

CANNON RIVER

Comprehensive Watershed Management Plan



March 2020

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Dakota, Goodhue, Le Sueur, Rice, Steele, and Waseca Counties and Soil Water Conservation Districts, North Cannon River Watershed Management Organization, and the Belle Creek Watershed District.

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Cannon River One Watershed, One Plan

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- Goodhue County Board of Commissioners
- Le Sueur County Board of Commissioners
- Rice County Board of Commissioners
- Steele County Board of Commissioners
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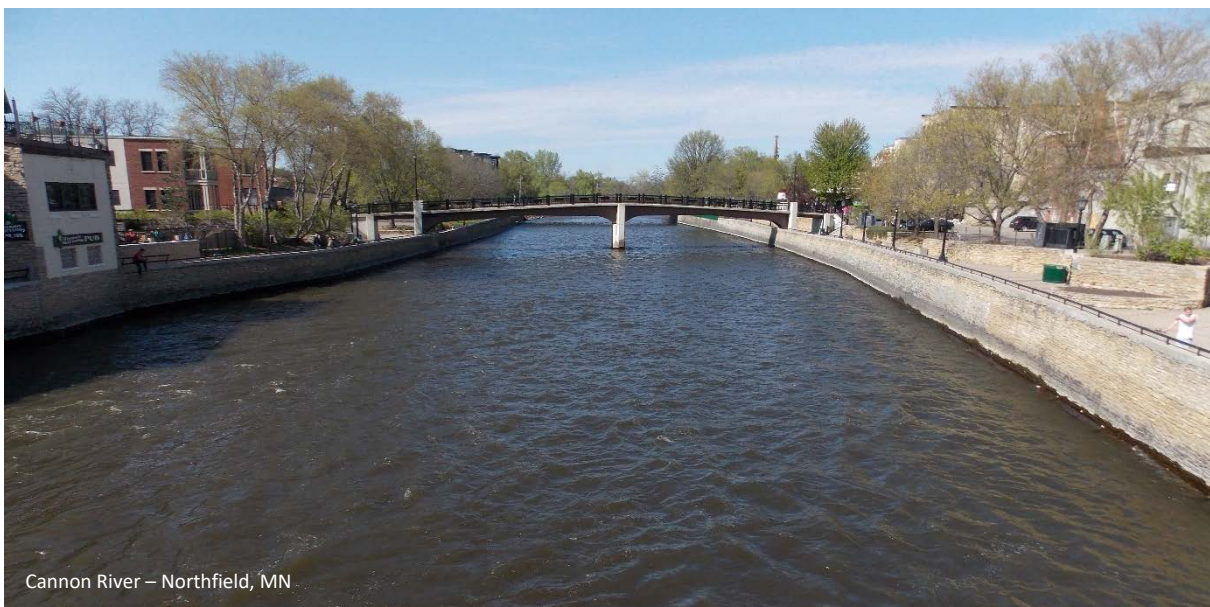
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ACRONYMS

1W1P	One Watershed, One Plan
AUID	Assessment Unit Identifier (for the Impaired Waters List)
ACPF	Agricultural Conservation Planning Framework
BCWD	Belle Creek Watershed District
BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
CAMP	Citizen Assisted Monitoring Program
CIP	Capital Improvement Program
CLID	Clear Lake Improvement District
CLMP	Citizen Lake Monitoring Program
CRPA	Cannon River Planning Area
CRWJPB	Cannon River Watershed Joint Powers Board
CRW	Cannon River Watershed
CRWP	Cannon River Watershed Partnership
CSMP	Citizen Stream Monitoring Program
DWSMA	Drinking Water Supply Management Area
<i>E. coli</i>	Escherichia coli
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
F-IBI	Fish-Based Index of Biological Integrity
FTPGW	Failing to Protect Groundwater
FWM	Flow weighted mean
FY	Fiscal year
GI	Green Infrastructure
GIS	Geographic Information Systems
GRAPS	Groundwater Restoration and Protection Strategies
H&H	Hydrologic & Hydraulic
HOA	Homeowners Association
HSPF	Hydrological Simulation Program – Fortran
HSPF-SAM	Hydrological Simulation Program – Fortran Scenario Application Manager
HUC	Hydrological Unit Code
IBI	Index of Biological Integrity
ITPHS	Imminent Threat to Public Health and Safety
IWM	Intensive Watershed Monitoring
JAA	Job Approval Authority
JPA	Joint Powers Agreement
LID	Low Impact Development
LiDAR	Light Detection and Ranging
LGU	Local Unit of Government
LTFES	Long-Term Flood Evaluation Study
LWRI	Land and Water Resource Inventory
MAWRC	Minnesota Agricultural Water Resource Center
MBS	Minnesota Biological Survey
MCL	Maximum Contaminant Level
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDM	Multi-benefit Drainage Management

MGS	Minnesota Geologic Survey
M-IBI	Macroinvertebrate-Based Index of Biological Integrity
MIDS	Minimal Impact Design Standards
MHA	Minnesota Hydrogeology Atlas
MNDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MPARS	Minnesota Department of Natural Resources Permitting and Reporting System
MPCA	Minnesota Pollution Control Agency
MS	Minnesota Statutes
MS4	Municipal Separate Storm Sewer System
NA	Not Applicable
NCH	North Central Hardwoods
NCRWMO	North Cannon River Watershed Management Organization
NGO	Non-governmental organization
NHIS	Natural Heritage Inventory Service
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPFP	Nonpoint Priority Funding Plan
NRBG	Natural Resources Block Grant
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
PTMApp	Prioritize, Target and Measure Application
PWI	Public Waters Inventory
SNA	Scientific and Natural Area
SGCN	Species of Greatest Conservation Need
SSURGO	Soil Survey Geographic Data Set from the Natural Resources Conservation Service
SSTS	Subsurface Sewage Treatment Systems
STATSGO	State Soil Geographic Dataset for the Conterminous United States
SWCD	Soil and Water Conservation District
SWM	Stormwater Management
TAG	Technical Advisory Group
TDP	Total Dissolved Phosphorus
TMDLs	Total Maximum Daily Loads
TP	Total Phosphorus
TP-40	Technical Paper 40
TSI	Trophic State Index
TSS	Total Suspended Solids
U of M	University of Minnesota
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geologic Survey
WCA	Wetland Conservation Act
WCBP	Western Corn Belt Plains
WD	Watershed District
WHEP	Wetland Health Evaluation Program
WMO	Watershed Management Organization
WRAPS	Watershed Restoration and Protection Strategies

GLOSSARY

AB soils – A/B soils are a mix of Hydrologic Soil Groups A and B which are generally more drained than Hydrologic Soil Groups C or D. See also the definition of Hydrologic Soil Groups.

Animal Units – Use in permitting, registration, and the environmental review process because they allow equal standards for all animals based on size and manure production. An AU is calculated by multiplying the number of animals by an animal unit factor for the specific type of animal. When more than one type of animal is planned for a feedlot, the number of AUs is the sum of the AUs for each type of animal.

Aquifer – A body of permeable rock that can contain or transmit groundwater.

Baseflow – Sustained flow of a stream in the absence of direct runoff. Natural base flow is sustained largely by groundwater discharges.

BATHTUB – A simplified volume and phosphorus mass balance model designed to facilitate application of empirical eutrophication models to reservoirs or lakes.

Benefitted Properties – "Benefits" refers either to the impact a drainage system has on land in terms of improving the market value of the land or the impact (and costs associated with that impact) that the land has on the drainage system because of land use that accelerates drainage, transports sediment or increases volume demand in a drainage system.

Best Management Practice (BMP) – Structural and non-structural practices and methods that can be used in both agricultural and urban settings that decrease runoff, erosion, and pollutants and improve water quality, soil health, and land use activities.

Calcareous Fen – A rare and distinctive wetland characterized by a substrate of non-acidic peat and dependent on a constant supply of cold, oxygen-poor groundwater rich in calcium and magnesium bicarbonates.

Chlorophyll-a – A green pigment, present in all green plants and in cyanobacteria, responsible for the absorption of light to provide energy for photosynthesis. Typically used to measure the amount of algae present in water.

Climate Change – A long-term change in climate measures such as temperature and rainfall.

Community Public Water Supply Wells – Serve more than 25 people or have more than 15 piped connections providing water to the public in their primary living space (where people live and sleep; homes, apartments, nursing homes, prisons, etc.)

Contaminants – Substances that, when accidentally or deliberately introduced into the environment, may have the potential to harm living organisms, including people, wildlife and plants.

Dissolved Oxygen – The level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water.

Drainage Authority – The board or joint county drainage authority having jurisdiction over a drainage system or project (Minn. Stat. § 103E.005, Subd. 9). Pursuant to Minn. Stat. § 103D.625, the managers of a watershed district established pursuant to Minn. Stat. 103D shall take over a joint county or county drainage system within the watershed district and the right to maintain and repair the drainage system if directed by a joint county drainage authority or a county board.

Drainage system – A system of ditch or tile, or both, to drain property, including laterals, improvements, and improvements of outlets, established and constructed by a drainage authority. "Drainage system" includes the improvement of a natural waterway used in the construction of a drainage system and any part of a flood control plan proposed by the United States or its agencies in the drainage system (Minn. Stat. § 103E.005, Subd. 12.).

E. coli – *Escherichia coli* (abbreviated as *E. coli*) is a fecal coliform bacteria that comes from human and animal waste. The Environmental Protection Agency (EPA) uses *E. coli* measurements to determine whether fresh water is safe for recreation.

eLINK – Web-based conservation and grants tracking system hosted by the Board of Water and Soil Resources.

Flooding – The Federal Emergency Management Agency (FEMA) defines a flood as a general and temporary condition where two or more acres of normally dry land or two or more properties are inundated by water or mudflow (Federal Emergency Management Agency, 2016).

Flow Regime – Term typically used to define the characteristic flow patterns of a stream or river.

Geomorphology – The study of the processes responsible for the shape and form, or morphology, of watercourses; describes the processes whereby sediment (e.g., silt, sand, gravel) and water are transported from the headwaters of a watershed to its mouth.

Green Infrastructure – Infrastructure that incorporates the natural environment and constructed systems in an integrated network to provide multiple benefits and support resilient communities. Green infrastructure is designed to reduce the effects of development on stormwater by maintaining or engineering some of the flood reduction functions of pre-development conditions.

Groundwater – Water located below ground in the spaces present in soil and bedrock.

Groundwatershed (also termed a Springshed) – Area that contributes groundwater flow to a given discharge point.

Groundwater Dependent Natural Resources – Natural resources, especially fens, wetlands, lakes, and streams, whose characteristics would change significantly if they were deprived of groundwater.

Groundwater Recharge – Water infiltrating through the ground surface to become groundwater.

Hotspots – An area where many restoration and protection resources are concentrated. Projects implemented in a hotspot are likely to achieve multiple watershed management benefits.

Hydro-conditioned Digital Elevation Model – An analysis of overland flow paths based on surface elevation (or topographical) data but conditioned (or modified) to account for culverts and pipe that create new flow paths not evident from surface elevations alone.

Hydrology – The movement of water. Often used in reference to water movement as runoff over the soil after a rainfall event as it contributes to surface water bodies.

Hydrologic Soil Groups – A soil classification system based on the ability to convey and store water; divided into four groups (USDA NRCS):

- a) Well drained sands and gravel, high infiltration capacity, high leaching potential and low runoff potential;
- b) Moderately drained fine to coarse grained soils, moderate infiltration capacity, moderate leaching potential and moderate runoff potential;
- c) Fine grained, low infiltration capacity, low leaching potential and high runoff potential;
- d) Clay soils, very low infiltration capacity, very low leaching potential and very high runoff potential.

For those soils in dual groups (e.g. A/D, B/D, or C/D) the first letter applies to the drained condition and the second applies to the undrained condition. A/B soils are a mix of A and B soils which are generally more drained than C or D soils.

Hydrologic & Hydraulic Model – A continuous simulation computer model that predicts natural (hydrologic) and artificial (hydraulic) flow paths, volumes, and rates in a defined area of land.

