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1 INTRODUCTION

There is growing momentum in the United States and elsewhere to manage water resources at the watershed scale. Minnesota, perhaps due to the predominance of water on its landscape, has many local watershed organizations. Minnesota was an early leader in enabling local watershed management with the passage of the Minnesota Watershed Act in the mid-1950.

In Minnesota, Watershed Districts are local units of government that work to prevent and solve water related problems. The boundary of a District generally follows a "natural" watershed boundary and is usually named after that "natural" watershed. Because water does not follow political boundaries, it makes sense to manage water and natural resources on a watershed basis. This allows for a comprehensive holistic approach to resource conservation.

The Upper Minnesota River Watershed District is one of Minnesota's 46 Watershed Districts. Each District is governed by a Board of Managers appointed by the County Board of Commissioners with land in the District. Chapter 103D of Minnesota Statutes is the enabling statute for Watershed Districts. To form a Watershed District, local residents, cities, or county boards may petition the Minnesota Board of Water and Soil Resources (BWSR) formerly the Minnesota Water Resources Board. Watershed Districts are formed for reasons ranging from flood control to water quality protection.

Minnesota Rules Chapter 103D requires the periodic update of the overall plan for the District. The plan serves as the guiding document for District operation. This document serves as the plan update for the Upper Minnesota River Watershed District.

The District is located at the headwaters of the Minnesota River, a river that has attained national prominence because of the ongoing restoration efforts. This plan represents an opportunity for local, state, and federal agencies to recognize the important and significant role-played by the Upper Minnesota River Watershed District in past and ongoing restoration efforts.

2 HISTORY OF THE WATERSHED DISTRICT

2.1 PREVIOUS PLANNING EFFORTS

The Upper Minnesota River Watershed District (hereafter referred to as the "District") was formed by Order of the Minnesota Water Resources Board on September 7, 1967. The Big Stone County Board of Commissioners signed a nominating petition for the District on September 8, 1966. The first overall plan was developed in 1970 and the Watershed District Board of Managers adopted it on December 15, 1970. The Minnesota Water Resources Board, as part of the state review and approval process, conducted a public hearing on the plan on March 11, 1971. On July 14, 1971, the Minnesota Water Resources Board approved the Upper Minnesota River Watershed District's first Overall Plan. At that time the Watershed District encompassed approximately 505 square miles primarily in Big Stone County, with smaller areas in Traverse County, Swift County, Lac Qui Parle County, and Stevens County. The present District boundary remains largely unchanged. (Figure 1).

The District continued operation under the policies identified in the first overall plan until approval of a Revised Plan, initiated in 1984. On March 6, 1984 the Board of Managers filed a revised overall Plan outline with the Minnesota Water Resources Board. The District received comments on the outline in March of 1984 from the Water Resources Board, urging the District to consider the following items: 1) the collection of existing information from other local units of government and state and federal agencies; 2) taking a total water resources management perspective; 3) initiation of a district water quality testing program; 4) promotion of conservation tillage in cooperation with Soil and Water Conservation Districts (SWCDs) and other agencies; and 5) a revision of the District's rules.

On July 29, 1985, the District filed a draft revised Overall Plan. The Water Resources Board issued comments on the draft plan on December 31, 1985. The comment letter suggested that the District: 1) more fully explain the features of the District's Clean Lakes Project; 2) include better information on feedlots, critical erosion areas, wetlands, and filter strips; 3) incorporate information about the Federal Conservation Reserve Program; 4) attempt to quantify the economic value of its water and related land resources; and 5) include specific measurable objectives.

On December 17, 1987, the District filed a second draft of its revised Overall Plan with the Water Resources Board. In March of 1988, the Water Resources Board issued a notice of filing of the revised overall plan. The notice was officially published within the District the first and second week of April 1988. The notice was also mailed to each affected county, SWCD, city, state agency, and other interested parties. The notice briefly summarized the content of the revised Overall Plan and stated that any person could request a public hearing. The Water Resources Board received no requests for a public hearing.

Water Resources Board members received summary information about the revised Overall Plan in May 1988. On November 30, 1988, the Minnesota Board of Water and Soil Resources (formerly the Water Resources Board) received and considered additional information on the content of the revised Overall Plan and prescribed the revised Overall Plan for the Upper Minnesota River Watershed District. The District operated under the policies identified in the revised Overall Plan from 1988 through 1999.

The District's most recent plan was updated and finalized in August of 2001. The current ten-year plan was revised in 2011, submitted for review by the Board of Water and Soil Resources in March 2013 and finalized September 25, 2013.

2.2 WATER MANAGEMENT HISTORY AND CONTEXT

The State of Minnesota led water management efforts within the area comprising the District from the late 1800s through the early 1940s. The State's efforts focused primarily on providing flood control and drainage for agriculture. The federal government, under the auspices of the U.S. Army Corps of Engineers ("Corps"), assumed a lead role for water management within the Minnesota River basin during the late 1940s. The Corps began investigating methods to reduce flooding and provide improved drainage. However, the implementation of any civil works by the Corps required local cooperation and commitments.

Local government has assumed a greater role in water management over the past 30 years. The District has initiated and completed many investigations or projects since formation, one of which is described in Appendix A. Past District projects have included surface and groundwater quality studies, flood control,

surface water level management, wetland restorations, natural resource management, education and erosion control projects.

2.3 DISTRICT EVOLUTION SINCE ESTABLISHMENT

2.3.1 Organizational Structure and Boundary Adjustments

The organizational structure of the Board of Managers remains unchanged since inception. The County Board of Commissioners for Big Stone appoints three of the District's Board of Managers, the County Board of Commissioners for Swift County appoints one Board Manager and the County Board of Commissioners for Traverse County appoints one Board Manager. Each Manager must be a resident of the District. Managers are prohibited from being a public official of the county, state or federal government. Each Manager serves a three-year term, which is renewable by approval of the County Board of Commissioners.

No boundary adjustments have occurred since inception of the District. Future boundary adjustments may be needed to reflect the effect of roadway alterations, local drainage activities, and additional topographic information.

2.3.2 Review and Assessment of Existing Objectives

Like many early water management agencies, the original goals and objectives of the District focused on managing water quantity. The early goals and objectives of the District are presented in "*Overall Plan, Upper Minnesota River Watershed District.*" General objectives identified by the plan included:

a. To slow down weed and algae growth in the District's Lakes.
b. To reduce the pollution of the water in the lakes and water courses within the District.
c. To intelligently regulate the water levels of the managed lakes within the District.
d. To keep adequate records of the water level, the chemistry, and other useful data.
e. To enhance the recreational facilities and scenic beauty of the District.
f. To improve the needed drainage, prevent excessive runoff or seepage, and provide needed soil and water conservation in the District.
g. To provide funds to accomplish these objectives and to engage technical assistance and advice.

h. Investigate the possibility of securing additional watershed area to operate within the natural boundary of the Upper Minnesota River.

i. To preserve, maintain, and improve habitat for fish and wildlife.

The Board of Managers understood the plan's purpose as providing a framework for operation of the District, rather than identifying all possible future projects. As technology, societal attitudes and economic conditions changed, the Board of Managers understood plan review and revision might be needed.

The District has undertaken and completed a number of activities in an effort to achieve their original objectives. More activities have been completed toward achieving some objectives than others. Table 1 evaluates the degree of activity by original objective and evaluates whether there is a need for a similar or revised objective within this updated plan. The need for a similar or revised objective is based on present water management problems within the District and whether there are solutions to these problems.

2.3.3 Future Direction

Maintaining and improving the water quality of Big Stone Lake has historically been the focus of the Upper Minnesota River Watershed District. The District has completed a number of activities oriented toward improving lake water quality, including the development of a work plan for continued improvement of lake water quality, bank stabilization projects along the shoreline, the implementation of agricultural conservation management practices, and addressing point source discharges within the watershed.

The emerging issues within the District are more related to potential conflicts between natural resource and water management issues associated with natural, modified and created watercourses than management of the lake. Many of the present legal drainage systems within the District have not been "maintained" and now exhibit some degree of natural resource value. Proposals to modify these waterways become controversial with natural resource agencies.

An important future direction for the District is becoming an integral component of the decision making process for these types of issues. Preference is to work with the Big Stone County Board of Commissioners to obtain responsibility for those financially solvent legal drainage systems. By integrating natural resource and water management issues, the District believes creative and innovative solutions, can be developed to address these complex issues.

2.4 MISSION STATEMENT

The mission of the Upper Minnesota River Watershed District is to serve the residents of the District by wisely and judiciously managing water, in a manner that sustains and enhances the social, economic and natural resources of the District. The District prefers the use of innovative water management methods, which recognize the unique agricultural, community, lake and stream, and natural resources within the District. These innovative approaches as reflected by the policies of the District should be oriented toward ensuring the economic viability of the District's agrarian community.

3 PRINCIPLES GUIDING PLAN DEVELOPMENT

Changes in technology and societal attitudes, new approaches toward water management, and progress have necessitated updating the District's Overall Plan. Three underlying principles have guided the development of this plan. First, recognition of the statutory authority provided under Minnesota Law to the Upper Minnesota River Watershed District for managing water and natural resources. The large number of local, state, and federal agencies with responsibility and authority for water management within the District represents a significant planning challenge. This plan is based on recognizing the responsibility and authority provided to the District within the larger context of state and federal government. The plan attempts to clearly identify the role and responsibilities of the various agencies involved in water management and identify the role and responsibilities of the District.

The second principle used during plan development is recognition of the need for and use of a comprehensive watershed based approach to water management at the local level. The policies, as a whole, which are recommended by this plan, represent a comprehensive approach toward water management. Each policy is one component of the approach. This comprehensive approach to water management will only function properly by using all plan components.

The need for sustainable solutions to water management problems is the third principle, which guided plan development. Sustainability is defined as using resources to meet current needs, while ensuring that adequate resources are available for future generations. The need for water resource management using sustainability principles has been recognized by many, but there are presently no guidelines for water resource plan development (see *The Minnesota Water Sustainability Framework—A plan for clean, abundant water for today and generations to come (2011),* **http://wrc.umn.edu/watersustainabilityframework/index.htm**). Therefore, this plan attempts to broadly incorporate the concept of sustainability.

2.1 PRINCIPLES OF SUSTAINABILITY AS THEY APPLY TO WATER MANAGEMENT

The basis for sustainability within water resource management is the realization that water is an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization. Priority must be given to satisfying basic human needs and the safeguarding of ecosystems. The concept of sustainability is a comprehensive form of planning that encompasses least-cost analysis of resource management options, as well as a participatory decision-making process and the development of water resource alternatives that take into consideration the communities and environment that may be affected, the numerous institutions concerned with water resources and the potential for competing policy goals.

2.2 CHARACTERISTICS OF SUSTAINABILITY[1] IN WATER RESOURCES MANAGEMENT

A set of characteristics is perhaps the best method to describe sustainability as it related to water management. These characteristics are:

a. The general objective is to make certain adequate supplies of water of good quality are maintained for human use, while preserving the hydrological, biological and chemical functions of ecosystem;

[1] **Modified from "Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources", United Nations Plenary in Rio de Janeiro, June 14, 1992 and "A white paper from the American Water Works Association - Integrated Resource Planning in the Water Industry" June, 1994.**

b. Adapting human activities within the limits imposed by nature;

c. Recognize the multi-sectorial nature and importance of water as a resource; i.e., for water supply and sanitation, agriculture, industry, urban development, hydropower generation, transportation, recreation, and ecosystems;

d. Recognize the need for coupling of water supply, conservation and waste minimization;

e. Design, implement and evaluate projects and programs that are both economically efficient and socially appropriate within clearly defined strategies, based on full public participation.

The recognition of the statutory authority of stakeholders, the use of a watershed based approach and the concept of sustainability form the basis for this plan. This plan constitutes a revision to "*Overall Plan, Upper Minnesota River Watershed District*" and is intended to meet the requirements of Chapter 103D,[2] Section 103D.405 of the Minnesota Statutes.

3 WATERSHED SETTING

4.1 SIZE, LOCATION AND SUBWATERSHEDS

4.1.1 Location

The Watershed District is located in west-central Minnesota, (Figure 1) and is the headwaters of the Minnesota River. Big Stone Lake and the South Dakota border form the western boundary of the District. The continental divide and Traverse County are located to the north. Areas south of the continental divide contribute runoff southerly to the Minnesota and Mississippi Rivers and north of the divide northerly to the Hudson Bay via the Red River of the North. Generally, the watershed district includes all of the land east of Big Stone Lake draining into Big Stone Lake and into the north side of the Minnesota River above the Marsh Lake Dam, which is located in Section 30, Township 120, Range 43, 5th Principal Meridian, Swift and Lac Qui Parle counties.

[2] **Chapter 103D represents recodification of the original Chapter 112, the Minnesota Watershed Act.**

Approximately 80% of the land area of Big Stone County is in the District. The small area of north central and northeast Big Stone County, not in the District, casts its runoff northward through the west branch of the Mustinka River. In Stevens County the few acres in the District are along the west line of the township situated in the southwest corner of Stevens County. Most of Shible Township in southwestern Swift County is in the District.

On the south, southwest of the Minnesota River, the District includes the northern part of Agassiz and Yellow Bank Townships in Lac Qui Parle County west of U.S. Highway 75. The territory of the District in northwestern Lac Qui Parle County includes the Big Stone National Wildlife Refuge.

3.1.2 Size

There is approximately 505 square miles of land within the District. The area is distributed between counties as follows:

a. Big Stone County – 410 square miles (81%).
b. Traverse County, 40 square miles (8%).
c. Swift County – 35 square miles (7%).
d. Lac Qui Parle County – 18 square miles (3%).
e. Stevens County – 2 square miles (1%).

4.1.3 Subwatersheds

Subwatersheds within the District flow to the Minnesota River, some through Big Stone Lake and others directly to the Minnesota River. Subwatersheds flowing into Big Stone Lake include Browns Valley, Hoss Creek, Fish Creek, Salmonsen Creek, Lindholm Creek, Meadowbrook Creek, direct drainage area in or near Ortonville and a number of small-scattered direct tributaries to Big Stone Lake. Subwatersheds which are tributaries on the northeast of the Minnesota River include: Stony Run, Upper Stony Run, County Ditch No. 4, Five-Mile Creek, Shible Lake and a few areas that contribute runoff directly to the Minnesota River. On the southwest side of the Minnesota River there are about 18 square miles that contribute runoff to the Minnesota River. Locations of the subwatersheds are shown in Figure 2.

Stream flows in the watershed generally attain peak flows in March or April following snowmelt runoff. Increased runoff occurs after heavy summer storms.

4.2 LOCAL STAKEHOLDERS WITHIN THE DISTRICT

There are several types of stakeholders within the Upper Minnesota River Watershed District. Stakeholders are defined as persons, groups or institutions having an interest in an activity, project or program. The definition includes the intended beneficiaries and intermediaries, winners and losers, and those involved or excluded from a decision-making process. Stakeholders include residents of the District, state and federal agencies, special interest groups, and local government. Local stakeholders are the local governmental units and residents responsible for or involved with local water management.

There are several types of local governmental units within the District. Cities located within the District include Ortonville, Browns Valley, Odessa, Beardsley, Barry, and Clinton. Townships included or partially included in the watershed are: Browns Valley, Toqua, Moonshine, Foster, Prior, Almond, Malta, Big Stone, Otrey, Artichoke, Ortonville, Odessa, and Akron, in Big Stone County; Shible, Appleton, and Hegbert in Swift, County; Yellow Bank and Agassiz in Lac Qui Parle County; Stevens in Stevens County and; Parnell, Arthur, and Folsom in Traverse County.

Big Stone, Traverse, Swift, Lac Qui Parle, and Stevens Counties are local units of government and vital stakeholders involved in District activities. The County Board of Commissioners for Big Stone appoints three of the District's Board of Managers, the County Board of Commissioners for Swift County appoints one Board Manager and the County Board of Commissioners for Traverse County appoints one Board Manager. Soil and Water Conservation Districts within Big Stone, Traverse, Swift, Lac Qui Parle, and Stevens Counties work jointly with District Staff.

Local residents are stakeholders in District activities by virtue of District residency. Some local residents serve on the Watershed District Advisory Committee. Members of the Advisory Committee are residents of the District, typically community leaders, and have the role of advising and assisting the District Board of Managers. They can also make recommendations on all contemplated projects and initiatives. Currently the District has seven Advisory Board Members. They include two landowners, one Big Stone County Commissioner, one Ortonville City Council Member, a District Conservationist for NRCS, the Big Stone County Environmental Officer, and the Big Stone County Highway Engineer. Other local residents become involved with specific District initiatives.

4.3 POPULATION OF THE DISTRICT

People have a direct effect on the use, need for and distribution of water. Therefore, some understanding of population trends within the District is useful when attempting to understand the need for water management within the future. Population within the District has declined 50% since its peak in 1940 when Big Stone County had 10,447 residents to the current population of 5,269 (2010 United States Census). The population of Big Stone County has dropped 9.5% since the last District Plan update in 2000. The trend seen for Big Stone County over the past decade is similar for Swift (-18.2%), Stevens (-3.3%), Traverse (-13.9%), and Lac Qui Parle (-10%). In contrast, the State of Minnesota recorded an overall population increase of 7.8% in the 2010 census.

In addition, the demographics of the District show an increase in the percent of residents age 65 and older. Four of the five counties in the District (with the exception of Stevens County) have 20% or more of their population age 65 and above, placing them among the oldest average age counties in the nation.[3]

The lack of population growth in western Minnesota has often been attributed to loss of employment opportunities within the agricultural economy. The area comprised by the District lacks regionally significant industrial activity. Most of residents of the District live in rural rather than urban areas, as few municipalities of significant size are located within the District.

In Big Stone County the number of full time farmers decline 7% to from 301 in 1997 to 281 in 2007[4]. This could reflect the number of producers who also have off-farm employment. Average farm size in the Big Stone does not show evident trends over time.

Year	Average Farm Size in Big Stone County
1992	570
1997	605
2002	614
2007	558

[3] Rural Policy Research Institute. 2008. Counties in which 20% or more of the population is 65 or older. http://www.rupri.org/Forms/20pcage65over08.pdf

[4] 2007 Census of Agriculture: County Profile- Big Stone County

The 9% drop in farm size between 2002 and 2007 is not intuitive as Big Stone County seems to have experience the same trend towards farmland aggregation as seen elsewhere in the farming sector. It will be interesting to see if the 2012 Agricultural Census bears out this apparently significant decrease in the average farm size in the county. In general, however, the State has seen a historic decline in the number of farms and farmers. Average farm size on a statewide basis was 211 acres in 1959 and increased to 332 acres in 2007. The number of farms in Minnesota peaked in 1935 at 204,000, and has declined to an estimated 81,000 in 2010[5].

4.4 THE ECONOMY

4.4.1 Overview

In the decade since the last District plan update, the United States had endured two recessions; the so-called dot-com bubble in 2000-2001 and the more recent "Great Recession" of 2007-2009[6]. Unemployment rates have remained over 9% since April 2009 and the collapse of a housing bubble that began in 2007 is contributing to the current stagnation of the US economy.

The change in unemployment rate for the population of the District was moderated because of the high percentage of older residents who do not participate in the workforce. The agriculturally based economy of the region has benefitted from record high commodity prices that have bolstered farm incomes. Accompanying the run up in commodity prices is a dramatic increase in the price of farmland. Minnesota farmland prices have more than doubled between 2000 and 2010. In inflation adjusted values, Minnesota farmland sold for approximately $1250 per acre in 2000 and approximately $3,000 acres in 2010[7]. Farmland prices in the District have experienced a similar trend.

The increase in commodity prices and the value of farmland over the past 4 years have impacted farming practices. Though this trend is too recent to have robust data, anecdotally more lands are being cultivated for corn and soybeans, including marginal lands, acres previously under pasture, and conservation set aside. The increase in commodity and farmland prices, combined with increased

[5] http://www.ers.usda.gov/statefacts/mn.htm
[6] 2011. Pers. Comm. Tom Stinson, Minnesota State Economist.
[7] Taff, Steven. 2011. Minnesota Farm Real Estate Sales 1990-2010. Staff Paper Series. University of Minnesota Department of Applied Economics.

rainfall for the past 4 years, have contributed to the increase in drainage permit applications to the District, with record high permit request in 2011 (see below).

Year is shown first and then drainage permit applications

2001	63	**2007**	110
2002	34	**2008**	69
2003	47	**2009**	85
2004	39	**2010**	139
2005	58	**2011**	181
2006	100	**2012**	135

4.4.2 Agriculture

As one of the nation's leading agriculture states, Minnesota sold $8.68 billion worth of agricultural products during 2007[8]. Nationally, Minnesota ranks sixth in total agricultural cash receipts in total crop sales and produced more sugar beets, green peas, sweet corn, and turkeys than any other state[9].

There were 452 farms with an average size of 558 acres in Big Stone County in 2007, the county comprising the largest portion of the District. Swift and Traverse Counties had 888 farms (437 acres) and 479 farms (684 acres), respectively. The average size of a farm within Minnesota is 332 acres. The number of farms has decreased and the average size increased since 1959, as advances in farm technology allow individual farmers to operate larger farms with less hired labor. However, across all counties in the district and statewide, there has been a trend towards increased farm numbers and lower average farm size between 2002 and 2007.

