



Cedar River Watershed
District

Watershed Management Plan

October 2009

Prepared by Barr Engineering Co.



Watershed Management Plan

Prepared for
Cedar River Watershed District

Adopted by
Cedar River Watershed District Board of Managers
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Approved by
Minnesota Board of Water and Soil Resources
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Chapter 1.0

Executive Summary

Cedar River Watershed District

Watershed Management Plan

Chapter 1: Executive Summary

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1.0 Executive Summary

The Cedar River Watershed District (CRWD) *Watershed Management Plan* (Plan) sets the vision, guidelines, and proposed tasks for managing the water resources within the boundaries of the CRWD. This Executive Summary summarizes the highlights of this first CRWD Plan, including introductory information, the CRWD vision and mission, goals, policies and implementation tasks.

1.1 Location and History

CRWD was established on April 25, 2007 in response to the Mower County Board of Commissioners petition to the State of Minnesota to address flooding and water quality issues in the watershed.

CRWD is located in southeast Minnesota, along the Iowa border, and covers approximately 434.7 square miles. Approximately 298.6 square miles are in Mower County, 69.4 square miles are in Dodge County, 59.1 square miles are in Freeborn County, and 7.6 square miles are in Steele County. Although the Cedar River watershed extends well into Iowa, only portions in Minnesota are included in the CRWD. **Figure 1-1** shows the location of the CRWD in relationship to the other watershed management authorities in Minnesota. **Table 1-1** lists the communities and townships that lie or partially lie within the CRWD.

Historically, the Sioux Indians controlled the area in CRWD until the Mendota Treaty in 1853. European settlement began in the 1850s and since that time the area has remained primarily agricultural. The largest city in the CRWD, Austin, grew as a railroad division center, a major agricultural shipping point and a center for the lumber trade. Currently, the largest employer in Austin is the Hormel Foods Corporation.

Table 1-1 Communities in Cedar River Watershed District

<u>Mower County</u>	<u>Mower County</u>	<u>Steele County</u>	<u>Dodge County</u>
Austin	Dexter Township	Blooming Prairie	Hayfield
Brownsdale	Grand Meadow Township	Blooming Prairie Township	Ashland Township
Dexter	Lansing Township	<u>Freeborn County</u>	Hayfield Township
Elkton	Lyle Township	Hayward Township	Ripley Township
Lyle	Marshall Township	London Township	Westfield Township
Mapleview	Nevada Township	Moscow Township	
Rose Creek	Red Rock Township	Newry Township	
Sargeant	Sargeant Township	Oakland Township	
Waltham	Udolpho Township	Shell Rock Township	
Adams Township	Waltham Township		
Austin Township	Windom Township		
Clayton Township			

Watershed districts are governed by a local board of managers who are appointed by the boards of the counties with land in the watershed district. In the CRWD, the board of managers has seven members; four members are appointed by the Mower County Board and one manager each is appointed by the Dodge County Board, Freeborn County Board and Steele County Board. The appointments are for staggered three-year terms.

The regularly scheduled meetings of the CRWD board of managers are held once a month, on the third Wednesday of the month at 7:00 p.m. The meetings are open to the public and are held at the JC Hormel Nature Center in the Ruby Rupner Room, located at 1304 21st Street NE in Austin.

Administration and technical services for the CRWD are provided by the Mower County Soil and Water Conservation District. The Austin Daily Herald is the legal paper for the CRWD. The board has contracted with Jones-Haugh and Smith, Inc. to be the District Engineer. The board selected Attorney Matt Benda of Peterson, Savelkoul & Benda LTD for legal council. The CRWD has a website (<http://www.cedarriverwd.org/>) that provides information about the district, press releases, agendas and minutes from managers' meetings, and annual reports.

1.2 Purpose and Scope

Like all watershed districts, the CRWD is a special purpose unit of local government that manages water resources on a watershed basis (a watershed is an area of land that drains to a given lake, river, stream or wetland). Watershed district boundaries generally follow natural watershed divides, rather than political boundaries.

Recognizing that water does not follow political boundaries, the State of Minnesota established the Watershed Act (Minnesota Statutes 103D) in 1955, which provided for the creation of watershed districts anywhere in the state and requires watershed districts to prepare watershed management plans. There are 46 watershed districts in the state (as of 2009).

As given in statute (Minnesota Statutes 103D.201), the general purposes of a watershed district are:

To conserve the natural resources of the state by land use planning, flood control, and other conservation projects by using sound scientific principles for the protection of the public health and welfare and the provident use of the natural resources.

Watershed districts may be formed for a number of specific purposes, including protection or enhancement of water quality, prevention and alleviation of flood damage, prevention and alleviation of soil erosion and sedimentation, regulation of streams, lakes and water courses for domestic, recreational and public use, and protection and regulation of groundwater uses (Minnesota Statutes 103D.201).

Minnesota statutes (103D.335 in particular) give watershed districts a number of broad authorities, including the authority to:

- Collect data
- Conduct studies and investigations
- Construct improvements
- Levy property taxes and assess properties for benefits received
- Adopt rules to regulate, conserve, and control the use of water resources
- Contract with private and public entities for the construction, maintenance, and operation of projects and other activities
- Hire staff and consultants
- Acquire property
- Incur debts, liabilities, and obligations
- Acquire, operate, construct and maintain dams, dikes, reservoirs, and water supply systems
- Enter lands for surveying and other investigations

See Minnesota Statutes 103D for additional authorities.

As required by law (Minnesota Statutes 103D.401), the CRWD Managers must adopt a watershed management plan for any or all of the purposes for which a watershed district may be established.

1.3 Plan Organization and Summary of Issues, Goals, Objectives, and Potential Solutions

The Plan sets the CRWD's water resource goals and objectives, provides data and other background information, outlines the applicable regulations, assesses watershed-wide and specific issues, and lists implementation tasks to achieve the goals. The Plan also provides information regarding the funding of the implementation program.

1.3.1 Plan Organization

The Plan is organized into six major chapters as follows:

Chapter 1	Executive Summary
Chapter 1 is the Executive Summary, which provides background information about the CRWD and summarizes the highlights of the Plan, including the Plan purpose and scope, goals, objectives, and implementation tasks.	
Chapter 2	Physical Environment Inventory
Chapter 2 provides technical information describing the surface and subsurface conditions of the CRWD. Most of Chapter 2 presents a watershed-wide inventory, including climate and precipitation, topography, soils, geology, groundwater, Minnesota Department of Natural Resources (MDNR) public waters, wetlands, surface water resource monitoring information, floodplain information, unique features and scenic areas, pollutant sources, and major watersheds. Chapter 2 also includes a number of maps, such as watershed-wide maps of land cover, MDNR public waters, impaired waters, wetlands, and watersheds. This chapter also includes a number of tables, such as precipitation information, and water quality information.	
Chapter 3	Assessment of Issues
Chapter 3 assesses the issues, challenges, and problems the CRWD faces in managing water resources on behalf of the public. Watershed-wide and specific issues are presented and discussed under a number of topic areas, including flood control, water quality, erosion and sediment control, etc.	
Chapter 4	Goals, Objectives, and Actions
Chapter 4 presents the CRWD's goals, objectives, and actions that will guide the CRWD in accomplishing its mission over the 10-year life of the Plan. The goals, objectives and actions are presented under a number of topic areas, including flood control, water quality, agricultural and urban drainage systems, erosion and sediment control, etc.	
Chapter 5	Implementation Program
Chapter 5 describes the components of the CRWD's Plan implementation program, including administrative activities, data collection and reporting, studies, and capital projects. This chapter also describes the available funding options, how projects can be initiated, the Plan review and approval process, the procedures for updating and amending the Plan, and the regulatory framework.	
Chapter 6	References
Chapter 6 lists the documents and other references used in the preparation of the Plan.	

1.3.2 Summary of Issues

The following section outlines the issues faced by the Cedar River Watershed District. These issues are discussed in greater detail in Chapter 3.0 of the Plan.

- Addressing existing flooding issues and preventing/minimizing the risk of future flooding. Impacts from flooding can include disruption of normal activities, physical damage to infrastructure, loss of life, and potential health hazards. Without controls, increased urbanization of a watershed causes an increase in average annual flood damage.
- Reducing non-point source pollution. For most water bodies, non-point source runoff, especially stormwater runoff, is a major contributor of pollutants. As urbanization increases and other land use changes occur in the watershed, nutrient and sediment inputs (i.e., loadings) from stormwater runoff can far exceed the natural inputs to the watershed's water resources.
- Implementing the action steps of TMDL studies, when completed, in cooperation with other agencies.
- Reducing sedimentation and turbidity in waterbodies within the CRWD. High levels of suspended sediment can reduce sunlight penetration and affect aquatic life, increase phosphorus concentrations, and alter channel capacity and drainage rates.
- Reducing nutrient loading to waterbodies, including nitrogen and phosphorus. Sources of nutrient loading may include increased runoff due to urbanization, agricultural practices, and failing subsurface sewage treatment systems.
- Reducing erosion within the CRWD. Erosion may be increased by construction and agricultural activities. Increased erosion and sediment loading may impact stormwater management systems (e.g., ponds, pipes, ditches), requiring more frequent maintenance, repair, and/or modification to ensure they will function as designed.
- Developing policies to guide the development and maintenance of sustainable agricultural and urban drainage systems.
- Protecting groundwater quality from the detrimental impacts of improperly operating subsurface sewage treatment systems, nonconforming feedlot operations, and chemical contamination from landfills, storage tanks, spills and other similar activities.

1.3.3 Plan Goals and Objectives

The following paragraphs summarize the goals and objectives for each of the topic areas in Chapter 4:

Flood Control (Chapter 4.1):

Goal 4.1.1 - Protect human life, property, and surface water systems that could be damaged by flood events.

Goal 4.1.2 - Correct/address existing flooding problems.

Goal 4.1.3 - Prevent future flooding problems.

Objective A - Quantify and understand where and when flooding problems occur and how water is stored/drained in the watershed.

Objective B - Regulate stormwater runoff discharges and volumes on a watershed-wide basis to 1) minimize flood problems, flood damages and the future costs of building and maintaining stormwater management systems; and 2) prevent structural damages during storms up through the critical 100-year precipitation event. Protect township, county, city and state infrastructure from flooding impacts.

Objective C - Decrease the risk of flooding throughout the watershed; specifically, decrease flooding by 20 percent in the Cedar River through the City of Austin during the critical 100-year rainfall or snowmelt event (based on current precipitation and runoff design events).

Objective D - Provide leadership and assist townships, cities, and counties with coordination of intercommunity stormwater runoff planning and design.

Water Quality (Chapter 4.2):

Goal 4.2.1 - Encourage and implement practices to address current water quality problems, and to maintain or improve the quality of surface waters in the CRWD.

Objective A - Develop and support the use of BMPs relating to improving the quality of surface water for all land uses and activities in the watershed.

Objective B - Eliminate or minimize the discharge of untreated stormwater to the Cedar River and its tributaries, as well as other watercourses and water bodies in the CRWD.

Objective C - Reduce the level of pollutants in surface waters of the CRWD as identified in Total Maximum Daily Load (TMDL) studies.

Objective D - Prevent or minimize contaminants from entering surface water resources in the CRWD.

Goal 4.2.2 - Improve and increase the understanding and knowledge of the quality of the surface water resources in the Cedar River watershed.

Objective A - Develop, operate, and maintain a surface water quality monitoring program in the CRWD.

Objective B - Assess and analyze data collected from the surface water monitoring program.

Goal 4.2.3 - Promote and enhance the full economic value and benefits of the Cedar River watershed.

Objective A - Support the maintenance of clean water supplies for the public, as well as agricultural uses and livestock.

Objective B - Support the maintenance of clean water for shoreland development and rural residential uses.

Objective C - Support the maintenance of clean water resources for commercial and industrial uses.

Agricultural and Urban Drainage Systems (Chapter 4.3):

Goal 4.3.1 - Inventory and analyze the state of the agricultural and urban (public and private) drainage systems within the CRWD.

Objective A - Inventory and map all agricultural and urban (public and private) drainage systems in the watershed to further the CRWD's understanding of where and how water is drained throughout the watershed.

Analyze/understand ongoing maintenance needed for drainage systems to correct/address existing flooding problems or to prevent future flooding problems in the watershed.

Erosion and Sediment Control (Chapter 4.4):

Goal 4.4.1 - Minimize erosion and its effects on water quality.

Objective A - Support the construction of sediment ponds, basins (including re-establishment of wetlands), and other erosion and sediment control BMPs throughout the watershed.

Objective B - Develop and implement programs that protect sensitive areas from erosion.

Wetlands and Natural Resources (Chapter 4.5):

Goal 4.5.1 - Maximize the water quality and quantity benefits of wetlands.

Objective A - Identify, restore, and enhance wetland areas on a prioritized basis to improve surface water quality, promote groundwater recharge, and support biodiversity in the CRWD.

Land Use (Chapter 4.6):

Goal 4.6.1 - Protect water resources from impacts associated with land use and land development in the CRWD.

Objective A - Support the development and implementation of local land use plans and policies that are based on sound water and land resource principles.

Goal 4.6.2 - Promote the coordination of land use management and regulation with other land use authorities in the CRWD.

Objective A - Support and coordinate the development and implementation of land use plans, ordinances, and other official controls which protect water resources.

Goal 4.6.3 - Encourage water resource protection in the Cedar River watershed through land conservation programs.

Objective A - Coordinate the implementation of land conservation programs as a part of the land development process.

Objective B - Support and coordinate the use of conservation agricultural practices that protect and conserve water resources in the CRWD.

Objective C - Support the development of a riparian area planting program.

Recreation, Habitat, and Shoreland Management (Chapter 4.7):

Goal 4.7.1 - Attain a high degree of recreational use of the surface water resources in the Cedar River watershed.

Objective A - Develop an outreach program to promote the recreational use of surface water resources in the CRWD.

Objective B - Develop a plan for managing fish, wildlife, and other recreational resources.

Objective C - Support increased opportunities for the safe and sustainable use of surface water resources in the CRWD.

Groundwater (Chapter 4.8):

Goal 4.8.1 - Protect groundwater resources in the Cedar River watershed.

Objective A - Support the development and implementation of wellhead protection plans.

Objective B - Promote the locating and sealing of abandoned wells.

Objective C - Support land use practices that enhance high quality groundwater recharge.

Objective D - Support agricultural practices that protect and conserve groundwater resources in the watershed.

Goal 4.8.2 - Improve and increase the understanding and knowledge of the groundwater resources in the CRWD.

Objective A - Develop an ongoing groundwater quality and quantity monitoring program.

Objective B - Establish and maintain a comprehensive database on groundwater resources in the watershed.

Objective C - Assess and analyze data collected from the groundwater monitoring program.

Objective D - Assess groundwater supply and quality of the aquifers in the watershed on an ongoing basis.

Goal 4.8.3 - Encourage the wise use of groundwater resources in the Cedar River watershed.

Objective A - Provide technical assistance and comments on land development requests and permits on groundwater issues.

Administration (Chapter 4.9):

Goal 4.9.1 - Apply statutory authorities in ways that protect and enhance safety, commerce, and natural resources.

Objective A - Develop rules to implement the goals, objectives, and actions of this plan.

Objective B - Provide training for board managers and advisory committee members to assist them in dealing with the complexities of managing a watershed district.

Objective C - Develop and maintain an active legislative program.

Objective D - Investigate and remain informed of new studies and research on emerging surface water issues, contaminants, and technologies.

Objective E - Monitor the effectiveness and efficiency of CRWD programs and services.

Goal 4.9.2 - Develop and maintain successful interagency working relationships to effectively implement the CRWD Plan.

Objective A - Build and maintain cooperative working partnerships with local, state, and federal government agencies.

Objective B - Develop collaborative partnerships with local school districts, universities, and non-profit organizations to implement the plan, especially education and information programs.

Objective C - Develop a “chain of authority” to identify roles and responsibilities integral to plan implementation.

Education and Public Involvement (Chapter 4.10):

Goal 4.10.1 - Maximize awareness and understanding of the value of water resources by all citizens living, working, and recreating in the Cedar River watershed.

Objective A - Support and coordinate the development and dissemination of educational programs and materials on water and land related resource issues and management throughout the watershed.

Objective B - Develop a comprehensive public relations program.

Objective C - Educate the citizens of the CRWD on surface water management.

Objective D - Develop an educational program for the general public on groundwater resources and safe drinking water.

Objective E - Maintain and update the CRWD website.

Objective F - Increase interest in and support of CRWD programs and projects.

Goal 4.10.2 - Encourage active public participation in the implementation of this plan and future plan updates and amendments.

Objective A - Develop an effective notification system for activities and actions administered by the CRWD.

Funding (Chapter 4.11):

Goal 4.11.1 - Achieve fair and fiscally responsible management of the affairs of the CRWD.

Objective A - Develop an annual CRWD budget and implementation program.

Objective B - Develop enhanced funding mechanisms to enable the CRWD to pursue the projects needed to improve water resources.

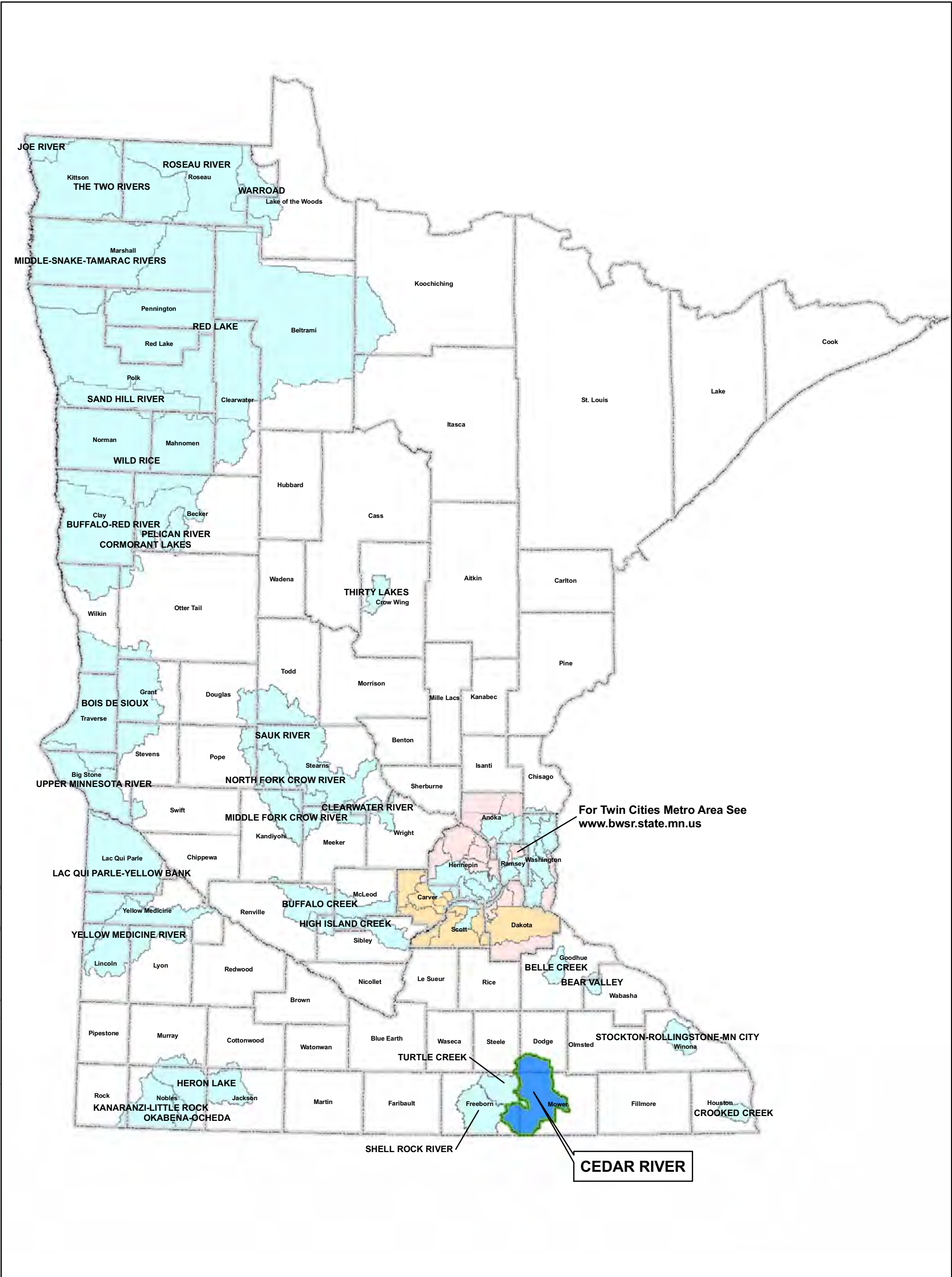
Objective C - Ensure the financial solvency and accountability of the CRWD and the efficient and effective use of CRWD funds.

1.3.4 Summary of Potential Solutions

Chapter 5.0 of the Plan presents the CRWD's implementation program. Significant implementation tasks are summarized in this section.

- Develop, adopt, and implement CRWD rules, in accordance with Minnesota Statutes 103D.341.
- Establish and adopt 100-year floodplain elevations for the CRWD established floodplain.
- Set/revise flow rate goals for subwatersheds within the CRWD.
- Construct, implement, and maintain flood control structures
- Develop a coordinated program to administer and implement BMPs in riparian and shoreland areas.
- Support the development of a coordinated and comprehensive program with partnering agencies for administering and implementing BMPs on agricultural and urban lands.
- Develop and implement plans to monitor water quality and quantity within the CRWD.
- Develop and implement a comprehensive education program in cooperation with other governmental units and educational institutions.
- Provide technical assistance to communities regarding surface water, groundwater, and land resources.
- Fund the implementation of this plan using the statutory tools provided to watershed districts, using grants, partnerships, and loans whenever possible and cost effective to reduce the CRWD's share of project costs.
- Implementing the action steps of TMDL studies, when completed, in cooperation with other agencies.

Figures

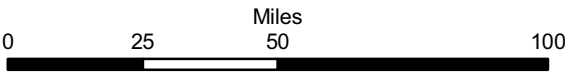


Sources:
Watershed Districts - Minnesota Board of Water and Soil Resources (2009)
County Boundary - MN Dept. of Transportation (2003)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)

Figure 1-1

Water Management Authorities in Minnesota

Cedar River Watershed District



Legend

- Cedar River Watershed District
- County Boundary
- Water Management Authorities**
 - Watershed Districts
 - Joint Powers Agreement Watershed Management Organizations
 - County Watershed Management Organizations

Cedar River Watershed District

Watershed Management Plan

Chapter 2: Physical Environment Inventory

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2.0 Physical Environment Inventory

This chapter of the Cedar River Watershed District (CRWD) *Watershed Management Plan* (Plan) provides a technical description of the CRWD. General concepts and data related to land use, climate, topography, watersheds, soils, geology, surface water resources data, pollutant sources, recreational areas, and habitat are discussed.

2.1 Land Use

The CRWD covers 435 square miles or 278,463 acres. Pre-settlement vegetation in this area was bur oak savanna, with areas of tallgrass prairie and maple-basswood forest. Tallgrass prairie was concentrated on level to gently rolling topography. Bur oak savanna was found on rolling moraine ridges. Maple-basswood forest was found in areas protected from fire, typically in steep ravines or near streams.

Figure 2-1 shows current land use, as taken from the 2001 National Land Cover Dataset (NLCD). Cultivated crops occupy 82.8 percent of the watershed's total land area, developed open space occupies 6.6 percent of the watershed's total land area, and grasslands occupy 4.1 percent of the watershed's total land area. According to the *Mower County Local Water Management Plan 2006-2015*, Mower County ranked 10th and 13th in 1999 in Minnesota for corn and soy bean production, respectively. Very few acres in the CRWD have been issued permits for agricultural irrigation. A summary of the 2001 NLCD land use for CRWD is listed in Table 2-1.

Table 2-1 Cedar River Watershed District Land Use Areas

Land Use	Area (acres)	Percent Area of Watershed District
Barren Rock (Rock/Sand/Clay)	66	0.02%
Cultivated Crops	230,645	82.83%
Deciduous Forest	2,952	1.06%
Developed Open Space	18,428	6.62%
Developed, High Intensity	343	0.12%
Developed, Low Intensity	4,690	1.68%
Developed, Medium Intensity	980	0.35%
Emergent Herbaceous Wetlands	775	0.28%
Evergreen Forest	36	0.01%
Grassland	11,390	4.09%
Open Water	354	0.13%
Pasture/Hay	3,473	1.25%
Woody Wetlands	4,330	1.55%
Total	278,463	100%

Land use data is an important factor for estimating surface water runoff. The hard or impervious surface areas associated with each land use greatly affect the amount of runoff generated from an area. Significant changes in land use can increase runoff due to added impervious surfaces, soil compaction and changes to drainage patterns. Row crops, such as corn and soy beans, increase the risk of erosion and of elevated total suspended solids levels in streams because the land can be without vegetation cover for major periods of time due to the short Minnesota growing season.

Although Dodge and Steele Counties are expected to experience a large percent increase in population growth by 2035 (as seen in Table 2-2), it is expected that the majority of this growth will be in Owatonna and Dodge Center, outside of the CRWD. It is expected that the land use in the CRWD will remain largely agricultural for at least the next 30 years. The City of Austin adopted a Comprehensive Growth Plan in 2000 that focuses on the planned growth of the city for the subsequent 10 years.

Table 2-2 Estimated Future Population by County

County	2005 Population	2035 Population	% Change Population
Dodge	19,833	28,800	45.2
Freeborn	32,266	31,940	-1.0
Mower	39,210	41,210	5.1
Steele	36,165	47,200	30.5

Source: Minnesota State Demographic Center, June 2007, *Minnesota Population Projections*, (<http://www.demography.state.mn.us>)

2.2 Climate and Precipitation

Because of its location near the center of the North American continent, the CRWD (and Minnesota) has a continental climate, meaning it experiences a wide variation in climate conditions (e.g., droughts and floods, heat and cold).

The mean annual temperature for Austin is 43.2°F, as measured at the Austin Wastewater Treatment Facility for the time period of 1971-2000 (National Oceanic and Atmospheric Administration (NOAA) Cooperative Station Austin 3 S, ID 210355, in service since December 1, 1948). Mean monthly temperatures vary from 10.9°F in January to 70.0°F in July (1971-2000). Extreme temperatures recorded were a high of 100°F on June 21, 1988 and a low of -42°F on January 15, 1963 and January 19, 1970. For the period 1971-2000, the average date for latest occurrence of freezing temperatures is May 2, while the average date for the first autumn frost is September 29. The average frost-free period (growing season) is approximately 150 days.

Table 2-3 summarizes precipitation data for the Austin station. Average total annual precipitation (1971-2000) is 31.97 inches at the Austin station and has ranged for the period of record since 1948 from a low of 17.73 inches in 1976, to a high of 46.01 inches in 1993. The mean monthly precipitation (1971-2000) varies from 4.51 inches in August to 0.96 inches in January. From May to September, the growing season months, the average rainfall (1971-2000) is 20.4 inches at Austin or about 64 percent of the average annual precipitation. Average annual lake evaporation is about 33 inches according to the *Minnesota Hydrology Guide* (NRCS, 1975).

Table 2-3 Precipitation Summary—Austin Station Averages: 1971-2000
Extremes: 1937-2001

Month	Total Precipitation, Inches					Snow, inches			# Days with Precip		
	Mean	High—Yr	Low—Yr	1-Day Max		Mean	High—Yr		≥ .10	≥ .50	≥ 1.0
Jan	0.96	3.68 1976	0.00 1983	2.53 1/22/1973		11.8	25.2 1996		2.2	0.5	0.1
Feb	0.57	3.02 1971	0.00 1975	1.04 2/27/1948		6.5	23.1 1959		1.6	0.3	0.0
Mar	1.62	4.31 1995	0.00 1984	1.94 3/26/1950		5.4	27.3 1951		3.8	1.3	0.3
Apr	3.11	7.09 1999	0.18 1983	2.67 4/23/1990		2.5	13.8 1962		6.6	2.0	0.7
May	4.05	7.69 2000	1.05 1949	3.50 5/30/1980		0	1.0 1954		7.4	3.0	1.0
Jun	4.07	11.07 1954	0.71 1950	3.30 6/16/1954		0	0.0 -		7.6	2.7	1.3
Jul	4.49	10.20 1999	0.71 1937	4.32 7/2/1944		0	0.0 -		6.9	3.1	1.4
Aug	4.51	10.23 1980	0.40 1949	4.55 8/29/1947		0	0.0 -		6.7	3.0	1.3
Sep	3.28	11.32 1965	0.39 1940	3.83 9/19/1983		0	0.5 1961		5.8	2.2	0.8
Oct	2.30	7.38 1970	0.00 1952	2.18 10/12/1966		0.3	2.0 1981		4.8	1.5	0.4
Nov	2.00	5.46 1975	0.00 1983	2.50 11/25/1993		4.7	21.0 1985		3.3	1.3	0.6
Dec	1.01	3.43 1975	0.00 1943	1.36 12/12/1965		9.7	36.5 2000		2.8	0.7	0.1
Annual	31.97	46.01 1993	17.73 1976	4.55 8/29/1947		40.9	76.2 1961-62		61.8	22.6	8.5
Winter	0.85	6.71 2001	0.00 1987	2.53 1/22/1973		NA	NA		6.6	1.5	0.3
Spring	2.93	15.96 1945	4.18 1967	3.50 5/30/1980		NA	NA		18.0	6.3	1.9
Summer	4.36	26.05 1990	4.37 1976	4.55 8/29/1947		NA	NA		21.2	8.7	4.0
Fall	2.53	17.59 1970	1.54 1952	3.83 9/19/1983		NA	NA		13.9	5.0	1.9

NA - Not Available

Source: Midwest Regional Climate Center Website (<http://mcc.sws.uiuc.edu>)

Average annual snowfall (1971-2000) is 40.9 inches at the Austin station. Extreme snowfall records range from 76.2 inches during the 1961-1962 season to 17 inches at Austin during the 1986-1987 season.

The major sources of information regarding rainfall in the region are publications TP-40 and TP-49 issued by the National Weather Bureau (now the National Weather Service) in 1961 and 1964, respectively. These data are generally consistent with the specific analysis of the intensity-frequency data compiled by USDA Miscellaneous Publication 204 (1944). The sources give information on storm durations of up to 10 days. Runoff from spring snowmelt is also important in this region. The Soil Conservation Service (now the National Resource Conservation Service (NRCS)) *National Engineering Handbook*, Hydrology, Section 4, presents maps of regional runoff volume. The information from all of these sources (except for the USDA analysis) is summarized in the *Minnesota Hydrology Guide*, published by the USDA's Soil Conservation Service (now the NRCS) in 1975.

Austin Climate & Precipitation Facts	
Mean annual temperature	43.2° F
Average annual precipitation	31.97 inches
Average annual snowfall	40.9 inches
Average annual lake evaporation	33 inches

Table 2-4 lists many of the precipitation and runoff events used for design purposes. The Rainfall Frequency Atlas (TP-40) is in the process of being updated with more recent precipitation data and is expected to be completed in 2011.

Table 2-4 Selected Precipitation and Runoff Events Used for Design Purposes

Type and Frequency	Duration	Amount (Inches)
Rainfall		
10-year	24 hour	4.4
25-year		5.0
50-year		5.5
100-year		6.2
25 year	10 day	9.0
50-year		10.4
100-year		11.2
Runoff (snowmelt)		
10-year	10 day	4.3
25-year		5.2
50-year		5.9
100-year		6.5

Source: *Minnesota Hydrology Guide* (USDA Soil Conservation Service)

Major flooding has occurred in the Cedar River watershed five times in the past 60 years. A summary of major flood events with flood crests of over 20 feet on the Cedar River at Austin are listed in Table 2-5. Flood stage at Austin is 15.0 feet. Two to three inches of rain fell over the headwaters of the Cedar River on July 5-6, 1978 and produced significant flooding. Ten days later, July 16-17, 1978, the already-soaked ground was deluged by a severe storm with an unofficial record precipitation of 9.5" in Waltham Township that produced a record flood at the time of 12,400 cubic feet per second as measured at the USGS station on the Cedar River south of Austin near the 29th Ave SE/County Road 28

bridge (USGS Station 05457000). The record flooding that occurred in early summer 1993 over much of the Mississippi River basin caused some flooding in the Cedar River watershed as well. A subsequent torrential rainfall occurred in the Cedar River watershed on August 15, 1993. Wet conditions from June storms and two nights of heavy rain on July 9-10, 2000 produced flash floods, estimated as a 200-year flood event. Evacuations were necessary in Austin; however, damage from the 2000 flood was less than the 1978 event due to extensive mitigation measures completed in the 1980's and 1990's. In 2004, after a month of relatively dry weather, a huge late summer storm brought record rainfall to the area. Residents banded together in sand bagging campaigns against this record flood. Two deaths were associated with this flooding event. In June 2008, strong storms and wet antecedent conditions caused extensive flooding. Property damages in the City of Austin were lower than previous floods due to buy-outs of houses and businesses in the flood plain. Interstate 90, along with other major roads in the area had to be closed for several days. One death was associated with this flooding event.

Table 2-5 Major Cedar River Flood Events

Year	Date	Maximum Storm Event Precipitation in Cedar River Watershed	Peak Flow at USGS Station (cfs)	Crest Height at USGS Station
1978	July 6-7	3.25" Austin	10,000	18.14'
1978	July 16-17	9.5" Waltham	12,400	20.35'
1993	August 15	8" Lyle	10,800	19.43'
2000	July 9-10	7" Austin	15,300	21.49'
2004	Sept. 14 & 15	11.5" Blooming Prairie	20,000	23.26'
2008	June 12	3 - 5" over entire area	15,500	22.40'

Source: NOAA's National Weather Service at La Crosse, WI Major Historical Floods webpage (<http://www.crh.noaa.gov/arx/historicalfloods.php>) Minnesota Climatology Working group Minnesota Flash Floods: 1970-2006 flash floods webpage (<http://climate.umn.edu/doc/flashflood.htm>) and USGS's Peak Streamflow for the Nation webpage for Station 05457000 (<http://nwis.waterdata.usgs.gov/usa/nwis/peak>)

Even with wide variations in climate conditions, climatologists have found four significant climate trends in the Upper Midwest (see right).

According to the Soil and Water Conservation Society's (SWCS) 2003 report on climate change, total precipitation amounts in the United States (and in the Great Lakes region) are trending upward, as are storm intensities. Precipitation records in the area show the annual average precipitation has increased, as shown in the following

Upper Midwest Climate Trends
<ol style="list-style-type: none"> 1. Warmer winters 2. Higher minimum temperatures 3. Higher dew points 4. Changes in precipitation trends (more rainfall from heavy thunderstorm events; increased snowfall)

Source: *Minnesota Weather Almanac*, Seeley, 2006.

examples with data from the High Plains Regional Climate Center website (<http://hprcc.unl.edu/wrcc/states/mn.html>):

- Austin, Minnesota station - the average annual precipitation has increased from 31.02 inches (1961-1990 average) to 31.97 inches (1971-2000 average), a 3.1 percent increase
- Albert Lea, Minnesota station - the average annual precipitation has increased from 31.71 inches (1961-1990 average) to 33.15 inches (1971-2000 average), a 4.5 percent increase
- Grand Meadow, Minnesota station - the average annual precipitation has increased from 32.96 inches (1961-1990 average) to 34.65 inches (1971-2000 average), a 5.1 percent increase
- Osage, Iowa station - the average annual precipitation has increased from 33.70 inches (1961-1990 average) to 34.43 inches (1971-2000 average), a 2.2 percent increase

As noted by the SWCS, increased storm intensities result in increased soil erosion and increased runoff. The Minnesota Pollution Control Agency's (MPCA) global warming website (<http://www.pca.state.mn.us/hot/globalwarming.html>) states that increased flooding could also result from more intense precipitation events. When the updated Rainfall Frequency Atlas (TP-40) is released in 2011, it will incorporate the increased precipitation noted above.

Climate information can be obtained from a number of sources, such as the following websites:

- For a wide range of Minnesota climate information: <http://climate.umn.edu/>
- For additional Minnesota climate information: <http://www.dnr.state.mn.us/climate/index.html>

2.3 Topography

The topography of the CRWD is gently rolling. Figure 2-2 shows the 10-foot USGS contour intervals of the CRWD. The lowest point in the watershed is 1140 feet above mean sea level at the border of Iowa and Minnesota on the Cedar River and the highest point in the watershed is 1440 feet above mean sea level in the southeastern corner of the watershed near Elkton, Minnesota. The CRWD includes only areas in Minnesota. The Cedar River continues to flow southeast through Iowa and merges into the Iowa River, which discharges into the Mississippi River.

2.4 Watersheds and Drainage Patterns

Figure 2-3 is an index map showing all of the 11 major subwatersheds and 36 minor subwatersheds of the watershed district. The major watersheds in the CRWD are

- Upper Cedar River watershed
- Roberts Creek watershed

- Wolf Creek watershed
- Dobbins Creek watershed
- Schwerin Creek watershed
- Rose Creek watershed
- Orchard Creek watershed
- Woodbury Creek watershed
- Mud Lake Creek watershed
- West Beaver Creek watershed
- Lower Cedar River watershed

The Upper Cedar River, Roberts Creek, Wolf Creek, Dobbins Creek and Turtle Creek watersheds, and some small portions of the Lower Cedar River watershed were included in the *Upper Cedar River Surface Water Management Plan* (UCRSWMP) completed in September 2007. The UCRSWMP plan divided these watersheds into 435 subwatersheds delineated to every major creek and river crossing such as roads, railroads and dams. Turtle Creek is a major tributary to the Cedar River that discharges into the Cedar River just south of Austin, Minnesota. However, as the Turtle Creek Watershed District was formed in 1968, separately from the CRWD, Turtle Creek and its watershed are not under the jurisdiction of the CRWD. The remaining subwatersheds outside of the UCRSWMP study area (Schwerin Creek, Rose Creek, Orchard Creek, West Beaver Creek, Mud Lake Creek, Woodbury Creek and the remaining portions of the Lower Cedar River Watershed watersheds) have not been further delineated beyond the larger subwatersheds already delineated by the Minnesota Department of Natural Resources (MDNR). **Figures 2-4 and 2-5** are maps of these subwatersheds and their minor subwatershed numbers. **Table 2-6** lists the major and minor subwatersheds areas as delineated by the MDNR.

Table 2-6 Major and Minor Subwatersheds

Major Subwatershed Name	Minor Subwatershed Name (if named) and MDNR Hydrologic Unit Code	Area (acres)	
		Immediate	Total
Upper Cedar River	Upper Cedar River - 4848001	7,944	97,652
	Upper Cedar River - 4848021	4,939	
	Upper Cedar River - 4848023	24,727	
	Upper Cedar River - 4848056	7,755	
	Little Cedar River - 4848054	6,042	
	Westfield-Ripley Ditch - 4848052	4,151	
	4848053	3,621	
	4848039	6,256	
	4848055	4,326	
	4848057	4,348	
	4848037	8,058	
	4848022	3,358	
	4848025	7,839	
	4848026	4,288	
Roberts Creek	Roberts Creek - 4848003	8,341	24,980
	4848002	9,505	
	4848038	7,134	
Wolf Creek	Wolf Creek - 4848004	7,605	7,605
Dobbins Creek	Dobbins Creek - 4848005	13,453	24,645
	4848006	11,192	
Schwerin Creek	Schwerin Creek - 4848009	5,984	5,984
Rose Creek	Rose Creek - 4848007	20,311	36,326
	Rose Creek - 4848008	5,617	
	Rose Creek - 4848019	4,415	
	4848028	5,983	
Orchard Creek	Orchard Creek - 4848030	7,636	20,413
	4848029	5,870	
	4848031	6,907	
West Beaver Creek	West Beaver Creek - 4848018	6,723	6,723
Mud Lake Creek	Mud Lake Creek - 4848050	9,256	9,256
Woodbury Creek	Woodbury Creek - 4848033	8,214	17,613
	Woodbury Creek - 4848034	9,399	
Lower Cedar River	Lower Cedar River - 4848020	8,355	27,355
	Lower Cedar River - 4848032	13,117	
	Lower Cedar River - 4848036	1,742	
	4848035	4,141	
Total		278,552	278,552

2.4.1 Upper Cedar River Watershed

The Upper Cedar River watershed, as delineated by the MDNR, is the largest subwatershed in the CRWD, covering 97,652 acres in Freeborn, Steele, Dodge and Mower counties. It includes the Ramsey Mill Pond. The subwatersheds were further delineated at road and railroad crossings in the *Upper Cedar River Surface Water Management Plan* (UCRSWMP) completed in September 2007. This watershed includes the towns and cities of Blooming Prairie, Hayfield, Lansing and portions of Mapleview and Waltham. The upper Cedar River flows into the lower Cedar River just north of Austin.

2.4.2 Roberts Creek Watershed

The Roberts Creek watershed covers 24,980 acres in Mower County. The subwatersheds were further delineated at road and railroad crossings in the UCRSWMP. This watershed includes portions of Brownsdale, Sargeant and Waltham. Roberts Creek flows into the Cedar River approximately six miles north of Austin.

2.4.3 Wolf Creek Watershed

The Wolf Creek watershed covers 7,605 acres in Mower County. The subwatersheds were further delineated at road and railroad crossings in the UCRSWMP. This watershed includes portions of Austin, Brownsdale and Mapleview. Wolf Creek flows into the Cedar River approximately one mile north of downtown Austin.

2.4.4 Dobbins Creek Watershed

As delineated by the MDNR, the Dobbins Creek watershed covers 24,645 acres in Mower County. It includes East Side Lake in Austin. The East Side Lake Water Quality Improvement Study was completed in October 1992. The study aimed to characterize water quality, sediment and nutrient loading to East Side Lake and Dobbins Creek and to develop an implementation plan to improve water quality in order for the lake to be suitable for swimming. Mower County SWCD conducted the Dobbins Creek Watershed Project Streambank Inventory in 1993 to study the causes of sedimentation of East Side Lake. The study found that almost all of the Dobbins Creek stream banks are somewhat eroded and areas with direct traffic from livestock are the most eroded. The subwatersheds were further delineated at road and railroad crossings in the UCRSWMP. This watershed includes portions of the city of Austin. Dobbins Creek flows into the Cedar River in Austin.

2.4.5 Schwerin Creek Watershed

The Schwerin Creek watershed, as delineated by the MDNR, is the smallest subwatershed in the CRWD, covering 5,984 acres in Mower County. This watershed includes the town of Elkton. Schwerin Creek flows into Rose Creek approximately 2 miles northwest of Elkton, near I-90 and County Highway 13.

2.4.6 Rose Creek Watershed

The Rose Creek watershed covers 36,326 acres in Mower County. This watershed includes the town of Rose Creek and portions of Dexter. Rose Creek flows into the Cedar River approximately four miles south of downtown Austin.