Impervious Surfaces – Surfaces that severely restrict the movement of water through the surface of the earth and into the soil below. Impervious surface typically refers to man-made surfaces such as non-porous asphalt or concrete roadways, buildings, and heavily compacted soils.

Index of Biotic Integrity (IBI) – The IBI is a biological assessment tool that provides a framework for translating biological community data into information regarding ecological integrity (“the capability of supporting and maintaining a balanced, integrated, functional organization comparable to that of the natural habitat of the region”, Frey 1977). It utilizes a variety of attributes (“metrics”) of the biological community, each of which

responds in a predictable way to anthropogenic disturbance. The metrics are based on ecological traits of the organisms present at a given site, represent different aspects of ecological structure and function, and are scored numerically to quantify the deviation of the site from least-disturbed conditions. When the individual metric scores are summed together, the composite IBI score characterizes biological integrity (Karr et al 1986).

Infiltration – A process by which water in the ground surface enters the soil.

Invasive Species – Organisms not endemic to a geographic location they often displace native species and have the potential to cause environmental change.

Issues – Problems, risks, or opportunities for your watershed’s priority resources (e.g., flood damage, groundwater contamination, protect unimpaired waters, etc.) that will be addressed in your plan.

Job Approval Authority – A component of a Technical Quality Assurance system developed and administered by the NRCS to enable more people within the conservation partnership of NRCS, SWCDs and BWSR to provide reliable conservation technical assistance and sign-off for federal conservation programs.

Karst – A terrain having distinctive landforms and hydrology created primarily from the dissolution of soluble bedrock. In karst, water dissolves fractures and joints in the bedrock forming a network of interconnected underground conduits that can easily transport surface water to the groundwater system and carry groundwater long distances at speeds up to miles per day.

Lakeshed – The area of land for which surface runoff drains to the same downstream lake.

Low Impact Development – A stormwater management strategy that seeks to mitigate the impacts of increased urban runoff and stormwater pollution by managing it as close to its source as possible. It comprises a set of site design approaches and small scale stormwater management practices that promote the use of natural systems for infiltration and evapotranspiration, and rainwater harvesting.

Macroinvertebrate – Organisms without backbones, which are visible to the naked eye without the aid of a microscope. Aquatic macroinvertebrates live on, under, and around rocks and sediment on the bottom of lakes, rivers and streams.

Measurable Goal – The quantifiable change expected in a resource after implementing the 10-year plan.

Minnesota Greenstep Cities – A voluntary challenge, assistance and recognition program to help cities achieve their sustainability and quality-of-life goals. A program of the Minnesota Pollution Control Agency and its partners.

Natural Environment Lake – The strictest of three lake classifications found in Minnesota’s Shoreland Management Program. Natural Environment Lakes usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winter kill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep. Classification used to determine lot size, setbacks and, to a certain degree, land uses on the adjacent land.

Natural Shoreline – A shoreline with native, deep-rooted vegetation that stabilize erosion, provide wildlife habitat, and filter pollutants from overland runoff.

Nitrate – A negatively charged compound (NO_3^-) that is water soluble, available for plant uptake, and a product of both organic matter and synthetic fertilizer.

NRCS Land Capability Class IV – Soils that when cultivated require more careful management and where conservation practices are more difficult to apply and maintain. Soils in Class IV may be well suited to only two or three of the common crops or the harvest produced may be low in relation to inputs over a long period of time. Cultivation on these soils is limited as a result of the effects of one or more permanent features such as (1) steep slopes, (2) severe susceptibility to water or wind erosion, (3) severe effects of past erosion, (4) shallow soils, (5) low moisture-holding capacity, (6) frequent overflows accompanied by severe crop damage, (7) excessive wetness with continuing hazard of waterlogging after drainage, (8) severe salinity or sodium, and (9) moderately adverse climate.

Nutrients – A group of chemicals that are needed for the growth of an organism. Within surface water systems, nutrients such as phosphorus and nitrogen can lead to the excessive growth of algae.

Nutrient Reduction Strategy – A statewide assessment of nutrient sources and the magnitude of nutrient reductions needed to meet in-state and downstream water quality goals.

Pathogens – a bacterium, virus, or other microorganism that can cause disease.

Peak flows – Term typically used to define the characteristic high flow period of a stream or river.

Perennial Crops – Crops which are alive year-round and are harvested multiple times before dying (e.g. alfalfa). Conversion of annual fields into perennial fields (perennial cropland) offers many benefits including reduced soil erosion, reduced pollutant loads and reduced irrigation demand.

Pollutant – Any substance, as in chemicals or waste products, that renders the air, soil, water, or other natural resource harmful or unsuitable for a specific purpose.

Pollution Sensitivity – The time it takes recharge and contaminants at the ground surface to reach the underlying aquifer.

Prioritized – Determining the relative importance and precedence of the resources and issues you have identified in your plan. This includes not only agreeing upon which items will be tackled first, but also those that will not be included in your plan.

Protection – Strategies that protect high quality and threatened resources that are essential to preventing further degradation and future impairment of Minnesota's waters.

Public Drainage Systems – A system of ditch or tile, or both, to drain property, including laterals, improvements, and improvements of outlets, established and constructed by a drainage authority. "Drainage system" includes the improvement of a natural waterway used in the construction of a drainage system and any part of a flood control plan proposed by the United States or its agencies in the drainage system (**Minn. Stat. § 103E.005, Subd. 12.**).

Public Water Suppliers – Entities that provide water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year.

Radionuclides – An atom that has excess nuclear energy, making it unstable.

Resources – Natural features on the landscape that can be grouped into categories for management activities (e.g., unimpaired lakes, shallow groundwater aquifers, stream riparian corridors, productive soils).

Restoration – Strategies that seek to restore or improve the quality of a resource which is currently impaired, threatened, and/or degraded.

Riparian – A vegetated ecosystem alongside a waterbody; characteristically have a high water table and are subject to periodic flooding.

Runoff – Water from rain, snow melt, or irrigation that flows over the land surface.

Safe Drinking Water Act (SDWA) – The federal law that protects public drinking water supplies throughout the nation. Under the SDWA, EPA sets standards for drinking water quality and, with its partners, implements various technical and financial programs to ensure drinking water safety.

Secchi Depth – Used as a lake monitoring tool. The depth at which an opaque disk, called a Secchi Disk is used to gauge the transparency, and ceases to be visible from the water's surface.

Species of Greatest Conservation Need – A USGS national database that identify the species most in need of conservation action in that state or territory.

Stormwater BMPs/Infrastructure – Methods used to control the speed and total amount of stormwater that flows off a site after a rainstorm and used to improve the quality of the runoff water.

Stream Channel – A natural waterway, formed by fluvial processes, that conveys running water.

Stream Connectivity – The term used to define the longitudinal connection a stream has along its length and the lateral connection a stream has with its floodplain and adjacent uplands.

Subwatershed – A smaller geographic section of a larger watershed unit with a typical drainage area between 2 and 15 square miles and whose boundaries include all the land area draining to a specified point.

Targeted – When and where actions will be implemented within the watershed to achieve the goals within the 10-year timeframe of the plan.

Tolerable Soil Loss – Soil loss tolerance for a specific soil, also known as the T value, is the maximum average annual soil loss expressed as tons per acre per year that will permit current production levels to be maintained economically and indefinitely.

Total Maximum Daily Loads (TMDLs) – The total amount of a pollutant or nutrient that a water body can receive and still meet state water quality standards. TMDL also refers to the process of allocating pollutant loadings among point and nonpoint sources.

Total Phosphorus – A measure of the amount of all phosphorus found in a water column, including particulate, dissolved, organic and inorganic forms.

Total Suspended Solids (TSS) – A measure of the amount of particulate material in suspension in a water column.

TP-40 – Technical Paper No. 40 refers to the Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years which was published by the Soil Conservation Service, U.S. Department of Agriculture in 1961.

Trichloroethylene (TCE) – A common, man-made chemical found in the environment, used in industry to remove grease from metal parts and found in household products – such as correction fluid, paint removers, parts cleaners, and spot removers. The main health concerns from exposures to TCE are immune system effects such as hypersensitivity or risks for auto-immune disease; an increased risk of cancer (kidney and liver cancer and Non-Hodgkin Lymphoma) from long-term exposure; heart defects in the developing fetus if the pregnant mother is exposed in the first trimester. At higher levels of exposures, TCE also can harm the central nervous system, kidney, liver, and male reproductive system.

Trophic State Index – A classification system designed to "rate" individual lakes, ponds and reservoirs based on the amount of biological productivity occurring in the water, typically as measured by algal biomass. A measure of the overall productivity (or greenness) of lake water. Higher TSI means more nutrients and more algae.

Turbidity – The cloudiness of the water that is caused by large numbers of individual particles that are generally invisible to the naked eye.

Vulnerable Soil – Soils with very severe limitations that restrict agricultural production through the choice of plants, require very careful management, or both. Soils may be suited for only two or three of the common crops or the harvest produced may be low in relation to inputs over a long period of time. Cultivation on these soils is limited as a result of the effects of one or more permanent features such as (1) steep slopes, (2) severe susceptibility to water or wind erosion, (3) severe effects of past erosion, (4) shallow soils, (5) low moisture-holding capacity, (6) frequent overflows accompanied by severe crop damage, (7) excessive wetness with continuing hazard of waterlogging after drainage, (8) severe salinity or sodium, or (9) moderately adverse climate. Defined as the Soil Survey Geographic Database, Land Suited to Cultivation and Other Uses – Class IV.

Water Quality – The chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular use. In the case of surface waters, uses are typically swimming and fishing. In the case of groundwater, uses are typically drinking and irrigation.

Wellhead Protection Plan – A plan developed to prevent contaminants from entering public waters.

Zonation – A conservation prioritization software that uses geographic information and user input weighting to identify locations on the landscape that have varying degrees of environmental sensitivity or management priority.

1. EXECUTIVE SUMMARY AND NAVIGATING THE PLAN

This document is a Comprehensive Watershed Management Plan for the Cannon River Planning Area. This Plan was developed through a partnership between:

- *Dakota County and Dakota County Soil & Water Conservation District*
- *Goodhue County and Goodhue County Soil & Water Conservation District*
- *Le Sueur County and Le Sueur County Soil & Water Conservation District*
- *Rice County and Rice County Soil & Water Conservation District*
- *Steele County and Steele County Soil & Water Conservation District*
- *Waseca County and Waseca County Soil & Water Conservation District*
- *Belle Creek Watershed District*
- *North Cannon Watershed Management Organization*

This Plan:

- *Identifies and prioritizes watershed resources and issues,*
- *Sets measurable goals for the priority resources and issues,*
- *Identifies a 10-year schedule of implementation activities and budget to achieve the goals, and*
- *Develops plan implementation programs, administration, and coordination frameworks needed to implement the Plan.*

The Cannon River Comprehensive Watershed Management Plan has been developed to meet the requirements of the One Watershed, One Plan (1W1P) program which is described under Minnesota Statute §103B.801. This program supports partnerships of local governments in developing prioritized, targeted, and measurable implementation plans. Key principles of this program are planning at the major watershed scale and aligning local plans with state strategies.

Soil and water conservation districts (SWCDs), counties, and watershed districts are encouraged to participate in the development of a comprehensive watershed management plan. While a total of 10 counties fall within the Cannon River Planning Area, the following participated in the development of the Comprehensive Plan: Dakota, Goodhue, Le Sueur, Steele, Rice, and Waseca. In accordance with BWSR's Operating Rules and participation by land area, Blue Earth County, Dodge County, Freeborn County, Scott County and their SWCDs did not participate due to only a small area of their jurisdiction falling within the Planning Area (less than 1 percent). In addition, both the Belle Creek Watershed District and the North Cannon River Watershed Management Organization, both of which are located entirely within the Planning Area, participated in the development of the Plan. All of the Planning Partners, except the North Cannon Watershed Management Organization, intend to adopt the Cannon River Comprehensive Watershed Management Plan as their local water management plan or watershed management plan. Only the Belle Creek Watershed District intends to satisfy their statutory watershed management planning duties with this Plan. The North Cannon River Watershed Management Organization will participate on the Cannon River Watershed Joint Powers Board (CRWJPB) but continue to operate under their current watershed management plan.