The sale of all agricultural products exceeded $86 million within Big Stone County and $206 million in Swift County in 2007, demonstrating the regional importance of agriculture to the economy. In 2007, crop sales within Big Stone and Swift Counties accounted for more than 76% and 55% respectively, of the agricultural products sold; the remainders of agricultural products sold were livestock related. The general trend within the Big Stone County continues to be toward the production of cash crops, rather than livestock. However, in Swift County livestock production is an increasing portion of the agricultural activity.

[8] 2007 Census of Agriculture. United States Department of Agriculture. National Agricultural Statistics Service.
[9] 2010. Minnesota Agricultural Profile. Minnesota Department of Agriculture. http://www.mda.state.mn.us/~/media/Files/agprofile.ashx

This trend is reflected in the livestock numbers within the District. According to the Census of Agriculture, the number of cattle and calves in Big Stone County decreased dramatically from 8,335 in 1997 to 2154 in 2007. Likewise hogs and pigs showed a similar trend decreasing from 36,103 in 1997 to 12,481 in 2007. In contrast, as of 2007 Swift County ranked second in turkey production in Minnesota, the largest turkey producing state in the nation.

Permitting responsibility for animal feedlots within the district is the responsibility of the Minnesota Pollution Control Agency (MPCA). In Big Stone, Traverse, Stevens, Swift, and Lac Qui Parle counties some aspects of this responsibility has been delegated to the counties. County Feedlot Officers are present in these counties to provide technical assistance and coordinate permitting activities. According to the Big Stone County Environmental reporting there were 70feedlots requiring permits in 2009.

4.4.3 Natural Resources, Recreation, and Tourism

The UMRWD is home to the headwaters of the Minnesota River, Big Stone Lake, and offers many opportunities for nature based tourism including hunting, fishing, and birding. According to Explore Minnesota data for 2011, tourism in Big Stone County generated $4.0 million in gross revenue and contributed to 140 private sector jobs. Tourism assets in the watershed include the Big Stone State Park with modern camping facilities, the Northern Tallgrass Prairie National Wildlife Refuge, and numerous recreational lakes, parks, bed and breakfasts, and a hotel. Among the nature based attractions is the Border Walleye Challenge, a fishing contest that is covered on national television. Thus, nature based and recreational tourism is an important economic driver for the watershed.

4.4.4 Government

The economic importance of government within the District is difficult to quantify. The primary form of government within the District is local; i.e., county, city, and township. Local Government is considered a significant employer within the District. The city of Ortonville is the county seat of Big Stone County and is the only county seat located within the District. A majority of the local government jobs are located at Ortonville. The Ortonville area also provides both state and federal positions. These include the Minnesota Department of Natural Resources, Natural Resource Conservation Service, and the Farm Service Agency.

4.4.5 Services

Service industries are those engaged in providing services for individuals, business and government establishments, as well as other organizations. The three largest service categories within Minnesota are business, health, and professional. The service industry is typically associated with population centers. Because of the lack of significant population centers within the District, earnings within the District resulting from services are likely to be less than state averages, with the majority of earning resulting from health care and legal services. The service industry within the District employs health care positions within the Medical, Health, Optometry, Chiropractic, and Dental fields.

4.4.6 Transportation

Other industries play a less prominent role within the District. Transportation is important because of the distance often commuted by residents when performing daily activities. Important transportation routes traversing the District from south to north include; State Highway 7 along the western portion of the District, U.S. Highway 75 bisecting the center of the District, and County State Aid Highway 25 along the eastern portion of the District. Important roads serving as east-west routes through the District include; U.S. Highway 12 in the southern portion of the District, County State Aid Highway 6 in the central portion of the District, and State Highway 28 in the northern portion of the District. These highway systems are important within the District, because they serve as access to other regionally important transportation routes. Two railroad systems are located within the District. The Burlington Northern Railroad operates a line running parallel to U.S. Highway 28. The Soo Line Railroad operates a line running parallel to U.S. Highway 75 south of Ortonville.

4.5 PHYSICAL CHARACTERISTICS OF THE DISTRICT

4.5.1 Climate

In general, the climate within the District can be described as continental, meaning the area is characterized by cold winters and mild summers, the result of being near the center of a large land mass (i.e., North America). Polar air masses dominate during the winter months, resulting in cold, dry weather. Warm, moist air masses originating from the Gulf of Mexico dominate during the spring and summer, resulting in warm days and nights. Seasonal temperature extremes within the District are common.

In total, there are eight U.S. Weather Bureau observation stations located within and in proximity to the District used for the determination of the long-term meteorological conditions. The six U.S. Weather Bureau observation stations within the District are located at Artichoke, Beardsley, Correll, Madison, Milan and Ortonville, MN; the two U.S. Weather Bureau observation stations outside the District are located at Milbank and Wilmot, SD. Each U.S. Weather Bureau observation station is located within 30 miles of Ortonville, the District's office.

Wide variations in temperature and moderate precipitation characterize the District. The mean annual temperature within the District is approximately 44ºF. Mean monthly temperatures vary between 12ºF in January to 74ºF in July. Within the District, temperature extremes as high as 114ºF and as low as -42ºF were recorded at Beardsley on July 29, 1927 and at Milan on February 16, 1936, respectively. Mean annual precipitation within the District is approximately 22 inches (Figure 3). Monthly precipitation varies, on average, between 0.6 inches in January to 4 inches in June. About 58% of the annual precipitation occurs between May and August. Maximum and minimum annual precipitation depths recorded within and around the District are 39.1 inches at Milan, MN and 11.5 inches at Milbank, SD. Maximum 24-hour rainfalls varying from 4.0 inches to 8.7 inches have been recorded on several occasions in the region. Annual snowfall totals about 36 inches and comprises about 16% of the mean annual precipitation.

Increased annual rainfall and snowpack in recent years has caused spring flooding issues and resulted in Federal Emergency Management Agency (FEMA) major disaster declarations in 2010 and 2011. Over the past five years, the average rainfall has been 7 inches above normal. In 2007, the annual precipitation was five inches –or nearly 25%-- greater than the historic average. The increased rainfall corresponds to the increase in drainage permit applications, as shown in section 4.4.1 above.

4.5.2 Physiography

The District is situated within the Northern Glaciated Plains Ecoregion and can further be divided into three geomorphic settings: 1) the headwaters flowing off the Coteau des Prairies, 2) the lower basin-situated within the Blue Earth Till Plain, and 3) the Minnesota River Valley-carved by the glacial River Warren.

The portion of the watershed within the Blue Earth Till Plain is represented by nearly level to gently sloping lands, ranging from 0-6% in steepness (Figure 4). Soils are predominantly loamy, with landscapes having a complex mixture of well and poorly drained soils. Drainage of depressional areas is often poor and tile drainage is common. Water erosion potential is moderate on much of the land within this geomorphic setting.

The Coteau des Prairies is a morainal plateau that occupies the headwaters of the Upper Minnesota River and several other rivers. In addition to being an impressive topographic barrier, the Coteau acts as an important drainage divide. Its well-drained southwestern side sheds water into the Big Sioux River, while waters on the northeastern side flow into the Des Moines and Minnesota Rivers. The Coteau is characterized by landscapes with long northeast facing slopes, which are undulating to rolling (2-18%). Soils are predominantly loamy and well drained.

Tributaries draining the Coteau and entering the Upper Minnesota River from South Dakota include the Little Minnesota River – headwaters of Big Stone Lake and the Whetstone River. Alluvial deposits at the mouth of the Whetstone River formed a natural dam, originally impounding Big Stone Lake. In 1973 a diversion was completed that directed flows of the Whetstone River directly into Big Stone Lake. Further modifications were made in the late 1980s with the completion of the Big Stone/Whetstone River Control Structure. This structure can redirect up to 1460 cubic feet per second (cfs) of flow from the Whetstone directly into the Minnesota River, bypassing the deposition of unwanted sediments and nutrients into Big Stone Lake during high flow periods.

Below Ortonville, the Minnesota is a small but distinct river. It flows for fifteen miles, passing through the Big Stone-Whetstone Reservoir and further down receives the waters of the Yellow Bank River whose headwaters are also in South Dakota. The Upper Minnesota then meets Marsh Lake and Lac Qui Parle. Both Marsh and Lac Qui Parle lakes are natural impoundments, dammed by alluvial fans of sediment deposited at the mouths of two major tributaries, the Pomme De Terre and Lac Qui Parle rivers respectively. The Pomme De Terre River comes down from the hills of the lake country to the north. The Lac Qui Parle River originates in the Coteau des Prairies, flows northeast through the prairies of the southwest, and then joins with the Minnesota River by Watson. Although they are natural reservoirs, the lakes were subject to some natural fluctuation; thus dams were built at the outlets for greater water

control. The outlet of the Upper Minnesota River Watershed is below the Lac Qui Parle Reservoir, 288 miles upstream from the mouth of the Minnesota River.

4.5.3 Geology

An understanding of geology provides insight into the location, movement and natural quality of ground water. The hydrologic character and water chemistry of streams and lakes are also strongly affected by surface geology. Except for the Minnesota River valley and its tributaries, the area is a hummocky plain underlain by 100 to 200 feet of glacial drift composed of clayey till and sandy outwash. The drift rests on Cretaceous shale and Precambrian granite. The present Minnesota River valley floor is 80 to 100 feet below the surrounding regional plain. The valley sediments consist of a thin deposit of fine grained recent alluvium on top of dense glacial till and channel deposits, Cretaceous shale, and Precambrian granite. Scattered granite knolls and ridges of glacial till and outwash protrude through the alluvium on the valley floor. The alluvium of the valley is primarily composed of clays, silts, fine sands and has high organic matter content. This material is variable in thickness that averages less than 25 feet and is not continuous over the valley floor. The main glacial unit is the till on the floor of the valley and forms the material in the valley walls and in the surrounding regional highland. Scattered large boulders are present in the till.

4.5.4 Soils

An understanding of soil type is important when discussing water management issues. Infiltration rates are a function of soil type and differing soil types have differing abilities to hold water. Soils are derived from geologic deposits. The source of minerals within the District is glacial sediments. Soils derived from these sediments range from poorly drained silty clays to well drained sandy loams.

Soils with similar slope, texture, natural drainage and other features are categorized within the same major association. Within the District ten major soil associations are present (Figure 5). However, three soil associations comprise at least 75% of the District. The primary associations within the District are the Hamerly-Parnell-Lindaas, Hattie-Fulda and Esmond-Heimdal. In proximity to the Lac Qui Parle River the major soil associations are quite varied. In general, the soils within the northern portion of the District are largely poorly drained silty clays and clay loams; the soils within the southern portion of the District are primarily well-drained loams.

4.5.5 Land Use and Cover Types

How land within the District is used by humans and how these uses are distributed across the landscape largely determines the need for water management activities. Most agree that different water management is needed within urban areas to protect infrastructure, while less intensive measures are needed in areas with lower population density, provided water management is not needed to sustain important activities (e.g., agriculture). Resource management, whether the resource is water, wildlife, or minerals, is essentially an issue of land management.

Land use within the District is primarily agricultural, with approximately 75% of the available acres utilized for production of grain crops, mainly corn and soybeans. The majority of the croplands (82%) are classified as moderately productive. Of the 338,310 acres in the county, about 10,491 acres are enrolled in CRP, CREP, RIM and the Wetland Reserve Program[10]. Big Stone County has 83 Waterfowl Production and Wildlife Management Areas. The Big Stone National Wildlife Refuge is located approximately two miles southeast of Ortonville. The 11,521-acre refuge was established in 1975. Land eligible for the RIM Reserve Program includes riparian lands, sensitive groundwater areas, wetland restoration areas (drained wetlands), marginal cropland and lands for living snow fences.

Approximately 39% of the lands draining into the District have high water erosion potential and 26% have the potential for significant wind erosion. Water erosion potential is highest on lands draining the Coteau region. Approximately 9% or 29,205 acres within the District are publicly owned. The majority of this land is managed as recreational or wildlife areas as parks or waterfowl production areas. Generally these parcels are under the management of the US Fish and Wildlife Service or the MN Department of Natural Resources.

4.6 BIOLOGICAL AND ECOLOGICAL RESOURCES

4.6.1 Ecological Units

Different types of classification systems have been used for describing ecological units. The Eco region concept has been used extensively within Minnesota. The District lies within the Northern Glaciated Plains Eco region. Just to the north of the District lies the Red River Valley Eco region, while the North

[10] 2012. Conservation Lands Summary—Statewide. Minnesota Board of Soil and Water Resources.

Central Hardwood Forests and the Western Corn Belt Plains Eco regions begin about 75 miles to the east. The Northern Glaciated Plains Eco region contains three geomorphic settings within the District. These include the Coteau des Prairies, the Blue Earth Till Plain, and the Minnesota River Valley. The Eco region concept is useful because characteristics within the area comprising an Eco region are often similar and water management strategies may differ by Eco region.

4.6.2 Original Vegetation

Original vegetation consisted of mostly Mesic and Hill Prairie with many marshes and sloughs (Figure 6). Woodlands, in the form of Oak Openings and Barrens occurred along streams and around lake perimeters. A few scattered prairie tracts remain where they have been maintained by haying and occasional fires or through protection or restoration in Waterfowl Production Areas and other Wildlife Management Areas. Major grass species occurring in these prairie remnants include big and little bluestem, indian grass, side-oats grama, prairie cordgrass, and prairie dropseed. The principal species of woody vegetation in the Oak Openings and Barrens community is the bur oak. This plant community is currently found mostly along the Little Minnesota River near the upper end of Big Stone Lake.

4.6.3 Important Wildlife Habitats

Important wildlife habitats in the District are grasslands and wetlands. The prairie remnants are valuable habitats for those species such as the greater prairie chicken that utilize wholly or in part grassland ecosystems. Woodlands and brushy areas are important as breeding, nesting, feeding, and resting areas for both migratory and resident wildlife. Wetlands, including potholes, marshes, and open water bodies, provide habitat for aquatic and terrestrial biota. Organisms utilizing these areas include fishes, various aquatic invertebrates, waterfowl, big and small game, furbearers, some rodents, wading birds, and many species of songbirds.

The white-tailed deer is the major big game animal within the District. Typical furbearers include the coyote, red and gray fox, mink, muskrat, beaver, and raccoon. Small game mammals consist of the cottontail rabbit, jackrabbit, and gray squirrel. Upland game birds are composed of the ring-necked pheasant and Hungarian partridge. Waterfowl production occurs in the wetland areas, with the most common breeding ducks consisting of the mallard, blue-winged teal, and northern shoveler. Other migratory birds utilize the stubble fields of the District during the fall. Common nongame breeding

birds are the killdeer, house wren, robin, and savannah sparrow. Typical herpetofauna include the western plains garter snake, red-bellied snake, eastern tiger salamander, leopard frog, and wood frog.

4.6.4 Fisheries of the District

The Minnesota Department of Natural Resources manages six lakes for game fish species within the District. The largest is Big Stone Lake. Big Stone Lake is located on the Minnesota-South Dakota border and was formed nearly 8,000 years ago when glacial sediments deposited at the southern end of the present day lake formed an earthen dam on what is now the Little Minnesota River. Big Stone Lake, classified as eutrophic, has an excellent fishery. The lake is primarily managed for walleyes, channel catfish, yellow perch, northern pike, black crappies, and sunfish. The four remaining lakes managed by the Minnesota Department of Natural Resources are generally classified as glacially formed prairie lakes. They include Arens, Botkers, Long Tom, Marsh, and North Long Tom. These lakes are rich in nutrients, relatively shallow and windswept. These fisheries are managed mostly for walleyes and northern pike. While these recreational lakes are managed for game fish species, nongame species or "rough fish" make up a substantial part of the spectrum of species present in the District. These nongame fishes include bullhead, sheepshead, buffalo, quillback, suckers, redhorse, and carp.

Aquaculture has been defined as the propagation and rearing of aquatic species in controlled or selected environments. The Department of Natural Resources (DNR) and private individuals are both major aquaculture producers. Approximately 35 shallow lakes totaling nearly 3500 acres are used by aquaculture in the UMRWD to raise walleyes. Walleyes produced by the DNR are used to meet statewide stocking quotas. Walleyes raised by private producers are sold to both public and private entities for stocking or food. In a typical year well over 20,000 lbs. of walleye are produced in the UMRWD.

4.6.5 Rare and Threatened Resources

The Minnesota Department of Natural Resources has identified 52 species of plants, animals, and insects as either endangered, threatened or species of special concern that have been observed within Big Stone County (Table 2). Some of the species listed are abundant within the watershed. The Minnesota Department of Natural Resources has similarly identified rare community types within the District (Table 3). This information was gathered February 2013. Another resource to consult in district planning is Minnesota Prairie Conservation Plan:

(http://files.dnr.state.mn.us/eco/mcbs/mn_prairie_conservation_plan.pdf).

This plan identifies priority Prairie Core and Corridor areas and includes conservation targets. Some of the Prairie Core areas fall within the UMRWD boundaries. Targeting some of these areas for the District's restoration projects could achieve multiple benefits.

4.7 CULTURAL RESOURCES

Locations and buildings of national significance are listed on the National Historic Registry. The Minnesota Historical Society also lists sites of state significance[11]. There are eight sites within the watershed district listed on the National Historic Registry; they include familiar landmarks such as the Big Stone County Courthouse, the Ortonville Free Library, and the Odessa Jail.

4.8 SURFACE WATER RESOURCES

4.8.1 Subwatersheds and Primary Tributaries

The subwatersheds flowing into Big Stone Lake include Browns Valley, Hoss Creek, Fish Creek, Salmonsen Creek, Lindholm Creek, Meadowbrook Creek, and Ortonville. Flows of selected tributaries are listed in Appendix B. The following subwatersheds are tributary to the northeast side of the Minnesota River; Stony Run, Upper Stony Run, County Ditch No. 4, Five-Mile Creek, and Shible Lake. On the southwest side of the Minnesota River there is about 18 square miles that contribute runoff to the Minnesota River.

4.8.2 Important Lakes within the District

The total number of lakes within the District recognized by the Minnesota Department of Natural Resources is six. The lakes within the District include Big Stone, Arens, Botkers, Long Tom, Marsh, and North Tom. Big Stone Lake is by far the largest of the six lakes, having a surface area of approximately 12,600 acres. Marsh Lake is the second largest, having a surface area of approximately 4,500 acres. The remaining four lakes are generally classified as small, prairie lakes with surface areas ranging from approximately 24 to 133 acres. All six lakes are characteristically shallow and nutrient rich.

[11] Updated based upon National and Minnesota Historical Society registries of historical places: accessed on 12/28/2011

Lakes within the District are used for recreation, including fishing, boating, and camping. They are also used by permanent residents, summer home residents, and tourists who are attracted to this area from all over the United States and Canada. Public access and campgrounds are available for public use on most of the lakes. Many year-round residences and summer homes have been built in part because of the recreational and aesthetic appeal of the area. Fishing is popular in these lakes. The most common fish found in these waters include bass, northern pike, panfish, and walleye.

The quality of water in the lakes is a fundamental concern of the District. The pressure for development around lakeshore, plus commercial tourism, could result in poor water quality. The District is committed to cooperating with other agencies, such as the Minnesota Pollution Control Agency and the Minnesota Department of Natural Resources, to control lake pollution and lake shore development, so that these valuable natural resources may be preserved. In addition, the District stays abreast of statewide efforts, and as such has both electronic and hard copies of the 2011 Minnesota Water Sustainability Framework[12] and has electronic copies of the Minnesota Statewide Conservation and Preservation Plan[13].

4.8.3 Density and Distribution of Wetlands

In general, wetland resources exist throughout the District. The northeast and south-central portions of the District generally contain more wetlands than the northwestern part. The northeast and south-central areas also tend to contain more semi-permanently flooded, permanently flooded, and intermittently exposed wetlands, while the northwestern part generally contains more saturated and temporarily flooded wetlands (Figure 7). Big Stone County has over 50,740 acres of water bodies/wetlands.

The number and types of wetlands within the District is a direct result of settlement patterns and historical incentives to landowners. The value of wetlands differs among individuals, but the efforts to preserve, enhance and maintain wetland systems is evidence of their societal importance. A variety of values are attributed to wetlands, i.e., flood control, water quality improvement, ecological, and groundwater recharge. Any specific wetland may exhibit one or many of these attributes depending

[12] 2011. Minnesota Water Sustainability Framework. http://wrc.umn.edu/watersustainabilityframework/index.htm
[13] 2008. Minnesota Conservation and Preservation Plan. http://www.lccmr.leg.mn/statewideconservationplan/SCPP_FinalPlan.html

upon size, location, and degree of human disturbance. Some wetlands clearly exhibit greater quality than others do.