2.4.7 Orchard Creek Watershed

The Orchard Creek watershed covers 20,413 acres in Mower and Freeborn counties. This watershed includes the southwestern-most portions of the city of Austin. Orchard Creek flows into the Cedar River approximately 6.5 miles south of downtown Austin.

2.4.8 Woodbury Creek Watershed

The Woodbury Creek watershed covers 17,613 acres in Mower and Freeborn counties. This watershed includes unincorporated portions of Oakland, London and Lyle Townships. Woodbury Creek flows into the Cedar River just north of the Iowa border.

2.4.9 Mud Lake Creek Watershed

The Mud Lake Creek watershed covers 9,256 acres in Mower and Freeborn counties. This watershed includes unincorporated portions of Oakland, London, Hayward and Shell Rock Townships. Mud Lake Creek flows into Woodbury Creek at the county line, near Mower County Highway 5.

2.4.10 West Beaver Creek Watershed

The West Beaver Creek watershed covers 6,723 acres in Mower County. This watershed includes unincorporated portions of Nevada, Windom, Austin and Lyle Townships. West Beaver Creek flows into the Cedar River less than a half of a mile south of the confluence with Orchard Creek, less than seven miles south of Austin.

2.4.11 Lower Cedar River Watershed

The Lower Cedar River watershed, as delineated by the MDNR, covers 27,355 acres in Mower County. It includes Mill Pond in Austin. The northernmost portions of this watershed located in the city of Austin were further delineated at road and railroad crossings in the UCRSWMP. This watershed includes portions of the cities of Austin and Lyle. The upper Cedar River flows into the lower Cedar River just north of Austin. The lower Cedar River leaves the watershed district at the Iowa border.

2.5 Soils

The general soil type of the eastern portion of the CRWD is loam to clay-loam textured glacial till. The general soil type of the southern portion of the CRWD is loam to sandy-loam textured glacial till. The general soil type of the western portion of the CRWD is the loam- to sandy-loam textured Sheldon Creek till and sand/gravel outwash. The thickness

of the glacial drift in CRWD is between 0 and 200 feet deep. The NRCS updates information presented in soil surveys on a continuing schedule. More up to date information for all four counties can be found on the NRCS Soil Survey webpage (<http://soils.usda.gov/survey/>) and the NRCS Soil Data Mart (<http://soildatamart.usda.gov/>). Six broad soil associations reported in the 2002 Mower County Comprehensive Plan include:

1. Marshan-Waukeee-Hayfield Association: This association is nearly level to gently sloping with poorly-drained to well-drained soils. The Cedar River and its floodplain are found in this association.
2. Rossfield-Taopi-Faxon Variant Association: These soils are nearly level to gently sloping and well- to poorly-drained. They cover only 2 percent of Mower County and are generally found in close correlation with creek systems. They offer considerable relief but generally have slight to moderate limitations for urban development.
3. Udolpho-Schley-Clyde Association: Nearly level and somewhat poorly- to poorly-drained, these soils comprise 14 percent of Mower County, typically in the southwest corner.
4. Sargeant-Brownsdale Association: These soils are nearly level and are somewhat poorly- to poorly-drained. They comprise only 4 percent of Mower County and offer severe limitations for building development.
5. Tripoli-Oran Readlyn Association: Nearly level and gently sloping, these soils are poorly- to somewhat poorly-drained. They comprise over half of Mower County's soils (typically in the center of the county) and represent some of the County's finest agricultural land.
6. Blooming-Maxcreek-Havana Association: Nearly level to modestly steep, these soils are well- to poorly-drained. These are excellent soils for agricultural activities. These soils are located in the western portion of the county.

Infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. The higher the infiltration rate is for a given soil, the lower the runoff potential. Conversely, soils with low infiltration rates produce high runoff volumes and high peak discharge rates. According to the soil surveys, most of the underlying soils in Mower, Dodge, Freeborn and Steele Counties are classified as hydrologic soil group B, with moderate infiltration rates. Some soils are classified as group C and D, with lower infiltration rates and very few soils are classified as group A, with high infiltration rates. Figure 2-6 shows the hydrologic soil groups in the CRWD.

After farmland has been tilled, it lays bare from fall to spring. This means there are no plants available to intercept rainfall to hold it on their surface for later evaporation, or to slow the velocity of the raindrops before they hit the bare ground. In addition to the mechanical weathering of the higher velocity raindrops hitting the ground, erosion is more likely to occur due to the lack of roots holding the soil in place. The upper soil layers are the most fertile and the most likely to be eroded. Erosion of these top soil layers causes

high levels of turbidity and total suspended solids in streams and rivers. However, some farms in CRWD utilize minimum till or no-till techniques to reduce erosion.

2.6 Geology and Groundwater Resources

The bedrock underlying the CRWD is part of the Upper Devonian and Upper Ordovician Series, which formed 375-450 million years ago. The Cedar Valley Group underlies the southern portion of the watershed district. The Wapsipinicon Group and Maquoketa and Dubuque Formations are mostly found in the northern portion of the watershed district. These groups and formations are composed of mainly limestone, dolostone and shale. More information about geology is available in the *Geologic Atlas of Mower County* from the Minnesota Geological Survey.

The terminal moraine of the Wisconsin Glaciation forms a north-south boundary approximately in the center of the watershed called the Bemis moraine. Approximately 8 percent of wells tap into glacial deposits, according to the USGS's 1975 report, *Water Resources of the Cedar River Watershed, Southeastern Minnesota*. East of the Bemis moraine, pre-Wisconsin Kansas drift of Leverett underlies most of the surface, and less than 3 percent of wells tap into thin glacial deposits. Near the Cedar River, surficial aquifers are categorized by glacial outwash and alluvium of sand and gravel and are at or near the land surface. The vast majority of wells tap into the Cedar Valley-Maquoketa-Dubuque-Galena Aquifer that underlies the entire watershed.

Most of the municipalities in the CRWD rely on groundwater from bedrock aquifers for their drinking water supply. Table 2-7 lists the number and depths of wells for the municipalities in the CRWD. Brownsdale is the only municipality that is in the process of preparing a wellhead protection plan, as defined under Minnesota Rules Chapter 4720.

Table 2-7 Municipal Well Depths

Municipality	Number of Wells	Depths of Wells (feet)
Austin	7	110, 132, 578, 992, 1010, 1017 and 1075
Waltham	1	275
Sargeant	2	340 and 400
Mapleview	1	383
Elkton	2	306 and 324
Rose Creek	3	179 and 197
Blooming Prairie	2	220 and 223
Hayfield	2	341 and 678
Brownsdale	2	150 and 171

In addition to these municipalities, the Minnesota Department of Health also conducted source water assessments for private water supply systems for campgrounds, churches, golf courses, industrial facilities, etc.

Figure 2-7 presents data from the Mower County Geologic Atlas regarding the sensitivity of groundwater to contamination in the uppermost bedrock aquifer. The County Geologic Atlas Regional Assessment Program is a joint program between the MDNR and the Minnesota Geological Survey (MGS). The MDNR defines a sensitive area as a geologic area characterized by natural features where there is significant risk of groundwater degradation from activities conducted at or near the land surface. The MDNR has designated five classes of geologic sensitivity (very high, high, moderate, low, and very low) that are based on time of travel ranges. Travel time is the approximate time that elapses from when a drop of water infiltrates the land surface until it enters an aquifer or a specific target such as a spring or river. The pollution sensitivity of an aquifer is assumed to be inversely proportional to the time of travel through the aquifer. Therefore, a short travel time indicates that an aquifer is highly sensitive to contamination. Of the four counties in the CRWD, the MDNR County Geologic Atlas has only been completed for Mower County.

2.7 MDNR Public Waters

MDNR Public waters
<i>MDNR Public waters</i> are all water basins and watercourses, natural or altered, that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15 that are identified on Public Water Inventory maps and lists authorized by Minnesota Statutes, Section 103G.201.
MDNR Public waters wetlands
<i>MDNR Public waters wetlands</i> include all type 3, type 4, and type 5 wetlands (as defined in U.S. Fish and Wildlife Service Circular No. 39, 1971 edition) that are 10 acres or more in size in unincorporated areas or 2 ½ acres or more in size in incorporated areas (see Minnesota Statutes Section 103G.005, subd. 15a and 17b).
MDNR Public waters as ditches
<i>MDNR Public waters</i> include natural and altered watercourses with a total drainage area greater than two square miles (see Minnesota Statutes Section 103G.005, subd. 15a9). This definition can include ditches that are privately held and not under the jurisdiction of the county drainage system.

The MDNR designates certain water resources as public waters to indicate those lakes, wetlands, and watercourses over which the MDNR has regulatory jurisdiction. By statute, the definition of public waters includes “public waters” and “public waters wetlands” (see box at left).

The MDNR uses county-scale maps to show the general location of the public waters and public waters wetlands (lakes, wetlands, and watercourses) under its regulatory jurisdiction. These maps are commonly known as Public Waters Inventory (PWI) maps. The regulatory “boundary” of these waters and wetlands is called the ordinary high water level (OHWL). PWI maps are available on a county-by-county basis from the MDNR’s website:

http://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html

There are three uniquely identified public waters (lakes) partially or completely within CRWD: Ramsey Mill Pond, East Side Lake, and Mill Pond. In addition to these waters, there are numerous uniquely identified public watercourses (streams and rivers) within the watershed district, as shown on **Figure 2-8**. There are no public waters wetlands in CRWD.

2.8 Wetlands

The U.S. Fish & Wildlife Service established the National Wetland Inventory (NWI) to document the characteristics, extent and status of the United States' wetlands. **Figure 2-9** shows the wetlands identified by the NWI as emergent, forested or shrub wetlands; pond wetlands or lake/riverine wetlands. More information about NWI wetlands can be found on the NWI website (<http://www.fws.gov/nwi/index.html>).

2.9 Water Resource Monitoring Information

Water resource monitoring information is collected by a variety of different agencies within CRWD. **Figure 2-10** shows the water quality and water quantity monitoring locations in the CRWD. Chapters 2.9.1 through 2.9.3 provide information about these monitoring programs.

2.9.1 Water Quality Data

The United States Geological Survey (USGS) operates one sampling site in the CRWD. It is located on the Cedar River south of Austin near the 29th Ave SE/County Road 28 bridge (USGS Station 05457000). The USGS measured suspended sediment concentration from 1979-1981. Additional water quality field measurements were made between 1961 and 1984. The MPCA has conducted additional water quality monitoring at this site after 1984. Parameters measured include total suspended solids, conductivity, total phosphorus, ortho phosphorus, dissolved oxygen, pH, temperature, turbidity, sulfate, chloride, ammonia, and nitrates. USGS data can be found on the USGS National Water Information System website (<http://waterdata.usgs.gov/nwis/>).

In addition to the numerous MPCA stream and lake water quality monitoring locations with intermittent records as seen in **Figure 2-10**, there are two MPCA "milestone" monitoring sites on the Cedar River—one is located a half-mile east of Lansing near the 270th Street bridge (MPCA Station ID S000-137) and the other is located three miles south of Austin near the 170th Street Bridge (MPCA Station ID S000-136). The water quality data span from 1967—present. Parameters measured include total suspended solids, fecal coliform, total phosphorus, biological oxygen demand, chlorophyll-*a*, dissolved oxygen, pH, temperature, turbidity, *E. coli*, and nitrates. These and other water quality data can be found in the MPCA Environmental Data Access website (<http://www.pca.state.mn.us/data/edaWater/index.cfm>).

Holders of NPDES permits, such as wastewater treatment plants, power plants and quarries (see Chapter 2.11) are required to monitor their discharges to surface waters. This monitoring data can also be found in the MPCA Environmental Data Access website (<http://www.pca.state.mn.us/data/edaWater/index.cfm>).

The *Water Quality Study of the Cedar River and Tributaries in Mower County, Summer of 2001* (Mostrom, 2001) summarizes water quality data from 15 sites within the Cedar River watershed. Thirteen of these sites were used in a similar study during 2000. The data show the same general pattern as reported in the 2000 study: the Cedar River becomes more polluted as it flows south and picks up water from Turtle Creek and flows through Austin. Parameters measured include total suspended solids, fecal coliform, transparency, nitrates and stream stage. This data can also be found in the MPCA Environmental Data Access website (<http://www.pca.state.mn.us/data/edaWater/index.cfm>).

The Mower County SWCD also has data for four sampling locations of Turtle Creek and its tributaries (Deer Creek, Rice Lake Branch, Turtle Creek at Highway 30, and Turtle Creek in Austin). Although not part of CRWD, Turtle Creek flows into the Cedar River near Austin and therefore affects the water quality of the Cedar River. Parameters measured include total suspended solids, fecal coliform, transparency, total phosphorus, ortho phosphorus nitrates and flow.

The MPCA Environmental Monitoring and Assessment Program randomly selects monitoring sites within a watershed to assess the status and trends of surface waters by integrating biological, physical and chemical components. Twelve locations in the CRWD were measured once in 2004. Physical and chemical parameters measured include substrate, mean depth, mean width, drainage area, flow, temperature, field turbidity, dissolved oxygen, pH, nitrogen, total phosphorus, total suspended solids, and ammonia. Biological parameters measured include invertebrate and fish species, and their count. This data can be found in the MPCA Environmental Data Access website (<http://www.pca.state.mn.us/data/edaWater/index.cfm>).

Secchi depth measurements were taken from 1989-1997 in East Side Lake as part of the MPCA Citizen Lake Monitoring Program. These data can be found on the MPCA Citizen Lake Monitoring Program website (<http://proteus.pca.state.mn.us/water/clmp.html>).

There are two major sampling programs underway in 2008 and 2009. The first program is in cooperation with the Cedar River Turbidity TMDL Project in which three sites will be monitored continuously for flow and turbidity: Cedar River at USGS Station 05457000 south of Austin, Cedar River at County Highway 2 north of Austin, and Dobbins Creek at the J.C. Hormel Natural Center. The second program is funded by a Clean Water Legacy (CWL) grant in which 11 sites throughout the watershed will be sampled. All sites associated with both programs will be sampled by the Mower County Soil and Water Conservation District (SWCD) once every

2 weeks or after rain events for total suspended solids, dissolved oxygen, sulfate, chloride, nitrate-nitrite, ammonia nitrogen, total phosphorus, ortho phosphorus, TKN, turbidity, pH, temperature, and conductivity (in total about 20 samples per season). Fecal coliform and flow data for the CWL grant sites will be collected but on a less frequent basis (approximately seven times per season).

2.9.2 Water Quantity Data

There are two USGS water quantity monitoring sites in the CRWD. However, the USGS operates only one monitoring station, USGS Station 05457000, located on the Cedar River south of Austin, near the 29th Ave SE/County Road 28 bridge. (The DNR/MPCA Cooperative Stream Gaging database identifies this station as 48020001). Discharge data are available from 1909 to present for this drainage area of 399 square miles. The mean average annual flow was 245 cubic feet per second (cfs) for the period of record. The USGS operated Station 05457080 on Rose Creek near Dexter from 1962 to 1985. The drainage area of this station is 1.17 square miles. USGS data can be found on the USGS National Water Information System website (<http://waterdata.usgs.gov/nwis/>).

In addition to the USGS stations, there are two DNR/MPCA Cooperative Stream Gaging stations in the CRWD. Station 48005001 is located on Dobbins Creek in Austin at County Road 61, approximately 1.7 miles upstream of the confluence with the Cedar River. Data has been collected for this site since 1998 (the National Weather Service identifies this site as DOBM5). Station 48023001 is located on the Cedar River near Lansing, at County Road 2 north of Austin. Data has been collected for this site since 1998. (The National Weather Service identifies this site as LANM5, the USGS station number is 05455950). DNR/MPCA Cooperative Stream Gaging data can be found on the MPCA webpage (<http://www.dnr.state.mn.us/waters/csg/index.html>).

The USGS published the *Water Resources of the Cedar River Watershed, Southeastern Minnesota* in 1975. Included in this publication are flow-duration curves, discharge-recurrence interval curves, and historic stream flows from 1909-1971.

According to the MDNR Lake Finder webpage, East Side Lake was monitored for lake levels from 1989 to 2001. The average water level is 1,191.5 feet.

2.9.3 Stream Inventory Data

The Minnesota Conservation Corps completed an inventory of streams in the CRWD in October 2007. The Clean Water Legacy provided \$24,000 of grant money to inventory Cedar River, Wolf Creek, Dobbins Creek (north and south branches), Rose Creek, Woodbury Creek and Mud Lake Creek for streambank erosion, adjacent land use, buffer width, hazards (e.g., garbage, fences and rock piles) and impediments (e.g., trees and beaver dams). Inventory results are presented in Table 2-8. It was unknown if all garbage items found in the stream were a result of illegal dumping or previous flooding.

Table 2-8 Minnesota Conservation Corps Stream Inventory Results

Reach	Survey Length (miles)	Average Stream Width (feet)	Average Buffer (feet/side)	Adjacent Land Use	Bank Erosion (sq. ft./mile)	Impediments	Waste
Cedar River	36	83	500	90% trees, 10% grass	862	121 trees, 14 beaver dams	6 dump sites, 12 misc. large garbage items
Wolf Creek	3	14	225	70% trees, 16% grass, 14% shrubs	560	19 trees, 22 beaver dams	None found
North Branch Dobbins Creek	13	16	340	39% trees, 52% grass, 6% pasture, 3% shrubs	1,383	86 trees, 3 beaver dams	3 metal drums
South Branch Dobbins Creek	10	13	235	37% trees, 44% grass, 17% pasture, 2% shrubs	589	18 trees, 5 beaver dams	None found
Rose Creek	14	59	300	82% trees, 5% crop, 6% grass, 7% pasture	3,016	113 trees, 12 beaver dams	1 dump site, 5 misc. large garbage items, 2 rock piles, 2 fences
Woodbury Creek	6	24	170	45% trees, 9% grass, 23% pasture, 23% shrubs	1,210	37 trees, 24 beaver dams	1 dump site
Mud Lake Creek	5.7	12	328	43% trees, 36% grass, 21% shrubs	700	37 trees, 8 beaver dams	2 dump sites, 1 rock pile, 1 wire pole

2.10 Impaired Waters

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. Water quality standards designate beneficial uses for each water body and establish criteria that must be met within the water body to maintain the water quality necessary to support its designated use(s). Section 303(d) of the CWA requires each state to identify and establish priority rankings for waters that do not meet the water quality standards. The state in turn requires watershed districts, cities and counties to participate in pollutant loading, or TMDL studies, and implement measures to reduce pollution. The list of impaired waters, or 303(d) list, is updated by the state (the Minnesota Pollution Control Agency/MPCA) every two years. Figure 2-11 shows the impaired streams in CRWD. Table 2-9 lists these impaired streams. There are no impaired lakes or wetlands in CRWD.

Table 2-9 CRWD Water Bodies Included in the 2008 Impaired Waters List

Reach	Description	Year added to list	River ID	Affected Use	Pollutant or Stressor	TMDL Target Start	TMDL Target Completion	Category
Cedar River	Rose Creek to Woodbury Creek	2002	07080201-501	Aquatic life	Turbidity	2008	2012	5B
Cedar River	Roberts Creek to Upper Austin Dam	2002	07080201-502	Aquatic consumption	PCB in Fish Tissue	2002	2015	5B
Cedar River	Roberts Creek to Upper Austin Dam	2002	07080201-502	Aquatic life	Turbidity	2008	2012	5B
Cedar River	Headwaters to Roberts Creek	2006	07080201-503	Aquatic recreation	Fecal Coliform	2012	2014	5B
Cedar River	Headwaters to Roberts Creek	2002	07080201-503	Aquatic consumption	PCB in Fish Tissue	2002	2015	5B
Cedar River	Upper Austin Dam to Wolf Creek	1998	07080201-511	Aquatic consumption	PCB in Fish Tissue	1998	2011	5B
Cedar River	Wolf Creek to Lower Austin Dam	2006	07080201-512	Aquatic consumption	PCB in Fish Tissue	2006	2021	5B
Dobbins Creek	T103 R18W S36, east line to East Side Lake	2006	07080201-535	Aquatic recreation	Fecal Coliform	2012	2014	5C
Dobbins Creek	East Side Lake to Cedar River	2006	07080201-537	Aquatic recreation	Fecal Coliform	2012	2014	5A
Dobbins Creek	East Side Lake to Cedar River	2006	07080201-537	Aquatic life	Turbidity	2008	2012	5A
Orchard Creek	T101 R18W S5, north line to Cedar River	2006	07080201-539	Aquatic recreation	Fecal Coliform	2012	2014	5C
Roberts Creek	Unnamed Creek to Cedar River	2006	07080201-504	Aquatic recreation	Fecal Coliform	2012	2014	5C
Rose Creek	Headwaters to Cedar River	2006	07080201-522	Aquatic recreation	Fecal Coliform	2012	2014	5C
Unnamed creek	Unnamed Creek to Cedar River	2006	07080201-533	Aquatic recreation	Fecal Coliform	2012	2014	5C

Table 2-9 CRWD Water Bodies Included in the 2008 Impaired Waters List

Reach	Description	Year added to list	River ID	Affected Use	Pollutant or Stressor	TMDL Target Start	TMDL Target Completion	Category
Wolf Creek	Headwaters to Cedar River	2006	07080201-510	Aquatic recreation	Fecal Coliform	2012	2014	5C
Woodbury Creek	Headwaters to Cedar River	2006	07080201-526	Aquatic recreation	Fecal Coliform	2012	2014	5C

Source: Minnesota Pollution Control Agency Website (<http://www.pca.state.mn.us/water/tmdl/index.html>)

Category 5A indicates that the water is impaired by multiple pollutants and no TMDL study plans are approved by the EPA.

Category 5B indicates that the water is impaired by multiple pollutants and at least one TMDL study plan is approved by the EPA.

Category 5C indicates that the water is impaired by one pollutant and no TMDL study plan is approved by the EPA.

A separate TMDL must be completed for each listed impairment. A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity within a waterbody and develops an allocation scheme amongst the various contributors, which include point sources, non-point sources and natural background contributions, as well as a margin of safety. As a part of the allocation scheme, a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from storm sewer networks), and a load allocation (LA) establishes allowable pollutant loadings from non-point sources and natural background levels in a water body. Unlike point sources, non-point source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport.

The *Revised Regional Total Maximum Daily Load (TMDL) Evaluation of Fecal Coliform Bacteria Impairments in the Lower Mississippi River Basin in Minnesota* was approved by the EPA on April 5, 2006. This TMDL study included 39 stream reaches classified as "impaired" by fecal coliform, used as an indicator of pathogens from fecal material. These impaired reaches span the 4.65 million-acre Lower Mississippi River Basin from Hastings to the Iowa/Minnesota border. For purposes of the study, the Lower Mississippi River Basin included the greater Cedar River Basin (and, therefore, the CRWD). Monitoring showed the problem was virtually everywhere. The core of the TMDL study was a pollutant source inventory and an allocation of the total pollutant load among major source categories. Failing septic systems and overgrazed pastures contribute the bulk of pollution during dry weather; surface-applied manure is the biggest contributor in spring wet periods; while feedlots, surface-applied manure and overgrazed pastures dominate summer wet periods. See Chapter 3.2.3.1 for a discussion of the implementation issues for this TMDL study.

The Cedar River in eastern Iowa has been listed as impaired by nitrate. Nitrate-N in the Cedar River has consistently measured above the 10 mg/L drinking water standard near the City of Cedar Rapids. Due to the impairment, a TMDL was completed in 2006, *Total Maximum Daily Load for Nitrate Cedar River Linn County, Iowa*. This TMDL also details potential sources and loadings of total nitrogen directly to the stream and the watershed. In this part of Iowa the Cedar River is designated for the following uses: primary contact recreation; significant resource warm water; and as a drinking water supply. The impaired use and subsequent 303(d) listing is for high nitrate concentrations in the drinking water supply for the City of Cedar Rapids. The listed impaired segment starts at the water intake located along the Cedar River, and extends upstream 11.6 miles, parallel to Cedar Rapids' shallow alluvial wells. The Cedar Rapids water utility provides drinking water to over 120,000 residents. The Cedar River was a "high priority" on the list for TMDL development because of the excess levels of nitrates and uses of river water. See Chapter 3.2.3.2 for a discussion of the implementation issues for this TMDL study.

In a separate study, the U.S. Geological Survey (Fields, 2004) modeled discharge and nitrate flux from six of the major tributaries of the Iowa portion of the Cedar River during the 2001-2004 calendar years. Models used were the Diffusion Analogy Surface Water Flow (DAFLOW) model and the chemical transport model WASP (Water Quality Simulation Program). Results from these models were paired with empirical methods to determine quantity of loads per source. The results of this report indicate that nonpoint source pollution is the significant contributor (>90 percent) of nitrate discharged from the Cedar River, with fertilizer and legume fixation the principal sources. It also found that dams and wetlands have had significant impact on decreasing nitrate levels in the tributaries.

The Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study is currently underway. This TMDL study is being undertaken as a joint effort of the CRWD, the Turtle Creek Watershed District (TCWD), and the Shell Rock River Watershed District (SRRWD). The MPCA is providing \$300,000 to fund the multi-year TMDL study, which includes the following four steps:

1. Step one began in spring 2008 and includes a three-year monitoring program and field inventory work to measure the levels of pollutants in, and entering, the streams in the watershed.
2. Step two includes using computer modeling to identify pollutant sources, using the data collected in step one.
3. Step three includes writing a plan to reduce the pollutant loading to the river, and involving the public in the development of the plan.
4. Step four includes starting to implement the identified water quality improvement measures activities, such as conservation practices on farm fields and erosion and sediment controls in urban and rural areas.

The first 3 steps of the TMDL process will be completed in June 2010. The TMDL study will be completed by the end of 2011.

The CRWD, TCWD, and the SRRWD are completing a joint TMDL for the Cedar River to provide the following benefits:

- Increase funding opportunities
- Start a comprehensive monitoring program
- Build cooperation with other government agencies and individual citizens
- Retain local control over the cleanup plan
- Increase efficiency by sharing expenses and holding joint meetings.

2.11 Pollutant Sources

In addition to non-point sources of runoff, such as surface water runoff from urban and agricultural areas, there are numerous permitted point source discharges located within the CRWD; these are listed in Tables 2-10 to 2-14.

Table 2-10 Wastewater Treatment Facilities in CRWD

Name	Permit Number	Design Load (million gallons per day)	Waste Load Allocation (t-orgs/month)
Lansing Township WWTP Improvements	MN0063461	0.026	0.006
Blooming Prairie WWTP	MN0021822	0.899	0.20
Brownsdale WWTP	MN0022934	0.184	0.04
Elkton WWTP	MNG580013	0.017	0.004
Austin WWTP	MN0022683	8.475	1.92
Sargeant WWTP	MN0021601	0.0106	0.002
Waltham WWTP	MN0025186	0.027	0.01
Rose Creek WWTP	MNG580072	0.065	0.01
Total		9.76	2.22

Source: MPCA, January 2006, *Revised Regional Total Maximum Daily Load Evaluation of Fecal Coliform Bacteria Impairments in the Lower Mississippi River Basin in Minnesota*. Note that the Hayfield WWTP discharges to the Zumbro River watershed via a pumping system.

The county feedlot program is an arrangement between the MPCA and county governments where the county is responsible for the implementation of feedlot rules and regulations such as registration, permitting, inspections, education and assistance and complaint follow-up. Dodge, Freeborn, Mower and Steele Counties all have developed databases of the feedlots in their jurisdiction. Table 2-11 lists the total number of feedlots per township that lay within or partially within CRWD. Freeborn and Dodge Counties have GIS databases of feedlots; whereas Steele County is in the process of creating a GIS database. Mower County currently does not have a GIS database of feedlots. The MPCA provides program oversight, and policy, technical and enforcement support. Minnesota Rules chapter 7020 requires owners of an animal feedlot or manure storage area with 50 or more

animal units, or 10 or more animal units if in a shoreland area (less than 300 feet from a stream or river, less than 1,000 from a lake) to register every four years. Typically, the swine facilities that dominate Mower, Freeborn and Steele counties confine livestock under a roof with a pit for liquid manure. Feedlot runoff tends not to be a problem from these facilities; however, land application of manure can be a major source of non-point pollution runoff. Large feedlots with NPDES permits are listed in Table 2-12.

Table 2-11 Total Number of Feedlots per Township Completely or Partially within CRWD

<u>Mower County</u>		<u>Freeborn County</u>		<u>Dodge County</u>		<u>Steele County</u>	
Adams Township	89	Hayward Township	13	Ashland Township	0	Blooming	5*
Austin Township	25	London Township	31	Hayfield Township	2		
Clayton Township	32	Moscow Township	28	Ripley Township	0		
Dexter Township	32	Newry Township	26	Westfield Township	40		
Grand Meadow	25	Oakland Township	29				
Lansing Township	47	Shell Rock Township	40				
Lyle Township	42						
Marshall Township	59						
Nevada Township	64						
Red Rock Township	44						
Sargeant Township	38						
Udolpho Township	45						
Waltham Township	49						
Windom Township	52						

* Only Feedlots within CRWD boundary are listed for Blooming Prairie Township

Source: Mower, Dodge, Freeborn, and Steele County SWCDs

Table 2-12 Livestock Facilities with NPDES Permits in Townships Completely or Partially within CRWD

Facility	County, Township	Registration Number	Description
Roland Kittleson Farm	Dodge, Westfield	039-50003	3,600 swine - 55 lbs. or more
Scott Masching Farm	Dodge, Westfield	039-82079	3,040 swine - 55 lbs. or more
Jim Masching Farm	Dodge, Westfield	039-82084	2,732 swine - 55 lbs. or more
Jason Masching Farm	Dodge, Westfield	039-112217	4,800 swine - 55 lbs. or more
Butler Enterprises	Freeborn, Newry	047-50005	3,830 swine - 55 lbs. or more
MHF of Freeborn County Inc - Farrowing	Freeborn, Newry	047-50007	12,138 swine - 55 lbs. or more
Dennis Magnuson Farm - Sec 23	Freeborn, Newry	047-50008	8,350 swine - 55 lbs. or more
Lukes Bros Inc	Freeborn, London	047-60153	6,013 swine - 55 lbs. or more, 5,120 swine - 55 lbs. or under
G & B Hog Farm	Freeborn, Moscow	047-68633	4,080 swine - 55 lbs. or more
MHF of Freeborn County Inc - Nursery	Freeborn, Newry	047-96991	14,780 swine - 55 lbs. or under
James O'Connor Feedlot	Freeborn, Newry	047-111170	4,800 swine - 55 lbs. or more
Geoff Stroup Hog Barns	Mower, Windom	099-50001	4,000 swine - 55 lbs. or more
David Reuter Farm	Mower, Nevada	099-50002	4,400 swine - 55 lbs. or more
Nielsen Farm Albert Lea	Mower, Lansing	099-50007	2,400 swine - 55 lbs. or more
Steven Felten Farm	Mower, Nevada	099-50008	5,000 swine - 55 lbs. or more
Bob Bartel Farm Sec 22	Mower, Udolpho	099-60649	4,800 swine - 300 lbs. or more
Larson Products Inc Sec 5	Mower, Sargeant	099-61683	60,000 turkeys
J & L Farms	Mower, Adams	099-80380	5,800 swine - 55 lbs. or more
James K Sathre Farm	Mower, Marshall	099-83048	4,500 swine - 55 lbs. or more
Hormel Foods Corporation	Mower, Lansing	099-83267	7,686 swine - 55 lbs. or more
Yunker Farms	Mower, Marshall	099-83464	6,000 swine - 55 lbs. or more
Jax Dairy Farm Inc	Mower, Nevada	099-83642	960 dairy cows - 1000 lbs. or more
Jamie Jax Farm	Mower, Nevada	099-83694	290 dairy heifers & 80 calves
Sun Prairie Pork	Mower, Le Roy	099-83798	14,500 swine - 55 lbs. or under
Justin Larson Farm - Sec 10	Mower, Marshall	099-93975	2,800 swine - 55 lbs. or more
Richard Gerber Farm 2	Mower, Adams	099-100204	
Nick, Nate & Tyler Holden Farm - Kingston	Mower, Lyle	099-110100	4,832 swine - 55 lbs. or more
MJC Farms	Steele, Blooming Prairie	147-50001	3,000 swine - 55 lbs. or more

Source: MPCA, October 2008

Table 2-13 Other NPDES Permits for Direct Surface Water Discharge

Facility	Permit Number	Description	Location
Austin Utilities	MN0025801	Electric Services	Austin
Austin Utilities Northeast Power Station	MN0025810	Electric Services	Austin
David Spinler Construction Incorporated	MNG490076	Asphalt Paving Mixtures and Blocks	Austin
Hormel Foods Corporation	MN0050911	Meat Packing Plants	Austin
Richard Jones Sand Pit	MNG490175	Dimension Stone	Brownsdale
Bishop Excavation Inc	MNG490128	Asphalt Paving Mixtures and Blocks	Blooming Prairie
Atofina Chemical Incorporated Viking Chemical Company Division	MN0041521	Industrial Organic Chemicals	Blooming Prairie
Wondra Pit	MNG490130	Construction Sand and Gravel	Blooming Prairie

Source: US EPA Envirofacts Data Warehouse website <http://www.epa.gov/enviro/index.html>

Table 2-14 Direct Toxic Releases to Surface Water

Facility	EPA TRI Facility ID	Description of 2006 Releases to Surface Water	Location
Austin Utilities Northeast Power	55912STNTL37011	5 lbs/yr of Barium, Copper and Zinc Compounds	Austin
Hormel Foods Corporation	55912GHRML500NE	Last release of Chlorine & Sulfuric Acid in 1987-1989	Austin

Source: US EPA Envirofacts Data Warehouse website <http://www.epa.gov/enviro/index.html>

The MPCA identified some communities in the CRWD as direct dischargers of untreated wastewater, through illegal straight pipes or drain tiles into water bodies; these are listed in Table 2-15.

Table 2-15 Straight-pipe Communities in CRWD

County	Community	Township	Number of Homes	Number of Businesses	Straight Pipe*	Receiving Body
Mower	Andyville	Lansing	21	1	Community	County Ditch
Mower	Cedar Dale	Lansing	14	0	Community	Cedar River
Mower	Nicolville	Red Rock	16	1	Community	Dobbins Creek
Mower	Woodhaven	Lansing	65	0	Individual	Cedar River

*Individual indicates that at least one home in a community has a straight pipe. Community indicates multiple buildings are connected to a straight pipe.

At the time when the article, *Archaic sewage lines tainting lakes, rivers*, was published in the Minneapolis-St. Paul Star Tribune on February 26, 2008, Nicolville and Woodhaven were taking steps to repair the discharge, including applying for funding. According to the report, *Small Community Wastewater Needs in Minnesota*, four small communities located in the CRWD completed wastewater improvements to nonconforming septic systems and straight pipes between 1996 and 2006. Lansing Township (population 200) and Sargeant (population 78) in Mower County completed new wastewater treatment ponds. Belleman's and Dinsmore Additions (populations of 55 and 115, respectively) connected their discharges to the Austin Wastewater Treatment Plant.

In addition to these straight pipe communities, households and communities with nonconforming septic systems can be a pollution source (mainly fecal coliform and nitrogen), especially during periods of low flows in the streams. Septic systems are called subsurface treatment systems (SSTS) by the MPCA and are also known as individual sewage treatment systems (ISTS). These nonconforming SSTS may provide partial settling and treatment, but on the whole do not fully treat the wastewater, whether due to inadequate soils, undersizing of the system, or improper maintenance.

There are an estimated 2,000 SSTS in the Mower County portion of CRWD. Mower County Environmental Services has estimated that approximately 25 percent of the population in the Mower County portion of CRWD is on SSTS. Of the 2,000 SSTS in the Mower County portion of CRWD, it is estimated that 30 percent are compliant, 60 percent are failing to protect groundwater, and 10 percent are failing and imminent public health threats (IPHT). The largest concentration of SSTS in CRWD, consisting of 120 homes and a business, is in Lansing Township just north of Austin. This area has recently been annexed by the City of Austin and will be connected to the city sewer system by 2010.

The MPCA adopted new SSTS Rules in February 2008 requiring counties to verify the subsurface soil conditions prior to issuing a "notice of compliance" for each new and repaired SSTS. All counties in the CRWD require a SSTS compliance inspection prior to home sales, if a complaint has been filed, or discharge observed during construction within the road right-of-way. Mower County is in the process of conducting an inventory of SSTS classified as IPHT in a ½ mile corridor along the length of the Cedar River.

2.12 Water Quality Modeling

Very little water quality modeling of the CRWD has been completed in the past. In the early 1990s, Mower County, the Mower County Soil and Water Conservation District, the MPCA, and others coordinated on a Phase I clean water partnership project for the Dobbins Creek watershed and East Side Lake. The Agricultural Nonpoint Source Pollution (AgNPS) model was used for the Dobbins Creek area during that project. Additional water quality modeling will be conducted for the Cedar River Watershed Turbidity, Excess Nutrients and pH Total Maximum Daily Load study that will be completed in 2011.

2.13 Water Quantity and Floodplain Information

Water quantity modeling, including floodplain delineation, of the areas within CRWD has been completed for flood insurance studies and a surface water management plan. Chapters 2.13.1 and 2.13.2 provide information about these water quantity and floodplain modeling efforts.

2.13.1 Flood Insurance Studies

A Flood Insurance Study (FIS) contains information regarding flooding in a community, including flood history of the community and information on engineering methods used to develop Flood Insurance Rate Maps (FIRM) for a community. Homeowners within Federal Emergency Management Agency (FEMA) designated floodplains are required to purchase flood insurance separate from their homeowners insurance policy. Homeowner and renters outside of the official flood plain can also qualify for flood insurance. Three different types of zones are identified in Figure 2-12:

- Special Flood Hazards (FEMA Zone A) - The area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year (i.e., 100-year flood). No depths or base flood elevations are shown within these zones because detailed analyses were not performed.
- 100-Year Floodplain (FEMA Zones AE, AH, AO, etc.) - The area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year (i.e., 100-year flood). Depths or base flood elevations are shown within these zones.
- 500-Year Floodplain - (FEMA Zone B) - The area that will be inundated by the flood event having a 0.2-percent chance of being equaled or exceeded in any given year (i.e., 500-year flood).

The most current flood information and maps for areas within the CRWD are and outlines of the floodplains can be seen in Figure 2-12:

- Freeborn County - May 1982 FIRM maps & November 1981 FIS
- Dodge County - September 1982 FIRM maps
- Hayfield - January 1982 FIRM maps & July 1981 FIS
- Steele County - November 1981 FIRM maps & May 1981 FIS
- Mower County - July 1979 FIRM maps & FIS
- Austin - August 1992 FIRM maps & FIS
- Maplevue - May 1984 FIRM maps & November 1983 FIS

- Rose Creek - July 1979 FIRM maps & January 1979 FIS
- Waltham - October 1979 FIRM maps & FIS

In some cases, homes within FEMA-designated floodplains on the FEMA floodplain maps may actually not be in the floodplain. In order to waive the mandatory flood insurance requirements for their homes, residents must remove their homes from the FEMA-designated floodplain by obtaining Letters of Map Amendment (LOMA). The following is a list of LOMAs within the CRWD:

- Freeborn County - two structures
- Dodge County - one structure, one portion of property
- Hayfield - one property
- Mower County - four structures & one portion of property
- Austin - five structures, one property & one portion of property

The following is a list of the counties and cities in the CRWD that have floodplain regulations:

- Mower County - the floodplain ordinance is Article III of the county's Zoning Ordinance and can be found on the Mower County website (<http://www.co.mower.mn.us/>).
- Dodge County - the floodplain ordinance is Section 15 of the county's Zoning Ordinance.
- Freeborn County - the floodplain ordinance is Article 5 of the county's Zoning Ordinance.
- Steele County - the Floodplain Ordinance can be found on the Steele County website (<http://www.co.steele.mn.us/>).
- City of Austin - the floodplain zoning regulations are in Chapter 12 of the City Code of Ordinances, which can be found on the City of Austin's webpage (<http://www.ci.austin.mn.us/>).

2.13.2 Upper Cedar River Surface Water Management Plan

In response to chronic flooding on the Cedar River and some of its tributaries, an Ad Hoc Committee was formed to develop a Surface Water Management Plan (SWMP) for the Upper Cedar River Watershed. The Ad Hoc Committee was formed prior to the formation of the CRWD and included representatives of the Mower Conservation District, Mower County, Turtle Creek Watershed District and the City of Austin. Barr Engineering completed the *Upper Cedar River Surface Water*

Management Plan in September 2007. The prime goal for the SWMP was to provide for flood protection throughout the entire Upper Cedar River Watershed through a 20 percent reduction in the Cedar River's peak 100 year flood discharge rate in and near the City of Austin, Minnesota. Therefore, only areas upstream (north) of Austin were investigated, including the entire Turtle Creek Watershed District.

The Upper Cedar River Watershed was delineated into 435 subwatersheds with divides delineated to every major creek and river crossing such as roads, railroads and dams. Barr Engineering developed an Army Corps of Engineers' HEC-HMS computer model of the existing conditions that was linked with the GIS databases of subwatershed maps, soils maps, topographic maps, and existing hydraulic structures such as culvert and bridge opening dimensions. The existing conditions model was calibrated to the USGS gaging station on the Cedar River near Austin (ID number 05457000). In order to reduce the 100 year flood discharge rate, 104 regional detention basin locations were ultimately modeled. The SWMP recommended creating these regional detention basins through flow restrictions at culverts or bridges; with these restrictions accomplished by 1) creating a ring dike upstream of the existing culvert or bridge through which a reduced sized culvert would be constructed; or 2) removing or filling in the existing bridge or culvert and replacing it with the necessary reduced sized culvert.

The SWMP reported that implementing these 104 regional detention basins, starting with the upstream-most subwatershed, would reduce the peak flow of the 100-year 24-hour storm event by 17.5 percent (17,100 cubic feet per second vs. 14,100 cubic feet per second) at the southern edge of Austin. Results from the SWMP revealed that the Ramsey Mill Dam currently reduces the Cedar River's peak 100-year, 24-hour storm runoff flow rate in the city of Austin by 9,000 cubic feet per second. It would be difficult to achieve additional flow reduction by modification of that dam and any such modifications would likely result in the detriment of the upstream river reach habitat. It was found that the greatest flood reduction benefit would come from installing 59 regional detention basins in the Wolf Creek and Dobbins Creek watersheds.

2.13.3 Other Hydrologic Modeling

Barr Engineering completed the *Drainage Plan for Mower County* in 1973. The plan consisted of an evaluation of the existing storm drainage facilities and a preliminary design of recommended additions to the existing storm drainage facilities. Most of these recommendations included increasing storm sewer sizes within the towns to decrease localized flooding and installing storm water ponds. The areas were modeled with the hydrograph method developed by Barr Engineering in the 1950's.

