

# Watershed Management Plan

November 2013

## Watershed Management Plan

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Adopted by the Board of Managers North Cannon River Watershed Management Organization November 20, 2013

Prepared for the North Cannon River Watershed Management Organization by Dakota County Soil and Water Conservation District

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## 1.1 Watershed Management Vision and Framework

In the process of developing this 3<sup>rd</sup> Generation Watershed Management Plan, the North Cannon River Watershed Management Organization (NCRWMO) Board of Managers adopted the following mission statement in order to help guide the formation of its goals and policies:

#### NCRWMO Mission Statement:

"Managing groundwater and surface water to prevent property damage, maintain hydrologic balance, and protect water quality for the safety and enjoyment of citizens and the preservation and enhancement of wildlife habitat through collaboration among member communities." (Adopted July 18, 2012)

Although this mission statement was only recently adopted, the NCRWMO has been working on these tasks since its inception, often in cooperation and collaboration with others (Table 6.3). It should be noted that this Watershed Management Plan is an adaptive plan and one that is part of an on-going campaign to improve water resources in the watershed. It is not a static document aimed at fixing all water quality issues within the next 10 years. Rather, this Plan is a framework for continuing the advancement of improvements in landuse and conservation practices for the restoration and protection of water resources.

## 1.2 Location and History

The NCRWMO is a government unit formed through a joint powers agreement (Appendix A) signed by eight townships and three small cities in southern Dakota County. Dakota County lies at the southern edge of the Twin Cities metropolitan area and is considered a metropolitan county, although the NCRWMO is south of the Metropolitan Urban Service Area (MUSA) and is rural in nature. The NCRWMO has an approximate population of 5,000 (in 2011) and its jurisdiction covers approximately 150 square miles including all or part of the following communities (Figure 2.1).

Castle Rock Township Douglas Township Eureka Township Greenvale Township Hampton Township Randolph Township Sciota Township Waterford Township City of Miesville City of New Trier City of Randolph

The NCRWMO does not include a small portion of the City of Northfield that extends into southern Dakota County because a formal exemption contained in the Metropolitan Surface Water Management Act; Minnesota Statute 473.121, subdivision 2 excludes the City of Northfield.

The NCRWMO includes the sub-watersheds of Chub Creek, Trout Brook, and Pine Creek, and the Cannon River from Northfield to Lake Byllesby. The NCRWMO is predominantly rural in nature with agriculture as its primary landuse.

The NCRWMO was created in 1983 as a result of the State of Minnesota's Surface Water Management Act. Minnesota Statute 103B.201 states that the purposes of a NCRWMO shall be to:

- 1. Protect, preserve, and use natural surface and groundwater storage and retention systems.
- 2. Minimize public capital expenditures needed to correct flooding and water quality problems.
- 3. Identify and plan for means to effectively protect and improve surface and groundwater quality.
- 4. Establish more uniform local policies and official controls for surface and groundwater management.
- 5. Prevent erosion of soil into surface water systems.
- 6. Promote groundwater recharge.
- 7. Protect and enhance fish and wildlife habitat and water recreational facilities.
- 8. Secure the other benefits associated with the proper management of surface and groundwater.

The NCRWMO's Board of Managers is comprised of one representative appointed from each of the eleven communities in the joint powers agreement.

In the past ten years, the NCRWMO participated in or accomplished the following tasks (see Table 6.3 for more detail on these projects):

- ✓ Collected annual dues from member communities (This practice began in 2004, before which dues were only collected twice since NCRWMO inception in 1988.)
- ✓ Monitored water quality and flow in all major creeks
- ✓ Established and maintained the Chub Creek Permanent Monitoring Station
- ✓ Cooperated on TMDLs by lending monitoring equipment and providing data
- ✓ Received \$180,000 in grant funding to install BMPs
- ✓ Implemented cost share program to install BMPs
- ✓ Partnered with Dakota County on SSTS Upgrade Program
- ✓ Developed and adopted an ordinance establishing erosion control and storm water management requirements for land disturbances and sponsored workshops for townships
- ✓ Performed education and outreach activities including hosting tours of projects and practices, developing newsletters, sponsoring Sewer Man shows, providing grants to the Cannon River Watershed Partnership and schools, and participating in the Cannon River Festival with an informational display and booth
- ✓ Partnered with the Dakota County SWCD on a Wetland and Watercourse Inventory
- ✓ Studied various options for wetland management ordinances

## 1.3 Concerns in the Watershed

Concerns in the watershed are primarily centered on poor water quality in its creeks and lakes, and increased water quantity from drainage activities. High nitrates in Trout Brook and Pine Creek, high bacteria levels in Chub Creek, high sediment levels in Trout Brook, and high nutrients in Lake Byllesby impact the quality of fish and wildlife habitat, aesthetics, and aquatic recreation. Additionally, the balance between landowners' rights and needed buffers along watercourses concerns many residents of the watershed. See Section 4.0 for a complete discussion of issues identified within the watershed.

## 1.4 Watershed Management Goals, Strategies and Policies

The following goals are included in Section 5.0 of this Plan. While these goals are broad, the NCRWMO feels strongly that each of these areas requires their attention. Specific and measureable strategies and policies are summarized here and detailed in Section 5.0.

<u>Surface Water Quality Goal:</u> To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is "fully supporting" for its use designations according to MN State Standards. Strategies include water quality monitoring; dissolved oxygen assessments; investigation of nitrate levels in Trout Brook; participation with local partners on monitoring or studies; providing cost share for best management practices; advocating for buffers along watercourses, installation of community wastewater treatment in city of Randolph, investigation of pollution of old dump on Chub Creek, and participation in Discovery Farms. A policy requires member communities to adopt and enforce appropriate ordinances controlling installation and maintenance of subsurface sewage treatment systems.

<u>Surface Water Quantity Goal:</u> To decrease the rates and volume of water that may contribute to flooding or non-point source pollution from overland runoff and subsurface drainage and dewatering activities. Strategies include water quantity monitoring; providing cost share for best management practices; gathering and disseminating information on latest technologies to reduce impacts of tile drainage; and investigating ways to inventory existing tile lines or collect data on new tile lines. A policy requires member communities to report on the implementation of their ordinance requiring stormwater management.

<u>Soil Erosion and Sedimentation Goal:</u> To reduce soil erosion and sedimentation throughout the watershed. Strategies include providing cost share to install best management practices; developing a model ordinance to provide guidance on how to enforce erosion control standards for new and renewing tax relief program participants and road right-of-way setbacks; and receiving data on estimated sediment load reductions from installation of best management practices. Policies require member communities to report all erosion control enforcement activities to the NCRWMO.

<u>Groundwater Goal:</u> To protect groundwater quality and quantity. Strategies include providing cost share to install best management practices; and cooperating with and receiving groundwater

information and data from other entities. A policy requires communities to review mining ordinances with regards to protection of groundwater resources.

<u>Wetlands Goal:</u> To protect wetlands from destruction or deterioration and to restore wetlands where possible. Strategies include providing cost share to restore or protect wetlands with priority in the Chub Creek subwatershed; and continuing to review Wetland Conservation Act (WCA) applications. Policies require member communities to post maps of the completed Wetland and Watercourse Inventory and Assessment in their town halls and to continue working with the Dakota SWCD for WCA coordination.

<u>Wildlife, Habitat and Recreation Goal:</u> To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality. Strategies include providing cost share to install best management practices to protect or restore lakeshores and streambanks; advocating and working with various entities to promote conservation easements, wildlife management plans, improved cooperation among stakeholders, research on effects of Lake Byllesby dam on wildlife, and implementation of Lake Byllesby Total Maximum Daily Load Study.

<u>Education and Outreach Goal:</u> To increase the awareness of water resources and practices needed for their improvement or protection among all sectors of the community. Strategies include providing education on water resources and best management practices to residents and agricultural producers in cooperation with other entities; promoting volunteer water monitoring, the installation of stream crossing signs on major roads, the installation of interpretive signs at Dakota County Parks; and maintaining a NCRWMO website with meeting notices, annual report, and directory of water resource jurisdictions and contacts.

<u>Administration Goal:</u> To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan. Strategies include cultivating and maintaining partnerships with agencies and organizations for collaboration; fulfilling the requirements of a watershed management organization; and evaluating implementation of strategies and policies identified in this Plan.

## **1.5 Implementation Program Costs**

Table 6.4 in Section 6.8 includes the estimated costs of each strategy included in the Plan. Many of the strategies require minimal financial resources as they rely on the continued collaboration with other groups. The average annual cost of implementing the strategies through member dues is \$26,561. However, the NCRWMO and/or their partners (e.g. the Dakota County SWCD) will continue to apply for grants to provide cost share to install best management practices. Grant funding may also be sought for education programs and additional water quality monitoring and studies. Continued and strengthened partnerships and collaboration with other groups will further augment the implementation of the goals and strategies (as indicated in Table 6.2).

### 1.6 Plan Development Process

This Watershed Management Plan was developed with input from various groups and individuals. The Dakota County Soil and Water Conservation District (SWCD) was contracted to coordinate the Plan development process, gather input from the NCRWMO Board of Managers and a Planning Advisory Committee (PAC), write the plan, respond to comments, and produce a final document.

The PAC consisted of representatives from agencies and organizations (recruited by the SWCD), residents of the member communities (recruited by those communities), and liaisons from the NCRWMO Board of Managers. PAC meetings were facilitated by Laura Jester, SWCD.

Active Planning Advisory Committee Members:

Allene Moesler, Lake Byllesby Improvement Association Bernie Pistner, Hampton Township Beth Kallestad, Cannon River Watershed Partnership Brad Becker, Dakota County Soil and Water Conservation District Carol Cooper, Eureka Township Duane Ness, Sciota Township and NCRWMO Board of Managers Greg Langer, Greenvale Township Guenther Moesler, Randolph Township and NCRWMO Board of Managers Jeff Berg, MN Department of Natural Resources Jessica Van Der Werff, Cannon River Watershed Partnership Justin Watkins, MN Pollution Control Agency Karen Jensen, Metropolitan Council Kenny Betzold, Castle Rock Township Mark Henry, Pheasants Forever Mary Jackson, Dakota County Mary Peterson, MN Board of Water and Soil Resources Melissa Lewis, MN Board of Water and Soil Resources Mike Rademacher, Castle Rock Township and NCRWMO Board of Managers Nancy Braker, Carleton Arboretum Nancy Sauber, Eureka Township Peggy Varien, Douglas Township Randy Binder, MN Department of Natural Resources, Fisheries Tony Nelson, Trout Unlimited

Others invited and kept informed via email:

Art Persons, MN Department of Health Johnny Forrest, Dakota County Parks Department Mark Zabel, Dakota County Water Resources Department Tara Carson, MN Department of Transportation Rob Sip, MN Department of Agriculture The process of Plan development and review by the NCRWMO Board of Managers and the Planning Advisory Committee (PAC) is outlined below and included 5 meetings with the Managers and 5 meetings of the PAC. A public hearing to receive comments on the draft plan was held on May 23, 2013, 7:00 p.m. at the Eureka Town Hall.

February 28, 2012 – Kick-off meeting with NCRWMO Board; reviewed activities and timeline, began issues identification

April 9, 2012 – NCRWMO Board meeting; continued issues identification

May 1, 2012 – First meeting of the Planning Advisory Committee; began issues identification

June 5, 2012 – Second meeting of the Planning Advisory Committee; continued issues identification

July 18, 2012 – NCRWMO Board meeting; developed a mission statement; finalized issues identification

August 15, 2012 – Third meeting of the Planning Advisory Committee; began development of goals and strategies

October 10, 2012 – Fourth meeting of the Planning Advisory Committee; finalized development of goals and strategies

October 22, 2012 – Draft of Plan Section 5 (Goals, Strategies and Policies) distributed to PAC for review and comment

November 14, 2012 – Draft of Plan Sections 2 - 5 distributed to Board and PAC for review and comment

November 28, 2012 – NCRWMO Board meeting; discussed entire Section 5 (Goals, Strategies and Policies)

December 10, 2012 – Draft of revised Sections 2 – 5 distributed to PAC for review

January 16, 2013 – Fifth Planning Advisory Committee meeting to discuss Implementation Program January 30, 2013 – NCRWMO Board meeting to discuss Implementation Program and take action to submit draft Plan for 60-day review

The NCRWMO would like to acknowledge and thank the following groups:

The Planning Advisory Committee comprised of watershed residents and representatives from agencies and organizations for their interest and input on this plan's development and for attending numerous meetings over the course of the year.

The Dakota County Soil and Water Conservation District for drafting this plan and facilitating the Advisory Committee

## 1.7 Acronyms

BMP	Best Management Practices
BWSR	(Minnesota) Board of Water and Soil Resources
CFS	Cubic Feet per Second
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FNAP	Farmland and Natural Areas Program
GIS	Geographic Information System
HEL	Highly Erodible Land
IBI	Index of Biotic Integrity
LBIA	Lake Byllesby Improvement Association
LGU	Local Government Unit
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MSHA	Minnesota Stream Habitat Assessment
MUSA	Metropolitan Urban Service Area
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
OHWL	Ordinary High Water Level
PAC	Planning Advisory Committee
SSTS	Subsurface Sewage Treatment System
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture
WCA	Wetland Conservation Act
WMA	Wildlife Management Area
WOMP	Watershed Outlet Monitoring Program
WRAPP	Watershed Restoration and Protection Plan

## 2.1 Hydrology, Geology, and Groundwater Resources

More detailed information related to surficial and bedrock geology, depth to bedrock and bedrock topography, Quaternary and bedrock hydrogeology, sensitivity of groundwater to pollution, and geology as it relates to well construction can be found in the "Geologic Atlas of Dakota County, Minnesota, Atlas C-6, 1990, Balaban, N.H. and Hobbs, H.C." available through the Minnesota Geologic Survey at <u>http://conservancy.umn.edu/handle/58494</u>.

For more information on the entire Cannon River Watershed, contact the Cannon River Watershed Partnership or visit their website at <u>www.crwp.net</u>.

Also see the "Physical Characteristics of Stream Sub-basins in the Cannon River Basin, Southeastern Minnesota, 2000, USGS open-file report number 99-472, Sanocki, C.A. and Winterstein, T.A." available at <u>http://pubs.er.usgs.gov/publication/ofr99472</u>.

Also see the Dakota County 2008 Comprehensive Plan for additional information on groundwater. Specifically, see the Policies, Goals, and Objectives on pages 2.3.11-2.3.18 (61-68) and the inventory on pages 2.4.17-2.4.20 (89-92).

Also see MDNR Groundwater Level Monitoring Program at <u>http://climate.umn.edu/ground\_water\_level/ and</u> <u>http://www.dnr.state.mn.us/waters/groundwater\_section/obwell/index.html</u>

Find an interactive map of the Wetland and Watercourse Inventory and Assessment (WWIA) at <u>http://gis.co.dakota.mn.us/DCGIS/</u>.

More information about the WWIA project can be found at <u>http://dakotaswcd.org/gis\_projects.html</u>.

#### Watershed Location

The North Cannon River Watershed Management Organization (NCRWMO) drains approximately 150 square miles in the southern third of Dakota County in eastern Minnesota (Figure 2.1). Dakota County lies at the southern edge of the Twin Cities metropolitan area and is considered a metropolitan county, although the NCRWMO is south of the Metropolitan Urban Service Area (MUSA) and is rural in nature. The NCRWMO includes all or part of eleven communities including the townships of Castle Rock, Douglas, Eureka, Greenvale, Hampton, Randolph, Sciota, and Waterford, and the small cities of Miesville, New Trier, and Randolph (Figure 2.1).

The NCRWMO lies at the northern edge of the Cannon River watershed, which drains a total of 1,470 square miles in 6 southeastern Minnesota Counties (Figure 2.1). However, approximately 90% of the NCRWMO drains directly to the Cannon River within Dakota County (without crossing into a neighboring County).

#### Hydrology

There are several significant surface water features in the NCRWMO including Chub Lake, Lake Byllesby, Chub Creek and its tributaries, Pine Creek, Trout Brook, and a section of the Cannon River (Figure 2.2). Streams and rivers in the watershed (including intermittent and perennial streams) were inventoried and assessed by the Dakota County SWCD through the Wetland and Watercourse Inventory and Assessment project in 2007 and 2008. That project found that only 2.5% of the watercourses are considered high quality while 20% and 77.5% are considered medium and low quality, respectively (Figure 2.18).

#### Chub Creek

Chub Creek originates in Chub Lake, a natural 274-acre lake (with a maximum depth of 10 feet) with a large adjacent wetland. The Chub Creek subwatershed drains 67.6 square miles in Dakota County, with some additional drainage area in western Rice County. Chub Creek is 22.7 miles in length and the major tributaries of Dutch Creek, Mud Creek, and the North Branch of Chub Creek are 9.3, 7.0, and 8.6 miles in length, respectively. Many other small tributaries and ditches – both perennial (constantly flowing) and intermittent (not always flowing) also run into Chub Creek for a total of 169 miles of stream channels in the sub-watershed (Figure 2.2). The sub-watershed is generally flat, making the streams meander slowly through the landscape.

The hydrology of the Chub Creek sub-watershed has changed substantially since pioneers began settling the area. An estimated 50% of the wetlands have been lost due to draining or filling, primarily for agricultural use. Historically, many natural streams were straightened and many new ditches were created in an effort to drain wetlands. These changes impact the streams by forcing them to carry more water more quickly than nature intended, thereby carrying more pollutants, causing streambank erosion and sedimentation, and increasing flooding potential. Much of the North Branch of Chub Creek is one of two jurisdictional ditches in the County.

Another man-made alteration occurred at the outlet of Chub Creek. The creek now empties into the Cannon River at Hwy. 56, just upstream of Lake Byllesby. Historically, however, the creek emptied directly into Lake Byllesby. The creek's channel was altered when Hwy. 56 was built in the 1950s (Figure 2.13). The wetlands and "backwaters" that were once associated with the outlet of Chub Creek into the lake were excellent spawning grounds for northern pike and other gamefish. The dike placed to redirect the creek's flow has been eroding away for decades as the creek tries to reclaim its original channel.

#### Pine Creek

Pine Creek runs 5.8 miles, mostly through southern Hampton Township in the eastern half of the watershed. The Pine Creek sub-watershed drains approximately 21 square miles of flat, agricultural land. Most of the creek's length was ditched and straightened to create County Ditch #1 in 1960 (Figure 2.2). Many additional intermittent streams and ditches enter Pine Creek throughout its length. With few meanders and a medium slope, the creek flows fairly quickly along its length. The creek is designated by the Minnesota Department of Natural Resources (MDNR) as a trout stream downstream of Hwy. 52 (Minnesota State Rules Chapter 6264.0050; www.revisor.mn.gov/rules/?id=6264.0050).

#### Trout Brook

Trout Brook runs through southern Douglas Township in the far southeastern corner of the watershed. Although the Trout Brook subwatershed drains over 26 square miles, there are only 8.8 stream miles that contain water year-round (perennial) (Figure 2.2). Most of the drainageways fill with water only during snow melt and storm events creating intermittent streams. Trout Brook has the highest slope of all the streams or creeks in the NCRWMO and even the uppermost portions of the subwatershed has rolling hills of cropped land (Figure 2.4). It flows relatively quickly through the Miesville Ravine Park Reserve and into the Cannon River. The majority of land in this subwatershed is agricultural although the lower portion in the Park is bordered by steep, forested hills and some rocky outcroppings. The perennial portions of Trout Brook are primarily spring-fed (note the paragraphs and maps on groundwater sensitivity to contamination and surface water – ground water connections further in this section). When rain or snowmelt run off the upper parts of the sub-watershed, Trout Brook rises quickly and becomes extremely turbid or cloudy. These runoff events also subside quickly creating a "flashy" stream. The lower sections are MDNR-designated trout streams (Minnesota Rules Chapter 6264.0050; www.revisor.mn.gov/rules/?id=6264.0050).

#### Lake Byllesby

The Byllesby Reservoir, or Lake Byllesby, was formed when the Byllesby hydroelectric dam was constructed on the Cannon River near Cannon Falls in 1910. The lake is divided by Dakota and Goodhue Counties and lies between the Cities of Randolph and Cannon Falls at the southern edge of the NCRWMO. Lake Byllesby is 1,435 acres in area with a mean depth of 11.6 feet and a maximum depth of 50 feet. It has a contributing sub-watershed area of 1,116 square miles (over 700,000 acres) (Figure 2.1). The flow through the Byllesby dam is highly regulated and used for generating hydroelectric power. The dam is owned by Dakota County and regulated by the Federal Energy Regulatory Commission and the MDNR. Dakota County contracts with a vendor to operate the County-owned turbines that produce electricity. The operator then sells the energy produced by the dam to Xcel Energy. Lake Byllesby Dam generates enough electricity to power about 2,400 homes for a year.

In order to meet Federal Energy Regulation Commission requirements, the Byllesby Dam requires some updates. Regulations require that the dam meet standards for 100 percent of a Probable Maximum Flood, the most severe possible flood and is calculated by combining information about precipitation, geology, and water management strategies. It is calculated partially by the Probable Maximum Precipitation, which is the greatest theoretical amount of precipitation for an area. To reach the worst-case scenario, the Cannon River Watershed area would need to get the equivalent of 24 inches of rain over a 10-square mile area in six hours. A part of the Byllesby Dam will be going through some construction updates in 2012-2013.

Dakota County maintains the Lake Byllesby Reservoir winter and summer water levels. A permit from the MDNR establishes the summer and winter elevation requirements. The summer elevation is 856.7 feet from May 15 to October 1. The winter elevation is 853.7 feet from October 1 to May 15. The fall drawdown gradually lowers the water by three feet to just below the sill of the Byllesby Dam. This lowers adjacent groundwater levels accommodating local agricultural needs. Annual refilling of the reservoir begins on May 15. Get more information on the Lake Byllesby dam at: www.co.dakota.mn.us/EnvironmentRoads/LakeByllesbyDam/default.htm

One unnamed stream (locally known as Dorden Glen Creek), almost 4 miles in length, is tributary to the Cannon River in this sub-watershed just downstream from Lake Byllesby at Hwy. 52. There is no known data regarding the water quality or quantity of this stream.

#### Cannon River

Although the Cannon River upstream of Lake Byllesby drains over 1,000 square miles of land from six counties, the Cannon River sub-watershed in the NCRWMO includes only 18.4 square miles of land in southern Dakota County (Figure 2.2).

A small section of the Cannon River, 8.6 miles, runs through a corner of Dakota County in Waterford and Sciota Townships before entering Lake Byllesby in Randolph Township (Figure 2.2). The Cannon River is one of seven designated Wild and Scenic Rivers in Minnesota. The recreation designation is from Faribault to Cannon Falls, while the scenic designation is from Cannon Falls to the Mississippi River. The Cannon River is also designated as an Outstanding Resource Value Water from Faribault to the Mississippi River. The Wild and Scenic River Act provides protection for a designated river or segment by limiting the licensing of dams, reservoirs, and other water projects that are on the river segment or which may adversely affect the river segment.

A flow gauge on the Cannon River at Carleton College in Northfield is no longer operational. Data collected here in the past recorded Cannon River base flows of 120 – 130 cubic feet per second (cfs) and extreme flows (like April and June 2001) of 7,000 cfs. The U.S. Geological Survey recently installed a new flow gage in Northfield and began collecting flow data in November 2012. http://waterdata.usgs.gov/mn/nwis/uv/?site\_no=05355024&PARAmeter\_cd=00065,00060

#### Ditches

There are two ditches under public jurisdiction within the NCRWMO (Figure 2.3). County Ditch #1 is located in Hampton and Douglas Townships and includes much of Pine Creek. County Ditch #2 is located mostly in Waterford Township and includes much of the North Branch of Chub Creek. The last official report on the condition and management of the ditches was prepared by Dakota County in 1991. The report recommended that the County transfer ditch management to the NCRWMO or the Dakota County Soil and Water Conservation District (SWCD). However, the County remains the ditch authority as NCRWMO declined to take on the responsibility and the SWCD lacks statutory authority to administer public ditches. Ditch #2 was designed to store water and move it slowly downstream because of the level topography. Ditch #1 was designed to drain the "Randolph Flats," a virtually level area near Lake Byllesby. Grasses in the ditch appeared to be trapping a considerable amount of sediment. Over time, the growth of the grasses has resulted in a substantial vegetative mat encroaching from the ditch banks and restricting flow to a meandering path through the center of the ditch.

#### Shoreland and Floodplain

Activities within shoreland and floodplain in Dakota County townships are regulated by the County through the Shoreland and Floodplain Management Ordinance 50. In these areas (Figure 2.3) the County must approve land use decisions in shoreland areas and the landward extent of the flooplain. Although cities with MDNR public waters and/or floodplain are required to adopt MDNR-approved

shoreland ordinances, the MDNR has delegated the authority to Dakota County in the 13 unincorporated townships (see Section 4.0 for more information).

The County recently completed a countywide floodplain restudy including flood-prone regions in the NCRWMO. This study was adopted by the Dakota County Board of Commissioners on November 15, 2011 as part of an amendment to Ordinance 50, and by the Federal Emergency Management Agency (FEMA) on December 2, 2011. New floodplain maps are available for review at the Dakota County Water Resources Department (*Dakota County Western Service Center, 14955 Galaxie Ave., Apple Valley*), at township halls, and on FEMAs website at www.fema.gov.

#### Wetlands

In 2007 and 2008, the Dakota County SWCD performed the Wetland and Watercourse Inventory (WWIA) throughout the Vermillion and North Cannon River Watersheds. This project inventoried and remotely assessed the conditions of wetlands and streams within the NCRWMO with funding from the Metropolitan Council and the NCRWMO. A method adopted from the Minnesota Routine Assessment Methodology (MnRAM) was used to evaluate the general functions and values of wetlands. Characteristics of each wetland basin were recorded and mapped including position in the landscape, existing and potential connectivity to upland buffer vegetation, flood or storm-water storage, groundwater interaction, recreation and education opportunity, shoreline protection, water quality protection, and wildlife habitat. High, medium and low value rankings were assigned to each characteristic and then to each wetland as an overall score (Figure 2.18). A GIS database houses the information from the inventory and assessment and can be updated new field information is obtained or conditions change.

The wetland portion of the project inventoried and assessed 8,134 acres of wetlands throughout the NCRWMO. The assessment found 16% of wetlands with a "high" ranking, 64% with "medium" ranking, and 20% as "low" ranking (Figure 2.18).

#### Topography

The topography of the NCRWMO is largely a function of several glacial advances. In general, the topography consists of rolling to steeply rolling hills in some areas, with large expanses of flat land (Figure 2.4). The NCRWMO has a maximum elevation of 1,211 feet above sea level in Section 31 of Eureka Township, and a minimum of elevation of 460 feet above sea level in the lower reaches of Trout Brook. Most of the geographic relief in the watershed is found around Chub Lake and along Trout Brook. Steep hills, bluffs, and rocky outcroppings exist in the Miesville Ravine Park Reserve along the lower sections of Trout Brook. The northern tier of the watershed has rolling hills and a bluff that drops to a large expanse of flat land in the mid sections of the watershed. More rolling hills lay in the southwest portion of the watershed.

#### Geology

The geology of the NCRWMO can be described by two major units: surface geology and bedrock geology. The surface geology includes all those deposits above the bedrock formations: primarily glacial tills and outwash, alluvium (river deposits), and lacustrine (lake) deposits. Bedrock geology in the watershed consists of several layers of limestone, dolomite, sandstones, and shales associated with advances and regressions of ancient seas (Figure 2.5).

