CHISAGO COUNTY LOCAL WATER MANAGEMENT PLAN

2013-2023

August 15, 2013

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ACKNOWLEDGEMENTS

Chisago County Board of Commissioners

District 1	Lora Walker
District 2	Rick Green
District 3	George McMahon
District 4	Ben Montzka
District 5	Mike Robinson

Water Plan Policy Team

John Eret	Citizen at Large
Diane Larkin	Citizen at Large
Joyce Marienfeld	Citizen at Large
Tom McKenzie	Citizen at Large (Chairman)
Craig Mold	Chisago Soil and Water Conservation District
Ann Norgaard	Chisago County Public Health
Mike Robinson	County Board
Kurt Schneider	Chisago County Zoning/Environmental Services
Frank Storm	Citizen at Large

Technical Advisory Committee

John Freitag	Minnesota Department of Health
Christopher Klucas	Minnesota Pollution Control Agency
Lynne Kolze	Minnesota Pollution Control Agency
Craig Mell	Chisago Soil and Water Conservation District
Mary Peterson	Minnesota Board of Water and Soil Resources
Robert Sip	Minnesota Department of Agriculture
Doug Thomas	Comfort Lake Forest Lake Watershed District
Craig Wills	Minnesota Department of Natural Resources

Staff to Water Plan Policy Team

Jerry Spetzman

EXECUTIVE SUMMARY

INTRODUCTION

Chisago County, located in east central Minnesota, approximately 35 minutes north of the Twin Cities metropolitan area, was established in 1851, seven years before Minnesota became a state. Chisago, the county name, comes from the Chippewa Indian word, Ki-Chi-Saga, which means Fair and Lovely Waters. Chisago County borders the St. Croix River to the east, and shares borders with Pine, Isanti, Anoka, and Washington Counties. The county seat, first at Taylors Falls, moved to Chisago City in 1865 and then to Center City in 1875, where it remains today.

Table 1: Population trends (US Census Bureau)

Year	Population	Percent Increase
1960	13,419	
1970	17,492	30.4
1980	25,717	47.0
1990	30,521	18.7
2000	41,101	34.7
2010	53,887	31.1

The Minnesota Planning State Demographic Center projects that by 2030, the population of Chisago County will be 69,540. This represents a 29% increase over 2010. This will accelerate development pressures.

A great majority of the land in Chisago County remains largely undeveloped, primarily in agricultural use, woodlands, or wetlands. The majority of development in the County has occurred in the southwest, along I-35 on the western side of the county, along Highway 8, and the Northern (Rush City) Lakes area.

Recently there has been a downturn in the housing market. It is anticipated that it will be several years before the housing market recovers.

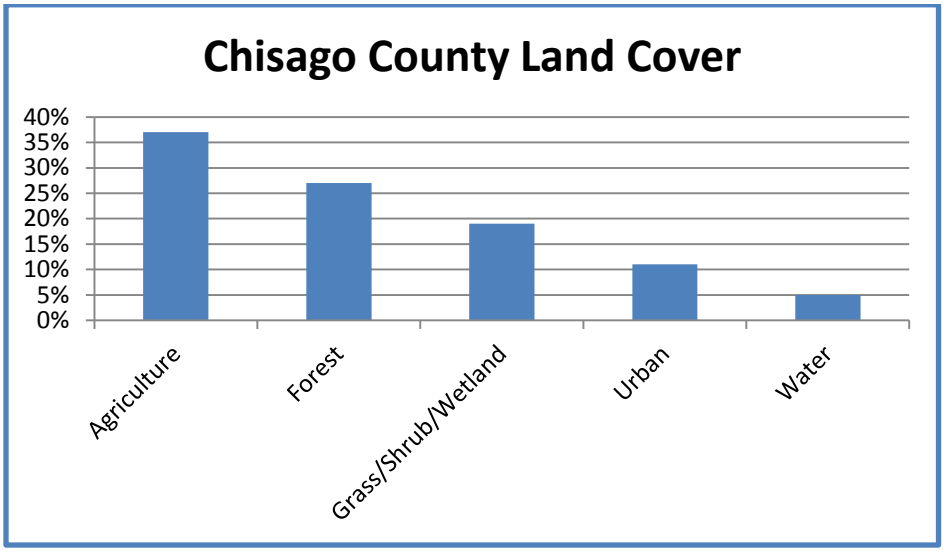
Minnesota Department of Natural Resources (DNR) owned land accounts for a large part of the County; Carlos Avery Wildlife Management Area, Wild River State Park, Interstate Park, and Chengwatana State Forest total over 15,500 acres, or 6%, of the total land area.

Chisago County (University of Minnesota 2000 Chisago County Land Cover and Impervious Surface Area) had the following percentages of land use:

Table 2: Chisago County Land Cover

Chisago County Land Cover	Acres	Percent
Agriculture	105,500	37%
Forest	77,100	27%
Grass/Shrub/Wetland	54,200	19%
Water	14,500	5%
Urban	31,800	11%
Total	**283,100**	**100%**

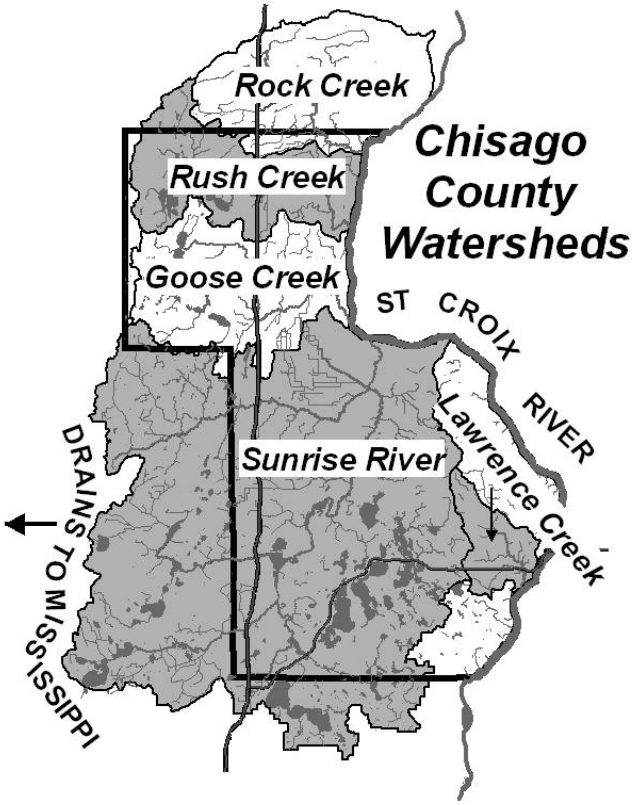
Figure 1: Chisago County Land Cover



Chisago County has abundant water resources. The DNR designates public waters to indicate which lakes, wetlands, and watercourses over which DNR Ecological and Water Resources has regulatory jurisdiction. The statutory definition of public waters includes public waters and public waters wetlands. Public waters are all waterbasins and watercourses that meet criteria set forth in Minnesota Statutes that are identified on Public Water Inventory maps authorized by Minnesota Statutes. Public water wetlands include all type 3, type 4, and type 5 wetlands (as defined in U.S. Fish and Wildlife Service Circular No. 39, 1971 edition) that are 10 acres or more in size in unincorporated areas or 2.5 acres or more in size in incorporated areas. Currently, DNR Waters utilizes scanned mylar county-scale maps printed on paper to show the general location of the public waters and public waters wetlands (lakes, wetlands, and watercourses) under its regulatory jurisdiction. These maps are commonly known as Public Waters Inventory maps. The DNR sets the regulatory "boundary" of these waters and wetlands as the ordinary high water level.

Chisago County is almost entirely in the St. Croix River watershed. Chisago County has been divided into multiple subwatersheds – Rock Creek, Rush Creek, Goose Creek, Sunrise River, Lawrence Creek, and direct drainage.

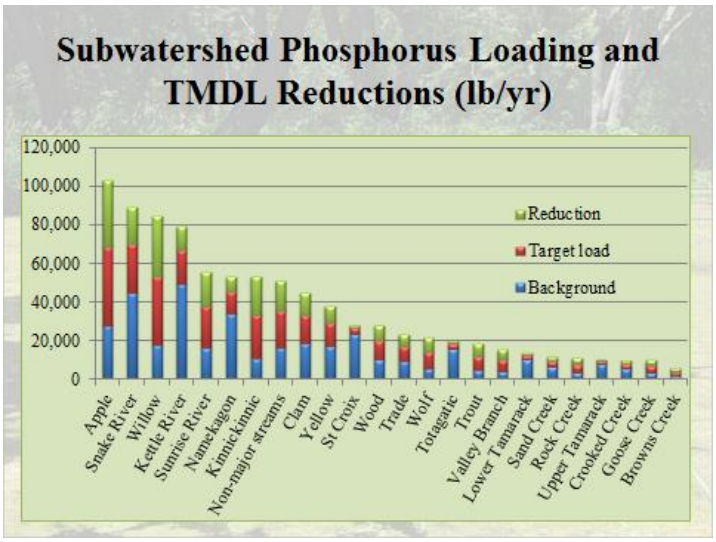
Figure 2: Chisago County Watersheds



Water runoff from Chisago County lands contribute to nutrient and sediment water quality concerns in the St. Croix River. A Total Maximum Daily Load study (TMDL) and Implementation Plan has been completed for Lake St. Croix. The TMDL allows for 46,000 pounds per year of phosphorus to be loaded to the St. Croix River from Chisago County. This requires 21,000 pounds per year of reduction from the estimated TMDL baseline load of 68,200 pounds per year in the early 1900s. Chisago County's required reduction ranks 3rd largest among the 19 counties in the St. Croix basin.

To achieve the St. Croix Basin Partners' goal of 20% reduction of phosphorus by 2020, Chisago County needs to reduce loadings by 16,200 pounds per year. To attain this goal, activities must be implemented that achieve an average annual rate of phosphorus reduction of 500 pounds per year over 30 years, or 1,600 pounds per year over 10 years.

Figure 3: Subwatershed Phosphorus Loading



Quantifying changes in phosphorus loadings to the St. Croix River since the TMDL baseline conditions of the early 1990s is difficult. With respect to agricultural practices, there have been several in Chisago County that have had a significant impact on phosphorus loading. The amount of animal agriculture has decreased dramatically. Farming practices have changed. In the 1990s it was common to see tillage practices that retained minimal residue on the field after harvest. Since then there have been significant improvements to tillage equipment, herbicides, and seed genetics that have resulted in an increase in residue retained on fields post-harvest which in turn lessens the amount of phosphorus in runoff.

Chisago County also has implemented a program to eliminate nearly 100% of septic systems characterized as "Imminent Threat to Public Health Septic Systems". However, many failing systems still exist throughout the county.

The State of Minnesota has passed legislation restricting the use of phosphorus in lawn fertilizer. This legislation has resulted in substantial reductions of phosphorus application to turf grass in Chisago County.

The Sunrise River in east-central Minnesota is a watershed and river system that has many impairments that affect water quality and aquatic biota. While the majority of the watershed is in Chisago County, portions of the watershed are in Isanti, Anoka, and Washington Counties. Within the St. Croix Basin, the Sunrise River (with approximately 5% of the land area) is one of the larger contributors of phosphorus and sediment to the St. Croix River. In fall 2007, a joint multi-agency effort was initiated to perform a detailed watershed study of aquatic resources of the Sunrise River Basin. The primary partners of this study include the US Army Corps of Engineers, Minnesota Pollution Control Agency, and Chisago County.

The objective of the Sunrise River Watershed Study is to prepare a plan for watershed management that provides the technical basis for future management of aquatic resources including wetlands. Key issues the group is evaluating include water quality, nutrient and sediment loading, stream stability and erosion, aquatic habitat conditions, and management of wetland resources. The study includes evaluation of how land use and projected future population growth influences these key resource issues, how future land use might be better managed, and the potential economic cost for such management actions. The results will be used by water managers to guide management decisions that will benefit the Sunrise River and the downstream St. Croix River.

BACKGROUND OF WATER PLAN PROCESS

Responsible Local Unit of Government

The Chisago County Board of Commissioners adopted Resolution No. 11/1019-1 – **Authorization to revise and update the Chisago County Comprehensive Water Management Plan** on October 19, 2011. This resolution is authorized under Minnesota Statutes, Chapter 103B.301, the Comprehensive Local Water Management Act.

The resolution states that the Chisago County Board of Commissioners delegates to the Chisago County Environmental Services/Zoning Department the responsibility of coordinating, assembling, writing, and implementing the revised local water management plan pursuant to M.S. 103B.301 as implemented through the Water Plan Policy Team (Policy Team).

The Policy Team consists of five citizen members (appointed by the Chisago County Board of Commissioners), one supervisor from the Chisago Soil & Water Conservation District, one County Commissioner, and the Director of Chisago County Zoning/Environmental Services. In addition, the Policy Team is supported by the Technical Advisory Team, which is made up of representatives from Chisago County Public Health, Chisago Soil & Water Conservation District, Comfort Lake Forest Lake Watershed District, Minnesota Board of Water & Soil Resources, Minnesota Department of Natural Resources, and the Natural Resources Conservation Service.

Water Plan administration and Policy Team coordination is overseen by the Chisago County Water Resource Manager.

The adopted resolution states that the Policy Team shall coordinate its effort in the revision and update of the Water Plan with all local units of government within Chisago County along with the state review agencies.

The resolution also states that the Policy Team shall incorporate into the water plan, where appropriate, any existing plans and rules that have been developed and adopted by watershed districts having jurisdiction wholly or partly within Chisago County.

Local Water Management Plan Adoption and Updates

First Chisago County Water Plan Adopted – January 19, 1993
First Update 1998 – 2002
Second Update 2006 - 2011
Amendment – August 27, 2009
Amendment 2010 to 2013 – March 4, 2010

Expiration Date of Current Plan

September 27, 2013

PURPOSE OF THE LOCAL WATER MANAGEMENT PLAN

Purpose

The purpose of the Chisago County Local Water Management Plan is to set County watershed priorities. The County will use these priorities to obtain and use resources to protect, improve, and conserve water resources in Chisago County including lakes, rivers, wetlands, and groundwater.

The Local Water Management Act of Minnesota (Minn. Stat. 103B.301 to 103B.355) states that the following guidelines will be met in this document.

1. The plan must cover the entire county.
2. The plan must address problems in the context of watershed units and groundwater systems.
3. The plan must be based upon principles of sound hydrologic management of water, effective environmental protection, and efficient management.
4. The plan must be consistent with local water management plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or groundwater system.
5. The plan must cover a five or ten year period. Chisago County has decided to develop a plan which will address the concerns of Chisago County for the next 10 years (2013-2023). The Implementation Plan will focus on 2013-2018.

Vision

Surface and groundwater quality and quantity in Chisago County is preserved, protected, restored, and enhanced for current and future generations.

Mission

Develop, update, and oversee implementation of the Chisago County Water Plan.

PAST ACCOMPLISHMENTS AND ONGOING ACTIVITIES

Chisago County has been very successful in competing and obtaining multiple state and federal grants for projects and practices to improve water quality. Many Clean Water Act Section 319, Clean Water Legacy, and US Department of Agriculture grants have been secured. In addition to local funding, these dollars have allowed Chisago County to complete many action items identified in the previous Water Plan.

Among other highlights, Chisago County leads the state in identifying and upgrading Imminent Threat to Public Health Septic Systems, completing watershed assessments, and installing water protection practices.