There have been no additional studies completed by the City of Austin that have included hydrologic modeling.

2.14 Surface Water System

In contrast to the majority of the state of Minnesota, the CRWD is unique, in that there are no natural lakes and few wetlands in the watershed.

The City of Austin is included in a group of communities with populations greater than 10,000 (the population of Austin was 23,314 in 2000) that are federally required to obtain a Municipal Separate Storm Sewer System (MS4) permit for managing non-point source stormwater. The permitting process requires cities such as Austin to file a Phase II NPDES permit with the Minnesota Pollution Control Agency (MPCA) which addresses how the city will regulate and improve stormwater discharges. MS4s are required to develop and implement a stormwater pollution prevention program (SWPPP) to reduce the discharge of pollutants from their storm sewer system to the maximum extent practicable and submit an annual report as a part of the NPDES permit. Austin's SWPPP addresses the six Minimum Control Measures outlined in the permit requirements. The six Minimum Control Measures required by the permit and addressed by the SWPPP are:

1. Public Outreach and Education
2. Public Participation/Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

The City of Austin provides a comprehensive inspection program of all surface waters, including lakes, streams and ditches within the city limits. Maintenance activities are coordinated with the watershed districts and ditch authorities.

2.14.1 Lakes

All three lakes within the CRWD (Ramsey Mill Pond, East Side Lake and Mill Pond) were created through dam construction. For more information about lakes please see the MDNR Lake Finder webpage (<http://www.dnr.state.mn.us/lakefind/index.html>).

The 52-acre Ramsey Mill Pond is located north of Austin on the Cedar River and has a maximum depth of 18 feet. Access to the Ramsey Mill Pond is maintained by the Ramsey Golf Club. The Ramsey Dam was originally constructed in 1872 for mill power. The dam was modified in the 1920's, 1940's and 1960's. The original mill was turned into the Old Mill restaurant in 1948. The length of the overflow structure is 138 feet and the height from the top of the dam to the streambed at the centerline of the dam is approximately 10 feet. The dam is privately owned. The U.S. Army Corps of Engineers (USACE) *1978 Dam Inspection Report* reports the hazard classification as significant.

East Side Lake is approximately 40 acres and is on Dobbins Creek. The maximum depth of the lake is 10 feet. The City of Austin maintains a boat landing and fishing dock on this lake in East Side Lake Park. The concrete East Side Lake Dam (MN No. 13) was constructed in the 1934 by the Federal Civil Works Administration and Works Progress Administration Programs. The lake was filled in 1939 after excavation of the pasture land behind the dam. Repairs and modifications were made in 1962, 1969 and 1975. The length of the dam is 70 feet and the height is 11 feet. The dam is owned by the City of Austin. The *National Dam Safety Program 1980 Inspection Report* reports the hazard classification as significant. After the July 2000 flood, the dam was inspected by Short Elliott Hendrickson Inc (SEH) for damage. SEH recommended that a 13 foot deep scour hole immediately downstream of the dam and horizontal cracking of the downstream right abutment wall be repaired.

The 19-acre Mill Pond is located in downtown Austin on the Cedar River and has a maximum depth of 17 feet. The City of Austin maintains a boat ramp on the north side of the pond in Horace Austin Park. Mill Pond is impounded by the concrete Cedar River Dam (MN No. 256) that was constructed in the 1918 to provide hydropower for an adjacent mill. The impoundment presently provides water supply for the City of Austin power plant and recreational opportunities. Modifications were made to the dam in 1924, 1961 and 1975. The dam is a concrete gravity type structure 22 feet high and 200 feet long and has 3 spillways. The dam is owned by the City of Austin. The April 1983 *National Dam Safety Program Inspection Report* reports the hazard classification of the Cedar River Dam as significant. After the July 2000 flood, the dam was inspected by SEH for damage. SEH recommended that grouted riprap at the upstream end of each bridge abutment and downstream end of the right abutment wall be repaired.

2.14.2 Streams

The CRWD contains 166.1 miles of perennial streams/drainage ditches and 32.0 miles of intermittent streams/drainage ditches identified as MDNR public waters. The predominant substrate of the Cedar River is sand according to the MPCA environmental monitoring and assessment program biological surveys. The MDNR requires a 50 foot wide permanent vegetation buffer strip in shoreland districts (agricultural areas adjacent to lakes, rivers and streams - see Minnesota Statutes, Section 103E.021).

2.14.3 Ditches

Many ditches were constructed in the early part of the 20th century to aid in land development for agriculture. The goal of these ditches is to remove water from agricultural lands. There are 41.1 miles of perennial and 1.6 miles of intermittent drainage ditches identified as MDNR public waters and shown on Figure 2-8. The Minnesota Statutes, Section 103G.005 Subd. 15a9 defines public waters as natural and altered watercourses with a total drainage area greater than two square miles.

Ditches identified as public waters may be part of private drainage systems or public drainage systems (also known as judicial or county ditches). A public drainage system is one administered under Chapter 103E of Minnesota Statutes and is under the jurisdiction of a drainage authority (e.g. county, watershed district). The land associated with an open ditch that is part of a public drainage system remains privately held. Some ditches identified by the MDNR as public waters due to their drainage areas are part of private drainage systems and are not under the jurisdiction of the county drainage system.

There are six county ditches in Mower County within CRWD. No county ditches in Dodge County are within CRWD. County ditch maps for Freeborn and Steele Counties are available for viewing at the county courthouses. At present, the CRWD has no direct authority over public drainage systems; the counties maintain jurisdiction over the ditches. For any new ditches or ditch improvements, the land adjacent to public ditches is required by the MNDR to include a buffer strip of permanent vegetation that is usually 1-rod (16.5 feet) wide on each side (Minnesota Statutes, Section 103E.021). Additional requirements for public drainage systems are included in Minnesota Statutes 103E.015, 103E.215, 103E.215, 103E.411, and 103E.701 Subdivision 6.

2.15 Recreational Areas

There are 30 municipal parks in the city of Austin. They include Decker Park, Lafayette Park, East Side Lake Park, Sterling Park, Early Morning Lions Park, Sulton Park, Cullen Park, Kaufman Park and J.C. Hormel Nature Center. The main park in Hayfield is the Earl B. Himle Memorial Park. Blooming Prairie parks include Central Park, Victory Field, East Side Park and the Blooming Prairie Firefighters' Park. There are no County Parks within the watershed district.

Golf Courses in the CRWD include Meadow Greens Golf Course and Ramsey Golf Club in Austin, and the Oaks Golf Club in Hayfield.

The Shooting Star State Trail is a multi-use trail that will stretch from Leroy to Austin. Currently eight miles have been paved. It is planned to connect this trail to the future Blazing Star State Trail in Austin.

Wild Indigo Prairie Scientific and Natural Area is a 12 mile long strip of abandoned railroad right-of-way containing mesic tallgrass prairie that extends between Ramsey and Dexter in Mower County. Iron Horse Prairie Scientific and Natural Area is a 35-acre mesic tallgrass prairie located approximately 2 miles south of Hayfield.

MDNR Wildlife Management Areas (WMA) within the CRWD include:

- Red Cedar River WMA - 74-acre wooded area containing mainly oaks managed for riparian hardwood along the Cedar River and their associated wildlife including deer, small game, forest game birds, pheasant and waterfowl.

- Lyle-Austin WMA - 116-acre, 10 mile long prairie with some aspen along a former railroad bed managed for deer, small game, and pheasant.
- Schottler WMA - 164-acre former row crop farm that is currently native grassland managed for deer, small game and doves.
- Ramsey Mill Pond WMA - 335 acre mixture of wetland, upland woods and established native prairie managed for deer, small game, pheasant, waterfowl and other non-game species. There is no boat access to the Cedar River from this area.
- Schwerin Creek WMA - 37 acre riparian grassland with pockets of shrubs and small trees along Schwerin Creek managed for pheasants and deer.

There are no state parks or state forests in CRWD.

2.16 Fish and Wildlife Habitat

According to the MPCA Environmental Monitoring and Assessment Program, game fish species found in the Cedar River and tributaries are largemouth bass, northern pike, carp, catfish, walleye, smallmouth bass, redhorse sucker, white bass, white crappie, black crappie, bluegill, and yellow perch. None of the streams within the CRWD are designated trout streams. In 2009, the MPCA reported finding an Ozark minnow and Redfin shiners in Turtle Creek for the first time since 1964. Ozark minnows were also found in large numbers in the main stem of the Cedar River south of Austin.

The MDNR has conducted fish surveys in East Side Lake in the past and most recently in 2007 (<http://www.dnr.state.mn.us/lakefind>). The 2007 survey identified black bullhead, black crappie, bluegill, common carp, golden shiner, green sunfish, largemouth bass, orangespotted sunfish, walleye, white crappie, white sucker, and yellow bullhead. The MDNR stocked walleye fingerlings in 2006, and walleye fingerlings and adults in 2007. Additional stocking of walleye was proposed in East Side Lake for 2008.

The MDNR completed a statewide mussel survey in 1999 that included the Cedar River and its tributaries. Surveys revealed that rivers and streams in the southern one-third of Minnesota do not support their historical assemblage of mussel species. The exception to this statement included Rose Creek and Otter Creek in CRWD. Historically, the Cedar River and Rose Creek contained 17 and 10 species of freshwater mussels, respectively. The 1999 survey found 10 and eight species, respectively. Spike (*Elliptio dilatata*) is a species of special concern that has declined in most portions of Minnesota but has a healthy population in Rose Creek. For more information about freshwater mussels in Minnesota's waters, see *Field Guide to the Freshwater Mussels of Minnesota*, published by the MDNR.

The Cedar River is also habitat to the Wood Turtle and represents the western limit of this species in Minnesota. The Wood Turtle was designated as a threatened species by the MDNR in 1984. This species occupies forested rivers and streams and adjacent upland habitats. It will forage in the upland forest habitat, but also uses grassy openings to feed and nest. Threats to this population include loss of forest habitat, reduced water quality,

and flooding of nesting and feeding areas. More information is available from the MDNR's webpage (<http://www.dnr.state.mn.us/rsg/profile.html>).

The U.S. Fish and Wildlife Service currently has no fish or wildlife listed as endangered or threatened in the counties encompassed by the CRWD. However, three plant species are listed as federally endangered or threatened. The endangered Minnesota dwarf trout lily (*Erythronium propullans*) historically observed in Dodge and Steele Counties is typically found on north-facing slopes and floodplains in deciduous forest. The threatened prairie bush clover (*Lespedeza leptostachya*) historically observed in Dodge and Mower Counties is typically found in native prairies on well-drained soil. The threatened western prairie fringed orchid (*Platanthera praeclara*) historically observed in Mower County is typically found in wet prairies and sedge meadows. For more information visit the U.S. Fish and Wildlife Service website (<http://www.fws.gov/endangered/>).

A survey of recently delisted fish species and of fish species of special concern was completed in southeastern Minnesota in 1998 and 1999 (Schmidt, 2000). A species of special concern is classified by MDNR as extremely uncommon in Minnesota or as requiring unique habitat that deserves careful monitoring of its status. Two redbfin shiners (*Lythrurus umbratilis*) were found in the Cedar River near Austin. Numerous species of special concern and recently delisted species were observed in Otter Creek, including the least darter (*Etheostoma microperca*), Ozark minnow (*Notropis nubilis*), slender madtom (*Noturus exilis*), and largescale stoneroller (*Campostoma oligolepis*). However, Otter Creek and its watershed are not under the jurisdiction of the CRWD, as the confluence of the Cedar River and Otter Creek is in Iowa.

According to the USGS Nonindigenous Aquatic Species website (<http://nas.er.usgs.gov/>) Common carp (*Cyprinus carpio*) is an invasive species that has been established in the greater Iowa River drainage, of which the Cedar River is a tributary.

The MDNR maintains a database of rare plants, animals, native plant communities and other rare features in its Natural Heritage Information System (NHIS). **Figure 2-13** presents the general location of these features within CRWD as provided in the NHIS Rare Features Database. The Rare Features Database contains historical records from museum collections, published information, and field work observations, especially from the MDNR Minnesota County Biological Survey. The survey is proposed to begin in 2008 for Dodge, Freeborn, Mower and Steele Counties. Hence, the amount of data provided in the NHIS Rare Features Database within CRWD will be expected to increase as these surveys are completed. More information can be found on the MDNR NHIS website (<http://www.dnr.state.mn.us/eco/nhrp/nhis.html>) and the MDNR Minnesota County Biological Survey website (<http://www.dnr.state.mn.us/eco/mcbs/index.html>).

figure 2-1_land_use

figure2-2_topography

figure 2-3_watersheds

figure 2-4_subwatersheds_north

figure 2-5_subwatersheds_south

figure 2-6_soils

figure 2-7_groundwater_sensitivity

figure 2-8_public_waters

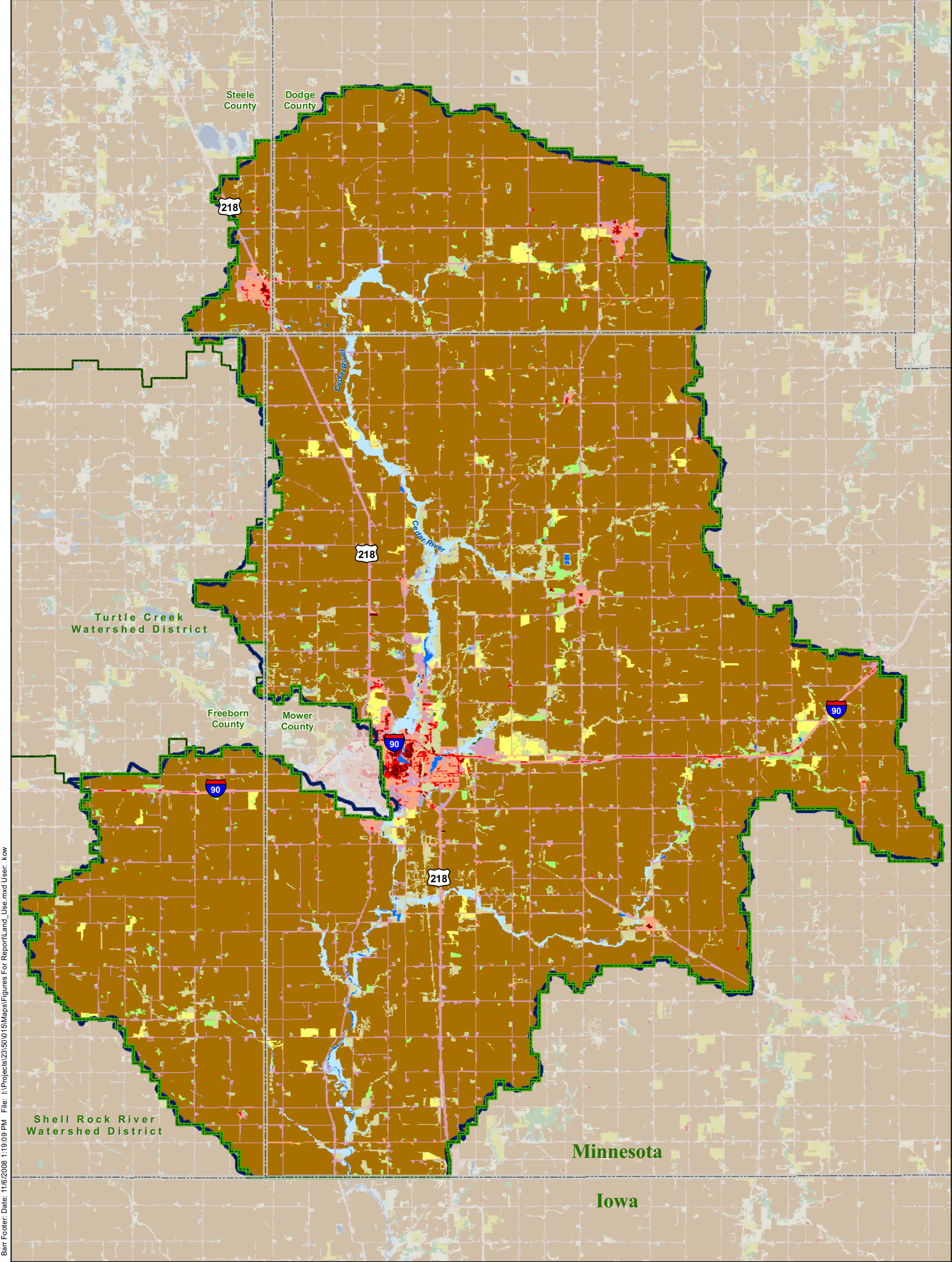
figure 2-9_wetland_inventory

figure 2-10_water_quality_monitoring

figure 2-11_impaired_waters

figure 2-12_fema_flooding

figure 2-13_natural_heritage



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Sources:
Land Cover - U.S. Environmental Protection Agency (2001)
County Boundary - MN Dept. of Transportation (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Dept. of Transportation (2003)

Figure 2-1

Land Cover
from the 2001 National
Land Cover Dataset

Cedar River
Watershed District

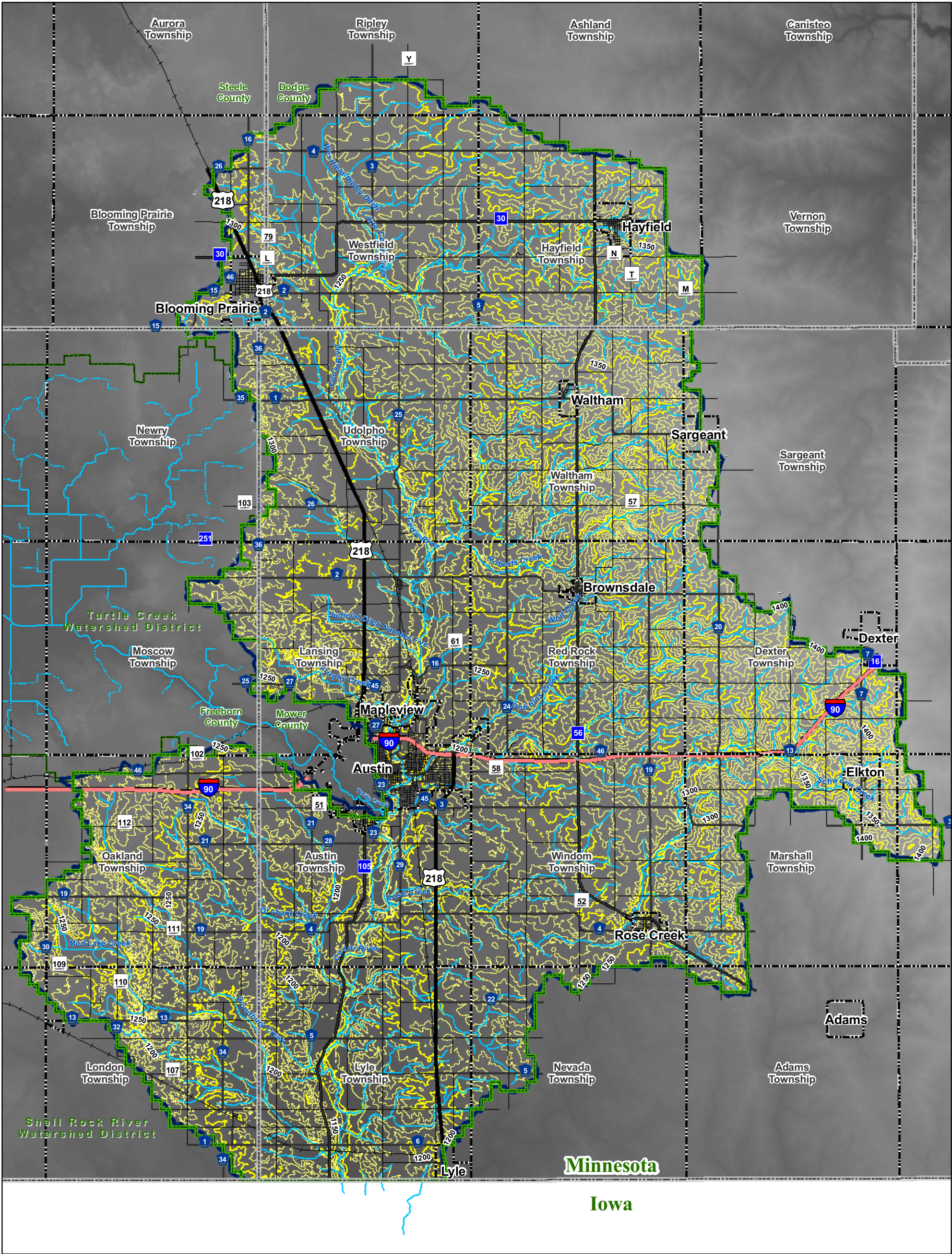


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Legend

- | | |
|---|------------------------------|
| County Boundary | Developed, High Intensity |
| Cedar River Watershed District Legal Boundary | Developed, Low Intensity |
| Cedar River Watershed Hydrologic Boundary | Developed, Medium Intensity |
| Turtle Creek Watershed District | Emergent Herbaceous Wetlands |
| 2001 Land Cover | |
| Barren Rock (Rock/Sand/Clay) | Evergreen Forest |
| Cultivated Crops | Grassland |
| Deciduous Forest | Open Water |
| Developed Open Space | Pasture/Hay |
| | Woody Wetlands |



Sources:
Topography - U.S. Geological Survey (2006)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

Figure 2-2

Topography

Cedar River Watershed District

Legend

10' Contours from USGS Data



- 10' Contour
- 50' Contour

Elevation (Feet)

High : 2300

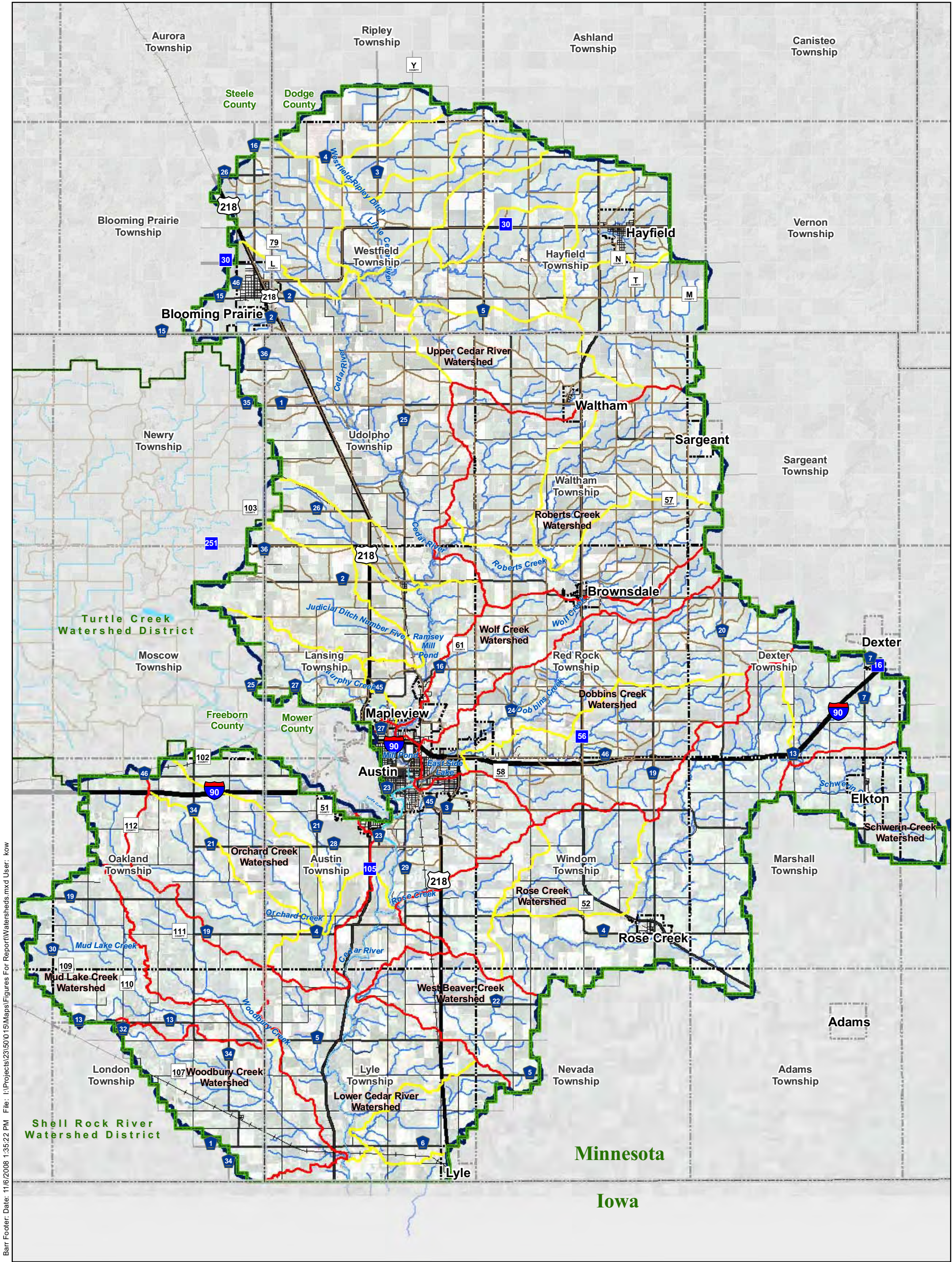
Low : 531

- County Boundary
- Cedar River Watershed District Legal Boundary
- Cedar River Watershed Hydrologic Boundary
- Turtle Creek Watershed District
- City and Township Boundaries



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0 1 2 4 6



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Sources:
Major and Minor Watersheds - MN Department of Natural Resources (1999)
Upper Cedar River Study Area Subwatershed Divides - Barr, Upper
Cedar River Surface Water Management Plan (2007)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of
Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN
Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones,
Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)



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Figure 2-3
Watersheds of the
Cedar River Watershed District
Cedar River
Watershed District

Legend

Major Watersheds

Minor Watersheds (MDNR)

Upper Cedar River Study Area Subwatershed Divides

County Boundary

Cedar River Watershed District Legal Boundary

Cedar River Watershed Hydrologic Boundary

Turtle Creek Watershed District

City and Township Boundaries

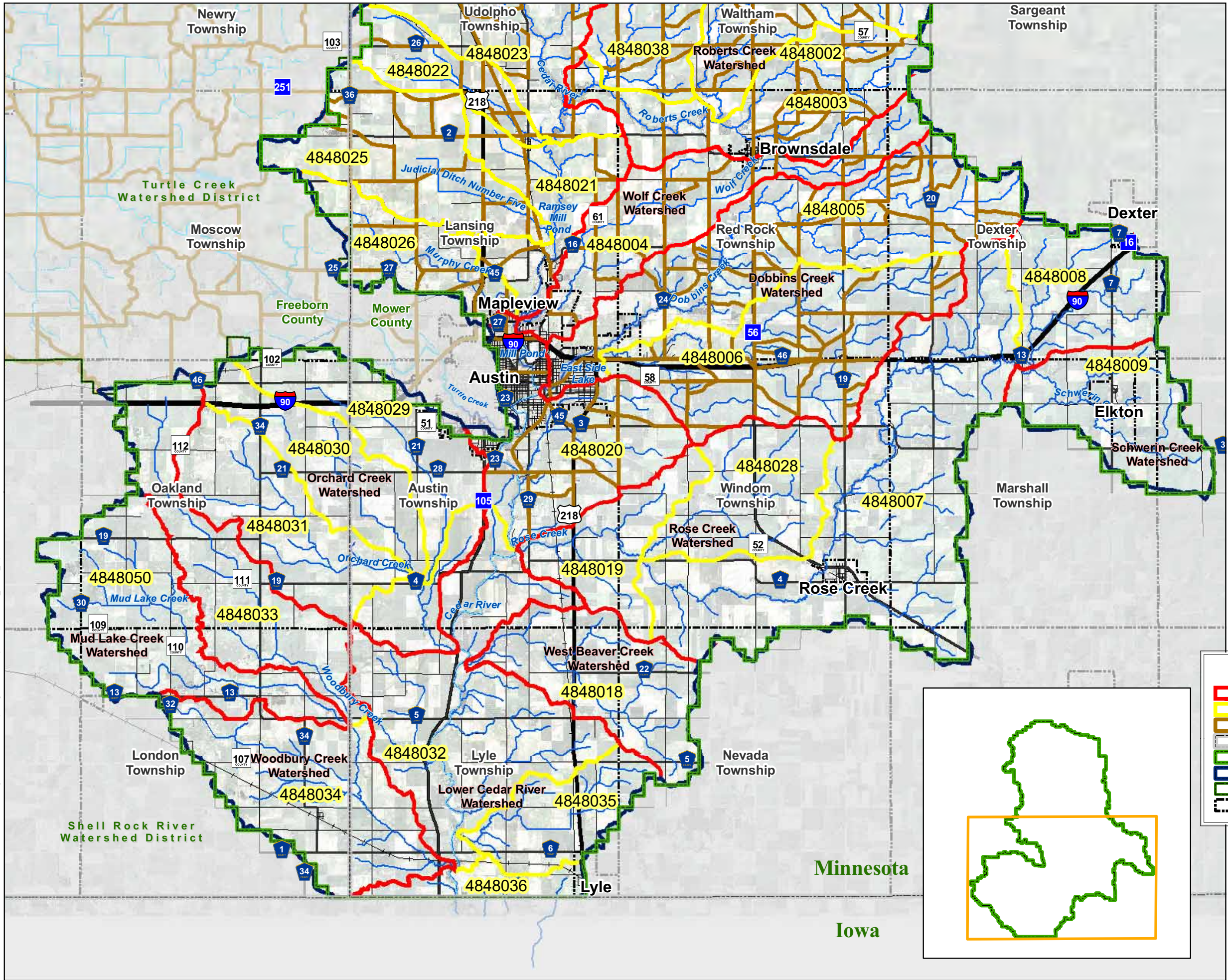
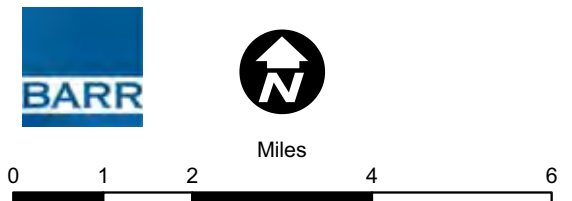


Figure 2-5
Subwatersheds
of the Cedar
River Watershed
District: South

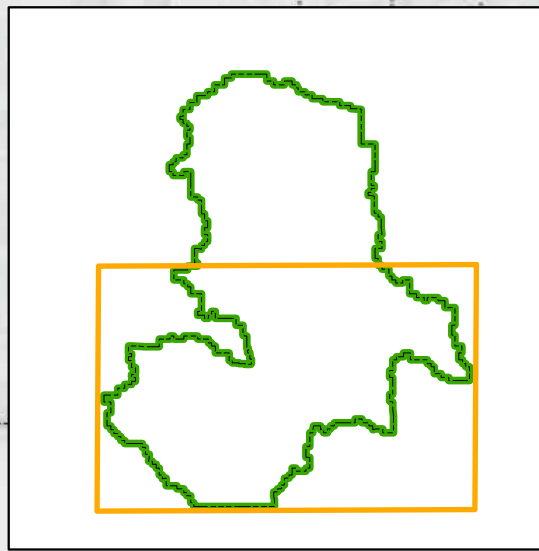
Cedar River
Watershed District

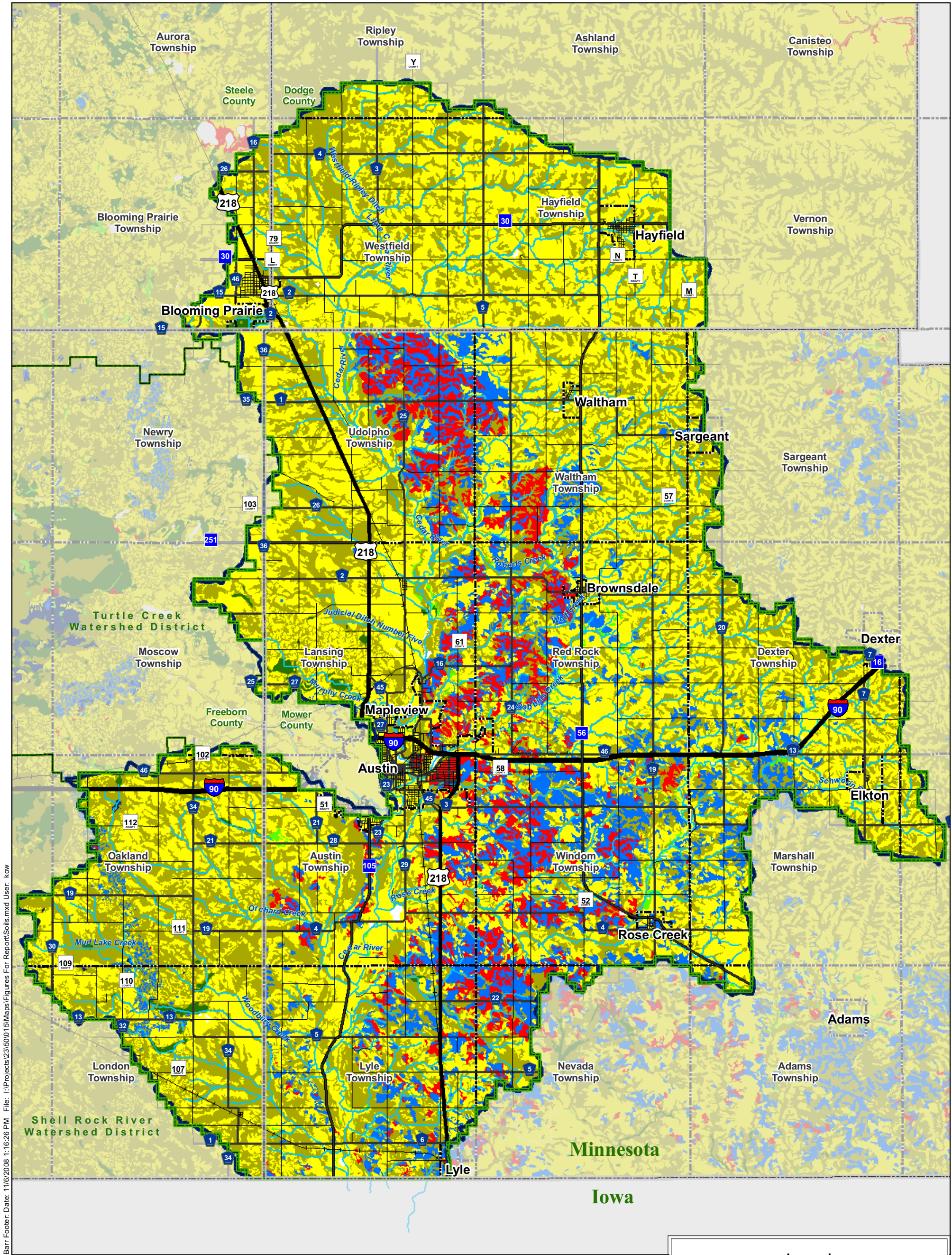


Legend

- Major Watersheds
- Minor Watersheds (48480XX - MDNR Minor7 Watershed Code)
- Upper Cedar River Study Area Subwatershed Divides
- County Boundary
- Cedar River Watershed District Legal Boundary
- Cedar River Watershed Hydrologic Boundary
- Turtle Creek Watershed District
- City and Township Boundaries

Sources:
Major and Minor Watersheds - MN Department of Natural Resources (1999)
Upper Cedar River Study Area Subwatershed Divides - Barr, Upper Cedar River Surface Water Management Plan (2007)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)





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Sources:
Dodge County Soils - Natural Resource Conservation Service (1961)
Freeborn County Soils - Natural Resource Conservation Service (1980)
Mower County Soils - Natural Resource Conservation Service (1989)
Steele County Soils - Natural Resource Conservation Service (1973)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of
Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN
Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones,
Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)



Miles



Figure 2-6
Soil Hydrologic Groups
Cedar River Watershed District

Legend

Soil Hydrologic Groups

No Data

A

A/D

B

B/D

C

C/D

D

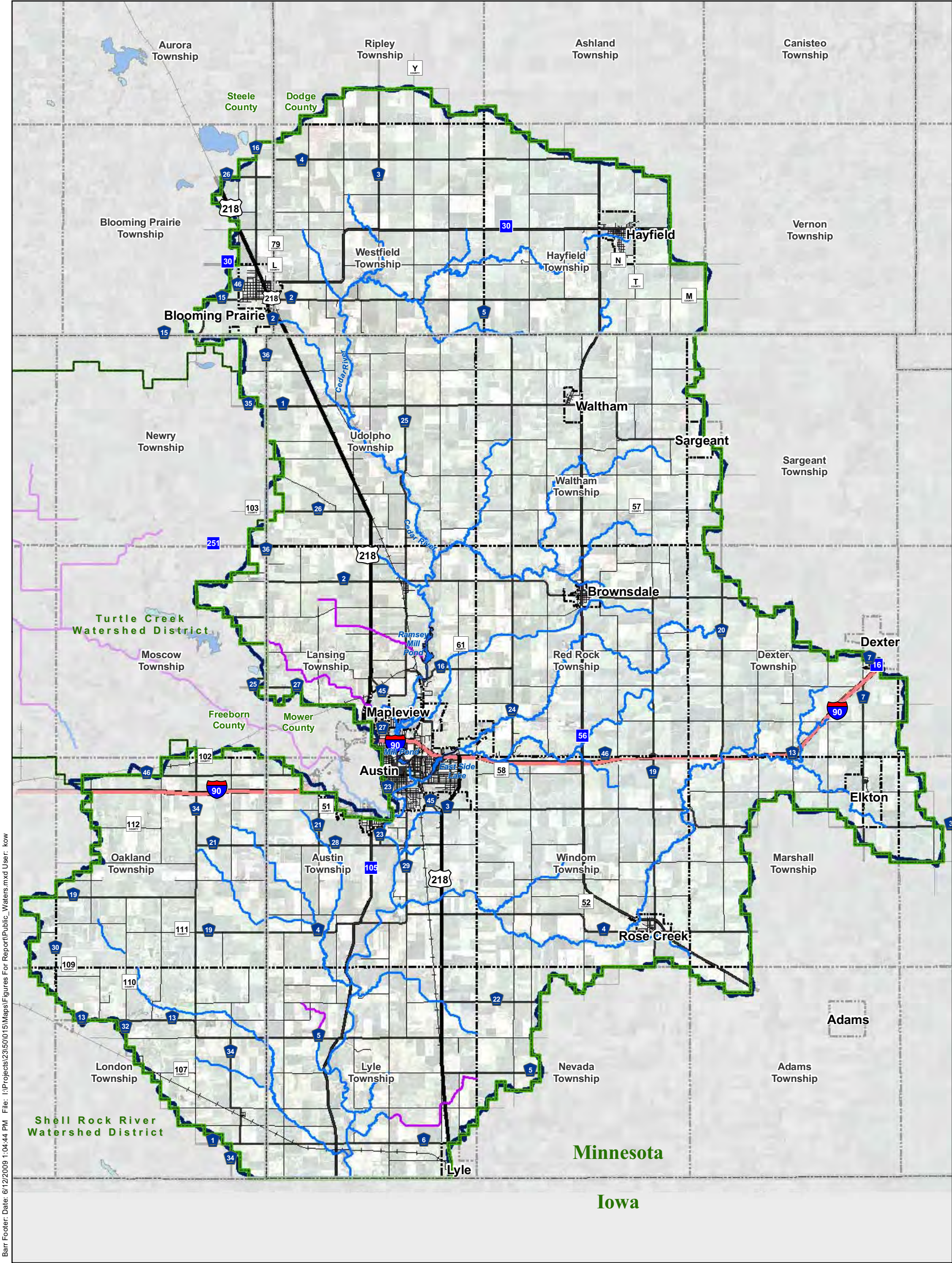
County Boundary

Cedar River Watershed District Legal Boundary

Cedar River Watershed Hydrologic Boundary

Turtle Creek Watershed District

City and Township Boundaries



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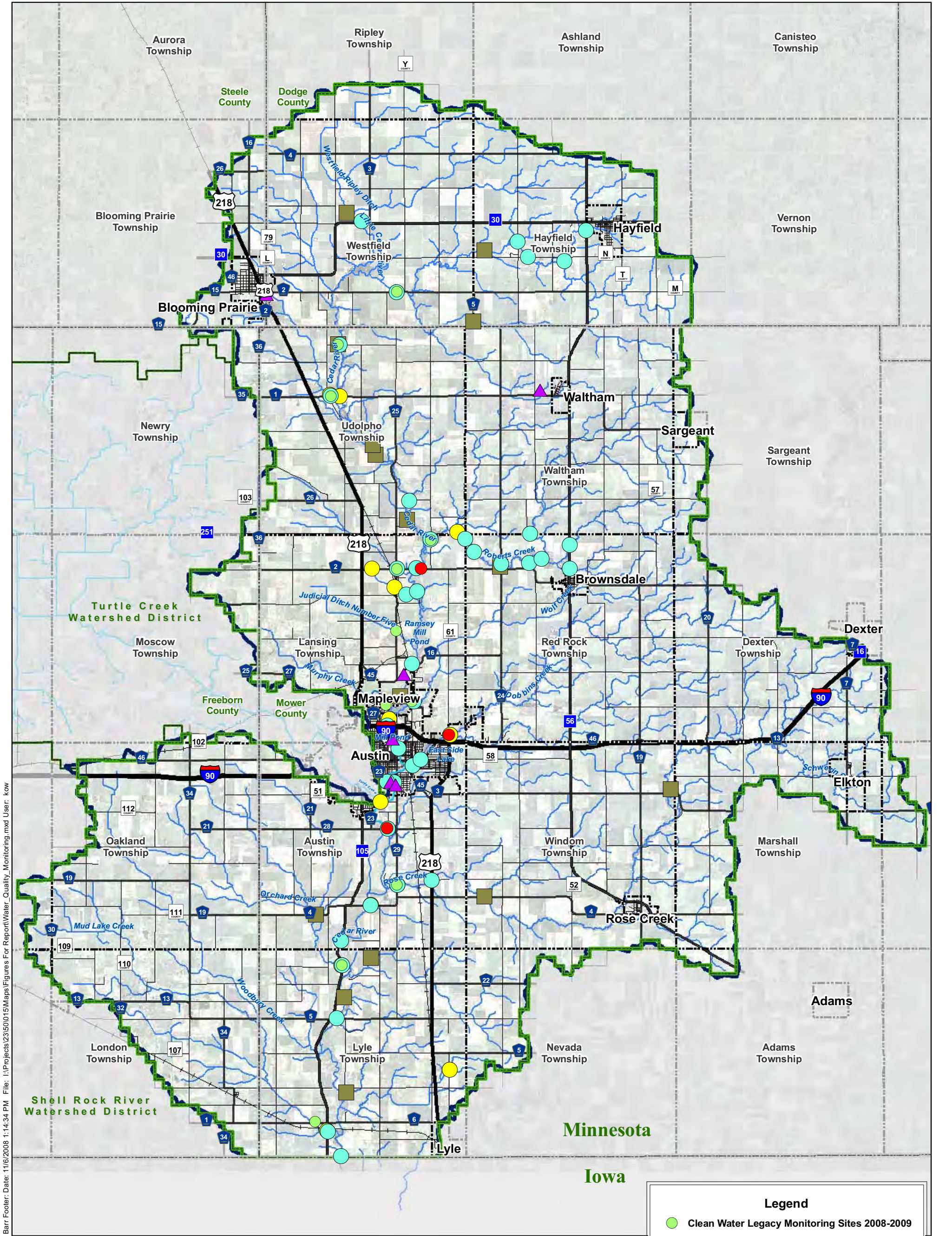
Sources:
Public Waters Inventory - MN Department of Natural Resources
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