Significant efforts were made to engage member communities, stakeholder groups, and the public in the development of the Cannon River Comprehensive Watershed Management Plan including:

- *Agricultural Partners (e.g., Farm Bureau, Commodity Groups, Farmers Cooperatives)*
- *Environmental Groups (e.g., Nature Conservancy, Minnesota Land Trust, Izaak Walton League)*
- *Sportsman Groups (e.g., Trout Unlimited, Sportsman Clubs, Pheasants Forever)*
- *Tourism Groups (e.g., Chamber of Commerce, Cannon Falls Canoe & Bike Rental)*
- *Wildlife Groups (e.g., MN Audubon, Red Wing Wildlife League)*
- *State Agencies, Cities, Townships, and Lake Associations*

The Cannon River Planning Area is on the fringe of the 7-county metropolitan area. The headwaters is dominated by agricultural land that is extensively drained and tiled, the western central part of the area is dominated by lakes and agricultural drainage systems, and the downstream portion of the area is characterized by karst, steep topography, and trout streams. The Planning Area comprises the drainage area of the Cannon River, which includes the Straight River, and the downstream portion of the Vermillion River where it joins the Mississippi River in Goodhue County. There are cities and towns within the Planning Area that experience flooding. Recreation is an important value in the Planning Area with boating and fishing in lakes, kayaking and fishing in streams, and numerous hiking trails. The Land and Water Resource Inventory section (Appendix A) describes important watershed characteristics that set the context for the other plan elements. The narrative tells the watershed story, including its long geological history; the native soils, vegetation, and natural abundance and quality of lakes, streams, and groundwater; historical and recent land use changes and hydrologic alterations; and social and economic factors that give clues about the watershed's future. The Cannon River Planning Area is illustrated in Figure 1-2 with some fast facts in Figure 1-1 below.

Not all resources and issues can be feasibly addressed within the 10-year timeframe of the Plan. The identification of priority areas allows for the development of a Targeted Implementation Plan focused on specific locations with the goal of achieving measurable results within the 10-year timeframe of the Plan. The Plan identifies four surface water priority areas (Figure 2-10), and two groundwater priority areas (Figure 2-11). Within those areas, the Plan targets implementation in the drainage areas to 8 Tier One priority lakes (Beaver, Dudley (and Kelly), Fish, Roemhildts, Cedar, Fox and Hunt; Figure 3-1 and Figure 3-2) and 7 Tier One priority streams (Lower Vermillion, Belle Creek, Little Cannon River, Trout Brook, Prairie Creek, Rush Creek, and Medford Creek; Figure 3-11, Figure 3-12 and Figure 3-13). Surface water priority areas were identified from local values; high-level priorities identified in the state's Nonpoint Priority Funding plan; Zonation conservation prioritization software results; watershed pollutant loading model results; and secondary benefits to downstream resources, communities, and systems. Groundwater priority areas were identified based on groundwater important areas identified in the Minnesota Department of Health 2017 Cannon River Watershed Groundwater Restoration and Protection Strategy report.

The Plan identified 20 Tier One issues organized within three broader organizational categories: Resource Concerns, Landscape Alteration Concerns, and Socioeconomic Concerns. The Plan

identified 41 goals to address the Tier One Issues. Specific and targeted implementation activities were identified that are needed to achieve the 10-year goals of the Plan, summarized below:

Resource Concerns

- **Tier One Issues:**

Protection Lakes, Impaired Lakes, Pollutant Impaired Streams, Wetland Restoration, Drinking Water Protection, Groundwater Dependent Natural Resources – Protection Lakes, and Monitoring Data

- **Implementation Activities:**

Streambank Stabilization Projects, Wetland Restoration Projects, Well Sealing, Monitoring Program Development, Groundwater Quantity Monitoring, Citizen Monitoring Program, Lake and Stream Water Quality Monitoring, Education for Public Water Suppliers, Education for Private Well Owners, and Education for Homeowners

Landscape Alteration Concerns

- **Tier One Issues:**

Agricultural Runoff and Leaching Loss, Soil Health, Flooding of Communities, Shoreland Management, Stormwater Management, Subsurface Sewage Treatment Systems, Drainage System Management, and Community Resilience to Climate Change

- **Implementation Activities:**

Cropland Conversion, Structural Practices, Manure Management Plans, Nutrient Management BMPs, Feedlot Runoff Control Projects, Increase Organic Matter, Flood Reduction Practices, Lakeshore Buffers, Drainage Improvements, Manure Management Plans, Long-Term Flood Evaluation Study, SSTS Inventory, Modernization of Drainage Records

Socio-economic Concerns

- **Tier One Issues:**

Educating Local Land Use Decision Makers, Citizen Engagement, Planning Area Partnerships, Internal Capacity, and Recreational Value

- **Implementation Activities:**

Workshops, Trainings, Presentations, One-on-one Communications with Stakeholder Groups, Guidance, Stormwater BMP Demonstration Projects, River Cleanup Projects, Land Stewardship Projects, 1W1P Website Upkeep, Regular Working Group Meetings, Member Board Updates

Prior to State approval and local adoption of the Cannon River One Watershed One Plan, it is anticipated that the Counties, SWCDs, and the WD and WMO will sign a Joint Powers Agreement (JPA) that will create a Cannon River Watershed Joint Powers Board (CRWJPB). The CRWJPB will provide for a watershed based entity within the Cannon River Planning Area and provide the ability for both

JPA members and land occupiers to address issues on a watershed scale rather than by individual geographical areas of each local unit of government. Table 1-1 summarizes the anticipated roles for plan implementation to be incorporated into the governance structure.

Table 1-1. Anticipated roles for plan implementation to be incorporated into governance structure.

Entity	Primary Implementation Role/Function
Cannon River Watershed Joint Powers Board	<ul style="list-style-type: none"> - Adopting the Plan - Implementation of the Plan - Amending the Plan - Allocating funding sources - Approving work plans - Approving contractual agreements - Approving fiscal reports and budgets - Approving reports required by BWSR - Approve grant applications and accept grant funds - Approve assessment on plan progress and measurable results - Establish committees
Cannon River Watershed Working Group (Member Staff)	<ul style="list-style-type: none"> - Provide recommendations to the CRWJPB - Prepare work plan - Prepare fiscal reports and budgets - Prepare reports required by grantors - Prepare and submit grant applications - Complete assessment on plan progress and measure results - Provide general administrative and fiscal functions
Technical Advisory Group	<ul style="list-style-type: none"> - Provide expertise and scientific data - Develop recommendations for Plan Implementation - Assist with work plan development and implementation - Identify and coordinate grant opportunities - Assist with assessment on plan progress and measure results

The following appendices are included in the Cannon River Comprehensive Watershed Management Plan:

- A. Land and Water Resource Inventory
- B. Identification of Potential Watershed Concerns and Issues
- C. Zonation Tool Supporting Information
- D. Pollutant Load Reduction Scenarios
- E. BWSR Local Funding Authorities
- F. Cannon River JPA
- G. BCWD – Agreements and Rules

To assist the reader navigate this large document, a flowchart is included at the end of the Executive Summary that illustrates how all the pieces of a Comprehensive Watershed Management Plan fit together for one specific issue, using an actual example from this Plan (Protection Lakes).

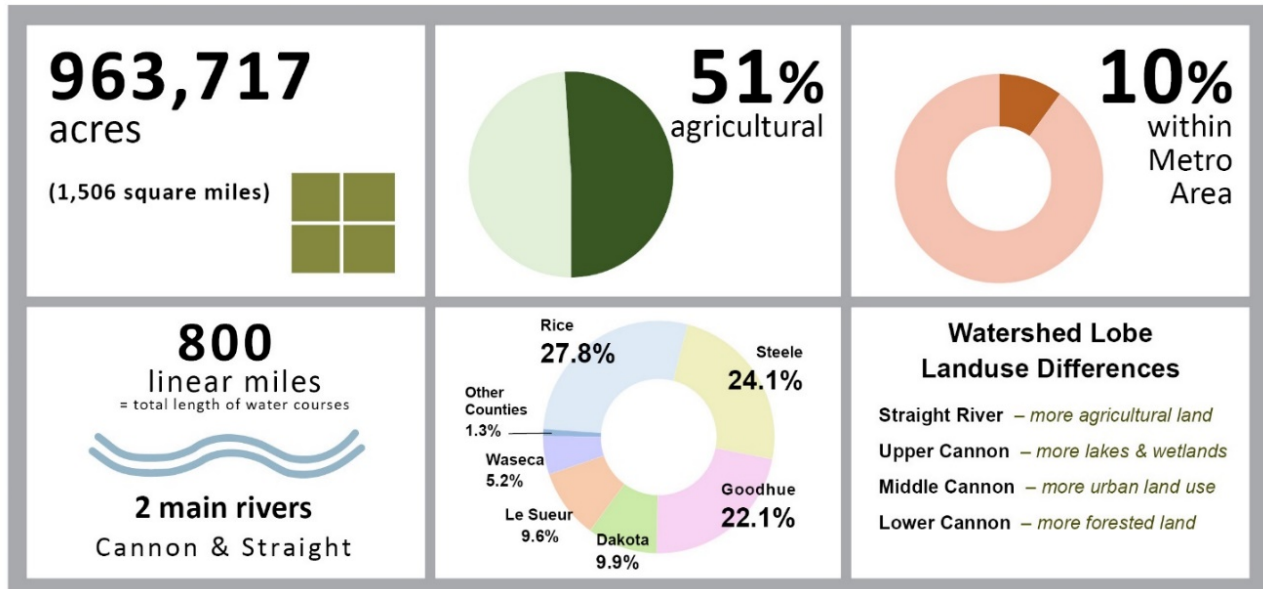


Figure 1-1. Cannon River Planning Area Fast Facts

Planning Area acres are based on the red boundary shown on Figure 1-2 on the next page; the percent agricultural land is based on acres of row crops and hay/pasture within the Planning Area from the 2013 University of Minnesota High Resolution Land Cover Data; and the percent within Metro Area is based on the percent of the Planning Area within Dakota and Scott counties. The Cannon River Watershed Lobes are illustrated in **Figure 1-3**.



