.** The parties agree to adopt and begin implementation of the plan within 120 days of state approval and provide notice of plan adoption pursuant to Minnesota Statutes Chapter 103B and 103D.

6. **Fiscal Agent:** Area II Minnesota River Basin Projects, Inc. will act as the fiscal agent for the purposes of this Agreement. In the event that Area II is unable to fulfill its obligations as Fiscal Agent, the Lincoln SWCD will serve in this capacity. The Fiscal Agent agrees to:

   a. Accept all responsibilities associated with the implementation of the BWSR grant agreement for developing a watershed-based plan.

   b. Perform financial transactions as part of contract administration.

   c. Annually provide a full and complete audit report.

   d. Provide the policy committee with such records as necessary to describe the financial condition of the BWSR grant agreement.

   e. The Scope of Services provided to the Yellow Medicine **ONE WATERSHED, ONE PLAN** Partnership is outlined in Attachment B to this document.

7. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Lac qui Parle County and **Lac qui Parle SWCD**
Terry Wittnebel or successor, County Water Planner/ District Manager
122 8th Avenue S, Suite 1
Madison, MN 56256
Email: terry.wittnebel@mn.nacdnet.net
Telephone: (320) 598-7321 ext 3

Lincoln County and **Lincoln SWCD**
Pauline VanOverbeke or successor, County Water Planner/District Manager
328 E. George Street
Ivanhoe, MN 56142
Email: pauline.vanoverbeke@mn.nacdnet.net
Telephone: (507) 694-1630 ext 3

Lyon County and **Lyon SWCD**
John Biren or successor, County Water Planner/District Administrator
1424 E. College Drive, Suite 600
Marshall, MN 56258
Email: johnbiren@co.lyon.mn.us
Telephone: (507) 537-0396 ext 3

Yellow Medicine County
Jolene Johnson or successor, County Water Planner
1000 10th Avenue, Suite 2
Clarkfield, MN 56223
Email: Jolene.johnson@co.ym.mn.gov
Telephone: (320) 669-7524

Yellow Medicine SWCD
Lou Ann Nagel or successor, District Manager
1000 10th Avenue, Suite 3
Clarkfield, MN 56223
Email: louann.nagel@mn.nacdnet.net
Telephone: (320) 669-4442 ext 3

Yellow Medicine River Watershed District
Cindy Potz or successor, District Administrator
122 N. Jefferson, Minneota MN 56264
Email: ymrw@centurytel.net
Telephone: (507) 872-6720

Area II Minnesota River Basin Projects, Inc.
Kerry Netzke or successor, Executive Director
1400 East Lyon Street, Marshall MN 56258
Email: area2@starpoint.net
Telephone: (507) 537-6369

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LAC QUI PARLE COUNTY**

APPROVED:

BY: _____ 9/2/14
Board Chair Date

ATTEST: Roy Marihart Commissioner 9/2/14
(Name) (Title) Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____ 9/2/14
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LAC QUI PARLE SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: Ed Radermacher 9-3-14
Board Chair Date

BY: Jerry Kittelsel 9-3-14
District Manager Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LINCOLN COUNTY**

APPROVED:

BY: Donald Evers 9-2-14
Board Chair Date

ATTEST: Kathy Schrenk, Auditor 9-2-14
(Name) (Title) Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LINCOLN SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: Daniel Christian 8-20-14
Board Chair Date

BY: Pauline VanOverbeke 8-20-14
District Manager Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LYON COUNTY**

APPROVED:

BY: Rick Hunter 9/2/2014
Board Chair Date

ATTEST: Doreen Stanley Administrator 9/2/2014
(Name) (Title) Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LYON SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: _____ 8/20/2014
Board Chair Date

BY: _____ 8-26-14
District Manager Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **YELLOW MEDICINE COUNTY**

APPROVED:

BY: _____ 9/9/14
Board Chair Date

ATTEST: _____ Adm. 9-9-14
(Name) (Title) Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____ 9-16-14
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **YELLOW MEDICINE SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: Brenda Knecht 8-28-2014
Board Chair Date

BY: Lisa Ann Nagel 8-28-2014
District Manager Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **YELLOW MEDICINE RIVER WATERSHED DISTRICT**

APPROVED:

BY: _____ 9/8/14
Board Chair Date

BY: Cindy M Potts 9-8-14
District Administrator Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____ 9/6/14
Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **AREA II MINNESOTA RIVER BASIN PROJECTS, INC.**

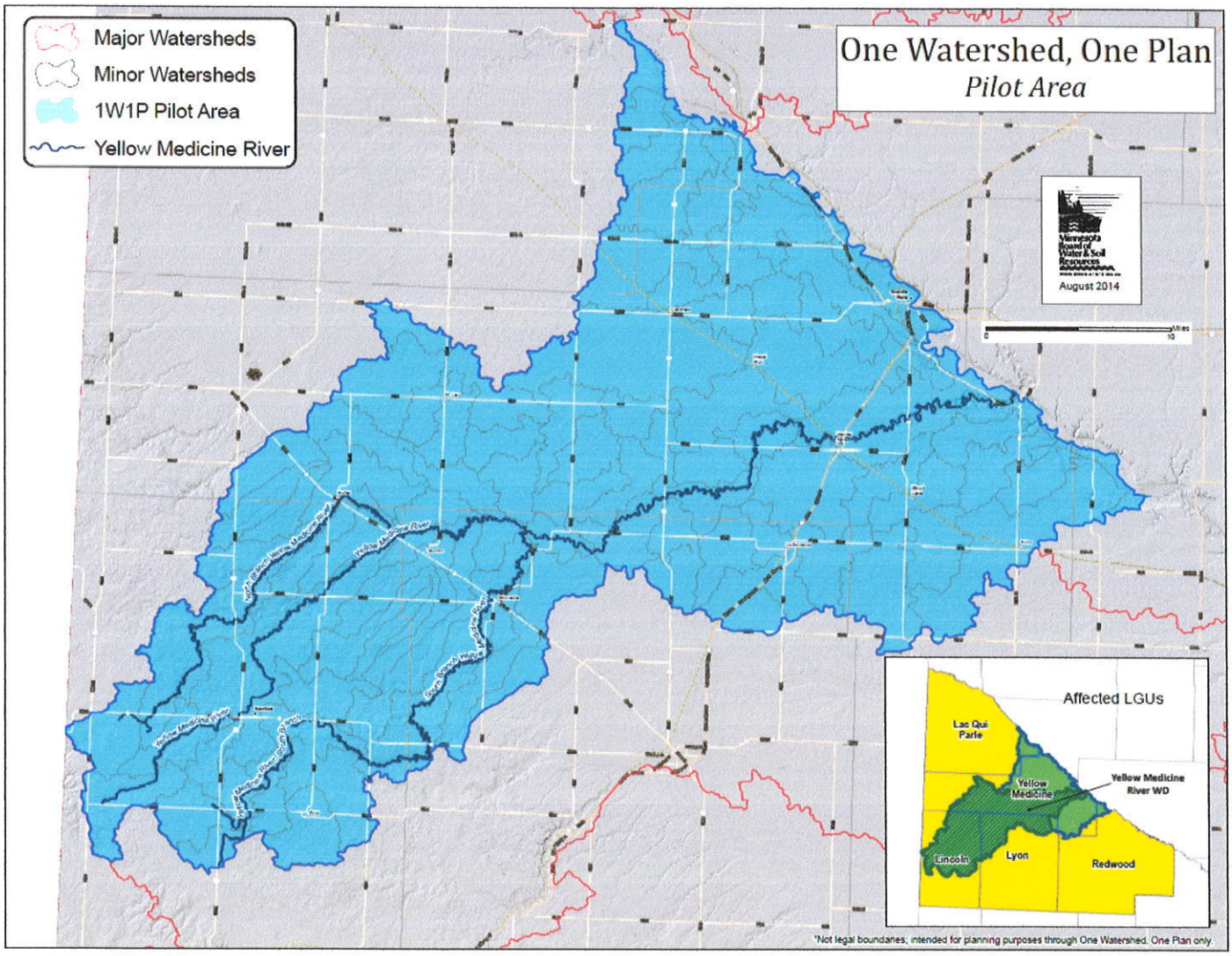
APPROVED:

BY: Robert Malvie 9-5-2014
Board Chair Date

BY: Kerry Netzke 9/5/2014
Executive Director Date

Attachment A

Yellow Medicine River Watershed Boundary Map



Attachment B

Scope of Services Provided by the Fiscal Agent

Area II Minnesota River Basin Projects, Inc. will have the following duties:

1. Coordination of Policy Committee meetings, including:
    a. Provide advance notice of meetings
    b. Prepare and Distribute the Agenda and related materials
    c. Prepare and Distribute Policy Committee Minutes
    d. Maintain all records and documentation of the Policy Committee
    e. Provide public notices for publication
    f. Gather public comments from public hearing and prepare for submittal

2. Coordination of advisory committee meetings, including the technical and citizen subcommittees, including:
    a. Provide advance notice of meetings
    b. Prepare and Distribute the Agenda and related materials
    c. Prepare and Distribute Minutes
    d. Maintain all records and documentation of the committees

3. Administration of the grant with the Board of Water and Soil Resources for the purposes of developing a watershed-based plan, including:
    a. Submit this Agreement, work plan, and other documents as required
    b. Execute the grant agreement
    c. Account for grant funds and prompt payment of bills incurred
    d. Complete annual eLINK reporting
    e. Present an annual audit of grant funds and their usage
    f. Maintain all financial records and accounting

4. Contracting for Services with the chosen consultant for plan preparation and writing of the watershed-based plan, including:
    a. Execute the Contract for Services agreement
    b. Oversee expenditures incurred by the consultant
    c. Provide prompt payment for services rendered
    d. Serve as primary contact person with the consultant

ADDENDUM NO. 1

This addendum, approved at the December 15, 2015 ~~2016~~ meeting of the Lac qui Parle County Board of Commissioners, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LAC QUI PARLE COUNTY**

APPROVED:

BY: Roy Marihart 12/15/15
Board Chair Roy Marihart Date

ATTEST: Jacob Sieg County Coordinator 12/15/15
(Name) Jacob Sieg (Title) Date

APPROVED AS TO FORM: *(use if necessary)*

BY: 12/15/15
County Attorney Richard Stulz Date

ADDENDUM NO. 1

This addendum, approved at the January 7, 2016 meeting of the Lac qui Parle SWCD Board of Supervisors, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LAC QUI PARLE SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: Ed Radermacher 1-7-2016
Board Chair Date

BY: Jenny Wittmeier 1-7-2016
District Manager Date

ADDENDUM NO. 1

This addendum, approved at the Dec 15, 2015 meeting of the Lincoln County Board of Commissioners, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LINCOLN COUNTY**

APPROVED:

BY: Donald Evers 12-15-15
Board Chair Date

ATTEST: Deb Vierling Auditor 12-15-15
(Name) (Title) Date

APPROVED AS TO FORM: *(use if necessary)*

BY: _____
County Attorney Date

ADDENDUM NO. 1

This addendum, approved at the Dec 16, 2015 meeting of the Lincoln SWCD Board of Supervisors, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LINCOLN SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: Daniel Clemister 12-16-15
Board Chair Date

BY: Pauline VanOverbeke 12-16-15
District Manager Date

ADDENDUM NO. 1

This addendum, approved at the February 16, 2016 meeting of the Lyon County Board of Commissioners, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LYON COUNTY**

APPROVED:

BY: _____ Feb. 16, 2016
Board Chair Date

ATTEST: _____ Admin. Feb. 16, 2016
(Name) (Title) Date

APPROVED AS TO FORM: *(use if necessary)*

BY: _____
County Attorney Date

ADDENDUM NO. 1

This addendum, approved at the JAN - 25, 2016 meeting of the Lyon SWCD Board of Supervisors, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **LYON SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: _____ 1-25-2016

Board Chair Date

BY: _____ 1-25-2016

District Manager Date

ADDENDUM NO. 1

This addendum, approved at the December 9, 2015 meeting of the Yellow Medicine County Board of Commissioners, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **YELLOW MEDICINE COUNTY**

APPROVED:

BY: _____ 12/9/15
Board Chair Date

ATTEST: _____ 12-10-15
(Name) (Title) Date

APPROVED AS TO FORM: *(use if necessary)*

BY: _____ 12-11-15
County Attorney Date

ADDENDUM NO. 1

This addendum, approved at the 12-22-2015, ~~2016~~ meeting of the Yellow Medicine SWCD Board of Supervisors, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **YELLOW MEDICINE SOIL AND WATER CONSERVATION DISTRICT**

APPROVED:

BY: Holli Wilke 12-22-15
Board Chair Date

BY: Lisa Ann Nagel 12-22-15
District Manager Date

ADDENDUM NO. 1

This addendum, approved at the January 11, 2016 meeting of the Yellow Medicine River Watershed District Board of Managers, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **YELLOW MEDICINE RIVER WATERSHED DISTRICT**

APPROVED:

BY: _____ 2/1/16
Board Chair Date

BY: Emily Javens 1/11/16
District Administrator Date

APPROVED AS TO FORM: *(use if necessary)*

BY: _____
Attorney Date

ADDENDUM NO. 1

This addendum, approved at the January 7, 2016 meeting of the Area II Minnesota River Basin Projects, Inc. Board of Directors, hereby revises **Section 2. Term** of the Yellow Medicine One Watershed, One Plan Memorandum of Agreement to extend the effective period of said agreement to December 31, 2016. All other terms and conditions shall remain unchanged.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: **AREA II MINNESOTA RIVER BASIN PROJECTS, INC.**

APPROVED:

BY: _____ 1-7-16
Board Chair Date

BY: _____ 1/7/2016
Executive Director Date

APPENDIX E
BYLAWS

Bylaws

of the

Yellow Medicine One Watershed, One Plan Partnership Policy Committee

Partnership Members:

Area II Minnesota River Basin Projects, Inc. (Area II)

Lac qui Parle County

Lac qui Parle Soil and Water Conservation District

Lincoln County

Lincoln Soil and Water Conservation District

Lyon County

Lyon County Soil and Water Conservation District

Yellow Medicine County

Yellow Medicine Soil and Water Conservation District

Yellow Medicine River Watershed District

ADOPTED: November 12, 2014

These bylaws establish rules governing the conduct of business by the Policy Committee of the Yellow Medicine One Watershed, One Plan Partnership, hereafter referred to as ORGANIZATION, adopted November 12, 2014.

ARTICLE I: PURPOSE

1. The purpose of the ORGANIZATION is to prepare, adopt, and assure implementation of a comprehensive watershed management plan to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages by floods, preserve wildlife, protect the tax base, and protect public lands and waters within the Yellow Medicine River watershed.

2. The ORGANIZATION is formed under a Memorandum of Agreement. Member local units of government are: Area II Minnesota River Basin Projects, Inc.; Lac qui Parle County; Lac qui Parle Soil and Water Conservation District; Lincoln County; Lincoln Soil and Water Conservation District; Lyon County; Lyon County Soil and Water Conservation District; Yellow Medicine County; Yellow Medicine Soil and Water Conservation District; and Yellow Medicine River Watershed District.

3. This One Watershed, One Plan pilot program will focus on the Yellow Medicine River Watershed and is Phase I of a larger effort and desire to develop One Watershed Plans for the entire Area II jurisdictional area including the Lac qui Parle, Redwood and Cottonwood watersheds. The best practices and approaches learned through the pilot project will provide the necessary tools and foundational knowledge needed to successfully extend the approach to the adjoining watersheds. The ORGANIZATION recognizes that development of One Watershed Plans will increase coordination, decrease duplication of efforts, and provide additional assurances for meeting defined goals and measurable outcomes.

ARTICLE II: MEMBERSHIP

1. The membership of the Policy Committee shall be comprised of ten (10) members appointed by the board of each member local unit of government. Each delegate member shall have one (1) vote.

2. An alternate member shall also be appointed. Only in the absence of the delegate is the alternate given voting responsibilities.

3. A second alternate member shall also be appointed. Only in the absence of the delegate and first alternate is the second alternate given voting responsibilities.

4. Members of the Policy Committee shall be appointed until June 30, 2016 or until the Memorandum of Agreement is terminated.

5. A Policy Committee member's term continues until a successor is appointed and qualified. In the event a member of the Policy Committee resigns or is otherwise unable to complete his or her term on the Policy Committee, the Policy Committee will advise the appointing authority of the vacancy thus created as soon as practicable, and the vacancy will be filled according to the requirements of the respective local unit of government.

6. The Policy Committee shall not take action that may materially benefit the financial interest of a Policy Committee member, a member's family member or a member's close associate unless that interest first is disclosed for the record. The interested Policy Committee member may be present to answer questions, but may not advocate for or vote on the action. If a Policy Committee member concludes that his or her interest does not create a conflict but that there may be an appearance of conflict, he or she shall disclose the interest for the record before participating in discussion or voting on an action.

ARTICLE III: OFFICERS

1. The officers of the Policy Committee shall consist of a chairperson, vice chairperson, and a secretary and shall be elected by members of the Policy Committee at the first meeting on November 12, 2014.

    a. The chairperson shall:

        i. Preside at the meetings and perform other duties pertained to the chair; and

        ii. Sign and deliver in the name of the ORGANIZATION any correspondence pertaining to the business of the ORGANIZATION.

    b. The vice chairperson shall:

        i. Discharge the chairperson's duties in the event of the absence or disability of the chairperson.

    c. The secretary shall:

        i. Maintain records of the ORGANIZATION:

        ii. Certify the accuracy of records and proceedings of the ORGANIZATION;

        iii. Ensure that minutes of all Policy Committee meetings are recorded and made available in a timely manner to the Policy Committee, and, maintain a file of all approved minutes including corrections and changes;

        iv. Provide for proper public notice of all meetings; and

        v. May delegate a representative to record the minutes and perform other duties of the secretary. The elected secretary will sign the official minutes of all meetings following approval of the Policy Committee.

2. An officer will serve until replaced by the election of a successor. No Policy Committee member may hold more than one office at a time.

3. In the event an officer cannot complete his or her term of office, the Policy Committee shall immediately elect from among its members an individual who will complete the unexpired portion of the term. The individual designated to complete the unexpired term of another officer may not already be serving as an officer of the ORGANIZATION.

4. The Policy Committee will request the respective local unit of government member to replace their representative member after missing two (2) consecutive meetings without notice to the chairperson.

ARTICLE IV: MEETINGS

1. All meetings of the Policy Committee will comply with statutes and rules requiring open and public meetings.

2. The conduct of all meetings of the Policy Committee shall be generally governed by the most recent edition of Robert's Rules of Parliamentary Law.

3. A quorum of the Policy Committee shall consist of a simple majority of the members.

4. All votes by Policy Committee members shall be made in person, and no member may appoint a proxy for any question coming before any meeting for a vote.

5. The notice of meetings shall be provided by mail or email not less than seven (7) days prior to the scheduled meeting date of the Policy Committee.

6. The minutes of any meeting shall be made available to all Policy Committee members prior to the next meeting.

ARTICLE V – VOTING

1. A motion or resolution shall be approved by a favorable vote of a simple majority of the members present providing enough members are present to make a quorum.

2. A supermajority vote of 75% of those members present will be required for final plan submittal or changes to these ByLaws or Memorandum of Agreement.

ARTICLE VI – COMPENSATION

1. Policy Committee members may be compensated for per diems and expenses incurred in attending meetings by the member local unit of government they represent, according to the policies of the local unit of government.

ARTICLE VII – SUBCOMMITTEES OF THE POLICY COMMITTEE

1. The Policy Committee may appoint subcommittees for the purpose of assisting the Policy Committee in the performance of its duties. Except for a Policy Committee member appointed

to a subcommittee, no other member of a subcommittee shall be able to make motions for consideration, or vote on matters put before the Policy Committee.

2. The Policy Committee will appoint an Advisory Committee. The Advisory Committee will routinely advise the Policy Committee on the plan and plan implementation and on issues of policy and administration as related to the purpose.

    a. Each member local government unit shall appoint one or more representatives to the advisory committee.

    b. In addition to member local government appointments, the advisory committee will include representatives from the state's main water or plan review agencies (Board of Water and Soil Resources, Department of Agriculture, Department of Health, Department of Natural Resources, and Pollution Control Agency). Each agency will designate a lead contact from their agency to participate on the advisory committee as an ex-officio member with no voting privileges.

    c. The term of membership of the Advisory Committee shall be until June 30, 2016 or until the Memorandum of Agreement is terminated.

    d. Subcommittees may be formed to increase effectiveness or to address specific topics or project areas. Each subcommittee will report to the full advisory committee membership at a meeting for review of findings and recommendations.

ARTICLE VIII: MEETING LOCATION

1. All regular meetings of the ORGANIZATION will be held at Marshall, MN. The Policy Committee may, at its own discretion, change the location.

ARTICLE IX: MISCELLANEOUS

1. Portions of these bylaws may be suspended temporarily by a supermajority vote of 75% of the Policy Committee members present.

2. Addition to, alteration, or repeal of any part of these bylaws by the Policy Committee may be made at any meeting, provided thirty (30) days' written notice of the proposed change has been given to each member of the Policy Committee, and, the proposed change is approved by a supermajority vote of 75% of the Policy Committee members present.

3. The ORGANIZATION's official records and requirements of the BWSR grant agreement shall be maintained by the fiscal agent, Area II Minnesota River Basin Projects, Inc. The maintenance and disposition of these records shall be in accordance with applicable laws.

4. All expenses incurred by the Yellow Medicine One Watershed, One Plan Partnership must have approval of the Policy Committee and have an invoice submitted itemizing expenses for Policy Committee approval at their next meeting. All claims must be submitted within sixty (60) days

after the month in which they were incurred. Prompt payment will be made after Policy Committee approval of the bills.

5. These bylaws are intended to be consistent with applicable provisions of Minnesota Statutes Chapters 103B, 103C, and 103D. In all cases of omission or error, those statutes will govern.

ARTICLE X – CERTIFICATION

These By-laws were adopted by a vote of 10 ayes and 0 nays by the members of the Policy Committee on November 12, 2014.

(Area II Minnesota River Basin Projects, Inc.)

(Lac qui Parle County)

(Lac qui Parle Soil and Water Conservation District)

(Lincoln County)

(Lincoln Soil and Water Conservation District)

(Lyon County)

(Lyon Soil and Water Conservation District)

(Yellow Medicine County)

(Yellow Medicine Soil and Water Conservation District)

(Yellow Medicine River Watershed District)

APPENDIX F
POLICY COMMITTEE MEMBERS

Table F-1. Policy Committee Members (Page 1 of 2)

Organization	Role	Name	Position	Address	Phone	Email
Lac qui Parle County	Delegate	Roy Marihart VICE CHAIR	Commissioner	3510 206th St Dawson, MN 56232	320.752.4491	marihart@farmerstel.net
	Alternate	DeRon Brehmer	Commissioner	2939 181st Avenue Bellingham, MN 56212	320.568.2226	deron.brehmer@lqpco.com
Lac qui Parle SWCD	Delegate	Jeff Johnson	Supervisor	2195 361st Avenue Montevideo, MN 56265	320.752.4674	jcdjohns@farmerstel.net
	Alternate	Bob Ludvigson	Supervisor	1979 US Hwy 212 Madison, MN 56256	320.598.7897	ludvig@frontiernet.net
Lincoln County	Delegate	Joe Drietz	Commissioner	412 E. Ashby Ivanhoe, MN 56142	507.694.1830	joedrietz@gmail.com
	Alternate	Don Evers	Commissioner	PO Box 325 Lake Benton, MN 56149	507.368.4884	dianekevers@yahoo.com
Lincoln SWCD	Delegate	Glen Sorensen SECRETARY	Supervisor	2777 County Road 125 Arco, MN 56113	507.487.5771	gisore@llwb.coop
	Alternate	John Boulton	Supervisor	2589 State Hwy 68 Porter, MN 56283	507.296.4668	
Lyon County	Delegate	Rodney Stensrud CHAIR	Commissioner	2040 380th Street Minneota, MN 56264	507.872.6858	stensrud6331@gmail.com
	Alternate	Rick Anderson	Commissioner	2332 140th Street Balaton, MN 56115	507.734.5194	rickanderson@co.lyon.mn.us
Lyon SWCD	Delegate	Gary Crowley	Supervisor	2449 210th Avenue Marshall, MN 56258	507.428.3827	crowley@mvtvwireless.com
	Alternate	Allen Deutz	Supervisor	2866 County Road 35 Marshall, MN 56258	507.532.6363	apdeutz@gmail.com
Yellow Medicine County	Delegate	Gary Johnson	Commissioner	4767 330th Avenue Montevideo, MN 56265	320.269.6793	gary.johnson@co.ym.mn.gov
	Alternate	Ron Antony	Commissioner	2535 230th Avenue Canby, MN 56220	507.223.5529	ron.antony@co.ym.mn.gov
Yellow Medicine SWCD	Delegate	Hollis Weber	Supervisor	2550 470th Street Hazel Run, MN 56241	320.564.2435	weberfarms@mvtvwireless.com
	Alternate	Jerry Nelson	Supervisor	4763 290th Avenue Granite Falls, MN 56241	320.564.3699	

Table F-1. Policy Committee Members (Page 2 of 2)

Organization	Role	Name	Position	Address	Phone	Email
Yellow Medicine Watershed District	Delegate	Tim Buysse	Manager, Chairman	2092 County Road 10 Cottonwood, MN 56229	507.872.6219	buytim@hotmail.com
	Alternate	Tim Dritz	Manager	1618 County Hwy 16 Hendricks, MN 56136	507.694.1185	dritzfarm@gmail.com
Area II MN River Basin Projects, Inc.	Delegate	Luke Johnson	Commissioner, Chairman	224 W. Main Street Pipestone, MN 56164	507.825.4404	mntokenman@yahoo.com
	Alternate	Dennis Potter	Commissioner, Vice Chairman	40520 US Hwy 14 Springfield, MN 56087	507.723.6144	dennis.potter@co.brown.mn.us

APPENDIX G
ADVISORY COMMITTEE

APPENDIX G - ADVISORY COMMITTEE

Table G-1. Advisory Committee Members

	Name	Organization	Contact
Planning Work Group	John Biren	Lyon SWCD Administrator	johnbiren@co.lyon.mn.us
	Jolene Johnson	YM Planning & Zoning	jolene.johnson@co.ym.gov
	Lou Ann Nagel	YM SWCD	louann.nagel@mn.nacdnet.net
	Kerry Netzke	Area II Executive Director	area2@starpoint.net
	Cindy Potz/Emily Javens	YMRWD Administrator	ymrw@centurytel.net
	Pauline VanOverbeke	Lincoln SWCD Manager	pauline.vanOverbeke@mn.nacdnet.net
	Terry Wittnebel	LQP SWCD Manager	terry.wittnebel@mn.nacdnet.net
Agencies	Mark Hiles	BWSR	mark.hiles@state.mn.us
	Matt Drewitz	BWSR	matt.drewitz@state.mn.us
	Amanda Strommer	MDH	amanda.strommer@state.mn.us
	Mike Weckwerth	MPCA	michael.weckwerth@state.mn.us
	Lucas Youngsma	DNR	lucas.youngsma@state.mn.us
	Spencer Herbert	MDA	spencer.herbert@state.mn.us
Technical Subcommittee	Chris Balfany	YM County Ditch Inspector	christopher.balfany@co.ym.mn.gov
	Jenny Breberg (invited)	LQP Environmental	jennifer.breberg@lqpco.com
	Dennis Johnson	Lincoln NRCS	dennis.johnson@mn.usda.gov
	Tyler Knutson	YM SWCD Technician	tyler.knutson@mn.nacdnet.net
	Robert Olsen	Lincoln Planning & Zoning	rolsen@co.lincoln.mn.us
	Luke Olson	Lyon SWCD Technician	lukeOlson@co.lyon.mn.us
	Dale Sterzinger	Lincoln SWCD Technician	dale.sterzinger@mn.nacdnet.net
	Emma Volz	YMRWD Technician	emma.volz@centurytel.net
	Brian Zabel	LQP SWCD Technician	brian.zabel@mn.nacdnet.net
Citizen Subcommittee	Gary Crowley	Lyon SWCD Supervisor	crowley@mvtvwireless.com
	Mitch Kling	YM Water Task Force	klingmitch@gmail.com
	Dennis Klingbile	Lincoln Water Task Force & representative from a city government	dennisklingbile@live.com
	Rodney Stensrud	Lyon County Commissioner	stensrud6331@gmail.com
	Jared Wagner (invited)	Upper Sioux Community	jaredw@uppersiouxcommunity-nsn.gov
	Galen Boerboom	Representative from local sportsmens clubs	glboerboom@frontier.com
	Richard Pesek	Representative from livestock producers	pesekcattlefarm@yahoo.com
	Doug Albin	Representative from Corn & Soybean Growers	dklfalbin@mvtvwireless.com
	Roger Dale	Citizen at-large member	rojodale@mvtvwireless.com
	Mike Gunlogson	Citizen at-large member	mggun@westtechwb.com
	David Werner (invited)	Citizen at-large member	ddwerner@charter.net

APPENDIX H
COMMENTS RECEIVED

March 30, 2015

Yellow Medicine River Planning Work Group
c/o Kerry Netzke, Area II Minnesota River Basin Projects, Inc.
1424 East College Drive, Suite 300
Marshall, MN 56258

RE: Response to request for priority issues and plan expectations (One Watershed, One Plan)

Dear Yellow Medicine River Planning Work Group,

Thank you for providing the opportunity to provide input regarding priority issues and plan expectations for the development of the Yellow Medicine River watershed, One Watershed One Plan under Minnesota Statutes Section 103B.101, Subd. 14. We appreciate the partners' willingness to participate in development of a multi-jurisdiction, watershed-based plan.

