

The 2013-2023 Chippewa County Water Plan

~ With 2013-2018 Implementation Plan ~

*Prepared by Chippewa County Land & Resource Management with assistance from the
Chippewa County Water Plan Task Force and Midwest Community Planning, LLC.*



**Photo: Shakopee
Dam Impoundment,
Shakopee Lake**

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"Each generation has its own rendezvous with the land, for despite our fee titles and claims of ownership, we are all brief tenants on this planet. By choice, or by default, we will carve out a land legacy for our heirs. We can misuse the land and diminish the usefulness of resources, or we can create a world in which physical affluence and affluence of the spirit go hand in hand." – Stewart Udall in the forward to his 1963 book, "The Quiet Crisis", published by Holt, Rinehardt & Winston.

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Chippewa County Water Plan:

Executive Summary

The Chippewa County Water Plan follows the provisions set forth in Minnesota State Statutes 103B.314 - Contents of Water Plan.

A. Purpose of the Local Water Plan

According to Minnesota Statute 103B, each county is encouraged to develop and implement a local water management plan with the authority to:

- Prepare and adopt a local water management plan that meets the requirements of this section and section 103B.315;
- Review water and related land resources plans and official controls submitted by local units of government to assure consistency with the local water management plan; and
- Exercise any and all powers necessary to assure implementation of local water management plans.

Pursuant to the requirements of the law, the Chippewa County Water Plan:

- Covers the entire area of Chippewa County;
- Addresses water problems in the context of watershed units and groundwater systems;
- Is based upon principles of sound hydrologic management of water, effective environmental protection and efficient management;
- Is consistent with comprehensive water plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or groundwater system; and
- Will serve as a 10-year water plan (2014-2023), with a 5-year implementation plan (2014-2018). In 2018, the implementation plan will be updated.

In addition, the Water Plan will also serve as the Chippewa County Soil and Water Conservation District's (SWCD) Comprehensive District Plan. This will be passed by the SWCD's Board of Supervisors by Resolution.

B. A Summary of Chippewa County's Priority Concerns, Goals, and Objectives

Chapter Two provides a detailed assessment of the priority concerns. Based upon the Chippewa County Water Priority Concerns Scoping Document, and comments received by the various water plan stakeholders, the Water Plan Task Force identified the following priority water planning issues:

Priority Concern 1: Surface Water Quality and Quantity Impairments and Concerns

Goal 1: Remove Chippewa County's water bodies from the MPCA's 303d List of Impaired Waters by 2033.

- Address Fecal Coliform/Bacteria TMDL Implementation for Chippewa River Watershed and Hawk Creek Watershed.
- Address Turbidity TMDL Implementation for Chippewa River Watershed and Hawk Creek Watershed.

Goal 2: Have all feedlots in the county in compliance with MN Statutes 7020 standards by 2023.

- Provide assistance to producers to reduce water quality concerns related to animal agriculture.
- Encourage the development and updating of manure management plans.
- Provide education on proper setbacks from sensitive areas.
- Encourage the proper crediting of manure nutrients.

Goal 3: Promote wise use of nutrients for optimum economic benefit to the producer while minimizing impacts on the environment.

- Provide education and information on proper application rates.

Goal 4: Manage new and existing Subsurface Sewage Treatment Systems (SSTS).

- Maintain SSTS programs to protect surface and ground water quality.

Goal 5: Establish and implement a management program to ensure that existing SSTS are operated and maintained properly to prevent the impairment or degradation of surface and ground waters.

- Maintain SSTS programs to protect surface and ground water quality.

Goal 6: Reduce and minimize the effects of soil erosion and sedimentation.

- Market conservation programs and best management practices (BMP's) that reduce soil erosion and sedimentation in regard to water and wind erosion.
- Multipurpose Drainage Management Planning.
- Preserve and protect the most sensitive areas of Chippewa County.

Goal 7: Stormwater Management

- Assist and encourage non-regulated communities to develop Storm Water Management Plans.
- Encourage communities to promote or provide incentives for homeowners to implement best management practices at the lot size level.

Goal 8: Shoreland

- Protect Shoreland areas in the County.

Priority Concern 2: Groundwater Quality and Quantity Impairments and Concerns

Goal 1: Protect and improve groundwater based drinking water sources.

- Implement Best Management Practices in Wellhead Protection Areas (WPA).
- Ensure landowners and homeowners that their supply of water is safe for drinking.
- Groundwater Quantity/I.D. Recharge Areas

Priority Concern 3: Public Awareness and Plan Administration

Goal 1: Maintain a Watershed Focus

- Support watersheds in Chippewa County

Goal 2: Staff and Coordinate Stakeholder Cooperation

- Stakeholder Cooperation
- Implement the County's land use controls

Goal 3: Raise Public Awareness on Key Water Planning Issues

- Raise public awareness through education and cooperation with residents, business and schools.

C. Description of Goals, Objectives, Action Steps, and Estimated Costs

To address the priority concerns identified in the scoping process, the Chippewa County Water Plan Task Force held meetings to develop the priority concern areas. The three priority concern areas were further broken down into interrelated goals and objectives that address each of the priority concerns. Most importantly, each objective has a series of action steps designed to help achieve implementation of the identified goal.

A summary of the County's Water Plan Goals, Objectives and Action Steps is provided below. Collectively they form the Implementation Plan for the County. In addition, a summary of the estimated costs is provided. These estimated expenses include all monies spent by water plan stakeholders, including the County, watershed districts, state agencies, and landowners.

Local costs include funds spent and activities performed by Chippewa County (including items such as the County's 103E administrative costs) and the Chippewa County SWCD. The Water Plan Task Force recognizes that not all of the identified Action Items will be accomplished over the course of the Water Plan's time-frame, however, the intent is to accomplish as many implementation activities as feasible. The costs identified are also only estimates, and actual direct and/or indirect costs may be more or less than indicated. Finally, many of the Action Items will be dependent upon receiving grants.

Surface Water Quality and Quantity Initiatives

The first priority concern area focuses on addressing surface water quality and quantity issues. Goals and Objectives were developed for numerous topics, including addressing

Impaired Waters, feedlots, nutrient management, Subsurface Sewage Treatment Systems, erosion, stormwater management, and protecting shoreland. The following water plan action steps highlight Chippewa County's key implementation strategies:

- Completing a Level 3 Feedlot Inventory and bringing 20% of non-compliant feedlots into compliance by 2018.
- Providing technical and cost-share assistance with Manure Management Plans.
- Review implementing property transfer inspections for Subsurface Sewage Treatment Systems (SSTS) and developing an Operation and Maintenance Planning Program for SSTS users.
- Extensive bank stabilization projects throughout the Chippewa River and Hawk Creek Watersheds.
- Completing a Drainage Water Management Plan on Buffalo Lake/JD 18 and cost-sharing drainage Best Management Practices (BMPs), such as installing alternative tile intakes. In addition, seek funding to hire a drainage engineer who will complete a public drainage system survey, inventory and evaluation on at least the Dry Weather Creek Watershed and the Shakopee Creek Watershed (for a 3-year grant period).
- Seeking Clean Water Legacy funds to complete a terrain analysis of Chippewa County.
- Work with ag suppliers and producers on following the University of MN application rates.
- Marketing conservation programs and best management practices (BMP's) that reduce soil erosion and sedimentation in regard to water and wind erosion.
- Apply for a grant with joint partners along the MN River Valley to preserve and protect approximately 200 acres of Granite Rock Outcrops in Chippewa County and their associated wetlands, plus improve water quality and aquatic habitat within the Minnesota River Valley.
- Seek funds to implement urban best management practice demonstration sites for stormwater throughout the municipalities in Chippewa County. In addition, offer incentives to homeowners for on-lot infiltration practices, including reduced lot grading, rain gardens or rain barrels, which control runoff at its source.
- Inventory/Assess status of required 50' buffer in shoreland areas and offer existing programs to help become compliant.

The various action steps identified to address the first priority concern area of surface water quality and quantity improvements in Chippewa County are estimated to have an overall 5-year cost of \$4,756,050. This amount represents a vast amount of staff time and money from all of Chippewa County's water plan stakeholders. In addition, many of the implementation activities will only be accomplished if grant funding becomes available.

Groundwater Quality and Quantity Initiatives

The second priority concern area is aimed at protecting and improving groundwater. Three objectives were developed to properly address Wellhead Protection Areas (WPAs), safe drinking water, and groundwater recharge (groundwater quantity). The key implementation steps include the following groundwater initiatives:

- Participating with Wellhead Protection Plans in the development and implementation stages, including inventorying abandoned wells in Wellhead Protection Areas (WPAs).
- Incorporating the County's sensitive groundwater recharge areas map into the local land use decision making process.
- Creating a gift certificate (not to exceed \$50) for free well testing for new parents that get their drinking water from private wells and offer free annual nitrate water testing through the Minnesota Department of Agriculture water testing clinics.
- Establishing suitable pharmaceutical collection spots.
- Pursue funding through a CWF to establish a Water Conservation/Drought Contingency Plan.
- Purchase rain barrels and offer them at a reduced rate to urban residents promoting water conservation.

The various action steps identified to address the second priority concern area of groundwater quality and quantity issues in Chippewa County are estimated to have an overall 5-year cost of \$66,700. Most of this amount is estimated to come from local sources, including direct and indirect (in-kind) expenses. This amount does not include, however, grant dollars awarded to address the issues and topics identified in the various action steps.

Public Awareness and Plan Administration Initiatives

The third priority concern area is aimed at effectively raising public awareness on key water planning issues and properly administering the County's Water Plan. Three specific goals were included to maintain a watershed focus, staff and coordinate stakeholder cooperation,

and to raise public awareness on key water planning issues. Key implementation steps include the following:

- Support watershed planning, monitoring and implementation activities by providing financial (in-kind) and technical assistance by attending and participating in the Local Work Group meetings, monthly meetings and annual meetings.
- Annually review monitoring data with the watersheds and implementation accomplishments to continue coordinating future initiatives. Participate and be informed via the watershed restoration and protection strategy (led by MPCA) and be an active participant as the watershed transitions to Comprehensive Watershed Management planning.
- Participate in training on how to use LIDAR based data to target BMPs to the most critical landscapes and improve the competitiveness of conservation grant proposal applications.
- Focus education and outreach efforts on two to three water planning issues a year. Integrate those efforts with the watershed projects educational goals. Identify the priority issues in spring each year.
- Hold five Problem Material Collections. Items to be collected are tires, appliances, electronics, fluorescent bulbs and other mercury items, cell phones and rechargeable batteries.

The various action steps identified to address the third priority concern area of effectively administering the Water Plan in Chippewa County are estimated to have an overall 5-year cost of \$1,040,950. This averages to approximately \$203,190 annually over the next five years.

D. Summary of Estimated Costs

The estimated costs for the three priority concern areas and their corresponding action steps are summarized below in Table 1. The initiatives are estimated to cost approximately \$7,839,200 over the next five years. This averages to approximately \$1,567,840 annually to address all of Chippewa County's water resource concerns.

**Table 1:
Summary of Chippewa County’s Water Plan
5-Year Estimated Costs***

	<i>Cost Estimates</i>
Priority Concern Area 1: Surface Water Quality/Quantity	\$4,756,050
Priority Concern Area 2: Groundwater Quality/Quantity	\$66,700
Priority Concern Area 3: Public Awareness/Plan Administration	\$1,040,950
	<i>5-Year Totals:</i> \$5,863,700
	<i>Average Annual Costs:</i> \$1,172,740

***Note:** Expenses may seem high but they actually represent the numerous stakeholders involved and a collaboration of their corresponding activities and budgets.

E. Relationship to other Plans

The Chippewa County Water Plan Task Force includes a diverse group of people representing a number of key water plan stakeholders. Assistance from the Task Force in the planning process, along with information requested from Local Governmental Units, helped to ensure the Water Plan, and its corresponding Goals, Objectives and Action Steps, were developed to be consistent with existing plans and official land use controls. As a result, the updated Chippewa County Water Plan is believed to be consistent with the plans and official controls of the other pertinent local, State and regional plans and controls. In conclusion, there are no recommended amendments to other plans and official controls to achieve consistency with this Water Plan.

CHAPTER ONE:

Chippewa County Assessment of Priority Concerns

Priority Concern 1. Surface Water Quality and Quantity Impairments and Concerns

Surface waters of Minnesota are managed under the doctrine of riparian rights. This means that riverbank landowners have equal rights to reasonable use of waters that border their property. The Minnesota Department of Natural Resources (DNR) Division of Waters has the authority to issue permits for water use, and to limit withdrawals of surface water and groundwater in accordance with the public interest.

A. Watershed Data

The Federal Clean Water Act requires states to adopt water quality standards. A water body is considered “impaired” or polluted if it fails to meet these standards. The Act requires the state to conduct a Total Maximum Daily Load (TMDL) study to identify point and non-point sources of each of these pollutants. MPCA and other agencies are working to reduce impairments in these waters.

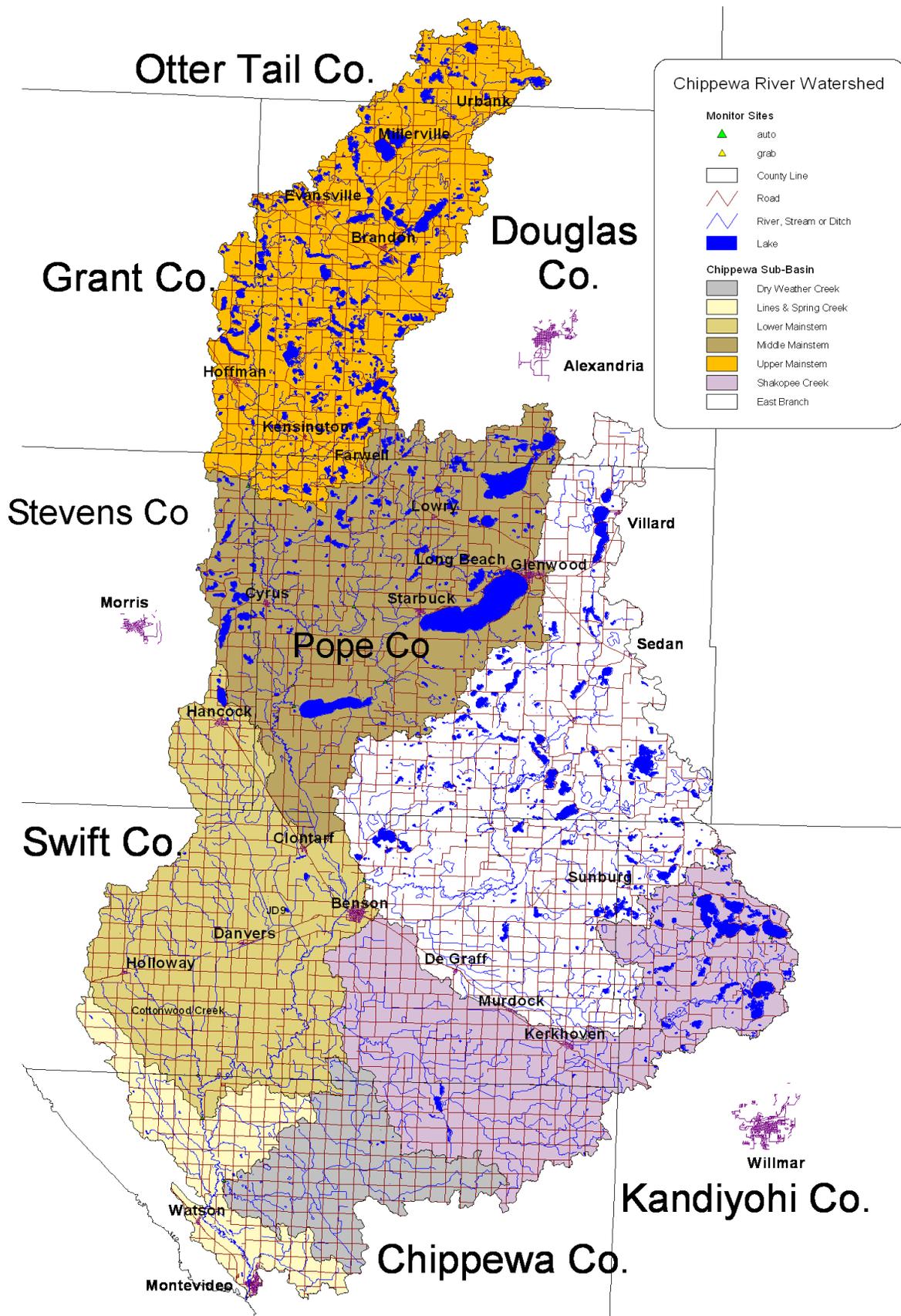
Chippewa River Watershed Project:

The Chippewa River Watershed Project began collecting surface water samples in 1998 and results were submitted to the Minnesota Pollution Control Agency (MPCA). Since then, reaches in the watershed were listed on the 303(d) Impaired Waters List for not meeting water quality standards for Fecal coliform bacteria and turbidity.

The Implementation Plan to address both the Chippewa River Fecal Coliform and Turbidity TMDL was developed in the spring of 2011. The TMDL Advisory Committee and the CRWP Local Work Group assisted with the development of the implementation plan.

Watershed Characteristics ~

The Chippewa River is one of 13 major tributaries of the Minnesota River. The Chippewa River Watershed drains a 2,080 square mile, 1,331,200 acre basin. The counties in this basin include portions of Otter Tail, Grant, Douglas, Stevens, Pope, Swift, Kandiyohi, Chippewa and a very small portion of Stearns. The source of the Chippewa River is in southern Otter Tail County near the Fish Lake area, from where it flows 130 miles south to its mouth in the Minnesota River at Montevideo, Chippewa County. The Chippewa’s average gradient is 4.5 feet per mile. The annual mean flow at the mouth is 200 cubic feet per second, although it has been as high as 14,400 cubic feet per second at record flood stage in 1997 (USGS 2010). The main tributaries are: the Little Chippewa River, East Branch Chippewa, and Shakopee Creek. Together, these tributaries contribute nearly half the flow of the main stem. The total distance of the stream network is 2,091 miles of which 1,567 miles are intermittent streams and 525 miles are perennial streams.



Chippewa River Sub-Basins

The Chippewa River Watershed is largely rural. A population base of roughly 41,000 residents make up the demographics of the watershed. Approximately 20,000 of the residents reside in the 25 cities, towns, and hamlets scattered across the watershed with the remainder residents in rural homesteads. According to the U.S. Census Bureau's Annual Estimates of the Population for incorporated places in Minnesota, April 1, 2000 to July 1, 2005, the population trend for the counties in the watershed is on the decline.

The major land use of the watershed is agricultural at 73.5 percent or approximately 980,000 acres. Major crops include corn, soybeans, small grains and sugar beets. Grasslands, including pastures and acres enrolled in conservation programs are roughly another 11 percent of the land use.

A wide variety of recreational activities take place in the watershed. Fishing, canoeing, snowmobiling, bird watching, nature walks, camping and cross country skiing, along with duck, goose, deer and pheasant hunting are all very popular activities throughout the watershed. The Ordway Prairie, Inspiration Peak, Terrace Mill Pond, Glacial Lakes Regional Trail, a state canoe and boat route and three State Parks all combine to make the Chippewa River Watershed landscape a unique and diverse area.

Impairments ~

The Chippewa River Watershed has been monitored by the Chippewa River Watershed Project since 1998. Previous to that, the Minnesota Pollution Control Agency and the MN Department of Natural Resources had limited monitoring sites established and collected water samples for analysis. All water samples were collected by trained staff and analyzed at state certified laboratories. The data was submitted to the MPCA and used for determination of impairment.

- Fecal coliform Impairment
The 1994 and 2006 Minnesota TMDL Clean Water Act Section 303(d) lists identified one and eight impaired reaches respectively for the Chippewa River Watershed. These reaches were listed as impaired for failure to meet their swimming designated beneficial uses due to excessive Fecal coliform concentrations. These reaches are identified in the following table.
- Turbidity Impairment
The 2006 and 2010 Minnesota TMDL Clean Water Act Section 303(d) lists identified seven and two impaired reaches respectively for the Chippewa River Watershed. These reaches were listed as impaired for failure to meet the turbidity standard required to support aquatic life and recreation. These reaches are also identified in the following table and map.

Table: CRWP Fecal Coliform and Turbidity Impaired Reaches in Chippewa County

Reach name	Reach Description ['from' - 'to']	Yr listed	River ID#	Affected designated use	Pollutant or stressor	TMDL Target start	TMDL Target completion
Chippewa River	Watson Sag to Minnesota R	2002	07020005-501	Aquatic Life	Turbidity	2004	2012
Chippewa River	Watson Sag to Minnesota R	2002	07020005-501	Aquatic Recreation	Fecal Coliform	2004	2012
Chippewa River	Dry Weather Cr to Watson Sag	2012	07020005-502	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	2009	2013
Chippewa River	Dry Weather Cr to Watson Sag	2012	07020005-502	Aquatic Life	Fishes Bioassessments	2009	2013
Chippewa River	Shakopee Cr to Cottonwood Cr	2012	07020005-507	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	2009	2013
Chippewa River	Shakopee Cr to Cottonwood Cr	2012	07020005-507	Aquatic Life	Turbidity	2009	2012
Chippewa River	Cottonwood Cr to Dry Weather Cr	2012	07020005-508	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	2009	2013
Chippewa River	Cottonwood Cr to Dry Weather Cr	2006	07020005-508	Aquatic Life	Turbidity	2008	2012
Chippewa River	Cottonwood Cr to Dry Weather Cr	2006	07020005-508	Aquatic Recreation	Fecal Coliform	2008	2012
Dry Weather Creek	Headwaters to Chippewa R	2006	07020005-509	Aquatic Recreation	Fecal Coliform	2006	2012
Shakopee Creek	Swan Lk to Shakopee Lk	2012	07020005-557	Aquatic Recreation	Escherichia coli	2009	2012
Shakopee Creek	Shakopee Lk to Chippewa R	2006	07020005-559	Aquatic Life	Fishes Bioassessments	2009	2013
Shakopee Creek	Shakopee Lk to Chippewa R	2006	07020005-559	Aquatic Recreation	Fecal Coliform	2009	2013
Shakopee Creek	Shakopee Lk to Chippewa R	2006	07020005-559	Aquatic Life	Turbidity	2008	2012

~ Lists compiled from EPA Website.

Map: CRWP Fecal Coliform and Turbidity Impaired Reaches in Chippewa County



Fecal Coliform Source Assessment ~

The assessment of Fecal coliform sources within a watershed and establishing the cause-effect relationship between the sources, the transport mechanisms, and the subsequent stream loading is complex and difficult to quantify. The survival rate of fecal coliform in terrestrial and aquatic environments is poorly understood and further exacerbates efforts to track sources.

Data at several Chippewa sub-watershed sites shows a strong positive correlation between precipitation, and Fecal coliform bacteria concentrations. When storms occur, weather-driven sources, e.g. feedlot runoff, overgrazed pasture runoff, manure applied fields, and urban stormwater overshadow continuous sources. In drought or low-flow conditions, continuous sources, e.g. cattle in streams, failing individual sewage treatment systems, unsewered communities, and wastewater treatment facilities dominate. Besides precipitation and flow, factors such as temperature, livestock management practices, wildlife activities, Fecal deposit age, and channel and bank storage also affect bacterial concentrations in runoff (Baxter-Potter and Gilliland, 1988).

Despite the complexity of the relationship between sources and in-stream concentrations of Fecal coliform, the following can be considered major source categories: wastewater treatment facilities, unsewered communities, urban and rural stormwater, livestock facilities with NPDES permits, NonCAFO livestock facilities and manure, subsurface sewage treatment systems, and background loads.

Turbidity Source Assessment ~

Identifying the sources of turbidity in a stream system is difficult because of the complex nature of stream systems and their interaction with the watershed. However, a general sense of the timing, magnitude and sources of TSS can be developed using available data to provide a weight of evidence for the sources.

When assessing sources of turbidity and ultimately TSS in streams, the first step is to determine the relative proportions of external and internal sources. External sources include those sources outside of the stream channel and include point sources, field and gully erosion, livestock grazing, runoff from construction sites, lakeshore development, and urban/impervious surface runoff. Internal sources of sediment include sediment resuspension, bank erosion and 15 failure, and in-channel algal production. A potential source assessment was developed for each of the major subwatersheds in the Chippewa River watershed and included as part of the Turbidity TMDL Report.

Fecal coliform Bacteria Measurable Water Quality Goals ~

The TMDL report was based on Minn. R. ch. 7050.0222 subp. 4 and 5, Fecal coliform water quality standard for Class 2B and 2C waters that states Fecal coliforms shall not exceed 200 organisms per 100 milliliters as a geometric mean of not less than five samples in any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 2,000 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

The MPCA has replaced the Fecal coliform standard with an *E. coli* (*Escherichia coli*) standard based on a geometric mean EPA criterion of 126 *E. coli* colony forming units (cfu) per 100ml. *E. coli* has been determined by EPA to be the preferred indicator of the potential presence of waterborne pathogens. The *E. coli* standard is in Minnesota rule, and there is a considerable amount of *E. coli* data available. For future assessment purposes, only *E. coli* measurements will be used. This change has been made because of the variability in the *E. coli*/Fecal coliform statistical relationship and to emphasize that current and future monitoring for aquatic recreations use support should be based on the newly adopted *E. coli* standard. Therefore, to adapt the Fecal coliform TMDL allocations based on the new *E. coli* standard requires a multiplication factor of 0.63.

Data over the full 10-year period are aggregated by individual month, as mentioned above (e.g., all April values for all 10 years, all May values, etc.). A minimum of five values for each month is ideal, but is not always necessary to make a determination. If the geometric mean of the aggregated monthly values for one or more months exceeds 126 organisms per 100 ml, that reach is placed on the 305(b) not supporting list and on the 303(d) impaired list. Also, a waterbody is considered impaired if more than 10 percent of individual values over the 10-year period (independent of month) exceed 1260 organisms per 100 ml This assessment methodology more closely approximates the five-samples-per-month requirement of the standard while recognizing typical sampling frequencies, which rarely provide five samples in a single month and usually only one.

Turbidity Measurable Water Quality Goals ~

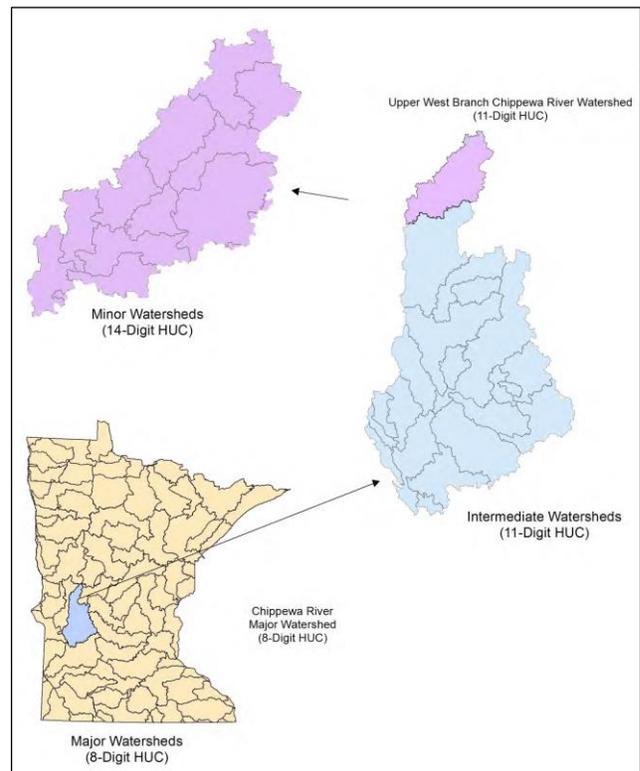
The applicable water body classifications and water quality standards are specified in Minnesota Rules Chapter 7050. Minnesota Rules Chapter 7050.0470 lists water body classifications and Chapter 7050.0222 lists applicable water quality standards for all waters with a given use classification. However, none of the reaches in this TMDL are specifically classified 16 and therefore fall under Minnesota Rules Chapter 7050.0430 which says that all water bodies have a 2B classification unless they are otherwise specifically classified.

Turbidity assessment protocol includes pooling of data over a ten-year period and requires a minimum of 20 independent observations. The surface water standard for each of the nine impaired reaches covered in this report is 25 nephelometric turbidity units (NTUs). For assessment purposes, a stream is listed as impaired if at least three observations and 10% of the observations exceed 25 NTUs. Transparency and total suspended solids samples may also be used as a surrogate for the turbidity standard. Transparency measurements below 20 cm are considered violations of the turbidity standard. The total suspended solid turbidity surrogate value for the Chippewa River Watershed Project is 54 mg/L. If there are two or more parameters observed in a single day, the hierarchy of consideration is turbidity, then transparency, then total suspended solids.

Diagram of Chippewa River Watershed intensive watershed monitoring design.

The outlet of the major watershed (HUC-8) is sampled for biology, water chemistry, and fish contaminants to allow for the assessment of aquatic life, aquatic recreation and aquatic consumption use-support. Each intermediate watershed (HUC-11) outlet is sampled for biology and water chemistry for the assessment of aquatic life and aquatic recreation use-support. Lastly, most minor watersheds (HUC-14) (typically 10-20 square miles) are sampled for biology to assess for aquatic life use-support. Chemistry monitoring is performed by MPCA staff and by local partners funded by Surface Water Assessment Grants (SWAGs) while biological monitoring is performed by MPCA staff.

The second step of the intensive watershed monitoring effort consists of follow-up monitoring at all intermediate watersheds determined to have impaired waters. This follow-up monitoring is designed to collect the information needed to initiate the stressor identification process in order to identify the source(s) and cause(s) of impairment required for TMDL development and implementation.



Additional assessments currently being conducted by the Chippewa River Watershed Project include the following:

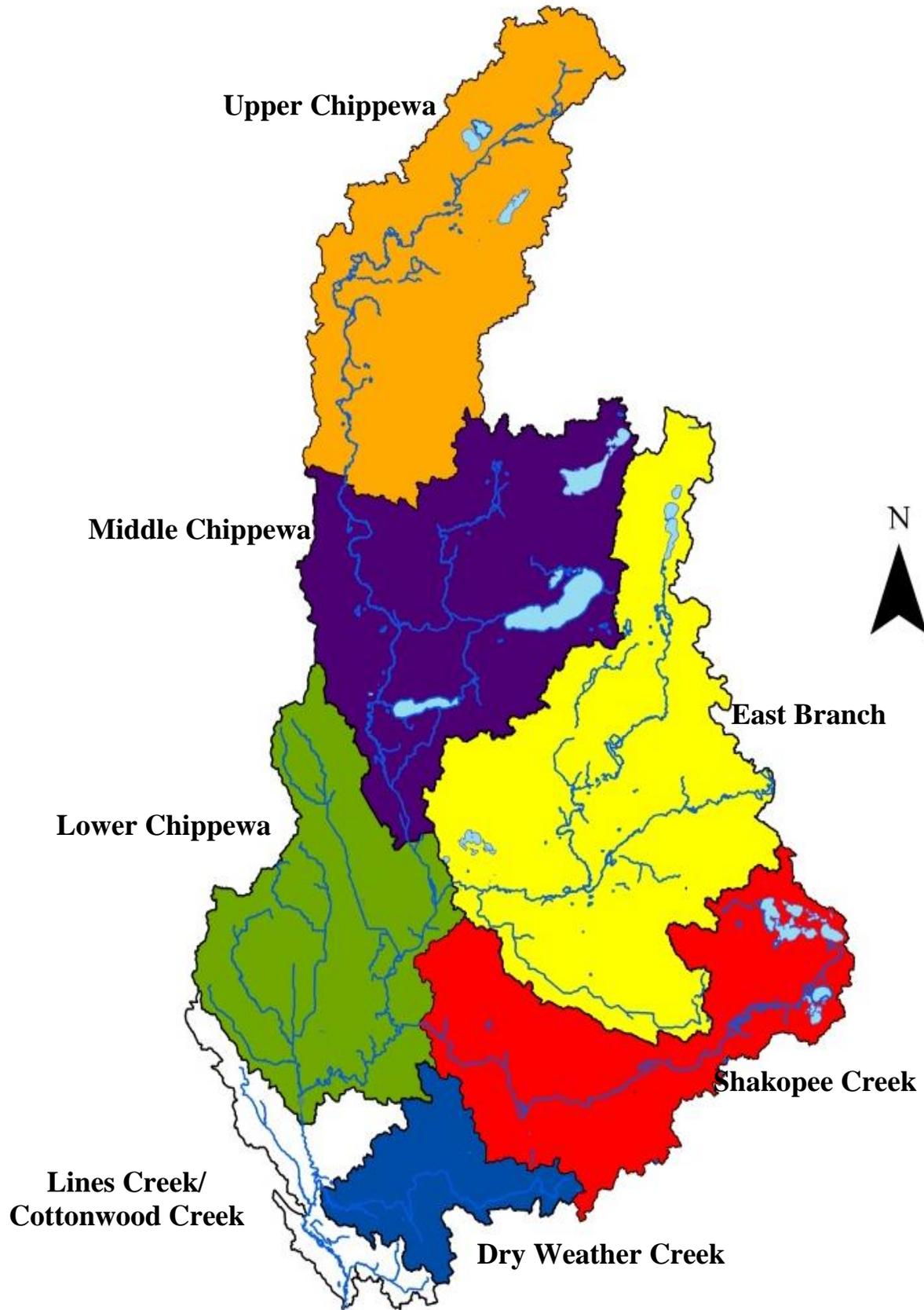
- Major Watershed Restoration and Protection Strategy – the CRWP is completing a Stressor Identification report for the 22 biological impairments. Priority Zone Management areas will be established utilizing the results of the Stressor ID, the 15 years of monitoring data, land use data, and stakeholder input.
- Chippewa 10% Project – the CRWP, in partnership with the Land Stewardship Project, is conducting intensive one-on-one landowners contacts. The purpose is to provide tools for landowners to diversify key parts of the watershed with a goal of increasing perennial landuse by 10%. One priority area is in the Shakopee subbasin, part of which is located in northeastern Chippewa County. A network of landowners is being established who are conducting nitrogen stalk testing to improve nitrogen management.
- Civic Engagement – a major component of the above 2 projects is connecting watershed residents and partners through workshops, one-on-one meetings, and presentations.

- Chippewa River Watershed Pollutant Load Monitoring – the CRWP continues to collect water quality/quantity data as part of the MPCA’s pollutant load monitoring network.

Known issues:

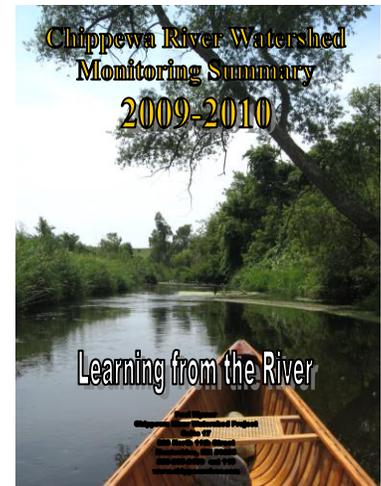
- ~25% of the Chippewa River’s Nitrogen pollution comes from Shakopee Creek downstream of Shakopee Lake.
- ~90% of the Lower Chippewa’s TSS pollution comes from the region adjacent to the Chippewa R. downstream of Benson.
- Shakopee Lake is a serious source of TSS, this 260 acre lake produced 5% of all Chippewa River TSS from 2008-2010. If the Shakopee Lake (Buffalo Lake) problem could be solved it would be the single most significant water quality improvement project for the Chippewa River in 20 years.
- The impacts of drainage are increasingly seen on stream and ditch banks, more water storage and infiltration would be beneficial almost anywhere.
- E-coli exceeds the standard almost everywhere, we need to intercept feces from septics and livestock before they hit the river.

Chippewa River Sub-Watersheds



Chippewa River Watershed Monitoring Summary 2009-2010

The following data (pages 11-27) is from the *Chippewa River Watershed Monitoring Summary 2009-2010:- Learning from the River* that was put out by Paul Wymar, Chippewa River Watershed Project. More information can be found on their web site at www.chippewariver.com.



Overview The 2009-2010 seasons saw the most intensive period of water quality monitoring ever conducted by the Chippewa River Watershed Project. The increased activity has pushed the knowledge of Chippewa River water quality to new levels and will be incredibly useful as the watershed moves forward with plans to identify what and where are the stressors to water quality and aquatic life.

During 2009 and 2010 CRWP maintained 29 intensive chemical monitoring sites, 12 of which had automated flow tracking equipment monitoring river stage levels every 15 minutes. The 250 transparency transect sites received special attention over these last two years. Rather than monitoring them three times a year CRWP bumped the number of visits per year up to ten and added Dissolved Oxygen, pH, Conductivity and Temperature to the transect field measurements. CRWP staff added a randomized stream bank survey to its list of activities surveying 71 sections of river for stream bank erosion levels. The Minnesota Pollution Control Agency also did significant monitoring in the watershed. They surveyed 74 sites for fish and aquatic insects.

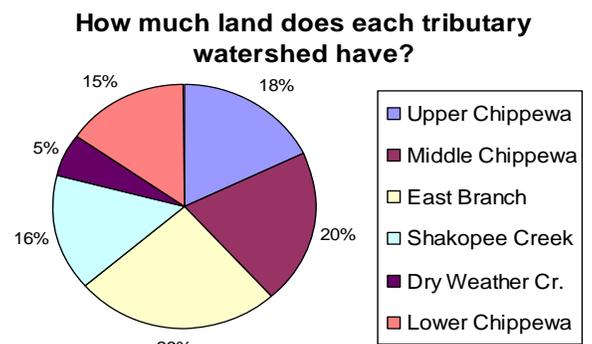
Flow Weighted Mean

A Flow Weighted Mean is a statistical way of expressing a monitoring seasons overall pollution concentration. It is expressed in milligrams per liter (mg/L). It statistically represents the concentration of pollutants in the water that one would measure if one was able to catch all the water that flows out of the river in a tank, mix it up and then take a sample from this tank.

A flow weighted mean is a useful way to compare pollution from one year to another because it removes some of the variation caused by weather differences from year to year. All concentration values represented in this report are flow weighted means.

Chippewa Watershed Land Use

Land Use	Acres	% of Total
Row Crop Agriculture	980,021	73.50%
Grassland (includes Pasture)	148,575	11.14%
Forest	74,798	5.38%
Water	71,668	5.37%
Wetlands	37,042	2.78%
Urban or Residential	23,565	1.77%
Gravel pits or exposed	724	0.05%
Unclassified	47	0.00%
TOTAL	1,333,440	100.00%



Precipitation & Flow

Precipitation:

2009 and 2010 were very different years in regard to rainfall. 2009 experienced significantly less rainfall than 2010. As can be seen in the adjacent chart, rain totals ranged widely across the watershed in both years.

Rain events before crop canopy closure in late June tend to result in increased field erosion and significantly higher amounts of water entering the river system. 2009 experienced fewer of these kinds of events than 2010.

Flow:

In hydrological terms 2009 and 2010 were very different years. 2009 experienced significantly less rainfall. Both years saw a very high spring flood melt. This accounted for 2009 showing a high annual yield for water even though it had less rain. The addition of the extra rainfall in 2010 caused the release of about 150,000 extra acre feet of water and pushed 2010 up to the second wettest year of the last 12.

In the hydrographs one can observe how the Chippewa responded differently to each year's rain pattern.

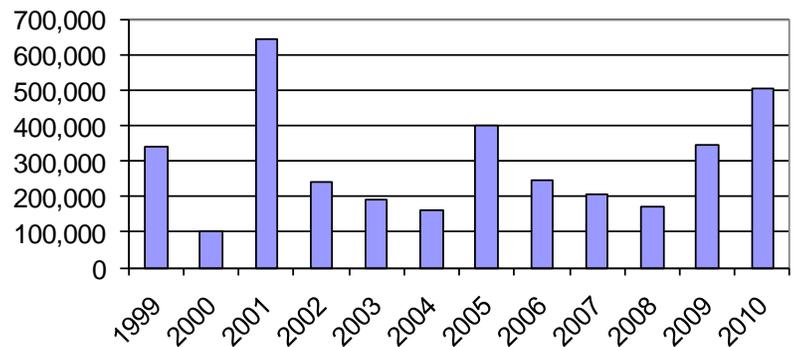
In 2009 the river did not show much of a response to the small nor the large rain storms. This was probably a result of the soils being sufficiently low enough in moisture that they soaked up what moisture came down as rain. Add to this that the big rains came later in July over thirsty established vegetation, it becomes clear why little of this rain made its way to the river.

In 2010, the many early season rains kept the soil moisture high, as a result, every time it rained we saw the river come up. This continued into the fall, even as crops matured. This is easily seen in the hydrographs to the right.

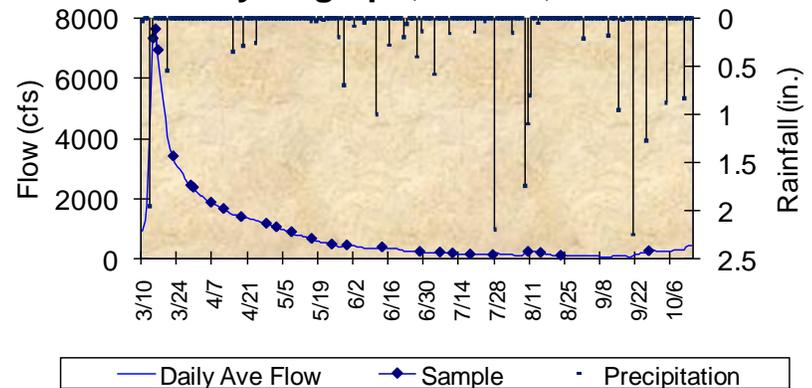
2009-2010 Annual Rainfall (inches)

	Montevideo	Benson	Glenwood	Brandon	Morris	Willmar
2009	23.17	18.38	21.79	14.85	21.95	17.9
2010	28.74	21.92	27.63	24.34	30.04	24.61

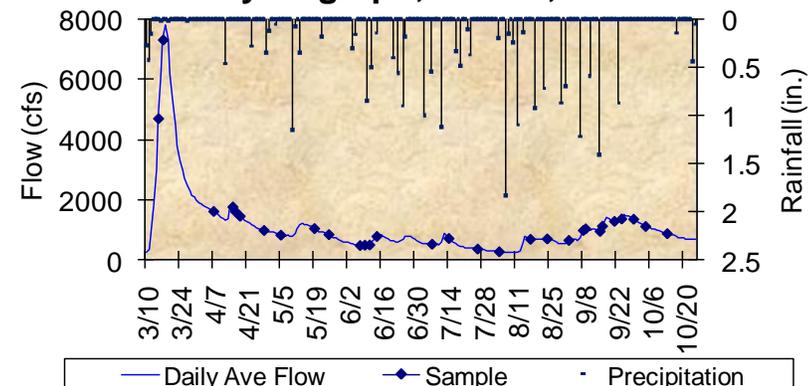
Chippewa Annual Water Volume (acre feet/year)



2009 Hydrograph, Site 18, HW40



2010 Hydrograph, Site 18, HW40



Transect Surveys: Transparency

In 2009 and 2010 CRWP increased its number of site visits from three a year to ten a year. In addition to monitoring transparency and bank buffer width CRWP added Dissolved Oxygen, pH, Conductivity and Temperature to the transect field measurements. This major increase in intensity was brought about through the support of the MPCA.

CRWP transparency data has been very useful in pinpointing where suspended solids and turbidity problems begin, end or are not an issue. This information can be used to convince landowners and resource managers to take action in those areas where we see the problem. The information from the transects has shown that water quality problems are not everywhere. There are many parts of the Chippewa Watershed that have very good water quality when it comes to transparency. These areas should be protected.

The data presented below is an assemblage of the last five years of monitoring. Generally, transparency is highest in the upstream reaches of a tributary. Sometimes the water maintains its high level of transparency for the full length of a tributary. In some cases the water's transparency drops. Once the transparency had dropped it is rare for it to recover. As water flows downstream it has more opportunities to pick up pollutants, thus lower stream stretches tend to have more polluted water and lower transparency.

Low Transparency during high flows is expected. The continuation of low transparency during low flow periods is concerning. The constant low transparency levels suggest that sediment and nutrient levels in the Chippewa are a serious issue throughout the watershed. Low transparency during low flows has serious negative consequences for aquatic life and aesthetic enjoyment of the river.

Sites where the transparency level drops to 20 cm or below more than 10% of the time can be listed as impaired by the US EPA (given at least 20 sampling events). In 2009 and 2010, 17.4% of the measurements exceeded the standard.

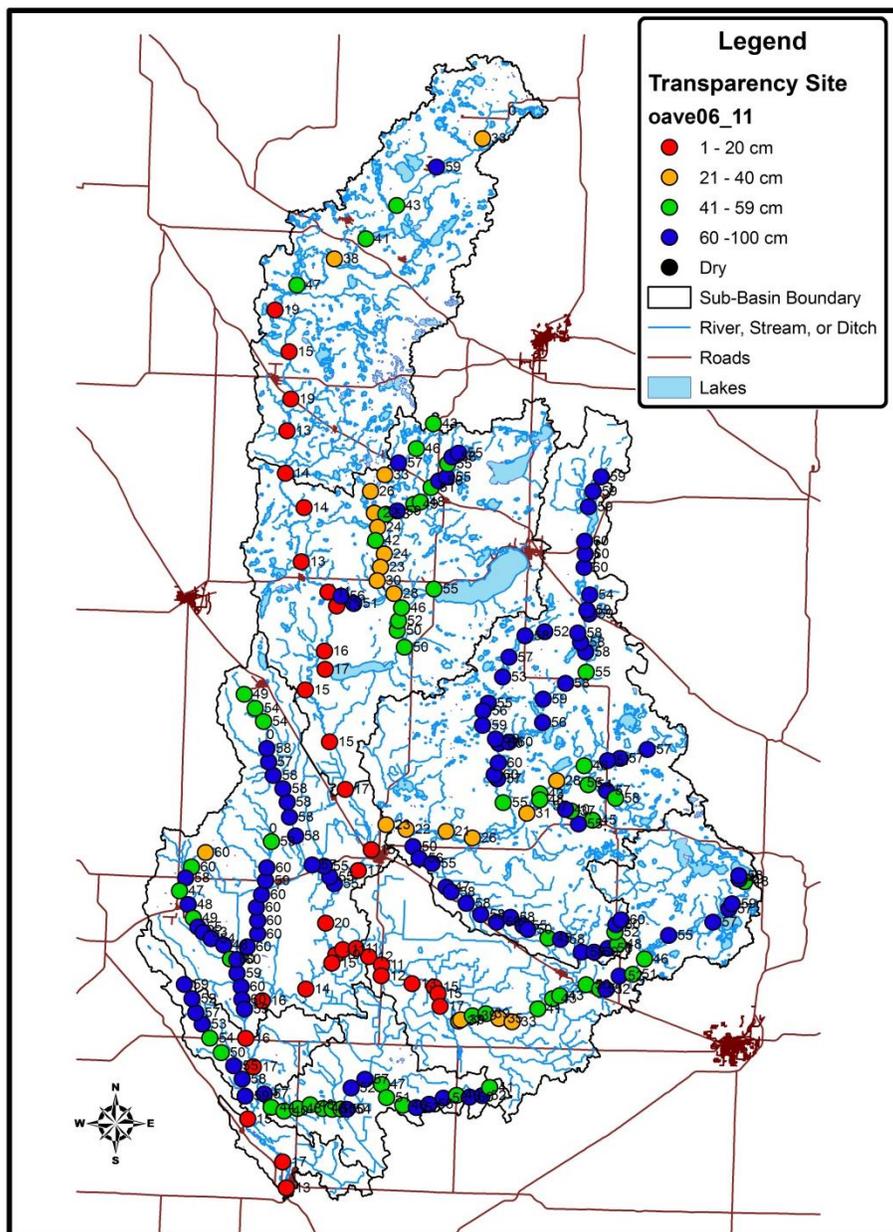
Basins that experienced problematic Transparency in 2009-2010 were the Lower Manstem, the Middle Mainstem, The Upper Chippewa from Peterson Lake down, Downstream of Shakopee Lake on Shakopee Creek, the Little Chippewa before it enters Outlet Creek and the lower portions of the East Branch.

Areas that experienced fair to good transparency included the Northern East Branch, the Upper Chippewa, JD19 (Swift County), Cottonwood Creek, and JD9 in Swift County. Dry Weather Creek also saw an improvement in transparency over previous years.

What is Transparency?

Transparency is a measurement of the clarity of stream water: how much sediment, algae, and other materials are suspended in the water. It is measured with a transparency tube, a clear 100 cm-long tube with a colored disk at the bottom for measuring the depth at which the disk is visible.

2006-2010 Transparency Transect Survey



Transect Surveys: Dissolved Oxygen

In 2009 and 2010 CRWP increased its number of site visits from three a year to ten a year. To these monitoring visits Dissolved Oxygen (DO) field measurements were added.

CRWP DO data has been very useful in identifying areas where DO is or is not an issue. This information combined with DO measurements taken at the automated sites can be used to identify the stressors causing difficulties for aquatic species.

The information from the transects has shown that water quality problems are not everywhere. There are many parts of the Chippewa Watershed that have very good water quality when it comes to DO. These areas should be protected.

The data presented below is an assemblage of the last two years of monitoring. The map presents a color code for each site representing the percentage of samples that were below the MN State Standard of 5 mg/L.

Some low DO is natural and expected. In the southwest part of the watershed Lines Creek passes through a number of wetlands and low lying areas. Slow moving and stagnant water tend to lose their DO. Headwater regions of small streams tend to have lower DO due to their low and often short-lived flows. In some cases changes to the watershed have caused the water levels to run low or even dry up in later parts of the year. These developments have created the conditions for low DO. Persistent low DO levels have negative consequences for aquatic life and aesthetic enjoyment of the river.

On the positive side, locations where the DO was never observed below the 5mg/L represented 52% of the sites. These sites represent the vast majority of mainstem sites and the lower ends of the major tributaries.

More concerning were the 35% of the sites where DO was observed to be below 5mg/L over 10% of the time. These low DO cases tended to cluster together suggesting a regional issue. The upper reaches of Cottonwood Creek, Lines creek, Pope CD15, and the Little Chippewa River deserve further attention to address their low DO levels.

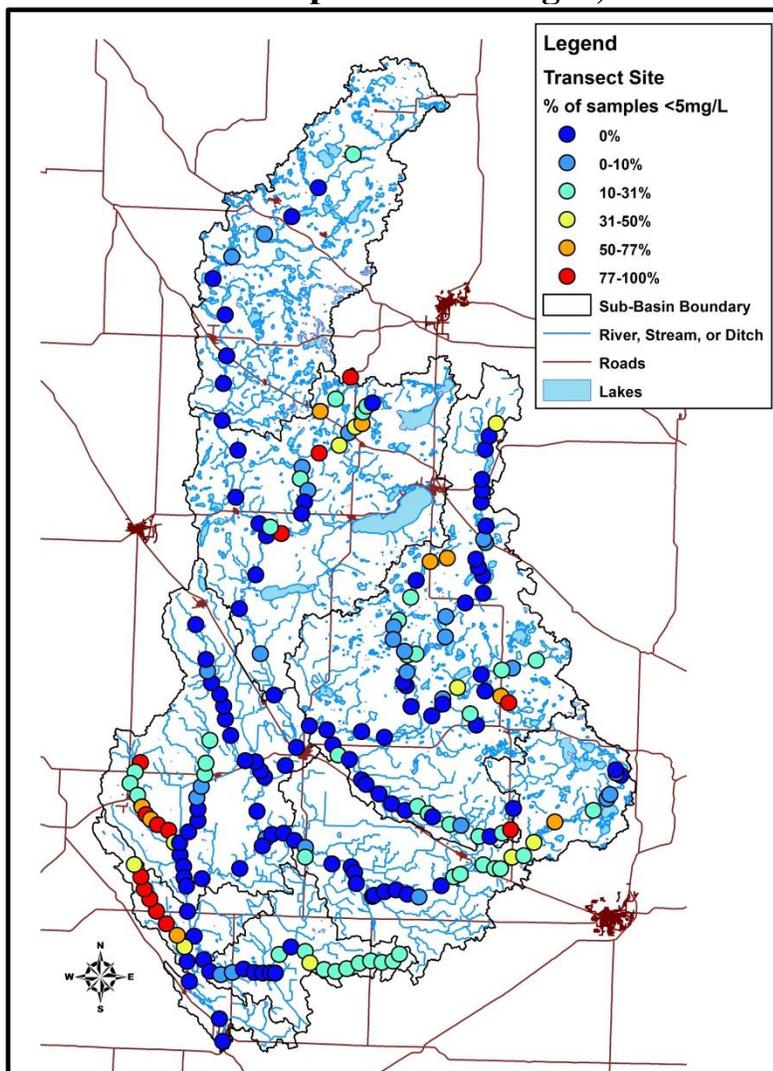
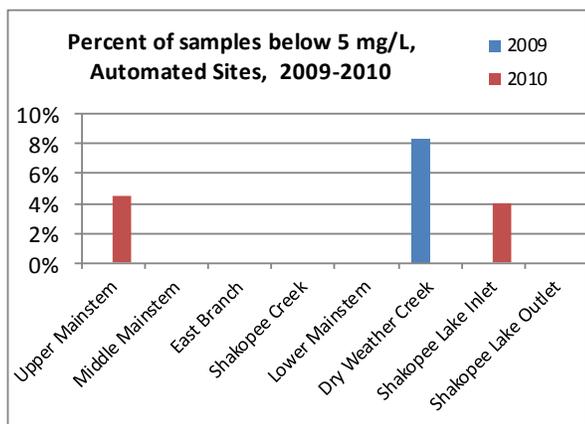
What is Dissolved Oxygen?

Dissolved oxygen is one of the best indicators of the health of a water ecosystem. Dissolved oxygen can range from 0-18 parts per million (ppm), but most natural water systems require 5-6 parts per million to support a diverse population.

Oxygen enters the water by direct absorption from the atmosphere or by plant photosynthesis. The oxygen is used by plants and animals for respiration and by the aerobic bacteria which consume oxygen during the process of decomposition. When organic matter such as animal waste or improperly treated wastewater enters a body of water, algae growth increases and the dissolved oxygen levels decrease as the plant material dies off and is decomposed through the action of the aerobic bacteria. A decrease in the dissolved oxygen levels is usually an indication of an influx of some type of organic pollutant.

<Science Junction, NC State University>

Percent of DO Samples below 5 mg/L, 2009-2010



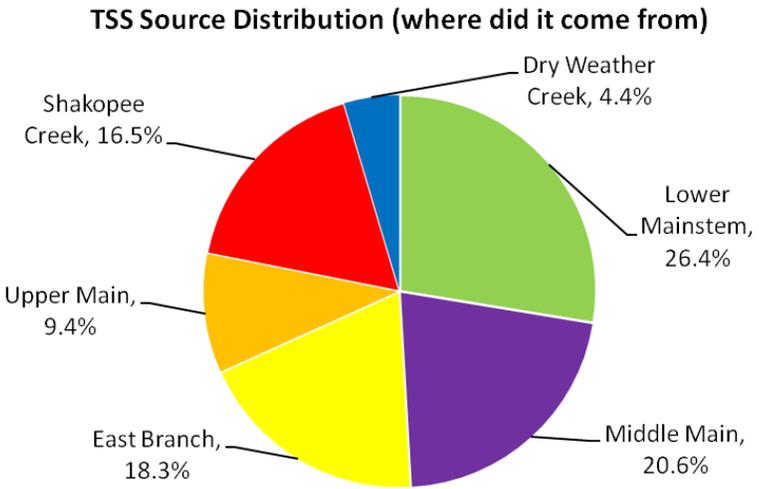
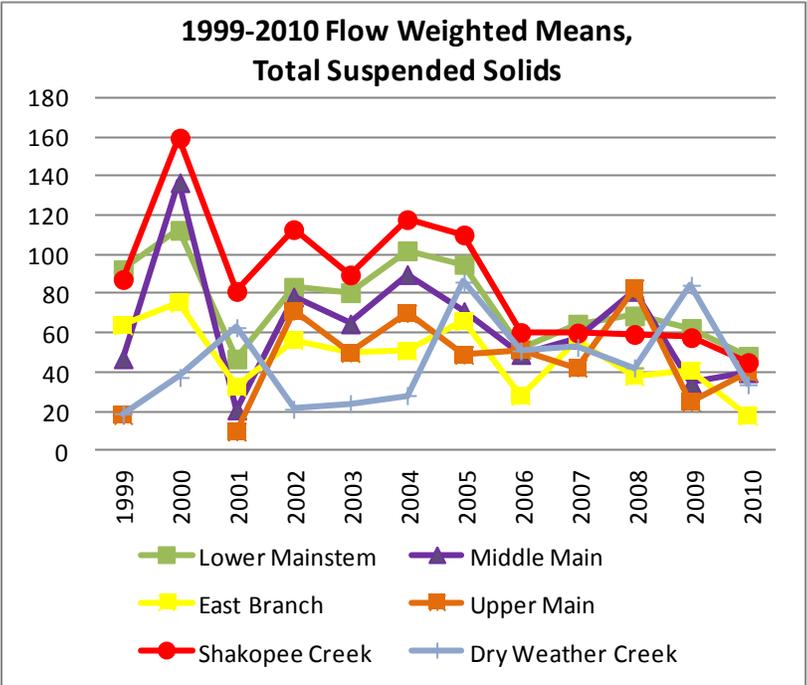
Total Suspended Solids

Total Suspended Solids (TSS) concentrations continued a declining trend in 2009 and 2010. In 2010 all of the sites actually came in under the 54 ppm target set for the watershed by the Minnesota Pollution Control Agency. 2009 would have been the same but for the notable exceptions of the Lower Mainstem, Dry Weather Creek and Shakopee Creek.

The big spring melts of both years had relatively low TSS levels. This brought the annual average down even though later season concentrations rose. As the spring melt ended, the algal component of TSS increased. This process is driven by water temperature and nutrient levels. As river levels drop the water saturated banks begin to fail and slump into the river this also contributes to later season increases in TSS.

The main contributor to the TSS levels observed at Hwy 40 was the Lower Mainstem. Evidence from Transparency Transects and monitoring sites previously located on Cottonwood Creek and Judicial Ditch 9/County Ditch 3 indicate that more than 95% of the TSS from the Lower Mainstem come from the region adjacent to the Chippewa River.

Overall, in 2010 the Chippewa River delivered 143 tons of suspended sediment a day to the Minnesota River. That would be like seven 20-ton dump trucks dumping soil into the river every single day.



What are Total Suspended Solids? <Taken From “State of The Minnesota River 2002 Executive Summary”>

The transport of sediment is a natural function of rivers. Modification of the landscape has accelerated the rate of soil into waterways. Increased runoff has resulted in stream bank erosion. Elevated sediment (suspended soil particles) has many impacts. It makes rivers look muddy, affecting aesthetics and swimming. Sediment carries nutrients, pesticides, and other chemicals into the river that may impact fish and wildlife species. Sedimentation can restrict the areas where fish spawn, limit biological diversity, and keep river water cloudy, reducing the potential for growth of beneficial plant species.

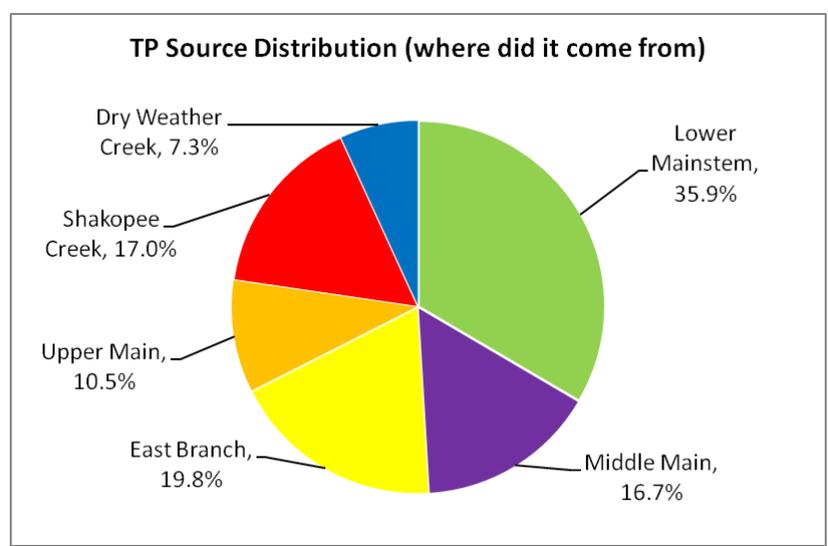
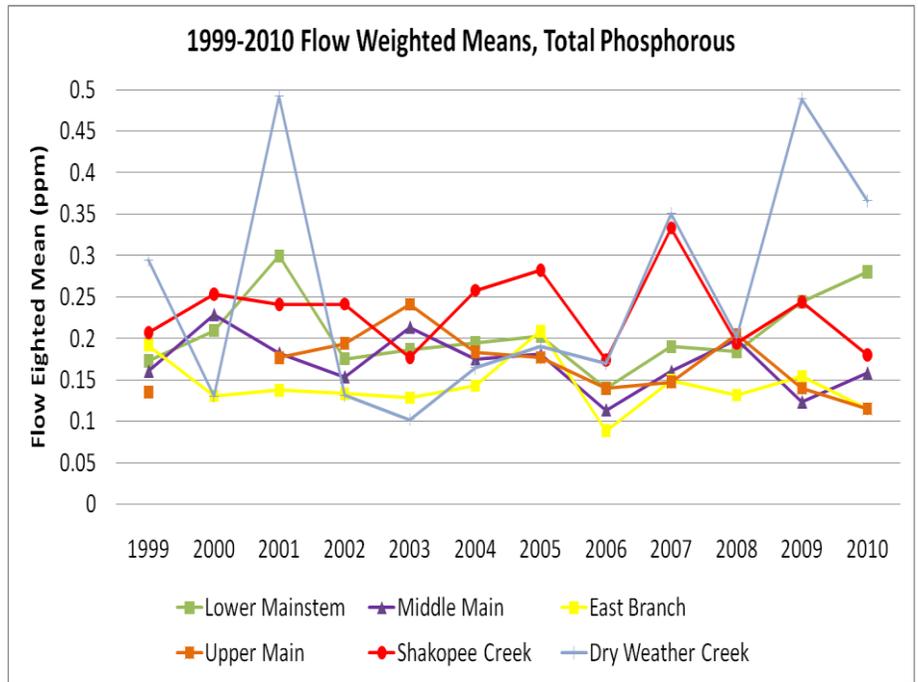
Total Phosphorous

Total phosphorous (TP) concentrations ranged widely across the watershed in 2009-2010. No basin was below the 0.1 mg/L desired goal set by the Environmental Protection Agency for prevention of algal growth.

Dry Weather Creek, Shakopee Creek and the Lower Mainstem presented the highest concentrations of Phosphorous.

Even though the Dry Weather Creek produced the highest concentrations, the Lower Chippewa has been the largest overall contributor of actual phosphorous. In the last ten years the Lower Chippewa contributed 36% of the TP observed in the river. Considering that it only represents 16% of the Chippewa Watershed's land area this is highly significant.

In 2010 at the outlet (Lower Mainstem) the 0.28ppm translated to 191.4 tons of phosphorous. 191 tons would have fertilized 10,914 acres of corn at 35 pounds/acre. It led to 191,400,000 pounds of algae in our lakes and rivers.