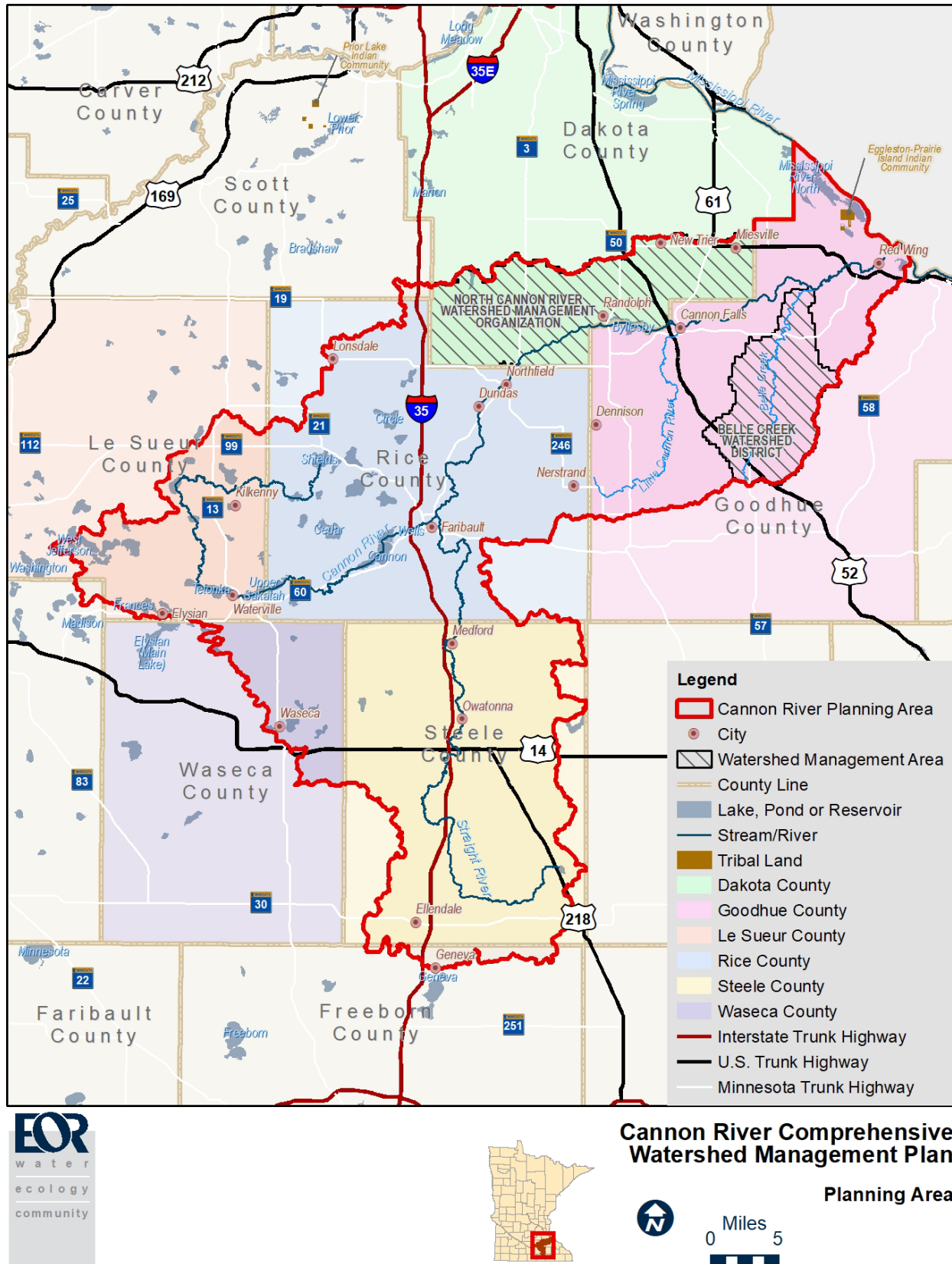
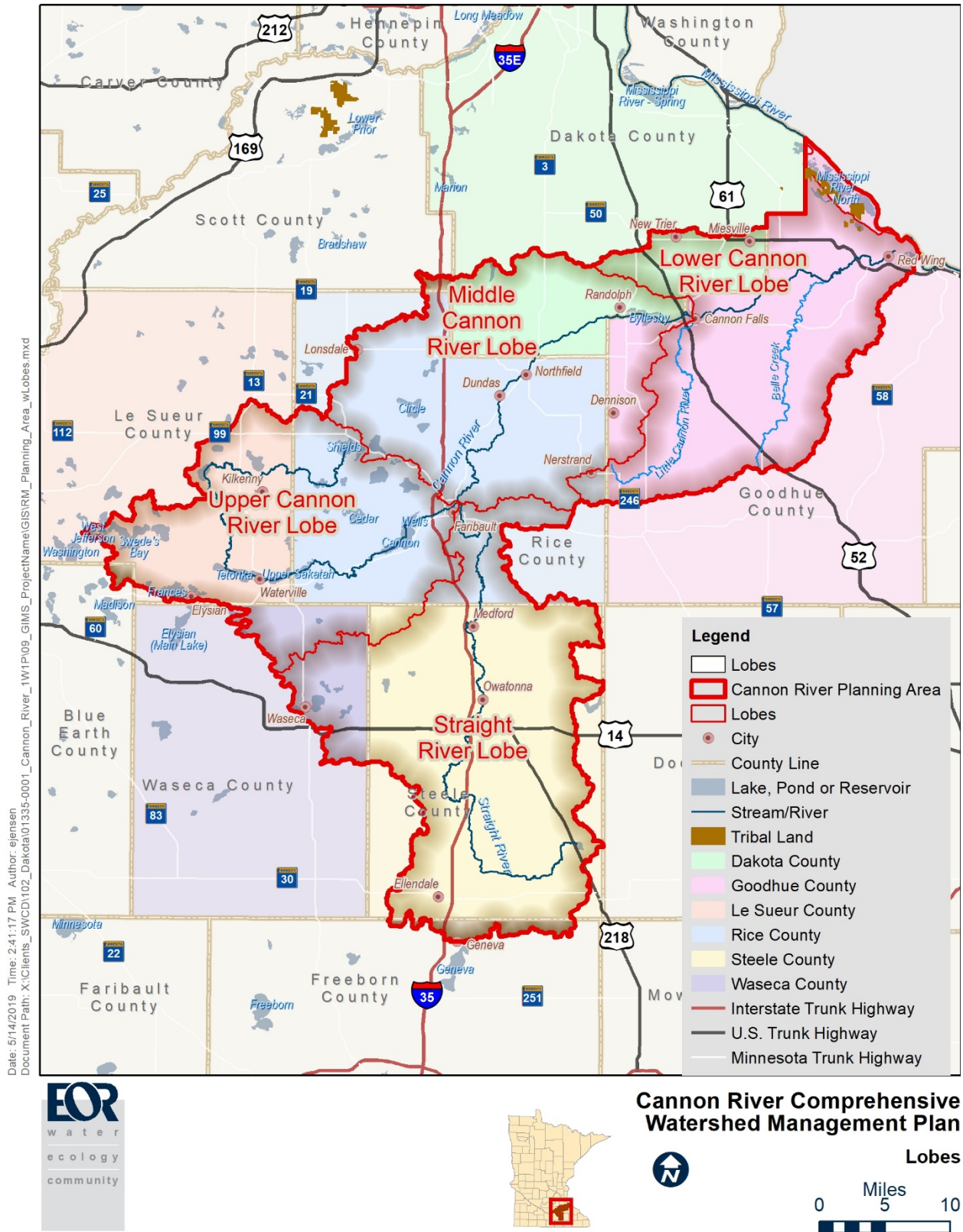


Figure 1-2. Cannon River Planning Area



Example Illustrating How to Navigate the Plan: this flow chart is designed to step the reader through the process of identifying issues, goals, and implementation activities using Protection Lakes as an example.

ISSUES AND CONCERNS

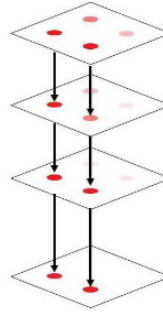
1

See
Sections:
- 2.2
- 2.2.5

THE WHAT: Identification and Prioritization of 'Concerns & Issues'

Tier One Priority
CONCERN = Streams, Lakes, & Rivers

Tier One Priority
ISSUE = Protection Lakes



Protection Conservation Areas
(Zonation)
+
Sediment Yields
(HSPF)
+
Groundwater
(GRAPS)
=
**PRIORITY
AREAS**

2

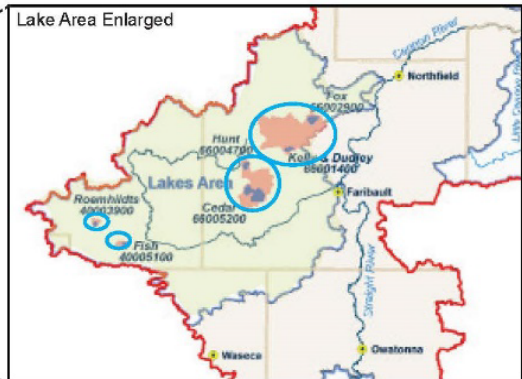
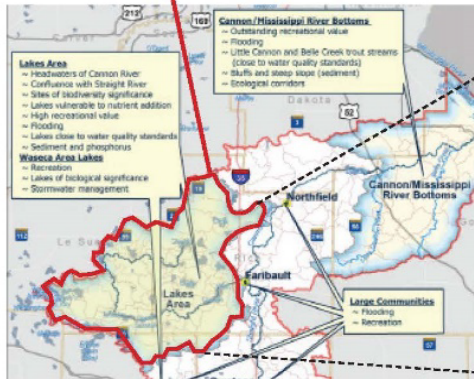
See
Sections:
- 2.2.7
- 2.2.8

THE WHERE: Locating the 'Concerns & Issues' to be Addressed w/10 Year Plan

Priority Area Identification
LAKES AREA = 263,055 Acres

Implementaion Area Identification
SPECIFIC SITES = 1,563 Acres

Drainage Area to:
Fish, Beaver, Dudley, Kelly, and Roemhildts



3

See
Section:
- 3.1.1

DEFINING THE SPECIFICS OF WHAT, WHERE, & HOW: Development of the 'Issue Statement'

There are 5 high quality lakes in need of protection: Beaver, Dudley, Fish, Kelly and Roemhildts. These lakes are all groundwater dependent (except Kelly) with a very small surface contributing drainage area, which has kept phosphorus loading to these lakes low and preserved their high water quality. While these lakes currently support recreation, they could become degraded in the future if phosphorus loads increase or there are changes in the groundwater contribution to these lakes. There are existing programs and activities that can be utilized to protect these lakes, but current funding is insufficient and further analysis on the most effective activities is needed. There is a need for additional activities and funding to address this issue.

MEASURABLE GOALS

4

OUTLINING THE GOALS:

See
Sections:

- 3.1.1
- 3.1.1

Protection Lake	Total Phosphorus (TP) Existing Load and Load Reduction Goals					
	WRAPS Existing TP Load (includes watershed and internal sources) [lb/yr]	12% TP Reduction (Long-term Future Condition) Measurable Goal [lb/yr]	Estimated 5-year TP Reduction Goal [lb/yr]	Estimated 10-year TP Reduction Goal (total from Table 3.3)** [lb/yr]	10-year Progress Towards 12% TP Reduction Measurable Goal** [%]	10-year TP Reduction from Existing Load** [%]
Beaver	42	5	2.9	6	114%	14%
Dudley & (and Kelly)*	723	87	4.2	87	100%	12%
Fish	46	6	3.5	7	128%	15%
Roemhildts	701	84	2.1	84	100%	12%

* Note that the Dudley and Kelly Lake basins are connected, and the two lake drainage areas were combined into one drainage area to represent that implementation of watershed activities benefit the water quality of both lake basins.

** Lake management plans will be completed by 2024 to identify activities to achieve the remaining phosphorus reductions needed to achieve the measurable goal.

Long Term: future conditions

Maintain or improve water quality (as measured by the growing season average in-lake phosphorus concentration, chlorophyll-a concentration, & Secchi depth) compared to observed conditions reported in Appendix 6.2 of the MPCA 2014 Cannon River Watershed Monitoring & Assessment Report (Table 3-1).

Short Term: 10-yr measurable goals

Maintain or improve water quality in the 5 high quality lakes (Beaver, Dudley, Fish, Kelly and Roemhildts) by achieving all of the phosphorous reduction goals (lbs/yr) identified by the 2016 Cannon River WRAPS.

5

JUSTIFICATION FOR THE GOAL(S)

Documenting How the Goal(s) Were Established

See
Section:
- 3.1.1

Phosphorus reduction goals for the 5 Tier One Protection Lakes (Beaver, Dudley, Fish, Kelly, and Roemhildts) were based on the phosphorus reduction goals identified in the 2016 Cannon River WRAPS. These phosphorus reduction goals were based on an evaluation process developed by MPCA and Minnesota Department of Natural Resources (DNR) that provides an initial attempt at prioritizing lakes within a WRAPS project. The preliminary TP concentration targets are computed as 25th percentile of the long-term summer mean TP concentration, estimated using the standard deviation of the annual data.

A target load and load goal are also estimated. The target load level is an estimate of the load needed to achieve the TP concentration target for the lake. A log-log regression model based on in-lake TP concentration, lake volume, and hydraulic inflow rate was used to estimate the target load. This load target provides a numeric mark to shoot for over the long-term. The load goal is the estimated total phosphorus load (in pounds/year) to meet a 5% load reduction goal for the lake. This goal provides the recommended reduction in the amount of pollution entering a lake that watershed partners can reasonably strive to achieve, which should help guide local stewardship practices in the context of a 10-yr. cycle WRAPS.