The Board of Water and Soil Resources (BWSR) has the following overarching expectations for the plan:

Process

- The planning process must follow the requirements outlined in the *One Watershed, One Plan – Operating Procedures for Pilot Watersheds* document, approved by the BWSR Board on June 25, 2014 and available on the BWSR website: www.bwsr.state.mn.us/planning/1W1P/index.html. More specifically, the planning process must:
  - Involve a broad range of stakeholders to ensure an integrated approach to watershed management.
  - Reassess the agreement established for planning purposes when finalizing the implementation schedule and programs in the plan, in consultation with the Minnesota Counties Intergovernmental Trust and/or legal counsel of the participating organizations, to ensure implementation can occur efficiently and with minimized risk. This step is critical if the plan proposes to share services and/or submit joint grant applications.

Plan Content

- The plan must meet the requirements outlined in the *One Watershed, One Plan – Plan Content Requirements for Pilot Watersheds* document, approved by the BWSR Board on September 24, 2014 and available on the BWSR website: www.bwsr.state.mn.us/planning/1W1P/index.html. More specifically, the plan must have:

- A thorough analysis of issues, using available science and data, in the selection of priority resource concerns.
- Sufficient measurable goals to indicate an intended pace of progress for addressing the priority issues.
- A targeted and comprehensive implementation schedule, sufficient for meeting the identified goals.
- A thorough description of the programs and activities required to administer, coordinate, and implement the actions in the schedule; including work planning (i.e. shared services, collaborative grant-making, decision making as a watershed group and not separate entities) and evaluation.

You have selected to develop a Comprehensive Watershed Management Plan, which is an all-inclusive plan that will address surface and groundwater, water quality and quantity, and land use. Implementation actions in the plan will need to consider a broad range of tools, including conservation practices, capital improvements, official controls, and other tools and programs necessary to achieve the goals of the plan. Because this is a comprehensive plan, the list of priority issues we identify below is quite long, however, it is important to note that there is overlap between many of these issues and addressing any one of them will likely have a positive effect on others.

Connection to Research, Scientific Analysis, and Monitoring Data:

Currently, a Watershed Restoration and Protection Strategy (WRAPS) is being developed for the Yellow Medicine River watershed. This document, which is anticipated to be completed later this year, will have valuable information regarding water quality monitoring and trends, pollutant load allocations and water quality goals, and a framework for water quality strategies for this watershed. It is important that the WRAPS and the associated data therein is taken into consideration when developing the watershed-based One Watershed, One Plan. Additionally, BWSR recommends you utilize the Minnesota Nutrient Reduction Strategy (MPCA, September 2014) when considering implementation efforts to address phosphorus and nitrogen. Lastly, BWSR recommends that you review and consider the Sediment Reduction Strategy for the Minnesota River and South Metro Mississippi River, January 2015 developed by the MPCA.

BWSR has identified the following specific priority issues:

- **Water Quality:** Surface and groundwater have many uses in the Yellow Medicine River watershed including drinking water, agricultural and industrial purposes, fishing and swimming. Protecting and improving water quality provides economic, social and environmental benefits. Surface water - the plan should use the information from the WRAPS study (expected draft June 2015) and other water quality data available to prioritize specific water resources and/or sub-watersheds needing land treatment and water quality practices for protection and restoration projects. Measurable reduction goals, including reasonable timelines, to address those priority resources, and target implementation activities to meet those goals, should be a part of the surface water quality strategy. Groundwater - is vital to Yellow Medicine River watershed's prosperity. Groundwater is at risk of overuse and

contamination. State, regional and local governments must work together with citizens and groundwater users to ensure that use of groundwater remains sustainable. Sustainable use of groundwater does not harm ecosystems, water quality, and the ability of present and future generations to meet their needs. The plan will need to address both the protection and wise use of the resource.

- **Altered Hydrology:** Altered hydrology in the Yellow Medicine River watershed has accelerated bed and bank erosion, increased carrying capacity of sediment and nutrients, and caused a loss of aquatic habitat and organisms. The plan should use existing data and inventories to restore more natural hydrology where possible. Changes to the landscape and land use that reduce volume, rates and timing of runoff, as well as increase the base flows, will be needed to prevent continued and further impairments.
- **Drainage System Management:** Drainage system management for multiple purposes will provide water quality and water quantity benefits, in addition to agricultural productivity benefits. The plan should prioritize landscapes and ditch systems and target implementation of drainage water management practices such as buffers, side water inlets, controlled subsurface drainage, saturated buffers, and storage. Many on-field, on-farm and on-drainage system practices can help provide storage (i.e. temporary detention, and also volume reduction for some practices), such as tillage management, cover crops, terraces, water and sediment control basins, side inlets, wetland restorations, culvert sizing and road retention. The plan should also attempt to lay out a coordinated approach for how implementation of drainage water management practices identified in the plan can be coordinated with, and/or integrated into, proceedings initiated by the drainage authorities when undertaking drainage system work. (See criteria outlined in Minnesota Statutes Section 103E.015, Subd. 1, as well as investigating integration of public and private funding and purposes outlined in Subd. 1a.) Drainage law does not mandate leadership of multipurpose water management (only consideration and investigation, but can work with local water planning and management). Water planning and implementation via One Watershed, One Plan is a new opportunity and responsibility to lead the integration of public and private programs and funding for multipurpose water management.
- **Soil Erosion and Sedimentation:** Protecting soil from both water and wind erosion has multiple benefits such as reducing sedimentation, maintaining/improving soil quality, meeting nutrient reduction goals, increasing water storage on the landscape via increased soil organic matter content and water holding capacity in the soil profile, and improving surface water quality. The plan should identify high priority areas for water and wind erosion and sedimentation concerns using available data (WRAPS), inventories, and models/tools, and target implementation efforts for applicable practices to those areas.
- **Flood Damage Reduction:** Flood damage issues are not only a concern to the Yellow Medicine River watershed, but to the Area II Southern Minnesota River Basin Projects area as a whole. Reducing flood damages will provide economic and social benefits and can also provide natural resource enhancements. The plan should develop a strategy and prioritization process for flood damage reduction in the watershed, and further define the types of projects

to be pursued. How will road retention structures, conservation easements, wetland restorations, on-channel storage, off-channel storage, increased soil organic matter and water holding capacity in the soil profile, controlled drainage, and alternative land uses for floodway creation be pursued and coordinated? Hydrologic modeling and inventories of landscape opportunities for applicable practices via GIS, digital elevation data, terrain analysis and field verification are ongoing tools for prioritizing and targeting different practices at the field, farm, drainage system, sub-watershed and watershed scales

- **Shoreland and Riparian Management:** Protecting and restoring riparian and adjacent floodplain resources have multiple benefits by reducing soil erosion, stream channel instability, phosphorus and nitrogen loading, restoring flood attenuation and improving wildlife habitat. The plan should aim to provide consistency across the watershed in meeting Minnesota Shoreland Rules buffer compliance, Chapter 103E buffer strip requirements for drainage ditches, and additional targeting of riparian corridor management to achieve plan objectives.
    - **Note:** Any gaps in official or unofficial controls (ordinances, local policies, etc.) or implementation of those controls across the watershed should be explored in the plan. Examples of these include but are not limited to shoreland buffer enforcement, SSTS compliance inspection requirements (property transfer, variances, etc.), shoreland regulations, level 3 feedlot inventories, and redetermination of benefits and damages for Chapter 103E ditch and tile systems.
- **Wetland Management:** Protection and restoration of wetlands provides benefits for water quality, flood damage reduction, habitat and wildlife. The plan should support the continued implementation of the Wetland Conservation Act and look for opportunities to improve coordination across jurisdictional boundaries. The plan should also identify high priority areas for wetland restoration and strategically target projects and landowner applications to applicable programs for those areas. Wetland and upland restoration higher in the watershed and sub-watersheds can provide storage that benefits more of the downstream areas.
- **Habitat and Wildlife:** Protection and restoration of key habitat complexes and corridors can provide water quality benefits for groundwater and surface water, protection for pollinators, and climate resiliency. The plan should address the protection and restoration of key habitat complexes and corridors throughout the watershed.
- **Emerging issues:** There are a number of emerging issues that could have an effect on water quality and quantity in the Yellow Medicine River watershed. These could include, but are not limited to, climate change, drainage technology, conversion of grassland, changes in crop rotations and cover crops. The Plan should assess strategies related to their resiliency based on expected changes in climate, land use, etc. This includes an understanding and use of current precipitation frequency and distribution information in the National Oceanic and Atmospheric Administration (NOAA) Atlas 14.

- **Data collection and monitoring activities:** Monitoring necessary to support the targeted implementation schedule and reasonably assess and evaluate plan progress are required and should be coordinated.

The state's Nonpoint Priority Funding Plan (NPFP) outlines a criteria-based process to prioritize Clean Water Fund investments. If planning partners are intending to pursue the Clean Water Fund as a source of funding, partners are strongly encouraged to consider the high-level state priorities, keys to implementation, and criteria for evaluating proposed activities outlined in the NPFP.

We commend the Yellow Medicine River watershed partners for your participation in the pilot. We look forward to working with you through the rest of the plan development process. The state's main water management agencies have committed to the One Watershed One Plan approach and will be available to assist you in this process. Do not hesitate to call on them/us to participate and provide information. If you have any questions about this letter, please feel free to contact Mark Hiles at 507-359-6077, or Matt Drewitz at 507-359-6076.

Sincerely,

Mark L. Hiles

Matt Drewitz

Mark Hiles
Board Conservationist

Matt Drewitz
Clean Water Specialist

cc: Jeff Nielsen, BWSR (via email)
Doug Thomas, BWSR (via email)
Melissa Lewis, BWSR (via email)
Al Kean, BWSR (via email)
Lucas Youngsma, MDNR (via email)
Spencer Herbert, MDA (via email)
Amanda Strommer, MDH (via email)
Mike Weckwerth, PCA (via email)
Emily L. Javens, RESPEC Consulting

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
SOUTHERN REGION
261 HWY 15 SOUTH
NEW ULM, MN 56073
507-359-6000

MNDNR

04/17/2015

Yellow Medicine River One Watershed One Plan Planning and Policy Committees
C/O Kerry Netzke
1424 East College Drive, Suite 300
Marshall, MN 56258

Dear Ms. Netzke:

Thank you for the opportunity to comment on the priority concerns and issues addressed in the Yellow Medicine River Watershed One Watershed One Plan (YM 1W1P). The Department of Natural Resources (DNR) appreciates the efforts of the stakeholders involved in this planning process. We look forward to supporting these monumental efforts by participating and providing assistance to ensure the success of the planning process and the implementation of the plan.

DNR staff have reviewed the draft plan and identified priority issues that need to be addressed in order to generate a complete comprehensive plan for improved water quality and watershed health within the Yellow Medicine Watershed.

Priority Issues

We recommend that the YM1W1P planning committee focus their attention on developing sound, science based, defendable goals for addressing the following broad priority issues.

- Altered Hydrology: Land use changes over the past 50-60 years have contributed to accelerated runoff resulting in erosive streams and a much higher runoff "footprint". These changes include conversion of pasture and grass lands to row crops, drainage of wetlands, stream channelization, and increases in the number of miles of drainage ditches and drain tile.

  Land use changes also alter the volume and rate of recharge to aquifers, increasing the vulnerability of our limited and already vulnerable groundwater and surface water resources. Hydrologic trend analysis of long term streamflow data shows evidence of changes in flow volumes and durations across the entire range of flows. Accelerated runoff and the loss of historic holding capacity on the landscape is contributing to higher flood peaks at shorter intervals that causes increased near channel erosion and sedimentation due to streamflow, as well as more frequent and extended low flow periods. *Altered hydrology is considered a major driver of water quality impairments* that adversely affects wetlands, streams, rivers, riparian lands, groundwater recharge and decreases aquatic and terrestrial habitat quality.

  The altered hydrologic connectivity of the watershed to receiving waters is also the major conduit for the transfer of pollutants (nutrients, sediment, and fecal bacteria) as well as a significant stressor of aquatic populations.

APR 2 2 2015

- Lack of Perennial Vegetative Cover: Changes in vegetation across the watershed, particularly the *loss of native and perennial plants are the determinate factor for watershed health.* Changes in agricultural practices including conversion of pasture and hay to row crops and the decrease in small grains and truck crops compared to row crops have decreased the diversity of crops on the landscape as well as the percentage of the watershed in perennial vegetation.

  Lack of perennial vegetation on the landscape reduces the holding capacity of the land to capture rain and snowfall, increases windblown and water driven erosion and degrades habitat.
  - Riparian Lands: Decreases in vegetation cover and vegetative biodiversity on riparian land have contributed to increased channel erosion, unstable river banks, increased flood damage potential to agricultural crops, and decreased wildlife habitat.

- Need for an Informed and Committed Public: Informed public opinion and commitment to better water quality and watershed health is required for a successful implementation of YM1W1P. The methods to fully address water quality impairments and poor watershed health are scientifically documented but are not widely disseminated or accepted by the general public.

  The plan needs to not only identify methods to address impairments, but also provide an educational component to help inform citizens on what is required to achieve these goals. Developing strong partnerships between all entities is essential to gain maximum support from voluntary, regulatory and financial programs.

- Protection of rare, threatened, and high quality features: Much of the Yellow Medicine Watershed has been altered but many unique features still require protection or can be restored through remediation. Similarly, the altered portions of the Yellow Medicine River Watershed are still supporting some features that contribute to a healthy watershed and should be protected from further degradation.

Priority Outcomes

We encourage you to address the above priority issues by focusing on these priority outcomes for your planning effort.

- The prioritization framework for implementing goals or actions should be based on the ability to address multiple priority issues. By promoting projects that truly improve watershed conditions while discouraging projects that degrade watershed health for the sake of improving only one area of concern, the YM1W1P will be consistent with BWSR 1W1P guidance and better compete for limited funding. *Achieving multiple benefits should be a recurring theme throughout the plan.*

- The YM 1W1P should seek to achieve Watershed Health by simultaneously addressing as many of the priority issues as possible. The YM 1W1P must be first and foremost a *plan for managing the landscape within the watershed.* The key to achieving clean, healthy water begins with a healthy watershed landscape.

- The goals identified within the YM1W1P must be vigorous enough to result in a *significant amount of resiliency within the watershed.* Climate uncertainty, catastrophic events, and land-

uses inconsistent with these goals are a reality for which planning and accommodation must be incorporated in the plan.

DNR staff will compile additional supporting information through a series of subsequent letters or reports to provide additional guidance useful in addressing each issue raised above.

We recommend that each of these subsequent communications be utilized by the YM1W1P Planning Committee to help guide their actions and decisions on how to effectively address the priority issues. We will also make available to the YM1W1P Planning Committee any resources DNR can readily provide to achieve the Priority Outcomes identified above. Additionally, we have allocated the staff time of Lucas Youngsma, Marshall Area Hydrologist and other staff to assist you throughout this process.

Sincerely,

Dennis Fredrickson

Dennis Fredrickson
Southern Regional Director

Ec: Lucas Youngsma, DNR Area Hydrologist
Mike Weckwerth, MPCA Project Manager
Mark Hiles, BWSR Board Conservationist
Matt Drewitz, BWSR Board Conservationist
Amanda Strommer, MDH Drinking Water Protection Planner
Spencer Herbert, MDA Pesticide & Fertilizer Mgmt. Soil Scientist

Minnesota Department of Agriculture

Date: 3/25/2015

From: Spencer Herbert
MN Dept. of Agriculture
422 Belgrade Ave. #104
North Mankato, MN 56003

To: Yellow Medicine One Watershed, One Plan Policy Committee
Attn. Kerry Netzke
1424 East College Drive, Suite 300
Marshall, MN 56258

Re: Invitation to Submit Priority Concerns for the
Yellow Medicine River One Watershed, One Plan

As an identified stakeholder, I am writing this letter on behalf of the Minnesota Department of Agriculture (MDA) in response to the request for input for the Yellow Medicine One Watershed, One Plan. The MDA has identified three areas of priority concern that we would like to see addressed in the planning process and resulting plan. These priorities are:

- Agricultural drainage and water management
- Targeting agricultural best management practice (BMP) implementation including but not limited to:
    - Steeply sloping locations to slow water velocity and provide water retention
    - Areas of livestock and animal feeding operations to address fecal coliform impairment in the South Branch
- Fertilizer and pesticide management

The MDA and its staff can offer a wealth of knowledge, research, and experience on these topics. We would be happy to provide any assistance that is needed moving forward to make sure these important topics are included in the planning process and part of a final plan to protect water quality in the Yellow Medicine River Watershed.

Thank you for the opportunity to provide input,

Spencer Herbert
Soil Scientist
MN Dept. of Agriculture

MINNESOTA
MDH
DEPARTMENT OF HEALTH

APR 09 2015

Protecting, maintaining and improving the health of all Minnesotans

April 6, 2015

Kerry Netzke
Executive Director, Area II Minnesota River Basin Projects, Inc.
1424 East College Drive, Suite 300
Marshall, MN 56258

Dear Ms. Netzke:

Subject: Minnesota Department of Health Priority Issues for the Yellow Medicine River One Watershed, One Plan

The Minnesota Department of Health (MDH) Source Water Protection Unit appreciates the opportunity to provide priority water management issues for the Yellow Medicine River One Watershed, One Plan (1W1P). Our agency looks forward to working closely with the local government units, stakeholders, and other agency partners on this watershed planning initiative.

Minnesota Department of Health Mission & Priority Issues

The mission of MDH is to protect, maintain, and improve the health of all Minnesotans. The Drinking Water Protection Program protects public health by ensuring a safe and adequate supply of drinking water at all public water systems, which are those that serve water to the public. MDH implements the federal Safe Drinking Water Act (SDWA) and the State Well Code (MR 4725). Central to each of these is the tenet of public health protection, as accomplished through drinking water protection activities. MDH has a strong focus in groundwater management and protecting drinking water sources.

Protection of groundwater quality and quantity are the top priority issues that MDH encourages the Yellow Medicine River 1W1P to address. The main supply of drinking water to the residents and businesses in the Yellow Medicine River Watershed is groundwater – either from private wells, community wells, or a rural water supply.

Groundwater Quality

MDH Source Water Protection seeks to prevent contaminants such as nitrates, organic and inorganic compounds, and pathogens from entering public water supply wells and groundwater. A very clear benefit of wellhead protection is the emphasis on the prevention of drinking water contamination versus the remediation of a contaminated drinking water supply. The cost of prevention is less than the cost of remediation. Wellhead Protection is a way to prevent drinking water from becoming polluted by managing potential sources of contamination in the area which supplies water to a well. Much can be done to prevent pollution, such as the wise use of chemicals and land use. Public health is protected and expense of treating polluted water or drilling new wells is avoided though wellhead protection efforts. A list of public water suppliers and communities involved with Wellhead Protection is available upon request.

Goals to consider include:

- Maintain safe and adequate public drinking water supplies which meet all state and federal drinking water standards.
- Increase awareness among public officials, land owners, and the general public about the importance of Wellhead Protection in protecting public drinking water supplies.
- Support ongoing data collection efforts to enhance future Wellhead Protection activities.
- Support private well testing and education about groundwater quality.
- Support locating and properly sealing abandoned wells.

MDH is available to assist local partners with understanding the groundwater vulnerability within this watershed. Many of the public water suppliers have low vulnerability which means that the aquifers are protected. However, there is still the potential for contamination through unused and abandoned wells. Unused wells that have not been properly sealed can be a source of groundwater contamination, potentially affecting nearby public and private drinking water wells.

Groundwater Quantity

Groundwater is a limited resource that is impacted by aquifer pumping and by surface water features that rely on groundwater such as streams, wetlands, and lakes. Finding abundant and high quality supplies of groundwater in this area has historically been a challenge; especially in light of altered hydrology and the impacts on groundwater recharge. To secure the integrity of water resources for future generations, MDH is committed to forging long term working relationships with a wide range of partners committed to sustainable stewardship of our natural resources.

Goals to consider include:

- Encourage water conservation efforts and education.
- Encourage land uses and the installation of best management practices which recharge groundwater.
- Increase awareness among public officials, land owners, and the general public regarding the interaction between groundwater and surface water sources in order to make informed water management decisions.

If you have any questions or if there is any way we can be of further assistance, please contact me at (507) 476-4241. We look forward to working with you to draft the water plan.

Sincerely,

Amanda Strommer

Amanda Strommer, Principal Planner
Source Water Protection Unit, Minnesota Department of Health
1400 E. Lyon Street, Marshall, MN 56258

cc: Yarta Clemens-Billaigbakpu, SW Minnesota Hydrologist, Source Water Protection Unit
Mark Wettlaufer, Planning Supervisor, Source Water Protection Unit
Carrie Raber, Planner, Source Water Protection Unit

Minnesota Pollution Control Agency

Marshall Office | 504 Fairgrounds Road | Suite 200 | Marshall, MN 56258-1688 | 507-537-7146

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April 13, 2015

Ms. Kerry Netzke
Executive Director, Area II Minnesota River Basin Projects, Inc.
1424 East College Drive, Suite 300
Marshall, MN 56258

RE: Response to request for water management issues and priority concerns to be addressed in the Yellow Medicine River One Watershed, One Plan

Dear Ms. Netzke:

The Minnesota Pollution Control Agency (MPCA) appreciates the opportunity to provide priority concerns for the Yellow Medicine River One Watershed, One Plan (1W1P).

Summary of Impairments:
In 2010, a holistic approach was taken to assess all of the watershed's surface water bodies for aquatic life, recreation and fish consumption use support, where data was available. For detail on the data behind that assessment, refer to the Minnesota River – Granite Falls Watershed Monitoring and Assessment Report: (http://www.pca.state.mn.us/index.php/view-document.html?gid=19934).

Within the Yellow Medicine River watershed there are 15 stream listings for E.coli, 5 listings for Turbidity, 7 listings for low macro invertebrate IBI scores, 7 listings for low fish IBI scores, and 7 lakes listed for nutrient eutrophication.

Water management issues in the Yellow Medicine River watershed:

Impairments are prevalent across the watershed. Future efforts to control sediment should include measures to hold more water in upland areas and stabilize stream bank channels. Based on the large number of impairments that are likely influenced by the intensive agriculture practices and development in the watershed, stressors to be examined should include: altered hydrology, turbidity, bacteria, biota (aquatic life), nutrients, low dissolved oxygen, and lack of habitat. Addressing nonpoint source pollution would benefit from a targeted approach to BMP placement, identifying areas in the watershed that are likely more prone to be sources and pathways of contamination and working with those landowners to protect and restore those sensitive areas. Collaborating with landowners will help the agricultural economy of the region to move forward in a sustainable way that does not neglect water quality.

After scientific analysis through the Monitoring and Assessment and Stressor Identification in the Yellow Medicine River watershed, there are a number of issues which should be addressed within the 1W1P for implementation activities to improve the conditions of the watershed.

Minnesota Pollution Control Agency
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- Altered Hydrology
  The primary stressor to the majority of the streams in this watershed is altered hydrology. Restoring the hydrology to provide a consistent base flow is imperative for the survival of the biological communities in this watershed. Changes to the landscape that reduce the volume, rates and timing of runoff as well as increase the base flows will be needed to prevent continued and further impairments. Increasing stream buffer width, improving hydrology, as well as improving riparian conditions are activities that need to be considered to reduce impairments.

- Turbidity (Aquatic Life)
  Increases in suspended solids and turbidity, which is a measure of water clarity affected by sediment, algae, and organic matter, within aquatic systems are now considered one of the greatest causes of water quality and biological impairment in the United States (U.S. EPA, 2003). Although sediment delivery and transport are important natural processes for all stream systems, sediment imbalance (either excess sediment or lack of sediment) can result in the loss of habitat in addition to the direct harm to aquatic organisms. As described in a review by Waters (1995), excess suspended sediments cause harm to aquatic life through two major pathways: (1) direct, physical effects on biota (i.e. abrasion of gills, suppression of photosynthesis, avoidance behaviors); and (2) indirect effects (i.e. loss of visibility, increase in sediment oxygen demand). Elevated turbidity levels and Total Suspend Solids (TSS) concentrations can reduce the penetration of sunlight and thus impede photosynthetic activity and limit primary production (Munavar et al., 1991; Murphy et al., 1981). Elevated Volatile Suspended Solids (VSS) concentrations can impact aquatic life in a similar manner as TSS – with the suspended particles reducing water clarity – but unusually high concentrations of VSS can also be indicative of nutrient imbalance and an unstable DO regime. Methods to control sediment entering into the water bodies should be addressed within the plan.

- Bacteria (Aquatic Recreation)
  High levels of bacteria are widespread across the watershed which is the cause of impairments of aquatic recreation. The abundance of feedlots, feedlot runoff, improper manure management and over grazed pastures in the watershed may correlate with this finding. High bacteria levels could also be attributed to noncompliant septic systems which are not well quantified across the watershed.