What is Phosphorus? <Taken From "State of The Minnesota River 2002 Executive Summary">
 Phosphorus is an important nutrient for plant growth. Total Phosphorous is the measure of the total concentration of phosphorous present in a water sample. Excess phosphorus in the river is a concern because it can stimulate the growth of algae. Excessive algae growth, death, and decay can severely deplete oxygen supply in the river, endangering fish and other forms of aquatic life. Low dissolved oxygen rates are of particular concern during low flow times or in slow moving areas such as reservoirs and the lower reaches of the river.
 Point-source Phosphorous comes mainly from municipal and industrial discharges to surface waters. Non-point-source phosphorous comes from runoff from urban areas, construction sites, agricultural lands, manure transported in from feedlots and agricultural lands, and human waste from noncompliant septic systems.

Orthophosphorous

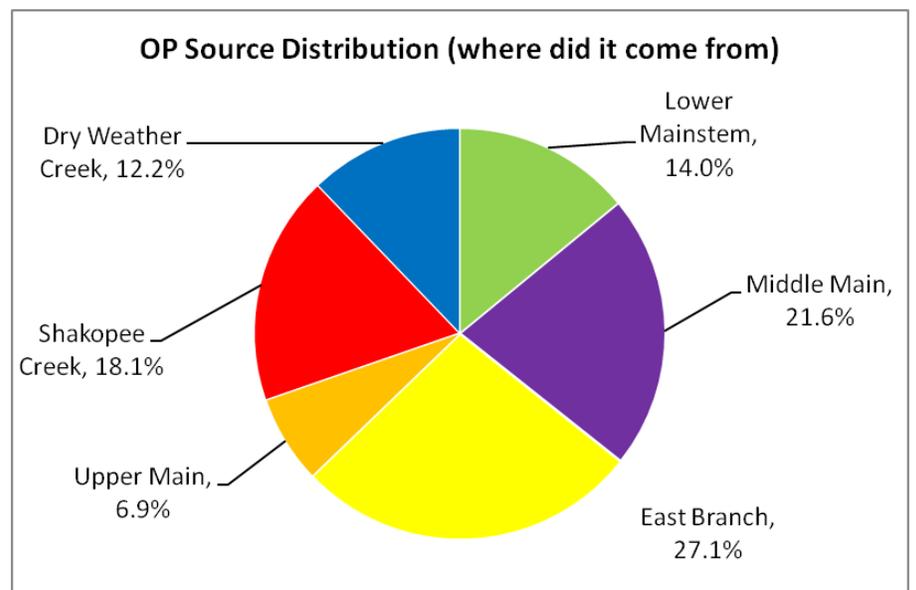
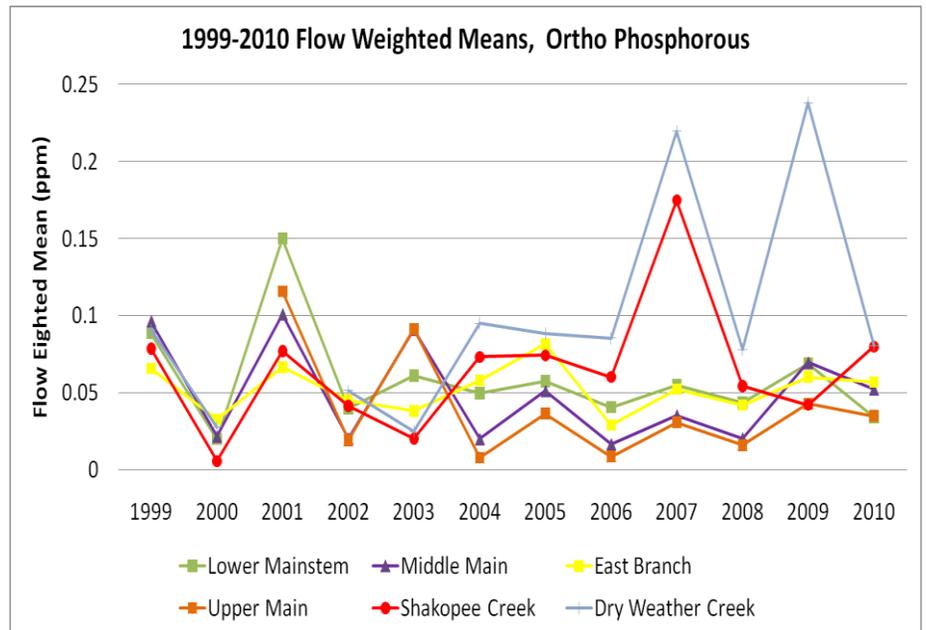
Ortho-Phosphorous (OP) concentrations were up for 2009 and 2010. Samples taken in March and April during both years exhibited extremely high concentrations. These high levels eventually dropped but proved that much phosphorous was moving off the land and through the river before the crops were planted.

Concentrations of Ortho-Phosphorous in Shakopee Creek and Dry Weather Creek tend to be the highest.

High OP values lead directly to problems with transparency and TSS later in the summer. As the phosphorous is taken up by algae during the warmer parts of the season the water quality is driven down.

The high OP levels observed are not natural. The higher levels of OP in the row cropped regions can be attributed to several factors:

- Phosphorous fertilizers marketed today are >85% water soluble
- The TP levels in row cropped soils are high and since the ratio of OP to TP is partially dependent on the level of TP more OP is available for water transport.
- In the spring, the well-drained, bare soils of row cropped fields provide the ideal conditions for OP to be moved into the river.
- Most of the Chippewa's row cropped watersheds lack open bodies of water where the OP can be removed via biological processes.



What is Orthophosphorous? Taken From "State of The Minnesota River 2002 Executive Summary">
 "Ortho phosphorus is soluble reactive phosphorous and is readily available for biological uptake. A particular concern with Orthophosphorous is that it is readily available to algae and under certain conditions can stimulate excess algae growth leading to subsequent depletion of dissolved oxygen. Primary sources of Orthophosphorous are fertilizers, wastewater treatment plants, feedlot runoff, and failing septic systems." According to Donald Christenson, Dept. of Crop and Soil Sciences, Michigan State University all Phosphorous fertilizers marketed today are greater than 85% water soluble.

Nitrate Nitrite Nitrogen

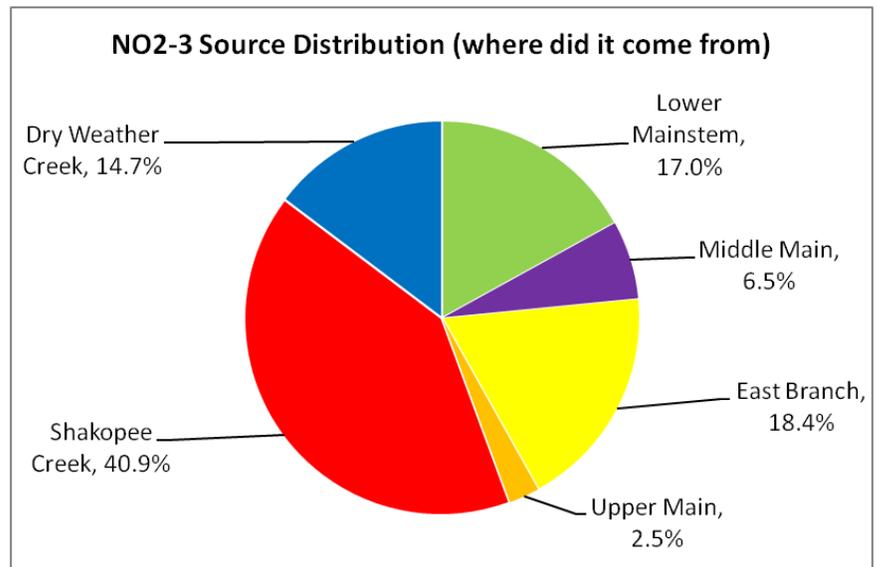
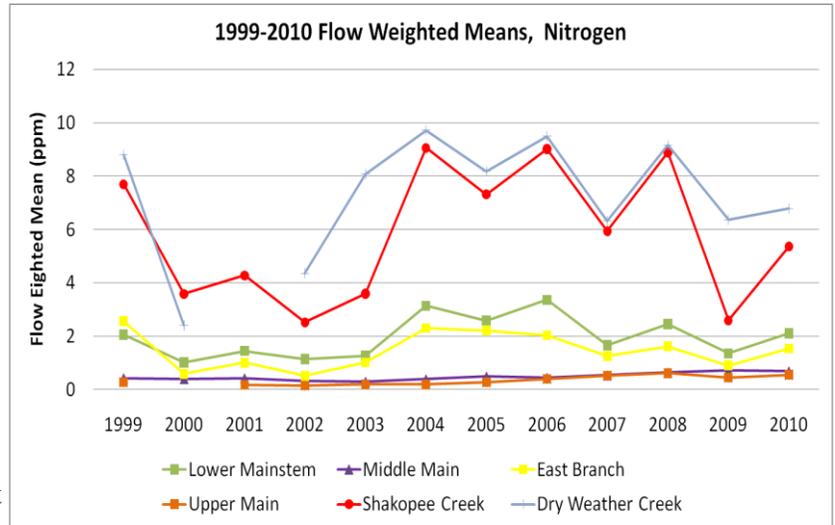
2009-2010 nitrogen concentrations were lower than their ten year averages.

The Upper Mainstem and the Middle Mainstem both maintained relatively low concentrations. These low concentrations managed to keep the level at Hwy 40 (Lower Mainstem monitoring site) at a relatively low level even against the mountain of nitrogen coming out of Shakopee Creek.

The main contributor of nitrogen over the last ten years has been Shakopee Creek. It has contributed 41% of the nitrogen observed at the Chippewa outlet site. Monitoring on this tributary shows that 65% of Shakopee Creek’s nitrogen comes from the 67,000 acre region downstream of Shakopee Lake.

Shakopee Creek and Dry Weather Creek Nitrogen levels were lower than recent years. Even so their nitrogen concentrations towered over the rest of the watershed. One possible reason for the lower levels was the rainy falls of 2008 and 2009. Possibly, the wet conditions prevented fall tillage and fertilizer applications and also washed out some of the Nitrogen before the start of the next monitoring season.

At the outlet (Lower Mainstem) in 2010 the 2.11 parts per million multiplied by the 502,500 acre feet of water translated to 1,444 tons of Nitrogen. 1,444 tons would have fertilized 18,685 acres of corn at 120 pounds/acre. At 30 cents a pound the equivalent in anhydrous Ammonia (82% N) represents \$1,056,745 going down the river. \$433,265 of this came from Shakopee Creek.



What are Nitrates? <Taken From “State of The Minnesota River 2002 Executive Summary”>
 Nitrogen exists in the environment in many forms. In recent decades, there has been a substantial increase in nitrogen fertilizer use. Elevated nitrate-N in the Chippewa River can pollute aquifers it recharges. Therefore nitrogen can affect drinking water. At high enough concentrations, nitrate-N can cause infants who drink the water to become sick and die (methemoglobinemia). Downstream, nitrate-N from the Chippewa River contributes to hypoxia (low levels of dissolved oxygen) in the Gulf of Mexico by stimulating the growth of algae which, through death and decay, consume large amounts of dissolved oxygen and thereby threaten aquatic life.

E-Coli

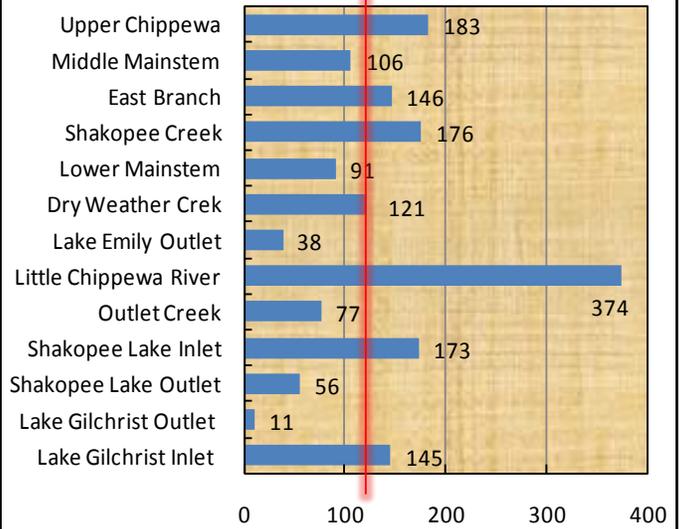
2009 and 2010 E-Coli levels were high during the warmer months. that residents of the Chippewa Watershed use the river for swimming. In the months of June through August, the majority of the samples tested above the 120 MPN per 100 ml standard. Overall 51.1% of all tests came in above the 120 standard.

E-coli pollution is widespread across the basin. The little Chippewa River had the highest geomean and the most exceedances of the standard. Shakopee Creek and the Upper Chippewa were only slightly better. All of the lake outlets monitored were better than the river sites. The three lakes monitored seem to be able to settle out the e-coli that are fed to them through their inlets.

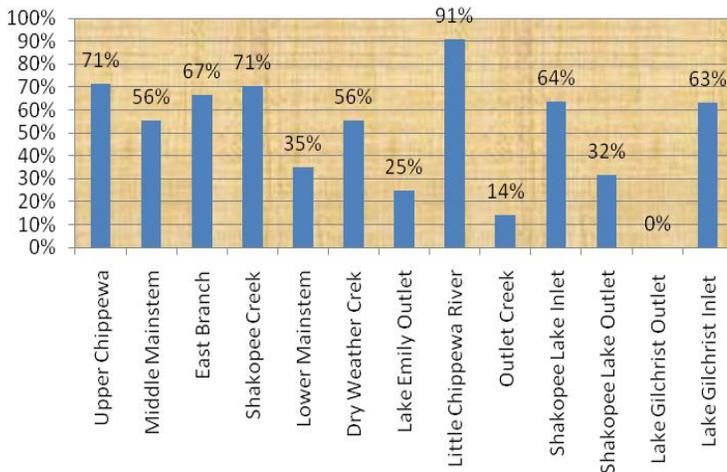
While some of the higher incidents of E-coli were after rain events indicating a field runoff event, many were also during lower flows suggesting that failed human septic systems are a major source as well.

Considering the evidence **swimming is still not recommended from June through August** in the Chippewa River. If you do decide to swim, keep your head above the water, do not get river water into your mouth and shower off after swimming.

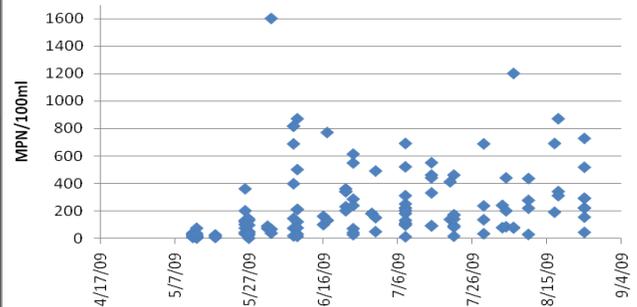
Chippewa Tributary E-coli, 2009-2010 Geomean (mpn/100ml)



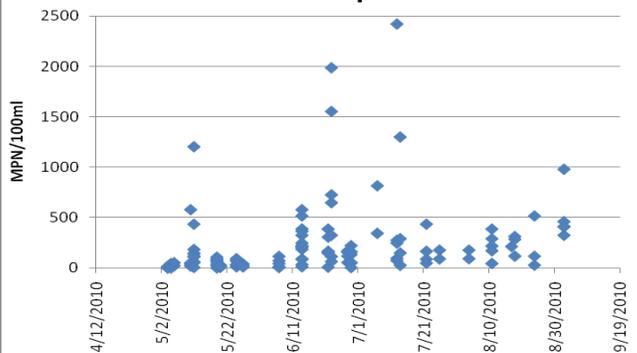
Percent of Samples Exceeding the 120 MPN Standard, 2009-2010



2009 e-coli samples all sites



2010 e-coli samples all sites



What is E-coli?: E. coli, short for Escherichia coli, is a type of bacteria commonly found in the intestines of animals and humans. There are hundreds of strains of the bacterium, some are dangerous to people, producing a powerful toxin that can cause severe illness to humans and livestock. According to the U.S. Environmental Protection Agency, the presence of E. coli in water is a strong indication of recent sewage or animal waste contamination. During precipitation, E. coli may be washed into creeks, rivers, streams, lakes, or groundwater. When these are used as sources of drinking water — and the water is not treated or inadequately treated — E. coli may end up in drinking water.

Turbidity

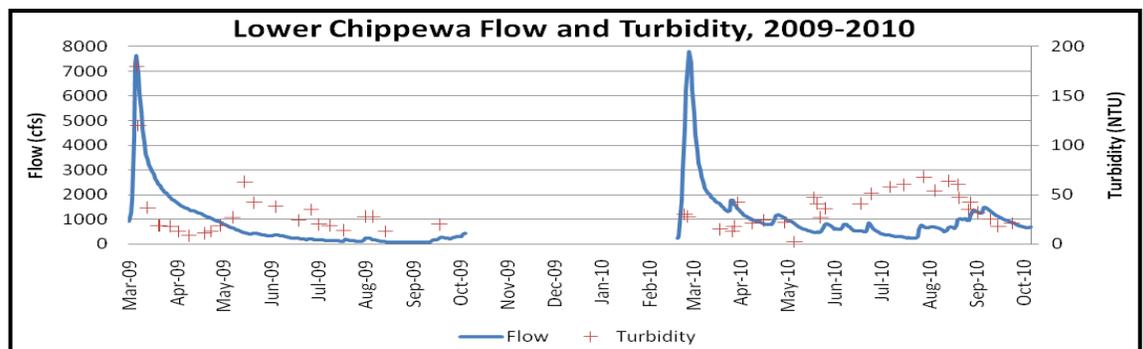
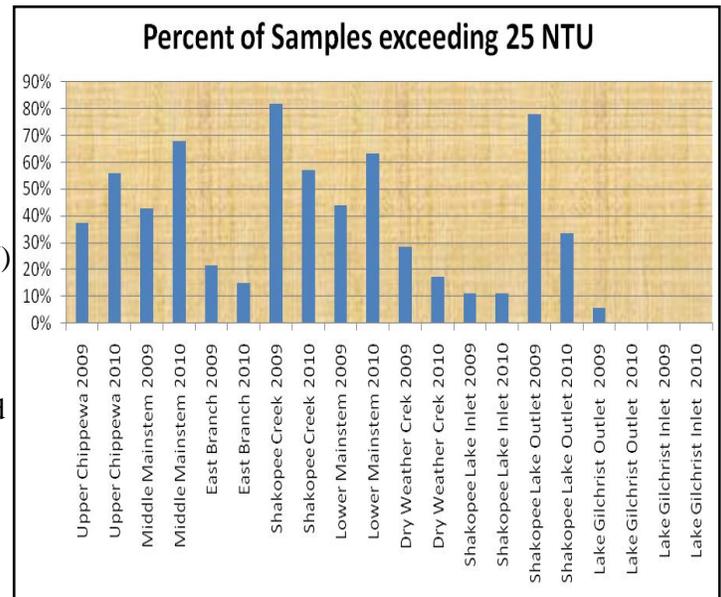
Much of the Chippewa River is impaired for Turbidity. The chart at right supports the MPCA's and the EPA's decision to list much of the River as not supporting the Turbidity Standard.

Sites where the turbidity level exceeds the standard (25 NTU) more than 10% of the time can be listed as impaired by the US EPA. In 2009 and 2010 most of the Chippewa's monitoring sites exceeded the standard.

In 2009 and 2010 overall 32% of the samples taken exceeded the standard for turbidity. Looking at both years separately, 2009 and 2010 saw about the same level of turbidity exceedances overall.

The two sites that exceeded the standard the most were Shakopee Creek and Shakopee Lake Outlet. Turbidity was high during both high and low flows. As we have identified in previous years there are major issues with the lake and its failing dam. Also the clay soils of this region lend themselves to higher turbidity levels. Interestingly, one of the sites that exceeded the standard the least was the inlet to Shakopee Lake. In the Chippewa we have observed a trend toward higher turbidity during June, July and August (see chart below). This may be due to high levels of nutrients and warm water temperatures creating the ideal conditions for algal growth in the stream channel and connected lakes.

High turbidity for long periods of time including during low flow periods is alarming. The constant high turbidity levels suggest that aquatic habitat and recreational enjoyment on the Chippewa is seriously degraded.



What is Turbidity? Turbidity refers to how clear the water is. The greater the amount of total suspended solids (TSS) in the water, the murkier it appears and the higher the measured turbidity. Dredging operations, channelization, increased flow rates, floods, or even too many bottom-feeding fish (such as carp) may stir up bottom sediments and increase the cloudiness of the water.

High concentrations of particulate matter can modify light penetration, cause shallow lakes and bays to fill in faster, and smother benthic habitats - impacting both organisms and eggs. As particles of silt, clay, and other organic materials settle to the bottom, they can suffocate newly hatched larvae and fill in spaces between rocks which could have been used by aquatic organisms as habitat. Fine particulate material also can clog or damage sensitive gill structures, decrease their resistance to disease, prevent proper egg and larval development, and potentially interfere with particle feeding activities. If light penetration is reduced significantly, macrophyte growth may be decreased which would in turn impact the organisms dependent upon them for food and cover. Reduced photosynthesis can also result in a lower daytime release of oxygen into the water. Effects on phytoplankton growth are complex depending on too many factors to generalize.

Very high levels of turbidity for a short period of time may not be significant and may even be less of a problem than a lower level that persists longer. The figure above shows how aquatic organisms are generally affected.

<Taken from WOW. 2003. Water on the Web - (<http://wow.nrri.umn.edu>). University of Minnesota-Duluth, Duluth, MN 55812.>

Total Suspended Volatile Solids

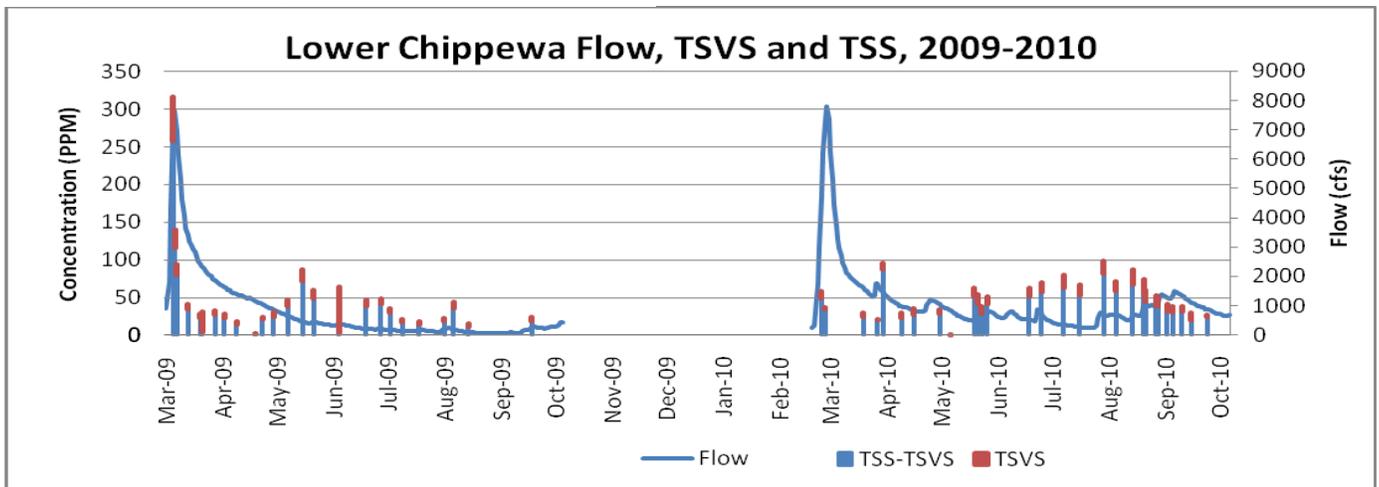
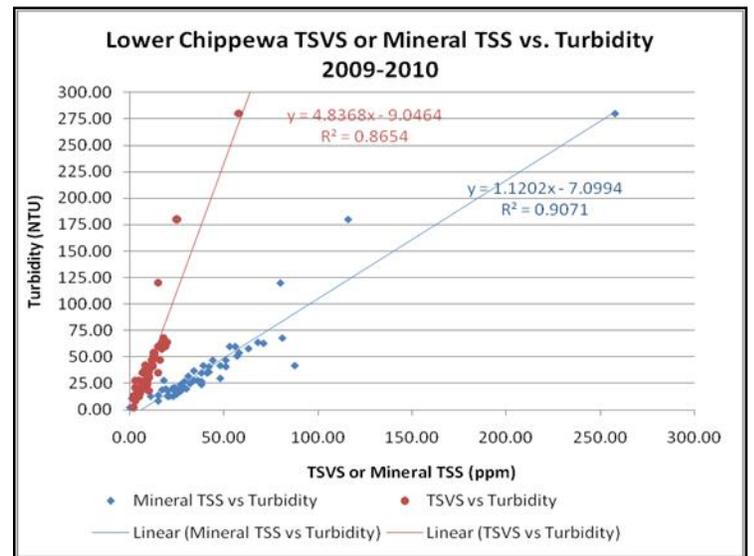
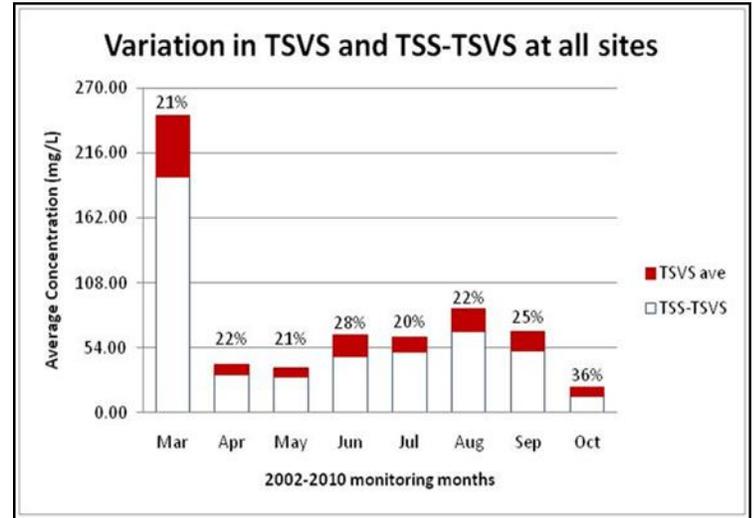
Total Suspended Volatile Solids (TSVS) are the organic component of Total Suspended Solids (TSS). Organic solids can reflect more light than mineral solids and thereby have a bigger impact on turbidity measurements (see middle chart).

The significance of sediment vs. organic matter to TSS levels and the Chippewa River turbidity impairments is important. In numerous cases on the Chippewa River Watershed TSVS was key in the TSS sample exceeding the TSS surrogate standard.

Organic matter contributions to turbidity must be addressed along with inorganic sediment to meet water quality standards. Although TSVS constitutes less of the total TSS load in the Chippewa River than sediment, high summer TSVS concentrations prolong the duration of high turbidity and water quality standard exceedances.

In many cases during the summer months TSVS levels on top of already high sediment levels were a substantial part of the turbidity exceedances above the standard. Eroding mineral sediments are abundant and contribute to high TSS and turbidity levels in streams. However, in the warm months, some lakes, wetlands and in stream regions contribute TSVS to streams and rivers via algae, diatoms and other organic particles.

If TSVS are the result of algae, as the mid-summer sample results suggest, waterborne nutrients are the most likely source of this growth.



What are Total Suspended Volatile Solids? Volatile solids are those solids lost on ignition (heating to 550 degrees C.) They are useful to measure because they give a rough approximation of the amount of organic matter present in a water sample. Organic matter in a water sample can be comprised of algae, diatoms, and organic debris (things such as crops, aquatic vegetation and other organic materials).

Buffer Surveys

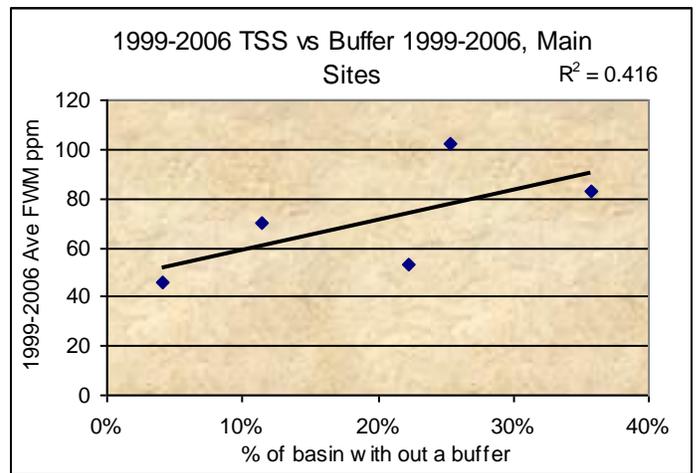
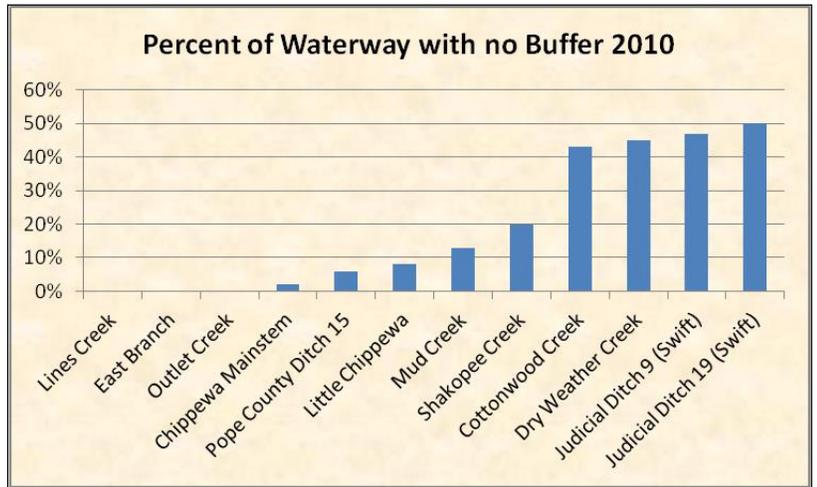
The presence of buffers increased slightly from 2008 to 2010. Buffers protect adjacent waterways by minimizing erosion, maintaining stream and ditch bank stability, creating wildlife habitat and filtering water soluble nutrients out of groundwater that enters the waterway. As Chippewa River Waterways have trended toward higher peak flood events the need has increased for buffers and the in-stream protection they offer.

Every year CRWP documents the size of buffers along approximately 775 miles of the Chippewa and its tributaries.

Close to 21% of the Chippewa River does not have any protection offered by buffers. Areas without a buffer have no defense against the stress of bank erosion, gullies and field runoff. This needs to change; even a one rod buffer makes a difference.

The presence or absence and width of the buffers tell us a lot about the resistance of the Chippewa. Buffers play a vital role in shielding the Chippewa River from pollution immediately along the waterways.

The graph (at right) comparing 1999-2006 average sediment concentrations for the various tributary basins and their corresponding portion of waterways without any buffer. There is a correlation, the fewer buffers the higher the suspended sediment.



What is a Stream or Ditch Buffer? The aquatic corridor, where land and water meet, deserves special protection in the form of buffers. A buffer can be placed along a stream, shoreline, or around a natural wetland. A buffer has many uses and benefits. Its primary use is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. For streams, a network of buffers acts as a right-of-way during floods and sustains the integrity of stream ecosystems and habitats. Buffers can also protect the adjacent field from erosion and unstable banks.
 (Taken from the Center for Watershed Protection, <www.cwp.org/aquatic_buffers.htm>)

Bank Erosion Survey

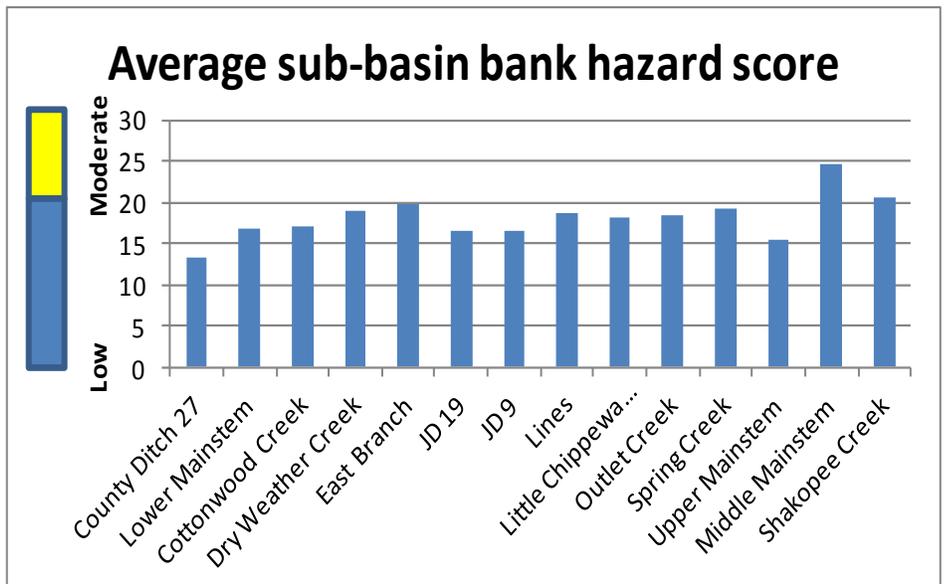
In 2009 and 2010 CRWP staff engaged in a watershed wide survey of the stability of the Chippewa River's ditch and stream banks.

Seventy sites were chosen to be surveyed. The sites were chosen to represent the different soils, sub-watersheds and landscapes found in the Chippewa River Basin. Of these seventy sites 62 locations were selected for the establishment of bank pins.

At each site the survey crew surveyed about 600 feet of stream or ditch bank. They followed two scientific methods for assessing the potential for bank erosion: the Bank Erosion Hazard Index (BEHI) and the Wisconsin Bank condition Severity Rating Method. Both methods generate a numeric rank for bank erosion potential based on a series of field observations including: bank vegetation, channel slope, soil type, bank condition etc.

The many sites monitored were averaged to come up with a score by sub basin (chart below). According to this the Chippewa exhibits low to moderate bank erosion. The methods used do not take actual erosion rates from the Chippewa River into account. Therefore the score may not be appropriate. In coming years using the newly established bank pins, CRWP should be able to match its surveys to actual measured rates of stream bank erosion.

It is important to understand that while the numbers for bank loss may seem small when they are applied year after year they can add up to massive amounts. Six inches a year becomes 25 feet in fifty years. This kind of change is considered an unnatural rate and leads to extensive cost when maintaining roads and drainage ditches.



What is Bank Erosion? Stream bank erosion is a natural process that over time has resulted in the formation of the productive floodplains and alluvial terraces common to river systems. Even stable river systems have some eroding banks. However, the rate at which erosion is occurring in stable systems is generally much slower and of a smaller scale than that which occurs in unstable systems. (Taken from: Natural Resources and Water <<http://www.nrw.qld.gov.au/factsheets/pdf/river/r2.pdf>>)

Modifications to a river and its uplands impact the rate at which the banks erode. These have long-reaching consequences, if the modifications are not compatible with the natural scale of energy-dissipating processes of the river, they will ultimately fail. Because the condition of a river is a dynamic balance between all forces impinging on it, every modification made to it has an ensuing reaction. Rivers are not always in equilibrium with the dynamic balance where they should be, and there can be a considerable lag in time until the appropriate 'event' provides the readjustment of levels or sediment supply or change in the channel.

(Taken from: New South Wales Department of Land and Water Conservation, <www.ozestuaries.org/indicators/Def_streambank_erosion.html>)

Shakopee Lake/Creek Monitoring

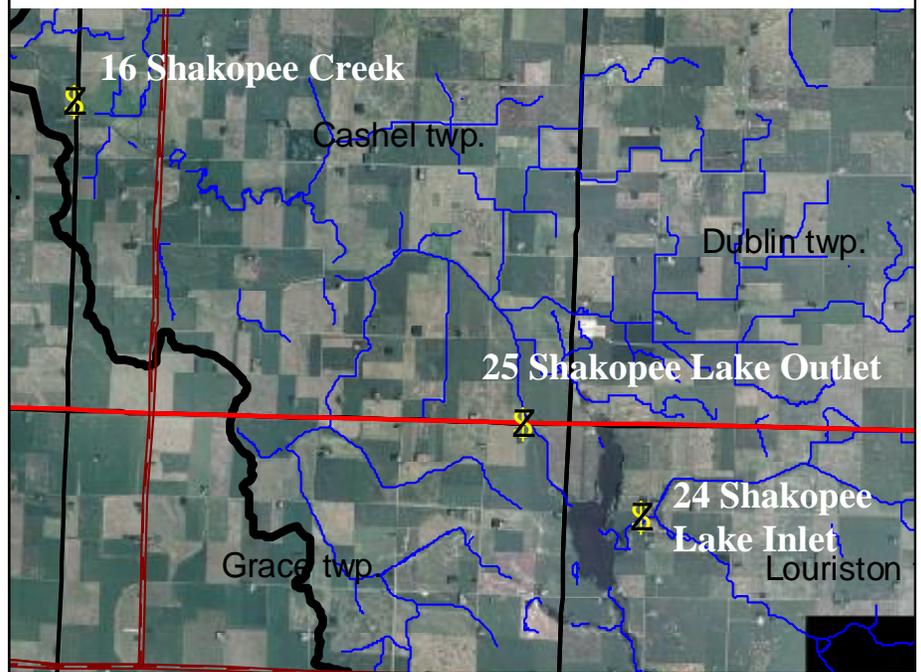
Why are we monitoring this region?

Over the last 10 years that the Chippewa River has been monitored, the Shakopee Creek has been the main contributor of nutrient pollution. In this same time, Shakopee Creek has also been one of the leading contributors of flood waters during high water events.

Monitoring above and below the 260 acre Lake Shakopee was initiated in 2008 to try and understand the nature of the nutrient and flow within Shakopee Creek and the impact of the lake on the creek. Monitoring will continue for the next two years.

2008 data cannot be used to draw many definitive conclusions but they do point out some interesting preliminary findings that we will continue to monitor in the coming two years.

Shakopee Monitoring Sites

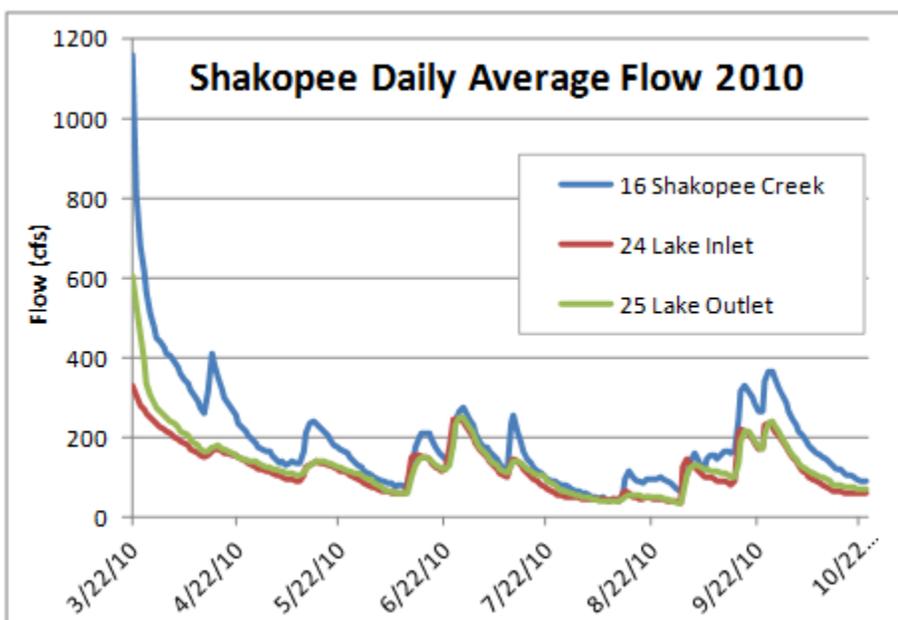


PRELIMINARY FINDINGS:

Shakopee Lake rather than being a settling pond for suspended sediments is actually a net contributor. The suspended sediment load almost doubled as the water passed through the lake. Even during times when the flow was low and not influenced by storm events there was a noticeable increase in water borne sediment caused by the lake. There is considerable evidence that carp are playing a significant role in this issue. Furthermore, bank erosion problems downstream of the lake's dam are a direct result of the dam. If the Shakopee Lake (Buffalo Lake) problem could be solved it would be the single most significant improvement project for the Chippewa River in 20 years. The turbidity of the incoming Shakopee Creek was excellent. Only two other

monitoring sites on the Chippewa River exceeded the turbidity standard (25 NTU) less. On the other hand the outlet of Shakopee Lake exceeded the turbidity standard more times than any other site monitored in the Chippewa Watershed!

Nitrogen load almost tripled from the outlet of the lake to the Chippewa River ten miles downstream. Given that Shakopee Creek is responsible for about half of the nitrogen pollution observed in the Chippewa River this 67,000 acre region appears to be contributing 40 % of the nitrogen of the 1.3 million acre Chippewa Watershed. (Continued on page 25)



Shakopee Lake/Creek Monitoring Continued

Phosphorous followed the same pattern as Nitrogen just not as extreme. Phosphorous levels from Shakopee Lake Outlet to the Chippewa River roughly doubled.

Flow peaks did not seem to be impacted by the lake.

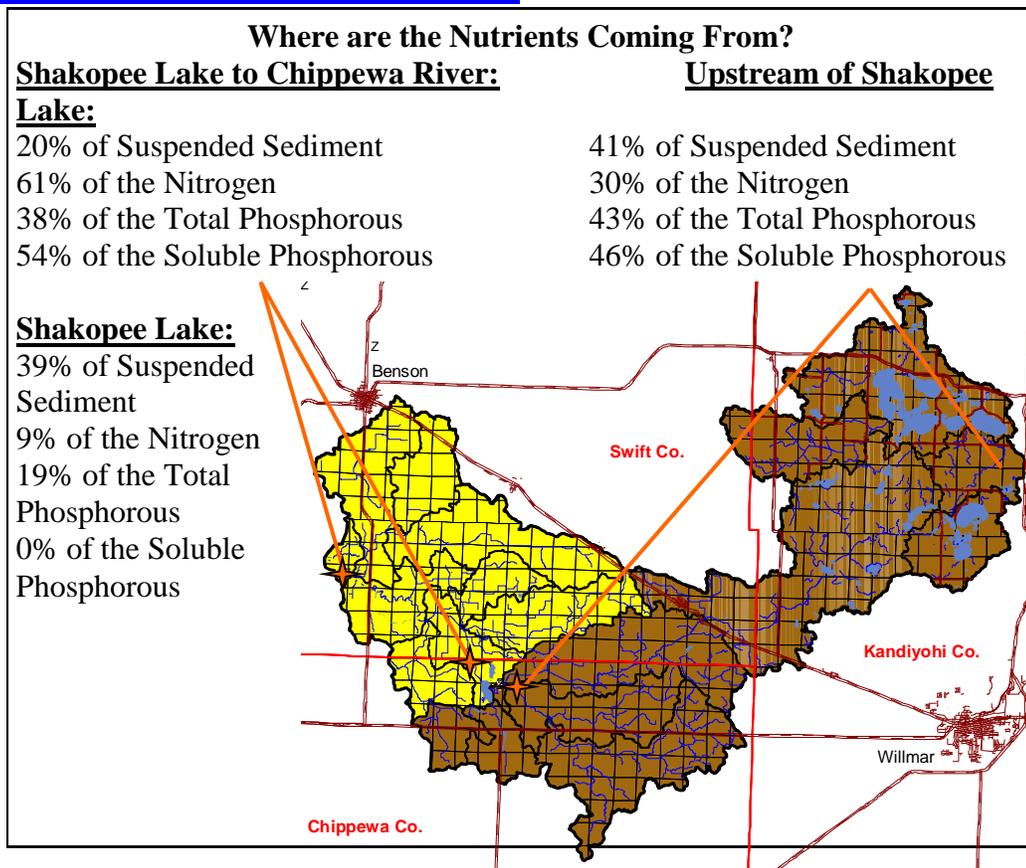
Generally lakes tend to slow water down and cause rising waters to not go as high as they would without the presence of a lake. This effect did not appear to be significant on the Shakopee in 2008. It needs to be said that the data used to assess flow is still very preliminary. After another year of monitoring we will have a more accurate picture of what happened.

The Cost of Excessive Nutrients

Excessive nutrients have a cost. Aside from the very real downstream costs to the environment and our shared resource, in Shakopee Creek they represent money lost to the farmers applying nutrients to their fields.

1,051 Tons of Nitrogen came out of the Creek. Subtracting the 378 tons from the region upstream of the lake leaves 674 Tons which is enough nitrogen to make 1,348,000 bushels of corn. This means that the lower region of Shakopee Creek lost 5 bushels of corn per acre per year to nitrogen runoff.

If the Shakopee Lake (Buffalo Lake) problem could be solved it would be the single most significant water quality improvement project for the Chippewa River in 20 years.



2008-2010 What went in, What came out

Water Quality Parameter in Tons	Shakopee Lake Inlet, Site 24	Shakopee Lake Outlet, Site 25	Shakopee Creek, Site 16 (10 miles downstream)
T. Suspended Solids	3,902	8,248	9,872
Nitrogen	626	378	1,052
Total Phosphorous	21.5	36.4	40.1
(Soluble) Phosphorous	16.6	18.4	10.7

**Shakopee Lake Added: 4,346 Tons of Suspended Solids
4.9 Tons of Total Phosphorous
1.8 Tons of Soluble Phosphorous**

Removed: 248 Tons of Nitrogen

Recommendations

Recommendations are based off of the monitoring results. They focus on the problems for each basin. E-coli will be discussed at the end since it is a watershed wide problem.

- **Dry Weather Creek:** This basin has the highest levels of Nitrogen (NO₂-3) and Ortho Phosphorus (OP) in the watershed. It also has the least number of ditch banks with buffers and the lowest portion of lakes, wetlands, grass and woodlands. In order to control the water soluble OP and NO₂-3 farmers should be encouraged to alter their fertilizer applications. Examples such as applying fertilizer in the spring rather than the fall or decreasing fertilizer applications to follow University of Minnesota recommendations are possible alterations. These would maintain crop yields, save farmers money and minimize nutrient loss to waterways. In addition, at least minimal 16 ft buffers ought to be extended to those areas where none are present. Furthermore, low lying, minimally productive crop lands should be converted to some kind of perennial land use via new market opportunities, or through incentive payments and easements. This will help filter the waterborne nutrients out of the water, they will have the additional benefit of decreasing high water levels which are causing havoc on the stream banks of the basin's lower regions.
- **Lower Mainstem:** This basin's issues are Sediment (TSS), Total Phosphorus (TP), e-coli, turbidity and bank erosion. Intensive monitoring has revealed that the main sediment contributing areas of this sub-basin are not Cottonwood Creek nor Judicial Ditch 3 and 9 but rather the region around the Mainstem of the Chippewa. The area from Benson to Hwy 40 is responsible for the majority of this area's sediment. Bank erosion and gullies coming down into the river are thought to be the source. Gullies should be targeted for remediation. A strong focus on upland water retention should be enacted throughout the Chippewa Watershed to help minimize high water events that are causing the stream bank erosion. The OP level is an issue of agricultural practice, farmers should be encouraged to spring apply fertilizer and follow UMN recommendations for fertilizer applications. As a result of these practices turbidity levels should improve.
- **Shakopee Creek:** Nitrogen (NO₂-3), Ortho Phosphorous (OP), Suspended Sediment (TSS), e-coli, turbidity and transparency are all major issues for Shakopee Creek. Intensive monitoring over the last three years has yielded a wealth of information about this basin. For example, Shakopee Lake (261 acres) is responsible for 39% of the suspended solids, 19% of the phosphorous, and 9% of the nitrogen. The lake is full of sediment, nutrients, algae and full of carp. Water coming out of Shakopee Lake is orders of magnitude worse than the water going in, even during low flow. Furthermore, bank erosion problems downstream of the lake's dam are a direct result of the dam.

-If the Shakopee Lake (Buffalo Lake) problem could be solved it would be the single most significant improvement project for the Chippewa River in 20 years. -In order to control the water soluble OP and NO₂-3 which are critical in driving up the algae, TSVS and Turbidity levels, farmers should be encouraged to follow UMN recommendations for fertilizer applications and apply them in the spring. This would maintain crop yields, save farmers money and minimize nutrient loss to waterways. In addition, at least minimal 16 ft buffers ought to be extended to those areas where none are present (38% of the basin has no buffer). Furthermore low lying, minimally productive crop lands should be converted to some kind of perennial land use via incentive payments and easements. This will help filter the waterborne nutrients out of the water, they will have the additional benefit of decreasing high water levels which are causing havoc on the stream banks of the basins lower regions. In particular, areas



(Continued on page 27)

Recommendations Continued

downstream of Shakopee Lake should be the main target for these programs. The region downstream of the lake has been found to yield 70% of the Shakopee's water and a disproportionate amount of this basin's pollutants (61% NO₂-3, 54% OP, 38% TP, 20% TSS) in addition this region has a higher portion of ditches without any buffer than the rest of the basin.

- **East Branch:** The East Branch is doing fairly well. Its major issue throughout is e-coli. There are some localized issues in Total Phosphorous (TP), Ortho Phosphorous (OP), and Turbidity. The last region of the river before it joins the Chippewa Mainstem consistently faces sediment and turbidity problems. Recent surveys have shown that the source for this is largely natural but is being exasperated by human activities. The OP is coming out of the agriculturally dominated JD19 sub-basin, fertilizer practices need to be targeted to match UMN recommendations there. Livestock manure finding its way to the River and non-compliant septic systems are likely sources for the e-coli. These need to be fixed to limit feces coming in contact with the water.
- **Middle Mainstem:** This basin faces trouble with Sediment (TSS), volatile solids (TSVS), Total Phosphorous (TP), turbidity, transparency and e-coli. Evidence suggests that the region along the Mainstem channel of this basin should be targeted. The Little Chippewa River faces intense pressure from cattle with long-term access to the creek. This causes the turbidity levels and TSVS levels to be high. This transfers downstream to Lake Emily which then contributes to Chippewa River pollution. Cattle access to waterways must be controlled, especially in the hot months when TSVS levels have been seen to rise. Areas along the River should be targeted for removing gullies and in the steep areas controlling field erosion. Buffer rates are pretty good but those areas without any buffer should be protected with at least a 16 ft. buffer. Lake Emily is a major settling pond for TSS and TP and this has caused serious algae outbreaks that are impacting the river. Lake management actions that deal with the carp and lack of emergent vegetative cover need to be undertaken to hold down sediment and phosphorous. Further downstream, near Clontarf the river has been channelized through unstable layers of alluvial sand, silt and clay. This needs to be stabilized through bank and stream stabilization methods.
- **Upper Chippewa:** This basin's issues include Suspended Sediment (both TSS and TSVS), e-coli, turbidity and transparency. Surveys from Urbank to Cyrus have documented that e-coil levels are high throughout this basin. TSS, Turbidity and transparency are fine until the river reaches Peterson Lake from here they plummet and never recover. The fact that these levels begin at a lake suggest algae and carp are factors from this point on and that there are contributions coming from the surrounding landscape on downstream. Transect Surveys regularly document numerous cattle operation with uncontrolled access to the river. Fine particulates dislodged by these cattle dominate mid-season water samples. Management practices that control livestock access to the river should be encouraged. Stream and ditch bank erosion also need to be stabilized.
- **E-Coli** levels can be reduced by eliminating the pathways that feces use to enter the river. Upgrading human septic systems that are delivering their waste directly to the river, controlling livestock access to the water and by following MPCA manure application guidelines would be a good start.



Hawk Creek Watershed Project:

The Hawk Creek Watershed Project (HCWP) was established in 1997 for the purpose of developing a Clean Water Partnership (CWP) Diagnostic Study and Implementation Plan and was completed in 2000. In 2008 the Hawk Creek and Beaver Creek Turbidity and Bacteria Total Maximum Daily Load (TMDL) Assessment and Implementation Plan Development Project work plan was developed. Following are the findings:

Watershed Characteristics ~

The Hawk Creek Watershed drains 612,822 acres (958 square miles) of land. It is unique among the other major watersheds of the Minnesota River in that it is composed of a main tributary (Hawk Creek) and several other streams that flow directly into the Minnesota River. Hawk Creek originates in the lakes region of Kandiyohi County and flows approximately 65 miles to its mouth in the Minnesota River, located eight miles southeast of Granite Falls. Several municipalities are located directly on the stream or on a tributary and use the creek to discharge wastewater treatment plant effluent or stormwater effluent. There are no municipalities directly on Hawk Creek that depend on it for drinking water or industries in the watershed that draw heavily on water resources.

Fifteen lakes also lie within its borders, including significant waters such as Eagle, Long, Foot and Willmar. Lake homes and lake recreational activities such as fishing, swimming and boating are common activities in the lakes region of the watershed in Kandiyohi County. Additionally, several county/regional parks and more than 15 state wildlife management areas dot the watershed's landscape. Agriculture is the dominant land use in the watershed and nearly 98% of the original wetlands in the watershed have been drained to increase agricultural opportunities. Agriculture depends on the creek and an extensive network of drainage ditches, open tile intakes and sub-surface tile systems to move water off the landscape and make it suitable for row crop farming. Corn, soybeans, and sugar beets are the primary crops grown in the watershed. Livestock production primarily consists of dairy, turkey, beef and swine. There is some livestock pasturing along riparian areas in the lower portions of the watershed, but it is limited and continues to decrease.

Draining an area of 973 square miles within sections of Chippewa, Kandiyohi, and Renville Counties, Hawk Creek and its major tributary, Chetomba Creek, do not rise in the high moraines as do the Pomme De Terre and Chippewa Rivers. Instead, they originate on a marshy till plain, not much above the level of the Minnesota Valley bluffs. Hawk Creek flows southwest through the Western Corn Belt Plains Eco region for approximately 65 miles before joining the Minnesota River below Granite Falls. Glacial till deposits cover the entire watershed and form the present land surface. With the exceptions of the northern tip (lying in the Alexandria Moraine Complex) and the southwestern corner (lying in the Benson Lacustrine Plain), the majority of Hawk Creek watershed falls within the geomorphic setting of the Olivia Till Plain. Soils of the Olivia Till Plain are mostly loamy and silty, with roughly two thirds of these being well drained and the remainder poorly drained but improved by tiling. Landscapes within the till plain are characterized as undulating to rolling in steepness (6-12 %), with roughly 55% of the lands classified as having the potential for moderate water erosion.

From 1999 to 2001 a diagnostic study was conducted to determine the pollution levels and to see if there was a need for attention. The study showed excessive levels of sediment, phosphorus, and nitrates. Bacteria is also a concern in some reaches of the watershed. These pollutants come from a wide variety of sources including: stormwater run-off, agricultural land run-off, wastewater treatment plants, livestock manure, failing septic systems, industrial wastewater and processing plants.

Another issue is water quantity. Frequent flooding occurs all too often.

Potential Pollutant Sources ~

The sampling regime completed in the Hawk Creek Watershed (Hawk) has indicated that the following problems stand out.

- Sediment is a major pollutant affecting the quality of water in the Hawk. Much of this can be attributed to the high percentage of intensively farmed land in the area. Many areas lack adequate vegetative cover, which buffers watercourses from cropland. These areas are highly susceptible to erosion.
- Fecal Coliform Bacteria violations are common in river reaches listed (303D list) for this work plan. Suspected causes of high levels of bacteria include: failing septic systems, waste water treatment plant (WWTP) by passes and flushes, unsewered communities, livestock waste from feedlots and livestock waste from land application.
- Water Quantity and the speed at which it passes through the system have also proven to be a problem faced by the watershed. With the high amount of drainage and few buffered areas, water tends to move through the watershed at a high speed, causing increased loads of sediments, fecal coliform bacteria and nutrients.
- Although Nutrients aren't parameters for the Hawk TMDL, nutrient loading of the watershed's streams is also a concern. The reduction of turbidity and fecal coliform bacteria would also have benefits to reduce nutrients throughout the watershed. A significant portion and potential source of nitrogen and phosphorus has been identified coming from storm drain runoff, WWTP effluent, livestock, land applied manure, failing septic systems, industrial facility discharges and industrial facility sugar beet stockpiles.

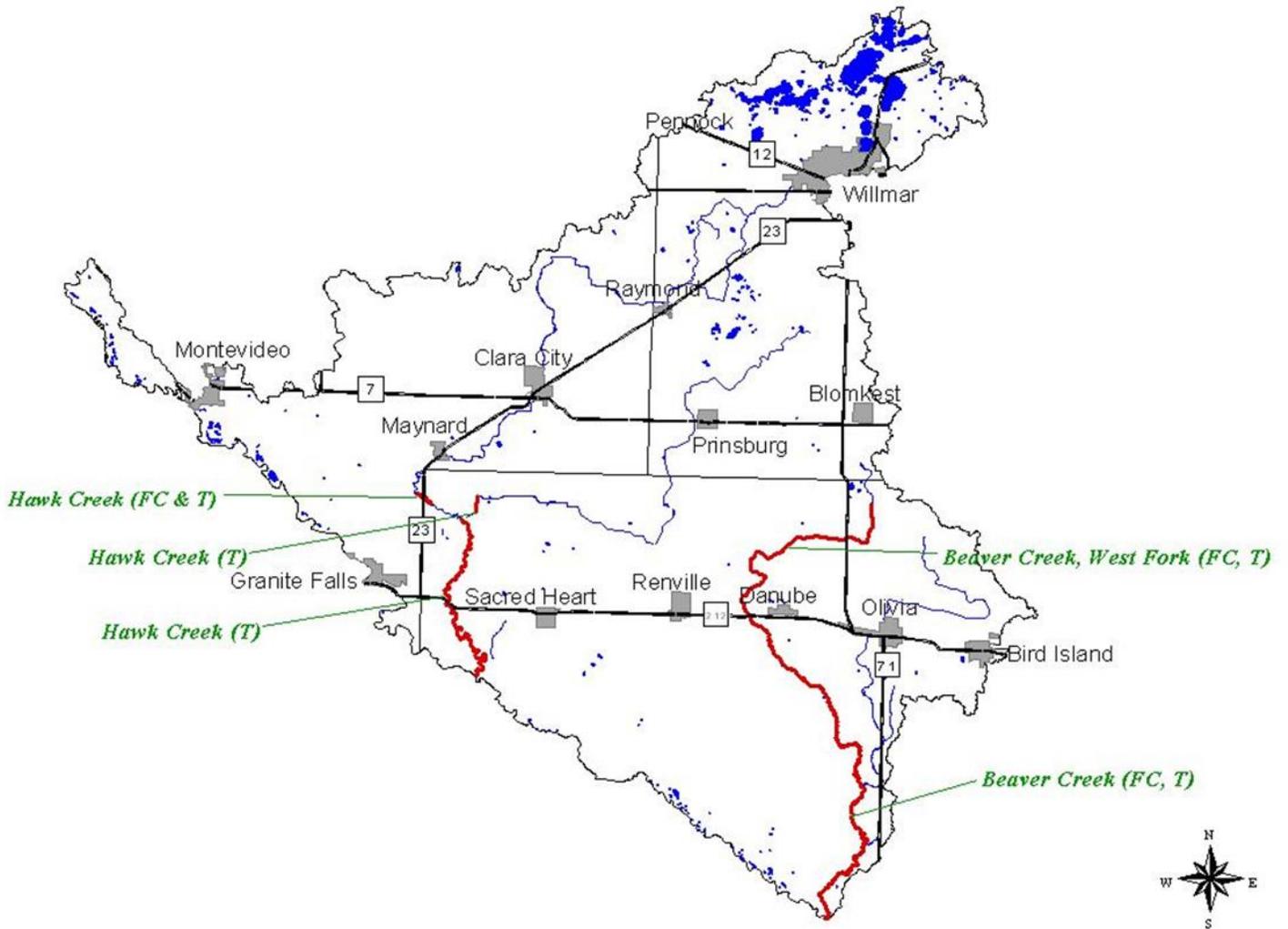
Impairments ~

- Turbidity is the pollutant that affects the designated beneficial use for aquatic life. These reaches are identified in the following table and map.
- Fecal Coliform Bacteria is the pollutant that affects the designated beneficial use for aquatic recreation. These reaches are identified in the following table and map.