TARGETED IMPLEMENTATION SCHEDULE

6

SELECTION OF IMPLEMENTATION ACTIVITIES TO ACHIEVE GOAL(S)

See
Sections:
- 3.1.1
- 3.2.1
- 4.0
- 5.0

Protection Lake	Drainage Area (including lake surface) [acres]	HSPF-SAM Estimated TP Load Reduction for Agricultural Conservation Practices [lb/yr] – see Section 3.2.1						PTMAApp Prioritized Targeted Implementation Areas** (sub- catchments with the highest TP load delivery to priority resources)	
		3.1.1-A-2	3.1.1-A-3	3.2.1-A-1	3.2.1-A-3	3.2.1-B-1	3.2.1-B-2	Area [acres]	TP Load Delivered Category [lb/ac/yr]
		Internal Load Mgmt.	Structural Practices on 5% of cultivated cropland (see Table 5 in Appx. D)	Cropland Conversion on Vulnerable Soils (see Table 1 in Appx. D)	Nutrient BMPs (see Table 2 in Appx. D)	Track & Monitor Cover Crops	Cover Crops on Corn/ Soybean (see Table 3 in Appx. D)		
Beaver	298	--	2.9	0.6	0.5	n/a	1.8	**	**
Dudley & Kelly*	581	78	4.1	1.0	2.9	n/a	0.5	184	0.03-0.08
Fish	433	--	3.2	1.8	1.2	n/a	0.7	230	0.08-0.10
Roemhildts	251	80	1.8	0.2	0.6	n/a	1.6	79	0.05-0.23

'--' denotes that little to no applicable treatment area is found within the drainage area to implement the practice.

* Note that the Dudley and Kelly Lake basins are connected, and the two lake drainage areas were combined into one drainage area to represent that implementation of watershed activities benefit the water quality of both lake basins.

** Subcatchments with the highest TP delivery will be prioritized for implementation of practices first. PTMAApp was used to determine the level of TP delivery from all the subcatchments within the targeted implementation areas to the Tier One impaired lakes (except Beaver Lake; Figure 3-3 through Figure 3-5). Beaver Lake falls within the Straight River Area which is not currently included in PTMAApp. The total acreage of subcatchments within the highest of the TP load delivery categories is provided in the right-hand column of Table 3-3.

n/a = Activity does not achieve a direct reduction in phosphorus but is needed to increase landowner willingness and implementation

Unique to the Issue

3.1.1-A-1:

Complete lake management plans by 2024 to identify the distribution of the total lake phosphorus load between external and internal phosphorus sources. After completing the lake management plans, the Planning Partners will readjust the phosphorus reduction goals and activities based on the findings. For example, the water quality of a lake may be controlled by fish and/or aquatic plant management, or sediment phosphorus loads may need to be addressed. Plans would focus on in-lake and near-shore management strategies that are not identified through other watershed loading models, such as: shoreline stabilization, shoreline septic system improvements, sediment phosphorus load reduction, aquatic plant management, or in-lake fish management.

3.1.1-A-2:

Implementation of in-lake and near-shore management strategies will occur in the second 5-year period of the Plan (2025-2029) to achieve the 10-year goals. Note that the load reductions associated with in-lake and near shore management activities reported in Table 3-3 represent the maximum reductions expected from these activities.

3.1.1-A-3:

Implement structural practices to treat 5%, or 36 acres, of cropland in the five Tier One Protection Lakes drainage areas.

Overlapping with Other Issues

Achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.1 - Agriculture and in the Targeted Implementation Schedule under Landscape Alterations:

3.2.1-A-1:

Convert 10% (11 acres total) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in the five Tier One Protection Lakes drainage areas.

3.2.1-A-3:

Implement nutrient management BMPs following U of M guidance on 10% (73 acres total) of cultivated cropland in the five Tier One Protection Lakes drainage areas.

3.2.1-B-1:

Track and monitor cover crops and residue into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project.

3.2.1-B-2:

Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (42 acres total) in the five Tier One Protection Lakes drainage areas.

7

See
Section:
- 6.1.1

HOW & WHERE PROJECTS ARE TO BE IMPLEMENTED

Annual Work Planning Schedule

The Planning Partners intend to refine the target and increase specificity in identifying project locations within the priority areas through the annual work planning process. The Planning Partners recognize that there are many potential tools and methodologies available to assist with tailoring including:

- *Lake Management Plans*
- *Feasibility Studies*
- *Surface Water Assessment Tools*
- *Subwatershed Analysis (SWA)*
- *PTMApp, HSPF-SAM, Agricultural Conservation Planning Framework (ACPF)*
- *Tools to evaluate stakeholder outreach effectiveness*
- *Landowner willingness to participate*



2. IDENTIFICATION AND PRIORITIZATION OF RESOURCES AND ISSUES

The identification of priority issues and resource concerns is an important component of the Comprehensive Watershed Management Plan development process. According to BWSR guidance, this part of the planning process should result in:

“A prioritized list of issue statements that clearly convey the most pressing problems, risks, and opportunities facing the watershed, and maps depicting locations of priority resources”.

This section of the plan describes the process Planning Partners used to identify the watershed issues and priorities that will be addressed within the 10-year timeframe of this Plan (generally depicted in Figure 2-1). It also describes the process Planning Partners used to identify issues and concerns that are still a priority but not intended to be addressed within the lifespan of this plan unless new opportunities to do so present themselves.

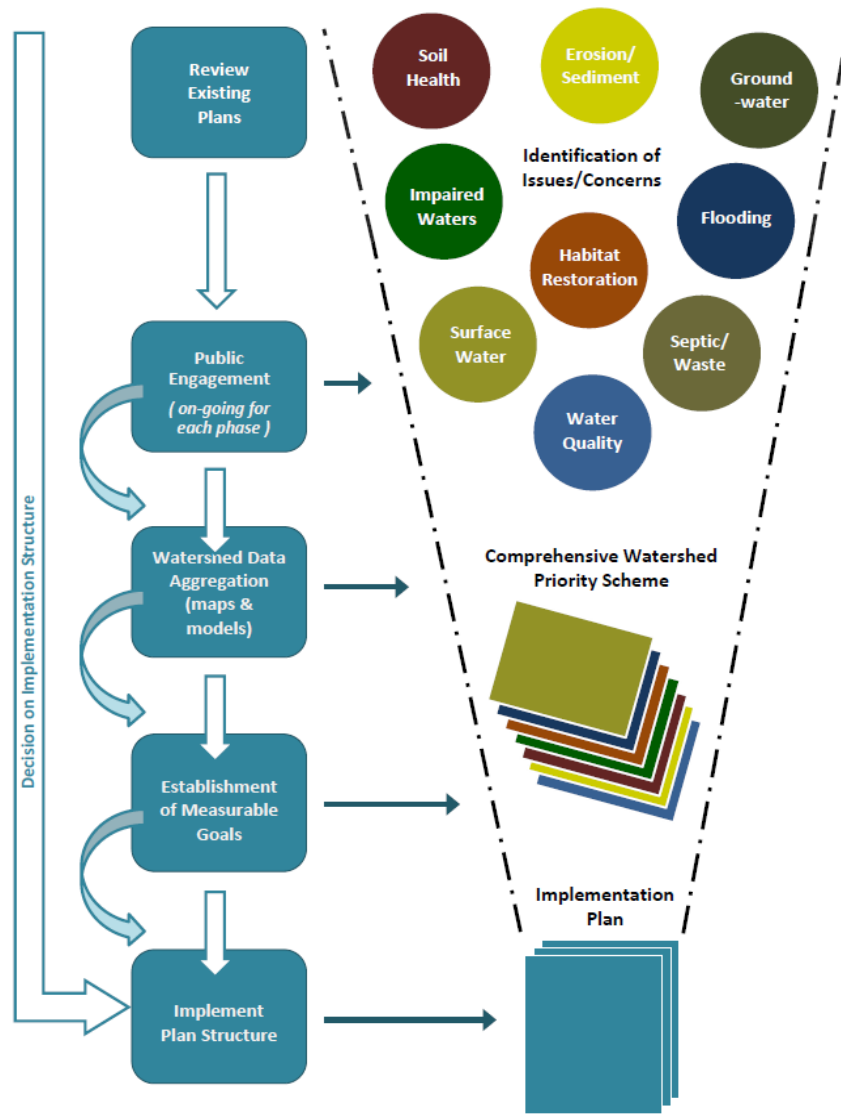


Figure 2-1. Schematic of the Comprehensive Watershed Management Plan Planning Process

2.1. DEFINITIONS

The following definitions help to describe the organizational structure of the Cannon River Comprehensive Watershed Management Plan:

- **Watershed Concerns:**
Watersheds are landscape units that integrate land, climate, surface water, groundwater, natural resources, wildlife, and people. Watershed management seeks to incorporate all of these factors in determining the most cost-effective means of protecting and restoring its resources, including Streams, Lakes, Wetlands, and Groundwater. Watershed Concerns may focus on individual resources (Resources) or the land uses that impact those resources (Landscape Alterations). Socioeconomic Factors are the social and economic factors that influence our ability to manage resources, such as Education, Coordination, Funding, and Partnerships.
- **Issues Affecting Watershed Concerns:**
Typically, an issue affecting a watershed concern is defined as a factor or stressor that results in an adverse impact to the watershed concern. In most cases, a watershed concern has multiple issues which affect it. For example, an issue affecting lakes is eutrophication. The issues affecting watershed concerns that are identified and prioritized in this plan were used to define the goals, implementation activities, and schedule for the 10-year implementation plan.
- **Prioritization:**
Determining the relative importance and precedence of the resources and issues identified in your plan. What items should be tackled in the first 10-years of the Plan? What items can wait until a later date to be addressed?
- **Restoration Area:**
Areas that are degraded, or impacted by human activities, and need to be restored.
- **Protection Area:**
Higher quality areas that have been less impacted by human activities, and need to be protected.
- **Hotspot:**
Areas where many restoration and/or protection issues are concentrated.



Grazing landuse, Belle Creek Watershed District - photo Goodhue SWCD

The issues affecting watershed concerns that are identified and prioritized in this plan were used to define the goals, implementation activities, and schedule for the 10-year implementation plan.

2.2. PLAN PARTNERS AND ROLE IN PLAN DEVELOPMENT

The Advisory Group, Planning Work Group and the Technical Advisory Group represented a broad cross-section of the special interests, technical expertise, and local values found in the Planning Area. Members of the Advisory Group were invited to participate in Water Conversations where smaller work groups discussed issues and concerns related to water resources management, provided feedback on priority areas, reviewed measurable goals and suggested implementation strategies that fit the communities they represented. The Technical Advisory Group was routinely invited to meet with the Planning Work Group to obtain additional input on the more technical aspects of the Plan content. Information obtained from both the Advisory Work Group and the Technical Advisory Group was added to the database used to highlight potential issues, goals, objectives, and action items already identified for the Planning Area.

In addition, significant efforts were made to engage member communities, stakeholder groups and the public in the planning process. One of the most critical components of any planning process is engaging members of the community in sharing local knowledge and identifying values and motivations that will inform the process and plan content.

This section describes the various groups involved in the public engagement process. A list of the meetings held during the public engagement process can be found in Appendix B. All notes from the planning meetings documenting decisions made at each meeting can be accessed from the Cannon River One Watershed, One Plan website: <http://www.dakotaswcd.org/1w1p.html>.