Numerous waterfowl production areas (WPAs) are located within the District. Waterfowl production areas were acquired by the U.S. Fish and Wildlife Service (USFWS) either through fee title or through domain. Their primary purpose is to preserve breeding, nesting, and feeding habitat for migratory waterfowl. These wetland areas are purchased with funds received from the sale of migratory bird hunting and conservation stamps ("duck stamps"). These WPAs are significant because they provide the public with a variety of wildlife oriented recreational opportunities, improve water quality, provide local flood control, as well as valuable habitat for migratory waterfowl and many other forms of wildlife. In addition to WPAs, the Minnesota Department of Natural Resources has purchased state-owned wildlife management areas extensively throughout the District. Previously drained or unsuccessfully drained wetlands within the District represent a unique opportunity. The U.S. Fish and Wildlife Service recorded information about whether a wetland had been drained while performing the National Wetland Inventory. These wetlands, depending upon the degree of present ecological function, represent an opportunity to enhance the storage of run-off while increasing ecological diversity, provided some degree of storage can be incorporated into the restoration or enhancement. Throughout the District, many opportunities exist for this type of effort.

4.8.4 Drainage Systems

Legal drainage systems, consisting of both county and judicial ditches, are present throughout the District (Figure 8). The drainage system is comprised of fourteen county ditches and one judicial ditch. All county ditches are located within Big Stone County, i.e. the center of the District. The lone judicial ditch present within the District forms the boundary between Big Stone County and Lac Qui Parle County, while connecting Big Stone Lake and Marsh Lake. Open channels, drainage tile ranging in diameter from 5 to 36 inches or a combination of the two comprise both the county and judicial drainage systems.

4.8.5 Surface Water Quality

Surface water quality has in the past and continues to be a concern of the residents of the District. Pollution of surface waters includes suspended sediments, excess nutrients, pesticides, pathogens, and biochemical oxygen demand. The major national effort to address surface water quality is through the

federal Clean Water Act. Specifically, this is known as the Total Maximum Daily Load (TMDL) process by which standards are created to determine the extent and then limit pollutants entering surface water. In Minnesota, the Pollution Control Agency is responsible for TMDL's as outlined here:

> MPCA responsibilities include performing assessment activities, listing impaired waters, and conducting TMDLs in Minnesota. The agency also coordinates closely with other state and local agencies on restoration activities[14].

The Watershed Approach for assessing water bodies process for the Upper Minnesota River Watershed District is scheduled to begin in 2015. The following impairments for water bodies in the District have been identified in advance of the TMDL process:

Water Body	**Impairment**
Big Stone Lake	Mercury
Long Tom Lake	Mercury
Minnesota River (Whetstone Creek to Yellow Bank River)	Mercury
Stoney Run Creek	Fish Biological Index and Invertebrate Biological Index
Marsh Lake	Mercury

Big Stone Lake has been the subject of continuous water quality monitoring for many years. More recently, beginning in 2007, continuous monitoring has been conducted for total phosphorus, chlorophyll a, and secchi depth at six sites from the north end to the south end of the lake.

In 2010 the District began an extensive two year monitoring project on the Whetstone River in cooperation with the East Dakota Water Development District from South Dakota. The project resulted in two impairment listings (2012 IR) in South Dakota. The classified segments of the North and South Forks of the Whestone River were listed for not supporting the limited contact recreation use due to E. coli. The E.coli. TMDLs for both forks of the Whestone River are currently being drafted.

[14] Minnesota's Impaired Waters and Total Maximum Daily Load. Minnesota Pollution Control Agency. http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/

In 2011 the District received a two year Surface Water Assessment Grant from MPCA to monitor seven major tributaries of the District and one Lake. The tributaries that were monitored included; Little Minnesota River, Hoss Creek, Fish Creek, Salmonsen Creek, Meadowbrook Creek, Minnesota River and Stoney Run Creek. Long Tom Lake was also monitored for the two year period. MPCA will use the data in their Watershed Approach process.

4.9 GROUNDWATER

4.9.1 Distribution

The three principal aquifers above the bedrock are Cretaceous sandstone, buried sand and gravel and near-surface sand and gravel deposits in the glacial till. Appendix C contains information about the Cretaceous rock and glacial drift overlaying Precambrian bedrock.

Groundwater in the District is also obtained from valley alluvium. Wells in the aquifers of the valley alluvium located near the river or lakes provide abundant supplies of water at comparatively shallow depths. Buried sand and gravel lenses are present in the glacial drift and produce adequate supplies of water for municipalities.

Most of the wells in Cretaceous aquifers are in the northwest and southwest parts of the District. Yields are small-to-moderate. Most of the water is relatively soft.

4.9.2 Recharge Areas

Recharge to aquifers in the valley alluvium occurs rapidly in response to local precipitation. Groundwater flow in the valleys is generally toward the river or lakes. Because of the clayey nature of the glacial drift, aquifers in the drift receive less recharge than valley alluvium.

4.9.3 Quantity and Yield

Adequate groundwater supplies exist generally throughout the District for Municipal and rural users. The best sources of water supply are the near-surface sand and gravel aquifers. Yields from this aquifer are known to be as high as 1,200 gallons per minute. Studies indicate that the groundwater aquifers adjacent to Big Stone Lake supply significant amounts of underflow to Big Stone Lake throughout the year.

4.9.4 Discharge Areas

In the east bluff area along Big Stone Lake are many springs that feed the small tributaries to the Big Stone Lake. In Ortonville, many of the residents living between the shoreline and the bluff obtain their water supply from springs. This supply of water is the westerly flow of groundwater towards Big Stone Lake.

4.9.5 Groundwater Quality

Groundwater profiles conducted by the Minnesota Pollution Agency (MPCA) of the West Central Region indicate a number of water quality issues relative to groundwater. The West Central Region consists of Becker, Big Stone, Chippewa, Douglas, Grant, Kandiyohi, McLeod, Meeker, Otter Tail, Pope, Renville, Sibley, Stevens, Swift, and Traverse Counties. The Upper Minnesota River Watershed is located roughly in the west central portion of this region.

The following groundwater quality issues were identified for this region.

a. Arsenic and other elevated trace metal are associated with the geology of the region.
b. Agricultural practices and domestic land uses may impact ground-water quality with the increased presence of nitrates and dissolved solids.
c. Lakeshore development may adversely impact ground and surface water in the northern part of this region.

The desired actions identified by MPCA to address these concerns include the implementation of a long-term, systematic evaluation of the ground-water resources, monitoring for the establishment of trends in nitrates, pesticides, and urban impacts of water table aquifers, and the identification of areas where nitrate levels in unconfined aquifers exceed drinking water standards. Factors potentially affecting water resources within the District ARE permitted feedlots and the Big Stone County Sanitary Landfill (now closed).

Unsewered communities and individual septic systems in the District have largely been resolved over the time period between the last update and 2011. Since 1997, all property transfers in Big Stone

County, which constitutes 81% of District area, is subject to septic system updates. Therefore, over time all outdated and underperforming systems are replaced.

4.10 UNIQUE WATER FEATURES

Features within the District considered unique are somewhat dependent upon point of view. However, two features in particular are worth noting. These include the wetland resources and Big Stone Lake. It has been estimated that 90% of the prairie wetlands within the Minnesota River Basin have been drained. The quantity of the remaining wetland resources within the District is unique when compared to the rest of the Minnesota River Basin. These are demonstrated in Figure 7 and also described in Section 4.8.3, Density and Distribution of Wetlands. Many of these wetland resources provide functions of ecological significance to the District and the region. Specific areas providing both ecological functions and public values include the Big Stone National Wildlife Refuge, the Lac qui Parle Wildlife Management Area, Waterfowl Production Areas, and wetland easements.

Big Stone Lake provides invaluable recreational and economic benefits to the residents of the District as well as the surrounding region. Appendix A provides current data to provide direction in water quality activities needed for Big Stone Lake. It is likely that the water quality of this lake will be an indicator of the effectiveness of resources management activities as well as the overall health of the region.

5 EXISTING PROGRAMS AND POLICIES

Understanding the missions, activities, programs and policies of existing water management agencies is imperative if the District's efforts are to be placed in proper context. Table 4 provides an overview of the missions, activities, programs and policies of existing water management agencies.

5.1 LOCAL GOVERNMENT

5.1.1 Counties

The Upper Minnesota River Watershed District encompasses portions of five counties. These include Big Stone County, Traverse County, Swift County, Lac Qui Parle County, and Stevens County. Each county has its own Comprehensive Water Plan, completed in accordance with Chapter 103B of the Minnesota Statutes. County Comprehensive Water Plans must be updated once every ten years in accordance with current Minnesota legislative requirements. These comprehensive water plans must be

consistent with Watershed District plans covering the same geographic area. Serious consideration should be given to having the next 10 year plan for the UMRWD and Big Stone County water plans undertaken jointly. District staff serves on the comprehensive water plan technical advisory committee for Big Stone and Traverse Counties and reviews update to Stevens, Lac qui Parle, and Swift Counties to ensure consistency. In addition to their comprehensive water plans, each county also has specific programs and policies relating to drainage issues on its highway systems and county ditch systems. Each county also has established shore land zoning ordinances for the control of development activity along the shorelines of lakes and the banks of major rivers. These zoning ordinances also regulate established 100-year flood plains. The Wetland Conservation Act is also under the administration by the county in collaboration with the local Soil and Water Conservation District.

5.1.2 Townships

Each township within the Watershed District has the authority under Minnesota Law to establish ordinances necessary for the administration of the township. In some cases, these ordinances relate to water management activities, especially drainage along or through township road systems. Townships included or partially included in the watershed are: Browns Valley, Toqua, Graceville, Foster, Prior, Almond, Malta, Big Stone, Otrey, Artichoke, Ortonville, Odessa, and Akron, in Big Stone County; Shible, Appleton, and Hegbert in Swift County, Yellow Bank and Agassiz in Lac Qui Parle County; Stevens in Stevens County; and Parnell, Arthur, and Folsom in Traverse County.

5.1.3 Municipalities

Each municipality within the Watershed District, which has been incorporated under Minnesota Law, has the authority to establish ordinances and conduct zoning activities within their territorial limits. In many cases, these ordinances relate to the management of storm water and municipal wastewater. Municipalities also have a responsibility for establishing water supply treatment and distribution systems, sewage collection and treatment systems, and storm drainage management systems. In many cases, municipalities are eligible to receive state and federal funding in support of these water-related projects. Municipalities within the district also are tasked with the responsibility of implementing floodplain management ordinances and zoning restrictions for the 100-year flood plain, and in some cases a floodway. Municipalities in the District include: Ortonville, Browns Valley, Odessa, Beardsley, Barry, and Clinton.

5.1.4 Soil and Water Conservation Districts

Soil and Water Conservation Districts (SWCDs) are established under Chapter 103C of the Minnesota Statutes. The purpose of these districts is to promote programs and policies, which can conserve the soil and water resources within their territorial limits. They are particularly concerned with erosion of soil due to wind and water. Therefore, SWCDs frequently are involved with the implementation of practices that effectively reduce or prevent erosion, sedimentation, siltation, and agriculturally related pollution in order to preserve water and soil as natural resources. Districts frequently act as local sponsors for many types of water management projects, including: drainage ditches, flood retarding dams, on-farm terracing, erosion control structures, and other water-related projects. The districts also are actively involved in educational programs, which promote water and soil conservation practices, such as minimum tillage. The Soil and Water Conservation Districts receive a great deal of technical assistance from the United States Natural Resource Conservation Service. The SWCD names and boundaries correspond with the counties within the District.

5.1.5 Joint Powers Board

Minnesota River Basin Joint Powers Board

The 37-county Joint Powers Board seeks to initiate and provide a coordinated effort to preserve and restore the Minnesota River. The Joint Powers Board is working to: 1) ensure the preservation and restoration of Minnesota River recreation, fish and wildlife habitat, and scenic beauty; 2) leverage existing resources at the local, state and federal levels - both private and public - to preserve and restore the Minnesota river to ensure a swimmable, fishable river with recreational and economic development opportunity available to all; 3) reduce the societal costs associated with river degradation; and 4) provide leadership to address the cumulative impact of many causes of river degradation over past years with a cooperative effort between all of the parties with an interest in the Minnesota River.

5.1.6 Special Projects and Environmental Learning Centers

5.1.6.1 Big Stone Lake Restoration Project (Clean Lake Project, CLP)

The project objective is to reduce nuisance algae blooms in Big Stone Lake through implementation of agricultural BMPs. The final report describes successful implementation of wetland restorations, no-till drill program, nutrient management, shoreline and stream bank erosion control and Whetstone River flow management. Significant lake water quality improvements have been noted. The sponsor is the

Upper Minnesota River Watershed District in cooperation with the Big Stone SWCD, city of Ortonville, Big Stone County, Citizens for Big Stone Lake, DNR, USFWS, MPCA, and state and local groups from South Dakota.

5.1.6.2 Bonanza Educational Center, Big Stone Lake

The Bonanza Educational Center is a consortium of seven school districts that have created a hands-on environmental education center for their students and communities. It is located at Big Stone State Park, Big Stone Lake. Students test water quality and survey zooplankton in conjunction with the DNR fisheries program.

5.1.7 Adjacent Watershed Districts

The Upper Minnesota River Watershed District is bounded to the north by the Bois de Sioux Watershed District and to the south by the Lac qui Parle – Yellow Bank Watershed District. Both of these watershed districts operate in a fashion similar to the Upper Minnesota River Watershed District in that they have an established watershed management plan, and have implemented rules and regulations. The Upper Minnesota River Watershed District frequently is involved in joint activities with each of its neighboring watershed districts to coordinate strategies to address water-related problems, which affect both districts.

5.2 STATE GOVERNMENT

5.2.1 Minnesota Board of Water and Soil Resources

The Minnesota Board of Water and Soil Resources (BWSR) was created by the 1986 legislature. Three functioning state boards were eliminated by this legislation and their duties were transferred to BWSR on October 1, 1987. BWSR's duties include oversight programs and funding of State Soil and Water Conservation Districts, formation and guidance of Watershed Districts, and the direction and assistance to counties in developing their Comprehensive Water Plans. A major activity of this Board is the development of policy and guidance involving natural resources enhancement. The BWSR is responsible for ensuring proper implementation of the Wetland Conservation Act (WCA) by local government units. BWSR reviews and approves water management plans and project activity of watershed districts and soil and water conservation districts.

5.2.2 Minnesota Department of Natural Resources

The DNR has both regulatory and enforcement authority over natural resource programs of the state. The principal divisions of DNR include the Division of Ecological and Water Resources, the Division of Forestry, Division of parks and Trails, the Division of Fish and Wildlife (which includes the Sections of Wildlife and Fisheries), and the Division of Enforcement. The DNR has permit authority over watershed district projects which impact the Public Waters jurisdiction of the state. The DNR is also actively involved in helping local units of government administer floodplain management ordinances and standards in addition DNR provides assistance with: Shore land and Stream Restoration; Sustainable Groundwater Management; Watershed Assessment, Restoration and Protection; Rare and Threatened Resources, Aquatic Invasive Species Prevention and Management; Wetland and Prairie Restoration; Dam Safety; Comprehensive Water Management including monitoring of groundwater, lakes, streams and climatology; and outdoor recreation.

The Upper Minnesota River Watershed District cooperates with the DNR in the development of water management projects, which enhance wetlands and wildlife habitat. The District has assumed oversight of DNR General Permits for a variety of work activities conducted in public waters. This has helped reduce overlapping regulatory programs, provided better customer service to the public and is evidence of the cooperative relationship between the DNR and the District in managing water resources.

5.2.3 Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency has both regulatory and enforcement authority relative to point source pollution and potential actions which could affect the quality of the ground waters and surface waters of the state. Since some of the District's projects involve water quality considerations, the MPCA becomes an active participant in these projects. The MPCA also is involved with other governmental units, such as municipalities, in the construction and operation of wastewater treatment plants and the control of nonpoint source pollution.

5.2.4 Minnesota Environmental Quality Board

The Minnesota Environmental Quality Board (EQB) has final authority on permits involving a wide range of construction activity throughout the state. The Board is comprised of the commissioners of state agencies, the chairmen of state boards, and five citizens. The EQB bases its decisions on formal environmental assessments or environmental impact statements written for specific project proposals.

5.2.5 Minnesota Department of Agriculture

The MDA is statutorily responsible for the management of pesticides and fertilizer other than manure to protect water resources. The MDA implements a wide range of protection and regulatory activities to ensure that pesticides and fertilizer are stored, handled, applied and disposed of in a manner that will protect human health, water resources and the environment. The MDA works with the University of Minnesota to develop pesticide and fertilizer Best Management Practices (BMPs) to protect water resources, and with farmers, crop advisors, farm organizations, other agencies and many other groups to educate, promote, demonstrate and evaluate BMPs, to test and license applicators, and to enforce rules and statutes. The MDA has broad regulatory authority for pesticides and has authority to regulate the use of fertilizer to protect groundwater.

5.2.6 Minnesota Department of Health

The Minnesota Department of Health (MDH) has permit authority and regulatory authority for monitoring water supply facilities. These facilities include water wells, surface water intakes, water treatment, and water distribution for public use.

5.2.7 Minnesota Department of Transportation

Several federal and state highway systems are administered by the Minnesota Department of Transportation within watershed district boundaries. Since highway systems cross drainage patterns of natural and artificial waterways, there is opportunity for frequent interaction between the District and Department of Transportation (DOT). District projects requiring structures through DOT regulated highways require coordination and approval by the DOT. In a similar fashion, DOT activities relating to improvements of their highway systems require a permit from the watershed district.

5.2.8 Minnesota Geological Survey (MGS)

The MGS is the University of Minnesota outreach center for the science and technology of earth resources in Minnesota. They conduct basic and applied earth science research, convey the information to the public through publications, presentations, and service activities, and promote earth science education.

5.2.9 East Dakota Water Development District (EDWDD)

The EDWDD is a non-regulatory subdivision of South Dakota state government that provides expertise and assistance, both financial and technical, to a twelve-county area in South Dakota. This group has worked cooperatively with the District and other area watershed districts on projects of mutual benefit in both a technical and financial basis.

5.3 FEDERAL GOVERNMENT

5.3.1 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers can have permit and regulatory authority over projects of the District. Generally areas of permit jurisdiction include the placement of fill or dredged material in wetlands and alterations or impacts to navigable waters. In addition, the Corps of Engineers has been actively involved in project planning and construction. The District has enjoyed a long relationship with the Corps of Engineers in the development of projects.

5.3.2 U.S. Department of Agriculture

Two major agencies of the U.S. Department of Agriculture (USDA) have had a great deal of impact on the activities of the Upper Minnesota River Watershed District. The Natural Resources Conservation Service (NRCS), has traditionally provided technical engineering design and financial assistance through the Environmental Quality Incentives Program (EQIP) within the Upper Minnesota River Watershed District. Many projects originally studied by the NRCS did not meet federal criteria for construction. However, the District has been able to use data generated during these studies in its own activities. The current activities of the NRCS involving U.S. Department of Agriculture program participation are a significant benefit toward water management within the Upper Minnesota River Watershed District.

The Farm Service Agency (FSA) is an agency which participates in sponsoring and funding projects related to water and soil conservation. In this respect, the NRCS serves as the technical and design function, while the FSA provides the funding. The FSA is involved in CRP/CCRP and EWP. These federal programs have a major impact on agricultural tillage practices which foster environmental enhancement.

Under the Freedom to Farm Act of 1996, the USDA, through the FSA and the NRCS, administers rules which, if violated, will result in the denial of agricultural subsidies and other governmental benefits. These rules, known as "Swampbuster", affect lands that have a predominance of hydric soils and that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and, under normal circumstances, do support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

5.3.3 U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) has had an expanding role in construction project activities of the Upper Minnesota River Watershed District. It has overview authority for Section 404 permits issued by the U.S. Army Corps of Engineers. EPA has the right to review the Corps of Engineers permit decisions.

5.3.4 U.S. Fish and Wildlife Service

The USFWS has been actively involved in the restoration of wetlands previously drained on agricultural land and now in the Conservation Reserve Program of the U.S. Department of Agriculture. The USFWS has developed wetland projects, which affect the water management activities of the Upper Minnesota River Watershed District. In constructing these wetland projects, the USFWS is required to obtain a permit from the Upper Minnesota River Watershed District before proceeding, if the project is located within the territorial jurisdiction of the District.

5.3.5 U.S. Geological Survey

The U.S. Geological Survey (USGS) is principally a data gathering agency of the federal government. The Upper Minnesota River Watershed District is particularly interested in data collected by the USGS related to the water resources of the district. These data include stream flow discharge, ground water levels, and water quality, which are used during the conduct of district activities. The Upper Minnesota River Watershed District places a high value on the data collection efforts of the USGS by partially funding stream-gauging stations at critical locations.

5.3.6 National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) was previously known as the U.S. Weather Bureau. NOAA collects and publishes weather data, which is of great utility to the Watershed

District. This data includes rainfall, snowfall, evaporation, and temperature. This information is used by the District in the design of water management projects.

5.4 PRIVATE ORGANIZATIONS

5.4.1 Nature Conservancy

The Nature Conservancy is an organization whose primary purpose is the preservation and utilization of grasslands, wetlands, and other natural assets in their historic natural condition, for public use. Their protection goal is to preserve ecologically significant natural areas through acquisition, gifts of land, management agreements, conservation easements and voluntary land protection. The Nature Conservancy is supported through membership and gifts from individuals, community groups, corporations and foundations. They have often served as a catalyst in creating, funding and supporting programs such as the Minnesota Biological Survey, which includes digital databases and Geographic Information Systems (GIS).