Below is a summary of accomplishments and ongoing activities under the previous Water Plan. These are organized by priority concerns.

Priority Concern: Reduce phosphorus loading from Chisago County to the St. Croix River to help meet 20% basin wide goal.

- In partnership with the St. Croix Basin Team, a point and non-point source nutrient loading study has been completed.
  Lead local agency – St. Croix Science Museum Research Station

- Staff participates in the St. Croix Basin Team.
  Lead local agency – Chisago County

- A Soil and Water Assessment Tool for the Sunrise River watershed has been developed.
  Lead local agency – St. Croix Science Museum Research Station

- A partnership has been formed between Chisago County, US Army Corps of Engineers, and Minnesota Pollution Control Agency to develop and implement a watershed based plan and strategies for water quality and aquatic ecosystem management, restoration, and protection. The Plan is anticipated to be complete spring 2013.
  Lead local agency – Chisago County

- An inventory of the St. Croix River escarpment for gully erosion concerns from Wild River State Park south to the Chisago/Washington County line has been completed. In fiscal year 2012 the Soil and Water Conservation District has secured Clean Water Funds to install Best Management Practices to correct gully erosion concerns in this region.
  Lead local agency – Chisago Soil & Water Conservation District

• In Fiscal Year 2011, Clean Water Funds were used to incorporate water smart Best Management Practices at the Chisago Lakes Middle School, Rush City High School, and the Wyoming Public Library. Additional best management practice projects have been completed throughout the Chisago Lakes Chain of Lakes watershed at Linden Street in Lindstrom and the Chisago County Government Center.

Lead local agency – Chisago Soil & Water Conservation District

• Each year, 20-30 agricultural related water quality improvement projects are completed utilizing Federal Funds.

Lead local agency – Chisago Soil & Water Conservation District & Natural Resources Conservation Service

• A partnership has been formed with the Minnesota Agricultural Water Resources Coalition to install a Discovery Farm site in Chisago County. The Discovery Farm is an innovative watershed project designed to engage agriculture and other members of the watershed community in improving and protecting water quality.

Lead local agency – Chisago Soil & Water Conservation District

• The Kost Dam road impairment project was completed in 2012 which reduced stormwater runoff into the Sunrise River.

Lead local agency – Chisago Soil & Water Conservation District

Priority Concern: Implement projects and practices recommended in the North Branch Sunrise River Restoration and Protection Plan.

• Imminent Threat to Public Health Septic Systems have been identified and upgraded within the Shoreland Zone in Isanti County, in the City of North Branch, and the Chisago County portion of the watershed.

Lead local agency – Chisago County

• Livestock producers in the County are being contacted by Soil and Water Conservation District staff and best management practices are being installed to reduce runoff from livestock production into water resources.

Lead local agency – Chisago Soil & Water Conservation District

Priority Concern: Implement projects and practices recommended in additional Restoration and Protection plans.

- The following Total Maximum Daily Load Watershed Restoration and Protection Plans have been completed or are in progress:

  Comfort Lake Forest Lake Watershed District 6 Lakes (Completed)
  Lead local agency – Comfort Lake Forest Lake Watershed District
  Chisago Lakes Chain of Lakes (Completed)
  Lead local agency – Chisago Soil & Water Conservation District
  Chisago Lakes Lake Improvement District
  North Branch Sunrise River (Completed)
  Lead local agency – Chisago County
  Sunrise River (Scheduled to be completed 2014)
  Lead local agency – Chisago Soil & Water Conservation District

- The Rock/Rush/Goose Creeks Restoration and Protection Plan is scheduled for completion in 2014.
  Lead local agency – Chisago Soil & Water Conservation District

- A County wide lake water quality monitoring program is in place.
  Lead local agency – Chisago County

- A Regional Stormwater Management Facility in a ditch leading to the Sunrise River downstream of the City of Forest Lake is being developed. The Facility will help correct problems related to excess nutrient and sediment loads to the Sunrise River and Comfort Lake.
  Lead local agency – Comfort Lake Forest Lake Watershed District

- County, township, and city public works departments are working to maximize the efficiency of the use of road maintenance products while protecting public safety and minimizing harmful effects to water quality.
  Lead local agency – Local Public Works Departments

- The Rush Lake Improvement Association is researching the use of iron concentrate to bind phosphorus in lake sediment.
  Lead local agency – Rush Lake Improvement Association

- A partnership is being formed to work within the Carlos Avery Wildlife Management Area to better understand the impacts pool draw-downs have on the Sunrise River.
  Lead local agency – Chisago Soil & Water Conservation District

Priority Concern: Expand obligations of the Chisago County Subsurface Sewage Treatment System Pilot Program.

- The Chisago Lakes Joint Sewage Treatment Plan is accepting and treating holding tank waste and septage as alternatives to land application.
  Lead local agency – Chisago Lakes Joint Sewage Treatment Commission

- As a result of the Pilot Program:
  - 4,752 septic system evaluations were conducted by County inspectors
  - 429 systems determined to be imminent threat to public health (9%)
  - All known imminent threat to public health systems are now compliant
  - Financial assistance is provided to low income property owners that install or update systems
  - 175,050 gallons of untreated sewage is prevented from impacting the environment every day
    = 29 milk trucks carrying 6,000 gallons EACH DAY or
    = an Olympic sized swimming pool every 3.4 DAYS

  Lead local agency – Chisago County

- Community Wastewater Treatment Systems are being developed for unsewered Rural Village Centers in Almelund, Sunrise, Palmdale, Rush Point, and Stark.
  Lead local agency – Chisago County

- Voluntary septic system inspections by County staff are offered to residents within shoreland areas throughout Chisago County.
  Lead local agency – Chisago County

Priority Concern: Continue the Abandoned Well Sealing Program for protection of groundwater resources.

- The Chisago County Geologic Atlas has been completed. The County Hydrogeologic Atlas is expected to be completed in 2013.
  Lead local agency – Chisago County

- Wellhead Protection Plans have been completed for Rush City, Harris, Lindstrom, Center City, Taylors Falls, and Hazelden Foundation in Center City.
  Lead local agency – Local Communities, Minnesota Department of Health

- Nitrate Testing Clinics are held annually in different locations in Chisago County.
  Lead local agency – Chisago County

- Drinking Water Test Kits are available to citizens.
  Lead local agency – Chisago County Public Health
  Chisago Soil & Water Conservation District

Priority Concern: Implement Stormwater Management Standards and erosion control projects in developing areas, especially the Chisago Lakes Lake Improvement District.

- Center City, Chisago City, and Lindstrom have been selected as pilot communities to develop and implement Minimal Impact Design Standards in land use ordinances.
  Lead local agency – Local Communitie
  Chisago Lakes Lake Improvement District

- Stormwater Retrofit Assessments have been completed for the communities of Center City, Chisago City, and Lindstrom. As a result of the Assessments, numerous stormwater Best Management Practices are being installed.
  Lead local agency – Chisago Soil & Water Conservation District

- Shoreland Best Management Practices and lakeshore restorations are being installed within the Chisago Chain of Lakes.
  Lead local agency – Chisago Soil & Water Conservation District

- Prior to and during construction, inspections and assessments take place to ensure that conditions placed on plats are fulfilled, especially relating to erosion control, stormwater protection, and wetland compliance.
  Lead local agency – Chisago County

- The Chisago Lakes ditch and weir system is properly maintained to control water levels during high water events.
  Lead local agency – Chisago Lakes Lake Improvement District

Priority Concern: Provide information, education, and training on water quality concerns.

- The county wide Chisago Children's Water Festival takes place on an annual basis. Over 7,000 5th grade students have attended the festival over the past 10 years.
  Lead local agency – Chisago County
  Chisago Soil & Water Conservation District

- Each year, approximately 400 Septic System Owners Guides are mailed to owners of new homes or replacement systems.
  Lead local agency – Chisago County

- Twice each year, the Environmental Connections Newsletter is distributed to property owners throughout the county. Each issue has articles on water quality and environmental stewardship.
  Lead local agency – Chisago County

• At least once each year, Chisago Soil & Water Conservation District distributes a newsletter on natural resources throughout the county.

Lead local agency – Chisago Soil & Water Conservation District

• Frequently, Conservation Notes articles are submitted to local newspapers.

Lead local agency – Chisago Soil & Water Conservation District

• Chisago County is an active participant in the PICKM (Pine, Isanti, Chisago, Kanabec, Mille Lacs) Alliance of Lake and River Associations.

Lead local agency – Chisago County

• The PICKM Alliance of Lake & River Associations sponsors semi-annual education opportunities for lakeshore residents.

Lead local agency – PICKM Alliance of Lake & River Associations

• Non Point Education for Municipal Officials (NEMO) training events are offered to municipal officials within the Chisago Lakes watershed.

Lead local agency – Chisago Lakes Lake Improvement District

• In partnership with the Minnesota Department of Natural Resources, watercraft inspections and education on aquatic invasive species take place at public water accesses throughout the County.

Lead local agency – Chisago Lakes Lake Improvement District
Comfort Lake Forest Lake Watershed District

PRIORITY CONCERNS TO BE ADDRESSED

The following Priority Concerns have been adopted by the Chisago County Water Plan Policy Team and are addressed in this plan.

> A Priority Concern is to protect the quality and quantity of groundwater used for drinking water.
>
> A Priority Concern is the introduction or spread of aquatic invasive species and their negative effect on water quality, navigation, recreation, or fisheries.
>
> A Priority Concern is septic systems that are failing, noncompliant, or an Imminent Threat to Public Health.
>
> A Priority Concern is the influence of agricultural, rural, and urban land use practices on water quality.
>
> A Priority Concern is that citizens and elected officials receive accurate and understandable information to make informed decisions.
>
> A Priority Concern is to obtain sufficient resources to achieve goals established in the Water Plan.

Summary of Goals and Objectives

The table below is a summary of the estimated timeline and potential resources needed to fully implement the Water Plan. These estimates are for planning purposes only and are not intended to be a commitment by Chisago County or partner resource agencies. Detailed information on specific goals and objectives can be found in the appendix.

Table 3: Summary of Goals and Objectives Costs in dollars

	2014	2015	2016	2017	2018	Totals
Protect Quality & Quantity of Groundwater	20,500	45,500	45,500	60,500	60,500	**232,500**
Aquatic Invasive Species	70,000	85,000	85,000	85,000	85,000	**41,0000**
Non-compliant Septic Systems	196,000	196,000	176,000	176,000	176,000	**920,000**
Land Use Practices	1,960,500	1,963,000	1,863,000	1,853,000	1,823,000	**9,462,500**
Make Informed Decisions	110,000	130,000	160,000	140,000	140,000	**680,000**
Sufficient Resources	140,000	140,000	140,000	140,000	135,000	**695,000**
Totals	**2,497,000**	**2,559,500**	**2,469,500**	**2,454,500**	**2,419,500**	**12,400,000**

Figure 4: Summary of Five Year Estimated Cost of Goals and Objectives in Dollars

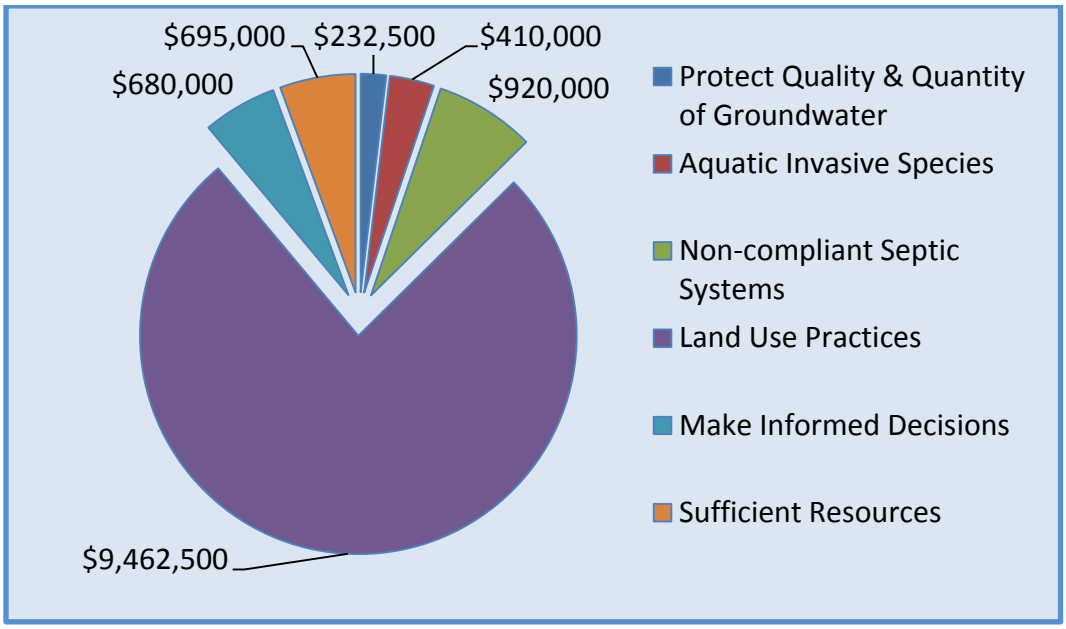
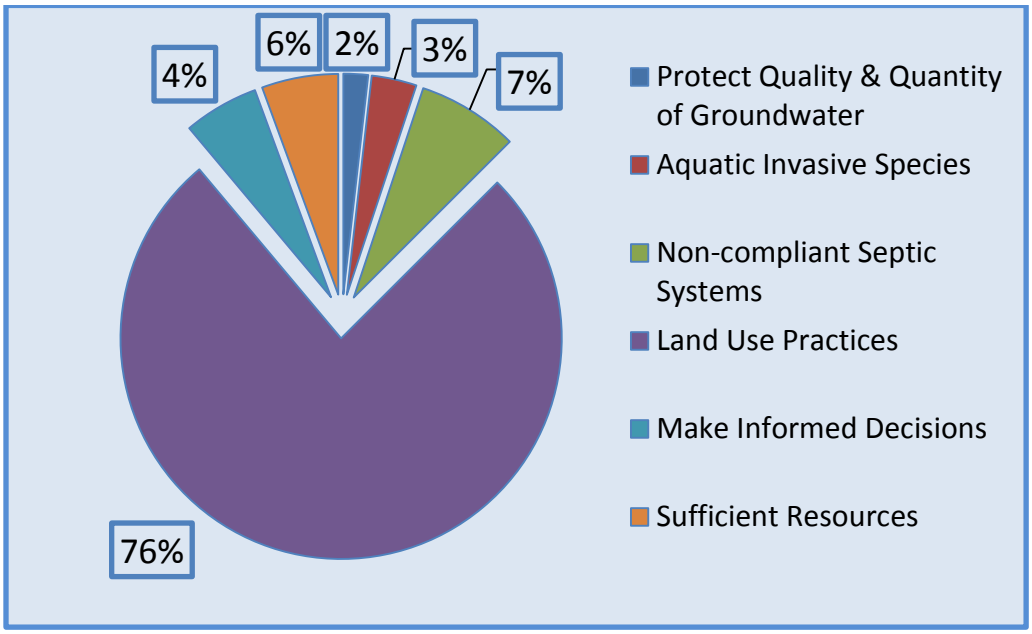


Figure 5: Summary of Five Year Estimated Cost of Goals and Objectives by Percentage



Participants in previous Water Plan activities have been very successful in obtaining state and federal resources for plan implementation. It is anticipated that this success will continue into the future.