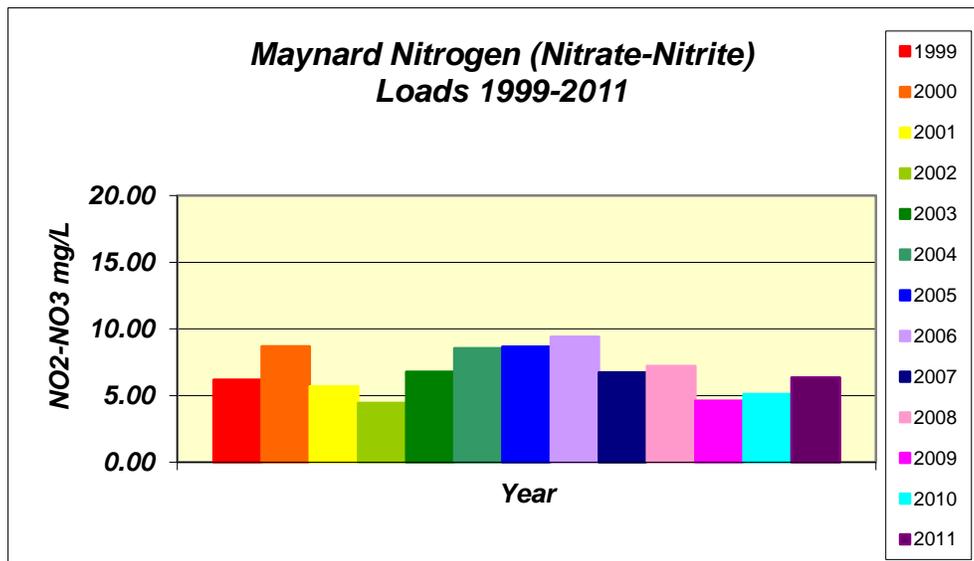
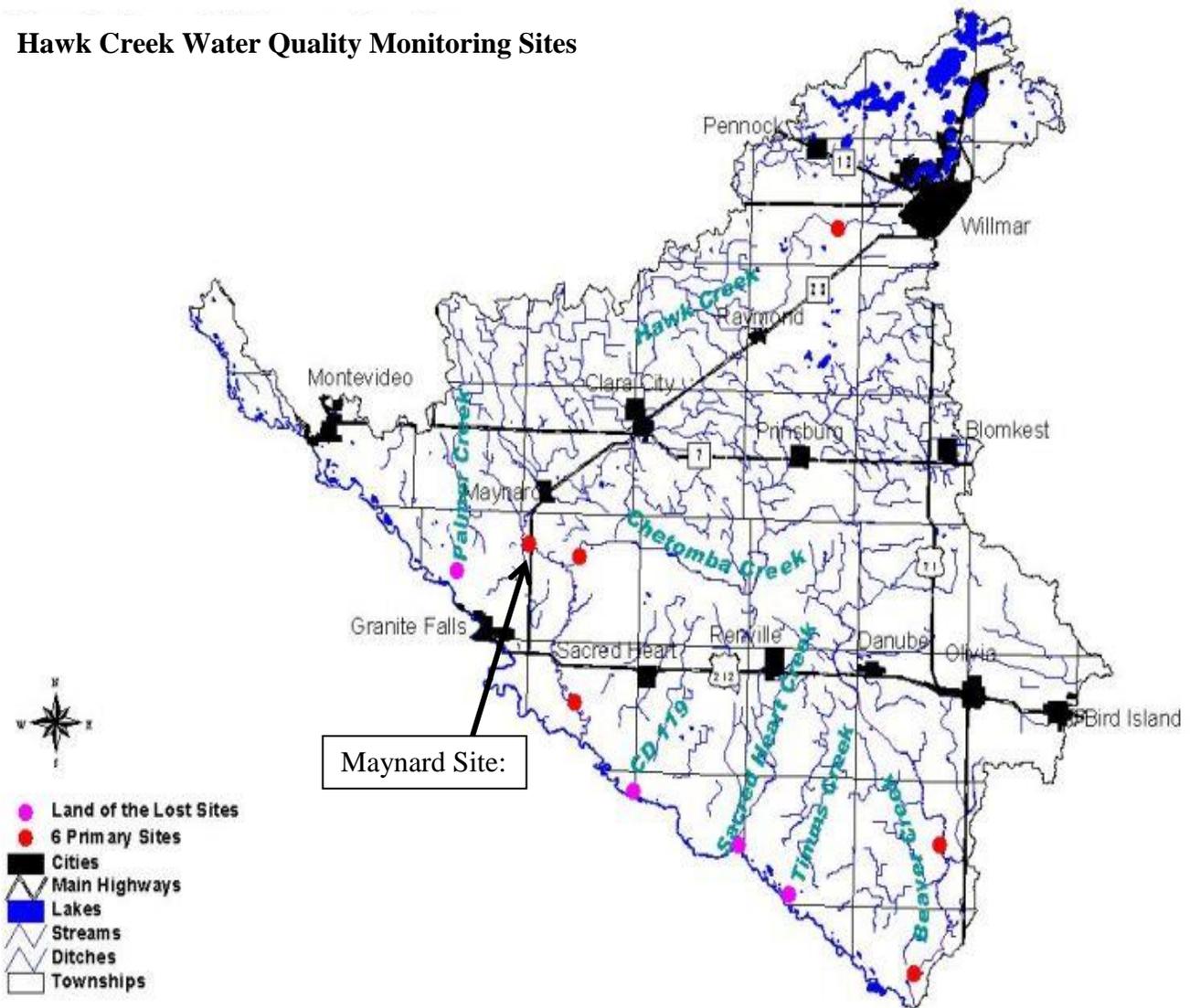
Table: HCWP Fecal Coliform and Turbidity Impaired Reaches in Chippewa County

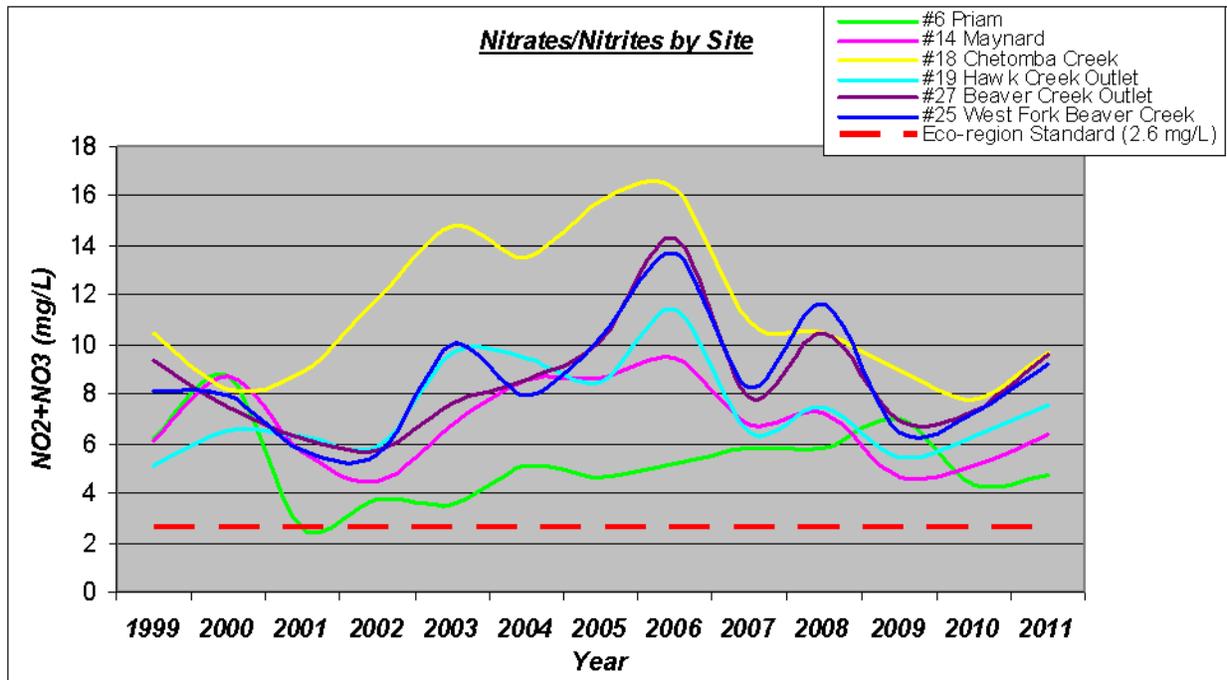
Reach Name	Reach Description ('from' - 'to')	Yr listed	River ID#	Affected designated use	Pollutant or stressor	TMDL Target start	TMDL Target completion
Hawk Creek	Unnamed cr to Unnamed cr	2006	07020004-568	Aquatic Recreation	Fecal Coliform	2010	2014
Hawk Creek	Unnamed cr to Unnamed cr	2006	07020004-568	Aquatic Life	Turbidity	2010	2014

Map: Identifying TMDL's in Hawk Creek Watershed



Hawk Creek Water Quality Monitoring Sites





Sites monitored in Chippewa County as part of HCWP:

Hawk Creek near Maynard:

The average yearly measurements from this site from 1999-2011 have been over the Ecoregion standard for Total Phosphorus and Nitrates/Nitrites for all consecutive 13 years.

Palmer Creek:

This site is predominately pasture/feedlots and grasslands along the ditch corridor, with a few rural residents along the creek. Cattle are in close proximity to Palmer Creek (we have some in the creek). For measurements taken from 2005-2012, Palmer Creek has been over the E. coli Ecoregion standard 66% of the time, over the fecal coliform standard 72% of the time, and over the nitrates/nitrites standard 56% of the time. Turbidity and Total Suspended Solids have been closer to the standards, with only 11% not making the standard.

Known Issues:

- Over 87% of the landscape is agricultural, including corn, soybeans, sugar beets and small grains.
- Renville and Chippewa Counties have granite rock outcrops, along the Minnesota River Valley. These rock outcrops hold many unique and rare plants and animals.
- Approximately 98% of the original wetlands in the watershed have been drained.
- Nitrogen levels have been above the Ecoregion standard since HCWP starting monitoring in 1999. The installation of buffers will significantly decrease nutrient levels entering waterways.
- Increased water quantities going down our waterways in shorter amounts of time are accelerating streambank erosion and sedimentation within the watershed. More water retention is needed, especially in the upper reaches of the watershed.

Upper Minnesota River Watershed:

Watershed Characteristics ~

The Upper Minnesota River Major Watershed is one of the twelve major watersheds of the Minnesota River Basin. It is located in west central Minnesota within Big Stone, Chippewa, Lac qui Parle, Stevens, Swift, Traverse counties and northeastern South Dakota and southeastern North Dakota. There are 12 municipalities in the watershed of which the city of Ortonville is the largest. The Upper Minnesota River major watershed area is approximately 2,097 square miles or 1,341,917 acres. Of the 1,341,917 acres, 487,068 acres are located in Minnesota and only 27,436 acres of that is in Chippewa County. The watershed is subdivided into 99 minor watersheds, only 3 minor watersheds make up the Chippewa County portion. Agriculture is the predominant land use within the watershed.

Situated within the Northern Glaciated Plains Ecoregion, the watershed can further be divided into three geomorphic settings: the headwaters flowing off the Coteau des Prairies, the lower basin-situated within the Blue Earth Till Plain and 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. Soils are predominantly loamy, with landscapes having a complex mixture of well and poorly drained soils. Drainage of depressional areas is often poor. As a result, tile drainage is common. The water erosion potential is moderate on much of the land.

The Coteau des Prairies (or “Highland of the Prairies” called by the French explorers) 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 and originally impounded 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 1,460 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 River passes through the Big Stone-Whetstone Reservoir (constructed during the 1970s). Further down, the Yellow Bank River, whose headwaters are also in South Dakota, enters into the Minnesota River. The Upper Minnesota then meets Marsh Lake and Lac qui Parle Lake (meaning “the Lake that Speaks”). 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, then confluences with the Minnesota River near the City of 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.

Land use within the Watershed is primarily agricultural, with 76% of the available acres utilized for production of grain crops, mainly corn and soybeans. Of these acres, approximately 15% have been tilled to improve poorly drained soils. The majority of the crop-lands (82%) are classified as moderately productive. Approximately 39% of the lands draining into the Upper Minnesota River 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.

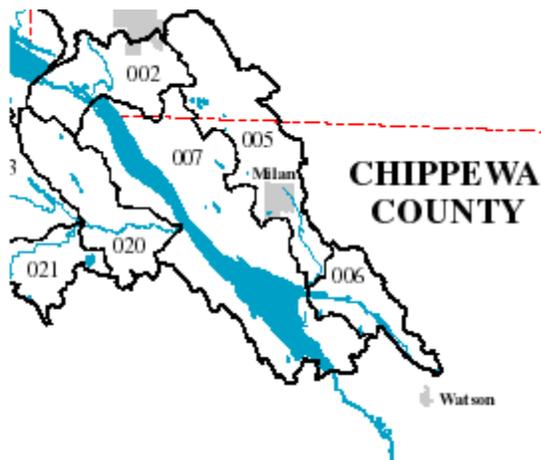
Potential Pollutant Sources ~

The Minnesota River - Headwaters watershed is scheduled to start intensive watershed monitoring in 2015 by the MPCA.

- Groundwater in the watershed is from three principal aquifers: near surface sand and gravel aquifers, buried sand and gravel aquifers, and aquifers within Cretaceous deposits. Hard water, commonly high in iron is found within the sand and gravel aquifers. The Cretaceous aquifers contain relatively soft water, low in iron but high in chloride, sulfate, sodium, and boron.
- Surface Water in the Minnesota River's major watersheds is a moderate to severe problem. Constituents of concern often include: *suspended sediments, excess nutrients (primarily nitrogen and phosphorus), pesticides, pathogens, and biochemical oxygen demand*. High concentrations and loads of suspended sediments and nutrients can often be linked to artificial drainage patterns (ditches, tile, etc.) and wetland reductions. Alone or in combination, these landscape alterations have effectively increased the hydraulic efficiency and magnitude of storm and snowmelt runoff events. Estimates vary, but about 80 percent of the wetlands in the Minnesota River Basin have been drained and converted to other uses. High nutrient levels in lakes and streams often result from over-land runoff across erodible soils. Eroded soils and the runoff which transport these particles often carry pesticides and excess nutrients to receiving waters. Increased discharges and elevated flood peaks also erode streambanks, destroy shoreline vegetation and deposit sediment on floodplains, in streams, and in downstream receiving waters. Sediment in water often leads to impaired habitat for aquatic life, decreased photosynthetic activity, and reduced recreational quality. Excessive levels of nutrients often promote eutrophication; defined as nutrient rich oxygen poor water. Elevated nutrient levels often promote abundant algal populations which in turn can cause large diurnal fluctuations in dissolved oxygen concentrations (photosynthesis being responsible for daytime highs, respiration for nighttime lows). In addition, algal decomposition is often a major factor responsible for high biochemical oxygen demand (BOD) levels. BOD is the amount of oxygen consumed biologically and chemically-over a five day period. The BOD test reflects the effect of easily decomposed organic materials on oxygen

depletion. Other sources of organic materials include eroded organic materials associated with sediment or manure, and discharges from faulty wastewater treatment plants, and faulty septic systems. The presence of water-borne pathogens is often characterized by determining the population of fecal coliform in water quality monitoring samples. Fecal coliform are a subset of bacterial populations, and generally arise from the fecal excrement of humans, livestock, and water fowl. Common sources of fecal coliform include feedlots, faulty wastewater treatment plants, and faulty septic systems.

Identifying Chippewa County portion of Upper MN River Watershed



Each minor watershed is assigned a unique five digit number. The first two digits are the major watershed number. The last three digits are the minor watershed number.

22 015 Unique five digit identifier
 └──┬── Minor watershed number
 └──┬── Major watershed number

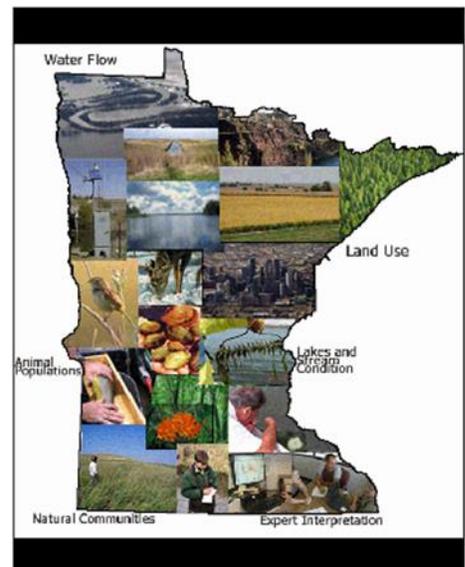
MAP KEY
 ─── Stream
 Lake
 City
 - - - County Line
 ─── Minor Watershed Boundary
 015 Three Digit
 Minor Watershed Number

Watershed Health is a term used to describe how well ecological systems are functioning. The biggest challenge in defining the health of any given watershed is to decide what "well-functioning" means for each location.

An ecologist will decide if a watershed appears to be "healthy" based on measurements like:

- presence of quality habitat,
- stream flow patterns and lake characteristics,
- presence of known contaminants and ecological risk factors,
- health and diversity of plant and animal communities;

while also considering the climate, geology, location and land use history of the watershed. (MN DNR)

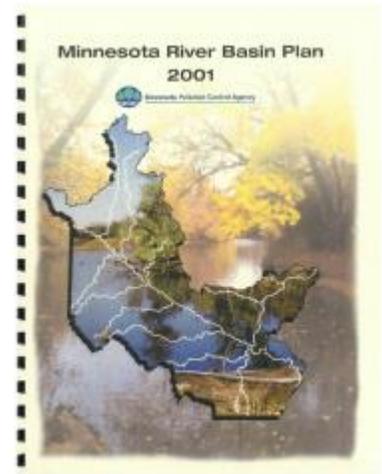


B. Minnesota River Basin Plan 2001

The overall goal of the MN River Basin Plan is *“To restore, protect and maintain the water quality, bio-diversity and the natural beauty of the Minnesota River”*; or, to make the Minnesota River “fishable and swimmable” once again.

This plan was created with the input of many agencies and organizations in Minnesota contributing. All the agencies we sought comments from were part of this group. The Minnesota River Basin Plan developed a nice platform to follow and use while assessing the water quality and quantity issues in Chippewa County. The document can be found at:

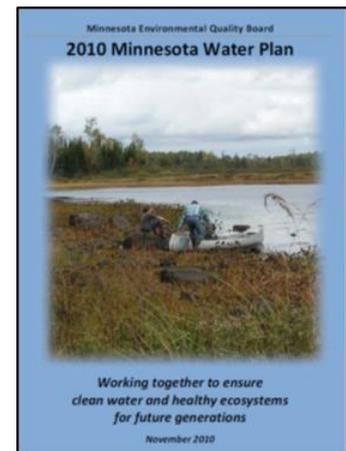
www.pca.state.mn.us/index.php/view-document.html?gid=9946



C. Minnesota Environmental Quality Board: 2010 Minnesota Water Plan

The *2010 Minnesota Water Plan (Plan)* defines a vision for Minnesota’s water resources that ensures healthy ecosystems and meets the needs of future generations. This *Plan* gave good direction on what regional and state agencies to seek advice from when developing and evaluating assessments and trends in our area of Minnesota but also looking at the larger picture of our watersheds within the county and a state and global view. The *Plan* is available at the Environmental Quality Board’s Internet site:

www.eqb.state.mn.us.



D. 2012 Local Work Group Development of Local EQIP (Chippewa NRCS led group)

The main resource concerns identified were *Water Quality* and *Soil Erosion*. Why? 90% plus of Chippewa County is in agriculture production and several streams are listed as impaired.

The geographic regions within the District that are especially sensitive are as follows:

- Shakopee Creek Watershed located within the Chippewa River Watershed.
- Palmer Creek Watershed located within the Hawk Creek Watershed.
- Lines Creek Watershed located within the Chippewa River Watershed.
- Dry Weather Creek Watershed located within the Chippewa River Watershed.

Known Issues:

- Shakopee Creek is in a heavy sugar beet area and includes a stream that is impaired for both fecal and turbidity.
- Palmer Creek empties into the Minnesota River which is impaired.
- Lines Creek is listed as impaired on the 2010 streams layer for fecal and turbidity.

- Dry Weather Creek is listed as impaired on the 2010 streams layer for fecal.

E. Public Drainage Ditch Buffer Study 2006 --- prepared by the Minnesota Board of Water and Soil Resources at the direction of the Minnesota Legislature.

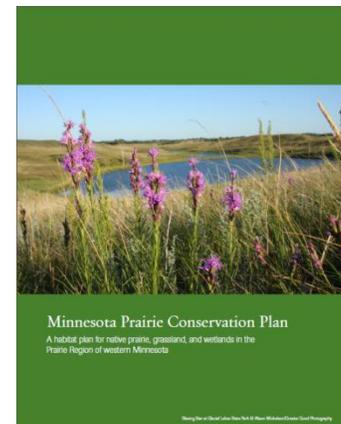
Key findings regarding buffers along public drainage ditches in Minnesota:

- GIS miles of public drainage ditch = 21,415 miles
- Approximately 60 percent of the estimated total miles of public drainage ditches in Minnesota may currently be buffered by natural buffers (45 percent), voluntary conservation program (8.3 percent), or Section 103E.021 required grass buffer strips (7.3 percent).
- The combined voluntary and natural buffers protect an estimated 53.8 percent of the public drainage ditches; however there are wide differences by county and region of the state.
- Natural buffers protect greater than 90 percent of ditches in many northern forested counties but are less prevalent in western and southern portions of the state where row crop agriculture is predominant.
- Summary of current public drainage ditch voluntary and natural buffers based on GIS evaluation:
 - Big Stone County – 35.2 percent
 - Chippewa County – 31.4 percent
 - Lac qui Parle County – 42.8 percent
 - Swift County (no data available, professional judgment) – 37 percent

F. Minnesota Prairie Conservation Plan

There are seven primary threats to the remaining native prairie and associated habitats in Minnesota.

- Continued loss of prairie and wetlands to conversion, development, and destruction.
- Invasive species
- Detrimental grazing practices
- Woody plant encroachment
- Energy development
- Atmospheric Nitrogen Deposition
- Change in Climate



All of these threats are impacting Minnesota’s prairie and wetland systems at the current time. Any one threat can be a major problem but collectively they are degrading thousands of acres annually and are creating urgency for immediate conservation action. To view the completed document go to:

http://files.dnr.state.mn.us/eco/mcbs/mn_prairie_conservation_plan.pdf. See Maps 8A & 8B.

G. Additional --- Surface Water Management assessment info.....

Why drainage is an important topic:

From the Minnesota Board of Water and Soil Resources:

- Water quality and quantity management are increasingly important as the Impaired Waters List for Minnesota continues to grow. Total Maximum Daily Load (TMDL) studies and plans are developed and implemented, and the Minnesota Clean Water, Land and Legacy Amendment is implemented.
- Because drainage is critical for agriculture, roads and urban areas, drainage management is likewise critical. Drainage management can be a sensitive issue.
- Drainage infrastructure provides substantial opportunity for multipurpose water management practices and projects.

From the Minnesota Department of Agriculture:

New drainage and drainage improvements and repairs represent an opportunity to design and install systems in ways that help reduce nutrient losses into surface water and positively affect the timing and flow of drainage water into surface waters. These efforts combined with wetland restoration and water retention initiatives can have positive impacts upon water quality in agricultural landscapes.

The *Minnesota Department of Natural Resources* writes that cumulative impacts of accelerated runoff due to loss of available water storage on the land surface have fundamentally changed the flow regimes in many watersheds.

- Increased flood potential due to decreased lag time of water entering surface drainage systems has resulted in greater and more frequent high flow events, especially in larger systems.
- Increased erosion in natural drainage systems due to accelerated runoff and more frequent flow events.
- Potential impacts to public infrastructure due to increased flood potential and necessary remediation and repair.
- Negative impacts to watershed ecology through habitat minimization.
- The public's expectations concerning drainage water management continues to evolve.

Multipurpose drainage management involves much more than just the specific drainage system. Rather conservation practices for on field, on farm and on drainage system must all work together using structural and non-structural means. Many conservation practices support multiple goals.

Guiding principles for multipurpose drainage management include

- Reduce runoff and nitrogen loss by increasing soil profile water storage and cover crops.
- Avoid runoff concentration.

- Protect concentrated flow areas from erosion.
- Reduce peak flows to reduce erosion and flooding, and to improve water quality and habitat. Store water appropriately.
- Manage nutrients and denitrify tile drainage.
- Target investments for both incremental practices and watershed approaches.
- Improve agricultural sustainability.

H. Water Plan Committee Trends, Concerns and New Technology Identified

Rural Building Demolition and Site Abandonment: What are the effects on the groundwater? Looking for a more secure way to make sure hazardous waste; such as fluorescent lights, thermostats, thermometers, are being disposed of properly before demolition; wells are being sealed; septic tanks are abandoned; loss of windbreaks, loss of wildlife habitat, etc., are being addressed on the forefront.

Expiring CRP: What are the effects of lost CRP acres? Identify where the acres are coming out and monitor changes if any.

Pattern Tiling: What concerns is this creating? Decreased recharge? Increased volume of water entering ditches/surfaces waters?

Communities and Wellhead Protection: What is being done for education in the communities that have updated wellhead protection plans? Are all surrounding land uses being evaluated and are programs needed to help assist with protecting wellhead protection areas? Expand wellhead protection education to anyone with a private well.

Stormwater Ponds vs. Rain Gardens: Seek more education on which is better for groundwater recharge.

Endocrine Disrupting Compounds (EDCs): EDCs are chemicals which, acting on human or animal endocrine systems, may have an adverse effect on reproduction or development. Most are man-made but there are a number of naturally occurring chemicals which may disrupt the endocrine system.

Pictometry: Chippewa County recently purchased a new analysis product from Pictometry, Inc. Pictometry is high resolution digital oblique imagery covering all of Chippewa County. The photos were taken from low altitude planes in November of 2012. With these images, county staff will be able to conduct detailed site analysis from the desktop. Virtual access to remote stretches of watersheds and stream banks can be gained through the use of this desktop product. County staff intends to utilize Pictometry when working with feedlots, impaired waters, Wild and Scenic River segments, zoning analysis, water plan work

The data cutoff for Drought Monitor maps is Tuesday at 7 a.m. Eastern Time. The maps, which are based on analysis of the data, are released each Thursday at 8:30 a.m. Eastern Time.

programs, flood plain research and others. Pictometry is another tool for staff to use when communicating with residents of Chippewa County.

LiDAR: Light Detection and Ranging is a method of collecting detailed digital elevation data. LiDAR – derived Digital Elevation Models provide landscape detail for some mapping and targeting tools. Clean Water Funding is supporting the acquisition of a statewide LiDAR data set. (http://www.mngeo.state.mn.us/committee/elevation/mn_elev_mapping.html) Staff will need training on how to use this tool and how it will work in conjunction with pictometry, GIS and in doing a Terrain Analysis.

Terrain Analysis: A Terrain analysis uses digital elevation data to analyze topographic features or terrain attributes. Selected terrain attributes can be analyzed to identify nearstream critical source areas related to upland erosion and surface runoff, such as gullies.

Drought conditions: Effects on water recharge? Rivers drying up or having very low flow? Industries affected? Effects on recreation? Change in farming practices, i.e. irrigation?

For local details and impacts, please contact your [State Climatologist](#) or [Regional Climate Center](#).

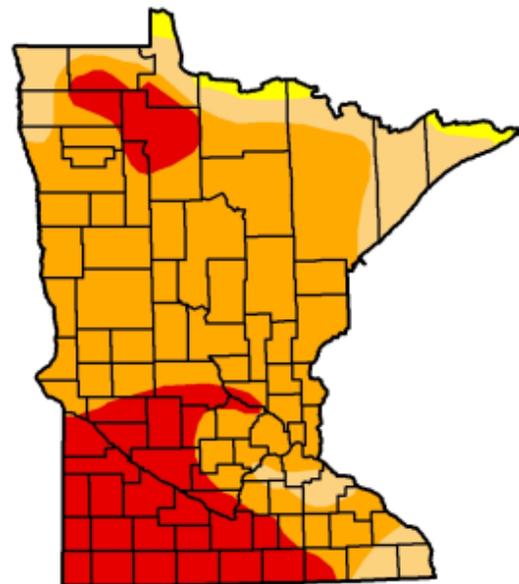
U.S. Drought Monitor

Minnesota

January 29, 2013
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	97.99	83.59	25.11	0.00
Last Week (01/22/2013 map)	0.00	100.00	97.99	83.59	25.11	0.00
3 Months Ago (10/30/2012 map)	0.00	100.00	96.38	43.13	25.29	0.00
Start of Calendar Year (01/01/2013 map)	0.00	100.00	97.84	83.44	25.17	0.00
Start of Water Year (09/25/2012 map)	1.92	98.08	77.45	35.36	18.51	0.00
One Year Ago (01/24/2012 map)	0.79	99.21	96.12	24.08	0.00	0.00



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>



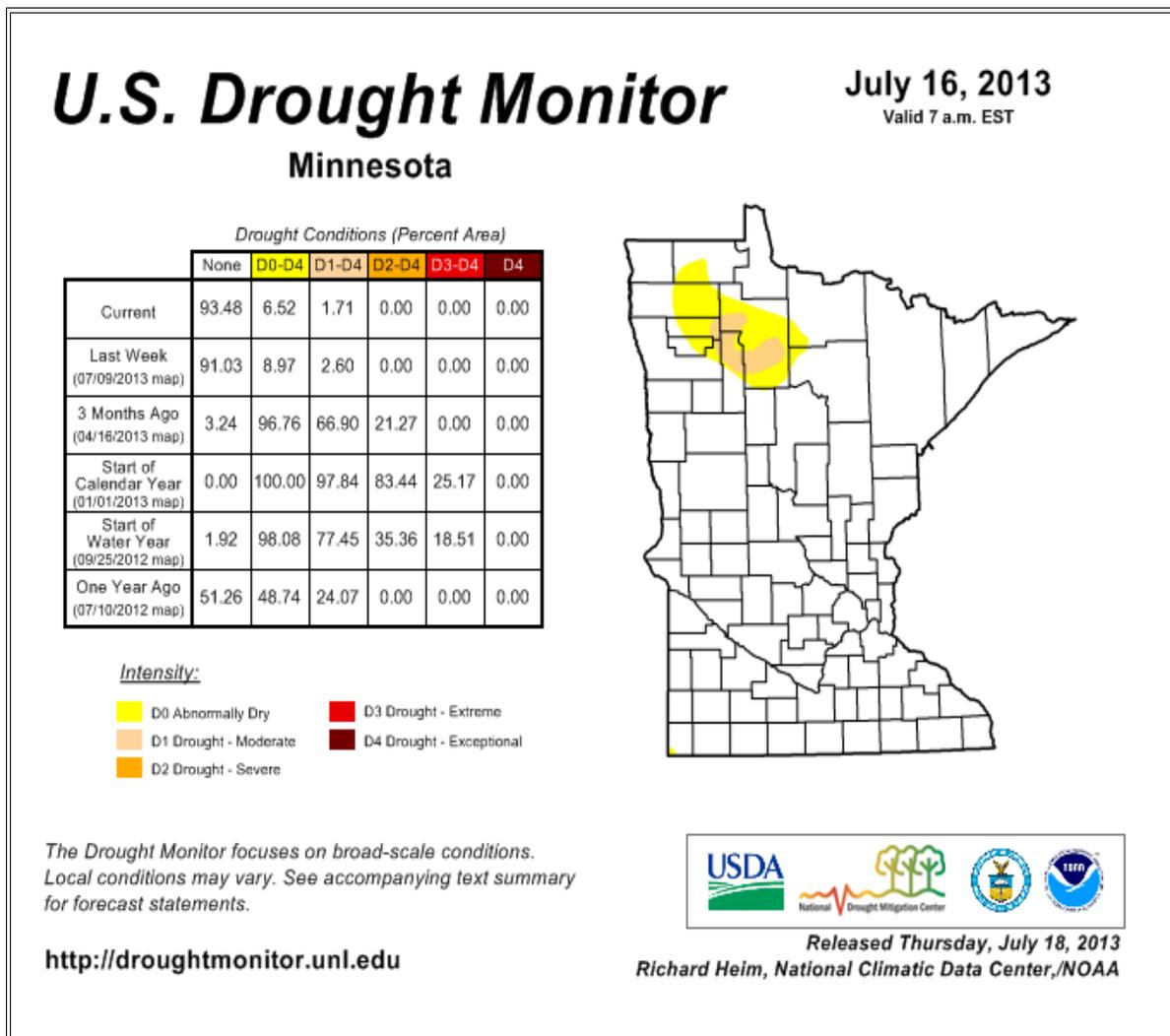
Released Thursday, January 31, 2013
Mark Svoboda, National Drought Mitigation Center

Update released on July 18, 2013:

The U. S. Drought Monitor, released on July 18, places small portions of northwest and north central Minnesota in the Moderate Drought category (map at right). Just two percent of Minnesota's landscape is in Moderate Drought, a substantial improvement over early April when 67 percent of Minnesota was experiencing Extreme Drought or Severe Drought.

Subsoil moisture across 10 percent of Minnesota's landscape is said to be Short or Very. Eight percent of recent reports indicate Short or Very Short topsoil moisture.

The lingering drought situation in northwest and north central Minnesota is the result of abnormally dry weather beginning in autumn 2011, continuing through 2012 and into the first half of 2013.



Priority Concern 2. Groundwater Water Quality and Quantity Concerns

What is all the concern about groundwater contamination?

Although most Minnesota groundwater is naturally potable (suitable for human consumption), nature does produce groundwater with a chemical make-up that is not potable in some areas. In addition, many human activities such as urban development, industrial processing, agriculture, chemical spills and even individual household septic systems have caused significant groundwater contamination in areas that previously had clean, potable groundwater.

Groundwater contamination can disperse over a wide area or migrate very deep underground. Often, many tons of overlying soil, sediment or rock hide the exact location of the contamination and present a substantial physical barrier to clean up efforts. As the groundwater moves, it often contaminates the earth materials it passes through which increases the volume of material that needs to be cleaned. The cost and technical difficulty of removing the contamination often multiplies over time as the contamination spreads out or migrates deeper.

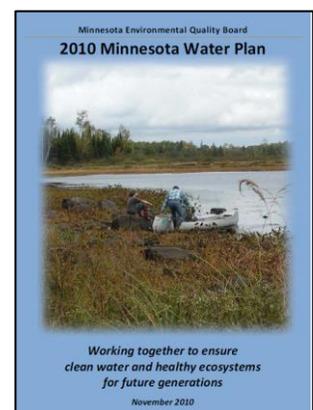
Under favorable conditions, certain contaminants tend to degrade or clean up naturally in a reasonable amount of time in ground water. However, in other cases, contamination can persist for long times because groundwater typically moves very slowly and often lacks the range of purifying organisms and processes that tend to cleanse streams and lakes much quicker. As a matter of fact, some of Minnesota's groundwater entered the subsurface more than 30,000 years ago and is still slowly traveling deep underground. (Source MPCA)

A. Minnesota Environmental Quality Board:

2010 Minnesota Water Plan

The *2010 Minnesota Water Plan (Plan)* defines a vision for Minnesota's water resources that ensures healthy ecosystems and meets the needs of future generations. In Chapter 3 Evaluating the Status of Minnesota's Water Resources in the Present – it states the following: *“The key goal for water resource management is to have enough water of the quality desired for the intended use at the location where it is needed now and for future generations. That is, while it may not be possible or practicable to protect or restore all waters of the state to the highest levels of quality, the state must be strategic in its water protection and restoration efforts to help ensure that ground and surface waters of the quality and quantity desired are available and that standards are met. Therefore, trend information is critical to defining a strategy that will address threats to water resources and ensure effective policies and plans that direct activities toward protecting and restoring water quality and quantity.”*

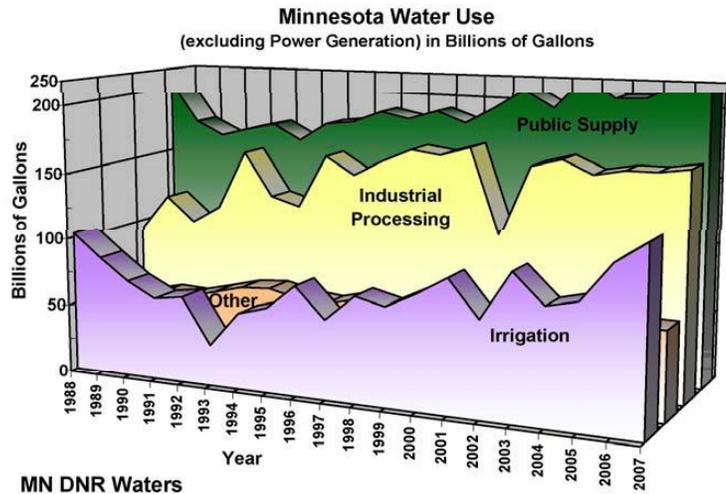
Chapter 3 continues on to address water quality trends and once again provides good direction on what regional and state agencies to seek advice from when developing and evaluating assessments and trends in our area. The full *Plan* is available at: www.eqb.state.mn.us.



Managing for Water Sustainability

The Minnesota Environmental Quality Board (EQB) produced a report of statewide water availability in 2008, titled, “*Managing for Water Sustainability*.” According to the report, Minnesota water use has increased by 24% over the last 20 years as tracked by the Department of Natural Resources through the water permit program, while population has increased 22%. The diagram below shows water use by major category in Minnesota from 1985-2007.

➤ *Public water supply.* Water distributed by community suppliers for domestic, commercial, industrial and public users. This category relies on both surface water and ground water sources. The increase in volume shown over the past 20 years correlates to a growth in population over the same period. Typically, residential water users consume 75 gallons per person per day. Public water supply accounted for approximately 16% of the total water used in 2007. It is estimated that water use from private household wells adds another 27.5 billion gallons to the public water supply annual use, representing slightly less than 2% of the total state water use.



➤ *Industrial processing.* Water used especially in mining activities, paper mill operations, and food processing, ethanol production, etc. Three-fourths or more of withdrawals are from surface water sources. Industrial processing used 12% of the total state water use for 2007. Based on ethanol facility water withdrawal reports provided to the DNR (1998-2006), Minnesota’s ethanol industry achieved a 30% reduction in water demand; improving from an average of almost six gallons to about four gallons of water demand per gallon of ethanol produced. Progress has been made in reducing water use while also increasing the amount of ethanol produced from a bushel of corn.

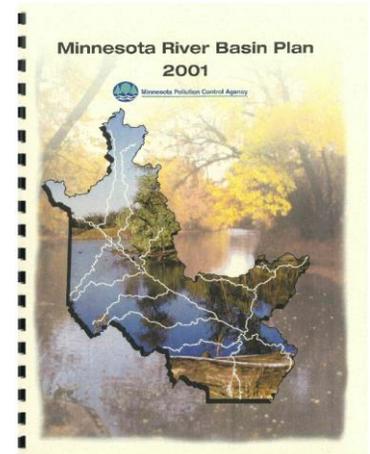
➤ *Irrigation.* Water withdrawn from both surface water and ground water sources for major crop and non-crop uses. Nearly all irrigation is considered to be consumptive use. Of 7,000 active water appropriation permits, 73% are for irrigation. Irrigation represented 9% of the total permitted water use in the state, most of which (89%) came from ground water sources.

➤ *Other.* Large volumes of water withdrawn for activities, including air conditioning, construction dewatering, water level maintenance and pollution confinement. Collectively, these represented about 4% of Minnesota’s 2007 total water use.

B. Minnesota River Basin Plan 2001

Although the *Minnesota River Basin Plan* primarily covers surface water data pertaining to the Minnesota River and its tributaries, it also addresses ground water. On page 73, 74, 81 and 82 of the *Minnesota River Basin Plan* it recognizes the need to protect, maintain and restore the quality and quantity of ground water in the Minnesota River Basin. It states that some of the pollutant sources that pose a threat to ground water include industrial disposal, improper application of pesticides and fertilizers, failing septic systems, former dumps, landfills and hazardous waste disposal. The complete document can be found at:

www.pca.state.mn.us/index.php/view-document.html?gid=9946



C. Minnesota Pollution Control Agency (MPCA)

Report on Chemicals of Emerging Concern in Groundwater

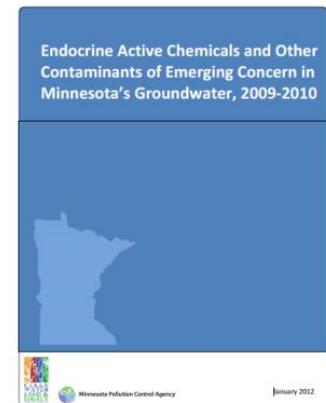
The MPCA's recent report provides significant information about groundwater in Minnesota. Baseline testing of 40 wells was done to find out what chemicals of emerging concern are currently in our groundwater and how they might be harmful. Contaminants of emerging concern are synthetic or naturally-occurring chemicals that are not commonly monitored or regulated in the environment. Common classes of these chemicals include antibiotics, detergents, fire retardants, hormones, personal care products, and pharmaceuticals. Contaminants of emerging concern are not necessarily newly-manufactured chemicals. In some cases, the release of these chemicals into the environment has occurred for a long time, but laboratory techniques sensitive enough to detect them in the environment were only developed within the last decade. This information is passed on to the Department of Health so it can establish health guidelines.

To see the complete study go to the following site: (This study was made possible through funding from the Clean Water Legacy Amendment)

[Endocrine Active Chemicals and Other Contaminants of Emerging Concern in Minnesota's Groundwater, 2009-2010](#) (wq-cm4-03)

The following is the SUMMARY AND CONCLUSIONS (page 21) section of the report:

This study suggested EACs (Endocrine Active Chemicals) and other contaminants of emerging concern were present at low concentrations in the ambient groundwater underlying urban areas in Minnesota that may be affected by wastewater contamination. Over 80 percent of the detected chemicals were measured at concentrations



of less than one microgram per liter (µg/L). No concentrations exceeded any applicable health guidance values established by the Minnesota Department of Health. The most-frequently detected chemicals were the fire retardant tris (dichloroisopropyl) phosphate, the antibiotic sulfamethoxazole, and the plasticizers bisphenol A and tributyl phosphate, which were detected in approximately 20 percent or less of the sampled wells.

EACs were detected in three of the sampled wells. The detected EACs were bisphenol A, trans-diethylstilbestrol, and 4-cumylphenol. Two of the wells with detections of these chemicals tapped a landfill-leachate plume, and the remaining well was shallow and supplied water to a residence.

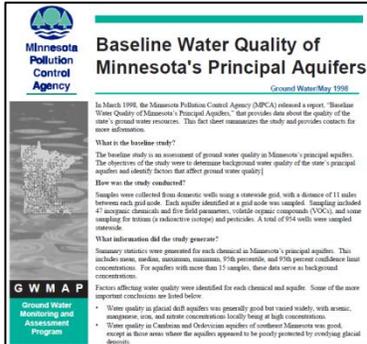
Groundwater affected by landfill leachate had the largest number of detections of EACs and other contaminants of emerging concern and the highest total sum of concentrations of these chemicals. The State's continued efforts to properly close, monitor, and maintain landfills likely will help minimize the migration of these contaminants to other parts of the aquifers. Further data collection will refine this assessment of EACs and other contaminants of emerging concern in Minnesota's groundwater. A limited number of wells in residential areas on SSTs were available for sampling from November 2009 to June 2010. The MPCA's Ambient Groundwater Monitoring Network currently (2012) is being enhanced to provide a better assessment of the effects of land use on groundwater quality. Additional wells in unsewered residential areas were installed for this monitoring network enhancement during the course of this study. These wells likely will be targeted for sampling as part of future monitoring. This study did not assess other settings susceptible to contamination from EACs and other contaminants of emerging concern, such as feedlots (Meyer et al. 2000) or agricultural lands amended with biosolids from wastewater treatment facilities (Kinny et al. 2006).

Additional data on the amount of contamination in the water samples is needed for subsequent assessments of EACs and other contaminants of emerging concern in the groundwater since these chemicals frequently were detected at concentrations at or below the method reporting limit. The collection of more field blank samples during future sampling events will provide a better assessment of the magnitude of contamination and will refine the characterization of the occurrence of these chemicals in Minnesota's groundwater.

Groundwater Monitoring and Assessment Program (GWMAP) / Ambient Groundwater Monitoring / Statewide Baseline Study

In 1993 and 1994, the Minnesota Pollution Control Agency's (MPCA) Ground Water Monitoring and Assessment Program (GWMAP) sampled 132 primarily domestic wells in MPCA Region 4, which encompasses southwestern Minnesota. This sampling effort was part of the statewide baseline assessment (baseline study). The objectives of this study were to determine water quality in Minnesota's principal aquifers, identify chemicals of potential concern to humans, and identify factors affecting the distribution of chemicals. An important benefit of this study was establishment of contacts with state and local ground water groups. GWMAP efforts in 1998 are focused on providing information from the baseline study, helping ground water groups prioritize monitoring efforts, and assisting with sampling

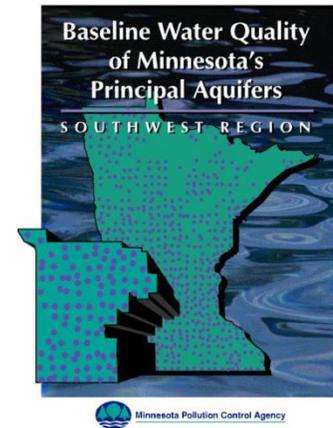
and analysis of ground water monitoring data at the state and local levels.



In March 1998, the Minnesota Pollution Control Agency (MPCA) released a report, "Baseline Water Quality of Minnesota's Principal Aquifers," that provides data about the quality of the state's ground water resources. This fact sheet summarizes the study and provides contacts for more information. The baseline study is an assessment of ground water quality in Minnesota's principal aquifers. The objectives of the study were to determine background water quality of the state's principal aquifers and identify factors that affect ground water quality. To view the entire report, go to:

<http://www.pca.state.mn.us/index.php/view-document.html?gid=6297>

Another report in cooperation with the "Baseline Water Quality of Minnesota's Principal Aquifers" report is the "Baseline Water Quality of Minnesota's Principal Aquifers Southwest Region" report. This report focuses on MPCA Region 4. Region 4 is located in southwestern Minnesota and includes the counties of Big Stone, Chippewa, Cottonwood, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, McLeod, Meeker, Murray, Nobles, Pipestone, Redwood, Renville, Rock, Swift, and Yellow Medicine. The regional office is located in Marshall.



The following information needs for Region 4 were identified in Myers et. al., 1991:

- long-term water quality monitoring;
- water quality assessments;
- baseline regional water quality;
- impacts from agricultural chemical use, industrial discharges, irrigation, and household hazardous wastes; and
- intensive monitoring in areas that lack alternative water supplies

Assistance needs were identified in the following areas:

- data collection and interpretation; and
- coordination of existing programs

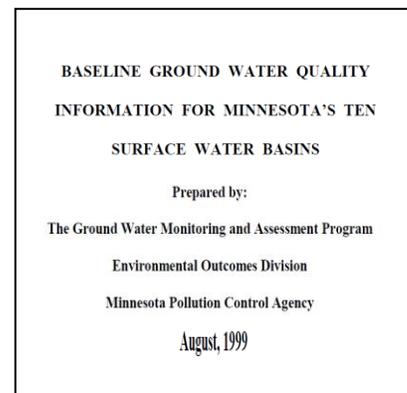
The baseline study conducted by GWMAP is ideally suited to fulfilling the informational need of establishing baseline regional water quality data. Information from the baseline study can be used to identify types of long-term monitoring that would be most useful in Region 4. Through analysis of the baseline data, GWMAP provides assistance in the area of data interpretation. The purpose of this report is to provide baseline water quality information for Region 4. Comparisons are made between water quality in the principal aquifers of Region 4 to that in the remainder of the state. Significant differences in ground water quality between Region 4 and the statewide data were determined, factors contributing to these differences were identified, and potential health implications were investigated. Water quality is a

relative term which may have multiple meanings. In this report, water quality typically refers to water chemistry. Specific instances occur where water quality relates to potential effects on humans consuming ground water or general quality of water. The reader should be aware of these different applications of water quality. To view the complete report go to: <http://www.pca.state.mn.us/index.php/view-document.html?gid=6294>

In conjunction with the above reports, another report “Baseline Ground Water Quality Information for Minnesota’s Ten Surface Water Basins” was put out in August, 1999. Although the date is more than 14 years ago it’s valuable information because groundwater doesn’t change that fast so this baseline information is very usable. The following is the information taken from this report on the Minnesota River Basin, in which Chippewa County is located.

Minnesota River Basin

The Minnesota River Basin encompasses an area of approximately 11790 square miles in western and south-central Minnesota. The Minnesota River originates in Big Stone Lake and flows eastward into the Mississippi River. Important contributing watersheds include the Yellow Medicine, Chippewa, Redwood, Cottonwood, Pomme de Terre, and Lac Qui Parle River watersheds, Hawk Creek Watershed, and Big Stone Lake Watershed. Annual precipitation ranges from less than 22 inches in the western part of the basin to over 28 inches near the confluence of the Minnesota and Mississippi rivers. Annual runoff ranges from 1.4 to about 4.5 inches and increases from west to east. The basin is intensively farmed, primarily with row crop agriculture. Topography ranges from nearly flat to steeply rolling, but most of the area is gently rolling. Steep valleys occur along the Minnesota River.



Precambrian crystalline bedrock underlies the entire area and crops out in some locations near major rivers. Precambrian and Paleozoic sedimentary bedrock occurs in the eastern third of the basin. Cretaceous bedrock underlies most of the western two-thirds of the basin, but has been eroded away along the river valleys. Sedimentary units are generally less than 100 feet thick. The bedrock surface is highly variable and sedimentary bedrock deposits may occur within less than 100 feet of the land surface.

The entire basin was glaciated. Surficial deposits range in thickness from less than 50 to well over 400 feet and consist primarily of ground moraine associated with the Altamont moraine. Smaller areas are covered by ground moraine associated with the Alexandria, Bemis, and Big Stone moraines, stagnation moraines associated with the Altamont moraine, glacial lake deposits of varying texture, and terrace deposits along the major rivers.

The hydrogeology of the basin is controlled by glaciation. Buried sand and gravel aquifers occur in most of the basin. These aquifers, taken as a whole, constitute a regional ground water system that discharges to the Minnesota River, but individual aquifers are

not hydrologically connected. Recharge occurs primarily in the uplands and in coarse textured deposits, such as those that occur within stagnation moraines. Ground water recharge and flow is likely to be slow within the glacial system. Sedimentary deposits of Cretaceous, Paleozoic, and Precambrian age are found in much of the study area and constitute important aquifers. Paleozoic bedrock aquifers are restricted to the eastern third of the basin. Paleozoic aquifers include, from the southeast corner of the basin toward the northwest, the Galena, St. Peter, Prairie du Chien, Jordan, Franconia, and Mt. Simon-Hinckley. These aquifers are generally covered by thick glacial deposits and are therefore confined and protected from contamination by humans. Precambrian crystalline rocks are not extensively used as aquifers.

Results

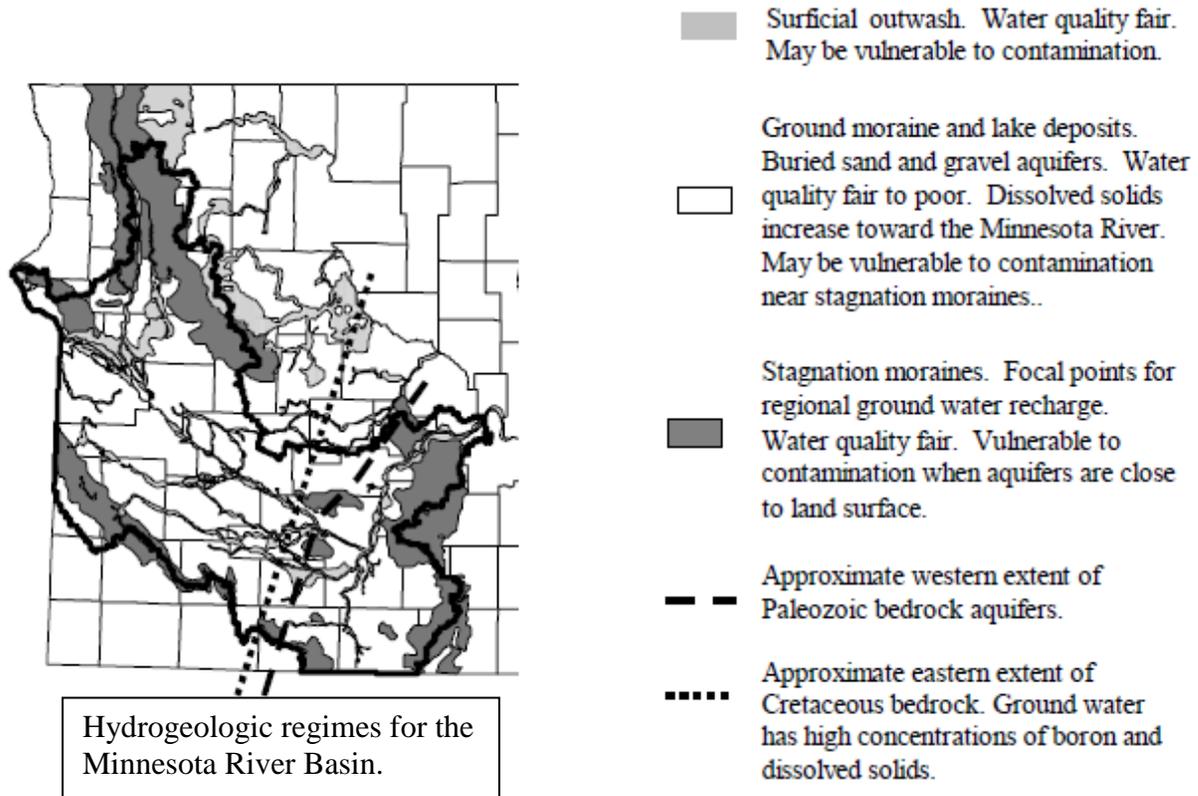
We collected 205 samples from a wide variety of aquifers and hydrogeologic settings. These include samples from buried sand and gravel, surficial sand and gravel, Precambrian, Cretaceous, St. Peter, Jordan, Galena, Prairie du Chien, Franconia, and Mt. Simon-Hinckley aquifers. The variety in aquifer types makes analysis of the data difficult. Some general results are summarized below.

- 1. Water quality of most aquifers in the basin is fair to poor, with high concentrations of dissolved solids. Boron, manganese, and nitrate concentrations can be high locally, and drinking water standards for boron, manganese, nitrate, lead, arsenic, beryllium, aluminum, chloride, and sodium were exceeded in at least one well.*
- 2. The drinking water standard for boron (600 ug/L) was exceeded in 16 percent of sampled wells. Nearly all these wells were located in the western half of the basin, where Cretaceous bedrock occurs. More than 50 percent of wells sampled in the eastern half of the basin had boron concentrations exceeding 300 ug/L, however, indicating a source of boron in the glacial deposits.*
- 3. The drinking water standard of 1000 ug/L for manganese was exceeded in 13 wells (6 percent). Nearly all manganese concentrations higher than 500 ug/L are located south of the Minnesota River.*
- 4. Tritium was primarily detected in samples collected along and within river valleys. These appear to be areas where recharge is occurring. Concentrations of dissolved oxygen were very low in these areas, however, indicating that nitrate contamination is unlikely. Nitrate was detected in only one sample that had a tritium concentration of 10 or more tritium units.*
- 5. Concentrations of dissolved solids are high throughout the basin, but increase from east to west.*
- 6. There were six exceedances of the drinking water standard for nitrate (10000 ug/L). Nearly all detections of nitrate occurred in the western half of the basin. Wells with very high concentrations of nitrate (more than 5000 ug/L) had high concentrations of dissolved oxygen and are thus sensitive to contamination. Some of these wells were large diameter, dug wells and are likely to be poorly constructed.*

We established three hydrogeologic regimes for the Minnesota River Basin.

Surficial outwash, including terrace deposits, occurs along the Minnesota and other rivers. These deposits are not extensive. Water quality is fair and the aquifers may be vulnerable to

contamination with nitrate. Stagnation moraines are focal points for regional ground water recharge. Water quality is fair. Aquifers may be vulnerable to contamination when close to the land surface. Ground moraine and fine-textured glacial lake deposits overlie most of the basin. These deposits effectively confine underlying aquifers. Water quality is fair to poor. Concentrations of dissolved solids increase from the stagnation moraines toward the Minnesota River. In areas underlain by Cretaceous bedrock, water quality is poor, with high concentrations of dissolved solids and boron.

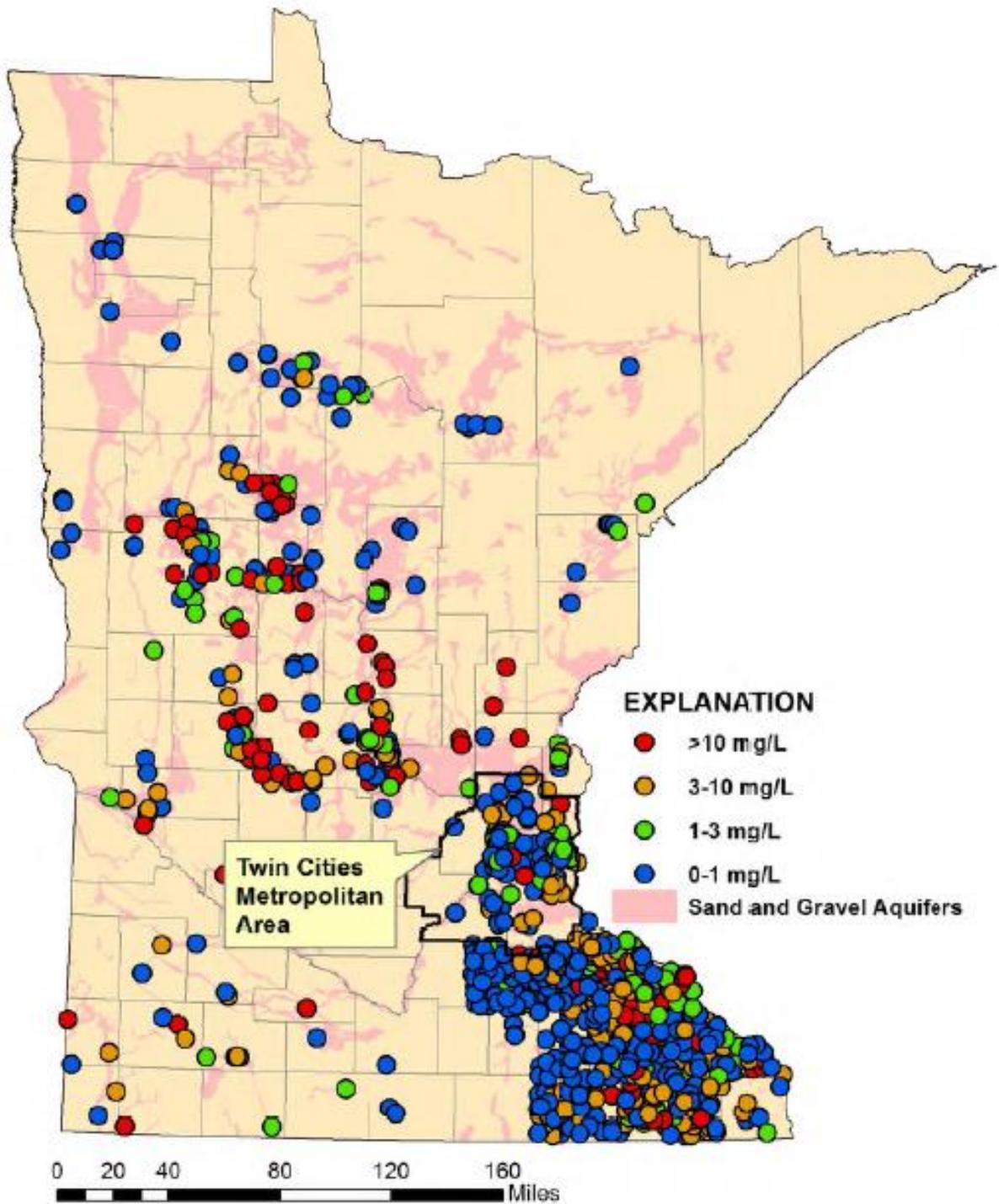


Recommendations

1. Mapping the extent of Cretaceous bedrock will help identify areas where water quality is likely to be poor and boron may exceed drinking water standards.
2. Recharge areas to the regional ground water system should be identified. These areas may require protection and long-term monitoring, particularly for nitrate.
3. Water quality of the Minnesota River and several of its tributaries is poor. The role of ground water in quality of surface water in the basin needs to be better understood. This includes understanding impacts from human activities such as tiling, manure application, and establishment of large feedlots, and understanding the impact of surface water on water quality of aquifers located in river valleys.

To view the entire report, go to: <http://www.pca.state.mn.us/index.php/view-document.html?gid=6340>

Nitrate concentrations in Minnesota's ambient groundwater, 2007-2011



D. Minnesota Geological Survey (MGS)

The mission of the MGS is to serve the people of Minnesota by providing systematic geoscience information to support stewardship of water, land, and mineral resources. MGS geological mapping and research evolve with the progress of science and technology, and the MGS works closely with university, government, industry, and community partners to ensure we respond to the diverse needs of Minnesota.

E. United States Geological Survey (USGS)

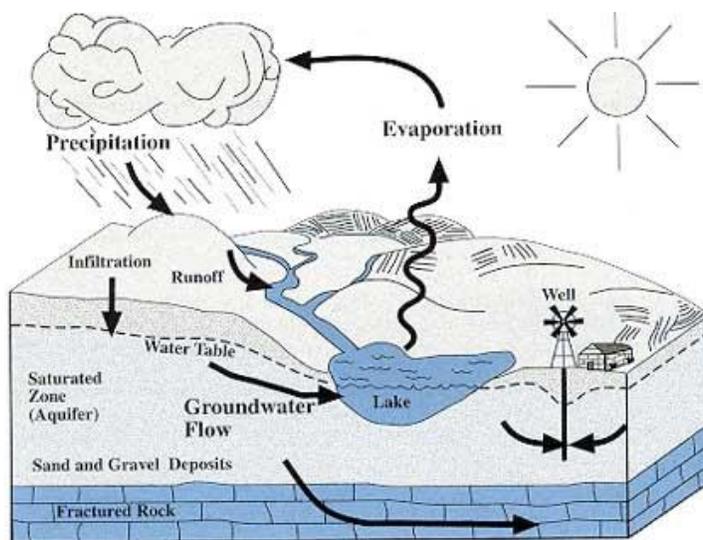
Groundwater Recharge Areas

Groundwater recharge refers to how water enters back into groundwater supplies.

The Hydrologic Cycle

For the most part, groundwater comes directly from precipitation or surface water that infiltrates into the subsurface (below the land surface). In turn, groundwater flows into many streams and lakes. Groundwater can be seen exiting from the subsurface as springs. But most commonly, we obtain groundwater from wells.

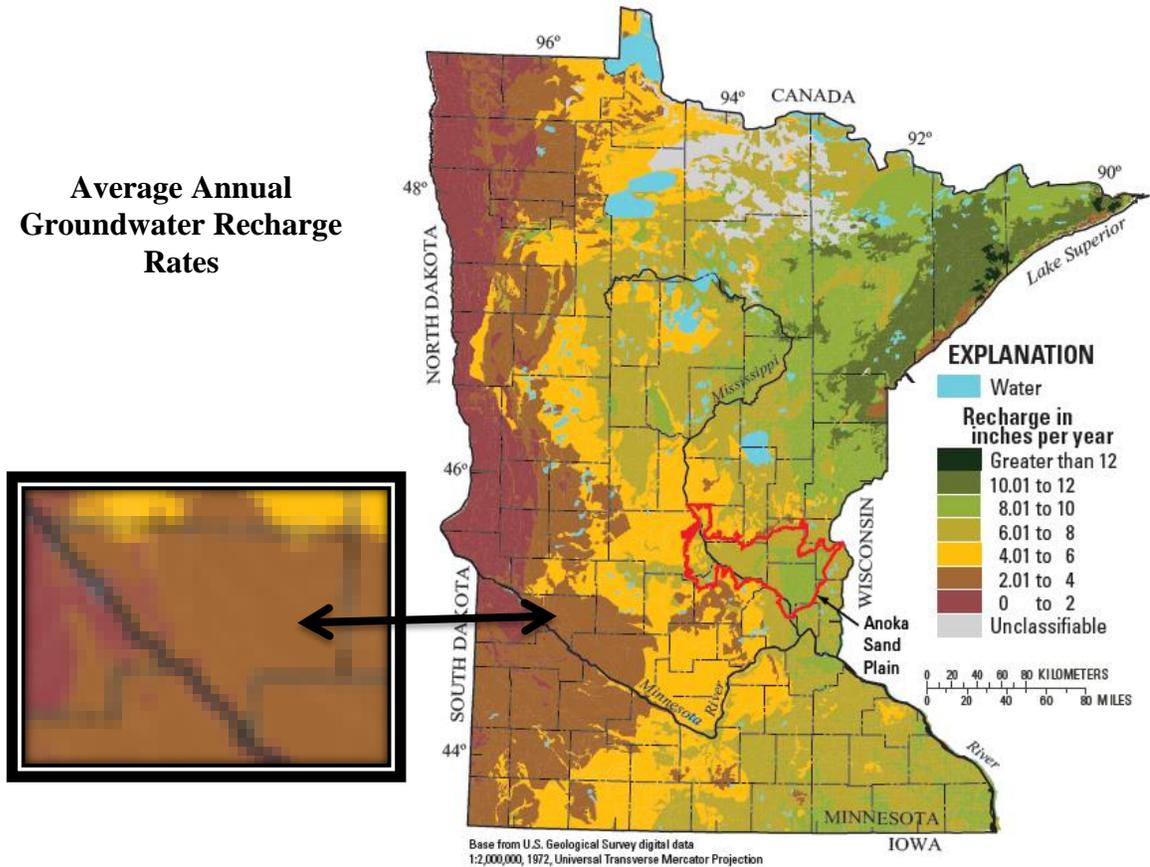
Source: www.pca.state.mn.us



Most potential water recharging the groundwater system moves rapidly into surface waters, however, some eventually reaches the aquifers. The USGS has produced a fact-sheet titled, “**Groundwater Recharge in Minnesota.**” Groundwater recharge is only between 0-2 inches per year in most of Chippewa County compared to greater than 6 inches per year in the central and eastern parts of the State. This follows general trends in precipitation. In the western and northern parts of the State, where precipitation is the least (between 20-25 inches on average per year), recharge rates are also the least. In contrast, in the central and eastern parts of the State, where precipitation is greater than 30 inches on average per year, groundwater recharge rates increase to over 6 inches per year.