- Biota (Aquatic Life)
  Aquatic life use impairments within the Yellow Medicine River portion of the HUC8 watershed are complex. Biotic impairments are likely a result of nonpoint source pollution and localized stress linked to poor habitat condition and altered hydrology. High nitrogen levels are likely impacting macroinvertebrate communities, as seen in other watersheds across southwestern Minnesota. Data shows increased nitrate levels were most evident in upper headwater areas of the watershed and subwatersheds, and generally decrease moving east consistent with increased flows seen in this region due to springs. Increases in riparian buffer width and stabilizing stream banks would greatly help the in-stream habitat. More monitoring is needed on those streams to better understand the stress that low dissolved oxygen has on the biological communities.

Minnesota Pollution Control Agency

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- Nutrients (Aquatic life/Eutrophication)
  High levels of nutrients (phosphorus) are driving nuisance algae blooms in the Yellow Medicine Watershed's impaired lakes. Algae blooms can deprive lakes of their oxygen as the algae die off and decay causing fish kills. High levels of algae cause increased levels of turbidity degrading aquatic recreation and aquatic life. Blue green algae can be deadly to humans.
  Management plans focusing on the timing and intensity of the fertilizers and manure application would help reduce the amount of phosphorus in the system. These reductions would also aid in the low dissolved oxygen problems present in the watershed. Further monitoring is recommended watershed wide to better understand the magnitude of stress phosphorus is causing.

The MPCA recognizes all the hard work and cooperation from the local partners within the Yellow Medicine River watershed and offer our continued support in the 1W1P pilot project. Thank you for the opportunity to provide comments during the planning process.

Please contact me if you have any questions or needing additional information.

Sincerely,

Mike Weckwerth, Project Manager
Minnesota Pollution Control Agency
SW Watershed Unit
504 Fairground Road, Suite 200
Marshall, MN 56258
Direct Office Line: 507-476-4267
Michael.Weckwerth@state.mn.us

cc: Mark Hiles, BWSR (via email)
Matt Drewitz, BWSR (via email)
Amanda Strommer, MDH (via email)
Lucas Youngsma, DNR (via email)
Spencer Herbert, MDA (via email)
Scott MacLean, MPCA (via email)

City of Minneota

June 9, 2015

Area II River Basin Projects, Inc.
ATTN: 1W1P Advisory & Policy Committees
1424 E. College Drive, Suite 300
Marshall, MN 56258

Dear Committee Members,

The City of Minneota's Council discussed floodwater issues and possible solutions at their June 8, 2015 meeting. The Council supports the efforts of the 1W1P Advisory & Policy Committees in addressing these issues.

Flood damages to Minneota have existed for decades, it is well documented and alleviation of the flood damages is desired. It is recommended that floodwater retention upstream of Minneota be included in the Yellow Medicine River, One Watershed, One Plan (1W1P) document.

If you have additional questions, please do not hesitate to contact me at 507-872-6144.

Sincerely,

Shirley Teigland
City Administrator

129 E First Street
P.O. Box 307
Minneota, MN 56264

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CITY OF TAUNTON

PO BOX 337
TAUNTON MN 56291
507-872-5950
Email cityoftaunton@centurytel.net

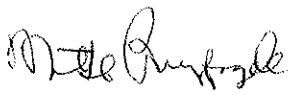
Mayor: Mike Breyfogle City Clerk: Rebecca Jurrens

Monday, June 8, 2015

The City of Taunton recommends that floodwater retention upstream of Taunton be incorporated into the Yellow Medicine River One Watershed, One Plan (1W1P).

Flood damages to Taunton have existed for decades is well documented, and alleviation of the flood damages is desired. It is the city's recommendation that floodwater retention upstream of Taunton be included in the 1W1P document.

Thank you,



Mike Breyfogle
Mayor of Taunton

From: City of Porter
PO Box 130
Porter, MN 56280

To: Kerry Netzke
Area II MN River Basin Projects Inc.
1424 E. College Drive Suite 300
Marshall, MN 56258

RE: One Watershed One Plan

To Attention: 1W1P Advisory and Policy Committees:

On behalf of the City of Porter this letter states that flood damages to Porter have existed for decades, is well documented, and alleviation of the flood damages is desired. It is recommended that floodwater retention upstream of Porter be include in the 1W1P document.

Any questions feel free to give me a call at 507-296-4442

Thank you,

Donald Verschelde

Donald Verschelde
Mayor
6/1/2015

Question:		One Watershed, One Plan Kick-Off Meetings -- March 10,11 & April 13, 2015
What do you value the most about the water resources in the Yellow Medicine River Watershed? What water resources need to be protected or enhanced?	Subcategory	Response
	Agriculture	Crop production/Crop irrigation **
	Beaver control	No beavers
	BMPs	Add additional filter strips and blind intakes on tile systems installed
	BMPs	Have buffer strips around lakes also.
	Buffers Strips	Buffers along the river and streams and also around all field tile intakes.
	Cooperation	Need to work with state and federal agencies to allow projects to be built
	Cooperation	Involve fish and wildlife services.
	Debris	Remove trash (tires, etc) from the river.
	Debris Removal	A clean open flow of the river free of dams or obstructions caused by logs & debris
	Debris Removal	Rivers & Streams need to be clean and unobstructed from dams, fallen trees and manmade obstructions.
	Debris Removal	Unobstructed clean flow of water
	Drainage	Good drainage provided and productive agriculture provided.
	Drainage	I would like to be informed when tiling and itching is to be done upstream and down strean.
	Drainage Management	3/8" maximum drainage co-efficient
	Drainage Management	It is critical for good drainage, move water off land more rapidly for flood control
	Drainage Management	Rain water that enters the Yellow Medicine from field tiles, waste water and run off from both cities and fields
	Drainage Management	Restore altered hydrology
	Drainage Management	Tile improvements
	Eco system	Ability to have productive land balanced with potential wildlife habitat
	Ecosystem	Crops & Wildlife are affected and need a balance action done.
	Ecosystem	Healthy crops & wildlife along waterways & Spring Creek.
	Ecosystem	Healthy eco system (Goal)
	Ecosystem	Healthy ecosystem
	Ecosystem	Must maintain water quality for livestock, fish & wildlife and more importantly human water needs. Protect eco system
	Ecosystem	Lake water from pollution by water fowl notably cormorants on Hawks Nest Lake. The island's trees have been nearly destroyed by cormorant droppings. The whiteness of the dropponsmake the island look like it is buried in show. This lake used to be an excellent habitat for muskrat and shorebirds. This lake is currently used for rearing fish. Fish are not the only wildlife that need habitat.
	Ecosystem	Fish and game/birds - nongame/invertebrates (food for fish)
	Ecosystem	The economic value of rain water that grows crops.
	Education	Provide multiple benefits
	Erosion	Ditch bank erosion
	Erosion	Erosion, excessive run off
	Erosion	Ground Water, clean rivers & streams, lower sediment, clean lakes.
	Erosion	Having good drainage system to reduce erosion
	Erosion	Keep banks from washing out
	Erosion	Less pollution entering streams & river
	Erosion	Less sediments entering streams, river and open ditches
	Erosion	Our river banks need to be protected or restored.

Erosion	Our rivers & drainage ditches
Erosion	Protect water ways from flooding erosion
Erosion	River ditch bank erosion
Erosion	Soil Erosion
Erosion	Stabilize ditch banks
Erosion	Stabilize streambanks that would otherwise erode from flooding
Erosion	Streambank erosion due to excess water
Erosion	Streambank stability
Erosion	Water Resources need to be protected by more grass waterways along lakes & streams
Erosion	Water run off
Erosion	Waterways run off
Erosion	Soil erosion, stream bank erosion, lakeshore development, nitrate pollution.
Erosion	Erosion control.
Erosion	I think work should be done on rivers and ditch banks.
Erosion	Maintenance and stabilizations of streambanks.
Erosion/Debris	I would like to see the trees cleaned out of the river and the trees that are going to fall in be taken down before they take the whole bank.
Flood control	Must try to stop other watersheds flowing over the top and running into the Yellow Medicine Watersheds. (Lots of top soil runs into the river.) * This will help stop the flooding in the Yellow Medicine River keep the ground on the land.
Flood control	Spring Creek - it's clarity & ability to convey run-off without flooding
Flood Control	Flood Control.
Flood Control	Need to control spring or heavy rain flooding.
Flood Control	The retention structures control the flooding, but they do little to protect and control the pollution.
Flood Control	Live mostly on Deer Creek Watershed.
Flood Control	Flood Control.
Flooding	Flooding too often. Backs up high water up the tiles. Drowns out crops.
Flooding	Flooding/High Volume (Concern)
Flooding	Spring Creak has consistently been overflowing especially the last 3 years and has destroyed acres of land farmed for 50 years. We have family's farmed some of these acres and have been flooded out the last 3 years. It is a big problem that needs addressing on a priority basis.
Flooding	Yellow Medicine Section 2 of Swede Prairie & East Yellow Medicine - Spring Creek needs to be cleaned out. Should have been done when petition to clean & deepen was turned down. And even when it wasn't okayed, I understand that 160 quarters of land west of was approved & let in to drain into creek & then the land we rent has flooded over haft the crop acres of that farm which we pay cash rent for. Even the best 42 acres field, which was the gest field is halfway covered & stays flooded into latter part of July so it can't be reseeded.
Funding	Water resources are very important. However, me must be careful some don't make it so expensive that we cause farmers to be put out of business. Taxes are very high now and we must recognize there is a limit what people can pay.
Ground Water	Clean Ground water
Ground Water	Clean Ground water
Ground Water	Ground Water
Ground water	Ground water protection & consumption (irrigation, rural water, etc.)
Ground Water	Ground water quantity, protect from over utilization
Ground water	Ground water recharge and storage needs to be projected (overall less use/wasting of water)

Ground Water	Protect groundwater
Ground Water	The ground water in some areas of the county need to be protected from fertilizer
Ground water/Surface water	Need to project surface & ground water resources
Habitat	The landscape & ecology/geology in & around the water resources. Tremendous streambanks, to flowing cat-tail sloughs, all of them support wildlife, livestock & occasionally nearby crops.
Hydrology	Base flow, restore to healthy contribution levels
Lakes	Protect Cottonwood Lake
Lakes	Shallow lakes, non-flooded wetland
Ordinances	Example of WHAT NOT TO DO: When a large corporation comes into the area to make some cash - weigh the long term costs of the effects to the river. (Washed sand operation). Someone permitted them to put a "temp" (?) culvert in the river. When the water came up in the spring it caused an ice jam and backed up water on my property. When the bank by the ice jam washed out, there was damage by a county bridge as well as damage to the river bank on my property. Should the company that put the culvert in the river be responsible? Or the agency that allowed them to do it? Location: Hwy 19 & Lyon Co. Road 13 North. The culvert is still sitting on their property at this time. They took it out of the river, but too late for me.
Precipitation	Rain to produce crops.
Protection	All resources need to be protected/enhanced
Recreation	Boating & Swimming
Recreation	Clean fishable water
Recreation	Clean lakes & rivers for recreation
Recreation	Clean river water for recreation & wildlife
Recreation	Clean water for recreation
Recreation	Enhance wildlife habitat along water courses.
Recreation	Fish & Recreation
Recreation	Fish & Wildlife
Recreation	I love to fish, camp and hunt. I have noticed the lakes going down hill dramatically over the last 3 years are School Grove, Dead Coon, Lady Slipper, Cottonwood, Yankton, Goose, Wood Lake, Island and Sarah. Pretty much every lake around have that I go to has gone to shit. Several people I know have gotten sick just swimming in some of the lakes around here.
Recreation	Quality & quantity for recreation.
Recreation	recreation (canoe/kayak)
Recreation	Recreational/scenic
Recreation	River for recreational fishing
Recreation	Scenic
Recreation	Spring Creek hinting & fishing
Recreation	Water quality improvement for aquatic recreation (fishing, canoeing, swimming)
Recreation	Recreation.
Sediment	A clean, sediment free river
Sediment	Siltatiation (Concern)
Soil Health	Soil health
Urban Runoff	Areas of 100% runoff need more attention.
Water quality	Availability of water for drinking, household, etc. (clean water)
Water quality	Clean ground water for drinking
Water quality	Clean ground water for drinking is appreciated. We need to protect this resource.
Water quality	Clean lakes

Water quality	Clean the river
Water quality	Clean unpolluted water in ground water and streams.
Water quality	Clean water
water quality	Clean Water
Water quality	Clean Water
Water quality	Clean water
Water quality	Enough quality water for crop production (3)
Water quality	Enough quality water for human consumption (1)
Water quality	Enough quality water for livestock production (2)
Water quality	Good clean water to keep lakes clean
Water quality	Ground water
Water quality	Ground water
Water quality	Ground water recharge protection
Water quality	Ground water to have good water from shallow wells
Water Quality	Having clean and consumable water available to use for everyday life
Water quality	Need to get a way to clean up the water
Water Quality	Priority for MN Department of Health is drinking water quality from ground water sources
Water quality	Protect the ground water.
Water quality	Quality of water
Water quality	Storm events are out of our control, direct intakes seem to be a good start.
Water quality	Streams need to be protected from chemicals/pollution
Water quality	The need for clean water to be used further down stream.
Water quality	The river quality protected & enhanced
Water quality	Water quality
Water quality	Water quality
Water quality	Water quality all around
Water quality	Water quality in lakes and streams
Water Quality	Water quality.
Water Quality	Fail to see the water quality aspect on .5, .3, .8 acre potholes that dot my fields. This is one of the dirty little secrets of the CRP Program.
Water Quality	I think all the water needs to be protected, but should be controlled sensibly - one plan for one farm doesn't all fit to others.
Water Quality	Pollution control.
Water Quality	A less polluted waterway. All.
Water Quality	Water quality to support.
Water Quality	Control sediment to increase floral fanna capacity of the river reproduction of O_2 levels.
Water Quality	Excess water needs to be kept clean.
Water retainage	Being our part of the state tends toward drought, we need to encourage ways to keep more of the water in the uplands instead of finding ways to get rid of it.
Water retainage	Control peak flows
Water retainage	Flood prevention & water retention.
Water retainage	It would be nice if the river would run all summer, instead of flood and run dry. We need to concentrate our efforts toward holding the water in our watershed as long as possible.
Water retainage	Keep water from going downstream
Water retainage	Larger flood water retention projects should be a top priority to reduce flooding erosion
Water retainage	Our lakes, rivers and streams - any body of water that migrates elsewhere

Water retainage	Retain more water on the top end and meter heavy run offs.
Water retainage	Use it for the crops where the rain falls hold it on the cropland & pastures
Water retainage	Water flow volume
Water retainage	Water retention
Water retainage	Water retention
Water retainage	Water retention
Water retainage	Water retention - ground water
Water retainage	Water retention - shallow lakes
Water retainage	Water retention - tributaries & main stem rivers
Water retainage	Water retention on landscape
Water retainage	Water storage on landscape
Water retention	Flood attention, ability to store water on land.
Water retention	More dam projects
Water Retention	Hold water back on the land (Especially in areas that are over aquifers.
Well Sealing	Seal old wells.
Wetland	Wetland protection/restoration
Wildlife	Clean water for fish
Wildlife	Grass land & wildlife **
Wildlife	Wildlife
Wildlife	Wildlife and fish

Question:		One Watershed, One Plan Kick-Off Meetings -- March 10,11 & April 13, 2015
What steps are you personally willing to take to protect or enhance water resources in the Yellow Medicine River Watershed?	Subcategory	Response
	Beaver Control	Eat more beaver
	Beaver Control	Have someone checking beaver dams as they are multiplying rapidly and harming good trees on hills & destructing the
	Beaver Control	Shoot the beaver
	BMPs	Alternative intakes.
	BMPs	Assist implementation to achieve goals and gain multiple benefits
	BMPs	Basins or terraces.
	BMPs	Blind intakes
	BMPs	Careful use of fertilizer
	BMPs	Control flow, plant vegetation
	BMPs	Control soil & sediment to streams
	BMPs	Fall incorporation of manure
	BMPs	Feed lot run off
	BMPs	Fertilize at variable rate
	BMPs	Follow nutrient management plans
	BMPs	Follow university recommendations, include corn covers to build up soil health
	BMPs	Good farming practices protection soil erosion
	BMPs	Grass waterways
	BMPs	Grass waterways on ditch banks
	BMPs	Help remove open intakes
	BMPs	I would be willing to install tile intake systems to minimize sediment entering streams.
	BMPs	Install blind intakes
	BMPs	Manage manure application
	BMPs	Not mowing ditches clear to the bottom
	BMPs	Promote BMPs
	BMPs	The only one not discussed is possible corn crops, reduce tillable, building better health improves filtration, reduces run off and more
	BMPs	Try blind tile inlets
	BMPs	Underground intakes
	BMPs	Variable rate fertilizing
	BMPs	Variable rate fertilizing
	BMPs	I have buffer strips on most of my farmland, plus holding ponds and water retention.
	BMPs	Come up with a plan and start. In this area, buffer strips, basins, waterways and enhanced tile outlets.
	BMPs	DO NOT want to fence creek banks on pastures.
	Buffer Strips	As a conservation staff: establish buffers
	Buffer strips	Buffer strips
	Buffer strips	Buffer Strips
	Buffer Strips	Buffer strips
	Buffer Strips	Buffer zone along river banks
	Buffer Strips	Buffers
	Buffer strips	CREP acres along the river
	Buffer strips	CREP acres next to river
	Buffer strips	Filter strips along creeks and waterways

Buffer strips	Filter strips on county ditches
Buffer strips	Maintain 1 rod buffer on all drainage ditches and rivers
Buffer Strips	Use butter strips along waterways and rivers.
Buffer Strips	More use of CRP buffer strips (corral approach rathan the slick).
Cooperation	As a commissioner, I would support initiatives which align with our local water plan
Cooperation	Assist implementers to accomplish goals while achieving multiple benefits
Cooperation	Assist Large Government Units with plan development & implementation
Cooperation	Attend meetings, pursue collaborative efforts where the combined efforts exceed the sum of the individual parts
Cooperation	Be willing to sit at the table
Cooperation	Contact your local watershed district if you see any problems occurring down stream.
Cooperation	Continue to work with Area II & RCRCA to implement projects and monitor their success
Cooperation	Ensure that I protect the drainage way on my property
Cooperation	I will do whatever it takes to clean up this area.
Cooperation	Let's not turn it into the environmental control
Cooperation	Support 1W1P
Cooperation	Team up with watershed members in getting solutions
Cooperation	Willing to follow the plan set out from these meetings.
Cooperation	Work on water plan
Cooperation	Work with the players to best utilize the existing and potential resources
Cooperation	Work/assist in water studies/projects at work.
Cooperation	Cut fertilizer use in cities, golf courses, work places, etc.
Cooperation	There are numerous ways utilities (cities) can help.
Cooperation	Existing studies have been made by Corps, Universitys on runoff, recharge, etc.
Cooperation	I signed w/MPCA as a water quality sediment volunteer.
Cooperation	Educate lakeshore landowners.
Cover crops	Cover crops
Cover Crops	Cover crops
Cover crops	Cover crops near river
Cover crops	Try Cover Crops
Cover crops	Use cover crops
Debris removal	Clean out trees and channels.
Debris removal	Log Removal
Debris Removal	We try to clean up the dead trees as much as we can but most jobs are too big.
Debris Removal	Having tree falls removed.
Debris Removal	Help in planning tree work is a feasibility.
Debris removal/beaver	Wildlife control (beavers)
Ditch maintenance	Ditch maintenance
Drainage Management	As a conservation staff: encourage reduced flow w/drainage management "slow down water"
Drainage Management	Get Creek cleaned & deepened & all who have water draining or entering in be taxed for it.
Drainage Management	Close intakes with more subsurface tile.
Drainage Management	Tiling to reduce surface runoff and slow down soil erosion into the creeks.
Drainage Management	Removing sedimentation in rivers to increase capacities and flow.
Drainage Management	How about tiling farmable wetlands to increase holding capacity.
Education	Assist with information and education about groundwater
Education	Assist with technical information related to groundwater vulnerability and quality

Education	Help support & promote ideas for a balance on water flow & healthy eco system
Education	I will write a letter to elected officials and I will continue to make people aware of the situation around here.
Education	Information & input meetings, contact & explain experiences covering Spring Creek watershed
Education	It is not all the farmer's fault
Education	Look for new ideas to address sediment & nutrient management resources of the landscape
Education	Use less water for personal use
Education	Biggest fear is loss of local control.
Erosion	Erosion control
Erosion	We need to prevent erosion where it starts and not buffers to try to stop it as a last resort.
Funding	Contact Senator & Representatives to urge them to provide funding.
Funding	Grant funding opportunities
Funding	Legacy funds money can be used to help
Funding	Legacy funds money.
Funding	To equal the playing field, the funding trump card has to be addressed. Those with the gold make the rules, not necessarily the plan holder.
Septic	Proper septic
Septics	Enforce SSTS ordinance, property transfer inspection mandate, bedroom addition and possibly eliminate health risks
Soil Health	Deep banding of phosphorous-potash
Soil Health	Soil health
Soil Health	Soil Tests
Soil Health	Test Soil for Proper application
Streambank Stabilization	Streambank stabilization
Terracing	More terracing on 2T soil
Tile Intakes	Remove drain tile intakes and replace with enhanced subsurface drain intakes.
Tillage	No till
Tillage	Strip till
Tillage Practices	No till crops
Tillage Practices	No till crops
Tillage Practices	Reduce tillage
Tillage Practices	Reduce tillage
Tillage Practices	Reduce tillage practices
Tillage Practices	Soil conservation measures such as not till, less tillage.
Tillage Practices	Leave as much as possible residue on the ground during fall tillage. Apply fertilizer in the spring.
Tillage Practices	Conservation/minimum tillage.
Tillage Practices	Use soil tillage methods that do the most to protect water resources.
Tillage Practices	Conservation tillage practices.
Water Quality	I have noticed that over the last 3 years our lakes are horrible and I want to get them back to where they were 10 years ago.
Water Quality	I will go door to door and speak with the farmers around each of those lakes if I have to. The run off is killing this area.
Water Quality	More water improvements
Water quality	Reduce pollutants
Water Quality	Lakes and streams in this watershed have been eutropic since glacial melt out. To bring the nutrient content to a lesser extent may indeed not be feasible.

Water Quality	I think it is a good idea to clean up our water so long as it doesn't become to expense. As I don't live close to a stream or creek, I am not as directly involved as some who live close to one.
Water retainage	As a conservation staff: restore wetlands to retain water
Water retainage	Control excessive, by retention structures to release accordingly by the capacity of below channel
Water retainage	Hold rainfall where it falls
Water retainage	Small dams
Water retainage	Water retention
Water retainage	Water retention projects
Water Retention	Find ways to slow down the flow of water during heavy ran. West Yellow Medicine County is 800' to 900' high than East Yellow Medicine.
Water Retention	Water retention, dams.
Water Retention	I have installed sediment blockes and retention ponds.
Water Retention	Maintain retention basins.

One Watershed, One Plan Comments Received by Phone, Email, or In Person		
Topic	Comment/Question	Response given
Farm Practice Changes	Received a call today from Bill Evans, a trustee was asking what effect 1W1P would have on the farming practices. This gentleman is responsible for renting out the ground that has been in his family for generations.	
Advocate of Clean Water	Bill Evans is an advocate for clean water and also respects the importance of farming in Minnesota. His only comment was to approach the planning effort and implementation with "balance" in mind. He would like to see a nice balance of water quality benefits to counterbalance any restrictions placed on farming practices to help meet the water quality goals that are identified.	
Agenda 21	Have you heard of Agenda 21?	Need to research.
Funding	What is the source of funding for the "One Watershed One Plan" activitiy?	BWSR is funding project.
Restrictions	What kind of restrictions are going to be put on us landowners. (Yellow Medicine County Land owner)	Invited to the Kick Off Mtg.
Debris	I have spent a lot of time on the river and I can say it's cleaner now than it's ever been in 40 years. There a lot of log jams and beaver dams that will slow down drainage this year.	
Overflow	The one concern I would have is to see the overflow between the Yellow Medicine River and Mud Lake in Yellow Medicine County, Township Normania, Section 26. The beavers have dams in the overflow outlet of Mud Lake and when the river backs up into the lake, it can't drain back down to the river and it kills all the cattails in Mud Lake.	
Lake Level	If the lake level could be controlled like it is on north Spellman Lake to the north, Mud Lake would return to be a great duck slough again. Now it is just open water without much wildlife since the river floods in every couple years.	
Feds & Ducks Unlimited	I know that the Feds and Ducks Unlimited have been talking about a project, I'd like to see everyone get together and make this happen. I have a small tract of land between the river and Mud Lake and am very familar with the area. If you need help please let me know. Kirk Lovsness 507-423-6215	
Buffer Strips	I am concerned about Governor Dayton's push for establishing buffers. I feel that 90% of the ditches are sloped correctly where runoff does not enter the ditch. Mark does agree that areas where the runoff does enter the ditch should be targeted for buffer strips, but that establishing buffers where they are not needed is wasteful. Mark Louwagie	
Incentive to Stockpile Manure	As a past participant in the federal CSP program, Mark Louwagie (507-828-2876) is disappointed that there is not an existing program when farmers could receive incentive payments to stockpile manure to be applied/incorporated in the Fall or Spring as there are obvisous times of the year when manure should not be applied. He would like this to be considered in the Implementation Plan. Charlie Seipel, 507-423-6488.	Invited to be part of the advisory committee.
Water Quality	For the City of Cottonwood, our main concern regardingwater quality in the district continues to be poor water quality in Cottonwood Lake. The lake receives a lot of runoff from nearby farm fields and lawns, and most years experiences significant algae blooms in the summer, making the lake smell and hazardous for recreational purposes. The lake has been listed as impaired by DNR.	Invited to Kick Off Meeting.
Sediment	From what I understand, there are also a lot of sediments that have accumulated in the lake, making the lake more shallow than it has in past decades.	
1W1P	What does the plan consist of?	Described the plan & invited to Kick Off Meeting.
Debris	It surely needs cleaing out the log jams that are present.	
Long Term Goals	What are the long term goals?	
Buffer Strips	For various reason, I see myself against buffers along the river and also against fencing of the river. I know sedimentation is a big problem, but don't currently have an opinion on how to go about stopping it. Harry Guza h.guza@starpoint.net	
Grievances	Fallen trees, don't allow trees to grow along the river bank, slow the the flow of the current in order to manage the quality of the water. When the watershed game began, we lost some interest.	
Concerns	Some landowners feel this project will only generate more government regulations, and they want to stop this. They feel that the state, and the governor, are not concerned with the well being of the landowners and out to destroy their livelihood.	Assured them that is the reason for public meetings.
Buffer Strips	They are concerned about the governor's idea for these filter strips. Will those who own homes along the leaks have to pput in a 50 ft filter strip and how will they be reimbursed?	
Buffer strips/Wildlife	They have heard that the buffer strips will be beneficial for the pheasant population, but that it will increase the coyote population as well. Will the governor come out and hunt coyotes as well? The increase of coyotes will be a big problem for some livestock, sheep in particular, cuase no pollution is caused by their grazing alongside a river.	