CONSISTENCY OF THE PLAN

The Chisago County Local Water Management Plan is consistent with other pertinent state, county, regional, and other local plans. There are no recommended amendments or potential conflicts with official controls at this time.

ASSESSMENT OF PRIORITY CONCERNS

The Priority Concerns of Chisago County water resources have been expressed by residents, Water Plan Policy Team members, and agency input. All comments and descriptions of the concerns have been documented in the Priority Concerns Scoping Document located in the Appendix of this plan.

PROTECT QUALITY AND QUANTITY OF GROUNDWATER

A Priority Concern is to protect the quality and quantity of groundwater used for drinking water.

Water, both surface water and groundwater, is one of the most precious resources in Chisago County. It nourishes communities, maintains crops, offers recreational opportunity, provides aesthetic beauty, and sustains life. Groundwater provides drinking water to all of Chisago County. However, groundwater and surface water cannot always be considered as separate resources. Groundwater discharge to surface waters allows streams to flow beyond rain and snowmelt periods and sustains lake levels during dry spells (http://www.dnr.state.mn.us/groundwater/index.html) In some settings, as in parts of Chisago County, surface water lakes and wetlands provide recharge to groundwater. Effective land and water management requires an understanding of the interaction between groundwater and surface water. **(PCSD Attachment 8: Chisago County Hydrogeologic Atlas Preliminary Findings June, 2012).**

To better understand the geology and groundwater resources of Chisago County, the Chisago County Geologic Atlas is currently under development with an anticipated completion date of 2013. This is a cooperative project of the Minnesota Department of Natural Resources, Minnesota Geological Survey, and Chisago County. The Chisago County Geologic Atlas is a systematic study of the county's geologic and groundwater resources. Geologic mapping (Part A), conducted by the Minnesota Geologic Survey, was published in 2010. Groundwater resource evaluation (Part B) is currently being conducted by the Minnesota Department of Natural Resources. The Part B atlas for Chisago County is expected to be published in 2013. **(PCSC Attachment 7: Project Update Chisago County Geologic Atlas, 2012)**

The maps, databases, and other information in the atlas are being used by counties and other levels of government in planning and environmental protection efforts. Atlases support good decision making for permit applications, land management planning, and the use and protection of natural resources. Examples of programs that benefit from atlas information include water planning, wellhead protection, lake management, site assessments such as septic assessments, and land use/development planning. Atlases are additionally used by consultants, engineering firms, educators, and the public to better understand groundwater resources.

Below is a preliminary findings summary of Part B, Hydrogeology and Pollution Sensitivity of the Chisago County Geologic Atlas **(PCSD Attachment 8: Chisago County Hydrogeologic Atlas Preliminary Findings June, 2012)**. Also provided as an attachment is a map of the bedrock aquifers in Chisago County including the Mt. Simon and Hinckley aquifers **(PCSD Attachment 9: Chisago County Bedrock Aquifers, 2012)**. The approach to near surface sensitivity to pollution is being reviewed and once complete, maps showing sensitivity to pollution will be developed.

Groundwater is generally extracted from two different geologic settings that exist across the county. Wells typically either penetrate saturated sand and gravel units (sand and gravel aquifers) or penetrate deeper saturated bedrock units (bedrock aquifers).

The following communities extract water from bedrock aquifers (information provided by the Minnesota Department of Health) as of June 11, 2012.

Table 4: Community Water Supplies

Community Public Water Supplies within Chisago County	
Population Served	
Center City	629
Chisago City	3,800
Harris	378
Lindstrom	4,442
North Branch	6,145
Rush City	3,072
Stacy	1,357
Shafer	861
Taylors Falls	976
Wyoming	3,540
Total	**25,200**
Community Public Water Supplies within Sunrise River watershed	
Population Served	
Columbus	35
East Bethel	105
Forest Lake	9,621
Scandia	35
Total	**9,796**
No record of having a community public water supply	
Almelund	
Ham Lake	
Linwood Township	

The high water yield demanded by municipalities often requires them to construct wells in deeper bedrock aquifers. In general, the added distance from the surface to these aquifers can provide the end user with an aquifer less susceptible to contamination from human activities. Chisago County does not predict a large increase in groundwater appropriations.

Wellhead Protection/Drinking Water Protection

Wellhead protection is a method of preventing contamination of a public water supply well by effectively managing potential contaminant sources in the area that contributes water to a public water supply well. The primary goal of Wellhead Protection is to protect public health.

A very clear benefit of Wellhead Protection is the emphasis on the prevention of drinking water contamination versus the remediation of a contaminated drinking water supply well. The cost of prevention is much less than the cost of remediation.

Wellhead Protection is mandated under the Federal Safe Drinking Water Act for public water suppliers. The Minnesota Department of Health has overall statutory authority over Wellhead Protection as granted through the Minnesota Groundwater Protection Act. Wellhead Protection is science based and identifies the water source along with vulnerability to contamination threats. The resultant plan identifies specific activities designed to protect the aquifer/water source. These activities can include groundwater education, land use planning, best management practices, and abandoned well sealing. Plan implementation is required and not optional. Minnesota Department of Health will audit community Wellhead Protection efforts. Financial support is available from the Minnesota Department of Health to communities to support Wellhead Protection activities.

All public water suppliers in Chisago County are required to implement Wellhead Protection measures. Many communities in Chisago County and the greater Sunrise River watershed are at various points in the process to develop Wellhead Protection Plans. Rush City, Harris, Lindstrom, Center City, Taylors Falls, Forest Lake, and Hazelden Foundation have completed Wellhead Protection Plans. Plans for North Branch, Stacy, Wyoming, Chisago City, and Shafer are in the process of completing Wellhead Protection Plans. **(PCSD Attachment 10: Wellhead Protection Areas, 2012)**

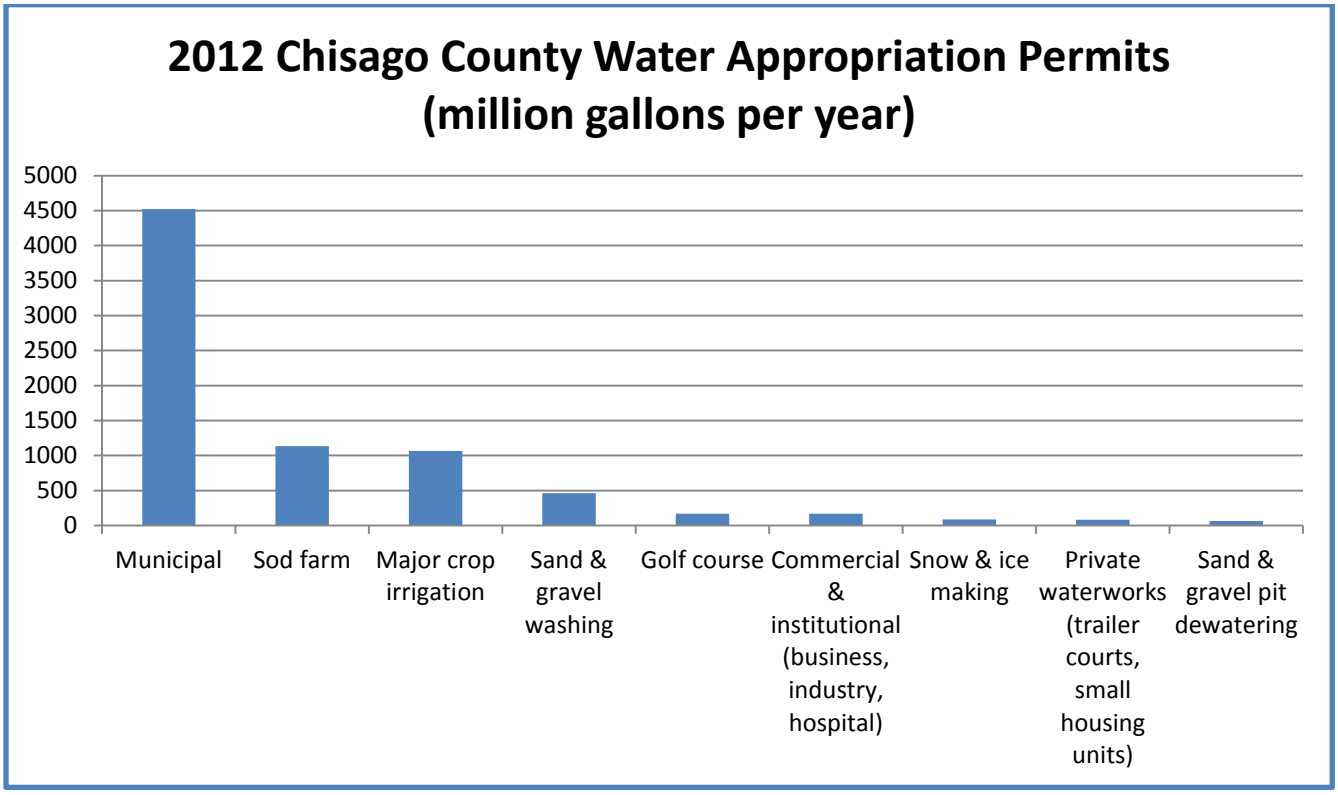
Water Use Appropriation Permits

A Water Use (appropriation) permit for Chisago County from Minnesota Department of Natural Resources is required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year, surface or groundwater. **(PCSD Attachment 11: DNR Water Use Appropriation Permits, 2012)** All active water appropriation permit holders are required to measure monthly water use with an approved measuring device to an accuracy of 10 percent and report water use yearly.

There are several exemptions to water appropriation permit requirements:
• domestic uses serving less than 25 persons for general residential purposes,
• test pumping of a groundwater source,
• reuse of water already authorized by a permit (e.g. water purchased from a municipal water system, or
• certain agricultural drainage systems.

The following is a summary of the 2012 Chisago County water appropriation permits **(PCSD Attachment 12: Chisago County Appropriation Permits, 2012)**. The information is provided in million gallons per year. The primary permitted use is for municipal water supplies. This is followed by agricultural production and sod farming. Smaller amounts of water are appropriated for sand and gravel washing, golf course irrigation, commercial and industrial, snow and ice making, private water works, and sand and gravel pit dewatering.

Figure 6: Chisago County Water Appropriation Permits



The above chart shows the amount of water permitted. It does not, however, show actual water usage, which is typically less than the permitted amount.

Well Interference Resolution Process

The Minnesota Department of Natural Resources has a well interference resolution process. Most well interference problems tend to be localized and short in duration, but being without water is a major inconvenience and can cause damage to well pumps. Some problems can be resolved by lowering the pump in the well or installing a new well pump.

Minnesota Statutes 103G.261 established domestic water use as the highest priority of the state's water when supplies are limited. The following is a listing of water use priorities:

1. The first priority is domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets the contingency planning provisions of section 103G.285, subdivision 6;
2. The second priority is a use of water that involves consumption of less than 10,000 gallons of water per day;
3. The third priority is agricultural irrigation, and processing of agricultural products involving consumption in excess of 10,000 gallons per day;
4. The fourth priority is power production in excess of the use provided for in the contingency plan developed under section 103G.285, subdivision 6;
5. The fifth priority is uses, other than agricultural irrigation, processing of agricultural products, and power production, involving consumption in excess of 10,000 gallons per day; and
6. The sixth priority is nonessential uses.

Groundwater Level Monitoring

Since 1944, the DNR has managed a statewide network of water level observation wells to collect baseline data on groundwater level fluctuations and trends. Data from these wells are used to assess groundwater resources, determine long term trends, interpret impacts of pumping and climate, plan for water conservation, evaluate water conflicts, and otherwise manage the water resource.

AQUATIC INVASIVE SPECIES

A Priority Concern is the introduction or spread of aquatic invasive species and the negative effect on water quality, navigation, recreation, or fisheries.

Aquatic invasive species pose an ever increasing threat to the health of Chisago County water resources. Aquatic invasive species can be plants, animals, or diseases that are not native to Minnesota and cause economic or environmental harm or harm to human health.

Minnesota's natural resources are threatened by a number of invasive species such as zebra mussels, Eurasian watermilfoil, common buckthorn, and emerald ash borer. Invasive species can occur on land or in the water. The Minnesota Department of Natural Resources works to help prevent the spread and promote the management of invasive species. Statewide information on aquatic invasive species can be found at the Minnesota Department of Natural Resources web site at www.dnr.state.mn.us/invasives/index.html

Invasive aquatic plants are introduced non-native plant species that have adapted to living in, on, or next to water and cause harm to native ecosystems. They can grow either submerged or partially submerged in water. Invasive aquatic animals require an aquatic habitat for at least part of their life cycle, but do not necessarily need to live entirely in water.

Aquatic invasive plants and animals threaten native species and aquatic ecosystems; interfere with municipal, commercial, and agricultural water supply and distribution; and impair water recreation activities. In their native environments, aquatic invasive species populations are typically held in check and controlled by predators, parasites, pathogens, or competitors. However, when they take hold in a new environment, the natural checks are usually left behind. This gives invasive plants and animals an advantage over native species and makes them very difficult to control.

Prevention is the key to controlling the spread of aquatic invasive species. It is much less costly to prevent an introduction than to eradicate an already introduced species. In most cases, it is impossible to completely eradicate a species once introduced.

There are several aquatic invasive species that are of particular concern to Chisago County lakes and rivers. Depending upon the species, aquatic invasives have varying degrees of negative impact on water quality, fisheries/wildlife and recreation (surface use). The following chart illustrates the impact.

Table 5: Aquatic Invasive Species

AQUATIC INVASIVE SPECIES	AREA OF IMPACT (negative)		
	WATER QUALITY	FISHERIES/WILDLIFE	RECREATION (surface use)
Asian Carp (Bighead & Silver)	x	x	x
Common Carp	x	x	
Curlyleaf Pondweed	x		x
Eurasian Watermilfoil		x	x
Flowering Rush			x
Rusty Crayfish	x	x	
Spiny Water Flea	x	x	
Zebra/Quagga Mussel	x	x	x

The following statements provide an update on the current status of aquatic invasive species in Chisago County.

• Common carp and curlyleaf pondweed are commonly found in Chisago County lakes and rivers.

• As of 2013, rusty crayfish, spiny water flea, zebra/quagga mussels, and Asian carp have not been found in Chisago County.

• Eurasian watermilfoil is spreading throughout most of the larger lakes in Chisago County. These lakes include Rush, Fish, North Center, South Center, North Lindstrom, South Lindstrom, Chisago, Green, Little Green, Ellen, and Bone. It also is found in Coon Lake in Anoka County, which is part of the greater Sunrise River watershed **(PCSD Attachment 13: Aquatic Invasive Species, 2012).**

• Flowering rush can be found in Forest Lake, which is in the Sunrise River watershed.

NONCOMPLIANT SEPTIC SYSTEMS

A Priority Concern is septic systems that are failing, noncompliant, or an imminent threat to public health.

Chisago County has been a statewide leader in septic repair and replacement since 2005, when the County conducted a Pilot Program to find all systems that were an Imminent Threat to Public Health. During the Pilot Program, Chisago County Environmental Services staff walked 4,752 properties under the County's jurisdiction and found 429 systems that were an Imminent Threat to Public Health (9% of all systems). All of these systems have since been replaced.

Chisago County received a Certificate of Achievement from the Commissioner of the Minnesota Pollution Control Agency for the accomplishments completed as part of the Pilot Program.