Figure 2-8
MDNR Public Waters
Cedar River Watershed District



0 1 2 4 6

- Legend**
- MDNR Public Waters Inventory***
- MDNR Public Waters Basins
 - MDNR Public Waters Wetlands
- MDNR Public Watercourse***
- MDNR Public Waters Stream
 - MDNR Public Waters Ditch (publicly or privately held)
- County Boundary**
- Cedar River Watershed District Legal Boundary
 - Cedar River Watershed Hydrologic Boundary
 - Turtle Creek Watershed District
 - City and Township Boundaries
- * As designated in Minnesota Statutes, Section 103G.005



Barr Footer: Date: 11/6/2008 1:14:34 PM File: I:\Projects\2350\015\Maps\Figures For Report\Water_Quality_Monitoring.mxd User: kow

Sources:
Monitoring Locations - Minnesota Pollution Control Agency (2008)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

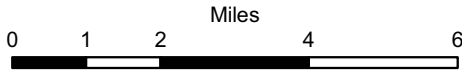


Figure 2-10
Monitoring Locations in the Cedar River Watershed District

Cedar River Watershed District

Legend

Clean Water Legacy Monitoring Sites 2008-2009

Turbidity TMDL Monitoring Sites 2008-2009

NPDES Discharge Monitoring Locations

Stream Water Quality Monitoring Locations

Biological Monitoring Locations

2001 Water Quality Study Sampling Locations

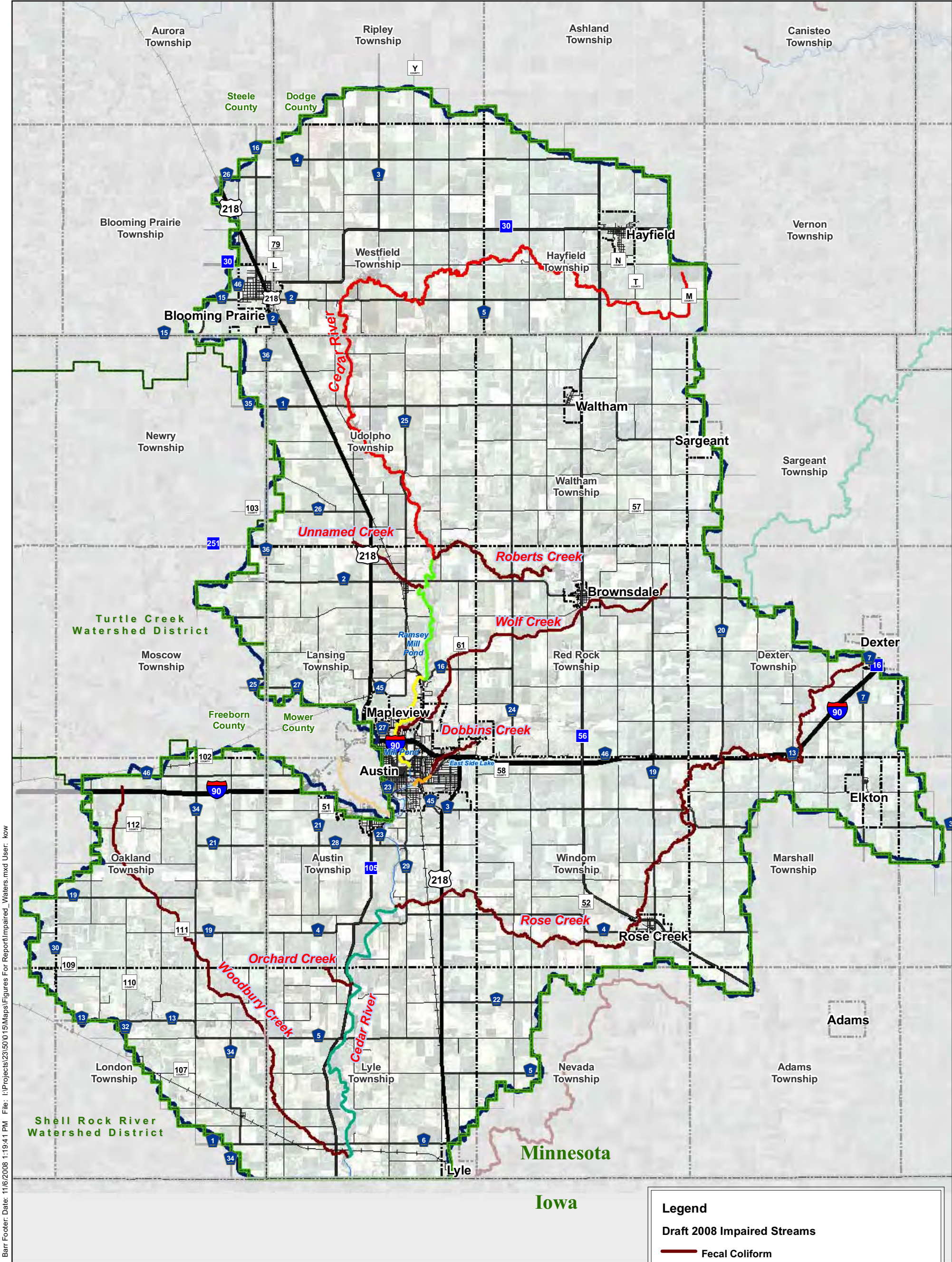
County Boundary

Cedar River Watershed District Legal Boundary

Cedar River Watershed Hydrologic Boundary

Turtle Creek Watershed District

City and Township Boundaries



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Sources:
Impaired Streams - Minnesota Pollution Control Agencies (2008)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

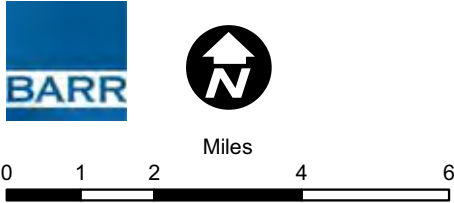
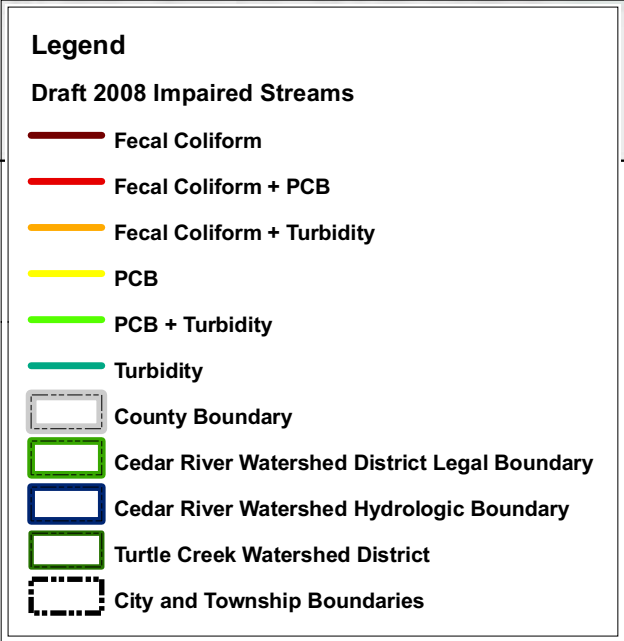
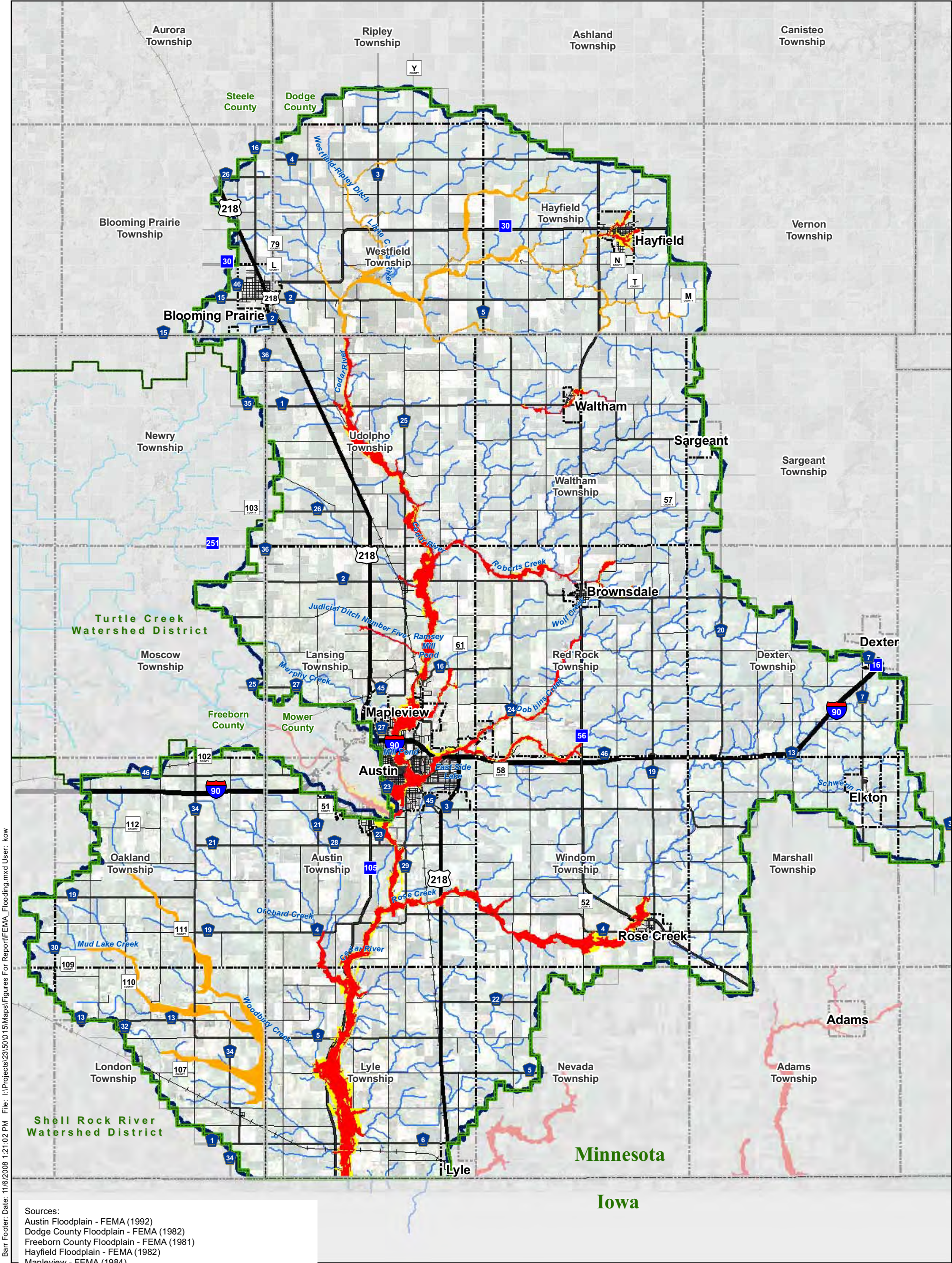


Figure 2-11
Impaired Waters
Cedar River Watershed District





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Sources:
Austin Floodplain - FEMA (1992)
Dodge County Floodplain - FEMA (1982)
Freeborn County Floodplain - FEMA (1981)
Hayfield Floodplain - FEMA (1982)
Mapleview - FEMA (1984)
Mower County Floodplain - FEMA (1979)
Rose Creek - FEMA (1979)
Waltham - FEMA (1979)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)



Miles



Figure 2-12
FEMA Floodplains
Cedar River Watershed District

Legend

FEMA Floodplains

Special Flood Hazards*

100-Year Floodplain*

500-Year Floodplain*

County Boundary

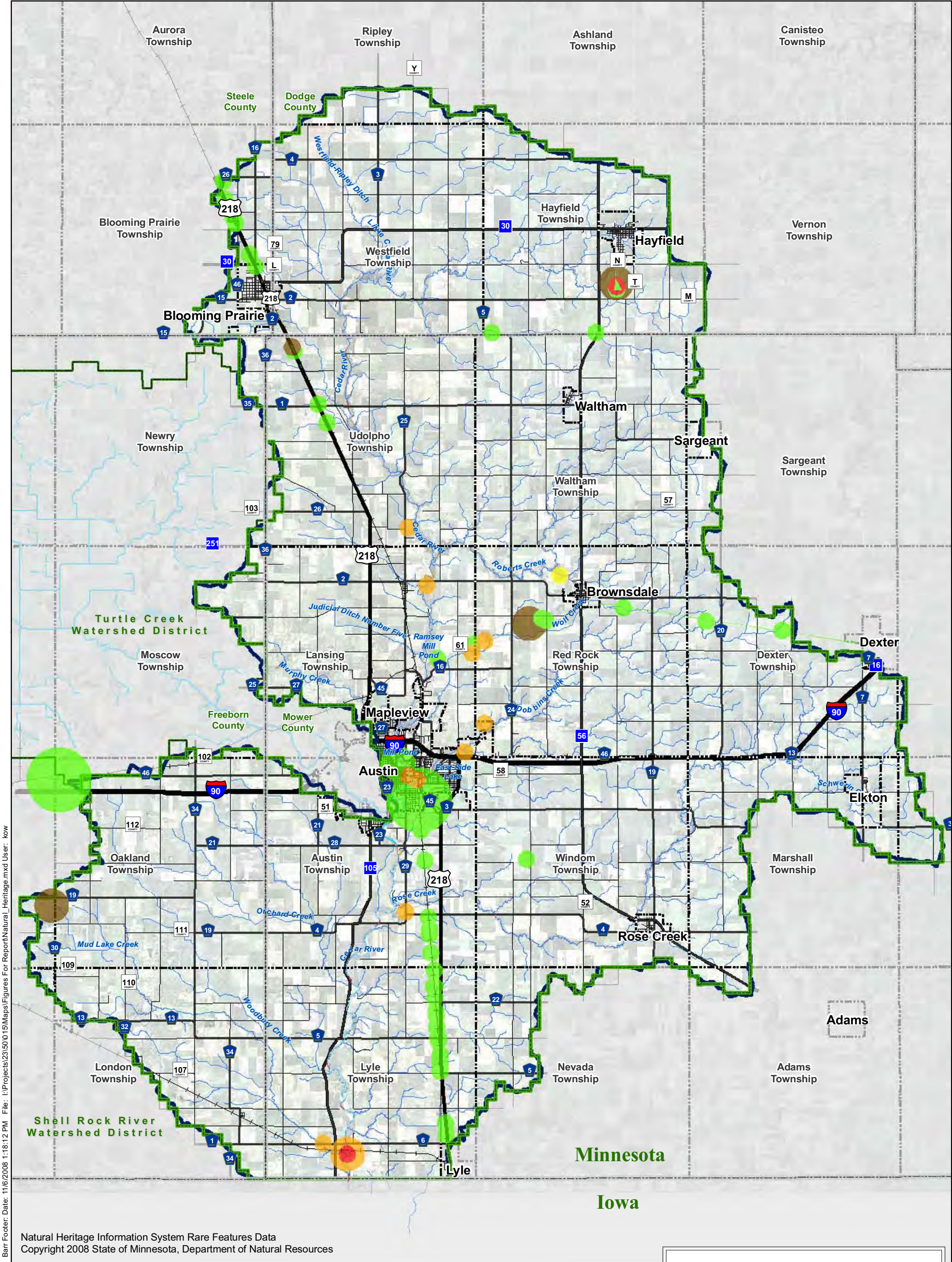
Cedar River Watershed District Legal Boundary

Cedar River Watershed Hydrologic Boundary

Turtle Creek Watershed District

City and Township Boundaries

*See Chapter 2.13.1 for explanation



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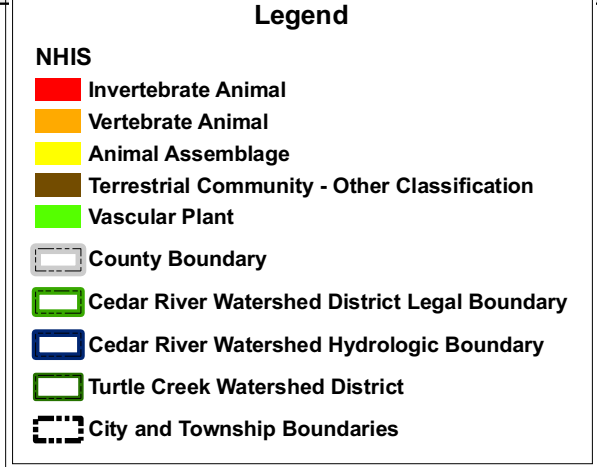
Sources:
Natural Heritage Information System - MN Department of Natural Resources (2008)
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)



Miles

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Figure 2-13
MDNR Natural Heritage
Information System - Rare
Features Data
Cedar River
Watershed District



Chapter 3.0

Assessment of Issues

Cedar River Watershed District Watershed Management Plan

Chapter 3: Assessment of Issues

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3.0 Assessment of Issues

The Cedar River Watershed District (CRWD) was recently established on April 25, 2007, and is setting its foundational programs and projects with this plan. The problems that led to the establishment of the CRWD have not been previously addressed adequately. This plan presents the programs and projects the CRWD will implement to correct problems and address issues by priority within the district.

In order to successfully implement the goals, objectives and actions for this plan, the CRWD must use the tools available to it. The CRWD finds the following regarding the resources of the CRWD:

- The CRWD possesses the capacity and legislative authority to fund programs that will promote the policy framework contained within this plan.
- The managers must adopt rules to accomplish the purposes of this plan and to implement the powers of the managers.
- The CRWD is able to leverage its existing authority with grants from outside and private agencies.
- Collaborative efforts are essential with all other units of government in the CRWD to maximize success.

This chapter of the plan presents the issues that present themselves to the new CRWD. The CRWD will use the tools available to it to address problems based on priority and feasibility. In the petition calling for the formation of the CRWD the following problems were noted:

- Increasingly damaging floods over the last 30 years.
- Degradation of water quality and major hydrologic changes subjecting the Cedar River to dangerous flash flooding during or following heavy rainfall events.
- Levels of fecal coliform and total suspended solids above state health standards.
- A coordinated and focused effort to reduce flooding and improve water quality is needed.

The petition also stated the following goals:

- Significant flood and peak flow reduction of 20 percent in the Cedar River and Dobbins Creek.
- Prevention of structural damages in the watershed area during a 100-year 24 hour rainfall event.
- Reduction of sediment loading to watershed streams as a result of reduced flows and corresponding reduction in farmland and riverbank erosion through wetland restoration, buffer installation and erosion control practices.
- Reduction of nutrient loads to all streams in the watershed.
- Protection and improvement of township, county, city and state infrastructure resulting from reduced levels of flooding.

- Protection of the Minnesota Department of Transportation highway system including Trunk Highway 218 and Interstate 90.

The rest of this chapter discusses issues and problems in detail by topic.

3.1 Flood Control Problems and Issues

Impacts from flooding can include damage to structures, utilities and transportation facilities, flood fighting costs, post-flood cleanup costs, business and agricultural losses, increased expenses for normal operating and living during a flood situation, and benefits paid to owners of flood insurance. Other losses that could be suffered during flooding include the loss of life, disruption of normal activities, potential health hazards from contaminated water and food supplies, dislodged fuel storage tanks, and flooding of wastewater collection facilities. Without controls, increased urbanization of a watershed causes an increase in average annual flood damage at a rate approximately proportional to the improvements to existing public facilities, increases in property values, and increases in runoff.

3.1.1 General Flooding Issues

The amount, rate, and type of precipitation are important in determining flood levels and stormwater runoff rates, all of which impact water resources. In urbanized watersheds, shorter duration events tend to play a larger role in predicting high water levels. Shorter duration events are generally used by hydrologists to study local issues (sizing catch basins, storm sewer pipes, etc.). Longer duration events are generally used by hydrologists to study regional issues, such as predicting high water levels and flow rates for streams.

Snowmelt and rainstorms that occur with snowmelt in early spring are significant in this region. The volumes of runoff generated, although they occur over a long period, can have significant impacts where the contributing drainage area to a stream is large.

Average weather imposes little strain on the typical stormwater drainage system. Extremes of precipitation and snowmelt are important for design of flood control systems. The National Weather Service has data on extreme precipitation events that can be used to aid in the design of flood control systems. Extremes of snowmelt most often affect major rivers and the design of large stormwater storage areas, while extremes of precipitation most often affect the design of conveyance facilities.

As noted in Chapter 2.2, climate trends are showing increased precipitation, warmer winters, and increased dew points leading to a higher frequency of large, flashy, intense storms. These flashy storms can overwhelm existing drainage systems. Engineers design drainage systems based on certain events. These design events may be changed in the future to account for climate change and the revision of the Rainfall Frequency Atlas (TP-40) scheduled to be completed in 2011.

The CRWD was formed with flood control as a primary concern. Current Cedar River flood control issues include:

- A need to address existing flooding problems through development and operation of a flood control system, with many homes and businesses remaining in the floodplain that need flood proofing or removal.
- A need to prevent future flooding by managing development and redevelopment throughout the watershed to prevent flooding (e.g. minimum building elevations, land use ordinances).
- A lack of protection for property, surface water systems, and other infrastructure that are often damaged by flood events.
- A need for control of excess stormwater runoff discharge rates and volumes to minimize flood problems, flood damages and the future costs of stormwater management systems.
- A need to bring necessary leadership, cooperation, and assistance to watershed counties and communities.
- A need to consider, operate and coordinate the drainageways and various flow control structures (e.g., roads, culverts, and bridges) as a drainage system.

3.1.2 Specific Flooding Issues

The Cedar River Watershed has experienced an increase in damaging floods over the last 30 years. The watershed has gone through land use changes that include urban development, intensive agricultural practices that lead to accelerated stormwater runoff and increased demands on drainage systems. These changes have resulted in degradation to water quality and major hydrologic changes subjecting the Cedar River to dangerous flash flooding during or following heavy rainfall events. Significant damaging floods have occurred in 1978, 1993, 2000, 2004, and 2008. Flood levels have generally increased over time. The September 2004 flood caused the loss of 2 lives and damages in Freeborn and Mower County were estimated at \$17 million in private and public property losses.

Specific flood control issues identified in the CRWD include:

- Significant flooding across the watershed, especially in flat areas.
- Significant flooding occurs during events smaller than the 100 year event (1 percent chance).
- Severe flooding results in damages to buildings, infrastructure (bridges, utilities, roads), and farmsteads.
- Flood damage to buildings and infrastructure (bridges, utilities, roads) has been experienced in Austin, Lansing, Udolpho Townships, and in rural areas north and south of Austin.
- Frequent significant stream bank and stream bed erosion occurs in all reaches of the Cedar River because of high bankfull flows occurring more frequently and for longer duration.

- Expected increased growth and land development pressures and corresponding increases in surface water runoff will require promotion of better stormwater management from a watershed perspective.
- The draining of wetlands has reduced flood storage capacities.
- Often in the past, when roads have been overtopped due to flooding, the culvert sizes have often been increased or a bridge installed. A chain reaction can then be created downstream as flow rates are increased and with water moving faster and faster. This has contributed to the flooding, water quality, natural resource, and wildlife problems in the watershed including:
 - More severe flooding
 - Creek, stream, and river bank erosion
 - Increased sediment loads/TMDL issues
 - Loss of aquatic and upland habitat
 - Damaged roads, lands, and buildings
 - Streams lose base flow/become more dried up as water moves downstream faster, with no chance to infiltrate.
 - Flooding negatively affects aquatic and upland habitat.
- Turtle Creek is a major tributary to the Cedar River that also experiences major flooding. Turtle Creek generally flows through the west and southwest parts of Austin and discharges into the Cedar River just south of Austin. Because Turtle Creek and its watershed come under the jurisdiction of the Turtle Creek Watershed District, the CRWD has no jurisdiction over the Turtle Creek watershed.

Flooding is often accompanied by high organic contaminant levels within rivers. According to the *Water Quality Study of the Cedar River and Tributaries in Mower County*, (Mostrom, 2001), levels of fecal coliform and total suspended solids on the Cedar River in 2000 and 2001 exceeded state health standards. Monitoring is needed to further evaluate the Cedar River and its tributaries under various precipitation and flow conditions and determine the sources of fecal coliform and total suspended solids in the Cedar River.

3.2 Water Quality Problems and Issues

Pollutants are discharged to surface waters as either point sources or non-point sources. Point source pollutants discharge to receiving surface waters at a specific point from a specific identifiable source. Discharges of treated sewage from a wastewater treatment plant or wastewater from an industry are examples of point sources. Unlike point sources, non-point source pollution cannot be traced to a single source (i.e. geographically targeted) or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport. All these forms of pollutant movement from land to water make up non-point source pollution. Point sources frequently discharge continuously throughout the year, while non-point sources (with the exception of subsurface sewage treatment systems (SSTS)) discharge in

response to precipitation or snowmelt events. SSTs are also known as septic systems and individual sewage treatment systems (ISTS).

For lakes, ponds, and wetlands, phosphorous is often a pollutant of major concern. By definition, point sources of phosphorus typically come from municipal and industrial discharges to surface waters, whereas non-point sources of phosphorus come from urban and agricultural runoff, construction sites, and SSTs.

Nitrates, fecal coliform bacteria, and sediment are also frequently contaminant issues, especially in agricultural areas. Nitrates and sediment are commonly found in agricultural runoff and can also occur in urban stormwater. Fecal coliform bacteria are usually associated with septic systems, feedlot operations, and concentrated wildlife, such as flocks of waterfowl. All of these contaminants can cause impairment of water bodies.

For most water bodies, non-point source runoff, especially stormwater runoff, is a major contributor of pollutants. As urbanization increases and other land use changes occur in the watershed, nutrient and sediment inputs (i.e., loadings) from stormwater runoff can far exceed the natural inputs to the watershed's water resources. Changes to the runoff hydrograph resulting from increased urbanization include higher peak flows, higher runoff volumes, and flashier hydrologic response to precipitation. Changes in the runoff hydrograph may further impact water quality treatment within the watershed (e.g. reduced residence time in sedimentation ponds). In addition to nutrients and sediment, stormwater runoff may contain pollutants such as oil, grease, chemicals, metals, litter, and pathogens, which can severely reduce water quality.

3.2.1 Impaired Waters and TMDL Issues

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. Water quality standards designate beneficial uses for each water body and establish criteria that must be met within the water body to maintain the water quality necessary to support its designated use(s). Section 303(d) of the CWA requires each state to identify and establish priority rankings for waters that do not meet the water quality standards. The state in turn solicits participation from watershed districts, cities, and counties in pollutant loading or TMDL studies, and in implementing measures to reduce pollution. The list of impaired waters, or 303(d) list, is updated by the state (Minnesota Pollution Control Agency (MPCA)) every two years.

For impaired waterbodies, the CWA requires the development of a total maximum daily load (TMDL). A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity within a waterbody and develops an allocation scheme amongst the various contributors, which include point sources, non-point sources and natural background, as well as a margin of safety. As a part of the allocation scheme a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from

storm sewer networks), and a load allocation (LA) establishes allowable pollutant loadings from non-point sources and natural background levels in a waterbody.

3.2.2 Impaired Waters in the Cedar River Watershed District

There are nine (9) stream and river reaches in the CRWD that are listed by the MPCA as impaired for aquatic recreation due to excess levels of fecal coliform bacteria (see Chapter 2.10). These stream and river reaches are covered by the *Revised Regional Total Maximum Daily Load Evaluation of Fecal Coliform Bacteria Impairments in the Lower Mississippi River Basin in Minnesota* (see Chapter 3.2.3).

There are also four (4) reaches of the Cedar River that are listed as impaired for aquatic consumption due to excess levels of PCBs.

Table 2-9 lists the impaired waters within the CRWD, the affected MPCA designated use, the pollutant or stressor that is not meeting the MPCA water quality criteria, and the MPCA target for starting and completing the TMDL process.

There is one additional impaired water body not listed in **Table 2-9** that affects the water quality of the CRWD. Turtle Creek is a major tributary to the Cedar River that discharges into the Cedar River just south of Austin, Minnesota and is impaired for turbidity and fecal coliform (aquatic life). However, as the Turtle Creek Watershed District was formed in 1968, separately from the CRWD, Turtle Creek and its watershed are not under the jurisdiction of the CRWD. Any future Turtle Creek Watershed District TMDL projects will affect water quality in the CRWD. The Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study, for example, is currently being undertaken as a joint effort of the CRWD, the Turtle Creek Watershed District (TCWD), and the Shell Rock River Watershed District (SRRWD) (see Chapter 2.10).

3.2.3 TMDL Studies

The federal Clean Water Act (CWA) requires states to develop total maximum daily loads (TMDL) for water bodies that do not meet water quality standards (i.e., impaired water bodies). A separate TMDL must be completed for each listed impairment.

In response to the listing of reaches of the Cedar River for nutrients, turbidity and PH, the MPCA has begun the development of the Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study. This study will likely result in implementation tasks that will be required within the watershed and will likely require additions or amendments to this plan (see Chapter 2.10 for more information regarding this TMDL study).

3.2.3.1 TMDL for Fecal Coliform Bacteria in the Lower Mississippi River Basin

The MPCA completed the *Revised Regional Total Maximum Daily Load Evaluation of Fecal Coliform Bacteria Impairments in the Lower Mississippi*

River Basin in Minnesota in 2006. The study is discussed in Chapter 2.10. The TMDL called for a two-thirds reduction in major sources of fecal coliform — mainly livestock manure and nonconforming SSTS — to meet the federal standard of 200 organisms/100ml of water. The *Lower Mississippi River Basin Fecal Coliform Implementation Plan*, published in February and September 2007, set implementation tasks, such as initiatives for residential unsewered wastewater reduction, feedlot runoff reduction, rotational grazing, and riparian buffers in various locations in the basin.

3.2.3.2 Iowa TMDL for Nitrate in the Cedar River

The *Total Maximum Daily Load for Nitrate Cedar River Linn County, Iowa*, is discussed in Chapter 2.10. The impaired use and subsequent 303(d) listing is for high nitrate concentrations above the EPA’s 10 mg/L standard in the drinking water supply for the City of Cedar Rapids. Nitrate in drinking water can cause many problems. It is especially harmful to infants, as excess concentrations may cause methemoglobinemia, or blue baby syndrome, a potentially fatal blood disorder that limits the intake of oxygen and can lead to suffocation (U.S.EPA, 1996). Two sub-basins of the Cedar River in Iowa extend into Minnesota: the Upper Cedar River and the Shell Rock River. In the Iowa TMDL, loading from Minnesota was assumed to be based on the percentage of the watershed in the state, and apportioned by point and nonpoint sources (Iowa DNR, 2006). Although Iowa has no authority in regulating pollution from Minnesota, the TMDL assumed a 35 percent reduction in total nitrate loading from Minnesota. Table 3-1 shows the existing nitrate-N loads and TMDL reductions for Minnesota:

Table 3-1 Existing Load and TMDL Allocation for Minnesota.

Sub-Basin	Percent in MN	MN Load	TMDL Allocation
Upper Cedar River	42%	5,811 tons N/yr	3,777 tons N/yr
Shell Rock River	18%	1,653 tons N/yr	1,075 tons N/yr

Reductions in nitrate loading to the Cedar River in Minnesota will be important for meeting water quality standards in Iowa.

3.2.4 Turbidity and Sedimentation

Turbidity (cloudiness or opaqueness of water caused by suspended particles) and sedimentation (the deposition of suspended particles) are widespread problems within the CRWD with several stream reaches impaired due to their impacts.

Total suspended solids (TSS) concentrations are estimated using a surrogate parameter called a Nephelometric Turbidity Unit (NTU) to indicate water clarity

and quality. High levels of TSS reduce sunlight penetration and affect aquatic life in general. In addition, phosphorus attaches itself to soil particles; therefore, as TSS levels increase, phosphorus concentration increases. Suspended sediment (measured as TSS) may also have a water quantity affect, as the deposition of suspended sediment can alter channel capacity and drainage rates. This can have an effect on water temperatures, flooding, wildlife habitat, dissolved oxygen levels, and many more aspects of the river or stream ecosystem. Reduced channel capacity and its corollary impacts may also result from the deposition of bedload sediments. Bedload sediments are transported along the bottom of the channel, primarily during high flows. There is a statewide water quality standard of 25 NTU, which correlates to a TSS concentration of 45 mg/L.

The report *Water Quality Study of the Cedar River and Tributaries in Mower County* (Mostrom, 2001) examined data collected in the summers of 2000 and 2001 and found that total suspended solids are consistently lower, and transparency is higher, north of Austin than in the Cedar River south of Austin. Turtle Creek had the highest average total suspended solids results in both 2000 and 2001, well above 45mg/L, which correlates to the state standard of 25 NTU. Some causes of turbidity and sedimentation include:

- Urbanization and development
- Agricultural activities
- Natural processes such as erosion, runoff and wind deposition.

Some remedies for turbidity and sedimentation issues include:

- Settlement ponds
- Vegetation buffers
- Construction site erosion control
- Agricultural best practices
- Stabilization of erosion sites
- Wind breaks

3.2.5 Nutrients: Nitrogen & Phosphorus

Total phosphorus and its dissolved form are the “limiting factor” for algae growth and many other types of aquatic vegetation in water bodies. The dissolved form of phosphorus is immediately available for uptake by aquatic vegetation and algae. The nuisance algal blooms can be drastically reduced and/or eliminated by reducing the available phosphorus.

Nitrogen can also increase certain forms of aquatic vegetation. But some types of algae (e.g. cyanobacteria, or blue-green algae) are not affected by nitrogen reduction because an alga of those types fixes its own form of nitrogen. Hence, efforts toward phosphorus reduction are usually a surface water quality priority.

However, because of their impact on groundwater drinking supplies, nitrite and nitrate (NO₂ and NO₃) are a top priority for groundwater protection (see Chapter 3.2.3.2). Since groundwater is recharged by surface water that can carry nitrogen from the surface, it is important to avoid excess nitrogen application in agricultural activities to prevent groundwater contamination.

It is worth noting that in the lower reaches of the Mississippi River nitrogen has become a major concern for the Gulf of Mexico and its aquatic species. This area is currently referred to as the “Dead Zone” due to the very low levels of oxygen there. Since the Cedar River discharges into the Mississippi River, reducing nitrogen concentrations in the Cedar River could help address this problem.

Sources of excess nutrients in surface water include:

- Runoff from urbanization and development, and agricultural activities
- Untreated or inadequately treated wastewater discharge (e.g. failing or noncompliant SSTS, straight-pipe discharge)
- Feedlot operations
- Fertilizers
- Atmospheric deposition

Remedies for excess nutrients in surface waters include:

- Settlement ponds
- Vegetation buffers
- Construction erosion control
- Turf management
- Agricultural best practices
- New or updated wastewater treatment facilities and systems
- Wind breaks
- Public education

3.2.6 Fecal Coliform

The study *Water Quality Study of the Cedar River and Tributaries in Mower County* (Mostrom, 2001) reports that all of the samples taken from the 15 sites in this 2000 and 2001 sampling study found fecal coliform levels above the state standard. The data indicated that fecal coliform levels increased by 60 percent as the river flows south through Mower County.

Some sources of fecal coliform in surface waters include:

- Human waste (e.g. failing or improperly maintained SSTS)

- Untreated or inadequately treated wastewater discharge
- Animal waste
- Overgrazed pastures
- Surface-applied manure
- Feedlots
- Wastes from ducks, geese, deer and other wildlife

Remedies for excess fecal coliform in surface water include:

- New or updated wastewater treatment facilities and systems
- SSTS upgrades
- Settlement ponds
- Agricultural best practices

3.2.7 Mercury

Mercury in Minnesota fish comes almost entirely from atmospheric deposition, with approximately 90 percent originating outside of Minnesota (MPCA, 2004). Because the main source of mercury comes from outside the state and the atmospheric deposition of mercury is relatively uniform across the state, the MPCA has developed a statewide TMDL for mercury of 11 kg/year.

3.2.8 Groundwater

Groundwater and surface water quality are necessarily linked as part of the hydrologic cycle. Especially of concern is the effect of nitrate fertilizers on drinking water supplies. When nitrogen is used for agricultural activities it can be mobilized by precipitation and infiltration, causing contamination to groundwater drinking water supplies.

The City of Austin uses groundwater as its drinking water supply but has not detected nitrite or nitrate (NO₂ or NO₃) in its water.

3.2.9 Water Quality Impacts from Flooding

Along with property damage, flooding can lead to a host of water quality problems due to inundation and high velocity flows. Large flow volumes can lead to stream and river bank erosion, increased sediment loads, loss of aquatic and upland habitat, and mobilization of upland contaminants.

3.2.10 Water Quality Data

Currently, there is a relative lack of consistent and detailed monitoring data for the CRWD. This lack of watershed-wide data makes water quality modeling difficult. Variable land use, practices, geology, stream conditions, and slope mean more data collection is needed to cover the various conditions.

Monitoring is most useful when it occurs consistently through time and is spread throughout the CRWD. Upcoming TMDL studies will provide an opportunity to initiate monitoring and efforts will be needed to continue monitoring even after these studies are complete.

3.2.11 CRWD-Identified Water Quality Issues

The following issues were identified as part of the basis for forming the CRWD:

- Improvements in agricultural operations have helped to reduce erosion and sediment loading but significant problems remain.
- Many segments of the Cedar River and its tributaries are listed as impaired by the MPCA for contamination that includes: turbidity, pH, PCB and fecal coliform.
- Monitoring is needed to further evaluate the Cedar River and its tributaries under various precipitation and flow conditions to determine the sources of fecal coliform and total suspended solids into the Cedar River.
- The abundance and quality of game fish has declined in the CRWD.
- Riparian area development has impacted the water quality of rivers and streams in the CRWD.

3.2.12 Emerging and Future Issues

In response to the listing of reaches of the Cedar River for nutrients, turbidity and pH, the MPCA has begun the development of the Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study. This study will undoubtedly result in implementation tasks that will be required within CRWD and will likely require additions or amendments to this Plan. These tasks could include treatment, enforcement, development of rules and/or standards, and construction projects.

It is likely that other waters will be identified by the state as impaired. The CRWD may be required to act on these potential listings too.

3.3 Erosion and Sediment Control Problems and Issues

Sediment is a major contributor to water pollution. Stormwater runoff from streets, parking lots, and other impervious surfaces carries suspended sediment with fine particles of soil, dust and dirt in moving water. Abundant amounts of suspended sediment are carried by stormwater runoff when erosion occurs.

Although erosion and sedimentation are natural processes, they are often accelerated by human activities, especially construction. Prior to construction, the existing vegetation on a site intercepts rainfall and slows down stormwater runoff rates, which allows more time for runoff to infiltrate into the soil. When a construction site is cleared and graded, the vegetation (and its beneficial effects) is removed. Also, natural depressions that provided temporary storage of rainfall are filled and graded, and soils are exposed and compacted resulting in increased erosion, sedimentation and decreased infiltration. As a result, the

rate and volume of stormwater runoff from the site increases (*Minnesota Urban Small Sites BMP Manual*, Met Council, 2001). The increased stormwater runoff rates and volumes cause increased soil erosion, which releases significant amounts of sediment that may enter the watershed's water resources.

Agricultural activities can also leave bare soil exposed to precipitation. Agricultural best practices can mitigate the loss of soil, but conventional row cropping leaves the surface exposed to a higher degree than natural conditions. Open tile intakes (e.g. bee-hive or other openings that move unfiltered and untreated field runoff water into pipes) further accelerate sedimentation in downstream water bodies. With the exception of large debris, all field material, including soil, may enter these pipes, especially during storm events. Alternatives to open tile intakes are designed to remove the sediment entering tile drainage systems and may include structural or vegetative BMPs. Regardless of its source, sediment deposition decreases water depth, and degrades water quality, fish and wildlife habitat, and aesthetics. Sediment deposition can also wholly or partially block culverts, manholes, storm sewers, etc., causing flooding. Sediment deposition in detention ponds and wetlands also reduces the storage volume capacity, resulting in higher flood levels and/or reducing the amount of water quality treatment provided. Suspended sediment, carried in water, clouds streams and lakes and disturbs aquatic habitats. Sediment also reduces the oxygen content of water and is a major source of phosphorus, which is frequently bound to the fine particles. Erosion also results in channelization of stormwater flow, increasing the rate of stormwater runoff, and further accelerating erosion.

As erosion and sedimentation increase, stormwater management systems (e.g., ponds, pipes, ditches) require more frequent maintenance, repair, and/or modification to ensure they will function as designed.

Owners and operators of construction sites disturbing one or more acres of land must obtain a NPDES Construction Stormwater Permit from the MPCA. Owners/operators of sites smaller than one acre that are a part of a larger common plan of development or sale that is one acre or more must also obtain permit coverage. The MPCA revised the NPDES Construction Stormwater General Permit; the revised permit went into effect on August 1, 2008. A key permit requirement is the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) with appropriate best management practices (BMPs). The SWPPP must include a combination of narrative and plan sheets that address foreseeable conditions, a description of the construction activity, and address the potential for discharge of sediment and/or other potential pollutants from the site. The SWPPP must include the following elements:

- Temporary erosion prevention and sediment control BMPs
- Permanent erosion prevention and sediment control BMPs
- Permanent stormwater management system
- Pollution prevention management measures

The project's plans and specifications must incorporate the SWPPP before applying for NPDES permit coverage. The permittee must also ensure final stabilization of the site, which includes final stabilization of individual building lots.

3.4 Agricultural and Urban Drainage Systems Problems and Issues

Agricultural and urban drainage systems are necessary for the long-term economic viability of agriculture and commerce within the CRWD. Sustainable agriculture, as well as urban development, relies on these existing drainage systems to allow stormwater to drain the landscape. Public drainage systems, though governed by separate law (see Chapter 2.14.3), can and should be managed in a manner similar to other watercourses.