APPENDIX I
REVIEWED PLANS

APPENDIX I - REVIEWED PLANS

I.1 WATERSHED PLANS

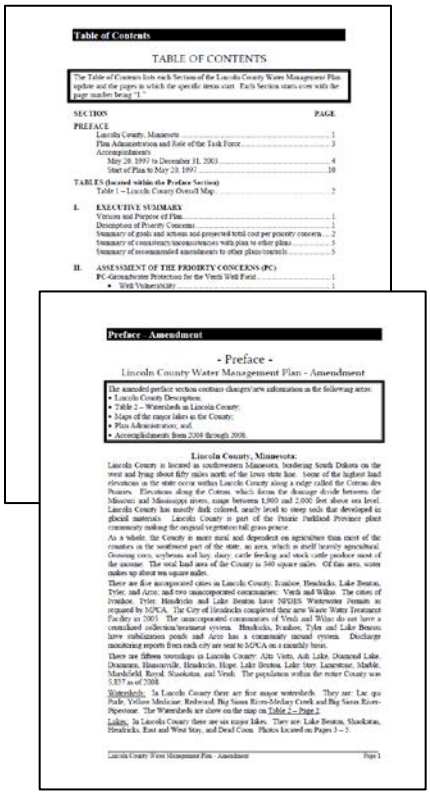
Lac qui Parle County Local Water Management Plan: Serving the Years 2014-2023, With 2014-2018 Implementation Plan

The Lac qui Parle County Resource Commission and Midwest Community Planning, LLC

Lac qui Parle County Water Plan covering the years 2014-2023.

2014 | 209 pp. | full text available online at no cost

http://www.lacquiparleswcd.org/uploads/2/6/6/9/26696833/lac_qui_parle_county_water_plan_2014-23_adopted_1-6-2014.pdf



Lincoln County Water Management Plan and 2009 Amendment

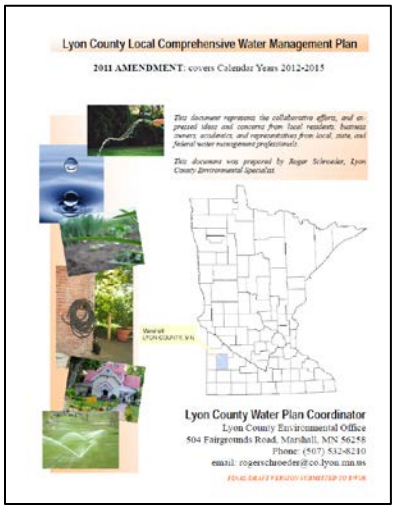
Pauline VanOverbeke, Water Plan Coordinator

The Lincoln County Water Management Plan covers the period September 2004 to August 2014, with an amendment document in 2009.

2004 | 111 pp. | full text available online at no cost

2009 | 45 pp. | full text available online at no cost

http://www.lincolnswcd.net/WaterPlan.htm



Lyon County Local Comprehensive Water Management Plan, 2011 Amendment

Lyon County Water Plan Coordinator

Lyon County Water Management Plan Amendment (2011) covering the years 2012 - 2015

2011 | 24 pp. | full text available online at no cost

http://www.lyonco.org/index.php/departments/lyon-county-soil-water-conservation-district/reports-and-plans/565-local-water-management-plan

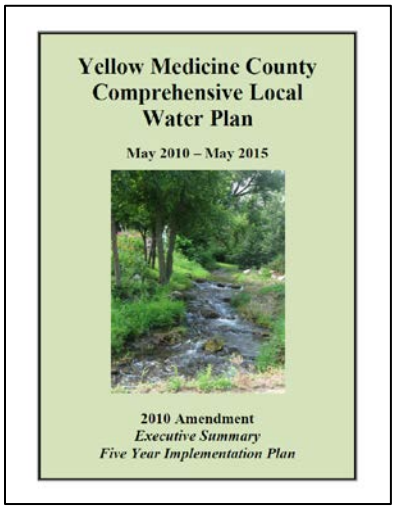
Yellow Medicine County Local Water Plan

Yellow Medicine County and Midwest Community Planning, LLC

Yellow Medicine County Water Management Plan covering the years 2005-2014

2004 | 85 pp. | full text available online at no cost

http://www.co.ym.mn.gov/index.asp?Type=B_BASIC&SEC={C3C725AC-DAA1-4C6C-A5D2-F07B9F71C951}&DE={132CFFED-5209-417E-B530-91BAB8CA4CB9}



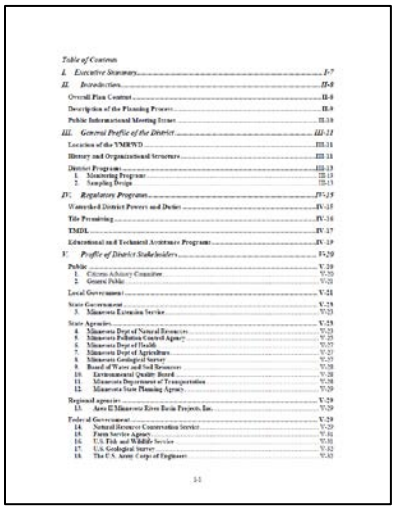
Yellow Medicine County Comprehensive Local Water Plan: 2010 Amendment

Yellow Medicine County Water Task Force Committee

Yellow Medicine County Water Management Plan Amendment covering May 2010 – May 2015

2004 | 85 pp. | full text available online at no cost

http://www.co.ym.mn.gov/index.asp?Type=B_BASIC&SEC={C3C725AC-DAA1-4C6C-A5D2-F07B9F71C951}&DE={132CFFED-5209-417E-B530-91BAB8CA4CB9}



Yellow Medicine River Watershed District Watershed Management Plan

Yellow Medicine River Watershed District

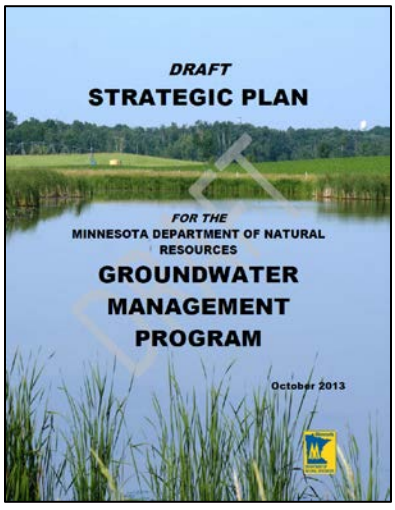
Yellow Medicine River Watershed District (2009), "Yellow Medicine River Watershed District Watershed Management Plan."

Yellow Medicine River Watershed District 10-Year Watershed Management Plan.

2009 | 116 pp. | full text available online at no cost

http://www.ymrwd.org/report.pdf

I.2 STATE WIDE PLANS



Draft Strategic Plan for the Minnesota Department of Natural Resources Groundwater Management Program

Minnesota Department of Natural Resources

Statewide strategic plan for groundwater use to maintain ecosystems, water quality, and groundwater availability.

2013 | 16 pp. | full text available online at no cost

http://files.dnr.state.mn.us/waters/gwmp/gwsp-draftplan.pdf

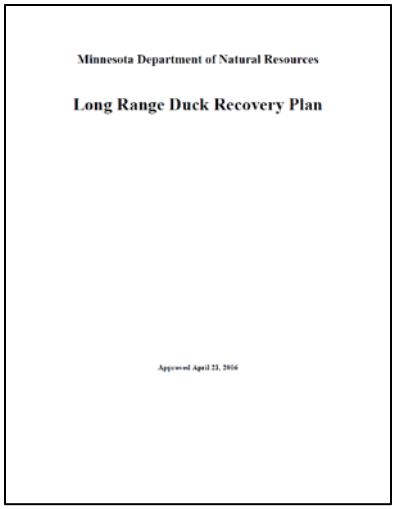
Fish Habitat Plan: A Strategic Guidance Document

Minnesota Department of Natural Resources

Statewide plan for protection and restoration of fish habitat in Minnesota's lake and streams.

2013 | 40 pp. | full text available online at no cost

http://files.dnr.state.mn.us/fish_wildlife/fisheries/habitat/2013_fishhabitatplan.pdf



Minnesota Department of Natural Resources Long Range Duck Recovery Plan

Minnesota Department of Natural Resources

Minnesota Department of Natural Resources (2006), "Minnesota Department of Natural Resources Long Range Duck Recovery Plan."

Statewide plan to restore breeding and migrating duck populations in Minnesota

2006 | 24 pp. | full text available online at no cost

http://files.dnr.state.mn.us/recreation/hunting/waterfowl/duckplan_042106.pdf

Minnesota Nitrogen Fertilizer Management Plan – Public Comment Draft

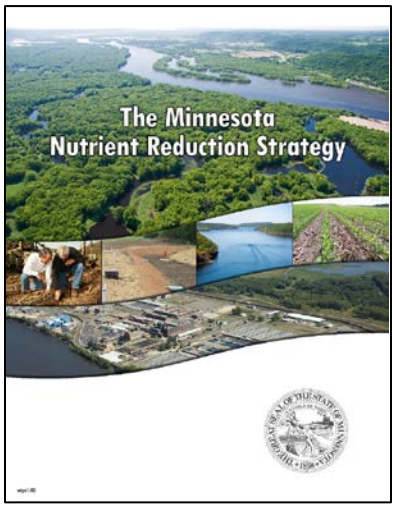
Minnesota Department of Agriculture

Minnesota Department of Agriculture (2013), "Minnesota Nitrogen Fertilizer Management Plan – Public Comment Draft."

Statewide plan for prevention and minimization of nitrogen fertilizer effects on groundwater.

2013 | 130 pp. | full text available online at no cost

http://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan/~/media/Files/chemicals/nfmp/2013nfmpdraft.pdf



The Minnesota Nutrient Reduction Strategy

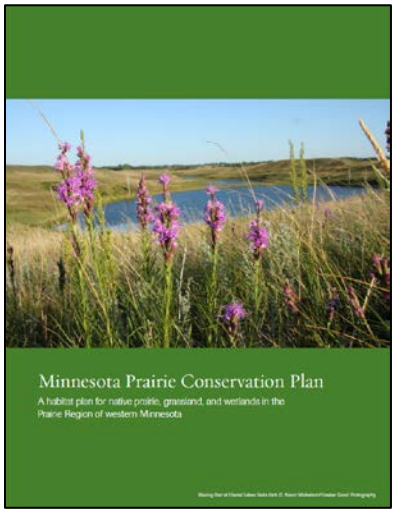
Minnesota Pollution Control Agency

Minnesota Pollution Control Agency (2014), "The Minnesota Nutrient Reduction Strategy."

Statewide plan to reduce nutrient concentrations and export in Minnesota's rivers and lakes in order to meet water quality goals.

2014 | 348 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=20213



Minnesota Prairie Conservation Plan

Minnesota Prairie Plan Working Group

Statewide plan for prairie conservation.

2011 | 55 pp. | full text available online at no cost

http://files.dnr.state.mn.us/eco/mcbs/mn_prairie_conservation_plan.pdf

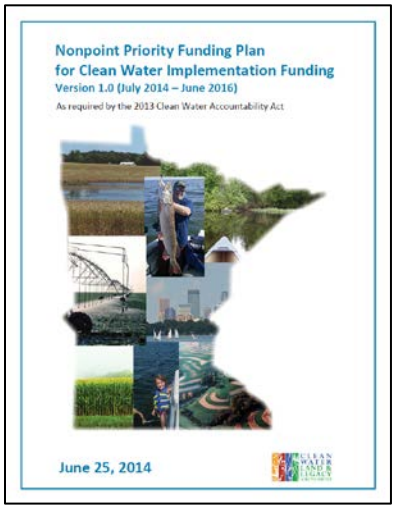
Minnesota's Nonpoint Source Management Program Plan 2013

Minnesota Pollution Control Agency

Plan documentation for Minnesota's efforts to address nonpoint source pollution to improve water quality.

2013 | 398 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=19810



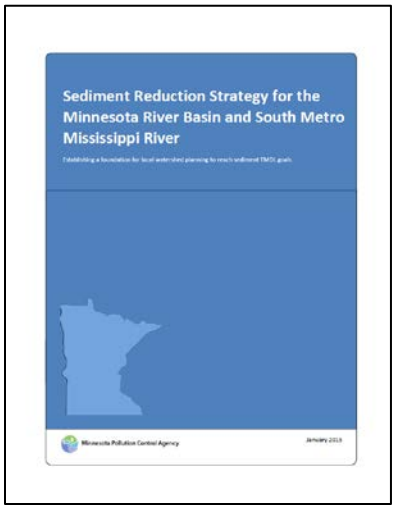
Nonpoint Priority Funding Plan for Clean Water Implementation Funding

Minnesota Board of Water and Soil Resources

Document summarizing statewide priorities for funding of Clean Water Fund projects, keys for implementation, evaluation criteria for proposed projects, and cost estimates for implementation.

2014 | 46 pp. | full text available online at no cost

http://www.bwsr.state.mn.us/planning/npfp/NPFP%20Final.pdf



Sediment Reduction Strategy for the Minnesota River Basin and South Metro Mississippi River

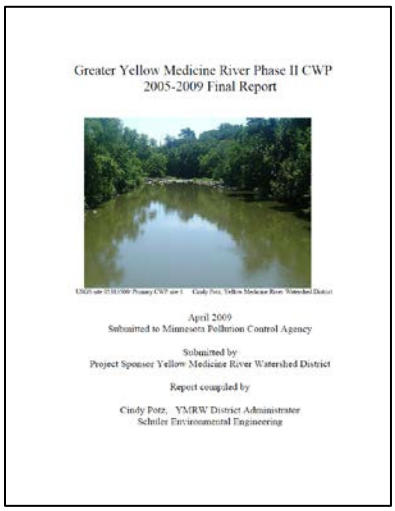
Minnesota Pollution Control Agency

Plan to reduce sediment loading and export in the Minnesota River basin and South Metro Mississippi River to meet TMDL goals.

2015 | 67 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=20703

I.3 WATERSHED STUDIES



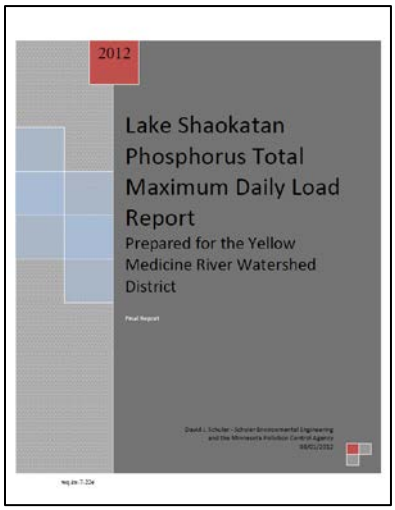
Greater Yellow Medicine River Phase II Clean Water Partnership 2005-2009 Final Report

Yellow Medicine River Watershed District and Schuler Environmental Engineering

Summary of Clean Water Partnership Phase II activities.

2009 | 13 pp. | full text available online at no cost

http://www.ymrwd.org/April%202009%20Final%20YMR%20CWP%20Implementation%20Report.pdf



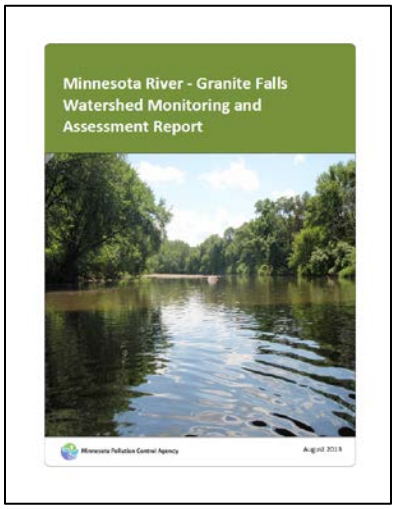
Lake Shaokatan Phosphorus Total Maximum Daily Load Report

David J. Schuler & Minnesota Pollution Control Agency

Phosphorus TMDL Report for Lake Shaokatan.

2012 | 54 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=18690



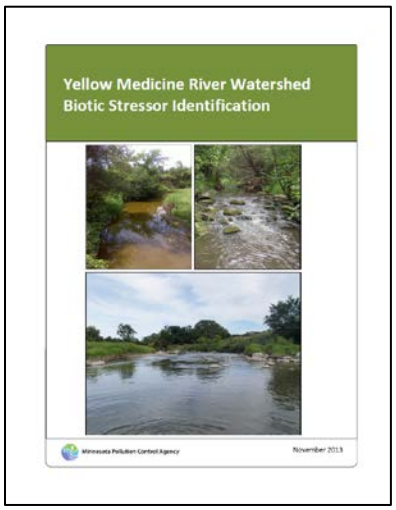
Minnesota River–Granite Falls Watershed Monitoring and Assessment Report

Minnesota Pollution Control Agency

Report of watershed monitoring and assessment activities in the Minnesota River – Granite Falls watershed.

2013 | 204 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=19934



Yellow Medicine River Watershed Biotic Stressor Identification

Minnesota Pollution Control Agency

Identification of stressors that correlate to IBI results from biological monitoring and assessment.

2013 | 93 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=20257

Yellow Medicine River Watershed Biotic Stressor Identification Summary

Minnesota Pollution Control Agency

Summary of the related report, which identified stressors correlating to IBI results from biological monitoring and assessment.

2013 | 2 pp. | full text available online at no cost

http://www.pca.state.mn.us/index.php/view-document.html?gid=21065

APPENDIX J
UNIVERSITY OF MINNESOTA
COMMUNITY READINESS SURVEY RESULTS

UNIVERSITY OF MINNESOTA
EXTENSION

ONE WATERSHED, ONE PLAN: YELLOW MEDICINE RIVER PILOT AREA

Community Readiness Survey Results

EXECUTIVE SUMMARY

In Fall 2014, University of Minnesota Extension assessed the community readiness for each watershed area piloting the *One Watershed, One Plan* using a watershed readiness survey. For the purposes of the *One Watershed, One Plan*, community readiness is defined as the degree to which Local Governmental Units (LGUs) are prepared to take collaborative action on water resource issues, such as water quality. Collaborative action is critical when addressing public issues, such as water quality, that are complex and beyond the scope of any single jurisdiction.

This survey, which is intended to evaluate the *One Watershed, One Plan's* contribution to strengthening collaboration among Local Government Units (LGUs) in the pilot watersheds, will be repeated at the end of the *One Watershed, One Plan* process to measure and document changes in collaboration between LGUs.

The survey focused on six dimensions of readiness. As seen in the table below, the Yellow Medicine River Watershed had the highest overall readiness score. It scored particularly high overall and in comparison to the other pilot watersheds surveyed on two domains: program capacity and relationships among LGUs.

Domains of Readiness	Watershed 1	Watershed 2	Yellow Medicine River Watershed	Watershed 4
Issue Awareness	54.0	50.0	52.0	50.0
Community Attitudes	66.0	64.0	64.0	66.0
Program Capacity	60.0	61.0	66.0	50.0
Relationships Among LGUs	50.3	47.8	66.5	48.9
Barriers Affecting Collaboration (higher means fewer barriers)	68.0	72.0	66.0	76.0
Watershed Leadership	64.0	64.0	62.0	60.0
Overall Readiness	**60.4**	**59.8**	**62.7**	**58.5**

The intent of this document is to provide an in-depth summary of survey results for the Yellow Medicine River pilot area and invite reflection on the results.

This report was compiled by the following staff from University of Minnesota Extension:

- Scott Chazdon, Ph.D., Evaluation and Research Specialist, Extension Center for Community Vitality
- Douglas Malchow, Extension Educator, Water Resources
- Karen Terry, Extension Educator, Water Resources
- Barbara Radke, Extension Educator, Leadership and Civic Engagement

With thanks to Somongkol Teng and Rachel Olm, University of Minnesota graduate students, for support in data collection and analysis

ONE WATERSHED, ONE PLAN: YELLOW MEDICINE RIVER PILOT AREA

Community Readiness Survey Results

INTRODUCTION

Community readiness is the degree to which a community is ready to make decisions and/or take action on an issue. For the purposes of the *One Watershed, One Plan*, community readiness is defined as the degree to which Local Governmental Units (LGUs) are prepared to take collaborative action on water resource issues, such as water quality. Collaborative action is critical when addressing public issues, such as water quality, that are complex and beyond the scope of any single jurisdiction.

In Fall 2014, University of Minnesota Extension assessed the community readiness for each watershed area piloting the *One Watershed, One Plan* using a watershed readiness survey. BWSR's vision for One Watershed, One Plan is to align local water planning on major watershed boundaries with state strategies towards prioritized, targeted and measurable implementation plans – the next logical step in the evolution of water planning in Minnesota. In June 2014, the BWSR Board selected five watershed planning boundaries for piloting One Watershed, One Plan: Red Lake River, Lake Superior North, North Fork Crow River, Yellow Medicine River, and Root River. These pilot watershed areas will organize and develop watershed-based plans over the next year and a half. This report summarizes the survey results for the Yellow Medicine River Watershed. The Appendix to this report includes the full text of the survey questions as well as the survey results grouped by staff and board members responses.

This survey will be repeated at the end of the *One Watershed, One Plan* process to measure and document changes in collaboration between Local Government Units (LGUs) in the pilot watersheds that result from the process.

It also provides information to the LGUs about the areas in which collaboration already exists and the areas in which collaboration could be improved. The survey focuses on six dimensions of readiness. These are:

- Issue Awareness
- Community Attitudes
- Program Capacity
- Relationships among LGUs
- Barriers Affecting Collaboration
- Watershed Leadership

The intent of this document is to provide an in-depth summary of survey results for the Yellow Medicine River pilot area and invite reflection on the results. **To this end, discussion questions are included throughout the report, and insights from local watershed representatives, which we hope to gather over the new few months, will be incorporated into this report.**

SURVEY RESPONSES

Table 1.

LGU	# Reponses	# Surveys Sent	Response Rate
Area II MN River Basin Projects, Inc.	1	1	100.0%
Lac qui Parle County	1	7	14.3%
Lac qui Parle SWCD	4	9	44.4%
Lincoln County	2	7	28.6%
Lincoln SWCD	6	9	66.7%
Lyon County	4	6	66.7%
Lyon SWCD	6	9	66.7%
Yellow Medicine County	2	6	33.3%
Yellow Medicine River WD	3	5	60.0%
Yellow Medicine SWCD	5	9	55.6%
Total	**34**	**68**	**50.0%**

Response rates varied quite a bit by LGU. The response rates on their own provide some baseline "data" about the current commitment to watershed-level work, but they also may reflect the extent to which the LGUs serve the watershed.

Discussion questions

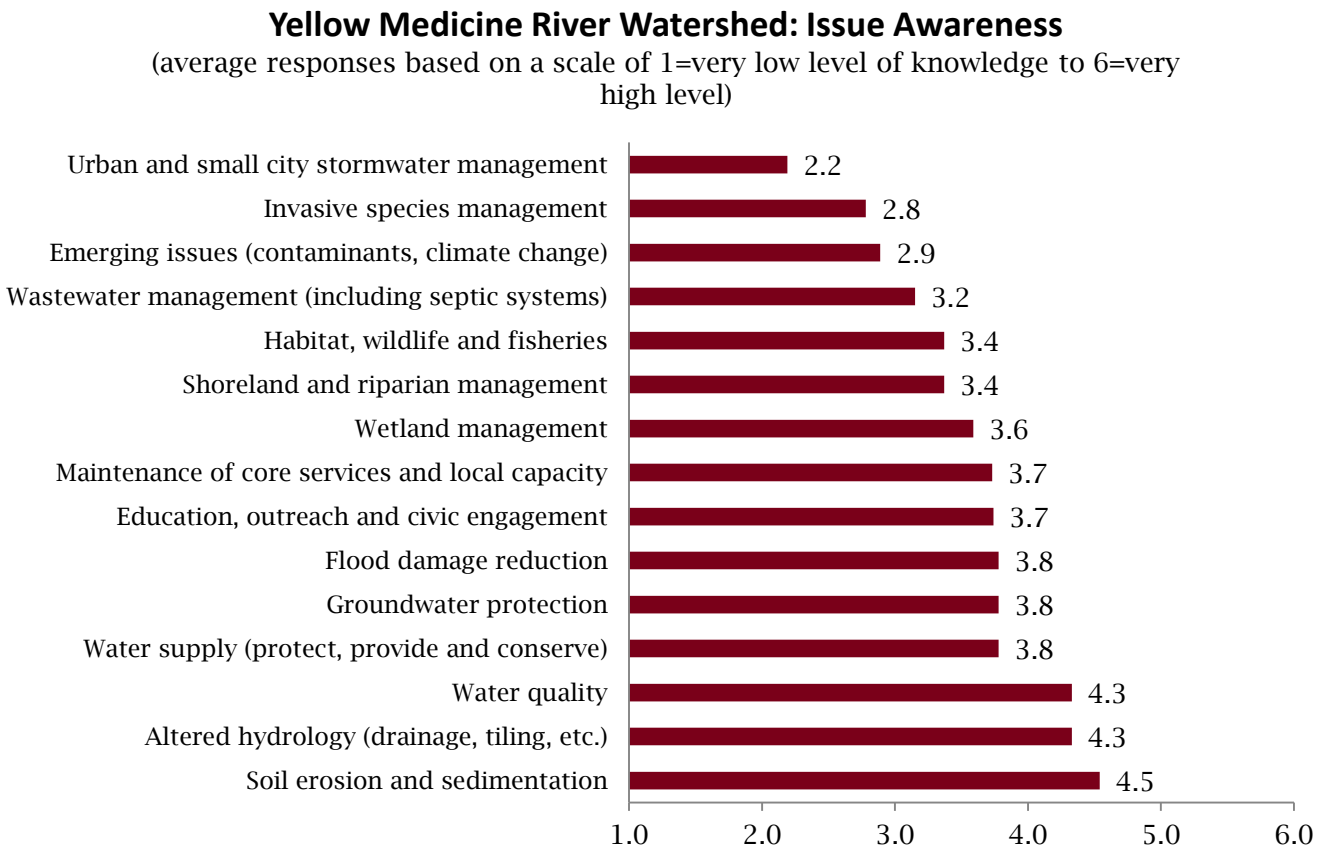
What do you think drove the low response rates in some of these LGUs?

Might higher response rates at the end of the pilot be an indicator of success for the Initiative?

ISSUE AWARENESS

In the first domain of readiness, participants were asked about their level of knowledge about a range of water resource topics.

Figure 1.



The overall average response to these items was 3.6. Keeping in mind that the mid-point of the scale is 3.5, there is a moderate level of issue awareness about most of these topics and therefore room for improvement. There were relatively high levels of awareness reported for water quality, altered hydrology and soil erosion issues.