#### Surface Geology

Surface geology in the NCRWMO consists of materials that have been deposited within the last two million years including glacially derived or reworked materials and non-glacial deposits. The non-glacial deposits include floodplain alluvium (river deposits), colluvium (materials deposited by gravity at the foot of a slope), and organic deposits. Since much of the geologic record was erased during the last major glaciation, most of the surface deposits in Dakota County were laid down less than 75,000 years ago.

Glacial deposits consist of sands and gravels, till, and loess. Sand and gravel deposits are generally associated with glacial outwash, which refers to materials deposited beyond the terminal margin of the ice. Outwash is usually well sorted and normally consists of rounded sand and gravels carried and reworked by streams and channels formed from glacial melt water. Finer silts and clays generally settle out in glacial lakes or are carried completely out of the system. The well-sorted gravel deposits mined in the Dakota County or the NCRWMO are, for the most part, found in glacial outwash deposits. The coarse texture of these deposits allows for the formation of surface aquifers. Where the outwash is close to the surface, these aquifers are particularity susceptible to contamination.

Another deposit associated with glaciation is loess. Loess is usually classified as homogeneous, fine windblown silt winnowed from glacial outwash and laid down in blanket-like deposits. Loess is generally highly porous and contains significant amounts of sand (5-10 percent) and clay (5-30 percent). Loess deposits are found in portions of Hampton Township and throughout much of Douglas Township.

The non-glacial surface deposits found in the watershed are floodplain alluvium, colluvium, and organic deposits that associated with events that occurred in the relatively recent geologic history (less than 12,000 years ago). In many cases the physical processes that created these deposits continue to work today.

Floodplain alluvium is generally poorly bedded, moderately well sorted sediments deposited by modern streams during flood stage. This consists mostly of sand in the valley of the Cannon River. Minor deposits of well-sorted sands have also been recorded in the Miesville Ravine along Trout Brook.

Organic deposits, mostly peat and mucky soils, are found in parts of Castle Rock Township. Peats and muck have a high capacity to absorb and hold water. Where they have not been ditched or tiled, wetlands are usually found in these areas.

Colluvium is found in small deposits scattered throughout watershed. Colluvium deposits are poorly sorted localized deposits derived from eroding hill slopes. These deposits generally consist of native rock topped with loess.

#### Bedrock Geology

The bedrock underlying the NCRWMO is part of the Twin Cities Basin that was formed during the Paleozoic Era (225-600 million years ago). All the bedrock formations in the watershed are marine sedimentary rock consisting of dolomite, limestone, sandstones, and shales associated with the advancing and receding of ancient seas in the area. Sand accumulated in near-shore bars, on beaches, and in sand dunes; silt and clay formed mud flats or settled out in quiet waters farther from shore; and carbonate derived from remains of invertebrate shells and algae accumulated in small banks and reefs and as layers on the sea floor. Over time, these sediments were compressed and hardened to form sandstone, shale, and dolomitic limestone of today.

Islands of the Platteville and Glenwood Formations are distributed throughout much of northern portion of the watershed. The Platteville Formation varies in thickness between 18 to 28 feet and is made up of a fine-grained dolostone and limestone. The Glenwood Formation varies between 2.5 to 10 feet thick and consists of green, sandy shale. Many of the flat-topped mesas in the southeastern part of the County are capped with the relatively resilient Platteville Formation. The St. Peter Sandstone is a widely distributed formation located below the Glenwood formation. The upper one-half to two-thirds of this formation is a poorly cemented homogenous quartzose sandstone. The lower parts of this formation contain multicolored beds of sandstone, siltstone, and shale interbedded with coarse-grained sandstone. This formation varies in thickness but is approximately 130 feet in the NCRWMO.

The Prairie du Chien Group that underlies the St. Peter Sandstone is a geologic unit made up of the Shakopee Dolomite, New Richmond Sandstone, and the Oneota Dolomite. The dolostone of the Shakopee formation forms the upper one-half to two-thirds of this unit. It is commonly thin bedded and sandy or oolitic (rounded pebbles generally with sandy center created in near-shore environments) and contains thin beds of sandstone and chert (silicate rock). The lower part of this unit, the Oneota Dolomite, is commonly thick and is generally not oolitic or sandy except in the transition zone just above the Jordan Sandstone. Dolostone in both formations is karsted, and the upper part, where the overlying formation may have been eroded, is rubbly. The Prairie du Chien Group underlies almost all of Dakota County and ranges in thickness from 240 to 280 feet in the NCRWMO. The Jordan Sandstone occurs below the Prairie du Chien Group. This formation is a poorly cemented, cross-bedded, quartzose sandstone that is approximately 115 feet thick.

#### **Groundwater Resources**

The Prairie du Chien Dolostone Aquifer and Jordan Sandstone Aquifer are the primary water supplies for domestic and high-capacity irrigation wells in the watershed (Figure 2.5). Groundwater quantity and quality have not been limiting in either aquifer, though there is evidence that quality is becoming a concern in the Prairie du Chien. Currently, data from one well in the Jordan Aquifer indicates a statistically significant decrease in nitrate levels and one well in the Prairie du Chien Aquifer in Castle Rock Township indicates a statistically significant increase in nitrates (2012, *personal communication, Dakota County staff*).

#### Aquifers

The Platteville Limestone and St. Peter Sandstone formations are present in isolated areas, and are not important aquifers in this watershed. The lower strata of the St. Peter formation have confining features and provide some protection to the Prairie du Chien formation.

Unconsolidated sediments, forming a connected aquifer unit that is unconfined above, typically overlie the Prairie du Chien formation, and are not hydrologically separated from it. Chemically eroded fractures (karst) are common in the limestone and are its most important source of hydraulic conductivity; as a result, it is difficult to accurately predict flow paths in this aquifer. The Prairie du Chien Aquifer is prohibited for new potable water supply wells in most of the area east of Waterford Township because it lacks fifty feet of cover within a one mile radius, though many older domestic wells use that aquifer there.

The Jordan Aquifer is weakly separated from the Prairie du Chien Aquifer by the Oneota formation, the lower member of the Prairie du Chien. This confinement is sufficient to produce artesian conditions in the Jordan Aquifer along the Cannon River.

Aquifers deeper than the Jordan are rarely used here, and information about them is extrapolated from areas to the north. In general, these lower aquifers are thought to have limited interaction with the upper aquifers because of the strong separation provided by the St. Lawrence formation. The Tunnel City Group (formerly named Franconia Formation) – Wonewoc Sandstone (formerly named Ironton and Galesville Sandstone) Aquifer lies below the St. Lawrence. The City of New Trier has a municipal well completed in the Tunnel City Group. The Mt. Simon Sandstone Aquifer is very strongly separated from the Wonewoc by the Eau Claire formation.

#### Groundwater Flow and Quantity

The northern edge of the NCRWMO boundary in Dakota County is a surface water divide, but it corresponds roughly with a groundwater divide computed by the Dakota County Groundwater Model (Barr Engineering, 1996). Along this divide the upper aquifers have a higher head than the lower aquifers and the groundwater is forced downward to recharge the lower aquifers. Along the Cannon River itself, the Jordan Aquifer has a higher head than the aquifer above, and the groundwater is forced upward.

Groundwater is recharged by rainfall and infiltration from surface waters. Natural groundwater discharge occurs along the Cannon River, Trout Brook, and to a lesser extent, some other creeks and springs.

Groundwater quantity has not been limiting in this watershed; rather, high water tables have been a problem for agricultural activities in some areas. There is an extensive network of drainage activities used to lower water tables. In addition, the MDNR has monitored high water table levels north of Lake Byllesby since its construction. Anecdotal evidence indicates rising water levels in some places over the last 50 to 100 years. Some of this may be related to the construction of large diameter irrigation wells connecting the Prairie du Chien Aquifer with the Jordan Aquifer below.

#### Groundwater Quality

Groundwater quality is highly dependent upon aquifer geology and any interactions with surface water or contaminant sources. Water from the Prairie du Chien and Jordan aquifers is generally low in dissolved solids although levels of iron, manganese, and total nitrates can be locally high and may exceed drinking water criteria. In general, drinking water quality, particularly the level of nitrate, is a function of the depth and the age of the well. Older wells are more likely to be shallow and not properly grouted around the well casing. Newer wells are more likely to be deeper and properly grouted around the well casing. Older wells thus are more likely to draw in younger water, and younger water is more likely to be contaminated.

The unconsolidated sediments aquifer is primarily composed of alluvium and glacial drift. Groundwater samples from this aquifer have had high levels of dissolved solids, aluminum, iron, lead, and manganese in localized areas. Total nitrate may exceed the drinking water standard of ten parts per million (ppm) or milligrams per liter (mg/L).

Dakota County's Ambient Groundwater Quality Study, designed to track changes in groundwater quality through time, has sampled several wells located within the watershed in the Prairie du Chien and Jordan aquifers. In 2000 - 2001 the study sampled eight wells in the Prairie du Chien aquifer and found four wells with less than five parts per million (ppm) of nitrate and three wells with nitrate greater than five ppm but less than ten ppm. Only one well had nitrate exceeding the drinking water standard of ten ppm. All four of the wells that had five ppm of nitrate or more also had detectable levels of pesticide and/or a pesticide breakdown product. However, there were no exceedances of water quality standards in these wells... The study sampled seven wells completed in the Jordan aquifer and found no detectable levels of pesticides and no nitrate above one ppm.

#### Sensitivity to Contamination in Groundwater

Figure 2.6 depicts general areas in the watershed that have varying degrees of susceptibility to pollution in the Prairie du Chien – Jordan aquifers. While the western portions of the watershed are rated low-moderate to high-moderate in their susceptibility, central and eastern portions of the watershed are rated high to very high in susceptibility. These ratings are based on characteristics of rock and sediment known to overlie the aquifer and the estimated travel time for water-soluble, geologically inert contaminants released at the surface to reach the Prairie du Chien-Jordan aquifer. These ratings are not contaminant specific as different substances move through the groundwater in different ways (Minnesota Geologic Atlas, 1990). However, it does indicate that the vertical seepage of pollutants from the surface of the land to groundwater can significantly contribute pollution to streams like Trout Brook that are largely groundwater fed. (See Section 2.5 for more on the relationship between landuse and nitrogen levels in streams.)

This map does not take into account human activity on the land's surface. Improperly constructed or abandoned, unsealed wells can create direct conduits for contaminants to enter aquifers and degrade or impact the ground water quality. The map also does not take into account the fact that deeper aquifers are somewhat protected from infiltrating contaminants in areas where the groundwater is discharging to the surface, discussed below.

#### **Groundwater – Surface Water Connections**

The map in Figure 2.6 shows all known springs, seepages and sinkholes in the watershed. Springs are locations where groundwater discharges out of the ground's surface. Seepages are places where the surface is saturated with groundwater. Sinkholes occur where the surface is underlain by carbonate bedrock that is dissolved by mildly acidic groundwater to form circular to elliptical depressions. These depressions range in size from less than 3 feet to more than 50 feet in diameter and from 1 to 50 feet deep.

According to the Minnesota Geological Survey maps for Dakota County (1990), there are several known springs across the northern tier of the watershed in Eureka, Castle Rock, and Hampton townships. Additionally, there are many springs along the Cannon River in Sciota Township and along Trout Brook in Douglas Township. The only mapped seepage occurs along a tributary to Pine Creek in eastern Hampton Township. A few known sinkholes are scattered throughout the middle of the watershed, and a cluster of several sinkholes occurs in eastern Douglas Township (Figure 2.6). Perennial tiles and ditches may be considered a form of seep or spring, and may mask natural seeps or springs.

A 2012 investigation of the karst hydrogeology in the Trout Brook subwatershed by the University of Minnesota found that only 30-40 percent of the total flow in Trout Brook is from discrete springs, and the rest appears to be from distributed groundwater discharge directly into the stream. Both the discrete springs and the distributed recharge occur along reaches of Trout Brook that drain the significant high transmissivity zone near the bottom of the regionally important Shakopee aquifer (Groten, Joel T and C. E. Alexander, Karst Hydrogeologic Investigation of Trout Brook, Dakota County, Minnesota, University of Minnesota, 2013.)

## 2.2 Precipitation and Climate

For more information on the precipitation and climate in Minnesota, visit the Climatology Working Group website at <u>http://climate.umn.edu</u> or the State Climatology Office at <u>http://www.dnr.state.mn.us/water/index.html</u>.

Historical climate and precipitation data for the NCRWMO originates from the National Weather Service monitoring sub-station in Farmington, MN. However, the Metropolitan Council installed an automated rain gauge at its Watershed Outlet Monitoring Program (WOMP) site in Welch, MN in 1999. Located very near the NCRWMO, recent (1999-2012) precipitation data from this monitoring location are shown in Figure 2.7.

The climate in the NCRWMO is predominantly continental, characterized by cold, dry winters and warm, sub-humid summers. The average daily temperature for Dakota County is 54.4 °F (National Weather Service sub-station in Farmington, MN). The average recent April-October (growing season) precipitation for 1999-2012 at Welch, MN is 18.23" which is substantially less than the historical 1850-1998 precipitation record (Farmington, MN) of 21.83" (Figure 2.7).

Although recent growing season precipitation amounts are less than historical averages, spells of wet weather are not without precedence and the climate can change quickly between wet and dry regimes. These dramatic changes were observed as recently as 2010-11 and in 2012. Total 2010 April-October precipitation equaled 27.95", while total 2011 April-October precipitation decreased to 18.48" (Figure 2.7). In 2012, the precipitation total for the year was above average, but 41% of the total rainfall (11.38") came during one week in June which caused serious flooding in some parts of the watershed.

## 2.3 Soils

The soils of the NCRWMO can be summarized by dividing the watershed into three areas that share similar soils: the Upper Watershed, the Central Watershed, and the Lower Watershed (moving west to east across the watershed). The Upper Watershed includes the townships of Eureka, Greenvale, and Waterford. The Central Watershed includes Castle Rock, Sciota, and Randolph Township, and the southern half of Hampton Township. The Lower Watershed includes Douglas Township and the northern half of Hampton Township.

The Upper Watershed has well-drained to somewhat poorly-drained soils formed in loam and silt sediments and loamy glacial till (Figure 2.8). The well-drained loam soils are typically found on gently sloping to moderately steep hills, while the somewhat poorly-drained silty loam soils are typically found in the depressional areas between the slopes. The Upper Watershed has the largest concentration of hydric soils<sup>1</sup> in the NCRWMO (Figure 2.10). The topography of Eureka and Greenvale Townships confine hydric soils to small, scattered depressional pockets, while the hydric soils in Waterford Township are found in expansive, level stretches of land (Figure 2.10). The soils of the Upper Watershed have a moderately high susceptibility to sheet and rill (channelized) erosion due to their texture, slope, and permeability. The relatively small amount of Highly Erodible Land

 $(\text{HEL})^2$  found in the Upper Watershed is primarily concentrated on the steep slopes adjacent to Chub Lake. (Figure 2.10)

The elevated portions of the Central Watershed have steep terraces of exposed bedrock. These terraces are surrounded by sloping, loamy farmland that drains downward toward expansive, nearly level poorly-drained silt loams (Figure 2.8). The soils in the Central Watershed have low available water capacity and high permeability; therefore many of the crops in this area are irrigated with center pivot towers. Heavier loam soils within the Chub Creek floodplain bisect the Central Watershed. Soils in this area are affected by the seasonal high water table and have low permeability rates (Figure 2.9). Hydric soils are found on the large, level, poorly-drained outwash areas and along the narrow drainage floodplains (Figure 2.10). HEL soils are sparsely scattered throughout the Central Watershed and are typically found on steep upland terraces (Figure 2.10).

The well-formed drainage systems found in the Lower Watershed differentiate its soils from the rest of the NCRWMO. The Lower Watershed's long, steep slopes and well-drained loamy soils create significant potential for erosion. Most agricultural producers use conservation tillage and planting methods to control runoff and reduce erosion potential. Many crops in this area are irrigated. Hydric soils are limited to small, narrow drainage valleys (Figure 2.10) and HEL soils are predominantly concentrated on the steep slopes and deep stream valleys adjacent to Trout Brook (Figure 2.10).

<sup>1</sup> Hydric soils refer to a subsoil feature indicating that the soil is saturated with water much of the year. They are typically found where permeability is low and groundwater is at or near the surface.

 $^{2}$  The basis for identifying highly erodible land is the "erodibility index" of a soil map unit on the soil survey. The erodibility index of a soil is determined by dividing the potential erodibility for each soil by the soil loss tolerance (T) value established for the soil. The T value represents the maximum annual rate of soil erosion that could take place, per acre, without causing a decline in long-term productivity. Land with soil with an erodibility index of 8 or more is considered highly erodible land (HEL).

## 2.4 Land Use, Public Utilities, and Recreation

#### Landuse and Public Utilities

Landuse and zoning authority in Dakota County is regulated by townships and cities, except for shoreland areas within townships.

Although prairies, wet prairies, and oak openings and barrens once dominated the watershed before settlers arrived (Figure 2.11), most of the watershed is now used for agriculture. In 2012, nearly 74% of the land is used for agriculture, with the vast majority of those acres in row crops. Another 15% of the land is covered in grasses, shrubs, trees, wetlands and open water. The remaining 11% is considered developed (Table 2.1, Figure 2.12).

		% of	Chub	Pine	Trout
Cover Type	NCRWMO	NCRWMO	Creek	Creek	Brook
Developed (residential, commercial,	10,182	10.8%	4,296	987	1,560
roads, farmsteads)					
Row Crop Agriculture	63,474	67.3%	27, 465	9,541	14,249
Other Agriculture (Hayfields,	6,050	6.4%	3,209	1,156	869
Pastures, Sod & Tree Farms)	-			-	
Other Lands (Grasslands, Shrublands,	14,644	15.5%	8,278	1,358	2,193
Wetlands, Woodlands)	,			·	
Total Acres	94,350	100%	43,248	13,042	18,871

Table 2.1. Landcover in acres in NCRWMO and major tributary subwatersheds (excludes land directly tributary to Cannon River and Lake Byllesby). Source: Dakota County Soil and Water Conservation District, 2012

The Metropolitan Urban Service Area (MUSA) (i.e. the area with current or future urban services such as sanitary sewer service) does not currently extend into the NCRWMO boundary and there are no future plans for the MUSA line to extend in the NCRWMO.

Due to the lack of developed land in the watershed, stormwater infrastructure such as ponds and pipes is very limited. It should be noted, however, there is a 500 square foot bioretention cell installed at Highview Christiania Church in Eureka Township. The cell was installed to provide water quality treatment for the first ½ inch of stormwater runoff from approximately 14,000 square feet of impervious parking area.

#### **Groundwater Appropriations**

Active groundwater and surface water appropriations permitted by the MDNR in the NCRWMO are available at: <u>http://files.dnr.state.mn.us/waters/watermgmt\_section/appropriations/index-county-location-active.pdf</u>

Crop irrigation is a significant use of groundwater in the NCRWMO. There are 142 groundwater appropriation permits for major crop irrigation in the watershed. In 2011, these wells pumped approximately 2.2 billion gallons of water (although permits would have allowed approximately 6.4 billion gallons to be pumped for irrigation).

There are two community wells in the NCRWMO serving the cities of New Trier and Randolph which pumped a total of 23.8 million gallons in 2011. Wellhead protection areas cover two small areas in the watershed including the northeast corner of Randolph Township (for the City of Cannon Fall well) and just northwest of the city of Randolph,

#### **Surface Water Appropriations**

A surface water appropriation permit is required from the Minnesota Department of Natural Resources (MDNR) for water withdrawals over 10,000 gallons per day or one million gallons per

year. There are five active surface water appropriations permitted by the MDNR in the North Cannon River Watershed (Table 2.2).

Table 2.2. Active surface water appropriations permitted by the MDNR in the NCRWMO. Source: <u>http://files.dnr.state.mn.us/waters/watermgmt\_section/appropriations/index-county-location-</u>active.pdf - February 2012

	±		-	Permit		Resource	Permi	itted					
Permit	ttee	Use		Number	Location	Туре	Acres		GPM		MGY		
Lorenc	es	Major	Crop	1989-6389	T112 R20	Pit/Pond	70		700		20		
Berry H	Farm	Irrigati	on		Sec. 3								
Report	ted Pun	nping (N	IGY)	•	•								
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
11.2	7.3	2.7	10.9	13.6	10.6	14.7	13.8	13.8	14.7	11.6	NA	NA	
				Permit		Resource	Permi	itted					
Permit	ttee	Use		Number	Location	Туре	Acres		GPM		MGY		
Gopher	r Hills	Golf C	ourse	1994-6214	T113 R17	Pit/Pond	35		250		20		
Inc.		irrigati	on		Sec. 26								
Report	ted Pun	nping (N	IGY)	•	•								
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
0	0	16.0	0	0	0	0	0	0	0	0	NA	NA	
				<b>D</b> ''		D	<b>D</b> .						
			Permit	Lagation	Resource	Permi	itted						
Copher Hills		Colf C	olf Course 2004-30		T112 D17	Type Dit/Dond	Aaros		GDM		MGV		
Juo		irrigation		2004-3043	$\frac{1115 \text{ K17}}{\text{Sec} 25}$	FIUFOIId	65		0FWI 800	800		37.0	
Benor	tod Pun	ning (N			BCC. 23		05		800		37.0		
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
0	0	0	0	0	0	0	0	0	0	0	NA	NA	
	Ŭ	ů.	Ű	0	•	0	Ũ	Ŭ	Ű	Ũ	1111	1111	
				Pormit		Besource	Dormi	ittad					
Permit	tee	Use		Number	Location	Type	Acres	licu	GPM		MGY		
Barsne	ss	Sand a	nd	rumber	Location	Турс	NA		300		25		
Constru	uction/	Gravel	liu	2000-6013	T112 R19	Pit/Pond	1 12 1		500		25		
Excava	tion	Washir	ıg	2000 0015	Sec 21	11010114							
Report	ted Pun	nping (N	<u>1GY)</u>		500.21								
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
0	0	0	0	0	0	0	0	0	0	0	NA	NA	
	•		•					•	•	•	•		
				Permit		Resource	Permi	itted					
Permit	ttee	Use		Number	Location	Туре	-						
Milesto	one	Sand a	nd	2009-0544	T112 R19	Pit/Pond	Acres		GPM		MGY		
Materia	als	Gravel			Sec. 15		NA		2,000		153.6		
		Washir	ng										
Report	ted Pun	nping (N	IGY)										
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
0	0	0	0	0	0	0	0	0	0	0	NA	NA	

GPM = gallons per minute; MGY = million gallons per year; NA = Data not available

#### Recreation

For more information on Dakota County Parks, see the Lake Byllesby Regional Park Master Plan (2005), the Miesville Ravine Park Reserve Master Plan (2005) and other pertinent reports at http://www.co.dakota.mn.us/parks/Planning/ParkPlans/Pages/default.aspx. Information on the Chub Lake WMA is available at <u>http://www.dnr.state.mn.us/wmas/index.html</u> and the Cannon River State Water Trail at <u>http://www.dnr.state.mn.us/watertrails/cannonriver/index.html</u>.

For a water trail guide and map for the Cannon (and Straight) Rivers, visit <u>www.mndnr.gov/watertrails</u>. For more information on the Wild and Scenic River designation visit <u>http://www.dnr.state.mn.us/waters/watermgmt\_section/wild\_scenic/wsrivers/cannon.html</u>.

Lakes, rivers, and creeks in the NCRWMO provide a variety of recreational opportunities (Figure 2.14). There are two Dakota County Regional Parks in the NCRWMO, both centered around water. The Lake Byllesby Regional Park is 620 acres in size, with 366 acres on the western shore of Lake Byllesby and 254 acres on the eastern shore of the lake. Park landscapes include floodplain forests, lakeshore, river terraces, and prairie. The eastern park includes an operating hydropower dam constructed in 1910, the Lake Byllesby Dam. Current recreational uses include swimming, hiking, picnicking, bird watching, camping (RV and tent), and boating. Although water quality and clarity in the lake often hampers some recreation, the lake does have periods of very good water quality. Both river flow and the dam operations together define water residence time, which is a major determining factor of the amount of nutrients and other pollutants in the Lake.

The Miesville Ravine Park Reserve, also owned by Dakota County, covers approximately 1,700 acres centered around Trout Brook, a MDNR-designated trout stream. The park provides over two miles of streamside public access to anglers. The 2005 Master Plan for this park includes the vision: "A pristine trout stream ecosystem with little sign of human intervention and sparse, primitive facilities for human use. Viewsheds and the surrounding park landscape are protected from development and agricultural impacts, to preserve the quality of the Trout Brook and to convey the notion of wilderness." Unfortunately, in recent years, trees downed by a tornado and erosion and other damage caused by severe flooding have taken a toll on this park and Trout Brook.

Pine Creek is another MDNR-designated trout stream for much of its length although there is neither streamside public land nor easements. Access to the creek can only be gained with landowner permission or by entering the water from a public road right of way.

Chub Creek, while not a trout stream, offers some game fish for anglers. Northern pike and largemouth bass are not abundant, but have been found to inhabit portions of the creek and its tributaries. The riparian areas of Chub Creek also offer wildlife habitat and thus wildlife watching, hunting, and trapping. The only streamside public land is a few hundred feet owned by Dakota County (as part of the Lake Byllesby Regional Park) at the outlet of the creek.

Chub Lake offers limited recreational opportunity. Public access is limited to a MDNR Wildlife Management Area (WMA) on its southern shores, and a road that crosses the lake's outlet. There is neither a boat launch nor swimming beach. It has a maximum depth of only 2.5 meters and is on

the impaired waters list for excess nutrients. In 2011, its average water clarity 0.5 meters. The lake offers a nice area for canoeing, duck hunting, trapping, and fishing for non-game species.

The WMA at the southern end of Chub Lake includes 203 acres of hardwoods, wetlands, and grasslands. It is open to hunting, including waterfowl, during normal hunting seasons. Hikers, birders and others can also use this public land for recreation. There is currently no written plan by the MDNR for this WMA, but a future plan will include topics such as habitat and facility development and expansion. Some planning ideas for the area include turkey vulture nesting areas, tree planting to expand the lake buffer, parking lot expansion, controlled burns, and exotic species control. A 40-acre parcel within the WMA was planted with native grasses.

The 2008 Dakota County Park System Plan includes a regional greenway corridor and possible trail connecting the Vermillion River with Chub Lake, Chub Creek, and the Cannon River. This corridor is viewed as a long-range prospect.

The Cannon River from Faribault to its confluence with the Mississippi River is designated a Wild and Scenic River and is considered desirable for canoeing, kayaking, and inner tubing. There are several "carry-in" access points including two in Northfield and one below the Lake Byllesby dam.

## 2.5 Water Quality and Quantity

The NCRWMO has been monitoring the water quality and quantity of major creeks in the watershed since 1999 (Figure 2.15). This monitoring has been crucial to identifying water quality issues including several parameters of particular concern. These include bacteria and nitrate concentrations, and turbidity concerns.

The NCRWMO monitoring goals have transitioned from an assessment/impairment focus, where watershed-wide monitoring occurred on a 4-year rotational basis, to a program dedicated to measuring long-term water quality trends at select locations most representative of the watershed. This strategy also allows for more targeted monitoring to identify "stressors" in the watershed. Future monitoring will seek to further identify pollutant sources and ultimately monitor long term water quality improvements in the watershed.