In the years 2005 – 2011, Chisago County conducted 1,175 inspections to determine the compliance of individual septic systems. Of those inspections, 65% of the systems were compliant, meeting State and County regulations, and 35% were noncompliant. Noncompliant systems are either an Imminent Threat to Public Health (surfacing to the ground or directly into surface water) or failing to protect groundwater by not meeting the required separation distance between the septage and groundwater.

With a noncompliance rate of 35% of all systems inspected, much work remains to be done to lessen the impact to water quality from failing septic systems. According to the County's septic ordinance, any septic system that fails a compliance inspection must be replaced. The most pressing need to facilitate replacement of noncompliant systems is to assist low income property owners with funding.

During the Pilot Program, it was discovered that many residents need assistance in funding the replacement of their systems. Environmental Services staff developed, and the County Board approved, a county septic loan program. The County has approved more than 30 such loans since the inception of this program.

In 2010, the County received additional Clean Water Legacy grant funding to assist low income homeowners with septic replacement. All those funds have been spent. An additional grant was awarded to Chisago County to conduct compliance inspections and assist with septic pumping fees in shoreland areas under the County's jurisdiction. To date, more than 200 property owners have taken advantage of this program. Chisago County will continue to seek Clean Water Legacy funding for this purpose.

Chisago County's emphasis in conducting inspections and replacing septic systems is due to the following primary reasons:

• All of the drinking water in the County comes from groundwater. Septic systems that are not meeting current standards for operation can contaminate groundwater with pollutants that are harmful to public health. Of particular concern is fecal coliform, which causes illness to both humans and animals.

• The Minnesota Pollution Control Agency has placed many of the lakes and streams in the County on the impaired waters list. Septic systems that do not meet State standards can leach septage directly to surface water, or through a groundwater to surface water connection, thus contributing to the impairment of the water body.

• Chisago County's mission is to protect the health, safety, and welfare of the public. It is essential that the County continue to work toward the repair and replacement of Imminent Threat to Public Health and failing septic systems to fulfill that mission. Providing financial assistance to homeowners through State grants or the County's septic loan program is a key factor in the success of that mission. Additional funding is needed to assist homeowners with the repair or replacement of their septic systems. The financial need outweighs the funding available at this time.

LAND USE PRACTICES

A Priority Concern is the influence of agricultural, rural, and urban land use practices on water quality.

Chisago County's lakes, rivers, forests, and farms all depend on the replenishing waters of annual precipitation. However, when rain falls on land and impervious surfaces such as paved streets, parking lots, and building rooftops, it can wash away soil and sediments. Stormwater runoff, or snow melt, can change both water quality and quantity, affecting our water resources physically, chemically, and biologically. Polluted runoff containing oil, grease, chemicals, nutrients, metals, litter, and pathogens, will severely reduce water quality.

New and existing development increases impervious surfaces. These changes alter natural drainage features, increase peak discharge rates and volumes, and reduce recharge to maintain wetlands and baseflows in streams. Development also results in corresponding increases in the concentration and types of pollutant loading, including nutrients, solids, metals, salt, pathogens, pesticides, and hydrocarbons.

A recent study of lakes in north-central Minnesota reveals water clarity is the most important factor in determining lakeshore property values. This fact gives property owners and elected officials firm economic reasons to think about and adopt land use and development ordinances that protect water and natural resources.

Removing trees, native plants, and aquatic vegetation in front of lake property, mowing down to the water, and heavy fertilizing might increase property value in the short term. But such changes by too many property owners will eventually alter a lake's ecology, degrade its water, and diminish property values.

Major concerns relating to surface water quality include erosion control, current practices and regulations, and chemical pollution and sedimentation from runoff. Non-point source pollutants can be traced to three primary sources – agriculture, rural, and urban.

The St. Croix Watershed Research Station Fact Sheet "Changes in phosphorus loading in the Sunrise River watershed from projected population increases" **(PCSD Attachment 2: Sunrise Population Change Fact Sheet, 2012)** makes the following observations:

"Most of the phosphorus appears to come from nonpoint sources, namely agriculture and developed (urban and residential) land uses. Under conventional agriculture and urban settings as modeled in the Soil and Water Assessment Tool, agriculture will remain the dominant source of phosphorus even though the area of developed land will exceed farm land by 2030. The model calculated similarly high phosphorus yields (load per unit area) for agricultural and urban land, but rural residential land yielded much less."

Chisago County Impaired Waters

The federal Clean Water Act requires states to adopt water quality standards to protect the nation's waters. These standards define how much of a pollutant can be in surface 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 they have pollution problems coming from a combination of point and nonpoint sources.

Chisago County places a high priority on addressing impaired waters and plans to fully participate in the development of Total Maximum Daily Loads (TMDLs), Watershed Restoration and Protection Strategies (WRAPs), pollutant allocations and implementation of TMDLs for these impaired waters studies. A list of impaired waters and types of impairments can be found in **(PCSD Attachment 14: MPCA Comments Chisago County Water Plan, 2012) (PCSD Attachment 15: Chisago County Impaired Waters, 2012)**. Pollutants causing the impairments can be found in the attachment. Chisago County commits to submit any data it collects to MPCA for use in a more comprehensive assessment of waters in the County.

There are multiple TMDL studies in various stages of progress within the St. Croix Basin, Chisago County and the Sunrise River watershed. These include Lake St. Croix **(PCSD Attachment 16: Lake St. Croix TMDL, 2011)**, Sunrise River Watershed Restoration and Protection Plan, North Branch of the Sunrise River **(PCSD Attachment 17: North Branch Sunrise River TMDL, 2006)**, Comfort Lake Forest Lake Watershed District "Six Lake" **(PCSD Attachment 18: Six Lake TMDL, 2009)**, Chisago Lakes Chain of Lakes TMDL, and Martin and Typo Lakes TMDL **(PCSD Attachment 19: Martin and Typo Lakes TMDL, 2005)**. A TMDL study for Rock Creek, Rush Creek and Goose Creek is underway. This project is named the Goose Creek Watershed Restoration and Protection Plan.

Agriculture

Agriculture, including sod farms, is a contributor of non-point source pollutants. This can occur as a result of intensive land cultivation and husbandry practices. It can appear in three different forms – soil erosion, agriculture supplements such as nutrients and pesticides, and animal waste products. Each of the sources, when allowed in water bodies, change the aquatic environment by limiting light penetration of the water and resulting in the transmission of toxins to area water bodies. Practices to conserve local groundwater and surface water use through irrigation will be considered.

- 65% of agriculture land in Chisago County is planted to either corn or soybeans (2009 United States Department of Agriculture Farm Service Agency records).

- 32% of all cropland in Chisago County had less than 30% residue left on the field after planting (2007 Chisago County tillage transect survey).

The St. Croix Watershed Research Station Fact Sheet "Reductions in phosphorus loading in the Sunrise River watershed from selected agricultural best management practices" **(PCSD Attachment 20: Sunrise Agriculture Fact Sheet, 2012)** makes the following observations:

- Agricultural land occupies only 21% of the Sunrise River watershed but delivers 55% of the phosphorus load from uplands to receiving waters, i.e. streams, lakes and wetlands. Too much phosphorus in these waters can degrade water quality because of excessive algal growth.

- Of all the crops, silage corn had the highest phosphorus yield at nearly 4 pounds per acre.

- Even though the phosphorus load reduction from any one Best Management Practice may be modest, in aggregate the reductions could be substantial.

The Minnesota Department of Agriculture provided comments to the Priority Concerns Scoping Document on

- agricultural drainage, wetlands and water retention;
- groundwater and surface water protection;
- manure management and livestock issues;
- agricultural land management; and
- targeting of best management practices**. (PCSD Attachment 21: MDA Priority Concerns Input, 2012)**

These comments will provide helpful considerations in development of implementation actions.

Primary Chisago County Farming Regions

(PCSD Attachment 22: Elevational Relief, 2012)
(PCSD Attachment 23: Chisago County Digital Elevation Model, 2007)

Anoka Sand Plain

- sandy soils
- Concern – wind erosion and groundwater contamination
- Priority conservation practices – field wind breaks, conservation tillage, nutrient and pest management (variable rate technology), grassed filter strips

South East Chisago County

• steep slopes

Concern – surface water pollution by soil erosion due to runoff

• Priority conservation practices – grassed waterways, water and sediment control basins, conservation tillage, contour farming, nutrient & pest management

East Central and Northern Chisago County

• mainly flat, heavily ditched region

• Concern – surface water pollution by soil erosion due to runoff

• Priority conservation practices – conservation tillage, nutrient and pest management (variable rate technology), grassed filter strips, forested riparian buffers along drainage ditches

Valley area East of Harris and North Branch

• glacial footprint of St. Croix River

• Concern – heavy nutrient loading due to type of crops grown, high water table and extensive ditch network

• Priority conservation practices – conservation tillage, nutrient and pest management (variable rate technology), grassed filter strips along drainage ditches

Urban

Urbanized land development generally increases the volume of runoff and the concentration of pollutants in the runoff. Many of the lakes in Chisago County have already been widely developed; lakes and rivers near Lindstrom, Center City, Chisago City, Harris, and Rush City are good examples. Although it is inevitable that the desire for further development around lakes will continue into the future, it is important to recognize the impacts of development on the surface and groundwater quality of the lakes, rivers, and wetlands and to prevent further degradation.

The St. Croix Watershed Research Station Fact Sheet "Changes in phosphorus loading in the Sunrise River watershed from projected population increases" **(PCSD Attachment 2: Sunrise Population Change Fact Sheet, 2012)** makes the following observations:

• Lakes receiving drainage from urbanizing land will experience the largest increases in phosphorus loads by 2030. Lakes whose phosphorus loads are projected to increase by more than 10% include Comfort, Chisago, North & South Lindstrom, North & South Pools (in Carlos Avery Wildlife Management Area), Green, and Forest Lakes.

- Lakes with projected phosphorus load increases below 10% include Bone, Typo, Linn, Sunrise, Martin, Linwood, Kroon, Coon, and North & South Center Lakes.

The St. Croix Watershed Research Station Fact Sheet "Reductions in phosphorus loading in the Sunrise River watershed from changing selected characteristics of developed land" **(PCSD Attachment 24: Sunrise Developed Land Fact Sheet, 2012)** makes the following observations:

- Developed land, i.e. urban and rural residential, currently occupies about 16% of the area of the Sunrise River watershed but accounts for about 27% of the non-point source phosphorus load reaching aquatic resources (wetlands, rivers, and lakes).

- By the year 2030, developed lands are projected to occupy about 24% of the watershed area and deliver 38% of the non-point phosphorus load.

- Urban high density lands have the highest phosphorus yield of all land use types, exceeding even that of row crop agriculture.

- Urban low density lands have phosphorus yields within the range of agriculture lands.

- Runoff from urban lands can be greatly influenced by the fraction of impervious cover and connected impervious cover, which are directly connected to channelized flow paths provided by curbs, gutters, and storm sewers.

- Phosphorus loads to the lakes are controlled by more than simply urban high density containing subbasins. In particular, growth of urban low density land in other nearby subbasins is the source of most of the projected increase in phosphorus loads, and these subbasins likewise need mitigation efforts.

Subwatershed Assessments

Stormwater runoff poses a significant threat to water resources throughout Chisago County. Stormwater volume and pollutant loads that are carried to receiving water bodies via stormwater infrastructure can have negative effects on water quality and surrounding habitat.

In response to these issues, Chisago Soil & Water Conservation District staff conduct stormwater retrofit assessments to identify retrofit opportunities in subwatersheds that are significant contributors to the degradation of lakes and streams. Projects identified as part of the assessment process improve water quality, increase groundwater recharge, and reduce stormwater runoff volumes throughout Chisago County.

Urban subwatershed assessments are completed for the developed portions of Center City, Lindstrom, and Chisago City. Rural subwatershed assessments are set to be completed in the rural portions of the Chisago Lakes and Rush Lake watersheds in 2013. These assessments help guide implementation activities by determining the potential runoff load as well as identify the most logical locations to start with best management practice implementation.

The Chisago City assessment identified projects in 27 subwatersheds that are contributing 50 pounds of phosphorus, 30,500 pounds of total suspended solids, and 34 acre feet of water per year.

The Center City assessment identified projects in 17 subwatersheds that are contributing 65 pounds of phosphorus, 23,700 pounds of total suspended solids, and 76 acre feet of water per year.

The Lindstrom assessment identified projects in 16 subwatersheds that are contributing 68 pounds of phosphorus, 43,000 pounds of total suspended solids, and 39 acre feet of water per year.

Development of subwatershed assessments has begun in other areas of Chisago County including North Branch, Harris, and Rush City.

Wetlands

A wetland is a land area that is saturated with water, either permanently or seasonally. The primary factor that distinguishes wetlands is the characteristic vegetation that is adapted to its unique soil conditions. Wetlands are made up of hydric soil which supports aquatic plants.

Wetlands serve a variety of functions, such as providing valuable habitat for wildlife, filtering out pollutants and sediment for the protection of downstream water quality in lakes and streams, and attenuating the impacts of floods by storing water during intense rain storms and snow melt. In addition to downstream benefits, wetlands are important resources in and of themselves. Wetlands are considered the most biologically diverse of all ecosystems, serving as home to a wide range of plant and animal life.

It is estimated that Chisago County has lost approximately 36% of the pre-settlement wetlands (Jeffrey P. Anderson and William J. Craig. 1984. Growing energy crops on Minnesota's wetlands: the land use perspective). Properly functioning wetlands trap phosphorus by settling phosphorus containing particles and trapping them in the wetland. However, if water levels are lowered in wetlands through artificial drainage, the phosphorus can be released, changing the wetland from a phosphorus trap into a phosphorus source. Although properly functioning wetlands act as a trap and filter sediment and phosphorus, they are not to be used as a treatment system for runoff.

The St. Croix Watershed Research Station Fact Sheet "Reductions in phosphorus loading in the Sunrise River watershed from wetland mitigation" **(PCSD Attachment 25: Sunrise Wetlands Fact Sheet, 2012)** makes the following observations:

- The loading of phosphorus from our lands to our water resources is commonly the single largest cause of eutrophication, where excess algal growth degrades water quality. Wetlands can play a critical role in reducing phosphorus loading to lakes and streams by trapping runoff water and sediment.

- The Sunrise watershed currently contains many wetlands and there is the potential to create or restore many more, a process commonly called wetland mitigation.

- In general, areas predicted to have the highest phosphorus loads are those with tillage agriculture, urban land use, and low infiltration rates.

- In the Chisago Lakes Lake Improvement District, the landscape is closely connected to the lakes and streams that flow into the lakes. This results in significant loading from all subwatersheds within the Lake Improvement District. However, the extent to which phosphorus landscape inputs contribute to St. Croix River loading depends on where in the watershed they originate. An estimated 40% of the total watershed phosphorus load is generated by areas in the upper reaches of the Sunrise, upstream of the North Pool (representing about 50% of the total watershed area). However, most all of this phosphorus from the upper watershed region is trapped in wetlands and lakes, including the North and South Pools. The result is only 5% of the total load at the confluence with the St. Croix River is predicted to originate from upstream of the North Pool. As a result, wetland scenarios for St. Croix phosphorus reduction considered only subwatersheds downstream of the North Pool. The pools are located within the Carlos Avery Wildlife Management Area.