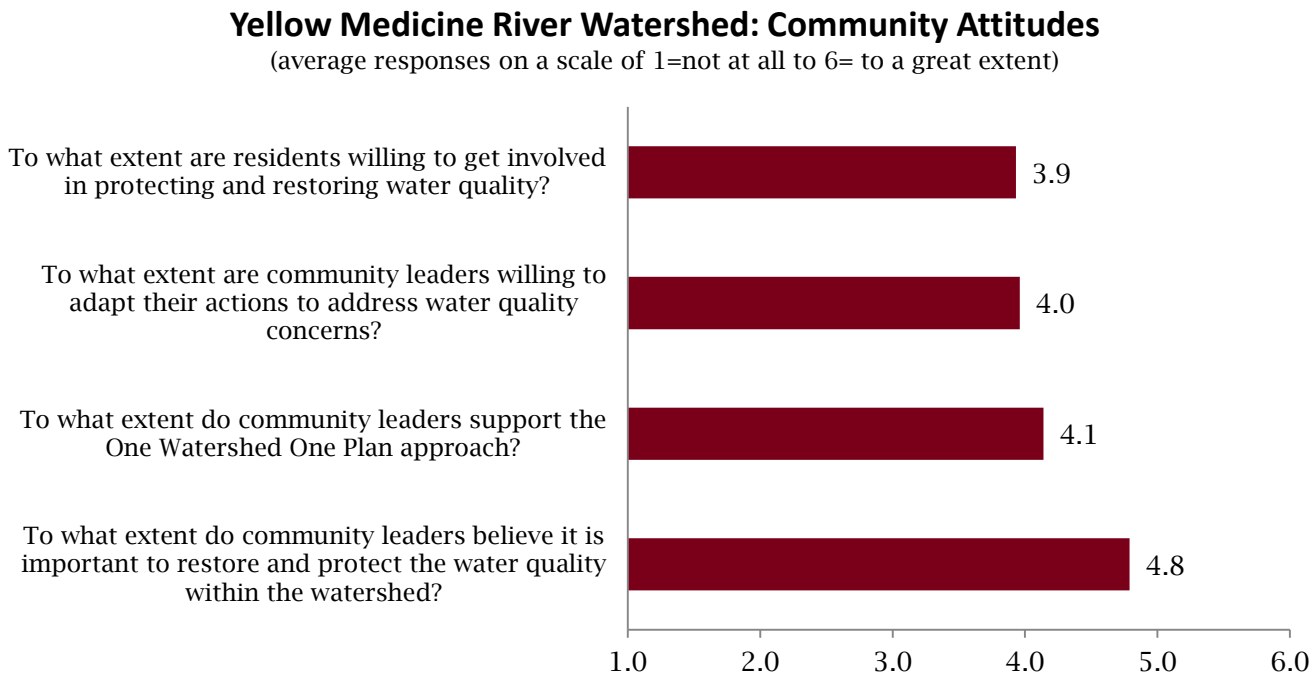
Discussion questions

What insights do you have about the levels of issue awareness that were reported? Are there particular issues that had more or less reported awareness than you would expect?

COMMUNITY ATTITUDES

Participants were asked four questions about community attitudes regarding water quality issues.

Figure 2.



The average overall response for these items was 4.2, well above the mid-point of the response scale. The item on the extent that leaders believe in restoring and protecting water quality received a higher average response than the other items, suggested that there is strong concern about water quality issues, but perhaps not as strong of a commitment to action. Board members also gave each item a higher score than staff members (see Appendix).

Discussion questions

What insights do you have about the responses to these items?

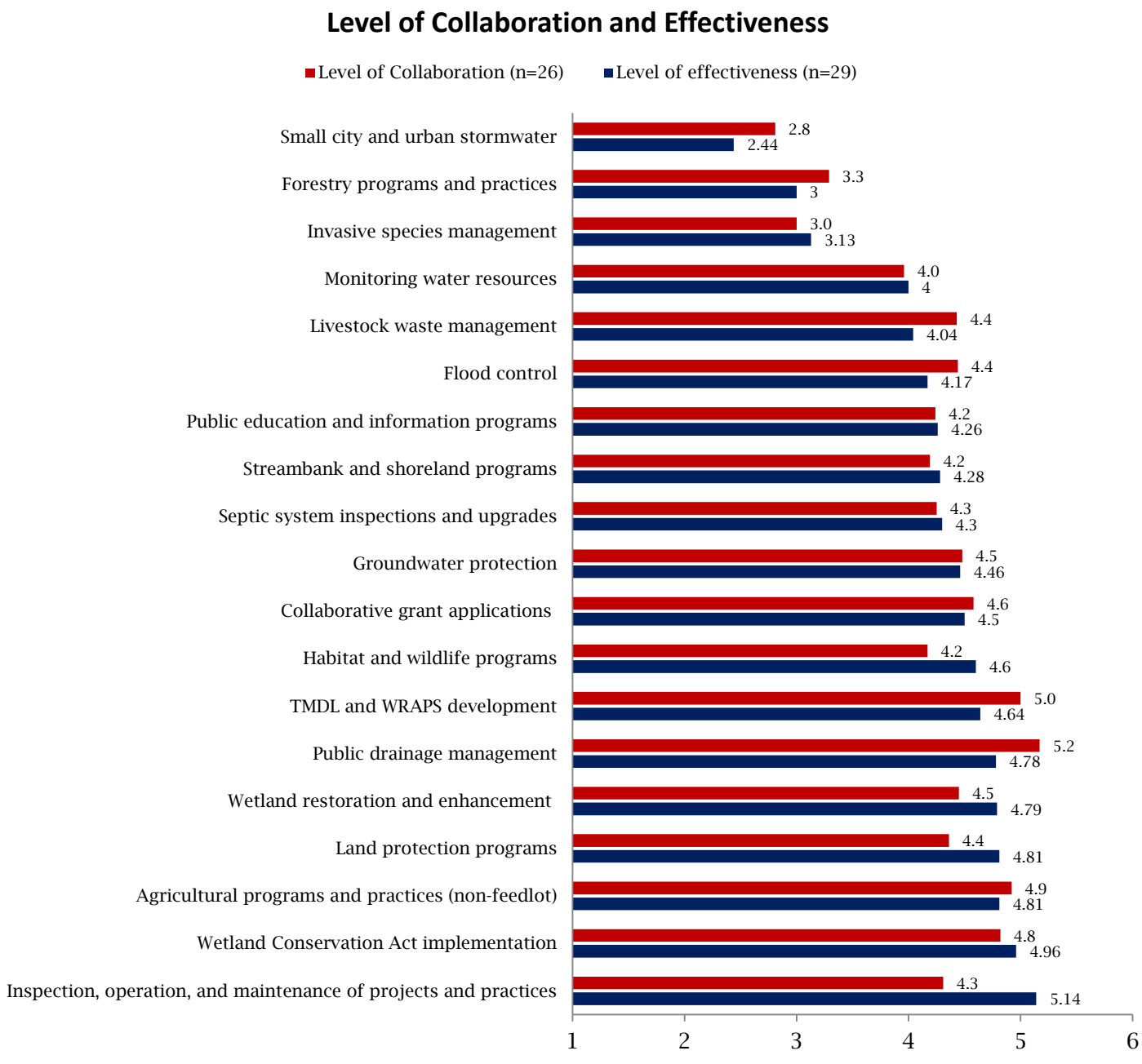
Why would the responses of board members and staff members be different?

What would encourage community leaders to stay engaged with the process through planning and implementation?

PROGRAM CAPACITY: LEVELS OF EFFECTIVENESS AND COLLABORATION

Participants were asked to rate their organization's level of effectiveness as well as their level of collaboration on a range of projects, programs, and activities.

Figure 3.



Perceived levels of effectiveness and collaboration were relatively high, with the average overall response to the effectiveness items of 4.27 and to the collaboration items of 4.26. Almost all items were above the mid-point of 3.5. The levels of effectiveness reported were similar to the

levels of collaboration, with the exception of the inspection, operation, and maintenance item. Effectiveness levels were reported to be higher than collaboration levels for that item.

While board and staff members overall reported similar levels of effectiveness, board members reported higher effectiveness in flood control (see Appendix).

Questions for discussion:

What insights do you have about the responses to these items?

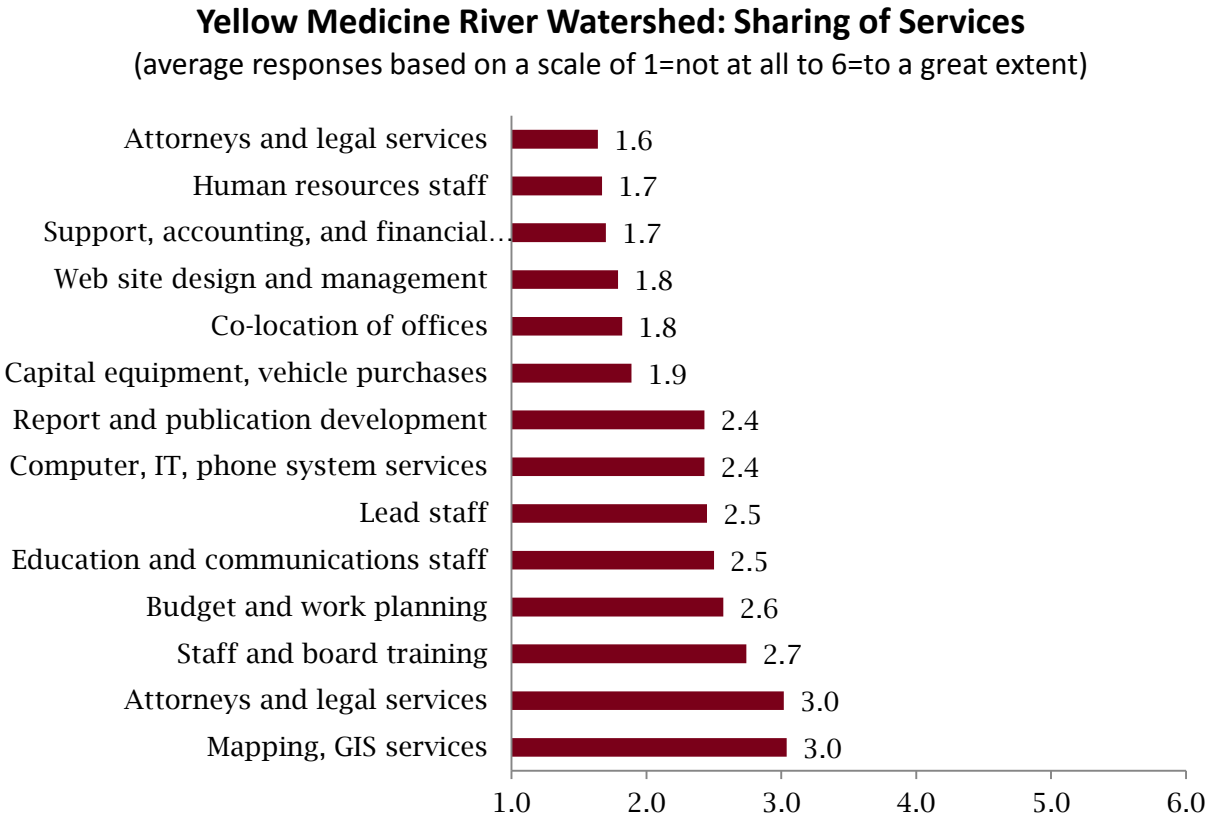
Are there programs here than could be strengthened via collaboration, or via technical assistance?

Is there anything that we can learn from how they collaborate on agricultural programs to improve collaboration in other areas where more collaboration is needed?

COLLABORATION: SHARING OF SERVICES

Participants were asked to what extent [in the past 12 months] their organization had shared any of the following operational and program services with other LGUs in the watershed.

Figure 6.



There was relatively little service sharing reported by the LGUs. The average overall response to these items was 2.3. On many items board responses were slightly higher than staff responses (see Appendix). Board responses were particularly higher on lead staff, co-location of offices, attorneys and legal services, and capital equipment.

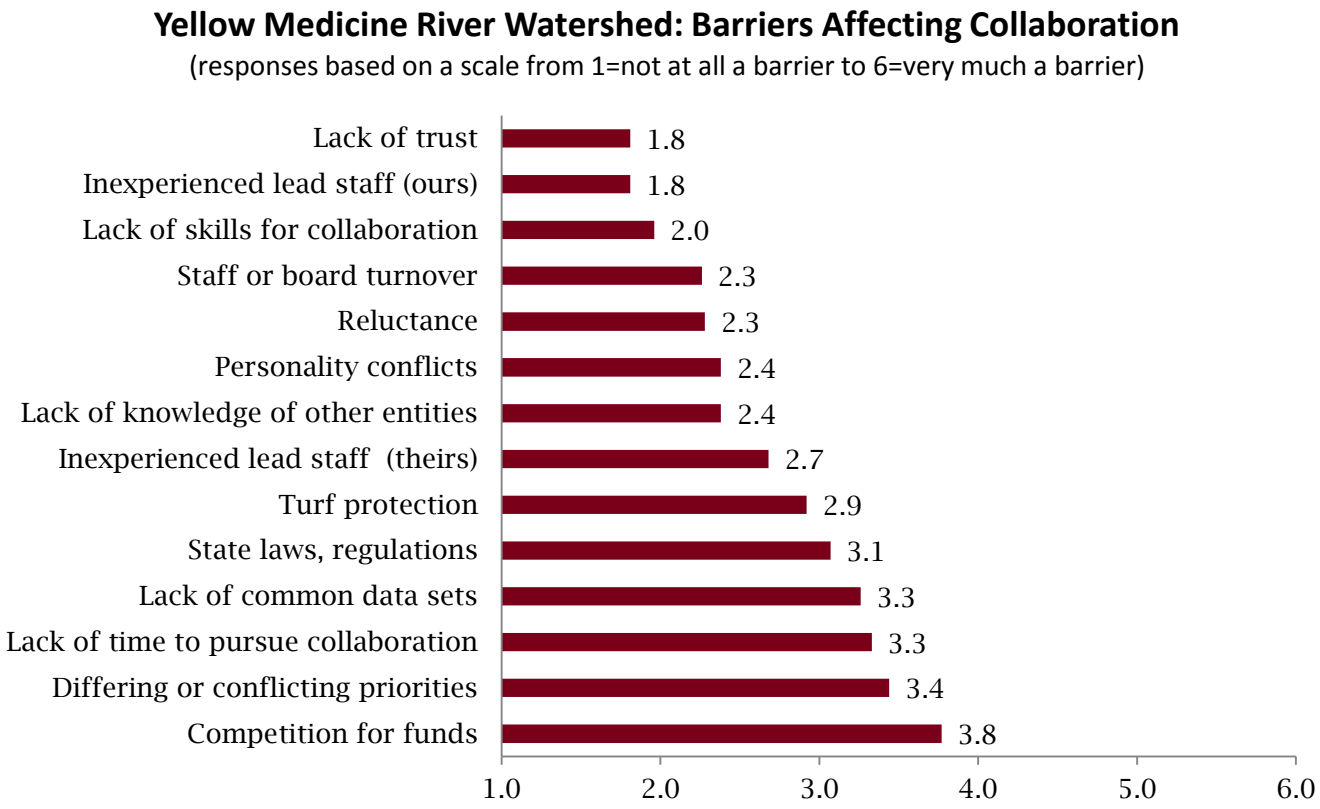
Questions for discussion:

What opportunities do you see here for service sharing to help move *One Watershed, One Plan* forward?

BARRIERS AFFECTING COLLABORATION

Participants were asked to what extent the following barriers affected their collaboration with other local water management entities in the watershed.

Figure 4.



The lower scores reflect lesser barriers and the higher scores indicate greater barriers. Most of the potential barrier items were not perceived as serious concerns, but a few did receive a rating over 3. The average overall response to these items was 2.7. The item that was reported as the most substantial barriers to collaboration was competition for funds.

Questions for discussion:

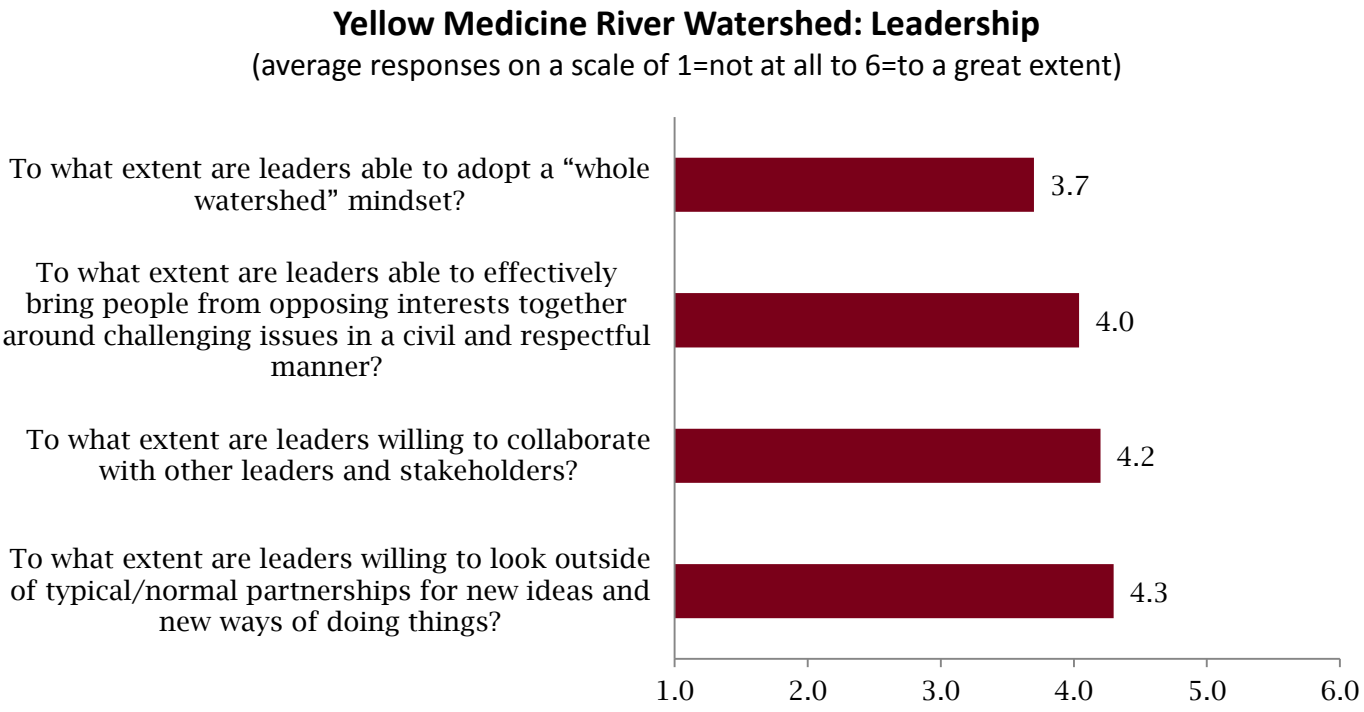
What insights do you have about the responses to these items?

What insights do you have about the items identified as more larger barriers and how they might be addressed as part of the *One Watershed, One Plan*?

WATERSHED LEADERSHIP

Participants were asked four questions on watershed leadership. The word "leader" in the questions refers to anyone who has a formal (elected or appointed position) or informal leadership role in the watershed. This includes anyone in the watershed who is able to influence others even if not in a formal, decision-making, or positional leadership role.

Figure 5.



The average overall response to these items was 4.1. The relatively high level of responses to these questions may reflect work already done in the watershed to build leadership and civic engagement skills. However, the responses of board members were notably higher than those of staff members (see Appendix).

Questions for discussion:

What insights do you have about the responses to these items?

Why might board members respond differently than staff members?

What insights does this graphic provide?

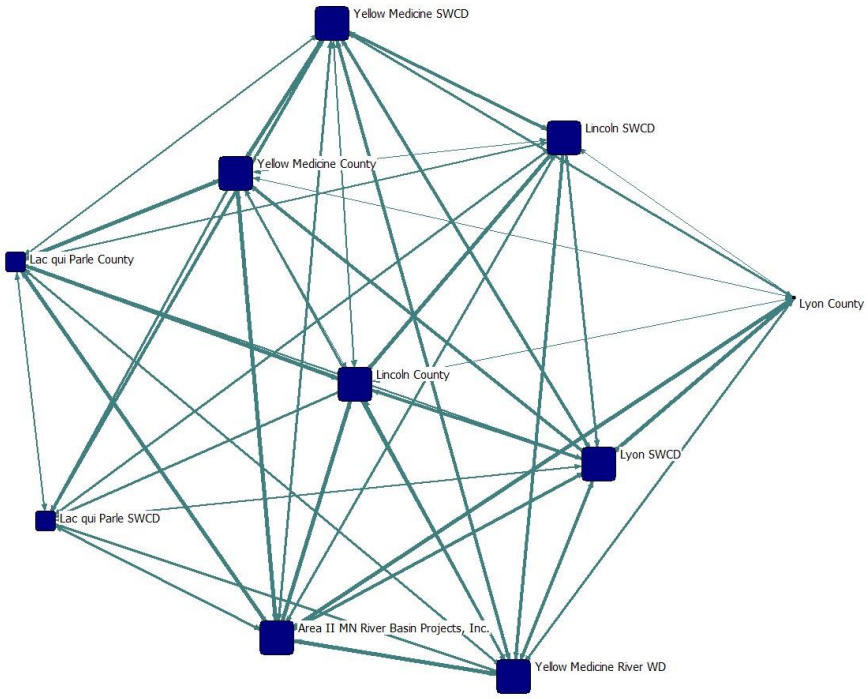
ORGANIZATIONAL NETWORK ANALYSIS

The understanding of organizational networks is an important aspect to addressing public issues such as water quality. Skillful use and weaving of networks can increase capacity to address water quality by enhancing the social and human capital to work on the issue. A fundamental first step is understanding what networks currently exist.

Social Network Analysis (SNA) is a method for focusing on patterns of relationships and tracking changes in these patterns over time. It helps to visualize, as well as quantify, the depth and breadth of relationships within or among organizations – in this case a visual mapping of the organizational network of LGUs within a watershed. As a general rule, strong networks look like webs, with most of the organizations reporting connections to most of the other organizations. Weaker networks have more of a star-like shape, with one or two core "connector" organizations and a larger group of less-connected organizations on the periphery.

The Yellow Medicine River Watershed LGUs were asked about the frequency of information sharing and collaboration they had with the other LGUs in the watershed during the past year. Because more than one person per LGU responded to the survey, the scores for all staff and board members associated with each LGU were averaged. Figure 7 displays the information sharing network.

Figure 7.
Information Sharing Network



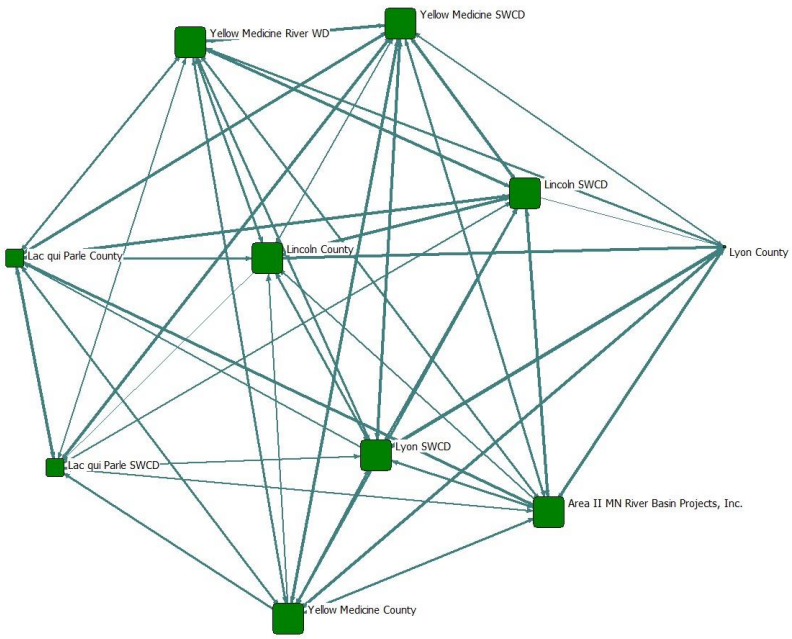
Each LGU is featured as a blue square. The lines represent reported connections among LGUs. The thicker the connecting line, the more frequently information is shared. No line between LGUs indicates that no information sharing relationship was reported for that pair of organizations.

The arrows show the direction of reported relationships. For example, Yellow Medicine County and Lincoln County each reported strong information with each other.

Overall, this information sharing network has a density of 85.6%. This means that of all possible information-sharing connections between LGUs, 85.6% were reported, which is rather high. A follow-up survey in one year will provide an opportunity to see if the *One Watershed, One Plan* initiative has increased the connections and strengthened this network.

The Yellow Medicine River Watershed LGUs also were asked about the frequency of collaboration they had with the other LGUs in the watershed during the past year. Figure 8 displays these deeper, collaborative relationships.

Figure 8. Collaboration Network



This overall network had a density of 87.8%, very similar to the density of the information sharing network and relatively high as well. This suggests that when LGUs in the watershed are engaged with each other, they are typically engaged for both information sharing and collaboration.

Questions for discussion:

Are there relationships that were not reported?

What are the implications, if any, of the position of the Crooked Creek WD for moving forward with effective collaboration in the Yellow Medicine River watershed?

What opportunities do you see here for information sharing or collaboration to help move *One Watershed, One Plan* forward?

COMPARISON OF THE FOUR LGUs SURVEYED TO DATE

Table 2 provides information on the overall readiness of the Yellow Medicine River Watershed to collaborate on water quality issues. The readiness survey measured six different domains of community readiness. For ease of comparison, responses to questions concerning each domain of readiness were combined, averaged, then converted to a uniform "score" on a 0 to 100 scale.

Responses to questions about barriers were reversed so that a high score reflects fewer barriers.

These scores are intended as starting points for talking about strengths and challenges in the watershed. The data are only reflective of the responses received from each watershed, but provide a very useful baseline measure of the six domains of readiness.

You can read this table by reading across— comparing the different watershed on each domain of readiness—or you can read down—looking at which domains are the strongest within the watershed.

Table 2. Readiness score comparison of all four pilot watersheds

Domains of Readiness	Watershed 3	Watershed 2	Yellow Medicine River Watershed	Watershed 4
Issue Awareness	54.0	50.0	52.0	50.0
Community Attitudes	66.0	64.0	64.0	66.0
Program Capacity	60.0	61.0	66.0	50.0
Relationships Among LGUs	50.3	47.8	66.5	48.9
Barriers Affecting Collaboration (higher means fewer barriers)	68.0	72.0	66.0	76.0
Watershed Leadership	64.0	64.0	62.0	60.0
Overall Readiness	**60.4**	**59.8**	**62.7**	**58.5**

Looking across, the Yellow Medicine River Watershed scored comparatively high in issue Relationships Among LGUs. It also scored relatively high on Program Capacity.

Among the domains of readiness, the Yellow Medicine River Watershed had the strongest scores in Relationships Among LGUs, Barriers Affecting Collaboration and Program Capacity relative to its scores in other domains.

A follow-up survey conducted at the end of the *One Watershed, One Plan* pilot that will allow us to gauge progress for each watershed on these domains of readiness.

Questions for discussion

The Yellow Medicine River LGUs' strongest scores were in the areas of Barriers to Collaboration and Community Attitudes. Is this surprising, or what you would expect?

As compared with other watersheds, Yellow Medicine River had higher levels of Issue Awareness, Community Attitudes, and Watershed Leadership. Is this based on work already undertaken?

What additional actions would strengthen collaboration among LGUs?

Appendix: Detailed survey results

The following tables provide average responses for all items in the survey, broken down by Board or Staff responses.