To date, water monitoring and assessments have led to a total of twelve impairments in the watershed (Table 2.3 and Figure 2.15). As "impaired waters" they are not meeting State water quality standards as defined by the federal Clean Water Act.

	U	)			
	Nutrients	Bacteria	Turbidity	Nitrates	Mercury and PCBs
Cannon River		Х	Х		Х
Chub Lake	Х				
Lake Byllesby	Х				
Chub Creek		Х			
Mud Creek		Х			
North Branch		Х			
Chub Creek					
Trout Brook			Х	Х	
Pine Creek				Х	

Table 2.3 Impaired Waters in the NCRWMO as found on the Federal 303(d) Impaired Waters List as of 2012. (also see Figure 2.15)

#### Bacteria

Monitoring within the NCRWMO has identified several locations where bacteria concentrations are exceeding state water quality standards (Table 2.4). It should be mentioned that state water quality bacteria standards changed from fecal coliform to *Escherichia coli* in 2008. As a result, the NCRWMO monitoring program also changed bacteria endpoints in 2008. Regardless of this change, bacteria concentrations remain problematic in multiple locations within the watershed (Table 2.4).

Potential bacteria sources include failing septic systems, runoff from agricultural fields and feedlots, livestock in streams, and wildlife. In addition, sediment may also serve as a reservoir for bacteria (MPCA, 2008- <u>http://www.pca.state.mn.us/index.php/view-document.html?gid=8543</u>). Due to high bacteria levels in widespread areas of southeastern Minnesota, the NCRWMO was included in a region-wide bacteria Total Maximum Daily Load (TMDL) study in 2006. This and the subsequent implementation plan identified probable bacteria sources and possible practices to alleviate that pollution throughout southeast Minnesota.

http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impairedwaters-and-tmdls/tmdl-projects/lower-mississippi-river-basin-tmdl-projects/project-lowermississippi-river-basin-regional-fecal-coliform.html

	M	anitaring Sita Information	Monitoring Years										Comments
		Sintering Site Information	1999	2000	2001	2002	2004	2005	2006	2008*	2010*	2011*	
	1	Chub Creek at Hwy 23	599	476			191	153					Exceeds state
	•	ende ereek a milj. ze	(n=6)	(n=31)			(n=10)	(n=7)					standard/impaired
	2	Mud Crook at Hwy 2	458	4310			548	455		311			Exceeds state
	2	Widd Creek at Hwy. 3	(n=5)	(n=6)			(n=9)	(n=7)		(n=11)			standard/impaired
	3	North Branch Chub Creek	418	573			309	32		239			Exceeds state
			(n=6)	(n=7)			(n=9)	(n=4)		(n=11)			standard/impaired
	4	Chub Creek Permanent	1015	2755			1430	498		836		183	Exceeds state
	4	Monitoring Station	(n=6)	(n=7)			(n=10)	(n=7)		(n=11)		(n=7)	standard/impaired
g Sites	5	Pine Creek at Hogan Ave.			63 (n=12)	142 (n=14)			98 (n=8)		115 (n=10)		Below state standard/ no impairment
onitorin	6	Pine Creek at 280th St.			48 (n=12)	137 (n=14)			125 (n=8)		54 (n=10)		Below state standard/ no impairment
ž	7	Trout Brook Tributary (south)			27 (n=12)	1139 (n=14)			79 (n=8)		166 (n=10)		Below state standard/ no impairment
	8	Trout Brook Tributary (north)			27 (n=12)	477 (n=14)			7 (n=8)		44 (n=10)		Below state standard/ no impairment
	9	Trout Brook Outlet			150 (n=10)	514 (n=14)			133 (n=8)		241 (n=10)		Below state standard/ no impairment

Table 2.4 Geometric mean of bacteria results for the North Cannon River Watershed 1999 - 2011

\*Measured endpoint changed from fecal coliform to *E. coli* to mirror change in state water quality standard. Shaded boxes indicate violation of state standard. N = number of samples

#### Turbidity

Turbidity is a measure of water clarity and is affected by the amount of suspended particles in the water column. Much of Trout Brook is impaired for turbidity (Table 2.5). Monitoring results show that turbidity levels in Trout Brook routinely violate state water quality standards during periods of watershed runoff (Table 2.5). However, it should be noted that Trout Brook is very clear during periods of low flow without the influence of overland runoff. Additionally, it should be noted that turbidity analysis methodology changed in 2006. As a result, 2006-2011 data are reported in nephelometric turbidity ratio units (NTRUs). The state water quality standard is evaluated as nepheolometric turbidity units (NTUs), which is similar to, but not identical to, NTRUs. Therefore, reportedly high 2006-2011 results may not necessarily constitute a water quality impairment.

Common turbidity sources include agricultural runoff, in-stream erosion, and algae. A future Watershed Restoration and Protection Project (WRAPP) (formerly known as a TMDL) coordinated by the Minnesota Pollution Control Agency (MPCA) will identify turbidity sources in the Trout Brook sub-watershed.

						Monitori	ng Years	-				Comments/impairment	
		onitoring Site											status
	. 1	nformation	1999	2000	2001	2002	2004	2005	2006	2008	2010	2011	
	1	Chub Creek at Hwy. 23	4.76 (n=7)	7.45 (n=14)			6.30 (n=10)	10.56 (n=7)					Below state standard/no impairment
	2	Mud Creek at Hwy. 3	4.76 (n=7)	7.82 (n=14)			6.21 (n=8)	15.81 (n=7)		10.91 (n=11)			Below state standard/no impairment
	3	North Branch Chub Creek	8.01 (n=7)	8.65 (n=14)				14.74 (n=7)		7.73 (n=11)			Below state standard/no impairment
ng Sites	4	Chub Creek Permanent Monitoring Station	9.50 (n=7)	9.19 (n=14)				16.94 (n=7)		14.55 (n=11)		6.86 (n=7)	Below state standard/no impairment
nitor	5	Pine Creek at Hogan Ave.			9.23 (n=12)	5.89 (n=14)			2.99 (n=8)		1.82 (n=11)		Below state standard/no impairment
Ř	6	Pine Creek at 280th St.			5.24 (n=12)	17.22 (n=14)			2.38 (n=8)		7.82 (n=11)		Below state standard/no impairment
	7	Trout Brook Tributary (south)			60.95 (n=12)	150.05 (n=14)			0.98 (n=8)		52.82 (n=11)		Exceeds state standard/impaired
	8	Trout Brook Tributary (north)			120.80 (n=12)	106.20 (n=14)			0.90 (n=8)		58.50 (n=11)		Exceeds state standard/impaired
	9	Trout Brook Outlet			227.12 (n=10)	175.66 (n=14)			1.49 (n=8)		76.27 (n=11)		Exceeds state standard/impaired

Table 2.5 Mean turbidity results in North Cannon River Watershed 1999 - 2011

1999-2006 Results=NTUs; 2008-2011 Results=NTRUs; n = number of samples; shaded boxes indicate violation of the State standard.

#### Nitrate

Nitrate is an inorganic molecule common in surface water and can be problematic for both humans and wildlife in high concentrations. Nitrate concentrations in surface waters of the NCRWMO exceed state water quality standards, and portions of Trout Brook and Pine Creek are impaired for nitrates (Table 2.6). In fact, nitrate concentration data from Trout Brook are consistently higher than any other monitored trout stream in southeast Minnesota (J. Watkins, personal communication, January 26, 2011).

Potential nitrate sources include fertilizer use, failing septic systems, wastewater treatment plant effluent, feedlot and manure runoff and industrial waste (EPA, 2012

http://water.epa.gov/type/rsl/monitoring/vms57.cfm). The primary source of nitrates within the NCRWMO is thought to be agricultural fertilizers seeping into groundwater and resurfacing in springs and seeps. In 2010 the MPCA studied the relationship between row crop land use and nitrate-nitrogen concentration in baseflow for 100 trout stream watersheds in the karstlands of southeast Minnesota. Results indicate that nitrate-nitrogen concentrations are directly related to the percentage of row crop in the watershed (r-squared = 0.68). A linear regression showed a slope of 0.16, suggesting that the average baseflow nitrate-nitrogen concentration in the trout stream watersheds of southeast Minnesota can be approximated by multiplying a watershed's row crop percentage by 0.16. The strong correlation between nitrate-nitrogen concentrations in streams and watershed row crop percentage suggests that, in general, nitrogen application over a span of decades has impacted the condition of the underlying aquifers that are the source of these streams' baseflow.

A future WRAPP (formerly known as a TMDL) coordinated by the MPCA will identify nitrate sources in the Trout Brook and Pine Creek sub-watersheds.

		Monitoring Site Information		М	onitoring Ye	<b>Comments/Impairment Status</b>		
	womtoring site information			2002	2006	2010	2011	
	4	Chub Creek Permanent Monitoring Station					4.68 (n=7)	Below state standard/no impairment
es	5	Pine Creek at Hogan Ave.	6.27 (n=12)	6.64 (n=14)	7.79 (n=8)	5.97 (n=11)		Individual results exceed state standard/impaired
Monitoring Site	6	Pine Creek at 280th St.	8.2 (n=12)	8.20 (n=14)	9.80 (n=8)	7.80 (n=11)		Individual results exceed state standard/impaired
	7	Trout Brook Tributary (south)	13.60 (n=12)	10.30 (n=14)	17.69 (n=8)	15.80 (n=11)		Exceeds state standard/impaired
	8	Trout Brook Tributary (north)	12.43 (n=12)	9.02 (n=14)	13.75 (n=8)	11.35 (n=11)		Exceeds state standard/impaired
	9	Trout Brook Outlet	10.23 (n=10)	9.13 (n=14)	11.45 (n=8)	9.79 (n=11)		Exceeds state standard/impaired
NI		abor of complex, aboded boyce indicate w	alation of Ct	sta atandard				

Table 2.6 Mean nitrate results for the North Cannon River Watershed 2001 - 2011 (mg/l)

N = number of samples; shaded boxes indicate violation of State standard

#### **Other Water Quality Concerns**

In addition to bacteria, turbidity, and nitrates described above, water monitoring results suggest other water quality issues may exist, but data are not currently sufficient to determine if conditions meet water quality standards. Dissolved oxygen concentrations are frequently near water quality standards at many locations in the watershed and may drop below levels needed to sustain aquatic life during periods of low flow and high summertime temperatures. Additional early morning dissolved oxygen measurements are needed across the watershed to determine if a dissolved oxygen impairment exists. Additionally, preliminary Minnesota Pollution Control Agency (MPCA) macroinvertebrate results from the Dutch Creek subwatershed suggest that there may be a biological impairment in this area of the watershed. Additional macroinvertebrate data, and supporting chemistry data, may be beneficial in identifying the extent of this potential impairment and its cause.

Chub Lake is a shallow, eutrophic lake (maximum depth of 2.5 m). The lake was monitored by Metropolitan Council staff in 2010 and 2011. The lake water quality in 2011 was characterized by high nutrient concentrations (summer avg TP = 115 ug/L, TKN = 2.48 mg/L), high chlorophyll-a concentrations (summer average = 96 ug/L), and low Secchi depths (summer avg = 0.5 m). The lake received a lake grade of F on the Metropolitan Council's Lake Grading system in 2010 and 2011.

#### Water Quantity

From the period from 1999 to 2008, stream flow was measured at several monitoring locations across the North Cannon River watershed on a four year rotating basis. Flow monitoring at irregular intervals like this resulted in low quality and unreliable data. Although the quality of these data is less than desirable, monitoring has documented frequent and dramatic changes in flow levels throughout the watershed over short periods of time. This appears to be especially problematic in the Trout Brook sub-watershed. This 'flashiness' can have substantial impacts on water quality and is likely partially responsible for erosion and turbidity issues observed throughout the watershed.

In 2008, the NCRWMO changed monitoring priorities to include annual monitoring at the Chub Creek Permanent Monitoring Station, located in Randolph, MN. Annual flow monitoring at this location has resulted in a good dataset of flow records in recent years. These results have been beneficial to flood management in downstream watersheds (Lake Byllesby) and will be critical for future activities and studies such as Watershed Restoration and Protection Projects. Recent flow monitoring results from the Chub Creek Permanent Monitoring Station are summarized in Table 2.7.

At the Chub Creek Permanent Monitoring Station stage is measured every 15 minutes using automated equipment. Stage measurements are then converted to flow data using a rating curve, derived from individual in-stream flow measurements. All in-stream flow measurements are completed following U.S. Geological Survey and MDNR discharge measurement protocols.

Results from 2008-2012 indicate that under 'normal' climatic conditions, flow at the Chub Creek Permanent Monitoring Station is approximately 60 cubic feet per second (cfs). However, recent intense rain events have produced flows exceeding 1000 cfs (Figure 2.16).

		Monitoring Year							
	2008	2008 2009 2010 2011 2012							
Mean Daily Flow (cfs)	39.7	21.6	98.6	88.4	96.92				
Minimum Flow (cfs)	0	0	21.7	14.3	<1.0				
Maximum Flow (cfs)	159.5	63.7	759.7	322.3	1,116				
Date of Maximum Flow	4/12/2008	10/25/2009	9/21/2010	7/18/2011	6/18/12				

Table 2.7. Summarized flow data for the Chub Creek Permanent Monitoring Station (April-October)

cfs=cubic feet per second

## 2.6 Biological Features and Assessments

For more information on the natural communities and endangered or threatened plants and animals, see the MDNR's Ecological Services website at www.dnr.state.mn.us/ecological\_services.

Pre-settlement vegetation in the NCRWMO was dominated by prairie, oak openings and barrens, and wetlands (Figure 2.11). Today, biological features in the watershed include Chub Lake and its surrounding wetlands and woodlands, wetland complexes in Greenvale and Waterford Townships, and the steep wooded ravines and bedrock bluffs along the lower sections of Trout Brook (Figure 2.14). Some rare plants and animals have been documented in various areas of the watershed. These include species that are listed as threatened, species of special concern, and other rare species that are tracked by the MDNR (Table 2.8).

Common Name	Scientific Name	Туре	Code
Black Sandshell	Ligumia recta	Invertebrate Animal	SPC
Creek Heelsplitter	Lasmigona compressa	Invertebrate Animal	SPC
Ellipse	Venustaconcha ellipsiformis	Invertebrate Animal	THR
Fluted-shell	Lasmigona costata	Invertebrate Animal	SPC
Mucket	Actinonaias ligamentina	Invertebrate Animal	THR
Round Pigtoe	Pleurobema coccineum	Invertebrate Animal	THR
American Ginseng	Panax quinquefolius	Vascular Plant	SPC
Beach-heather	Hudsonia tomentosa	Vascular Plant	SPC
	Desmodium cuspidatum var.		
Big Tick-trefoil	longifolium	Vascular Plant	SPC
Cowbane	Oxypolis rigidior	Vascular Plant	NON
Kitten-tails	Besseya bullii	Vascular Plant	THR
Lilia-leaved Twayblade	Liparis liliifolia	Vascular Plant	NON
Long-bearded Hawkweed	Hieracium longipilum	Vascular Plant	NON
Plains Wild Indigo	Baptisia bracteata var. leucophaea	Vascular Plant	SPC
Prairie Bush Clover	Lespedeza leptostachya	Vascular Plant	THR
Rattlesnake-master	Eryngium yuccifolium	Vascular Plant	SPC
Small White Lady's-slipper	Cypripedium candidum	Vascular Plant	SPC
Valerian	Valeriana edulis ssp. ciliata	Vascular Plant	THR
Waterwillow	Decodon verticillatus	Vascular Plant	SPC
American Brook Lamprey	Lampetra appendix	Vertebrate Animal	NON
Bald Eagle	Haliaeetus leucocephalus	Vertebrate Animal	SPC
Blanding's Turtle	Emydoidea blandingii	Vertebrate Animal	THR
Loggerhead Shrike	Lanius ludovicianus	Vertebrate Animal	THR
Milk Snake	Lampropeltis triangulum	Vertebrate Animal	NON
North American Racer	Coluber constrictor	Vertebrate Animal	SPC
Ozark Minnow	Notropis nubilus	Vertebrate Animal	SPC
Upland Sandpiper	Bartramia longicauda	Vertebrate Animal	NON
Western Harvest Mouse	Reithrodontomys megalotis	Vertebrate Animal	NON

Table 2.8 Rare plants and animals in the NCRWMO. Source: Natural Heritage Information System maintained by the Minnesota Department of Natural Resources

THR = Threatened species under State law

SPC = Species of Special Concern under State law

NON = Tracked by the MDNR but with no legal status

#### **Fisheries and Invertebrates**

#### Chub Creek

The MDNR classifies Chub Creek as Class II supporting warmwater gamefish from Hwy. 47 downstream to its confluence with the Cannon River. Upstream of Hwy. 47, the creek is classified as Class IV supporting roughfish and forage fish. Overall, the Chub Creek sub-watershed supports a typical assemblage of warmwater fish species. Fish collected in surveys in the sub-watershed in 2000 included game fish such as northern pike and largemouth bass. However, most of the fish were tolerant or somewhat tolerant to degraded water quality. Common carp, an exotic species, were also seined with regularity. In Chub Lake, the DNR completed a survey of the fishery in 1985. Species collected included green sunfish, black bullhead, and carp.

Biological sampling by the MPCA in 2011 indicated mixed results among the tributaries to Chub Creek and the mainstem of Chub Creek. Most tributaries were found to support fair to good populations of fish and macroinvertebrates. However, dissolved oxygen levels were often low. The mainstem of Chub Creek from its headwaters to the Cannon River had areas with poor biota and other areas with fair biota.

#### Trout Brook

The Trout Brook fishery is classified by the MDNR as Class IA trout waters for its entire length. The stream contains naturally reproducing populations of both brook and brown trout. However, fish habitat in Trout Brook is generally only fair to poor with high amounts of shifting sands in the streambed and few deep pools with suitable cover. Other fish species collected in Trout Brook over the years include the blacknose and longnose dace, brook stickleback, white sucker, and green sunfish.

Trout Brook was sampled in September 2011 at one of the MDNR's Long-Term Monitoring stations sampled annually to monitor temporal variations in trout abundance in southeast Minnesota streams. The estimate of adult brook trout was 3,841/mile, well above the long-term mean of 345 adults/mile in this station. Most of the fish were small age 1 fish from the strong 2010 year class. No brook trout  $\geq 10$  inches were sampled. The total brook trout biomass estimate was 247.8 pounds/acre, the highest recorded estimate for this station, and well above the mean of 64.2 pounds/acre. One brown trout fingerling was sampled for an estimate of 10 fingerlings/mile. No other species were sampled.

During the same sampling event, the Coldwater Stream Index of Biotic Integrity (IBI) and the Minnesota Stream Habitat Assessment (MSHA) were calculated in Trout Brook. The coldwater IBI score of 115 (maximum score = 120) received a qualitative rating of excellent and was similar to previous assessments. The high IBI scores are influenced by a fish community comprised almost entirely of brook trout. The MSHA score was 61.1 (maximum score = 100) and has declined slightly in recent years. The biggest change has been lower scores for in-stream substrates, with more fine substrates present.

Also in 2011, the MPCA performed an assessment of the fish and macroinvertebrates in Trout Brook. In the lower section of Trout Brook (from the confluence with the Cannon River upstream three miles) the assessment found the stream to be supporting of coldwater aquatic life for fish and
macroinvertebrates. The fish community was comprised mostly of Brook Trout and Brown Trout. Both species were well represented by different age classes indicating a naturally reproducing population. For aquatic macroinvertebrates, the community was comprised of a high number of mayflies, stoneflies, caddisflies, and other and sensitive taxa.

The two branches of Trout Brook upstream of Hwy. 91 were determined to be impaired for aquatic macroinvertebrates but supporting for a coldwater fishery. The fish communities at both stations were dominated by Brook Trout. At both stations the macroinvertebrate community lacked mayflies, stoneflies, caddisflies and other pollution sensitive taxa and was dominated by tolerant taxa. Sampling images of the stream demonstrate nuisance algae conditions which may indicate a nutrient impairment. Given the presence of riffle habitat, the absence of mayflies, stoneflies, and caddisflies is unusual. High nitrates could be a stress to the macoinvertebrate community. Some dissolved oxygen measurements recorded were at or below the standard at both stations which could also indicate a stress to the biological communities.

A Stream Management Plan for Trout Brook was prepared in February 2002 by the MDNR. Several stream surveys and fish population assessments have been conducted since 1977, giving the MDNR a good idea of the habitat and fish communities in Trout Brook. Goals in the management plan include maintaining water quality and quantity capable of supporting native brook trout fishery able to sustain moderate fishing pressure, continuing stream surveys every three years, encouraging watershed protection measures and best management practices, and implementing a stream improvement project utilizing woody debris to provide cover for brook trout.

## Pine Creek

Pine Creek is classified as Class ID (trout waters) from its headwaters downstream to Hwy. 20. This is the stretch that is within Dakota County and within the NCRWMO. Downstream of Hwy. 20 to its confluence with the Cannon River, it is classified as Class IA trout waters (although this stretch lies outside the WMO boundaries). MDNR stream surveys note that the stream above Hwy. 20 is channelized (ditched and straightened) and receives water from numerous tile lines. Habitat in this section of the stream is limited to in-stream vegetation (such as grasses) as there are few welldefined riffles and pools.

Pine Creek supports a naturally reproducing population of brown trout. Other fish species found in Pine Creek include blacknose and longnose dace, white sucker, and brook stickleback. A Stream Management Plan for Pine Creek was prepared by the MDNR in 1998. Management goals include improving trout populations, continuing stream surveys every three years, and restoring the channelized section to a free flowing stream corridor.

Pine Creek was sampled at two locations in September and October 2011. At the station downstream from the NCRWMO, MNDNR Fisheries personnel collected an estimated 599 adults and 7,019 recruits/mile. The estimates of larger brown trout were 104/mile  $\geq$  12 inches and 42/mile  $\geq$  14 inches. No fish  $\geq$  16 inches were sampled. Brown trout were the only species sampled.

At the station within the NCRWMO, the stream is noted as "a straight ditch and trout habitat is limited." Because of the stream size and low fish numbers only one electrofishing pass was completed. The population estimate was calculated based on actual numbers captured in the first run. Only 4 adult brown trout were sampled. The estimate of adult brown trout was 47/mile. The

estimates of larger fish were  $35/\text{mile} \ge 12$  inches,  $35/\text{mile} \ge 14$  inches and  $12/\text{mile} \ge 16$  inches, but this is based on a very small sample size. No other species were sampled.

The Coldwater Stream Index of Biotic Integrity (IBI) was not calculated for the NCRWMO station as too few fish were sampled. The Minnesota Stream Habitat Assessment score for this station was a low 36.5. This reach is mostly ditched and surrounded by row crop agriculture resulting in poor scores for surrounding land use and channel morphology.

Also in 2011, the MPCA performed an assessment of the fish and macroinvertebrates in Pine Creek. Dissolved oxygen in the creek was measured as low as 1.3 mg/L near the upper portion and was determined to not meet 2A water quality standards. The fish community at all three monitoring stations was dominated by brown trout and rated good at all three stations. For macroinvertebrates, the community ratings were more variable. At the upstream station macroinvertebrates were rated fair while at the downstream station the community was rated good. Habitat conditions on the lower portion of the reach (downstream of the NCRWMO) are very different than the upper portion. The lower portion is well-shaded and has coarse substrates and bedrock providing fast flowing riffle habitat. The upper portion of the stream is channelized and low-gradient with sand and gravel substrate and lack of riparian shading. Even though dissolved oxygen was not formally listed as an impairment at this time, additional monitoring is recommended to determine the cause since the low measurements observed indicate a potential stress to the coldwater communities.

### Lakes

Lake Byllesby is considered a roughfish-gamefish community with a management classification of warm water gamefish, according to the MDNR. In the past, fisheries management has centered on non-gamefish removal by commercial fishermen and subsequent gamefish stocking. Poor water quality and fish habitat, typical of many artificial reservoirs, allows less desirable species such as carp to thrive in these waters, further degrading the water quality and habitat. However, low numbers of northern pike, walleye, bass and panfish are present in the lake... Fish consumption advisories by the Minnesota Department of Health (MDH) for Lake Byllesby include black crappie, northern pike, channel catfish and walleye for mercury; and carp and channel catfish for PCBs.

The Cannon River in the stretch between the City of Faribault and Lake Byllesby is classified as a warmwater gamefish community, Classes IIB and IIC, supporting walleye and northern pike. The river was sampled with electrofishing gear in May 2010 between Lake Byllesby and the Northfield dam to assess gamefish populations. All gamefish were collected, measured and recorded on a 0.9 mile reach of river. A total of 92 gamefish comprising seven species were collected. Channel catfish and smallmouth bass were the most abundant gamefish. Seven walleye were collected ranging in length from 9.4 to 12.7 inches. Two bluegill, one largemouth bass, one northern pike and two white bass were also collected.

## 2.7 Pollution Sources

There are many different sources of pollution throughout the NCRWMO (Table 2.9). Most of these sources are non-point sources, or those that cannot be traced back to a single point. Most sources of pollution can affect surface waters by running directly into waterbodies, or by flowing overland to waterbodies during periods of rain or snowmelt. Additional pollutants can enter surface and groundwater through unsealed wells, subsurface drainage, sinkholes, cracks and fissures in the bedrock (karst features), or by leaching through the soil.

### **Nitrogen Fertilizers**

The largest source of nitrate pollution in Trout Brook and Pine Creek is most likely the leaching of nitrogen fertilizers into the groundwater and resurfacing in springs and seeps along these creeks. In karst areas like the NCRWMO, the underlying aquifer readily takes on the character of the land above. That character is expressed in the baseflow of the local streams. If the land is rich in nitrogen, the aquifer will be rich in nitrogen, and so will the stream. Much of the Trout Brook subwatershed has a very high sensitivity to groundwater contamination due to quick vertical seepage from land to groundwater (Figure 2.6).

The MPCA studied the relationship between row crop land use and nitrate-nitrogen concentration in baseflow for 100 trout stream watersheds in the karstlands of southeast Minnesota. Results indicate that nitrate-nitrogen concentrations are directly related to the percentage of row crop in the watershed (r-squared = 0.68). A linear regression showed a slope of 0.16, suggesting that the average baseflow nitrate-nitrogen concentration in the trout stream watersheds of southeast Minnesota can be approximated by multiplying a watershed's row crop percentage by 0.16. The strong correlation between nitrate-nitrogen concentrations in streams and watershed row crop percentage suggests that, in general, nitrogen application over a span of decades has impacted the condition of the underlying aquifers that are the source of these streams' baseflow.

Another statewide MPCA study (published June 2013) found high nitrates in surface waters throughout the State, especially in the southern Minnesota where cropland sources account for 89-95% of the nitrate load in several major rivers including the Lower Mississippi River.