5.4.2 Ducks Unlimited

Portions of the District are considered by DU to be among the most critical habitats for migratory waterfowl in North America. Ducks Unlimited (DU) is primarily involved in the design, construction, and funding of projects enhancing waterfowl habitat. The mission of Ducks Unlimited is to support the habitat needs of North America's waterfowl and other wildlife by protecting, enhancing, restoring, and managing important wetlands and associated uplands. To date, DU has contributed to the conservation of more than 8.2 million acres of wildlife habitat throughout the U.S., Canada, and Mexico. The District is interested in cooperating with DU in the development and funding of multipurpose projects for waterfowl habitat and flood control.

5.4.3 Friends of the Minnesota Valley

A nonprofit citizens group devoted to conserving the natural and cultural resources of the Minnesota Valley, and to promoting wildlife oriented education. They foster congressional support and sponsor programs, such as the Minnesota Valley Heritage Registry, that protect the natural and cultural resources of the Valley. Incentives and public recognition are provided for landowners that commit to protection of the natural qualities of their lands.

5.4.4 Citizens for Big Stone Lake

Citizens for Big Stone Lake is an 400-member organization in Minnesota and South Dakota which initiates and coordinates projects and activities related to water quality of Big Stone Lake. Several state and federal grants have been obtained and projects implemented since 1977. Significant water quality improvement has been achieved.

5.4.5 Clean Up Our River Environment

Clean Up Our River Environment (CURE) is a grassroots organization working to restore and protect the upper Minnesota River. It is involved in education, community organizations, and cultural change. Activities include river awareness/observation trips, wetlands restoration, cleanup campaigns, river celebrations, publicity, and informational meetings.

5.4.6 Coalition for a Clean Minnesota River

The Coalition for a Clean Minnesota River serves as an umbrella organization for grassroots nonprofit organizations, businesses, faith communities and individuals that have an interest in cleaning up pollution in the Minnesota River. Activities include "Ambassadors for the Minnesota River", outreach and education, guidance and coordination for grassroots organizations, as well as advising and assisting government in its activities related to improvement of the river.

5.4.7 Farm Organizations

Farm Bureau and Farmers Union are organized farmer and farm advocacy groups operating within the watershed. Their mission is to promote local, state, and national policies that protect and preserve the agricultural sector.

5.4.8 Miscellaneous Wildlife, Conservation and Sportsmen's Organizations

Within the District, there are numerous sportsmen's clubs and wildlife preservation groups. These organizations sponsor a wide variety of environmentally positive initiatives, including wildlife habitat, wetland development, and other activities which are beneficial to and consistent with the goals of the District. The District has an ongoing policy of cooperating with these groups in the development of projects of mutual benefit.

The District has had periodic contact with national conservation and environmental organizations, such as the Audubon Society, the Isaak Walton League, the Wildlife Federation, and the Sierra Club. These organizations are interested in those aspects of project development and water management that ensure the enhancement and protection of environmental quality. The District is also dedicated to cooperating with nation-wide groups in the development of projects such that mutual interests can be achieved.

5.5 OTHER AGENCIES' WATER MANAGEMENT PLANS AND GOALS

A variety of plans and goals have been developed by other agencies for resource management within the District. The Environmental Quality Board, the DNR and the Counties comprising the District were the primary entities, which have identified goals that affect the District. The District continually seeks opportunities for cooperation with the goals and strategies of those agencies, which are compatible with those of the District.

6 EXISTING WATER AND WATER-RELATED PROBLEMS

The purpose of problem identification is to assist with the development of future goals and objectives. This section of the plan identifies whether an issue is perceived by the District or another resource agency as a problem, the severity of the problem, the location within the District and the role of the District in addressing the problem.

A variety of informational sources were used to identify possible problems. The identification of local resource concerns was completed through surveys of local, state and federal agencies, as well as surveys of Watershed District Managers. The agency surveys were sent to a number of environmental agency and local government entities. These included: 1) the field staff from the U.S. Fish and Wildlife Service; 2) the Natural Resource Conservation Service; 3) the Minnesota Department of Natural Resources; 4) the Big Stone County Board of Commissioners; 5) the Big Stone Soil and Water Conservation District Board of Supervisors; 6) the Big Stone County Engineer; 7) the Big Stone County Environmental Office; and 8) representatives of the Citizens for Big Stone Lake.

The surveys, administered in 2011, instructed the participant to rank the following issues in terms of importance within the Watershed: 1) lake water quality; 2) stream water quality; 3) legal drainage systems; 4) flooding; 5) private drainage systems; 6) natural waterways; 7) groundwater quality;

8) wetlands; 9) water levels of closed basins; and 10) soil erosion. In addition, a more detailed description of the resource concerns and proposed solutions were requested for the three most important resource issues. Finally, a map of the Watershed was included to provide the participant an opportunity to identify locations of resource concerns.

The returned surveys were collected and evaluated. The analyses of concerns, ranked in order of importance, are:

1	Stream Water Quality
2	Groundwater Quality
3	Soil Erosion
4	Lake Water Quality
5	Water Levels of Wetland or Closed Basins
6	Private Drainage Systems
6	Flooding
7	Wetlands
8	Legal Drainage Systems
9	Other
10	Natural Waterways

Stream water and ground water quality and soil erosion were identified as the three most importance issues within the Watershed. Two issues, private drainage systems and flooding, tied in ranking for the number six position. It is of note that the concerns for flooding did not rate higher in this 2011 survey, despite the area of the District being declared a FEMA Disaster area for flooding in that year. This may be a reflection of the survey participants being distributed among a broader group of public stakeholders.

The process of problem identification also included utilizing resource and planning agency documents as well as Watershed District staff experience. The intent of identifying a completed list of problems is to ensure appropriate lead agencies take action and to better understand the District's present and future role.

In addition to the agency surveys, the Watershed District Board Managers were asked to summarize the water management concerns within each of their areas of the Watershed. Some of the problems identified included water quality concerns with Big Stone Lake due to sediment and stormwater impacts, various locations with excess water levels within closed basins, and runoff and flooding problems along drainage systems (Table 4).

Potential problems were placed in one of the following categories: 1) surface water; 2) groundwater; 3) ecological; 4) streams and channels; 5) recreation; 6) structures; 7) policy; 8) education; and 9) coordination. Items identified as a problem within the District are classified by the board of managers and staff relative to severity and location (Table 4).

The District's responsibility to resolve a specific problem may be: 1) to lead the effort; 2) to cooperate with another lead agency; 3) to facilitate discussion, as needed to effect problem resolution; or 4) no involvement. The District has developed a number of goals and objectives, intended to address identified problems (see Section 7.0). The solution to most problems involves multiple District policies (see Table 4).

The priority for defining solutions is to address high severity problems occurring throughout the District where lead responsibility is with the District. Table 4 shows problems associated with surface water quantity tend to have greater priority than other problems. It is worth noting the greater priority does not imply greater importance. Rather, the District believes addressing District-wide problems for which they have authority and lead responsibility is prudent.

District-wide problems with moderate severity are the second priority. One example of these problems would be the accumulation of debris jams within channels, which potentially leads to damages. Priorities established by the District are subject to future revisions, primarily depending upon assignment of lead responsibility. The District has a cooperating role for many of the District-wide ecological issues. Identifying these types of problems within the plan seems prudent to ensure due consideration while performing District activities. However, lead responsibility for resolving these problems is the task of other resource agencies and, therefore, of lower priority for the District.

7 GOALS AND OBJECTIVES OF THE DISTRICT

The Upper Minnesota River Watershed District has established broad-based goals within the water resource management areas of water quantity, water quality, erosion and sedimentation, biotic diversity, recreational resources, intergovernmental relationships and public information and education. When appropriate, more specific objectives are identified as a means to accomplish the goals. In all cases it is the intent of the District to cooperate with the counties within its boundaries in order to achieve mutual goals and objectives that have been identified in each of the counties' Comprehensive Local Water Plan. This is done by staff participation on the water plan technical advisory committees.

7.1 WATER QUANTITY

7.1.1 To reduce damages caused by floodwaters.

a. All drainage in the District, public and private, must be coordinated and include careful analysis by the board of managers; their engineer and county engineers under their individual authority.
b. Wetland restoration, enhancement and creation will be utilized where feasible and desirable to create storage.
c. Land management techniques which improve infiltration, water-holding capacity, and reduce runoff will be encouraged.
d. Water flow control measures, such as levees and dikes, will be utilized to control flooding where desirable and feasible.
e. Consistent and fair culvert sizing will be used on natural streams and drainage systems.
f. Collaboration with public and private entities will be encouraged to maximize flood control efforts and mitigate flood damage.
g. Runoff rates should be controlled through the use of water control structures or other suitable means so as to delay the flow of water and release water in a controlled manner.
h. Land locked basins will be investigated and taken into consideration for water level management.

i. The use of water control structures to develop storage of excess runoff on drained lake basins should be sought in areas where such storage is compatible with the present land use.

j. Overflow of water from one watercourse to another should be controlled in the best interests of the District and its residents.

k. The District will encourage cooperation with agencies and organizations, private or public, in the management of flooding.

l. The Managers of the District will endeavor to seek out assistance, private or public, financial or technical, concerning floodwater management.

m. District reserves the right to call a moratorium on all drainage activities during extreme spring runoff events.

n. Promote drainage water management techniques as a multiple benefit best management practice.

o. Encourage a systematic redetermination of benefits for the county drainage system before the next ten year plan.

7.1.2 Administer and maintain the drainage systems of the District in order to fulfill their intended function.

The following objectives are necessary in order to support its goal of maintaining adequate and functional drainage systems within the District:

a. Comply with the laws of the Minnesota Drainage Code.

b. Allow the addition and construction of a new drain into an existing legal drainage system or natural waterway only if it will not adversely impact downstream landowners, and the additionally benefited lands pay their proportionate share.

c. Clarify responsibilities and foster cooperation among land owners in regards to drainage issues by:

    1. Promoting more public, rather than private, drainage systems

    2. Promote private drainage agreements that are recorded on property deeds

d. Coordinate the development of agricultural drainage and ensure the adequacy of the outlets.

e. Repair, improve, relocate, modify, consolidate or abandon all or parts of drainage systems as best meets the needs of the District.

f. Authorize no drainage project until the project effects are understood and the project is deemed to be in the best interest of the District and the public.

g. Encourage landowners within the District to maintain wetlands.

h. Consider the utilization of drainage systems or natural waterways for the discharge of wastewater only when such discharges meet permit requirements of the Minnesota Pollution Control Agency and do not adversely impact downstream water quality as determined by the District.

i. Redetermine benefits when it is determined the present drainage system does not reflect current values or conditions.

j. Consider assessing outlet benefits on property responsible for increased sedimentation and drainage system maintenance, caused by land use practices that accelerate erosion and sedimentation.

k. Encourage landowners undertaking private drainage system improvements to establish permanent 1-rod grassed buffer strips for those systems with a constructed bottom width of 4 feet or greater.

7.1.3 Develop programs and projects, which sustain an adequate supply of high quality surface and groundwater for public and private use.

a. Use groundwater on a sustained yield basis.

b. Understand the extent of water use for irrigation. When necessary, restrict irrigation where it is found to have detrimental effects to ground or surface water supplies. The District will encourage the use of low pressure sprinkler systems for irrigation.

c. Encourage the study and delineation of aquifers that are important groundwater resources within the District.

d. Consider the possibility of incorporating water supply as a purpose into selected flood control projects.
e. Cooperate with municipalities within the District to determine how adequate water supply and water quality can be maintained.
f. Ensure that District policies and permits support the integrity of designated groundwater protection areas.
g. Encourage the restoration, enhancement or creation of wetlands that have the potential for groundwater recharge.
h. Encourage water conservation practices.

7.1.4 Lake Level – Big Stone Lake

Operation of the dam regulating flows leaving Big Stone Lake should be operated in a prudent, reasonable manner, in accordance with "Operation and Maintenance Manual Big Stone Lake - Whetstone River Flood Control Upstream Works – Minnesota River," dated March 1987 or subsequent revisions. Progress will be made in the coming years to both update and finalize the 1987 Operations and Maintenance Manual. In addition, the District will work to find an equitable cost sharing arrangement for the operations and maintenance of the dam among Minnesota, South Dakota, and benefiting private sector parties.

7.2 WATER QUALITY

7.2.1 General

Maintain or improve water quality of all surface water and groundwater resources within the District. To achieve the goal of maximizing water quality within the District, the following objectives are established:

a. Promote advanced treatment of wastewater at all point sources within the District and promote advanced treatment of surface water discharge as new technologies become available.
b. Uphold the existing laws controlling discharge of conventional and toxic pollutants into surface waters from point sources.

c. Monitor water quality when necessary and feasible to protect surface and ground water resources.

d. Encourage responsible, efficient use of fertilizers and pesticides in agricultural and urban settings.

e. Encourage land use and agricultural practices that reduce the movement of nutrients, sediments and other substances off surfaces and into groundwater and surface water resources.

f. Encourage the maintenance, restoration, enhancement or creation of wetlands that may be important for nutrient entrapment.

g. Assist the Minnesota Pollution Control Agency with the assessment and creation of any TMDL's necessary to address impaired waters with the District, and participate in the Watershed Approach activities as well.

h. Assist with educating and informing District residents how individual actions may impact water quality. Involve citizens in water quality monitoring.

7.2.2 Big Stone Lake Water Quality Goals

Because Big Stone Lake is such an important recreational and economic resource within the District and previous efforts to improve water quality are extensive; a separate goal has been developed for the lake. The contributing drainage area to Big Stone Lake is an estimated 740,157 acres, with 83.7% of the area located within South Dakota and 16.3% of the area in Minnesota. The present total phosphorus and total nitrogen loads to Big Stone Lake for a "normal" hydrologic year, for the entire contributing drainage area, are 16,346 kg/yr and 80,054 kg/yr, respectively.

The District has established an ***interim goal*** of no-net increase in nutrient loading to Big Stone Lake, from the contributing drainage area. The District established the interim goal because of the amount of time likely needed (probably decades) to attain the ultimate goal.

The District has also established an ***ultimate goal*** for the lake. This goal was a direct result of the ten year Big Stone Lake Restoration final report. The ultimate goal is to reduce nutrient loading to Big Stone Lake by 40% for a normal hydrologic year, from the contributing drainage area. The 40% annual load reduction corresponds to the following in-lake annual concentration goals:

Lake Segment	Total Phosphorus (ug l^{-1})	Chlorophyll-a (ug l^{-1})
BSL-1	220	42
BSL-2	160	38
BSL-3	105	38
BSL-4	80	36
BSL-5	100	39
BSL-6	110	38

7.3 EROSION AND SEDIMENTATION

Wind and water erosion and their affects upon streams and drainage systems are a significant, long-term problem within the District. Sedimentation reduces the capacity of drainage systems and streams, damages aquatic habitat and transfers nutrients and other pollutants downstream to lakes.

7.3.1 The District will initiate and support viable projects whose primary or secondary purpose is reducing erosion.

The following objectives have been adopted in support of the erosion and sedimentation goal:

a. The District will promote the installation of erosion control measures as needed on natural and artificial channel systems.
b. The District will ensure proposed projects incorporate sufficient erosion control measures in the design.

7.3.2 The District will pursue erosion control and sedimentation management along all drainage systems whether private or public.

The following objectives are in support of the goal of erosion control and sediment management:

a. Erosion control measures will be pursued where problems exist and in priority areas such as Fish Creek, Hoss Creek, and Stoney Run.
b. Erosion control practices should be included as a component on all projects, including repairs and improvements.

c. Establishment of permanent vegetation and buffer strips will be vigorously pursued through the district's permitting process on all drainage systems in collaboration with the SWCD and NRCS.

d. Encroachment upon ditch right-of-way by destroying permanent cover or cultivating over the crown of a spoil bank will not be permitted.

e. Sediment will be removed from legal drainage systems in order to maintain effective, efficient drainage systems.

f. Promote and advocate the use of accepted agricultural conservation management practices.

7.3.3 Natural areas and riparian buffer strips will be encouraged along natural waterways.

7.4 BIOTIC DIVERSITY

The District recognizes the value of its biotic resources and will seek to maintain the conditions and habitats critical to the existence of these resources. An immediate need is to determine the baseline of the existing biotic resources.

The District will promote the maintenance of biotic diversity (defined as the number and types of plants and animals).

a. The District will cooperate with agencies and organizations to maintain biotic resources.

b. The District will encourage the maintenance of habitat (wetlands, native prairie, woodlands, etc.) that is important for fish wildlife populations.

c. Concepts of biotic diversity will be incorporated into projects where deemed feasible (e.g., use of native grasses for buffer strips).

d. Exceptional or unique resources identified by the Minnesota Biological Survey will be protected.

e. Promote the use of temporary and permanent easements to enhance fish and wildlife habitat.

f. Work with and assist the DNR on education and implementation of invasive species goals and procedures, including distribution of materials that reference identification and preventative action for invasive species.

7.5 THE MARSH LAKE OPPORTUNITY

Marsh Lake is a shallow 5,000 acre reservoir at the confluence of the Pomme de Terre and Minnesota Rivers. It forms part of the boundary between Big Stone, Lac qui Parle and to a minor extent Swift Counties. The Work Progress Administration created the reservoir in 1938 as part of a water conservation project. According to the U.S. Army Corps of Engineers, the project was never intended to be used for flood control. The creation of the Marsh Lake Dam provided increased fish and wildlife habitat, new Colonial Water bird habitat, and associated recreational opportunities. Unfortunately, there were inherent ecological costs associated with the project. Natural river processes were disrupted, impacting sediment movement, floodplain function, fish movement and various aquatic habitats. Additionally, natural flooding and drying cycles were disrupted, reducing plant diversity and associated fish and wildlife benefits found in the area prior to the Dam.

Marsh Lake has also been subject to long-term degradation that is associated with the Dam and its design. As a result, the lake continues to evolve into a sterile, turbid basin where recreational, ecological and associated economic values are lost. In addition, land use changes and the rapid deliveries of water into the system are causing larger and faster rises in lake elevation. This has increased sediment, nutrient and bacteria loadings. Carp thrive in this environment and along with wind driven wave action, their activities stir up sediments, uproot vegetation and prevent the growth of new vegetation. All of these factors work together to suppress the aquatic vegetation critical for improving water quality and providing fish and wildlife habitat. With declining habitat quality, the ability of Marsh Lake to sustain hunting, fishing and other recreational opportunities is being lost.

7.6 RECREATIONAL RESOURCES

Promote recreational opportunities when possible within the District.

The following objectives are consistent with the District's goal of creating recreational opportunities:

a. Remove stream impediments to enhance boating and rafting activities on the river systems, consistent with ecological principles.

b. Complete wetland restoration and wildlife enhancement features to enhance wildlife habitat and in turn recreational opportunities.

c. Develop facilities, where feasible and practical, to enhance recreational activities on streams and lakes within the District.

d. To provide facilities, where feasible and practical, for the observation of wildlife.

7.7 INTERGOVERNMENTAL RELATIONSHIPS

7.7.1 All initiatives of the District should utilize potential cooperative efforts with appropriate federal, state, county, and township agencies.

7.7.2 The District shall adopt by reference the applicable and compatible provisions of County Comprehensive Local Water Plans.

7.7.3 The District shall continue to provide representation on County Water Resource Advisory Committees which are active within its jurisdiction.

7.8 PUBLIC INFORMATION AND EDUCATION

7.8.1 The District shall seek to inform and educate the citizens within its jurisdiction of all its ongoing activities and projects.

7.8.2 The District shall seek to inform and educate the citizens within its jurisdiction of the benefits of the conservation of water and soil in the preservation and enhancement of our natural resources.

7.9 IMPLEMENTATION OF GOALS AND OBJECTIVES

The Upper Minnesota River Watershed District was created by and operates under Section 103D of the Minnesota Statutes. This legislation gives the District its authority to establish rules and regulations, require permits, construct projects, conduct studies, and perform other activities which contribute to the purpose for which the District was organized. Therefore, the District will use the power granted to it by the legislature to implement its goals and objectives. Implementation decisions are made at regularly scheduled Board meetings throughout the year. In addition, the Board conducts project planning and

coordination meetings with its Watershed District Advisory Committee, as required under Section 103D.331, on an annual basis. These meetings provide the Board of Managers with an opportunity to reflect on the effectiveness of meeting goals and objectives during the past year, as well as to re-invigorate its efforts for the coming year. Through these various meetings, the Board maintains an effective course of action to insure the implementation of its goals and objectives.

8 POLICIES OF THE DISTRICT

The following policies have been developed by the District as solutions to problems identified in Section 6.0, Existing Water and Water-Related Problems and to obtain the goals identified in Section 7.0, Goals and Objectives of the District.

8.1 PROJECT INVESTIGATION AND INITIATION

8.1.1 Petitioned Projects (Policy PI-1)

Projects of the Upper Minnesota River Watershed District may be initiated through the petition process as outlined in Section 103D of the Minnesota Statutes. The petition process remains an effective way for interested landowners to receive relief from unacceptable and undesirable "as-is" conditions.