ISSUE AWARENESS

What is your level of knowledge about the following water resource topics in your watershed? (Select on a scale of 1=Very low to 6=Very high)

Issue Awareness	Board responses (n=15)	Staff responses (n=16)
Soil erosion and sedimentation	4.4	4.6
Altered hydrology (drainage, tiling, etc.)	4.5	4.2
Water quality	4.0	4.5
Water supply (protect, provide and conserve)	4.0	3.7
Groundwater protection	3.7	3.8
Flood damage reduction	4.8	3.2
Education, outreach and civic engagement	3.4	3.9
Maintenance of core services and local capacity	3.5	3.9
Wetland management	3.7	3.5
Shoreland and riparian management	3.2	3.5
Habitat, wildlife and fisheries	3.0	3.6
Wastewater management (including septic systems)	3.6	2.9
Emerging issues (contaminants, climate change)	3.0	2.8
Invasive species management	2.5	2.9
Urban and small city stormwater management	2.6	1.9
Average	**3.6**	**3.5**

COMMUNITY ATTITUDES

Please respond to the following questions about ATTITUDES regarding water quality issues. (Select on a scale from 1=Not at all to 6=To a great extent, or Don't know)

Community Attitudes	Board responses (n=15)	Staff responses (n=14)
To what extent do community leaders believe it is important to restore and protect the water quality within the watershed?	4.9	4.7
To what extent do community leaders support the *One Watershed, One Plan* approach?	4.8	3.5
To what extent are community leaders willing to adapt their actions to address water quality concerns?	4.6	3.3
To what extent are residents willing to get involved in protecting and restoring water quality?	4.3	3.7
Average	**4.7**	**3.8**

PROGRAM CAPACITY: LEVEL OF EFFECTIVENESS

How would you rate your organization's LEVEL OF EFFECTIVENESS on each of the following projects, programs, and activities? (Select on a scale of 1=Very low to 6=Very high, or select "Don't know/Not applicable")

Program Capacity, Level of Effectiveness	Board responses (n=15)	Staff responses (n=15)
Inspection, operation, and maintenance of projects and practices	5.1	5.2
Wetland Conservation Act implementation	4.8	5.1
Agricultural programs and practices (non-feedlot)	4.7	4.9
Land protection programs	4.7	4.9
Wetland restoration and enhancement	4.6	4.9
Public drainage management	4.8	4.8
TMDL and WRAPS development	4.6	4.6
Habitat and wildlife programs	4.3	4.8
Collaborative grant applications	4.5	4.5
Groundwater protection	4.4	4.5
Septic system inspections and upgrades	4.7	4.0
Streambank and shoreland programs	4.6	4.1
Public education and information programs	4.3	4.3
Flood control	5.0	3.6
Livestock waste management	4.4	3.8
Monitoring water resources	4.2	3.9
Invasive species management	3.3	3.0
Forestry programs and practices	2.7	3.2
Small city and urban stormwater	2.7	2.2
Average	**4.3**	**4.2**

PROGRAM CAPACITY: LEVEL OF COLLABORATION

How would you rate your organization's LEVEL OF COLLABORATION with the other local water management entities in the watershed on the following projects, programs, and activities? (Select on a scale of 1=Very low to 6=Very high, or select "Don't know/Not applicable")

Program Capacity, Level of Collaboration	Board responses (n=15)	Staff responses (n=15)
Public drainage management	5.0	5.3
TMDL and WRAPS development	4.5	5.4
Agricultural programs and practices (non-feedlot)	5.0	4.9
Wetland Conservation Act implementation	4.7	4.9
Collaborative grant applications	4.0	5.0
Groundwater protection	4.8	4.3
Wetland restoration and enhancement	4.8	4.3
Flood control	5.3	3.9
Livestock waste management	4.8	4.2
Land protection programs	4.1	4.5
Inspection, operation, and maintenance of projects and practices	4.6	4.1
Septic system inspections and upgrades	4.9	3.8
Public education and information programs	3.7	4.6
Streambank and shoreland programs	4.7	3.9
Habitat and wildlife programs	3.8	4.4
Monitoring water resources	4.4	3.6
Forestry programs and practices	3.2	3.3
Invasive species management	2.9	3.1
Small city and urban stormwater	3.4	2.3
Average	**4.3**	**4.2**

COLLABORATION: SHARING OF SERVICES

To what extent [in the past 12 months] has your organization shared any of the following OPERATIONAL AND PROGRAM SERVICES with other LGUs in the watershed? (Select on a scale from 1=Not at all to 6=To a great extent)

Sharing of Services among LGUs	Board responses (n=15)	Staff responses (n=15)
Technical staff	3.2	3.7
Mapping, GIS services	2.7	3.2
Staff and board training	2.6	2.8
Budget and work planning	2.8	2.4
Education and communications staff	2.5	2.5
Lead staff	3.2	2.0
Computer, IT, phone system services	2.9	2.2
Report and publication development	2.1	2.6
Capital equipment, vehicle purchases	2.5	1.6
Co-location of offices	2.5	1.4
Web site design and management	2.2	1.6
Support, accounting, and financial services staff	1.9	1.6
Human resources staff	2.0	1.5
Attorneys and legal services	2.3	1.3
Average	**2.5**	**2.2**

BARRIERS AFFECTING COLLABORATION

To what extent do the following BARRIERS affect your collaboration with other local water management entities in your watershed? (Select on a scale from 1=Not at all a barrier to 6=Very much a barrier, or Don't know)

Barriers Affecting Collaboration	Board responses (n=15)	Staff responses (n=14)
Competition for funds	4.0	3.6
Differing or conflicting priorities	3.4	3.5
Lack of Time to pursue collaboration	2.6	3.8
Lack of common data sets	3.3	3.2
State laws, regulations	3.1	3.1
Turf protection	2.3	3.3
Inexperienced lead staff (theirs)	2.2	2.9
Lack of Knowledge of other entities	2.4	2.4
Personality conflicts	1.7	2.8
Reluctance	2.1	2.4
Staff or board turnover	1.8	2.5
Lack of Skills for collaboration	1.6	2.1
Inexperienced lead staff (ours)	2.3	1.5
Lack of Trust	1.6	1.9
Average	**2.5**	**2.8**

WATERSHED LEADERSHIP

The word "leader" in the questions below refers to anyone who has a formal (elected or appointed position) or informal leadership role in the watershed. This includes anyone in the watershed who is able to influence others even if not in a formal, decision-making, or positional leadership role. (Select on a scale from 1=Not at all to 6=To a great extent, or Don't know)

Watershed Leadership	Board responses (n=15)	Staff responses (n=14)
To what extent are leaders willing to look outside of typical/normal partnerships for new ideas and new ways of doing things?	5.0	3.9
To what extent are leaders willing to collaborate with other leaders and stakeholders?	4.6	4.0
To what extent are leaders able to effectively bring people from opposing interests together around challenging issues in a civil and respectful manner?	4.6	3.7
To what extent are leaders able to adopt a "whole watershed" mindset?	4.5	3.2
Average	**4.7**	**3.7**

APPENDIX K
MONITORING PLAN RECOMMENDATIONS

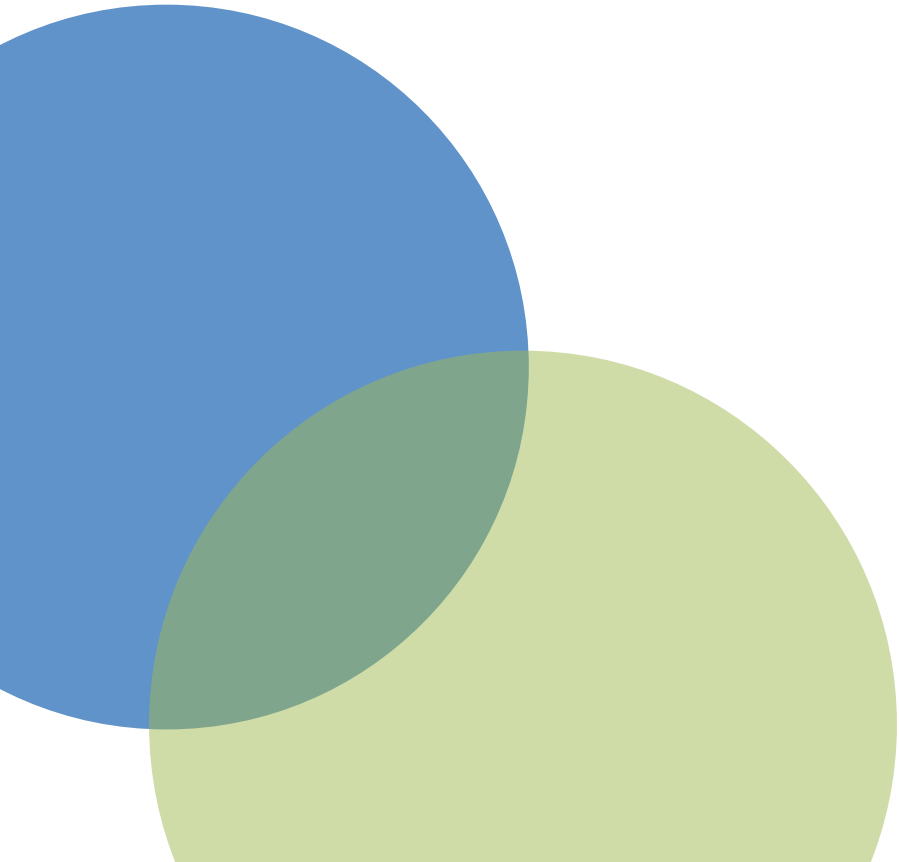
YELLOW MEDICINE
ONE WATERSHED ONE PLAN
MONITORING PROGRAM
RECOMMENDATIONS

Topical Report RSI-2615

prepared for

Yellow Medicine
One Watershed One Plan Partners

August 2016



YELLOW MEDICINE
ONE WATERSHED ONE PLAN
MONITORING PROGRAM
RECOMMENDATIONS

Topical Report RSI-2615

by

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August 2016

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1.0 INTRODUCTION

The Yellow Medicine River (YMR), which is a portion of Hydrologic Unit Code [HUC] 07020004, drains an area of 665,073 acres (approximately 2,074 square miles) in southwestern Minnesota located southwest of the Minnesota River. The Yellow Medicine Watershed One Watershed One Plan's (YM1W1P's) initial efforts focus on three management zones (Coteau, Transitional, and Flatlands) with future efforts to follow in the Minnesota River Valley zone (Figures 1-1 and 1-2). Building on the extraordinary success of Lake Shaokatan's restoration, the project partners chose to continue working downstream along the Upper YMR and the North Branch of the YMR. These stream reaches extend from the Coteau into the Transitional zone. Mud Creek is another priority area that begins in the Transitional zone with most of its drainage extending into the Flatlands Zone. The last of the initial priority areas was identified in the Flatlands with work beginning in headwater areas of Judicial Ditches 10 and 24YM&L. Two other priority areas not included in the initial efforts are Stony Run Creek and Judicial Ditch 23.

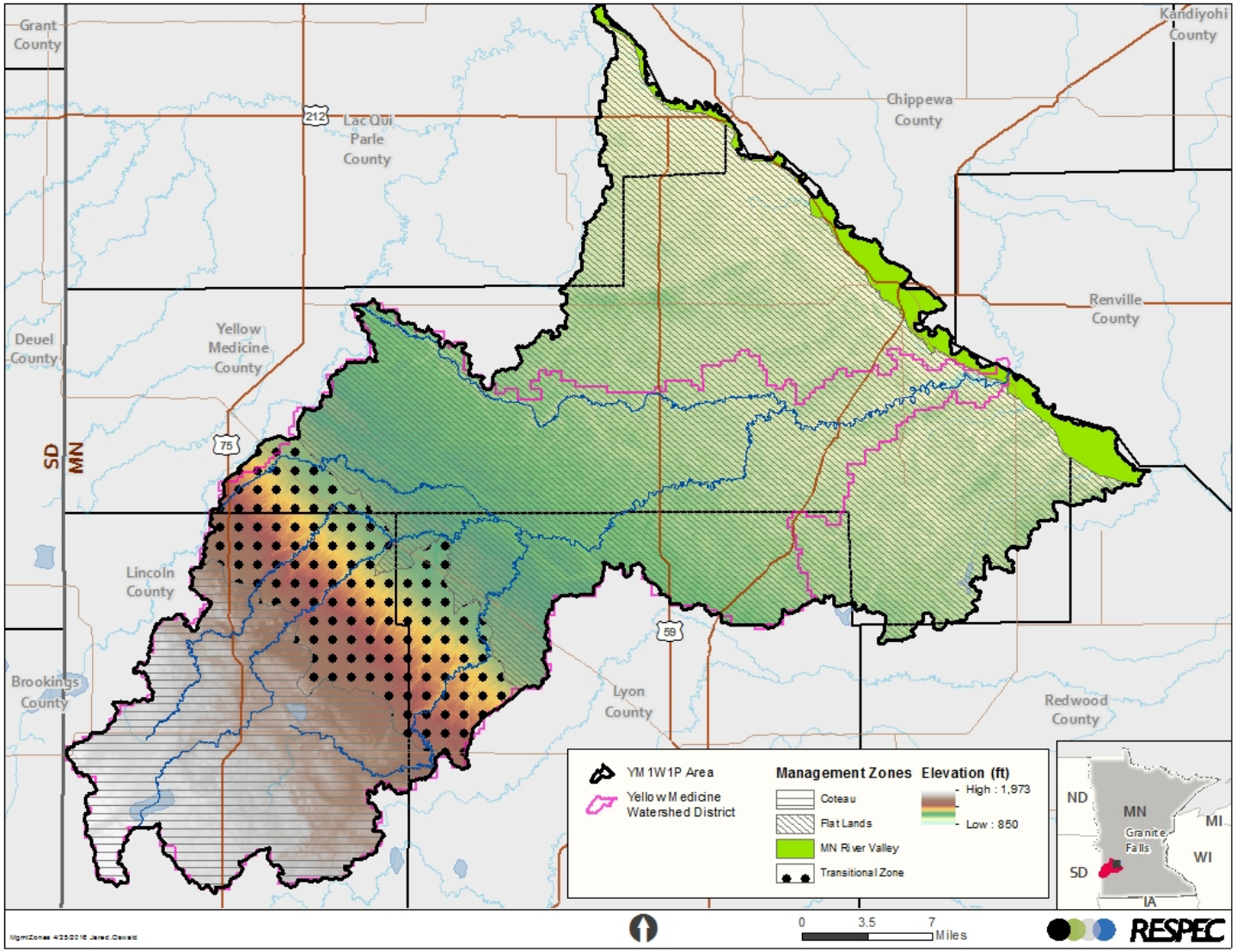

Figure 1-1. Management Zones Within the Yellow Medicine One Watershed One Plan Watershed Boundary.

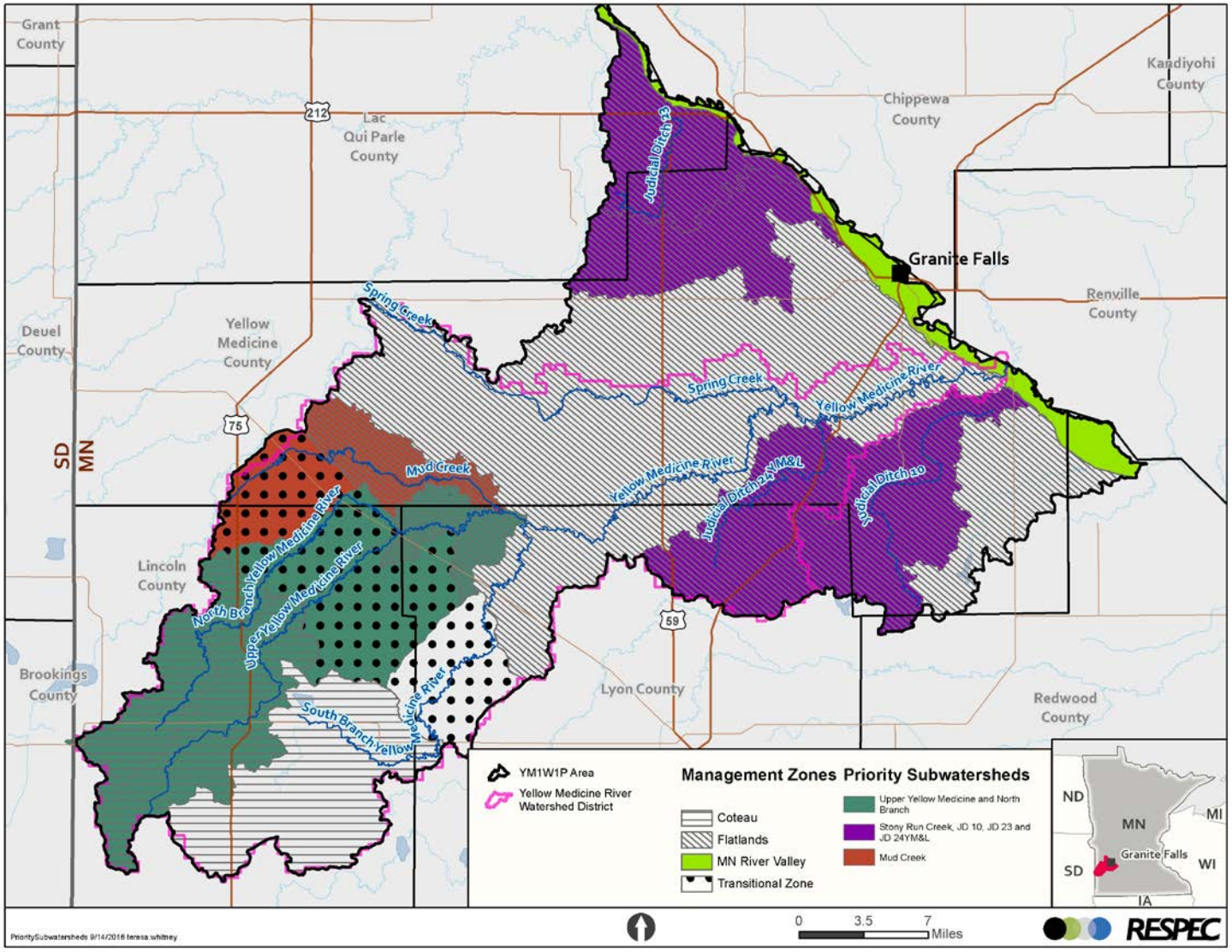

Figure 1-2. Priority Watersheds Selected for Implementation.

2.0 MONITORING OBJECTIVES: TRACKING GOAL PERFORMANCE

The proposed monitoring is based on the following three identified water resource management priority concerns:

1. Mitigate altered hydrology and minimize flooding
2. Minimize the transport of sediment, excess nutrients, and bacteria
3. Protect and preserve groundwater quantity and quality.

The YM1W1P has defined priority concerns, issues, and measurable goals as outlined in Table 2-1. The last column in Table 2-1 identifies general monitoring appproaches for each of the priorities that will be discussed in further detail in this report. The first two priority concerns are surface water related; therefore, the future performance assessments are based on flow characterization along the river reaches (flow networks). Initial groundwater priorities focus on proper closure of unused wells. Efforts associated with mitigating the altered hydrology priority concern will, in turn, have positive effects in achieving the priority concern (minimizing the transport of sediments, excess nutrients, and bacteria).

Table 2-1. Priority Goals and General Tracking Approaches

Priority Concern	Identified Issue and Concern	2016–2026 1W1P Measurable Goals	Generalized Tracking Approaches
Mitigate altered hydrology and minimize flooding	Flood reduction Stream health	Add 1,000 acre-foot (ac-ft) of new stormwater storage	Tabulate wetland and storage basin morphometry, location in flow network. Estimate rate control and sediment pond-performance metrics
		No net increase in highest annual peak flows[(a)]	Spring snowmelt and big storm peak water levels, flows
		3% increase in dry season base flow[(a)]	Summer through winter: base water levels, flows
Minimize the transport of sediment, excess nutrients, and bacteria	Excess sediment	10% decrease in total suspended solids (TSS) loads[(a)]	Pour points: continuous flow gaging; load sampling protocols; TSS compliance monitoring
	Excess phosphorus	10% decrease in total phosphorus (TP) loads[(a)]	Pour points: continuous flow gaging; load sampling protocols; TP compliance monitoring
	Excess nitrogen	8% decrease in total nitrogen (TN) loads[(a)]	Pour points: continuous flow gaging; load sampling protocols. TN monitoring = Total Kjeldahl Nitrogen (TKN) + Nitrate + Nitrite
Protect and preserve groundwater quantity and quality		Seal 25 unused wells per year	Tabulate well closure locations and well-log data (as available)

(a) As measured by the Scenario Application Manager program at the mouth of the Yellow Medicine River at its confluence with the Minnesota River.

3.0 FUTURE PERFORMANCE TRACKING OPTIONS

The YM1W1P measurable goals are outlined in Table 2-1. This chapter describes the generalized approaches to track performance for priority concerns goals that vary from desktop tabulations of implemented actions for both surface and groundwater to a wide range of typical river monitoring. The first priority was placed on mitigating altered hydrology and minimizing flooding.

3.1 MONITORING ASSOCIATED WITH PRIORITY CONCERN 1 — MITIGATE ALTERED HYDROLOGY AND MINIMIZE FLOODING

The more significant results of altered hydrology can be seen during peak high- and low-flow events (flooding and very low- or no-flow periods). The primary objective of this priority concern is to reduce the magnitude of both extremes by increasing rate controls (storage), sedimentation, filtration, and infiltration practices. These controls can be achieved by implementing a wide variety of runoff best practices for urban and agricultural stormwater treatment that slow runoff velocity and encourage sedimentation/filtration and percolation into soils and substrates. Stabilizing extreme flows will have substantial benefits in conserving soils and associated nutrients and will thereby address the priority concern to minimize the transport of sediment, excess nutrients, and bacteria rather than generating pollutants.

Monitoring options associated with the Mitigate Altered Hydrology and Minimize Flooding priority concern focus on (1) tabulating, from completed projects, upland wet pond and wetland storage volumes and pollutant reductions and (2) tracking river water levels/flows at key flow network “pulse” points along the Coteau and Flatland management zones.

As implemented, storage pond design configurations can be used to estimate water volumes and the resulting rate-control effects on downstream flows by using standard engineering practices. Stormwater-pond software can be used to estimate approximated removals of TSS and TP for each pond (e.g., Det Pond or Pondsiz software). Long-term performance of ponds for reducing the flow rate and removing sediments and phosphorus depends on (1) design configurations, (2) construction adherence to specifications including using specification materials, and (3) maintenance.

A wide variety of water level recorders to continuously record stream water depths over time are commercially available. Water level loggers will require installation at set elevations that are cross-referenced to established benchmarks. Site maintenance and converting water level records to continuous flows should follow established hydrologic practices as defined by the US Geological Survey (USGS) [Stone et al., 2012]. Corresponding levels of professional expertise are required to perform these assessments and range from trained volunteers to experienced technicians and hydrologists/engineers.

Peak flows can be generally compared to values included in this report (see Section 5.3) from available USGS and Minnesota Department of Natural Resources (DNR) flow gaging stations. Periods with very low flows or no flows can be expected to occur such that most increases in base flows should be readily apparent over time.

3.2 MONITORING ASSOCIATED PRIORITY CONCERN 2 — MINIMIZE THE TRANSPORT OF SEDIMENT, EXCESS NUTRIENTS, AND BACTERIA

Monitoring associated with the priority concern to Minimize the Transport of Sediment, Excess Nutrients, and Bacteria rely on more complicated water quality monitoring (WQM) protocols, including (1) sampling used to evaluate improved compliance to water quality standard concentrations; (2) recording continuous flows coupled with intense sampling to reasonably characterize TSS, TP, and bacterial-loading rates at key monitoring sites; and (3) hotspot identification (sequential diagnostics).

Performance can be assessed by tracking compliance to river standards for TSS and TP along with related river response variables (average river growing season) algal chlorophyll-*a* (Chl-*a*), daily fluctuations of stream dissolved oxygen (DO) concentrations, related amount of organic matter that consume stream oxygen (Biochemical Oxygen Demand or BOD_5) and *E. coli* concentrations. This approach requires grab sampling as generally described in Table 3-1 and will aid in tracking pollutant levels over time.

Table 3-1. Compliance Monitoring Parameters, Schedule, and Locations

Parameter	Season	Schedule	Locations
TSS	April 1–September 30	Approximately Every Other Week Grab Samples	Priority WQM Sites and Investigative Monitoring
TP	June 1–September 30	Approximately 6–8 Growing Season Grab Samples	Priority WQM Sites and Investigative Monitoring
Chl-*a*	June 1–September 30	Approximately 6–8 Growing Season Grab Samples	Priority WQM Sites and Investigative Monitoring
Biochemical Oxygen Demand (BOD)	June 1–September 30	Approximately 6–8 Growing Season Grab Samples	Priority WQM Sites and Investigative Monitoring
E. coli	April 1–October 31	Approximately Every Other Week Grab Samples	Priority WQM Sites and Investigative Monitoring
Ammonia	Year-Round	Grab Samples, Lower Flows	Priority WQM Sites and Investigative Monitoring
Chlorides	Year-Round	Grab Samples, Snow Melt Focus and Summer	Priority WQM Sites and Investigative Monitoring
DO	June 1–September 30	(4) 24-Hour Measurements or Continuous	Priority WQM Sites
Discharge	Year-Round	Continuous	Priority WQM Sites
pH	Growing Season	With TP, TSS	As needed

Monitoring required to reasonably estimate TSS and TP loading rates typically require state-of-the-art continuous water level/flow recording coupled with intensive sampling (approximately 25–35 samples including flow-paced automatic sampling and grab samples). The flow monitoring required to determine pollutant load estimates is in place at three downstream Minnesota Pollution Control Agency (MPCA) flow sites; however, these sites are not within the five priority areas. Monitoring at these sites for load estimates will represent a more comprehensive assessment of watershed trends.

Identifying substantial sediment-, nutrient-, or bacterial-loading sources (hotspots) can sometimes be accomplished by using less-intensive assessments that measure relative changes in pollutant concentrations during higher flow events. These assessments can be accomplished by leap-frog sampling of sites going from downstream to upstream locations to define inflows with elevated concentrations. In general, sequential diagnostic monitoring should have a downstream stream-level gaging station that can be used to quantify continuous flows. Upstream monitoring stations with staff gages and corresponding staff-discharge/flow relationships may be correlated to the downstream continuous gaged flows. Coupled with a grab sampling of peak and routine flows, approximated loads and flow-weighted mean concentrations can be developed for each site for comparative purposes. Sampling should be repeated for several high and routine flow events over a several month period. This type of monitoring may not be expected to reasonably calculate pollutant loads in extremely flashy (boom-bust flow) sites.

The MPCA identified 24 stream segments within the YMR Watershed that had degraded to the point of violating state water quality standards. The water quality standards for this region are identified in Table 3-2 and include fish and macroinvertebrates index of biological integrity (IBI) impairments, bacterial impairments, and TSS impairments. Additionally, multiple lakes are impaired for nutrients and are illustrated in Figure 3-1 (excludes mercury impairments).

Table 3-2. Southern River Nutrient Region Standards and Monitoring Overview

Minnesota Water Quality Standards for Rivers and Streams					
River Region	**TSS (mg/L) Exceed less than =, 10% of the time. April 1–September 30**	**TP[(a)] (µg/L) Less than or equal to**	**Chl-*a*[(a)] (µg/L) Less than or equal to**	**Daily DO Minimum / Maximum Fluctuation[(a)] (mg/L) Less than or equal to**	**BOD[(a)] (mg/L) Less than or equal to**
Class 2Bd waters					
South River Nutrient Region	65	150	35	4.5	3.0

mg/L = milligrams per liter.

µg/L = micrograms per liter.

Note: All Streams and Rivers: Periphyton, 150 milligrams per square meter (mg/m^2) more than one year in ten, *E.coli* 126#/100 ml.

(a) Exceeding TP (average June–September 30) and one or more of the following: Chl-*a* (seston), 5-day BOD5, daily DO fluctuation.