Agricultural and urban drainage systems are subject to most of the issues described above especially erosion and associated sediment and nutrient discharge to streams. In some cases the management and maintenance of the agricultural and urban drainage systems has not been adequate. Repair or improvement of agricultural ditches in the CRWD needs to include proper control measures to minimize adverse impacts downstream. These measures require effective planning and implementation, and may include re-sloping of banks, providing buffers, and increasing their storage capacity.

Policies that guide the maintenance of the agricultural and urban drainage systems in the CRWD and the assessment of costs are needed. The ditch authority's maintenance program needs to incorporate the use of BMPs such as buffers and sediment ponds. CRWD is not currently the authority for public drainage systems, but may be asked to accept this authority from the counties (per Minnesota Statutes 103D.625). There are many private ditches (which may or may not be Minnesota Department of Natural Resources (MDNR) public waters) that affect the hydrology of the CRWD. There is a need to understand the impacts of all drainage systems, both publicly and privately held, on the hydrology of the CRWD and its impact on pollutant transport.

3.5 Wetland Problems and Issues

Wetland filling and drainage have placed significant pressure on water resource quality and quantity management. Determining the degree of wetland loss in the CRWD is limited by the availability of data. Identifying potential areas for wetland restoration and restoring wetlands as opportunities arise could mitigate the historic loss of wetland areas.

3.6 Groundwater Problems and Issues

The following issues regarding groundwater have been identified within the CRWD:

- The location of groundwater recharge areas in the CRWD have not been mapped or documented in any detail.
- Groundwater is the drinking water source for most citizens of the CRWD and therefore needs protection.

Groundwater, like surface water, varies in quality and quantity and is often more difficult to assess. Due to the porous substrate in the CRWD, the possibility of groundwater

contamination is ever present. At the same time, groundwater is the primary source of drinking water in the CRWD and is used for domestic, industrial and agricultural purposes.

Ground water quality is threatened by activities occurring on the land as well as below the land surface such as improperly operating SSTs, nonconforming feedlot operations, and chemical contamination from landfills, storage tanks, spills and other similar activities. The application of fertilizers and chemicals to crops and lawns, the disposal of waste in the soil and construction below the surface in the form of wells, sewers, pits and quarries can also impact the quality of water below the ground surface.

Areas with sandy surface sediments and shallow limestone aquifers are areas with greatest susceptibility. However, most groundwater is susceptible to contamination from improper application of farm and lawn chemicals and fertilizers, feedlot and urban stormwater runoff, and improper disposal of wastewater from SSTs and municipal treatment plants.

Little work has been done in the CRWD to determine which hydrologic units and wells are most vulnerable due to geography or geology, and to develop maps and protection plans. There is a need for this work to occur in the watershed.

There is also a need to promote and provide public education regarding lawn and agricultural fertilizer and chemical use, proper wastewater treatment, and solid waste disposal to reduce chemical and nutrient infiltration to groundwater.

3.7 Land Use Management Issues

Significant changes in the use of land in the CRWD have occurred over the past 100 years. Forest and prairie were predominant in presettlement times. Today, agricultural land uses dominate the landscape. These changes have especially important consequences for streams and lakes, due to the disappearance of natural vegetation which has removed a substantial amount of the natural buffering that previously existed, and has resulted in increased runoff volumes and velocities.

The following issues relating to land use impact water resources in the CRWD:

- Significant alterations of the landscape have occurred over the last 100 years that have dramatically impacted the quality and quantity of water.
- The amount of vegetative buffering that helps to reduce erosion and the transport of sediment and nutrients has been significantly reduced in composition (from trees to shrubs to seasonal grasses) as well as the amount of land area covered.
- The amount of exposed or bare soil conditions through use of the land, from agricultural to mining to land and road construction, dramatically increases the vulnerability of soil erosion and the transport of sediments and nutrients.
- Development has increased surface water runoff and phosphorus loading on CRWD rivers and streams.
- Land use is a matter primarily of local control and local governmental resources are limited.

- The CRWD can provide technical and financial assistance to local units of government to better manage water and land related resource issues.

Agriculture is primary to the social and economic fabric of the CRWD. While it creates jobs, income, and essential products for community livelihood resulting from cultivation and the raising of livestock, it impacts the water resources in the CRWD. Land cover is important to both water quality and quantity in terms of surface water runoff. Each spring and fall, cultivated lands create bare soil conditions, which can erode and runoff into surface water. Finding fair and effective solutions that minimize water resource problems relating to agriculture will challenge the CRWD.

As a part of the MPCA feedlot program, counties have inventoried feedlots and developed databases. This analysis could be utilized to prioritize efforts towards mitigating the impacts of feedlots on water resources in the CRWD.

SSTS serve a large number of households in the CRWD. In general, the higher concentrations of septic systems are found in rural residential neighborhoods, and in the smaller communities in the CRWD that do not presently have a public sewer treatment facility. Detailed data for analyzing the impacts of septic systems on water resources in the CRWD is not readily available. Each county administers an SSTS ordinance and permitting program but the data is typically not site specific or easily convertible to mapping.

Continued inspection of systems and provision of low-interest loans for upgrades could be a priority for targeted areas in the CRWD. Reconstruction, replacement or connection to municipal or common sanitary sewer systems of nonconforming septic systems in these areas should receive the highest priority for funding and technical assistance. New systems in these areas should be inspected by the appropriate local officials.

Within the CRWD there are sand and gravel pits. Aggregate and stone materials produced from these sites has provided a range of products essential for growing communities such as those for road and building construction. Unfortunately, pits and mines are often abandoned and not properly closed. Further, the location and condition of many of these potential abandoned pits and mines is not known. The CRWD should consider developing an inventory of existing mines and abandoned pits. Comparing those sites with a soil sensitivity map would help to prioritize any reclamation and revegetation efforts toward groundwater protection. The impacts that mining can place on water resources, from dewatering to stormwater runoff and erosion, can be significant.

3.8 Public Education

Within the overall watershed context individual actions are important. In order to mobilize the community, water resource education is critical. Currently there are limited and scattered efforts aimed at public education within the CRWD. The creation of the CRWD provides an opportunity to address education and public participation on a watershed scale.

3.9 Funding Problems and Issues

Funding projects and programs is always a challenging task and yet may determine the success of the CRWD's implementation plans. It is the intent of the CRWD Board to utilize funding from as many sources as might be available. Some of these might include:

- grants (federal state and local)
- ad valorem taxing authority
- assessments
- charges/fees ("utility")
- sales taxes
- donations and bequests

Descriptions of these funding sources are located in Chapter 5.1. CRWD can apply for a variety of grants to offset project and program costs. Grant programs change frequently, including amounts, priorities, availability of new grants, and termination of programs. Assessments are often met with public opposition as only properties that drain to and benefit from a certain project are charged. Assessments are also challenging to the watershed district as formulas computing the assessments are complex, notices must be served to all property owners, and property sales produce a steady stream of inquiries regarding the status of unpaid assessments. Ad valorem taxing authority has proved successful for other watershed districts for basic operations and small projects. However state law limits the amount of money that can be collected, excluding large projects from this source. Therefore many watershed districts use charges/fees, similar to other utilities, to pay for projects. In order to charge a fee, an amendment must be prepared to the watershed management plan.

Chapter 4.0

Goals, Objectives and Actions

Cedar River Watershed District Watershed Management Plan Chapter 4: Goals, Objectives and Actions

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4.0 Goals, Objectives and Actions

Cedar River Watershed District Mission Statement: *It is the mission of the Cedar River Watershed District (CRWD) to apply our statutory authorities in ways that protect and enhance safety, commerce, and natural resources for today and tomorrow.*

To accomplish this mission, the CRWD approach is to minimize and prevent (to the extent possible) future flooding and water quality problems and address existing flooding and water quality problems.

This chapter of the Cedar River Watershed District (CRWD) *Watershed Management Plan* (Plan) identifies the goals, objectives, and actions that will guide the CRWD in accomplishing its mission over the next ten years (2008-2018). Each action has been assigned specific information, thus laying the foundation for achieving goals and objectives.

The goals, objectives, and actions were developed with input from the public, CRWD Board of Managers and the CRWD Planning Advisory Group (PAG). The following provides a definition of each of these components:

Goal: A goal is an idealistic statement intended to be attained at some undetermined future date. Goals are purposely general in nature.

Objective: An objective is an action-oriented statement that supports the completion of a goal. There may be more than one objective per goal.

Action: An action is a specific task that will be implemented in order to help achieve or contribute to achieving an objective and goal.

4.1 Flood Control

Goal 4.1.1 - Protect human life, property, and surface water systems that could be damaged by flood events.

Goal 4.1.2 - Correct/address existing flooding problems.

Goal 4.1.3 - Prevent future flooding problems.

Objective A - Quantify and understand where and when flooding problems occur and how water is stored/drained in the watershed.

Actions:

1. Monitor (or arrange for monitoring of) water levels and flow rates on the primary flowages in the watershed, including water levels on Cedar River, its tributaries and other water bodies periodically, and during flooding events. This monitoring could range from volunteers reading stream gauges to the use of automatic flow gauging stations.

2. Photograph flooding events in the watershed, including aerial photographs during major flooding events.
3. Collect rainfall data from agencies and cooperators.
4. Survey remnant debris lines and other water marks after flood events that indicate how high water rose during the flood event.

Objective B - Regulate stormwater runoff discharges and volumes on a watershed-wide basis to 1) minimize flood problems, flood damages and the future costs of building and maintaining stormwater management systems; and 2) prevent structural damages during storms up through the critical 100-year precipitation event. Protect township, county, city and state infrastructure from flooding impacts.

Actions:

1. Require CRWD, the counties, the cities and/or the townships to evaluate the function and condition of stormwater systems and prioritize problem areas.
2. Provide incentives to counties, cities and townships to retrofit existing stormwater systems to reduce stormwater rates and volumes in priority locations.
3. Establish CRWD rules regarding flood control, such as rate control, flood levels, minimum building elevations, etc., and require townships, cities, and counties to implement them.
4. Establish and adopt 100-year floodplain elevations for those reaches of the Cedar River and its tributaries that are under the CRWD's jurisdiction. These floodplain elevations will be based on either a) current/future Flood Insurance Studies (FIS); or (b) studies completed by other entities (e.g., the CRWD, counties, cities, etc.) and accepted by the CRWD (**Figure 2-12** shows the current FEMA floodplains in the CRWD). This means the CRWD established floodplain may extend to areas (i.e., smaller tributaries) beyond those designated in FIS.
5. Review proposed improvements, developments and redevelopment projects in the watershed and, if necessary, require compliance with CRWD rules and policies to help ensure such projects will not create flood conditions that are worse than currently exist. The CRWD's review of development, redevelopment and improvement projects in the watershed includes review of proposed work in the CRWD established floodplain.
6. Require project proposers to apply best management practices (BMPs) to site designs that reduce the volume and rate of stormwater runoff, to the maximum practical extent. Examples of urban stormwater runoff volume reduction methods include:
 - Reducing the amount of planned impervious surface (as areas develop).

- Reducing the amount of impervious surface (during redevelopment).
- Rain gardens and other BMPs that promote infiltration.

In areas where infiltration is difficult to achieve or not desirable, project proposers must consider providing extended detention basins.

7. Allow only those land uses in the CRWD established floodplain that will not have facilities that could be damaged by floodwaters and will not increase flooding. Allowable types of land use that are consistent with the floodplain include recreation areas, parking lots, excavation and storage areas, public utility lines, agriculture, and other open spaces.
8. Prohibit permanent storage piles, fences and other obstructions in the floodplain that would collect debris or restrict flood flows. The CRWD will work with the MDNR to remove downed trees, snags and debris in the main channel of the Cedar River, especially after flood events, to reduce flow resistance.
9. Prohibit net filling within the CRWD-established floodplain and develop a “no net loss of floodplain” rule.
10. Prevent (if possible) construction of new roads in the floodplain, and bring existing roads out of the floodplain, if possible. Discourage development where the sole access to the site is through the established 100-year floodplain.
11. Minimum building elevations:
 - a. Require the following minimum building elevations be met for all new permanent structures located within or around the CRWD established 100-year floodplain:
 - i. The lowest floor (including basement) must be at least 1 foot above the 100-year floodplain elevation; this requirement is equivalent to the regulatory flood protection elevation within FEMA-designated floodplains as defined in MN Rules 6120.
 - b. Encourage the following minimum building elevations be met for all new permanent structures located within or around the CRWD established 100-year floodplain:
 - i. The lowest floor (including basement) must be at least 3 feet above the highest local groundwater elevation.
 - ii. All HVAC facilities must be at least 2 feet above the 100-year floodplain elevation.
 - iii. All HVAC facilities must be at least 3 feet above the highest local groundwater elevation.

- iv. The lowest opening must be at least 2 feet above the 100-year flood elevation of emergency overflow swales.
12. Assist and require municipalities and counties within the watershed to implement floodplain ordinances that are consistent with a Cedar River model ordinance (utilizing FEMA standards) and that cover the CRWD established floodplain. [The “broader CRWD-established floodplain” is as discussed in Action 4 above. Typically, city/county floodplain ordinances only regulate activities within the FEMA-designated floodplain shown in the FIS. By following this requirement, cities/counties would be applying their ordinances to floodplains of smaller tributary streams and detention/retention basins.]

Objective C - Decrease the risk of flooding throughout the watershed; specifically, decrease flooding by 20 percent in the Cedar River through the City of Austin during the critical 100-year rainfall or snowmelt event (based on current precipitation and runoff design events).

Actions:

1. The CRWD will accomplish this objective through the following key steps:
 - a. Set 100-year flow rate goals for subwatersheds throughout the CRWD.
 - i. The CRWD will set flow rate goals for a number of subwatersheds in the northern/upstream part of the Cedar River watershed. **Figures 4-1A and 4-1B** show the CRWD subwatersheds and if a flow rate goal has been set for the subwatershed. **Table 4-1** shows the subwatershed flow rate goals. These flow rate goals are based on the modeling results shown in the *Upper Cedar River Surface Water Management Plan* (Barr, September 2007).
 - ii. The CRWD will set flow rate goals for the remaining subwatersheds in the CRWD by developing and/or updating hydrologic and hydraulic models. **Table 4-2** shows the subwatersheds where flow rate goals have not yet been set, but a model already exists and would need updating to set flow rate goals. **Table 4-3** shows the subwatersheds where flow rate goals have not yet been set, and no model exists. For this situation, either the existing model would need to be expanded to incorporate these subwatersheds, or a new model would need to be developed. **Figure 4-1A, Figure 4-1B, and Table 4-1** will be updated as models are developed and/or updated.
 - iii. As additional modeling is completed, the CRWD may revise already-set flow rate goals, where appropriate.
 - b. Designate “priority” subwatersheds, where flood control features and measures should be implemented first. **Figures 4-1A and 4-1B** show the CRWD’s initial designated priority subwatersheds. This initial designation is based on two

criteria: 1) the CRWD has set a flow rate goal for the subwatershed, and 2) there are no Minnesota Department of Natural Resources (MDNR) public waters present in the subwatershed. Generally, these subwatersheds are the furthest upstream subwatersheds. **Figure 4-1A and Figure 4-1B** will be updated as models are developed and/or updated, and as priorities change.

- c. Construct/implement flood control features and measures that achieve the CRWD's subwatershed flow rate goals.
2. The CRWD will focus on implementing flood control features and measures in the designated "priority" subwatersheds. Possible flood control features and measures that the CRWD will consider include:
- a. Infiltration of all or a portion of the surface water runoff from a storm event into the soil. Examples of infiltration devices include:
 - i. Infiltration basins
 - ii. Subsurface infiltration trenches
 - iii. Rainwater gardens/bio-retention basins
 - iv. Native plantings (encourage infiltration through their deep root systems)
 - v. Porous pavement
 - b. Detention devices to slow down surface water runoff or channelized flows. Examples of detention devices include:
 - i. Wetlands
 - ii. Dry basins (e.g., berms constructed across swales, culvert restrictions, road raises, abandoned railroad berms modified for detention)
 - iii. Extended detention basins (similar to dry basins, but designed to hold water longer by draining more slowly)
 - iv. Wet detention basins, where the permanent pool provides water quality treatment and the "bounce" above the normal permanent pool elevation provides flood detention
 - v. Other facilities/practices that slow down the flow of stormwater runoff across the land, such as contour farming, conservation tillage, Conservation Reserve Program (CRP) land (in permanent vegetation), other agricultural runoff conservation practices, and buffers
 - c. Drawdown of lakes/ponds in anticipation of flood events. This is only effective if there is enough forewarning to perform the drawdown, such as a spring

snowmelt event. The CRWD will also need to consider the water quality and other impacts of such drawdowns.

3. Coordinate with Turtle Creek Watershed District to achieve the subwatershed flow rate goals for the Turtle Creek watershed, as set in the *Upper Cedar River Surface Water Management Plan* and as set in the Turtle Creek Watershed District report *Summary of Potential Water Storage Sites* (Barr, 1970). **Figure 4-2** shows the subwatersheds in the Turtle Creek Watershed District where flow rate goals have been set.
4. In the event of a road washout:
 - a. Require the road authority to create a protected overflow path/route where protective armoring material prevents future road washouts.
 - b. Encourage the road authorities to consider implementing flood reduction measures where increased flooding will not be problematic for upstream buildings and land areas; examples of flood reduction measures include:
 - i. Maintaining existing culvert size(s)
 - ii. Raising the road elevation
 - iii. Adding a flow restriction
5. Analyze the upstream and downstream impacts of proposed flood reduction measures and mitigate any negative impacts prior to their implementation.
6. Support the removal of homes, businesses, and other occupied structures from the floodplain.
7. Provide financial or other assistance (when possible) to implement localized individual floodproofing measures for those structures that cannot be moved out of the floodplain. These measures could include raising the building; abandoning the lower level; floodproofing the lower level with membrane wrap and installing a tile/sump pump system with backup power; and constructing small berms/dikes.
8. Apply for grants from the MDNR, other state and federal agencies, and other sources to support the funding of flood control/flood reduction projects.
9. Operate, inspect, maintain, modify and repair all future CRWD flood control and water quality improvement projects.

Objective D – Provide leadership and assist townships, cities, and counties with coordination of intercommunity stormwater runoff planning and design.

Actions:

1. Support the development of a coordinated and comprehensive program with partnering agencies for administering and implementing BMPs on agricultural lands.

2. Develop and enforce rate control rules (e.g., post-development rates must be less than or equal to pre-development rates).
3. Prohibit diversions of surface water within, into, or out of the watershed that may have a substantial adverse effect on stream flow or water levels at any point within the watershed.

4.2 Water Quality

Goal 4.2.1 - Encourage and implement practices to address current water quality problems, and to maintain or improve the quality of surface waters in the CRWD.

Objective A - Develop and support the use of BMPs relating to improving the quality of surface water for all land uses and activities in the watershed.

Actions:

1. Support the development of a coordinated and comprehensive program with partnering agencies for administering and implementing BMPs on agricultural and urban lands.
2. Partner with federal, state, and local agencies to promote efficient use of fertilizers for agricultural and residential applications including: soil testing, application recommendations, and sewage/manure application monitoring.
3. Support the Soil and Water Conservation Districts (SWCDs) in their role as the buffer strip program coordinator for all efforts by federal, state, and local agencies, and non-profit groups to implement agricultural buffer projects.
4. Work with local feedlot officers to bring feedlot operations in compliance with state regulations.
5. Develop and implement a coordinated and comprehensive program with partnering agencies for administering and implementing BMPs in riparian/shoreland areas, including a program that supports the design, installation and maintenance of riparian/shoreland vegetation in riparian/shoreland areas. The program should provide incentives to riparian/shoreland landowners to maintain and enhance natural vegetation on their property.
6. Work to incorporate water quality treatment components into future flood control projects for cost efficiency and effective use of land resources.
7. Provide municipalities and counties with technical assistance in applying stormwater management BMPs on road and land development projects.
8. Work with cities, counties, townships and other agencies to assess and address water quality issues relating to road salt application, salt storage, snow removal, and snow piling/disposal.

9. Continue to apply for grants from the Minnesota Pollution Control Agency (MPCA), Minnesota Board of Water and Soil Resources (BWSR), other state and federal agencies, private foundations, and other sources to support the funding of targeted water quality projects relating to point and non-point pollution sources.
10. Partner with local government offices to discourage the improper spreading/application of manure and sewage - e.g., keep away from creeks and other areas of concentrated flow, such as draws and swales. Encourage the use of filter strips between manure/sewage application areas and areas of concentrated flow (swales, draws, streams, etc.).
11. Partner with the SWCDs/NRCS to encourage practices that exclude livestock from streams, creeks, ponds, concentrated flow areas, etc.

Objective B - Eliminate or minimize the discharge of untreated stormwater to the Cedar River and its tributaries, as well as other watercourses and water bodies in the CRWD.

Actions:

1. Support efforts by local units of government in the CRWD to develop, adopt and administer performance standards that protect water resources.
2. Develop rules to address stormwater discharge rate, volume and quality.
3. Develop a program that encourages communities, landowners, and other road authorities to eliminate or minimize the discharge of untreated stormwater runoff to the surface water resources in the CRWD.
4. Develop rules requiring CRWD to be notified of all new direct discharges (including tile systems) to water resources.
5. Develop CRWD permitting procedures, including but not limited to, applications, checklists, fees, and inspections.
6. Develop an enforcement program for the CRWD rules.
7. Operate, inspect, maintain, modify and repair all future CRWD flood control and water quality improvement projects.

Objective C - Reduce the level of pollutants in surface waters of the CRWD as identified in Total Maximum Daily Load (TMDL) studies.

Actions:

1. Support the MPCA and other monitoring programs for rivers, streams, and other waterbodies in the watershed.
2. Support the preparation of TMDL studies for the MPCA-designated impaired waters in the CRWD.

3. Develop performance standards and rules to protect surface water in the CRWD, as recommended in the TMDL studies.
4. Take the lead and coordinate with the counties and local units of government in implementing the water quality improvement measures recommended in TMDL studies to reduce pollutants in MPCA-designated impaired waters in the CRWD. The CRWD will take on this role if funding is available and intends to fund these efforts through the receipt of grants.
5. Once it is completed, incorporate the implementation plan for the Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study into this Plan as an amendment (this study is scheduled to be completed in 2011). Similarly, implementation plans for future Cedar River TMDL studies will be incorporated into this Plan as amendments.
6. Consider implementing draft/preliminary water quality improvement measures identified in the Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study, prior to its formal approval by the EPA.
7. Cooperate with Turtle Creek Watershed District, Shell Rock River Watershed District, and other agencies/units of government (e.g., counties, SWCDs, cities) to implement measures to reduce nitrate concentrations in the Cedar River watershed.

Objective D - Prevent or minimize contaminants from entering surface water resources in the CRWD.

Actions:

1. Refer to the recommendations from the Minnesota Department of Health (MDH) *Recommendations And Guidance Pertaining To The Development And Implementation Of Source Water Protection Plans For Public Water Supplies Relying On Surface Waters* (2005) and MDH *Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas* (2007) for guiding the development of source water protection plans for systems that use surface water sources.
2. Support the preparation and implementation of source water protection plans in the CRWD.
3. Support the counties', cities' and townships' efforts to minimize surface water impacts from SSTs.
4. Coordinate with counties, townships and cities to create and update an inventory of municipal and commercial/industrial point source discharges to surface waters.

Goal 4.2.2 - Improve and increase the understanding and knowledge of the quality of the surface water resources in the Cedar River watershed.

Objective A - Develop, operate, and maintain a surface water quality monitoring program in the CRWD.

Actions:

1. Prepare an annual water quality monitoring program that delineates the specific sites and monitoring to be undertaken in the upcoming year(s). The CRWD will install and operate automatic sampling equipment at as many sites as possible (as funding allows).
2. Implement the annual water quality monitoring plan, which may include monitoring key tributaries, streams, lakes, high quality wetlands, surface runoff in drainage ditches, and other water resources within the CRWD.
3. Gather and organize monitoring results and maintain an active and user-friendly database.
4. Support volunteer and agency efforts to monitor water resources in the CRWD.
5. Support the active involvement of citizens in the monitoring of water resources in the CRWD through existing programs of the MPCA or other agencies and/or developing specific programs for groups such as schools within the CRWD.

Objective B - Assess and analyze data collected from the surface water monitoring program.

Actions:

1. Develop a web-based digital database for surface water monitoring data that connects specific data with monitoring sites.
2. Include a summary of the surface water monitoring results in the annual report.

Goal 4.2.3 - Promote and enhance the full economic value and benefits of the Cedar River watershed.

Objective A - Support the maintenance of clean water supplies for the public, as well as agricultural uses and livestock.

Actions:

1. Advocate programs through the USDA Farm Services Agency (FSA) and other agencies that support good water supplies for agricultural operations.
2. Develop and implement a riparian area livestock fencing program to keep livestock out of riparian areas.

3. Advocate for the development of wellhead protection plans for municipal water supplies.

Objective B - Support the maintenance of clean water for shoreland development and rural residential uses.

Actions:

1. Maintain data that reflects the economic benefits of clean water in the CRWD's rivers and streams to the local economy.
2. Identify quantifiable aspects of the benefits that riparian area protection efforts have on communities.

Objective C - Support the maintenance of clean water resources for commercial and industrial uses.

Actions:

1. Review and provide comments on all surface water appropriation permits for the MDNR.

4.3 Agricultural and Urban Drainage Systems

Goal 4.3.1 - Inventory and analyze the state of the agricultural and urban (public and private) drainage systems within the CRWD.

Objective A - Inventory and map all agricultural and urban (public and private) drainage systems in the watershed to further the CRWD's understanding of where and how water is drained throughout the watershed. Analyze/understand ongoing maintenance needed for drainage systems to correct/address existing flooding problems or to prevent future flooding problems in the watershed.

Actions:

1. The CRWD will not seek authority over the public drainage systems within the CRWD, but may be asked to accept this authority from the counties (per Minnesota Statutes 103D.625).
2. Work with the drainage authorities, SWCDs, counties, townships, property owners and others to develop an inventory of available data regarding agricultural and other rural drainage systems (e.g., maps, plans, and legal descriptions of drainage features) to determine location, approximate size of tile, approximate dimensions of ditches (profile and cross section), and type/condition of vegetation along and within the ditch (e.g., trees, grass, deadfalls, eroded areas, sediment deltas). Where information is not available, obtain data through surveys or other methods and add the data to the inventory. Where needed, work with the drainage authorities, SWCDs, counties, townships, property owners and others to field review the drainage capacity and

condition of each agricultural and other rural (public and private) drainage system in the watershed. Collect and organize records on ditch maintenance and assessments.

3. Work with the drainage authorities, SWCDs, counties, townships, property owners and others to develop and maintain the data for agricultural and other rural drainage systems for each county in the CRWD, using GIS software.
4. Work with the drainage authorities, SWCDs, counties, townships, property owners and others to correlate the drainage systems to current land use conditions and with erodible soils, steep slopes, and other sensitive soil characteristics.
5. Work with the drainage authorities, SWCDs, counties, cities, townships, and others to identify specific areas within agricultural and urban areas where drainage systems are causing significant impacts to water resources and work to correct or minimize such impacts as described in Chapters 4.1 and 4.2 of this Plan.
6. Work with the drainage authorities, SWCDs, counties, cities, townships, and others to develop a prioritized listing of drainage systems where action is required to correct water quality and quantity problems.
7. Work with the drainage authorities, SWCDs, counties, cities, and townships to
1) develop an ongoing schedule for visiting and inspecting all drainage systems for maintenance purposes, and 2) develop a comprehensive drainage system monitoring and maintenance plan including an inventory and assessment of past maintenance efforts, identification of chronic problem areas, and a prioritization of maintenance needs.

4.4 Erosion and Sediment Control

Goal 4.4.1 - Minimize erosion and its effects on water quality.

Objective A - Support the construction of sediment ponds, basins (including re-establishment of wetlands), and other erosion and sediment control BMPs throughout the watershed.

Actions:

1. Develop rules requiring application of and appropriate design requirements for sediment ponds, basins, contour farming, buffer strips, conservation tillage, grassed swales/draws, and other erosion and sediment control BMPs.
2. Provide design recommendations and technical assistance for erosion and sediment control plans prepared for all major construction and roadway projects.
3. Provide support and assistance for the construction of sediment ponds and basins for intensive agricultural operations.
4. Facilitate discussions and provide seminars or workshops for local units of government, agencies and relevant parties on issues of BMPs and stormwater.

5. Investigate and implement measures that address controlling the movement of sediment once it has entered the river or stream system, and the minimization of bank erosion.

Objective B - Develop and implement programs that protect sensitive areas from erosion.

Actions:

1. Develop rules requiring the preparation of plans that show grading and temporary and permanent erosion/sediment controls for all major land development proposals and public construction projects.
2. Develop procedures and methods for enforcing CRWD grading and erosion control requirements.
3. Work with the SWCDs/NRCS to develop an erosion problem inventory for prioritized application of stabilization BMPs.
4. Encourage livestock producers to develop grazing plans to reduce grazing in streams, creeks, ditches, draws, and other waterways.

4.5 Wetlands and Natural Resources

Goal 4.5.1 - Maximize the water quality and quantity benefits of wetlands.

Objective A - Identify, restore, and enhance wetland areas on a prioritized basis to improve surface water quality, promote groundwater recharge, and support biodiversity in the CRWD.

Actions:

1. Support a coordinated interagency watershed-wide study to determine the location of presettlement wetlands and the amount of wetland area that has been drained or filled.
2. Work with the SWCDs/NRCS/MDNR to develop and adopt a prioritized list of wetland restoration opportunities.
3. Support and assist in the restoration and re-establishment of priority wetlands as feasible.
4. Support the use of a wetland banking program in the CRWD.

4.6 Land Use

Goal 4.6.1 - Protect water resources from impacts associated with land use and land development in the CRWD.

Objective A - Support the development and implementation of local land use plans and policies that are based on sound water and land resource principles.

Actions:

1. Provide technical assistance and information to communities regarding surface water, groundwater and land resources.
2. Review and comment on goals and policies proposed in county and municipal plans as they are being prepared. Recommend the integration of goals and policies that protect water resources.
3. Coordinate the implementation of resource protection programs with local governments through the adoption and implementation of county and municipal land use plans.

Goal 4.6.2 - Promote the coordination of land use management and regulation with other land use authorities in the CRWD.

Objective A - Support and coordinate the development and implementation of land use plans, ordinances, and other official controls which protect water resources.

Actions:

1. Inventory and assess local controls for effectiveness, consistency and coordination as they relate to water resource management.
2. Assist local units of government in their development of appropriate protections where they lack standards or regulatory controls to protect water resources.
3. Provide technical assistance and information regarding natural resources to local units of government in the CRWD to assist them in their efforts to prepare zoning ordinances, subdivision regulations, SSTS ordinances, feedlot ordinances, official maps and other regulatory controls as well as preparing for meetings with variance boards, planning commissions, water planning committees, and other water related boards and committees. (SSTS are also known as septic systems and individual sewage treatment systems (ISTS)).
4. Review and comment on the specific regulations relating to water resource issues proposed in the various ordinances as they are being prepared.
5. Assist local governments in the administration of their ordinances as they relate to water resource management.

6. Review and provide recommendations on subdivision plats and major zoning approvals as they relate to water resource management.
7. Assist cities and counties in the development, administration and enforcement of stormwater design standards.

Goal 4.6.3 - Encourage water resource protection in the Cedar River watershed through land conservation programs.

Objective A - Coordinate the implementation of land conservation programs as a part of the land development process.

Actions:

1. Assist in the collection, organization and distribution of information materials that describe the various land conservation programs that protect and conserve water and land related resources offered by federal, state, local agencies and non profit organizations. Examples of such resources include the Minnesota Department of Agriculture's *Minnesota Conservation Guide* (for agricultural practices) and the MPCA's *Minnesota Stormwater Manual* (for stormwater management practices).
2. Recommend that all local governments in the watershed with land use controls incorporate goals and policies that encourage the use of land conservation programs.
3. Support the SWCDs/NRCS to encourage the use of the Conservation Reserve Program, the Reinvest in Minnesota Program and other land resource protection programs.
4. Support the development of conservation easements in appropriate areas of the watershed concurrent with land development requests.
5. Work with the SWCDs/NRCS to promote the adoption of conservation tillage and contour farming through education and interaction with farmers.
6. Recommend and provide assistance on the preservation or installation of buffers along surface water features through applicable conservation programs.

Objective B - Support and coordinate the use of conservation agricultural practices that protect and conserve water resources in the CRWD.

Actions:

1. Work with the SWCDs/NRCS to assist farmers in using crop residue management practices, no-till drilling, rotational grazing, grassed waterways, terracing and other methods to prevent or reduce erosion.
2. Partner with local agencies to support tours and field demonstrations on improved agricultural practices.

3. Research and analyze the impacts of new farm bills and related legislation. Review the land conservation programs that are funded or mandated through the legislation and their impacts on the CRWD's programs and projects.
4. Support and coordinate with other units of government and organizations to develop programs that protect farmland through water resource conservation programs.
5. Develop an incentive program that provides financial assistance for the implementation of conservation practices by agricultural operators in the CRWD.

Objective C - Support the development of a riparian area planting program.

Actions:

1. Develop a program that provides financial incentives for permanent riparian plantings in priority areas of the CRWD.
2. Work with the SWCDs/NRCS to provide technical assistance on the selection of the appropriate planting materials and maintenance of vegetation in riparian areas.
3. Maintain a list of equipment suppliers and contractors who can provide equipment and services needed to install and maintain vegetation.
4. Partner with the SWCDs to increase the incentive for landowners to create buffer strips along wetlands, rivers and streams in the district.

4.7 Recreation, Habitat, and Shoreland Management

Goal 4.7.1 - Attain a high degree of recreational use of the surface water resources in the Cedar River watershed.

Objective A - Develop an outreach program to promote the recreational use of surface water resources in the CRWD.

Actions:

1. Develop and distribute a Cedar River watershed recreational map to chambers of commerce, the Minnesota Department of Trade and Economic Development and other tourism organizations.
2. Support the distribution of MDNR public access maps for rivers and streams within the CRWD.
3. Support the development and distribution of a Cedar River canoe route map.
4. Distribute maps locating public hunting lands within the watershed.
5. Support the development of marketing materials that promote major destinations and features in the watershed.

Objective B - Develop a plan for managing fish, wildlife, and other recreational resources.

Actions:

1. Work with MDNR (Divisions of Fish and Wildlife and Waters) to develop and implement management programs.
2. Support the inventory of fish and wildlife resources.
3. Support the identification and protection of critical water bodies and wetlands for fish and wildlife.
4. Support the minimization of road ditch mowing during the nesting season.

Objective C - Support increased opportunities for the safe and sustainable use of surface water resources in the CRWD.

Actions:

1. Work with the MDNR Division of Trails and Waterways to support the design and construction of public access facilities to surface water features in the CRWD, where appropriate.
2. Support the open and unimpeded access and use of all navigable public waters in the CRWD. Coordinate and assist enforcement efforts to maintain open access and to remove illegal fencing.

4.8 Groundwater

Goal 4.8.1 - Protect groundwater resources in the Cedar River watershed.

Objective A - Support the development and implementation of wellhead protection plans.

Actions:

1. Provide technical assistance to communities preparing wellhead protection plans. Provide additional staffing support to community water suppliers and transient systems where there is limited or no staffing available to prepare the plans.
2. Share resource information with public water suppliers that can help in identifying and establishing source water protection areas.
3. Pursue financial resources to assist communities in the purchase of development rights in vulnerable wellhead protection priority areas.
4. Meet with landowners and public water suppliers and facilitate workable solutions that protect the groundwater resources.

Objective B - Promote the locating and sealing of abandoned wells.

Actions:

1. Periodically include information on the potential impacts of abandoned wells in a CRWD newsletter and/or the CRWD website.
2. Work with local units of government to identify and record the locations of unused or abandoned wells.
3. Develop an abandoned well sealing cost-share program for targeted areas that are not adequately served by any municipal, county or state programs.

Objective C - Support land use practices that enhance high quality groundwater recharge.

Actions:

1. Encourage and support the responsible agencies to develop a groundwater recharge area map based on available information. Distribute the map to land use authorities in the CRWD for their use and consideration when reviewing land development proposals.
2. Coordinate and support the use of BMPs that protect and conserve groundwater resources.
3. Recommend and advocate the protection of wetlands, especially those considered essential for groundwater recharge.
4. Identify areas in the watershed where SSTs may potentially impact groundwater resources and monitor these areas on a regular basis.
5. Support the counties', cities' and townships' efforts to minimize groundwater impacts from SSTs.
6. Use the Minnesota Department of Health's *Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas*, and the MPCA's *Minnesota Stormwater Manual* guidance for evaluating proposed stormwater infiltration projects in wellhead protection areas.

Objective D - Support agricultural practices that protect and conserve groundwater resources in the watershed.

Actions:

1. Coordinate and support state and federal incentive programs that encourage agricultural producers to use groundwater protection BMPs in their operations.
2. Support the adoption and use of sound irrigation management techniques.

3. Investigate and implement a notification system or comment role regarding MDNR water appropriation permit applications.
4. Work with the state, county and local governments in evaluating the condition of SSTs.

Goal 4.8.2 - Improve and increase the understanding and knowledge of the groundwater resources in the CRWD.

Objective A - Develop an ongoing groundwater quality and quantity monitoring program.

Actions:

1. Assist responsible agencies in the development of a groundwater monitoring program that delineates the specific sites and monitoring to be performed in the upcoming year.
2. Assist responsible agencies in coordinating all groundwater testing efforts in the CRWD including programs through the MPCA, MDA, county health departments, Extension Service and other local programs.

Objective B - Establish and maintain a comprehensive database on groundwater resources in the watershed.

Actions:

1. Support other agencies' efforts to collect and gather existing data sets on groundwater monitoring.
2. Assist other agencies' efforts to organize and maintain records on groundwater permits.
3. Support other agencies' efforts to develop and maintain a database on groundwater use in the watershed.

Objective C - Assess and analyze data collected from the groundwater monitoring program.

Actions:

1. Develop a web-based digital database for groundwater monitoring data that connects specific data with monitoring sites.
2. Include a summary of the groundwater monitoring results in the CRWD annual report.

Objective D – Assess groundwater supply and quality of the aquifers in the watershed on an ongoing basis.

Actions:

1. Coordinate with counties, townships and cities to create an inventory of existing and abandoned gravel pits, junkyards, fuel storage facilities, and other potential point sources of groundwater contamination.
2. Assist responsible agencies in identifying and mapping groundwater recharge areas in the watershed.
3. Support increased intensity of groundwater monitoring in targeted areas.
4. Support the preparation of maps illustrating trends in groundwater conditions in the watershed.

Goal 4.8.3 – Encourage the wise use of groundwater resources in the Cedar River watershed.

Objective A – Provide technical assistance and comments on land development requests and permits on groundwater issues.

1. Provide comments on major subdivision and planned unit developments that have the potential to impact groundwater resources.

4.9 Administration

Goal 4.9.1 – Apply statutory authorities in ways that protect and enhance safety, commerce, and natural resources.

Objective A – Develop rules to implement the goals, objectives, and actions of this plan.

Actions:

1. Develop, adopt, and implement CRWD rules, in accordance with Minnesota Statutes 103D.341. The statute requires the following:
 - a. Rules will be adopted or amended by a majority vote of the managers, after public notice and hearing. Rules will be signed by the CRWD secretary and recorded in the board of managers' official minute book and/or posted on the CRWD website.
 - b. Prior to adoption, the proposed CRWD rules or amendment to the rules will be submitted to the BWSR for review and comment at least 45 days prior to adoption. The BWSR's review shall be considered advisory. The CRWD's proposed rules or amendments to the rules will also be noticed for review and

comment to all public transportation authorities that have jurisdiction within the watershed district at least 45 days prior to adoption.

- c. For each county affected by the CRWD rules, the managers will publish a notice of hearing(s) regarding the adopted rules in one or more legal newspapers published in the county and generally circulated in the watershed district. The managers will also provide written notice of adopted or amended rules to public transportation authorities that have jurisdiction within the watershed district. The managers will file adopted rules with the county recorder of each county affected by the watershed district.
- d. The CRWD will mail a copy of the rules to the governing body of each municipality affected by the CRWD rules.
- e. When a rule or resolution affects land or water within the boundaries of a city, the CRWD will notify the city of the rule content and intent.

Objective B – Provide training for board managers and advisory committee members to assist them in dealing with the complexities of managing a watershed district.

Actions:

- 1. Prepare a handbook that provides managers and advisory committee members with the basic procedures and processes involved in CRWD operations. Include a copy of the *Watershed District Handbook* prepared by the Minnesota Association of Watershed Districts, the adopted CRWD Plan, annual work programs and budgets, CRWD rules and bylaws, phone directory and meeting calendar.
- 2. Each new manager will attend the orientation workshop or similar program within the first six months of serving as manager.

Objective C – Develop and maintain an active legislative program.

Actions:

- 1. Support the legislative oversight and lobbying efforts of the Minnesota Association of Watershed Districts (MAWD).
- 2. Consider targeted lobbying efforts, when appropriate, to gain funding and support when specific measures and projects are identified.

Objective D – Investigate and remain informed of new studies and research on emerging surface water issues, contaminants, and technologies.

Actions:

- 1. Seek opportunities such as conferences and publications to learn about emerging issues regarding surface water and integrate this information into watershed management goals.

Objective E - Monitor the effectiveness and efficiency of CRWD programs and services.

Actions:

1. Annually evaluate CRWD performance in relation to the CRWD's established mission and goals and prepare an annual report for distribution to the county, BWSR and the MDNR, in accordance with Minnesota Statutes 103D.351. The annual report will incorporate the annual audit (see Chapter 4.11).

Goal 4.9.2 - Develop and maintain successful interagency working relationships to effectively implement the CRWD Plan.

Objective A - Build and maintain cooperative working partnerships with local, state, and federal government agencies.

Actions:

1. Provide a financial and regulatory link between local and state authorities where programs or projects are missing.
2. Maintain direct, on-going relationships with the cities, townships, counties, and SWCDs in the CRWD to optimize the joint implementation of CRWD, city, township, county, and SWCD goals.
3. Develop effective cooperative agreements with local, state, and federal agencies, including utilizing their assistance, activities, and expertise to implement the CRWD goals.

Objective B - Develop collaborative partnerships with local school districts, universities, and non-profit organizations to implement the plan, especially education and information programs.

Actions:

1. Partner with the University of Minnesota Extension Service, as well as local school districts, vocational/technical schools, and community colleges (e.g. Riverland Community College) to provide educational programs.
2. Create and maintain ongoing relationships with non-profit organizations, such as the Minnesota Farm Bureau, Pheasants Forever, Ducks Unlimited, local sportsman clubs, Boy Scouts, Girl Scouts, and the J.C. Hormel Nature Center.