The District has and will continue to assist the landowners and other interested parties in actively pursuing projects through the petition procedure.

8.1.2 Projects for the General Benefit of the District (Policy PI-2)

The District has historically allocated funds from its administrative and maintenance accounts for work with widespread benefits throughout the District. The restoration efforts of Big Stone Lake are an example. The District has and will continue to sponsor works of common benefit within the District.

8.1.3 Majority Resolution of the Board (Policy PI-3)

Section 103D.601 of the Minnesota Statutes authorizes the Board of Managers of Watershed Districts to initiate projects by a majority resolution of the Board of Managers. In most cases, funding utilized to construct projects of this nature is obtained from other governmental agencies or other agencies outside of the affected area. These projects are unique in that it is usually difficult to define an immediate adjacent benefiting area for assessment purposes. Instead, the benefiting area for these projects may be

found many miles away from the location of the project, and in some cases entirely outside of the watershed district.

The Board of Managers, having jurisdiction and concern for the entire watershed, including that of the entire Minnesota River basin, has the responsibility for finding solutions to problems within the District. The Board has historically conducted public informational meetings and required hearings to receive public response for projects proposed through the majority resolution procedure.

The Board of Managers will continue to actively pursue investigations and to maximize the use of public information when addressing water management issues. The Board will also continue to use the resolution procedure to initiate such projects, if needed.

8.1.4 Miscellaneous Studies and Investigations (Policy PI-4)

The Upper Minnesota River Watershed District can levy a tax for its "survey and data acquisition" account as needed and allowed for by Minnesota Statutes (Chapter 103D.905, Subd. 8). This fund allows for the research and investigation into potential solutions to problems that are brought to the Board's attention by interested citizens of the District or by individual members of the Board of Managers. Some of the technical investigations could result in project initiation. This account could be useful in the future as the District completes the more immediately apparent project investigations.

The District will establish its "Survey and Data Acquisition" account and conduct the necessary technical investigations and surveys for water-related problems brought to the attention of the Board of Managers.

8.1.5 Special Purpose Management Districts (Policy PI-5)

Certain District activities are more "specialized" in nature (i.e., water quality studies) specific to a localized portion of the District, (i.e., subwatershed) and more suited to funding through the establishment of a Special Purpose Management District. The Board of Managers has authority under 103D.729, Water Management District, to establish smaller geographical areas within the District for the purposes of addressing problems where benefits are more narrowly focused.

The District will consider the use of Special Purpose Management Districts to address issues and problems within the District. Establishment of such an entity will only occur after the territory to be included within the Special Purpose Management District is identified, and fiscal matters including the methods for computing and assessing charges are identified.

8.2 REGULATION OF ACTIVITIES AFFECTING WATER RESOURCES

8.2.1 Rules and Regulations of the District (Policy RE-1)

The "Rules", as adopted and subsequently amended, are the guiding force behind the District's permit system. All landowners, public entities, and governmental units that anticipate implementing projects which affect the water resources of this District, as governed by the "Rules" of the District, are required to apply for and receive a permit before beginning construction activity. Participation by the public in the District's permit process has increased over the years. The District also acts in a consultant role as a disseminator of information for the public relative to local, state, and federal permits needed before initiating construction activity. A copy of the current Rules and Regulations of the District are included in this Water Management Plan in Appendix E.

The District will continue to enforce its Rules and Regulations as a matter of policy.

8.2.2 Permits (Policy RE-2)

The Upper Minnesota River Watershed District uses the permit system to enforce its adopted Rules and Regulations of the District. Permits are required for a wide variety of construction activities that affect the water resources of the District. Any individual landowner, public entity, or governmental unit that contemplates a project impacting the water resources of the District, must secure a permit. (See Appendix F). Permit applications are considered at regular monthly meetings of the Board of Managers. It is a common occurrence for permit applicants to meet with the Board of Managers to explain their individual circumstances and conditions surrounding their permit application. Such interaction with the permit applicants is strongly encouraged by the Board of Managers. The Board members and office staff are available to assist applicants in the permitting process. In addition to "in-house" assistance, it has become very common for prospective applicants to request field investigations by the Board or the District's staff in order to obtain recommendations on construction technique and "best practices" applications.

The District will continue to use the permit system to enforce its adopted Rules and Regulations. It is also a policy of the District to assist permit applicants with technical advice so that project function may be accomplished in the most environmentally acceptable manner. During times of heavy flooding the District maintains the right to implement a moratorium on accepting new drainage request and a suspension of pending requests.

8.3 NATURAL, MODIFIED AND CREATED WATERWAYS

The Upper Minnesota River Watershed District recognizes resource agency concern about the loss of ecological value by activities, which modify the course, current and cross section of natural waterways. Natural waterways are defined as streams, rivers and creeks whose course, current and cross section have not been previously modified by human activities. The District also recognizes that some streams; rivers and creeks are greatly modified with regard to course, current and cross-section, compared to the natural condition, with diminished ecological value. Created waterways are those constructed by man where none previously existed.

It will be the policy of the District to consider whether a waterway is natural, modified or created, when undertaking District activities and recommending appropriate solutions. The District will recommend solutions consistent with the type of waterway.

8.3.1 Grade Control Structures (Policy NMCW-1)

Grade control structures within natural, modified or created waterways shall be properly engineered. The District will give due consideration to structures which allow fish passage, enhance natural character, and provide for long-term stream stability.

8.3.2 Bank Erosion and Stabilization (Policy NMCW-2)

Bank stabilization activities to reduce erosion must be engineered and designed in a manner intended to increase the long-term stability of District waterways and minimize future need for maintenance. The specific bank stabilization activity will consider the "value" of the resource being protected; i.e., whether a road, bridge, agricultural, field, or fish spawning area. It is the District's policy that methods proposed for bank stabilization will be commensurate with the value of the resource at risk, the type of waterway, and the probability of attaining bank stability.

8.3.3 Debris Removal (Policy NMCW-3)

The District recognizes "debris" consisting of downed trees and timbers, large rocks and other "natural" features provides habitat to aquatic life within streams, lakes and rivers. The District also recognizes that debris and sediment accumulation within created waterways reduces hydraulic capacity and diminishes their hydraulic effectiveness. Some of the methods include vegetation, toe-wood sod-mats, or J-hook rock vanes especially for resources with natural characteristics. The use of hard armoring should be limited to projects needed to protect essential infrastructure or to ensure public safety. The District will, as a matter of policy, consider the type of stream and recreational uses when evaluating the need for debris removal from District waterways.

Debris removal will be paramount on all District waterways where accumulation poses an immediate threat to the loss of human life or infrastructure (e.g., a bridge). The District will give due consideration to minimizing debris removal on unaltered, natural waterways, where the accumulation does not pose a risk to human life, infrastructure loss, or increase flood damages.

8.3.4 Fish Passage (Policy NMCW-4)

The District will, as a matter of policy, give due consideration to the issue of fish movement through unaltered natural waterways of the District. Permanent barriers to fish movement on unaltered natural waterways will be duly evaluated and recommended only when deemed as absolutely necessary by the District. The District will generally consider fish passage a lesser issue when posing solutions for created waterways.

8.3.5 Riparian Areas (Policy NCMW-5)

The District recognizes the concern of resource agencies relative to the loss of riparian areas. The District will, as a matter of policy, duly consider the potential impact upon the riparian areas of unaltered natural and modified natural channels. The primary concern of the District for areas adjacent to created waterways will be maintaining the function of the created waterway as well as encourage buffer establishments on all systems.

8.3.6 Consideration of Agricultural Drainage Alternatives (Policy NCMW-6)

The District recognizes the importance of drainage to maintaining and enhancing the economic viability of agriculture within its boundary. Drainage completed in a reasonable and prudent manner is an essential component of water management within the District. Because of the increased complexity of agricultural, social, and environmental issues associated with agricultural drainage the District will, as a matter of policy, encourage the evaluation of reasonable and prudent alternatives to traditional agricultural drainage. These alternatives may include any of the following: 1) the storage of water; 2) retiring land from production; 3) the use of temporary set-aside programs; 4) the utilization of set-back levees; 5) the use of diversions (which may include strategically diverting agricultural water into temporary storage areas); 6) restoring the natural flow characteristics of the stream channel; 7) creating multi stage channels; and 8) all other traditional and non-traditional approaches. Providing project cost-share and other financial incentives to project proponents will be the primary vehicle for implementing this policy.

8.4 BASIN WATER TRANSFERS

8.4.1 Interbasin Transfer of Water (Policy ITW-1)

Because of the topography within portions of the District, a potential exists for the transfer of surface water between basins. The interbasin transfer of water can be undesirable because problems related to the amount of water are transferred downstream. The District will, as a matter of policy, work to minimize activities, which results in the transfer of water between basins, unless deemed beneficial.

8.4.2 Water Levels Within Land-Locked Basins

Excessive runoff during wet cycles results in rising water levels within many land-locked basins, potentially causing damage to roads, buildings and other infrastructure. Maintaining water levels at reasonable, non-damaging levels is most prudent when infrastructure damage is the primary concern. Maintaining water levels at reasonable or normal elevations within land-locked basins will be allowed as a matter of policy when infrastructure protection is the primary consideration and the potential for inducing downstream flood damages is low.

8.5 PROTECTION AND USE OF FREQUENTLY FLOODED LANDS (Policy FFL-1)

Some lands within the District are subject to flooding with sufficient frequency and severity that use for agricultural production is greatly reduced and, therefore, does not appear to be economically sustainable. The extended detention of floodwaters upon these frequently flooded lands has the potential to decrease flooding downstream. The District will, as a matter of policy, evaluate alternative uses for frequently flooded lands, including the extended detention of floodwaters.

8.6 INCREASING CONTRIBUTING DRAINAGE AREA (Policy DA-1)

Increasing contributing drainage area has the potential to diminish the benefits provided by downstream water management efforts. The District will, as a matter of policy, consider and evaluate activities which increase contributing drainage area, without due consideration for the effects of the increased drainage area. The District will pursue conducting a culvert inventory to determine where culverts can be sized appropriately to control water during flood events.

8.7 WETLANDS

8.7.1 Wetland Restoration (Policy W-1)

The Upper Minnesota River Watershed District recognizes resource agency concern about the loss of wetlands within the District. The District will cooperate with resource agency efforts to restore wetlands within the District.

The District identifies the entire watershed district as a high priority wetland preservation, enhancement, and restoration area. This area is consistent with high priority wetland areas identified in the county comprehensive local water plans of Big Stone, Swift, and Traverse counties. The District however, recognizes the need for comprehensive approach to the identification of specific high priority areas within the District and would support such an effort.

The District also recognizes that the likelihood of negative ecological effects is greater where human activities may impact a previously unaltered wetland system. Wetland systems previously altered by

human activities, whether partially or wholly, represent an opportunity for attaining multiple benefits. It is a policy of the District to recognize the value of previously altered wetland systems for potential multiple benefits, which includes flood control.

8.7.2 Wetland Banking (Policy W-2)

The District recognizes that human activities, including those of the District, potentially affect wetland resources within the District. The District will, as a matter of policy, consider the development and use of a wetland banking system to offset the potential impact of District activities.

8.8 MANAGEMENT OF BIG STONE LAKE

The policies and procedures developed for Big Stone Lake are intended to achieve the interim and ultimate water quality goals. The actions and activities of the District will be completed in a manner consistent with the desire to reduce present nutrient (i.e., total phosphorus and total nitrogen) loads from the entire drainage for a normal hydrologic year area by 40%.

The District anticipates using these policies to address lake management issues, either through direct activities like the District's existing permit program or indirect activities like participation in the State environmental review process or state/federal permit processes.

8.8.1 Early Engagement During Planning (Policy BSL-1)

The District shall maintain of policy of early engagement and discussion with potential point and nonpoint source dischargers, including cities, developers, farmers and others. The primary purpose of the early engagement and discussion is to clearly describe the water quality goals for Big Stone Lake to potential dischargers and to explain the ramification of the goals relative to possible (project) proposals.

8.8.2 No-Net Increase in Nutrient Load (Policy BSL-2)

An increase in the annual nutrient load to Big Stone Lake is contrary to the goals of the District. Increased nutrient loading elevates in-lake concentrations and increases the probability of occurrence of algal blooms. The District will, as a matter of policy, ensure permit decisions under their jurisdiction are evaluated on the basis of (at a minimum) a no-net increase in nutrient load on a project specific basis. The District will actively engage agencies, municipalities, counties, developers, landowners and others to work toward a no-net increase in nutrient load.

8.8.3 Long-Term Reduction in Nutrient Load (Policy BSL-3)

A reduction in nutrient loading is necessary to achieve the ultimate water quality goals for Big Stone Lake. The District will, as a matter policy, encourage a net reduction in the annual nutrient load on a project specific and a subwatershed basis.

	Estimated Annual Load Reduction					
	Total Solids		Total Phosphorus[11]		Total Nitrogen	
Restoration Activity	(kg/yr)	(lb/yr)	(kg/yr)	(lb/yr)	(kg/yr)	(lb/yr)
Permanent Cover[1,5]	503,437	1,109,871	302	666	10,069	22,197
No-till[2,5]	212,285	468,000	127	281	4,246	9,360
Ridge till[3,5]	776,255	1,711,320	466	1,027	15,525	34,226
Mulch till[3,5]	565,208	1,246,050	339	748	11,304	24,921
15-30% residue[3,5]	1,117,441	2,463,494	145	319	4,819	10,624
Less than 15% residue[3,5]	240,952	531,200	670	1,478	22,349	49,270
Animal Waste Management Units[4]	ne	ne	2,640	5,820	2,048	4,514
Wastewater Treatment Plants[6]						
Browns Valley, MN	ne	ne	277	611	ne	ne
Sisseton, SD	ne	ne	825	1,818	ne	ne
Lake Level Management[7,9]	6,367	14,037	708	1,560	56,596	124,771
Whetstone River Flow Diversion[8,9]	939	2,070	104	230	835	1,840
Wetland Restoration[10]	10,491	23,129	14	30	137	303
Total	3,433,376	7,569,170	3,977	8,768	125,879	277,512

8.8.4 Pollutant (Nutrient) Load Trading (Policy BSL-4)

A watershed based approach is key in obtaining the ultimate water quality goals for Big Stone Lake. A component of the watershed based approach is the ability to "trade" pollutant loads between sources; e.g., it may be more cost-effective to reduce point source nutrient loads than nonpoint or vice versa. Pollutant trading on a watershed basis represents an important opportunity to reduce nutrient loads to Big Stone Lake, greater than might be possible by reductions from a single discharge. And, these load reductions could be achieved at substantial economic savings.

On a negotiated case by case basis, the District will encourage the use of pollutant trading, especially within the contributing drainage area to Big Stone Lake. Pollutant trading must be done in a manner

consistent with state and federal rules National Point Discharge Elimination System rules. Progress toward achieving the water quality goals for Big Stone Lake must also be demonstrated.

8.8.5 Lake Level Management (Policy BSL-5)

As local sponsor for the U.S. Army Corps of Engineers project, the District has agreed to operate the dam at the outlet from Big Stone Lake. Dam operation is constrained by the Minnesota/South Dakota Boundary Waters Commission. The Boundary Commission established the operating level (elevation) of Big Stone Lake at 964.6 msl. The ability of the District to maintain this level is dependent in part upon the hydraulic characteristics of the dam and the outlet channel. The District will, as a matter of policy, operate the dam in accordance with operational procedures established within and described by the operational plan.

8.9 SPECIAL PURPOSE MANAGEMENT PROGRAMS

8.9.1 Data Collection Programs (Policy SPMP-1)

Subject to budget limitations, the District intends to install stream gages at critical points throughout the District, which supplement gaging stations already operated by the U.S. Geological Survey. The District has collected water quality data at selected locations. The accumulated data is recorded and published for future utilization in decision-making activities of the Board of Managers. Stream gaging data is usable in the design of water management projects, and in the operation of existing water management structures. Data collected from the SWCD volunteer rain gage network is used in conjunction with stream gage information to assess relationships between rainfall and runoff.

The District intends to install new gaging stations as necessary throughout the District. It is also the District's policy to cooperate with the U.S. Geological Survey in the funding and operation of its gaging stations.

8.9.2 Watershed Modeling Studies (Policy SPMP-2)

Historically, the Upper Minnesota River Watershed District has been very active in conducting watershed studies on various subwatersheds draining to Big Stone Lake. The objective of these studies has been to develop an understanding of how lake water quality can be improved. The Big Stone Lake Restoration Project water quality model was used to establish the ultimate water quality goals.

The District has supported the modeling studies for the Minnesota River under the direction of the MPCA. The completion of this basin-wide perspective of Minnesota River Water quality should be used for funding purposes. The District will continue to utilize watershed modeling as a tool in achieving optimum water management within the District.

8.9.3 Technical Assistance Programs (Policy SPMP-3)

The District has traditionally provided technical assistance and advice wherever requested in the solution of water-related problems. The District's legal and technical staff is available to provide assistance as required and authorized by the Board of Managers.

The Board will continue to provide needed technical assistance and consultation to landowners, governmental units, and other entities within the jurisdiction of the Upper Minnesota River Watershed District.

8.10 PUBLIC INFORMATION AND EDUCATION PROGRAMS (Policy PIE-1)

The Upper Minnesota River Watershed District is extremely concerned that information relating to its activities and projects are adequately publicized. In addition, the District realizes that optimum water management practices result when affected people are sufficiently educated on water issues. For this reason, the District has taken an active position in publicizing its activities and educating the public. From the standpoint of education, District staff and managers have appeared before other governmental boards and organizations to inform them about District activities and programs. The District has provided support for educational exhibits at county fairs, school programs and agricultural winter shows. The Board of Managers actively participates in state, regional, and basin functions associated with Watershed District activities. The District also maintains a considerable amount of printed information concerning watershed activities and water-related issues. This information is available to the public at the office of the District.

The District will continue to aggressively publicize its activities and other water-related information so that its constituent public is educated on water issues to the maximum extent possible.

8.11 INTERGOVERNMENTAL COORDINATION AND COOPERATION (Policy IGCC-1)

Watershed District coordination and cooperation with other governmental units, at all levels, is a natural outcome of the political water environment. This cooperation and coordination is both horizontal and vertical. Vertical coordination between the Watershed District and permitting agencies such as the Corps of Engineers, Department of Natural Resources, and the Minnesota Pollution Control Agency, are mandated through legislative and permit requirements. Horizontal cooperation between the Board and comparable units of government such as municipalities, township boards, and county boards, are a practical necessity to facilitate District activities. Coordination between the District and agencies such as the U.S. Fish and Wildlife Service is routinely required to coordinate funding of project works. Many times, cooperative agreements have been arrived at between various governmental units and the District in the construction of certain types of projects.

The District will pursue several "Interagency Cooperative Memoranda" to establish procedures for participation in the management of important issues to the Watershed. The role of the District will be determined in memoranda. This role could include review and comment on permits, providing permitting services, and providing technical assistance. In some cases these agreements have already been established. Currently the UMRWD has been delegated permitting responsibilities for DNR General Permits. This enables the Board to issue permits for various types of activities in protected waters. Listed below are additional priority issues and corresponding agencies where these agreements will be pursued.

Natural Resource Management Issue	Agency
New Feedlots, Relocations and Expansions	MPCA/County Feedlot Officers
Water Use Permits	DNR
Land Application of Industrial or Municipal Wastes	MPCA/County Zoning
Vegetative Management Near Lakes and Drainage ways	DNR/County Zoning
Management of Aquatic Vegetation in Lakes	DNR
Develop and Implement TMDL's	MPCA

The District performs annual work planning in conjunction with its annual business meeting. This includes a coordination meeting with its Watershed District Advisory Committee, as required under Section 103D.331 of the Minnesota Statutes. It should be noted that the Statute recommend, where practicable, that the Advisory Committee members include a supervisor of a Soil and Water Conservation District, a member of a County Board, a member of a sporting organization, and a member of a farm organization. Therefore, this annual meeting with the Advisory Committee provides a forum of reporting to the Soil and Water Conservation Districts, the County Board, recreational and sporting organizations, and farm organizations.

The Watershed District views intergovernmental coordination and cooperation as an absolute necessity in order for it to perform its required functions. The Board will continue to foster an environment, which enhances coordination and cooperation to the maximum extent possible.

The Board will continue to provide representation on County Water Resource Advisory Committees which are active within its jurisdiction. The District will invite the involvement of Department of Natural Resources' personnel at the earliest possible time in all project planning. It shall be District policy to coordinate with and inform all Soil and Water Conservation Districts within its jurisdiction of Watershed District activities and planning initiatives.

8.12 SELF ASSESSMENT POLICY

The Upper Minnesota River Watershed District will conduct a periodic review of its goals and objectives with the intent to assessing the Board's effectiveness in meeting them.

8.13 SUMMARY STATEMENT OF DISTRICT POLICY AND COMMITMENT

The Upper Minnesota River Watershed District is committed to carrying out the goals, objectives, and policies outlined in its Water Management Plan. To ensure compliance with appropriate ordinances and standards, the District will maintain open communication and will cooperate and coordinate with all governmental units in implementing, reviewing, and regulating water development within the District.