3.3 MONITORING OPTIONS ASSOCIATED WITH PRIORITY CONCERN 3 — PROTECT AND PRESERVE GROUNDWATER QUANTITY AND QUALITY

Monitoring options associated with the priority concern to Protect and Preserve Groundwater Quantity and Quality, as identified by the Yellow Medicine Planning Work Group (PWG), focus on sealing unused wells in the watershed to prevent contamination. For this purpose, the action is to seal 25 unused wells per year by licensed contractors following local and state protocols. The location of each sealed well and available well-log information should be recorded. One location is recommended to serve as the YMR's data repository for this information, which should include GIS metadata. This method should be considered for all monitoring data storage.

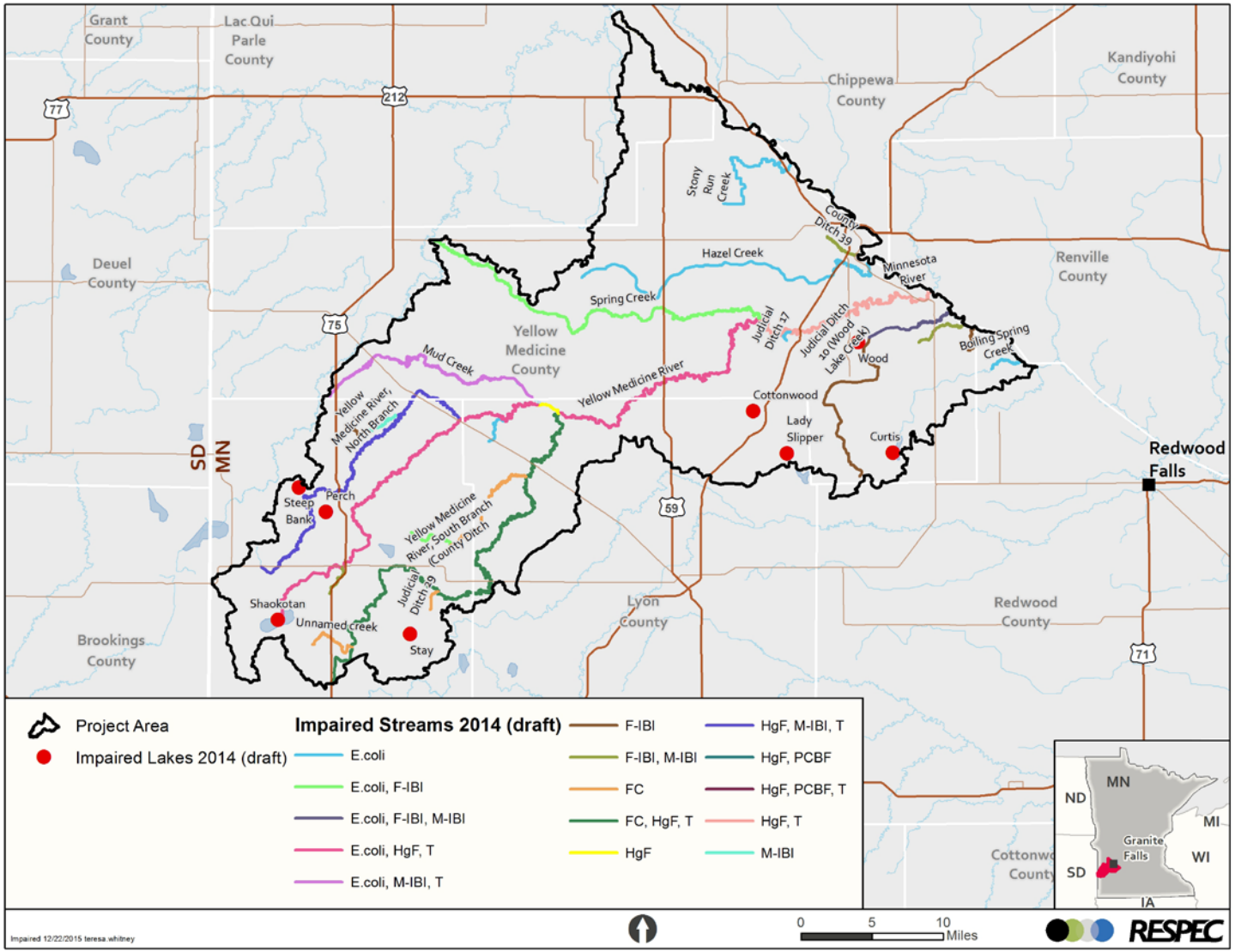

Figure 3-1. Impaired Reaches [Minnesota Pollution Control Agency, 2014].

4.0 CURRENT MONITORING EFFORTS

YMR monitoring efforts have been shared among several partnering groups. Several local, state, and federal agencies collect valuable watershed information, beginning with weather data collected by a variety of volunteers and airports and data storage and analysis provided by services such as the DNR Climatology Office and the National Weather Service. Other agency-sponsored monitoring has been provided by the MPCA's milestone and condition monitoring programs and the DNR/MPCA cooperative stream gaging program. The cooperative stream gaging program houses gages that are jointly operated and/or support programs operated by the USGS.

Future implementation planning will be aided by comparing monitored conditions with management goals as adjusted for changing land uses, weather patterns, and water quality standards/targets. The ability to detect changes along the flow network and comparison reliability will depend on the design of the monitoring programs, including potential adjustment for hydrologic and climatologic variations. For example, intense storms may generate substantial runoff, particularly from low probability events (e.g., one in 100-year, 24-hour storm event). Therefore, the performance metrics may need to be adjusted for comparative purposes. Tracking meteorological and stream flow data will aid data assessments.

4.1 METEOROLOGICAL MONITORING

In addition to the agricultural community's weather vigilance, periodic summaries of recent and long-term weather reporting station data may be helpful in modifying monitoring activities and interpreting data to reflect weather variability. Several free weather reporting services are available to help better define patterns. Data summaries are available from the Minnesota Climatology Office (*http://climate.umn.edu/)* and the Midwestern Regional Climate Center (*http://mrcc.isws.illinois.edu/CLIMATE/*) with local reporting stations at Granite Falls, Minneota, Canby, Dawson, and Montevideo. Certain data are of particular note: characterizing wet period cumulative precipitation from back-to-back storms; dry period durations and intensities, such as the number of consecutive days with a cumulative total of less than 0.1 inch of precipitation; and the number of winter-thaw periods (defined for this purpose as 2 or more days with peak temperatures above 32 degrees Fahrenheit [°F]).

4.2 MINNESOTA POLLUTION CONTROL AGENCY'S STREAM WATER QUALITY MONITORING PROGRAMS

4.2.1 Assessment Monitoring

To characterize Minnesota's water quality, the MPCA collects requisite data from state, local, and federal agencies, as well as citizens, and then conducts a rigorous assessment. One result of this effort is identifying impaired waters or waterbodies that do not meet the intended beneficial uses and are reported to the US Environmental Protection Agency (EPA) as 303(d) listed waters. One of the MPCA's recent advances is developing the intensive watershed monitoring approach for providing monitoring resources (local and agency) and standard assessment methods throughout Minnesota.

The MPCA intensely monitors each of the state's 81 major watersheds (8-digit HUC) on a rotating 10-year cycle. A watershed approach is employed to guide the MPCA's monitoring efforts; aggregate monitoring information from local, state, and federal agencies; and integrate watershed information from small to large scales. Sampling occurs in each major watershed once every 10 years. In this approach, intermediate-sized (approximately 11-digit HUC) and minor (14-digit HUC) watersheds are sampled, along with the major watershed (8-digit HUC) outlet to provide a complete water quality assessment. Sites are selected near the outlet, or "pour point," at all watershed scales. This approach provides robust assessment coverage of rivers and streams without monitoring every single stream reach. The MPCA's intensive monitoring of the YMR began in 2010. The following is an excerpt from the MPCA's website [MPCA, 2014]:

> *The outlet of the major watershed is sampled for biology, water chemistry, and fish contaminants to allow for the assessment of aquatic life, aquatic consumption, and aquatic recreation use support. Each 11 digit HUC pour point is sampled for biology and water chemistry to support the assessment of aquatic life and aquatic recreation use support. Watersheds at this scale generally consist of major tributary streams with drainage areas ranging from 75 to 150 square miles. Lastly, most minor watersheds (typically 10-20 square miles) are sampled for biology to assess for aquatic life use support.*
>
> *The second step of the intensive watershed monitoring effort consists of follow up monitoring at all 11 digit HUC's determined to have impaired waters. This follow up monitoring is designed to identify the source(s) and cause(s) of impairment.*

In addition to the MPCA's intensive watershed monitoring effort described above, the Minnesota Department of Agriculture monitors pesticides in Minnesota water resources to identify surface-water pesticides of concern, identify trends over time, provide information on the effectiveness of pesticide management plans and best management practices (BMPs), and provide data needed by the MPCA to assess water quality. This information can also be factored into the watershed framework to further enhance the understanding of water quality within each watershed.

4.2.2 Stressor Identification Monitoring

Stressor identification is a formal and rigorous assessment process that identifies stressors that cause biological impairments of aquatic ecosystems (or the factors that harm fish and other river life). The basic approach is to examine fish and aquatic invertebrates (mostly insects) and relate habitat conditions at sites within 12-digit HUC watersheds. This information is used to calculate an IBI that is compared to standards. Low IBI scores are deemed "impaired." The MPCA's Yellow Medicine River Watershed Biotic Stressor Identification report was completed in 2013.

4.2.3 Watershed Pollutant Load Monitoring Network

The MPCA's Watershed Pollutant Load Monitoring Network (WPLMN) collects much of the long-term data that will be used to assess the larger-scale watershed responses. Monitoring data collected at WPLMN sites in the YMRW are typically combined with flows from the DNR's/ MPCA's Cooperative Stream Gaging (CSG) program flows (listed in Table 4-1) to define mass balances and loads. The CSG is a joint effort between the DNR and the MPCA and was designed to ensure that either the USGS or DNR

flow gaging stations were established and maintained at WPLMN locations through the year 2034. Depending on the classification of the site, 25–35 nutrient and sediment samples are collected at these sites annually or seasonally.

Table 4-1. Monitoring Inventory

Inventory / Monitoring Program	Location	Frequency	Lead	Local Coordinator
Land Management				
Tillage Transect Survey	Watershed	Every 5 years	Board of Water and Soil Resources (BWSR)	None required
Subsurface Sewage Treatment System (SSTS) Monitoring	Lincoln	Annually	Lincoln County Planning & Zoning	
Surface Water				
Stream-Flow Monitoring	Three Stations: YMR Near Granite Falls + Near Hanley Falls, Spring Creek Near Hanley Falls	Continuous water levels converted to flows	DNR/MPCA Cooperative Program	YMR Watershed District (YMRWD)
Stream Water Quality	Watershed-wide	Once every 10 years (TSS, Total Volatile Solids, *E. coli*, Chl-*a*, TP, OP, Nitrate+ Nitrite, TKN, ammonia, pH, Dissolved Oxygen, conductivity, temperature, sulfates, calcium, magnesium, transparency)	MPCA	YMRWD
Stream Biota	Watershed-wide	Once every 10 years (fisheries and macroinvertebrate IBIs, habitat, fish contaminants)	MPCA/DNR	YMRWD
Stream Survey	TBD	Once every 10 years	DNR	YMRWD
Lake Water Quality	Watershed-wide	Once every 10 years (TP, Chl-*a*, Secchi)	MPCA	YMRWD
Lake Water Biota	Watershed-wide	Once every 10 years (DNR IBI being developed)	MPCA/DNR	YMRWD
Citizen Monitoring	TBD	Annually May to September, lake transparency (Secchi)	MPCA	YMRWD
Meteorological				
Weather Stations	Granite Falls, Minneota, Canby, Dawson, Montevideo	Continuous	DNR, MWCC (Climate Divisions 4 and 7)	DNR
Rain Gage	Various Locations	Continuous	SWCD Coordinates volunteers + DNR MN gage	N/A
Groundwater				
Groundwater Quantity	Various Locations	Continuous	DNR	
Groundwater Quality	Public Water Supply Wells	Annually	Minnesota Department of Health (MHD)/Public Water Supplies	
Township Private Well Nitrate Testing				
Private Well Nitrate Clinics				

5.0 MONITORING CONSIDERATIONS

While many factors influence the design of river monitoring programs, several key aspects should be considered. In general, flow and pollutant variability can be expected to increase as the size of the drainage area decreases. Therefore, more upstream river reaches (with smaller drainage areas) frequently require increased sampling effort if tracking pollutant-loading trends. Smaller watershed areas may show significant (measureable) improvements over shorter periods of time because of fewer contributing sources; therefore, targeted restoration activities may be more readily detected at the smaller scale. The cumulative impact of the implementation plan will reduce variability in the quantity and quality of the YMR by increasing base flows and reducing peak flows (flooding), sediment erosion, and pollutant loads along the flow network.

Minnesota has made significant investments in monitoring, databases, standard assessment protocols, and forecasting tools to guide and measure the performance of restoration and protection efforts. As part of these efforts, Minnesota's agencies and local partners have cooperatively developed networks of stream, river, lake, and groundwater monitoring stations to characterize water resources.

5.1 DEFINING FLOW NETWORKS

Because the first two priority concerns are surface water flow-based, most of the proposed future monitoring will focus on tracking annual or non-ice period water levels that can be converted to flow estimates. Given the challenges of monitoring along steeply sloped gradients, the river level/flow monitoring should focus at pulse points located in the Coteau and Flatlands at road crossings that afford safe access for equipment installation and flow gaging. Flow/level gaging stations should be co-located with established WQM stations as feasible, as depicted in Figure 5-1.

5.2 MONITORING CONTEXT — PRECIPITATION

The average monthly climate normals for 1981–2010 are depicted in Figure 5-2 and show that maximum precipitation amounts are typically about 3 inches or greater per month from May to September, with peak precipitation noted to occur in June. Another way of examining precipitation patterns is to tabulate the number of precipitation events per month that exceed daily threshold values and that may be expected to generate runoff depending on crop canopy status and other seasonal factors. These rainfall statistics can be useful for general planning and for scheduling sampling/water flow monitoring based on weather forecasts. For this purpose, daily rainfall amounts of 0.1, 0.25, 0.5, 1.0, and 2.0 inches were defined by month and summarized in Table 5-1 for Granite Falls, Minnesota (Site USC00213311) [Midwestern Regional Climate Center, 2015]. From this analysis, about 39 events with more than 0.1 inch per day occur per year with somewhat less than one 2-inch event expected per year. For the area around Granite Falls, approximately 25 rainfall events per year greater than 0.25 inch per day and 13 events greater than 0.5 inch per day can be expected. Higher amounts of daily rainfall per year decline substantially. The greatest number of rainfall events was noted to occur in June across all of these precipitation thresholds.

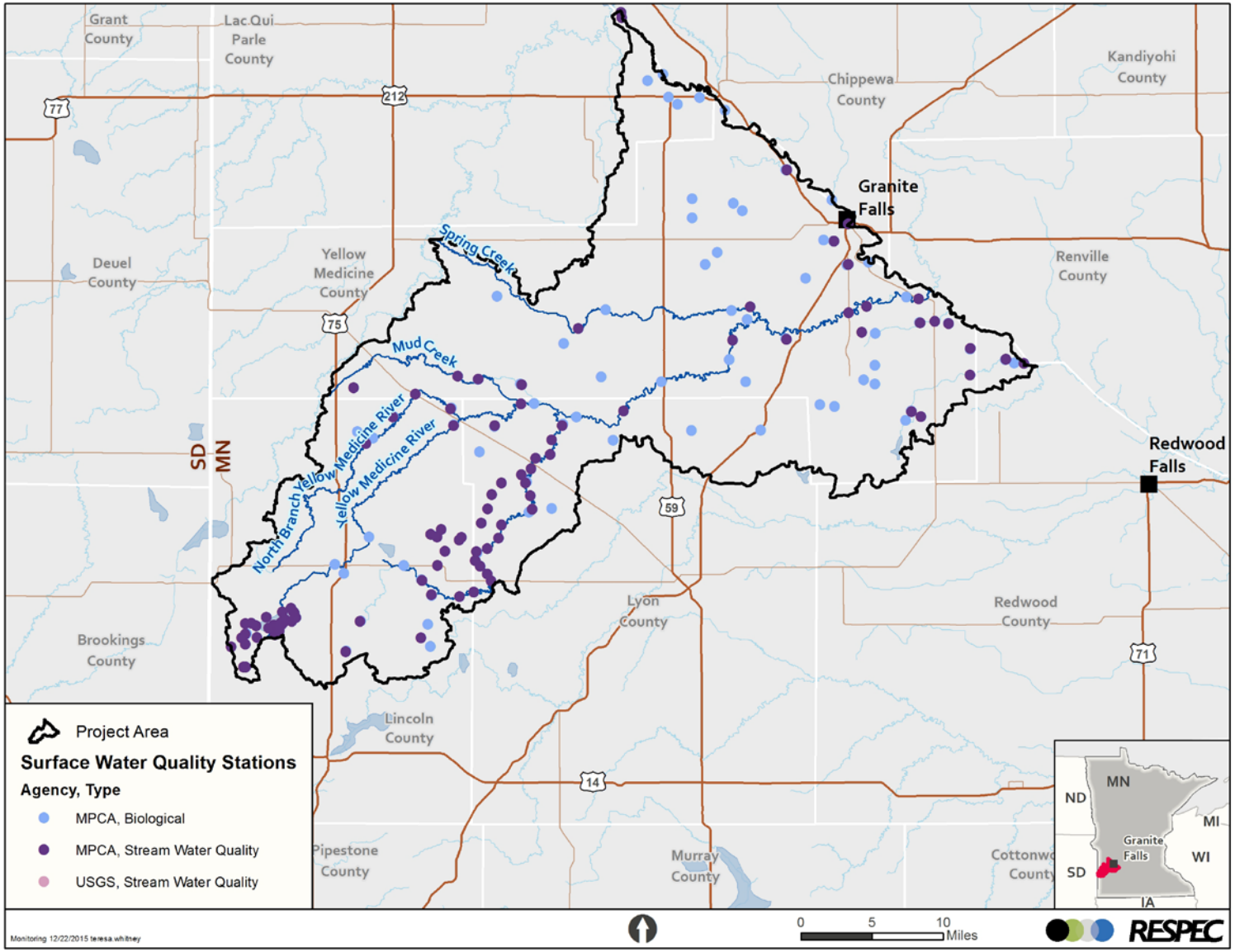

Figure 5-1. Surface-Water Quantity and Quality Monitoring Locations.

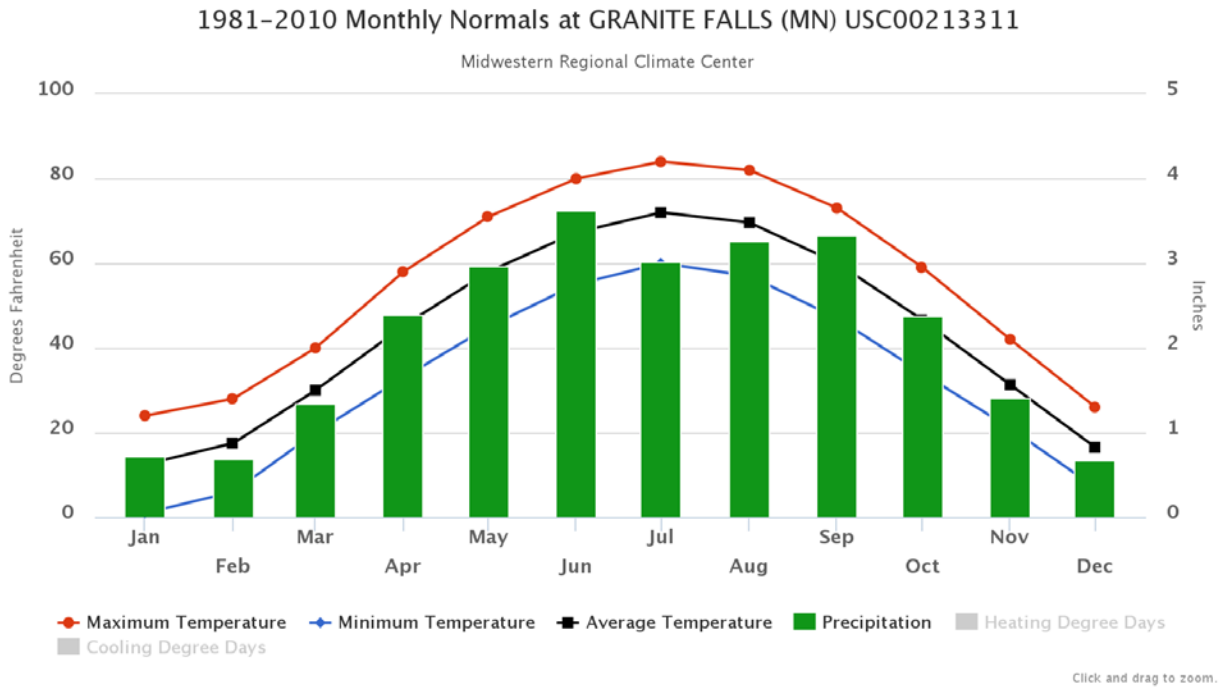

Figure 5-2. Monthly Climate Normals for Granite Falls, MN [Midwestern Regional Climate Center, 2015].

5.3 MONITORING CONTEXT -- FLOW PATTERNS

Average monthly flows for the YMR near Granite Falls for USGS Site 05313500 were plotted in Figure 5-3, where a pattern of rising and declining flows may be noted with alternating peak flows occurring in April (556 cubic feet per second [cfs]) and June (454 cfs). Low flows were typically noted from August to February. Peak-flow events tend to be associated with (1) snowmelts that occur in March and April and (2) summer storms with a higher prevalence in June and July. Hence, peak-flow monitoring focus on these times with base flows typically expected from August to February.

To place additional context to future watershed management, summary flow statistics were prepared from available YMR sites with continuous flow data for the most recent 10-year period. These flow statistics help identify the magnitude, frequency, and duration of high- and low-flow events. Table 5-2 summarizes the calculated 7-day low flow, average annual flow, and peak flow for each gaged site. The extreme range of low flows and peak flows indicate that these systems are "flashy" in nature, or that they respond quickly to runoff events.

The number of no-flow or very low-flow conditions tabulated for these sites should be noted. Very low- or no-flow conditions present substantial challenges to supporting fish and aquatic life because of the system's inability to buffer temperature fluctuations and maintain the necessary DO concentrations. Hence, a high priority was placed on watershed management actions to increase base flows.

Table 5-1. Number of Precipitation Events Exceeding Threshold Amounts by Month (1990–2015) for Granite Falls, Minnesota (USC00213311) [Midwestern Regional Climate Center, 2015]

No. of Events per Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Total
Events 1981–2014 > 0.10 inch	1.8	1.8	2.6	3.8	5	5.9	3.9	3.6	3.7	3.4	1.8	1.9	39.1
Events > 0.25 inch	0.8	0.8	1.4	2.3	3.4	4.1	2.6	2.5	2.5	2	1.1	1.2	24.6
Events > 0.50 inch	0.1	0.3	0.6	1.3	1.7	2.4	1.6	1.7	1.2	1.2	0.7	0.3	13.1
Events > 1.00 inch	0	0	0.1	0.4	0.5	1	0.4	0.8	0.4	0.5	0.3	0.1	4.5
Events > 2.00 inches	0	0	0	0	0.1	0.1	0	0.2	0.1	0	0	0	0.7

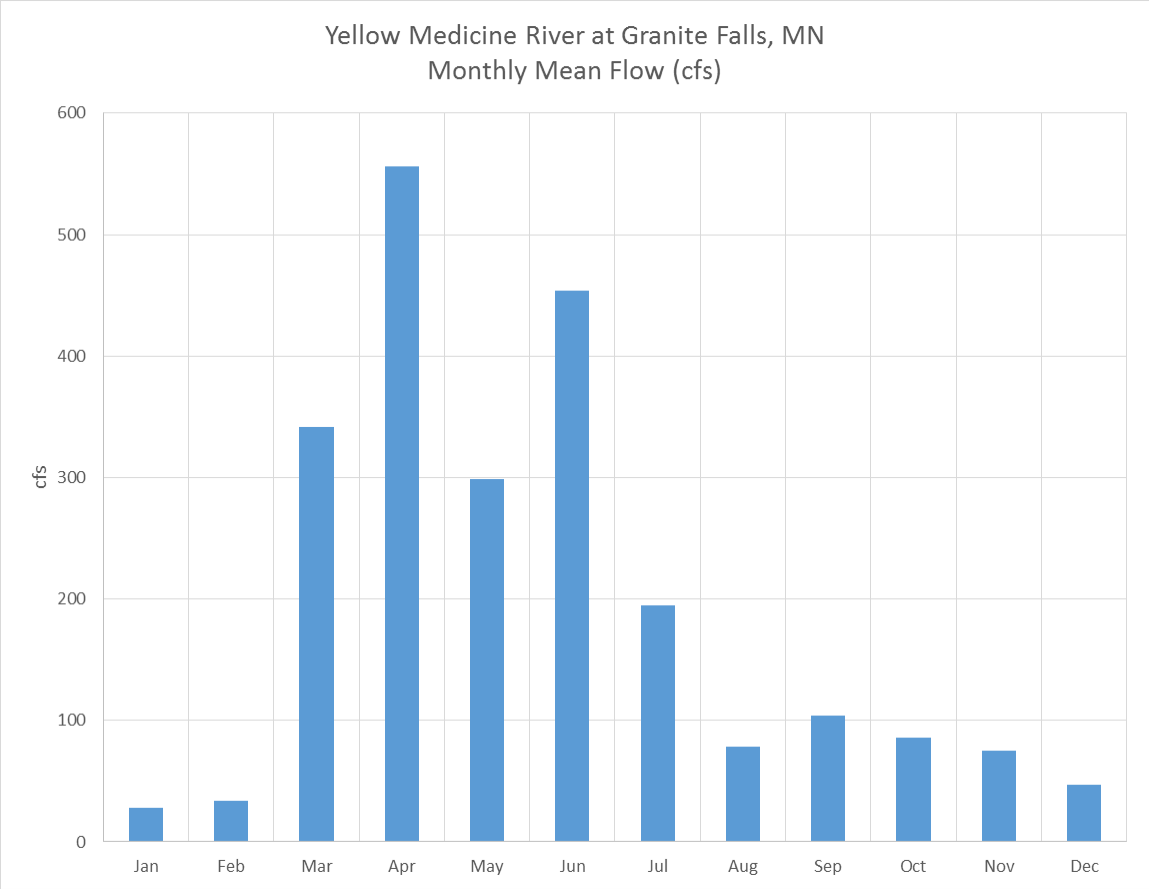

Figure 5-3. Average Monthly Flows for the Yellow Medicine River at Granite Falls, Minnesota [US Geological Survey, 2016] From 1970 to 2014.

On the other end of the flow spectrum, characterizing high flows is important for assessing flooding, soil loss, stream scouring, bank collapse, and resulting conditions that cause turbid streams. In this regard, the number of bank-full events per year and season, monthly mean flows, and frequency and intensity of high-flow events are important and may be tracked by continuous flow gaging stations.

5.4 STREAM FLOW MONITORING

Current stream flow gaging conducted by the USGS and the DNR within the YMR is listed in Table 5-3 and depicted in Figure 5-4. Three active stream flow gages are being operated and maintained at this time. Building on previous monitoring data and experience, older, decommissioned sites may be considered for reactivation.