# More information on the effects of nitrates and other agricultural chemicals can be found at: <u>http://www.mda.state.mn.us/protecting/waterprotection/waterplanning/agchemicals.aspx</u>

More information on the MPCA's 2013 "Nitrogen in Minnesota Surface Waters" Report can be found at: http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/nutrient-reduction/nitrogen-study-looks-at-sources-pathways.html

### **Agricultural Drainage**

Drainage can be a critical component of a successful farm operation, but can also result in nutrients, bacteria, and sediment entering groundwater and surface waters. Additionally, drainage structures can contribute to elevated flows that result in streambank erosion. Changes in economics and land prices have the potential of increasing conversion of pasture and forage land to row crops, which in

turn may lead to the installation of new drainage systems or drainage improvements to existing systems. New drainage and drainage improvements provide an opportunity to design and install systems in ways that help reduce nutrient losses into surface water and positively affect the timing and flows of drainage water into surface waters. These efforts combined with wetland restoration and water retention initiatives can have positive impacts upon water quality in agricultural landscapes.

http://www.mda.state.mn.us/en/protecting/waterprotection/waterplanning/agdrainage.aspx

#### **Dakhue Sanitary Landfill**

The Dakhue Sanitary Landfill in Hampton Township was once considered a Superfund site by the U.S. Environmental Protection Agency (EPA) but has since been removed from the National Priorities List as the pollution is decreasing and becoming less and less of a threat to groundwater and human health. This unlined landfill operated from 1971 to 1988 and was covered with limited infiltration layers in 1992. The State of Minnesota now owns the site and continues to monitor the water quality of the surficial and deep aquifer. Groundwater flows from the landfill to the south-southeast. Pollutants found in the monitoring wells include organic and inorganic compounds such as vinyl chloride, tetrachloroethene, and 1,2-DCA. No residential wells currently exist within the known limits of the groundwater contamination.

According to a 2009 EPA report on the Landfill, an active gas extraction system was installed in 2003 to remediate landfill gas migration and remove additional volatile organic compounds from the waste before it can leach into the groundwater. A property boundary fence was installed as well. Groundwater quality has improved significantly, likely from the installation of the active gas extraction system. Sampling in 2007 and 2008 found minor exceedances of arsenic and nitrate+nitrite. These data indicated continued improvements to groundwater quality beneath and down gradient of the Dakhue Landfill. A site inspection on October 22, 2008 found the site in general was in very good condition and undisturbed. No new uses of groundwater were observed. The lock and fences were in good condition, as was the vegetative cover with no bare spots or stressed vegetation observed. <u>http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0503946</u>

#### Feedlots

Feedlots, confined areas where livestock are concentrated, can pose a threat to water quality if runoff from the feedlot is not properly diverted away from surface water or conduits to groundwater. Additionally, manure from feedlots should be properly stored and, if utilized as fertilizers, should be applied according to rules, guidelines, and recommended management practices. The majority of feedlots within the NCRWMO have between 50 and 300 animal units (Figure 2.17). There are a few dairy, hog, and poultry farms remaining within the watershed, but most sites raise horses or beef cattle. There is only one extremely large feedlot (The MPCA refers to all feedlots over 1,000 animal units as "Concentrated Animal Feeding Operations") within the watershed, located in the northern half of Sciota Township, in the Chub Creek sub-watershed.

#### Wastewater Discharge

There are no permitted wastewater discharges within the NCRWMO. The residents of the small cities of Randolph, New Trier, and Miesville currently use individual sewage treatment systems rather than a centralized wastewater treatment facility. These communities are considered "unsewered" or "undersewered" by the MPCA meaning they have inadequate or no centralized wastewater treatment system. It's possible that some of the individual treatment systems in these cities may be failing or discharging directly to an open ditch. The pollution potential increases because of the high number of individual systems concentrated in a small area.

#### **Other Sources**

Unsealed, abandoned and unused wells could be a direct conduit from the surface to groundwater, thus acting as a potential source of groundwater pollution. Dakota County and the MDH retain information regarding private wells including well sealing records, locations of possible abandoned wells, and unused wells. Dakota County works to find and seal wells that are unused or abandoned through a variety of mechanisms such as property transfers, property development, and reports from landowners. Dakota County has been delegated authority under Minnesota Statute 103I to regulate wells and water supplies within the NCRWMO.

There are additional sources throughout the watershed that could pose a threat to surface water or groundwater in the NCRWMO (Table 2.9). Figure 2.17 shows the locations of various waste disposal sites, contaminant release sites, hazardous waste generators, and leaking above and belowground storage tanks according to the MPCA. Many of these areas may have been remediated and many are closed. It's likely that none of these sites pose an immediate threat to surface or groundwater. There is one historical solid waste dump on the Cannon River near the City of Randolph. The status of this area is unknown.

Potential Source	Pollutants of Concern
Row Crops, Hay Fields, Vegetable and	Sediment, Pesticides, Nutrients, Bacteria
Fruit Fields and Orchards	
Feedlots	Bacteria, Solids, Nutrients
Livestock in waterways	Bacteria, Solids, Nutrients
Pastureland	Bacteria, Solids, Nutrients
Landspread Manure	Bacteria, Solids, Nutrients
Sod Farms	Pesticides, Nutrients
Failing/Non-compliant Individual	Bacteria, Nutrients
Septic Systems	
Leaking Storage Tanks	Pesticides, Oil, Gasoline, Toxins
Landfills/Junkyards/Dumps	Toxins, Nutrients
Storage Piles (temporary or permanent)	Salt, Arsenic, Sediment, Sand, Solids, Nutrients
Household Hazardous Waste	Toxins, Nutrients
Leaking Autos	Oil, Gasoline, Antifreeze
Abandoned Unsealed Wells	Any – direct conduit to groundwater
Open Pit Quarries/Aggregate Mines	Excess water from dewatering, conduit to groundwater
Pet Waste	Bacteria, Solids, Nutrients
Wildlife	Bacteria, Solids, Nutrients
Residential Lawns	Pesticides, Nutrients
Construction Sites	Sediment
Streambank Erosion	Sediment
Atmospheric Deposition	Toxins, Nutrients
Impervious Surfaces	Excess water, any substance on the surface, road salt
Drainage Tiles/Drainage Ditches	Excess water, Pesticides, Nutrients, Bacteria

Table 2.9. Potential sources of pollution in the NCRWMO.

# 3.0 Regulatory Framework

Various Federal, state and local units of government are involved in regulating activities that may affect water resources.

The Minnesota Board of Water and Soil Resources (BWSR) is the state's administrative agency for soil and water conservation districts, watershed districts, metropolitan watersheds, and county watershed management organizations. The BWSR also oversees the administration of the Wetland Conservation Act.

The Minnesota Pollution Control Agency (MPCA) and the U.S. Environmental Protection Agency (EPA) enforce the Federal Clean Water Act and various permitting programs in order to limit pollution caused by businesses, organizations and individuals to protect human health and the environment.

The Minnesota Department of Natural Resources (MDNR) enforces conservation law throughout the state including the Wetland Conservation Act, surface and ground water appropriations, and floodplain, shoreland, and in-stream alterations.

The Minnesota Department of Health (MDH) administers the Well Management Program, the Wellhead Protection Program, and the Safe Drinking Water Act rules.

The Minnesota Environmental Quality Board administers the state's environmental review program, including Environmental Assessment Worksheets (EAW) and Environmental Impact Statements (EIS).

The U.S. Army Corps of Engineers administers the permit programs under Section 404 of the Clean Water Act.

The NCRWMO does not administer a permit program. Rather, the NCRWMO relies on the member communities to maintain regulatory control and responsibility for water resource management.

The following sections describe the units of government involved in water resource related activities.

## 3.1 Public Waters, Shoreland and Floodplain Management

The MDNR's Public Waters and Wetlands Permit Program (Minnesota Statutes 103G) requires a MDNR public waters permit for any work below the Ordinary High Water Level (OHWL) or any work that will alter or diminish the course, current, or cross-section of any designated protected water, including lakes, wetlands and streams. For lakes and wetlands, the MDNR's jurisdiction extends to designated U.S. Fish and Wildlife Service Circular 39 Classification Types 3, 4, and 5 wetlands which are generally10 acres or more in size in unincorporated areas, or generally 2.5 acres

or more in size in incorporated areas. The program prohibits most filling of protected waters and wetlands for the purpose of creating upland areas.

The MDNR jurisdiction over some activities (e.g. road and shoreline access) that would change the course, current or cross-section of a Public Water Wetland (those designated with a W), may be waived to the Local Government Unit (LGU) for administering the WCA. For activities that involve both public water wetlands and public water (lakes), the MDNR also has the discretion to waive permit jurisdiction to the LGU. For projects in which the MDNR waives jurisdiction or projects adjacent to a Public Water or Public Water Wetland, a MDNR representative has been added to the Technical Evaluation Panel (TEP). For projects with MDNR jurisdiction, an individual MDNR permit is required using MDNR rules and WCA sequencing and replacement rules. The MDNR has retained jurisdiction over all Public Waters (those designated with a P).

The NCRWMO member communities cooperate with this program by referring project proposers to the MDNR and the LGU.

Dakota County administers Ordinance 50: Shoreland and Floodplain Management Ordinance (<u>www.co.dakota.mn.us/NR/rdonlyres/00004dac/jbreawwvradzlvxouqzqapjiquzbipsl/FINALOrdina</u> <u>nce50Nov152011.pdf</u>.) within 13 unincorporated townships in the County. The ordinance is enforced to regulate the use and orderly development of shoreland within the unincorporated areas of the county to promote the interests of public health, safety and welfare and to protect, preserve and enhance natural resources as provided in Minn. Stat. § 103A.201 and Minn. Stat. ch. 116B. Included in the Ordinance, is a requirement for the maintenance of a 50-foot vegetated buffer along all MDNR-protected watercourses in the County (Ordinance Section 16.08B). While this regulation has been "on the books" since 1973, the County is taking new steps to make sure landowners are in compliance with this provision.

The floodplain provisions of this ordinance are adopted to comply with the rules and regulations of the National Flood Insurance Program codified as 44 CFR Parts 59-78, as may be amended, so as to maintain the county's eligibility in the National Flood Insurance Program. The Cities of Randolph, New Trier and Miesville do not have shoreland ordinances, since the MDNR did not require ordinance adoption in these small cities. MDNR protected waterbodies or watercourses are not present within the city limits of New Trier or Miesville, although the City of Randolph includes shoreland along Chub Creek and Lake Byllesby. Though shoreland ordinances were not required in these communities, the MDNR encourages ordinances or other official controls that protect water resources.

There are two ditches under public jurisdiction within the NCRWMO (Figure 2.3). County Ditch #1 is located in Hampton and Douglas Townships and includes much of Pine Creek. County Ditch #2 is located mostly in Waterford Township and includes much of the North Branch of Chub Creek. The County is the responsible drainage authority with regards to these two ditches.

## 3.2 Wetlands

There are federal and state regulations pertaining to wetland management:

**Food Conservation and Energy Act of 2008 (2008 Farm Bill)** — The federal USDA Natural Resources Conservation Service (NRCS) began regulating wetlands under the 1985 Farm Bill. Their regulations only apply to those farmers that participate in USDA programs. The USDA wetland compliance provisions are not administered through an approval or permitting process and the NRCS does not issue drainage permits. Wetland compliance is administered through farmer self- certification. Farmers may request a certified wetland determination from the NRCS to proactively assist them in identifying specific areas that are protected from new or additional drainage activities.

**Section 404 of the Clean Water Act** — The federal U.S. Army Corps of Engineers (USACOE) administers Section 404 of the Clean Water Act which regulates the discharge of dredge or fill material into waters of the United States including wetlands. The USCOE has several types of permits they issue under various circumstances including Letters of Permission, General Permits, Nationwide Permits and Individual Permits. The USCOE regulates all discharge of dredge or fill activities in wetlands including agricultural drainage projects, regardless of other State or Federal regulatory programs. However, the USACOE currently does not regulate isolated wetlands. The USCOE has attempted to coordinate its regulatory program with the USDA NRCS Farm Bill provisions. However the USCOE currently retains sole responsibility for implementing the Section 404 Program including the regulation of non-exempt discharges into waters of the United States, including wetlands, located on lands in agricultural use.

**Section 401 of the Clean Water Act**—The Environmental Protection Agency delegated responsibility for this program to the MPCA. Activities which require a Section 404 individual permit, or Federal Energy Regulatory Commission permit must first obtain Section 401 water quality certification from the MPCA stating that the activity conforms to state water quality standards.

**Protected Waters and Wetlands program, Minnesota Statutes 103G**—The MDNR is the responsible agency for administering this program (see Section 3.1 of this plan for changes to jurisdiction and administration).

Wetland Conservation Act of 1991 (WCA)—Local Government Units (LGUs) are responsible for administering the State Rule. The member communities in the NCRWMO are the LGUs responsible for administering the WCA. (However, the Minnesota Department of Transportation is the WCA LGU in its right-of-way.) Under delegated agreements, many of these communities use the technical assistance of the Dakota County Soil and Water Conservation District (SWCD) for wetland delineations and WCA administration. While there are no explicit delegation agreements between the SWCD and the communities of Sciota Township, Hampton Township, New Trier, Miesville and the City of Randolph, the SWCD has been the clearinghouse for WCA information within Dakota County and assists all LGUs to various extents. The intent of the WCA is to promote no net loss of wetlands. The WCA rules regulate draining, filling, and some excavation activities in wetlands not under the jurisdiction of the MDNR., The WCA rules (Minnesota Rules 8420) require

that altered wetlands be replaced at replacement ratios of 2:1 or 1:1, depending on the situation. Local units of government may adopt stricter wetland regulations. The WCA allows for the preparation of wetland management plans by LGUs that may give them more flexibility with the State Rule. . These wetland management plans need to go through a public review process and become effective upon adoption by the local government unit and the BWSR board. The MDNR is involved in enforcement of the WCA and is responsible for identification, protection and management of calcareous fens.

As part of administering the WCA Rules, the LGUs or their delegated authority are responsible for reviewing wetland delineations, wetland functions and values assessments, and wetland replacement plans.

**State Water Quality Standards, Minnesota Rules 7050**—The MPCA is the responsible agency. The rules include water use classifications and water quality standards for wetlands that are narrative rather than numerical. The rules include a mitigative process to protect wetlands from significant adverse impacts and to maintain nondegradation of wetland-designated uses.

All Communities in North Cannon River Watershed Management Organization – In 2008, after the completion of the Wetland and Watercourse Inventory and Assessment (Section 2.1 and Figure 2.18), the NCRWMO drafted and distributed for comment a "Wetland and Stream Buffer Ordinance." In 2009, after a Citizens Listening Session and further consideration by a subcommittee and the Board, a decision was made to use the already adopted Erosion Control and Stormwater Management Ordinance as the wetland management ordinance.

The Erosion Control and Stormwater Management Ordinance includes the following wetland protection measures:

- 1. Wetland may be used for stormwater storage and treatment only if the use will not adversely affect the function and public value of the wetland as determined by the appropriate regulating governmental agency.
- 2. If any land disturbance is within two hundred (200) feet of a wetland, a wetland delineation report and functional assessment for vegetative diversity shall be submitted to the Township and appropriate regulating governmental agency for review and approval prior to Township issuance of a permit.
- 3. All structures shall have a minimum setback of 35-feet from the delineated edge of wetlands.
- 4. A permanent vegetative buffer strip, at least 25-feet in width, is required parallel to and adjoining all delineated wetland boundaries, water bodies, watercourses and streams to filter stormwater runoff. The Township may require wider buffers widths for the protection of higher value resources. Buffer strips are not required around storm water ponds or roadside ditches.
- 5. The first 25-feet of the buffer strip as measured from the water body, stream or wetland edge cannot be cleared, graded or otherwise disturbed during construction without prior written Township approval. Grading within the buffer for the purpose of accommodating house pad or yard elevations is prohibited. The buffer perimeter must be surrounded by silt fencing prior to construction. Adjacent construction grading or stormwater outlets must not channelize surface flows into or otherwise decrease the effectiveness of the buffer.

# 3.3 Stormwater Management & Erosion and Sediment Control

The Metropolitan Council requires cities to adopt stormwater management ordinances as part of their comprehensive plan updates. The Metropolitan Council's adopted "Interim Strategy to Reduce Nonpoint Source Pollution to All Metropolitan Water Bodies" includes three requirements:

(1) local governments must adopt design standards (such as Nationwide Urban Runoff Program) for new stormwater ponds that will reduce pollutant loadings from stormwater runoff, (2) local governments must follow the best management practices given in the MPCA's 2000 document *Protecting Water Quality in Urban Areas*, or an equivalent set of standards, and (3) local governments must adopt the DNR's shoreland regulations, as required by the DNR's priority phasing list.

The MPCA administers the EPA's Storm Water Phase II National Pollution Discharge Elimination Systems (NPDES) Rules. In the NCRWMO, Phase II requires that operators of construction sites disturbing greater than one acre to obtain an NPDES permit. Types of controls could include filter fences, storm drain inlet protections, and temporary mulching and seeding of exposed land areas.

In 2005, the NCRWMO adopted an ordinance "Establishing Erosion Control and Storm Water Management Requirements for Land Disturbances" which was subsequently adopted by each of the NCRWMO member communities

(www.dakotaswcd.org/watersheds/ncrwmo/pdfs/Final%20NCRWMO%20Model%20Ordinance%2 <u>Ofor%20Twps.pdf</u>). The ordinance requires erosion and sediment control during construction activities if greater than one acre of land is disturbed (with exemptions for horticulture, utility installation). Additionally, any development creating over one acre of new impervious surfaces must manage the stormwater runoff including the requirement that the pre-development one year storm event runoff volume is not increased in the post developed condition.

The NPDES Phase II Storm Water Permit will require controls on stormwater runoff from construction sites that are one acre or larger.

## 3.4 Dam Safety Requirements

The Lake Byllesby Dam is located on the southern edge of Dakota County. The dam is owned by Dakota County and regulated by the Federal Energy Regulatory Commission (FERC) and the Minnesota Department of Natural Resources (MDNR). The MDNR administers the state's dam safety program (MN Rules 6115.0300–6115.0520), which applies to all impoundments that pose a potential threat to public safety or property, including the Byllesby Dam. The dam safety rules require that the downstream impacts of a dam failure be analyzed under high-flow conditions, such as an extreme flood (e.g. the probable maximum flood), which much greater than a 100-year flood.

In order to meet FERC requirements, the Byllesby Dam requires some updates. FERC regulations require that the dam meet standards for 100 percent of a Probable Maximum Flood, the most severe

possible flood and is calculated by combining information about precipitation, geology, and water management strategies. It is calculated partially by the Probable Maximum Precipitation, which is the greatest theoretical amount of precipitation for an area. A part of the Byllesby Dam will be going through some construction updates in 2013-2014. Dakota County will inform residents of specific details about this project prior to construction.

## 3.5 Groundwater Protection

At the state level, different agencies have responsibility for different aspects of groundwater quality and quantity. The Minnesota Department of Health (MDH) is the official state agency responsible for addressing all environmental health matters, including groundwater protection. The MDH is responsible for preventing pollution of water supplies to ensure safe drinking water sources and to limit public exposure to contaminants. Through implementation of the Safe Drinking Water Act, the MDH conducts the Public Water Supply Program, which allows the MDH to monitor ground water quality and train water supply system operators. Through its Well Management Program, the MDH administers and enforces the Minnesota Water Well Code, which regulates activities such as well abandonment and installation of new wells. The MDH also administers the Wellhead Protection Program, which is aimed at preventing contaminants from entering the recharge zones of public well supplies. In 1997, the Wellhead Protection Program rules (Minnesota Rules 4720.5100 to 4720.5590) went into effect. These rules require all public water suppliers that obtain their water from wells to prepare, enact, and enforce wellhead protection plans. The MDH prepared a prioritized ranking of all such suppliers in Minnesota. Regardless of the ranking, Rules 4720 require all public water suppliers to initiate wellhead protection measures for the inner wellhead management zone prior to June 1, 2003. If a city drills a new well and connects it to the distribution system, the city must begin development of a wellhead protection plan.

The Minnesota Department of Agriculture, (MDA) under the state Groundwater Protection Act, is responsible for preventing and mitigating the degradation of groundwater from agricultural chemicals, in particular from fertilizers and from pesticides.

The MDNR regulates the rate and volume of groundwater use as part of its charge to conserve and use the waters of the state. For example, suppliers of domestic water to more than 25 people or applicants proposing a use that exceeds 10,000 gallons per day or 1,000,000 gallons per year must obtain a water appropriation permit from the MDNR. The MDNR is also responsible for mapping sensitive groundwater areas, conducting groundwater investigations, addressing well interference problems, and maintaining the observation well network.

The MPCA administers and enforces laws relating to pollution of the state's waters, including groundwater (except for agricultural chemicals). The MPCA monitors ambient groundwater quality, and administers septic system design and maintenance standards. The Tanks and Spills Section of the MPCA regulates the use, registration and site cleanup of underground and above ground storage tanks.

The Minnesota Geological Survey provides a complete account of the state's groundwater resources through geological mapping and investigation projects. The Minnesota Geological Survey produces the county geologic atlases, interprets water well log information, and manages a database of county well information.

Dakota County plays a role in groundwater protection, assessment and management. (See Water Resources section of Dakota County's 2030 Comprehensive Plan, prepared in 2008. <u>www.co.dakota.mn.us/NR/rdonlyres/00002e4a/xbvtkyznthnuceuqaqvlkuhuzmkakcba/naturalsystem s.pdf</u>) The county is active in wellhead protection efforts, protection of sensitive areas, and studying groundwater contamination issues. The county is delegated by the state to regulate wells, other than municipal wells, under Minnesota Rules 4725 and Dakota County Ordinance 114.

## 3.6 Onsite Sewage Treatment Systems

Onsite sewage treatment systems are regulated through a combined state and local program. The state effort is led by the Minnesota Pollution Control Agency (MPCA). The MPCA has three main responsibilities: 1) Revisions to the state's onsite code (MN Rules Chapters 7080 - 7083), 2) Assistance and interpretations to Chapters 7080 - 7083, and 3) Administration for the statewide professional certification and licensing program.

The statewide code requires that all onsite professionals including maintainers, service providers, installers, designers, and inspectors, be licensed by the MPCA. The requirements to become licensed include education, examination, apprenticeship, continuing education, and appropriate insurance and bonding.

The MPCA adopted new Sewage System Rules 7080, 7081, 7082, and 7083 on February 4, 2008. Dakota County subsequently adopted a new septic system ordinance (County Ordinance 113; <u>www.co.dakota.mn.us/LawJustice/Ordinances/CountyOrdinances/default.htm</u>) on November 17, 2009. The purpose of the Ordinance is to provide standards, guidelines, and regulations for the compliance and enforcement of the proper siting, design, construction, installation, operation, maintenance, repair, reconstruction, inspection and permanent abandonment of standard sewage systems. Some of the standards in Ordinance 113 are more restrictive than MN Rules 7080 – 7083.

State Rules require that cities and townships adopt the minimum County Ordinance standards into their own local septic ordinance within one year after the County's Ordinance amendment. Most communities within the NCRWMO have adopted Ordinance 113. (According to the latest communication from the MPCA dated March 16, 2012, the NCRWMO communities of Greenvale Township and Waterford Township have not updated their SSTS ordinances in accordance with State Rules. However, a Greenvale Township official indicates their ordinance was updated in August 2011 (*personal communication, 2013*).) The County has septic system jurisdiction in shoreland areas and within the City of Randolph, which recently relinquished its septic system authority to the County. Among other provisions, the County Ordinance requires regular pumping of septic tanks (at least once every three years), and required septic system compliance inspections for all property transfers and bedroom additions. Septic systems with a failing compliance inspection are required to be upgraded within 10 months.

## 3.7 Feedlots

The MPCA administers the state feedlot rules (MN Rules Chapter 7020) first adopted in 1971, and most recently revised in 2000. Over time the MPCA has delegated regulatory authority to many counties throughout the state, including Dakota County in 1996. Currently, the Dakota County Water Resources Department and the Soil and Water Conservation District (SWCD) cooperate to complete feedlot program responsibilities including registration, permitting, inspections, education, technical assistance, and complaint follow-up. The MPCA still provides program oversight, training, and enforcement support.

All feedlot owners with 50 or more animal units (10 or more animal units in Shoreland areas) are required to register their feedlot with the MPCA, and the registration must be updated every four years. The feedlot registration process simply identifies the feedlot owner and operator, the location of the feedlot, and the maximum animal unit capacity the feedlot can hold. Feedlot permits provide additional feedlot details, including the site's runoff and manure management, and are required for construction of new feedlots or expansion of existing feedlots over 300 animal units. New feedlots cannot be constructed and existing feedlots are not allowed to expand within designated Shoreland areas (typically within 300-feet of a stream or 1,000-feet of a lake). All feedlots over 300 animal units must develop and maintain a Manure Management Plan.

## 3.8 Federal Farm Program and Pesticide Use

The primary regulatory controls in agricultural areas such as the NCRWMO come from the U.S. Department of Agriculture Food Conservation and Energy Act of 2008 (Farm Bill). Most agricultural operators enroll and participate in the Farm Bill programs in order to ensure price support for their crop or produce. With inclusion in the Farm Bill Program, there are two major regulatory controls, Swampbuster and Sodbuster, administered by the Natural Resources Conservation Service (NRCS). Swampbuster prohibits the alteration of wetlands that weren't already altered before 1985 and requires an approved mitigation plan for the alteration of wetlands after 1985. (Existing wetlands are shown in Figure 2.2.) The NRCS, in coordination with the U.S Corps of Engineers, is currently working to develop a general permit process to reduce the amount of wetland regulatory overlap between federal agencies on agricultural lands enrolled in the Farm Bill. Sodbuster requires an approved conservation plan if historically uncultivated areas are to be plowed and cultivated in areas of Highly Erodible Land (Figure 2.10). This helps prevent soil loss from agricultural fields.

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

The MDA has broad regulatory authority for pesticides and has authority to regulate the use of fertilizer to protect groundwater.

# 3.9 Surface Water Quality

The federal Clean Water Act requires states to adopt water quality standards to protect lakes, streams, and wetlands from pollution. The standards define how much of a pollutant (bacteria, nutrients, turbidity, mercury, etc.) can be in the water and still meet designated uses, such as drinking water, fishing, and swimming. A water body is "impaired" if it fails to meet one or more water quality standards.

To identify and restore impaired waters, Section 303(d) of the Clean Water Act requires states to:

- 1. Assess all waters of the state to determine if they meet water quality standards.
- 2. List waters that do not meet standards (also known as the 303d list or the impaired waters list) and update the list every even-numbered year.
- 3. Conduct TMDL (total maximum daily load) studies in order to set pollutant reduction goals needed to restore waters.

Federal and state regulations and programs also require implementation of restoration measures to meet TMDLs. The Minnesota Pollution Control Agency (MPCA) is charged with enforcing the Clean Water Act in Minnesota. MPCA responsibilities include monitoring and assessing water quality, listing impaired waters, and conducting TMDLs. The agency also coordinates closely with other state and local agencies on restoration activities. To best align resources, the MPCA is following the Intensive Watershed Monitoring approach for both monitoring (agency and local via grant funds) and assessments.

The Clean Water Legacy Act, passed in June 2006, allocates first-year funding to accelerate water monitoring, TMDL development and restoration activities throughout the state. The Clean Water Council was established by the Legacy Act to provide recommendations on the administration and implementation of the Act.

The MPCA's watershed approach includes four steps: 1) monitor waterbodies and collect data, 2) assess data, 3) develop strategies to restore and protect the watershed's waterbodies, and 4) conduct restoration and protection projects in the watershed. Step 3 includes the completion of a watershed restoration and protection strategy (WRAPS) and report which:

- summarizes scientific studies of the watershed, including the physical, chemical, and biological assessment of the water quality of the watershed
- identifies impairments and water bodies in need of protection
- identifies biotic stressors and sources of pollution (both point and nonpoint)
- scientific analysis for impairments (<u>TMDLs</u>) that determines the sources of pollution and the reductions needed to meet water quality standards
- includes an implementation table which contains strategies and actions designed to achieve and maintain water quality standards and goals.