9 FUTURE DIRECTIONS AND PRIORITIES OF THE DISTRICT

Through this planning process the Board of Managers has identified a number of directions and priorities the District will pursue as high priority activities until the next plan update is completed. These activities will primarily be pursued through application of the rules and policies established by the District within this plan. New policies and programs may be implemented through the use of innovative financing options like the use of Special Purpose Water Management District.

Developing an exhaustive, unchanging list of the future priorities and activities the District plans to pursue is not possible. This is due to the need to adapt to changing importance of priorities and/or activities in response to the needs of District residents and local, state and federal policies. For example, there is increasing focus on managing water at a watershed scale as reflected in Minnesota Water Sustainability Framework in their recommendation to have water resource managed at a watershed scale throughout the State.[15]

Although developing an exhaustive, unchanging list in not possible, future priorities and activities of the District can generally be categorized based on past efforts and emerging issues. Expectations are that the following will be the future priorities of the District:

- Drainage systems, wetlands, and natural waterways – many of the private and legal drainage systems within the District have not been maintained and conflicts arise when there is a desire to do so. The District believes innovative solutions to these conflicts are possible and plans to work cooperatively with the County and other agencies to attain solutions. Priorities are to: 1) actively engage the County Board of Commissioners in discussion about obtaining responsibility for the County legal drainage system; 2) the use of watershed based principles as they apply to managing drainage systems; 3) the use of private and state funding sources to implement watershed based solutions; 4) Geographic Information System mapping of drainage systems, 5) review of DNR Public Waters Inventory for possible discrepancies, and 6) promote upland storage and wetland restoration for multiple habitat and watershed benefits, sediment reduction, flood control and recreational assets

[15] Minnesota Water Sustainability Framework. 2011. University of Minnesota Water Resources Center.

Geographical areas, which are a District priority, include:

- Stony Run;
- Big Stone County Ditch No. 2;
- Swift County Ditch No. 10; and
- Toelle Coulle
- Mud Lake
- Big Stone Lake and watershed
- Whetstone River
- Fish Creek

- Continue efforts to improve the water quality of Big Stone Lake – the District has long been engaged in efforts to improve the water quality of Big Stone Lake. Funding is the primary limitation to continuing these efforts. Additional (external) funding is needed to implement priority lake improvement measures (see Appendix F).

  The water quality goals for Big Stone Lake effectively establish maximum allowable or total maximum daily loads for the lake. State and federal funding sources will be pursued and should be allocated to achieving the necessary long-term load reductions.

- Minnesota River Restoration effort -- the headwaters of the Minnesota River are within the Upper Minnesota River Watershed District. Consequently. As such, opportunities and impact of implementing priorities for improving water quality, particularly Big Stone Lake, can have great downstream impacts. The successful implementation of District activities can be greatly enhanced by recognizing the geographical importance of the District. The District plans to initiate discussions with the Minnesota Pollution Control Agency and DNR about how state and federal funding can be used to establish permanent flow and water quality monitoring

locations within the District, commensurate with the states unified watershed assessment and total maximum daily load efforts.

- The District will take into account the most recent and emerging research on agricultural drainage and consider emerging ideas for mitigating downstream impacts. This includes consideration of research and pilot projects for multipurpose drainage systems, including best management practices such as drainage coefficients and drainage water management techniques

These future priorities and activities are subject to refinement and change. The primary mechanism for refinement and change will be present and future discussions between the Board of Managers, the Watershed District Advisory Board, the County Board of Commissioners and appropriate state agencies.

10 WATERSHED MANAGEMENT PLAN ADMINISTRATION

This section provides detailed information on the District's watershed plan administration. It defines the roles of the District and other agencies in the implementation process and a process to resolve intergovernmental conflict. Watershed Management Plan amendment and evaluation procedures are also defined.

10.1 USE OF GUIDANCE DOCUMENTS IN THIS WATERSHED MANAGEMENT PLAN (WMP)

10.1.1 General Intent

The District intends for the WMP to be actively utilized in guiding annual and long-term work efforts. This WMP provides the structure and rationale for the development and utilization of Guidance Documents as a tool to incorporate elements into this WMP by reference. Expectations are that the primary guidance documents will be related to implementing TMDLs (e.g., a TMDL implementation plan) or engineering feasibility reports for capital projects, which are consistent with the goals and policies of this WMP. Thus this WMP has been structured to afford the District the highest degree of long term flexibility to develop or modify technical details into this WMP by reference, in the face of emerging issues and regulations, while maintaining clarity as to management intentions and

expectations. Given the existing issues discussed in this WMP, the District recognizes that considerable work remains in the watershed to manage water related issues. The WMP provides the framework to implement this work by identifying issues, action items, and project areas. Products and outcomes of the work efforts are not considered significant changes to the WMP. They are results that will be incorporated into the District's administration as Guidance Documents.

10.1.2 Criteria and Incorporation Process

Not all studies, reports, documents or publications prepared by the District will be considered Guidance Documents for supporting the WMP. Because of the anticipated significance of a Guidance Document in providing long-term assistance towards addressing an issue or topic, such studies, publications, or similar work products are expected to meet certain criteria:

- The product must have a direct relationship with the WMP content. The relationship may be identified as an overlap with issues, policies / actions, programs, or more broadly, a management area.
- The product must follow due diligence during development to include a formal public involvement process in accordance with MS 103D or MS 103E.
- The product content should provide adequate specificity in describing desired processes, outcomes, or recommendations so that implications of the proposed Guidance Document should be clear to the Board and others.

Any product proposed as Guidance Documents must be formally accepted by and approved by the District Board and the record shall indicate the intent to incorporate the findings into this WMP as a Guidance Document. When requesting acceptance by the Board, the District Administrator will make the board aware that the product is intended to serve as a Guidance Document and generally state conformance with the criteria. Similarly, updates or adjustments to established Guidance Documents are anticipated to have Board approval. The District's Board shall determine the priority of any proposed projects based on data specific to the issue provided in the Guidance Document and the policies of the WMP. Access to established Guidance Documents will be provided through the District's website.

The District will maintain a distribution list of agencies and individuals who have received a copy of the notice and will distribute notices within 30 days of Guidance Document update or availability.

10.2 WATERSHED MANAGEMENT PLAN COORDINATION

In order to implement the actions identified in this WMP, the District intends to work closely with the CAC, local, state, and federal government agencies, and watershed residents.

10.3 WATERSHED MANAGEMENT PLAN IMPLEMENTATION

This WMP is intended to be implementation oriented. The District is positioned for successful WMP implementation by the establishment of clearly linked resource issues, goals and policies, and specific action items. Section 11 of this document defines a probable implementation timeframe as well as an estimated index for successive years' budget. It is, however, anticipated that the implementation plan will be periodically reviewed and updated. The District will annually prioritize work activities from the implementation plan which will constitute the targeted efforts for the coming year. These work activities represent the annual work plan for the District. The intent is to provide flexibility to address emerging issues or new opportunities. Thus, priorities set for items in the implementation plan can be modified during development of annual work plans. Unforeseen items not on the implementation plan can be added.

An evaluation of the estimated costs associated with the implementation of this Plan is provided in Table 1. According to the Table, to fully implement the 112 initiatives contained in the Plan, costs would be estimated at $5,458,100 over the next ten years. Whiel the District generates $180,000 per year through its General Fund tax levy, not all of this money can be dedicated to projects; a portion will be used for staffing and other administrative costs. As a result, the District understands that it will need to seek outside sources of revenue (i.e. grants) and partnerships with other local units of government and State and Federal agencies to effectively implement this Plan.

Table 1

ESTIMATED PLAN IMPLEMENTATION COSTS

Goal	# of Initiatives	Total Estimated Costs
Goal 1: Water Quantity	32	$3,027,500
Goal 2: Water Quality	19	$787,500
Goal 3: Erosion & Sedimentation	7	$353,000
Goal 4: Biotic Diversity	5	$23,100
Goal 5: Recreational Resources	4	$100,000
Goal 6: Intergovernmental Relationships	7	$314,500
Goal 7: Public Information & Education	11	$85,000
Goal 8: Implementation of Goals & Objectives	27	$767,500
Total	**112**	**$5,458,100**

10.4 WATERSHED MANAGEMENT PLAN SCHEDULE

Implementation of the WMP will begin with its adoption by the board of managers and final approval from BWSR. The WMP will remain in effect for a ten-year period which is specified as August 2013 to August 2023.

10.5 INTERGOVERNMENTAL CONFLICTS/RESOLUTION PROCESS

During plan development, no intergovernmental conflict occurred. Should such a conflict arise, the board of managers will attempt to mitigate the conflict. If efforts to resolve the conflict fail, a petition to conduct a contested case hearing will be submitted to BWSR.

10.6 WATERSHED MANAGEMENT PLAN EVALUATION

Periodic review is necessary to assess the success of this plan. The board of managers and CAC will conduct a review every two or three years to ensure the management strategies remain pertinent. Amendments will be recommended if needed.

10.7 WATERSHED MANAGEMENT PLAN REVISION AND AMENDMENT PROCEDURE

10.7.1 General Approach

The District has carefully considered its long term goals and needs extending through the effective date of this WMP. Should an amendment be required based on perceived significant changes involving goals, objectives, standards, administrative procedures, or capital improvements, it will require a thorough review process as described below. The District may revise its WMP through an amendment prior to a WMP update if minor changes are required or if problems arise that are not addressed in the WMP. However, this WMP, the authorities, and the official controls of the District will remain in full force and effect until a WMP revision is approved by BWSR.

All amendments to this WMP will follow the procedures set forth in this section, or as required by Minnesota laws and rules (as revised). WMP amendments may be proposed by any person, city or county to the District board, but only the District Board may initiate the amendment process. All recommended WMP amendments must be submitted to the District in writing, along with a statement of the problem and need, the rationale for the amendment, and an estimate of the cost.

The District recognizes that the WMP may need to be periodically amended to remain useful as a long-term planning tool. However, the structure and intent of this WMP provides flexibility to respond to short-term emerging issues and opportunities. The structure is provided by the use of guidance documents, concise identification of broad issues, and related goals and actions.

Technical information (especially water quality data) will require periodic updating, such as when new site specific data are generated. The District intends to post this updated information on its website (http://www.umrwd.org/), with hard copies available upon request. Technical information produced through studies and contained in reports will be incorporated as an extension of the overall Plan through the acceptance of the report as a guidance document, also to be posted to the District's website. A report, study, or other written document can only be considered a guidance document if subject to a formal public review process in accordance with the requirements of 103D or 103E.

Generally these technical updates and studies which are guidance documents are considered part of the normal course of District operations consistent with the intent of this Plan and not a trigger for a WMP amendment. However, when a guidance document results in an action or policy that is a significant change of direction from the WMP, or implementation of a capital improvement project not identified in the WMP (or not in sufficient detail), a WMP amendment may be required. The District will keep records of all changes and supplemental data and will, as required for clarity, republish the guidance documents or portions thereof from time to time to provide an updated document for referral by the cities and others.

10.7.2 Amendments to Watershed Management Plan

10.7.2.1 Criteria and Format

The District recognizes that considerable work remains in the watershed to manage water related issues. The WMP provides the framework to implement this work by identifying issues, action items, and project areas. Neither a minor nor a general WMP amendment will be required for the following situations:

1. The estimated cost of an activity/study (i.e., non-capital project) is different than shown in the long-range work plan; and
2. The District adds or deletes activities and/or studies to/from the long-range work plan, provided these additions or deletions are consistent with the goals and policies of the WMP, and will be proposed, discussed and adopted as part of the District's annual budgeting process or some other process which involves public input.

If an amendment is needed, the District will prepare plan amendments in a format consistent with Minnesota Rule 8410.014026, Subd.4, unless a different format is approved by BWSR. The rule requires that, unless the entire document is reprinted, all amendments adopted must be printed in the form of replacement pages for the WMP, each page of which must:

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

The District will maintain a distribution list of everyone who receives a copy of the WMP. Within 30 days of adopting an amendment, the District will distribute copies of the amendment to everyone on the distribution list. Generally, the District will provide electronic copies of the amendment or make the documents available for public access on the District's website. Printed copies will be made available upon written request, and printed at the cost of the requester.

10.7.2.2 Minor Watershed Management Plan Amendments

The minor WMP amendment process is more streamlined than the general plan amendment process. Although no comprehensive criteria are set forth for what constitutes a minor amendment, Minnesota Rule 8410.0020, Subpart 10 gives the following examples of minor plan amendments:

> "—...items such as recodification of the WMP, revision of a procedure meant to streamline administration of the WMP, clarification of the intent of a policy, the inclusion of additional data not requiring interpretation, or any other action that will not adversely affect a local unit of government or diminish a water management organization's ability to achieve its WMP's goals or implementation program".

Although this rules pertains solely to Metropolitan Watershed Districts, the content of that rule is used here as guidance for the preparation of amendments to this WMP.

A minor WMP amendment will be required for the following situations:

1. When the District initiates a capital project based on an action listed in the implementation plan and the District proposes a new financing approach or method other than an ad valorem levy, cost share, or bonding;
2. Addition of new goals or actions or revision of existing goals or actions that will require revision of the District's rules and regulations;
3. Changes to the goals and/or actions that directly affect the programs or budgets of other local units of government within the District; and
4. When the District initiates a capital project listed in the LRWP and the updated cost estimate is:

(a) $500,000 or less, and the increase is more than $200,000 higher than the estimated costs in the implementation plan (as annually adjusted); or

(b) More than $500,000 and the increase is more than 60% higher than the estimated costs shown in the LRWP (as annually adjusted).

In addition, the District will consider certain changes (beyond those changes listed in Section 10.6.2.1) to its itemized program of actions contained in the implementation plan to be minor WMP amendments if both of the following conditions are met:

1. The original WMP setting forth the itemized program of actions did not provide enough specificity or information needed for one, some, or all actions to meet the definition of "capital improvement program" as provided in Minnesota law.
2. The affected county did not object to the District when a project was identified in the implementation plan. County approval is needed only if the District proposes to use county bonding to fund projects.

The District will follow the following review process for minor WMP amendments:

1. The District will send copies of the proposed minor WMP amendment to the affected cities, townships and counties, the state review agencies, and BWSR for review and comment.
2. The District will hold a public meeting, which may be a Board meeting, to explain the amendments and publish a legal notice of the meeting twice, at least 7 days and 14 days before the date of the meeting. The District will also post the notice of the public meeting on the District's website and mail the notices to each affected city, township and county.
3. If the proposed amendment is a minor amendment to the District's capital improvement program and the project proposes county bonding as the funding method, affected Counties must approve the minor amendment.
4. BWSR must either agree that the amendment is minor or fail to act within 45 days of receipt of the amendment.

10.7.2.3 General Watershed Management Plan Amendments

If the District or the BWSR decides that a general WMP amendment is needed, the District will follow the general WMP amendment process described in Minnesota rules and laws. The general WMP amendment process is as follows (and is the same as the WMP review process):

1. The District must submit the amendment to the cities, counties, state review agencies (the DNR, MPCA, MDA, and Minnesota Department of Health), and BWSR for a 60-day review;

2. The District must respond in writing to any concerns raised by the reviewers;
3. The District must hold a public hearing on the proposed amendment;
4. The District must submit the revised amendment to the state review agencies and BWSR for a 45-day review; and
5. The District must submit the final revised amendment to the BWSR for approval.

The District will consider sending drafts of proposed general WMP amendments to all WMP review authorities to receive input before beginning the formal review process. Examples of situations where a general WMP amendment may be required include:

1. Establishment of a WMD (or more than one district) to collect revenues and pay for projects initiated through MS 103D.601, 605, 611 or 730 when not currently included in the WMP. To use this funding method, Minnesota law (MS 103D.729) requires that the watershed district prepare an amendment to its WMP. The amendment must describe the area to be included in the WMD, the amount to be charged, the methods used to determine the charges, and the length of time the WMD will remain in force;
2. Addition of a capital improvement project that is not included in the LRWP and is not identified in the WMP's discussion of issues, policies, or goals; and
3. Addition of new programs or other initiatives that have the potential to create significant financial impacts or controversy.

11 IMPLEMENTATION PLAN

The Upper Minnesota River Watershed District's Watershed Management Implementation Plan for the years 2013 to 2023 is as follows:

11.1 GOAL 1: WATER QUANTITY

11.1.1 Objective A: Reduction of damages caused by floodwaters

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Finalize the phase I Browns Valley Flood Mitigation Project by completing as built drawings and conducting grant fund closeouts.	Little Minnesota River	2013-2015	*UMRWD	$50,000
2. Browns Valley Flood Mitigation Project annual inspections and maintenance.	Little Minnesota River	2013-2023	*UMRWD	$120,000
3. Reduce flows to Big Stone Lake from the Whetstone River. Work with the US Army COE on the restoration of the Whetstone River. • Complete diagnostic feasibility study, pre engineering and cost estimate. • Complete final engineering and project development plans. • Secure Funding Construction/Restoration of river channel.	Big Stone Lake, Minnesota River	2015-2016 2016-2017 2017-2018 2019-2023	*COE, UMRWD, DNR, SD DENR, CBSL, Big Stone County	$300,000
4. Toelle Coulee. Apply for flood damage reduction funding for the design and construction of Phase II of the Browns Valley Flood Mitigation Project.	Little Minnesota River	2017-2019	*UMRWD City of Browns Valley MN DNR	$1,000,000
5. Flood Predictions. Work with the North Central Rivers Forecast Center on flood predictions for Big Stone Lake. Submit lake level and snow pack data to NCRFC for evaluation on an annual basis.	Big Stone Lake	2013-2023	*UMRWD	$1,000/yr
6. Beardsley Dry Lake Flood Control Project. Operation, maintenance and annual inspection.	Hoss Creek	2013-2023	*UMRWD	$500/yr
7. New Drainage. Investigate the adoption of conservation drainage techniques which may include a drainage coefficient and control structures on new gravity flow pattern tile systems, where applicable.	All	2014-2016	*UMRWD	$2,000
8. Highway 12 Flood Control Project - Initiate annual operation and maintenance review	Minnesota River	2013-2023	*UMRWD	$1,000/yr

9. Garner resources in order to conduct a complete hydrological model of the UMR watershed. • Identify project parameters • Determine potential consultants and estimated costs • Seek funding resources to complete.	All	2013-2023 2014-2015 2016-2017 2018-2020	*UMRWD, DNR, BWSR.	$180,000
10. Based on hydrologic modeling, identify key areas for wetland restoration on private land and partner with USFWS, DNR, SWCD's and others and implement	All	2013-2023	*UMRWD, DNR, BWSR., MOA, SWCD	100,000
11. Promote drainage water management techniques as a multiple benefit best management practice	All	2013-2023	*UMRWD, DNR, BWSR., MOA	100,000

11.1.2 Objective B: Administer and maintain drainage systems of the District.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Drainage System Management. Ensure that public drainage systems are operated and maintained in accordance with State Drainage Law (M.S. Chapter 103E) and other applicable regulations.	All	2013-2023	*Counties, *UMRWD, DNR	$2,000/yr
2. Reduce flows to Big Stone Lake from the Whetstone River. Work with the US Army COE on the restoration of the Whetstone River.	Big Stone Lake, Minnesota River	2013-2023	*COE, UMRWD, DNR, SD DENR	$300,000
3. Rules and regulations. Review existing permit rules and regulations and make necessary changes.	All	2013	*UMRWD	$1,000
4. Branch 3A to County Ditch 13. Annual inspection and maintenance.	Lindholm Creek	2013-2023	*UMRWD	$35,000
5. Public Drainage Systems Inventory. Develop a GIS-based inventory of public drainage systems in the District. This inventory should include detailed attribute information for each system, including past maintenance efforts.	All	2013-2016	*Counties, UMRWD	$10,000
6. Improvement of Subwatershed Delineations. Work with partnering agencies to improve the accuracy of subwatershed delineations. Identify and document tile drainage that crosses sub-watershed boundaries	All	2013-2023	*DNR, *USGS, UMRWD	$500/yr
7. Public Waters Inventory. Review the current Public	All	2013-2023	*UMRWD, DNR	$5,000

Waters Inventory via field review or in office GIS review annually.				
8. Alternative Drainage Practices. Provide financial incentives to landowners for the implementation of alternative drainage water management practices that have the potential to improve water quality and reduce peak flows. Utilize District funds or apply for grants from BWSR Clean Water Funds to implement these activities. These alternatives may include any of the following: 1) the storage of water; 2) retiring land from production; 3) the use of temporary set-aside programs; 4) the utilization of set-back levees; 5) the use of diversions (which may include strategically diverting agricultural water into temporary storage areas); 6) restoring the natural flow characteristics of the stream channel; 7) creating multi stage channels; and 8) all other traditional and non-traditional approaches	Stony Run, Big Stone County Ditch 2, Swift County Ditch 10, Fish Creek.	2013-2023	*UMRWD, Counties, SWCDs, BWSR, MDA	$100,000
9. Seek grant funding for County and WD Drainage Records Modernization from the BWSR. Conversion of paper, Mylar and other types of hard copy documents and maps to digital format providing an archived copy of all original documents and maps. Conversion to digital format will improve access to drainage system records; and enhance drainage system management ability.	All	2015-2018	UMRWD, *Big Stone County,	$50,000
10. Seek funding via the Clean Water Fund/BWSR for Multipurpose Drainage Management Planning for a public drainage system. With engineering assistance develop sub-watershed (drainage system) scale implementation plans for multipurpose drainage management on Chapter 103E drainage systems to protect and improve water quality, together with adequate agricultural drainage, equitable flood protection, peak flow and erosion reduction, and wildlife habitat improvement.	County Ditch 7, County Ditch 13, County Ditch 2	2013-2023	UMRWD, *Big Stone County.	$200,000