Planning Partners

The following plan partners joined together and were selected by BWSR to receive financial assistance to develop the Cannon River Comprehensive Watershed Management Plan:

- *The counties of Dakota, Goodhue, Le Sueur, Rice, Steele and Waseca through their respective County Board of Commissioners.*
- *The Dakota, Goodhue, Le Sueur, Rice, Steele and Waseca Soil and Water Conservation Districts through their respective SWCD Board of Supervisors.*
- *The Belle Creek Watershed District through their Board of Managers and the North Cannon Watershed Management Organization through their Joint Powers Board.*

Policy Committee

Through an executed memorandum of understanding, the Policy Committee was the decision-making authority for the planning process. In addition, the Policy Committee served as a liaison to their respective governing body and acted on behalf of their governing body in all matters. The committee was made up of a representative from each of the counties and Soil and Water Conservation Districts in the Planning Area. In addition, a representative of the Belle Creek Watershed District and the North Cannon Watershed Management Organization served on the Policy Committee.

Planning Work Group

The Planning Work Group (PWG) guided the logistics of the planning process. In close collaboration with the Advisory Committee, the PWG drafted the plan and made recommendations to the Policy Committee on the development, content, and implementation of the Plan. The work group was made up of a representative from each of the Planning Partners and a representative from BWSR.

Advisory Group

The role of the Advisory Group was to make recommendations on the plan content and plan implementation. These recommendations were brought forward to the Policy Committee by the Planning Work Group. The Advisory Group represented various interests and provided local knowledge, values and motivations throughout the planning process. Given the geographic extent of the Planning Area, the Advisory Group included 200+ members from the following entities:

- *Agricultural Partners (e.g. Farm Bureau, Commodity Groups, Farmers Cooperatives)*
- *Environmental Groups (e.g. Nature Conservancy, Minnesota Land Trust, Izaak Walton League)*
- *Lake Associations*
- *Sportsman Groups (e.g. Trout Unlimited, Sportsman Clubs, National Wild Turkey Federation, Pheasants Forever)*
- *Tourism Groups (e.g. Chamber of Commerce, Cannon Falls Canoe & Bike Rental)*
- *Wildlife Groups (e.g. MN Audubon, Red Wing Wildlife League)*
- *Cities*
- *Townships*
- *State Agencies*

In order to expand the opportunity for public input and ensure that all stakeholder groups were included, the six Water Conversations held throughout the planning process were for the Advisory Group and the general public. Direct invitations for the Water Conversations were always sent to the 200+ Advisory Group list, and public notices were posted in order to reach the general public.

Technical Advisory Group

The Technical Advisory Group (TAG) was a subset of the Advisory Group that provided additional input on the technical aspects of Plan content. Entities invited to participate on the Technical Advisory Group were those that were most knowledgeable of the Planning Area or those whose contributions would most likely benefit the plan development process. The TAG included one staff representative from Board of Water and Soil Resources (BWSR), Minnesota Department of Natural Resources (MNDNR), Minnesota Pollution Control Agency (MPCA), Metropolitan Council, Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), city of Faribault, city of Northfield, city of Owatonna, city of Red Wing, city of Waseca, the Cannon River Watershed Partnership (CRWP), and the Prairie Island Indian Community.

Technical Consultant

The Planning Partners retained the consultant Emmons & Olivier Resources, Inc. (EOR) to assist with plan development.

Stakeholders and the General Public

Stakeholders and the general public were engaged during the plan development process primarily through public meetings and a written survey. To facilitate participation by stakeholders and the public, a series of water conversations were held at various locations throughout the planning area over the course of the plan development process.

2.3. PROCESS FOR PRIORITIZATION OF ISSUES AND RESOURCES

The prioritization process identifies the watershed issues that will become the focal point of the Comprehensive Watershed Management Plan. All issues identified as part of the planning process are included in the Plan, but only the highest priority issues were given specific goals and implementation activities to be completed within the first 10-year implementation plan (see Section 2.2.8: Tier One Priority Issues). That said, watershed management requires an adaptive management approach, and the relative importance of the issues may change over the 10-year period of the Plan as additional data is gathered and implementation activities are completed.

In addition to prioritizing the issues, the Planning Partners prioritized where on the landscape these issues should be addressed first. For example, lake eutrophication was identified as a priority issue to address in the Cannon River Watershed, and several lake drainage areas were targeted for implementation practices to improve lake water quality within the first 10-year timeframe of the plan. Not every issue can be addressed everywhere in the watershed within the first 10-years of the plan, therefore the Planning Work Group and Technical Advisory Group used a multi-step, iterative process for prioritizing resources and targeting areas for implementation during the 10-year timeframe of the Plan.

First, the Planning Partners identified large surface water and groundwater priority areas based on where priority issues and concerns are concentrated through a Comprehensive Watershed Priority Scheme mapping process. Next, the Planning Partners identified priority resources within these larger priority areas to develop goals and implementation activities needed to achieve these goals during the 10-year timeframe of the Plan. Finally, the Planning Partners targeted locations in each resource drainage area where implementation practices should be implemented first based on a ranking of the areas contributing the highest pollutant yields to the priority resources.

This targeted approach of watershed management results in the placement of strategic practices that will achieve measurable improvements in specific resources within the timeframe of the Plan, rather than implementing fewer practices across more resources that would not achieve measurable improvements in any resource within the timeframe of the Plan.

The Planning Partners participated in a thorough and rigorous process to complete the “Analysis and Prioritization of Issues” as required. See Table 2 of Appendix B for a description of all public engagement meetings for the planning process, including those that focused on prioritizing issues and resources in the Planning Area. General considerations by the Planning Partners during the prioritization process included prioritizing issues and resources that were:

- Identified as an issue or local value by members of the public through the public engagement process.
- Coincided with high-level priorities identified in the state’s Nonpoint Priority Funding plan:
 - *Restore those impaired waters that are closest to meeting state water quality standards.*
 - *Protect those high-quality unimpaired waters at greatest risk of becoming impaired.*
 - *Restore and protect water resources for public use and public health, including drinking water.*
- Identified what could reasonably be achieved within the timeframe of the Plan recognizing that many of the concerns and issues identified in the Planning Area are priorities.
- Provided secondary benefits to downstream resources, communities, and systems.

The process for identifying priority issues (the “what”) and priority areas (the “where”) was conducted using the following approach:

Step 1: Compilation and Review of Existing Documents

Over 100 documents were compiled to create a comprehensive list of plans to inform the Cannon River Comprehensive Watershed Management Plan planning process (Appendix B). Information contained in these plans was entered into a database which was used to highlight potential issues, goals, objectives, and action items already identified for the Planning Area. The planning documents reviewed can be categorized as follows:

- *County, SWCD and Watershed District/Watershed Management Organization plans*
- *State resources and documents (e.g. 2016 Nonpoint Priority Funding Plan, Minnesota Nutrient Reduction Strategy, MNDNR Wildlife Habitat plans, Total Maximum Daily Load and Watershed Restoration and Protection Strategy reports)*
- *Known pollutant modeling and assessment efforts for local resources*
- *Groundwater management plans (e.g. Cannon River Watershed Groundwater Restoration and Protection Strategies report)*
- *Natural resources management plans (e.g. Minnesota’s Prairie Conservation Plan)*

As part of the local water management process, and pursuant to Minnesota Statutes: 103B.304-103B.355, a notification letter is required to be sent to plan review authorities and other stakeholders of the Comprehensive Watershed Management Plan development process. This notification letter invites plan review authorities and other stakeholders to submit priority issues and concerns for consideration in the plan development process. The Cannon River Comprehensive Watershed Management Plan notification letter was distributed to multiple stakeholders, including stakeholders outside of those required to receive notification, on February 2, 2017. Responses were received from the following entities:

- *City of Faribault*
- *City of Northfield*
- *Board of Water and Soil Resources (BWSR)*

- *Metropolitan Council*
- *Minnesota Department of Agriculture (MDA)*
- *Minnesota Department of Health (MDH)*
- *Minnesota Department of Natural Resources (MNDNR)*
- *Minnesota Pollution Control Agency (MPCA)*

Copies of the responses can be found in Appendix B. Agency responses to notification letters were reviewed and included in the database of existing planning documents.

Step 2: Preliminary Table of Watershed Concerns and Issues

A preliminary table of watershed concerns was developed using issues/concerns identified in existing planning documents, agency responses to the notification letter, feedback received at the Plan public kickoff meeting in May 2017 and the first series of Water Conversations, which were held in July 2017. This table of issues/concerns was grouped into three main categories (Resource Concerns, Landscape Concerns and Socioeconomic Concerns), each of which was broken down into sub-categories.

This preliminary table of watershed concerns and issues was reviewed and further refined by the Technical Advisory Group and the Planning Work Group in a series of meetings from August through November of 2017. As more information was shared and discussed by the Planning Partners, the TAG/PWG began to coalesce around a sub-group of issues that needed to be tackled first in order to address local concerns and alleviate downstream impacts. To exemplify the nature of this process, meeting notes and informal sticky dot ranking of the preliminary table are shown in Figure 2-2. By the end of this three-month process, Planning Partners had refined the resource concerns and ranked them as high, medium or low priority (which later became the Tier One, Tier Two and Tier Three issues described in Section 2.2.8).



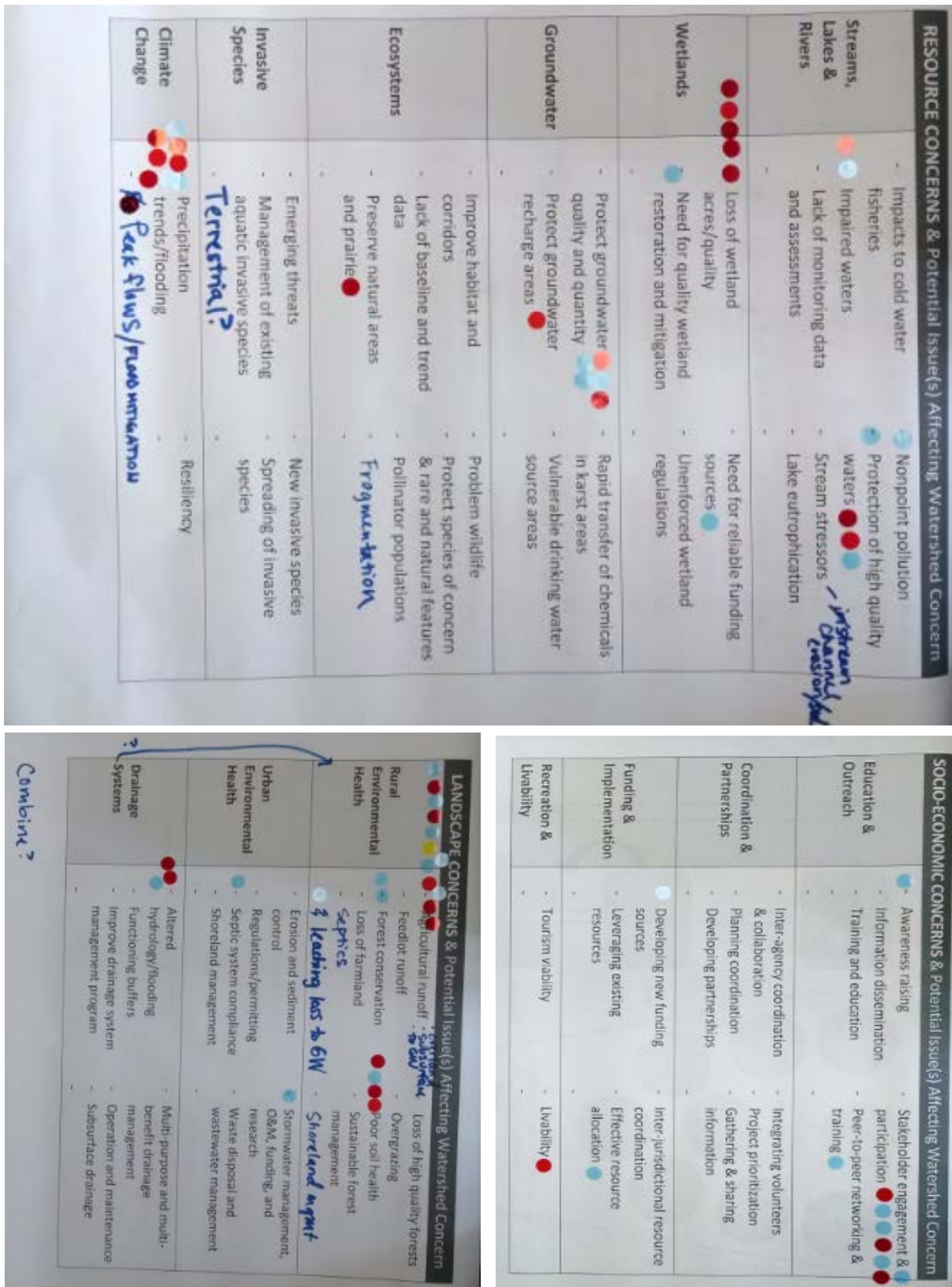


Figure 2-2. August 2017 Joint Technical Advisory Group / Planning Work Group meeting notes and informal sticky dot ranking of the preliminary table of watershed concerns and issues

Step 3: Comprehensive Watershed Priority Scheme

A comprehensive watershed priority scheme was used by the Planning Partners to rank where on the landscape priority issues and concerns need to be addressed within the Cannon River Planning Area. The comprehensive watershed priority scheme uses the output from a variety of modeling and prioritization tools, and other watershed characteristics, represented as a series of maps. Overlaying these maps highlight commonalities and differences in the spatial distribution of restoration and protection needs across the watershed. A priority area is an area where a number of restoration and protection issues are concentrated (see red dots in Figure 2-3), and therefore achieves multiple benefits.