Recharge rates into unconfined aquifers are typically about 20-25 percent of precipitation. According to the United States Geological Survey (USGS), water at very shallow depths might be just a few hours old; at moderate depth, it may be 100 years old; and at great depth or after having flowed long distances from places of entry, water may be several thousands of years old.

Average Annual Groundwater Recharge Rates



The Minnesota Department of Agriculture submitted a Priority Concerns Input Form (found in Appendix B), that provided a number of key implementation suggestions for Chippewa County’s Water Plan. Of special significance, the MDA submitted a map showing Chippewa County’s Water Table Sensitivity, commonly referred to as “groundwater recharge.” The map, shown on the next page, classifies the County into three aquifer sensitivity ratings: low, medium, and high. These reflect the likelihood that infiltration precipitation or surface water would reach the water table, potentially polluting the groundwater with surface contaminants.

F. Minnesota Department of Health (MDH)

The Minnesota Department of Health's (MDH) programs and monitoring activities have been mentioned throughout the Water Plan, but especially in the groundwater assessment section. This is because drinking water quality, and all of the subtopics that can be categorized under that, is the MDH's main responsibility. Specifically, MDH is involved with the following water quality initiatives:

1. Maintaining Drinking Water Quality Data
2. Drinking Water Protection: Public Water Supplies
3. Drinking Water: Private Wells (Well Management Program)
4. Clean Water Funding Activities
5. County Well Index (online database)
6. Licensed/Registered Well Contractor Directory
7. Well Sealing/Unused Wells
8. Well Disinfection for Private Wells

In addition, the MDH produces an Annual Drinking Water Report, which is a summary of drinking water protection activities in Minnesota. According to the 2011 report (the most recent one online), fifteen community systems, including the City of Watson in Chippewa County, tested positive for bacteriological contamination in 2011. Standard procedures were followed in all of these cases (i.e., disinfected, flushed, and retested) to ensure that any contamination problems had been eliminated. All of the residents served by the affected systems were informed of the situation. MDH's website is full of a variety of water quality information and Best Management Practices. For more information, visit the following website: <http://www.health.state.mn.us/index.html>

Wellhead Protection Areas

The fundamental goal of wellhead protection (WHP) is to prevent contaminants from entering public wells. To accomplish this goal, public well owners must first determine where the water supplying their well(s) is coming from this area is called the Wellhead Protection Area (WHPA). It can also be thought of as the recharge area to the public well and is ultimately the area to be managed by the WHP Plan. The process used to determine the WHPA boundaries is called delineation. An accurate WHPA delineation is critical to the overall success of WHP plans.

The WHP rule provides the framework and a minimum set of criteria to be considered for delineating WHPAs. These criteria are the technical factors which affect the size, shape, orientation, and location of the WHPA boundaries. There are five delineation criteria: 1) Time-of-Travel (TOT), 2) Aquifer Transmissivity, 3) Flow Boundaries, 4) Daily Volume of Water Pumped, and 5) Groundwater Flow. The Minnesota Department of Health (MDH) assigns staff in their Source Water Protection Unit to assist with preparing and implementing wellhead protection plans.

Drinking Water Supply Management Areas

The Drinking Water Supply Management Area (DWSMA) is the geographic area, including the Wellhead Protection Area (WHPA), which is to be protected and managed by the WHP Plan. Water suppliers use geographic landmarks, such as roads and property lines, to map the boundaries of the area so that it is identifiable to the general public.

Drinking Water Supply Management Area DWSMA Vulnerability

DWSMA Vulnerability identifies wells that should receive priority for source water protection efforts. Vulnerability assessments must address three components: 1) Geologic Sensitivity, 2) Well Construction, Maintenance, and Use, and 3) Water Chemistry and Isotopic Composition (age dating). The Minnesota Department of Health (MDH) uses a vulnerability rating method in which points are assigned for conditions that represent a perceived risk to a well. Supply wells classified as *non-vulnerable* are required to manage contaminant risks that may enter the aquifer through other wells. Wells classified as *moderately vulnerable* must manage point source contaminant risks through other wells along with identifying underground hazardous chemical storage tanks. Wells classified *vulnerable* must manage all point source contamination risks and address land use activities that threaten the aquifer.

Chippewa County's Online Source Water Protection Areas

The MDA's online source water protection mapping application reveals four Source Water Protection Areas in Chippewa County. The main information for each area is summarized below:

- **City of Milan Source Water Protection Areas** – The City of Milan has a Wellhead Protection Area of approximately 1,129 acres that was delineated in 2006. It is estimated that it takes approximately 10 years for surface water to reach the aquifer. In addition, the City of Milan has a Drinking Water Supply Management Area that is approximately 2,075 acres. Of this, approximately 114 acres are classified as “Very High Vulnerability” to potential pollution, with another 110 acres classified with “Moderate Vulnerability.” According to Minnesota State Statutes, all wells that are classified as high vulnerability must manage all point source contamination risks and address land use activities that threaten the aquifer. The moderate vulnerable wells must manage point source contaminant risks through other wells along with identifying underground hazardous chemical storage tanks. (See Map 7B)
- **City of Watson Source Water Protection Areas** - The City of Watson has a Wellhead Protection Area of approximately 551 acres that was delineated in 2007. It is estimated that it takes approximately 10 years for surface water to reach the aquifer. In addition, the City of Watson has a Drinking Water Supply Management Area that is approximately 1,132 acres. Of this, approximately 568 acres are classified as “Moderate Vulnerability.” (See Map 7D)

- **City of Montevideo Source Water Protection Areas** - The City of Montevideo has a Wellhead Protection Area of approximately 1,946 acres that was delineated in 2005. It is estimated that it takes approximately 10 years for surface water to reach the aquifer. In addition, the City of Montevideo has a Drinking Water Supply Management Area that is approximately 2,980 acres. Of this, approximately 1,235 acres are classified as “High Vulnerability” to potential pollution, with another 1,746 acres classified with “Moderate Vulnerability.” According to Minnesota State Statutes, all wells that are classified as high vulnerability must manage all point source contamination risks and address land use activities that threaten the aquifer. The moderate vulnerable wells must manage point source contaminant risks through other wells along with identifying underground hazardous chemical storage tanks. (See Map 7C)

- **City of Granite Falls Source Water Protection Areas** - The City of Granite Falls has a Wellhead Protection Area north of the community (located in Chippewa County) of approximately 638 acres that was delineated in 2010. It is estimated that it takes approximately 10 years for surface water to reach the aquifer. In addition, the City of Granite Falls has a Drinking Water Supply Management Area that is approximately 1,108 acres, all of which is considered to have “Low Vulnerability” to potential pollution. (See Map 7A)

Source Water Assessment

A Source Water Assessment (SWA) is a document - produced by the Minnesota Department of Health (MDH), provided to the public water system, and made available to the public - which summarizes a variety of information regarding the water sources used by a public water system. There are 29 areas in Chippewa County with SWAs (listed in the following table). Many of the sites are listed as having “potential” known contaminates of concern. This simply means that nearly potential pollutions sources are present in the inner wellhead management zone, such as an underground tank, sewer system, or similar potential pollution source. If “unknown” potential contaminants are listed, this simply means an inventory has not been completed. SWAs normally include the following information:

- A description of the drinking water source(s) used by the water system (i.e. your well or wells) and the area that contributes water to the source(s). This will include a map showing the location of the water source(s).

- A determination of the "susceptibility" of your drinking water source to contamination. Susceptibility describes how likely it is that a water source may become contaminated. For wells, susceptibility is based on well construction, the type of aquifer that supplies the well(s) and previous water sampling results.

- Drinking water contaminants of concern to anyone using the water source. For wells, this will be based on any detection of regulated contaminants during previous water sampling.

Chippewa County’s Source Water Assessments

Public Water Supply Name	Assessment ID	Known Contaminants of Concern?	Nearest City
Buffalo Lake Lutheran Church	5120022	Potential	Kerkhoven
Meadow Creek Assisted Living	5120161	Unknown	Montevideo
Holt House Bed and Breakfast	5120160	None	Granite Falls
Granite Falls Energy, LLC	5120154	None	Granite Falls
St. John's Lutheran Church	5120033	Unknown	Montevideo
LqP Wildlife Management Area	5120155	Potential	Watson
Kibble Equipment	5120035	None	Montevideo
Tebben Enterprises	5120001	None	Clara City
Immanuel Lutheran Church	5120011	Potential	Montevideo
Watson Hunting Camp	5120151	Potential	Watson
Maynard	1120002	Potential	Maynard
Hinterland Vineyards	5120157	None	Clara City
Watson	1120006	Potential	Watson
Jevnaker Lutheran Church	5120007	None	Montevideo
Montevideo	1120004	Potential	Montevideo
Cargill, Inc.-Gluek Office	5120042	None	Gluek
Saron Lutheran Church	5120041	Potential	Maynard
Big Bend Lutheran Church	5120023	None	Milan
Clara City	1120001	None	Clara City
Faith Evangelical Church	5120150	None	Clara City
Trinity Lutheran Church	5120010	Potential	Montevideo
Milan Beach Resort	5120027	Potential	Milan
Duffy's Good Time Saloon	5120146	Potential	Montevideo
Valin Senior Care	5120159	None	Montevideo
Western Cooperative Transport	5120043	Yes	Montevideo
Bunde Christian Church	5120026	Potential	Clara City
Ben Ervin Preserve	5120152	None	Watson
Albrecht Spring Water	5120158	Potential	Montevideo
Milan	1120003	Potential	Milan

Source: <http://www.health.state.mn.us/divs/eh/water/swp/swa/swainfo/pdwgetpws.cfm>

The preceding table reveals that one site had violated one or more standards for drinking water quality established under the federal Safe Drinking Water Act. The water system is currently taking corrective action (such as treatment or provision of bottled water) to ensure that its users are supplied with safe drinking water.

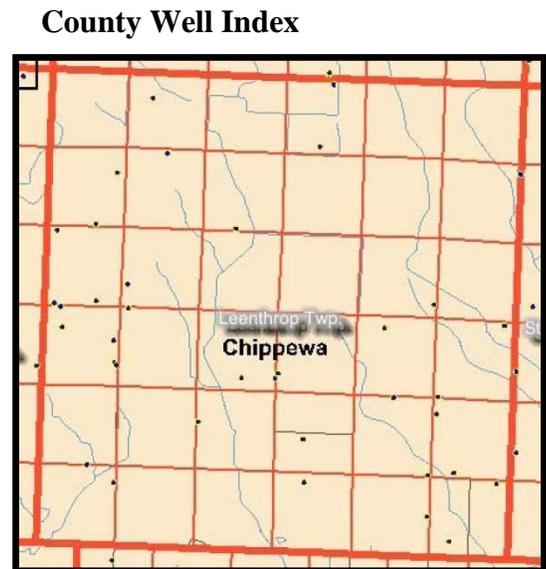
Minnesota Well Records Online Data Base

County Well Index (CWI) Online is a web-based version of the CWI data system developed by the [Minnesota Geological Survey](#) (MGS) and the Minnesota Department of Health (MDH) for the storage, retrieval, and editing of water-well information.

The CWI database contains basic information, such as location, depth, and static water level, for wells drilled in Minnesota. The database contains construction and geological information from the well record (well log) for many wells. CWI Online also provides mapping of wells onto aerial photos, allowing users to visually identify well locations.

For example, the diagram shown to the right shows the approximate well locations in Leenthrop Township in Chippewa County. By clicking on each well online, one can view the Well and Boring Record. Information can also be searched by aquifer type.

To access this data online, visit the following website:
<http://www.health.state.mn.us/divs/eh/cwi/>



Well Water Testing through Countryside Public Health at Benson, MN Certified Lab

The following information was received from Countryside Public Health for Chippewa County:

Attached are a number of graphs, summarizing Chippewa County water testing from 2002 – 2012. The graphs include the following:

1. “Total Coliform Tests Performed” by year, as well as the number of those tests that were absent/ positive for Coliform bacteria.
2. “Percentage of Total Coliform Tests that were absent /positive for Coliform” bacteria. Note that the percentage of positive Coliform tests range from about 20% - about 40% of all Coliform tests.

3. “Percentage of positive Total Coliform tests that also tested positive for E. Coli”. Note that these results ranged from 0 % - about 32 %. E. Coli bacteria are a sub group of the Total Coliform family of bacteria. E. Coli bacteria get into well water from fecal matter that comes from people or animals (mammals). E. coli bacteria are more likely to cause illness than the more general Total Coliform group.
4. “Total number of Nitrate tests performed”, as well as the number of those tests that were greater than and less than 10.0 ppm (the drinking water standard for Nitrate Nitrogen levels).
5. “Percentage of Nitrates tested that had a reading over 10 ppm”. The percentage of Nitrate tests that exceeded 10 ppm ranged from 2 % - 19 % of the total number of Nitrate tests.

Coliform bacteria and Nitrate Nitrogen are the standard water tests recommended to determine the safety of drinking water. They are also the tests that are required for most home sales and refinances. These same tests are required annually for all licensed establishments on well water. Licensed establishments include restaurants, bars, campgrounds, mobile home parks, and assisted living facilities, etc... Foster family homes that are on well water also must have their water tested for these two parameters.

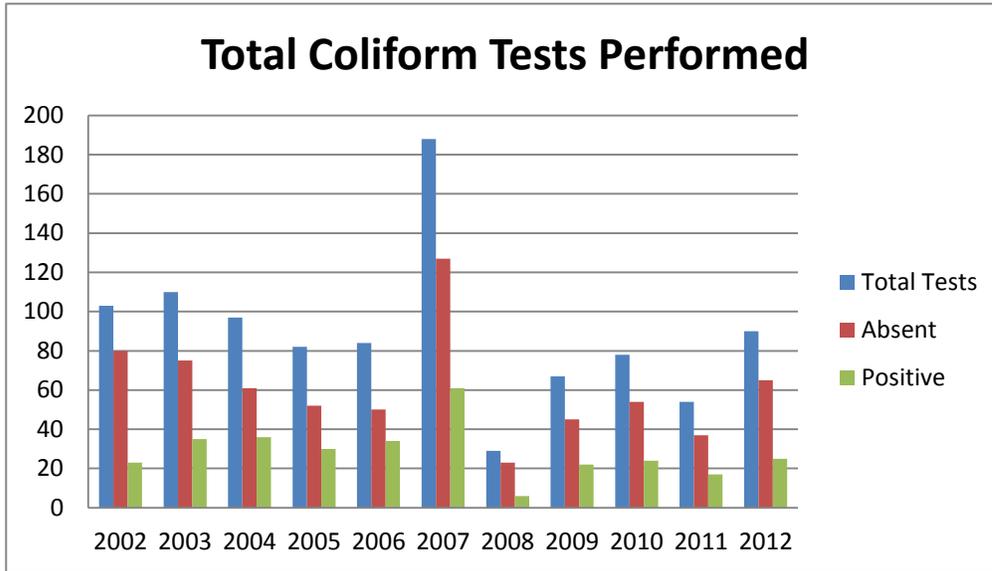
Any Coliform bacteria present in a sample, is a failure of the water supply to provide ‘safe’ water. No coliform are allowed in drinking water. Note that while Coliform bacteria can cause diarrheal illness, the test is also used as an indicator that other harmful bacteria may also be present in the sample. When a Coliform test is performed, if Coliform is present/positive then an E. Coli test is automatically performed and the results are noted on the report. E. Coli bacteria are a sub-group of the total Coliform family of bacteria. E. Coli bacteria get into well water from fecal matter that comes from people or animals (mammals). E. coli bacteria are more likely to cause illness than the more general total Coliform group.

When Coliform bacteria are found in a well, the first step most people take is to disinfect the well. Sometimes additional steps must be taken to correct a Coliform problem.

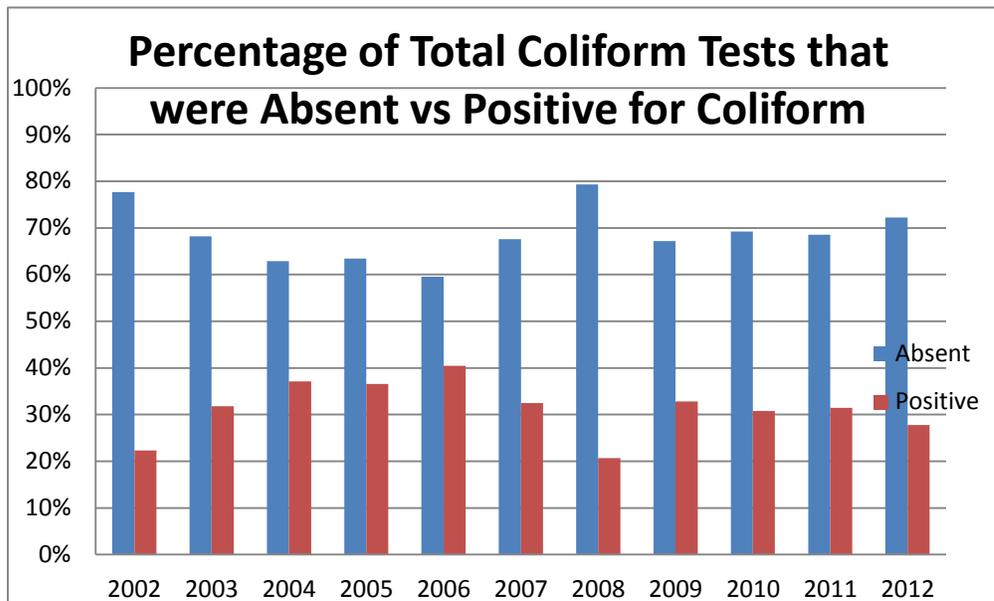
Nitrates occur naturally in soil, but they are also commonly derived from nitrogen fertilizers, crop residues, human and animal wastes, and some industrial wastes. In Minnesota, the biggest cause of Nitrate contaminated drinking water is improper waste water treatment systems (septic systems). Elevated Nitrate levels in drinking water can also lead to baby formula and food being prepared with this water leading to a severe, life threatening condition known as “methemoglobinemia” or “blue baby syndrome” in infants. Nitrates greater than the 10 ppm exceed the drinking water standard. Nitrates are very stable. Boiling the water only raises the Nitrate level by boiling off water and concentrating the Nitrates. The presence of high Nitrate levels, just like the presence of Coliform bacteria, may also indicate that other contaminants may be entering the well from the surface.

When Nitrates are found in a well, there are some water treatment systems that can reduce or remove nitrates. Distillation, Reverse Osmosis, or anion exchange systems can both be used to decrease Nitrate levels. Sometimes, drilling a deeper well is the best choice to get to water lower in Nitrates.

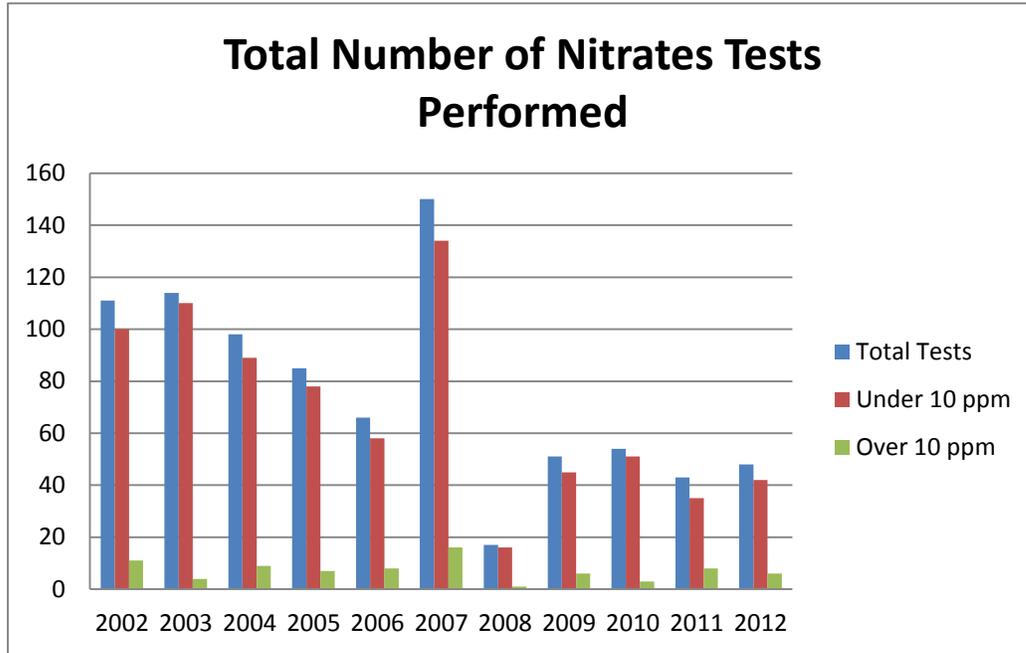
Graph 1:



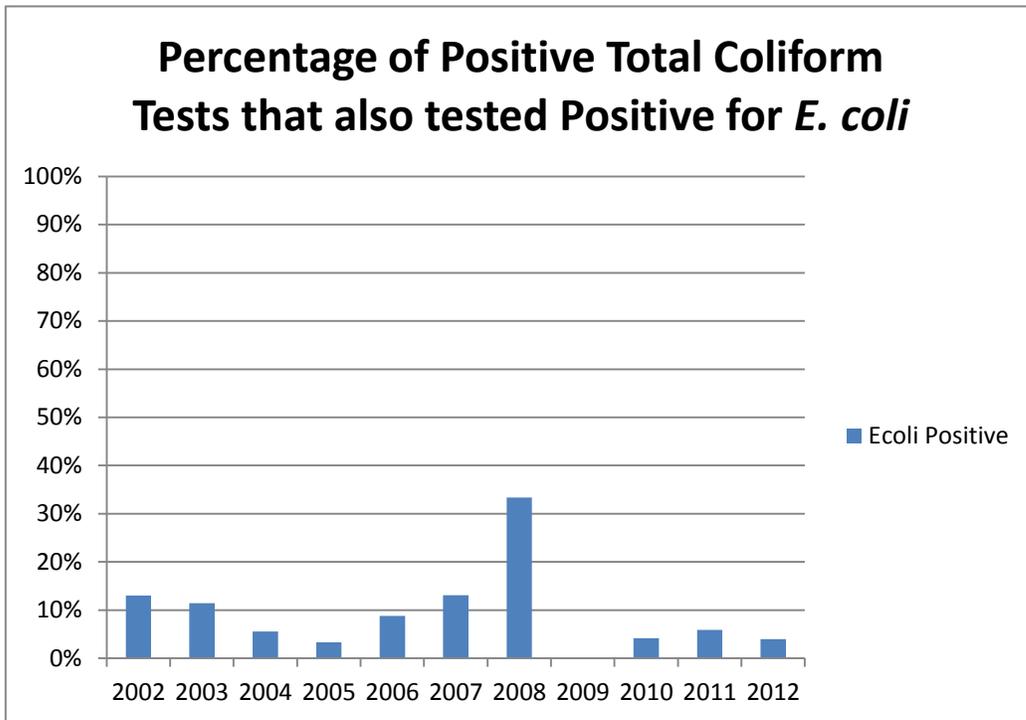
Graph 2:



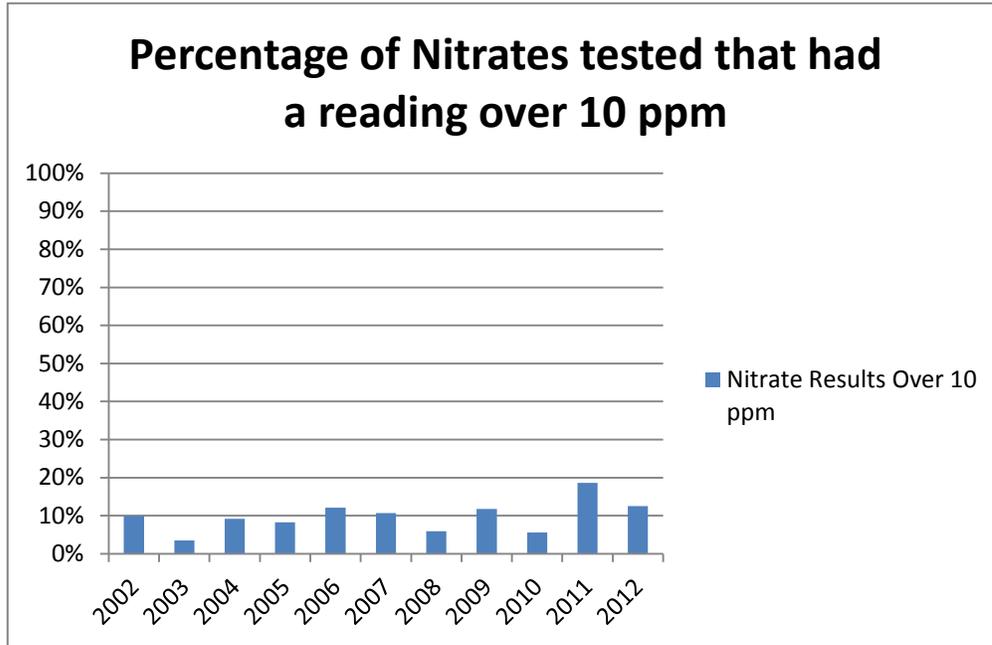
Graph 3:



Graph 4:



Graph 5:



G. Minnesota Department of Agriculture (MDA)

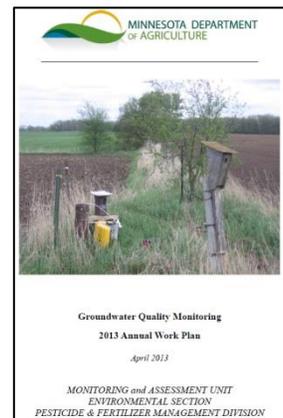
The Minnesota Department of Agriculture (MDA) is the lead agency for all aspects of pesticide and fertilizer environmental and regulatory functions.

Groundwater Quality Monitoring: 2013 Annual Work Plan

Through the cooperation of the Monitoring and Assessment Unit, Environmental Section and Pesticide and Fertilizer Management Division, an annual work plan is developed and used to describe planned groundwater monitoring activities of the Minnesota Department of Agriculture (MDA) Monitoring and Assessment Unit (MAU) for the year.

Beginning in 2004 to facilitate water quality monitoring, pesticide management and BMP promotion, MDA, with assistance of the University of Minnesota, divided the state into 10 Pesticide Monitoring Regions (PMRs). PMRs are based on areas with similar cropping practices, soil characteristics, hydrogeologic conditions, rainfall, and agro-ecosystem classifications. Chippewa County is in PMR 6, West Central region, along with Stevens, Big Stone, Swift, Lac qui Parle, and Yellow Medicine counties. Their physical characteristics are the following:

- Some areas of glacial outwash sand
- Thin and narrow alluvial aquifers
- Many buried sand aquifers



- Mix of corn and soybeans
- Thick glacial tills in some areas

During 2013 the plan is to test seven to fourteen wells per PMR. Wells are sampled twice a year: once during April and once during October. Well locations can be viewed in the complete plan located at:

https://www.google.com/url?q=http://www.mda.state.mn.us/chemicals/pesticides/~//media/Files/chemicals/maace/2013gwworkplan.ashx&sa=U&ei=wtD_UYnJH8jXyAHErYCYCg&ved=0CBEQFjAF&client=internal-uds-cse&usg=AFQjCNEbh1_VZCySdwGlrmx1fC_TTPDbQ

The most sensitive ground water conditions in PMR 6 are alluvial river valley deposits of sand and gravel. A large outwash plain in the vicinity of Appleton is also of concern. The river valley deposits tend to be narrow and relatively thin with sandy surface soils and are highly valued where they exist. These areas display rapid infiltration of water from the soil surface to underlying ground water and contain little capacity to limit the downward movement of dissolved or suspended chemicals. Agricultural chemicals have been detected in these areas in reconnaissance sampling previously completed. Irrigated fields of corn and soybeans are prevalent in the areas of interest in PMR 6. Soils in the area typically have higher pH and low organic matter. Animal agriculture is increasing in the area although it is somewhat limited by the availability of adequate supplies of water. For more information on MDA's pesticide monitoring, visit the following MDA website:

<http://www.mda.state.mn.us/chemicals/pesticides/maace.aspx>

Nitrate Water Testing Program

Nitrate clinics were developed for homeowner education and outreach and are not designed as a scientific study. Nitrate is a common contaminant found in many wells throughout Minnesota. Shallow wells, dug wells, and wells with damaged or leaking casings are the most vulnerable to nitrate contamination. Major sources of nitrate contamination can be from fertilizers, animal waste, and human sewage. The Minnesota Department of Agriculture developed a "walk-in" style of water testing clinic with the goal of increasing public awareness of nitrates in rural drinking and livestock water supplies. Results from the testing not only educate the participants but may also provide some broad information on the occurrence of nitrate 'hotspots' across the state; this could eventually aid in justifying nitrate monitoring networks/programs. The clinic concept revolves around a number of simple principles: local participation is critical; testing is free to the public with immediate results; the overall program needs to be inexpensive; a non-regulatory atmosphere is important and well owners may remain anonymous; and the staff's most important goal is to provide the required technical assistance across a diverse audience of well owners. It is highly recommended to test your drinking water supply on a regular basis. To read more about the Clinics and see some results, visit the following MDA website link:

<http://www.mda.state.mn.us/protecting/waterprotection/nitrate.aspx>

MDA's Source Water Protection Web Mapping Application

The MDA has an online source water protection mapping application that was developed in cooperation between the Minnesota Department of Health (MDH) and intended for use as a visual aid to better understand where source water protection areas are located throughout Minnesota. The web map provides basic information to the general public of where their drinking water supply comes from, and probability to which it may be impacted by potential contamination sources. The web application identifies completed Wellhead Protection Areas (WHPA), Drinking Water Supply Management Areas (DWSMA), and Drinking Water Supply Management Area (DWSMA) vulnerability. Each of these categories is briefly described below. The interactive website can be viewed at the following address:

<http://gis.mda.state.mn.us/source/>

Minnesota's Groundwater Condition: A Statewide View (2007)

Ground water quality data collected in 2004 and 2005 by the MPCA and the Minnesota Department of Agriculture (MDA), served as the basis for evaluating the condition of Minnesota's ground water. The results were presented in the publication, "*Minnesota's Groundwater Condition: A Statewide View*" (2007). The following conclusions about ground water quality in Minnesota's vulnerable aquifers were made:

- Ground water quality is generally good and in compliance with drinking water standards. However, human-caused impacts to ground water quality are apparent in many areas of the state.
- In urban areas, especially the Twin Cities metropolitan area, Rochester and St. Cloud, elevated concentrations of chloride and nitrate and detectable concentrations of VOCs are common.
- In rural and agricultural areas, nitrate concentrations are frequently elevated or exceed standards; and pesticides are commonly detected, though at concentrations that are nearly always less than applicable drinking water standards.
- Areas of impacted ground water correlate well with land uses that are known to cause the observed quality impacts. The prevalence of elevated nitrate concentrations in ground water in regions dominated by agricultural land uses and in unsewered residential areas is particularly noteworthy.

According to the report, there are two key considerations for MPCA's future groundwater quality monitoring efforts that are worth highlighting:

- There is a growing need to better incorporate ground water and surface water interaction into water resource management activities. Several Minnesota cities have struggled to maintain a reliable source of good quality water and found that their ground water quality problems resulted in part from the interaction with impacted surface water. The potential for ground water to improve (or potentially degrade) surface water quality is a factor that should be routinely evaluated as the MPCA undertakes investigation of Minnesota's impaired waters.

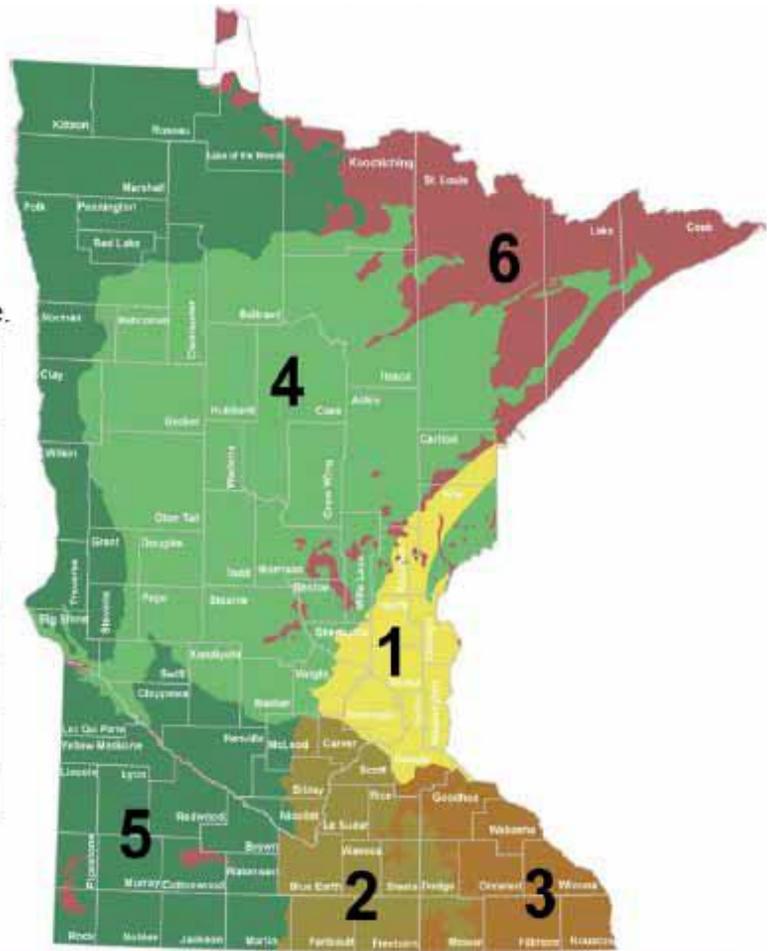
- Many new challenges will be faced by Minnesota’s water resource managers as the 21st century unfolds. Chief among these is a changing and less predictable climate, rapid growth of impervious soil cover that reduces the land area where aquifers can be recharged, and an ever increasing demand for potable water. These challenges require that Minnesota water resource managers monitor ground water condition with an eye to the future, and make the critical step of linking land use activities with their impact on ground water, so that practices and guidelines can be developed that will protect this valuable resource.

The Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Health (MDH) profiled Minnesota’s groundwater quantity in their 2007 report, “*Minnesota’s Groundwater Condition: A Statewide View.*” According to the report, groundwater, particularly ground water of adequate quality for drinking and other desired uses, has always been scarce in northwest and southwest Minnesota because of the natural geologic and hydrologic conditions in these areas. The following figure shows the availability of groundwater statewide. Notice that Chippewa County is rated as having mostly moderate to limited availability of groundwater.

Availability of Groundwater in Minnesota (2005)

TABLE 1. Ground-water availability in the state.

Area	General Availability of Ground Water by Source		
	Surficial Sands	Buried Sands	Bedrock
1	Moderate	Moderate	Good
2	Limited	Moderate	Good
3	Limited	Limited	Good
4	Good	Moderate	Limited
5	Moderate	Limited	Limited
6	Limited	Limited	Limited



H. Minnesota Department of Natural Resources (DNR)

The Minnesota Department of Natural Resources (DNR) monitors the use of the State's water and allocates resources to assure there is sufficient quality and quantity to supply the needs for future generations. Under the DNR's observation well network program, groundwater levels are routinely measured in 750 wells statewide. The primary objectives of the observation well network are to:

- Place wells in areas of future or present high groundwater use while considering variations in geologic and other environmental conditions;
- Identify long-term trends in groundwater levels;
- Detect significant changes in groundwater levels;
- Provide data for evaluation of local groundwater complaints;
- Provide data to resolve allocation problems; and
- Identify target areas that need further hydrogeologic investigation, water conservation measures, or remedial action.

Chippewa County's DNR Observation Wells

There are a total of 14 DNR observation wells located throughout Chippewa County, however only 6 are actively monitored. The following table provides an overview of the information regarding these wells contained in the DNR's online records. It reports on well depth, number of observations recorded, average depth to water, and the last recorded depth to water.

Chippewa County's DNR Observation Wells

Number	Well Depth	Nearest Town/Feature	1st Monitored - Currently Monitored?	Number of Observations	Average Depth to Water	Last Recorded Depth to Water (date)
12007	140 ft	Milan	1981 – Yes	57	49 ft	50 ft (4/22/13)
12005	21 ft	Milan	1972 – No	195	6 ft	5 ft (7/25/00)
12006	18 ft	Milan	1973 – No	24	6 ft	6 ft (10/22/73)
12003	27 ft	Milan	1972 – No	70	17 ft	20 ft (12/31/81)
12004	19 ft	Watson	1972 – No	186	5 ft	5 ft (12/22/98)
12015	25 ft	Watson	2000 – Yes	117	3 ft	3 ft (4/22/13)
12002	48 ft	Watson	1972 – No	29	31 ft	31 ft (10/22/73)
12001	63 ft	Montevideo	1964 – No	218	14 ft	10 ft (6/11/68)
12000	95 ft	Montevideo	1948 – No	131	53 ft	52 ft (4/5/54)
12008	42 ft	Wegdahl	1969 – No	58	4 ft	5 ft (4/22/13)

12009	109 ft	Raymond	1984 – Yes	257	3 ft	10 ft (4/16/13)
12012	240 ft	Granite Falls	1986 – Yes	150	13 ft	16 ft (9/1/08)
12010	80 ft	Granite Falls	1986 – Yes	152	16 ft	19 ft (9/1/08)
12014	72 ft	Granite Falls	1986 – Yes	154	31 ft	33 ft (9/1/08)

To access additional DNR’s groundwater quantity information, visit the following website:

http://www.dnr.state.mn.us/waters/groundwater_section/obwell/waterleveldata.html

Below is a map of the wells located in Chippewa County. More detailed information regarding the DNR Observation Wells can be found using the following site:

http://climate.umn.edu/ground_water_level/

Ground Water Level Data Retrieval



- = water table aquifer
- = bedrock aquifer
- = buried artesian aquifer
- = other aquifer

● indicates measurements are no longer made

County Atlas – Regional Assessment Program

The County Atlas - Regional Assessment Program exists to develop County Geologic Atlases and Regional Hydrogeologic Assessments. It is a joint program between the Minnesota Department of Natural Resources (DNR) and the Minnesota Geological Survey (MGS). The program creates maps and reports depicting the characteristics and pollution sensitivity of Minnesota's groundwater resources. The main DNR online link for additional information is: http://www.dnr.state.mn.us/waters/groundwater_section/mapping/index.html

County Geologic Atlas

A County Geologic Atlas is a systematic study of a county's geologic and groundwater resources. Geologic studies include both near-surface deposits and bedrock. Groundwater studies include flow systems, aquifer capacity, groundwater chemistry, and sensitivity to pollution. In some areas sand and gravel deposits, sinkholes, or other features are studied. The information is organized, analyzed, and displayed using GIS technology.

Atlas information is used in planning and environmental protection efforts at all levels of government. Source water protection and well sealing programs are examples of local programs that need geologic and groundwater information. Other typical uses include providing information for permit applications and plans and emergency response to contaminant releases. The information is also used by businesses and the general public.

Regional Hydrogeologic Assessment: Upper Minnesota River Basin, MN

A Regional Hydrogeologic Assessment is similar to an atlas in that both geology and groundwater are studied. However, a regional assessment covers a larger area--typically four to nine counties--in less detail. A regional assessment emphasizes near-surface geology, groundwater properties, and sensitivity to pollution.

Chippewa County was included in the Upper Minnesota River Basin Regional Hydrogeologic Assessment, along with Swift, Lac qui Parle, and Yellow Medicine Counties. In addition, parts of Big Stone, Lincoln, Lyon, Redwood, and Renville Counties are also included. The Assessment can be divided into the following four mapped subsections, referred to as "Plates:"

Geology

Plate 1 – Surficial Geology (information contained in report or GIS layer)

Plate 2 – Quaternary Stratigraphy (information contained in report or GIS layer)

Hydrogeology

Plate 3 – Surficial Hydrogeology (map can be viewed online)

Plate 4 – Geologic Sensitivity to Pollution of Groundwater (map can be viewed online)

To view Chippewa County’s County Atlas – Regional Assessment online, visit the following website:

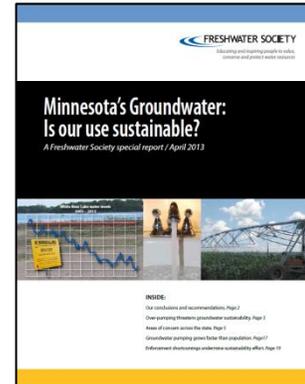
http://www.dnr.state.mn.us/waters/programs/gw_section/mapping/platesum/umrbrha.html

I. The Freshwater Society

Minnesota’s Groundwater: Is Our Use Sustainable?

The Freshwater Society, a public non-profit organization, published this special report in April 2013. The following highlights of the report are worth noting:

- Minnesota cannot afford to continue increasing its groundwater consumption as we have over the last several decades.
- Pumping of Minnesota’s groundwater increased, on average, about 2.8 billion gallons each year from 1988 through 2011, a statistical analysis of reporting pumping estimates (shown in highlighted box). Over that 23-year period, total reported groundwater use increased an estimated 31 percent, while the State’s population increased 24 percent. Pumping for agricultural irrigation increased about 1.5 billion gallons per year over that period, equaling a 73 percent increase.
- The DNR plans in 2013 to use a 3-year-old law to begin creating “groundwater management areas” in two heavily irrigated regions of the state, agency officials say. The agency hopes to win community support for intensive monitoring of the impact of existing pumping and, perhaps, support for future limitations on pumping.



MINNESOTA GROUNDWATER PUMPING TRENDS: 1988-2011

- Total groundwater pumping varied widely from year to year, but averaged about 235 billion gallons per year.
- Pumping by city water systems averaged 123 billion gallons per year, and averaged 53 percent of total reported groundwater pumping.
- Agricultural irrigation pumped an average of 63 billion gallons per year, averaging 26 percent percent of total reported pumping.
- Industrial pumping averaged about 22 billion gallons per year, averaging 9.5 percent of the total reported pumping.
- The next-biggest component of the total – a division the DNR calls “Special Categories” and that includes pollution containment, fish farms, snow making, livestock watering and sewage treatment – accounted for an average of 7.3 billion gallons pumped each year, about 3 percent of all groundwater use on average.
- Golf course sprinkling used an average of 4.7 billion gallons per year, 2 percent of total groundwater use on average.
- All other uses combined averaged about 14.7 billion gallons per year, 6 percent of the total on average.

- The connections between ground and surface water need to be studied. Specifically, groundwater recharge rates and the flow between aquifer systems need to be better understood.
- Agricultural irrigation is Minnesota's second largest use of groundwater (behind municipal use), and it is by far the fastest growing segment of groundwater use.
- High commodity prices, high land prices, and incremental weather patterns, are likely to encourage more farmland to be irrigated.

J. Summary of Groundwater Implications and Assessments

The following items summarize the implications and assessments for groundwater quality and quantity issues. Many of the listed items prescribe actions that are needed to properly address the issues identified.

- Current groundwater monitoring efforts by stakeholders should be continued and expanded within the County. More importantly, any important conclusions regarding the results of these monitoring efforts should be shared with Chippewa County in a timely fashion.
- The County should continue to partner with the Minnesota Department of Agriculture in hosting Nitrate Testing Clinics.
- Groundwater Best Management Practices should be promoted by providing cost-share incentives.
- Sealing abandoned wells should continue to be a priority.
- Conduct training sessions and workshops for farmers who have agricultural production activities within wellhead protection areas and drinking water supply management areas.
- Increased use of groundwater by multiple users has placed an increase stress on aquifer systems. An increasing amount of groundwater conflicts are being reported statewide.
- There is a high need for continued research and assistance to understand the impacts of drainage or other land use practices on groundwater recharge rates, and the means to quantify these impacts.
- Minnesota's groundwater use patterns are not sustainable (i.e., groundwater is being used more than it is being recharged). As a result, the Minnesota DNR has considered creating groundwater management areas in parts of the State where groundwater is stressed by over-use or pollution.

Priority Concern 3. Public Awareness and Plan Administration

Look into modern ways of education and reaching the public. Ways such as increased use of web sites, facebook,

A. Gap Analysis

A technique that businesses use to determine what steps need to be taken in order to move from its current state to its desired, future state. Also called need-gap analysis, needs analysis, and needs assessment.

Gap analysis consists of:

- listing of characteristic factors (such as attributes, competencies, performance levels) of the present situation ("what is"),
- listing factors needed to achieve future objectives ("what should be"), and then
- highlighting the gaps that exist and need to be filled.

Gap analysis forces a company to reflect on who it is and ask who they want to be in the future.

B. Key Organizations Providing Water-Based Education

Organization	Contact	Web Site
Chippewa Co. Land & Resource Mgmt.	(320) 269-6231	www.co.chippewa.mn.us
Chippewa River Watershed Project	(320) 269-2139	www.chippewariver.com
Chippewa Soil & Water Conservation District	(320) 269-2139	www.chippewaswcd.org
Hawk Creek Watershed Project	(320) 523-3674	www.hawkcreekwatershed.org
MN Board of Water & Soil Resources	(507) 537-6374	www.bwsr.state.mn.us
MN Department of Agriculture	(800) 967-2474	www.mda.state.mn.us
MN Department of Health	(651) 215-5800	www.health.state.mn.us
MN Department of Natural Resources	(320) 796-2161	www.dnr.state.mn.us
MN Geological Survey	(612) 627-4780	www.mngs.umn.edu
MN Pollution Control Agency	(507) 537-7146	www.pca.state.mn.us
Natural Resources Conservation Service	(320) 269-2139	www.nrcs.usda.gov
University of MN Extension Service-Chippewa	(320) 269-6521	www.extension.umn.edu

CHAPTER TWO:

Implementation to Address Priority Concerns

Priority Concern 1: Surface Water Quality and Quantity Impairments and Concerns

Goal 1: Remove Fecal Coliform/Bacteria TMDL Implementation for Chippewa River Watershed and Hawk Creek Watershed.

Goal 2: Have all feedlots in the county in compliance with MN Statutes 7020 standards by 2023.

Goal 3: Promote wise use of nutrients for optimum economic benefit to the producer while minimizing impacts on the environment.

Goal 4: Manage new and existing Subsurface Sewage Treatment systems (SSTS).

Goal 5: Establish and implement a management program to ensure that existing SSTS are operated and maintained properly to prevent the impairment or degradation of surface and ground waters.

Goal 6: Reduce and minimize the effects of soil erosion and sedimentation.

Goal 7: Storm Water Management

Goal 8: Shoreland

Priority Concern 2: Groundwater Quality & Quantity Impairments and Concerns

Goal 1: Protect and improve groundwater based drinking water sources

Priority Concern 3: Public Awareness and Plan Administration

Goal 1: Maintain a Watershed Focus

Goal 2: Staff and Coordinate Stakeholder Cooperation

Goal 3: Raise Public Awareness on Key Water Planning Issues

Implementation to Address Priority Concerns:

This section establishes the implementation program for local water management to address priority concerns by watersheds and county-wide actions. Action items describe specific measures that the County intends to implement, in cooperation with appropriate local, state, and federal agencies and organizations. Action items listed below were reached by consensus and are not necessarily in rank order.

Priority Concern 1: Surface Water Quality & Quantity Impairments and Concerns

Goal 1: Remove Chippewa County's water bodies from the MPCA's 303d List of Impaired Waters by 2033.

Objective A: Address Fecal Coliform/Bacteria TMDL Implementation for Chippewa River Watershed and Hawk Creek Watershed.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
Dry Weather Creek #07020005-509 Shakopee Creek #07020005-559 Hawk Creek #07020004-568 County Wide	1.A.1	Complete a Level 3 Feedlot/Livestock Inventory. - Do one-on-one visits with all (estimated 109) feedlot/livestock owners to complete an inventory gathering information with an outcome of knowing the MINNFarm Analysis for each feedlot. - Develop a relationship with feedlot operators, determine numbers, identify potential pollution problems, ultimately provide assistance. ◇ Engage and inform commodity or producer groups, county commissioners, township officers and other local decision makers of inventory. ◇ Through direct mailing and informational meetings.	Land & Resource Mgmt. Chippewa SWCD CRWP HCWP	2014-2015	\$15,000

		- Once inventory is completed, maintain/update the information on a regular basis through use of GIS.			
Dry Weather Creek #07020005-509 Shakopee Creek #07020005-559 Hawk Creek #07020004-568 County Wide	1.A.2	Based on the findings of the inventory, bring 20% of non-compliant feedlots into compliance by 2018 through the use of EQIP, state cost-share, clean water funds and low interest loans. - Provide technical assistance and cost-share to fix feedlot problems.	Land & Resource Mgmt. Chippewa SWCD-TSA CRWP , HCWP NRCS	2013-2018	\$100,000
County Wide	1.A.3	Complete Manure Management Plans for landowners that purchase manure to use for fertilizer. - Offer \$300 cost-share for completing a manure management plan from purchased manure. - Map fields that have manure management plans from manure purchased.	Chippewa SWCD CRWP HCWP	2013-2018	\$5,000
Dry Weather Creek #07020005-509 Shakopee Creek #07020005-559 Hawk Creek #07020004-568 County Wide	1.A.4	Complete/update Manure Management Plans for all feedlot operations with animal units between 300 - 999 animal units. - Map fields that are part of a manure management plan for manure application. - Offer \$300 cost-share for new Manure Management Plans and \$200 for updating Plans.	Chippewa SWCD CRWP HCWP	2013-2018	\$10,000
County Wide	1.A.5	Encourage the County Planning Commission to recommend to the County Board of Commissioners to update the Zoning Ordinance to establish guidelines on the storage of manure/waste on site areas before incorporation.	Co. Planning Commission Co. Bd. of Commissioners Land & Resource Mgmt.	2013-2014	\$200
County Wide	1.A.6	Recommend to the County Planning Commission and County Board of Commissioners to include property transfer inspections for SSTS at the time of property sales to promote increased water quality to meet Fecal TMDLs in the Chippewa and Hawk Creek River Watershed areas and Countywide. - Written recommendation from the Water Plan Committee to include property transfer inspections at time of property sale.	Land & Resource Mgmt.	2013	\$200

Shakopee Creek #07020005-559 Hawk Creek #07020004-568 County Wide	1.A.7	Complete 50 new SSTS upgrades annually reducing Phosphorus by an average of 1,460 lbs./yr.; Nitrogen by 3,832.50 lbs./yr.; and BOD by 12,410 lbs./yr.	Land & Resource Mgmt.	2013 - 2018	\$2,500,000
		- Secure MPCA and MDA funding to provide low interest loans to upgrade noncompliant SSTS.			\$500
		- Apply annually for cost-share to upgrade four (4) low-income non-compliant systems annually with 75% cost-share up to \$5,000.			\$100,000
		<i>Outreach:</i> Newspaper ads, cooperation with Prairie Five Community Action Council Inc. and SSTS Contractors to help get information to homeowners that funds are available to help with upgrade.			\$1,000
Dry Weather Creek #07020005-509	1.A.8	Complete 10 new SSTS upgrades reducing Phosphorus by an average of 292 lbs./yr.; Nitrogen by 766.5 lbs./yr.; and BOD by 2482 lbs./yr.	Land & Resource Mgmt.	2013-2018	See PC1: 1.A.7
		- Secure MPCA and MDA funding to provide low interest loans and/or grant funds to low income residents to upgrade noncompliant SSTS.			
		<i>Outreach:</i> Newspaper ads, cooperation with Prairie Five Community Action Council Inc. and SSTS Contractors to help get information to homeowners that funds are available to help with upgrade.			See PC1: 1.A.7

Objective B: Address Turbidity TMDL Implementation for Chippewa River Watershed and Hawk Creek Watershed.

Dry Weather Creek #07020005-509	1.B.1	Install 235' of bank stabilization through the use of bio-engineering techniques such as tow mats, root wads and/or stream barbs along a stretch of Dry Weather Creek (location: Tunsberg Township 118-41; Section 11; SE 1/4) that is causing sloughing along County Road 35. <i>Outcome</i> - The project would benefit public safety on County Road 35 as well as reduce the addition of TSS by 59 tons/year, Sediment by 59 tons/year and Phosphorus by 68 lbs./year to the Creek.	Chippewa SWCD Chippewa Co. Hwy Dept. CRWP	2014	\$84,450
Dry Weather Creek #07020005-509	1.B.2	Install 200' of bank stabilization through the use of bio-engineering techniques such as tow mats, root wads and/or stream barbs along a stretch of Dry Weather Creek (location: Tunsberg Township 118-41; Section 11; W 1/2, NE 1/4) that is causing sloughing along the stream bank. <i>Outcome</i> - The project would benefit pollution reduction of TSS by 25.5 tons/year, Sediment by 25.5 tons/year and Phosphorus by 25.5 lbs./year to the Creek.	Chippewa SWCD CRWP	2014-2018	\$72,000
Dry Weather Creek	1.B.3	Complete a Drainage Water Management Plan on Dry Weather Creek/Ditch 22.	Chippewa Ag/Drainage	2014-2016	\$100,000

Ditch 22 #07020005-509		<ul style="list-style-type: none"> - Seek funds to hire a firm to do some modeling to help strategically place water storage to reduce water quality and quantity issues on Dry Weather Creek. - Address areas suitable for drainage water management BMPs which will consider erosion control and hydrology management practices both on the ditch and on the field/upland. 	Chippewa SWCD		
Shakopee Creek JD #18 #07020005-559	1.B.4	<p>Complete a Drainage Water Management Plan on Buffalo Lake/JD #18.</p> <ul style="list-style-type: none"> - Seek funds in cooperation with Swift County to hire a consulting/engineering firm to evaluate options related to the identified pollution in Buffalo Lake and how to address the problem. - Address areas suitable for drainage water management BMPs which will consider erosion control and hydrology management practices both on the ditch and on the field/upland. - Complete a summit of status of Buffalo Lake: What's been done? What needs to be done? Where to now? Strategy to move forward? Redetermination of Benefits? Dam Structure? Etc. 	Chippewa Ag/Drainage CRWP DNR ACOE NRCS SWCD Swift County	2014-2016 2013-2014	\$100,000 \$500
Dry Weather Creek #07020005-509	1.B.5	Inventory the bridges and culverts on the ditch systems that are showing signs of erosion due to water quantity stress. Complete a hydrologic budget for improvement practices to improve and protect the infrastructure and enhance water quality at the same time.	Chippewa Ag/Drainage CRWP, HCWP County Highway Dept.	2013-2014	\$4,000
Dry Weather Creek #07020005-509 Hawk Creek #07020004-568	1.B.6	<p>Complete a field check of gully erosion and side slope erosion in sub-watershed.</p> <ul style="list-style-type: none"> - Assess potential drop inlet sites and inventory sites using GPS for potential repair of side slope and gully erosion. In cooperation with the CRWP, help guide and direct BMP selections and placement. - Provide 75% cost-share opportunities for 50 drop pipes/side inlets. 	Chippewa Ag/Drainage Chippewa SWCD CRWP HCWP	2013-2018	\$1,000 \$1,000 \$40,000
County Wide	1.B.7	Provide 75% cost-share opportunities for 50 alternative tile intakes to address water quality and quantity by reducing nutrient loading in priority zone TMDL areas.	CRWP & HCWP Chippewa Ag/Drainage Chippewa SWCD	2013-2018	\$10,000
Dry Weather Creek #07020005-509 Shakopee Creek	1.B.8	<p>Provide 75% cost-share on Drainage Water Management with three (3) landowners.</p> <ul style="list-style-type: none"> - Seek assistance from MDA to talk about opportunities to engage landowners to complete a drainage water management project on their field. 	CRWP & HCWP Chippewa Ag/Drainage Chippewa	2013-2018	\$36,000

#07020005-559		- Market multipurpose drainage management to landowners within the public drainage system sub watershed(s). ◊ Include such things as controlled subsurface drainage, denitrifying bioreactors, and nutrient management components.	SWCD		
Dry Weather Creek #07020005-509	1.B.9	42% of the Dry Weather Creek Watershed has no buffer strips on its ditches. Complete an inventory of the buffer strips via on-site visits or pictometry, determine which unbuffered ditches need buffers to reduce ditch bank erosion.	Chippewa SWCD CRWP Chippewa Ag/Ditch	2013-2015	\$5,000
Dry Weather Creek #07020005-509	1.B.10	Promote and market conservation programs and best management practices that reduce soil erosion and sedimentation in regard to soil erosion. Use a direct mailing to the landowners in the Dry Weather Creek and Shakopee Creek Watershed.	Chippewa SWCD NRCS County Ag/Drainage CRWP	2013-2018	\$5,000
Shakopee Creek #07020005-559		- Establish 50 acres of new or re-enrolled filter/buffer strips. Target TMDL areas.			\$15,000
Hawk Creek #07020004-568		- Seed 100 acres of most sensitive erodible/marginal lands into CRP, RIM easements, WRP easement, native prairie easements and/or other perennial cover.	HCWP		\$10,000
County Wide		- Install 300 alternative in-takes (i.e. blind in-takes) and promote benefits.			\$112,500
		- Construct 6 water & sediment control structures as erosion runoff control.			\$6,000
		- Install 50 side inlet structures in County and private ditch. Target TMDL areas.			\$40,000
		- Construct 1000' of terraces for erosion control.			\$50,000
		- Construct 2000' of grassed waterways.			\$100,000
County Wide	1.B.11	Map 4B identifies priority watercourses within steep slope areas to add potential erosion control structures from these flows. - establish sediment basins/structures to meter/slow flows before they hit the steep slopes decreasing sediment loads to downstream waters and provide some temporary storage. - work with DNR on different strategy scenarios - refine the mapping with DNR's assistance	SWCD, NRCS, DNR	2015	\$10,000
County Wide Dry Weather	1.B.12	LiDAR and Terrain Analysis: - Seek Clean Water Legacy funds to complete a terrain analysis of Chippewa	Chippewa SWCD Land &	2013-2018	\$35,000

Creek #07020005-509 Hawk Creek #07020004-568 Shakopee Creek #07020005-559		County. - Concentrate on the impaired reaches of Chippewa County that currently have TMDL's. - Train staff locally to use the information to analyze and prioritize and target best management activities in minor watershed areas. - Obtain needed software and equipment to use this program. Multiple watershed maps will be developed and show priority ranking of best management practices and areas to target based on environmental sensitivity variables, such as slope, soil type, land use, distance to surface water, overland flow potential, stream gradient, bluffs and ravines, and erosion potential.	Resource Mgmt. HCWP CRWP DNR		
Dry Weather Creek #07020005-509	1.B.13	In cooperation with the DNR, complete assessment in Dry Weather Creek on priority restorable wetlands identified by DNR in conjunction with different landscape scenarios and steep slopes. Assess the benefits if the area identified is restored as a whole or just parts.	DNR, NRCS, Chippewa SWCD, Land & Resource Mgmt.	2015	\$10,000

Goal 2: Have all feedlots in the county in compliance with MN Statutes 7020 standards by 2023.

Objective A: Provide assistance to producers to reduce water quality concerns related to animal agriculture.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	2.A.1	Provide technical and financial assistance, if available, to assist producers in adopting BMP's to reduce the impacts of manure runoff.	All agencies	2013-2018	\$50,000
County Wide	2.A.2	Seek additional funding to mitigate or eliminate pollution from feedlots and animal manure. Promote existing funding sources such as EQIP, cost-share, County water funds and AgBMP low interest loans to correct problems.	Land & Resource Mgmt., SWCD	2013-2018	\$125,000

Objective B: Encourage the development and updating of manure management plans.

County Wide	2.B.1	Promote the economic benefit of manure management planning through direct mailings to feedlot operators and landowners identified that purchase manure.	All agencies	2014-2015	\$500
County Wide	2.B.2	Utilize the Manure Management Plan from MPCA or University of Minnesota - Extension as tools for operators.	Chippewa SWCD NRCS	2013-2018	\$5,000
County Wide	2.B.3	Ensure feedlots with 300 to 999 AU have developed and are utilizing a current manure management plan.	Chippewa SWCD	2013-2018	\$20,000

		<ul style="list-style-type: none"> - Provide assistance for plans by offering \$200 cost-share to have existing plans updated or \$300 cost-share for new plans. - Consider purchasing scales and other equipment available for producers in implementing their plans. - Provide opportunities for continuing education and training for agronomists and crop consultants. Possibly develop continuing education and training opportunities via a multi county or watershed effort. - Work with local decision makers (County Board of Commissioners, County Attorney) on a Plan of Action with consequences when manure management plans are not followed. 	NRCS Land & Resource Mgmt. CRWP MPCA County Board		
County Wide	2.B.4	<p>Increase efforts on feedlots less than 300 AU not required under current statute to have a manure management plan.</p> <ul style="list-style-type: none"> - Provide assistance for plans by offering \$300 cost-share for new plans. 	Chippewa SWCD NRCS Land & Resource Mgmt.	2013-2018	\$7,500
County Wide	2.B.5	Partner with MPCA to distribute and provide training for their newly developed program on manure management planning for smaller sites.	Land & Resource Mgmt. SWCD, MPCA	2013-2018	\$500
Objective C: Provide education on proper setbacks from sensitive areas.					
County Wide	2.C.1	Utilize GIS to identify environmentally sensitive areas for manure application.	All agencies	2013-2018	\$10,000
County Wide	2.C.2	Educate manure and fertilizer applicators and producers on existing setbacks from sensitive areas, including open tile intakes, wetlands, drainage ditches and road ditches.	Land & Resource Mgmt. Chippewa SWCD	2014	\$1,500
	2.C.3	Incorporate and encourage vegetated buffers in regard to runoff.	All agencies	2013-2018	\$2,500
Objective D: Encourage the proper crediting of manure nutrients.					
County Wide	2.D.1	Provide education on current application rates, soil testing, grid sampling and soil health by holding a "fair" for landowners.	NRCS, SWCD, MPCA U of M Extension	2013-2018	\$5,000
County Wide	2.D.2	Support the utilization of manure as a valuable resource.	NRCS, SWCD, MPCA	2013-2018	\$5,000
County Wide	2.D.3	Encourage producer groups or agencies to host field days on demonstration plots and calibration of equipment.	NRCS, SWCD, MPCA	2013-2018	\$5,000

County Wide	2.D.4	Promote and provide education on the University of MN guidelines, which vary by soil type, yield, manure application, etc.	U of M Extension	2013-2018	\$5,000
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Goal 3: Promote wise use of nutrients for optimum economic benefit to the producer while minimizing impacts on the environment.

Objective A: Provide education and information on proper application rates.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	3.A.1	Work with ag suppliers and producers on following the University of MN application rates, which sometimes differ from agronomist rates in plans.	SWCD NRCS	2013-2018	\$5,000
County Wide	3.A.2	Promote EQIP, CWP and other grant incentives for producers entering a nutrient management contract.	SWCD NRCS	2013-2018	\$5,000
County Wide	3.A.3	Explore the possibility of holding classes or workshops for ag suppliers.	SWCD, NRCS	2013-2018	\$500
County Wide	3.A.4	Encourage soil sampling to utilize as base data.	SWCD, NRCS	2013-2018	\$2,500
County Wide	3.A.5	Educate those writing plans on rates eligible for programs.	SWCD, NRCS	2013-2018	\$1,000

Goal 4: Manage new and existing Subsurface Sewage Treatment Systems (SSTS).