• Wetlands trap phosphorus by settling phosphorus containing particles or by accumulating organic matter from plants that have incorporated phosphorus into their biomass. Organic matter accumulates when plant growth exceeds decay. The waterlogged soils of wetlands inhibit decay of organic matter, thereby promoting net accumulation in the wetland. However, if water levels are lowered by either drought or artificial drainage, decay of organic matter will accelerate and phosphorus can be released, changing the wetland from a phosphorus trap into a phosphorus source.

• Wetlands play an important role in reducing phosphorus loading to lakes and streams in the Sunrise watershed. The Sunrise Soil and Water Assessment Tool model estimates that existing wetlands reduce phosphorus loading to the St. Croix River and into the Lake Improvement District by 25% and 40% respectively.

• Increasing the number of wetlands in the Sunrise River watershed is predicted to be an effective method to further reduce phosphorus. Results of model simulations show that increasing the extents of wetlands downstream of the North Pool by 25% and 50% would reduce phosphorus loading to the St. Croix River by 9% and 19%, respectively. Likewise, increasing extents of Lake Improvement District wetlands by 25% and 50% is predicted to reduce phosphorus loading to lakes by 11% and 19%, respectively.

• The potential for wetland mitigation to reduce phosphorus loading in Chisago County is considerable. When utilized as part of combined efforts that include agricultural and urban best management practices, the effects could be substantial. It is important to note that wetlands also provide other benefits such as nitrogen and sediment removal, flood attenuation, and wildlife habitat. This suite of benefits makes wetland mitigation in the Sunrise River watershed a valuable and viable tool for resource managers.

Ravines

In 2011, the Chisago Soil & Water Conservation District received a Clean Water Fund grant from the Minnesota Board of Water and Soil Resources to complete an inventory of the active gully sites along the St. Croix River escarpment. This is from the Wild River State Park entrance near Almelund south to the Chisago/Washington County line. Overall fifteen miles of the escarpment was inventoried and a total of 618 gullies were identified through desktop analysis as possibly eroding. Of these, permission was received to field check 494 gullies. 112 were identified as actively eroding. This assessment identified the 36 most severely eroding gullies and estimated that they are contributing 478 tons of sediment and 464 pounds of phosphorus per year to the St. Croix River. Over time, individual gullies will be further assessed and mitigation activities will take place to reduce the negative effect on the St. Croix River.

Shorelands

Healthy shorelines support a diverse community of fish and wildlife by providing native vegetation that fulfills habitat needs where land and water meet. Native vegetation provides important water quality functions by slowing and filtering water runoff as it moves to the lake or stream. Shorelines with a diverse mixture of native plants extending inland as well as offshore of the bank are more resilient to wave and ice erosion. Chisago County lakes, streams, and wetlands need healthy shorelines to reduce runoff, filter pollutants, and provide important habitat functions that benefit fish and wildlife.

Shorelands are classified in Chisago County as either General Development, Natural Environment, or Recreational Development. **(PCSD Attachment 26: Shoreland Classification, 2006)**

Drainage Ditches

Drainage ditches can be a source of sediment from eroding ditch banks and can also quickly transport sediment and pollutants from agricultural and urban runoff to surface waters. Buffer strips along drainage ditches help reduce erosion and sedimentation by slowing overland flow, trapping sediment and other pollutants, and holding soil in place along the ditch banks. Reducing erosion and sedimentation also reduces maintenance costs for ditch owners.

Chisago County drainage ditches **(PCSD Attachment 27: County Ditches, 2004)** alter natural hydrology by efficiently removing water from poorly drained areas. Peak flows in the drainage system have the potential to cause erosion both in the drainage system and in downstream surface waters. Retaining water within drainage systems can reduce peak flows and the rate of erosion in the drainage system and downstream.

Forests

The following comments, provided by Don Mueller, DNR Forestry, summarizes the value and importance of forests to water quality in Chisago County.

Forest management is a viable practice on public and private lands in Chisago County, particularly in the northern townships. Managed forest land, whether it is conifer plantations or native hardwood forests, will return a healthy financial gain while providing wildlife habitat, recreational opportunities, and helping to manage stormwater runoff. Managed forest land places very little demand on county services other than roads. The Water Plan and other county documents acknowledge the value of managed forest lands.

Trees and other natural vegetation are an important tool to manage stormwater runoff in urbanizing sections of the county. Maintaining tree canopy cover is an important tool to intercept and store rainfall as well as break the kinetic energy of falling rain that will dislodge soil particles. Builders, contractors, and property owners can incorporate existing native vegetation and mature trees into construction plans. Where native vegetation and mature trees are absent, planning for adequate growth space needs to occur from the very beginning of the planning process. If vegetation is treated as a "nicety" that can be added at the end of the design phase, the functionality of this "necessity" will almost certainly be compromised during the construction process. Foresters, horticulturists, ecologists, and landscape architects who understand plants and soils need to be involved in the early design process for each new project.

MAKE INFORMED DECISIONS

A Priority Concern is that citizens and elected officials receive accurate, understandable information to make informed decisions.

Every resident lives in a watershed. Whether knowingly or not, every resident of Chisago County may contribute to water pollution through everyday activities such as fertilizing farm fields, throwing litter down storm drains, or not cleaning up after pets. The resulting stormwater runoff from the surrounding watershed is one of the greatest threats to lakes, ponds, wells, and groundwater.

Watershed education is an important tool for protecting and restoring urban, rural, and agricultural watersheds. The primary goals of watershed education include increasing community awareness, preserving local water resources, and gradually changing behaviors to reduce the amount of pollutants from stormwater runoff. Education programs may focus outreach on a single behavior on a broad basis, or concentrate efforts at the subwatershed level. The most effective watershed education programs focus on key pollutants or behaviors, carefully target audiences, and survey residents to understand their attitudes before designing education campaigns.

Since the passage of the Clean Water Act of 1972, point source pollution in Chisago County (e.g. a pipe dumping discolored or sludge-like liquid into a lake or river) has been dramatically reduced. Another form of pollution, "non-point source", is now the most prominent problem affecting water quality. Non-point source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human made pollutants and then deposits them into lakes, rivers, wetlands, and even underground sources of drinking water. Non-point source pollution is now the major source of poor water quality.

Although non-point source pollution is not as easy to identify as point source pollution, the solution involves many small steps that everyone can take in their day to day lives. The one advantage of this problem is the potential to solve it together on a community level.

Providing accurate, understandable information is a key part of addressing this problem and helping preserve and protect Chisago County waters. Many County agencies, organizations, programs, and individuals are working towards protecting and improving the County's shared water resources. Providing accurate, understandable information is a primary tool that is used with citizens and elected officials to help them understand how issues such as non-point source pollution affect their personal, economic, and environmental health. This information is valuable for making informed decisions and prioritizing projects.

When a resource is cheap and readily available, it becomes all too easy to forget the reliance upon it and what is needed to care for it over time. Accurate, understandable water information will provide Chisago County citizens and elected officials with the knowledge of how they are connected to water, how water connects all life and systems, how water is being used and abused, their own impacts on water, the ways water can be improved, and the choices available to help protect water resources. Accurate information can influence people's attitudes about water resources. By understanding there are problems with water quality and caring about this shared resource, individuals can become empowered to be part of solving the problem.

Another key component that influences people's attitudes about water is personal experience. Experience is a basic building block to help people understand how lakes, rivers, wetlands, and groundwater work. Education and information without a personal connection is not nearly as effective. Experiential learning is a major component of excellent water education.

Providing accurate, understandable information relates to all of the other Priority Concerns. Several waterways in the County are listed as impaired or are threatened by aquatic invasive species.

Chisago County is fortunate in having considerable high quality water resource information that citizens and elected officials can make informed decisions. This information includes:

- Chisago County Geologic and Hydrogeologic Atlas
- Chisago County Water Resource Management Plan
- Protection and Restoration Plans
- Rural and Urban Assessments
- Sunrise River Watershed Study
- Water Quality Monitoring Reports
- Wellhead Protection Plans

Children and students who have a better understanding of the complexities involved in caring for water will be better stewards of this precious resource in the future. Each year, Chisago County hosts the Children's Water Festival. The mission of the Festival is to provide youth and classroom teachers with an innovative, quality, hands-on learning opportunity highlighting the relationship and interdependence of water to all living things. Each year, approximately 750 fifth grade students, from all school districts in the County, attend the Festival. The 10th anniversary of the Festival was in 2012. To date, over 6,000 students have attended the Festival and high school seniors who graduated in 2012 were among the first students to attend the Festival in 2003.

It is important to build relationships and partnerships with organizations in and around Chisago County. There are several lake and river associations in Chisago County. In addition, the PICKM (Pine, Isanti, Chisago, Kanabec, Mille Lacs) Alliance of Lake and Rivers Associations works to share information and resources among members.

SUFFICIENT RESOURCES

A Priority Concern is to obtain sufficient resources to achieve goals established in the Water Plan.

Chisago County is fortunate in having abundant water resources, both ground and surface water. Unfortunately, these water resources are at risk from many threats, including point and non-point pollution, aquatic invasive species, and over use. Citizens of Chisago County place high value on the importance of preserving and protecting water resources.

The vision of the Chisago County Water Plan is to preserve, protect, and enhance surface and groundwater quality and quantity for current and future generations. Implementation of the goals and objectives of the Water Plan is essential to preserving, protecting, and enhancing Chisago County water resources.

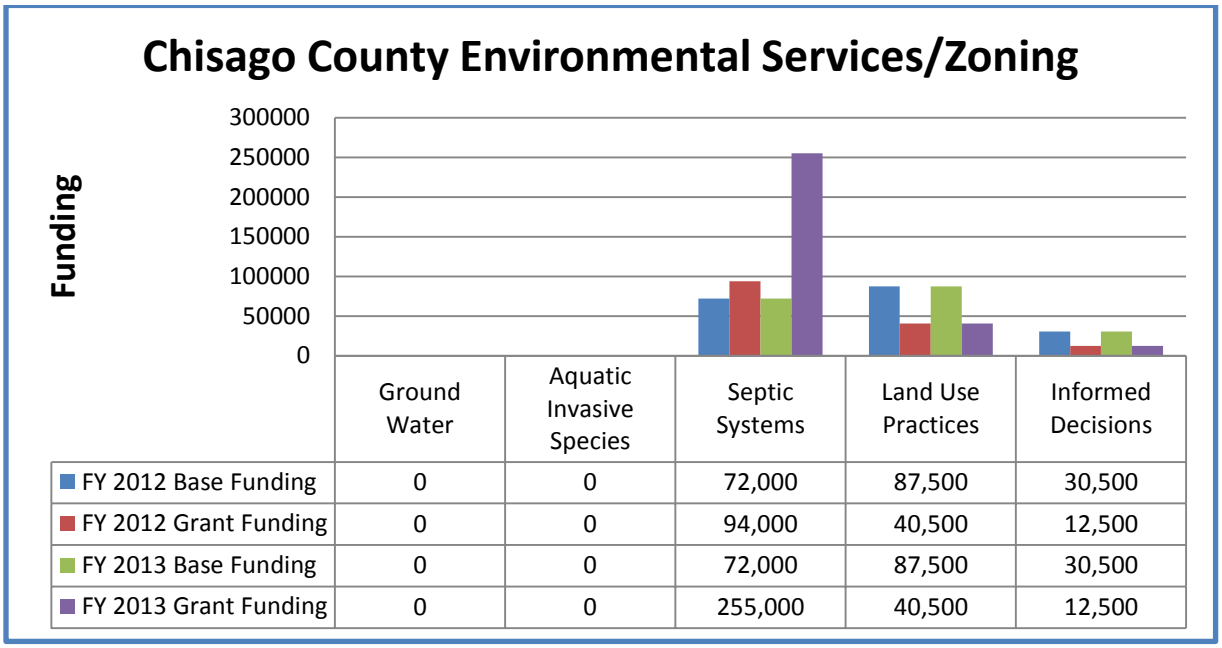
Accomplishing the vision will not be easy. Chisago County is committed to efficiently achieving the goals and objectives in the Water Plan. To effectively complete this vision, it is essential that sufficient staff and funding be provided from multiple sources. This can be accomplished through a combination of federal and state grants, along with local resources.

There are four primary local agencies with responsibility for implementing portions of the Water Plan. These are Chisago County, Chisago Lakes Lake Improvement District, Chisago Soil and Water Conservation District, and Comfort Lake Forest Lake Watershed District. These agencies have the ability to either fund projects, using local tax dollars or apply for state and federal grants to implement projects. These four agencies have been very effective in funding and receiving grants to implement a multitude of water quality projects. It is anticipated that this success will continue into the future.

The tables below summarize 2012 and 2013 budgets. The budgets include base funding along with grants obtained. Spending by these agencies is organized by priority concern. These tables show that much water protection and restoration work is currently taking place in Chisago County. Based on current funding levels, it is reasonable that a majority of objectives in the Water Plan will be funded and implemented.

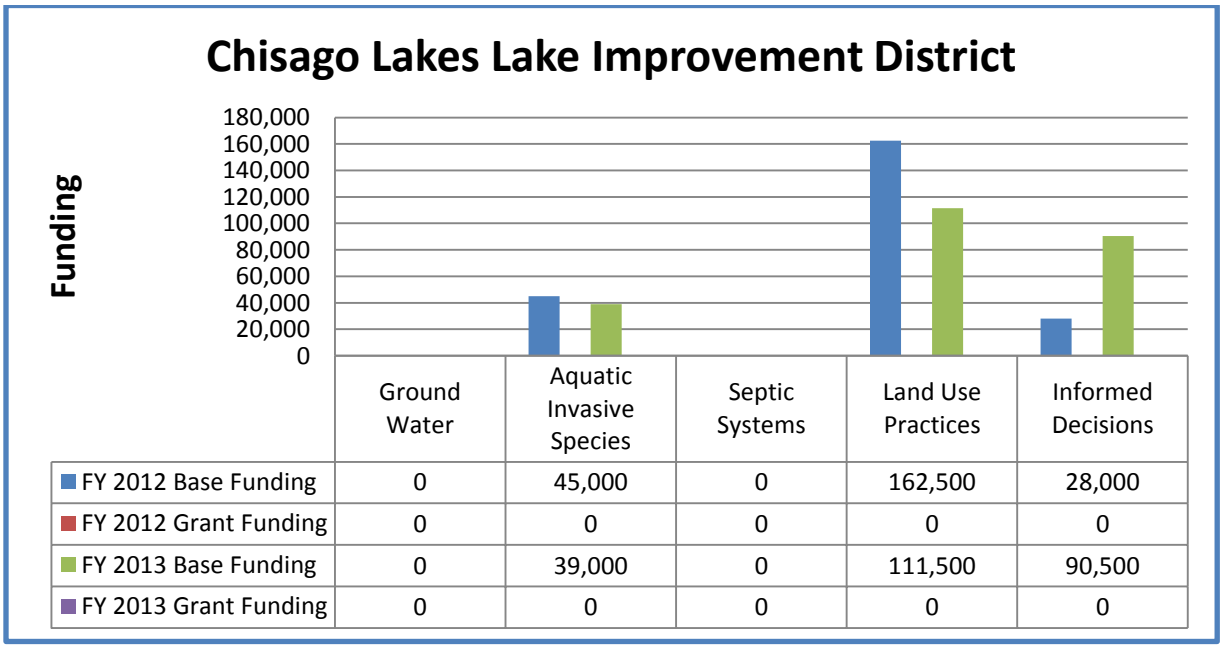
The four agencies have a coordinated approach. Each agency focuses resources on the priorities in a different manner. Collectively, the agencies are actively implementing the majority of their priorities.