The Planning Work Group and Technical Advisory Group agreed upon a multiple lines of evidence approach for using model outputs and prioritization tools as each model or tool used individually has strengths and weaknesses. For example, HSPF watershed pollutant loading models identify areas of greatest runoff and pollutant yields, while the Zonation conservation prioritization software identifies areas of local value, rare and natural features, groundwater sensitivities, pollutant risk, conservation priorities, and other wildlife and habitat concerns.

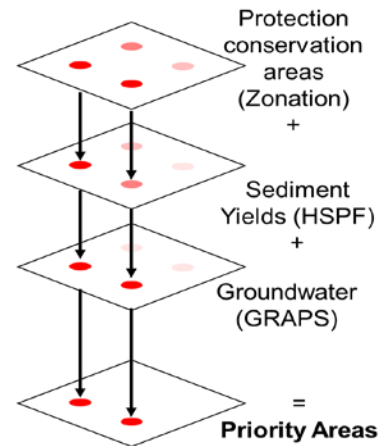


Figure 2-3. Priority Area “Hotspot” Identification Process in the Comprehensive Watershed Priority Scheme

As a result, no single model or tool was used exclusively in the Cannon River planning process, but rather they were used collectively to guide the prioritization and targeting process. The criteria from these models and tools used to identify priority areas are listed and described in Table 2-1. The individual map layers from each feature used in the comprehensive watershed priority scheme are included in Appendix B.

During the process of identifying the priority issues (the “what”), the Planning Partners reviewed the Comprehensive Watershed Priority Scheme to identify where in the landscape the priority issues are concentrated (the “where”). This scheme consisted of the zonation map (which included spatial data layers characterizing many of the higher priority issues/concerns identified using the process described above), the impaired resources, and the PTMApp and HSPF pollutant yield maps.

The Comprehensive Watershed Priority Scheme was reviewed by the Advisory Group in a series of Water Conversations where participants were asked to identify high priority areas/resources based on the criteria listed in Table 2-1; recognizing that these were the areas where high priority issues/concerns should be addressed first (Figure 2-5).

The Water Conversation Invitation and Meeting Summary, the individual Zonation conservation tool layers and subwatershed pollutant loading maps are included in Appendix B.

Table 2-1. Comprehensive Watershed Priority Scheme feature supporting methods and tools

Comprehensive Watershed Priority Scheme Feature	Resource	Criteria for Identifying Priority Areas
Impaired or fully supporting lakes and streams	2016 Cannon River Watershed Restoration and Protection Strategies Aquatic Life Use and Recreation Use assessment maps	Lake eutrophication impairments, stream aquatic life impairments, and fully supporting lakes and streams.
Nearly or barely impaired lakes	2016 Cannon River Watershed Restoration and Protection Strategies report	In-lake phosphorus concentrations near the lake aquatic recreation water quality standards, and lakes and streams with declining long-term trends in water quality
Conservation hotspots	2017 Cannon River Zonation Conservation Prioritization Software Results	Areas with a concentration of lakes vulnerable to nutrient addition, lakes of biological significance, groundwater contamination susceptibility, floodplains, bluff/steep slopes, and trout stream catchments
High sediment, phosphorus or water yields	2015 Cannon River Watershed HSPF watershed pollutant loading model results 2017 Cannon River Watershed Prioritize, Target, and Measure Application (PTMAApp) results	Long-term annual average magnitude of pollutants (as pounds per acre per year) or water (as inches per acre per year) discharged by each subwatershed to surface water resources. Subwatersheds with higher sediment, phosphorus, and nitrogen pollutant yields
Groundwater dominated lakes Pollution sensitivity of near surface materials Pollution sensitivity of wells Nitrate well results	Minnesota Department of Health Cannon River Groundwater Restoration and Protection Strategies (GRAPS) report	Groundwater dominated lakes, high pollution sensitivity of near surface materials, high pollution sensitivity of wells, and wells with high nitrate results.



Figure 2-4. Review of the Comprehensive Watershed Priority Scheme mapping results during the second Water Conversation series in Cannon Falls (bottom) and Waterville (top) in September 2017.

Step 4: Preliminary Surface Water and Ground Water Priority Areas

The Technical Advisory Group and Planning Work Group identified the first draft of priority areas in October 2017 (Figure 2-10 and Figure 2-11) from a comprehensive review of:

- Advisory Work Group notes from the second Water Conversation where participants identified high priority areas using the Comprehensive Watershed Priority Scheme mapping results (Figure 2-5);
- Zonation conservation tool summary map (Figure 2-6) where 13 hot spots were identified in the Planning Area. As Figure 2-6 illustrates, the reasons these portions of the Planning Area were identified as hot spots include: lakes vulnerable to nutrient addition, lakes of biological significance, groundwater contamination susceptibility, floodplain, bluff/steep slopes and trout stream catchments. Many of these spatial data layers characterize the priority issues being identified by the Planning Partners at the same time;
- 2016 Nonpoint Priority Funding Plan priorities (Figure 2-7) where the group focused on the nearly/barely impaired lakes identified in the WRAPS; and
- HSPF and PTMApp pollutant loading maps (Appendix B) where the group focused on the subwatersheds with the highest phosphorous, sediment and nitrogen yield.



Cannon River Turtle Preserve SNA

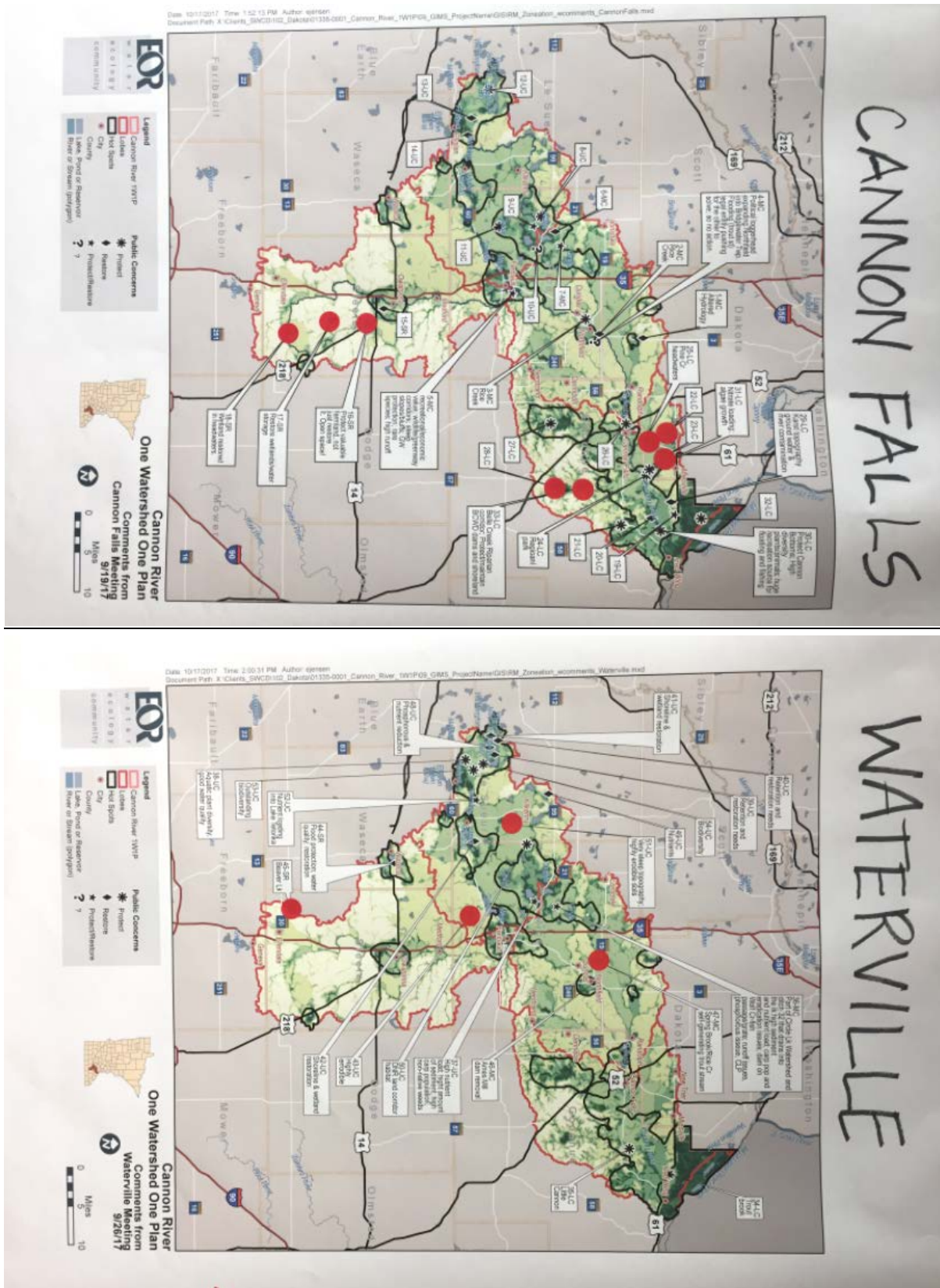


Figure 2-5. Water Conversation notes of the Comprehensive Watershed Priority Scheme mapping results reviewed by the Technical Advisory Group/Planning Work Group in October 2017.