Table 5-2. Summary Statistics for Each Discharge Gage

Flow Gage	DNR 25151002			DNR 25088001			DNR 25087001			DNR 25075001		
Description	South Branch YMR Near Minneota, CSAH26			Spring Creek Near Hanley Falls, 480th St			YMR Near Hanley Falls, CR18			YMR Near Granite Falls, MN		
Drainage	124 mi²			129 mi²			454 mi²			678 mi²		
Water Year	Flow (cfs)			Flow (cfs)			Flow (cfs)			Flow (cfs)		
	7-day Low	Avg. Ann.	Peak	7-day Low	Avg. Ann.	Peak	7-day Low	Avg. Ann.	Peak	7-day Low	Avg. Ann.	Peak
2005					35	136		106	654	84.0	179	246
2006					35	271	5.0	175	1,586	10.6	215	1,910
2007					25	184	9.4	164	1,225	5.4	186	3,590
2008					37	237		174	1,120	3.8	140	1,320
2009										2.3	94	1,030
2010										45.1	686	6,030
2011	0.0	163	1,360	0	128	1,190		576	3,000	9.7	530	6,280
2012	0.1	25	438				0	76	1,150	2.2	66	1,060
2013					30	306	0	142	2,130	3.0	153	2,470
2014					37	1,010	0	133	2,080	2.6	251	3,690

Table 5-3. Yellow Medicine River Watershed Stream Gage Descriptions

Gage	Gage Description	Corresponding Water Quality Station	Data Availability	Drainage Area (mi²)
DNR 25075001/ USGS 05313500 (Active)	YMR Near Granite Falls, MN	S002–316	April 1931–December 2015	678
DNR 25088001/ USGS 05312500 (Active)	Spring Creek Near Hanley Falls, 480th St	S002–318	October 2003–December 2015	129
DNR 25087001/ USGS 05311800 (Active)	YMR Near Hanley Falls, CR18	S002–317	April 2003–December 2015	454
DNR 25151001/ USGS 05311400 (Inactive)	South Branch YMR at Minneota, MN	NA	April 1960–September 1987	114
DNR 25151002/ USGS 05311410 (Inactive)	South Branch YMR near Minneota, CSAH26	S002–320	March 2011–October 2012	124
DNR 25130002 USGS 05311310 (Inactive)	Dillon-Sylte Impoundment Inlet Near Porter	NA	January 1980–October 1984	< 30
DNR 25130001/ USGS 05311320 (Inactive)	Dillon-Sylte Impoundment Outlet Near Porter	NA	January 1980–October 1984	< 30

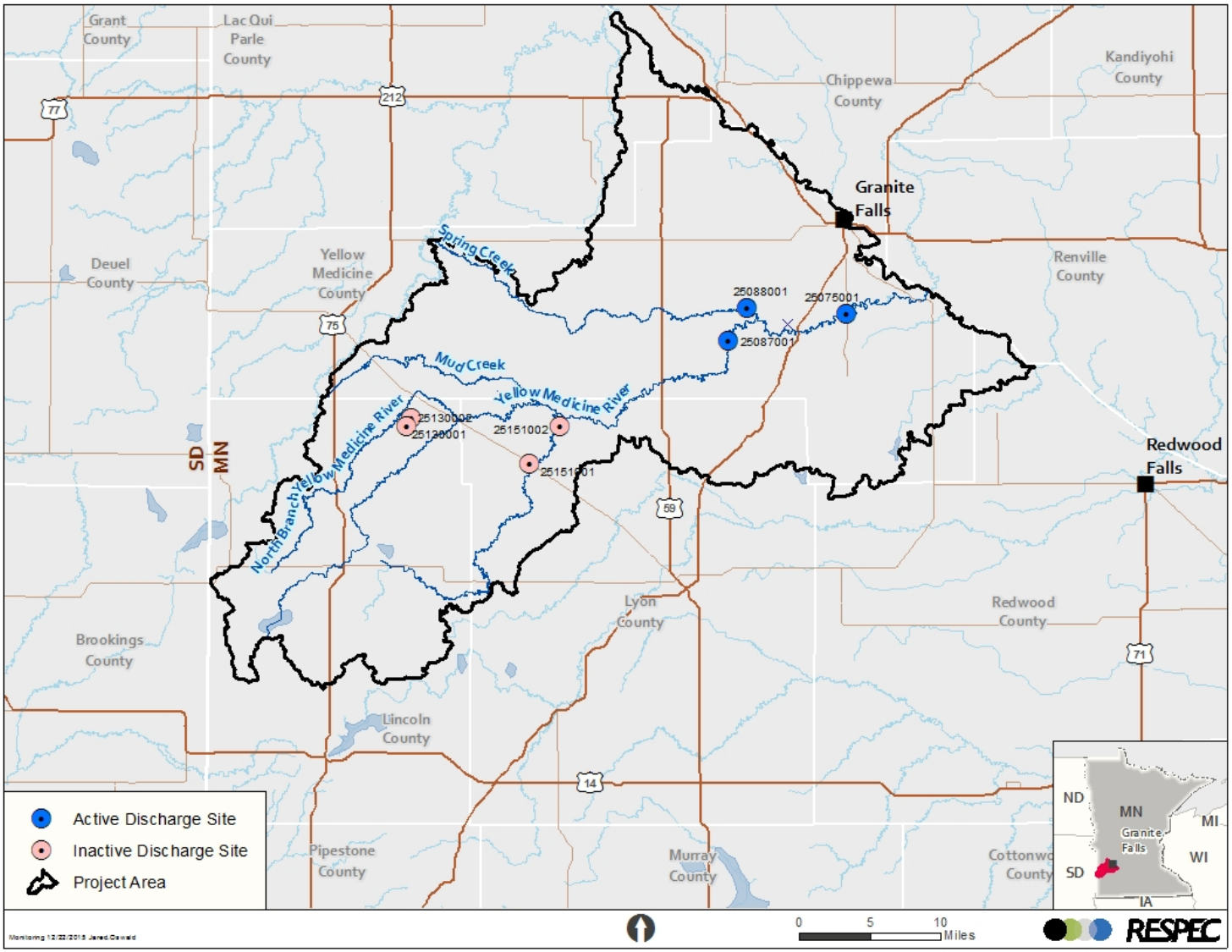

Figure 5-4. Discharge Gage Locations.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The YM1W1P has three priority concerns in seven priority management areas. This approach builds on the success of the Lake Shaokatan restoration project and proceeds downstream along the Upper YMR. Tracking performance to goals can be accomplished by using a wide variety of monitoring tools and varies from relatively simple tabulation and GIS tracking of implementation projects to various stream monitoring levels of effort. Corresponding levels of professional expertise are required to perform these assessments, which range from trained volunteers to experienced technicians and hydrologists/engineers. These assessment options may be used in various combinations over time, depending on information requirements, budgetary constraints, time periods, and legal requirements.

6.2 RECOMMENDATIONS

A summary of the performance tracking recommendations are included below.

1. Flow networks should be defined for each of the seven priority management areas distinguishing tributaries by river mile location along mainstem rivers.
    a. Annual and seasonal flow dynamics can be tabulated by flow network position to aid in defining watershed runoff patterns and future priority areas.
    b. Defining stream flow and sampling site configurations with partnering entities will help identify opportunities for shared efforts.
2. Because the majority of the priority concerns are surface-water related, primary emphasis has been placed on measuring river water levels and flows that can be used for tracking peak- and base-flow changes and estimating changes in loading over time.
    a. Long-term river water level/flow gaging sites should be established for each priority area. These estimations may require investments for acquiring automated equipment (water level recording technologies, and samplers), laboratory analytical expenses and staff training. If possible, standardizing equipment among the participating entities will help increase efficiencies and reduce labor costs.
    b. Tracking systems should be developed to identify completed projects by tributary location along each portion of the flow networks to more effectively assess cumulative impacts. Initial efforts have focused on (1) increasing basin storage by ponds and wetland treatment areas, and (2) closing unused wells. Best practice information (e.g., location, BMP type, and maintenance needs) can also be tracked over time by using GIS methodologies.

7.0 REFERENCES

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APPENDIX L
YELLOW MEDICINE RIVER WATERSHED DISTRICT RULES AND REGULATIONS

Yellow Medicine River Watershed District Rules and Regulations

Mission Statement:

The Mission of the Yellow Medicine River Watershed District is to provide and organized means for proper management and protection of the water resources in the Yellow Medicine River Watershed. To carry out all the responsibilities of the Minnesota Watershed Act as set forth in Minnesota Statute, Chapter 103D. To carry forth all activities and powers given under the Minnesota Drainage code in Minnesota Statute, Chapter 103E. The District will encourage the wise use of the Natural Resources within its boundaries and promote the improvement of the health and welfare of its citizens.

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Section 1.0 Introduction

The Yellow Medicine River Watershed District was established by Order of the Minnesota Water Resources Board on August 26, 1971.

1.01 Statutory Policy

Minnesota Statute 103D.201, subdivision 1: To conserve the natural resources of the State by land use planning, flood control, and other conservation projects by using sound scientific principles for the protection of the public health and welfare and the provident use of the natural resources, the establishment of watershed districts is authorized under this chapter.

1.02 Statutory Authority to Adopt Rules

Minnesota Statute, 103D.341, subdivision 1: The managers must adopt rules to accomplish the purposes of this chapter and to implement the powers of the managers.

1.03 Short Title

These rules shall be known and may be cited as the "Yellow Medicine Watershed District Rules."

1.04 Jurisdiction

The jurisdiction of these Rules shall include all of the area, incorporated, and unincorporated, including both land and water, within the territory of the Yellow Medicine River Watershed District. The Board recognizes that in the management of land use primary control rests with county, city, and town.

1.05 Adoption or Amendment of these Rules

Subdivision 1. Minnesota Statutes 103D.341, Subdivision 2: Rules of the Watershed District must be adopted or amended by a majority vote of the managers, after public notice and hearing. Rules must be signed by the Secretary of the Board of Managers and recorded in the Board of Managers' official minutes.

Subd. 2. Prior to adoption, the proposed rule or amendment to the rule must be submitted to the Board of Water and Soil Resources for review and comment. The board's review shall be considered advisory. The board shall have 45 days from receipt of the proposed rule or amendment to the rule to provide its comments in writing to the watershed district. Proposed rules or amendments to the rule shall also be noticed for review and comment to all public transportation authorities that have jurisdiction within the watershed district at least 45 days prior to adoption. The public transportation authorities have 45 days from receipt of the proposed rule or amendment to the rule to provide comments in writing to the watershed district.

Subd. 3. For each county affected by the Watershed District, the managers must publish a notice of hearing and adopted rules in one or more legal newspapers published in the county and generally circulated in the Watershed District. The managers must also provide written notice of adopted or amended rules to public transportation authorities that have jurisdiction within the watershed district. The managers must file adopted rules with the county recorder of each county affected by the Watershed District and the Board of Water and Soil Resources.

Subd. 4. The managers must mail a copy of the rules to the governing body of each municipality affected by the Watershed District.

Subd. 5. Minnesota Statute 103D.341, Subdivision 3: A rule or resolution that affects land or water within the boundaries of a city is not effective within the city's boundaries until the governing body of the city is notified.

Subd. 6. Each rule adopted by the Board of Managers shall have the full force and effect of law.

1.06 Inconsistent Provisions

If any rule or rules herein contained are inconsistent with the provisions of the water law of the State of Minnesota as established by Minnesota Statutes Chapters 103A, 103B, 103C, 103D, 103E, 103F, and 103G, or other applicable state or federal law, then such state or federal law shall govern.

1.07 Scope.

It is not intended by these rules to repeal, abrogate, annul, or in any way impair or interfere with existing provisions of other laws or with private restrictions placed upon property by covenant, deed, or other private agreement.

1.08 Severability

The provision of these rules shall be severable and invalidity of any section, paragraph, subdivision, or any other part thereof shall not make invalid any other section, subsection, paragraph, subparagraph, subdivision, or any part thereof.

1.09 Rights of Appeal

Any parties believed to be adversely affected by the adoption or enforcement of a rule or any action of the Board of Managers rising out of and pursuant to the adoption or enforcement of a rule may appeal from the rules or any action taken thereon in accordance with the appellate procedure and review provided in Minnesota Statutes 103D.535 and 103D.537.

1.10 Due Process of Law

No person shall, under these rules, be deprived or divested of a previously established beneficial use or right without due process of law.

Section 2.0 More Restrictive Rules and Regulations

2.01 Adoption of Water Law

The Board of Managers of the Yellow Medicine River Watershed District expressly adopts by reference all of the water law of the State of Minnesota, as contained in Minnesota Statutes, Chapter 103A, 103B, 103C, 103D, 103E, 103F, and 103G, as amended. The District reserves the right to impose rules which are more restrictive than those contained in the water law of the State of Minnesota.

2.02 Applicable Rules

The provisions of the following agencies and statutes that are more restrictive than these Rules of the Watershed District shall apply provided said statute, rule, regulation, code, or ordinance applies in whole or in part to any of the purposes for which a Watershed District may be formed according to Minnesota Statute 103D.201, as amended, or applies to any of the powers and duties of the Managers listed in Minnesota Statute 103D.335, as amended.

Subdivision 1. The applicable rules of the Minnesota Board of Water and Soil Resources, Department of Health, Pollution Control Agency, Department of Natural Resources, Environmental Quality Board, Department of Agriculture, United States Environmental Protection Agency, United States Army Corps of Engineers, and other state and federal agencies vested with jurisdiction over water use and policy affecting public waters within the Watershed District.

Subd. 2. The Rules of Lincoln, Lyon and Yellow Medicine Counties' Soil and Water Conservation Districts and all soil and water conservation district laws imposed by Minnesota Statues, Chapter 103C, as amended.

Subd. 3. Any zoning, sanitation, and subdivision ordinances of Lincoln, Lyon and Yellow Medicine Counties.

Subd. 4. Any ordinances, rules, or regulations of any towns and townships and cities existing in part or in whole within the confines of the Yellow Medicine River Watershed District.

Subd. 5. The Watershed Law, Minnesota Statutes Chapter 103D, as amended.

Subd. 6. The Minnesota Environmental Rights Law, Minnesota Statutes Chapter 116B, as amended.

Subd. 7. The State Environmental Policy, Minnesota Statutes, Chapter 116D, as amended.

Subd. 8. The Minnesota Wetland Conservation Act of 1991, as amended.

Subd. 9. The law regarding Waters of the State, Minnesota Statutes Chapter 103G, as amended.

Section 3.0 Definitions

For purposes of these Rules, certain words and terms are herein defined as followed. In the absence of a definition hereinafter, the definition established for the State of Minnesota by statute or by case law shall apply to these Rules unless clearly in conflict, clearly inapplicable, or unless the content makes such meaning repugnant thereto. Certain terms or words used herein shall be interpreted as follows: the word "shall" is mandatory, not permissive. All distances, unless otherwise specified, shall be measured horizontally.

3.01 **Best Management Practices** shall mean a technique or series of techniques which has been effective in maintaining or improving water quality by controlling agricultural, urban, or construction related runoff, erosion, and sedimentation.

3.02 **Board of Managers** shall mean the Board of Managers of the Yellow Medicine River Watershed District.

3.03 **Board.** When not referring to the Board of Managers, Board shall mean the Board of Soil and Water Resources.

3.04 **Conditional Use** is a land use or development that would not ordinarily be allowed under existing rules or ordinances, but may be allowed with appropriate controls or conditions.

3.05 **Department of Natural Resources or DNR** shall mean the Minnesota Department of Natural Resources.

3.06 **Diversion** shall mean a channel constructed across the slope with a supporting ridge on the lower side.

3.07 **Fill** shall mean any material placed or intended to be placed on the bed or shoreland of a body of water or watercourse or wetland.

3.08 **General Welfare** shall include any act or anything tending to improve or benefit or contribute to the safety or well being of the general public or benefit the inhabitants of the Watershed District. General Welfare shall be synonymous with "Public Welfare" or "Public Benefit".

3.09 **Impervious Surface** shall mean a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include, but are not limited to, rooftops, sidewalks, patios, storage areas, and roads, streets, driveways, and parking lots constructed of concrete, asphalt, or compacted soils.

3.10 **MPCA** shall mean the Minnesota Pollution Control Agency.

3.11 **Parties** shall mean any individual, firm, partnership, association, corporation, landowner, developer, public or political subdivisions, or governmental subdivisions.

3.12 **Plan** shall mean a map, drawing, report, photograph or other similar supportive exhibit for a proposed work project.

3.13 **Public Health** shall mean any act or thing or condition that tends to improve the general sanitary or environmental conditions of the Watershed District.

3.14 **Private Drainage System** shall mean drainage tile, catchment basins, ditches, diversions, lift stations, or culverts, owned by any individual, firm, partnership, association or corporation, installed for the purpose of agricultural land drainage, but does not include the same owned by public or political subdivisions or governmental subdivisions. A private drainage system shall also include reshaping or removing soils, whether or not deposited by erosion, to cause, enhance, or speed the flow of water across agricultural land.

3.15 **Public Drainage System** shall mean drainage tile, catchment basins, ditches, diversions, lift stations, or culverts, owned and maintained by public or political subdivisions or governmental subdivisions, installed for the purpose of agricultural land drainage.

3.16 **Rip Rap** shall mean natural rock or concrete (with no exposed rerod) of at least 12 inches in diameter or larger. It may not be installed more than five feet waterward of the Ordinary High Water Mark. It must conform to the natural alignment of the shore and not obstruct the flow of water. The finished slope may be permitted to have exposed concrete.

3.17 **Runoff** is water, including nutrients, pollutants, and sediments carried by water that is discharged from land surface to a water body.

3.18 **Shore Impact Zone.** The shore impact zone boundary is a line parallel to and 50 feet from the ordinary high water level.

3.19 **Terrace** shall mean an earthen embankment, a channel, or a combination ridge and channel constructed across the slope.

3.20 **Watercourse** shall mean any channel having definable beds and banks capable of conducting generally confined runoff from adjacent lands. During floods water may leave the confining beds and banks but under low and normal flows water is confined within the channel. A watercourse may be perennial or intermittent.

3.21 **Watershed of Yellow Medicine River Watershed District** shall mean waters of the state as defined in Minnesota Statutes, Chapter 103G.005 Subd. 17, as amended, that are located within the boundary of the Yellow Medicine Watershed District.

3.22 **Watershed District** shall mean the legally established agency named and referred to as the Yellow Medicine Watershed District; when the word "district" appears without capitalization, it shall mean the land contained within the boundary of the Yellow Medicine Watershed District.

3.23 **Waterway** shall mean a natural or constructed grass channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

3.24 **Wetland** shall mean all wetlands, as defined in the Corps of Engineers 1987 Wetland Delineation Manual.

Section 4.0 Permit Requirements

4.01 Actions Requiring Permits

The following actions shall not be commenced before the issuance of a permit by the Yellow Medicine River Watershed District Board of Managers.

Subdivision 1. The installation of new or improvement of existing public and private drainage systems, excluding normal maintenance.

Subd. 2. The installation of agricultural best management practices that require land alteration including surface tile intakes, terraces waterways and diversions.

Subd. 3. The installation of new surface tile intakes and catch basins.

Subd. 4. The disposal of snow within the shore impact zone of steams, lakes, creeks and rivers.

Subd. 5. The creation of one acre or more of impervious surface.

Subd. 6. The creation of an artificial drainageway across a watershed and thereby delivering water into another subwatershed.

Subd. 7. The diversion of water by any artificial means into any public drainage system from land not assessed into said drainage system, and the excavation, shaping, removal of soils, fence lines, or other natural or artificial structures affecting the flow of water into any public drainage system from land not assessed into said drainage system.

Subd. 8. The alteration, removal, or reconstruction of any private or legal drainage system without a permit from the managers.

Subd. 9. The draining or alteration of natural waterways, streams, lakes, marshes or wetlands, including the bed, banks or shores.

Subd. 10. The construction, alteration, repair or removal of a dike.

Subd. 11. The alternation, construction, removal or abandonment of a reservoir or impoundment of water.

Subd. 12. The construction, reconstruction, repair or replacement of a bridge, culvert or drain laid in, to, or across any natural, legal or private drainageway.

Subd. 13. The construction of “new feedlots” or the expansion of “existing feedlots”, as those terms are defined by the MPCA within the shore impact zone.

Subd. 14. The performance of other actions that may adversely affect ground water or surface water quality or quantity with the Watershed District.

4.02 Permit Conditions:

Subdivision 1. Drainage Tiles. A permit for drainage tile will normally be issued provided the tile has a noneroding outlet and no other adverse or water conservation or water management concern exists, such as, but not limited to the following:

(A) The burdening of a lower or downstream landowner with more water than is reasonable under the circumstances.

(B) The failure to make adequate provision for the passage of water across the property of a lower or downstream landowner.

(C) The obstruction of a natural waterway, so as to cause an overflow onto the property of others.

(D) If the additional drainage caused by the installation of the tile will exceed the capacity of the ditch, waterway, watercourse, private drainage system or public drainage system into which the tile directly or indirectly outlets.

Subd. 2. Alteration of Watercourses. A permit for channelization of watercourses and lakeshore alterations will, at a minimum, require that the exposed banks be mulched and seeded and that all spoil piles be seeded.

Subd. 3. Best Management Practices. A permit for agricultural best management practices that have not been designed by the Natural Resource Conservation Service or Soil and Water Conservation District will, at a minimum, require that measures are taken to minimize the erosion of soil and deposition of sediment.

Subd. 4. Snow Disposal. A permit for disposal of snow within a shoreland impact zone may be issued provided the disposal conditions will not pollute surface water or ground water and no other adverse conservation or water management concerns exist.

Subd. 5. Impervious Surfaces. A permit for creation of impervious surface will, at a minimum, require the submission of plans utilizing standards and procedures for controlling runoff rates, nutrients, and sediments as described by Minnesota Pollution Control Agency. Wetlands may be incorporated to reduce the rate of runoff and improve the quality of discharge.

Subd. 6. Manure Storage Facilities. A permit for a manure storage facility shall make adequate provision for leakage and perimeter tiles. A public or private drainage system shall not be used as an outlet for a perimeter tile.

4.03 Permit Procedure Requirements

Subdivision 1. The Board of Managers shall act upon an application for a permit within 60 days of the next regular board meeting.

Subd. 2. If a permit application is refused or if granted subject to conditions, the applicant may, within thirty days thereafter, demand a hearing on the application.

Subd. 3. Obtaining a permit from the Board of Managers does not relieve the applicant from the responsibility of obtaining any other authorization required.

Subd. 4. After-the-fact permits for any action by a landowner for which a permit is required by not obtained prior to taking that action, including but not limited to unpermitted drainage, and any disturbance of the 16.5 foot buffer strip on watershed drainage ditches, or any greater buffer strip required by law, easement, permit or agreement

with the watershed or other person or entity, will be subject to a fee of not less than $250.00 or exceeding $750.00 as determined by the Watershed's Board of Managers. In determining the after-the-fact permit fee the board will consider the severity of the permit infraction, any prior infractions by the landowner, and the landowner's willingness to correct the lack of compliance with permitting requirements in a timely manner after notice to the landowner. If the landowner fails to make a permit application after written notice from the Watershed District of a permit requirement violation within 30 days after notice of violation is sent to the landowner by US mail, properly addressed with postage affixed to the notice or some similarly reliable method of notification, and fails to otherwise cooperate in making any changes necessary to the installed drainage to bring it into compliance with any Watershed Rules, drainage law, or permit requirements, an additional fee of $100.00 per month or any fraction of a month shall be added to the after-the-fact permit fee application. In addition to the permit fee, all other costs incurred by the Yellow Medicine Watershed District to resolve the violation shall be charged to the landowner. Nothing in this provision requires the Board of Managers to issue a permit to a landowner who does not meet permitting criteria, or limits the Yellow Medicine Watershed's ability or remedies to require removal or blockage of drainage installed which is not permitted or installed in violation of permit conditions.

Subd. 5. Unless otherwise specified in the permit, works for which the permit is issued shall be completed within one year or an extension must be requested.

Section 5.0 Enforcement Powers of Board Managers

Subdivision 1. Any provision of Minnesota Statutes Chapters 103A, 103B, 103C, 103D, 103E, 103F, and 103G, as amended, these Rules, or any order issued by the Board of Managers of the Watershed District may be enforced by criminal prosecution, injunction, action to compel performance, restoration, abatement, and other appropriate action.

Subd. 2. Any violation of the provisions of Minnesota Statutes Chapter 103D, these Rules, or any order, stipulation, or agreement made by the Board of Managers of the Watershed District is a misdemeanor in accordance with Minnesota Statues 103D.545.

Subd. 3. If the Rules are violated, the Board of Managers may issue cease and desist orders and pursue either restoration, corrective measures, and/or damages through either civil or criminal court proceedings.

Subd. 4. Any parties contracting to perform services regulated by these Rules shall be responsible for ascertaining that all permits have been obtained and the work performed complies with all requirements of these Rules. Contractors in violation shall be subject to all sanctions or penalties, criminal or civil, imposed by these Rules.

Subd. 5. The Watershed District, at its discretion, may file notification of a violation or threatened violation of any part of these rules by any person, governmental subdivision,

or governmental agency with the Pollution Control Agency, the Department of Natural Resources, Board of Soil and Water Resources, or the Minnesota Department of Health as appropriate; however, such notification shall not preclude any right of the Watershed District to prevent or continue to prevent any act not allowed or any action required to be performed by these rules, nor shall it prevent simultaneous actions to be taken against any violator by the Watershed District, the Department of Natural Resources, the Minnesota Pollution Control Agency, the Minnesota Department of Health, the courts, or any other person or authority having jurisdictional powers or interest to take such action.

Section 6.0 Adoption or Amendment

These Rules of the Yellow Medicine River Watershed District shall be adopted or amended by a majority vote of the Board of Managers, after public notice and hearing. Rules must be signed by the secretary of the Board of Managers and recorded in the Board of Managers official minute book, pursuant to Minnesota Statutes 103D.341, Subdivision 2.

Section 7.0 Variances

7.01 Variances Authorized.

The Board of Managers may hear requests for variances from the literal provisions of these rules in instances where their strict enforcement would cause undue hardship because of circumstances unique to the property under consideration and having made public notice of such hearings. The Board of Managers may grant variances where it is demonstrated that such action will be in keeping with the spirit and intent of these rules.

7.02 Standard.

In order to grant a variance, the Board of Managers shall determine that the special conditions which apply to the structure or land in question do not apply generally to other land or structures in the district, that, in granting of such variance, will not merely serve as a convenience to the applicant and that the variance will not impair or be contrary to the intent of these rules.

7.03 Term.

A variance shall become void after one year after it is granted, unless used.

7.04 Violation.

A violation of any condition set forth in a variance shall be a violation of the district rules. The Board of Managers shall ask the variance applicants to appear in front of the Board to show cause why the variance should not be terminated.

Section 8.0 Effective Date

Subdivision 1. Rules and Amendments of the Rules of the Yellow Medicine River Watershed District previously approved by the Board of Managers are hereby rescinded.

Subd. 2. The new Rules of the Yellow Medicine River Watershed District shall be effective upon adoption by majority vote of the Managers, after public notice and hearing and publication of the adopted Rules in at least one legal newspaper published in Lincoln, Lyon and Yellow Medicine Counties and generally circulated in the Watershed District.

Subd. 3. Upon adoption, the Managers must file the adopted Rules with the County Recorder of each county affected by the Watershed District and to the governing body of each municipality affected by the Watershed District.

Subd. 4. These Rules Adopted according to Minnesota Statutes 103D.341 are hereby effective this 10th day of August, 2015.

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Corey Hoffman, Secretary