11.1.3 Objective C: Sustain high quality surface and ground water supply.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Wellhead Protection. Participate in the preparation and implementation of wellhead protection plans for public water suppliers which include Ortonville, Odessa, Browns Valley, and Beardsley.	All	2013-2023	*Cities, UMRWD, Counties, MDH	$1,000/yr
2. BMP Program. Provide technical and financial assistance, as available, to local governmental units and landowners for the implementation of groundwater protection BMPs in the drinking water management areas identified by the city wellhead protection plans.	All	2013-2023	*Cities, UMRWD, Counties, MDH	$2,000/yr
3. Water Appropriation Permits. Review and provide comments, as necessary. On all water appropriation permit applications submitted to the DNR within the District.	All	2013-2023	*MN DNR, UMRWD, SWCD, Counties	$250/yr
4. Dam Reconstruction and Repair. Provide technical and financial assistance, as available, for the reconstruction and repair of dams to ensure adequate water levels are maintained. Complete an inventory of dam structures.	All	2013-2023	*UMRWD	TBD
5. Rule Recommendation. Regulate the reconstruction and repair of dams and other water control structures in the District.	All	2013-2023	*UMRWD	$1,000
6. Hydrologic Investigations. Conduct hydrologic investigations, as needed, to resolve conflicts in existing data and determine the influence of lesser-known basins in the District.	All	2013-2023	*UMRWD, DNR, USGS	$2,000/yr

11.1.4 Objective D: Lake level management

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Big Stone Lake/Whetstone River Operating Plan. • Finalize the draft Operating and Maintenance Plan by reconvening the Minnesota/South Dakota Boundary Waters Commission. • Implement operation and maintenance plan annually.	Big Stone Lake, Minnesota River	2013-2018 2013-2023	*UMRWD, COE, DNR, SD DENR, MPCA, SD GF&P, Ottertail Power	$8,000
2. Big Stone Lake/Whetstone River Maintenance Funding. Work with cooperating agencies to provide funding for operation and maintenance.	Big Stone Lake, Minnesota River	2013-2015	*UMRWD, COE, DNR, SD DENR, MPCA, SD GF&P, Ottertail Power	$3,000

3. Landlocked Basins. Work with DNR on the reduction and/or management of lake levels on Swenson Lake, and wetlands located in Sections, 11, 14, 16, 17 of Otrey Township, Section 27 of Akron Township, Sections 14 and 15 of Ortonville Township and Section 3 of Toqua Township which include subwatersheds: Stony Run, Five Mile Creek, and Fish Creek.	Stony Run, Five Mile Creek, Fish Creek	2013-2023	*DNR, Counties, UMRWD, USF&WS, ACOE	$10,000
4. Reduce flows to Big Stone Lake from the Whetstone River. Work with the US Army COE on the restoration of the Whetstone River. • Complete diagnostic feasibility study, pre engineering and cost estimate. • Complete final engineering and project development plans. • Secure Funding • Construction/Restoration of river channel.	Big Stone Lake, Minnesota River	2015-2016 2016-2017 2017-2018 2019-2023	*COE, UMRWD, DNR, SD DENR, CBSL, Big Stone County	$300,000
5. Stream flow Monitoring. Submission of lake level data to USGS monthly and financial support for the USGS gaging station at Peever quarterly.	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, USGS	$50,000

11.2 GOAL 2: WATER QUALITY

11.2.1 Objective A: Maintain or improve the quality of all surface and groundwater

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Wastewater discharges. Work with the City of Ortonville on the dilution of their WWTP discharges.	Minnesota River	2013-2023	*UMRWD, City of Ortonville	$100/yr
2. Wetland Restoration. Kleindl wetland restoration bank restored. Complete annual monitoring of vegetation management and water control structures; also documentation of hydrology for the five year monitoring period. Sub-watershed – identify where located.	Fish Creek Big Stone Lake	2013-2018	*UMRWD	$8,000/yr
3. Storm water BMPs. Continue the rain garden/lakeshore buffer cost-share program by completing three projects per year.	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, CBSL	$5,000/yr
4. Water Quality Monitoring. Continue the Big Stone Lake Water Quality Monitoring Program and Big Stone Lake	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, CBSL	$11,000/yr

tributary monitoring.				
5. Data Collection and Organization. Develop and maintain a user-friendly database for all water resource monitoring data.	All	2013-2023	*UMRWD, MPCA	$2,000/yr
6. Subwatershed Water Quality Goals. Build local water quality database, utilizing available data to identify specific water quality goals for water resources. Use to target BMP implementation at the sub-watershed level utilizing CWL funding.	All	2015-2016	*UMRWD	$5,000/yr
7. Monitoring Plan. Prepare an annual Monitoring Plan for assessing the condition of surface and groundwater resources, as well as identifying pollution sources. This Plan should identify the specific sites to be monitored and contain detailed information on the physical, chemical, and biological parameters to be analyzed at each site.	All	2013-2023	*UMRWD, DNR, CBSL, MPCA, USGS	$1,000/yr
8. Volunteer Monitoring. Recruit volunteers to participate in monitoring programs. At least one volunteer should be identified from Big Stone Lake, Long Tom, Marsh, and Otrey.	All	2013-2023	*UMRWD, CBSL, MPCA	$300/yr
9. Annually submit surface water quality data to MPCA/EPA to be entered into MPCA's Environmental Data Access (EDA) system.	All	2013-2023	*UMRWD	$2000/yr
10. Mapping Application. Develop an interactive, web-based mapping application that connects users with water quality data from specific monitoring sites. UMRWD plans to link the interactive web based mapping application on our website.	All	2013-2014	*UMRWD	$5,000
11. Monitoring Summary. Include a summary of all monitoring data in the Watershed District annual Report.	All	2013-2023	*UMRWD	$500/yr
12. Stormwater Management Regulations. Cooperatively work with local units of government to ensure that all new development complies with local, State and Federal stormwater management regulations, whichever is more stringent. Provide watershed technical information and data as requested.	All	2013-2023	*Cities, *Counties, UMRWD, MPCA	$250/yr

13. Stormwater Management Ordinances. Provide technical assistance to local governmental units for the development of stormwater management ordinances.	All	2013-2023	*UMRWD, Cities, Counties	$8,000
14. BMP Program. Provide technical and financial assistance, as available, to local governmental units and landowners for the implementation of stormwater management BMPs.	All	2013-2023	*UMRWD, Cities, Counties, SWCDs	$5,000/yr
15. Rule Recommendation. Require that stormwater discharges to all water resources be approved by the District.	All	2013	*UMRWD	$1,000
16. MPCA Watershed Approach. Coordinate the preparation and implementation of the MPCA's Watershed Approach. • Intensive monitoring and assessment. • Watershed characterization and problem investigation (occurs over first three years); • Watershed Restoration and Protection Strategies	All	2015-2017 2015-2018 2016-2020	*UMRWD, LAs, MPCA	$200,000
17. Wastewater Treatment. Cooperatively work with local governmental units and other partners to identify and resolve wastewater treatment-related pollution issues in Ortonville, Browns Valley.	Big Stone Lake, Minnesota River	2016-2020	*City of Browns Valley, *City of Ortonville, UMRWD, MPCA	$2,500/yr
18. Based on subwatershed modeling, analysis, and TMDL results. Those high priority subwatersheds identified will be focused upon for implementation of restoration and/or protection activities and projects.	All	2018-2023	*UMRWD, *MPCA	$40,000/yr
19. Finalization of the Mud Lake wetland restoration projects, 5-Mile Creek subwatershed	Five Mile Creek	2013-2018	*DNR, *NCRS, UMRWD	$2,000

11.3 GOAL 3: EROSION & SEDIMENTATION

11.3.1 Objective A: Initiate and support projects to reduce erosion.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Stormwater Runoff. Restoration of the Central Park stormwater system in Ortonville.	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, City of Ortonville, CPR	$80,000
2. Installation of water and sediment basins, grassed waterways and buffer strips. Encourage the installation of water and sediment	All	2013-2023	UMRWD, *SWCDs, Counties, FSA,	$300/yr

basins along with other erosion control practices through the District's permitting program.			*NRCS	
3. Highly Erodible Land. We will communicate to our local partners SWCD and NCRS to identify and target highly erodible land for enrollment in conservation easement programs and other cost share programs, such as CRP and RIM.	Hoss Creek, Fish Creek, Stony Run, Swift County Ditch #10	2013-2023	*SWCDs, UMRWD *NCRS	$2,000/yr
4. Stream Stabilization. Implement and/or provide technical and financial assistance, as available, to landowners for stream stabilization.	All	2013-2023	*UMRWD, DNR, COE	$20,000/yr
5. Implement stream stabilization and debris removal projects to maintain stream integrity on the lower reaches on the Whetstone River, Little Minnesota River, and the far upper reach of the Minnesota River.	All	2013-2023	*UMRWD, DNR, COE	$20,000/yr
6. BMP Program. Provide technical and financial assistance, as available, to local governmental units and landowners for the implementation of erosion and sediment control BMPs. Through the use of GIS and LIDAR develop an electronic map of the landscape to identify critical sources of water quality degradation and their locations in order to select and implement BMPs.	All	2013-2023	*UMRWD, *SWCDs, NRCS	$2,500/yr

11.3.2 Objective B: Erosion control along all private and public drainage systems.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Buffer strips. Continue to promote the installation of buffer strips on all private and public drainage systems within the district and work with the SWCD to develop an inventory of existing buffers within the District.	All	2013-2023	*UMRWD, Counties, SWCDs	$500/yr

11.4 GOAL 4: BIOTIC DIVERSITY

11.4.1 Objective A: Cooperate with agencies to maintain and improve biotic resources.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost

1. River Restoration. Continue to work with DNR Fisheries and the National Wildlife Refuge on the Whetstone River and Minnesota River Restoration projects.	Minnesota River	2013-2023	*UMRWD, DNR, USF&WD	$5,000
2. Public Water Access Signage. Install and maintain signage regarding the spread of invasive aquatic species at all public water accesses. .	All	2013-2023	*DNR, *LAs, UMRWD	$2,000
3. Minnesota Biological Survey. Acquire and utilize county Biological Survey data to prevent impact to the critical habitat areas of listed species.	All	2013-2023	*UMRWD, DNR	$100
4. On an individual basis, work with DNR on installing fish passages and barriers	Minnesota River Stoney Run	2013-2023	*DNR, *UMRWD	$1,000
5. Work with and assist the DNR on education and implementation of invasive species goals and procedures, including distribution of materials that reference identification and preventative action for invasive species	All	2013-2023	*DNR, *USF&WS, *UMRWD	$15,000

11.5 GOAL 5: RECREATIONAL RESOURCES

11.5.1 Objective A: Create recreational resources.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Facilities. Enhance the Big Stone Lake/Whetstone River Control site for recreational use.	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, City of Ortonville, DNR	$3,000/yr
2. Wetland Restoration. Continue to work with the US F&WS on wetland restorations on Public lands. We would estimate up to 20 in this time frame	All	2013-2023	*UMRWD, USF&WS	$1,000/yr
3. Consider alternative opportunities for land locked basins, like Swenson Lake which could include flood easements, and controlled outlets.	Stoney Run, Fish Creek, Five Mile Creek, Minnesota River	2013-2023	*DNR, *USF&WS, UMRWD	$10,000
4. Support/sponsor the Marsh Lake restoration efforts that will restore the Pomme de Terre River to its historic channel, modify the Marsh Lake Dam, construct fishway, construct secondary drawdown structure, breach dike at abandoned fish pond, install gated culvert in the Louisburg Grade Road.	Minnesota River	2013-2017	*DNR, *COE, FWS, UMRWD	$5,000/yr

11.6 GOAL 6: INTERGOVERNMENTAL RELATIONSHIPS

11.6.1 Objective A: Cooperative efforts with federal, state, counties and townships.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Continue the cooperative DNR General Permitting Program.	All	2013-2023	*UMRWD, DNR	$2,000/yr
2. Host a rain garden demonstration with the U of M or DNR. Contact landowners for site location.	All	2013-2023	*UMRWD, DNR, U of M	$3,500
3. Continue to work with the State of SD on the implementation of a water quality monitoring program for the Whetstone and Little Minnesota Rivers, and all future water quality/quantity projects.	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, SD DENR, EDWDD	$1,000
4. Continue to work with the National Wildlife Refuge and DNR Fisheries on the restoration of the Whetstone River and Minnesota River. • Complete diagnostic feasibility study, pre engineering and cost estimate. • Complete final engineering and project development plans. • Secure funding • Construction/Restoration of river channel.	Big Stone Lake, Minnesota River, Whetstone River	2015-2016 2016-2017 2017-2018 2019-2023	*COE, UMRWD DNR, SD DENR, DNR	$300,000
5. Continue the cooperative Rural Well Testing and Fourth Grade Wetland Restoration Projects with the Ortonville School, Big Stone County LWP, and USF&WS.	All	2013-2023	*UMRWD, Big Stone County, Ortonville School District, USF&WS	$2,000/yr
6. Continue to assist the City of Browns Valley and Traverse County with Browns Valley Flood Mitigation Plan.	Big Stone Lake, Minnesota River	2013-2023	*UMRWD, City of Browns Valley, Traverse County	$1,000/yr
7. Watershed board will maintain open communications and work with the township and county boards on issues pertaining to and impacting water quality and quantity management.	All	2013-2023	*UMRWD, Big Stone County Townships	$1,000/yr

11.7 GOAL 7: PUBLIC INFORMATION/EDUCATION

11.7.1 Objective A: Inform and educate citizens on conservation projects/programs.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Produce articles on conservation practices such as rain gardens, water quality, and conservation BMPs. We will produce articles at least annually.	All	2013-2023	*UMRWD	$300/yr
2. Continue the Rural Well Testing Program through Ortonville High school and cooperative effort with the Big Stone County Local Water Plan.	All	2013-2023	*UMRWD, Big Stone Co., Ortonville School District	$100/yr
3. Website for the District. Continue to enter data and update information and provide links to resources.	All	2013-2023	*UMRWD	$2,000/yr
4. Update the District's water management plan beginning in 2021 through 2023.	All	2013-2023	*UMRWD	$2,000
5. Hold a drainage tile educational seminar for local farmers and tile installers regarding emerging technologies for conservation drainage and drainage water management.	All	2014-2015	*UMRWD, MDA	$3,000
6. Volunteer Recruitment. Actively recruit and properly train volunteers to assist the District in water resource management.	All	2013-2023	*UMRWD, CBSL	$500/yr
7. Advisory Committee. Actively recruit residents to serve on the District's Advisory Committee.	All	2013-2023	*UMRWD	$100/yr
8. Youth Involvement. Support the implementation of water resource projects with youth.	All	2013-2023	*UMRWD	$1,000/yr
9. Educational Events and Workshops. Sponsor and facilitate education events and workshops with partnering agencies.	All	2013-2023	*UMRWD, DNR, SWCDs, Counties	$2,500/yr
10. Public Information Package. Develop a public information package that can be economically mailed or distributed to residents that explains what a watershed is and how they can impact water resources on a daily basis.	All	2013-2023	*UMRWD	$1,000/yr
11. Information Materials. Develop and collect informational materials, including brochures and other handouts that summarize land use/water resource issues in the District and make them readily available to the public.	All	2013-2023	*UMRWD	$500/yr

11.8 GOAL 8: IMPLEMENTATION OF GOALS AND OBJECTIVES

11.8.1 Objective A: Maintain an active Board of Managers and Advisory Committee.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Board of Managers Meetings. Hold monthly meetings of the District's Board of Managers.	All	2013-2023	*UMRWD	$7,500/yr
2. Advisory Committee Meetings. Hold quarterly meetings of the District's Advisory Committee.	All	2013-2023	*UMRWD	$1,000/yr
3. Future Membership. Recruit and maintain a listing of persons who are interested in serving on the Advisory Committee.	All	2013-2023	*UMRWD	$100/yr

11.8.2 Objective B: Maintain adequate staffing and utilize consultants when necessary.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Staffing Plan. Develop and implement a Staffing Plan to ensure that the goals and objectives of the District are effectively implemented.	All	2013	*UMRWD	TBD
2. Consultants. Utilize consultants to address engineering, hydrologic, and planning issues when necessary	All	2013-2023	*UMRWD	TBD
3. Increased staffing to implement water quality and quantity project and resource acquisition	All	2013-2023	*UMRWD	$40,000/yr

11.8.3 Objective C: Provide training opportunities for Board Managers, Advisory Committee members, and staff.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Conferences and Workshops. Provide funding for Board Managers, Advisory Committee members, and staff to attend conferences and workshops to increase internal knowledge and skills.	All	2013-2023	*UMRWD	$4,000/yr
2. New Manager and Committee Member Training. Conduct or provide funds for new Board Managers and Advisory Committee members to attend a training program to familiarize them on the	All	2013-2023	*UMRWD	$1,000/yr

many functions and responsibilities of the District.				

11.8.4 Objective D: Develop a comprehensive public relations program.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Mission Statement. Annually review District's mission statement.	All	2013	*UMRWD	$100/yr
2. District Website. Regularly maintain and update the District website.	All	2013-2023	*UMRWD	$500/yr
3. Annual Report. Prepare and distribute an Annual Report that summarizes the District's accomplishments to be submitted to BWSR by July 15th of each year.	All	2013-2023	*UMRWD	$1,500/yr
4. District Newsletters. Prepare and distribute newsletters at least annually via our district website. www.umrwd.org	All	2013-2023	*UMRWD	$2,000/yr
5. Tours. Provide tours of the watershed to stakeholders that highlight projects that the District has been involved with and areas that are in need of attention.	All	2013-2023	*UMRWD	$2,000/yr
6. Press Releases. Prepare and distribute quarterly press releases that summarize District activities and decisions.	All	2013-2023	*UMRWD	$500/yr

11.8.5 Objective E: Foster relationships with potential partners.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Meetings. Hold regular meetings with potential partners to discuss partnership opportunities and roles in implementation.	All	2013-2023	*UMRWD	$1,000/yr
2. Technical Committees. Form technical committees, as necessary, to address specific water resource issues.	All	2013-2023	*UMRWD	$500/yr
3. Directory. Maintain a current directory of representatives from all Federal, State, and local agencies, offices, and special interest groups. These representatives should be sent regular updates on the activities of the District.	All	2013-2023	*UMRWD	$100/yr

11.8.6 Objective F: Develop and implement a regulatory program.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. District Rules. Review, revise, adopt, and implement rules for the District.	All	2013-2023	*UMRWD	$30,000
2. Permitting and Inspection Program. Review and revise a permitting and inspection program for the implementation of rules.	All	2013-2023	*UMRWD	$8,500

11.8.7 Objective G: Strive for efficient planning and fiscal accountability.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Additional Funding Sources. Actively pursue additional funding sources, such as grants and donations, in order to fund the implementation of initiatives and reduce the tax levy burden on the residents of the District. Seek partnerships and cooperative agreements to finance initiatives, when appropriate in coordination with the District's annual work plan identify Clean Water Fund grant opportunities to pursue that year.	All	2013-2023	*UMRWD	$2,000/yr
2. Annual Work Plan and Budget. Prepare and adopt an annual work plan and budget following the statutory requirements of M.S. Chapter 103D.	All	2013-2023	*UMRWD	$500/yr
3. Annual Audit. Conduct an annual audit of the financial records of the District.	All	2013-2023	*UMRWD	$2,000/yr
4. Financing Mechanisms. Utilize appropriate financing mechanisms to fund District initiatives, including but not limited to mechanisms and procedures outlined in M.S. Chapter 103D.	All	2013-2023	*UMRWD	TBD

11.8.8 Objective H: Review and update the Watershed Management Plan.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Annual Plan Review. Hold an annual meeting of the Advisory Committee to review progress in achieving plan initiatives and identify emerging issues and opportunities that should be incorporated into the Plan through the amendment process.	All	2013-2023	*UMRWD	$100/yr

2. Plan Revision. Revise the Watershed Management Plan prior to its expiration by utilizing the completed watershed restoration and protection strategies (*WRAP*) via the one watershed, one plan approach.	All	2021-2023	*UMRWD, BWSR	$50,000

11.8.9 Objective I: Provide for UMRWD General Operating Support.

Initiative	Priority Subwatershed(s)	Proposed Timeframe	Coordinating Agency(s) (*Lead)	Estimated Cost
1. Continued levy based support of the UMRWD with a base 2013 level of approximately $100,000. *Please refer to table 1	All	2013-2023	*UMRWD	$1,000,000

Table 2

EVALUATION OF ORIGINAL OBJECTIVES OF THE UPPER MINNESOTA RIVER WATERSHED DISTRICT

Plan Objective	Degree of Activity[16]	Is there Need for Similar or Revised Policy?
To slow down weed and algae growth in the District's Lakes.	High	Yes
To reduce the pollution of the water in the lakes and water courses within the District.	High	Yes
To intelligently regulate the water levels of the various lakes within the District.	High	Yes
To keep adequate records of the water level, the chemistry, and other useful data.	High	Yes
To enhance the recreational facilities and scenic beauty of the District.	Moderate	Yes
To improve the needed drainage, prevent excessive runoff or seepage, and provide needed soil and water conservation in the District.	High	Yes
To provide funds to accomplish these objectives and to engage technical assistance and advice.	Moderate	Yes
To preserve, maintain, and improve habitat for fish and wildlife.	High	Yes

[16] Since preparation of "Overall Plan Upper Minnesota River Watershed District" (1988).