Objective C - Develop a “chain of authority” to identify roles and responsibilities integral to plan implementation.

Actions:

1. Continually monitor and evaluate state and federal changes to water policy and programs in order to ensure that the CRWD Plan and Plan implementation remain consistent with changing policy and avoid inherent conflicts of interest.
2. Identify key players and the unique roles they play, or could play, in resolution of issues or plan implementation.
3. Identify overlapping roles between players and identify groups that contribute in a support capacity to reduce duplication of effort, streamline programs, and provide efficient and cost effective delivery of service.

4.10 Education and Public Involvement

Goal 4.10.1 - Maximize awareness and understanding of the value of water resources by all citizens living, working, and recreating in the Cedar River watershed.

Objective A - Support and coordinate the development and dissemination of educational programs and materials on water and land related resource issues and management throughout the watershed.

Actions:

1. Coordinate and develop educational programs on surface water resources.
2. Collect informational materials from the Extension Service on a regular basis and distribute to CRWD constituents.
3. Support youth education events and programs in school districts within the watershed.
4. Support the implementation of volunteer water resource projects.
5. Develop a public information package that can be distributed to landowners that explains what a watershed is and how they might impact water resources.
6. Gather, maintain and distribute data on economic benefits related to water resources.

Objective B - Develop a comprehensive public relations program.

Actions:

1. Prepare and distribute to all households in the watershed an annual CRWD newsletter via technologically appropriate media.
2. Prepare and distribute press releases that highlight CRWD activities and decisions.

3. Develop a CRWD logo and use on all future correspondence.
4. Develop and hold an annual poster contest for youth that focuses on water quality.
5. Produce, distribute and present targeted information for government and agency partners.
6. Contact media on an annual basis to update contact information and activities.
7. Establish an annual volunteer clean-up day to pick up debris and trash along rivers and streams.
8. Coordinate on-the-ground tours in CRWD to foster better understanding of water quality and related resource issues.

Objective C - Educate the citizens of the CRWD on surface water management.

Actions:

1. Distribute the results of the surface water monitoring program to the official CRWD newspapers.
2. Publish the results of the surface water monitoring program in the CRWD newsletter and/or website.
3. Develop a strategic education program that identifies key water resource stakeholder groups and outlines an educational strategy for each group.
4. Coordinate and disseminate information regarding University of Minnesota Extension Service, MPCA, BWSR or other workshops on surface water management topics.

Objective D - Develop an educational program for the general public on groundwater resources and safe drinking water.

Actions:

1. Develop a safe drinking water public education program that includes brochures, press releases, and informational materials. Utilize existing materials from other organizations such as the MDH and the MPCA.
2. Conduct an annual groundwater educational event for children on the importance of groundwater protection.
3. Provide residents in the CRWD with information about safe drinking water supply. Provide information to address the specific drinking water needs and concerns for infants, such as high nitrate levels.
4. Combine groundwater curriculum and materials with surface water education programs for students.

5. Distribute groundwater educational materials on a periodic basis to cities and townships for their use and distribution.
6. Incorporate water testing clinics into educational events.

Objective E - Maintain and update the CRWD website.

Actions:

1. Maintain the CRWD website and update as needed to post meeting agendas and minutes, publications, data, etc.
2. Post this plan and future plan amendments/updates on the CRWD website.

Objective F - Increase interest in and support of CRWD programs and projects.

Actions:

1. Maintain an advisory committee to advise and assist the managers on all matters affecting the interests of the CRWD and to make recommendations to the managers on all proposed projects and improvements within the CRWD (per Minnesota Statutes 103D.331). The advisory committee must consist of at least five members. If possible, the members should include representatives from the following: each SWCD; each county; a sporting organization and a farming organization. The members must live in the CRWD except for representatives of the SWCD and the county. The members serve at the will of the Board of Managers.
2. Seek to develop meaningful responsibilities for the advisory committee. These responsibilities could include: identification of water resource issues; assisting in establishing program goals; assisting the board in considering issues; serving as a "sounding board" for the board; communicating between the CRWD and the community; carrying out watershed information and education activities; collecting information and data; generating new ideas and approaches and carrying out delegated board of manager responsibilities.

Goal 4.10.2 - Encourage active public participation in the implementation of this plan and future plan updates and amendments.

Objective A - Develop an effective notification system for activities and actions administered by the CRWD.

Actions:

1. Maintain a list of local elected officials for all units of local government in the watershed.
2. Maintain a list of official newspapers where notices are published.

3. Maintain a list of all agency and organization representatives, including federal and state agencies, SWCDs, county planning and zoning, county environmental health departments, cities, townships, school districts, etc.

4.11 Funding

Goal 4.11.1 - Achieve fair and fiscally responsible management of the affairs of the CRWD.

Objective A - Develop an annual CRWD budget and implementation program.

Actions:

1. Adopt the CRWD annual budget after holding a public hearing and meeting other statutory requirements.
2. Update the CRWD's implementation program at least every two years, including the capital improvement program (CIP).

Objective B - Develop enhanced funding mechanisms to enable the CRWD to pursue the projects needed to improve water resources.

Actions:

1. Use the statutory tools provided to watershed districts to fund the implementation of this plan.
2. Seek grants, partnerships, loans, etc. whenever possible and cost effective to reduce the CRWD's share of project costs.

Objective C - Ensure the financial solvency and accountability of the CRWD and the efficient and effective use of CRWD funds.

Actions:

1. Complete an annual audit of the books and accounts of the CRWD, as required by Minnesota Statutes 103D.355. The audit will be included with the CRWD annual report (see Chapter 4.9).

Table 4-1 Subwatershed Flow Rate Goals (As Set by CRWD)

Subwatershed #	Existing Conditions 100-Year, 24-Hour Storm Peak Discharge (cfs) ^{1,2}	Proposed Conditions 100-Year, 24-Hour Storm Peak Discharge (cfs) ^{1,2}
Cedr-13	3,526	2,558
Cedr-29	2,030	1,863
Cedr-34	4,873	3,994
Cedr-47	1,018	220
Cedr-60	1,435	994
Cedr-61	1,312	932
Cedr-66	7,094	4,766
Cedr-79	446	243
Cedr-85	1,858	1,311
Cedr-96	781	398
Cedr-111	761	233
Cedr-123	1,034	950
Cedr-129	11,476	10,381
Cedr-144	2,412	1,865
Cedr-148a	12,182	11,062
Cedr-148b	17,092	14,126
Dbbn-1	138	106
Dbbn-2	212	190
Dbbn-3	295	124
Dbbn-4	785	465
Dbbn-5	98	86
Dbbn-6	114	100
Dbbn-7	1,109	777
Dbbn-8	116	72
Dbbn-9	67	29
Dbbn-10	1,443	576
Dbbn-11	1,394	583
Dbbn-12	127	45
Dbbn-13	1,836	737
Dbbn-15	2,378	809
Dbbn-16	2,431	822
Dbbn-17	2,029	846
Dbbn-18	226	54
Dbbn-19	2,266	838
Dbbn-20	29	12
Dbbn-21	20	10
Dbbn-22	36	6
Dbbn-23	138	68
Dbbn-24	2,338	844
Dbbn-25	180	119
Dbbn-26	2,283	975

Table 4-1 Subwatershed Flow Rate Goals (As Set by CRWD)

Subwatershed #	Existing Conditions 100-Year, 24-Hour Storm Peak Discharge (cfs) ^{1,2}	Proposed Conditions 100-Year, 24-Hour Storm Peak Discharge (cfs) ^{1,2}
Dbbn-27	75	69
Dbbn-28	66	18
Dbbn-29	255	192
Dbbn-30	3,742	1,987
Dbbn-31	139	89
Dbbn-32	134	90
Dbbn-33	458	427
Dbbn-34	734	493
Dbbn-35	850	539
Dbbn-36	103	36
Dbbn-37	428	418
Dbbn-38	405	391
Dbbn-39	113	113
Dbbn-40	55	38
Dbbn-41	38	8
Dbbn-42	763	296
Dbbn-43	827	196
Dbbn-44	805	197
Dbbn-48	1,816	920
Dbbn-49	1,775	837
Dbbn-50	85	33
Dbbn-51	409	346
Dbbn-52	57	8
Dbbn-53	23	14
Dbbn-54	451	359
Dbbn-55	2,079	1,121
Dbbn-56	1,755	823
Dbbn-57	1,680	820
Dbbn-58b	3,776	2,010
Mrph-7	1,428	900
Rbrts-6	1,657	1,184
Rbrts-12	865	437
Rbrts-26	1,383	1,094
Rbrts-27	1,986	728
Rbrts-33	3,904	1,606
Rbrts-38	6,996	3,612
Rbrts-46	1,957	496
Rbrts-52	2,631	856
Rbrts-57	550	347
UpCdr-7	754	229
UpCdr-13	585	225
UpCdr-24	1,533	787

Table 4-1 Subwatershed Flow Rate Goals (As Set by CRWD)

Subwatershed #	Existing Conditions 100-Year, 24-Hour Storm Peak Discharge (cfs) ^{1,2}	Proposed Conditions 100-Year, 24-Hour Storm Peak Discharge (cfs) ^{1,2}
Wolf-1	370	356
Wolf-2	86	53
Wolf-3	446	386
Wolf-5	760	414
Wolf-6	888	412
Wolf-7	1,093	456
Wolf-8	183	41
Wolf-9	175	38
Wolf-10	1,674	492
Wolf-11	1,744	968
Wolf-12	1,769	653
Wolf-13	103	30
Wolf-14	2,351	931

¹ Flow rate goals were set based on the modeling results given in the
Upper Cedar River Surface Water Management Plan

² Rates listed are for planning purposes only and are subject to change
with future study.

Total of 96 subwatersheds

Table 4-2 Subwatersheds Without Set Flow Rate Goals, but Subwatersheds Have Been Modeled

Subwatershed #
Cedr-1 - Cedr-12
Cedr-14 - Cedr-28
Cedr-30 - Cedr-33
Cedr-35 - Cedr-46
Cedr-48 - Cedr-59
Cedr-62 - Cedr-65
Cedr-67 - Cedr-78
Cedr-80 - Cedr-84
Cedr-86 - Cedr-95
Cedr-97 - Cedr-110
Cedr-112 - Cedr-122
Cedr-124 - Cedr-128
Cedr-130 - Cedr-143
Cedr-145 - Cedr-147
Cedr-149 - Cedr-158
Dbbn-14
Dbbn-45 - Dbbn-47
Dbbn-58a
Mrph-1 - Mrph-6
Mrph-8
Rbrts-1 - Rbrts-5
Rbrts-7 - Rbrts-11
Rbrts-13 - Rbrts-25
Rbrts-28 - Rbrts-32
Rbrts-34 - Rbrts-37
Rbrts-39 - Rbrts-45
Rbrts-47 - Rbrts-51
Rbrts-53 - Rbrts-56
Rbrts-58
UpCdr-1 - UpCdr-6
UpCdr-8 - UpCdr-12
UpCdr-14 - UpCdr-23
UpCdr-25 - UpCdr-27
Wolf-4

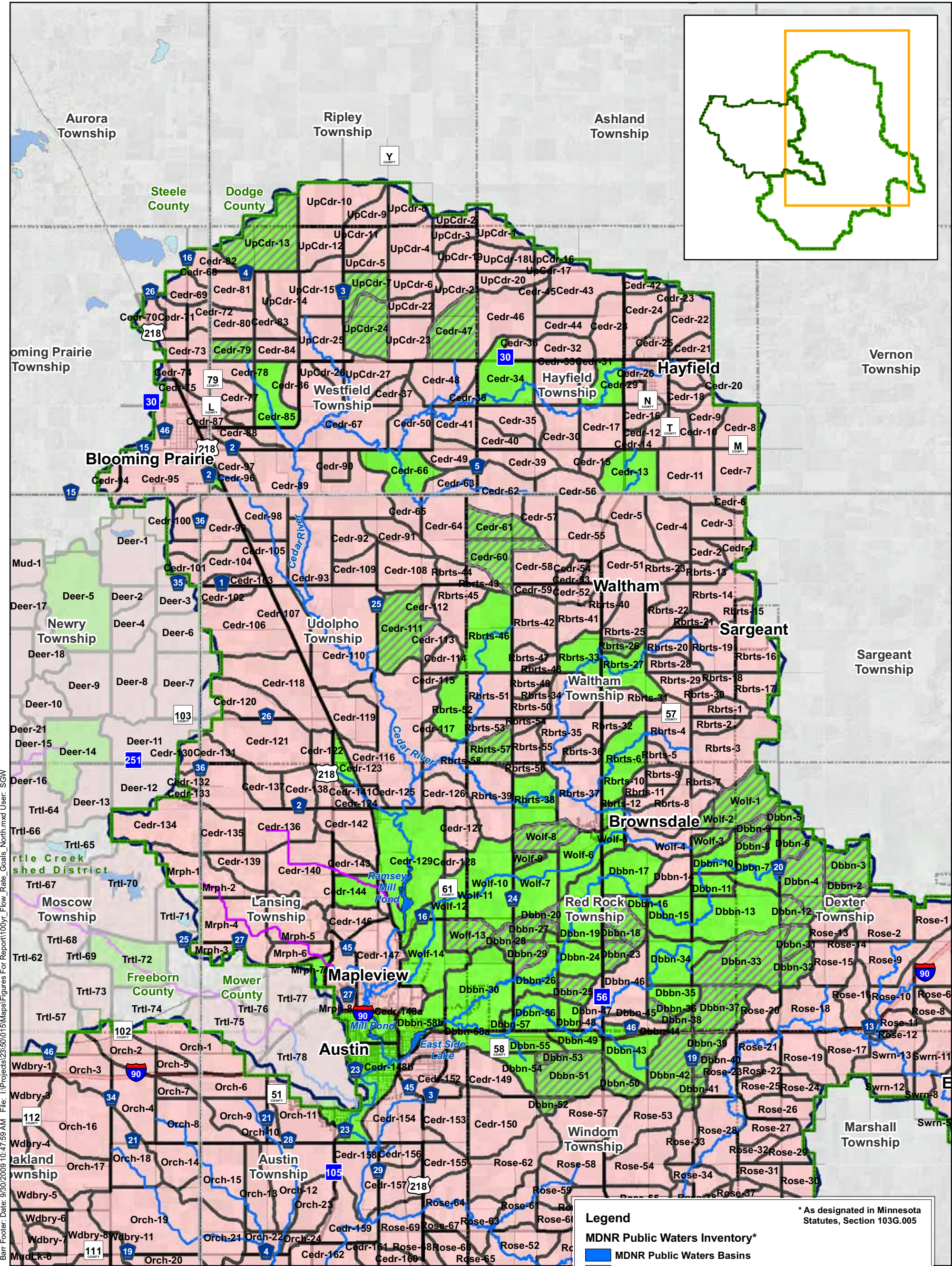
Total of 229 subwatersheds

Table 4-3 Subwatersheds Without Set Flow Rate Goals, and No Modeling has been Completed

Subwatershed #
Cedr-159 - Cedr-206
MudLk-1 - MudLk-14
Orch-1 - Orch-26
Out-1 - Out-3
Rose-1 - Rose-69
Swrn-1 - Swrn-13
Wdbry-1 - Wdbry-25

Total of 198 subwatersheds

Figures



Sources:
Flow Rate Goals - Barr, Upper Cedar River Surface Water Management Plan (2007)
Public Waters Inventory - MN Department of Natural Resources
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

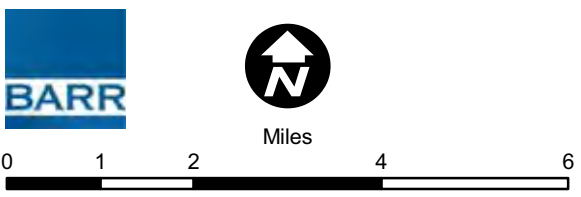


Figure 4-1A
Subwatersheds and
100-Year Flow Rate Goals:
North
Cedar River
Watershed District

Legend

MDNR Public Waters Inventory*

MDNR Public Waters Basins

MDNR Public Waters Wetlands

MDNR Public Watercourse*

MDNR Public Waters Stream

MDNR Public Waters Ditch (publicly or privately held)

Subwatersheds and Flow Rate Goals

100-Year Flow Rate Goal Set

Priority Subwatershed for Project Implementation – Flow Rate Goal Set & No MDNR Public Waters in Subwatershed

Need to Develop 100-Year Flow Rate Goal

County Boundary

Cedar River Watershed District Legal Boundary

Cedar River Watershed Hydrologic Boundary

Turtle Creek Watershed District

City and Township Boundaries

* As designated in Minnesota Statutes, Section 103G.005

Barr Footer: Date: 9/30/2009 10:47:59 AM File: I:\Projects\23\50\01\15\Maps\Figures For Report\100yr_Flow_Rate_Goals_North.mxd User: SGW

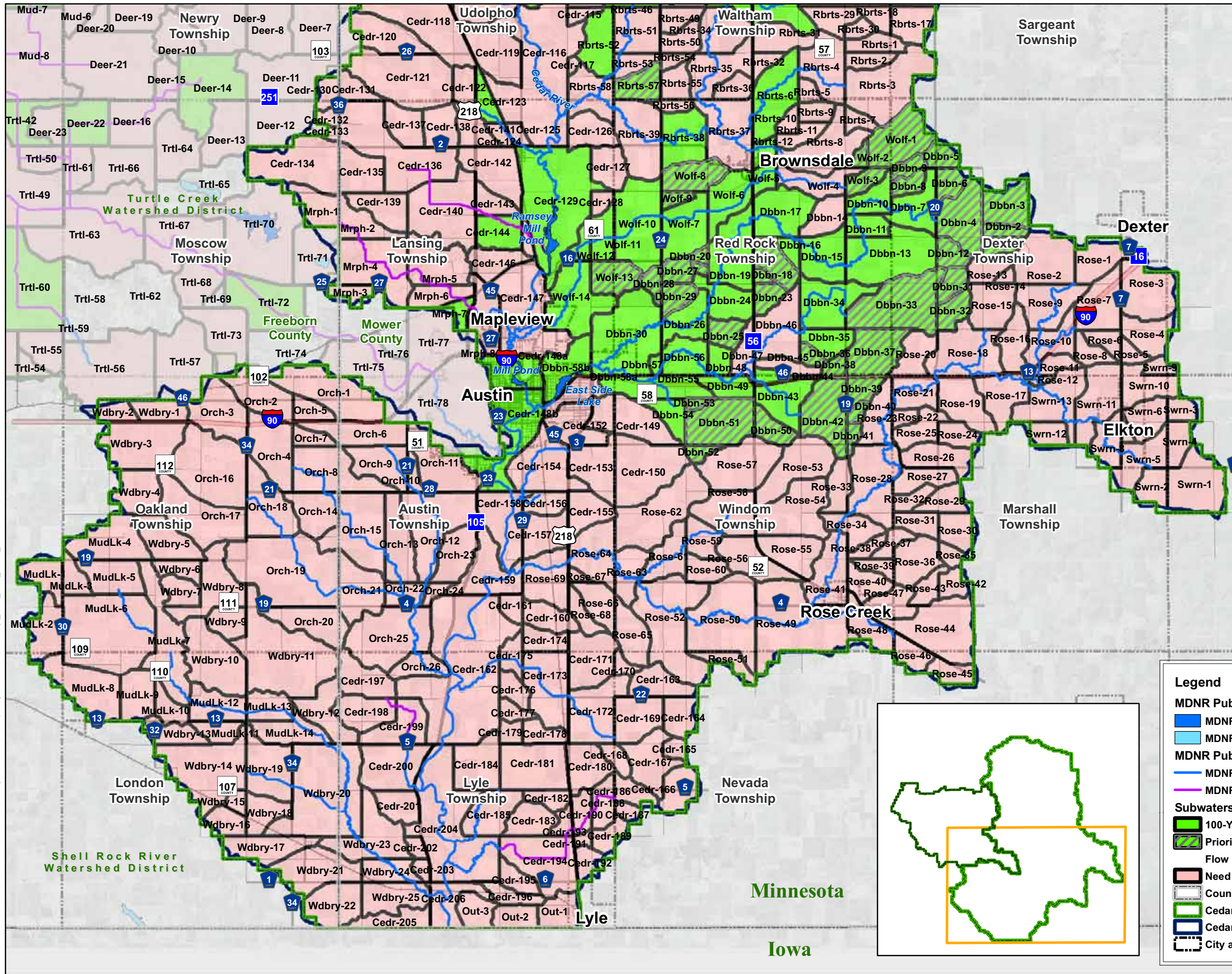


Figure 4-1B

Subwatersheds and 100-Year Flow Rate Goals: South

Cedar River Watershed District



Miles



Sources:
Flow Rate Goals - Barr, Upper Cedar River Surface Water Management Plan (2007)
Public Waters Inventory - MN Department of Natural Resources
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

Legend

MDNR Public Waters Inventory*

- MDNR Public Waters Basins
- MDNR Public Waters Wetlands

MDNR Public Watercourse*

- MDNR Public Waters Stream
- MDNR Public Waters Ditch (publicly or privately held)

Subwatersheds and Flow Rate Goals

- 100-Year Flow Rate Goal Set
- Priority Subwatershed for Project Implementation – Flow Rate Goal Set & No MDNR Public Waters in Subwatershed
- Need to Develop 100-Year Flow Rate Goal
- County Boundary
- Cedar River Watershed District Legal Boundary
- Cedar River Watershed Hydrologic Boundary
- City and Township Boundaries

* As designated in Minnesota Statutes, Section 103G.005

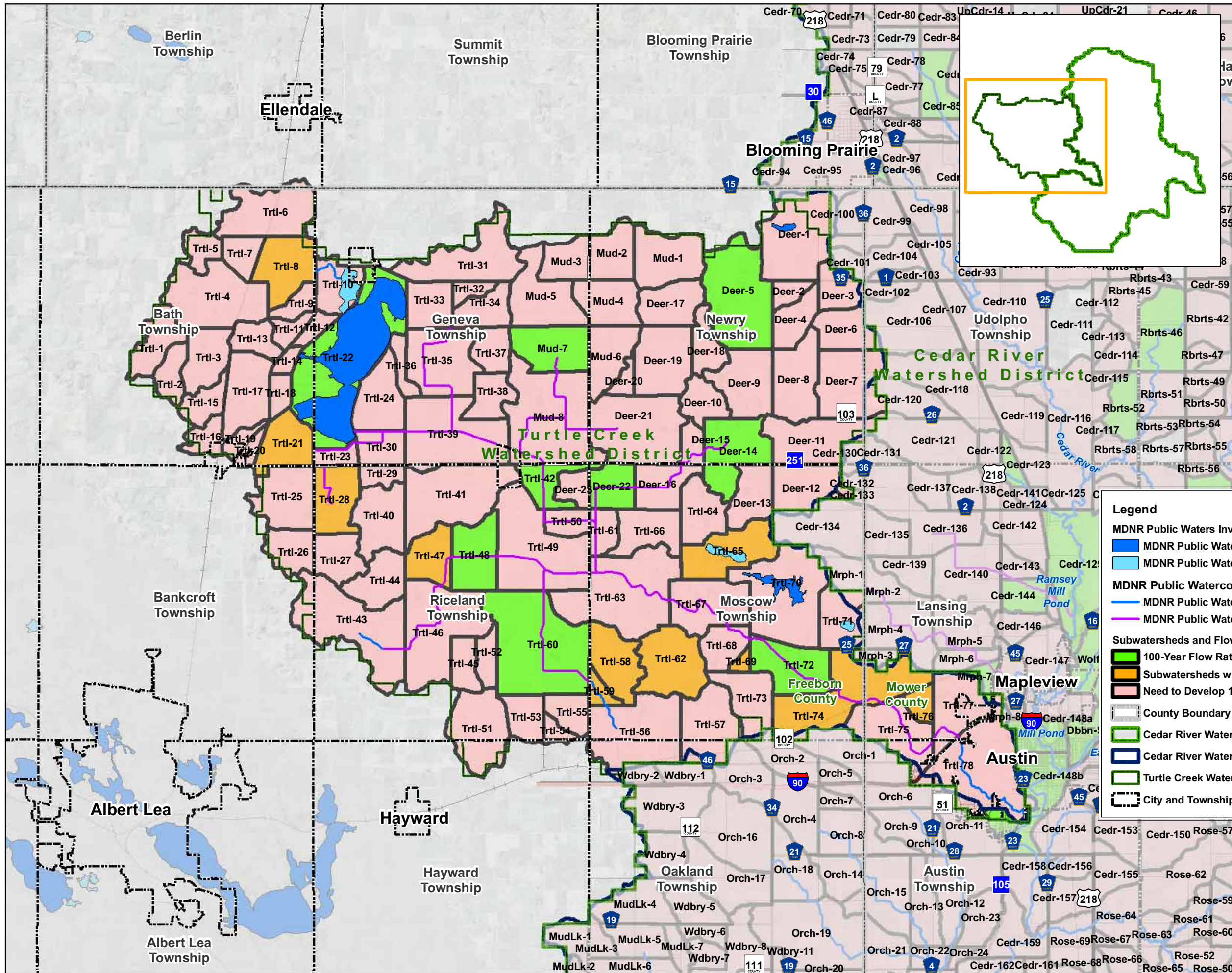
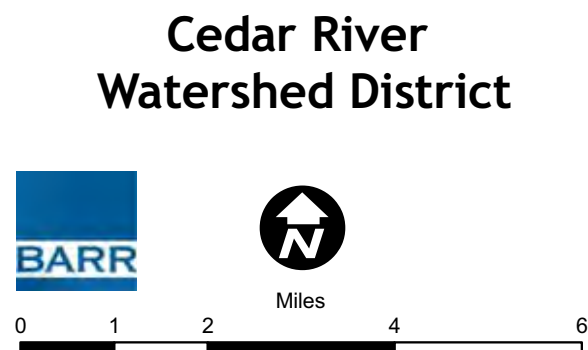


Figure 4-2
Subwatersheds and
100-Year Flow Rate Goals
within Turtle Creek
Watershed District



Legend

MDNR Public Waters Inventory*

- MDNR Public Waters Basins
- MDNR Public Waters Wetlands

MDNR Public Watercourse*

- MDNR Public Waters Stream
- MDNR Public Waters Ditch (publicly or privately held)

Subwatersheds and Flow Rate Goals

- 100-Year Flow Rate Goal Set
- Subwatersheds with Potential Water Storage Site from 1970 Turtle Creek Plan
- Need to Develop 100-Year Flow Rate Goal

County Boundary

Cedar River Watershed District Legal Boundary

Cedar River Watershed Hydrologic Boundary

Turtle Creek Watershed District

City and Township Boundaries

* As designated in Minnesota Statutes, Section 103G.005

Sources:
Flow Rate Goals - Barr, Upper Cedar River Surface Water Management Plan (2007)
Public Waters Inventory - MN Department of Natural Resources
County Boundary - MN Department of Transportation (2003)
City and Township Boundaries - MN Department of Transportation (2001)
Turtle Creek Watershed District Boundary - Minnesota Board of Water and Soil Resources (2003)
Cedar River Watershed District Hydrologic Boundary - MN Department of Natural Resources (1999)
Cedar River Watershed District Legal Boundary - Jones, Haugh & Smith Inc. (2007)
Roads - MN Department of Transportation (2003)

Chapter 5.0

Implementation Program

Cedar River Watershed District

Watershed Management Plan

Chapter 5: Implementation Program

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5.0 Implementation Program

This chapter describes the Cedar River Watershed District's implementation program to address the issues and incorporate the actions identified in this Plan, funding of the implementation program, implementation priorities, and procedures for updating/amending the Plan.

The implementation program of this Plan includes both capital improvement (structural) projects and non-structural activities (e.g. programs, studies) to provide flood control, water quality improvement, and education and public involvement. The implementation program identifies the specific projects, studies and other activities necessary to implement the CRWD goals, objectives, and actions. **Table 5-1** is a comprehensive list of the CRWD implementation program. The implementation program components will be funded as shown in **Table 5-1** and in accordance with applicable state laws.

The activities in **Table 5-1** (implementation table) are broken down into the following headings (and item numbers):

- Flood Control
- Water Quality
- Agricultural and Urban Drainage Systems
- Erosion and Sediment Control
- Wetlands and Natural Resources
- Land Use
- Recreation, Habitat, and Shoreland Management
- Groundwater
- Administration
- Education and Public Involvement
- Funding

For each activity, **Table 5-1** provides a description of the activity, gives a plan reference (e.g., Chapter 4.6, Goal 4.6.2, Objective A, Action 5), identifies the CRWD's involvement in the implementation, provides an estimated cost, lists the potential funding sources, and shows the proposed year of implementation. In most cases, CRWD will be the lead agency for implementing the activities, but in many cases the CRWD will support, cooperate, and coordinate with other agencies and organizations. However, because the CRWD is so new, the activities in the CRWD Plan are known only at the conceptual level. As projects become better-defined, so will the responsibilities of CRWD and the other participating agencies/organizations. The cost estimates shown in **Table 5-1** are conceptual, based on 2009 dollars, do not account for inflation, and are for planning purposes only. For capital projects, the costs shown in **Table 5-1** reflect the total estimated project costs; for items other than

capital projects, the costs shown in the table include only the portion of the cost that will be borne by the CRWD.

Table 5-2 reorganizes all of the activities in Table 5-1 to show the year-by-year estimated costs of the implementation program and the total annual costs from 2009–2019. As shown in Table 5-2, it could cost an estimated \$260,000 to \$902,000 annually to implement all of the actions in the CRWD Plan. The CRWD only generates \$250,000 per year through its general fund tax levy, and not all of the \$250,000 can be dedicated to projects (a portion will be used for administrative costs). This means the CRWD will need to seek outside funding sources (e.g., grants) and partnerships with other units of government and organizations to fully implement the CRWD Plan. If sufficient funds are not available or obtained, the CRWD will not be able to implement all of the suggested activities outlined in Table 5-1 and Table 5-2. Therefore, Table 5-2 represents a target of activities and projects that CRWD may complete if sufficient funding is obtained.

Most non-structural activities will be funded through the CRWD administrative budget (called “general fund” in Minnesota statutes) fund. In accordance with laws and county requirements, the CRWD must adopt a budget for the following year and forward its budget to the counties by September 15. The CRWD holds an annual hearing on the budget prior to forwarding it to the counties.

The capital improvement project costs in Table 5-1, expressed in 2009 dollars, will be adjusted annually in accordance with an inflation index (i.e., the Engineering News Record’s Construction Cost Index).

Using the information in Table 5-1 and Table 5-2 as a guide, the CRWD Board will develop a work plan covering at least the next two years, and will revise the work plan annually as part of the CRWD budgeting process. The process and schedule for developing and revising the work plan will include the following:

1. In June, the CRWD Board will discuss the current year’s work plan and develop a “wish list” for the following years’ work plan. (For example, in June 2010, the CRWD Board will discuss the 2011 and 2012 work plans.)
2. Staff will develop the draft work programs for discussion at the July CRWD Board meeting.
3. In August, the CRWD Board will hold a public hearing on the next year’s budget and levy request.
4. By September 15, the CRWD Board must submit its levy request to the county auditors.

When deciding the activities to include in the work plan, the CRWD Board will need to prioritize the implementation activities. Criteria that the CRWD Board could use in their decision-making include:

- Annual commitments from previous years

- Funding (e.g., tax revenues, grants, and cost-share funding)
- Health, safety and welfare (e.g., will the activity address/correct a threat to the health, safety, and welfare of the community?)
- Property damage (e.g., will the activity address/correct a property damage threat?)
- Environment (e.g., will the activity provide an environmental benefit?)
- Cost benefit (e.g., what is the cost of the activity compared to the benefit received?)
- Public benefit (e.g., who/how many people when benefit from the activity?)
- Prevention of future problems (e.g., will the activity prevent a future problem?)
- Consistency with CRWD Plan (e.g., for an activity currently not in the CRWD Plan, is the proposed activity consistent with the CRWD Plan?)
- Feasibility (e.g., can the activity be implemented?)
- Risk (e.g., what is the risk in implementing/not implementing the activity?)

Prior to undertaking projects included in the CRWD's work plan, the CRWD will conduct a feasibility study. The feasibility study will examine the benefits and costs related to the implementation of the project and evaluate alternatives to the project. Benefits and costs may be environmental, social, and/or economic. Feasibility studies will include the involvement of property owners, affected political bodies and regulatory agencies to help determine costs, required permits and/or reviews, and project constraints. The CRWD Board will also hold a public hearing to solicit input from affected stakeholders prior to project construction. During this time, stakeholders may raise concerns associated with a specific project.

5.1 Funding of Implementation Program

The CRWD will fund its implementation program through a series of taxing authorities authorized by state statute, and will seek to obtain grant funds, cost-sharing, in-kind contributions, etc. to offset implementation costs. (Much of the information in Chapters 5.1–5.4 is taken from the *Watershed District Handbook*, November 2005, prepared by the Minnesota Association of Watershed Districts.)

The following fiscal pools are available to the CRWD:

- Ad valorem taxes
- Special assessments
- Watershed district bonds
- Water management charges
- Grants
- Donations and in-kind contributions

Through state statute, the CRWD is allowed to establish a number of funds for the purpose of carrying out its powers and duties. Each fund has specific limits as authorized by state statute. The following paragraphs describe the available funds.

5.1.1 Funds Generated By Ad Valorem Tax Levies

“Ad valorem” is a phrase meaning “in proportion to the value.” Ad valorem taxes are collected over the entire taxing district and are based on property value, rather than benefits. For example, if a watershed district wishes to raise \$100,000 through an ad valorem tax, it would calculate a tax rate, expressed in percent, that is necessary to raise the \$100,000, based on the total value of real property within the watershed district. This tax rate would then be used to determine the tax for individual properties by maintaining the same proportion of tax to value for all properties within the watershed district.

Organizational expense fund

(M.S. 103D.905, Subd. 2)

When a watershed district is first established (or later enlarged) it may levy for an organizational expense fund. The fund is used to pay for organizational expenses and preparation of the watershed management plan. Unspent funds remaining in this account after organization and preparation of the watershed management plan may be transferred to the general fund. The watershed district may levy only once upon creation (or expansion) for this fund. The levy is an ad valorem tax levy, which cannot exceed 0.01596 percent of taxable market value or \$60,000, whichever is less. The CRWD levied \$60,000 for an organizational expense fund.

Managers may borrow from the affected counties up to 75 percent (75%) of the anticipated funds that would be collected from the organizational expense levy. The advancement of these funds needs to be apportioned among the affected counties in the same ratio as the net tax capacity of the area of the counties within the watershed district bears to the net tax capacity of the entire watershed district. If the watershed district is enlarged, an organizational expense fund may be levied in the same manner against the area added to the watershed district.

General fund

(M.S.103D.905, Subd. 3)

The purpose of the general fund is to pay for general administrative expenses of the watershed district, including staff salaries, consultant fees, insurance, office expenses, manager per diem and expenses, studies, and projects of common benefit to the watershed district.

A watershed district may levy annually for a general fund. The levy consists of an ad valorem tax levy, which is currently the lesser of 0.048 percent of taxable

market value of real property within the watershed district or \$250,000 (for CRWD the maximum amount is \$250,000). The amount of the annual levy for the fund must be determined and justified through the watershed district's annual budget process (M.S. 103D.911). Watershed districts may exceed the amount only with special legislative authority.

In addition to the annual general levy, watershed districts may annually levy to pay the cost of basic water management features of projects initiated by petition of a political subdivision within the watershed district or by petition of at least 50 resident owners whose property is within the Watershed District. The annual levy cannot exceed 0.00798 percent of taxable market value, and may continue for not more than 15 consecutive years. Political subdivision means a county, city, township, soil and water conservation district, school district or other political subdivision of the state, but not a watershed district.

Watershed districts are permitted to levy outside of the administrative levy for liability insurance (M.S. 466.06). In order to exercise this authority, a watershed district must identify the liability insurance premium as a separate line in its levy certification to the county and indicate that the premium amount is being levied under M.S. Chapter 466.06.

Survey and data acquisition fund

(M.S. 103D.905, Subd.8)

The survey and data acquisition fund is designed to pay for making necessary surveys and acquiring data. This fund is to be established only if other funds are not available to the watershed district. The survey and data acquisition fund is established by an ad valorem tax levy. The levy may only be collected once every five years. The maximum levy is 0.02418 percent of taxable market value of real property within the watershed district or \$50,000, whichever is less. The fund balance cannot exceed \$50,000. At the end of a five-year period, any balance remaining in the fund may have to be accounted for in the new levy in order to keep the fund balance below \$50,000.

For future projects where a survey has been paid for from this fund, the cost of the survey will be included as part of the project work and the sum will be repaid to the survey and data acquisition fund.

Emergency projects of common benefit fund

(M.S. 103D.615, Subd. 3)

The purpose of this levy is to pay the costs of projects that are associated with a watershed district's declaration of an emergency. If the work is found to be of common benefit to the watershed district, funding may be raised by an ad valorem tax levy upon all taxable property within the watershed district, if the cost is not

more than 25 percent of the most recent general ad valorem levy of the watershed district.

This ad valorem authority may be combined with assessments against benefited property in order to pay costs associated with emergency work performed without a contract.

5.1.2 Funds Generated By (Special) Assessment Levies

An assessment levy is a special tax levied on a property to pay for a local public improvement that will benefit that property, such as a drainage ditch.

Preliminary fund

(M.S. 103D.905, Subd. 6)

This fund is used for preliminary work on proposed projects of the Watershed District. The fund must be established by District Court. The fund can be established both for projects that are petitioned and for projects the managers initiate. The fund can be established both for projects that are to be paid for by assessment and for projects that are to be paid for by a combination of assessment and ad valorem, such as basic water management features of a project. When a project is ordered, the fund (i.e. county) must be repaid by assessment. If a project is not ordered, repayment could be made from ad valorem.

Construction or implementation fund

(M.S. 103D.905, Subd. 5)

The purpose of a construction fund is to establish an account that consists of:

- the proceeds of watershed district bonds or notes or of the sale of county bonds
- construction or implementation loans from the Minnesota Pollution Control Agency (MPCA) under M.S. Chapter 103F.701-103F.761 or from any agency of the federal government
- funds from special assessments, stormwater charges, loan repayments and ad valorem tax levies levied or to be levied to supply funds for the construction or implementation of projects

Repair and maintenance fund

(M.S. 103D.905, Subd. 7 and 103D.631)

The purpose of this fund is to provide money for maintaining the projects of a watershed district to ensure the projects will be effective. The cost of normal or

routine maintenance of the projects and the cost of removing obstructions/foreign substances from a drainage system may be paid from the maintenance fund.

Watershed districts may assess all the parcels of property and municipal corporations previously assessed for benefits at the time of construction. The assessment must be made pro rata according to benefits determined. The collection (or levy) resulting from an assessment may be made annually; however, the fund may not exceed 20 percent of the original cost of construction of the project. Before ordering the levy, the managers may give notice of a hearing on making the assessment and establishing the maintenance fund.

Emergency projects for benefited property fund

(M.S. 103D.615, Subd. 3)

See emergency projects of common benefit fund under Chapter 5.1.1 for assessment information.

5.1.3 Funds Generated Through Bond Sales

(M.S. 103D.905, Subd. 4)

A watershed district may establish a bond fund, consisting of the proceeds of special assessments, stormwater charges, loan repayments, and ad valorem tax levies pledged by the watershed district for the payment of bonds or notes issued by the watershed district. The fund is to be used for the payment of the principal, premium or administrative surcharge and the interest on the bonds and notes issued by the watershed district and for payments required to be made to the federal government.

5.1.4 Funds Generated Through Collection of Charges

(M.S. 103D.729 and 444.075)

This provision allows a watershed district the authority to establish one or more water management districts within the territory of the watershed district to collect revenues and pay the costs of projects initiated under sections 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730. To use this funding method, the law requires that the watershed district prepare an amendment to its watershed management plan. The amendment must describe the area to be included in the water management district, the amount to be charged, the methods used to determine the charges, and the length of time the water management district will remain in force (MS 103D.729).

This provision also allows revenue to be collected in the form of a charge or fee. The method for determining the fee is authorized by M.S. 444.075.

5.2 Types of Watershed District Projects

State statute also establishes the types of projects that a watershed district can initiate and establish and how they may be done. The statute establishes different criteria for establishing the various types of projects. The method with which a project is initiated dictates the type of funding method that can be used. The following paragraphs describe the project types.

Basic water management projects; those constructed with government aid

(M.S.103D.605 and 103D.905, Subd. 3)

Projects that fall under this category must be identified in the watershed district's watershed management plan or constructed within the watershed district under an agreement between the managers and the state or federal government. The right-of-way and the cost of the project are the obligation of the watershed district. A project hearing procedure is described. A grant or cost-share agreement is developed.

Projects initiated under this section may be linked to M.S.103D.905, Subd. 3, which allows the use of an ad valorem levy over the entire watershed district if the project is initiated by a political subdivision and the cost is attributable to implementing and managing the basic water management features of projects identified in the plan.

Construction by government agencies

(M.S. 103D.611)

These are projects to be constructed within the watershed district under a contract between the watershed district and the state or federal government. The cost of the construction is paid by the governmental agency but the right-of-way, legal, and general expenses of the improvement are paid by the watershed district.

The main difference between this type of project and projects constructed with government aid is that this section requires a contract between the parties as compared to a grant or cost-share agreement. In addition, costs attributed to construction are not incurred by the watershed district under this section as they are under M.S. 103D.605.

Emergency Projects of Common Benefit

(M.S. 103D.615, Subd. 3)

These are associated with a watershed district's declaration of an emergency. If the work is found to be of common benefit to the Watershed District, funding may be raised by an ad valorem tax levy upon all taxable property within the watershed if the cost is not more than twenty-five (25) percent of the most recent general ad valorem levy of the Watershed District.

This ad valorem authority may be combined with assessments against benefited property in order to pay costs associated with emergency work performed without a contract.

Drainage systems and projects

(M.S. 103D.621–103D.625)

A county board or a joint county drainage authority may direct a watershed district to assume responsibility for a drainage system within the watershed district (M.S.103D.625). After the transfer, any repairs, improvements or construction must take place under Minnesota Drainage Law, M.S. 103E.

Project repairs and improvements

(M.S.103D.631, 103D.635 and 103D.641)

Managers are responsible for maintaining the projects of the watershed district in an effective condition. The cost of normal or routine maintenance of the watershed district's projects, and the cost of removing obstructions and accumulations of foreign substances from a drainage system, must be paid from the watershed district's maintenance fund. If the cost of a repair, including all fees and costs relating to it, is less than \$25,000, the watershed district may have the work done by contract without advertising for bids (M.S.103D.641).

For repairs and improvements exceeding normal maintenance, an engineer must prepare technical and cost specifications (M.S.103D.635). A public hearing must be held before the work can be ordered. A single levy for the repair or improvement may not exceed the amount of benefits originally determined.