# 4.0 Problem Assessment

In spring 2012 a Planning Advisory Committee (PAC) comprised of citizens of the watershed, representatives from various organizations, and technical experts from state and local agencies was formed to guide the development of this Watershed Management Plan.

Active Planning Advisory Committee members represented:

- Communities of Eureka Township, Greenvale Township, Castle Rock Township, Randolph Township, Douglas Township
- Organizations including Pheasants Forever, Carleton Arboretum, Cannon River Watershed Partnership, Trout Unlimited, Lake Byllesby Improvement Association
- Agencies including MN Department of Natural Resources, MN Board of Water and Soil Resources, MN Pollution Control Agency, Metropolitan Council, MN Department of Agriculture and Dakota County

At preliminary meetings with the PAC and separate meetings with the NCRWMO Board of Managers (Board), members identified and discussed issues or problems currently facing the watershed. The following sections discuss the most pressing issues and problems. These issues then informed the development of the goals, policies and strategies found in Section 5.0

## 4.1 Water Quantity and Flooding

The amount and possible increase in subsurface drainage in agricultural fields is a concern among PAC and Board members. There is general frustration that the location of drainage tile (especially tile lines installed historically) are unknown and that there seems to be little consideration for the overall effect of large-scale or whole field drainage installations. Agricultural drainage alters normal stream flow and can cause streams to become "flashy" with high fluctuations in stage during runoff events. This leads to streambank erosion, channel cutting, and high turbidity levels – ultimately degrading the quality of water and habitat. Additionally, tile drainage often carries pollutants such as nutrients, bacteria, and sediment, further degrading water quality. Advances and new technologies in drainage systems, including tile gates and woodchip bioreactors, should be researched, supported, and utilized when possible.

Flooding in the watershed is typically only localized. However, large rain events (like the June 2012 event) can have devastating effects throughout the watershed. The June 2012 event resulted in the formation of numerous large-scale gullies that washed sediment into streams and ditches and demonstrated a need for improvements in agricultural conservation practices in certain locations.

Increased runoff volumes from development are not an issue in the watershed. Communities in the NCRWMO have adopted a stormwater control ordinance limiting the amount of runoff volume that can result from development.

## 4.2 Water Quality

Water quality is the watershed continues to be one of the main concerns from PAC and Board members. There are many mechanisms of pollutant transport into surface waters including overland runoff during rain and snowmelt events and leaching of contaminants into surficial and deep aquifers. Although many best management practices have been installed with the goal of improving water quality, there remain numerous stream and lake impairments (see Section 2.5) that effect multiple water uses including aquatic life, aesthetics and water-based recreation. High levels of bacteria remain a problem in Chub Creek and its tributaries – even during periods of low flow. Turbidity is very high after runoff events in Trout Brook. And new information on the high levels of nitrates in Trout Brook and Pine Creek is very concerning. In fact, current data indicate that Trout Brook has the highest nitrate levels of all monitored streams in southeastern Minnesota. It is noted that the source of high nitrates in this area is likely largely due to agricultural use of fertilizers. There is hope, however, that improvements in mapping (GIS) technologies, better education of producers and agricultural product suppliers (like elevator operators and co-ops), and the increasing cost of fertilizers will result in a reduction in the use of fertilizers.

Declining water quality and increased sedimentation in Lake Byllesby is also a significant concern. Although most of the land draining to Byllesby is outside the NCRWMO, there are actions that can be taken within the watershed and by the NCRWMO to reduce some of the pollution inputs and to better understand the changing conditions of the lake.

Other issues influencing water quality in the watershed include the enforcement of ordinances related to subsurface sewage treatment systems (SSTS) and the possible need for a collective wastewater treatment plant in the City of Randolph.

Water quality (and quantity) monitoring is an important function of the NCRWMO. The water monitoring program should improve over time by collaborating with other monitoring organizations and efforts (such as State –sponsored Watershed Restoration and Protection Projects, Cannon River Watershed Partnership programs, investigations by colleges and universities, etc.). Data gaps (such as a lack of fish and macroinvertebrate data) should be identified and consistent monitoring should continue.

## 4.3 Erosion

Erosion from fields, gullies, streambanks and shorelines contributes to soil loss, plugged culverts, and degraded water quality and habitat in lakes and streams. Several issues related to soil erosion were identified by the PCA and the Board. Many members noted the recent removal of trees from areas with erosion-prone soils. Others noted that streambank erosion along the Cannon River and the fact that "crops are falling into the river" provide indicators that riparian buffers are lacking here. Additionally, the topography of Miesville Ravine and the Trout Brook subwatershed increases the need for water and sediment control basins, grassed waterways, and gully stabilization measures.

Other needs related to soil erosion include more appropriate property tax assessments, more subsidies for permanent cover crops, more incentives to protect and improve streambanks and waterways, widespread adoption of conservation tillage practices, and lakeshore restoration and shoreline protection on Lake Byllesby.

Erosion from construction sites was not identified as an issue in this watershed as there is very little development and ordinances are in place to control construction site erosion.

## 4.4 Wetlands

Issues with wetlands in the NCRWMO are varied. While Greenvale Township indicates they have an increase in wetlands due to the Wetland Banking program, other PAC and Board members indicate there are fewer wetlands now due to farming practices, sod farms, and some development. Wetland restoration should be promoted, especially in areas with historical wetlands.

Enforcement of the Wetland Conservation Act (WCA) works well in the NCRWMO with assistance from the Dakota County Soil and Water Conservation District. There was consensus that functions and values assessments of wetlands could be effective when done on an as-needed basis in this area.

## 4.5 Ditches

There were no pressing issues identified with regards to the management of the two designated ditches in the watershed. However, it was noted that cleaning out a ditch requires official permission from the ditch authority (Dakota County), and that the 50-shoreland buffer rule applies to ditches that are designated as MDNR protected waters such as Pine Creek.

## 4.6 Groundwater and Mining

The quality of groundwater in the watershed is a concern to the PAC and Board members. Although the area is known for its karst topography, the location of connections between groundwater and surface are not well known. The contamination of nitrates and other pollutants in private wells and the movement of these contaminants from groundwater to surface water are also relatively unknown. Cooperation with entities such as Dakota County, the University of Minnesota, and the Department of Health is essential.

Sand and gravel mining and the possibility of frac sand mining are also issues in the watershed. PAC and Board members wonder if mines are engineered correctly and if regulations are being followed. The adequacy of appropriate mining ordinances among communities is also a question.

## 4.7 Fish and Wildlife Habitat and Recreation

Wildlife habitat in the watershed may be decreasing due to an increase in row crops and some development. Many have witnessed the destruction of field wind breaks and old fence rows in recent years. While these are not large parcels of land, they do provide corridors for wildlife and some habitat benefits. However, the County's Farmland and Natural Area Program (FNAP) has preserved much farmland and natural areas. There is support to continue FNAP and to improve the diversity of crops and cropland should be sought.

The proliferation of invasive species like buckthorn and garlic mustard, the need for a management plan for the Chub Lake Wildlife Management Area, and the desire by residents to keep Chub Lake as "natural environment lake" rather than overrun with hunters and anglers were also identified as issues in this area.

The need for riparian buffers along not only MDNR protected waters, but continuing upstream along smaller and intermittent streams was also identified as an issue throughout the watershed. (Some of this sentiment comes from a point of "fairness" among landowners. If downstream landowners must install buffers and protect waterways, upstream landowners should have equal requirements.)

The fish and wildlife habitat and the recreational opportunities within the Miesville Ravine Park Reserve provide an excellent amenity to Douglas Township and surrounding communities. However, more collaboration is needed among residents, township officials, Dakota County Parks Department, the NCRWMO, and Trout Unlimited to improve and manage the area's fish and wildlife habitat. Trout Unlimited and the MDNR are ready and willing to help improve and protect the area. Cooperation from Dakota County Parks Department should be sought.

Recreation on Lake Byllesby is limited by poor water quality and increasing sedimentation (especially at the head of the lake). Riparian and aquatic habitat could be improved in and along Lake Byllesby through shoreline stabilization and restoration projects.

## 4.8 Education and Outreach

There were many education and outreach needs identified by the PAC and Board members. In general, more funding and greater collaboration is needed for educational activities which tend to "fall through the cracks" and are left low on the priority list. It was noted that appropriate education can improve the adoption of conservation practices and lessen the need for regulations. There are a variety of education and outreach methods and avenues as well as new techniques (termed "civic engagement") that can and should be used in the watershed.

Topics identified as needing additionally education among watershed residents include water resources, in general; buffers; nitrates; and innovative practices or latest agricultural best management practices.

While some producers may be slow to change and external forces (such as commodity prices and property taxes) seem to trump the adoption of some best practices, an increase in information dissemination can only improve conditions in the long term.

## 4.9 Administration

Administration of the NCRWMO has its own issues including a low tax base (approximately \$8 million in net tax capacity in 2012), the need for additional collaboration with agencies and organizations, and the need for evaluation of this Plan's implementation by the NCRWMO and member communities. Targeting activities where they are needed most and where they offer the best return on time and money invested is essential in this watershed. Total member dues collected from the eleven member communities will remain lower than urban or suburban watersheds due to a lower tax base and competing funding priorities for the townships such as road maintenance and fire protection. Additional issues regarding administration include a concern about overreaching mandates and requirements that unfairly impact watershed residents.

The North Cannon River Watershed Management Organization (NCRWMO) is committed to the protection and enhancement of water resources in southern Dakota County. The NCRWMO will not be a permitting authority for activities in the watershed. Instead, the NCRWMO will require member communities to enforce ordinances related to water quality and will use strategies and policies (listed below and under each goal) based on evidence that the policies will result in achieving or advancing toward the specified goals. Member communities will be required to comply with and report their actions to complete and enforce the policies included in this Plan. The NCRWMO will develop a reporting process and consequences for non-compliance within one year of Plan adoption. The NCRWMO will work to balance the cost of its actions with their anticipated benefits. The NCRWMO recognizes that many landowners are motivated to care for their land. At the same time, the NCRWMO asserts that landowners have a responsibility to protect land and water resources in their communities.

This section is organized by topic to address the issues identified by the NCRWMO Board of Managers and the Planning Advisory Committee (Section 4.0). Strategies are referenced again in Table 6.4 in Section 6.0 with a timeline and budget for implementation. Nomenclature for this section is as follows:

**STRATEGIES**: Core activities performed by the NCRWMO through its annual work plan and budget

POLICIES: Requirements for specific action by member communities including:

- 1. Member communities shall adopt and enforce ordinances as strict as or stricter than Dakota County Ordinance 113 regarding the installation and maintenance of subsurface sewage treatment systems (SSTS) or will delegate the SSTS ordinance enforcement to Dakota County.
- 2. Member communities will annually report to the NCRWMO information on how and when their required storm water control ordinance is enforced on developments greater than one acre.
- 3. Member communities will annually report to the NCRWMO data on how and when their required ordinance on stormwater management for land disturbances is enforced in their communities.
- 4. Member communities will annually report to the NCRWMO information on how and when their required ordinance on erosion control during land disturbances is enforced in their communities.
- 5. Member communities will annually report to the NCRWMO on their activities to enforce erosion control standards for new and renewing tax relief programs participants.

- 6. Member communities will annually report to the NCRWMO on their activities to enforce road right-of-way setback requirements.
- 7. Member communities shall review the appropriateness of their existing mining ordinances with regards to protection of surface and groundwater resources. If none is adopted, community shall consider adopting a mining ordinance.
- 8. Member communities shall post maps of the Wetland and Watercourse Inventory and Assessment or future inventories in their respective town halls.
- 9. Member communities will continue to work with the Dakota County SWCD for WCA coordination.
- 10. Member communities shall report to the NCRWMO on their implementation of all policies stated above.

# 5.1 Surface Water Quality

**GOAL:** To protect and improve the water quality of streams, rivers, and lakes such that each waterbody is "fully supporting" for its use designations according to MN State Standards.

**Strategy 1:** Monitor water quality at the Chub Creek Permanent Monitoring Station near the outlet of Chub Creek by collecting monthly grab samples April – October and analyzing for temperature, dissolved oxygen, conductivity, field pH, total phosphorus, dissolved phosphorus, total Kjeldahl nitrogen, nitrate, nitrite, ammonia, total suspended solids, turbidity, and bacteria. Analyze the data in conjunction with water quantity data collected here.

**Strategy 2:** Conduct dissolved oxygen assessments in key streams to determine if water quality standards are being met, as funding allows.

**Strategy 3:** Analyze Trout Brook springs for nitrates triennially to better assess nitrate levels and possible sources. (Work may be in conjunction with other studies and partnering organizations as stated in Groundwater Strategy #2.)

**Strategy 4:** Participate as a local partner in supplemental water quality monitoring and watershed studies and projects by partnering in field work, sharing data, participating on advisory committees, or providing a local planning and prioritizing mechanism in cooperation with other agencies and organizations, as needed and as funding allows.

**Strategy 5:** Provide local match for grants and/or cost share assistance to landowners to install best management practices (BMPs) that reduce pollution in surface waters. Examples of water quality BMPs include grassed waterways, streambank or shoreline stabilization, feedlot improvements, nutrient management, tile outlet and woodchip bioreactors, crop irrigation management, riparian buffers, etc. Priority will be given to projects that reduce nitrates in the Trout Brook subwatershed, reduce pollution in other impaired waters, and/or address issues identified through future monitoring or studies.

**Strategy 6:** Collaborate with member communities and others to help identify buffer priorities for use in community planning and future grant applications.

**Strategy 7:** Re-examine the possibility of buffer requirements along <u>all</u> watercourses and waterbodies, including those outside of MDNR-protected waters, in 2018.

**Strategy 8:** Advocate with the County Board and others to fund buffer installations along watercourses upstream from MDNR-protected waters in order to protect buffers required along MDNR-protected waters. Activities may include writing a letter or discussing the matter by phone or in person.

**Strategy 9:** Advocate with the City of Randolph, Randolph Township and Dakota County to pursue the installation of a community wastewater treatment system or other shared and upgraded sewer and water systems in the City of Randolph due to its proximity to Chub Creek (impaired for bacteria); and along the shore of Lake Byllesby (impaired for nutrients). Activities could include writing a letter and/or convening stakeholders.

**Strategy 10:** Seek agricultural producers interested in applying to be a Discovery Farm to gather water quality data from farm runoff to improve farm management and inform other local producers. <u>www.discoveryfarmsmn.org/</u> Activities may include writing articles for township newsletters or convening an informational meeting.

**Strategy 11:** Advocate with Dakota County to investigate the pollution potential of the old dump on the Cannon River near the City of Randolph, and other potential sources of pollution such as leaking underground storage tanks, historical dumps and waste sites. Activities may include writing a letter or discussing the matter by phone or in person.

**Policy 1:** Member communities shall adopt and enforce ordinances as strict as or stricter than Dakota County Ordinance 113 regarding the installation and maintenance of subsurface sewage treatment systems (SSTS) or will delegate the SSTS ordinance enforcement to Dakota County.

**Policy 2:** Member communities will annually report to the NCRWMO information on how and when their required storm water control ordinance is enforced on developments greater than one acre.

## 5.2 Surface Water Quantity

**<u>GOAL</u>**: To decrease the rate and volume of water that may contribute to flooding or non-point source pollution from overland runoff and subsurface drainage and dewatering activities.

**Strategy 1:** Monitor surface water quantity at the Chub Creek Permanent Monitoring Station near the outlet of Chub Creek by maintaining automated stage monitoring equipment and taking approximately four in-stream flow measurements, across a variety of flow regimes when possible, to continuously refine the flow rating curve and analyze the data in conjunction with water quality data collected here.

**Strategy 2:** Provide local match for grants and/or cost share assistance to landowners to install BMPs that reduce rate and volume of runoff and subsurface drainage systems including tile gates, tile systems with lower gradient co-efficients, water control basins, infiltration basins, two stage ditches, side inlet controls, saturated buffers, wetland restoration, raingardens, etc.

**Strategy 3**: Investigate possible mechanisms to inventory existing tile lines and/or collect data on installation of new tile lines, and understand the impact of tiling on stream water quantity in collaboration with other groups and as funding allows.

**Strategy 4:** Gather and disseminate information on the latest technologies and practices for tracking and improving the impacts of tile line drainage including new conservation drainage approaches being researched and demonstrated in Minnesota like controlled drainage, shallow drainage, woodchip bioreactors, saturated buffers, rock inlets, alternative ditch design and various kinds of storage basins.

**Policy 1:** Member communities will annually report to the NCRWMO data on how and when their required ordinance on stormwater management for land disturbances is enforced in their communities.

## 5.3 Soil Erosion and Sedimentation

**<u>GOAL</u>**: To reduce soil erosion and sedimentation throughout the watershed.

**Strategy 1:** Provide local match for grants and/or cost share assistance to landowners to install BMPs that reduce soil erosion including grassed waterways, riparian buffers, sediment control basins, establishing cover crops, conservation tillage, etc.

**Strategy 2**: Develop a model ordinance that member communities may adopt providing guidance on how to enforce erosion control standards for new and renewing tax relief programs participants.

**Strategy 3**: Develop a model ordinance that member communities may adopt providing guidance on how to enforce road right-of-way setback requirements.

**Strategy 4:** Receive, at least biennially, data on the estimated reduction in sediment load to NCRWMO water resources due to the installation or use of best management practices as recorded through SWCD and/or U.S. Department of Agriculture (USDA) programs.

**Strategy 5:** Seek agricultural producers interested in applying to be a Discovery Farm to gather water quality data from farm runoff to improve farm management and inform other local producers. <u>www.discoveryfarmsmn.org/</u>

**Policy 1:** Member communities will annually report to the NCRWMO information on how and when their required ordinance on erosion control during land disturbances is enforced in their communities.

**Policy 2:** Member communities will annually report to the NCRWMO on their activities to enforce erosion control standards for new and renewing tax relief programs participants.

**Policy 3:** Member communities will annually report to the NCRWMO on their activities to enforce road right-of-way setback requirements.

## 5.4 Groundwater

**<u>GOAL</u>**: To protect groundwater quality and quantity.

**Strategy 1:** Cooperate with Minnesota Department of Agriculture, University of Minnesota Extension, and Dakota County to update nitrogen fertilizer management plan and/or disseminate new recommendations when published.

**Strategy 2:** Cooperate with researchers and others to determine the routes of nitrogen transport from surface water to groundwater in the Trout Brook subwatershed by sharing data, sitting on advisory committees, and/or co-sponsoring or supporting research grants.

**Strategy 3:** Provide local match for grants and/or cost share assistance for nutrient management practices.

**Strategy 4:** Track groundwater quantity and quality trends by reviewing reports from entities such as Dakota County, U.S. Geological Survey, and MN Department of Natural Resources.

**Policy 1:** Member communities shall review the appropriateness of their existing mining ordinances with regards to protection of surface and groundwater resources. If none is adopted, community shall consider adopting a mining ordinance.

## 5.5 Wetlands

**<u>GOAL</u>**: To protect wetlands from destruction or deterioration and to restore wetlands where possible.

**Strategy 1:** Continue to review applications submitted under the Wetland Conservation Act (WCA) and the MDNR permitting program for compliance with WCA sequencing and mitigation rules and this watershed management plan.

**Strategy 2:** Provide local match for grants and/or cost share funding to wetland restoration projects, with priority given to projects in the Chub Creek watershed and its subwatersheds.

**Policy 1:** Member communities shall post maps of the Wetland and Watercourse Inventory and Assessment or future inventories in their respective town halls.

**Policy 2:** Member communities will continue to work with the Dakota County SWCD for WCA coordination.

## 5.6 Wildlife, Habitat and Recreation

**<u>GOAL</u>**: To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.

**Strategy 1:** Advocate with MDNR and seek partners such as the Dakota County Habitat Alliance for the development and implementation of management plans for the Chub Lake Wildlife Management Area. Activities may include writing a letter or discussing the matter by phone or in person.

**Strategy 2:** Advocate with Dakota County to continue developing and implementing land conservation programs such as the Farmland and Natural Area Program to protect and preserve critical natural areas, farmland, and wetlands in the watershed. Activities may include writing a letter or discussing the matter by phone or in person.

**Strategy 3:** Provide local match for grants and/or cost share assistance to landowners to install BMPs that protect, restore, or improve lakeshores and streambanks.

**Strategy 4:** Provide a forum for or otherwise advocate for improved cooperation among Dakota County Parks, Douglas Township, Trout Unlimited, and the MDNR to prepare and implement a management plan for in-stream and riparian habitat restoration in Trout Brook and Pine Creek.

**Strategy 5:** Receive and review information from Dakota County and other entities on the status of dam operations on Lake Byllesby and advocate for research on the effects of dam operations and fluctuating water levels on lake wildlife.

**Strategy 6:** Receive and review information on the implementation status of a Total Maximum Daily Load Study on Lake Byllesby in order to improve water quality and recreation.

**Strategy 7:** Advocate with the City of Randolph to adopt a shoreland ordinance similar to Dakota County's Shoreland and Floodplain Ordinance 50. Activities may include writing a letter or coordinating a meeting among organizations involved.

## 5.7 Education and Outreach

**<u>GOAL</u>**: To increase the awareness of water resources and practices needed for their improvement or protection among all sectors of the community.

**Strategy 1:** Promote and encourage volunteer water monitoring, including the use of college students.

Strategy 2: Maintain an updated website and notify the public of regular meetings.

Strategy 3: Develop an annual report and annual plan; post on website.

**Strategy 4:** Provide education to watershed residents by partnering with other entities and/or seeking funding to educate and engage agricultural producers, agricultural groups, and other residents about water resources, water conservation, and BMPs, including new and innovative practices, septic system maintenance, nutrient management, lakeshore and shoreline restoration, and buffers; through avenues such as field days, watershed councils, township officers meetings, township newsletters, etc.

**Strategy 5:** Disseminate information on Minnesota Department of Agriculture's current and future guidelines for nitrogen application rates and timing through avenues such as township newsletters, township officers meetings, correspondence from agricultural product suppliers to producers, etc.

Strategy 6: Use technical and citizen advisory committee, as needed.

**Strategy 7:** Request that Dakota County Transportation Department install stream identification signs at all major stream crossings on Dakota County roads.

**Strategy 8:** Advocate and partner with Dakota County and others for the development and installation of interpretive information on natural resources and water quality, such as signs, in Miesville Ravine Park Reserve and Lake Byllesby Regional Park. Activities may include writing a letter or discussing the matter by phone or in person, or assisting with development of sign content.

**Strategy 9:** Maintain an online directory of water and natural resource organizations, jurisdictions and contacts for use by citizens and NCRWMO member communities.

## 5.8 Administration

**<u>GOAL</u>**: To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.

**Strategy 1:** Cultivate partnerships with agencies and organizations that have similar goals including collaborating on programs and co-sponsoring grant applications including but not limited to Cannon River Watershed Partnership, Dakota County, MDNR, Dakota County SWCD, Trout Unlimited, Pheasants Forever, MN Pollution Control Agency, USDA Natural Resources Conservation Service.

**Strategy 2:** Fulfill the requirements of the MN Board of Water and Soil Resource's Performance Review and Assistance Program and submit required annual reporting activities per MR 8410.0150.

**Strategy 3:** Amend this Plan, as necessary, to avoid duplication or conflict with the regulations or policies of other governmental agencies and ensure that Plan implementation strategies do not violate the constitutional rights of private property owners or other individuals.

**Strategy 4:** Evaluate the implementation of the strategies and policies in this Watershed Management Plan and examine their effectiveness. Consider the elimination of ineffective strategies or policies. Member communities will annually submit a report card type form (developed by the NCRWMO). The NCRWMO will evaluate for compliance with the policies.

**Policy 1:** Member communities shall report to the NCRWMO on their implementation of all policies stated above.

## 6.1 Responsibilities

The North Cannon River Watershed Management Organization (NCRWMO) is not a permitting agency. The responsibility of the NCRWMO is to ensure that the goals listed in this plan are pursued through the strategies and policies laid out in the implementation schedule (Table 6.4). The core activities of the NCRWMO include 1) monitoring water quality and quantity, 2) providing cost share funding and grant match funding to install best management practices, 3) providing information and education to landowners and agricultural producers on best practices, and 4) evaluating the implementation of best practices and enforcement of related ordinances throughout the watershed.

All programs to be implemented by NCRWMO will be in effect within one year of plan adoption or according to the schedule in Table 6.4. All local controls specified in this plan will be developed and in effect within two years of plan adoption (Per Minnesota Rules 8410.0130 Subpart 2.).

# 6.2 Financial Considerations

Minnesota Statute 103B.241 gives Watershed Management Organizations (WMOs) the power to levy ad-valorem taxes to pay for capital improvements. However, the State of Minnesota has ruled that other statutes do not specifically allow joint powers WMOs to use this funding authority. Minnesota Statute 103B.251 gives WMOs with an adopted watershed plan the ability to certify for payment by the county all or part of the cost of a capital improvement contained in the capital improvement program of the plan. Additionally, Minnesota Statutes 103B.245 allows a WMO to change its Joint Powers Agreement giving its member communities the ability to levy funds for the WMO through individual taxing districts within each community.

Minnesota Statutes 103B.252 allows Local Government Units (LGUs) or WMOs to declare an emergency and order work to be done without a contract. This statute does not contain levy limits.

Through the NCRWMO joint powers agreement (Appendix A), each member community may be asked to contribute annually to the NCRWMO general fund. The annual contribution is based 50% on the assessed valuation of all real property and 50% on the basis of the total area of each member within the boundaries of the watershed.

The NCRWMO joint powers agreement allows the establishment of a capital improvement fund for each improvement project ordered by the Board. However, this option is not currently used by the NCRWMO, nor will it be used in the foreseeable future.

Funding sources available to member communities include special assessments, ad valorem taxes, stormwater utility fees, development fees, and tax increment financing. Other funding sources include various grant and loan programs from local, state, and federal agencies and private foundations. The following paragraphs list these various funding sources.

## 6.3 Funding Sources

The NCRWMO will collect member dues to fund its core activities of 1) monitoring water quality and quantity, 2) providing cost share funding and grant match funding to install best management practices, 3) providing information and education to landowners and agricultural producers on best practices, and 4) evaluating the implementation of best practices and enforcement of related ordinances throughout the watershed. Supplemental funding will also be sought through grant applications and collaboration and partnerships with other organizations. (See Table 6.2 for a list of opportunities for collaboration.)

## Grants

In 2008, Minnesota's voters passed the Clean Water, Land and Legacy Amendment (Legacy Amendment) to the Minnesota Constitution to protect drinking water sources; protect, enhance, and restore wetlands, prairies, forests, and fish, game, and wildlife habitat; preserve arts and cultural heritage; support parks and trails; and protect, enhance, and restore lakes, rivers, streams, and groundwater.

The Legacy Amendment increases the state sales tax by three-eighths of one percent beginning on July 1, 2009 and continuing until 2034. The additional sales tax revenue is distributed into four funds as follows: 33 percent to the clean water fund; 33 percent to the outdoor heritage fund; 19.75 percent to the arts and cultural heritage fund; and 14.25 percent to the parks and trails fund.

Of the Legacy Amendment funding, the Legislature appropriated \$179.43M of Clean Water Funds for water activities during fiscal years 2012-2013. These activities include a continuation of previous clean water efforts funded in the first biennium, plus some new water management efforts. The activities include:

- Water quality monitoring and assessment: \$23.4M
- Water quality study development (TMDLs): \$34.86M
- Protection and restoration activities: \$104.14M, and
- Drinking water protection: \$17M.