Figure 7: Chisago County Environmental Services/Zoning Funding



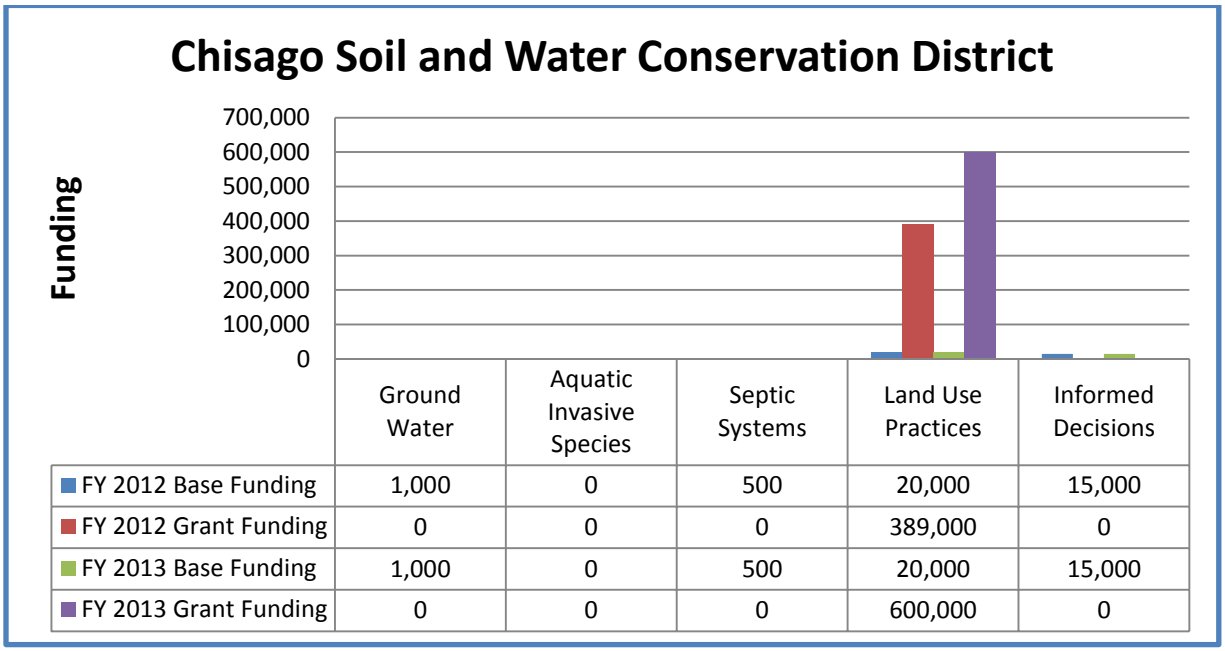
	Ground Water	Aquatic Invasive Species	Septic Systems	Land Use Practices	Informed Decisions
FY 2012 Base Funding	0	0	72,000	87,500	30,500
FY 2012 Grant Funding	0	0	94,000	40,500	12,500
FY 2013 Base Funding	0	0	72,000	87,500	30,500
FY 2013 Grant Funding	0	0	255,000	40,500	12,500

Figure 8: Chisago Lakes Lake Improvement District Funding



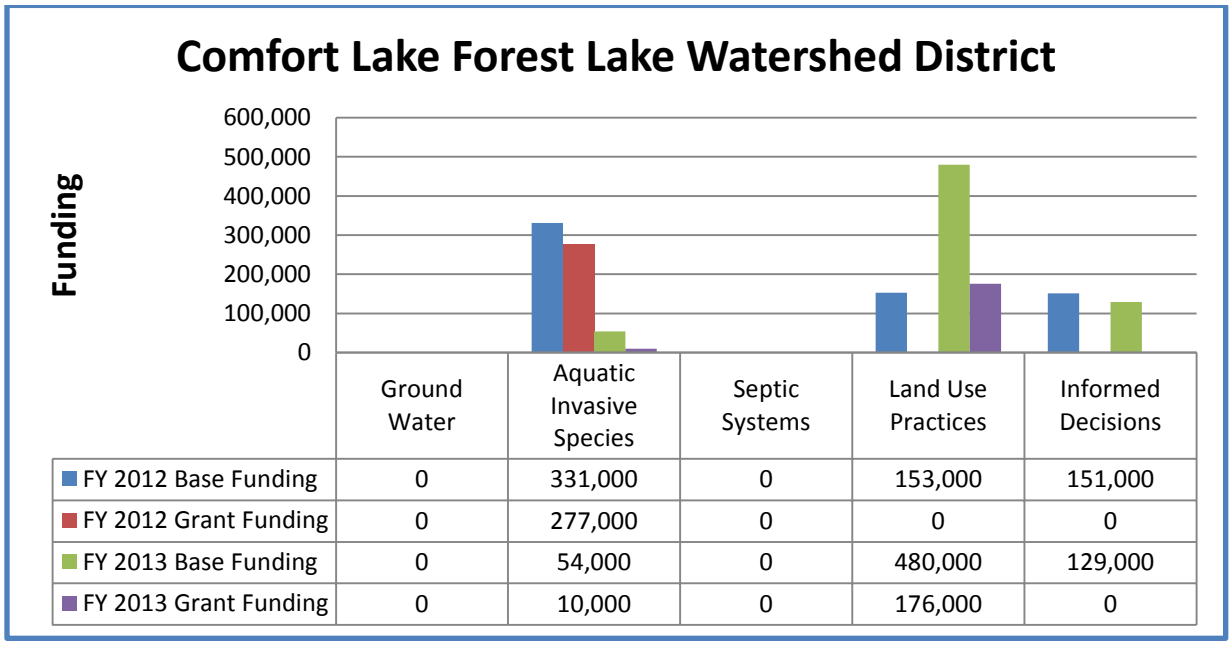
	Ground Water	Aquatic Invasive Species	Septic Systems	Land Use Practices	Informed Decisions
FY 2012 Base Funding	0	45,000	0	162,500	28,000
FY 2012 Grant Funding	0	0	0	0	0
FY 2013 Base Funding	0	39,000	0	111,500	90,500
FY 2013 Grant Funding	0	0	0	0	0

Figure 9: Chisago Soil and Water Conservation District Funding



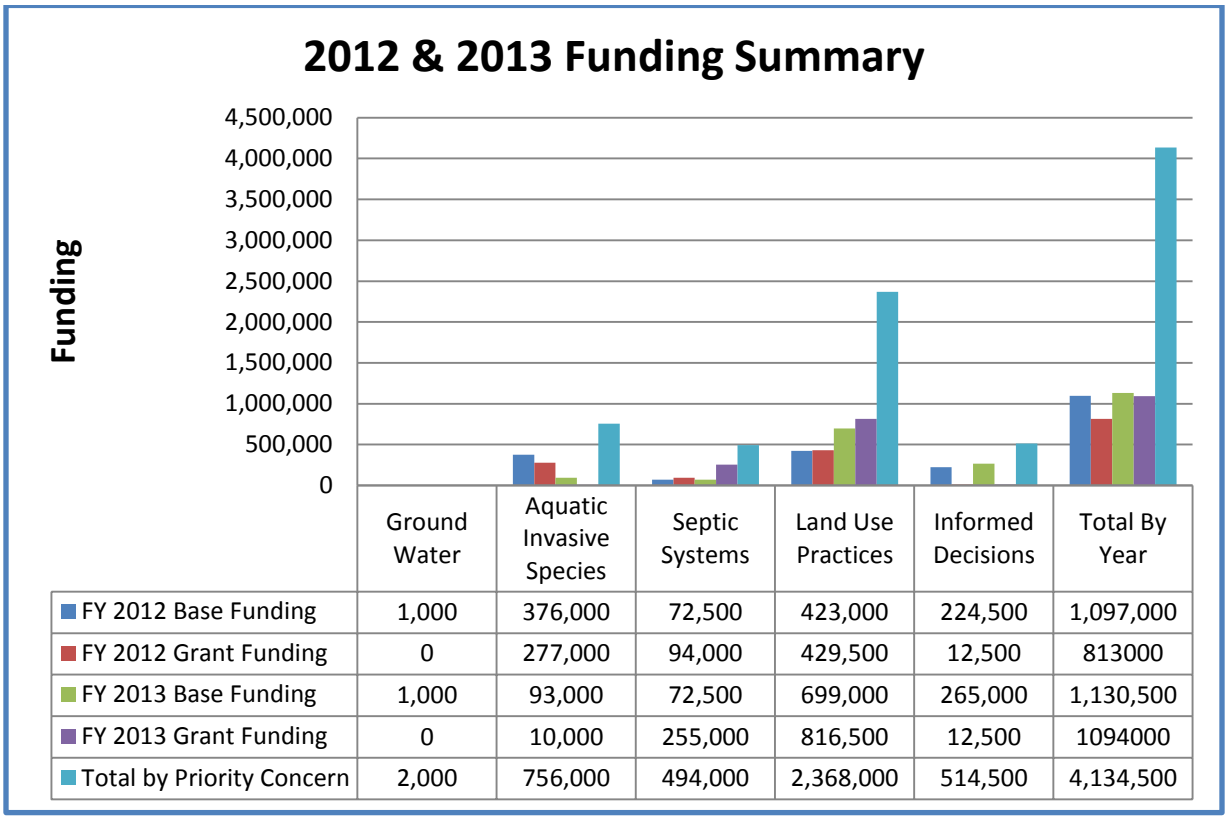
	Ground Water	Aquatic Invasive Species	Septic Systems	Land Use Practices	Informed Decisions
FY 2012 Base Funding	1,000	0	500	20,000	15,000
FY 2012 Grant Funding	0	0	0	389,000	0
FY 2013 Base Funding	1,000	0	500	20,000	15,000
FY 2013 Grant Funding	0	0	0	600,000	0

Figure 10: Comfort Lake Forest Lake Watershed District Funding



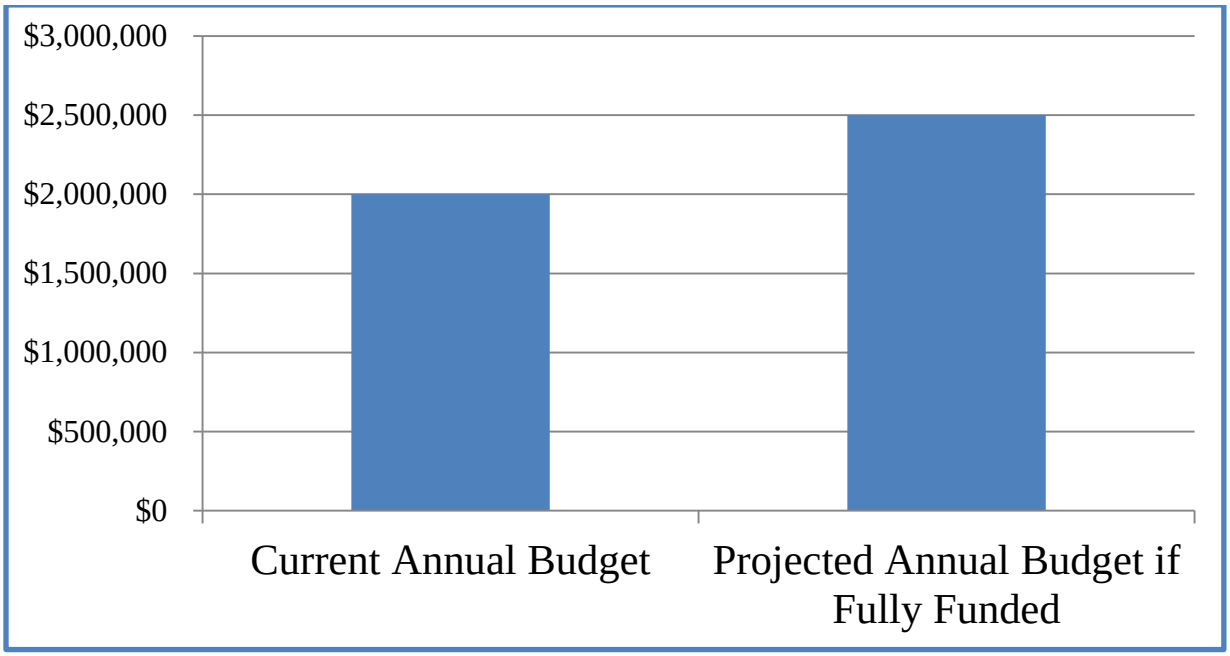
	Ground Water	Aquatic Invasive Species	Septic Systems	Land Use Practices	Informed Decisions
FY 2012 Base Funding	0	331,000	0	153,000	151,000
FY 2012 Grant Funding	0	277,000	0	0	0
FY 2013 Base Funding	0	54,000	0	480,000	129,000
FY 2013 Grant Funding	0	10,000	0	176,000	0

Figure 11: 2012 & 2013 Funding Summary



	Ground Water	Aquatic Invasive Species	Septic Systems	Land Use Practices	Informed Decisions	Total By Year
FY 2012 Base Funding	1,000	376,000	72,500	423,000	224,500	1,097,000
FY 2012 Grant Funding	0	277,000	94,000	429,500	12,500	813000
FY 2013 Base Funding	1,000	93,000	72,500	699,000	265,000	1,130,500
FY 2013 Grant Funding	0	10,000	255,000	816,500	12,500	1094000
Total by Priority Concern	2,000	756,000	494,000	2,368,000	514,500	4,134,500

Figure 12: Current Annual Budget Compared with Projected Annual Budget if Fully Funded



The annual budget for the four agencies combined is approximately $2 million. The estimated cost to fully implement the objectives in the Water Plan is approximately $2.5 million. The gap of $0.5 million is reasonable as not all planned activities will eventually be implemented.

There are two primary resource needs remaining.

1. Protect the quality and quantity of groundwater. Currently, minimal resources are allocated toward groundwater. There are multiple groundwater objectives in the Water Plan. Funding resources for groundwater has yet to be determined.

2. Areas of Chisago County without local tax support. Currently, there is local funding established in the Comfort Lake Forest Lake Watershed District along with the Chisago Lakes Lake Improvement District. In these two districts, local funds have been used successfully as match in obtaining substantial state and federal grants. The local match is not available outside the two Districts. This restricts the ability of residents and the County to provide match support for state and federal grants.

GOALS AND OBJECTIVES

Listed below are the goals and objectives to support the six priority concerns. Each objective includes a brief description of the proposed activity. Included with the description is:

a. When it is anticipated to be completed
b. Local unit(s) of government delegated implementation responsibility
c. Estimated financial and in-kind resources it will take to complete the objective
d. The watershed or groundwater units benefiting from the objective.

PROTECT QUALITY AND QUANTITY OF GROUNDWATER

A Priority Concern is to protect the quality and quantity of groundwater used for drinking water.

Goals

- Protect groundwater from human caused contamination to meet or exceed applicable drinking water standards.
- Manage groundwater withdrawal to protect and conserve current and future uses including drinking water, recreation, ecological, agriculture, commercial, and industrial uses.