Objective A: Maintain SSTS programs to protect surface and ground water quality.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	4.A.1	Through the County Land & Resource Management Ordinance, amend the SSTS Ordinance to meet the requirements of the Minnesota Pollution Control Agency, Chapter 7080-7084. <i>Outreach:</i> Establish a working committee with the County Planning Commission, SSTS Contractors, Realtors, Water Plan member and Land & Resource Management staff to amend ordinance and make recommendation to the County Board of Commissioners for approval. <i>Audience:</i> Working Committee with groundwater quality and homeowners protection as main focus for amendments.	Land & Resource Mgmt.	February 4, 2014	\$15,000
County Wide	4.A.2	Complete 50 new SSTS upgrades annually.	Land &	2013 - 2018	See PC

		<ul style="list-style-type: none"> - Secure MPCA and MDA funding to provide low interest loans to upgrade noncompliant SSTS. - Apply annually for cost-sharing upgrading four (4) low-income non-compliant systems annually with a maximum \$5,000 cost-share. 	Resource Mgmt.		1:1.A.7
County Wide	4.A.3	<p>Continue to provide oversight and assistance of State and County regulations and inspection services as part of the County's SSTS Program including assistance to homeowners on proper SSTS design, installation, operation and maintenance.</p> <p><i>Outreach:</i> Service provided as part of homeowners SSTS permit.</p>	Land & Resource Mgmt.	2013 - 2017	\$25,000
County Wide	4.A.4	<p>Continue to inventory upgraded systems using County GIS. Use data to evaluate areas where fecal coliform is still high.</p> <p><i>Outreach:</i> Upgrade 50 new systems a year and inventory on GIS maps.</p>	Land & Resource Mgmt.	2013 - 2017	\$7,500
County Wide	4.A.5	<p>Recommend to the County Planning Commission and County Board of Commissioners to include property transfer inspections at the time of property sales to promote increased water quality to meet Fecal TMDLs in the Chippewa and Hawk Creek River Watershed areas and Countywide.</p> <p><i>Outreach:</i> Written recommendation from the Water Plan Committee to include property transfer inspections at time of property sale.</p> <p><i>Audience:</i> County Planning Commission and County Board of Commissioners</p>	Land & Resource Mgmt.	2013	\$500

Goal 5: Establish and implement a management program to ensure that existing SSTS are operated and maintained properly to prevent the impairment or degradation of surface and ground waters.

Objective A: Maintain SSTS programs to protect surface and ground water quality.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
Homeowners with SSTS	5.A.1	<p>Develop and Implement an Operation and Maintenance Planning Program for SSTS users to promote keeping SSTS in operational and treating order and increase the longevity of systems.</p> <p><i>Outreach:</i> Direct mailings to homeowners with new systems and systems installed within the past 10 years on the program. Hold a workshop on Operation and Maintenance for homeowners and realtors.</p>	Land & Resource Mgmt.	2013 - 2014	\$1,300

		<i>Audience:</i> Homeowners that install new systems and homeowners that have existing systems.			
County Wide	5.A.2	Keep an updated system inventory that provides management information regarding type of system, location, capacity, installation date, owner, date of last inspection and pumping record information.	Land & Resource Mgmt.	2013-2018	\$5,000
County Wide	5.A.3	Through direct mailings, notify homeowners every three years that pumping is required to keep their system in compliance.	Land & Resource Mgmt.	2013-2018	\$2,500
County Wide	5.A.4	Ensure that residuals pumped from tank are properly disposed of in a manner that does not present significant risks to surface or ground waters. Maintain an inventory of fields being used for disposal.	Land & Resource Mgmt.	2013-2018	\$2,500
County Wide	5.A.5	Publicize information on the importance of SSTS maintenance on the County website.	Land & Resource Mgmt.	2013-2018	\$5,000
Certified Contractors	5.A.6	Continue annual training/update meeting for all system designers, installers, pumpers and inspectors working in Chippewa County.	Land & Resource Mgmt.	2013-2018	\$1,000

Goal 6: Reduce and minimize the effects of soil erosion and sedimentation.

Objective A: Market conservation programs and best management practices (BMP's) that reduce soil erosion and sedimentation in regard to water and wind erosion.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	6.A.1	Target 500' of bank stabilization, etc. in area identified in TMDL areas.	SWCD	2013-2018	See PC 1:1.B.1&2
County Wide	6.A.2	Establish 50 acres of new or re-enrolled filter/buffer strips. Target TMDL areas.	NRCS	2013-2018	See PC 1:1.B.10
County Wide	6.A.3	Establish and restore 100 acres of most sensitive erodible/marginal lands into CRP, RIM easements, WRP easement, native prairie easements and/or other perennial cover. - Use Map 3A for reference	CRWP HCWP	2013-2018	See PC 1:1.B.10
County Wide	6.A.4	Establish 2000' of windbreak.	Co. Ag/Drainage Land & Resource Mgmt.	2013-2018	
County Wide	6.A.5	Install 300 alternative in-takes (i.e. blind in-takes) and promote benefits.		2013-2018	See PC 1:1.B.10

County Wide	6.A.6	Construct 6 water & sediment control structures as erosion runoff control.		2013-2018	See PC 1: 1.B.10
County Wide	6.A.7	Install 50 side inlet structures in County and private ditch. Target TMDL areas.		2013-2018	See PC 1: 1.B.10
County Wide	6.A.8	Construct 1000' of terraces for erosion control.		2013-2018	See PC 1: 1.B.10
County Wide	6.A.9	Construct 2000' of grassed waterways.		2013-2018	See PC 1: 1.B.10
County Wide	6.A.10	Wildlife Habitat: Establish 15 acres of wildlife tree plantings.		2013-2018	\$24,400
County Wide	6.A.11	Establish 20 acres of field windbrakes and farmstead shelterbelts.		2013-2018	\$40,000
County Wide	6.A.12	Actively demonstrate and promote conservation tillage methods that are cost effective and environmentally friendly. - Complete tillage survey biannually.		2013-2018	\$10,000
County Wide	6.A.13	Educate absentee landowners and women landowners not actively involved in agriculture on the opportunities available to them for implementing/installing BMP's on their land and the benefits and needs of these BMP's for conservation and sustainability.		2013-2018	\$2,500
County Wide	6.A.14	Target marginal land for BMP programs promoting soil health by encouraging cover crops, no-till/minimum till, grazing, etc.		2013-2018	\$2,500
County Wide	6.A.15	Provide educational, technical and financial assistance, as available, to landowners for the implementation of erosion and sediment control BMPs.		2013-2018	\$10,000
County Wide	6.A.16	CRP contracts expiring: contact landowners through direct mailing that have CRP contracts expiring to engage them to re-enroll.		2013-2018	\$2,500
County Wide	6.A.17	Provide outreach and education on the need of residue management for wind erosion.		2013-2018	\$1,000
County Wide	6.A.18	Submit Ditch Buffer Strip Annual Report to BWSR as required. Work with non compliant sites to meet compliance according to law set in Statute 103E.067.		2013-2018	\$1,000
Objective B: Multipurpose Drainage Management Planning					
County Wide	6.B.1	Encourage ditch authorities when addressing drainage systems that are at their functional life span to consider technologies such as controlled drainage, wetland restoration, buffer and filter strips that can aid in flood water control and water quality improvements.	CRWP, HCWP, Co Ag/Drainage	2013-2018	\$10,000
County Wide	6.B.2	Seek funding through the Clean Water Conservation Drainage Management Grants to complete Multipurpose Drainage Management Planning for public drainage systems.	CRWP, HCWP, Co Ag/Drainage	2014	\$75,000

<p>Dry Weather Creek #07020005-509 Shakopee Creek #07020005-559 County Wide</p>	<p>6.B.3</p>	<p>Seek funding to hire a drainage engineer who will complete a public drainage system survey, inventory and evaluation on at least the Dry Weather Creek Watershed and the Shakopee Creek Watershed for the 3 year grant period.</p> <p>Develop sub watershed scale implementation plans for multipurpose drainage management to protect and improve water quality, together with adequate agricultural drainage, equitable flood protection, peak flow and erosion reduction, and wildlife habitat improvement.</p> <ul style="list-style-type: none"> - The plan(s) should consider practices such as grassed waterways, water and sediment control basins, culvert sizing, side inlets, controlled subsurface drainage, nutrient management, denitrifying bioreactors, constructed or restored wetlands and other applicable hydrology management and water quality practices on a sub watershed basis that reduce peak flows, nutrient transport and erosion potential. Target the following BMP's to critical areas in our drainage systems: buffer strips, bank stabilization, alternative intakes, water and sediment structures, side inlets and grassed waterways. 	<p>CRWP, HCWP, Co Ag/Drainage</p>	<p>2014-2016</p>	<p>See PC1: 1.B.3 & 1.B.4</p>
Objective C: Preserve and protect the most sensitive areas of Chippewa County.					
<p>County Wide</p>	<p>6.C.1</p>	<p>Apply for a grant with joint partners along the MN River Valley to preserve and protect approximately 200 acres of Granite Rock Outcrops in Chippewa County and their associated wetlands, plus improve water quality and aquatic habitat within the Minnesota River Valley.</p>	<p>SWCD, NRCS, CRWP, HCWP</p>	<p>2014-2017</p>	<p>\$500,000</p>
<p>County Wide</p>	<p>6.C.2</p>	<p>Prairie Plan: actively participate in implementation of the Prairie Plan via prairie core area based conservation.</p> <ul style="list-style-type: none"> - assist in prioritizing parcels with local technical team - contact landowners - technical staff will be well versed in program options - help landowners navigate programs <p>See Map 8A.</p>	<p>SWCD Land & Resource Mgmt</p>	<p>2013-2018</p>	<p>\$25,000</p>

Goal 7: Storm Water Management

Objective A: Assist and encourage non-regulated communities to develop Storm Water Management Plans.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
Urban Residents	7.A.1	<p>Encourage the development of model Storm Water Management Plans that could be easily adopted or modified by small communities.</p> <p>- Include the following information in plans:</p> <ul style="list-style-type: none"> ◇ Drainage ◇ Basic urban best management practice information such as: <ul style="list-style-type: none"> ▪ street sweeping, catch basin cleaning, leaf litter management, salt application, snow removal storage, ponds, filter strips, infiltration, lawn fertilizer, etc. ◇ Plans for future improvements. 	SWCD Land & Resource Mgmt. Municipalities in County CRWP HCWP	2013-2018	\$2,500
Urban Residents	7.A.2	Provide education and training opportunities for implementation and management of storm water best management practices.	Municipalities in County Land & Resource Mgmt. Chippewa SWCD CRWP, HCWP	2013-2018	See PC3:3.A.2
Urban Residents	7.A.3	<p>Seek funds to implement urban best management practice demonstration sites throughout the municipalities in Chippewa County.</p> <p>- Promote the use of semi-permeable surfaces by creating at least two (2) demonstration sites per community.</p> <p>- Design and install at least two (2) rain gardens per community for demonstration and education sites.</p>	Municipalities in County Land & Resource Mgmt. Chippewa SWCD CRWP HCWP	2013-2018	\$60,000

Objective B: Encourage communities to promote or provide incentives for homeowners to implement best management practices at the lot size level.

Municipalities	7.B.1	Offer incentives to residents to direct rooftop runoff to pervious areas such as yards, open channels or vegetated areas, and avoid routing rooftop runoff to the roadway and the storm water conveyance system.	Municipalities in County Land & Resource Mgmt.	2013-2018	\$10,000
Municipalities	7.B.2	Offer incentives to homeowners for on-lot infiltration practices, including reduced lot grading, rain gardens or rain barrels, which control runoff at its source.	Municipalities in County Land & Resource Mgmt.	2013-2018	\$10,000
Municipalities	7.B.3	Pursue funding sources for the establishment of urban best management practices.	Municipalities in County Land & Resource Mgmt.	2013-2018	\$2,500
Municipalities	7.B.4	Educate homeowners on the proper handling and disposal of hazardous waste to eliminate pollutants entering the storm sewers.	Municipalities in County Land & Resource Mgmt.	2013-2018	\$2,500
Municipalities	7.B.5	Support cities implementing the new stormwater permitting process which essentially requires each city to adopt the best way to hold water on the land, techniques that could range from rain gardens to holding ponds to pervious pavements to new sediment-collecting baffles in storm sewers. Practices can reduce phosphorus by 90% compared with the 50% that is typical of current water treatment systems. Create Urban BMP's and seek funds to assist with implementing the BMP's.	Municipalities in County Land & Resource Mgmt.	2013-2018	\$5,000
Municipalities	7.B.6	Provide educational opportunities on urban best management practices and their benefit through workshops, press releases, county fair and possibly community education classes.	Municipalities in County Land & Resource Mgmt.	2013-2018	\$2,500
Municipalities in Chippewa County	7.B.7	Purchase rain barrels through the Recycling Association of MN and offer them at a reduced rate to urban residents promoting water conservation and reducing stormwater runoff.	Land & Resource Mgmt.	2014	\$2,000

Goal 8: Shoreland

Objective A: Protect Shoreland areas in the County

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	8.A.1	Inventory/Assess status of required 50' buffer in shoreland areas. - Use public waters inventory and seek DNR's assistance. - Assess status of compliance and contact non-compliant through mailings. - Offer programs to become compliant with existing programs, CRP, etc.	DNR, SWCD, Land & Resource Mgmt	2015	\$50,000
County Wide	8.A.2	Review Floodplain update mapping. Compare with old maps to identify changes and land use of new areas identified. Implement BMP's as necessary.	DNR, Land & Resource Mgmt., Chippewa SWCD	2014	\$5,000

Priority Concern 2: Groundwater Quality & Quantity Impairments and Concerns

Goal 1: Protect and improve groundwater based drinking water sources.

Objective A: Implement Best Management Practices in Wellhead Protection Areas (WPA).

<i>Watershed</i>	<i>Objective</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
Cities of Montevideo, Milan & Granite	1.A.1	In cooperation with the following municipalities; Montevideo, Milan and Granite Falls; participate in the implementation and education of approved wellhead protection plans.	Municipalities, Chippewa SWCD, Land &	2013-2018	\$1,000

Falls			Resource Mgmt.		
Cities of Maynard, Watson & Clara City	1.A.2	Provide planning assistance to the Cities of Maynard, Watson and Clara City and MN Department of Health when process begins.	Municipalities, Chippewa SWCD, Land & Resource Mgmt., MDH	unknown	\$1,000
City of Watson	1.A.3	Watson: Drinking Water Supply Management Area (DWSMA) vulnerability boundary identified. Inventory wells within those boundaries and complete a simple land use analysis to see if BMP's are necessary to protect the wellhead area. Offer cost-share for sealing abandoned wells and offer funding for BMP's needed.	City of Watson Land & Resource Mgmt.	2014	\$1,000
County Wide	1.A.4	Inventory abandoned wells in WPA's and target sealing all abandoned wells through use of cost-share well sealing program.	WPA's county wide Land & Resource Mgmt.	2014	\$2,000
County Wide	1.A.5	Incorporate the County's sensitive groundwater recharge areas map (source MN DNR) into the local land use decision making process.	Land & Resource Mgmt. MN DNR	2014-2015	\$1,000
County Wide	1.A.6	County Geologic Atlas - systematic study of a county's geologic and groundwater resources. Host a workshop every three years with the DNR and Minnesota Geological Survey on how best to incorporate the County's Geologic Atlas into the land use decision making process.	Land & Resource Mgmt. MN DNR, MN Dept. of Health, MN Geological Surv.	2014 & 2017	\$2,000
Objective B: Ensure landowners and homeowners that their supply of water is safe for drinking.					
County Wide	1.B.1	Create a gift certificate (not to exceed \$50) for free well testing for new parents that get their source of drinking water from a private well. <i>Outreach:</i> Create an educational package to be handed out to new parents. Provide gift certificates to rural residents having new babies to test their private wells through Countryside Public Health for fecal coliform and nitrates/nitrites. Also provide other educational information on water quality pollutants such as HHW and pharmaceutical waste. <i>Audience:</i> New parents in Chippewa County serviced by private wells. Approximately 20 births annually in rural Chippewa County.	Land & Resource Mgmt.	2013-2018	\$5,000

County Wide	1.B.2	Seal 10 wells annually and offer 50% cost-share up to \$400 per well to landowners to seal old unusable/abandoned wells on their property.	Land & Resource Mgmt. Chippewa SWCD	2013-2018	\$20,000
Flood Plain Areas County Wide	1.B.3	Send out an informational direct mailing to landowners located in flood plain areas about wells located in well pits. Recommend retrofitting the wells so the casing is located above the flood level for their own safety and for groundwater protection.	Land & Resource Mgmt.	2015	\$500
County Wide	1.B.4	Educate landowners on the affects on SSTS and waste water treatment plants to surface and groundwater resources from improper disposal of pharmaceutical wastes. Increase awareness on free drop off sites for pharmaceutical waste through advertising in local newspapers, radio and assistance from law enforcement, hospital, clinics, nursing homes, assisted living, home healthcare and pharmacies.	Land & Resource Mgmt.	2013-2018	\$1,000
City of Clara City	1.B.5	In cooperation with the City of Clara City and Police Department, locate a collection spot in their community for pharmaceutical waste.	Land & Resource Mgmt.	2013	\$100
County Wide	1.B.6	In cooperation with the Chippewa County Sheriff's Department, locate a pharmaceutical collection spot in the Sheriff's Department for all County residents to use.	Land & Resource Mgmt.	2013	\$100
County Wide	1.B.7	Promote the use of Kandiyohi County's Household Hazardous Waste (HHW) Regional Facility located in the City of Willmar. With the use of our HHW trailer, hold HHW collections annually. (See PC 3:3.A.7)	Land & Resource Mgmt.	2013-2018	See PC 3:3.A.7
County Wide	1.B.8	Through the MN Department of Agriculture water testing clinic, offer free nitrate water testing with the goal of increasing public awareness of nitrates in rural drinking and livestock water supplies.	Land & Resource Mgmt. MN Dept. of Ag	2013-2018	\$500
County Wide	1.B.9	Offer well testing bi-annually in cooperation with the MN Department of Health for nitrates and fecal coliform bacteria. Offer \$10 cost-share for each test. Provide user guide safety and BMPs for private well users.	Land & Resource Mgmt. MN Dept. of Health	2014, 2016, 2018	\$2,500
Objective C: Groundwater Quantity/I.D. Recharge Areas					
County Wide	1.C.1	Pursue funding through a CWF to establish a Water Conservation/Drought Contingency Plan.	Land & Resource Mgmt. NRCS, SWCD, MN DNR County Emergency Mgmt.	2016	\$10,000

			Municipalities		
City of Milan	1.C.2	Gather information from the City of Milan on current water usage. Develop an education program to promote water conservation with an emphasis on the energy savings, and offer free packets of water conservation tools, i.e. low flow showerheads, to all dwellings on current municipal water system and continue to gather water usage information and review the results.	City of Milan Land & Resource Mgmt.	2015-2016	\$5,000
Municipalities in Chippewa County	1.C.3	Establish a program to offer incentives to homeowners for on-lot infiltration practices, including reduced lot grading and rain gardens to control runoff at its source and promote recharge to the groundwater. Complete two practices annually.	Land & Resource Mgmt. CRWP, HCWP	2014-2018	\$10,000
County Wide	1.C.4	Continue to monitor two DNR observation wells monthly and two irrigation wells twice annually in April and October. - Work closely with DNR to determine if more wells should be tested throughout the county to determine ground water levels. - Discuss the needs and benefits of having more test sites.	Chippewa SWCD DNR	2013-2018	\$1,000
County Wide	1.C.5	Continue to be engaged and informed regarding on-going research to understand the impacts of drainage or other land use practices on ground water recharge rates and the means to quantify these impacts. - continue to inform and educate citizens	County Ag/Ditch Dept. NRCS, SWCD MN DNR	2013-2018	\$1,000
County Wide	1.C.6	Develop a strategy to promote water conservation and educate on the benefits and importance of ensuring an adequate and clean amount of water for the future.	Land & Resource Mgmt. U of M Extension	2015	\$2,000

Priority Concern 3: Public Awareness and Plan Administration

Goal 1: Maintain a Watershed Focus

Objective A: Support watersheds in Chippewa County.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
CRWP HCWP	1.A.1	Continue to support the watershed monitoring and information gathering efforts in order to better understand, assess, and identify gaps related to the condition of the County's water resources.	Land & Resource Mgmt. Chippewa SWCD County Ag/Ditch Dept.	2013-2017	\$500
CRWP HCWP	1.A.2	Support watershed planning, monitoring and implementation activities by providing financial (in-kind) and technical assistance by attending and participating in the Local Work Group meetings, monthly meetings and annual meetings.	Land & Resource Mgmt. Chippewa SWCD County Ag/Ditch Dept.	2013-2017	\$80,000
CRWP HCWP	1.A.3	Annually review monitoring data with the watersheds and implementation accomplishments to continue coordinating future initiatives. Participate and be informed via the watershed restoration and protection strategy (led by MPCA) and be an active participant as the watershed transitions to Comprehensive Watershed Management planning.	Local Water Plan Committee CRWP, HCWP	2013-2017	\$500

Goal 2: Staff and Coordinate Stakeholder Cooperation

Objective A: Stakeholder Cooperation

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	2.A.1	Maintain the County Local Water Management Coordinator position.	Land & Resource Mgmt.	2013-2017	\$125,000
County Wide	2.A.2	Maintain a strong Water Planning Committee. - Hold at least 4 meetings per year to discuss issues and work plan agenda. - Review, design and implement programs. - Educate public on "What is Your County Water Plan?" by highlighting objectives and accomplishments thru radio and newspaper articles and seek other new ways also.	Land & Resource Mgmt.	2013-2017	\$10,000
County Wide	2.A.3	Use the following technology tools when tracking, reviewing, assessing and analyzing data in identifying high priority areas. - Use the County's Geographic Information System (GIS) to track water plan accomplishments and maintain current and past inventories. - Through the active use of Pictometry <ul style="list-style-type: none"> ◊ Maintain pictometry with updated flights every 3-5 years. 	Land & Resource Mgmt. Chippewa SWCD County Ad/Ditch Dept.	2013-2017	\$50,000
		<ul style="list-style-type: none"> ◊ Lidar/Terrain Analysis. Use tools to prioritize non-point source, surface water management and water quality management targeting ◊ Assess data needs ◊ Obtain necessary training 		2017	\$80,000
County Wide	2.A.4	Take a course on how to use LIDAR based data to target BMPs to the most critical landscapes and improve the competitiveness of conservation grant proposal applications.	Land & Resource Mgmt. Chippewa SWCD County Ag/Ditch Dept.	2013-2017	\$1,000
Federal, State & Local Agencies	2.A.5	Administer a Gap Analysis of technical skills with the main purpose to evaluate "where we are and where we want to be" and "what tools do we have and what are we missing."	Land & Resource Mgmt. Chippewa	2013-2014	\$1,500

within Chippewa Counties area		<ul style="list-style-type: none"> · Gain fuller understanding of each departments skills and duties. · Determine the “gaps” between organization’s and identify needs. · Prioritize the gaps identified and implement a strategy to fill in those gaps. <p>Upon completion of the gap analysis, project teams will have the following:</p> <ul style="list-style-type: none"> · An understanding of the differences between current practices and needed practices. · An assessment of the barriers that need to be addressed and identify possible staffing needs for future grants. 	SWCD		
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Objective B: Implement the County's land use controls.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	2.B.1	Continue to implement the County's land use controls which includes the County's Land and Related Resources Management Ordinance and the Solid Waste Ordinance. <ul style="list-style-type: none"> - The Land & Related Resource Management Ordinance includes but is not limited to the following topics: Floodplain, SSTS, MN River Management District, Natural Areas Preservation District, Shoreland and Feedlots. - The Solid Waste Ordinance includes but is not limited to the following topics: Household Hazardous Waste, Recycling and Problem Materials. 	Land & Resource Mgmt.	2013-2017	\$450,000
County Wide	2.B.2	Administer the SSTS program through the BWSR Base Grant annually and provide needed annual reports to MPCA.	Land & Resource Mgmt.	2013-2017	\$75,000
County Wide	2.B.3	Amend the SSTS Ordinance to implement the new Rules developed by the MPCA and the University of MN Extension by the assigned deadline of February 4, 2014.	Land & Resource Mgmt.	2013-2014	See P 3:2.B.1
County Wide	2.B.4	Administer the Shoreland Administration program through the BWSR Base Grant annually and provide needed annual reports to MN DNR.	Land & Resource Mgmt.	2013-2017	\$27,000
County Wide	2.B.5	Administer the Wetland Conservation Act administration program through the BWSR Base Grant annually and provide needed annual reports to BWSR.	Chippewa SWCD Land & Resource Mgmt.	2013-2017	\$50,000

Goal 3: Raise Public Awareness on Key Water Planning Issues.

Objective A: Raise public awareness through education and cooperation with residents, businesses and schools.

<i>Area / Audience</i>	<i>Objective #</i>	<i>Action</i>	<i>Responsibility</i>	<i>Time Frame</i>	<i>Total Units/Cost</i>
County Wide	3.A.1	Provide educational, technical and financial assistance, as available, to homeowners to upgrade noncompliant SSTSSs. Investigate and initiate corrective measures for improperly discharging SSTSSs.	Land & Resource Mgmt.	2013-2017	See PC 1:1.A.4
County Wide	3.A.2	<p>Focus education and outreach efforts on two to three water planning issues a year. Integrate those efforts with the watershed projects educational goals. Identify the priority issues in spring each year.</p> <p><i>Priority issues and activities already identified to be addressed in the next 5 years:</i></p> <ul style="list-style-type: none"> - Participate in annual Environmental Field Days for approximately 200 - 5th grade students from school districts located within Chippewa County. - Display a topic at the annual County Fair. Outreach is approximately 1000 people. - Display a topic at the bi-annual Health & Wellness Fair or Woman's Day Event in Montevideo. Outreach is approximately 300 adults. - Participate in annual Woman's Day event . Outreach is approximately 50 woman annually. <p><i>Annual topics chosen will be promoted through the use of the following sources:</i> newspaper articles ~ radio ads ~ posters ~ displays ~ field days ~ speakers ~ classes ~ direct mailings ~ SWCD, Chippewa County, U of M Extension, CRWP and HWCP internet sites.</p> <p><i>The following is a list of educational topics covered by the Water Plan but is not limited to the following:</i></p> <ul style="list-style-type: none"> * Burn Barrels * Sealing Abandoned Wells * Phosphorus Free products and education on fertilizer use * Water Conservation / Ground Water Quantity * Lawn Care (i.e. leaf maintenance, grass clippings) 	Land & Resource Mgmt. FSA U of M Extension Chippewa SWCD CRWP HCWP NRCS	2013-2017	\$25,000

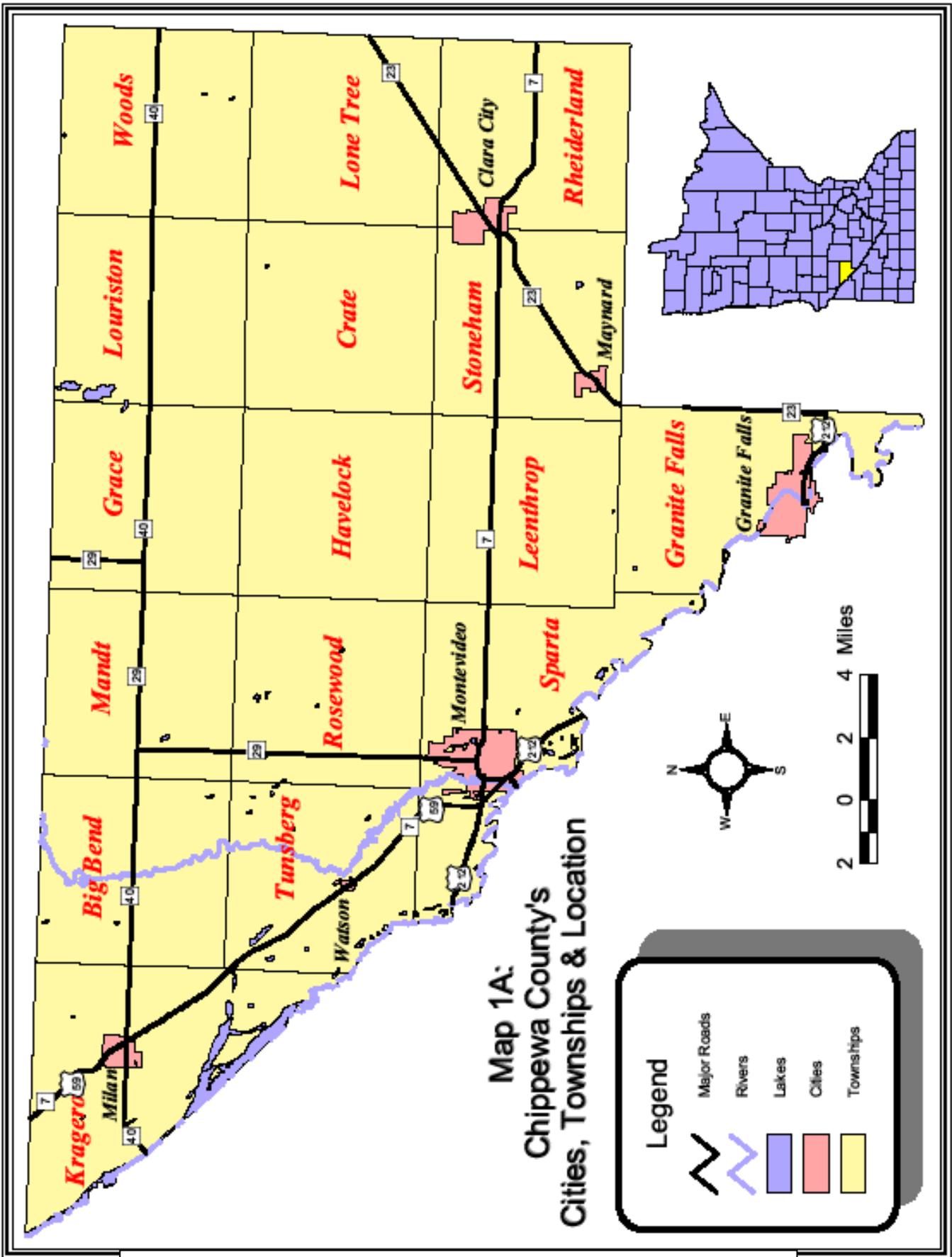
		<ul style="list-style-type: none"> * Feedlots * Wetland Conservation Act * Shoreland Management * Septic Systems * Well Testing * Mercury * Buffers (grass & tree) * Recycling * Household Hazardous Waste * Above Ground Fuel Storage Tanks * Empty Fuel Tank Disposal * Construction Site BMP's * Backyard Conservation * Rain Gardens * Wellhead / Private Well Protection * Tree Maintenance * Manure, Pest & Nutrient Management * Nutrient Management and Nitrogen * Prairie Plan * Drainage Water Management and Water Quality * Endocrine Disruptor's/Contaminants of Emerging Concern * Pharmaceutical Waste * Other Rural Best Management Practices * Other Urban Best Management Practices 			
County Wide / Certified SSTS Businesses & Individuals	3.A.3	Continue to provide annual training and information program for SSTS installers, designers and haulers. Outreach: direct mailing and annual meeting (approximately 15 contractors)	Land & Resource Mgmt.	2013-2017	\$500
County Wide	3.A.4	Create an Operation and Maintenance Program for residents that operate their own SSTS. <i>Outreach:</i> direct mailing to landowners that have installed new systems over the past 5-10 years. Research options on how to keep these landowners informed and reminded to continue maintenance of their systems and then implement the program.	Land & Resource Mgmt.	2013-2017	\$1,000
Local Excavators	3.A.5	Distribute annually updated information to excavators on proper site	Land &	2013-2017	\$250

County Wide		abandonment. Use information made available by the MN Department of Health (MDH) and MN Pollution Control Agency (MPCA) to ensure public safety and environmental safety procedures when taking down a building site. - Sealing Unused Wells brochure by MDH - Pre-Renovation/Demolition Environmental Checklist by MPCA - SSTS Abandonment Reporting Form by MPCA	Resource Mgmt.		
County Wide	3.A.6	Promote the use of Kandiyohi County's Regional Household Hazardous Waste (HHW) Facility located in the City of Willmar.	Land & Resource Mgmt.	2013-2017	\$200
County Wide	3.A.7	Hold five HHW Collections using Chippewa County's HHW trailer and the assistance of our Regional Facility in Kandiyohi County with the following schedule: - Cities of Maynard and Clara City and Townships of Granite Falls, Rheiderland, Stoneham, Crate, Louriston, Woods, Leenthrop, Grace and Lone Tree. - City of Montevideo and Townships Sparta, Tunsberg, Rosewood and Havelock. - City of Milan and Townships Kragero, Big Bend and Mandt.	Land & Resource Mgmt.		
				2013 & 2016	\$3,000
				2014	\$11,000
				2015 & 2017	\$2,000
County Wide	3.A.8	Hold five Problem Material Collections. Items to be collected are tires, appliances, electronics, fluorescent bulbs and other mercury items, cell phones and rechargeable batteries.	Land & Resource Mgmt.	2013-2017	\$47,500

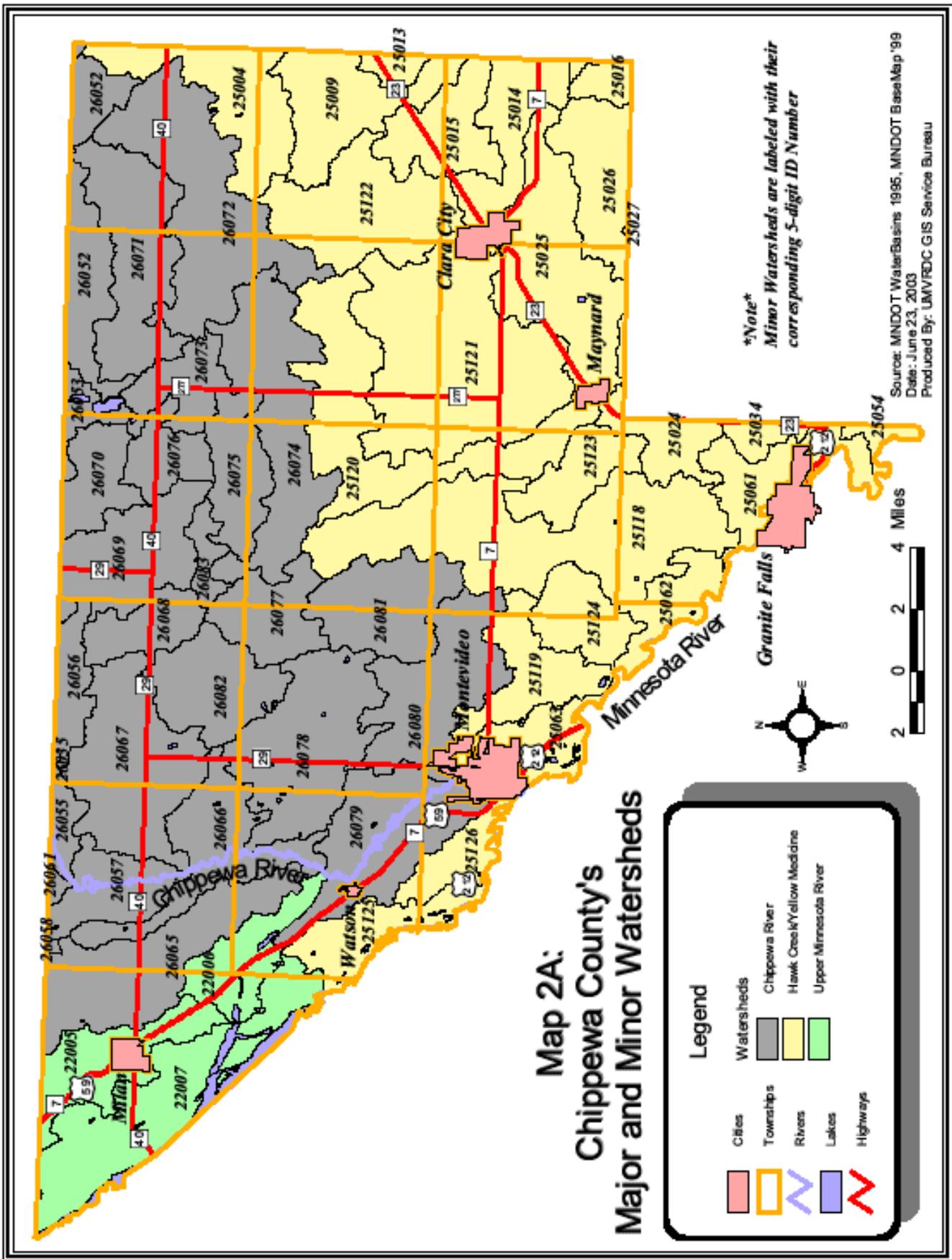
CHAPTER THREE:

Maps & Tables

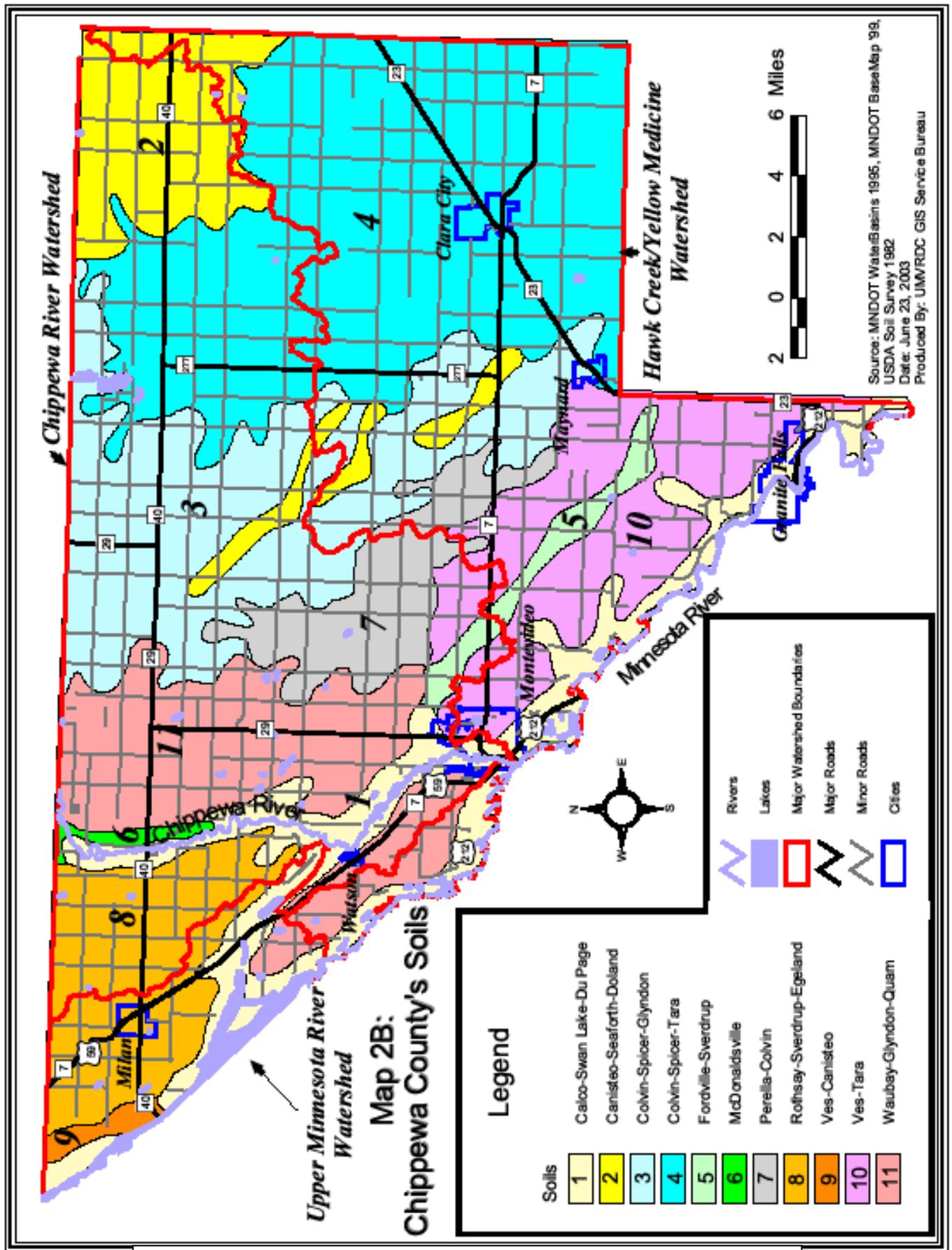
- Map 1A: Chippewa County's Cities, Townships and Location
- Map 2A: Chippewa County's Major and Minor Watersheds
- Map 2B: Chippewa County's Soils
- Map 2C: Chippewa County's Pre-Settlement Vegetation
- Map 2D: Chippewa County's Land Use
- Map 2E: Chippewa County's Land Ownership
- Map 2F: Chippewa County's DNR Observation Wells
- Map 2G: Chippewa County's Wetlands
- Map 2H: Chippewa County's Floodplains
- Map 3A: Chippewa County's Erosion Prone Soils
- Map 4A: Chippewa County's Calcareous Fens
- Map 4B: Chippewa County's Priority Tributaries / Steep Slopes
- Map 4C: Chippewa County's Priority Restorable Wetlands / Steep Slopes
- Map 5A: Chippewa County's Feedlots
- Map 5B: Chippewa County's Septic System Upgrades
- Map 6A: Chippewa County's Drainage
- Map 6B: Chippewa County's Drainage
- Map 6C: Chippewa County's Drainage
- Map 6D: Chippewa County's Drainage
- Map 7A: City of Granite Falls DWSMA
- Map 7B: City of Milan DWSMA
- Map 7C: City of Montevideo DWSMA
- Map 7D: City of Watson DWSMA
- Map 8A: Minnesota's Remaining Native Prairie
- Map 8B: Prairie Core Areas
- Table 1: Conservation Lands Summary (BWSR)



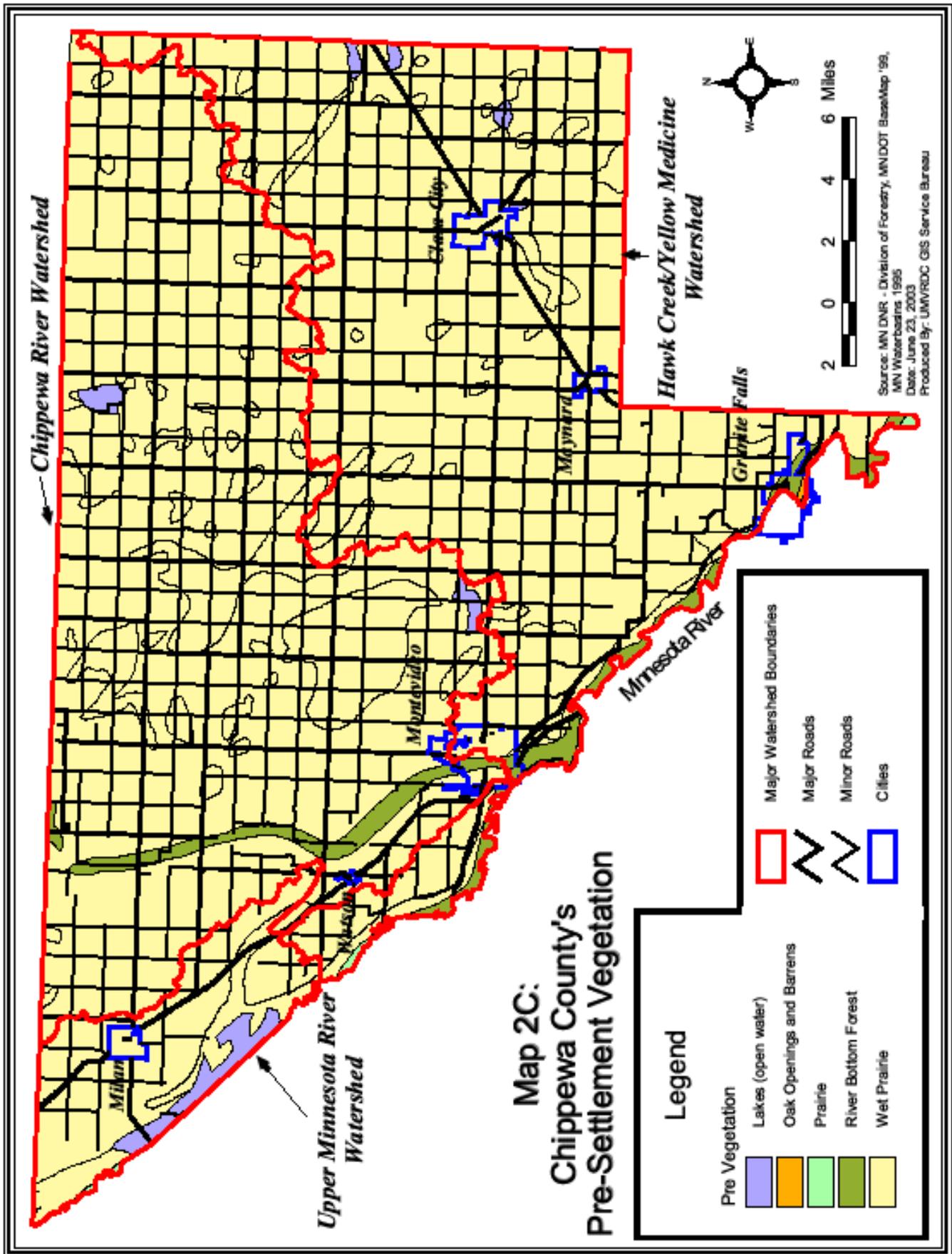
Map 1A: Chippewa County's Cities, Townships and Location



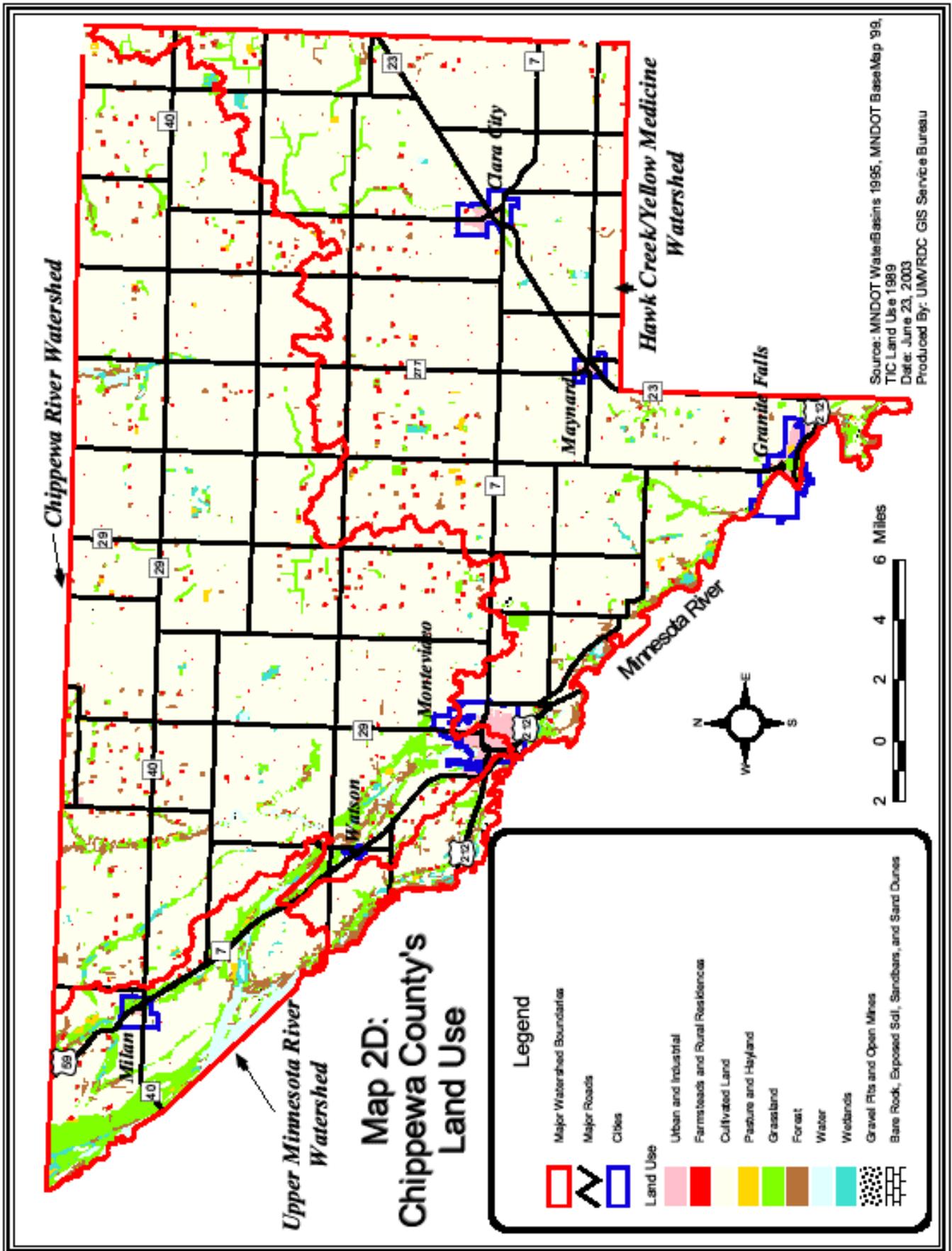
Map 2A: Chippewa County's Major & Minor Watersheds