Clean Water Funds are distributed through the grant and loan programs of several State agencies including:

- Clean Water Fund Grants (Minnesota Board of Water and Soil Resources)
- Surface Water Assessment Grants (Minnesota Pollution Control Agency)
- Clean Water Partnership (Minnesota Pollution Control Agency)
- Total Maximum Daily Load Grant Program (Minnesota Public Facilities Authority)
- Phosphorus Reduction Grant Program (Minnesota Public Facilities Authority)
- Small Community Wastewater Treatment Construction Loans & Grants (Minnesota Public Facilities Authority)
- Source Water Protection Grant Program (Minnesota Department of Health)

A list of grant programs from regional, state and national agencies and organizations are included in Table 6.1.

Table 6.1 Grant programs for natural resources-related activities. (Adapted from a table developed by Barr Engineering, September 2012.)

Grant Program	
BWSR Clean Water Accelerated Implementation Grant Program	
BWSR Clean Water Assistance Grant Program	
BWSR Clean Water Community Conservation Partner Program Grant Program	
BWSR Conservation Drainage Grant Program	
BWSR Cooperative Weed Management Area Grants	
Conservation Corp Minnesota Clean Water Fund Grants	
Dakota County Community Conservation Partnership	
Great Lakes Habitat Restoration Program	
Great River Greening Metro Conservation Corridor Partnership Habitat Restoration	
Hennepin County Environmental Response Fund Grants Program	
LCCMR Environment & Natural Resources Trust Fund	
Lessard-Sams Outdoor Heritage Fund Program	
McKnight Foundation Environmental Grants	
MDA Ag Literacy Grant	
MDA Clean Water Ag BMP Loan Program	
MDA County Fair Arts Access and Cultural Heritage Grant	
MDA Forest Protection Reserve Appropriation	
MDA Livestock Investment Grant	
MDA Specialty Crop Grants	
MDA Sustainable Agriculture Grant	
MDA Value Added Grant Program	
MDA's Clean Water Research Program	
MDH Source Water Protection Competitive Grant Program	
MDH Source Water Protection Plan Implementation Grant Program	
MDNR Aquatic Invasive Species Control Projects - Grant Program	
MDNR Conservation Partners Legacy Grant Program (from Lessard-Sams Outdoor Heritage Council)	
MDNR Federal Recreation Trail Program	
MDNR Flood Hazard Mitigation Grants	
MDNR Invasive Species Grant Program- Public Awareness Projects	
MDNR Local Trail Connections Program	
MDNR Natural and Scenic Area Grants	
MDNR Outdoor Recreation Grant Program	
MDNR Parks and Trails Legacy Grant Program	
MDNR Regional Park Program	
MDNR Regional Trail Grant Program	
MDNR Shoreland and Aquatic Habitat Block Grant Program	
MDNR State Park Road Account Program	
Met Council Livable Communities Demonstration Account Development Grant Program	
Met Council Tax Base Revitalization Account (TBRA) Program- Clean-up Grants	

Table 6.1 Continued	
Met Council Tax Base Revitalization Account (TBRA) Program- Investigation Grants	
Metropolitan Council Livable Communities Act (LCA) Transit Oriented Development (TOD) Grant Program	
Midwest Glacial Lakes Partnership/USFWS National Fish Habitat Action Plan	
MPCA Clean Water Partnership (CWP) Implementation Grants	
MPCA Clean Water Partnership (CWP) Resource Investigation/Diagnostic Study Grants	
MPCA Environmental Assistance Grant Program	
MPCA Surface Water Assessment Grant	
MPFA Clean Water Revolving Fund: Opportunity for Wastewater or Stormwater	
NFWF Acres for America	
NFWF Five Star Restoration Matching Grants Program	
NFWF Keystone Initiative Grant Program	
NFWF Native Plant Conservation Initiative	
NFWF Pulling Together Initiative (invasive plant species)	
NFWF Sustain our Great Lakes Community Grants Program	
NFWF Sustain our Great Lakes Stewardship Grants Program	
USDA Community Forest and Open Space Conservation Program	
USEPA Brownfields Assessment Grants	
USEPA Brownfields Cleanup Grant Program	
USEPA Brownfields Revolving Loan Fund Grant Program	
USEPA Environmental Education Regional Grant Program	
USEPA Environmental Justice Small Grants Program	
USEPA Urban Waters Small Grant Program	
USFWS / Great Plains Fish Habitat Program Driftless Area Restoration Effort	
USFWS Great Plains Fish Habitat Partnership Grant Program	
USFWS Neotropical Migratory Bird Conservation Act (NMBCA) Grant Program	
USFWS North American Wetland Conservation Act U.S. Small Grants Program	
USFWS North American Wetland Conservation Act U.S. Standard Grants Program	

Additional grant and funding programs include the following:

The U.S. Department of Agriculture's **Natural Resource Conservation Service (NRCS)** provides financial and technical assistance to help landowners conserve, maintain, and improve natural resources and the environment. Among others, the NRCS administers the Environmental Quality Incentives Program (EQIP), the Conservation Reserve Program (CRP), and the Conservation Stewardship Program (CSP). EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices that promote agricultural production and environmental quality. Current EQIP priorities include practices that address water quality, air quality, wildlife habitat, and soil erosion. CRP encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. CSP is a voluntary conservation program that encourages producers to address resource concerns in a comprehensive manner by undertaking additional conservation activities and improving, maintaining, and managing existing conservation activities. CSP presents a significant shift in how NRCS provides conservation

program payments. CSP participants will receive an annual land use payment of operation-level environmental benefits they produce. Under CSP, participants are paid for conservation performance: the higher the operational performance, the higher their payment.

**Ducks Unlimited, Trout Unlimited, and Pheasants Forever often provide** funds for projects that enhance, create, or protect fish and wildlife habitat.

**Individual entities** needing to provide wetland mitigation in compliance with the Wetland Conservation Act (WCA) may have funds and/or technical resources available to restore or create wetland function and values lost or intended to be destroyed as part of a project. Other private funding sources include service organizations (i.e., Lions Club and Elks), youth groups (i.e., Boy/Girl Scouts), Adopt-a-Highway/River cleanup groups, and sportsman clubs.

# 6.4 Existing Programs and Partnering Opportunities

Within the North Cannon River Watershed, there is a network of agencies and organizations already working toward goals similar to those of the NCRWMO (Table 6.2). The NCRWMO is committed to making the best use of its financial resources and thus will collaborate with these entities whenever possible to meet its goals and implement its strategies. Collaboration may mean partnering on or providing matching funds for grant applications; providing space or facilitation assistance for an educational event or meeting; promoting events or educational campaigns; sharing data or monitoring equipment; inviting others to informational meetings or events; assisting with recruitment of volunteers; or attending meetings of partnering organizations to stay informed of local activities. Below is a list and brief description of potential opportunities for partnerships between the NCRWMO other entities. Additionally, Table 6.2 includes a list of natural resource-related programs currently being implemented by other organizations working within the boundaries of the NCRWMO.

The **Cannon River Watershed Partnership** (CRWP) is a non-profit organization that works with agencies, organizations and individuals to protect and restore healthy lakes, streams, rivers, woods and prairies throughout the Cannon River watershed. CRWP sponsors activities such as educational programs, river clean ups, and canoe trips. They perform numerous research projects on water quality, educate local units of government, work to affect local and state policy, work with rural cities to improve wastewater treatment, coordinate stream and lake volunteer monitors, and distribute grant funds when available. The NCRWMO can promote CRWP events, participate in educational campaigns, and collaborate on research and monitoring projects.

The **Basin Alliance for the Lower Mississippi in Minnesota** (BALMM) is a locally led alliance of land and water resource agencies that works to create an organized unified effort to improve water quality in the Lower Mississippi River Basin. BALMM emphasizes the implementation of land use practices through watershed management, aquifer protection, and flood plain management. BALMM sponsors and promotes workshops and educational campaigns, establishes ongoing coordination of local, state, tribal, and federal agencies with regards to water protection, and lobbies elected officials and funding sources to give priority attention to the water quality in southeastern

Minnesota. The NCRWMO can stay apprised of BALMM activities, participate in educational campaigns, and partner on programs and grant applications.

The **Dakota County Soil and Water Conservation District** (SWCD) in cooperation with the **Natural Resource Conservation Service in Dakota County** (NRCS) provides technical and costshare assistance to groups, local units of government, and individual landowners for conservation practices such as feedlot improvements, conservation tillage, filter strips, buffer strips, grassed waterways, shelter belts, windbreaks, manure and nutrient management, wetland restoration, natural resource based planning, streambank restoration and stabilization, low impact development, and more. The SWCD also uses geographic information systems to map landuse and landcover, identify wetlands, and identify potential greenways. The SWCD also performs water quality monitoring, contracts with some cities and townships to inspect construction sites for erosion control, and assists townships with Wetland Conservation Act (WCA) applications. The NCRWMO can promote SWCD and NRCS programs among its member communities and landowners.

At the **University of Minnesota Extension Service**, staff offers educational assistance to Dakota County farmers on a variety of subjects including: manure nutrient management, pasture management, sheep production, beef production, horse and alternative livestock production, and Farm Bill education. Dakota County farmers also have access to Extension Specialists in neighboring counties to provide education on subjects such as: dairy production, crop production, pesticide applicator training, marketing, and more. Dakota County staff can also help farmers access research-based information on almost any agricultural-related topic available through the University of Minnesota. The NCRWMO can use the Extension Service as technical advisors, when needed and can promote their educational campaigns.

The **Minnesota Pollution Control Agency** (MPCA) is the state agency responsible for controlling pollution in water, on land, and in the air. With regards to water, the MPCA collects water quality data and maintains the statewide database, oversees the total maximum daily load (TMDL) program, administers the National Pollution Discharge Elimination System (NPDES), coordinates a citizen stream and lake monitoring program, and provides technical assistance on pollution prevention and control. The NCRWMO can work with the MPCA to make sure the NPDES Phase II is implemented in southern Dakota County, and can work with them to perform TMDLs and improve water quality.

The **Minnesota Department of Natural Resources** (MDNR) collects data on the fisheries, habitat, and water quality. They also work to improve fish and wildlife habitat in trout streams and wildlife management areas. The NCRWMO can cooperate with the MDNR in these efforts and stay informed on data collected in their area.

The **Minnesota Board of Water and Soil Resources** (BWSR) provides technical and financial assistance to local units of government to plan and implement conservation practices and watershed management plans. The NCRWMO can take advantage of their technical expertise, especially when drafting ordinances for their members to adopt or consider.

**Dakota County** has many departments that can partner with the NCRWMO on various programs. The NCRWMO plans to work with various County departments and advocate for specific actions by the County including funding buffer installations, pursue a community wastewater treatment system in the City of Randolph, investigate pollution potential of old dumps, enforce road right-of-way setback requirements, monitor groundwater quality and quantity, continue land conservation programs, provide Lake Byllesby dam operations status and study effects of operations on wildlife, install stream identification road signs at stream crossings, and develop and install interpretive signage at parks.

The **Metropolitan Council** engages communities and the public in planning for future growth and development in the seven county metro area and performs some water quality monitoring. The Met Council's "2030 Regional Development Framework" serves as a guide for decisions and implementation of regional services. Under the Metropolitan Land Planning Act, local communities must prepare and submit to the Council local comprehensive plans that are consistent with the Council's regional system plans. The Metropolitan Council Environmental Services collects and treats wastewater, operates a laboratory, and partners with various public and private groups to provide technical and financial assistance and educational strategies for sustainable environmental management and protection. Additionally, the Met Council funds the water quality and quantity monitoring of the Cannon River at Welch and has collected water quality samples on Chub Lake. The NCRWMO can partner with the Met Council in a variety of ways by taking advantage of technical and financial assistance, using their laboratory services for water quality analyses, partnering on water monitoring efforts, and learning more about how growth and development in the NCRWMO can occur with environmental sustainability.

The **Minnesota Department of Agriculture** (MDA) works directly with some producers and implements a variety of statewide programs including pesticide and fertilizer water monitoring, outreach and education to agronomists and producers, and development and eventual implementation of the Minnesota Agricultural Water Quality Certification Program. The MDA is statutorily responsible for the management of pesticides and fertilizer other than manure to protect water resources. The MDA implements a wide range of protection and regulatory activities to ensure that pesticides and fertilizer are stored, handled, applied and disposed of in a manner that will protect human health, water resources and the environment. The MDA works with the University of Minnesota to develop pesticide and fertilizer Best Management Practices (BMPs) to protect water resources, and with farmers, crop advisors, farm organizations, other agencies and many other groups to educate, promote, demonstrate and evaluate BMPs, to test and license applicators, and to enforce rules and statutes. The MDA has broad regulatory authority for pesticides and has authority to regulate the use of fertilizer to protect groundwaterThe NCRWMO can partner with MDA in providing technical resources and education to the agricultural community.

The **Minnesota Department of Health** (MDH) can assist the NCRWMO with gathering data on groundwater quality and quantity and the location of abandoned and/or unsealed wells. The MDA also manages the State's Wellhead Protection Program which helps prevent drinking water from becoming polluted by managing potential sources of contamination in the area which supplies water to a public well.

The NCRWMO can partner with conservation organizations such as **Trout Unlimited** and **Pheasants Forever** to educate landowners and the general public about natural resource restoration and preservation. Additionally, the NCRWMO and these groups can work together on certain conservation programs and projects. The NCRWMO can also partner with local schools and colleges such as **Randolph Area Schools, Carleton College,** and **St. Olaf College** in many ways. Students can perform ongoing studies and assessments of water quality and watersheds through testing, biological monitoring, and mapping.
Agency or Organization	Activity	Location	Timeline	Related NCRWMO Goal/Strategy
CRWP	Monitor water quality (particularly during runoff events) for MPCA's Watershed Pollutant Load Monitoring Network (see MPCA below) to determine pollution loading of various pollutants. Monitoring includes: phosphorus, solids, nitrogen, turbidity, temperature, pH, conductivity, dissolved oxygen, transparency	Cannon River @ 2 <sup>nd</sup> Street, Northfield	Funded by MPCA 2013 – 2014; may be extended	Goal 5.1
	Coordinate volunteer stream monitoring	Various streams in various years	Annually monitor some sites	Goal 5.7; Strategy 1
	Provide education for agricultural producers, various topics	Throughout watershed, as needed/requested	Ongoing as opportunities/ needs arise	Goal 5.7; Strategies 4 and 5
	Raise watershed awareness and provide activities to residents including river clean ups and Cannon River canoe trips	Varies	Annual events	Goal 5.7; Strategy 4
	Provide technical and program assistance to NRCS, SWCD, or WMO, as requested, through grant-funded program.	Throughout watershed, as requested.	Funded thru 12/31/14; additional funding being sought	Goals 5.1 – 5.7
	Convene citizen-led Watershed Councils, where requested, through grant- funded program.	Throughout watershed, as requested.	Funded through 12/31/14; additional funding being sought	Goals 5.1 - 5.7 Goal 5.7; Strategy 4
	Assist small communities (like City of Randolph) to assess options for wastewater system upgrades including facilitation and grant writing	Possibly in City of Randolph	Ongoing	Goal 5.1; Strategy 9
	Perform outreach; provide civic engagement activities to inform and involve stakeholders in Lake Byllesby TMDL implementation	Lake Byllesby and upstream locations	Unknown	Goal 5.6; Strategy 6 Goal 5.7; Strategy 4

Table 6.2 Opportunities for Collaboration: Existing Activities of Other Organizations in NCRWMO

Agency or Organization	Activity	Location	Timeline	Related NCRWMO Goal/Strategy
USGS	Monitor flow and volume of Cannon River (used with MPCA's Watershed Pollutant Load Monitoring Network)	Cannon River @ 2 <sup>nd</sup> Street, Northfield	Since 2012; Ongoing indefinitely	Goal 5.2
MDNR Fisheries	Survey fish communities and assess habitat to track changes in populations and conditions	Trout Brook Pine Creek Chub Creek? Lake Byllesby Cannon River	Annually Once every 3 years ? Once every 5 years As time/need arises	Goal 5.6
MPCA	Intensive Watershed Monitoring Program (IWM): to assess the aquatic health of the entire major watershed through intensive biological (fish and bugs) and water chemistry sampling; to determine the condition of all watersheds throughout the state for a variety of indicators, to locate watersheds with impairments, to provide information for the stressor identification/TMDL process, and to monitor conditions over time	Entire Cannon Watershed with multiple sites on Chub Creek, Pine Creek, Trout Brook	Once every ten years; started in 2011	Goals 5.1 and 5.2
	Watershed Pollutant Load Monitoring Network; On-going effort to quantify pollutant loads at the outlet of each major watershed in the state, and at key "intermediate" points within each watershed. Flow gauges at each site maintained by USGS and MDNR; grab samples for solids and nutrients collected at each site by Met Council or local partners.	Cannon River @ Morristown, Northfield, Welch + Straight River	Year-round flow data; 30 – 35 grab samples collected annually	Goals 5.1 and 5.2
	Complete Lake Byllesby Nutrient Total Maximum Daily Load Study	Lake Byllesby	2013 completion	Goals 5.1 and 5.2; Goal 5.6; Strategy 6
	Hydrologic modeling of the Cannon River Watershed (Hydrologic Simulation Program Fortran)	Entire Cannon River Watershed	2013 - 2014	Goal 5.2

Agency or Organization	Activity	Location	Timeline	Related NCRWMO
MPCA	Watershed Restoration and Protection (WRAP) Strategy Development and Watershed Planning – uses a culmination of studies listed above to comprehensively restore and protect waters throughout Watershed	Entire Cannon River Watershed	2014 - 2015	Goal/Strategy Goal 5.1
St. Olaf College	Research by college students on agricultural practices such as differences in soil quality and subsurface water quality between conservation and conventional tillage practices; nitrogen rate trials; etc.	St. Olaf Natural Lands, Greenvale Township	Ongoing; 1 – 5 research projects/year	Goals 5.1, 5.2, 5.3, 5.4 and 5.7
Carleton College	Preserve, restore and maintain natural habitats including prairies, woods, wetlands; invasive species control, prairie burns, erosion control Provide educational workshops open to the public including invasive species control and habitat restoration techniques Provide recreation opportunities including hiking, fishing, skiing, canoeing, bird watching, etc.	Carleton's Cowling Arboretum, Waterford Township	Ongoing	Goals 5.1, 5.3, 5.5, and 5.6 Goal 5.7 Goal 5.6
MDNR Groundwater Observation Wells	Monitor groundwater level in observation wells to assess ground water resources, determine long term trends, interpret impacts of pumping and climate, plan for water conservation, evaluate water conflicts, and otherwise manage the water resource.	5 wells in NCRWMO currently monitored	Ongoing; Monthly readings collected	Goal 5.4; Strategy 4
Dakota County Parks	Repair of eroded areas from 2012 flood	Miesville Ravine Park Reserve	2013 – 2014; beyond as needed	Goal 5.3
	Convert county-owned land from row crops to permanent vegetation; increased management and restoration of prairie and other natural areas	Miesville Ravine Park Reserve	Annually	Goal 5.6
Dakota County Water Resources Department	Establish permanent easements through Farmland & Natural Areas Program in order to purchase development rights, improve water quality and protect wildlife habitat. Require permanent buffers and erosion control BMPs for all easements.	Throughout Dakota County	Ongoing	Goal 5.6; Strategy 2, Goal 5.1, Goal 5.3
	Purchase permanent conservation easements for buffers along priority waters within Dakota County through Dakota County Shoreholders Program.	Throughout Dakota County	Ongoing	Goal 5.6; Strategy 2, Goals 5.1, 5.3
	Monitor groundwater quality in domestic wells through County's Ambient Groundwater Quality Study. Samples analyzed for general chemistry including nitrate, nitrite, herbicides, fluoride and occasionally other special contaminants of concern.	Throughout Dakota County; 6 – 8 wells in NCRWMO	Ongoing since 1999; Collections once every other year	Goal 5.4; Strategy 4

Agency or Organization	Activity	Location	Timeline	Related NCRWMO Goal/Strategy
Dakota County Water Resources Department in cooperation with MDA	Dakota County Nitrate Reduction Project and implementation of MDA's Revised Nitrogen Fertilizer Management Plan. Includes sampling wells and defining nitrate reduction zones, surveying agricultural practices, forming advisory committees and providing outreach and education on appropriate practices and fertilizer rates.	Throughout Dakota County	2013 - 2016	Goal 5.4; Strategies 1 and 4. Goal 5.7; Strategies 4 and 5
Lake Byllesby Improvement Association	Advocates for improved lake water quality by distributing information and hosting annual events and updating a Facebook page.	Lake Byllesby	On-going	Goals 5.1 and 5.7
Dakota County SWCD	Provide cost-share and per-acre incentive payments for the installation of agricultural BMPs through 2012 Clean Water Fund Grant "Ag Conservation Incentive Program"	Vermillion & North Cannon Watersheds	Through 2014	Goal 5.1; Strategy 5 and Goal 5.2; Strategy 2 and Goal 5.3; Strategy 1
	Provide cost-share for the repair of existing or installation of new agricultural flood reduction BMPs through 2012 Flood Relief Grant.	Dakota County	Unknown	Goal 5.1; Strategy 5 and Goal 5.2; Strategy 2 and Goal 5.3; Strategy 1
	Repair Trout Brook gully erosion and stream banks within Dakota County Miesville Ravine Park through 2012 FEMA Grant.	Dakota County	Unknown	Goal 5.3; Strategy 1 and Goal 5.6; Strategy 3
	Administer the MPCA rules and permitting process for all feedlots through Feedlot Program.	Dakota County	Ongoing	Goal 5.1
	Provide cost-share for conservation projects through State Cost Share Program.	Dakota County	Ongoing	Goal 5.1; Strategy 5 and Goal 5.2; Strategy 2 and Goal 5.3; Strategy 1

Agency or Organization	Activity	Location	Timeline	Related NCRWMO Goal/Strategy
	Provide equipment for rent including no-till drill to plant native prairie, inter-seed or plant new pastures, and plant no-till crops, hand-seeder for smaller projects, and a crimper i for crimping straw into erosion control projects to protect the soil until vegetation emerges.	Dakota County	Ongoing	Goals 5.1, 5.3, 5.6
MN Department of Agriculture	Work with landowner to demonstrate and monitor innovative agricultural drainage control practices including woodchip bioreactor, saturated buffer and controlled drainage	Lands rented/worked by David Legvold, Greenvale Twp.	Installation scheduled for 2013	Goal 5.1; Goal 5.2; Strategy 4
	Implement Minnesota Agricultural Water Quality Certification Program: Statewide educational, incentive-based, voluntary program to accelerate on-farm adoption of recommended management practices and provide certainty to producers that maintained practices help meet water quality standards	Statewide	Program development in 2013	Goals 5.1 – 5.7
	Provide outreach to agronomists and producers to disseminate information on best practices for nutrient and pesticide management	Statewide	Ongoing	Goals 5.1, 5.4 and 5.7
	Monitor surface waters for pesticides and fertilizers to compare against standards, guidelines or criteria	Cannon River @ Welch	Ongoing since 2004	Goal 5.1
USDA – Natural Resource Conservation Service	Provide cost-share for conservation projects through Federal Environmental Quality Incentives Program.	Throughout Dakota County	Ongoing	Goal 5.1; Strategy 5 and Goal 5.2; Strategy 2 and Goal 5.3; Strategy 1
Trout Unlimited	In-stream habitat improvements using Lessard Sams Outdoor Heritage Council funding in Trout Brook. Project needs cooperation of landowners, Pheasants Forever and others to install and coordinate needed riparian buffers and upland treatments.	Trout Brook	2015 - 2020	Goal 5.6; Strategy 4
Metropolitan Council	Monitor water quality and quantity on Cannon River including samples analyzed for solids, bacteria, nutrients	Cannon River @ Welch	Since 1999 and ongoing; continuous flow gaging	Goals 5.1 and 5.2
	Monitor water quality including total phosphorus, nitrogen, chlorophyll, and Secchi depth	Chub Lake	2010 – 2011; 2021	Goals 5.1 and 5.6

# 6.5 Impact on Member Communities

## Local Planning

Following approval and adoption of this 3<sup>rd</sup> Generation North Cannon River Watershed Management Plan, governmental units having land use planning and regulatory responsibility are required by Minnesota Rules 8410 to prepare a local water management plan, or update their comprehensive plan. Local units of government may adopt this Watershed Management Plan by reference rather than writing a different local water management plan, or they may update their comprehensive plan. However, local plan content must include a capital improvement program and implementation plan to bring the local water management plan into conformance with this Watershed Management Plan and Minnesota Rules 8410. All local controls specified in this plan will be developed and in effect within two years of plan adoption (Per Minnesota Rules 8410.0130 Subpart 2.).

Before a township or city adopts its local watershed management plan, it must be submitted to the NCRWMO for its review. The local plan must also be submitted to the Metropolitan Council and Dakota County for a 45-day review. Within in 60 days of receipt of the local plan, the NCRWMO will review the local plan for conformance with the WMO plan. The NCRWMO will take into consideration any comments received from the Metropolitan Council and Dakota County. The NCRWMO will approve or disapprove all or part of the local plan within the 60-day timeframe, unless the city or township agrees to an extension. If the NCRWMO does not complete its review, or fails to approve/disapprove the plan within the allotted time, and an extension was not granted, the local plan will be considered approved (MN Rules 8410.0170, Subd. 12 and MN Statutes 103B.235, Subd. 3 and 3a).

Once the NCRWMO approves the local plan, the local government must adopt and implement its plan within 120 days and amend its official control within 180 days of plan approval.

This Watershed Management Plan will require the enforcement of several existing required ordinances including:

- Erosion Control from Construction Sites
- Low Impact Development, Stormwater Management
- Dakota County Ordinance 113 regarding installation and maintenance of subsurface sewage treatment systems (SSTS)

This plan also requires that communities review the appropriateness of their existing mining ordinances with regards to surface and groundwater protection and shall consider adopting an ordinance if none currently exists. Model ordinances for the enforcement of road right-of-way setback requirements and soil erosion control on tax relief program properties will also be developed through the implementation of this Plan. Member communities will be encouraged to adopt these model ordinances.

This Plan includes several policies that are requirements of member communities (Find a complete list of policies at the beginning of Section 5.0). Member communities will be required to comply with and report their actions to complete and enforce the policies included in this Plan. The NCRWMO will develop a reporting process and consequences for non-compliance within one year of Plan adoption.

The financial impact on member communities will stem from the enforcement of required ordinances and the reporting of enforcement activities. This Plan cannot estimate the expense of these actions for each community. However, annual dues will be collected by the NCRWMO for its general fund to perform the strategies laid out in this plan (Table 6.4)

# 6.6 Amendments to Plan

This plan remains in effect for ten (10) years from the year it was approved and adopted, unless it is superseded by adoption and approval of a succeeding plan. All amendments to this plan must follow the procedures set forth in this section, or as required by laws and rules; or as may be subsequently revised. Plan amendments may be proposed by any person to the NCRWMO Managers, but only the NCRWMO may initiate the amendment process. The NCRWMO may amend its plan in the interim (interim plan amendment) if either minor changes are required or if problems arise that are not addressed in the plan.