Objectives

1. Develop a County groundwater plan, subject to Minnesota Statutes, that lays out the technical framework, issues, policies, and implementation actions for the protection and conservation of groundwater resources including those in the Mount Simon/Hinckley aquifer. The plan will include high priority implementation actions to protect the County's groundwater. Implementation goals will include projects in areas such as: non-agricultural land use, industrial, mining, agriculture, turf, animal waste management, individual sewage treatment systems, source water protection, well management, groundwater supply, groundwater and surface water interaction, and hazardous materials management and transportation.

    a. 2017-2018
    b. Chisago County, state and local agencies
    c. $20,000 per year X 2 years = $40,000
    d. All Chisago County groundwater

2. Implement projects identified in the County groundwater plan.

    a. 2018 and beyond
    b. Chisago County, state and local agencies
    c. Resources needed will be determined based on priorities identified in County groundwater plan

3. Promote the sealing and permanent closure of abandoned wells to protect groundwater. Minnesota Rules specify the requirement for sealing unused wells in Minnesota. Prioritization will be given to areas within a wellhead protection area or a drinking water supply management area.

    a. Ongoing program 2014-2018
    b. Chisago County, Minnesota Department of Health
    c. Landowners responsible for cost of closure
    d. All Chisago County groundwater

4. Support local Wellhead and Source Water Protection activities and provide technical assistance and information as requested.

    a. Ongoing program 2014-2018
    b. Chisago County, Minnesota Department of Health, local communities
    c. $5,000 per year X 5 years = $25,000 to support Chisago County staff
    d. Wellhead Protection Areas

5. Hold a Nitrate Testing Clinic annually in locations where nitrates in groundwater are a concern.

    a. Ongoing program 2014-2018
    b. Chisago County, Minnesota Department of Agriculture
    c. $500 per year X 5 years = $2,500
    d. Chisago County drinking water aquifers

6. Provide drinking Water Test Kits to citizens through the Chisago County Public Health Department and Chisago Soil and Water Conservation District.

    a. Ongoing program 2014-2018
    b. Chisago County Public Health Department, Chisago Soil and Water Conservation District
    c. Homeowner financed
    d. All Chisago County groundwater

7. Use information in the Chisago County Geologic and Hydrogeologic Atlas in decision making.

    a. Ongoing program 2014-2018
    b. Chisago County, Minnesota Geologic Survey
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County groundwater

8. Support improved security of city water supply wells and Wellhead Protection areas.

    a. Ongoing program 2014-2018
    b. Chisago County, Minnesota Department of Health, local communities
    c. $5,000 per year X 5 years = $25,000
    d. Wellhead Protection areas

9. Support protection of water resources by participation in Chisago County Emergency Management Planning.

    a. 2015-2016
    b. Chisago County, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency
    c. $5,000 per year X 2 years = $10,000
    d. All Chisago County groundwater

10. Investigate potential detrimental effects of the process of sand and gravel mining upon ground and surface water in Chisago and adjacent counties and, in particular, the mining and processing of frac sand.

    a. 2015 – 2016
    b. Chisago County
    c. $5,000 per year X 2 years = $10,000
    d. All Chisago County groundwater

11. Promote comprehensive policies to protect ground and surface water from sand and gravel mining and processing, including frac sand mining.

    a. 2015-2016
    b. Chisago County
    c. $10,000 per year X 2 years = $20,000
    d. All Chisago County groundwater

12. Access Minnesota Department of Health Contaminants of Emerging Concern program for support in outreach and education efforts to enhance citizen understanding of their role in protecting groundwater quality including their use and disposal of pharmaceuticals, personal care products, hazardous materials, pesticides, and fertilizers.

    a. Ongoing program starting in 2015-2018
    b. Chisago County
    c. $5,000 per year X 4 years = $20,000
    d. Al Chisago County groundwater

13. Participate in a northeast Twin Cities study of water supplies and lakes to determine: if Chisago County lake levels are being impacted by metro area water use, to what extent lake levels are being impacted by municipal or other water use, and prepare long term plans for lake and groundwater use.

    a. 2014-2016
    b. Chisago Lakes Lake Improvement District
    c. $5,000 per year X 3 years = $15,000
    d. All Chisago County groundwater

AQUATIC INVASIVE SPECIES

A Priority Concern is the introduction or spread of aquatic invasive species and their negative effect on water quality, navigation, recreation, or fisheries.

Goals

- Monitor aquatic invasive species for current and new infestations.
- Manage aquatic invasive species to maintain water quality, recreation, and fish and wildlife habitat.
- Develop an aquatic invasive species management plan for up to 10 lakes in the County with public accesses.

Objectives

1. Partner with the Comfort Lake Forest Lake Watershed District, Minnesota Department of Natural Resources, and other agencies to provide watercraft inspections and education on aquatic invasive species at public water accesses throughout the Comfort Lake Forest Lake Watershed District, Chisago Lakes Lake Improvement District, and northern Chisago County.

    a. Ongoing program 2014-2018
    b. Chisago County, Comfort Lake Forest Lake Watershed District, Minnesota Department of Natural Resources
    c. $50,000 per year X 5 years = $250,000
    d. Comfort Lake Forest Lake Watershed District, Chisago Lakes Lake Improvement District, northern Chisago County

2. Partner with local lake associations to control Eurasian watermilfoil for purposes of improved navigation.

    a. Ongoing program 2014-2018
    b. Chisago Lakes Lake Improvement District
    c. $15,000 per year X 5 years = $75,000
    d. Chisago Lakes Chain of Lakes watershed

3. Proactively provide education and information on aquatic invasive species.

    a. Ongoing program 2014-2018
    b. Chisago County, Minnesota Department of Natural Resources
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

4. Develop and implement one comprehensive lake aquatic invasive species management plan every other year using principles of integrated pest management to control specific aquatic invasive species such as common carp, zebra mussels, Eurasian watermilfoil, flowering rush, curlyleaf pondweed, or others.

    a. Ongoing program starting in 2015-2018
    b. Chisago Lakes Lake Improvement District
    c. $15,000 per year X 4 years = $60,000
    d. Chisago Lakes Lake Improvement District

NONCOMPLIANT SEPTIC SYSTEMS

A Priority Concern is septic systems that are failing, noncompliant, or an imminent threat to public health.

Goals

- Keep 100% of Imminent Threat to Public Health septic systems in compliance with State and County standards.
- Bring 50% of failing septic systems in rural unincorporated areas into compliance.
- Bring 80% of failing septic systems in the shoreland zone into compliance.

Objectives

1. Provide inspections and enforcement of Imminent Threat to Public Health and failing septic systems.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $60,000 per year X 5 years = $300,000
    d. All Chisago County watersheds

2. Provide financial assistance to homeowners for upgrades or repairs of Imminent Threat to Public Health or failing septic systems.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $100,000 per year X 5 years = $500,000
    d. All Chisago County watersheds

3. Implement a strong septic system education program for homeowners, septic installers, maintainers, designers, service providers, realtors, business owners, and builders. Provide contacts with the public in the office and during field visits, along with news articles in publications such as the Environmental Connections Newsletter.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $4,000 per year X 5 years = $20,000
    d. All Chisago County watersheds

4. Preserve septic system data by updating septic system index.

    a. 2014-2015
    b. Chisago County
    c. $15,000 per year X 2 years = $30,000
    d. All Chisago County watersheds

5. Support the construction of community wastewater treatment systems in unsewered Rural Village Centers as defined in the Chisago County Comprehensive Plan: Almelund, Sunrise, Palmdale, Rush Point, and Stark. Provide support through staff assistance to communities in researching grant opportunities.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

6. Partner with local communities in the effort to connect areas of high density, undersized, riparian lots to community wastewater treatment systems. This includes shoreland areas around the Chisago Lakes Chain of Lakes, Goose Lake, Rush Lake, and resorts such as Rose Hill.

    a. Ongoing program 2014 - 2015
    b. Chisago County
    c. $5,000 per year X 2 years = $10,000
    d. All Chisago County watersheds

7. Promote and encourage participation in the Chisago County/Chisago Lakes Joint Sewage Treatment Commission Holding Tank Waste Receiving Program and encourage expansion of the program so that septage may be accepted. Promote and encourage all municipal sewage treatment facililties to accept individual sewage treatment system sewage.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

8. Mail approximately 200 Septic System Owners Guides each year to owners of new or newly purchased homes or replacement septic systems.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $1,000 per year X 5 years = $5,000
    d. All Chisago County watersheds

9. Promote use of phosphorus free dishwashing detergent.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $1,000 per year X 5 years = $5,000
    d. All Chisago County watersheds

LAND USE PRACTICES

A Priority Concern is the influence of agricultural, rural, and urban land use practices on water quality.

Goals

- Reduce phosphorus loading from Chisago County to the St. Croix River to help meet 20% basin wide reduction goal.

- Protect surface water from human caused contamination to meet or exceed applicable water quality and environmental standards by implementing local water management plans.

Objectives

St. Croix Basin

1. Implement projects that will help meet the goals of the Lake St. Croix Total Maximum Daily Load Watershed Implementation Plan or that are identified in completed subwatershed assessments including direct drainage areas to the St. Croix River. Actively market local/state/federal conservation programs which provide incentives to landowners to stabilize erosion concerns.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $45,000 per year X 5 years = $225,000

2. Complete subwatershed assessments in all urban and rural portions of Chisago County to determine areas of untreated stormwater and potential best management practices to reduce pollution loading to surface waters. Complete 2 subwatershed assessments per year.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District
    c. $20,000 per year X 5 years = $100,000

3. Complete whole farm management plans for local agricultural producers to identify best management practice locations to reduce nutrient loading to surface waters. Complete 2 whole farm management plans per year.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $10,000 per year X 5 years = $50,000

4. Implement projects identified in the St. Croix River Escarpment Inventory to stabilize erosion concerns and improve water quality. Assist in stabilization of 2 gullies per year.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $30,000 per year X 5 years = $150,000

Sunrise River Watershed

5. Complete Sunrise River Total Maximum Daily Load Study and Watershed Restoration and Protection Plan.

    a. 2014
    b. Chisago Soil and Water Conservation District, Chisago County
    c. $100,000 per year X 1 years = $100,000

6. Implement projects that will help meet the goals of the Sunrise River Watershed Restoration and Protection Plan or those identified in completed watershed assessments. Actively market local/state/federal conservation programs that provide incentives to landowners to install 20 best management practices per year to improve overall water quality within the watershed.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service, Chisago County
    c. $150,000 per year X 5 years = $750,000

7. Provide local sponsorship and participation in completion of US Army Corps of Engineers Sunrise River Watershed Study.

    a. 2014
    b. Chisago County
    c. $5,000 per year X 1 years = $5,000

8. Implement projects recommended in the US Army Corps of Engineers Sunrise River Watershed Study and strategies for water quality and aquatic ecosystem management, restoration, and protection.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. Resources needed: to be determined when Study is complete

9. Implement projects recommended in the Soil and Water Assessment Tool model of the Sunrise River watershed.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. Resources needed: To be determined

10. Collect surface water runoff samples at the Spring Creek Farms Discovery Farms monitoring station to determine edge of field pollutant runoff levels.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Minnesota Agricultural Water Resources Coalition
    c. $3,000 per year X 5 years = $15,000

Chisago Lakes Chain of Lakes Watershed

11. Adopt uniform water protection ordinances within Chisago Lakes Chain of Lakes watershed communities, and possibly areas where Chisago County has jurisdiction, consistent with the Minimal Impact Design Standards Pilot Project.

    a. 2014-2015
    b. Center City, Chisago City, Lindstrom
    c. $40,000 per year X 2 years = $80,000

12. Implement projects that will help meet the goals of the Chisago Lakes Chain of Lakes Watershed Restoration and Protection Plan (TMDL) or those identified in completed subwatershed assessments. Actively market local/state/federal conservation programs that provide incentives to landowners to install 40 best management practices per year to improve overall water quality within the watershed.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service, Chisago County
    c. $300,000 per year X 5 years = $1,500,000

13. Install urban best management practices within the Lindstrom Stormwater Retrofit Catchment L20 (Pleasant Hills Park area) to capture and provide treatment of the currently untreated stormwater runoff draining to South Lindstrom lake.

    a. 2014-2015
    b. Chisago Soil and Water Conservation District, Chisago Lakes Lake Improvement District, City of Lindstrom
    c. $125,000

Comfort Lake Forest Lake Watershed District

14. Implement projects that will help meet the goals of the Six Lakes Total Maximum Daily Load Implementation Plan and completed subwatershed assessments. Actively market local/state/federal conservation programs that provide incentives to landowners to install 10 best management practices per year to improve overall water quality within the watershed.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service, Comfort Lake Forest Lake Watershed District
    c. $40,000 per year X 5 years = $200,000

15. Implement projects that will help meet the goals of the District's Capital Improvement Program (2011).

    a. Ongoing program 2014-2018
    b. Comfort Lake Forest Lake Watershed District
    c. $100,000 per year X 5 years = $500,000

16. Implement projects using the District's Residential, Agricultural, and Urban Stormwater Retrofit programs to help with achieving the in-lake water quality goals established in the Comfort Lake Forest Lake Watershed District Watershed Management Plan.

    a. Ongoing program 2014-2018
    b. Comfort Lake Forest Lake Watershed District
    c. $50,000 per year X 5 years = $250,000

17. Support development of a Sunrise River Regional Stormwater Management Facility downstream of the City of Forest Lake to help correct problems related to excess nutrient and sediment loads to the Sunrise River and Comfort Lake.

    a. Ongoing program 2014-2018
    b. Comfort Lake Forest Lake Watershed District
    c. $500,000 per year X 5 years = $2,500,000

18. Complete an inventory and assessment of the drained and partially drained wetlands within the watershed to prioritize areas for potential restoration to reduce pollutant loading to surface waters.

    a. 2014
    b. Chisago Soil and Water Conservation District, Comfort Lake Forest Lake Watershed District
    c. $25,000

19. Implement projects that will help meet the goals of the City of Wyoming Surface Water Management Plan

    a. Ongoing program upon plan approval 2015-2018
    b. City of Wyoming
    c. $10,000 per year X 4 years = $40,000

North Branch Sunrise River Watershed

20. Implement projects that will help meet goals of the North Branch Sunrise River Total Maximum Daily Load Implementation Plan or are identified in completed subwatershed assessments. Actively market local/state/federal conservation programs that provide incentives to landowners to install 10 best management practices per year to improve overall water quality within the watershed. Conduct citizen informational meetings.

    a. Ongoing program 2014-2018
    b. Chisago County, Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $75,000 per year X 5 years = $375,000

Rock Creek, Rush Creek, Goose Creek Watersheds

21. Complete Rock, Rush, Goose watersheds Total Maximum Daily Load Study and Watershed Restoration and Protection Plans

    a. 2014
    b. Chisago Soil and Water Conservation Districts, Chisago County, Minnesota Pollution Control Agency
    c. $100,000 per year X 1 years = $100,000

22. Implement projects that will help meet the goals of the Rock, Rush, Goose Creeks Watershed Restoration and Protection Strategies or are identified in completed subwatershed assessments. Actively market local/state/federal conservation programs that provide incentives to landowners to install 20 best management practices per year to improve overall water quality within the watersheds.

    a. 2015-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service, Chisago County
    c. $150,000 per year X 4 years = $600,000

23. Partner with other organizations researching new methods to control internal loading of phosphorus in lakes. Examples include iron or aluminum augmentation of lake sediment to control phosphorus in Rush Lake.

    a. Ongoing program starting in 2014-2018
    b. Rush Lake Improvement Association.
    c. $30,000 per year X 5 years = $150,000
    d. Rush Creek watershed