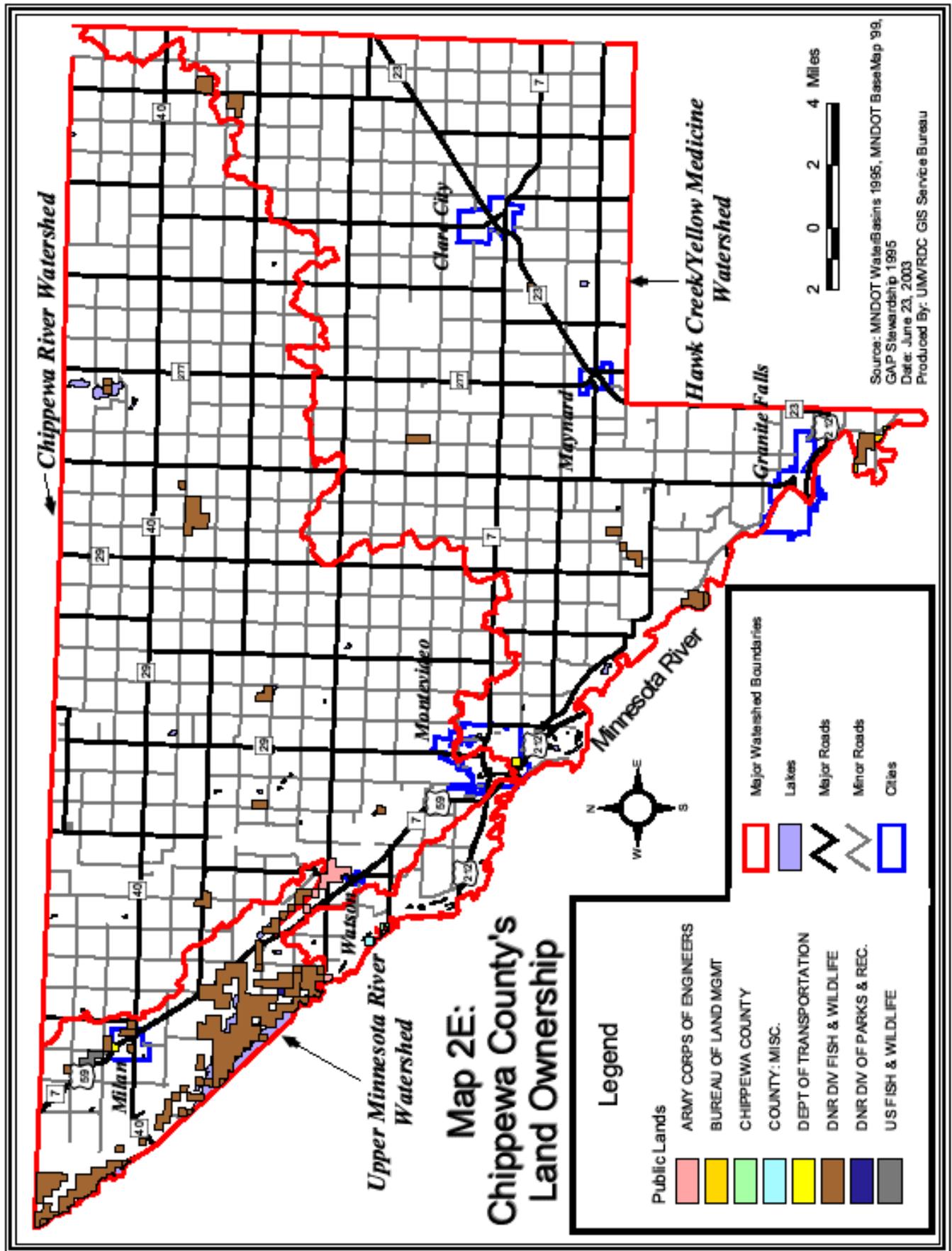
Map 2B: Chippewa County's Soils



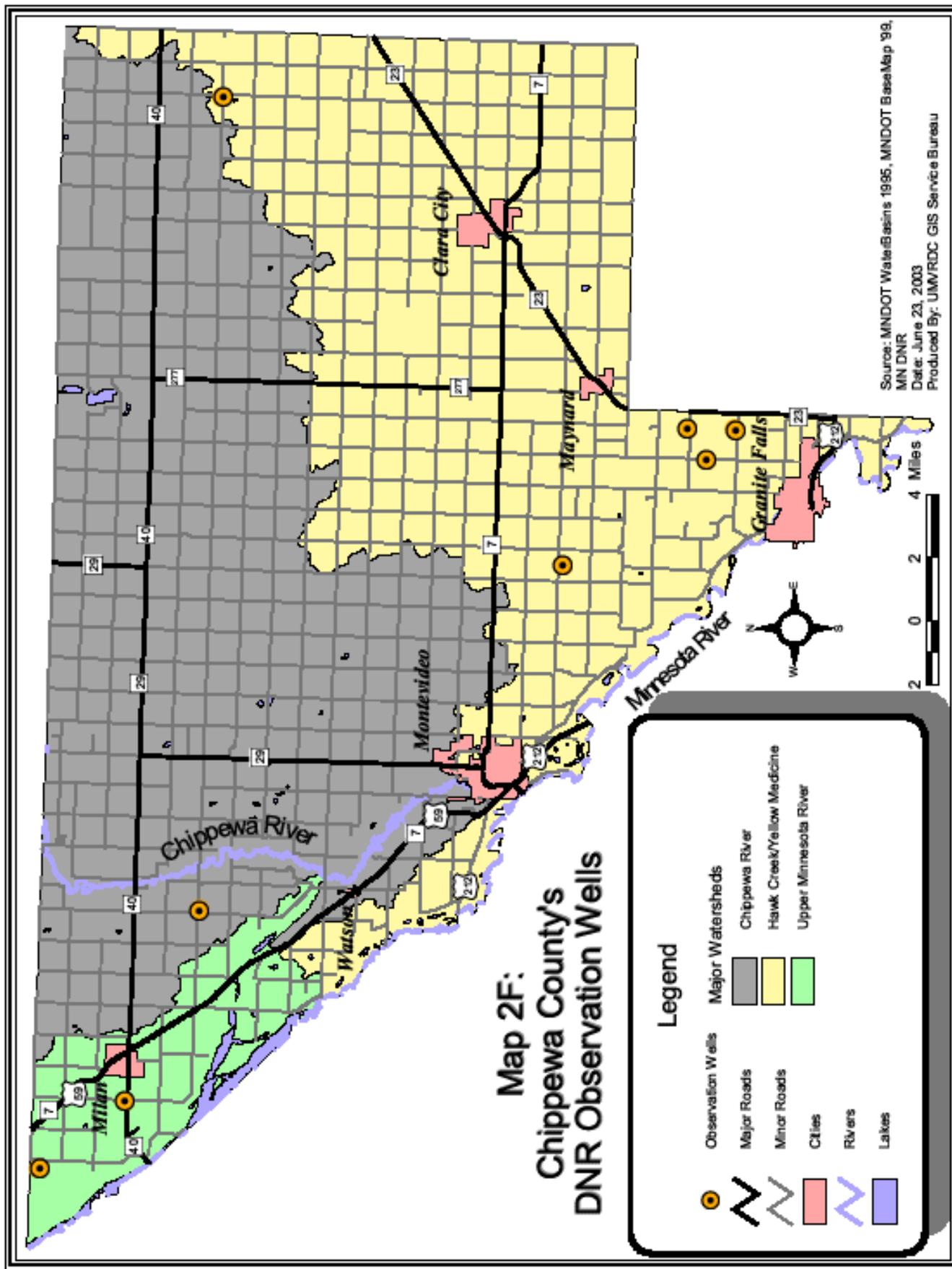
Map 2C: Pre-settlement Vegetation



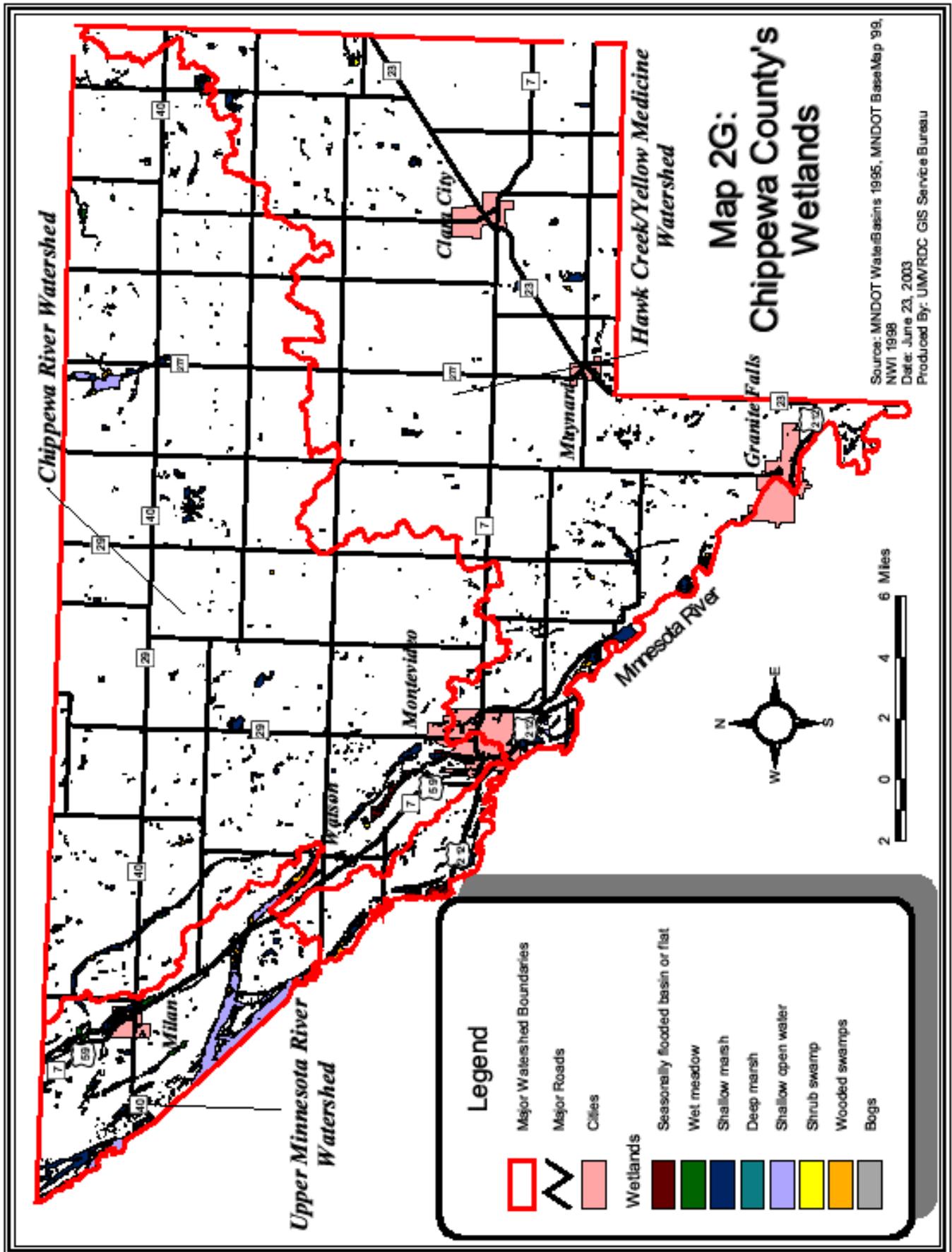
Map 2D: Land Use



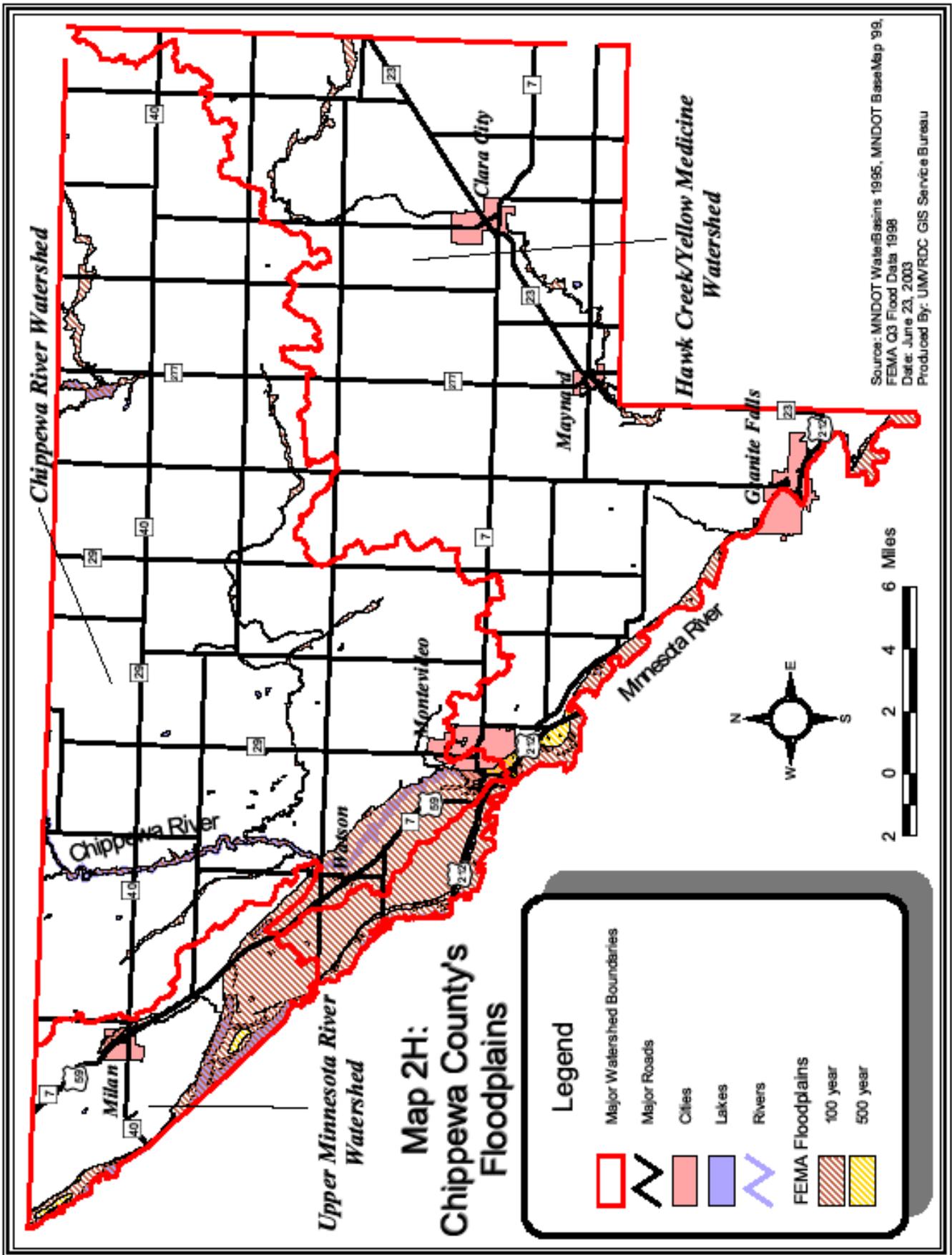
Map 2E: Land Ownership



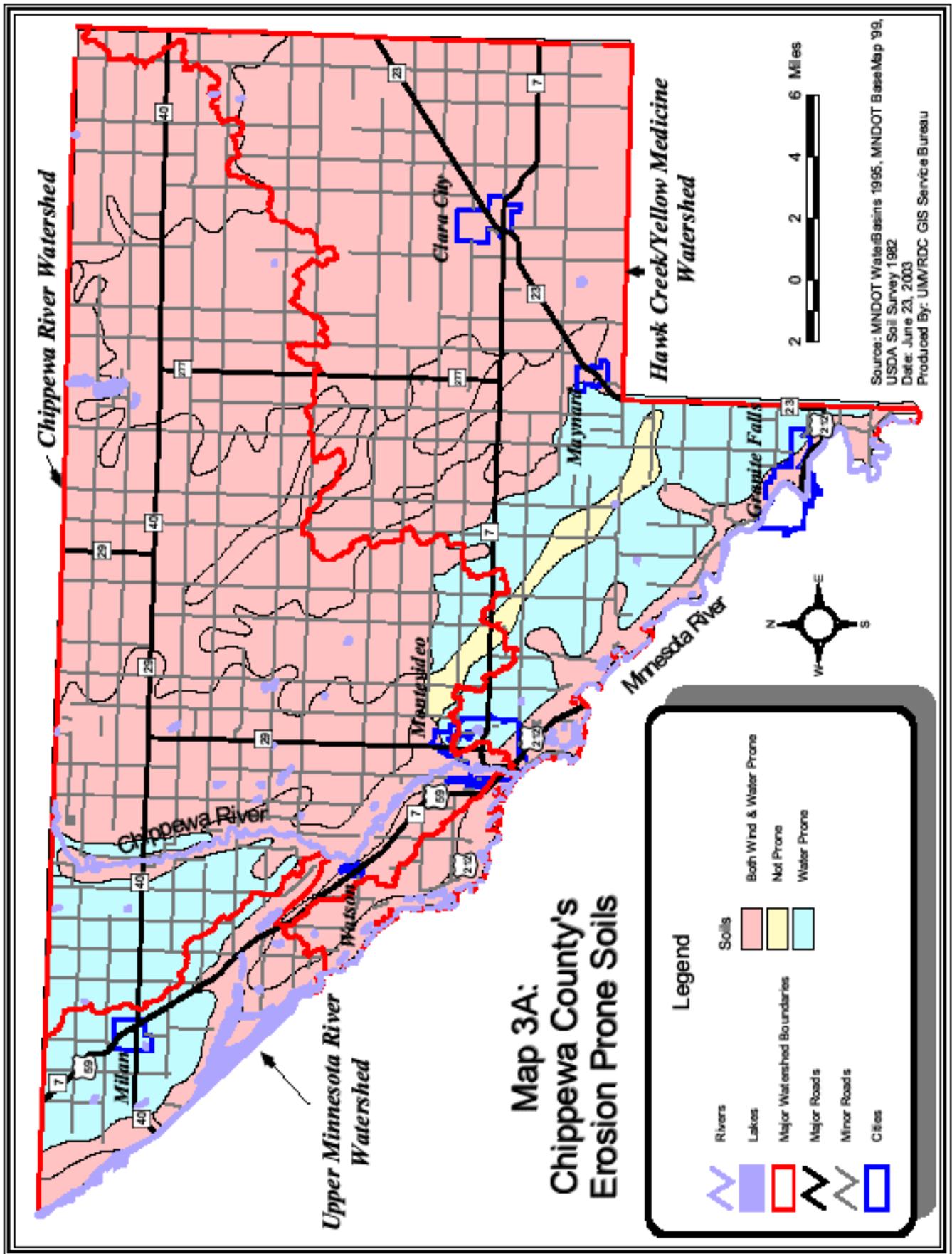
Map 2F: DNR Observation Wells



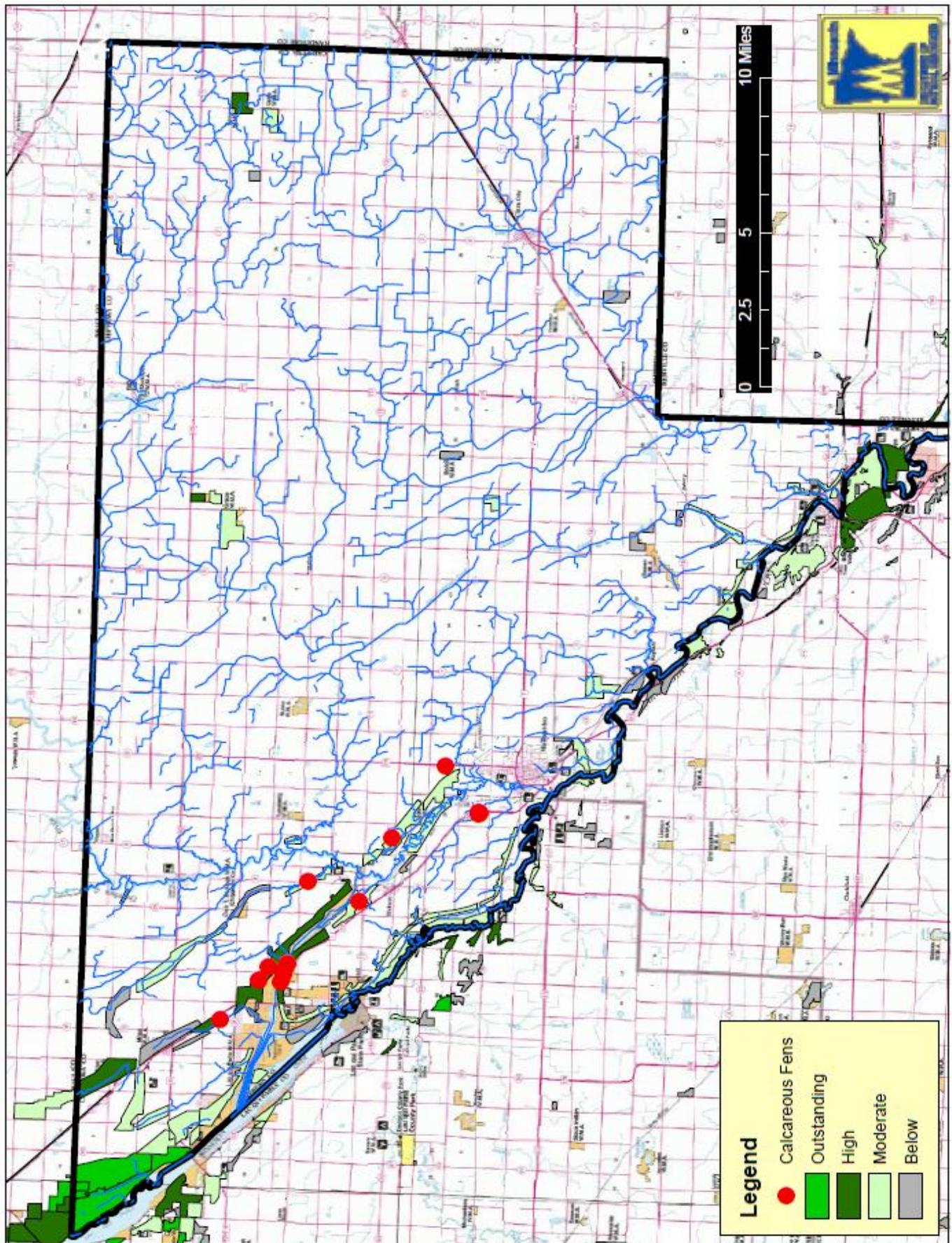
Map 2G: Wetlands



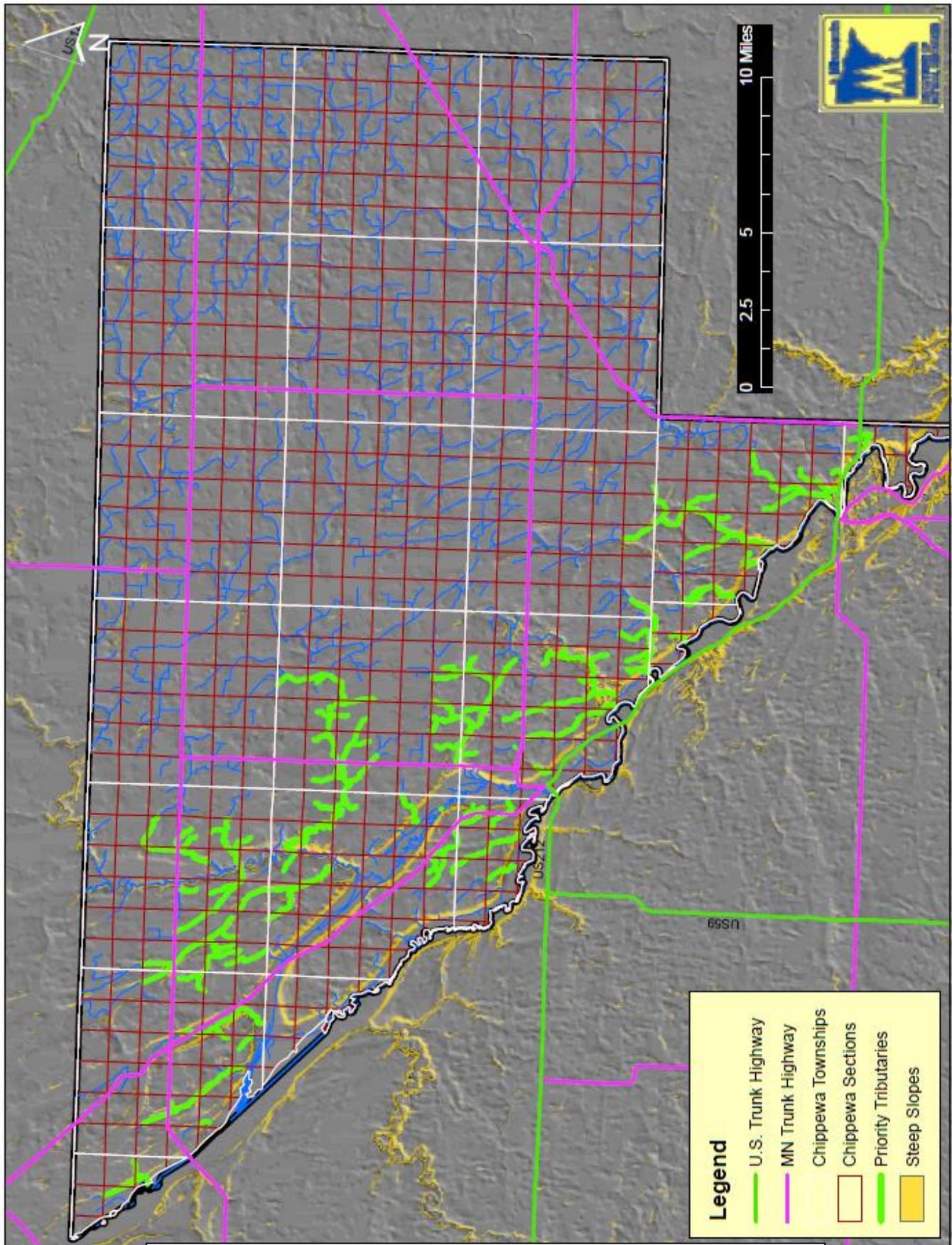
Map 2H: Floodplains



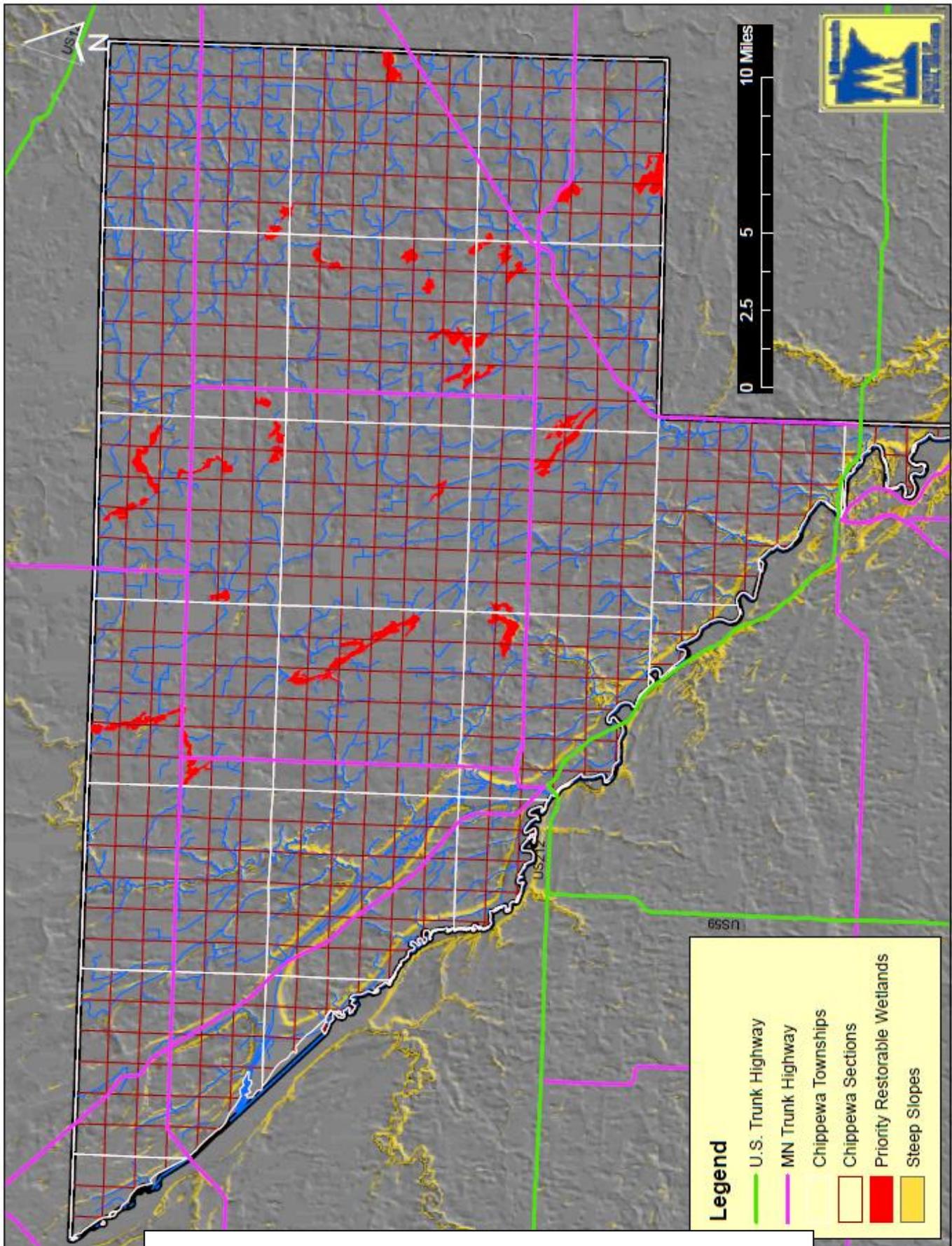
Map 3A: Erosion Prone Soils



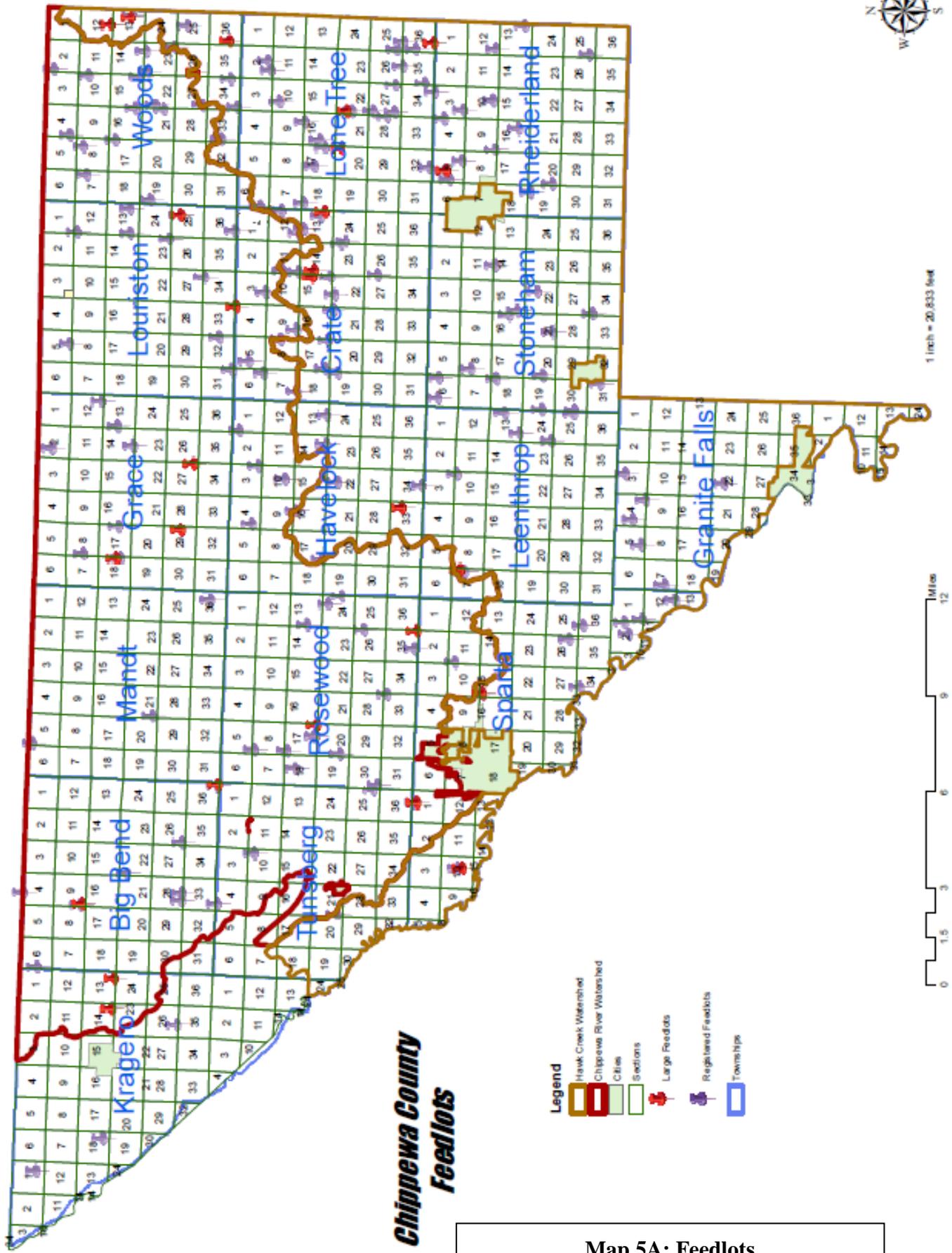
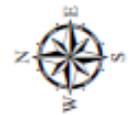
Map 4A: Calcareous Fens



Map 4B: Priority Tributaries / Steep Slopes



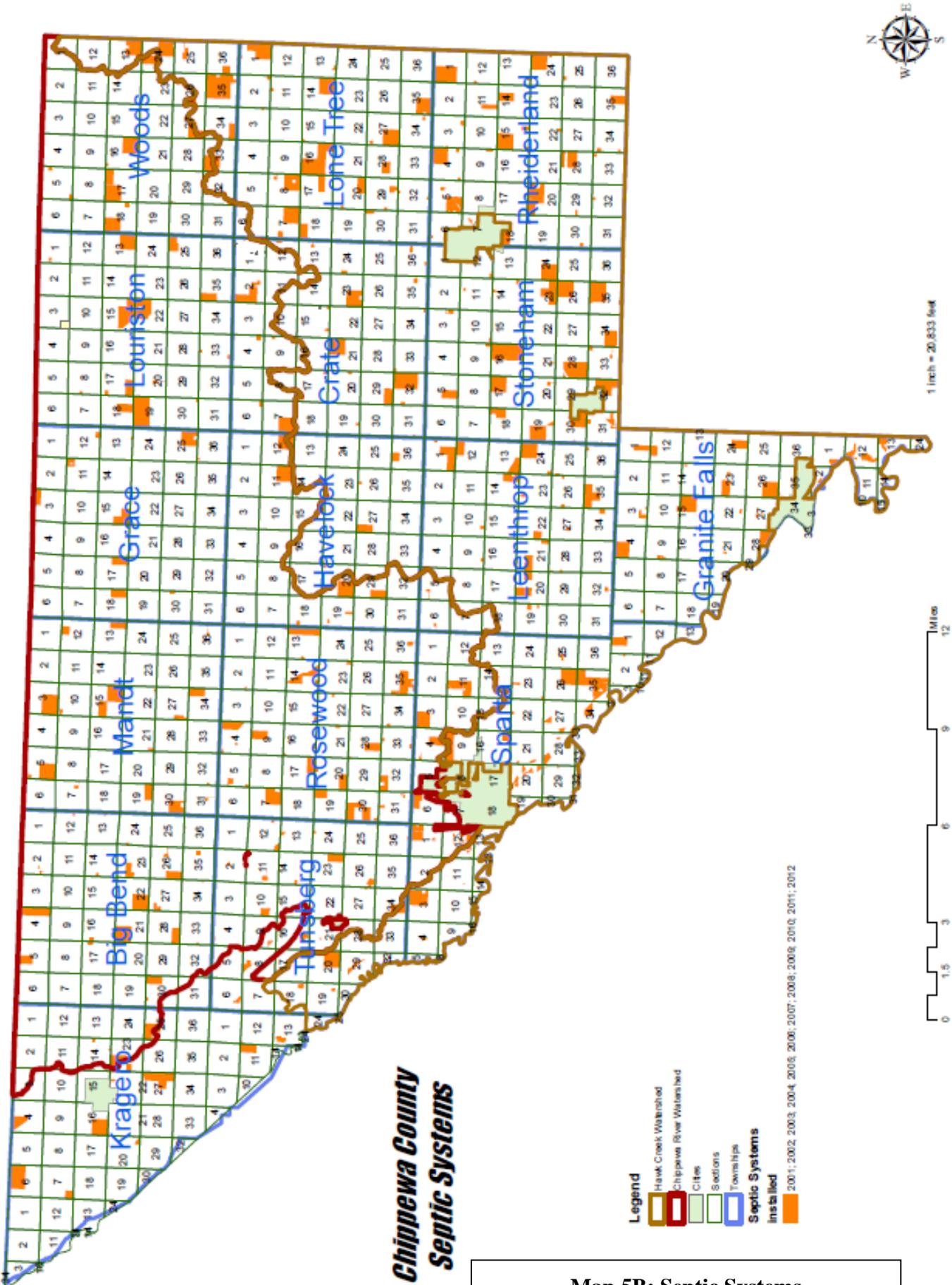
Map 4C: Priority Restorable Wetlands / Steep Slopes

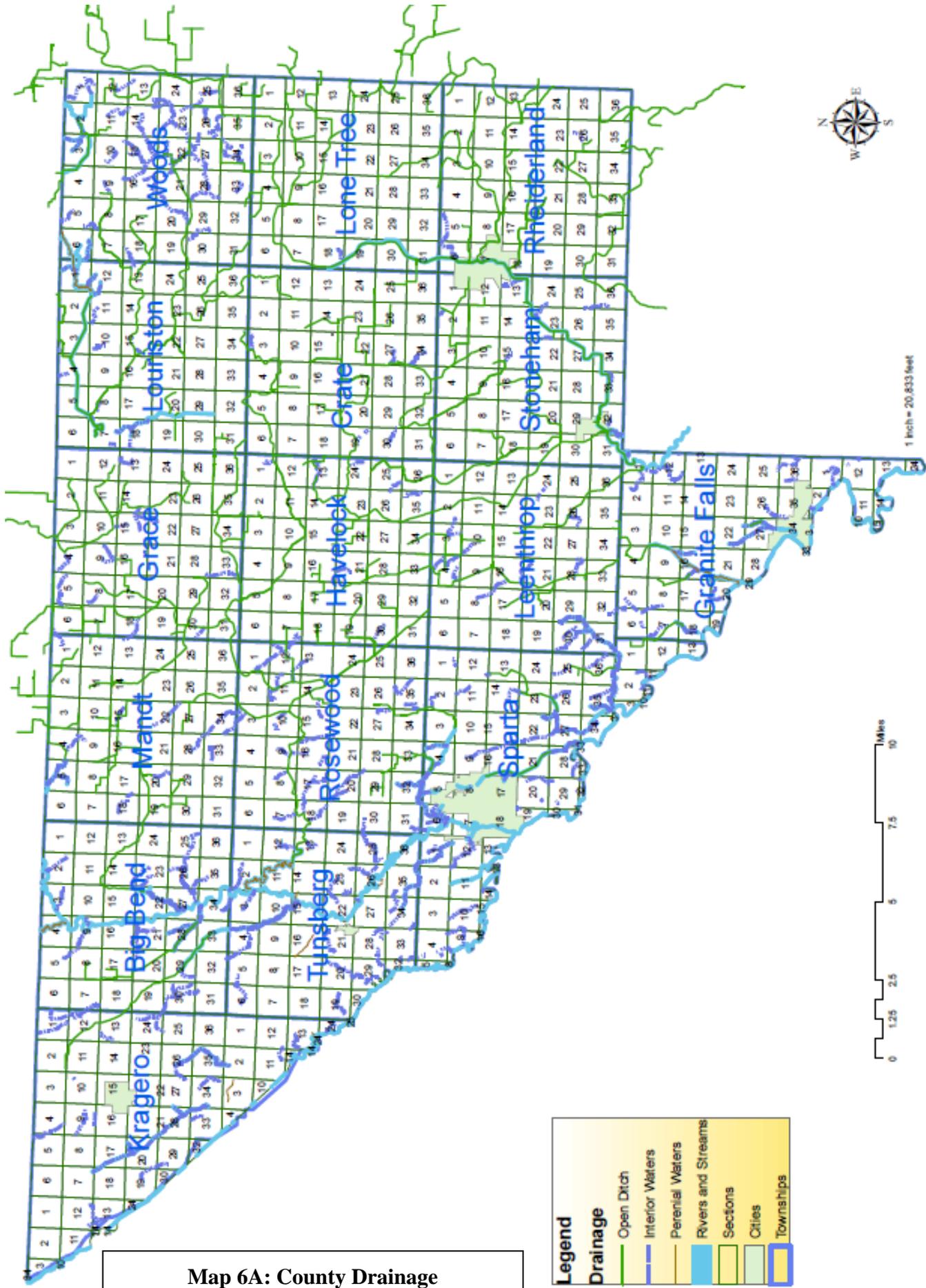


**Chippewa County
Feedlots**

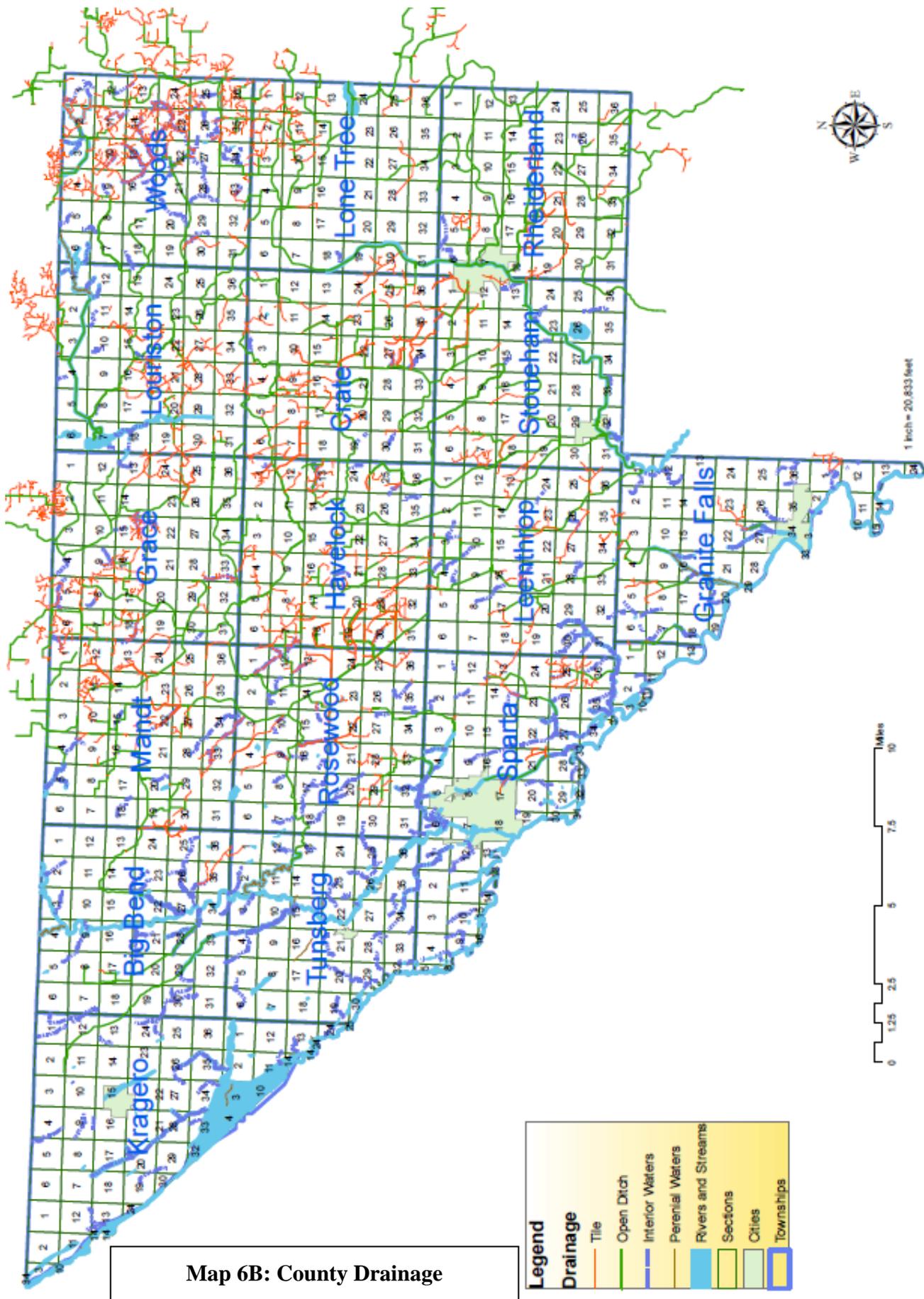
- Legend**
- Hawk Creek Watershed
 - Chippewa River Watershed
 - Cities
 - Sections
 - Large Feedlots
 - Regional Feedlots
 - Townships

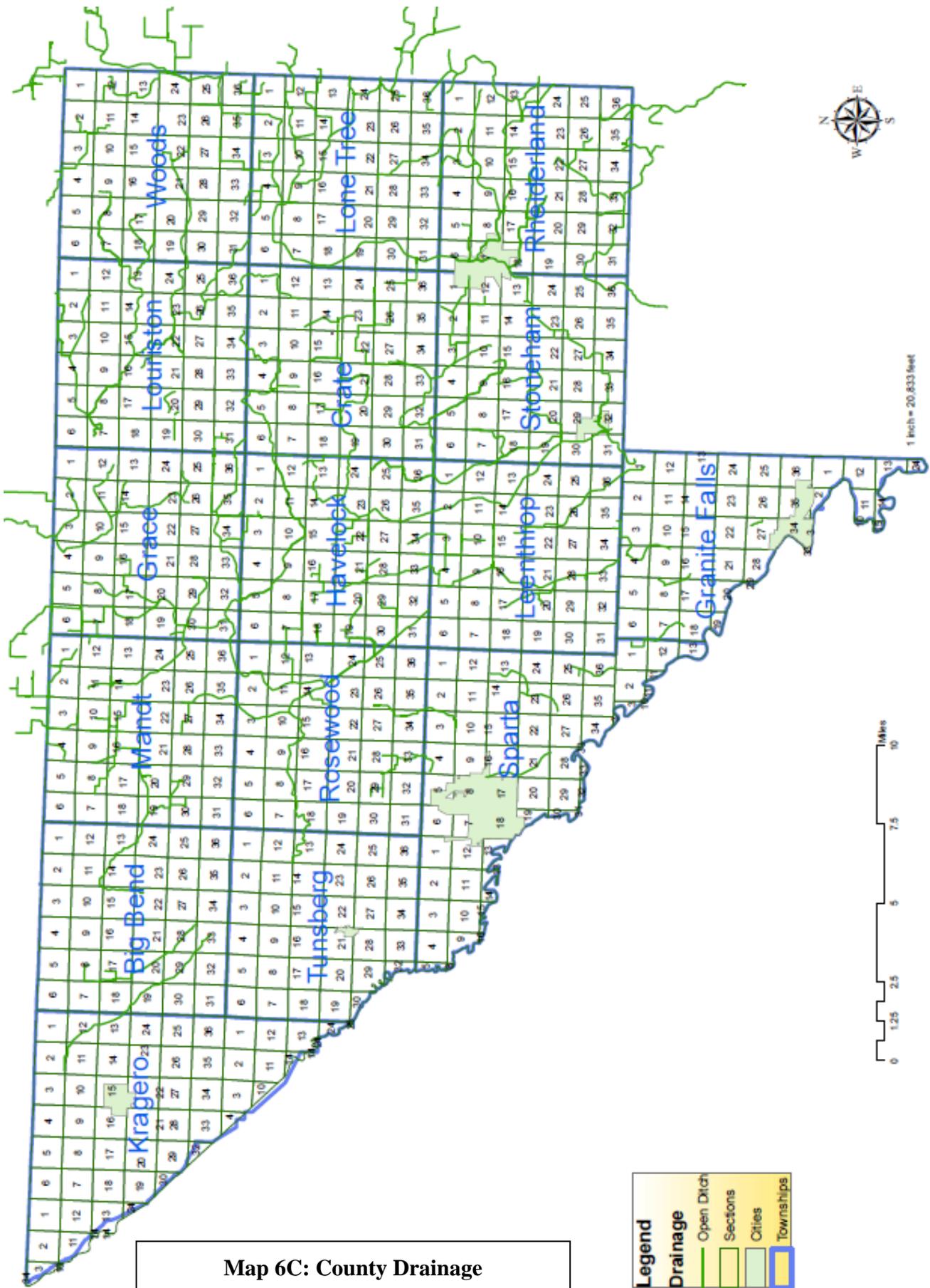
Map 5A: Feedlots



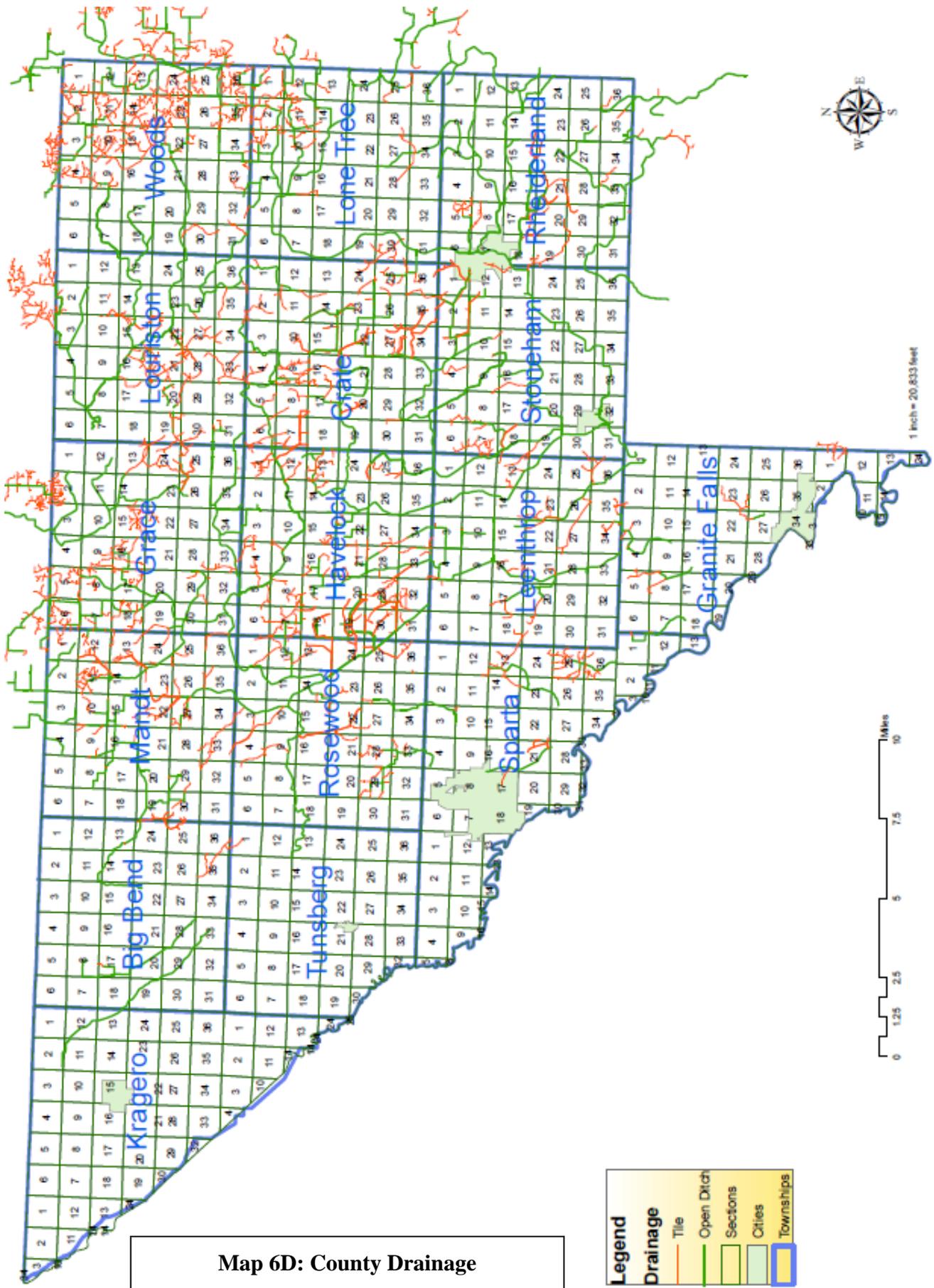


Map 6A: County Drainage



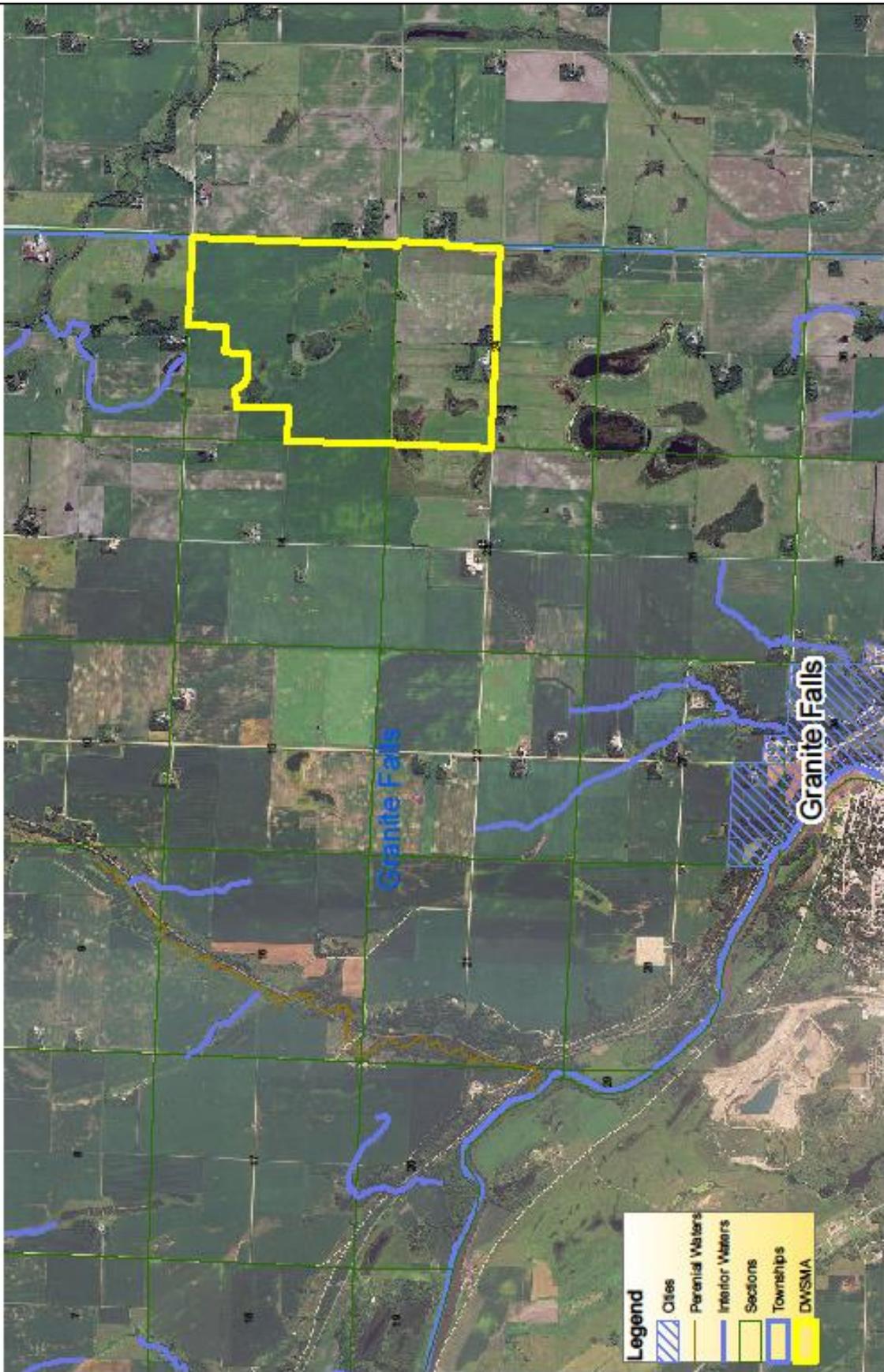


Map 6C: County Drainage



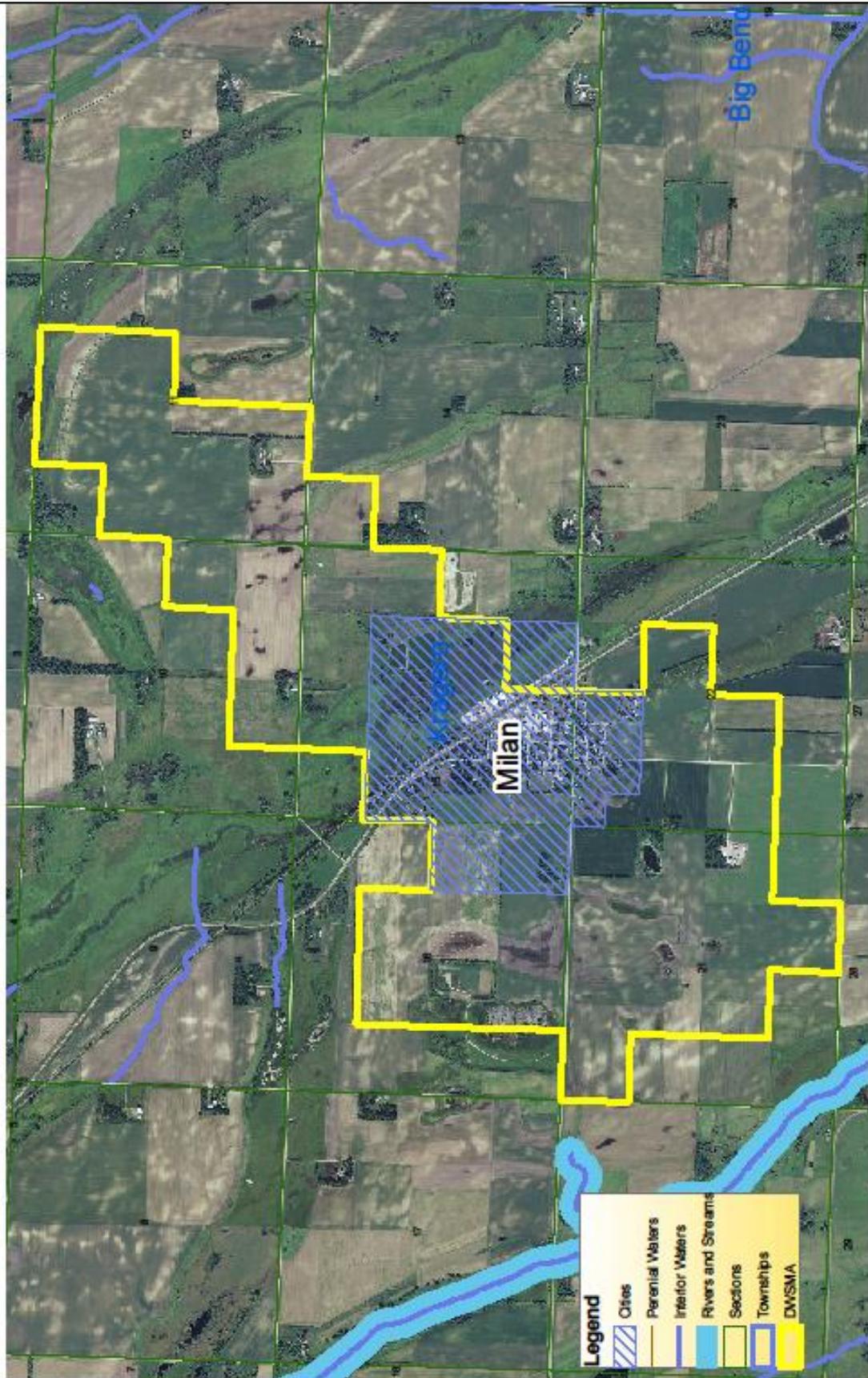
Map 6D: County Drainage

**City of Granite Falls
DWSMA**

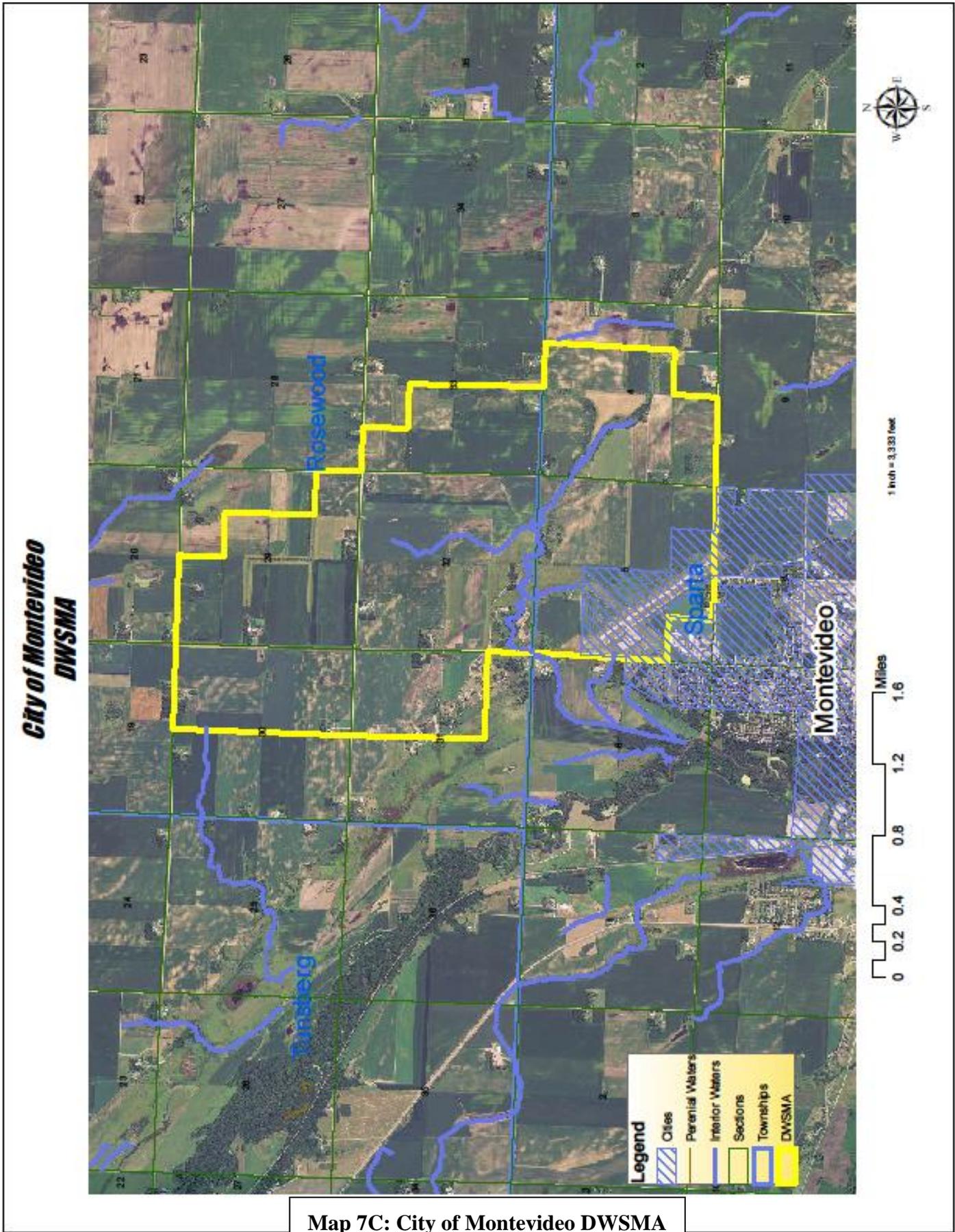


Map 7A: City of Granite Falls DWSMA

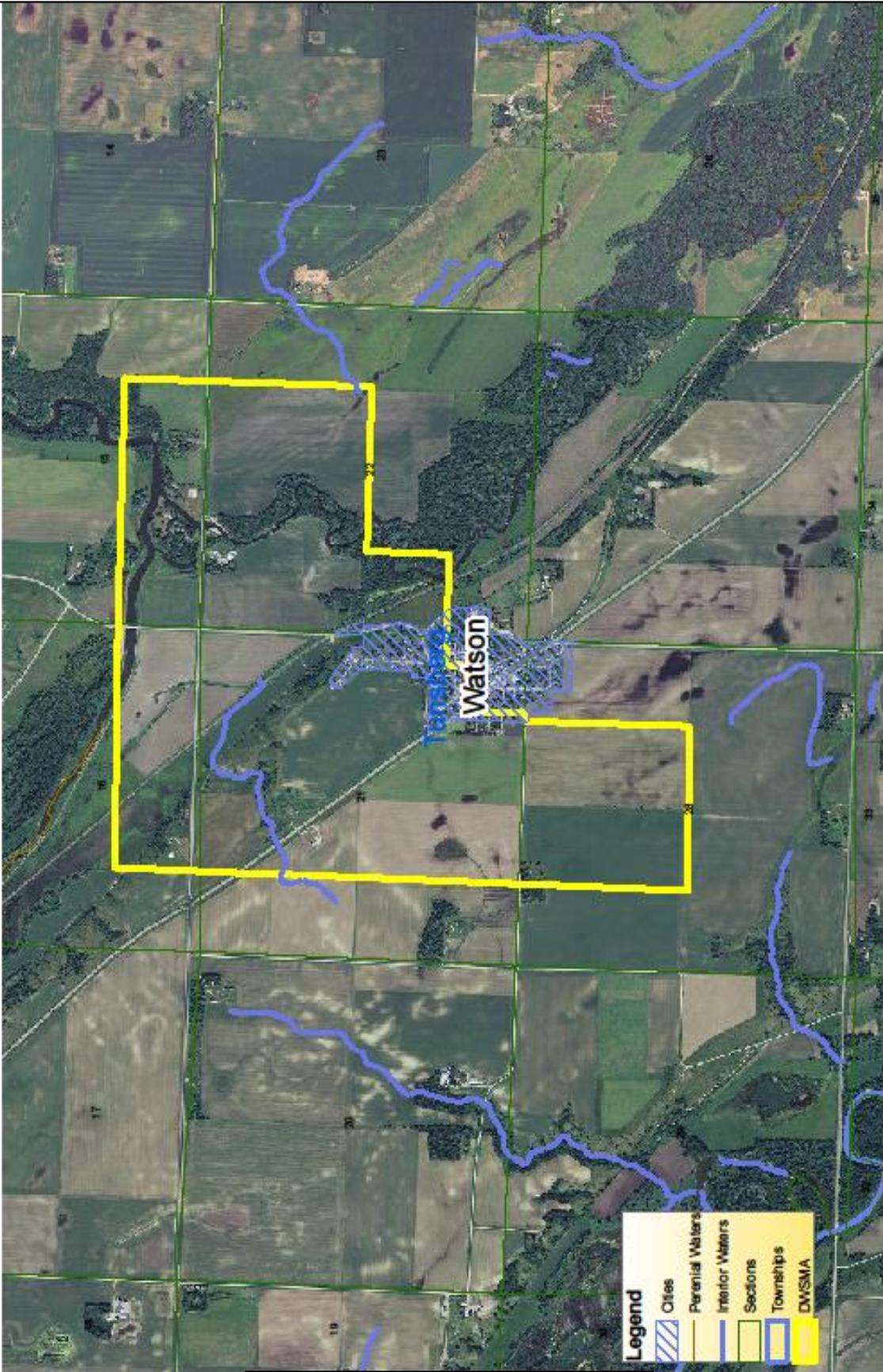
**City of Milan
DWSMA**



Map 7B: City of Milan DWSMA



**City of Watson
DWSMA**

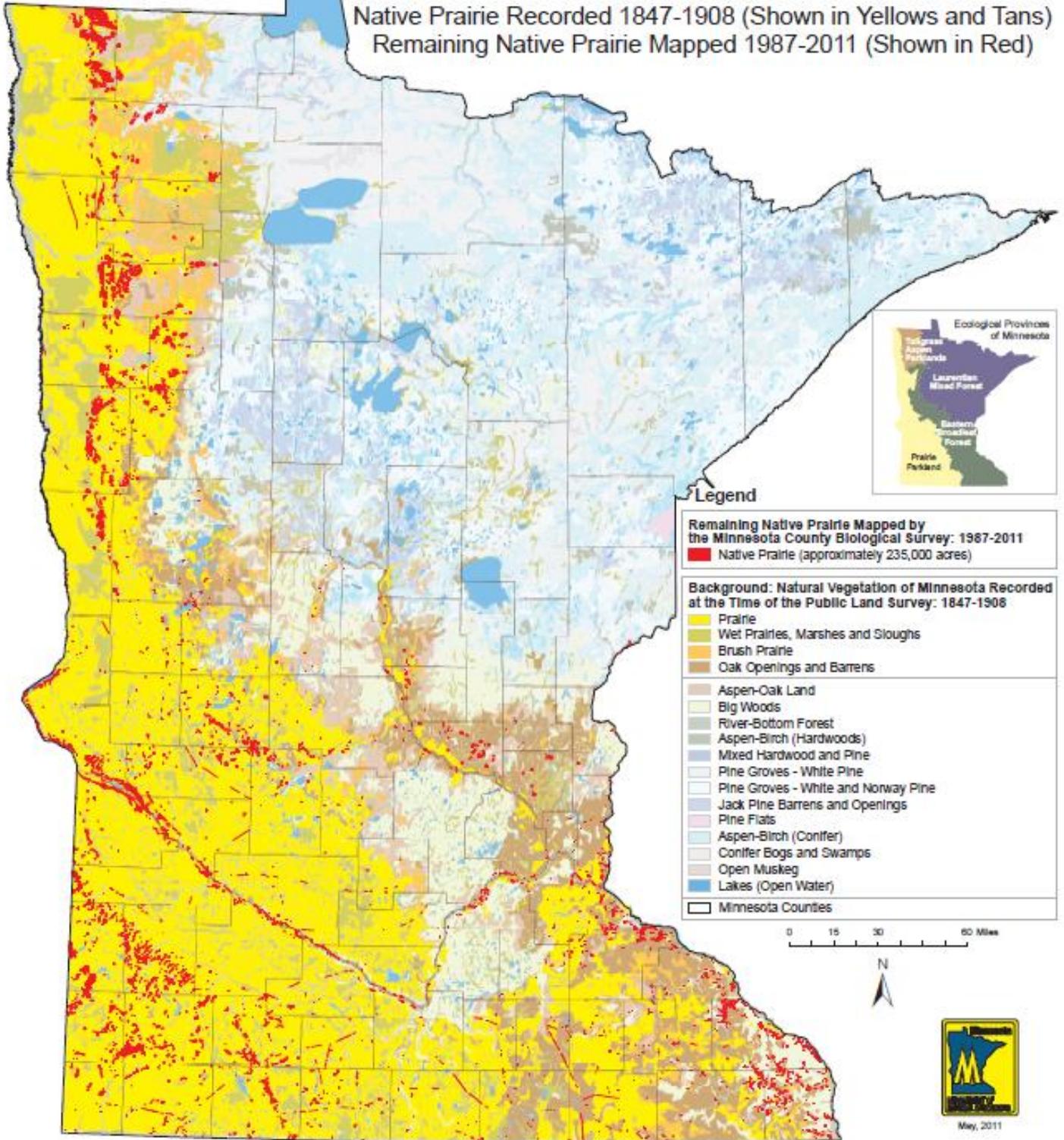


Map 7D: City of Watson DWSMA

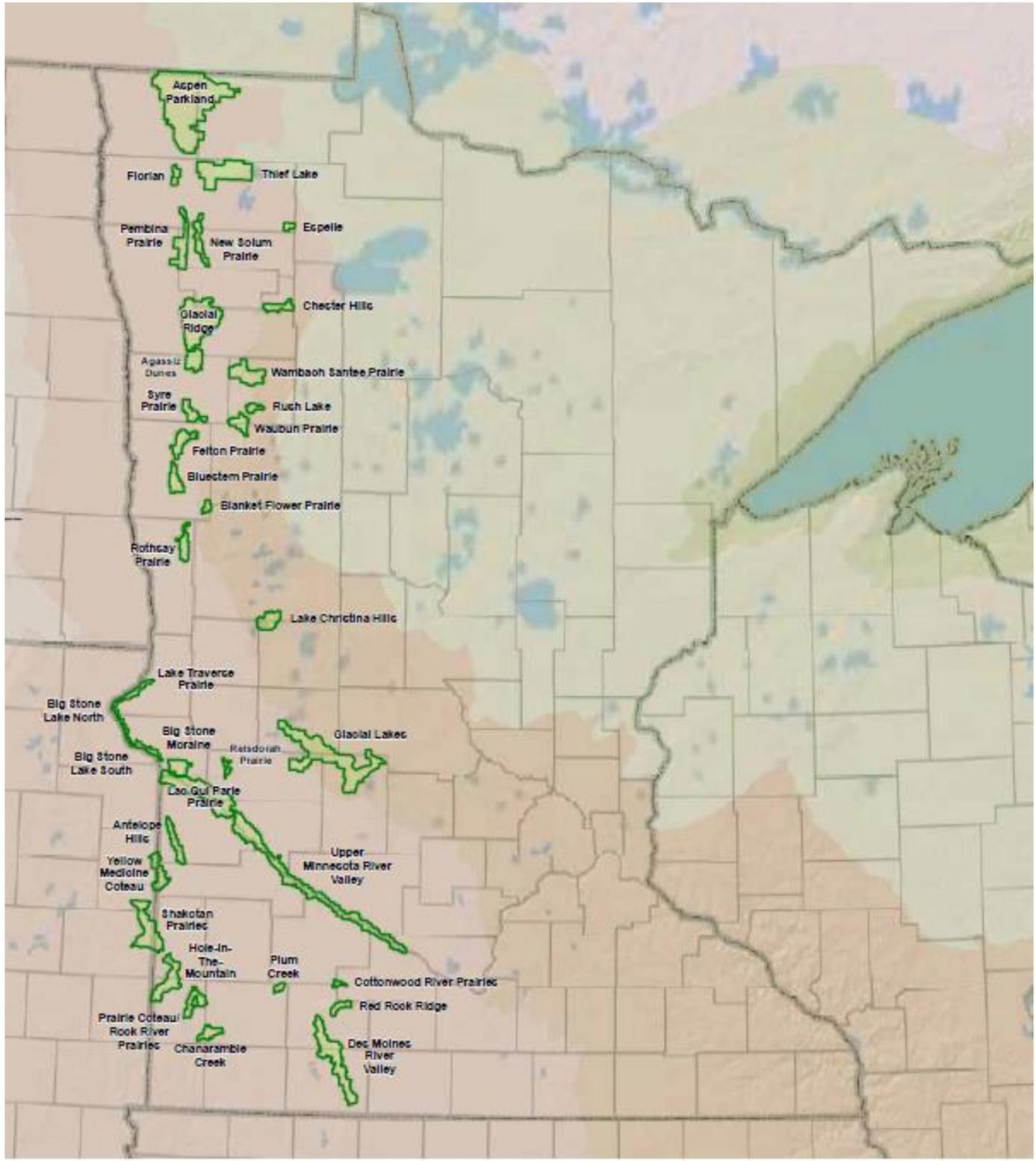
Map 2

Minnesota's Remaining Native Prairie A Century After the Public Land Survey

Native Prairie Recorded 1847-1908 (Shown in Yellows and Tans)
Remaining Native Prairie Mapped 1987-2011 (Shown in Red)



Map 8A: MN Remaining Native Prairie



- Prairie Core Areas
- State
- County



Minnesota Statewide System Project 02 Year Plan - 2013
 Prairie Plan - Core GIS - Counties - Final
 Map created by: RCU, Inc. 04/04/2013, 10:49:02