Storm water facilities/storm water utilities

(M.S.103D.729–103D.730)

M.S.103D.729 allows a watershed district to establish a water management district for the purpose of collecting revenue to pay the cost of projects, including storm water facilities. Water management districts are established through revision of the watershed district's watershed management plan. The plan amendment must clearly identify the area to be included in the water management district, the amount of the necessary charges, the method used to determine charges, and the length of time the water management district will be used. M.S. Chapter 444 permits watershed districts to collect the charges in any manner it chooses and allows certification to the county to collect the charges.

M.S.103D.730 allows watershed districts to build, construct, reconstruct, repair, enlarge, improve, or in any other manner obtain stormwater systems, including mains, holding areas and ponds, and related facilities for the collection and disposal of storm water. It also allows them to maintain and operate the facilities and acquire land and easement.

5.3 Project Initiation and Establishment

(M.S. 103D.601–103D.615)

Watershed district projects can be established in one of the following ways:

- by a vote of the managers
- by a petition
- by a contract with a government entity
- through establishment of an emergency project
- through the drainage code, M.S. 103E

The following paragraphs discuss the establishment procedures for projects.

Establishment procedure for a project constructed with government aid or as part of the Watershed District plan

(M.S. 103D.605)

The Board of Managers must follow these steps:

- Submit a copy of the project plan to the Minnesota Board of Water and Soil Resources (BWSR) and the director of the Minnesota Department of Natural Resources (MDNR) Division of Waters for their review and their preparation of a report.
- After receiving the BWSR and MDNR reports, the managers must give proper notice of a project hearing and hold a project hearing to establish the project.
- After the project hearing and findings by the managers that the project should move ahead, the managers must establish the project, by order. The establishment order must include the findings of the managers.

Establishment procedure for a project involving construction by government agencies

(M.S. 103D.611)

The Board of Managers must follow these steps:

- Submit a copy of the project plan to the director of the MDNR Division of Waters and the BWSR for their review and their preparation of a report.
- The managers must give proper notice and hold a public hearing.
- After authorizing the project, the managers will appoint three disinterested resident owners of the state to act as appraisers to determine benefits and damages to property affected by the proposed project.
- After the appraisers' report, plans and engineering data are filed with the managers, the managers will prepare a detailed statement of all costs to be incurred by the watershed district.
- The managers will hold a hearing on the appraisers' report and make a determination. If the managers determine benefits from the construction or

implementation will be greater than the assessments, including damages, they will confirm the appraisers' report.

Establishment procedure for emergency projects

(M.S. 103D.615)

If the managers find that an emergency situation exists and that immediate action must be taken, they may declare an emergency and designate the location, nature, and extent of the emergency. Once declared, they may order that work be done under the direction of the managers and the engineer without a contract. The project may be paid for in one of the following ways:

- the cost of work may be assessed against benefited properties
- if the cost is not more than 25 percent of the most recent general ad valorem levy of the watershed and the work is found to be of common benefit to the watershed district, funding may be raised by an ad valorem tax levy upon all taxable property within the watershed district
- both methods can be used

Establishment procedure for projects initiated through petition

(M.S. 103D.701 and 103D.705)

Projects may not be initiated until the BWSR approves a watershed management plan for the watershed district. The watershed district's projects that will be paid for by assessment of the benefited properties must be initiated by a project petition filed with the managers, by unanimous resolution of the managers, or as otherwise prescribed by statute.

Many watershed district projects originate through a petition from landowners or local government within the watershed district. The following is general information on how a project is established after being initiated by petition.

These are the steps to initiate and establish a project by petition:

1. Prepare petition, which must contain certain elements prescribed by law.
2. Prepare engineer's report per M.S. 103D.711
3. Determine benefits and damages by managers per M.S. 103D.715 and 103D.721
4. Hold a hearing, establish project, and file order per M.S. 103D.735 - 103D.745

5.4 Project Construction

(M.S. 103D.801—103D.815)

After the managers establish and order a project, the managers must call for bids for the construction work. Bid notices must be published in at least one of the newspapers of the

state where notices are usually published. Bids which exceed the total estimated cost of construction by more than thirty (30) percent must follow M.S.103E.511.

5.5 Plan Review, Approval and Adoption

The CRWD Plan was submitted for formal review to the counties, soil and water conservation districts, cities, townships, BWSR and MDNR, in accordance with Minnesota statutes. (See **Table 1-1** for a listing of all of the counties, cities and townships in the CRWD.)

The CRWD Board formed a Planning Advisory Group (PAG) to assist the Board in the preparation of the CRWD Plan. The PAG met four times during the development of the draft Plan. Prior to submitting the CRWD Plan for formal review, the CRWD solicited comments on a preliminary draft of the CRWD Plan from the PAG (its fifth meeting) and the CRWD Advisory Committee. Prior to submitting the Plan for formal review, the CRWD managers and staff also met with city councils, town boards, county boards, and other stakeholders to discuss the preliminary draft and to gather feedback.

After formal review of the CRWD Plan, the PAG met a sixth time to review the formal comments received on the Plan, and the CRWD Board held a public hearing on the Plan. BWSR approved the CRWD Plan on September 23, 2009, indicating that the CRWD Plan met all the requirements of the current Minnesota laws (Minnesota Statutes 103D.401). The CRWD Board formally adopted the CRWD Plan on October 21, 2009.

5.6 Plan Update and Amendment Procedures

This Plan will guide CRWD activities through 2019, or until superseded by adoption and approval of a subsequent Plan or revised plan. According to Minnesota laws (M.S. 103D.405), the CRWD must revise its Plan at least once every ten years. Approximately 2 years prior to the expiration date of this Plan (in 2017), the CRWD will begin the process of updating its Plan. The updated Plan will meet the requirements of the applicable Minnesota laws.

The CRWD may revise its Plan through an amendment prior to a scheduled Plan update. However, this Plan, authorities, and official controls of the CRWD will remain in full force and effect until a Plan revision is approved by BWSR.

All amendments to this Plan will follow the procedures set forth in this section, or as required by Minnesota laws (M.S. 103D.411). Citizens, landowners, local units of government, county commissioners, or staff may propose to the CRWD Board, but only the CRWD Board may initiate the amendment process.

After the Plan amendment is prepared, the CRWD must initiate the amendment procedure by (M.S. 103D.411)

1. Submitting a petition along with a copy of the proposed amendment to the BWSR.

2. At the same time that the CRWD sends the proposed Plan amendment to the BWSR, it must also send a copy of the amendment to the MDNR, as well as the county boards, county auditors, cities, and soil and water conservation districts within its territory.
3. Within sixty (60) days of receiving the proposed amendment, the MDNR must review and make recommendations on the proposed amendment. The MDNR must send the recommendations to the CRWD.
4. Within forty-five (45) days of receiving the MDNR's recommendations, the BWSR must give notice and hold a hearing on the proposed amendment. If the BWSR determines the proposed amendment to be non-controversial, it may provide notice to that effect. If a non-controversial procedure is used, a hearing will be held only if one or more persons request a hearing on the proposed amendment.
5. After the hearing, the BWSR may, by order, approve or prescribe changes in the amendment.

The amendment becomes part of the Plan after it is adopted by the Board of Managers. The BWSR is responsible for notification of the approved amendment.

A Plan amendment will NOT be required for the following situations:

1. The capital projects, annual activities, or studies listed in **Table 5-1** are implemented at a different time than shown in the table;
2. Implementation of a capital project discussed in the Plan, but not listed in **Table 5-1**;
3. The estimated costs for a project (capital and non-capital) are different than shown in **Table 5-1**;
4. The CRWD adds or deletes projects (capital and non-capital) to/from **Table 5-1**. Such additions or deletions will be proposed, discussed and adopted as part of the CRWD's annual budgeting process; and
5. The proposed funding method for a capital improvement project listed in **Table 5-1** is different than shown in the table (e.g. special assessment instead of ad valorem levy). In this situation, CRWD will hold a public hearing on the proposed change to the funding method.

Examples of situations where a Plan amendment will be required include:

1. Establishment of a water management district (or more than one district) to collect revenues and pay for projects initiated through MS 103D.601, 605, 611 or 730. To use this funding method, Minnesota law (MS 103D.729) requires that the watershed district prepare an amendment to its watershed management plan. The amendment must describe the area to be included in the water management district, the amount to be

charged, the methods used to determine the charges, and the length of time the water management district will remain in force.

2. Incorporation of TMDL implementation plans into the CRWD Plan.
3. Acceptance of authority over the public drainage systems within the CRWD, if turned over to the CRWD by the drainage authorities.

If an amendment is needed, the CRWD will prepare and distribute the plan amendment. The CRWD will maintain a distribution list of everyone who receives a copy of the Plan. Within 30 days of adopting an amendment, the CRWD will distribute copies of the amendment to everyone on the distribution list.

5.7 Regulatory Framework and Agency Responsibilities

Besides the CRWD, various units of government are involved in regulating water resource related activities including: local units of government - counties, cities and townships, state agencies - the Minnesota Department of Natural Resources, the Minnesota Board of Water and Soil Resources, the Minnesota Pollution Control Agency, the Minnesota Department of Health, the Minnesota Environmental Quality Board, the Minnesota Department of Transportation, and federal agencies - the US Corps of Engineers.

5.7.1 Local Units of Government

Counties

Counties have a wide variety of duties, including property assessment, record-keeping, road maintenance (including street sweeping, and snow/ice control), surface water management (including bridges, pipes, and ditches), administration of election and judicial functions, social services, corrections, child protection, library services, hospitals and rest homes, public health services, planning and zoning, economic development, parks and recreation, water quality, and solid waste management and recycling (including yard waste and compost sites).

Individual counties may have specific responsibilities with respect to surface water management. In Mower County, for example, all bridges and pipes under County State Aid Highways and all bridges and pipes under township roads greater than or equal to 48 inches in diameter (or equivalent area) are owned by the county and controlled by the County Board.

The counties' responsibilities directly related to CRWD include:

- Appointing the CRWD Board of Managers - Mower County appoints four managers, Dodge County, Freeborn County and Steele County each appoint one manager.
- Levying taxes for CRWD.

- Providing bonds for CRWD capital improvement projects, if needed.
- Acting as the local government unit (LGU) responsible for administering the Wetland Conservation Act (WCA).
- Developing and administering ordinances. The counties' ordinances need to be revised to include the CRWD standards for flood control, erosion and sediment control, and stormwater management. The counties should revise their ordinances to be consistent with low impact development principles (e.g., allow narrower streets, allow native plantings in boulevards, encourage pervious driveway and roadway surfaces).
- Preparing and adopting local (county) water management plans, if they choose to prepare one.
- Enforcing SSTS requirements.

More information is available at the County websites:

- Dodge County - <http://www.co.dodge.mn.us/>
- Freeborn County - <http://www.co.freeborn.mn.us/>
- Mower County - <http://www.co.mower.mn.us/>
- Steele County - <http://www.co.steele.mn.us/>

Cities

Cities also perform a wide variety of duties, similar to those performed by counties, but on a smaller scale. Following are several water resource-related city responsibilities:

- Local Water Resource Management: Cities are responsible for addressing water resource management issues that are related to the city's stormwater management infrastructure.
- Project Review & Permitting: Once the CRWD implements a permit program, cities will be responsible for informing developers and other project applicants regarding the need to obtain a CRWD permit. Cities will also be responsible for developing and implementing permit programs for projects that fall below the threshold for a CRWD permit. Cities should also inform permit applicants, for projects over one acre, that they are required to obtain a Minnesota Construction Site Permit from the MPCA.
- Land Use Planning & Zoning: Cities are responsible for land use planning and zoning in their cities. However, cities need to recognize that proposed zoning changes have the potential to 1) impact water quality in downstream resources;

and 2) cause flooding problems due to increased runoff rates. These impacts should be reviewed prior to adoption of the zoning change.

- Maintenance of City Stormwater Management Systems: Cities are responsible for the inspection, maintenance, cleaning, repair, and reconstruction of the city's stormwater management system (storm sewers, ponding areas, ditches, water level control structures, etc.) to keep it in good working order to prevent flooding and water quality problems. Such maintenance requirements should be addressed in the city's NPDES Phase II MS4 stormwater permit (where applicable).
- City Ordinances: The cities' ordinances need to be revised to include the CRWD standards for flood control, erosion and sediment control, and stormwater management. The cities should revise their ordinances to be consistent with low impact development principles (e.g., allow narrower streets, allow native plantings in boulevards, encourage pervious driveway and roadway surfaces).
- Wetlands Management: The counties within the CRWD are the LGUs responsible for administering the WCA.
- Groundwater: The cities are responsible for developing, adopting, and implementing wellhead protection programs. Cities should submit their wellhead protection plans to the CRWD during the review process. Cities also enforce local SSTS requirements.

Townships

Township duties include road maintenance (including snow/ice control), and may also include land use planning and zoning, parks and recreation, wastewater treatment, and cemetery maintenance. Townships also enforce local SSTS requirements. If townships have ordinances, they will need to be revised to include the CRWD standards for flood control, erosion and sediment control, and stormwater management. The townships should revise their ordinances to be consistent with low impact development principles (e.g., allow narrower streets, allow native plantings in boulevards, encourage pervious driveway and roadway surfaces).

5.7.2 State Agencies

Minnesota Department of Natural Resources (MDNR)

The MDNR Division of Waters (Waters) manages water resources through a variety of programs in its Water Management Section, Surface Water and Hydrographics Section, and Ground Water and Climatology Section. MDNR Waters administers the public waters work permit program, the water appropriation permit program, and the dam safety permit program. MDNR Fisheries administers the aquatic plant management control permit program and other fishery related permits.

In addition to permit programs, the MDNR oversees the floodplain management program, the public waters inventory program, the shoreland management program, the flood damage reduction grant program, the wild and scenic rivers program, various surface and groundwater monitoring programs, and the climatology program. The MDNR is involved in enforcement of the Wetland Conservation Act (WCA) and is responsible for identifying, protecting, and managing calcareous fens.

The MDNR's public waters work permit program (Minnesota Statutes 103G) requires a MDNR public waters permit for work below the MDNR designated Ordinary High Water Level (OHWL) that will alter or diminish the course, current, or cross-section of any public waters or public waters wetlands, including lakes, wetlands and streams. For lakes and wetlands, the MDNR's jurisdiction extends to designated U.S. Fish and Wildlife Service Circular #39 Types 3, 4, and 5 wetlands which are 10 acres or more in size in unincorporated areas, or 2.5 acres or more in size in incorporated areas. The program prohibits most filling of public waters and public waters wetlands for the purpose of creating upland areas. The public waters work permit program was amended in 2000 to reclassify public waters and to make the administrative program more consistent with the WCA administrative program. Under certain conditions, work can be performed below the OHWL without a public waters work permit. Examples include docks, watercraft lifts, beach sand blankets, ice ridge removal/grading, riprap, and shoreline restoration.

The MDNR regulates groundwater usage rate and volume 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. Appropriation permits from the MDNR are not required for domestic uses serving less than 25 persons for general residential purposes. The MDNR is also responsible for mapping sensitive groundwater areas, conducting groundwater investigations, addressing well interference problems, and maintaining the observation well network.

More information is available at the MDNR website: www.dnr.state.mn.us

Minnesota Board of Water and Soil Resources (BWSR)

BWSR oversees the state's watershed management organizations (joint powers, county and watershed district organizations), oversees the state's Soil and Water Conservation Districts, and administers the rules for the WCA and metropolitan area watershed management.

More information is available at the BWSR website: www.bwsr.state.mn.us

Minnesota Pollution Control Agency (MPCA)

The MPCA administers the State Discharge System/National Pollutant Discharge Elimination System (NPDES) Permit program (point source discharges of wastewater), the NPDES General Stormwater Permit for Construction Activity, the NPDES General Industrial Stormwater Permit program, the NPDES Phase I and Phase II Storm Water Permit program, and the individual sewage treatment system regulations (7080 Rules). The MPCA also reports the state's "impaired waters" to the U.S. Environmental Protection Agency. Spills should be reported directly to the MPCA.

The MPCA administers and enforces laws relating to pollution of the state's waters, including groundwater. 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 MPCA is responsible for administering the programs regulating construction and reconstruction of subsurface sewage treatment systems (SSTS). SSTS are also known as septic systems and individual sewage treatment systems (ISTS). The MPCA requires an inspection program for SSTS that meets MPCA standards. Minnesota Rules 7080 govern administration and enforcement of new and existing SSTS. The individual cities, counties and townships with CRWD enforce SSTS rules.

In 2007, the MPCA resumed selective administration of Section 401 of the Clean Water Act - Water Quality Certification program, which is primarily administered by the U.S. Army Corps of Engineers (COE) (See Chapter 5.8.3 below). Section 401 certification is required to obtain a federal permit for any activity that will result in a discharge to navigable waters of the U.S. Formal applications for 401 certification must be sent to the MPCA.

The MPCA provides guidance for the disposal of dredged material, which is defined as a waste and regulated by the MPCA. The MPCA considers material excavated from public waters below the MDNR's ordinary high water level to be dredged material. A guidance document is available from the MPCA website:
<http://www.pca.state.mn.us/water/dredgedmaterials.html>.

The MPCA's dredged material guidance document provides assistance in determining what types of regulatory oversight and/or permitting is required at projects and sites involving the removal and management (storage, treatment, disposal, and/or reuse) of dredged materials, once excavated, as well as what is required for discharges from the project site and/or management control site, including stormwater.

Because the MPCA's guidance is not mandatory, it does not establish or affect legal rights or obligations. However, should a permit be needed for managing the

dredged material, such as in the event of short term or long term storage of dredged material on site, any generation of runoff from the stored materials (including stormwater runoff), dewatering runoff, etc., then following the guidance will help ensure a project is in compliance.

Some types of dredging projects do not require a permit from the MPCA for the management of dredged material; examples include the following:

- Projects involving the removal of less than or equal to 3,000 cubic yards of material with no surface water discharge (i.e., the material is immediately hauled away or any dewatering water infiltrates and does not runoff), and where the material is either:
 - more than 93 percent sand, as determined by the grain size analysis;
 - characterized as having contaminant values less than the relevant soil reference values (SRV) for the proposed disposal option; or,
 - disposed at a site or landfill that already has an MPCA permit to manage dredged material (industrial waste management plan).
- Projects involving the removal of more than 3,000 cubic yards with no surface water discharge that is disposed at a site or landfill that already has an MPCA permit to manage dredged material (industrial waste management plan).

If not disposed of in a landfill, the dredged material needs to be characterized according to the relevant soil reference values (SRV). A Level 1 SRV is required for the material to be re-used on residential/recreational lands, whereas a Level 2 SRV means the material must be re-used on industrial sites. The guidance document specifies the number, location, and depth of sediment cores that are to be collected.

For projects not requiring a permit, information pertaining to the project must be submitted to the MPCA for review prior to initiation of dredge activities. A Notification to Manage Dredged Materials without a Permit (notification) is used for this purpose. The MPCA will review the notification within 30 days, and if there's no response otherwise from the MPCA, no permit is required and the project can proceed. Even if no permit is required, sediment cores must be collected and analyzed. If a permit is required, it needs to be submitted at least 180 days before the anticipated date of dredging.

More information is available at the MPCA website: www.pca.state.mn.us

Minnesota Department of Health (MDH)

The MDH is the official state agency responsible for addressing all environmental health matters, including groundwater protection. The MDH administers the Well Management Program, the Wellhead Protection Program, and the Safe Drinking

Water Act rules. The MDH also issues fish consumption advisories. The MDH is responsible for preventing pollution of water supplies to ensure safe drinking water sources and limit public exposure to contaminants. Through implementation of the federal 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. The 1996 amendments to the federal Safe Drinking Water Act require the MDH to prepare source water assessments for all of Minnesota's public water systems and to make these assessments available to public.

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 water supply wells.

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. Wellhead protection plans include: delineation of groundwater "capture" areas (wellhead protection areas), delineation of drinking water supply management areas (DWSMA), assessment of the water supply's susceptibility to contamination from activities on the land surface, and management programs, such as identification and sealing of abandoned wells, and education/public awareness programs. As part of its role in wellhead protection, the MDH developed the guidance document *Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas* (MDH, 2007).

See the Minnesota Department of Health website (<http://www.health.state.mn.us/divs/eh/water/index.html>) for more information about these programs.

Minnesota Environmental Quality Board (EQB)

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

More information is available at the EQB website: www.eqb.state.mn.us

Minnesota Department of Transportation (MnDOT)

When NPDES Phase II became effective in 2003, MnDOT was required to apply for a NPDES permit to discharge stormwater from its right-of-way. In addition to the NPDES permit, if a project constructed on MnDOT property disturbs one or more acres, a Stormwater Pollution Prevention Plan (SWPPP) must be developed for the project. Any work done on, or affecting, MnDOT property must be approved by MnDOT.

More information is available at the MnDOT website: <http://www.dot.state.mn.us/>

5.7.3 Federal Agencies

U.S. Army Corps of Engineers (COE)

The COE administers the Section 10 of the Rivers and Harbors Act permit program, and the Section 404 permit program.

Section 404 Authorizations. The Federal Clean Water Act requires that anyone who wants to discharge dredged or fill material into U.S. waters including wetlands must first obtain a Section 404 permit from the U.S. Army Corps of Engineers. Examples of activities that require a Section 404 permit include: construction of boat ramps, placement of riprap for erosion protection, placing fill in a wetland, building a wetland, construction of dams or dikes, stream channelization, and stream diversion.

When Section 404 permit applications are submitted to the Corps of Engineers, the applications are typically posted for the U.S. Fish and Wildlife Service, the U.S. Forest Service, the U.S. EPA, and other federal agencies to review and provide comments on the application. The Corps of Engineers evaluates permit requests for the potential impact to various functions and values of the wetland.

Section 401 Water Quality Certifications. A Section 401 water quality certification may be granted if an applicant demonstrates that a proposed activity “will not violate Minnesota’s water quality standards or result in adverse long-term or short-term impacts on water quality.” Greater protection is given to a category of waters designated as Outstanding Resource Value Waters. The waters in this category have received this designation because of their exceptional value. These include such groups as scientific and natural areas, wild, scenic and recreational river segments and calcareous fens.

More information is available at the COE website: www.usace.army.mil

Table 5-1 Cedar River Watershed District (CRWD) Implementation Program

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood Control (Chapter 4.1)							
Flood-1	Data Collection and Reporting	Monitor water levels and flow rates on the primary flowages in the watershed, including water levels on Cedar River, its tributaries and other water bodies periodically, and during flooding events.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3, Objective A, Action 1	CRWD performs or contracts for performance, and/or volunteers perform	\$2,000 per manual stream gauge reading; \$5,000 per automatic station per year	CRWD Ad Valorem	Annually
		Install automatic flow gauging stations on the Cedar River and other water bodies.			\$3,000 per automatic station		2010
		Collect rainfall data from agencies and cooperators.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective A, Action 3	CRWD performs	\$500		Annually
Flood-2	Data Collection and Reporting	Photograph flooding events in the watershed, including aerial photographs during major flooding events.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3, Objective A, Action 2	CRWD performs or contracts for performance, other units of government perform, and/or volunteers perform	\$3,000	CRWD Ad Valorem	As needed, during and after flood events
		Survey remnant debris lines and other water marks after flood events that indicate how high water rose during the flood event.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3, Objective A, Action 4				
Flood-3	Data Collection and Reporting	Require CRWD, the counties, the cities and/or the townships to evaluate the function and condition of stormwater systems and prioritize problem areas	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Action 1	CRWD performs or contracts for performance, and/or other units of government perform	\$6,000	CRWD Ad Valorem	2010 - 2012

* Cost estimates are conceptual, based on 2009 dollars, do not account for inflation, and are for planning purposes only. For capital projects, the costs shown reflect the total estimated project costs; for items other than capital projects, the costs shown include only the portion of the cost borne by the CRWD.

Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
Edu:	Education and Public Involvement	GW:	Groundwater	Wetland:	Wetlands and Natural Resources
E&SC:	Erosion and Sediment Control	LU:	Land Use		

Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-4	Admin-istrative	Provide incentives to counties, cities, and townships to retrofit existing stormwater systems to reduce stormwater rates and volumes in priority locations.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Action 2	CRWD performs	\$10,000 - \$50,000 per project	CRWD Ad Valorem	As funding allows and projects are proposed
Flood-5	Admin-istrative	Establish CRWD development policies and require townships, cities, and counties to implement them.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Action 3	CRWD performs	Included in item Admin-1	CRWD Ad Valorem	2009
		Require project proposers to apply best management practices (BMPs) to site designs that reduce the volume and rate of stormwater runoff, to the maximum practical extent. Examples of urban stormwater runoff volume reduction methods include: <ul style="list-style-type: none"> Reducing the amount of planned impervious surface (as areas develop). Reducing the amount of impervious surface (during redevelopment). Rain gardens and other BMPs that promote infiltration. In areas where infiltration is difficult to achieve or not desirable, project proposers must consider providing extended detention basins.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Action 6				

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-6	Admin-istrative	Review proposed improvements, developments and redevelopment projects in the watershed and, if necessary, require compliance with CRWD rules and policies to help ensure such projects will not create flood conditions that are worse than currently exist. The CRWD's review of development, redevelopment and improvement projects includes review of proposed work in the CRWD established floodplain.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Action 5	CRWD	\$5,000	CRWD Ad Valorem	Annually
Flood-7	Admin-istrative	Establish and adopt 100-year floodplain elevations for those reaches of the Cedar River and its tributaries that are under the CRWD's jurisdiction. These floodplain elevations will be based on either a) current/future Flood Insurance Studies (FIS); or (b) studies completed by other entities (e.g., the CRWD, counties, cities, etc.) and accepted by the CRWD.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Action 4	CRWD performs	\$5,000	CRWD Ad Valorem	2009 and updated as needed thereafter, based on study results

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-8	Admin-istrative	<p>Require cities/counties to revise their floodplain ordinances to cover the broader CRWD established floodplain and include the following CRWD requirements. [The "broader CRWD- established floodplain" is as discussed in Action 4 above. Typically, city/county floodplain ordinances only regulate activities within the FEMA-designated floodplain shown in the FIS. By following this requirement, cities/counties would be applying their ordinances to floodplains of smaller tributary streams and detention/retention basins.]</p> <p>Allow only those land uses in the CRWD established floodplain that will not have facilities that could be damaged by floodwaters and will not increase flooding. Allowable types of land use that are consistent with the floodplain include recreation areas, parking lots, excavation and storage areas, public utility lines, agriculture, and other open spaces</p>	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective B, Actions 7 – 12	CRWD	Included in item Admin-1	CRWD Ad Valorem	2010

* Cost estimates are conceptual, based on 2009 dollars, do not account for inflation, and are for planning purposes only. For capital projects, the costs shown reflect the total estimated project costs; for items other than capital projects, the costs shown include only the portion of the cost borne by the CRWD.

Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Prohibit permanent storage piles, fences and other obstructions in the floodplain that would collect debris or restrict flood flows. Require removal of downed trees, snags and debris in the main channel of the Cedar River, especially after flood events, to reduce flow resistance.					
		Prevent (if possible) construction of new roads in the floodplain, and bring existing roads out of the floodplain, if possible. Discourage development where the sole access to the site is through the established 100-year floodplain.					

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost *	Potential Funding Sources/ Authority	Proposed Implementation Year
		<p>Require the following minimum building elevation be met for all new permanent structures located within or around the CRWD 100-year floodplain:</p> <p>i. The lowest floor (including basement) must be at least 2 feet above the 100-year floodplain elevation.</p> <p>Encourage the following minimum building elevations be met for all new permanent structures located within or around the CRWD 100-year floodplain:</p> <p>i. The lowest floor (including basement) must be at least 3 feet above the highest local groundwater elevation.</p> <p>ii. All HVAC facilities must be at least 2 feet above the 100-year floodplain elevation.</p> <p>iii. All HVAC facilities must be at least 3 feet above the highest local groundwater elevation.</p> <p>iv. The lowest opening must be at least 2 feet above the 100-year flood elevation of emergency overflow swales.</p>					
		Develop a "no net loss of floodplain" rule			\$5,000	CRWD Ad Valorem	2010

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
Edu:	Education and Public Involvement	GW:	Groundwater	Wetland:	Wetlands and Natural Resources
E&SC:	Erosion and Sediment Control	LU:	Land Use		

Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-9	Study	Set flow rate goals for the remaining subwatersheds in the entire CRWD by developing and/or updating hydrologic and hydraulic models. Revise already-set flow rate goals, where appropriate, as additional modeling is completed. Update Figure 4-1A, Figure 4-1B, and Table 4-1 as models are developed and/or updated.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Actions 1.a	CRWD	\$250,000	CRWD Ad Valorem	2009-2012
		Designate “priority” subwatersheds, where flood control features and measures should be implemented first.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 1.b				
Flood-10	Capital Project	Construct/implement flood control features and measures that achieve the CRWD’s subwatershed flow rate goals, focusing on implementing projects in priority subwatersheds.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C—Actions 1.c & 2	CRWD performs	Variable, from less than \$10,000 to more than \$500,000 per project	CRWD Ad Valorem, special assessments, stormwater utility, grants	Annually and as funding allows
Flood-11	Administrative	Drawdown of lakes/ponds in anticipation of flood events. Consider the water quality and other impacts of such drawdowns.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 2.c	CRWD performs or contracts for performance	\$5,000	CRWD Ad Valorem	When needed, and only if there’s enough forewarning, such as a spring snowmelt event.

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-12	Admin-istrative	Coordinate with Turtle Creek Watershed District to achieve the subwatershed flow rate goals for the Turtle Creek watershed, as set in the <i>Upper Cedar River Surface Water Management Plan</i> and as set in the Turtle Creek Watershed District report <i>Summary of Potential Water Storage Sites</i> (Barr, 1970).	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 3	CRWD and Turtle Creek Watershed District	\$1,000	CRWD Ad Valorem	Annually
Flood-13	Admin-istrative	In the event of a road washout: a. Require the road authority to create a protected overflow path/route where protective armoring material prevents future road washouts. b. Encourage the road authorities to consider implementing flood reduction measures where increased flooding will not be problematic for upstream buildings and land areas; examples of flood reduction measures include: i. Maintaining existing culvert size(s) ii. Raising the road elevation iii. Adding a flow restriction	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 4	CRWD in cooperation with other units of government	\$1,000	CRWD Ad Valorem	As needed

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-14	Study	Analyze the upstream and downstream impacts of proposed flood reduction measures and mitigate any negative impacts prior to their implementation.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 5	CRWD	\$5,000 per proposed project	CRWD Ad Valorem	As needed
Flood-15	Administrative	Support the removal of homes, businesses, and other occupied structures from the floodplain.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 6	CRWD	\$1,000	CRWD Ad Valorem	As needed/ requested
Flood-16	Administrative	Provide financial or other assistance (when possible) to implement localized individual floodproofing measures for those structures that cannot be moved out of the floodplain.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 7	CRWD	Up to \$5,000	CRWD Ad Valorem	As funding allows and projects are proposed
Flood-17	Administrative	Apply for grants from the MNDNR, other state and federal agencies, and other sources to support the funding of flood control/flood reduction projects.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 8	CRWD	Included in item Fund-3	CRWD Ad Valorem	Annually/As needed
Flood-18	Annual Operation and Maintenance	Operate, inspect, maintain, modify, and repair all future CRWD flood control and water quality improvement projects	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective C, Action 9	CRWD performs or contracts for performance by others	Cost will depend on number of projects	CRWD Ad Valorem	After construction, annual inspections will be needed.
Flood-19	Administrative	Support the development of a coordinated and comprehensive program with partnering agencies for administering and implementing BMPs on agricultural lands.	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective D, Action 1	CRWD, supporting and partnering with other units of government	\$5,000	CRWD Ad Valorem	2010

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Flood-20	Admin-istrative	Develop and enforce rate control rules (e.g., post-development rates must be less than or equal to pre-development rates).	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective D, Action 2	CRWD performs	Included in item Admin-1	CRWD Ad Valorem	2010 Annually (after rule development)
Flood-21	Admin-istrative	Prohibit diversions of surface water within, into, or out of the watershed that may have a substantial adverse effect on stream flow or water levels at any point within the watershed	Chapter 4.1 Goals 4.1.1, 4.1.2, 4.1.3 Objective D, Action 3	CRWD performs	Included in item Admin-1	CRWD Ad Valorem	Annually (after fund development)
Water Quality (Chapter 4.2)							
WQual-1	Admin-istrative	Support the development of a coordinated and comprehensive program with partnering agencies for administering and implementing BMPs on agricultural and urban lands.	Chapter 4.2 Goal 4.2.1 Objective A, Action 1	CRWD, supporting and partnering with other agencies and units of government	Included in item Flood-19	CRWD Ad Valorem	See item Flood-19
		Develop and implement a coordinated and comprehensive program for administering and implementing BMPs in riparian/ shoreland areas, including support of the design, installation and maintenance of riparian/shoreland vegetation in riparian/ shoreland areas. The program should provide incentives to riparian/ shoreland landowners to maintain and enhance natural vegetation on their property.	Chapter 4.2 Goal 4.2.1 Objective A, Action 5		\$5,000		2012 and annually thereafter

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Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
WQual-2	Administrative	Provide municipalities and counties with technical assistance in applying stormwater management BMPs on road and land development projects.	Chapter 4.2 Goal 4.2.1 Objective A, Action 7	CRWD	\$5,000	CRWD Ad Valorem	As needed
WQual-3	Administrative	Partner with federal, state, and local agencies to promote efficient use of fertilizers for agricultural and residential applications including: soil testing, application recommendations, and sewage/manure application monitoring.	Chapter 4.2 Goal 4.2.1 Objective A, Action 2	CRWD, partnering with other units of government	\$5,000	CRWD Ad Valorem	Annually
WQual-4	Administrative	Support the SWCDs in their role as the buffer strip program coordinator for all efforts by federal, state, and local agencies, and non-profit groups to implement agricultural buffer projects.	Chapter 4.2 Goal 4.2.1 Objective A, Action 3	SWCDs	\$10,000	CRWD Ad Valorem	Annually
WQual-5	Administrative	Work with local feedlot officers to bring feedlot operations in compliance with state regulations.	Chapter 4.2 Goal 4.2.1 Objective A, Action 4	CRWD	\$5,000	CRWD Ad Valorem	Annually
WQual-6	Administrative	Encourage practices that exclude livestock from streams, creeks, ponds, concentrated flow areas, etc.	Chapter 4.2 Goal 4.2.1 Objective A, Action 11	CRWD, partnering with SWCDs/NRCS	\$5,000	CRWD Ad Valorem	Annually

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Develop and implement a riparian area livestock fencing program to keep livestock out of riparian areas.	Chapter 4.2 Goal 4.2.3 Objective A, Action 2	CRWD, in coordination with other units of government	\$5,000		2011 develop program and implement annually thereafter
WQual-7	Administrative	Discourage the improper spreading/application of manure and sewage – e.g., keep away from creeks and other areas of concentrated flow, such as draws and swales. Encourage the use of filter strips between manure/sewage application areas and areas of concentrated flow (swales, draws, streams, etc.).	Chapter 4.2 Goal 4.2.1 Objective A, Action 10	CRWD, partnering with other units of government	\$5,000	CRWD Ad Valorem	Annually
WQual-8	Administrative	Work to incorporate water quality treatment components into future flood control projects for cost efficiency and effective use of land resources.	Chapter 4.2 Goal 4.2.1 Objective A, Action 6		Costs will vary; Included in item Flood-10	CRWD Ad Valorem	As needed
WQual-9	Administrative	Assess and address water quality issues relating to road salt application, salt storage, snow removal, and snow piling/disposal.	Chapter 4.2 Goal 4.2.1 Objective A, Action 8	CRWD, with cities, counties, townships and other agencies	\$5,000	CRWD Ad Valorem	2013

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
WQual-10	Admin-istrative	Continue to apply for grants from the Minnesota Pollution Control Agency (MPCA), Minnesota Board of Water and Soil Resources (BWSR), other state and federal agencies, private foundations, and other sources to support the funding of targeted water quality projects relating to point and non-point pollution sources.	Chapter 4.2 Goal 4.2.1 Objective A, Action 9	CRWD	Included in item Fund-3	CRWD Ad Valorem	Annually
WQual-11	Admin-istrative	Support efforts by local units of government in the CRWD to develop, adopt and administer performance standards that protect water resources.	Chapter 4.2 Goal 4.2.1 Objective B, Action 1	CRWD	\$5,000	CRWD Ad Valorem	Annually, as needed
WQual-12	Admin-istrative	Develop a program that encourages communities, landowners, and other road authorities to eliminate or minimize the discharge of untreated stormwater runoff to the surface water resources in the CRWD.	Chapter 4.2 Goal 4.2.1 Objective B, Action 3	CRWD	\$5,000	CRWD Ad Valorem	2009
WQual-13	Admin-istrative	Develop rules to address stormwater discharge rate, volume and quality.	Chapter 4.2 Goal 4.2.1 Objective B, Action 2	CRWD	Included in item Admin-1	CRWD Ad Valorem	2009
		Develop rules requiring CRWD to be notified of all new direct discharges (including tile systems) to water resources.	Chapter 4.2 Goal 4.2.1 Objective B, Action 4				

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Develop an enforcement program for the CRWD rules.	Chapter 4.2 Goal 4.2.1 Objective B, Action 6				
WQual-14	Admin-istrative	Develop CRWD permitting procedures, including but not limited to, applications, checklists, fees, and inspections.	Chapter 4.2 Goal 4.2.1 Objective B, Action 5	CRWD	Included in item Admin-1	CRWD Ad Valorem	2009
WQual-15	Annual Operation and Main-tenance	Operate, inspect, maintain, modify, and repair all future CRWD flood control and water quality improvement projects	Chapter 4.2 Goal 4.2.1 Objective C, Action 7	CRWD performs or contracts for performance by others	Cost will depend on number of projects, included in item Flood-18	CRWD Ad Valorem	Annually after project construction or implementation
WQual-16	Data Collection and Reporting	Support the MPCA and other monitoring programs for rivers, streams, and other waterbodies in the watershed.	Chapter 4.2 Goal 4.2.1 Objective C, Action 1	Other units of government perform	\$5,000	CRWD Ad Valorem	Annually
WQual-17	Study	Support the preparation of TMDL studies for the MPCA-designated impaired waters in the CRWD.	Chapter 4.2 Goal 4.2.1 Objective C, Action 2	MPCA or CRWD	\$5,000	CRWD Ad Valorem, grants (if CRWD performs)	As needed, while TMDL studies are underway
WQual-18	Admin-istrative	Develop performance standards and rules to protect surface water in the CRWD, as recommended in the TMDL studies.	Chapter 4.2 Goal 4.2.1 Objective C, Action 3	CRWD	\$5,000	CRWD Ad Valorem	After completion of TMDL studies

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Incorporate implementation plans for future Cedar River TMDL studies into this Plan as amendments, including the implementation plan for the Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study into this Plan as an amendment (this study is scheduled to be completed in 2011).	Chapter 4.2 Goal 4.2.1 Objective C, Action 5		\$5,000		After completion of TMDL studies (2012 for Cedar River Watershed Turbidity, Excess Nutrient, and pH TMDL Study)
WQual-19	Capital Project	Take the lead and coordinate with the counties and local units of government in implementing the water quality improvement measures recommended in TMDL studies to reduce pollutants in MPCA-designated impaired waters in the CRWD.	Chapter 4.2 Goal 4.2.1 Objective C—Action 4	CRWD, coordinating with other units of government	Varies/to be determined	Grants	Upon completion of TMDL (or draft TMDL) studies and if funding is available
		Consider implementing draft/preliminary water quality improvement measures identified in the Cedar River Watershed Turbidity, Excess Nutrient and pH TMDL Study, prior to its formal approval by the EPA.	Chapter 4.2 Goal 4.2.1 Objective C—Action 6				

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
WQual-20	Administrative	Cooperate with Turtle Creek Watershed District, Shell Rock River Watershed District, and other agencies/units of government (e.g., counties, SWCDs, cities) to implement measures to reduce nitrate concentrations in the Cedar River watershed.	Chapter 4.2 Goal 4.2.1 Objective C, Action 7	CRWD, in cooperation with other units of government	\$5,000	CRWD Ad Valorem	2013, and annually thereafter
WQual-21	Administrative	Support the preparation and implementation of source water protection plans in the CRWD.	Chapter 4.2 Goal 4.2.1 Objective D, Actions 1 – 3	CRWD	\$5,000	CRWD Ad Valorem	Annually/As needed
		Support the efforts of the counties, cities, and townships to minimize groundwater impacts from SSTs.					
		Refer to the recommendations from the Minnesota Department of Health (MDH) <i>Recommendations And Guidance Pertaining To The Development And Implementation Of Source Water Protection Plans For Public Water Supplies Relying On Surface Waters</i> (2005) and MDH <i>Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas</i> (2007) for guiding the development of source water protection plans for systems that use surface water sources.					