Agriculture

24. Implement agricultural best management practices for soil health that increase crop productivity and profitability while improving the environment. Best management practices include: cover crops, reduced tillage practices, conservation crop rotation, nutrient and pest management, and rotational grazing.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $10,000 per year X 5 years = $50,000

25. Assist livestock operators with proper management of manure, wastewater, and contaminated runoff. Prioritization will be to areas with direct discharge to waters of the state. Priority conservation practices include: manure storage facilities, grass filter strips, manure management plans, clean water diversions, and closure of waste storage facilities.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $5,000 per year X 5 years = $25,000

Rural

26. Implement healthy forest initiatives to reduce soil erosion and sedimentation, improve water quality, and create or enhance wildlife habitat throughout Chisago County. Common healthy forest practices include: riparian buffers, private forestland management, native plant community restoration, tree and shrub plantings, native grass plantings, and increased canopy cover in developed areas.

    a. Ongoing program: 2014-2018
    b. Chisago Soil and Water Conservation District, Natural Resources Conservation Service
    c. $10,000 per year X 5 years = $50,000

27. Implement projects that will help meet water quality goals of the Chisago County Comprehensive Parks and Trails Plan and other public lands. County parks include: Dennis Frandsen, Fish Lake, Checkerboard, Kost Dam, Ki-Chi-Saga, Sunrise Prairie Trail, and North Sunrise Park Reserve.

    a. Ongoing program: 2014-2018
    b. Chisago County Environmental Services, Parks Division
    c. 20,000 per year X 5 years = $100,000

28. Develop a plan to remove excess sediment in the shoreland area of Dennis Frandsen Park. Complete appropriate studies, which may include an Environmental Assessment Worksheet, and obtain necessary permits.

    a. 2014-2015
    b. Chisago County Environmental Services, Parks Division
    c. $10,000 per year X 2 years = $20,000

29. Implement the plan to remove excess sediment in the shoreland area of Dennis Frandsen Park. Plan may include application of sediment to nearby farmland.

    a. 2016-2017
    b. Chisago County Environmental Services, Parks Division
    c. $30,000 per year X 2 years = $60,000

30. Review historic aerial photographs to determine locations of abandoned or converted feedlots adjacent to public waters to identify potential remnant pollutant loading sources.
    a. 2014
    b. Chisago Soil and Water Conservation District
    c. $2,500

31. Develop a pilot conservation payment initiative at a watershed level that provides agricultural producers an annual payment based on the level of conservation performances implemented throughout the farm

    a. 2015-2018
    b. Chisago Soil and Water Conservation District
    c. $25,000 per year X 4 years = $100,000

Urban

32. Assist local communities with the incorporation and installation of stormwater Best Management Practices to reduce nutrient and sediment loading during reconstruction of local road projects, especially areas with direct discharge of untreated stormwater to public waters. Examples include, but are not limited to: North Branch Maple Street, and City of Lindstrom streets that dead end at a lake.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Chisago Lakes Lake Improvement District
    c. $10,000 per year X 5 years = $50,000

33. Inspect and assess construction sites before and during construction to ensure that conditions placed upon plats are fulfilled, especially those relating to erosion control, stormwater protection, and wetland compliance. The inspection includes a summary of the soil, water, and vegetative resources, a summary of resource degradation potential, and recommendations on the preservation, enhancement, and protection of the resources.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District
    c. $15,000 per year X 5 years = $75,000

34. Update the Chisago County Subdivision Ordinance to include standards that will improve water quality of surface water runoff.

    a. 2015-2016
    b. Chisago County, Chisago County Planning Commission
    c. $20,000 X 2 years = $40,000

Wetlands

35. Administer, educate, and provide resources on the Minnesota Wetland Conservation Act.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $80,000 per year X 5 years = $400,000
    d. All Chisago County watersheds

36. Administer and provide oversight for several wetland restoration projects on private and public property to provide wildlife habitat, flood storage, and infiltration areas for runoff.

    a. Ongoing program starting in 2014-2018
    b. Chisago County
    c. $10,000 per year X 5 years = $50,000
    d. All Chisago County watersheds

37. Utilize the drained wetlands inventory completed by Chisago County and the US Army Corps of Engineers Sunrise River Wetlands Study to prioritize and install wetland restorations on private and public property to provide wildlife habitat, food storage, and infiltration areas for runoff.

    a. Ongoing program starting in 2014-2018
    b. Chisago Soil and Water Conservation District
    c. $50,000 per year X 5 years = $250,000
    d. All Chisago County watersheds

38. Compile and manage a computerized inventory of all Wetland Conservation Act replacement plans, wetland banks, no net loss determinations, and delineations.

    a. 2014-2015
    b. Chisago County
    c. $15,000 per year X 2 years = $30,000
    d. All Chisago County watersheds

Shorelands

39. Update the Chisago County Shoreland Ordinance to be consistent with the anticipated revised State of Minnesota Shoreland Ordinance.

    a. On hold until State of Minnesota Shoreland Ordinance is adopted.
    b. Chisago County, Chisago County Planning Commission
    c. No estimate at this time
    d. All Chisago County watersheds

40. Inventory all General Development and Recreational Lakes in the County to determine the percentage of shoreline that has been converted from natural vegetation to maintained yard. Use this inventory to educate and promote landowners to install Best Management Practices that will help capture and treat the runoff from their property before entering their lake.

    a. 2015-2016
    b. Chisago Soil and Water Conservation District
    c. $10,000 per year X 2 years = $20,000
    d. All Chisago County watersheds

41. Assist landowners in the installation of best management practices and lakeshore restorations on their property. Priority areas include the Chisago Lakes Chain of Lakes and Comfort Lake Forest Lake watersheds.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

Drainage Ditches

42. Develop an inventory of the County public ditch systems, and significant tributaries, including record searching and field verification to confirm locations of existing public ditches. Identify, inventory, and evaluate functions, purpose, and necessity of the Chisago County ditch system. Determine legal status of ditches, rights, and responsibilities as defined in Minnesota Statutes 103E.

    a. 2015
    b. Chisago County Public Works Department
       Supporting agency: Chisago County Department of Environmental Services/Zoning, Chisago Soil and Water Conservation District
    c. $20,000
    d. All Chisago County watersheds

43. Develop a plan for management and maintenance of the Chisago County ditch system. Establish a system and protocol for establishing Best Management Practices within the easement right of ways of existing public ditches.

    a. 2016
    b. Chisago County Public Works Department
       Supporting agency: Chisago County Department of Environmental Services/Zoning
    c. $20,000
    d. All Chisago County watersheds

44. Implement the management and maintenance plan for the Chisago County ditch system. Recommend and complete maintenance upgrades.

    a. Ongoing program 2017-2018
    b. Chisago County Public Works Department
       Supporting agency: Chisago County Department of Environmental Services/Zoning
    c. $20,000 per year X 2 years = $40,000
    d. All Chisago County watersheds

45. Correct and minimize erosion concerns and sedimentation issues occurring in public waters as a result of public roads and county ditch system.

    a. Ongoing program 2014-2018
    b. Chisago County, Township and City Public Works Department.
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

46. Maintain the Chisago Lakes ditch and weir system to control water levels during high water events.

    a. Ongoing program 2014-2018
    b. Chisago Lakes Lake Improvement District
    c. $20,000 per year X 5 years = $100,000
    d. Chisago Lakes Chain of Lakes watershed

47. Maximize the efficiency of the use of road maintenance products while protecting public safety and minimizing harmful effects on water quality. Conduct annual road and sidewalk salt management training. Attendees may include local units of government, private applicators, and local businesses.

    a. Ongoing program 2014-2018
    b. Chisago County Public Works Department
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

MAKE INFORMED DECISIONS

A Priority Concern is that citizens and elected officials receive accurate, understandable information to make informed decisions.

Goals

- Develop a civic engagement strategy.
- Provide high quality information to citizens and decision makers.
- Maintain a high quality monitoring and assessment program.

Objectives

Education and Outreach

1. Host the countywide Chisago Children's Water Festival on an annual basis. Invite all Chisago County fifth grade students and teachers to the one day event. Provide youth and classroom teachers with an innovative, quality, hands-on learning opportunity highlighting the relationship and interdependence of water to all living things.

    a. Ongoing program 2014-2018
    b. Chisago County, Chisago Soil and Water Conservation District
    c. $8,000 per year X 5 years = $40,000
    d. All Chisago County watersheds

2. Develop a civic engagement strategy for County water resource management.

    a. 2015-2016
    b. Chisago County
    c. $10,000 per year X 2 years = $20,000
    d. All Chisago County watersheds

3. Establish and maintain county-wide Hook, Line and Sinker recycling program.

    a. Ongoing program 2014-2018
    b. Chisago County, Chisago Lakes Lake Improvement District
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

4. Promote the incorporation of water best management practices such as rain gardens, pervious pavers, rain barrels, green roofs, and native plantings, to reduce phosphorus loading to local surface waters practices during new construction or in retrofit situations. Prioritization will be given to highly visible, highly impervious areas such as public libraries, churches, schools, government offices, and commercial structures.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Chisago County
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

5. Provide information to the public on shoreland management techniques, erosion control, septic system upgrades in shoreland areas, and natural shoreland alterations (lakescaping).

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $10,000 per year X 5 years = $50,000
    d. All Chisago County watersheds

6. Partner with Metro Watershed Partners to conduct clean water media campaigns focusing on a specific water quality message. Campaign will be coordinated with other groups such as lake associations, adjacent counties, and other water management organizations. Possible means of getting the message to the public include use of Environmental Connections Newsletter, news releases, radio spots, and utility bill inserts.

    a. Ongoing program starting in 2014 – 2018
    b. Chisago County
    c. $1,000 per year X 5 years = $5,000
    d. All Chisago County watersheds

7. Offer shoreland education workshops on topics such as shoreland restoration, buffer strips and rain gardens to lakeshore owners.

    a. Ongoing program starting in 2014
    b. Chisago Soil and Water Conservation District
    c. $1,000 per year X 5 years = $5,000
    d. All Chisago County watersheds

8. Provide opportunities to municipal officials, planning commissions, and the agricultural community to receive education on how their land use decisions have a direct impact on non-point source runoff pollution. Principles outlined in the University of Minnesota Non Point Education for Municipal Officials (NEMO) program will be implemented.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

9. Provide information and education to Chisago County citizens using the Environmental Connections Newsletter. Publish newsletters twice yearly.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $20,000 per year X 5 years = $100,000
    d. All Chisago County watersheds

10. Partner with local organizations to provide additional information and education opportunities on topics such as grazing workshops, soil testing, and other types of agriculturally supported workshops.

    a. Ongoing program 2014-2018
    b. Chisago Soil and Water Conservation District, Chisago County
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

Monitoring and Assessment

11. Develop a County wide annual water quality monitoring plan for nutrients, aquatic life, and other parameters to determine ambient water quality concentration trends and loading for all public waters in Chisago County, including lakes with public accesses and the main stems and selected tributaries of Rock Creek, Rush Creek, Goose Creek, Sunrise River, and Lawrence Creek.

    a. 2015-2016
    b. Chisago County
    c. $10,000 per year X 2 years = $20,000
    d. All Chisago County watersheds

12. Implement a County wide lake water quality monitoring plan.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $10,000 per year X 5 years = $50,000
    d. All Chisago County watersheds

13. Implement County wide river and stream water quality monitoring plan.

    a. Ongoing program starting in 2016-2018
    b. Chisago County, Chisago Soil and Water Conservation District
    c. $30,000 per year X 3 years = $90,000
    d. All Chisago County watersheds

14. Develop an annual water quality monitoring report for Chisago County describing the water resources that were monitored and what parameters they were monitored for. The annual report will provide a complete summary of the monitoring results.

    a. Ongoing program starting in 2014-2018
    b. Chisago County, Chisago Soil and Water Conservation District
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

15. Participate in programs such as the Minnesota Pollution Control Agency Citizen Lake and Stream Monitoring, Surface Water Assessment, or Citizen Lake Monitoring Plus.

    a. Ongoing program 2014-1018
    b. Minnesota Pollution Control Agency
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

16. Participate in county-wide DNR lake level monitoring program. Periodically collect lake level readings during open water season.

    a. Ongoing program 2014-2018
    b. Chisago Lakes Lake Improvement District, Chisago County
    c. $10,000 per year X 5 years = $50,000
    d. All Chisago County watersheds

PICKM (Pine, Isanti, Chisago, Kanabec, Mille Lacs) Alliance of Lake and River Associations

17. Support the PICKM Alliance of Lake and River Associations. Assist local lake and river associations, lake improvement districts, and lake management planning within the PICKM counties. Provide liaison and technical assistance, help facilitate grant resources for water quality improvement projects, and continue to work with existing lake and river associations as they form a 5 county alliance.

    a. Ongoing program 2014-2018
    b. Chisago County
       Supporting agencies: Local lake and river associations, Chisago Soil and Water Conservation District
    c. $10,000 per year X 5 years = $50,000
    d. All Chisago County watersheds

18. Provide lake and river associations within the PICKM counties the opportunity to attend educational events or trainings 2 times per year.

    a. Ongoing program 2014-2018
    b. PICKM Alliance of Lake and River Associations
       Supporting agency Chisago County, Chisago Soil and Water Conservation District
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

19. Strengthen existing and help form new lake and river associations in Chisago County. Provide technical assistance and act as a conduit of information between PICKM, state agencies and local lake and river associations. Provide educational opportunities at least 2 times per year for lake and river associations.

    a. Ongoing program 2014-2018
    b. Chisago County
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

SUFFICIENT RESOURCES

A Priority Concern is to obtain sufficient resources to achieve goals established in the Water Plan.

Goals

- Sufficiently fund Water Plan activities.
- Maintain sufficient staff in place to implement Water Plan activities.
- Maintain active participation of government, volunteer organizations, and citizens in Water Plan activities.

Objectives

1. Administer and coordinate the Chisago County Local Water Management Plan.

   a. Ongoing program 2014-2018
   b. Chisago County
   c. $80,000 per year X 5 years = $400,000
   d. All Chisago County watersheds

2. Administer and coordinate the Chisago Lakes Lake Improvement District Water Resources Management Plan.

   a. Ongoing program 2014-2018
   b. Chisago County
   c. $50,000 per year X 5 years = $250,000
   d. All Chisago County watersheds

3. Explore the feasibility of formation of additional lake improvement districts, watershed management organizations, or watershed districts in Chisago County.

   a. 2014-2015
   b. Chisago County
   c. $5,000 per year X 2 years = $10,000
   d. All Chisago County watersheds

4. Provide technical and administrative support to the St. Croix Basin Water Resources Planning Team.

   a. Ongoing program 2014 – 2018
   b. Chisago County
   c. $5,000 per year X 5 years = $25,000
   d. St. Croix River Basin

5. Utilize the 2009 Chisago County Biofuels Feasibility Study to continue to explore the development of a renewable energy demonstration facility in Chisago County.

    a. 2016-2017
    b. Chisago County, Chisago Soil and Water Conservation District
    c. $5,000 per year X 2 years = $10,000
    d. All Chisago County watersheds

6. Pursue additional partnership and funding opportunities. Actively pursue local, state, and federal grants

    a. Ongoing program 2014-2018
    b. Chisago County, Chisago Soil and Water Conservation District
    c. $5,000 per year X 5 years = $25,000
    d. All Chisago County watersheds

APPENDIX

IMPLEMENTATION SCHEDULE

PRIORITY CONCERNS SCOPING DOCUMENT