Table 3

RARE SPECIES GUIDE

Common name	Scientific name	Group	Federal status	State status
American White Pelican	***Pelecanus erythrorhynchos***	bird	none	special concern
Arogos Skipper	***Atrytone arogos***	insect	none	special concern
Bald Eagle	***Haliaeetus leucocephalus***	bird	none	special concern
Black Sandshell	***Ligumia recta***	mussel	none	special concern
Blanding's Turtle	***Emydoidea blandingii***	reptile	none	threatened
Creek Heelsplitter	***Lasmigona compressa***	mussel	none	special concern
Cutleaf Ironplant	***Machaeranthera pinnatifida***	vascular plant	none	special concern
Dakota Skipper	***Hesperia dacotae***	insect	candidate	threatened
Dwarf Spike-rush	***Eleocharis parvula***	vascular plant	none	special concern
Elktoe	***Alasmidonta marginata***	mussel	none	threatened
Few-flowered Spike-rush	***Eleocharis quinqueflora***	vascular plant	none	special concern
Fluted-shell	***Lasmigona costata***	mussel	none	special concern
Forster's Tern	***Sterna forsteri***	bird	none	special concern
Franklin's Gull	***Larus pipixcan***	bird	none	special concern
Greater Prairie-chicken	***Tympanuchus cupido***	bird	none	special concern
Hair-like Beak-rush	***Rhynchospora capillacea***	vascular plant	none	threatened
Lake Sturgeon	***Acipenser fulvescens***	fish	none	special concern
Larger Water-starwort	***Callitriche heterophylla***	vascular plant	none	special concern
Leonard's Skipper	***Hesperia leonardus***	insect	none	special concern
Loggerhead Shrike	***Lanius ludovicianus***	bird	none	threatened
Marbled Godwit	***Limosa fedoa***	bird	none	special concern
Missouri Milk-vetch	***Astragalus missouriensis***	vascular plant	none	special concern
Mucket	***Actinonaias ligamentina***	mussel	none	threatened
Mudwort	***Limosella aquatica***	vascular plant	none	special concern
Ottoe Skipper	***Hesperia ottoe***	insect	none	threatened
Plains Hog-nosed Snake	***Heterodon nasicus***	reptile	none	special concern
Plains Reedgrass	***Calamagrostis montanensis***	vascular plant	none	special concern
Powesheik Skipper	***Oarisma powesheik***	insect	none	special concern
Prairie Mimosa	***Desmanthus illinoensis***	vascular plant	none	special concern
Prairie Moonwort	***Botrychium campestre***	vascular plant	none	special concern
Red Three-awn	***Aristida purpurea* var.*longiseta***	vascular plant	none	special concern
Red-Tailed Prairie Leafhopper	***Aflexia rubranura***	insect	none	special concern
Regal Fritillary	***Speyeria idalia***	insect	none	special concern
Round Pigtoe	***Pleurobema coccineum***	mussel	none	threatened
Sea Naiad	***Najas marina***	vascular plant	none	special concern
Short-eared Owl	***Asio flammeus***	bird	none	special concern
Short-pointed Umbrella-sedge	***Cyperus acuminatus***	vascular plant	none	threatened
Skipjack Herring	***Alosa chrysochloris***	fish	none	special concern
Slender Milk-vetch	***Astragalus flexuosus***	vascular plant	none	special concern
Small White Lady's-slipper	***Cypripedium candidum***	vascular plant	none	special concern
Small-leaved Pussytoes	***Antennaria parvifolia***	vascular plant	none	special concern
Soft Goldenrod	***Solidago mollis***	vascular plant	none	special concern
Spike	***Elliptio dilatata***	mussel	none	special concern

Sterile Sedge	***Carex sterilis***	vascular plant	none	threatened
Sullivant's Milkweed	***Asclepias sullivantii***	vascular plant	none	threatened
Trumpeter Swan	***Cygnus buccinator***	bird	none	threatened
Tumblegrass	***Schedonnardus paniculatus***	vascular plant	none	special concern
Water-hyssop	***Bacopa rotundifolia***	vascular plant	none	special concern
Western White Prairie-clover	***Dalea candida* var. *oligophylla***	vascular plant	none	special concern
Widgeon-grass	***Ruppia maritima***	vascular plant	none	special concern
Wilson's Phalarope	***Phalaropus tricolor***	bird	none	threatened
Yellow Prairie Violet	***Viola nuttallii***	vascular plant	none	threatened

Table 4

RARE COMMUNITY TYPES WITHIN THE DISTRICT IDENTIFIED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES

Number of Known Occurrences Within District	Community Name
7	Wet Prairie
58	Mesic Prairie
44	Hill Prairie
19	Rock Outcrop
1	Dry Prairie Woodland Complex

Table 5

WATER MANAGEMENT AND RESOURCE ISSUES IDENTIFIED BY THE UPPER MINNESOTA RIVER WATERSHED BOARD MANAGERS

Resource Issue	**Location**	**Possible Solution**	**Problem[17] Category**
Storm water impact to Big Stone Lake	Ortonville	Detention pond	Surface water
Water levels in closed basins	1. U.S. Fish & Wildlife Unit Sec. 2, T121 R 43	None given	Surface water
	2. Grifith Lake – Swift County Road No. 55	None given	Surface water
	3. Hart and Shible Lakes	None given	Surface water
	4. Swenson Lake	Installation of a controlled outlet	
	5. Horseshoe Lake	Installation of a controlled outlet	Surface water
Sediment deposition issues to Big Stone Lake	North end of Lake	None given	Surface water
	South end of Lake	Restoration of the original Whetstone River Channel	Surface water
Funding programs needed for wetland restorations/impoundments on agricultural land	District wide	Encouragement of conservation tiling and practices.	Ecological
Soil erosion on agricultural land	District wide	Increase no-till and minimum till farming along with the installation of buffer strips	Ecological

[17] See Section 8.0 for policies to address problems

Resource Issue	Location	Possible Solution	Problem[17] Category
Runoff and flooding problems	1. Swift County Ditch No. 10 2. County Ditch #30 3. Stony Run above the City of Odessa 4. County Ditch #2 5. Toelle Coulee 6. Big Stone Lake	Impoundments None given None given Installation of earthen dike system Restoration of the original Whetstone River Channel	Streams and channels Structures Streams and channels Streams and channels Surface Water
Sediment and erosion problems	1. Swift County Ditch No. 10 2. Hoss Creek near Bartlett Slough 3. County Ditch No. 7 (Fish Creek)	Long-term land retirement BMPs and a sedimentation basin Sedimentation basin below County Road No. 33	Streams and channels Streams and channels Streams and channels
Debris along stream channels	Little Minnesota River Whetstone River	Removal	Streams and channels
Flood safety	Big Stone Lake outlet	Restoration of the original Whetstone River Channel	Structures
Drainage issues – downstream and erosion impacts	1. Projects impacting Big Stone Lake 2. New drainage improvements – district wide	None given Encouragement of tiles rather than open ditches	Policy Policy
Ditch maintenance issues	District wide	Evaluate how equitable and effectively the District rules are enforced	Policy

Table 6

EVALUATION OF WATER MANAGEMENT PROBLEMS WITHIN THE UPPER MINNESOTA RIVER WATERSHED DISTRICT

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Surface Water								
Overbank flows resulting from summer rainfalls result in frequent damage to agricultural crops	Y	High	WD	Most prevalent on flat areas with little slope.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1	Y
The lack of a channel system causes ponding for sufficient time to damage agricultural crops, during the growing season	Y	High	WD	Most prevalent on flat areas with little slope. Isolated cases throughout the District.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1	Y
Water levels of closed basins causes impacts to agricultural lands and public roads.	Y	High	WD	Primary concerns include USF&W Land Sec. 2, T121 R43, Grifith Lake located in Swift County impacting County Road 55, and Hart and Shible Lakes located in Swift County.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Flooding from snowmelt and rainfall events threatens infrastructure, homes and cities	Y	High	WD	Cities of Odessa and Browns Valley are primary concerns.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1	Y
The overflow of water between subwatersheds contributes to excessive flows for others	Y	High	WD	Isolated cases within the District.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, ITW-1, DA-1, SPMP-2, SPMP-3, PIE-1	Y
Lack of maintenance on man-made drainage systems causes elevated water levels on upstream lands	Y	Low	WD	Generally case-by-case problem often related to debris accumulation, beaver dams or other factors.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-3, SPMP-2, SPMP-3, PIE-1	N
The accumulation of debris (e.g., logs and trees) in culverts and some waterways causes elevated water levels on upstream land and excessive ponding, sufficient to damage agricultural crops and causing erosion.	Y	Moderate	WD	Generally case-by-case problem often related to beavers or trees. Primary areas of concern include the Little Minnesota River.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-3, SPMP-2, SPMP-3, PIE-1	Y
Ice jams and debris accumulation within structures (i.e., bridges, culverts) increases the probability of structure failure	Y	Moderate	WD	Generally case-by-case problem often related to beavers or trees.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-3, SPMP-2, SPMP-3, PIE-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
The lack of adequate outlets for nature and man-made drainage systems causes flooding on downstream lands.	Y	High	WD	Generally case by case problems	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-3, SPMP-2, SPMP-3, PIE-1	Y
Base flow is insufficient to support the ecological needs of the stream	UN	UN		Determination of ecologically based base flow needs is yet to be completed.	Y	Cooperator, Facilitator	PI-2, PI-3, PI-4, ITW-1, DA-1, SPMP-1, SPMP-2, SPMP-3, IGCC-1	Y
Too little surface water is available for human consumptive uses (e.g., drinking water, irrigation, industrial use)	N			Surface water use within District is minor.	Y			
Hydropower operation cause excessively modifies hydrologic regime	N			No hydropower with the District.	Y			
Drainage of new lands increases downstream peak discharges, resulting in increased flood damage	UN			The increase in the drainage permits applications has an unknown or unquantified impact on downstream	Y	Cooperate, Facilitator	PI-2, PI-4, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	
Urban areas need protection from large flood events	Y	Moderate	GLP	Primarily the cities of Odessa and Browns Valley.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Farmsteads need protection from flooding	Y	High	WD		Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1	Y
Storm water runoff from urban areas causes water quality impacts to surface waters.	Y			Developing areas within District are few. Primary concerns include the City of Ortonville.	Y	Lead, Cooperator, Facilitator	PI-1, PI-4, PI-5, BSL-2, BSL-3, IGCC-1	
Continued agricultural drainage increases peak discharge and flooding	UN			The effect of agricultural drainage on flooding is complex and subject to debate. Generalizations about the effects of drainage are misleading and need to be evaluated on a site specific basis. Site specific effects are presently evaluated as required by drainage law.	Y	Cooperator, Facilitator	PI-2, PI-4, RE-1, RE-2, NMCW-3, ITW-1, FFL-1, DA-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Wetland drainage increases discharge and flooding downstream	N			Consideration for small rainfall events, where runoff remains within the channel and no storage within the wetland.	Y		W-1, SPMP-2	Y
Funding opportunities are insufficient for a comprehensive wetland restoration program.	Y	Moderate	WD	Additional funding sources and a comprehensive management plan and inventory is needed.	Y	Lead, Cooperator Facilitator	W-1,W-2	
Wetland restoration increases discharge downstream	N			False when restoration incorporates storage.	Y		W-1, SPMP-2	Y
Recreational demand for lake use is excessive	Y			Launch facilities on Big Stone Lake are periodically inadequate because of high use.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, SPMP-3, PIE-1, IGCC-1	Y
Erosion is impacting surface waters from agriculture fields.	Y	High	WD	Increase minimum and no-till farming to reduce soil erosion.	Y	Cooperator, Facilitator	SPMP-3	Y
Lake elevations are too high or too low	Y			Many closed basins within the District are a problem. Big Stone Lake elevation established in accordance with operating plan.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, ITW-1, DA-1, W-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Water quality is poorer than it should be	Y	Moderate	WD	Efforts continue to improve water quality of Big Stone Lake. Sediment is a concern in the upper portion of Big Stone Lake. Little is known relative to streams.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, ITW-1, DA-1, W-1, SPMP-2, SPMP-3, PIE-1, IGCC-1, BSL-2, BSL-3, BSL-4	Y
Water quality is insufficient to support the intended stream uses	UN	High	WD	Little is known relative to streams.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, PI-5, ITW-1, DA-1, W-1, SPMP-2, SPMP-3, PIE-1, IGCC-1, BSL-2, BSL-3, BSL-4	Y
Groundwater								
The volume of available ground water is insufficient for human use	N			Little ground water is utilized for human use within the District.	Y			
Ground water use is too great, reducing the elevation of the aquifer and reducing stream base flow	N			Little ground water is utilized for human use within the District.	Y			
Ground water use is too great, threatening water supply wells and increasing pump costs	N			Little ground water is utilized for human use within the District.	Y			
Aquifer recharge areas are at risk, affecting the recharge capability of the aquifer	UN			Location of recharge areas not entirely known.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Contamination of surficial aquifers by human activities threatens the water supply	N			None documented.	Y			
Contamination of bedrock aquifers by human activities threatens the water supply	N			None documented.	Y			
Ground water is already contaminated	UN			No documented cases.	Y	Cooperator, Facilitator		Y
Ecological								
The frequency of overbank flow to adjacent riparian areas has been sufficiently altered, placing the riparian area at risk	UN	UN		Need information about the change in frequency of bankfull discharge.	Y	Cooperator	NMCW-1, NNCW-3, NCMW-5, ITW-1, FFL-1, DA-1, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
The number of acres of various types of habitats (e.g., wetlands, grasslands, woodlands) is insufficient.	Y*	High	WD	No goals have been established for the District.	Y	Cooperator	W-1, W-2, SPMP-1, SPMP-3, PIE-1, IGCC-1	Y
Control structures prevent the movement of fish and other aquatic life upstream	N	UN	WD	Few structures within the District.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-3, NMCW-4, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Exotic species threaten the ecological integrity of streams and lakes	UN		WD	No information.	Y	None	SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Stream channel lacks habitat for fish and other aquatic life	UN	High	WD	No information.	Y	Cooperator	SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Areas of continuous habitat along natural streams and rivers is being reduced, impacting riparian ecology	UN	High	WD	No information.	Y	Cooperator	PI-4, NMCW-2, NMCW-3, NMCW-5, FFL-1, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Structures on lakes result in artificially high levels, altering the natural lake functions	N	Low	WD	More of an issue with "natural outlets".	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Streams and Channels								
Bank erosion threatens infrastructure (e.g., bridges, culverts, road crossings)	Y	Moderate	WD	Occurs on a case-by-case basis. Priority areas include Swift County Ditch No.10. BMP's and long term land retirement is needed.	Y	Lead	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Increasing stream bed elevation (i.e. stream aggradation) is increasing the frequency of flooding from small storms	UN		WD	No Streams Identified.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Decreasing stream bed elevation results in excessive bank sloughing (i.e., mass wasting)	UN		WD	No Streams Identified.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Decreasing stream bed elevation threatens infrastructure (e.g., bridge foundations, drinking water intakes)	UN		WD	No Streams Identified.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Excessive sedimentation results in increased maintenance costs	Y	High	WD	Occurs on a case-by-case basis. Priority areas include Swift County Ditch No.10, Stony Run, County Ditch No.7 (Fish Creek) and Hoss Creek near Bartlett Slough. Sedimentation Basins are needed in these subwatersheds.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Channel capacity in downstream areas is insufficient to carry the flow, resulting in excessive flooding	Y	High	WD	Occurs on a case-by-case basis.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, NMCW-4, NMCW-5, FFL-1, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	
Meandering of the stream channel threatens infrastructure and results in the loss of farmland and ecological resources	Y*	Low	WD	Occurs on a case-by-case basis.	Y	Lead, Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, NMCW-1, NMCW-2, NMCW-3, NMCW-4, NMCW-5, FFL-1, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Recreation								
Natural channels are unsuitable for recreational use (i.e. canoeing) and are insufficient for navigation	Y*	Moderate	WD	No navigation within District. Structures on lower part of river deemed as recreational barrier.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-2, NMCW-1, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Structures present a barrier to river and stream recreation (e.g., canoeing)	Y*	Moderate	WD	No navigation within District. Structures on lower part of river deemed as recreational barrier.	Y	Cooperator, Facilitator	PI-1, PI-2, PI-3, PI-4, RE-2, NMCW-1, NMCW-3, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Surface water based recreational opportunities are lacking	N	High		Big Stone Lake is the primary recreational resource.	Y	Cooperator, Facilitator		Y

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Structures								
Aging dams present a safety hazard because of the possibility of failure	N			No Structures owned by District (including Big Stone Lake Dam). District is cooperative operator. District communicates needs to State and Federal agencies.	Y			
Frequent maintenance of structures is expensive	N			Cost for annual visit for inspection is minimal.	Y			
No conclusion to the Dry Lake Dam Project.								
No emergency spillway is present on Big Stone Lake.				District needs to communicate need to State and Federal Agencies.	N	Cooperator, Facilitator	IGCC-1	
Policy								
Lack of floodplain regulations results in development within the flood plain	N			Responsibility of county.	N			
Building codes are insufficient to ensure construction above the 100-year flood elevation	N			Responsibility of county.	N			

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Clear policy is needed on drainage improvements impacting Big Stone Lake.	Y			Drain tiles should be constructed instead of open ditches. Equitable enforcement of District drainage policies is difficult.	Y		PI-1, PI-2, PI-3, PI-4, RE-1, RE-2, SPMP-1, SPMP-2, SPMP-3, PIE-1, IGCC-1	Y
Acquisition and relocation programs for flood prone structures are insufficient	N			Responsibility of county.	Y			
Benefit determinations relative to legal drainage systems are dated	N			Responsibility of county.	Y			
Assessing benefits to individuals for certain types of projects and programs is difficult	Y	Moderate		Responsibility of county.	Y	Lead	PI-5, PIE-1, IGCC-1	N
Education								
There is a general lack of understanding of drainage law	Y	High	WD	Issue is not confined to District.	Y	Cooperator	PIE-1, IGCC-1	
There is a general lack of understanding about roles and responsibilities relative to water management	Y	High	WD	Issue is not confined to District.	Y	Cooperator	PIE-1, IGCC-1	
A lack of technically based discussion prevents informed policy decisions	Y	High	WD	Issue is not confined to District.	Y	Cooperator	PIE-1, IGCC-1	
Lack of baseline water quality data for decision making	Y	High	WD	Mainly for streams not draining to Big Stone Lake.	Y	Cooperator	PIE-1, IGCC-1	

Description of the Possible Problem	Problem[1] Within District? (Y/N)	Severity[5]	Location[6]	Comment	Authority To Address? (Y/N)	District's[4] Role	Applicable[2,3] District Policy	Additional Responsible Agencies? (Y/N)
Lack of understanding and awareness of land stewardship and natural resource practices	Y	High	WD		Y	Cooperator	PIE-1, IGCC-1	
Coordination								
Coordination among those responsible for water management is lacking	Y	High	WD	Issue is not confined to District. Work is needed on Minnesota – South Dakota cooperation on lake management and improvement efforts.	Y	Cooperator	IGCC-1	
There is apprehensiveness to recognize the responsibilities of entities involved in water management	Y	High	WD	Issue is not confined to District.	Y	Cooperator	IGCC-1	
A lack of trust exists among those involved in water management	Y	High	WD	Issue is not confined to District.	Y	Cooperator	IGCC-1	
Philosophical differences among those involved in water management are great	Y	High	WD	Issue is not confined to District.	Y	Cooperator	IGCC-1	

[1] The identification of possible water management problems is intended to be comprehensive, independent from District perspective. May be considered as a problem by other resource agencies.
[2] Solutions to the problems will be pursued by the District using policies identified in Section 8 Policies of the District.
[3] Types of solution: 1) PI = project initiation or investigation; 2) PIE = public information and education; 3) RE = regulation; 4) SPMP = special purpose management program; 5) IGCC = intergovernmental cooperation and coordination; and 6) POL = policy.
[4] District roles: 1) Lead; 2) Coordinator; 3) Facilitator; and 4) None.
[5] Problem Magnitudes: 1) High; 2) Moderate; and 3) Low.
[6] Location: WD = Whole District.
* Depends on the value placed on the resources.