## **General Amendment Procedure**

If the NCRWMO or BWSR decide that a general plan amendment is needed, the NCRWMO will follow the general plan amendment process described in MN Rules 8410.0140, Subp. 2 and MS 103B.231, Subd. 11). The general plan amendment process is as follows:

1. The NCRWMO must submit the amendment to the state review agencies (the BWSR, MDNR, MPCA, Minnesota Department of Agriculture, and MDH), Minnesota Department of Transportation (courtesy review), NCRWMO member communities, the Metropolitan Council, the county boards, and the soil and water conservation districts within its territory for a 60-day review.

2. The NCRWMO must respond in writing to any concerns raised by the reviewers.

3. The NCRWMO must hold a public hearing on the proposed amendment no sooner than 14days after the 60-day review period. 4. The NCRWMO must submit the final revised amendment and a summary of changes resulting from the review process to the BWSR for final review to be completed within 90 days. Within that time, the BWSR may, by order, approve or prescribe changes in the amendment.

Following BWSR approval of the amendment, the NCRWMO will adopt the amendment. The above process must be completed except when the proposed amendments constitute minor amendments (see criteria described below).

## **Minor Plan Amendments**

Minor plan amendments follow an abbreviated version of the general plan amendment process, including only a single review period. MN Rules 8410.0140, Subp. 3 considers amendments to the approved capital improvement program to be minor plan amendments if the following conditions are met:

1. The original plan set forth the capital improvements but not to the degree needed to meet the definition of "capital improvement program" as provided in Minnesota Statutes, Section 103B.205, subdivision 3; and

2. The affected county or counties approve the capital improvement in its revised, more detailed form. The following examples of other minor plan amendments are given in Minnesota Rules 8410.0020, Subp. 10:

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

Prior to sending a proposed minor plan amendment out for review, the NCRWMO will obtain BWSR's concurrence that the proposed amendment is a minor plan amendment.

### **Amendment Format**

Upon completion of the plan amendment, the NCRWMO will submit the plan amendment to the appropriate review authorities in a format consistent with Minnesota Rules 8410.0140, Subp. 4. The rule requires that, unless the entire document is reprinted, all amendments adopted must be printed in the form of replacement pages for the plan, each page of which must:

1. Show deleted text as stricken and new text as underlined (for draft amendments under consideration):

- 2. Be renumbered as appropriate; and
- 3. Include the effective date of the amendment.

## **Distribution of Amendments**

The NCRWMO will maintain a distribution list of everyone who receives a copy of the plan. Within 30 days of adopting an amendment, the NCRWMO will distribute printed copies of the amendment to everyone on the distribution list. Electronic versions of the amendment will be made available at the NCRWMO web site. The NCRWMO will also consider sending drafts of proposed amendments to all plan review authorities to receive input before establishing a hearing date or beginning the formal review process.

# 6.7 Past Accomplishments

Over the life of their 2<sup>nd</sup> Generation Plan, the NCRWMO performed water monitoring activities, provided education, sought and received grants to provide landowners with cost share funding to install best practices, developed and required erosion control and stormwater management ordinances in every member community, and partnered with other organizations to further work towards its goals. The NCRWMO began collecting member due in 2004. By 2012, member dues had increased nearly 3-fold (275%) in order to fund monitoring and outreach and to raise funds for local match to State grants. Table 6.3 lists the activities of the NCRWMO since 2003.

NCRWMO Member Dues Collected over life of 2 <sup>nd</sup> Generation Plan increased by 275% from 2004 to 2012.										
2003 GOAL	Activities Completed by NCRWMO and Partners									
Natural Area Protection	NCRWMO secured grant funding for the establishment of riparian and wetland buffers.									
Goal: To promote the protection, expansion, and restoration of high quality natural areas throughout the	NCRWMO participated in a wetland and watercourse inventory through the Dakota SWCD (with funding from Met Council) (2004). (Figure 2.18)									
watershed including wetlands, woodlands, prairies, and riparian corridors (preferably in large contiguous	NCRWMO provided large maps to each township showing shoreland, surface water, wetlands, and other important natural features.									
tracts of land) for the betterment of water-based recreation, fish and wildlife habitat, and water quality.	Dakota County adopted the state's 50-foot buffer requirement into their Shoreland ordinance rules (2010)									
2003 GOAL	Activities Completed by NCRWMO and Partners									
Wetlands	All WCA and DNR permit applications within the watershed are reviewed at each NCRWMO Board meeting.									
Goal: To protect wetlands from destruction or deterioration due to development, drainage, agriculture, and	NCRWMO participated in a wetland and watercourse inventory through the Dakota SWCD (with funding from Met Council) (2004).									
other adverse activities.	In 2008, the NCRWMO drafted and distributed for comment a "Wetland and Stream Buffer Ordinance." In 2009, after a Citizens Listening Session and further consideration by a subcommittee and the Board, a decision was made to use the already adopted Erosion Control and Stormwater Management Ordinance as the wetland management ordinance.									
2003 GOAL	Activities Completed by NCRWMO and Partners									
<b>Groundwater</b> Goal: To protect groundwater quality and quantity.	In 2005 – 2008, the NCRWMO partnered with Dakota Co. and the VRWJPO on a shoreland SSTS inspection and upgrade program; provided \$6,000 match. Along Chub Creek, 30 inspections resulting the identification and eventual upgrade of 13 failing systems. This program included education to homeowners on septic system maintenance.									
	Nitrate data in wells is collected by Dakota County.									
	Any environmental review issued within the watershed is reviewed at NCRWMO Board meetings.									

# Table 6.3 Past Accomplishments and Activities of the NCRWMO

2003 GOAL	Activities Completed by NCRWMO and Partners
	In 2004, the NCRWMO developed an ordinance for construction
Soil Erosion	site erosion control and permanent stormwater management
Goal: To reduce soil erosion throughout	standards. The final Erosion & Stormwater Management
the watershed	Ordinance was approved on $11/10/05$ and was subsequently
	adopted by all member communities NCRWMO partnered with
	the SWCD to provide education on ordinance implementation to
	township officials through a series of workshops
	township officials through a series of workshops.
2003 COAL	Activities Completed by NCRWMO and Partners
2003 GOAL	In 2002, the MPCA completed a regional bacteria TMDL for
Surface Water and In stream Habitat	southoostern MN including the NCPWMO
Surface water and m-stream nabitat	The NCDWMO has manifored Chub Greak and its tributarias
Quality Cool: To motost and immersion the	The NCK which has monitored Chub Creek and its tributaries,
Goal. To protect and improve the	I rout Brook and Pine Creek extensively since 1999. Flow,
surface water quality and in-stream	bacteria, sediment, nitrates, and phosphorus are among the
habitat of streams, rivers, and lakes such	parameters measured.
that each water body is "fully	
supporting" for its use designation	In 2011, a permanent monitoring station at the outlet of Chub
according to Water Quality Standards	Creek was established for continued water quality and quantity
(MN Rules Chapter 7050) and PCA's	monitoring here.
"Water Quality Criteria – Aquatic Life	Macroinvertebrates were monitored by the NCRWMO in Chub
Use Support in Rivers and Streams."	Creek, Pine Creek and Trout Brook in 1999 and 2001. Fish have
	been monitored by the DNR in Pine Creek, Trout, and Cannon
	Rivers in recent years.
	The NCRWMO assisted the Cannon River Watershed Partnership
	with the Lower Cannon River Turbidity TMDL by monitoring
	Trout Brook and Pine Creek and lending equipment (2003 -
	2005).
	In the 2014 NCRWMO started a cost share program to provide
	in the 2044 INCR white statute a cost share program to provide
	incentives for the instantion of water quanty Bivir's.
	In 2005 and 2006, 7 projects were installed totaling \$26,080
	in 2005 and 2000, 7 projects were instance totaning \$20,080.
	In 2006, the NCRWMO received a \$30,000 grant from Met
	Council to install BMPs, with emphasis on controlling sediment
	loading to Trout Brook
	In 2007, the NCRWMO began using their grant funds and
	member dues to supplement the established cost share programs
	of the SWCD to streamline conservation and cost share delivery.
	2007-2011 = total of 36 projects installed in the NCRWMO.
	In 2009, the NCRWMO provided \$12,000 in grant matching
	funds for a MPCA grant to the SWCD to install best management
	practices.
	r
	In 2010, the NCRWMO received \$150,000 grant from BWSR to
	install structural and vegetative BMPs

2003 GOAL	Activities Completed by NCRWMO and Partners
<b>Surface Water Quantity</b> Goal: To decrease the rate and volume of water that may contribute to flooding or non-point source pollution from overland runoff and/or dewatering activities.	The NCRWMO collected flow data on Chub Creek and its tributaries in 1999, 2000, 2004, 2005 and 2008; and on Pine Creek and Trout Brook in 2001, 2002, 2006 and 2010.
2003 GOAL	Activities Completed by NCRWMO and Partners
<b>Development</b> Goal: To protect groundwater, surface water, wetlands, and natural areas from accelerated development pressures.	See ordinance development activities under Soil Erosion goal above. The SWCD routinely works with NCRWMO member communities to review and address erosion control concerns on development sites.
2003 COAL	Activities Completed by NCRWMO and Partners
<b>Information and Education</b> Goal: To inform landowners, children,	In 2006, the NCRWMO provided \$300 to CRWP to help fund a macroinvertebrate monitoring training program.
and local units of government, about the watershed and human impacts on water quality and quantity, and to invite public	Volunteer stream monitors were recruited and trained starting in 2007. These volunteers are now part of CRWP's volunteer monitoring program to streamline training and data handling.
participation in watershed management processes.	The NCRWMO purchased water resource curriculum for Randolph Middle School (2003).
	The NCRWMO published and made available an annual newsletter 2003 – 2006.
	NCRWMO Board members attended and distributed education materials at the Cannon River Festival in 2003 and 2005.
	The NCRWMO funded "Sewer Man" presentations to groups of young people (2005).
	Three NCRWMO Board members attended the SE MN Water Quality Forum to learn more about bacteria and sediment pollution and reduction strategies.
	The NCRWMO sponsored two training events to educate township officials in how to implement the new erosion control and stormwater management ordinance (2006).
	The NCRWMO supplied CRWP with \$700 to reprint 5,000 copies of the Cannon River Watershed brochure (2007).
	An annual tour of NCRWMO watershed projects is held for NCRWMO Board members and others.

# 6.8 Implementation Schedule and Estimated Budget

Table 6.4 shows the budget and schedule for implementing the strategies laid out in this plan. The table is organized with numbered goals and strategies as they are numbered in the Section 5.0 of this plan. Figures are shown in 2013 dollars with no estimated increase for inflation. While some of the activities need grant funding or collaboration with others to complete, most of the activities are funded through member dues, as indicated.

A list of "likely partners" is included in Table 6.4. Partnerships and collaboration are an important component of the overall plan for watershed management in this area. As evident in Table 6.3, the NCRWMO has been collaborating with various entities for years. This practice will continue and increase through this Plan's implementation.

The NCRWMO is committed to improving water quality throughout its jurisdiction. One of the most effective ways to improve water quality is by offering financial incentives (cost share) to landowners to install best management practices. Therefore, the NCRWMO will continue its practice of using a portion of its member dues to leverage other funds such as Clean Water Fund grants and NRCS funding. A total of \$4,000 per year is budgeted and can be used as a local match to grants, can be carried over in the budget to accumulate a larger sum, and/or can be used to augment existing cost share programs like those at the Soil and Water Conservation District. (The NCRWMO's Administrative funds can also be used as match on some grants.)

The total budget of the NCRWMO is likely to be higher than shown in Table 6.4 because of grants. However, grants are currently unknown and therefore not included in the table. In a few instances, grant needs *are* known for certain strategies. These are shown in shaded boxes in Table 6.4.

## Table 6.4 Implementation Program

Goal and Strategy		-	-	Year and	d Estimated	Cost (2013	8 dollars)			-	Potential	Likely
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Funding Source	Partners
5.1 Surface Water Quality												
1. Monitor water quality at Chub Cr. Permanent Station	\$3,265	\$3,265	\$3,265	\$3,265	\$3,265	\$3,265	\$3,265	\$3,265	\$3,265	\$3,265	Member Dues	
2. Conduct DO assessments in key streams			\$3,830	\$3,830							Grants and Collaboration	MPCA
3. Analyze nitrates in Trout Brook springs	\$3,580					\$3,580					Grants and Collaboration	County MPCA
4. Participate in other water quality studies as needed					Unknow	n needs					Grants and Collaboration	Multiple
5. Provide grant match and cost share for water quality BMPs		See "Cost Share and Grant Match Fund" below									Member Dues and Clean Water Funds <sup>1</sup>	BWSR SWCD NRCS
6. Collaborate with communities to help						\$700					Member Dues	
identify buffer priorities						\$5,000					Grants	Twps SWCD County
<ol> <li>Re-examine possible buffer requirements for all watercourses</li> </ol>					\$700						Member Dues	
<ol> <li>Advocate w/ County to fund buffers on watercourses upstream from DNR streams</li> </ol>	\$350										Member Dues	County
9. Advocate for improved wastewater system in City of Randolph			\$350								Member Dues	CRWP County
10. Seek producers interested in Discovery Farms participation	\$70										Member Dues	CRWP Extension
11. Advocate w/ County to investigate old dumps and other pollution sources	\$140										Member Dues	County

Go	al and Strategy	Year and Estimated Cost (2013 dollars)											Likely	
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Funding Source	Partners	
5.2	2 Surface Water Quantity													
1.	Monitor water quantity at Chub Cr. Permanent	\$3,650	\$3,650	\$3,650	\$3,650	\$3,650	\$3,650	\$3,650	\$3,650	\$3,650	\$3,650	Member Dues		
2.	Provide grant match and cost share for BMPs that reduce rate and volume of runoff		See "Cost Share and Grant Match Fund" below									Member Dues and Clean Water Funds <sup>1</sup>	BWSR SWCD NRCS	
3.	Investigate methods to collect data on tile lines			\$1,000 \$5,000								Member Dues Grants and Collaboration	MDA County SWCD	
4.	Disseminate info on conservation drainage BMPs	\$700										Member Dues	MDA SWCD	
5.3 Soil Erosion and Sedimentation         1. Provide grant match and cost share for erosion control BMPs    See "Cost Share and Grant Match Fund" below												Member Dues and Clean Water Funds <sup>1</sup>	BWSR SWCD NRCS	
2.	Develop model ordinance to enforce erosion control on tax relief property		\$700									Member Dues	SWCD	
3.	Develop model ordinance to enforce road right-a- way setback requirements		\$700									Member Dues	SWCD County	
4.	Receive data on sediment load reductions due to BMPs installed		\$70		\$70		\$70		\$70		\$70	Member Dues	BWSR SWCD NRCS	
5.	Seek producers interested in Discovery Farms participation	Shown in 5.1 #10												

Goal and Strategy	Year and Estimated Cost (2013 dollars)											Likely	
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Funding Source	Partners	
5.4 Groundwater	1			1	1	1	1	1	1	1		T =:	
<ol> <li>Cooperate w/ agencies to update nitrogen fertilizer rates; disseminate recommendations</li> </ol>		\$210	\$210								Member Dues	County MDA SWCD	
2. Cooperate w/ researchers on nitrogen transport in Trout Br.			Member Dues	County U of M MDA MPCA									
3. Provide grant match and cost share for nutrient management practices			Member Dues and Clean Water Funds <sup>1</sup>	BWSR SWCD NRCS									
<ol> <li>Track GW quantity and quality through reports by others</li> </ol>					No costs a	inticipated					Member Dues	County USGS	
5.5 Wetlands													
1. Review WCA applications					No costs a	anticipated					Member Dues	SWCD Twps	
2. Provide grant match and cost share funding for wetland restoration projects				See "Cost S	Share and Gr	ant Match F	fund" below				Member Dues and Clean Water Funds <sup>1</sup>	BWSR SWCD NRCS	
5.6 Wildlife. Habitat and Recre													
<ol> <li>Advocate w/ MDNR and others to develop Chub Lake WMA Management Plan</li> </ol>	\$140										Member Dues	MDNR	
2. Advocate w/ County to continue land conservation programs				\$210							Member Dues	County	

Goal and Strategy Year and Estimated Cost (2013 dollars)									Potential	Likely			
											Funding	Partners	
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Source	
3.	Provide grant match and				See "Cost S	Share and Gr	ant Match F	und" below				Member	BWSR
	cost share to install				Dues and	SWCD							
	shoreline BMPs				Clean Water	NRCS							
			r		Funds <sup>1</sup>								
4.	Provide a forum or assist	\$700										Member	TU
	w/ improved cooperation											Dues	County
	for Trout Brook Habitat												
	management												
5.	Review Byllesby Dam	\$70										Member	LBIA
	status; advocate for											Dues	CRWP
	research on effects of dam												County
	operations on wildlife												(CD VID
6.	Review information on					No costs a	inticipated					Member	CRWP
	implementing Lk Byllesby											Dues	MPCA
-	IMDL		<b>0010</b>	1	1				1				LBIA
1.	Advocate W/ City of		\$210									Member	County
	Randolph to adopt											Dues	SWCD
	shoreland and lloodplain												
	ordinance												
5.7	Education and Outreach												
1.	Promote/encourage					No costs a	inticipated					Member	CRWP
	volunteer water monitoring						1					Dues	MPCA
2.	Maintain updated website	\$775	\$775	\$775	\$775	\$775	\$775	\$775	\$775	\$775	\$775	Member	SWCD
	1 I											Dues	
3.	Develop annual report and	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	Member	
	plan											Dues	
4.	Provide education and	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	Member	CRWP
	partner w/ others; find											Dues	MDA
	funding to educate and			Est	imates avail	able when n	eeds and op	portunities a	rise			Grants and	County
	engage agricultural											Collaboration	SWCD
	producers												Extension
													Colleges
5.	Disseminate updated					Show	vn in					Member	MDA
	nitrogen fertilizer					5.4	· #1					Dues	County
	application												SWCD
1	recommendations												

Goal and Strategy	Year and Estimated Cost (2013 dollars)						Potential	Likely				
											Funding	Partners
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Source	
6. Use technical and citizen		No costs anticipated					Member	Member				
advisory commutees as											Dues	Tashnisal
needed												agencies
7. Request that County install	\$350										Member	County
stream signs on Co. roads											Dues	
8. Advocate and partner w/				\$350							Member	County
County to install											Dues	5
interpretive signs at Parks												
9. Maintain online directory		Costs associated with 5.7 #2 above					Member	SWCD				
of water/natural resource											Dues	
jurisdictions/organizations												
50.4.1												
5.8 Administration								Manahan	A 11			
1. Cultivate partnerships with		Included in "General Administration"					Dues	All				
2 Eulfil DWSP performance							Dues					
2. Fullifi B w SK performance		Included in "General Administration" and 5. / $\#2$ and $\#3$					Dues					
A mend plan, as needed, to		Included in "Comment Administration"					Member	BWSD				
avoid duplication		included in General Administration					Dues	DWSK				
4 Evaluate implementation		Included in "General Administration"						Member	Member			
of strategies and policies				1110104							Dues	Communities
General Administration + Audit	\$10,300	\$10,300	\$10,300	\$10,300	\$10,300	\$10,300	\$10,300	\$10,300	\$10,300	\$10,300	Member	SWCD
(meetings, budget development,	· · · · · · · · · · · · · · · · · · ·		,	,	, i	,	, i i i i i i i i i i i i i i i i i i i	, i i i i i i i i i i i i i i i i i i i	·		Dues	
correspondence, coordination)												
Build Reserves for 4 <sup>th</sup>	\$1,500	\$1,500	\$1,000	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	Member	
Generation Plan Development											Dues	
Grant Match and Cost Share	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	Member	
Fund <sup>2</sup>											Dues	
TOTAL BUDGET												
(less grants for cost share										_		
programs) <sup>1</sup>	\$31,840	\$27,630	\$36,130	\$30,200	\$26,440	\$35,090	\$25,740	\$25,810	\$25,740	\$25,810		
Estimated Member Dues	\$28,260	\$27,630	\$27,300	\$26,370	\$26,440	\$26,510	\$25,740	\$25,810	\$25,740	\$25,810		
Estimated Grant Needs (less												
grants for cost share programs)	\$3,580		\$8,830	\$3,830		\$8,580						

<sup>1</sup>Clean Water Funds and other grants will be sought by the NCRWMO (or other groups for use in the NCRWMO) as needs arise and other funding sources are depleted.

 $^{2}$  \$4,000 per year (member dues) will be used to leverage grant dollars. This line item will be spent or may be carried over to future years for use as cash match in grant-funded projects

# Appendix A

North Cannon River Watershed Joint Power Agreement

# JOINT POWERS AGREEMENT TO

# PROTECT AND MANAGE THE NORTHERN CANNON RIVER WATERSHED Agreement #2000

THIS AGREEMENT, made and entered into as of the date of execution, by and between the units of government within the Northern Cannon River Watershed, helps each party realize that the success or failure of the Northern Cannon River Watershed Management Organization created by this agreement is dependent upon the sincere desire of each member community to cooperate in the exercise of a joint power to address mutual concerns. Each party to this agreement pledges this cooperation.

#### WITNESSETH:

WHEREAS, units of government, including but not limited to Cities/Townships within the Northern Cannon River Watershed, have authority, pursuant to Minn. Stat. 471.59, to jointly or cooperatively, by agreement, exercise any powers common to the contracting bodies; and

WHEREAS, the parties are desirous of jointly and cooperatively developing a surface water management plan for the watershed and instituting programs to conserve soil and water resources through implementation of practices that preserve and use natural water storage areas, control excessive volumes and rates of runoff, effectively reduce or prevent erosion and sedimentation, promote and protect ground water recharge, preserve and enhance water quality and prevent unnatural flooding in order to protect and manage the natural and artificial water conveyance systems of the Northern Cannon River Watersheds.

NOW, THEREFORE, the parties to this Agreement do mutually agree as follows:

#### SECTION 1

#### **GENERAL PURPOSE**

It is the general purpose of the parties to this Agreement to establish an organization to jointly and cooperatively develop a surface water management plan and program for management and protection of the soil and all water resources of the Northern Cannon River Watershed and to develop an intergovernmental mechanism which will jointly and severally implement said surface water management plan and program. The program shall operate within the legal boundaries of the Northern Cannon River Watershed.

This agreement is to provide an organization which can investigate, survey, study, plan, monitor and supervise the construction of facilities to drain or pond storm waters; to alleviate damage by flood waters; to assist in planning for land use, to repair, improve, relocate, modify, consolidate or abandon in whole or in part, drainage systems within the watershed areas to do whatever is necessary to assist in water conservation and the abatement of water pollution within the Northern Cannon River Watershed area.

The legal boundaries of the Northern Cannon River Watershed are set forth in Exhibit A, attached hereto and hereafter referred to an the 'Area". In general, the surface water management program may include projects which accomplish the following:

- 1. Preserve and use natural water storage and retention systems in order to reduce to the greatest practical extent the public capital expenditures necessary to control excessive volumes and rates of runoff.
- 2. Protect and improve existing surface water quality through proper land use and appropriate soil and water conservation practices.
- 3. Prevent flooding and erosion by implementing floodplain management and erosion control programs.
- 4. Protect and enhance fish and wildlife habitat and water recreational facilities by reducing pollutant loads to surface waters, restoring and protecting streambanks and riparian areas, establishing greenways, and performing other activities.
- 5. Undertake programs to promote groundwater recharge and protect groundwater quality.
- 6. Provide a mechanism for the review of local land and water management plans.
- 7. Provide a form for resolution of intergovernmental disputes relating to water management and protection of the Northern Cannon River Watershed.
- Cooperate on a united basis on behalf of all units of government within the Area with all other levels of government for the purpose of facilitating surface and ground water management in the Area.

The above descriptions are not intended to be exclusive or overly restrictive of the surface water management plan and programs, but rather are intended to act as guidelines.

## SECTION II DEFINITIONS

For the purposes of this agreement, the terms used herein shall have the meanings as defined in this article.

Subdivision 1. "Watershed Management Organization" hereinafter referred to as WMO, means the organization created by this agreement, the full name of which is "Northern Cannon River Watershed Management Organization:" hereinafter referred to as the WMO. It shall be a public agency of its members.

Subdivision 2. "Board" means the Board of managers of the WMO, consisting of one Manager from each of the governmental units which is a party to this agreement and which shall be the governing body of the WMO.

Subdivision 3. "Council or Board" means the governing body of a governmental unit which is a member of this WMO.

Subdivision 4. "Governmental Unit" means any City, County, Town, Township, and other political subdivision as cited in M.S.A. 471.59 Subd. 1.

Subdivision 5. "Member" means a governmental unit which enters into this agreement.

Subdivision 6. "Multi-jurisdictional Project" means any project or capital improvement undertaken in more than one member community, or any project or capital improvement that involves contribution or benefit from more than one member community.

Subdivision 7. "Northern Cannon River Watershed" means the area contained within a line drawn around the extremities of all terrain whose surface drainage is tributary to the Northern Cannon River.

Subdivision 8. "Local Comprehensive Plan" has the meaning given it in Section 473.852, Subdivision 5.

Subdivision 9. "Local Government Units" or "local unit" has the meaning given it in Section 473.852.

Subdivision 10. "Official Controls" has the meaning given it in Section 473.852.

Subdivision 11. "Capital Improvement Program" means an itemized program for at least a five year prospective period, and any amendments to it, subject to at least biennial review, setting forth the schedule, timing, and details of specific contemplated capital improvements by year, together with their estimated cost, the need for each improvement, financial sources, and the financial effect that the improvements will have on the local government unit or the WMO.

Subdivision 12. "Plan" means the watershed management plan adopted by the WMO pursuant to Minnesota Statutes Section 103B.231.

## SECTION III BOARD OF MANAGERS

Subdivision 1. <u>Appointment</u>. The governing body of the WMO shall be its Board. Each member shall be entitled to appoint one representative on the Board, and said representative shall be called a "Manager." Dakota County, Rice County, Goodhue County and the Dakota County Soil and Water Conservation District may be requested to appoint a non-voting advisory member.

Subdivision 2. <u>Eligibility or Qualifications</u>. The Council / Board of each member shall determine the eligibility or qualification of its representative on the WMO but the terms of each Manager shall be as established by this agreement. Pursuant to Minn. Stat. 103B.227 Subd. 2, staff of local units of government that are members of the watershed management organization are not eligible to be appointed to the board.

Subdivision 3. <u>Term</u>. The members of the WMO Board of Managers shall not have a fixed term but shall serve at the pleasure of the governing body of the local unit appointing each member to the WMO.

Subdivision 4. <u>Vacancy</u>. Any vacancy shall be filled within 90 days for the unexpired term of any Manager by the Council/Board of the governmental unit of the member who appointed said Manager. The watershed management organization shall notify the Board of Water and Soil Resources within 30 days of any vacancies. Vacancies will be filled and published according to Minn. Stat. 103B.227.

Subdivision 5. <u>Filing</u>. Each member shall within 30 days of appointment file with the Secretary of the Board of Managers a record of the appointment of its Manager. The watershed management organization shall notify the Board of Water and Soil Resources within 30 days of any new appointments.

Subdivision 6. <u>Compensation</u>. Managers shall attend regular and special WMO meetings without compensation from the WMO, but this shall not prevent a governmental unit from providing compensation for its Manager for serving on the Board, if such compensation is authorized by local governmental unit and by law.