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
WQual-22	Data Collection and Reporting	Coordinate with counties, townships and cities to create and update an inventory of municipal and commercial/ industrial point source discharges to surface waters.	Chapter 4.2 Goal 4.2.1 Objective D, Action 4	CRWD, in coordination with other units of government	\$5,000	CRWD Ad Valorem	2013
WQual-23	Data Collection and Reporting	Prepare an annual water quality monitoring program that delineates the specific sites and monitoring to be undertaken in the upcoming year(s).	Chapter 4.2 Goal 4.2.2 Objective A, Action 1	CRWD	\$10,000 for first year, \$2,000 thereafter	CRWD Ad Valorem	2010, and annually thereafter
		Install and operate automatic sampling equipment at as many sites as possible (as funding allows).			\$3,000 per year per automatic sampling site		
		Implement the annual monitoring plan, which may include monitoring of key tributaries, drainage ditches, streams, lakes, high quality wetlands, surface runoff in drainage ditches, and other water resources within the CRWD	Chapter 4.2 Goal 4.2.2 Objective A, Action 2	CRWD, in support of volunteer and other agency efforts	Grab samples: \$1,000 per site Automatic sampling: \$10,000 per site		Annually
		Support volunteer and agency efforts to monitor water resources in the CRWD	Chapter 4.2 Goal 4.2.2		\$5,000		

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Support the active involvement of citizens in the monitoring of water resources in the CRWD through existing programs of the MPCA or other agencies and/or developing specific programs for groups such as schools within the CRWD	Objective A, Actions 4 & 5				
WQual-24	Data Collection and Reporting	Gather and organize monitoring results and maintain an active and user-friendly database.	Chapter 4.2 Goal 4.2.2 Objective A, Action 3	CRWD, in coordination with other units of government	\$5,000	CRWD Ad Valorem	Annually
		Develop a web-based digital database for surface water monitoring data that connects specific data with monitoring sites.	Chapter 4.2 Goal 4.2.2 Objective B, Action 1		\$5,000		2013
WQual-25	Admin-istrative	Include a summary of the surface water monitoring results in the annual report.	Chapter 4.2 Goal 4.2.2 Objective B, Action 2	CRWD	Included in item Admin-6	CRWD Ad Valorem	Annually
WQual-26	Admin-istrative	Advocate programs through the USDA Farm Services Agency (FSA) and other agencies that support good water supplies for agricultural operations.	Chapter 4.2 Goal 4.2.3 Objective A, Action 1	CRWD	\$1,000	CRWD Ad Valorem	Annually
WQual-27	Admin-istrative	Advocate for the development of wellhead protection plans for municipal water supplies.	Chapter 4.2 Goal 4.2.3 Objective A, Action 3	CRWD	\$1,000	CRWD Ad Valorem	Annually
WQual-28	Data Collection and Reporting	Maintain data that reflects the economic benefits of clean water in the CRWD's rivers and streams to the local economy.	Chapter 4.2 Goal 4.2.3 Objective B, Action 1	CRWD	Included in item Edu-3	CRWD Ad Valorem	Annually

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
WQual-29	Study	Identify quantifiable aspects of the benefits that riparian area protection efforts have on communities.	Chapter 4.2 Goal 4.2.3 Objective B, Action 2	CRWD	\$2,000	CRWD Ad Valorem	2014
WQual-30	Admin-istrative	Review and provide comments on all surface water appropriation permits for the MDNR.	Chapter 4.2 Goal 4.2.3 Objective C, Action 1	CRWD	\$1,000	CRWD Ad Valorem	Annually
Agricultural and Urban Drainage Systems (Chapter 4.3)							
Drain-1	Admin-istrative	The CRWD will not seek authority over public drainage systems within the CRWD, but may be asked to accept this authority from the counties (per Minnesota Statutes 103D.625).	Chapter 4.3 Goal 4.3.1 Objective A, Action 1	CRWD	To be determined	CRWD Ad Valorem	When/if authority turned over to CRWD

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
Edu:	Education and Public Involvement	GW:	Groundwater	Wetland:	Wetlands and Natural Resources
E&SC:	Erosion and Sediment Control	LU:	Land Use		

Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Drain-2	Data Collection and Reporting	Develop an inventory of available data regarding agricultural and other rural drainage systems to determine location, approx. size of tile, approx. dimensions of ditches (profile and cross section), and type/condition of vegetation along and within the ditch (e.g., trees, grass, deadfalls, eroded areas, sediment deltas). Where information is not available, obtain data through surveys or other methods and add the data to the inventory. Where needed, field review the drainage capacity and condition of each agricultural and other rural (public and private) drainage system in the watershed. Collect and organize records on ditch maintenance and assessments.	Chapter 4.3 Goal 4.3.1 Objective A, Action 2	CRWD, in coordination with drainage authorities, SWCDs, counties, townships, property owners and others	\$30,000	CRWD Ad Valorem	2010 – 2012
		Develop and maintain the data for agricultural and other rural drainage systems for each county in the CRWD, using GIS software.	Chapter 4.3 Goal 4.3.1 Objective A, Action 3		\$5,000 to develop GIS database; \$1,000 to maintain		Annually after development of inventory (2010)

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Correlate the drainage systems to current land use conditions and with erodible soils, steep slopes, and other sensitive soil characteristics.	Chapter 4.3 Goal 4.3.1 Objective A, Action 4		\$5,000		2013
Drain-3	Data Collection and Reporting	Identify specific areas within agricultural and urban areas where drainage systems are causing significant impacts to water resources.	Chapter 4.3 Goal 4.3.1 Objective A, Actions 5 & 6	CRWD, in coordination with drainage authorities, SWCDs, counties, cities, townships, and others	\$20,000	CRWD Ad Valorem	2013
		Develop a prioritized listing of drainage systems where action is required to correct water quality and quantity problems.					
	Capital Project	Work to correct or minimize identified significant impacts of drainage systems to water resources.	Chapter 4.3 Goal 4.3.1 Objective A, Action 5		Varies/to be determined	CRWD Ad Valorem, drainage authority funds, other agency funds, grants	2014 – 2018

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Drain-4	Annual Operation and Maintenance	Develop an ongoing schedule for visiting and inspecting all drainage systems for maintenance purposes. Develop drainage system monitoring & maintenance plan, including an inventory and assessment of past maintenance efforts, identification of chronic problem areas, and a prioritization of maintenance needs.	Chapter 4.3 Goal 4.3.1 Objective A, Action 7	CRWD, in coordination with drainage authorities, SWCDs, counties, cities, and townships	\$5,000	CRWD Ad Valorem	2013
Erosion and Sediment Control (Chapter 4.4)							
E&SC-1	Administrative	Develop rules regarding design requirements for sediment ponds, basins, contour farming, buffer strips, conservation tillage, grassed swales/draws, and other erosion and sediment control BMPs.	Chapter 4.4 Goal 4.4.1 Objective A, Action 1	CRWD	Included in item Admin-1	CRWD Ad Valorem	See item Admin-1
E&SC-2	Administrative	Provide design recommendations and technical assistance for erosion and sediment control plans prepared for all major construction and roadway projects.	Chapter 4.4 Goal 4.4.1 Objective A, Actions 2 & 3	CRWD	Included in item WQual-7	CRWD Ad Valorem	Annually/as needed (see item WQual-7)
		Provide support and assistance for the construction of sediment ponds and basins for intensive agricultural operations.					

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
E&SC-3	Admin-istrative	Facilitate discussions and provide seminars or workshops for local units of government, agencies and relevant parties on issues of BMPs and stormwater.	Chapter 4.4 Goal 4.4.1 Objective A, Action 4	CRWD	\$2,000	CRWD Ad Valorem	Annually
E&SC-4	Study	Investigate measures that address controlling the movement of sediment once it has entered the river or stream system, and the minimization of bank erosion.	Chapter 4.4 Goal 4.4.1 Objective A, Action 5	CRWD	\$10,000	CRWD Ad Valorem	2013
E&SC-5	Capital Project	Implement measures that address controlling the movement of sediment once it has entered the river or stream system, and the minimization of bank erosion.	Chapter 4.4 Goal 4.4.1 Objective A, Action 5	CRWD	Varies/to be determined	CRWD Ad Valorem, drainage authority funds, other agency funds, grants	2014 – 2018
E&SC-6	Admin-istrative	Develop rules requiring the preparation of plans that show grading and temporary and permanent erosion/ sediment controls for all major land development proposals and public construction projects.	Chapter 4.4 Goal 4.4.1 Objective B, Actions 1 & 2	CRWD CRWD	Included in item Admin-1	CRWD Ad Valorem	2010 (see item Admin-1)
		Develop procedures and methods for enforcing CRWD grading and erosion control requirements.					

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
E&SC-7	Data Collection and Reporting	Develop an erosion problem inventory for prioritized application of stabilization BMPs.	Chapter 4.4 Goal 4.4.1 Objective B, Action 3	CRWD, in coordination with SWCDs/NRCS	\$10,000	CRWD Ad Valorem	2013
E&SC-8	Administrative	Encourage livestock producers to develop plans to reduce grazing in streams, creeks, ditches, draws, and other waterways.	Chapter 4.4 Goal 4.4.1 Objective B, Action 4	CRWD, partnering with SWCDs/NRCS	Included in item WQual-11	CRWD Ad Valorem	Annually
Wetlands and Natural Resources (Chapter 4.5)							
Wetland-1	Study	Support a coordinated interagency watershed wide study to determine the location of presettlement wetlands and the amount of wetland area that has been drained or filled.	Chapter 4.5 Goal 4.5.1 Objective A, Action 1	CRWD, with other agencies	\$2,000	CRWD Ad Valorem	2010
Wetland-2	Study	Develop and adopt a prioritized list of wetland restoration opportunities.	Chapter 4.5 Goal 4.5.1 Objective A, Action 2	CRWD, with the SWCDs/NRCS	\$2,000	CRWD Ad Valorem	2011
Wetland-3	Capital Project	Support and assist in the restoration and re-establishment of priority wetlands as feasible.	Chapter 4.5 Goal 4.5.1 Objective A, Action 3	CRWD, SWCDs/NRCS, and others	Varies/to be determined	CRWD Ad Valorem. other agency funds, grants	2010 – 2018
Wetland-4	Administrative	Support the use of a wetland banking program in the CRWD.	Chapter 4.5 Goal 4.5.1 Objective A, Action 4	CRWD and local units of government responsible for administering the Wetland Conservation Act	\$1,000	CRWD Ad Valorem	Annually

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
Land Use (Chapter 4.6)							
LU-1	Admin-istrative	Provide technical assistance and information to communities regarding surface water, groundwater and land resources.	Chapter 4.6 Goal 4.6.1 Objective A, Action 1	CRWD	Included in item WQual-7	CRWD Ad Valorem	Annually
LU-2	Admin-istrative	Review and comment on goals and policies proposed in county and municipal plans as they are being prepared. Recommend the integration of goals and policies that protect water resources.	Chapter 4.6 Goal 4.6.1 Objective A, Actions 2 & 3	CRWD	\$2,000 per plan	CRWD Ad Valorem	As needed
		Coordinate the implementation of resource protection programs with local governments through the adoption and implementation of county and municipal land use plans.					
LU-3	Admin-istrative	Inventory and assess local controls for effectiveness, consistency and coordination as they relate to water resource management.	Chapter 4.6 Goal 4.6.2 Objective A, Actions 1 – 5	CRWD	\$5,000	CRWD Ad Valorem	2011
		Assist local units of government in their development of appropriate protections where they lack standards or regulatory controls to protect water resources.			\$5,000		2012 - 2014

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Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Provide technical assistance and information regarding natural resources to local units of government to assist them in their efforts to prepare zoning ordinances, subdivision regulations, SSTS ordinances, feedlot ordinances, official maps and other regulatory controls as well as preparing for meetings with variance boards, planning commissions, water planning committees, and other water-related boards and committees.			\$3,000		Annually/as needed
		Review and comment on the specific regulations relating to water resource issues proposed in the various ordinances as they are being prepared.					
		Assist local governments in the administration of their ordinances as they relate to water resource management.					
LU-4	Administrative	Review and provide recommendations on subdivision plats and major zoning approvals as they relate to water resource management	Chapter 4.6 Goal 4.6.2 Objective A, Action 6	CRWD	\$1,000	CRWD Ad Valorem	Annually/as needed

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
LU-5	Admin-istrative	Assist cities and counties in the development, administration and enforcement of stormwater design standards.	Chapter 4.6 Goal 4.6.2 Objective A, Action 7	CRWD	\$1,000	CRWD Ad Valorem	Annually/as needed
LU-6	Admin-istrative	Assist in the collection, organization and distribution of information materials that describe the various land conservation programs that protect and conserve water and land related resources offered by federal, state, local agencies and non profit organizations.	Chapter 4.6 Goal 4.6.3 Objective A, Actions 1 – 6	CRWD, working with the SWCDs/NRCS and other agencies	\$25,000	CRWD Ad Valorem	Annually/as needed
		Recommend that all local governments in the watershed with land use controls incorporate goals and policies that encourage the use of land conservation programs.					
		Support the SWCDs/NRCS to encourage the use of the Conservation Reserve Program, the Reinvest in Minnesota Program and other land resource protection programs.					
		Support the development of conservation easements in appropriate areas of the watershed concurrent with land development requests.					

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Promote the adoption of conservation tillage and contour farming through education and interaction with farmers.					
		Recommend and provide assistance on the preservation or installation of buffers along surface water features through applicable conservation programs.					
		Develop an incentive program that provides financial assistance for the implementation of conservation practices by agricultural operators in the CRWD.	Chapter 4.6 Goal 4.6.3 Objective B, Action 5				2011
LU-7	Administrative	Assist farmers in using crop residue management practices, no till drilling, rotational grazing, grassed waterways, terracing and other methods to prevent or reduce erosion.	Chapter 4.6 Goal 4.6.3 Objective B, Action 1	CRWD, working with the SWCDs/NRCS	\$5,000	CRWD Ad Valorem	Annually
LU-8	Administrative	Support tours and field demonstrations on improved agricultural practices.	Chapter 4.6 Goal 4.6.3 Objective B, Action 2	CRWD, partnering with local agencies to	\$2,000 per tour	CRWD Ad Valorem	As needed/as opportunities arise
LU-9	Administrative	Research and analyze the impacts of new farm bills and related legislation. Review the land conservation programs that are funded or mandated through the legislation and their impacts on the CRWD's programs and projects.	Chapter 4.6 Goal 4.6.3 Objective B, Action 3	CRWD, with assistance from the SWCDs/NRCS	\$2,000	CRWD Ad Valorem	Annually/as needed

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
LU-10	Admin-istrative	Support and coordinate with other units of government and organizations to develop programs that protect farmland through water resource conservation programs.	Chapter 4.6 Goal 4.6.3 Objective B, Action 4	CRWD, coordinating with other units of government	\$1,000	CRWD Ad Valorem	Annually
LU-11	Admin-istrative	Develop a program that provides financial incentives for permanent riparian plantings in priority areas of the CRWD.	Chapter 4.6 Goal 4.6.3 Objective C, Actions 1 – 4	CRWD, with other units of government	\$2,000	CRWD Ad Valorem	2011
		CRWD, working with the SWCDs/NRCS CRWD, working with the SWCDs/NRCS		\$1,000	CRWD Ad Valorem	Annually	
		Maintain a list of equipment suppliers and contractors who can provide equipment and services needed to install and maintain vegetation.					
		Increase the incentive for landowners to create buffer strips along wetlands, rivers and streams in the district.		CRWD, working with the SWCDs/NRCS	\$2,000		
Recreation, Habitat, and Shoreland Management (Chapter 4.7)							
RecHab& Shore-1	Admin-istrative	Develop and distribute a Cedar River watershed recreational map to chambers of commerce, the Minnesota Department of Trade and Economic Development and other tourism organizations.	Chapter 4.7 Goal 4.7.1 Objective A, Actions 1 & 3	CRWD, with other units of government	\$7,000	CRWD Ad Valorem	2015

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Item Number	Type of Activity	Item Description	Plan Reference	Responsible Party (CRWD, Other Unit of Government, etc.)	Total Estimated Cost*	Potential Funding Sources/ Authority	Proposed Implementation Year
		Support the development and distribution of a Cedar River canoe route map.					
RecHab& Shore-2	Admin-istrative	Support the distribution of MDNR public access maps for rivers and streams within the CRWD.	Chapter 4.7 Goal 4.7.1 Objective A, Actions 2 & 4	CRWD	\$1,000	CRWD Ad Valorem	Annually
		Distribute maps locating public hunting lands within the watershed.					
RecHab& Shore-3	Admin-istrative	Support the development of marketing materials that promote major destinations and features in the watershed.	Chapter 4.7 Goal 4.7.1 Objective A, Action 5	CRWD, in support of other units of government	\$1,000	CRWD Ad Valorem	As needed
RecHab& Shore-4	Admin-istrative	Work with MDNR (Divisions of Fish and Wildlife and Waters) to develop and implement management programs.	Chapter 4.7 Goal 4.7.1 Objective B, Action 1	CRWD	\$500	CRWD Ad Valorem	Annually

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

RecHab& Shore-5	Data Collection and Reporting	Support the inventory of fish and wildlife resources.	Chapter 4.7 Goal 4.7.1 Objective B, Actions 2 & 3	CRWD, in support of MDNR and other agencies	\$2,000	CRWD Ad Valorem	As needed
		Support the identification and protection of critical water bodies and wetlands for fish and wildlife.					
RecHab& Shore-6	Admin-istrative	Support the design and construction of public access facilities to surface water features in the CRWD, where appropriate.	Chapter 4.7 Goal 4.7.1 Objective C, Actions 1 & 2	CRWD, in support of MDNR and other units of government	\$2,000	CRWD Ad Valorem	As needed
		Support the open and unimpeded access and use of all navigable public waters in the CRWD. Coordinate and assist enforcement efforts to maintain open access and to remove illegal fencing.					
RecHab& Shore-7	Admin-istrative	Support the minimization of road ditch mowing during the nesting season.	Chapter 4.7 Goal 4.7.1 Objective C, Action 3	CRWD, in support of road authorities	\$500	CRWD Ad Valorem	Annually
Groundwater (Chapter 4.8)							
GW-1	Admin-istrative	Provide technical assistance to communities preparing wellhead protection plans. Provide additional staffing support to community water suppliers and transient systems where there is limited or no staffing available to prepare the plans.	Chapter 4.8 Goal 4.8.1 Objective A, Action 1	CRWD	\$1,000	CRWD Ad Valorem	As needed
GW-2	Admin-istrative	Share resource information with public water suppliers that can help in identifying and establishing source water protection areas.	Chapter 4.8 Goal 4.8.1 Objective A, Action 2	CRWD	\$500	CRWD Ad Valorem	As needed

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

GW-3	Admin-istrative	Pursue financial resources to assist communities in the purchase of development rights in vulnerable wellhead protection priority areas.	Chapter 4.8 Goal 4.8.1 Objective A, Action 3	CRWD	\$5,000	CRWD Ad Valorem	As needed, as funding is available
GW-4	Admin-istrative	Meet with landowners and public water suppliers and facilitate workable solutions that protect the groundwater resources	Chapter 4.8 Goal 4.8.1 Objective A, Action 4	CRWD	\$1,000	CRWD Ad Valorem	As needed
GW-5	Admin-istrative	Periodically include information on the potential impacts of abandoned wells in a CRWD newsletter and/or the CRWD website.	Chapter 4.8 Goal 4.8.1 Objective B, Action 1	CRWD	Included in item Edu-3	CRWD Ad Valorem	As appropriate
GW-6	Data Collection and Reporting	Identify and record the locations of unused or abandoned wells.	Chapter 4.8 Goal 4.8.1 Objective B, Action 2	CRWD, working with local units of government	\$5,000	CRWD Ad Valorem	2014
GW-7	Admin-istrative	Develop an abandoned well sealing cost-share program for targeted areas that are not adequately served by any municipal, county or state programs.	Chapter 4.8 Goal 4.8.1 Objective B, Action 3	CRWD	\$2,000	CRWD Ad Valorem	2015
GW-8	Admin-istrative	Encourage and support the responsible agencies to develop a groundwater recharge area map based on available information. Distribute the map to land use authorities in the CRWD for their use and consideration when reviewing land development proposals.	Chapter 4.8 Goal 4.8.1 Objective C, Action 1	CRWD, in support of other agencies	\$1,000	CRWD Ad Valorem	2015
GW-9	Admin-istrative	Coordinate and support the use of BMPs that protect and conserve groundwater resources.	Chapter 4.8 Goal 4.8.1 Objective C, Action 2	CRWD, in coordination and support of other units of government	\$500	CRWD Ad Valorem	Annually

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

GW-10	Admin-istrative	Recommend and advocate the protection of wetlands, especially those considered essential for groundwater recharge.	Chapter 4.8 Goal 4.8.1 Objective C, Action 3	CRWD, in coordination and support of other units of government	\$500	CRWD Ad Valorem	Annually
GW-11	Data Collection and Reporting	Identify areas in the watershed where ISTS/SSTS may potentially impact groundwater resources and monitor these areas on a regular basis.	Chapter 4.8 Goal 4.8.1 Objective C, Action 4	CRWD	\$10,000 to identify \$5,000 to monitor	CRWD Ad Valorem	2013 – identify areas, monitor thereafter
		Work with state, county, and local governments in evaluating the condition of SSTS	Chapter 4.8 Goal 4.8.1 Objective D, Action 4	CRWD, working with local units of government			
GW-12	Admin-istrative	Support the efforts of the counties, cities, and townships to minimize groundwater impacts from SSTS	Chapter 4.8 Goal 4.8.1 Objective C, Action 5	CRWD	\$500	CRWD Ad Valorem	Annually
GW-13	Admin-istrative	Use the Minnesota Department of Health's <i>Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas</i> , and the MPCA's <i>Minnesota Stormwater Manual</i> guidance for evaluating proposed stormwater infiltration projects in wellhead protection areas.	Chapter 4.8 Goal 4.8.1 Objective C, Action 6	CRWD	\$500	CRWD Ad Valorem	As needed
GW-14	Admin-istrative	Coordinate and support state and federal incentive programs that encourage agricultural producers to use groundwater protection BMPs in their operations.	Chapter 4.8 Goal 4.8.1 Objective D, Actions 1 & 2	CRWD, in coordination and support of other units of government	Included in item Flood-19	CRWD Ad Valorem	Annually
		Support the adoption and use of sound irrigation management techniques.					

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
Edu:	Education and Public Involvement	GW:	Groundwater	Wetland:	Wetlands and Natural Resources
E&SC:	Erosion and Sediment Control	LU:	Land Use		

Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

GW-15	Admin-istrative	Investigate and implement a notification system or comment role regarding MDNR water appropriation permit applications.	Chapter 4.8 Goal 4.8.1 Objective D, Action 3	CRWD, in coordination and support of other units of government	Included in item WQual-30	CRWD Ad Valorem	Annually
GW-16	Admin-istrative	Develop a groundwater monitoring program that delineates the specific sites and monitoring to be performed in the upcoming year.	Chapter 4.8 Goal 4.8.2 Objective A, Actions 1 & 2	CRWD, assisting responsible agencies	\$1,000	CRWD Ad Valorem	2015
		Coordinate all groundwater testing efforts in the CRWD including programs through the MPCA, MDA, county health departments, Extension Service and other local programs.					
GW-17	Data Collection and Reporting	Collect and gather existing data sets on groundwater monitoring.	Chapter 4.8 Goal 4.8.2 Objective B, Actions 1 – 3	CRWD, in support of other agencies' efforts	\$1,500	CRWD Ad Valorem	2015
		Organize and maintain records on groundwater permits.					
		Develop and maintain a database on groundwater use in the watershed					
GW-18	Data Collection and Reporting	Develop a web-based digital database for groundwater monitoring data that connects specific data with monitoring sites.	Chapter 4.8 Goal 4.8.2 Objective C, Action 1	CRWD	\$2,000	CRWD Ad Valorem	2015
GW-19	Admin-istrative	Include a summary of the groundwater monitoring results in the CRWD annual report.	Chapter 4.8 Goal 4.8.2 Objective C, Action 2	CRWD	Included in item Admin-6	CRWD Ad Valorem	Annually

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

GW-20	Data Collection and Reporting	Identify and map groundwater recharge areas in the watershed.	Chapter 4.8 Goal 4.8.2 Objective D, Actions 1 – 3	CRWD, assisting responsible agencies	\$2,000	CRWD Ad Valorem	2015
		Create an inventory of existing and abandoned gravel pits, junkyards, fuel storage facilities, and other potential point sources of groundwater contamination.		CRWD, in coordination with counties, townships and cities			
		Support increased intensity of groundwater monitoring in targeted areas.		CRWD, in support of other agencies' efforts	\$1,000		2015 and as needed thereafter
GW-21	Data Collection and Reporting	Support the preparation of maps illustrating trends in groundwater conditions in the watershed.	Chapter 4.8 Goal 4.8.2 Objective D, Action 4	CRWD, in support of other agencies' efforts	\$1,000	CRWD Ad Valorem	2016
GW-22	Administrative	Provide comments on major subdivision and planned unit developments that have the potential to impact groundwater resources.	Chapter 4.8 Goal 4.8.3 Objective A, Action 1	CRWD	Included in item LU-2	CRWD Ad Valorem	Annually/as needed

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Administration (Chapter 4.9)							
Admin-1	Admin-istrative	Develop, adopt, and implement CRWD rules, in accordance with Minnesota Statutes 103D.341.	Chapter 4.9 Goal 4.9.1 Objective A, Action 1	CRWD	\$25,000	CRWD Ad Valorem	2010
Admin-2	Admin-istrative	Prepare a handbook that provides managers and advisory committee members with the basic procedures and processes involved in CRWD operations. Include a copy of the <i>Watershed District Manager's Handbook</i> prepared by the Minnesota Association of Watershed Districts, the adopted CRWD Plan, annual work programs and budgets, CRWD rules and bylaws, phone directory and meeting calendar.	Chapter 4.9 Goal 4.9.1 Objective B, Action 1	CRWD	\$1,000	CRWD Ad Valorem	2009
Admin-3	Admin-istrative	New manager attendance at the orientation workshop or similar program within the first six months of serving as manager.	Chapter 4.9 Goal 4.9.1 Objective B, Action 2	CRWD	\$500	CRWD Ad Valorem	As needed
Admin-4	Admin-istrative	Support the legislative oversight and lobbying efforts of the Minnesota Association of Watershed Districts (MAWD).	Chapter 4.9 Goal 4.9.1 Objective C, Action 1	CRWD CRWD CRWD	\$2,500	CRWD Ad Valorem	Annually
		Seek opportunities such as conferences and publications to learn about emerging issues regarding surface water and integrate this information into watershed management goals.	Chapter 4.9 Goal 4.9.1 Objective D, Action 1				

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Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

		Continually monitor and evaluate state and federal changes to water policy and programs in order to ensure that the CRWD Plan and Plan implementation remain consistent with changing policy and avoid inherent conflicts of interest.	Chapter 4.9 Goal 4.9.2 Objective C, Action 1				
Admin-5	Admin-istrative	Prepare, publish, and distribute CRWD annual report	Chapter 4.9 Goal 4.9.1 Objective E, Action 1	CRWD	\$5,000	CRWD Ad Valorem	Annually
Admin-6	Admin-istrative	Provide a financial and regulatory link between local and state authorities where programs or projects are missing	Chapter 4.9 Goal 4.9.2 Objective A, Action 1	CRWD	\$500	CRWD Ad Valorem	Annually
Admin-7	Admin-istrative	Maintain relationships with Dodge, Freeborn, Mower and Steele SWCDs to optimize joint implementation of CRWD and SWCD goals	Chapter 4.9 Goal 4.9.2 Objective A, Actions 2 & 3	CRWD	\$2,000	CRWD Ad Valorem	Annually
		Develop effective cooperative agreements with local, state, and federal agencies, utilizing available resources to implement CRWD goals					
		Create and maintain relationships with non-profit organizations (e.g. MN Farm Bureau, Pheasants Forever, Ducks Unlimited, local sportsmans clubs, Boy Scouts, Girl Scouts, and the J.C. Hormel Nature Center)	Chapter 4.9 Goal 4.9.2 Objective B, Action 2				

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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Admin-8	Admin-istrative	Partner with the U of M Extension Service, as well as local school districts, vocational/technical schools, and community colleges to provide educational programs.	Chapter 4.9 Goal 4.9.2 Objective B, Action 1	CRWD	Included in item Edu-3	CRWD Ad Valorem	Annually
Admin-9	Admin-istrative	Identify key players and the unique roles they play, or could play, in resolution of issues or plan implementation.	Chapter 4.9 Goal 4.9.2 Objective C, Actions 2 & 3	CRWD	\$500	CRWD Ad Valorem	Annually
		Identify overlapping roles and identify groups that contribute in a support capacity to reduce duplication of effort, streamline programs, and provide efficient and cost effective service.					
Education and Public Involvement (Chapter 4.10)							
Edu-1	Admin-istrative	Coordinate and develop educational programs on surface water resources.	Chapter 4.10 Goal 4.10.1 Objective A, Action 1	CRWD, in coordination with other units of governments	\$5,000	CRWD Ad Valorem	Annually
Edu-2	Admin-istrative	Develop a strategic education program that identifies key water resource stakeholder groups and outlines an educational strategy for each group.	Chapter 4.10 Goal 4.10.1 Objective C, Action 3	CRWD	\$2,000	CRWD Ad Valorem	2011
Edu-3	Admin-istrative	Implement annual education program, which may include the following:	See actions below:	CRWD, in coordination with other units of governments and educational institutions	\$15,000	CRWD Ad Valorem	Annually/as needed
		Collect informational materials from the Extension Service on a regular basis and distribute to CRWD constituents.	Chapter 4.10 Goal 4.10.1 Objective A, Action 2				

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Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

		Support youth education events and programs in school districts within the watershed	Chapter 4.10 Goal 4.10.1 Objective A, Action 3				
		Support the implementation of volunteer water resource projects	Chapter 4.10 Goal 4.10.1 Objective A, Action 4				
		Establish an annual volunteer clean-up day to pick up debris and trash along rivers and streams.	Chapter 4.10 Goal 4.10.1 Objective B, Action 7				
		Prepare and distribute press releases that highlight CRWD activities and decisions.	Chapter 4.10 Goal 4.10.1 Objective B, Action 2				
		Coordinate on-the-ground tours of the CRWD to foster better understanding of water quality and water resource issues	Chapter 4.10 Goal 4.10.1 Objective B, Action 8				
		Contact media on an annual basis to update contact information and activities.	Chapter 4.10 Goal 4.10.1 Objective B, Action 6				
		Develop and hold an annual poster contest for youth that focuses on water quality.	Chapter 4.10 Goal 4.10.1 Objective B, Action 4				
	Data Collection and Reporting	Gather, maintain and distribute data on economic benefits related to water resources.	Chapter 4.10 Goal 4.10.1 Objective A, Action 6				
	Admin-istrative	Distribute the results of the surface water monitoring program to the official CRWD newspapers.	Chapter 4.10 Goal 4.10.1 Objective C, Action 1				
		Publish the results of the surface water monitoring program in the CRWD newsletter and/or website.	Chapter 4.10 Goal 4.10.1 Objective C, Action 2				

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

		Coordinate and disseminate information regarding University of Minnesota Extension Service, MPCA, BWSR or other workshops on surface water management topics.	Chapter 4.10 Goal 4.10.1 Objective C, Action 4				
		Produce, distribute and present targeted information for government and agency partners.	Chapter 4.10 Goal 4.10.1 Objective B, Action 5		Included in item E&SC-3		
		Prepare and distribute to all households in the watershed an annual CRWD newsletter via technologically appropriate media.	Chapter 4.10 Goal 4.10.1 Objective B, Action 1		Included in item Admin-6		
Edu-4	Admin-istrative	Develop a CRWD logo and use on all future correspondence.	Chapter 4.10 Goal 4.10.1 Objective B, Action 3	CRWD	\$1,000	CRWD Ad Valorem	2010
Edu-5		Develop a public information package that can be distributed to landowners that explains what a watershed is and how they might impact water resources.	Chapter 4.10 Goal 4.10.1 Objective A, Action 5	CRWD	\$1,000	CRWD Ad Valorem	2010

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Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Edu-6	Admin- istrative	Develop a safe drinking water public education program that includes brochures, press releases, and informational materials. Utilize existing materials from other organizations such as the MDH and the MPCA.	Chapter 4.10 Goal 4.10.1 Objective D, Action 1 – 6	CRWD, with information from other agencies	\$4,000	CRWD Ad Valorem	2012
		Distribute groundwater educational materials on a periodic basis to cities and townships for their use and distribution.					2012 and periodically thereafter
		Conduct an annual groundwater educational event for children on the importance of groundwater protection.					Annually/as appropriate
		Provide residents in the CRWD with information about safe drinking water supply. Provide information to address the specific drinking water needs and concerns for infants, such as high nitrate levels.					
		Combine groundwater curriculum and materials with surface water education programs for students.					
		Incorporate water testing clinics into educational events.					

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Edu-7	Admin-istrative	Maintain the CRWD website and update as needed to post meeting agendas and minutes, publications, data, etc. Post this plan and future plan amendments/updates on the CRWD website.	Chapter 4.10 Goal 4.10.1 Objective E, Actions 1 & 2	CRWD	\$1,000	CRWD Ad Valorem	Annually
Edu-8	Admin-istrative	Maintain an advisory committee (per Minnesota Statutes 103D.331). Seek to develop meaningful responsibilities for the advisory committee.	Chapter 4.10 Goal 4.10.1 Objective F, Actions 1 & 2	CRWD	\$2,000	CRWD Ad Valorem	Annually
Edu-9	Admin-istrative	Maintain lists of: <ul style="list-style-type: none"> • local elected officials for all units of local government in the watershed. • official newspapers where notices are published. • all agency & organization representatives, including federal & state agencies, SWCDs, county planning and zoning, county environmental health departments, cities, townships, school districts, etc. 	Chapter 4.10 Goal 4.10.2 Objective A, Actions 1, 2 & 3	CRWD	\$500	CRWD Ad Valorem	Annually
Funding (Chapter 4.11)							
Fund-1	Admin-istrative	Adopt the CRWD annual budget after holding a public hearing and meeting other statutory requirements.	Chapter 4.11 Goal 4.11.1 Objective A, Action 1	CRWD	\$500	CRWD Ad Valorem	Annually
		Use the statutory tools provided to watershed districts to fund the implementation of this plan	Chapter 4.11 Goal 4.11.1 Objective B, Action 1				

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Admin:	Administration	Flood:	Flood Control	RecHab&Shore:	Recreation, Habitat, and Shoreland Management
Drain:	Agricultural and Urban Drainage Systems	Fund:	Funding	WQual:	Water Quality
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Table 5-1 Cedar River Watershed District (CRWD) Implementation Program (Continued)

Fund-2	Admin-istrative	Update the CRWD's implementation program at least every two years, including the capital improvement program (CIP)	Chapter 4.11 Goal 4.11.1 Objective A, Action 2	CRWD	\$500	CRWD Ad Valorem	Annually
Fund-3	Admin-istrative	Seek grants, partnerships, loans, etc. whenever possible and cost effective to reduce the CRWD's share of project costs.	Chapter 4.11 Goal 4.11.1 Objective B, Action 2	CRWD	\$1,000 (cost varies depending on application requirements)	CRWD Ad Valorem	Annually
Fund-4	Admin-istrative	Complete CRWD annual audit and include with CRWD annual report.	Chapter 4.11 Goal 4.11.1 Objective C, Action 1	CRWD will contract for performance by others	\$3,000	CRWD Ad Valorem	Annually

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Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year

Item Number	Estimated Costs by Year (\$) ¹									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Flood Control (Chapter 4.1)										
Flood-1		\$48,500	\$30,500	\$30,500	\$30,500	\$30,500	\$30,500	\$30,500	\$30,500	\$30,500
Flood-2 ²				\$3,000				\$3,000		
Flood-3		\$2,000	\$2,000	\$2,000						
Flood-4 ²	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
Flood-5	Included in item Admin-1									
Flood-6	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Flood-7 ²	\$5,000					\$5,000				
Flood-8		\$5,000	Included in item Admin-1							
Flood-9	\$62,500	\$62,500	\$62,500	\$62,500						
Flood-10 ³		\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000
Flood-11 ²		\$5,000		\$5,000		\$5,000		\$5,000		\$5,000
Flood-12	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Flood-13 ²				\$1,000				\$1,000		
Flood-14 ²	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Flood-15 ²		\$1,000		\$1,000		\$1,000		\$1,000		\$1,000
Flood-16 ²	\$5,000		\$5,000		\$5,000		\$5,000		\$5,000	
Flood-17	Included in item Fund-3									
Flood-18 ²			\$5,000	\$10,000	\$15,000	\$20,000	\$25,000	\$30,000	\$35,000	\$40,000
Flood-19		\$5,000								
Flood-20	Included in item Admin-1									
Flood-21	Included in item Admin-1									

¹ Cost estimates are based on 2009 dollars, do not account for inflation, and are for planning purposes only. This table represents a target of activities and projects the CRWD may complete if sufficient funding is available.

² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

³ For capital projects, the cost is the total estimated project cost, which may be funded wholly or in part by outside sources (e.g. grants, other agency funds)

Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year (continued)

Item Number	Estimated Costs by Year (\$) ¹									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<i>Flood Total</i>	\$113,500	\$420,000	\$396,000	\$406,000	\$341,500	\$352,500	\$351,500	\$361,500	\$361,500	\$367,500
Water Quality (Chapter 4.2)										
WQual-1	Included in item Flood-19			\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-2 ²		\$5,000		\$5,000		\$5,000		\$5,000		\$5,000
WQual-3	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-4	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
WQual-5	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-6	\$5,000	\$5,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
WQual-7	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-8	Included in item Flood-10.									
WQual-9					\$5,000					
WQual-10	Included in item Fund-3									
WQual-11	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-12	\$5,000									
WQual-13	Included in item Admin-1									
WQual-14	Included in item Admin-1									
WQual-15 ²	Included in item Flood-18									
WQual-16	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-17 ^{2,3}	\$5,000		\$5,000		\$5,000		\$5,000		\$5,000	
WQual-18 ²				\$10,000			\$10,000			\$10,000
WQual-19 ^{2,3}		\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
WQual-20					\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-21	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-22					\$5,000					

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² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

³ For capital projects, the cost is the total estimated project cost, which may be funded wholly or in part by outside sources (e.g. grants, other agency funds)

Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year (continued)

Item Number	Estimated Costs by Year (\$) ¹									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
WQual-23		\$93,000	\$85,000	\$85,000	\$85,000	\$85,000	\$85,000	\$85,000	\$85,000	\$85,000
WQual-24	\$5,000	\$5,000	\$5,000	\$5,000	\$10,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
WQual-25	Included in item Admin-6									
WQual-26	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
WQual-27	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
WQual-28	Included in item Edu-3									
WQual-29						\$2,000				
WQual-30	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
<i>WQual Total</i>	\$63,000	\$251,000	\$248,000	\$263,000	\$273,000	\$260,000	\$268,000	\$258,000	\$258,000	\$268,000
Agricultural and Urban Drainage Systems (Chapter 4.3)										
Drain-1										
Drain-2		\$15,000	\$11,000	\$11,000	\$6,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Drain-3 ³					\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Drain-4					\$5,000					
<i>Drain Total</i>	\$0	\$15,000	\$11,000	\$11,000	\$31,000	\$21,000	\$21,000	\$21,000	\$21,000	\$21,000
Erosion and Sediment Control (Chapter 4.4)										
E&SC-1	Included in item Admin-1									
E&SC-2	Included in item WQual-7									
E&SC-3	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
E&SC-4					\$10,000					
E&SC-5 ^{2,3}						\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
E&SC-6	Included in item Admin-1									
E&SC-7					\$10,000					
E&SC-8	Included in item WQual-11									

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² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

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Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year (continued)

Item Number	Estimated Costs by Year (\$) ¹									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<i>E&SC Total</i>	\$2,000	\$2,000	\$2,000	\$2,000	\$22,000	\$52,000	\$52,000	\$52,000	\$52,000	\$52,000
Wetlands and Natural Resources (Chapter 4.5)										
Wetland-1		\$2,000								
Wetland-2			\$2,000							
Wetland-3 ^{2,3}		\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
Wetland-4	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
<i>Wetland Total</i>	\$1,000	\$103,000	\$103,000	\$101,000	\$101,000	\$101,000	\$101,000	\$101,000	\$101,000	\$101,000
Land Use (Chapter 4.6)										
LU-1	Included in item WQual-7									
LU-2 ²	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
LU-3	\$3,000	\$3,000	\$8,000	\$8,000	\$8,000	\$8,000	\$3,000	\$3,000	\$3,000	\$3,000
LU-4	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
LU-5	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
LU-6	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
LU-7	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
LU-8 ²	\$2,000		\$2,000		\$2,000		\$2,000		\$2,000	
LU-9	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
LU-10	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
LU-11	\$3,000	\$3,000	\$5,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
<i>LU Total</i>	\$45,000	\$43,000	\$52,000	\$48,000	\$50,000	\$48,000	\$45,000	\$43,000	\$45,000	\$43,000
Recreation, Habitat, and Shoreland Management (Chapter 4.7)										
RecHab&Shore-1							\$7,000			
RecHab&Shore-2	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
RecHab&Shore-3 ²		\$1,000				\$1,000				\$1,000

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² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

³ For capital projects, the cost is the total estimated project cost, which may be funded wholly or in part by outside sources (e.g. grants, other agency funds)

Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year (continued)

Item Number	Estimated Costs by Year (\$) ¹									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
RecHab&Shore-4	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
RecHab&Shore-5 ²	\$2,000			\$2,000			\$2,000			\$2,000
RecHab&Shore-6 ²			\$2,000				\$2,000			
RecHab&Shore-7	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
<i>RecHab&Shore Total</i>	\$4,000	\$3,000	\$4,000	\$4,000	\$2,000	\$3,000	\$13,000	\$2,000	\$2,000	\$5,000
Groundwater (Chapter 4.8)										
GW-1 ²	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	
GW-2 ²	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	
GW-3 ²			\$5,000			\$5,000			\$5,000	
GW-4 ²		\$1,000			\$1,000			\$1,000		
GW-5 ²	Included in item Edu-3									
GW-6						\$5,000				
GW-7							\$2,000			
GW-8								\$1,000		
GW-9	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
GW-10	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
GW-11					\$10,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
GW-12	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
GW-13 ²				\$500	\$500	\$500	\$500	\$500	\$500	\$500
GW-14	Included in item Flood-19									
GW-15	Included in item WQual-30									
GW-16							\$1,000			
GW-17							\$1,500			

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² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

³ For capital projects, the cost is the total estimated project cost, which may be funded wholly or in part by outside sources (e.g. grants, other agency funds)

Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year (continued)

Item Number	Estimated Costs by Year (\$) ¹									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GW-18							\$2,000			
GW-19	Included in item Admin-6									
GW-20							\$3,000	\$1,000	\$1,000	\$1,000
GW-21								\$1,000		
GW-22	Included in item LU-2									
<i>GW Total</i>	\$3,000	\$4,000	\$8,000	\$3,500	\$14,500	\$18,500	\$18,000	\$12,500	\$14,500	\$8,000
Administration (Chapter 4.9)										
Admin-1		\$25,000								
Admin-2	\$1,000									
Admin-3 ²	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Admin-4	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Admin-5	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Admin-6	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Admin-7	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
Admin-8	Included in item Edu-3									
Admin-9	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
<i>Admin Total</i>	\$12,000	\$36,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000

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² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

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Table 5-2 Cedar River Watershed District (CRWD) Implementation Program Summarized by Year (continued)

Education and Public Involvement (Chapter 4.10)										
Edu-1	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Edu-2			\$2,000							
Edu-3	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
Edu-4		\$1,000								
Edu-5		\$1,000								
Edu-6				\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
Edu-7	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Edu-8	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
Edu-9	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
<i>Edu Total</i>	\$23,500	\$25,500	\$25,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500
Funding (Chapter 4.11)										
Fund-1	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Fund-2	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Fund-3	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Fund-4	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
<i>Fund Total</i>	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Total Estimated Costs by Year										
<i>Total</i>	\$260,000	\$871,500	\$854,500	\$871,000	\$867,500	\$888,500	\$902,000	\$883,500	\$887,500	\$898,000

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² For items in Table 5-1 with "as needed" or "to be determined" cost, an estimated cost and the distribution of costs in each year is provided based on anticipated need.

³ For capital projects, the cost is the total estimated project cost, which may be funded wholly or in part by outside sources (e.g. grants, other agency funds)

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References

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