Map 8B: Prairie Core Areas



CONSERVATION LANDS SUMMARY - STATEWIDE

BWSR Prepared: 08/1/13

COUNTY	CRP ACRES	CONTINUOUS CRP ACRES	CREP ACRES	RIM WRP	RIM WRP	WRP	TOTAL RESOURCE ACRES	CROPLAND ACRES	PERCENT ENROLLED	OTHER DATA		
										USF&W ACQ.	DNR WMA	COUNTY SIZE TOTAL ACRES
AITKIN	71	566	0	15	0	0	652	77,035	0.8%	14,539	54,869	1,275,737
ANOKA	0	161	0	0	0	0	161	44,633	0.4%	0	18,297	285,069
BECKER	21564	5636	0	120	1,350	2,380	31,049	307,784	10.1%	54,534	6,693	925,043
BELTRAMI	13981	347	0	94	0	0	14,422	143,725	10.0%	9,008	192,845	1,954,893
BENTON	861	1543	0	477	0	0	2,881	133,397	2.2%	648	1,975	264,211
BIG STONE	4075	3296	772	398	285	835	9,661	251,987	3.8%	24,095	11,877	338,272
BLUE EARTH	3828	3297	5,402	707	390	899	14,522	392,239	3.7%	2,057	3,041	489,715
BROWN	6268	5697	5,041	1,281	324	606	19,217	335,790	5.7%	0	3,693	395,590
CARLTON	47	256	0	0	0	0	303	52,480	0.6%	0	3,659	559,738
CARVER	1585	2417	135	626	116	481	5,361	137,078	3.9%	2,335	838	240,442
CASS	209	353	0	33	0	0	596	80,935	0.7%	43	11,710	1,544,115
CHIPPEWA	3108	5090	8,401	1,567	235	133	18,535	326,760	5.7%	469	12,199	376,390
CHISAGO	135	329	0	41	0	0	505	97,257	0.5%	57	10,079	283,021
CLAY	21300	2695	149	2,109	2,592	3,466	32,311	524,605	6.2%	15,734	8,298	674,342
CLEARWATER	7152	1311	0	92	151	0	8,705	125,931	6.9%	1,425	4,649	658,995
COOK	0	0	0	0	0	0	0	946	0.0%	0	1,734	1,027,613.04
COTTONWOOD	7518	2934	3,441	2,125	136	48	16,201	360,943	4.5%	3,725	7,669	415,027
CROW WING	0	52	0	26	0	0	78	60,183	0.1%	0	5,381	739,776
DAKOTA	718	1755	10	54	0	0	2,536	207,049	1.2%	1,679	7,533	374,970
DODGE	742	2002	123	59	0	0	2,927	226,716	1.3%	96	936	281,152
DOUGLAS	10603	9306	2,306	1,647	783	1,022	25,666	236,375	10.9%	17,481	5,430	460,928
FARIBAULT	849	1486	3,985	846	0	41	7,207	415,041	1.7%	959	3,566	461,613
FILLMORE	13068	4229	309	474	0	0	18,080	346,876	5.2%	95	1,968	551,443
FREEBORN	4137	5061	1,169	709	3,656	3,252	17,984	390,339	4.6%	2,319	2,696	461,946
GOODHUE	4660	2103	440	869	0	113	8,184	305,255	2.7%	0	5,210	499,078
GRANT	6459	18852	484	1,117	981	1,215	29,107	293,726	9.9%	14,832	3,548	368,557
HENNEPIN	571	335	0	339	0	4	1,249	58,618	2.1%	2,675	214	388,090
HOUSTON	10198	2280	188	2,330	0	175	15,172	149,239	10.2%	13,086	1,884	363,930
HUBBARD	705	397	0	20	0	0	1,121	80,717	1.4%	14	3,925	639,514
ISANTI	54	747	0	28	0	0	830	106,568	0.8%	125	5,672	288,723
ITASCA	678	524	0	0	0	0	1,202	30,959	3.9%	0	9,131	1,872,320
JACKSON	5241	2701	1,317	1,752	302	377	11,689	397,517	2.9%	5,123	5,867	460,250
KANABEC	12	206	0	444	0	0	662	71,727	0.9%	472	11,204	341,274
KANDIYOHI	16703	15473	3,017	2,923	2,592	81	40,788	377,217	10.8%	19,114	4,232	551,859
KITSON	62931	25680	0	392	0	177	89,180	468,948	19.0%	140	57,360	706,925
KOOCHICING	0	63	0	0	0	0	63	41,861	0.2%	612	1,647	2,017,005
LAC QUI PARLE	12431	11405	8,006	926	185	0	32,953	410,614	8.0%	16,675	22,686	498,310
LAKE	0	0	0	0	0	0	0	1,606	0.0%	0	601	1,463,540.58
LAKE of the WOODS	714	616	0	0	0	124	1,454	90,826	1.6%	49,640	158,642	1,138,938
LE SUEUR	9061	6454	1,070	1,248	171	60	18,064	210,106	8.6%	684	3,735	303,008
LINCOLN	9681	13442	3,184	731	340	0	27,378	278,292	9.8%	5,172	8,905	351,283
LYON	6412	3135	4,555	1,667	169	18	15,956	387,950	4.1%	2,301	10,319	462,067

Table 1A: Conservation Lands Summary

COUNTY	CRP ACRES	CONTINUOUS CRP ACRES	CREP ACRES	RIM	RIM WRP	WRP	TOTAL RESOURCE ACRES	CROPLAND ACRES	PERCENT ENROLLED	OTHER DATA		
										USF&W ACQ.	DNR WMA	COUNTY SIZE TOTAL ACRES
MCLEOD	1455	4231	865	940	1,082	410	8,982	255,423	3.5%	2,799	3,080	323,347
MAHNOMEN	8898	1858	0	0	2,299	1,144	14,200	160,029	8.9%	12,771	10,300	373,523
MARSHALL	123973	19227	0	882	1,180	6,232	151,494	806,893	18.8%	62,412	115,325	1,161,043
MARTIN	1433	1710	4,977	846	207	0	9,172	411,001	2.2%	649	3,137	466,598
MEEKER	10247	6390	0	5,328	387	151	22,504	277,071	8.1%	7,581	2,782	412,467
MILLE LACS	93	466	0	260	0	0	819	86,683	0.9%	664	36,597	435,718
MORRISON	3450	2856	0	797	0	0	7,103	237,829	3.0%	2,717	6,130	737,760
MOWER	143	5201	730	1,213	571	486	8,343	381,564	2.2%	138	1,862	454,995
MURRAY	9855	6554	4,023	1,470	45	0	21,948	388,780	5.6%	2,361	10,362	460,659
NICOLLET	1132	1931	1,107	1,980	127	1,176	7,454	234,169	3.2%	0	4,724	298,528
NOBLES	2234	6363	233	439	0	0	9,269	399,176	2.3%	669	4,681	462,630
NORMAN	22267	4950	0	1,915	2,624	750	32,507	481,471	6.8%	1,584	6,188	561,574
OLMSTED	5920	1198	79	318	48	0	7,563	253,019	3.0%	0	4,131	418,726
OTTER TAIL	44748	21972	790	1,039	764	1,120	70,433	630,659	11.2%	40,932	13,523	1,423,923
PENNINGTON	45674	4347	0	38	744	0	50,803	302,392	16.8%	301	3,329	395,629
PINE	76	151	0	2	0	0	229	129,121	0.2%	1,001	3,727	917,133
PIPESTONE	3360	3258	327	569	0	0	7,514	242,801	3.1%	135	3,024	298,515.0
POLK	88437	14446	27	791	52	25,547	129,299	1,000,146	12.9%	40,573	23,675	1,279,437
POPE	19038	10009	4,857	2,871	2,257	1,332	40,364	285,591	14.1%	25,161	3,883	458,938
RAMSEY	0	0	0	0	0	0	0	5,935	0.0%	160	0	108,730.70
RED LAKE	28817	724	12	226	0	5	29,784	205,986	14.5%	261	2,264	277,184
REDWOOD	5105	4791	8,021	3,043	625	28	21,614	510,646	4.2%	62	6,679	564,173
RENVILLE	1601	5253	10,375	5,256	621	1,079	24,186	575,177	4.2%	1,932	2,006	631,718
RICE	9560	2074	236	1,421	327	53	13,672	224,642	6.1%	1,024	2,596	329,901
ROCK	636	1644	184	830	0	0	3,294	257,381	1.3%	1,077	949	309,146
ROSEAU	103042	19384	0	34	0	593	123,052	549,220	22.4%	28,369	94,668	1,074,125
ST. LOUIS	0	87	0	0	0	0	87	61,533	0.1%	0	7,127	4,312,019
SCOTT	1219	859	118	889	0	21	3,105	105,357	2.9%	4,765	1,994	235,501
SHERBURNE	639	851	0	0	0	51	1,541	93,107	1.7%	29,638	1,086	288,256
SIBLEY	1106	2078	810	1,708	579	30	6,311	323,296	2.0%	1,159	1,746	384,128
STEARNS	17042	9440	0	818	0	212	27,512	511,177	5.4%	11,395	6,287	889,248
STEELE	3960	6084	249	513	2,024	1,442	14,272	231,158	6.2%	667	1,680	276,467
STEVENS	4112	9044	972	1,198	1,724	4,688	21,738	315,465	6.9%	10,956	3,139	368,346
SWIFT	15688	8534	6,378	1,593	655	520	33,368	400,611	8.3%	10,258	10,289	481,440
TODD	9950	2276	0	28	209	0	12,462	272,396	4.6%	845	10,127	626,752
TRAVERSE	1465	13640	330	323	539	276	16,573	335,488	4.9%	5,595	1,855	375,277
WABASHA	6804	446	0	822	0	0	8,072	183,651	4.4%	19,031	6,507	351,360
WADENA	1211	2380	0	49	0	0	3,640	113,085	3.2%	54	5,492	347,597
WASECA	2407	3903	2,087	954	399	326	10,075	235,099	4.3%	260	2,431	276,934
WASHINGTON	319	21	0	25	0	0	365	68,738	0.5%	0	1,793	270,637
WATONWAN	1775	2063	2,914	769	81	0	7,601	251,650	3.0%	225	1,755	281,242
WILKIN	6561	4634	100	1,988	590	4,483	18,356	407,406	4.5%	2,837	6,191	481,178
WINONA	6362	1003	854	833	38	0	9,089	186,348	4.9%	2,473	22,817	410,310
WRIGHT	5454	2826	0	830	0	79	9,189	220,990	4.2%	3,606	5,345	457,171
YELLOW MEDICINE	8070	8080	5,697	2,468	39	369	24,722	424,077	5.8%	3,284	6,330	488,646
STATE TOTAL	903,666	393,467	110,858	76,601	35,590	68,108	1,588,289	23,071,285	6.9%	624,342	1,170,027	53,993,262

rs/Market Data/Conservation Land Summary/August 2013/CLS Statewide Summary 8.1.13

Sources:
 CRP Acres: 7/2013 USDA FSA
 CREP Acres: 6/30/13 (BWSR)
 WRP Acres: NRCS (7/2013)
 Cropland Acres: FSA - 2001
 RIM-WRP Acres: 6/30/13 (BWSR)

Sources: (Continued)
 USF&W Acquisitions: 2013 Unpublished Data
 DNR WMA: 2013 Unpublished data
 RIM (BWSR): 6/30/13

APPENDICES

Appendix A

Summary of Watercourses (“Other Waters”):

Approved by Chippewa Soil & Water Conservation District on May 1, 2017 and
Chippewa County Board of Commissioners on March 20, 2018.

Appendix B

Priority Concerns Scoping Document:

Approved by BWSR Board on March 27, 2013

APPENDIX A
Summary of Watercourses (“Other Waters”):

**Resolution to Incorporate the Summary of Watercourses
into the Chippewa County
Comprehensive Local Water Management Plan**

Whereas; Minnesota Statutes Chapter 103F.48 requires Soil and Water Conservation Districts (SWCDs) in consultation with Local Water Management authorities, to develop, adopt, and submit to each Local Water Management authority within its boundary a summary of watercourses.

Whereas; The Board of Water and Soil Resources has adopted Buffer Law Implementation Policy #6 'Local Water Resources Riparian Protection ("Other Watercourses")' which identifies steps SWCDs are required to take in developing said inventory.

Whereas; Chippewa SWCD has adopted a descriptive inventory and a map, to be used as a reference, of other watercourses and provided it to Chippewa County on May 1, 2016.

Whereas; Chippewa County recommends that implementation of buffers or other practices on these waters be voluntary in nature through the Comprehensive Local Water Management Plan.

Whereas; Minnesota Statutes Chapter 103F.48 requires a local water management authority that receives a summary of watercourses identified under this subdivision must incorporate an addendum to its Comprehensive Local Water Management Plan or Comprehensive Watershed Management Plan to include the SWCD recommendations by July 1, 2018.

Whereas; Minnesota Statutes Chapter 103F.48 does not require a plan amendment as long as a copy of the included information is distributed to all agencies, organizations, and individuals required to receive a copy of the plan changes.

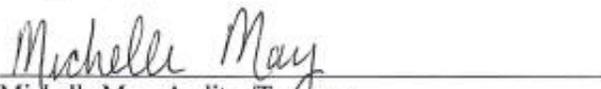
Therefore be it resolved that; The summary of watercourses or "other waters" for Chippewa County shall be incorporated as an addendum in its current Local Water Management Plan under Appendices.

Be it further resolved that; Chippewa County authorizes staff to provide a copy of the addendum and any supporting information to be distributed to all agencies, organizations, and individuals required to receive a copy of the plan changes.

WHEREUPON the above resolution was adopted at a regular meeting of the Chippewa County Board of Commissioners this 20th day of March, 2018.



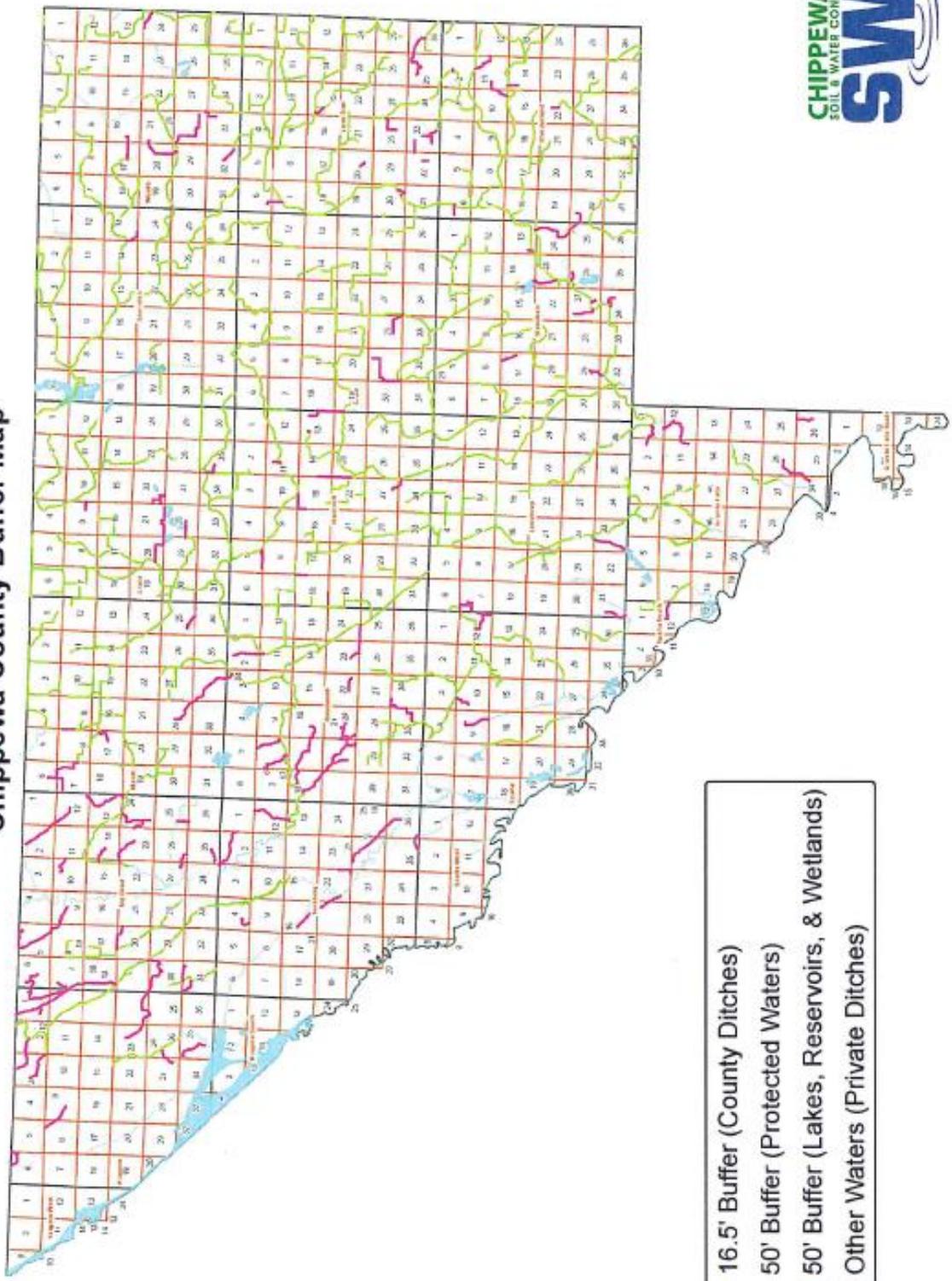
Jeffrey Lopez, Chairman



Michelle May, Auditor/Treasurer

(SEAL)

Chippewa County Buffer Map



- 16.5' Buffer (County Ditches)
- 50' Buffer (Protected Waters)
- 50' Buffer (Lakes, Reservoirs, & Wetlands)
- Other Waters (Private Ditches)



Chippewa Soil and Water Conservation District
Resolution
To Adopt Summary of Watercourses
For inclusion into the Chippewa County Local Water Management Plan

Whereas; Minnesota statues 103F.48 requires SWCDs in consultation with local water management authorities, to develop, adopt, and submit to each local water management authority within its boundary a summary of watercourses for inclusion in the local water management plan.

Whereas; The Board of Water and Soil Resources has adopted the Local Water Resources Riparian Protection ("Other Watercourses") Policy August 25, 2016 which identifies steps SWCDs are required to take in developing said inventory.

Whereas; Chippewa SWCD has met with local water management authorities within its jurisdiction on May 1st, 2017.

Whereas; Chippewa SWCD and the water management authorities within its jurisdiction discussed watershed data, water quality data and land use information as a criteria in development of this list.

Whereas; Chippewa SWCD has assessed the water quality benefits that buffers and alternative practices could provide and determine that State and Federal programs have eligibility criteria for watercourses where water quality would benefit from the installation of a buffer or filter strip.

Whereas; The Chippewa SWCD determined that the rational for inclusion of "other watercourses" is to be inclusive of all watercourses where water quality would benefit from the voluntary installation of a buffer or filter strip.

Whereas; producing a map of all the watercourses meeting the eligibility criteria would be time consuming and may not be inclusive of all watercourses where water quality would benefit from the voluntary installation of a buffer or filter strip.

Therefore be it resolved that; The summary of watercourses or "other waters" for Chippewa County shall be descriptive in format instead of solely in map format.

Be it further resolved that; the description of watercourses to be included in the summary of watercourses or "other waters" **shall be;** all watercourses deemed eligible for the adjacent land to be voluntarily enrolled into a buffer or filter strip practice under the eligibility criteria for government programs. Excluding those watercourses depicted on the DNR buffer protection map.

A list of watercourses included in this descriptive inventory are;

Perennial streams, Seasonal streams depicted on USGS topographic maps,

Perennial streams, Seasonal streams depicted on soil survey maps and LiDar data,

Other watercourses identified by onsite visits,

And

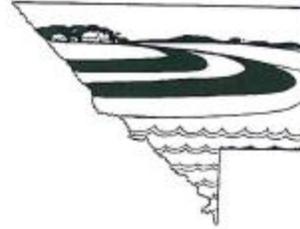
Drainage ditches that are perennial or seasonal streams.

And, as a reference, the attached map of private ditches/other watercourses can be used to characterize watercourses depicted in this summary. The map is not to be used for any future regulatory use and is contingent on corrections, additions, or subtractions.

CHIPPEWA SOIL AND WATER CONSERVATION DISTRICT

629 NORTH 11TH STREET
COURTHOUSE
MONTEVIDEO, MINNESOTA 56265

Telephone 320-269-2139



Chippewa Soil and Water Conservation District Regular Board Meeting May 1, 2017

Minutes of the Chippewa Soil and Water Conservation District, Courthouse, NRCS/SWCD office, Montevideo, MN 56265.

1. Meeting was **called to order** by Chairman Scott Roelofs at 3 p.m.
 - Members **present**: Schuler, Roelofs, Eisenlohr, Sunderland
 - Others **present**: SWCD staff: Desirae Sharp, Zach Bothun, Tom Sletta, Tom Warner; NRCS: Shantel Lozinski; County Commissioners: Matt Gilbertson, Jeff Lopez
2. M/S/P Schuler, Sunderland approve the agenda/with additions.
3. M/S/P Schuler, Eisenlohr approve the April minutes with corrections.
4. The Treasurer gave the **Treasurer's report** and the supervisors placed it on file subject to audit and authorized payment of the bills as presented.
5. **New Business:**
 - District 1 Supervisor: The board discussed potential supervisors.
 - M/S/P Schuler, Sunderland motion to appoint Ray Trager to fill the District 1 Supervisor spot until the next general election.
 - Audit: Two bids for completing our 2016 audit were discussed.
 - M/S/P Schuler, Sunderland motion to have Michael D. Peterson Company LTD perform our audit.
 - Cost Share J. Mulder: Tom W. discussed a cost share project for a 412 grassed waterway in Rosewood Section 18. The estimated total project cost is \$16,540.
 - M/S/P Sunderland, Eisenlohr approve cost share project with state cost share to not exceed \$12405 or 75%.
 - J. Lee project update: Discussed some possible funding issues with this project as bids are coming in much higher than estimated. Board agrees to redistribute funds in DRAP to make this project work. Could use local capacity funding to cover moved DRAP funds at a later date. Board will wait for all bids to be in to make a motion.
6. **Old Business:**
 - Trailer: Zach presented 2 bids for a 24' trailer. One bid from Felling Trailers and one from Renville Sales. Board also discussed what to do with old trailer: will sell via Craigslist or upper court house parking lot when new trailer arrives.
 - M/S/P Sunderland, Eisenlohr motion to purchase 2018 PJ 24' skidloader trailer from Renville Sales Inc. for \$6190.00.
 - "Other Waters": Discussion was held on the waterplans committee's thoughts whether to use a resolution or the "other waters" map that Zach created. It was decided that the Water Plan would use the resolution but would also add the map as a reference.
 - M/S/P Sunderland, Schuler approve to accept the proposed resolution.

AN EQUAL OPPORTUNITY EMPLOYER

Appendix B
Priority Concerns Scoping Document:

THE CHIPPEWA COUNTY COMPREHENSIVE LOCAL WATER PLAN

~ PRIORITY CONCERNS SCOPING DOCUMENT ~



~ Chippewa River ~

Date: December 7, 2012

*Prepared by the Chippewa
County Water Plan Task Force
and Midwest Community Planning, LLC*

Water Plan Committee Members:

Plan Amended: 2013

Voting Members:

Jaci Ast, Homeowner
Marc Stevens, Ag. Landowner
Byron Hayunga, Montevideo City
Kent Bosch, Ag. Landowner
Robert Nielsen, Landowner
Joe Keller, City Homeowner
Steve Nokleby, Ag. Landowner
Steve Sunderland, Ag. Landowner and SWCD
Kenneth Koenen, Ag. Landowner and County Board
Jeffrey Lopez, Ag. Landowner and County Board

Non-Voting Members

Jean Diggins, SWCD District Manager
Shantel Lozinski, NRCS
Josh Macziewski, County Ditch Inspector
Jeff Miller, DNR Wildlife
David Sill, BWSR Board Conservationist
Scott Williams, Land & Resource Mgmt.
JoAnn Blomme, Environmental Technician

Chippewa County
Water Plan Priority Concerns Scoping Document
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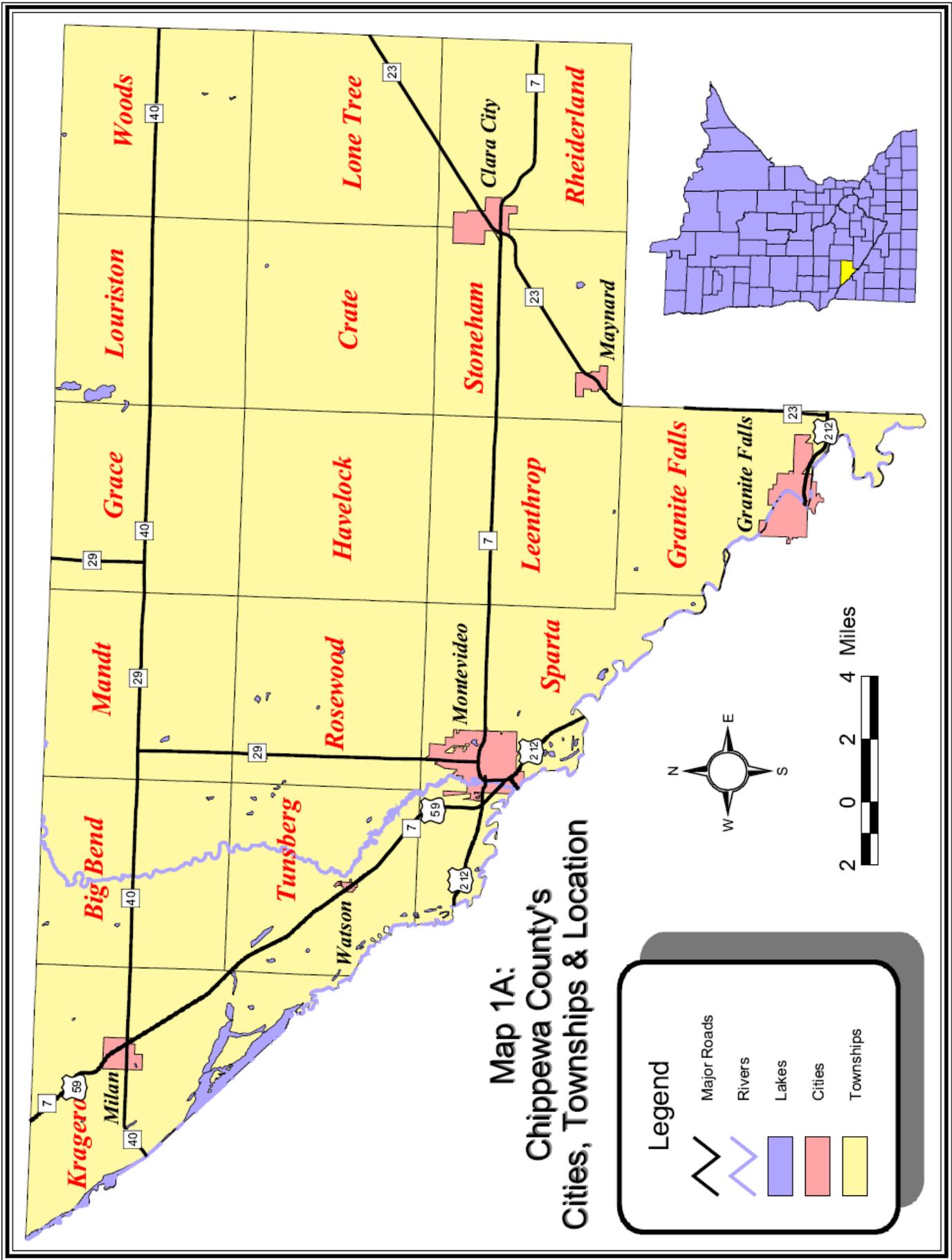
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Chippewa County

Water Plan Priority Concerns Scoping Document

Section One: Introduction to the Water Plan & Chippewa County

A. Water Plan Background

The Chippewa County Comprehensive Local Water Plan was first adopted in September 1991. This Plan is the County's fourth generation Water Plan, with the current one expiring in May 2013.

On May 1, 2012, the Chippewa County Board of Commissioners passed a resolution to amend the Chippewa County Comprehensive Water Management Plan. On May 1, 2012, they also entered into a contract for professional services with Midwest Community Planning, LLC, to help write the new 10-year plan. On June 28, 2012, a Notice of Decision to Revise & Update Chippewa County's Water Plan was sent to all Local units of Government and State review agencies. A survey was developed and was made part of the Notice. The surveys were first distributed at the Annual Township Meeting in March, 2012, and also placed in two public areas in Montevideo, the Library and CURE building. We received 53 surveys. Open Houses were scheduled on July 23, 2012, in Clara City and on July 24, 2012, in Montevideo to solicit public comments. The Chippewa County Land and Resource Management Department is responsible for administering the County's Water Plan.

According to Minnesota Statute 103B, each county is encouraged to develop and implement a local water management plan with the authority to:

- (1) Prepare and adopt a local water management plan that meets the requirements of this section and section 103B.315;
- (2) Review water and related land resources plans and official controls submitted by local units of government to assure consistency with the local water management plan; and
- (3) Exercise any and all powers necessary to assure implementation of local water management plans.

Pursuant to the requirements of the law, this Chippewa County Water Plan:

- Covers the entire area of Chippewa County;

- Addresses water problems in the context of watershed units and groundwater systems;
- Is based upon principles of sound hydrologic management of water, effective environmental protection and efficient management;
- Is consistent with comprehensive water plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or groundwater system; and
- Will serve as a 10-year water plan (2013-2022), with a 5-year implementation plan (2013-2017). In 2017, the implementation plan will be updated.

B. Water Plan Task Force

Chippewa County maintains a Water Plan Task Force which meets regularly on water plan initiatives (the members are listed on the inside cover of this document). In addition, the Task Force is used throughout the water planning process to help identify priority issues and to develop the water plan's Goals, Objectives, and Action Steps.

C. Water Plan Accomplishments

“With Minnesota’s residents using an estimated 700 million gallons of groundwater per day, knowing more about this rich resource is well worth the efforts that we put into this Plan”

~ JoAnn Blomme, Chippewa County Water Planner ~

The history of the Chippewa County Comprehensive Local Water Plan has addressed many water quality and quantity issues. The following is a summary of accomplishments during the second half of the Third Generation Water Plan (2008-2012):

Education and Information

- ❖ Developed a *Safety Checklist* for landowners removing buildings from building sites.
- ❖ Participated in annual Environmental Field Days for 5th graders with approximately 200 students per year.
- ❖ Displays were put up annually at the Chippewa County Fair. Topics were: “Go Green/Stay Green”; “Clean Water is on the Line”; “Proper Disposal of Household Hazardous Waste”; “Stormwater Reduction”; “Backyard Conservation”; “Weed Management”; and, “Do The Green Thing!”

- ❖ In cooperation with the FSA, NRCS and Chippewa SWCD, a Women’s Field Day was held annually. The themes were as follows:
 - ✓ *Women Working Toward Landscape Solutions* – offering information on local water quality issues and how to be a water wise landowner of rural and backyard lands. Received information about federal, state and local conservation programs; local water monitoring results, rain gardens and rain barrels.
 - ✓ *Women Rockin’ Conservation* – offering information on local, natural resource concerns and programs. Included a tour of the Gneiss Outcrops Scientific and Natural Area. These rocks are among the oldest on Earth, and are located right here in Chippewa County, providing rare habitat and are being threatened at an alarming rate.
 - ✓ *Picnic on the Prairie* – offered information on local land use, natural resources and programs and services available for conservation. Included a trip to the Chippewa Prairie for a native plant identification walk.
 - ✓ *Wine, Women and Wonderful Local Foods* – offered an evening of a tour of the Hinterland vineyards, meal featuring local foods and a keynote speaker Marla Spivak, University of MN Professor, who specializes in honey and native bee pollinators.
- ❖ In 2008 and 2009 Displayed “This is your Prairie” and “Why Rain Barrels” displays and distributed brochures at Horse Days at the Swenson Farm.
- ❖ Displayed “Do The Green Thing!” display at the 2012 Woman’s Expo. Approximately 350 people attended. Also did break-out sessions on the benefits of using reusable grocery bags and other ways to make your house greener.
- ❖ Displayed “Storm Water Reduction is a BARREL of Fun” display at the 2010 Health & Wellness Fair. Included handouts on how to make your own rain barrel and the benefits. Approximately 400 people attended.
- ❖ In 2010 started the “Little People’s Garden” at Kinder Kare with pre-school children. (20 students) Planted a garden for them to watch grow and care for, and eventually harvest and experience different foods. In cooperation with FSA, NRCS, Chippewa SWCD, Extension, Chippewa River Watershed Project, County Ditch/Ag Department and Chippewa Land & Resource Management, we conduct weekly learning activities on environmental issues and food. Participated in 2011 & 2012 also.
- ❖ In 2011 started the “Big People’s Garden” at Kids Korner with school age children between K-6 gr. (80 students). Conducted same educational series for older kids. In

2012 we continued but did in cooperation with Montevideo Community Education and ECFE.

- ❖ In 2010 displayed “Stormwater Reduction is a Barrel of Fun” display promoting BMP’s for urban practices and the benefits of rain barrels. We also had a cost-share program for urban residents to purchase rain barrels at a discounted price. Over 100 were sold.
- ❖ Distribute septic system owner’s guides to all landowners installing new systems.
- ❖ Many newspaper articles and radio ads were run annually. Topics highlighted the water plan actions. A few of the main topics covered are burn barrels, rain barrels, compost, household hazardous waste, leaf maintenance, well testing, well sealing, septic systems, mercury, buffers, tree maintenance, BMP’s, and recycling just to name a few.
- ❖ Held Problem Materials Collections (tires, appliances, electronics & fluorescent bulb/mercury) in 2008, 2010-2012.
- ❖ Submit annual ad in Monte Thunderhawk athletic program for the year. Reaches about 8,000 people annually. Topics addressed: recycling plastic bottles, burn barrels, all recycling in Chippewa County including problem materials and description of office programs.
- ❖ Offered grants to school districts within Chippewa County for education materials to teach water quality. 7 applications were received and 3 were funded. The materials purchased can be used over and over again reaching approximately 200 kids annually.
- ❖ Held a training session for SSTS Designers and a homeowners operation & maintenance class.
- ❖ Offered free nitrate testing at the 2011 and 2012 Chippewa County Fairs. Done in cooperation with the MN Department of Agriculture.
- ❖ Created a new “Take it to The Box” brochure for pharmaceutical waste and distributed them to the local pharmacies in Montevideo. Approximately 1500 brochures were put out for distribution.
- ❖ In cooperation with the Chippewa 4-H program, City of Montevideo, City of Maynard and Chippewa County Fair Association, we purchased 12 sets of 3 bins to be used at community events. They included cans, plastic bottles and trash. They have been used annually at community celebrations in the county.
- ❖ Ordered promotional items made from recycled materials to distribute at public events.

- ❖ In 2011 we participated in “Kids in the Community Day” sponsored by the Montevideo Middle School. 20 kids helped clean debris away from storm sewer inlets to keep the leaves, twigs, etc. from entering the storm sewers and being deposited into our local rivers. They also distributed flyers on storm sewer awareness do’s and don’ts to every home in the designated area. 500 brochures were distributed. In 2012 we continued the project in a different area of town.

Monitoring and Data Collection

- ❖ Conducted transect crop residue management surveys.
- ❖ We continue to provide in-kind services to the Chippewa River Watershed Project and the Hawk Creek Watershed Project through the use of office space, supplies, equipment and education.

Inventory and Mapping

- ❖ With the assistance of SWCD we took the current feedlot inventory from the MPCA and sent out letters to verify which sites are still in existence. We are still in the process of completing this inventory.
- ❖ Our County SSTS inventory is updated annually into our GIS.
- ❖ 2009 Drainage Records Modernization grant: through this grant the County Ag Inspector scanned all county, joint county and judicial ditch wide format plan sets going back over 100 years. In addition, the Ditch Inspector reviewed plans with the scanner to verify accuracy and add notes to the scanned documents, The Land & Resource Mgmt. Director set up the index, comparing scans to the GIS system and providing oversight to the project.

Land and Water Treatment

- ❖ Four HHW collections were held for Cities of Maynard, Milan, Montevideo and Clara City and their surrounding townships. 258 households participated. 552 households brought items directly to the regional facility in Kandiyohi County.
- ❖ Septic Systems: 163 systems were installed for either new construction or to fix a non-conforming system. 1 was upgraded with SSTS Challenge Grant funds.
- ❖ 24 residents in the City of Watson applied for low interest funds to hook up to City sewer.
- ❖ Abandoned wells sealed: 49 wells were sealed.
- ❖ Tree fabric maintenance: 39 landowners installed 81,986’ of fabric.
- ❖ Farmstead shelterbelts/Field windbreaks: 41 landowners planted approximately 9,361 trees with cost-share assistance.

- ❖ Tree buffer plantings: 2 landowners installed 493' of trees with cost-share assistance.
- ❖ We continue to support the annual empty pesticide container collection.

Regulations, Ordinances and Planning

- ❖ The Subsurface Sewage Treatment System (SSTS) Ordinance is in the process of being updated. New rules have been adopted by the Minnesota Pollution Control Agency with the assistance of the University of MN Extension Services. Updates are due by February of 2014. We currently administer the 2008 SSTS Code in compliance with MN Rules Chapters 7080 through 7083.
- ❖ The Shoreland Ordinance was enforced and reports were completed annually and sent to BWSR and the DNR.
- ❖ Chippewa County continues to delegate the responsibility of the Wetland Conservation Act (WCA) to the Chippewa SWCD. They administer and implement the program and annual reporting is completed for BWSR.

Technical Staff Service

- ❖ To administer the water plan, we receive technical assistance from many state and federal agencies.
- ❖ In 2011 and 2012 we contracted with SWCD for technical assistance on completing a feedlot inventory.
- ❖ We contracted with two SSTS Inspectors/Designers to help conduct second soil verifications for Designers writing up SSTS plans.

Plan Coordination

- ❖ The water plan goals and objectives are the basis for the SWCD Annual Comp Plan.
 - ❖ The Water Plan Committee met 18 times over the past 5 years. We continue to work through the challenges to stay progressive with our goals to improve or maintain water quality in Chippewa County.
 - ❖ Chippewa County continues to maintain adequate staffing and an active Water Planning Committee. The Water Plan continues to be coordinated through the Chippewa County Land & Resource Management office. We hold a 10 member committee and have a strong federal, state and local commitment.
 - ❖ The Water Plan Coordinator participated in the annual MOWA conferences to stay on top of new rules and changes taking place in the Septic System industry.
-

Other

- ❖ From 2008 through 2012 the following areas received funding through the MN Department of Agriculture’s State Revolving Low Interest Loan Program. The total of new dollars has remained the same, but the total spending, new money and revolving loans, from the beginning of the program in 1995 is up to \$1,337,815.60. The following areas were funded in this time frame:
 - ✓ 1 piece of conservation tillage equipment was purchased
 - ✓ 8 septic systems were upgraded
- ❖ Through the Chippewa River Watershed Project and the Hawk Creek Watershed Project, 47 landowners upgraded their SSTS with the use of low-interest loans that are put on their taxes as a special assessment. \$419,295 of loans were dispersed from 2008-2012.
- ❖ Equipment purchased from 2008 through 2012.
 - ✓ Display Board
 - ✓ PPE for hazardous waste trailer
 - ✓ Action Imaging 3680 Colortrack scanner

**Table 1:
Summary of Funds brought into
Chippewa County through Water Planning**

Project/Grant Name	Amount Funded
NRBG 2008 – 2012 Local Water Planning	\$ 89,071.00
NRBG 2008 – 2012 Wetland Conservation Act	\$ 47,408.00
NRBG 2008 – 2012 Shoreland Administrative	\$ 14,175.00
NRBG 2008 – 2012 SSTS	\$ 58,803.00
2008 – 2012 SRF Funds received from MN Dept. of Ag	\$ 0
SRF revolved to other loans	\$ 124,950.46
2009 Drainage Records Modernization	\$ 14,800.00
2011 SSTS Imminent Health Threat Abatement Grant	\$ 7,795.00
2013 Low-Income SSTS Upgrades	\$ 20,901.00
 Total Funds Received 2008 – 2012:	 \$ 377,903.46
 <i>County’s contributions from 2008 – 2012:</i>	
Cash contributions	\$ 42,602.00
In-kind contributions	\$ 60,680.00
 Total Funds Contributed 2008 – 2012:	 \$ 103,282.00



Chippewa County Local Water Plan...locally driven to work for you!

D. Chippewa County Profile

Chippewa County is located in south-central Minnesota, approximately 100 miles west of the Minneapolis-St. Paul Metropolitan Area. As Map 1A shows (placed after the Table of Contents), there are 7 cities and 16 townships within the County. The City of Montevideo is the County Seat of Chippewa County. Agricultural land (approximately 87%) is currently and will remain the dominant type of land use. The County shares borders with Swift County to the north, Kandiyohi and Renville Counties to the east, Yellow Medicine County to the south, and Lac qui Parle County to the west.

According to the Census, Chippewa County has a total area of 587.83 square miles, of which 582.80 square miles (or 99.14%) is land and 5.02 square miles (or 0.85%) is water. Map 2A shows there are three major watersheds in Chippewa County: Hawk Creek/Yellow Medicine, Chippewa River, and the Upper Minnesota River Watersheds. The southern border of Chippewa County abuts the Minnesota River.

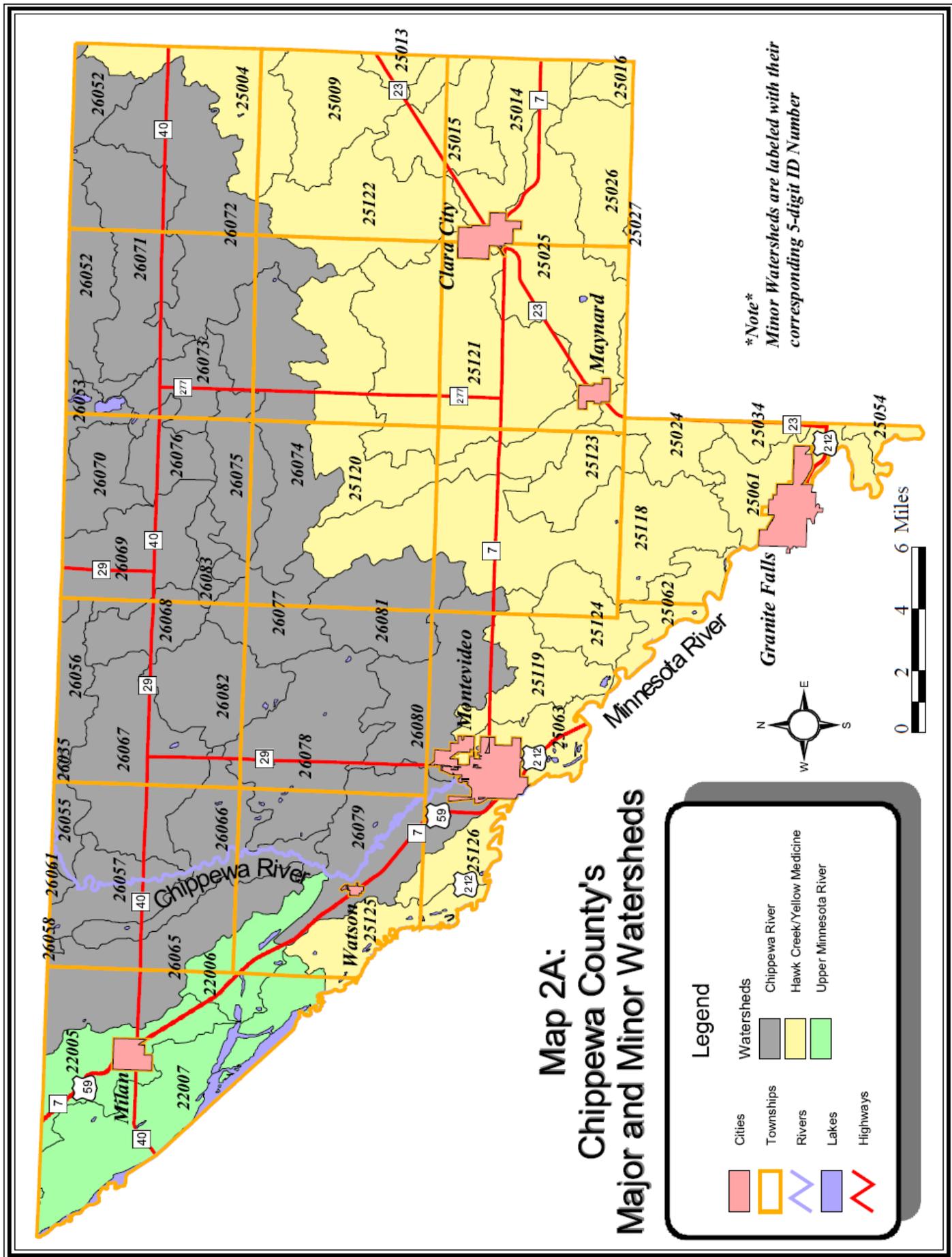
Table 1 shows Chippewa County's Census population since 1970, which is currently around 12,441 residents (2010 Census). Chippewa County has steadily lost population since 1970 and is projected to gradually continue this trend over the next 10 years. This is a common trend among rural counties throughout Minnesota.

**Table 1:
Chippewa County's Population since 1970***

Area	U.S. Census Year					Change since 1970	
	1970	1980	1990	2000	2010	#	%
Clara City	1,491	1,574	1,307	1,393	1,360	-131	-9%
Granite Falls**	3,225	3,451	3,083	3,070	2,897	-328	-10%
Maynard	n/a	n/a	n/a	n/a	366	n/a	n/a
Milan	n/a	n/a	n/a	n/a	369	n/a	n/a
Montevideo	5,661	5,845	5,499	5,346	5,383	-278	-5%
Watson	n/a	n/a	n/a	n/a	205	n/a	n/a
Chippewa County	15,109	14,941	13,228	13,088	12,441	-2,668	-18%
State of Minnesota	3,804,971	4,075,970	4,375,099	4,919,479	5,303,925	1,498,954	39%

**Source: U.S. Census*

*** Granite Falls shares borders with Chippewa, Renville, and Yellow Medicine Counties*



Section Two:

Priority Concerns Scoping Document Planning Process

E. Resolution to Update the Chippewa County Water Plan

The first step in the Water Planning Process was for the Chippewa County Board of Commissioners to approve a resolution indicating the County was officially updating its Water Plan. This action took place on May 1, 2012, at the regularly scheduled County Board meeting. A copy of the resolution appears in Appendix A.

F. Notice of Plan Update

An official “Notice of Plan Update” for the Chippewa County Water Plan was sent on June 28, 2012, to contacts as prescribed by Minnesota Statutes 103B (www.revisor.mn.gov/statutes) and according to the “Routing Information” contained on BWSR’s website under the Resource Management and Planning tab:

www.bwsr.state.mn.us/planning/routing.html

A copy of the Notice of Plan Update can be found in Appendix A.

G. Water Plan Public Informational Meeting

Two open houses were scheduled in Chippewa County to gather input from local residents (July 23, 2012 in Clara City and July 24, 2012 in Montevideo). The sign-up sheet can be found in Appendix A.

H. Water Plan Survey Results

Chippewa County created a Chippewa County Comprehensive Local Water Management Survey in 2012. An online survey was made available to stakeholders and paper copies of the survey were made available through the Chippewa County Land and Resource Management Office and placed in the CURE office and Montevideo Library. They were also handed out at the annual Township Officers meeting. Fifty-three people completed surveys. Of the 53 surveys completed, an estimated 80% were completed by rural residents and 20% completed by urban residents. A copy of the actual survey used and the results can be found in Appendix A.

I. State & Local Stakeholder Comments

At the beginning of Chippewa County's water planning process, the County's key water planning stakeholders were asked to submit comments on priority water planning issues and suggested implementation activities. This was accomplished by completing either a Chippewa County Priority Concerns Input Form, or by simply submitting a letter. The following stakeholders submitted comments:

- The Minnesota Department of Agriculture (MDA)
- The Minnesota Pollution Control Agency
- The Minnesota Board of Water and Soil Resources
- Chippewa River Watershed Project
- Hawk Creek Watershed Project

The following is a summary of their comments:

Minnesota Department of Agriculture (MDA)

The MDA submitted a Priority Concerns Input Form for Chippewa County. A copy of the form, dated July 27, 2012, is contained in Appendix B. The MDA identified the following five priority water planning concerns:

1. Agricultural Drainage, Wetlands and Water Retention
2. Groundwater and Surface Water Protection: Agricultural Chemicals and Nutrients/Water Use/Land Management in Wellhead Protection Areas
3. Manure Management and Livestock Issues
4. Agricultural Land Management
5. Targeting of BMPs, Aligning Local Plans and Engaging Agriculture

The MDA also created a webpage which communicates and profiles their top five priority water planning concerns. The webpage provides links to each of the five priority concern areas, including information on why the issue is important, what actions need to be taken, and links to more information on the subject. For more information, please visit the following MDA link:

www.mda.state.mn.us/protecting/waterprotection/waterplanning.aspx

Minnesota Pollution Control Agency (MPCA)

The MPCA submitted a letter outlining their top three priority concerns for Chippewa County. A copy of the map and letter, dated July 23, 2012, can be found in Appendix B. The MPCA submitted the following three priority concerns for Chippewa County:

1. Impaired Waters/Total Maximum Daily Loads (TMDL)
2. Watershed Approach
3. Update of the LWM Plan information relative to MPCA Programs

Minnesota Board of Water and Soil Resources (BWSR)

The BWSR submitted a Chippewa County Priority Concerns Input Form on July 27, 2012 (a copy of the correspondence can be found in Appendix B). BWSR identified the following four top priority concerns:

1. Erosion and Sediment Control; Nutrient Management on Agricultural Land
2. Feedlot Program Management and Non-Conforming Subsurface Septic Treatment Systems
3. Drainage Water Management Planning/Drainage System Maintenance and Repair
4. Address Accelerated Runoff Impacts via Wetland Restoration, Protection, and Enhancement/Water Storage

Chippewa River Watershed Project (CWRP)

The Chippewa River Watershed Project submitted a Priority Concerns Input Form which can be found in Appendix B. Based upon the information submitted, the Watershed Project identified the following three priority concerns:

1. Surface Water Quality
2. Water Quantity
3. Soil Erosion

Hawk Creek Watershed Project (HCWP)

The Hawk Creek Watershed Project's priority concerns were determined based off information provided on the Project's website (www.hawkcreekwatershed.org). A copy of the information can be found in Appendix B. Based upon this information, Hawk Creek Watershed has the following priority issues:

1. Alternative Tile Intakes and Conservation Drainage
2. Buffer Strip Incentives
3. Ditch Bank Side Inlets
4. Sediment Basins

Landowner Concerns received at Public Open Houses

July 23, 2012 in Clara City Community Center

Main items addressed:

- Ditch Redetermination
 - Ditch 36 – Mandt Township going into Swift County
 - Shakopee Creek – Judicial
- How many acres are coming out of CRP?
- Stormsewer Management
- Address Landfill issues
- Gully erosion
- Erosion on crossings of bridges, ditches and roads
- Work on getting maps put together for Aug. 20 meeting at 9:00 a.m.
- Survey's analyzed

July 24, 2012 in Montevideo Courthouse Assembly Room

Main items addressed:

- Carlton Lake – getting flooded out below the hill
 - 212 culvert – box
- Water retention projects needed / smaller culverts
- Lots of P&K coming down
- Drainage issues and normal erosion caused from it – 1977 or newer
- Buffers on the ditches – enforce it!
- Do we know the % of ditches prior to 1977 that are buffered?
- How much capacity is in larger ditches? Can they hold more?

The following table summarizes the priority concerns identified by each of the stakeholders. The “Survey” column combines the responses from the Chippewa County Water Plan Survey. The Landowner Concerns discussed at the open houses are not part of this table due to the input was consolidated already and number of individuals concerned about each topic were unidentifiable. Based upon the stakeholders comments received, *Chippewa County’s top three priority issues are:*

- 1) **Soil Erosion/Sediment Control**
- 2) **Drainage Management**
- 3) **Surface Water Quality/TMDLs (Impaired Waters)**

Summary of Stakeholder's Priority Concerns						
Priority Concern/Issue	Stakeholders					
	MDA	MPCA	BWSR	CRWP	HCWP	Survey**
Soil Erosion/Sediment Control	Yes		Yes	Yes	Yes	Yes
Feedlots/Nutrient Management	Yes		Yes	Yes		Yes
Septic Systems (SSTS)			Yes			
Drainage Management	Yes*	Yes	Yes			Yes*
Wetlands/Water Retention	Yes*		Yes	Yes		
Groundwater Quality/Quantity	Yes			Yes		
Surface Water Quality/TMDLs	Yes	Yes*		Yes*	Yes*	
Best management Practices	Yes			Yes	Yes*	
Stakeholder Cooperation	Yes	Yes				
Watershed Approach		Yes				
Natural Habitat						
Urban/Stormwater Management						Yes
Public Education						
** = Comments received from the County's Water Plan Survey						
* = Stakeholder's Top Priority Concern						

Section Three: Chippewa County Priority Water Planning Issues

J. Priority Water Planning Issues

The Chippewa County Water Plan Task Force met on November 26, 2012, to review the Water Plan Survey results and the Priority Concerns Input Forms received. Based upon the survey results and the comments received in the Priority Concerns Input Forms, the Water Plan Task Force identified the following as Chippewa County's priority water planning issues (note: these issues are not ranked):

1. Reducing Priority Pollutants ~ Surface Water Quality
 - a. TMDL Implementation
 - b. Feedlot/Livestock Management
 - c. Subsurface Sewage Treatment Systems
 - d. Erosion and Sediment
2. Surface Water Management
 - a. Agricultural/Conservation Drainage
 - b. Stormwater Management
 - c. Wetlands and Water Storage/Retention
 - d. Shoreland Management
3. Groundwater Quality & Quantity
 - a. Wellhead Protection Areas
 - b. Drinking Water Quality
 - c. Groundwater Quantity/Recharge Areas
4. Recreation and Biodiversity
5. Plan Administration
 - a. Watershed Focus
 - b. Stakeholder Cooperation
 - c. Raising Public Awareness/Education

The five priority areas have been merged together into the following three major priority concerns:

Priority Concern 1: *Surface Water Quality and Quantity Impairments and Concerns*

Priority Concern 2: *Groundwater Water Quality and Quantity Concerns*

Priority Concern 3: *Public Awareness and Plan Administration*

K. Priority Issues Not Addressed by this Water Plan

All of the priority issues identified in the Chippewa County Water Plan Survey and received in Chippewa County's Priority Concerns Input Forms will either directly or indirectly be addressed in Chippewa County's updated Water Plan. This is particularly important to Chippewa County, since BWSR and the other State agencies have indicated that projects are less likely to receive grant money unless they are mentioned in Local Water Management Plans.

As a result of not excluding any priority concern identified by a water plan stakeholder, Chippewa County does not anticipate needing to resolve any differences between Chippewa County's Priority Water Plan Issues and other state, local and regional concerns.

Section Four: Chippewa County Ongoing Water Plan Activities

Chippewa County has numerous ongoing programs and land use controls that are directly linked to the County's Water Plan. These ongoing activities include educational efforts on key water planning issues, stream monitoring, and Best Management Practices (BMPs) implementation. In addition, County staff regularly attends water management meetings, educational conferences, and promotes and supports water protection projects, including the Chippewa River Watershed Project and the Hawk Creek Watershed Project. All of these activities directly are related to implementing the Local Water Management Program (i.e., "Water Plan").

In addition to implementing the County's Water Plan, the County also accomplishes numerous water plan initiatives through implementing the following County programs.

- ***Subsurface Sewage Treatment System (Program SSTS)*** – Chippewa County enforces MN Rules Chapter 7080-7083 through the Chippewa County SSTS Ordinance. This Ordinance helps ensure that septic systems are designed and maintained properly, and includes a compliance inspection requirement when property is transferred (seller's responsibility).

- ***Shoreland Management Program*** – Chippewa County assists the Minnesota Department of Natural Resources (DNR) with administering the Shoreland Management Act. This Act regulates land use development within 1,000 feet of a lake and 300 feet of a river and its designated floodplain.

- ***Wetland Conservation Act Program (WCA)*** – Chippewa County delegated the Wetland Conservation Act (WCA) Administration to the Chippewa Soil & Water Conservation District. The goals of WCA are to maintain a "no-net-loss of wetlands", minimize any impacts on wetlands, and to replace any lost wetland acres affected by development.

Appendix A:
Water Plan Supporting Documents

~ Resolution to Update the Chippewa County Water Plan ~

~ Notice of Plan Update ~

~ Water Plan Public Informational Meeting Sign-In Sheet ~

~ Chippewa County Water Plan Survey & Results ~

Resolution to Update the Chippewa County Comprehensive Water Management Plan

WHEREAS, Minnesota Statutes, Chapter 103B.301, Comprehensive Local Water Management Act, authorizes Minnesota Counties to develop and implement a local water management plan, and

WHEREAS, the Act requires that a county update and revise their local water management plan on a periodic basis, and

WHEREAS, the Act encourages that a county coordinate its planning with contiguous counties, and solicit input from local governmental units and state review agencies, and

WHEREAS, the Act requires that plans and official controls of other local governmental units be consistent with the local water management plan, and

WHEREAS, Chippewa County has determined that the revision and continued implementation of a local water management plan will help promote the health and welfare of the citizens of Chippewa County, and

NOW, THEREFORE, BE IT RESOLVED, that the Chippewa County Board of Commissioners resolve to revise and update its current local water management plan.

BE IT FURTHER RESOLVED that Chippewa County will coordinate its efforts in the revision and update of its plan with all local units of government within the county, and the state review agencies; and will incorporate, where appropriate, any existing plans and rules which have been developed and adopted by watershed districts having jurisdiction wholly or partly within Chippewa County into its local water management plan.

BE IT FURTHER RESOLVED that the Chippewa County Board of Commissioners authorizes the establishment of a Water Management Advisory Committee with the responsibility of revising and updating the plan and who shall report to the County Board on a periodic basis.

BE IT FURTHER RESOLVED that the Chippewa County Board of Commissioners delegates the Chippewa County Land and Resource Management Department the responsibility of coordinating, assembling, writing and implementing the revised local water management plan pursuant to M.S. 103B.301.

CERTIFICATION

STATE OF MINNESOTA
COUNTY OF CHIPPEWA

I do hereby certify that the foregoing resolution is a true and correct copy of a resolution presented to and adopted by the County of Chippewa at a duly authorized meeting thereof held on the 1st of May 2012.


Chairman of County Board

Attest:


County Auditor/Treasurer

Notice of Decision to Revise & Update Chippewa County's Water Plan

Chippewa County Water Plan Stakeholder:

Chippewa County is currently in the process of updating their Comprehensive Water Plan. As a valuable water plan stakeholder, you are being asked to complete the attached Chippewa County Priority Concerns Input Form. Please feel free to only complete as much of the information as you want (you may have to "Enable Content" after you open the file in order to complete the form...Microsoft Word should prompt you to do this). Simply input your answers by typing into the boxes, save a copy of the document, and e-mail me back a copy **by July 30, 2012**. The County Water Plan Task Force will then use this information to help write the County's Water Plan Priority Concerns Scoping Document.

In addition to completing a Priority Concerns Input Form, **Chippewa County is holding an Open House for the County Water Plan on July 23 and 24, 2012**. The Monday, July 23rd meeting will take place in the Clara City Community Center from 6:00 to 7:30 p.m. The Tuesday, July 24th meeting will take place in the Chippewa County Courthouse Assembly Room in Montevideo from 6:00 to 7:30 p.m. The meetings will be facilitated by Matthew Johnson from Midwest Community Planning, LLC.

Chippewa County has also created an online Water Plan Survey which can be accessed by the following link:

<http://www.surveymonkey.com/s/D3PRKM2>

If you have any comments or questions, please contact JoAnn Blomme, Land & Resource Management Environmental Technician at (320) 269-6231 or by e-mail at jblomme@co.chippewa.mn.us.

Please feel free to forward this email to anyone else who may be interested in Chippewa County's Water Plan.

Thank you!

Please Sign In!

Date: July 23, 2012

Location: Clear City Community Center

Purpose: Public Input Mtg. for Water Plan Update

Name	Representing
1. Byron Hajunga	City of Montevideo
2. Joe Keller	Chair / City ^{Home} Landowners
3. Jeff Lopez	Chippewa County
4. Marc Flever	
5. Jackie Art	
6. _____ July 24 Chippewa County Assembly Room	
7. _____	
8. _____ Eugene Evans	
9. _____ Robert M. Shomon	
10. Kenneth F. Kaenen	
11. _____ John L. Fother	
12. _____ Jim Diggro	
13. _____ Steve Sundulof	
14. _____ Jeff Lopez	Chippewa County
15. _____ Bob Niles	Chipp. Co. water plan
16. _____	
17. _____	
18. _____	
19. _____	

Chippewa County Comprehensive Local Water Management Survey

The Chippewa County Comprehensive Local Water Plan focuses on priority concerns with respect to groundwater and surface water in our county.

The Local Water Plan Committee asks for your help in completing this short survey as we prepare the water plan 10-year update. We thank you in advance for your time.

- How do you rate the progress of erosion control and runoff in the past 20 years?
 14 good _23_ progressing _14_ fair _1_ poor
- How do you rate the progress of city runoff containing fertilizer and grass clippings?
 3 good _18_ progressing _21_ fair _4_ poor
- What urban practices would you like to install or take responsibility for to reduce stormwater runoff that you would be interested in cost-share or an incentive for?

14	Rain Gardens	17	Rain Barrels	12	Reduce Impervious Surfaces
10	Keep stormdrains clear of debris	0	Other:		

- What rural practices do you feel money would best be spent on? Choose your top 2 choices.

11	Alternative Tile Inlets	20	Buffer Strips	13	Conservation Tillage
1	Construction Site Mgmt.	0	Contour Farming	5	Detailed Nutrient/Manure Management Plans
1	Easements	5	Flood Control Structures		
10	Grassed Waterways	5	Livestock Waste Mgmt.	5	Native Prairie Restoration
12	Streambank Erosion Cont.	3	Terraces/Sediment Ponds	4	Wetland Restorations
1	Other: more pattern tile to slow water				

- In Chippewa County what do you think will be the biggest water problem in the next 10-years? Mark only one.
 3 Not enough water for us to use
 5 Groundwater will be too polluted for us to use
 4 Surface water will be too polluted for us to use
 26 The systems that supply and move our water will need expensive repairs and upgrades
 5 We will not have any major water problems
 1 Other: Too much water
- What do you think is the most likely potential source of water quality concern Chippewa County will be faced with in the next 10-years?
 4 Industrial Pollution (factories, wastewater treatment plants)
 15 Soil erosion (agricultural fields, shoreland, construction sites, roads)
 12 Streambank/Ditch bank erosion
 9 Nutrient Runoff (from lawns, gardens, agricultural fields)
 9 Pesticide Runoff (from lawns, gardens, agricultural fields)
 7 Faulty Individual Sewage Treatment Systems
 2 Runoff from Livestock Production
 11 Stormwater Runoff
 9 Water quantity (flooding) problems
 5 Drought conditions
 0 Other: _____

7. Where do you get your water from? 5 own well 13 city well 0 rural water
8. Do you drink your well water? 3 yes 2 no If no, why?
-
9. How often do you test your well? 0 annually 1 every 1-3 yrs. 3 every 4-10 yrs. 1 never
10. What do you feel is the best way to reach you with new education on water plan topics (i.e. burn barrels, household hazardous waste, septic systems, and pharmaceutical waste) and programs (i.e. cost-share) being offered?
- | | | |
|--|--------------------------------|------------------------------------|
| <u>17</u> Montevideo Newspaper | <u>11</u> Clara City Newspaper | <u>10</u> Granite Falls Newspaper |
| <u>4</u> Star Advisor | <u>6</u> Radio KDMA | <u>1</u> Other Radio: KWLM Willmar |
| <u>10</u> Internet/Email | <u>4</u> Facebook | <u>7</u> Mail |
| <u>4</u> Local TV Channel | <u>7</u> Attend a Meeting | |
| <u>6</u> Displays/Presentations at local fair, expo events, etc. | | |
| <u>0</u> Other: | | |
-
11. Are there topics that you would like to learn more about? Please list: impervious surface alternatives; What are the most polluting factors in our county?
12. Do you have any water concerns in your area that you feel need to be addressed? Increased drainage/tiling/ plan for water management; soil erosion; enforce buffer strips rule along ditches; streams buffered; compliance with existing laws; unabated, unregulated farm drainage
13. Do you have any concerns of the Water Plan Committee in their commitment to continue to improve our soil and water resources and to its continued voluntary approach with Chippewa County residents?
- 5 Yes 31 No
- If you answered Yes, what are your concerns? Well water doesn't taste good; treat all landowners equal regardless of size or wealth; not enough coverage of what this committee does; protect our water quality while allowing for proper ag land drainage; need to be designing water catchment areas; are all our buffered streams in compliance with the law?; how do we rate in terms of other MN River counties?
14. *PLEASE RETURN TO:* Chippewa Co. Land & Resource Management; 629 N 11th St., Suite 16; Montevideo, MN 56265.