Subdivision 7. <u>Commission</u>. At the first or second meeting of the year the WMO shall elect from its Managers a Chairman, a Vice-Chairman, a Secretary, a Treasurer, and such other officers as it deems necessary to conduct its meetings and affairs. At the organizational meeting or as soon thereafter as it may be reasonably done, the WMO shall adopt rules and regulations governing its meetings. Such rules

and regulations may be amended from time to time at either a regular or a special meeting of the WMO provided that a ten day period notice of the proposed amendment has been furnished to each person to whom notice of the WMO meetings is required to be sent; a majority vote of all eligible votes shall be sufficient to adopt any proposed amendment to such rules and regulations.

Subdivision 8. <u>Alternate Members</u>. One alternate member to the WMO shall be appointed by appropriate resolution of the governing body of each party to this Agreement and filed with the WMO. The alternate shall attend any meeting of the WMO where the regular member is absent; and vote on behalf of the party the member represents only if the regular member is absent from the meeting. If a WMO member is also an officer of the WMO, the alternate shall not be entitled to serve as such officer.

Subdivision 9. <u>Quorum</u>. A majority of all voting members to the WMO shall constitute a quorum, but less than a quorum may adjourn a scheduled meeting.

Subdivision 10. <u>Voting</u>. Except as hereinafter provided, Board action shall be by a majority vote of the entire Board. Decisions regarding capital improvement projects shall require a 2/3 majority of the entire Board.

Subdivision 11. <u>Meetings</u>. Regular meetings of the WMO shall be held at least quarterly on a day selected by the WMO. Special meetings may be held at the call of the Chair or by any three members by giving not less than seventy-two (72) hours written notice of the time, place and purpose of such meeting delivered or mailed to the residence of the WMO member. Notification of all meetings with date, time and location will be made not less than seventy-two (72) hours prior to meeting. All meetings of the WMO are subject to Minn. Stat. 471.705.

Subdivision 12. <u>Operating Funds</u>. On or before August 1 or each year, the WMO shall prepare an operating budget for the following year for the purpose of providing funds to operate the WMO's business. The annual contribution of each member shall be based on fifty percent (50%) on the assessed valuation of all real property and fifty percent (50%) on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the Northern Cannon River Watershed. In no event shall any assessment require a contribution by a local unit of government in any calendar year to exceed \$0.0005 on each dollar of assessed valuation of its territory within the watershed. The annual operating budget shall be recommended to the parties for ratification upon majority approval of all voting members of the WMO, through its finance committee delegate. After approval, the Secretary shall certify the recommended budget to each party on or before September 1 of each year, together with a statement showing the amounts due from each party. Each party shall pay over to the WMO the amount owing in two equal installments, the first on or before January 1 and the second on or before July 1, in accordance with the tax year for which the amount due is being paid.

Subdivision 13. Capital Improvement Program.

- a) An improvement fund shall be established for each improvement project ordered by the Board. Each member agrees to contribute to the funds, its proportionate share of the engineering, legal and administrative costs, as determined by the amount to be assessed against each member as a cost of the improvement. The Board shall submit in writing, a statement to each member setting forth in detail, the expenses incurred by the Board for each project. Each member further agrees to pay its proportionate share of the cost of the improvement in accordance with the determination of the Board. The Board or the member awarding the contract shall submit in writing copies of the engineer's certificate authorizing payment during construction, and the member being billed agrees to pay its proportionate share of the costs within 60 days after receipt of the statement. The Board or the member awarding the contract shall advise other contributing members of the tentative time schedule of the work and the estimated times when the contributions shall be necessary.
- b) Notwithstanding the provisions of paragraph (a) of this subdivision, the Board may fund all or any part of the cost of a capital improvement contained in the capital improvement program of the plan in accordance with Minn. Stat. 103B.251. The Board may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Dakota County pursuant to Minn. Stat. 103B.251 Subd. 5, 8 and 9. The levy and collection of an ad valorem tax levy for maintenance shall be by Dakota County based upon a tax levy resolution adopted by the Board and remitted to the county on or before October 1<sup>st</sup> of each year. When it is determined to levy for maintenance, the Board shall be required to follow the hearing process established by Minn. Stat. 103B.251 Subd. 3. Mailed notice shall also be sent to the Clerk of each member at least 30 days prior to the hearing.

Subdivision 14. <u>Capital Cost Allocation of Improvements in the Board's Watershed</u> <u>Management Plan.</u> All capital improvement costs of improvements designated in the Board's adopted watershed management plan for construction by the Board which the Board determines will provide multi-jurisdictional benefits shall be constructed and financed pursuant to Min. Stat. 103B.245 Subd 1, 103B.251 Subd 5, 8, 9, or in a manner to be determined by each member. The members understand and agree that the costs will be levied on all taxable property in the watershed.

Capital costs or the financing thereof shall be apportioned to each member fifty percent (50%) on the assessed valuation of all real property and fifty percent (50%) on the basis of the total area in the Northern Cannon River Watershed.

Subdivision 15. Works of Improvement. All construction, reconstruction, extension or maintenance of the Northern Cannon River Watershed, including outlets, lift stations, dams, reservoirs, or appurtenances of a surface water or storm sewer system of a multi-jurisdictional nature, ordered by the WMO which involve potential construction by or assessment against any member governmental unit or against privately or publicly-owned land within the watershed if the law provides therefore; and which has been identified in the capital improvement program shall follow the statutory procedures such as in outlined in Minn. Stat. Chapter 429. The Board shall secure from its engineers or some other competent person a preliminary report advising it whether the proposed improvement is feasible and as to whether it shall best be made as proposed or in connection with some other improvement and the estimated cost of the improvement as recommended. The Board shall then hold a public hearing on the proposed improvement after mailed notice in the Board's official newspaper. The WMO shall not be required to mail notice except by notice to the clerks of the member communities. The notice shall be mailed not less than 45 days before the hearing, shall state the time and place of the hearing, the general nature of the improvement, the estimated total cost and the estimated cost to each member governmental unit.

To order the improvement, a resolution setting forth the order shall require a favorable vote of 2/3 of all of the then existing Board of Managers. The order shall describe the improvement, shall allocate in percentages the cost allocation between the member governmental units, shall designate the engineers to prepare plans and specifications, and shall designate who will contract for the improvement.

After the Board has ordered an improvement, it shall forward the preliminary report to all member governmental units with an estimated time schedule for the construction of the improvement. The Board shall allow an adequate amount of time, and in no event less than 90 days, for each member governmental unit to conduct hearings, in accordance with the provisions of Chapter 429 or the charter requirements of any city, or to ascertain the method of financing which the member governmental unit will use to pay its proportionate share of the costs of the improvement.

If the WMO proposed to use Dakota County's bonding authority, or if the WMO proposes to certify all or any part of a capital improvement to Dakota County for payment, then and in that event all proceedings shall be carried out in accordance with Minn. Stat. 103B.251 Subd. 5, 8, 9.

The Board shall not order and no engineer shall prepare plans and specifications before the Board has adopted a resolution ordering the improvement. The Board may order the

advertising for bids upon receipt of notice from each member governmental unit who will be assessed that it has completed its hearing or determined its method of payment, or upon expiration of 90 days after the mailing of the preliminary report to the members whichever comes first.

Subdivision 16. <u>Implementation of Capital Improvements</u>. The WMO shall not undertake a capital improvement project until the watershed plan and the Capital Improvement Program have been adopted.

Subdivision 17. <u>Local Projects</u>. The WMO may provide assistance to a member on a project that is only of a local nature, but the WMO shall not order a member to undertake a local project.

Subdivision 18. Arbitration. Any member governmental unit aggrieved by the determination of the Board as to the allocation of the costs of an improvement, the implementation of the Plan or local water management plan, or items related to this agreement shall have 30 days after the WMO resolution ordering the improvement to appeal the determination. The appeal shall be in writing and shall be addressed to the Board asking for arbitration. The determination of the members appeal shall be referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons: one to be appointed by the Board of Managers; one to be appointed by the appealing member governmental unit; and one to be appointed by the two so selected. In the event the two persons so selected do not appoint the third person within 15 days of their appointment, then the chief judge of the district court of Dakota County shall have jurisdiction to appoint, upon application of either or both of the two earlier selected, the third person to the Board. The third person selected shall not be a resident of any member governmental unit. The Arbitrators expenses and fees, incurred in the conduct of the Arbitration shall be divided equally between the WMO and the appealing member. Arbitration shall be conducted in accordance with the Uniform Arbitration Act. Minn. Stat. Chapter 572 and the decision reached through Arbitration shall be final.

Subdivision 19. <u>Tax District</u>. Each city of township, a party to this Agreement, may establish a watershed management tax district in the territory within the watershed, for the purpose of paying costs of the planning required to develop a surface water management plan for the Northern Cannon River Watershed. Any local government unit which has part of its territory within a watershed for which a watershed plan has been adopted and which has a local water management plan adopted and approved by the WMO may establish a watershed management plan adopted and approved by the WMO may establish a watershed tax district in the territory within the watershed, for the purpose of paying capital costs of the water management facilities

described in the capital improvement program of the plans and for the purpose of paying for normal and routine maintenance of the facilities.

Subdivision 20. <u>Procedure</u>. The tax district shall be established by ordinance adopted after a hearing by the local government unit, following provision of Minnesota Statutes 473.883. 103B.251 Subd. 5, 8, 9.

Subdivision 21. <u>Tax</u>. After adoption of the ordinance under Subdivision 18-19, a local government unit may annually levy a tax on all taxable real property in the district for the purposes for which the tax district is established.

Subdivision 22. <u>Bonds</u>. After adoption of the ordinance under Subdivision 19 and after a contract for the construction of all or part of an improvement has been entered into or the work has been ordered done by day labor, the local government unit may issue obligations in the amount it deems necessary to pay in whole or in part the capital cost incurred and estimated to be incurred in making the improvements; all in accordance with Minn. Stat 103B.251 Subd. 5, 8, 9.

Subdivision 23. <u>Capital Improvements Payment by County</u>. The WMO after adoption of a Watershed Plan may certify for payment by the County as provided in Minn. Stat. 103B.251 Subd. 5, 8,9 all or any part of the cost of a capital improvement contained in the capital improvement program of the plan.

#### **SECTION IV**

#### **POWER AND DUTIES OF THE BOARD**

Subdivision 1. <u>WMO</u>. The WMO, acting by its duly appointed Board of Managers, shall as it relates to surface water management, flood prevention, erosion control, water quality improvement, and other benefits associated with the proper management of surface water of the Northern Cannon River, have the powers and duties set out in this section.

Subdivision 2. <u>Surface Water Management Plan</u>. The WMO undertakes to prepare a second generation surface water management plan and schedule its operation so that it will be completed by December 31, 2002. This plan will cover all of the area of the Northern Cannon River Watershed and comply with the requirements of Chapter 509, Laws of 1982, Minnesota Statute Section 103B.231. The plan will describe the existing physical environment, local and metropolitan comprehensive plans. In addition the plan will:

a) Present information on the hydrologic system and its components and existing and potential problems related thereto:

- b) State objective and policies, including management principles, alternatives and modifications, for water quality, and protection of natural characteristics;
- c) Set forth a management plan, including the hydrologic and water quality conditions that will be sought and significant opportunities for improvement;
- d) Describe conflicts between the watershed plan and existing plans of local government units;
- e) Set forth an implementation program consistent with the management plan, which includes a capital improvement program and standards and schedules for amending the comprehensive plans and official controls of local government units in the watershed to bring about conformance with the watershed plan; and
- f) Set out a procedure for amending the plan.

Subdivision 3. <u>Personal and Real Property</u>. It The Board may acquire necessary property to carry out its powers and its duties.

Subdivision 4. <u>Committees</u>. The WMO may appoint such committees such as citizen and technical advisory committees and sub-committees as it deems necessary.

Subdivision 5. <u>Rules and Regulations</u>. The WMO may prescribe and develop such rules and regulations as it deems necessary or expedient to carry out its duties and the purposes of this Agreement unless specifically prohibited elsewhere in this document.

Subdivision 6. <u>Review and Recommendations</u>. Where the WMO is authorized or requested to review and make recommendations on any matter, the WMO shall act on such matter within sixty (60) days. Failure to act shall constitute a waiver of the WMO's authority to make recommendations.

Subdivision 7. Local Water Management Plan. After consideration but before adoption by the governing body, each local unit shall submit its water management plan to the WMO for review for consistency with the watershed plan for the Northern Cannon River. The WMO shall approve or disapprove the local plan or parts thereof. The WMO shall have 60 days to complete its review. If the WMO fails to complete its review within the prescribed period, unless an extension is agreed to by the local unit, the WMO waives its authority to make recommendations.

Subdivision 8. <u>Use and Development of Land</u>. If, within the time frame prescribed by the Northern Cannon River Watershed Plan, a local unit does not have an approved local water management plan, the WMO may have the authority of a Watershed District under Minn. Stat. Chapter 112 to regulate the use and development of land within that local units jurisdiction. The WMO may also have the authority to regulate the use and development of land when an amendment to, or variance from, the adopted local water management plan is applied for.

Subdivision 9. <u>Data</u>. The Board may establish and maintain devices for acquiring and recording hydrological data within the Northern Cannon River Watershed.

Subdivision 10. <u>Claims</u>. The Board may enter upon lands within or without the watershed to make surveys and investigations to accomplish the purposes of the WMO. The WMO shall be liable for actual damages resulting therefrom but every person who claims damages shall serve the Chairman or Secretary of the Board of Managers with a Notice of Claim as required by Chapter 466.05 of the Minnesota Statutes.

Subdivision 11. Legal and Technical Assistance. The Board may provide legal and technical assistance in connection with litigation or other proceedings between one or more of its members and any other political subdivision, commission, board or agency relating to the planning or construction of water management facilities within the Northern Cannon River Watershed. The use of WMO funds for litigation shall be only upon a favorable vote of a majority of the eligible votes of the then existing members of the WMO.

Subdivision 12. <u>Reserve Funds</u>. The Board may accumulate reserve funds for the purpose herein mentioned and may invest funds of the WMO not currently needed for its operations, in the manner and subject to the laws of Minnesota applicable to townships and cities.

Subdivision 13. <u>Monies Collectable</u>. The Board may collect monies subject to the provisions of this agreement, and state law, from its member and from any other source approved by a majority of its board.

Subdivision 14. <u>Contracts</u>. The Board may make contracts, incur expense and make expenditures necessary and incidental to the effectuation of these purposes and powers and may disburse therefore in the manner hereinafter provided. Every contract for the purchase or sale of merchandise, materials, equipment or services by the WMO shall be let in accordance with the Uniform Municipal Contracting Law, Minn. State. 471.345 and the Joint Exercise of Power Statute, Minn. Stat. 471.59. No Manager of the WMO shall take part in any vote on any contract in which a direct or indirect conflict of interest is present.

Subdivision 15. <u>Surveys</u>. The Board may make necessary surveys or utilize other reliable surveys and data and develop projects to accomplish the purposes for which the WMO is organized.

Subdivision 16. <u>Other Governmental Units</u>, <u>Agencies</u>. It may cooperate or contract with the State of Minnesota or any subdivision thereof or federal agency or private or public organization to accomplish the purposes for which it is organized.

Subdivision 17. <u>Water Conveyances</u>. The Board may order the construction, cleaning, repair, alteration, abandonment, consolidation, reclamation or changes in the course or terminus of any ditch, drain, storm sewer, water course, natural or artificial within the Northern Cannon River Watershed.

Subdivision 18. <u>Watershed Operations</u>. The Board may order the construction, acquisition, operation or maintenance of dams, dikes, reservoirs and appurtenant works.

Subdivision 19. <u>Water Pollution</u>. The Board may investigate on its own initiation or shall investigate upon petition of any member all complaints relating to pollution of the Northern Cannon River or its tributaries. Upon finding that ground or surface waters are being polluted, the Board may order the member governmental unit to abate this nuisance and each member agrees that it will take all reasonable action available to it under the law to alleviate the pollution and to assist in protecting and improving the water quality of surface and ground water in the watershed.

Subdivision 20. <u>Permits</u>. The Board may require permits for the establishment or expansion of any solid water, hazardous waste, sewage sludge, sludge ash disposal, application or treatment facility or any project that may degrade surface or ground water quality.

Subdivision 21. <u>Surface Waters</u>. The Board may regulate, conserve and control the use of storm and surface water within the Northern Cannon River Watershed.

Subdivision 22. <u>Insurance</u>. The Board may contract for or purchase such insurance as the Board deems necessary for the protection of the WMO.

Subdivision 23. <u>Audit</u>. The Board shall cause to be made an annual audit of the books and accounts of the WMO and shall make and file a report to its members at least once each year including the following information:

- a) The financial condition of the WMO
- b) The status of all WMO projects and work within the watershed.
- c) The business transacted by the WMO and other matters which affect the interests of the WMO.

Copies of said report shall be transmitted to the clerk of each member governmental unit.

Subdivision 24. <u>Records</u>. The Board's books, reports and records shall be available for and open to inspection by its members at all reasonable times.

Subdivision 25. <u>Amendments</u>. The Board shall recommend all changes in this agreement to its members. Any amendments shall require ratification by all member units of government.

Subdivision 26. <u>Other Powers</u>. The Board may exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth herein.

Subdivision 28. <u>Local Studies</u>. Each member reserves the right to conduct separate or concurrent studies on any matter under study by the WMO.

Subdivision 29. <u>Gifts; Grants; Loans</u>. The WMO may within the scope of this Agreement: accept gifts, apply for and use grants or loans of money or other property from the United States, the State of Minnesota, a unit of government or other governmental unit or organization, or any person or entity for

the purposes described herein; enter into any reasonable agreement required in connection therewith; comply with any laws or regulations applicable thereto; and hold, use and dispose of such money or property in accordance with the terms of the gift, grant, loan or agreement relating thereto.

#### SECTION V

#### **DURATION**

Subdivision 1. <u>Duration of Agreement</u>. Each member agrees to be bound by the terms of this agreement until January 1, 2020 and it may be continued thereafter at the option of the parties.

Subdivision 2. <u>Termination of Agreement</u>. This agreement may be terminated prior to January 1, 2020 by the unanimous consent of the parties.

Subdivision 3. <u>Petition to Dissolve Agreement</u>. Any member may petition the Board to dissolve the agreement. Upon 60 days notice in writing to the clerk of each member governmental unit the Board shall hold a hearing and upon a favorable vote by three-fourths of all eligible votes of then existing Board members, the Board may by Resolution recommend that the WMO be dissolved. Said Resolution shall be submitted to each member governmental unit and if ratified by three-fourths of the Council/Boards of all eligible members within 60 days, said Board shall dissolve the WMO allowing a reasonable time to complete work in progress and to dispose of personal property owned by the WMO.

## SECTION VI

#### DISSOLUTION

Upon dissolution of the WMO, the Board shall provide at least a 90 days notice of the intent to dissolve to the affected counties and the Board of Water and Soil Resources.

Upon dissolution of the WMO, all property of the WMO shall be sold and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the members. Such distribution of the WMO assets shall be made in proportion to the total contributions to the WMO required by the last annual budget.

# SECTION VII EFFECTIVE DATE

This agreement shall be in full force and effect upon the filing of a certified copy of the resolution approving said agreement by each member. Said resolutions shall be filed with Dakota County Planning Services, who shall notify all members in writing of its effective date.

#### SECTION VIII

#### **COUNTERPARTS**

This agreement may be executed in several counterparts and all so executed shall constitute one Agreement, binding on all of the parties hereto notwithstanding that all of the parties are not signatory to the original of the same counterpart.

IN WITNESS WHEREOF, the parties hereto have executed the Agreement as of the day of complete execution hereof by the parties.

#### **Township of Castle Rock**

Dated: \_\_\_\_\_ 13, 2000

By <u>Kennett Beteall</u> Chairman Attest: <u>Maralue Rocher</u> Clerk

#### Township of Douglas

Dated:

By

Chairman

Attest:

Clerk

# **SECTION VII EFFECTIVE DATE**

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IN WITNESS WHEREOF, the parties hereto have executed the Agreement as of the day of complete execution hereof by the parties.

#### **Township of Castle Rock**

Dated:

By

Chairman

Attest:

Clerk

Dated: 6/5/00

Township of Douglas Chairman Chairman Joh Schmut Bv

Attest: Ra

## Township of Eureka

<u>Schindeldecker</u> Chairman <u>him H Sein</u> Clerk By Chernel Attest:

## **Township of Greenvale**

By		
	Chairman	

Attest:

Clerk

## Township of Hampton

By

Chairman

Attest:

Clerk

## City of Miesville

By\_\_\_\_

Mayor

Attest:

Clerk

## City of New Trier

Dated:

Mayor

\_\_\_\_

Attest:

By\_\_\_

Clerk

Dated:

Dated:

Dated:  $0^{-26-00}$ 

Dated:

Bv

JILY UI

## Township of Eureka

Dated:	

By\_

Chairman

Attest:

Clerk

Dated: June 20, 2000

Township of Greenvale By Robert Weiter Chairman en Attest: ESeth Nilson

## Township of Hampton

By		
	Chairman	

Attest:

Clerk

#### **City of Miesville**

By\_\_\_\_\_

Mayor

Attest:

Clerk

## **City of New Trier**

Mayor

Attest:

By\_\_\_\_

Clerk

Dated:

Dated:

Dated:
### Township of Eureka

Dated:	By
· · · · · · · · · · · · · · · · · · ·	Chairman
	Attest:
	Clerk
	Township of Greenvale
Dated:	By
	Chairman
	Attest:
• · ·	Clerk

Dated: 6/20/00

**Township of Hampton** 

Chairman Schuller By Attest:

### City of Miesville

By\_\_\_\_\_ Mayor

Attest:

Clerk

## City of New Trier

Dated:

Dated:

Mayor

Attest:

By\_\_\_\_

Clerk

	Township of Eureka
Dated:	By
	Chairman
	Attest:
• · · · · · · · · · · · · · · · · · · ·	
	Township of Greenvale
Dated:	Ву
	Chairman
	Attest:
	Cierk
	Township of Hampton
Dated:	Ву
	Chairman
	Attest:
	Clerk
	City of Miesville
Dated: $6 - 19 - 00$	By Alex Shaffer
	Mayor . Attendente Treiermith
	Clerk

# City of New Trier

Dated:\_\_\_\_

By\_\_\_\_

Mayor

Attest:

Clerk

	Township of Eureka
Dated:	By Chairman
•	Attest:Clerk
	Township of Greenvale
Dated:	By Chairman
	Attest:
	Clerk
	Township of Hampton
	By Chairman
	Attest:Clerk
	City of Miesville
Dated:	By Mayor
	Attest:Clerk
Dated: 5/2.2/00	City of New Trier By fathy that Mart Mayor Attest: <u>EllChal Sm. Cleck</u> Clerk

Dated:	6-14	-00
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City of Randolph	_
By R. L. L.	20k
Mayor	
	-Chala

ret Clerk

## Township of Randolph

D	•	
ву		
	Chairman	

Attest:

Clerk

Township of Sciota

By\_\_\_\_

Chairman

Attest:

Clerk

# Township of Waterford

By\_\_\_

Chairman

Attest:

Clerk

## Dated:

Dated:

Dated:

## City of Randolph

Dated:	, 	•	

By\_

Mayor

Attest:

Clerk

Dated: 620 2000

Township of Randolph Joehn Min Bernde By\_ Attest: Clerk

## Township of Sciota

By	· ·		
	Chairman		
Attest:			

Clerk

## Township of Waterford

By\_\_\_

Chairman

Attest:

Clerk

Dated:

Dated:\_

## City of Randolph

By\_\_\_

Mayor

Attest:

Clerk

## Township of Randolph

By\_

Chairman

Attest:

Clerk

Dated: June 12, 2000

Township of Scieta By Cuille Karmann Chairman Attest: <u>futh Chimann</u>

### **Township of Waterford**

Dated:

Dated:

Dated:

Chairman

Attest:

By\_

Clerk

# City of Randolph

Dated:	By Mayor
	Attest: Clerk
	Township of Randolph
Dated:	By Chairman
	Attest: Clerk
	Township of Sciota
Dated:	By Chairman
	Attest:Clerk
- (2-9-000	Township of Waterford

Dated: 4 r  $\boldsymbol{\nu}$ 

Township of water lord	
By John Deele	-7
Chairman	abla
Attest: Mary Ella Trame	
Clerk	



This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651.480.7777. FIGURE 2.1 Watershed Location





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FIGURE 2.2 **Surface Hydrology** 







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# **Surface Water Jurisdictions**

- **Designated Trout Streams**

- Shore Land Ordinance
- NCRWMO Boundary

67 Subwatershed Boundaries

# FIGURE 2.3 Surface Water Jurisdictions





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FIGURE 2.4 Topography

SYSTEM	GEOLOGIC UNIT	THICKNESS (Feet)	LITHOLOGY	]
X	Alluvium	0-150		_
Quaternar	Glacial Drift	0-400		8
	Decorah Shale	0-95		Decorah-
	Platteville Limestone	30-50		Platteville
iclan	St. Peter Sandstone	140-160		St. Peter Aquifer
rdov	Shakopee Dolomite	35-60	21217	า
•	New Richmond Sandstone	0-10		
	Oneota Dolomite	70-90		Prairie Du Chien- Jordan Aquifer
Cambr I an	Jordan Sandstone	80-105		-
	St. Lawrence Formation	35-70		
	Franconia Sandstone	100-200		Franconia-
	lronton - Galesville Sandstones			Aquifer
	Eau Claire Formation	250-400	000000	
	Mount Simon Sandstone		-	Mount Simon-
Precam- brian	Hinckley Sandstone	75-175		Hinckley Aquifer

SOURCE: United States Geological Survey

Figure 2.5 Bedrock Geology and Aquifers



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Groundwater Sensitivity to Pollution and Surface to Groundwater Connections



ht: Dakola SWCD. 2012



Figure 2.7 Precipitation Record



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# FIGURE 2.8 **Soil Associations**



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FIGURE 2.9 Hydrologic Soils Group





This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is networked in the series of the series and the series of the series of the series and the series of at 651,480,7777



FIGURE 2.10 Hydric Soils and Highly Erodible Soils



This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651,480,7777



# FIGURE 2.11 **Presettlement Vegetation**





ht: Dakola SWCD. 2012

# **FIGURE 2.12** Land Cover



Figure 2.13 Channel alteration at the outlet of Chub Creek



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FIGURE 2.14 **Biological Features and Recreational Features** 



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FIGURE 2.15 **Imparied Waters and Monitoring Sites** 



Figure 2.16 Stream Flow in Chub Creek 2008 - 2012



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Dakota County Soil & Wate Conservation District oht: Dakola SWCD. 2012 240TH ST E 50 61 MIESVILLE 250TH ST E 93 20 260TH ST E 91 2 BL DOUGLAS Z 270TH-STE Troup TWP e Cree

	$\bigcirc$	Hazardous Waste Generators
erennial)	0	MPCA Leaking Underground Storage Tank Sites
termittent)		MPCA Other Sites of Concern
Boundary	•	MPCA Spills
ned Boundaries		MPCA Tanks
lic Waters gistered		Solid Waste Facilities Waste Sites (Disposals, Dumps, LUSTs, Spills)

# FIGURE 2.17 **Potential Pollution Sources**



WATERSHED: MISSISSIPPI RIVER & LAKE PEPIN SUBWATERSHED: NORTH CANNON RIVER

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ight: Dakota SWCD 2013

## Waterway Classification

# **FIGURE 2.18** Wetland and Waterway Inventory and Assessment