Thank You for your Time!!

On behalf of the Chippewa County Water Plan Committee

Voting Members: Jaci Ast Kent Bosch
 Robert Nielsen Marc Stevens, Vice-Chair
 Joe Keller, Chair Steve Nokleby
 Byron Hayunga Steve Sunderland
 Commissioners Kenneth Koenen & Jeffrey Lopez

Non-Voting Members: JoAnn Blomme & Scott Williams, Land & Resource Management
 Jean Diggins, Tom Warner & Zach Bothun, SWCD
 Shantel Lozinski & Rhiannon Buth, NRCS
 Liz Ludwig, FSA
 Josh Macziewski, Ditch/Ag Inspector
 Jeff Miller, DNR Wildlife
 David Sill, BWSR Board Conservationists

Appendix B:

Water Plan Priority Concerns Input Forms

~ The Minnesota Department of Agriculture ~

~ The Minnesota Pollution Control Agency ~

~ The Minnesota Board of Water and Soil Resources ~

~ Chippewa River Watershed Project ~

~ Hawk Creek Watershed Project ~

~ MN Department of Natural Resources ~



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Water Planning Assistance

County Water Plans

In the State of Minnesota, the Board of Water and Soil Resources (BWSR) has oversight to ensure that county water plans are prepared and coordinated with existing local, and state efforts and that plans are implemented effectively. County Water Plans are a major tool for addressing water resource concerns in Minnesota. The Minnesota Department of Agriculture (MDA), through this website and via input on County Water Plans, seeks to provide current planning guidance and references to support the planning process.

The MDA has a role in protecting water quality as it relates to agricultural pesticides and fertilizers. We can provide technical information, financial assistance to implement specific programs, and education and outreach assistance.

At the beginning of the County Water Plan Update Process, State Agencies, including the Minnesota Department of Agriculture are invited to provide input, in the form of Priority Concerns to the County. MDA has selected five Priority Concerns to focus on in Minnesota.

The MDA has redeveloped its process to comment on local water plans and to provide comments to local units of government. The MDA appreciates the opportunity to work with counties and other partners on these local plans. This information is general guidance primary focused on counties that are conducting 10-year water plan re-writes. The MDA will provide more specific comments to counties that are going through this process. Information provided may not specifically be applicable for 5-year water plan updates. For those counties working on the 5-year updates, the MDA may also provide detailed comments or guidance. In any case, MDA will work closely with the local unit of government to provide information.

Priority Concerns

[Agricultural Drainage, Wetlands & Water Retention](#)

[Agricultural Chemicals & Nutrients in Ground & Surface Water](#)

[Livestock & Manure Management](#)

[Agricultural Land Management](#)

[Targeting BMPs, Aligning Local Plans & Engaging Agriculture](#)

[MDA Contacts](#)



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Agricultural Drainage, Wetlands and Water Retention

Why is it important the plan focus on this concern?

Adequate drainage can be a critical component of a successful farm operation. High crop and land prices have the potential of increasing conversion of pasture and forage land to row crops, which in turn may lead to the installation of new drainage systems or drainage improvements to existing systems. New drainage and drainage improvements represent an opportunity to design and install systems in ways that help reduce nutrient losses into surface water and positively affect the timing and flows of drainage water into surface waters. These efforts combined with wetland restoration and water retention initiatives can have positive impacts upon water quality in agricultural landscapes.

What actions are needed for Agricultural Drainage?

Generally, local plans should provide guidance, objectives, goals and action items for further coordination of agricultural water management issues and Conservation Drainage (CD) implementation efforts at the local level. A number of CD practices exist to address water quality issues. There is no single CD practice that will address all agricultural drainage issues. However, multi-purpose approaches to managing water quality and quantity on the agricultural landscape using a suite of CD initiatives is the best approach. It is recommended that:

- Local plans discuss how CD practices can be utilized based on the drainage needs of the county coupled with associated water management issues.
- Local drainage authorities be proactive in encouraging the use of CD practices and designs during repairs and improvements of existing drainage systems.
- Redetermination of Benefits for ditch systems continue to be done in a proactive, consistent and systematic manner.
- Buffer initiatives continue to be implemented consistently and according to current drainage law.
- The local drainage authority continues to base drainage regulations on science and current best management practice knowledge.
- The local drainage authority consider multipurpose drainage approaches as developed by BWSR.

As a point of interest, a technical and scientific committee is currently addressing the effect of tiling upon flooding in the Red River Valley. Here's a [weblink](#) where two recent briefing papers can be viewed on this subject. This committee conducted an extensive literature review and developed a number of conclusions from the review in addition to a set of statements and recommendations from these papers. While this document and effort is specific to the Red River Valley, counties may find it useful to reference this report within the drainage discussion of draft water plan amendments or re-writes.

What actions are needed for Wetlands and Water Retention?

Properly locating wetlands and water storage or retention projects can be a strategic component of overall efforts to manage nutrients, sediments and water quantity issues. Counties may consider consulting with the Red River

Watershed Management Board – Flood Damage Reduction Workgroup to determine how flood damage reduction, retention and mitigation efforts have progressed in Northwest Minnesota in conjunction with wetland restoration (via various state and federal programs).

The Red River Valley has a long history of managing floodwater and constructing impoundments to manage floodwaters and significant insight could be gained by corresponding with this organization regarding water retention. A Technical and Scientific Advisory Committee as part of this Board has also developed a number of scientific papers on a variety of issues related to flood damage reduction. Specifically, counties should consider:

- Conducting/updating culvert inventories in conjunction with identifying where water retention projects can be constructed utilizing LIDAR and GIS technologies.
- Identifying projects where tile water from public drainage systems can potentially be used to augment long-term water levels in wetland restorations for water retention purposes.
- Working with local farmers on agricultural wetland mitigation banking initiatives and include agricultural sectors on overall wetland planning efforts.
- Identify areas where constructed wetlands can be located for treating tile drainage water.

What resources may be available to accomplish the actions for Agricultural Drainage, Wetlands and Water Retention?

- [MDA Drainage Information](#)
- [MDA Drainage Demonstration Sites](#)
- [Conservation Drainage Practices](#)
- [Conservation Drainage Designs](#)
- [University of Minnesota Drainage Research](#)
- [Board of Water and Soil Resources](#)
- [University of Minnesota Extension Service](#)
- [Red River Watershed Management Board](#)

What area(s) of the county is high priority?

All agricultural lands of the county.

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Minnesota Dept. of Agriculture, 625 Robert St. N, St. Paul, MN 55155-2538, mda.info@state.mn.us



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Groundwater and Surface Water Protection: Agricultural Chemicals and Nutrients/Water Use/Land Management in Wellhead Protection Areas

Why is it important the plan focus on this concern?

Agricultural chemicals may contribute to water pollution from runoff into surface waters or infiltration into groundwater. Contaminated groundwater and surface water can affect human health as well as ecosystem quality. The protection of drinking water is an important health issue as approximately 75 percent of Minnesotans obtain their drinking water from groundwater. In areas with vulnerable groundwater, nitrates may exceed the drinking water standard. Once the standard is exceeded, it may be difficult to reduce the levels of contaminants. Therefore, it is highly desirable to prevent contamination of groundwater from occurring through protective actions in areas with vulnerable aquifers.

In areas with elevated nitrates in groundwater it is important to reduce their concentration. Similarly, pesticides may be present in shallow vulnerable groundwater. Agricultural chemicals are also frequently a concern related to surface water impairments under the clean water act. The most common agricultural sources of excess nutrients in surface water are chemical fertilizers and manure. Such nutrients contribute to eutrophication in surface water and have been identified as a source of hypoxia in the Gulf of Mexico.

What actions are needed?

- Continue the sealing of abandoned wells in agricultural landscapes and prioritize efforts for ISTS upgrades in sensitive areas. Utilize the MDA Ag BMP loan program and cost-share programs to assist landowners in addressing these issues.
- Crop Irrigation - Encourage the conversion of older irrigation systems to low pressure. [MDA](#)

What resources may be available to accomplish the actions?

The MDA prepares specific maps for counties to assist in local groundwater protection efforts. The maps should be used to prioritize groundwater BMP implementation, protection and restoration efforts. The Water Table Aquifer Sensitivity map classifies the county into three aquifer sensitivity ratings: low, medium and high. These reflect the likelihood that infiltrating precipitation or surface water would reach the water table possibly bringing surface contaminants with it. Priority should be given to the Drinking Water Supply Management Areas (DWSAs), Wellhead Protection Areas and to the areas given a high aquifer sensitivity rating.

Nitrate concentrations found in MDA monitoring wells and wells in the County Well Index (CWI) are also shown on the map. Concentrations greater than 3 mg/L indicate nitrate concentrations above background levels, while concentrations greater than 10 mg/L are above the nitrate drinking water standard. Additional websites:

EVALUATE

- [Agricultural Chemical Monitoring and Assessment Programs](#)
- [Interactive Source Water Mapping Tool](#)
- [County Geologic Map Program](#)
- [Farm Nutrient Management Assessment Program \(FANMAP\)](#)
- [Nutrient Management Initiative](#)

PREVENT

- [Management Ideas for Wellhead Protection Programs](#)

[website on irrigation BMPs](#). The MDA recommends that this water plan consider the following items specific to irrigation:

- Develop and implement educational programs regarding water management in conjunction with nitrogen fertilizer management. Reference the following websites regarding coarse textured soils.
 - [Best Management Practices for Nitrogen on Coarse Textured Soils](#)
 - [Best Management Practices for Nitrogen Use - Irrigated Potatoes](#)
- Promote the establishment and data access of local climate stations to irrigators for ET (evapotranspiration) estimates.
- Promote the use and availability of irrigation scheduling software and record keeping.
- Promote the use of the county soil survey and other localized soils information in determining soil moisture holding capacity on a field-specific scale.
- Encourage the use of soil moisture sensors (moisture blocks, tensiometers, etc.) and other advanced tools for determining crop water stress.
- Fertigation (nitrogen applied through the irrigation water) is an excellent option for irrigators to distribute small amounts of nitrogen (20-30 lb/A). See the website above regarding coarse textured soils for details. Note that a fertigation permit and the proper backflow equipment is required by the MDA.
- Provide assistance in irrigation uniformity testing and nozzle calibrations.
- Provide nitrate testing services on irrigation water to help promote N crediting concepts and environmental protection. MDA staff can help provide equipment and technical assistance.
- Promote hybrid and crop selection that have lower water and/or nitrogen requirements.
- Conduct training sessions and workshops for farmers that have agricultural production activities within wellhead protection areas and drinking water supply management areas. Encourage the use of the Nutrient BMP Challenge, Nutrient Management Initiative and similar tools within these areas. More resources regarding [drinking water protection in agricultural settings](#).

- [Water Quality BMPs for Agricultural Herbicides](#)
- [Water Quality BMPs for Nitrogen Fertilizers](#)
- [Private Well Testing for Pesticide Contamination](#)
- [Nutrient and Manure Management Planning](#)
- [Nutrient and Manure Management Tables](#)

What area(s) of the county is high priority?

Rural or agricultural areas that are actively growing crops/producing livestock, coarse textured soils areas and wellhead protection areas that have agricultural activity.

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Manure Management and Livestock Issues

Why is it important the plan focus on this concern?

Livestock manure used as fertilizer has benefited farmers for decades and if applied properly can meet crop nutrient requirements, build up soil organic material and decrease dependence on commercial fertilizers, increase soil fertility, and in some cases, reduce soil erosion. Manure as fertilizer is a constant reminder that we can reuse and recycle a product that was once thought of as a waste product with insignificant value. However, if manure is not properly applied it can lead to negative environmental impacts.

Manure, feed/silage leachate and milkhouse waste can be high in nutrient values, specifically pertaining to nitrogen and phosphorous. If improperly applied, manure does have the potential to contribute to nutrient loading and bacteria/viral levels of water sources. It is important for counties in the state to encourage the development of manure/nutrient management plans for the livestock producers within their borders. These plans address agronomic application rates for crops planted, buffered or protection areas around sensitive features, and reduce the potential of impacting surface or ground water.

Pasturing livestock is a common practice among livestock producers. Several studies and research through the University of Minnesota show that livestock grazing, if done properly, can enhance the quality of grazing lands. As your county is aware, pasture areas are often those areas that are not conducive to farming and generally contain sensitive landscape and surface water features. Nutrients left by livestock serve as a fertilizer source to pasture plant species, which then utilize and filter the nutrients rather than the nutrients being in excess and exiting the area in the form of runoff.

Types of vegetation, length of time in a pasture, stocking density and water availability are all issues livestock producers must be continued to be educated, in order to produce and utilize a productive, environmentally sound pasture or grazing system. Pastures or grazing systems not managed properly can restrict or eliminate vegetative growth and cover, which in turn can result in potentially negative water quality issues.

Producers in watersheds that are impaired due to fecal coliform/E coli impairments need to be encouraged to be involved in TMDLs developed in the region. Local producer involvement on water plan advisory committees and water quality initiatives will provide additional insight into how producers can work with agencies to improve water quality.

What actions are needed?

- Continue and renew education and outreach efforts on manure/nutrient/pasture management planning and implementation. Work closely with local NRCS staff on this issue as well as regional MPCA staff.
- Encourage livestock producers to work with Technical Service Providers and/or Certified Crop Advisors to better utilize and understand the value of using GIS/GPS technologies in developing:
 - Manure management plans.
 - Comprehensive nutrient management plans
 - Pasture management plans

- Rotational grazing plans
- Encourage involvement from livestock producers located within impaired watersheds and vulnerable areas in the landscape. One such approach may be the development of a [local agricultural advisory committee](#).
- Continue and/or make it a priority to provide technical and financial assistance for livestock producers to assist them with adopting best management practices to reduce impacts from manure runoff and manure storage structures or areas.
- Encourage livestock producers to participate in an on-farm environmental assessment program. A number of livestock producer groups in the state have specific programs that are available to their members. The [Livestock Environmental Quality Assurance \(LEQA\)](#) program is available to all livestock producers in Minnesota. LEQA is an on-farm environmental assessment and results in a water quality score for a farm.

As ecosystem services are better defined, producers that participate in an on-farm environmental assessment may be better situated to participate in future water quality or ecosystem services trading markets.

What resources may be available to accomplish the actions?

- [MDA Ag BMP Loan Program](#)
- [Sustainable Ag Loan Program](#)
- [NRCS Cost Share Programs](#)
- [BWSR Cost Share Funds](#)
- [MPCA 319 Grants](#)
- [Minnesota Rural Finance Authority Loans](#)
- [Livestock Environmental Quality Assurance Program \(LEQA\)](#)

What area(s) of the county is high priority?

Feedlots with open lots in shoreland or near sensitive water features and land where manure is applied in shoreland or near sensitive water features. Pasture areas located adjacent to shoreland areas.

Contacts/Resources:

[MDA Livestock Resources](#)

[MPCA Feedlot Program](#)

[University of Minnesota Manure Management and Air Quality Education and Research](#)

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Minnesota Dept. of Agriculture, 625 Robert St. N, St. Paul, MN 55155-2538, mda.info@state.mn.us



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Agricultural Land Management

Why is it important the plan focus on this concern?

The MDA recommends voluntary approaches to addressing soil loss and soil erosion issues and offers some suggestions as outlined below to engage agricultural producers in your county. Many advances have been made over the past decades to assist crop and livestock producers in managing their lands, including both from a technological and scientific standpoint. Advancements have also been made in recent years regarding seed technology, nutrient placement and timing of application, crop physiology research and overall land management, including improved soil and water management techniques. However, on certain soils, steep slopes, hydrologic settings or unique landscape features, there may be a need for additional voluntary measures to be implemented.

What actions are needed? What resources may be available to accomplish the actions?

The water plan should consider including discussion about how to further encourage voluntary initiatives, such as the use of:

- Enhanced use of [Precision Agricultural Technologies \(PCT\)](#). While adoption of PCT has been widely adopted and accepted by many agricultural producers, there may be additional opportunities to further encourage the voluntary use of PCT in various agricultural settings of the county.
- [Cover crops](#) when appropriate. The use of cover crops may not be conducive to every crop rotation or landscape setting. However, certain cover crops can be beneficial for soil quality improvements, erosion control and soil fertility.
- Innovative [residue management](#) techniques that are crop rotation appropriate and designed to fit the needs of individual farming operations.
- Survey tools. The MDA developed a diagnostic tool a number of years ago called [Farm Nutrient Management Assessment Process \(FANMAP\)](#) to get a clear understanding of existing farm practices regarding agricultural inputs such as fertilizers, manures and pesticides. The use of FANMAP or other survey tools may be useful in certain areas of the county when working on a minor watershed basis. Contact the MDA for more specifics about how FANMAP can be used in your county.
- Enhanced promotion of buffer strips, filter strips, water and sediment and control basins and grassed waterways in areas with steep slopes, coarse soils and other high priority areas. The MDA realizes that resources are needed to accomplish promotional and educational initiatives to encourage the adoption of these types of practices. Your county may want to partner with other local units of government in promoting higher levels of adoption for the above mentioned BMPs.

What area(s) of the county is high priority?

All agricultural areas of the county. Specifically important for areas with steep slopes or coarse soils.



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Targeting of BMPs, Aligning Local Plans and Engaging Agriculture

Why is it important the plan focus on this concern?

Technical, financial and staff resources are becoming more difficult to retain and obtain. As resources are scarce, the targeting of agricultural BMPs and conservation structures to the most vulnerable areas of the landscape is critical. The goal should be to target conservation practices to the areas of the landscape where they will be most effective to meet local and regional water quality and ecosystem goals and objectives.

New tools and technologies are making it possible to [target conservation practices](#) to specific areas of the landscape. State agencies are working together to support the development of new technologies and to make them available to local partners through training and online resources. This area of research is developing and more tools such as digital terrain analysis, are made available each year. These resources should be used whenever possible. A multi-faceted approach to implementing BMPs on the landscape is an important component of preserving, conserving, enhancing and sustaining water and natural resources. It is recommended that consideration be given towards further developing and enhancing relations with all local conservation partners to align goals, objectives and outcomes of local plans to meet local water quality goals.

It is recommended that the authors of the local water plan continually review and acknowledge areas of shared concern and opportunity between complementary plans and to foster new partnerships. Considerations should be given for further engaging the agricultural sector while developing new plans or updating existing plans. Agricultural producers involved with local TMDL implementation plans, local water management plan advisory committees, NRCS local workgroups and other local committees can provide additional insight into agricultural landscape management.

What actions are needed?

- Utilize targeting tools and technologies to locate BMPs and conservation structures using the targeting tools.
- Consider and implement multifaceted approaches to working with agricultural producers.
- Further engage local partners on conservation implementation such as NRCS staff, local conservation groups, lake associations, etc.
- Foster new relationships with the agricultural sector or enhance existing relations. Consider joint meetings of NRCS local work groups and local water management plan advisory committees.

What resources may be available to accomplish the actions?

Agricultural producers are key stakeholders in working with local, state and federal agencies on implementing positive changes within the agricultural landscape. The [Clean Water Fund Activities](#) website was developed to encourage producers to become involved at the local level with impaired waters issues.

The [Minnesota Conservation Funding Guide](#) provides more detailed information about funding opportunities. This guide complements, but does not replace the customized local expertise available via SWCDs and other local units

of government to landowners throughout Minnesota. The guide provides contact information for Minnesota's 90 local SWCDs and other organizations that help landowners plan and implement conservation.

The [Minnesota Agricultural Water Resource Center](#) may be able to provide additional expertise on engaging agricultural producers in your county.

What area(s) of the county is high priority?

All areas of the county.

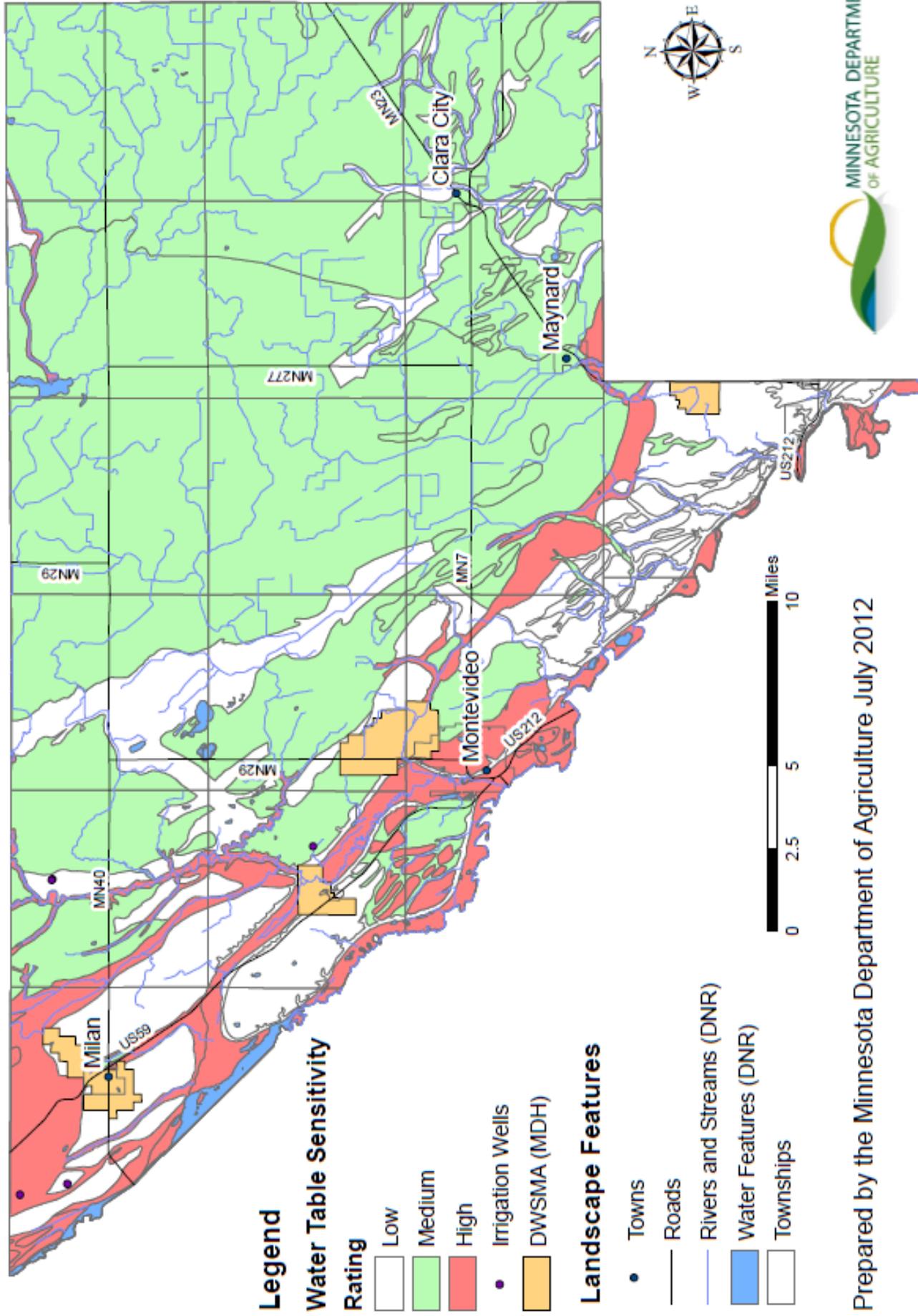
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CHIPPEWA COUNTY WATER TABLE AQUIFER SENSITIVITY

Surficial Aquifer vulnerability based on Sediment Association of Mn Geomorphology, (DNR 1997)



Prepared by the Minnesota Department of Agriculture July 2012





Minnesota Pollution Control Agency

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July 23, 2012

Mr. Matthew Johnson
Midwest Community Planning, LLC
P.O. Box 541
Willmar, MN 56201

RE: Chippewa County Priority Concerns
Local Water Management Program

Dear Mr. Johnson:

The Minnesota Pollution Control Agency (MPCA) is pleased to provide priority concerns for consideration in Chippewa County's (County) Local Water Management (LWM) planning efforts. We trust these priority concerns will be helpful with developing the forthcoming Priority Concerns Scoping Document (PCSD) and Local Water Management (LWM) Plan.

1. Impaired waters/Total Maximum Daily Loads

The federal Clean Water Act requires states to adopt water quality standards to protect the nation's waters. These standards define how much pollution can be in a surface and/or groundwater while still allowing it to meet its designated uses, such as for drinking water, fishing, swimming, irrigation or industrial purposes. Many of Minnesota's water resources cannot currently meet their designated uses because of pollution problems from a combination of point and nonpoint sources.

Addressing impaired waters in LWM plans is voluntary. However, the MPCA strongly encourages counties to consider how their LWM plans address impaired waters, as identified on the "Final List of Impaired Waters" available on MPCA's website at:

<http://www.pca.state.mn.us/water/tmdl/tmdl-303dlist.html#finalist>

It is suggested the LWM Plan:

- identify the priority the County places on addressing impaired waters, and how the County plans to participate in the development of Total Maximum Daily Load (TMDL) pollutant allocations and implementation of TMDLs for impaired waters
- include a list of impaired waters and types of impairment(s) (see table below)
- identify the pollutant(s) causing the impairment (see table below)
- address the commitment of the County to submit any data it collects to the MPCA for use in identifying impaired waters, provide plans, if any, for monitoring as yet unmonitored waters for a more comprehensive assessment of waters in the County
- describe actions and timing the County intends to take to reduce the pollutant(s) causing the impairment, including those actions that are part of an approved implementation plan for TMDLs

Regional TMDL reports for mercury have been approved by the U.S. Environmental Protection Agency (EPA). The MPCA recommends counties address waters listed for pollutants/stressors other than mercury and polychlorinated biphenyls (PCB) in their LWM plans.

The list of impaired waters in the County is provided in the table below.

Clean Water Act Section 303 [d] List of Impaired Waters in the County.

Reach

Assessment Unit	ID	Impaired Use	Impairment Cause	Impairment Status
Chippewa River: Cottonwood Cr to Dry Weather Cr	07020005-508	AqRec	Fecal Coliform	TMDL Approved
Chippewa River: Cottonwood Cr to Dry Weather Cr	07020005-508	AqLife	Turbidity	TMDL Required
Chippewa River: Cottonwood Cr to Dry Weather Cr	07020005-508	AqCons	Mercury in Fish Tissue	TMDL Approved
Chippewa River: Dry Weather Cr to Watson Sag	07020005-502	AqCons	Mercury in Fish Tissue	TMDL Approved
Chippewa River: Shakopee Cr to Cottonwood Cr	07020005-507	AqCons	Mercury in Fish Tissue	TMDL Approved
Chippewa River: Watson Sag to Minnesota R	07020005-501	AqLife	Ammonia (Un-ionized)	Removed from Inventory - Restored By Corrective Actions
Chippewa River: Watson Sag to Minnesota R	07020005-501	AqRec	Fecal Coliform	TMDL Approved
Chippewa River: Watson Sag to Minnesota R	07020005-501	AqLife	Turbidity	TMDL Required
Chippewa River: Watson Sag to Minnesota R	07020005-501	AqCons	Mercury in Fish Tissue	TMDL Approved
Dry Weather Creek: Headwaters to Chippewa R	07020005-509	AqRec	Fecal Coliform	TMDL Approved
Hawk Creek: Chetomba Cr to Unnamed cr	07020004-591	AqCons	Mercury in Fish Tissue	TMDL Approved
Hawk Creek: T117 R37W S6, north line to Chetomba Cr	07020004-510	AqCons	Mercury in Fish Tissue	TMDL Approved
Hawk Creek: T119 R35W S19, north line to T118 R37W S31, south line	07020004-508	LimUse	Mercury in Fish Tissue	TMDL Approved
Hawk Creek: Unnamed cr to Unnamed cr	07020004-568	AqRec	Fecal Coliform	TMDL Required
Hawk Creek: Unnamed cr to Unnamed cr	07020004-568	AqLife	Turbidity	TMDL Required
Hawk Creek: Unnamed cr to Unnamed cr	07020004-568	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River (Lac Qui Parle Lake): Lac Qui Parle Lk below Emily Cr	07020001-517	AqLife	Ammonia (Un-ionized)	TMDL Required
Minnesota River: 8th Ave and Baldwin St bridge to Minnesota Falls Dam	07020004-613	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Chippewa R to Stony Run Cr	07020004-501	AqRec	Fecal Coliform	TMDL Required
Minnesota River: Chippewa R to Stony Run Cr	07020004-501	AqLife	Turbidity	TMDL Required

Minnesota River: Chippewa R to Stony Run Cr	07020004-501	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Granite Falls City N boundary to Granite Falls Dam	07020004-575	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Granite Falls Dam to 8th Ave and Baldwin St bridge	07020004-612	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Hazel Cr to Yellow Medicine R	07020004-516	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Hazel Cr to Yellow Medicine R	07020004-516	AqCons	PCB in Fish Tissue	TMDL Required
Minnesota River: Lac qui Parle dam to Chippewa R	07020004-688	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Lac Qui Parle Lk to Lac Qui Parle R	07020001-502	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Lac qui Parle R to Lac qui Parle dam	07020001-550	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Minnesota Falls Dam to Hazel Cr	07020004-515	AqLife	Turbidity	TMDL Required
Minnesota River: Minnesota Falls Dam to Hazel Cr	07020004-515	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Minnesota Falls Dam to Hazel Cr	07020004-515	AqCons	PCB in Fish Tissue	TMDL Required
Minnesota River: Palmer Cr to Granite Falls City N boundary	07020004-583	AqCons	Mercury in Fish Tissue	TMDL Approved
Minnesota River: Stony Run Cr to Palmer Cr	07020004-519	AqCons	Mercury in Fish Tissue	TMDL Approved
Shakopee Creek: Shakopee Lk to Chippewa R	07020005-559	AqLife	Fishes Bioassessments	TMDL Required
Shakopee Creek: Shakopee Lk to Chippewa R	07020005-559	AqRec	Fecal Coliform	TMDL Approved
Shakopee Creek: Shakopee Lk to Chippewa R	07020005-559	AqLife	Turbidity	TMDL Required

Lakes

Assessment Unit	ID	Impaired Use	Impairment Cause	Impairment Status
Lac Qui Parle: NW Bay	37-0046-02	AqCons	Mercury in Fish Tissue	TMDL Approved
Lac Qui Parle: SE Bay	37-0046-01	AqCons	Mercury in Fish Tissue	TMDL Approved

Wetlands

Assessment Unit	ID	Impaired Use	Impairment Cause	Impairment Status
Unnamed:	12-0013-00	AqLife	Aquatic Macroinvertebrate Bioassessments	TMDL Required
Unnamed:	12-0013-00	AqLife	Aquatic Plant Bioassessments	TMDL Required

Draft/public noticed TMDL studies and approved TMDLs and implementation plans can be viewed on the MPCA's website at: <http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/tmdl-projects/tmdl-projects-and-staff-contacts.html>.

Total Maximum Daily Load studies have been approved for Long/Ringo Lakes (nutrients) and Diamond Lake (nutrients) and the Chippewa River (fecal coliform.) Diamond Lake also has an approved implementation plan. Please refer to the above link for the status of other TMDL projects that are in development or underway for future reference for local water planning activities.

The County should consider continued participation with other units of government in the watershed to develop and implement TMDL implementation plans once TMDL studies receive final approval from the EPA. Grant funding applications for TMDL impaired water implementation projects may request citations from local water plans identifying water bodies as County priorities. This documented commitment by a County may improve an applications ranking and ultimately the County's ability to secure implementation funding.

MPCA Environmental Data Access System

The water quality section of MPCA's Environmental Data Access (EDA) system allows visitors to find and download data from surface water monitoring sites located throughout the state. Where available, conditions of lakes, rivers, or streams that have been assessed can be viewed. We encourage the County to visit this site for water quality monitoring data which may be useful with LWM planning efforts:
<http://www.pca.state.mn.us/data/edaWater/index.cfm>

Areas of the County that should be considered priority waters are the impaired water bodies and reaches of impaired water bodies on the Clean Water Act 303 [d] TMDL List. We believe the County should consider impaired waters as a top priority for discussion in the LWM Plan.

2. Watershed approach

Since 2007, the MPCA has been assessing waters by the process known as the Watershed Approach (<http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/watershed-approach.html>). The Watershed Approach process begins with intensive watershed monitoring and assessment. The Watershed Approach project area is at the 8 digit hydrologic scale and is referred to as the Watershed Restoration and Protection (WRAP) area. The Chippewa River WRAP project began this approach in 2009, Hawk Creek WRAP project began in 2010, and the Upper Minnesota River is scheduled to start in 2015. The MPCA encourages the County to incorporate the Watershed Approach and WRAP for these watersheds.

The Watershed Approach is a 10-year rotation for addressing waters of the state on the level of Minnesota's major watersheds. Since 2007, the MPCA and its partners have begun implementing this approach, as recommended by the Clean Water Council and directed by the Minnesota State Legislature <http://www.pca.state.mn.us/index.php/view-document.html?gid=6125>

The Watershed Approach focuses on the watershed's condition as the starting point for water quality assessment, planning, implementation, and measurement of results. This approach may be modified to meet local conditions, based on factors such as watershed size, landscape diversity, and geographic complexity. This Watershed Approach will ultimately lead to a more comprehensive list of impaired and non-impaired waters. This list will be used to develop TMDL studies and restoration strategies for impaired waters as well as protection strategies for non-impaired waters. The development of strategies will rely greatly on County participation and counties will likely be asked to provide priority areas to

target restoration and protection activities. Targeted priorities will be an important step toward receiving funding for implementation activities. Communication and coordination between counties located in the WRAP watersheds will be essential to develop a comprehensive and effective implementation plan.

Recommended actions include:

- **Monitor and gather data and information.** MPCA employs an intensive watershed monitoring schedule that will provide comprehensive assessments of all of the major watersheds on a ten-year cycle. This schedule provides intensive monitoring of streams and lakes within each major watershed to determine overall health of the water resources, to identify impaired waters, and to identify those waters in need of additional protection to prevent future impairments. It is suggested that the LWM Plan address Surface Water Assessment Grants (SWAGs) and additional County monitoring that may be used in the WRAP.
- **Assess the data.** Based on results of intensive watershed monitoring in step one, MPCA staff and its partners conduct a rigorous process to determine whether or not water resources meet water quality standards and designated uses. Waters that do not meet water quality standards are listed as impaired waters. It is suggested that the LWM Plan address data submittal and representation to participate in the assessment process for use in the WRAP.
- **Establish implementation strategies to meet standards.** Based on the watershed assessments, a TMDL study with restoration and/or protection strategy is completed. Existing LWM plans and water body studies are incorporated into the planning process. It is suggested that the LWM Plan address participation in development of restoration and protection strategies developed through the WRAP as well as priority management zones.
- **Implement water quality activities.** Included in this step are all traditional permitting activities, in addition to programs and actions directed at nonpoint sources. Partnerships with state agencies and various local units of government, including watershed districts, municipalities, and soil and water conservation districts, will be necessary to implement these water quality activities. It is suggested that the LWM Plan address implementation of restoration and protection strategies once developed through the WRAP.

It is suggested the County maintain the current relationships with the Chippewa River Watershed Project (CRWP), Hawk Creek Watershed Project (HCWP), and the Upper Minnesota River Watershed District for continued participation in the watershed projects. Financial resources for coordination and communication between counties could include, but not be limited to, grants from the Clean Water Fund (CWF), Clean Water Partnership (CWP), Surface Water Assessment Grant (SWAG), Legislative Citizen Commission on Minnesota Resources (LCCMR) and Section 319. Technical assistance could be sought from an advisory group of local and state agency staff, local decision makers, and landowners.

Priorities by year (start-completion): Chippewa River (2009-2013), Hawk Creek (2010-2014), and Upper Minnesota River (2015-2019).

Mr. Matthew Johnson

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3. Update of LWM Plan information relative to MPCA programs

Much of the information and terminology on MPCA programs is out of date (example STORET is now Environmental Quality Information System (EQIS) and individual sewage treatment system (ISTS) is now subsurface sewage treatment system (SSTS).

It is recommended to use updated information and terminology in the new LWM Plan. Resources to help accomplish these actions include MPCA website (www.pca.mn.us), and appropriate program staff.

If we may be of further assistance, please contact Mark Hanson in the Marshall Regional Office at 507-476-4259 or Dave L. Johnson in the St. Paul Office at 651-757-2470.

Thank you and we look forward to reviewing the forthcoming PCSD and LWM Plan.

Sincerely,



Rebecca J. Flood
Assistant Commissioner

RJF/DLJ:kb

cc: Jeff Nielsen, Minnesota Board of Water and Soil Resources
Mark Hanson, Minnesota Pollution Control Agency, Marshall Office

Chippewa County Water Plan – Priority Concerns Input

Your Agency/Organization: Minnesota Board of Water and Soil Resources (BWSR)

Submitted by (name): David Sill

Submitted on: 7/27/12 (via e-mail)

1. Top Priority Concern: Erosion and sediment control; nutrient management on agricultural land

Why is it important the plan focus on this concern (include or cite relevant data)? According to the “2003 – 2012 Chippewa County Comprehensive Local Water Plan”, the single largest land use in the County is cultivated agricultural land--approximately 87%. Farming practices have changed over the past few decades. What once was a diversified agricultural landscape is now primarily cash grain operations. Cash grain operations tend to have soils that are more susceptible to water and/or wind erosion, which can and do impact the quality and quantity of surface and ground water resources. The rivers, shallow lake/wetlands and streams of the County (and Minnesota) depend on best management practices to be implemented on these lands so water quality degradation from sediment of eroding lands does not occur. To provide for the long-term productive capacity of the County’s soil resource base (and the quality of surface water), these agricultural soils need to be protected.

Agricultural runoff is also a significant source of nutrient loading to surface and ground waters. Commercial fertilizers as well as animal waste (manure) from livestock and hog producers are utilized for crop production on agricultural land. Proper application of commercial fertilizer and animal waste is critical in reducing loss of these nutrients to receiving waters. Preventing soil loss due to erosion and attached phosphorous from entering receiving waters will help to improve water quality.

The Minnesota Pollution Control Agency continues to update its Impaired Waters listing, which includes specific reaches of surface waters in the county. Implementation of best management practices are needed to protect and keep the productive soils in place, provide for proper utilization of chemical fertilizers and animal waste, and to retain precipitation on the land that aids in the control of surface water runoff.

What actions are needed?

- Continue and accelerate the promotion and marketing of state and federal conservation program opportunities to land owners/users.
- Increase the assistance to landowners in implementing agricultural best management practices (structural and land use change).
- Continue and accelerate technical assistance to landowners planning and implementing agricultural best management practices within the county.
- Continue the participation with watershed management projects and groups to pool financial and technical resources.
- Educating the land owners and users to follow University of Minnesota nutrient management recommendations.
- Utilize gully and bank survey information from the Chippewa River Watershed Project regarding high priority erosion sites. (Appears gullies and bank erosion along Chippewa River main stem between Benson and Highway 40 generates 20% of all suspended sediment.)
- Utilize LiDAR analysis to identify critical erosion areas, catchment areas, etc. to help prioritize and target implementation activity.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

- USDA Farm Bill conservation provisions administered by NRCS (Natural Resources Conservation Service) and FSA (Farm Service Agency) at the county level.
- State Cost Share Program, Re-Invest in Minnesota Reserve (RIM) Program, etc. through local SWCD.
- State Clean Water Fund Program opportunities available through the County and local SWCD.
- State Revolving Loan Fund through Minnesota Department of Agriculture.
- Numerous private grant opportunities.
- Conservation/implementation programs through Minnesota Pollution Control Agency.
- Ongoing educational opportunities provided by the University of Minnesota, Minnesota Department of Agriculture.
- Information available through MN Pollution Control Agency, MN Dept. of Agriculture, University of MN.

What areas of the county are high priority? Meet with Chippewa River Watershed Project and Hawk Creek Watershed Project to identify targeted, priority areas for implementation - using their monitoring results and data---(key in on available turbidity, suspended solids and nutrient data.) Regarding turbidity it appears Shakopee Lake Outlet, Shakopee Creek and the Chippewa main stem at Highway 40 seem to have the most trouble regarding the Chippewa Watershed. Also use gully and bank erosion survey data for prioritization in the Chippewa.

Nitrogen - Shakopee Creek is responsible for 41% of all NO₂-3 in the Chippewa River (the region downstream of Shakopee Lake contributes more than the upstream region.) Dry Weather Creek is responsible for 15%. Phosphorous – there is considerable amount of Phosphorous stored in Shakopee Lake which is feeding the high algae and turbidity levels in the lake.

Contact Hawk Creek Watershed for additional data and prioritization information.

2. **Second Priority Concern: Feedlot Management and Non-conforming Subsurface Septic Treatment Systems**

Why is it important the plan focus on this concern (include or cite relevant data)? The “2003 – 2012 Chippewa County Comprehensive Local Water Plan” identifies feedlots and Individual Septic Treatment Systems (ISTS), also called subsurface septic treatment systems (SSTS), as potential pollution sources in the County. These pollution sources if improperly managed will contribute to the nutrient and contaminate loading of water resources in the County. The County has capable staff in place to provide assistance to land owners for both resource issues. This assistance is a critical component in properly managing water resources. There are MN Statues in place that provide for enforcement actions to address problems associated with feedlots and non-conforming septic systems. Enforcement action must take place as warranted, but incentives and assistance to obtain voluntary compliance is a better approach. Financial incentives opportunities are available. The County needs to seek out these opportunities to help bring the land owners in to compliance.

What actions are needed?

- Consider becoming a Feedlot Program delegated county.
- Accelerate County/SWCD staff assistance in engaging and assisting feedlot operators.
- Complete a Level III feedlot inventory.
- Continue to implement the County’s SSTS Program.
- Continue to provide County staff to administer the SSTS Program and assist land owners.
- Seek out Federal, State and other funding sources to provide cost-share assistance and loan program assistance to land owners/users.
- Educate the land owner/user and general public on feedlot and SSTS issues and health effects as well as water quality concerns.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

- Technical: NRCS, SWCD, Technical Service Area (area SWCD engineering), private.
- Financial: Federal Farm Bill, State Cost Share, MN Clean Water Fund, MN Pollution Control Agency programs, MN Department of Agriculture Loan program.

What areas of the county are high priority? Note areas identified on the Impaired Waters list for fecal or E-coli and nutrients. I believe for the Chippewa River Watershed, E-coli is a watershed wide issue in the county. Check if this is also true for the Hawk Creek Watershed. (For feedlot issues a Level III feedlot inventory would provide a prioritized list.) Also note – when seeking grant funding for these activities a riparian location will be a higher priority.

3. **Third Priority Concern: Drainage water management planning / drainage system maintenance and repair**

Why is it important the plan focus on this concern (include or cite relevant data)? According to the “2003 – 2012 Chippewa County Comprehensive Local Water Plan”, there are approximately 460 miles of county open public ditches (County and Judicial), in the County. Many of these systems probably date back to the early 1900s and require repair and maintenance. In many cases the systems were not designed for the current drainage volume. Private drainage of agricultural lands adds hundreds of miles of underground tile that tie to the county’s public system. The waters of these public (county) and private drainage systems make their way to streams and lakes, in turn impacting the water quality of these water resources.

Many counties are beginning to complete a systematic redetermination of benefits for each of their county drainage systems. Chippewa County should consider this also.

Drainage systems that require repair can make use of new drainage water management technologies that can aid in flood water control and water quality improvement as well as address the drainage needs for agriculture. Properly maintained drainage systems support the productive capability and erosion protection of soils.

What actions are needed?

- Continue and accelerate the promotion and marketing of conservation buffers.
- Continue to promote and market State and Federal conservation programs (RIM, CRP, WRP, etc.).
- Develop and implement a plan to complete a systematic redetermination of benefits for each county drainage system.
- Continue to use and update a GIS-based county-wide public drainage system inventory to be used to compliment management efforts and use as a tool for current and future water resources management efforts.
 - Inventory should include identifying systems that are overloaded, areas needing filter strips, potential wetland restorations, potential sites for controlled drainage, etc.
- Market and implement Drainage Water Management – Conservation Drainage bmps to land users.
- Select and assess several drainage systems to learn more about the water quality of each system.
- Overview the economic benefits and concerns of these selected systems.
- Identify areas of these systems that are overloaded and research the creation of water storage areas.
- Manage these systems at the watershed scale when repairs, maintenance or improvements are being considered.
- Seek out information from other county drainage authorities regarding management of their drainage systems.
- Establish a schedule of repair and maintenance for the drainage systems.
- Make use of technologies that aid in flood water reduction and water quality improvement in the design and implementation of public drainage system repair and maintenance.
- Provide information and assistance to private drainage system operators to include technologies used on public drainage systems.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

- Long-term set-aside programs such as RIM, CRP, WRP via local NRCS and SWCD office.
- Clean Water Fund application opportunities via County and local SWCD.
- Watershed projects, such as the Hawk Creek Watershed Project or Chippewa River Watershed Project.
- Utilize local ditch authority funding mechanism.
- University of MN Research and Outreach Centers (Waseca, Lamberton).
- MN Department of Agriculture / Conservation Drainage (contact Mark Dittrich).
- University of MN Agricultural Engineering Department.
- MN Board of Water and Soil Resources Drainage Engineering staff.

What areas of the county are high priority? County-wide application – but I would encourage some identification of several priority or targeted county drainage systems that will be your focus over the next 5 years. Where do you want to place emphasis in the next 5 years – I would identify it as part of this priority concern.

4. Fourth Priority Concern: Address accelerated runoff impacts via Wetland Restoration, Protection and Enhancement / Water Storage

Why is it important the plan focus on this concern (include or cite relevant data)? Like many other agricultural counties, most of the pre-settlement wetlands were drained beginning in the early 1900s (the start of public ditching) and probably reached its peak in the mid-1900s. This effort was for the purpose of land improvement. We now know that wetlands and flood plains provide for a wide range of functions including: helping to control flooding; purifying waters by recycling nutrients, filtering pollutants, and reducing siltation; controlling erosion; sustaining biodiversity and providing habitat for plants and animals; recharging groundwater, augmenting water flow, and storing carbon.

Gains have been made in restoring lost wetlands through the efforts of the local SWCD and NRCS offices: conservation programs and state/federal wetland protection programs. These efforts need to continue to balance ongoing land use demands from agricultural and development pressures. Retaining water on the landscape in the watershed by wetland protection and restoration, other water storage opportunities, and

restoring existing flood plain connectivity will help address priority concerns of erosion control and storm water quantity and quality.

What actions are needed?

- Continue and accelerate the promotion and marketing of wetland preservation and restoration programs (RIM, CRP, WRP, etc.) – develop a strategy / priorities for drained wetland restoration.
- Continue administering the MN Wetland Conservation Act.
- Continue educational efforts on the function and value of wetlands.
- Complete a drained wetland inventory and identify high priority areas for wetland restoration/enhancement.
- Continue administration of shore land and flood plain ordinances.
- Identify and target natural corridors to be enhanced or protected – increase/restore floodplain connectivity.
- Determine protection level for targeted areas through local ordinance development and voluntary conservation programs.
- Focus stream bank restorations in headwater areas.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

- Long-term set-aside programs such as RIM, CRP, WRP (Wetland Reserve Program) via local NRCS and SWCD office.
- Clean Water Fund grant opportunities.
- Wetland Inventory Guidebook - June 1991, available through MN BWSR and MN DNR (Dept. of Natural Resources).
- Example of county developed and adopted Comprehensive Wetland Management and Protection Plans; contact MN BWSR.

What areas of the county are high priority? This can be determined more thoroughly as inventories and assessments are completed. I would encourage some targeted watershed or sub watershed areas to be identified for this priority concern and 5 year implementation window.

Other Considerations.

When developing the county's Priority Concerns Scoping Document that will be distributed for state agency review and comment, don't forget to add a brief section that talks about implementing the County's ongoing programs and ordinances. Although these ongoing programs and ordinances may not be among the selected priority concerns for the next five or ten years, implementing them will work hand-in-hand with the selected priority concerns to protect and improve the natural resources of the county.

Note:

To have a useful, fundable plan (i.e. receive competitive grant funds) targeting and prioritization of priority concerns, and goals and actions will be needed. You will not be successful if your plan reflects implementation with a county wide or even watershed wide emphasis. A more targeted approach will be necessary!

Chippewa River Watershed
Water Plan Priority Concerns Input Form

Please save a copy and email to Matthew Johnson, Midwest Community Planning, LLC
midwestplanning@gmail.com

Your Agency/Organization: Chippewa River Watershed Project

Submitted by (name): Kylene Olson

1. Top Priority Concern: Surface Water Quality

Why is it important the plan focus on this concern (include or cite relevant data)? The Chippewa River has 14 reaches in Chippewa County listed on the impaired water list

What actions are needed? Erosion and sediment control, nutrient management, ag land management

What resources may be available to accomplish the actions? Clean Water Legacy funds, BWSR, state cost share, NRCS, EQIP, Water Plan, MPCA
(include contact names, funding sources, partnerships, citizen volunteers, etc.)

What areas of the Chippewa River Watershed are high priority? Mainstem of Chippewa River, Dry Weather Creek, Shakopee Creek (aka JD18), Lines Creek, Spring Creek and the county ditches

2. Second Priority Concern: Water Quantity

Why is it important the plan focus on this concern (include or cite relevant data)? Loss of wetlands, higher than normal flows, flooding which increases erosion

What actions are needed? Address runoff impacts, wetland restorations, upland storage, replace open tile intakes with alternative intakes

What resources may be available to accomplish the actions? Clean Water Legacy funds, BWSR, state cost share, NRCS, EQIP, Water Plan, MPCA
(include contact names, funding sources, partnerships, citizen volunteers, etc.)

What areas of the Chippewa River Watershed are high priority? Mainstem of Chippewa River, Dry Weather Creek, Shakopee Creek (aka JD18), Lines Creek, Spring Creek and the county ditches

3. Third Priority Concern: Soil erosion

Why is it important the plan focus on this concern (include or cite relevant data)? The Chippewa River is impaired for turbidity, lack of filter strips and wetlands

What actions are needed? BMPS targeting reduced runoff, wetland restorations, soil management, soil

health

What resources may be available to accomplish the actions? Clean Water Legacy funds, BWSR, state cost share, NRCS, EQIP, Water Plan, MPCA
(include contact names, funding sources, partnerships, citizen volunteers, etc.)

What areas of the Chippewa River Watershed are high priority? Mainstem of Chippewa River, Dry Weather Creek, Shakopee Creek (aka JD18), Lines Creek, Spring Creek and the county ditches

Hawk Creek Watershed
Water Plan Priority Concerns Input Form

Please save a copy and email to Matthew Johnson, Midwest Community Planning, LLC
midwestplanning@gmail.com

Your Agency/Organization: Hawk Creek Watershed Project

Submitted by (name): Heidi Rauenhorst

1. Top Priority Concern: turbidity (i.e. erosion and sedimentation, nutrients)

Why is it important the plan focus on this concern (include or cite relevant data)?

Waterways in the Hawk Creek Watershed do not meet water quality standards and have been placed on the 303(d) Impaired Waters List. The Hawk Creek Watershed continues to see increased water quantity and velocity.

What actions are needed?

BMPS such as streambank stabilizations, gully erosion, sediment control basins, and buffer strips, all of which reduce erosion, sedimentation, and excess nutrients.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

Grants from partner agencies (MPCA, BWSR, DNR, etc.) are utilized to implement BMPs and improve water quality. HCWP partners with many different organizations, such as SWCDs, NRCS, DNR, BWSR, counties, lake associations, and citizen volunteers, to accomplish our goals.

What areas of the Hawk Creek Watershed are high priority?

Turbidity, erosion, and sedimentation are issues throughout the Hawk Creek Watershed.

2. Second Priority Concern: Nutrient Loading (phosphorus and nitrogen)

Why is it important the plan focus on this concern (include or cite relevant data)?

Waterways in the Hawk Creek Watershed do not meet water quality standards and have been placed on the 303(d) Impaired Waters List. The Hawk Creek Watershed continues to see increased water quantity and velocity.

What actions are needed?

BMPs such as buffer strips, water retention ponds, bioreactors, urban runoff practices (rain gardens, rain barrels, pervious pavement), ag waste reduction, intakes (alternative, rock/blind), septic system upgrades, feedlot upgrades, livestock waste reduction practices, aquatic vegetation management, lakeshore buffers, runoff reduction practices, shoreland erosion control, lawn fertilizer reduction, and wetland management/restorations/enhancements address nutrient loading. Water quality monitoring is also needed to monitor the nutrient levels in the water and measure the effectiveness of BMP implementation.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

Grants from partner agencies (MPCA, BWSR, DNR, etc.) are utilized to implement BMPs and improve water quality. HCWP partners with many different organizations, such as SWCDs, NRCS, DNR, BWSR, counties, lake associations, and citizen volunteers, to accomplish our goals.

What areas of the Hawk Creek Watershed are high priority?

The entire Hawk Creek Watershed is a priority for nutrient loading.

3. Third Priority Concern: Civic Engagement

Why is it important the plan focus on this concern (include or cite relevant data)?

Public involvement is critical for HCWP to accomplish its goals. We rely on the cooperation and input from local landowners, producers, and citizens to implement BMPs and address water quality issues.

What actions are needed?

HCWP holds several meetings, including an annual meeting, public meetings, and local work group meetings, all in an effort to inform citizens of water quality issues and to learn from them what their concerns are in our watershed.

What resources may be available to accomplish the actions? (include contact names, funding sources, partnerships, citizen volunteers, etc.)

Grants from partner agencies (MPCA, BWSR, DNR, etc.) are used to hold meetings. HCWP partners with many different organizations, such as SWCDs, NRCS, DNR, BWSR, counties, lake associations, and citizen volunteers, to accomplish our goals.

What areas of the Hawk Creek Watershed are high priority?

Civic engagement and public involvement from everyone in the Hawk Creek Watershed is a priority.

Priority Concerns Scoping Document
Local Water Management Plan Update

Agency/organization **MN Department of Natural Resources**

Submitted by (name): **Skip Wright** (phone) **(320)796-6272** (email) **skip.wright@charter.net**

Submission deadline: **2-8-13**

1. The **{choose agency}** has reviewed the Priority Concerns Scoping Document for **Chippewa** county. The following is submitted for the Board's consideration regarding the priority concerns selected:
 - The agency **concur**s with the priority concerns identified.
 - The agency strongly **recommends** the following revision to the priority concerns identified, but does not require the revision: *(clearly identify the revision and provide an explanation of why it is recommended)* **_____**
 - The agency **does not recommend** the board approve the final plan unless the following concern (s) are identified in the water management plan: *(clearly identify the revision and provide an explanation of why it is recommended)* **_____**

2. The **{choose agency}** feels the process to identify the priority concerns was:
 - Commendable
 - Adequate
 - Inadequate. Please explain: **_____**

3. The **{choose agency}** would like to offer the following comments to be considered when drafting the local water management plan:

Please see attached comments from Area Hydrologist, Ethan Jenzen

DNR Ecological & Water Resources – Spicer Area
Serving Big Stone, Chippewa, Kandiyohi, Meeker, & Swift Counties
10590 Co Rd 8 NE, P.O. Box 457, Spicer, MN 56288
Phone: 320-796-2161 ext. 232 Ethan.Jenzen@state.mn.us

February 5, 2013

Skip Wright
DNR Ecological and Water Resources
DNR Comment Coordinator for Swift County PCSD

RE: Chippewa County Priority Concern Scoping comments

Skip,

Please accept the following as the priority concerns for Chippewa County in regards to the Priority Concern Scoping Document draft submitted December 7, 2013.

The top 5 priority water resource concerns/issues I have identified for Chippewa County are:

- 1.) Impacts of excessive runoff
- 2.) Unstable/altered hydrology
- 3.) Groundwater sustainability
- 4.) Feedlots/Manure/Fertilizer/Nutrient Management/Chemicals/Bacteria
- 5.) Degraded Habitat

The specifics of the concerns are as follows:

1.) The cumulative impacts of excessive/accelerated runoff due to loss of available surface water storage in wetlands.

- The loss/drainage of natural wetlands has drastically reduced available water storage on the lands surface, and increased and accelerated inputs into downstream systems.
 - Extensive loss of storage and hydrologic alteration including ditching, natural channel alteration, wetland drainage, and subsurface drainage system installation have fundamentally changed the flow regimes in many watersheds
 - Increased flood potential due to decreased lag time of water entering surface drainage systems, resulting in overall greater and more frequent high flow events, especially in larger systems.
 - Increased erosion in natural drainage systems due to accelerated runoff and more frequent flow events.
 - Potential impacts to public infrastructure due to increase flood potential, damage, and necessary remediation/repair
 - Negative impacts to watershed ecology through associated habitat minimization, degradation, or elimination related to wetland loss.
 - Headwater wetland loss and stream channelization lead to downstream system degradation.

- Actions needed
 - Strategically restore drained wetland areas, with priority given to larger systems and those located in headwaters areas, as well as riparian areas, such as floodplain wetlands
 - Headwater streambank restorations/re-meandering of channelized/ altered systems.
 - Monitor and/or manipulate existing degraded systems to increase system benefits.
 - Increase/restore existing floodplain connectivity to restore more natural stream function.
 - Accelerate shallow lake and stream habitat/restoration efforts.

2.) Unstable/highly altered hydrology leading to degraded surface water systems.

- The highly altered nature of natural hydrology in lake watersheds areas has drastically affected water quality in surface water systems.
 - Increased nutrient inputs into lake systems, resulting in water quality/clarity impacts.
 - Alteration to natural hydrology has increased water level variability/bounce in lakes and streams, resulting in degraded near shore vegetation/habitat
 - Cumulative impacts to larger systems, resulting in ecosystem degradation and habitat loss.
 - Increase frequency, intensity and duration of algal blooms, which also affect recreational perception of lakes.
 - Sediment and nutrient inputs from urban stormwater systems
- Actions needed
 - Generation of Shallow Lakes Management Plans to aid in targeting specific issues within individual lake watersheds and/or priority given to turbid systems with potential wildlife/fisheries habitat benefits
 - Additional buffering requirements/initiatives for surface water features, including waterways, ditches, surface intakes and drains, or day lighting tile systems and allowing flow through grass buffers prior to entering surface systems
 - Engage active civic entities (lake associations, watershed organizations, etc) to generate management plans for highly developed basins to include BMP's such as shoreland naturalization, wetland restoration and rain gardens.
 - Restore wetland storage areas upstream of basins to increase storage and attenuate surface runoff.
 - Ensure systems are in place for effective treatment of urban stormwater so discharge areas are unaffected.
 - Implementation of two-stage ditches and BMPs, including BMPs for sensitive and rare natural features, as defined by MN DNR.

3.) Groundwater Sustainability/Supply

- Increased groundwater utilization for a number of purposes, including municipal and private use, agricultural irrigation, and industrial/commercial purposes has placed increase stress on aquifer systems.
 - High yield uses such as agricultural irrigation are increasing, and sustainable use within these systems is difficult to determine.
 - During high use periods of over long periods of time, cumulative impacts on groundwater/surface water interaction may manifest in surface water systems, including effects on base flow in rivers and dry year water surface elevation impacts on wetlands.

- Increased use can lead to water use conflict, including well interference in domestic water supply, and has the potential to affect municipal supply in certain areas.
- Potential loss of system recharge areas due to diversion of recharge flows by extensive drainage systems.
- Increased industrial/commercial high yield use has placed pressure on already stressed systems.
- Actions needed
 - Identification of sensitive use area and groundwater management areas with existing high user density or limited supply.
 - Increased monitoring and analysis of sensitive areas to determine sustainable yield and compare to existing/potential use.
 - Chippewa County should join the Ground Water Atlas program.

4.) Feedlots/Manure/Fertilizer/Nutrient Management/Chemicals/Septic Systems

- Application of agricultural chemical and fertilizer over a large area of a watershed can definitely have effects on the area ecosystem if incorrectly applied or other factors, such as stormwater runoff and application timing is not considered. Improper application can lead to direct inputs to drainage systems, increasing nutrient loading, or toxicity of water.
- In addition, uncontained feedlots and non-conforming septic systems can contribute bacteria in the form of fecal coliform and E. Coli

5.) Degraded Habitat related to isolation/discontinuity of riparian habitat

- Fragmentation and partial/total loss of habitat in riparian areas has progressed with loss of wetland areas and discontinuity of waterway riparian corridor.
 - Loss of seasonal/ephemeral wetlands has limited existing smaller habitat blocks
 - Fragmentation of riparian corridor has limited contiguous habitat on many waterways.
 - Incision/erosion/flow variability/development on major systems has degraded the floodplain and riparian corridor, and can negatively impact the channel and limits habitat in riparian areas.
 - Lack of buffers on smaller systems
 - Sedimentation and/or erosion from altered hydrology has degraded aquatic habitat due to aggradation/degradation of the water resource.
- Actions needed
 - Targeted acquisition of riparian areas to create contiguous corridors of available habitat.
 - Buffer initiatives/survey to assure that all systems have buffers
 - Preserve, protect, and restore native plant communities in riparian corridors and buffers.
 - Wetland restoration and headwater streambank restoration/remeandering.
 - ENFORCE existing rules and regulations

The comments submitted are for the most part parallel to the priority concerns identified in the PCSD, however, I have placed added emphasis on groundwater management and sustainability than what is currently identified in the plan. Specifically, potential impacts to surface water systems

through groundwater withdrawal can be significant, including but not limited to decreased discharge during baseflow periods, which can have significant impacts and implications for aquatic life, habitat, and stream morphology.

In addition, the presence of invasive species is also a priority issue that should be included in the document. The recent discovery of zebra mussels in Lake Minnewaska in the upper portion of the Chippewa River Watershed has significant implications for downstream waters, which includes the majority of the Chippewa River mainstem and the Minnesota River. As these are substantial recreational resources, the implications of the presence of invasive species must be considered, including the increased potential for transport through those utilizing these resources.

Thank you for consideration of these comments. Please contact me if you have any comments, questions, or concerns with the materials that I have submitted.

Sincerely,
DNR Ecological and Water Resources,

Ethan Jenzen
Area Hydrologist