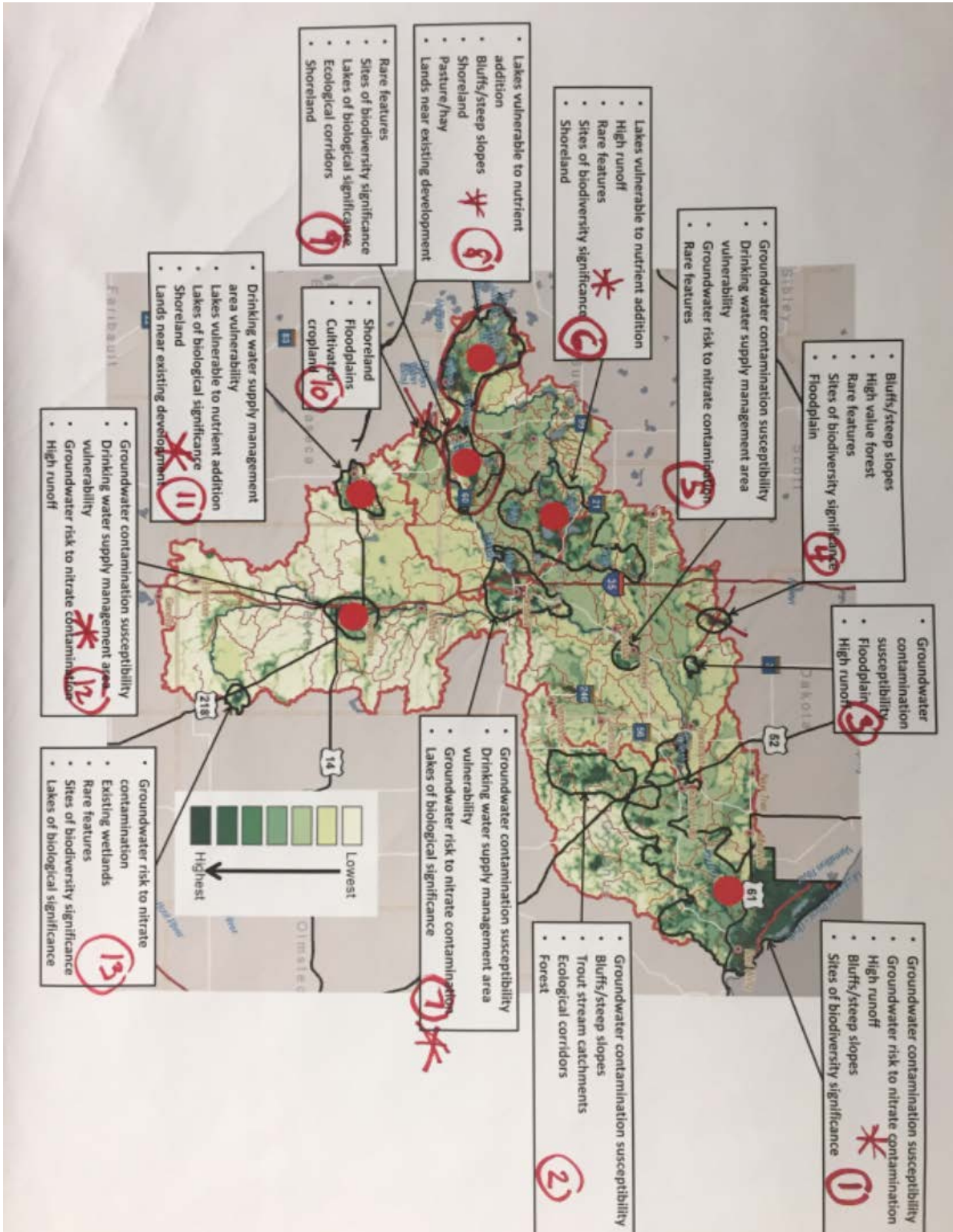


Figure 2-6. Zonation conservation tool summary map reviewed by the Advisory Work Group during the second Water Conversation series in September 2017 and by the Technical Advisory Group and Planning Work Group in October 2017.

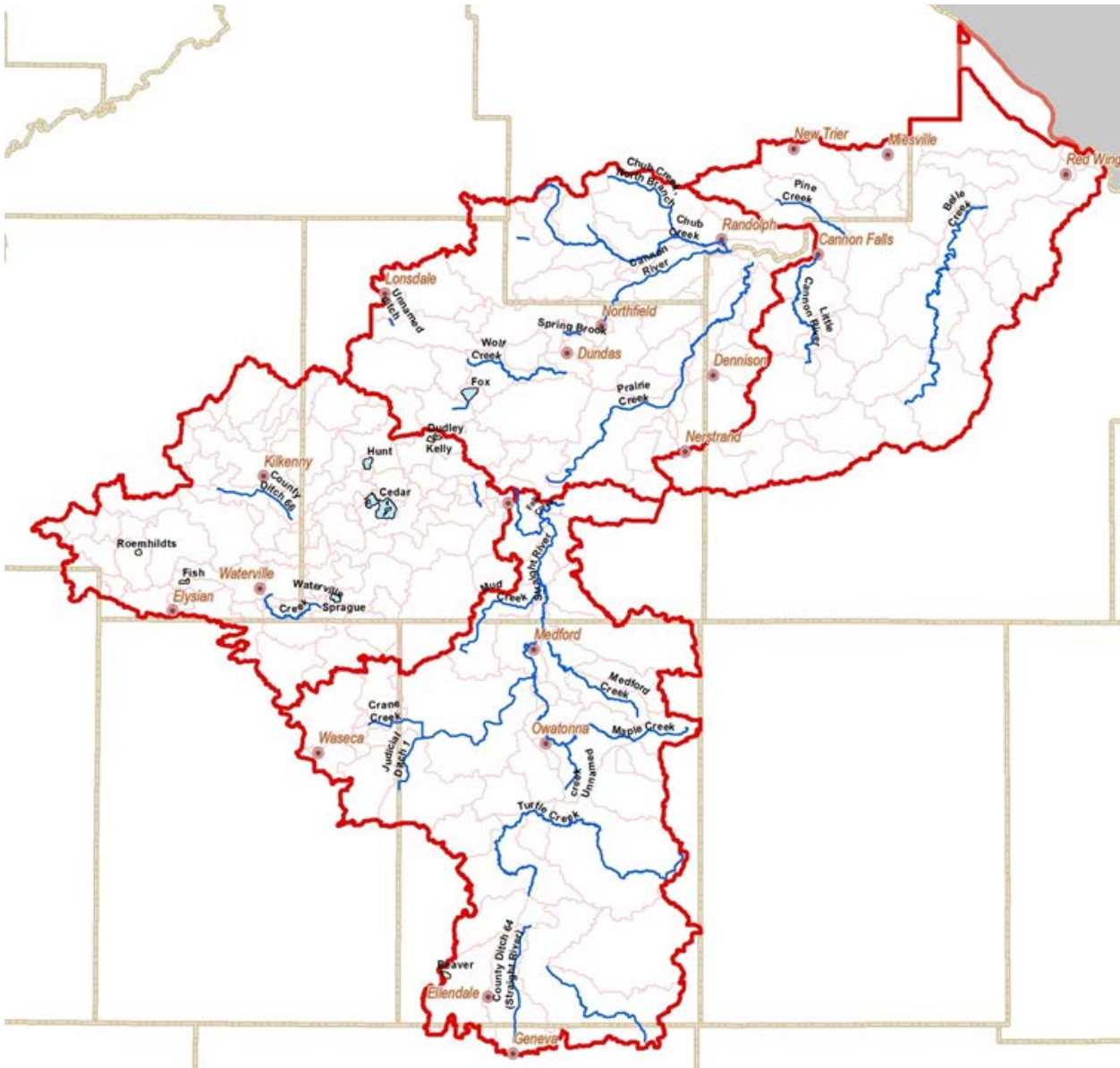


Figure 2-7. Minnesota 2016 Nonpoint Priority Funding Plan Barely Impaired and Nearly Impaired Resources

During this meeting, the Technical Advisory Group and the Planning Work Group participated in a prioritization exercise where they were asked to walk through the following 6 steps (see Figure 2-8).

1. Identify the top 5 hot spot areas utilizing the zonation conservation tool summary map;
2. Identify the top 5 streams and lakes utilizing the nearly/barely impaired lakes identified in the WRAPS and considering public use and public health, including drinking water;
3. Identify the top 5 subwatersheds utilizing the HSPF and PTMApp pollutant loading maps;
4. Identify the priority resources, subwatersheds or systems by evaluating overlapping concerns/issues, geographic distribution in the Planning Area, and benefits to downstream resources;
5. Evaluate whether or not there are additional issues that need to be identified as high priority by identifying the top 5 issues/concerns; and
6. Evaluate how well existing programs address high priority issues by identifying which programs address the priority issues.

Prioritization Exercise for the Cannon River One Watershed, One Plan Oct. 18, 2017

STEP 1 Zonation Hotspot Commonalities	STEP 2 2016 Nonpoint Priority Funding Plan [Nearly/Barely Impaired, Public Use/Health]		STEP 3 Subwatershed Pollutant Loading [HSPP/PTMAp]	STEP 4 Is there overlap in Steps 1-3?	STEP 5 Rems missed from local planning documents, state agency priorities, public engagement process?	STEP 6 Do existing programs address any of these issues/concerns?
Identify Top 5 Hotspot Areas - Water Conservation #2 - PWG/TAG	Identify Top 5 Streams and Lakes - Resource or Protection - Multiple Pollutants - Single Pollutant (e.g. nitrates) - On the cusp		Identify Top 5 Subwatersheds - Sediment - Phosphorus - Nitrogen	Identify the Priority Resources, Subwatersheds, Systems?	Identify Top 5 Issues/Concerns - Issue Identification Matrix - Public Survey	Identify Which Programs Address These Concerns
#1 Area: Why - _____ _____ #2 Area: Why - _____ _____ #3 Area: Why - _____ _____ #4 Area: Why - _____ _____ #5 Area: Why - _____ _____	#1 Stream: Why - _____ _____ #2 Stream: Why - _____ _____ #3 Stream: Why - _____ _____ #4 Stream: Why - _____ _____ #5 Stream: Why - _____ _____	#1 Lake: Why - _____ _____ #2 Lake: Why - _____ _____ #3 Lake: Why - _____ _____ #4 Lake: Why - _____ _____ #5 Lake: Why - _____ _____	#1 Subwatershed: Why - _____ _____ #2 Subwatershed: Why - _____ _____ #3 Subwatershed: Why - _____ _____ #4 Subwatershed: Why - _____ _____ #5 Subwatershed: Why - _____ _____	Topics for Consideration: - How many priority issues/concerns? - How are they distributed in the Planning Area? - Are there benefits to downstream resource issues/concerns?	#1 Issue/Concern: Why - _____ _____ #2 Issue/Concern: Why - _____ _____ #3 Issue/Concern: Why - _____ _____ #4 Issue/Concern: Why - _____ _____ #5 Issue/Concern: Why - _____ _____	Yes / No: Program(s) - _____ _____ Yes / No: Program(s) - _____ _____ Yes / No: Program(s) - _____ _____ Yes / No: Program(s) - _____ _____ Yes / No: Program(s) - _____ _____
PHASE I				PHASE II		

Figure 2-8. Prioritization Exercise for the Cannon River 1W1P

By the end of this exercise, the Planning Partners identified the priority areas and the priority resources that would become the focus of the Cannon River Comprehensive Watershed Management Plan. Prioritization exercise notes from the Technical Advisory Group and Planning Work Group meeting in October 2017 are shown in Figure 2-9.

Prioritization Exercise for the Cannon River One Watershed, One Plan

STEP 1 Zonation Hotspot Commonalities	STEP 2 2016 Nonpoint Priority Funding Plan [Nearly/Barely Impaired, Public Use/Health]	STEP 3 Subwatershed Pollutant Loading [HSPF/PTM Top]
Identify Top 5 Hotspot Areas Winter Conservation #2 PWS/TAG	Identify Top 5 Streams and Lakes Resource or Protection Multiple Pollutants Single Pollutant (e.g. nitrates) Use/Health	Identify Top 5 Subwatersheds Sediment Phosphorus Nitrogen
#1 Area: Cannon Bottoms Why: Rec. trout st. susceptibility to GW steep slopes, natural #2 Area: Lakes Why: High rec. flooding #3 Area: Lakes shields Cedar Why: Cannon HW. outstanding birds. high quality #4 Area: Waseca Why: Rec. flooding, clear Lake, urban #5 Area: Owatonna Why: Out rec. flooding GW #6 Area: Fairbault Why: Out rec. flooding GW Straight Cannon confluence	#1 Stream: Little Trout Stream Why: Belle Creek Trout #2 Stream: Little Cannon Why: Trout #3 Stream: Rice Cr. Why: Dishd HW Trout #4 Stream: Straight River Why: wetland storage, flooding #5 Stream: _____ Why: _____	#1 Lake: Fox, Circle, Drums P, Wolf Creek Why: Kelly/Dudley #2 Lake: Kelly/Dudley Why: Identified in other plans #3 Lake: Protection Lakes Why: All #4 Lake: Restoration Lakes Why: All #5 Lake: _____ Why: _____
		#1 Subwatershed: Pollutant Loads Why: _____ #2 Subwatershed: Sediment Why: carries P + other pollutants #3 Subwatershed: Nitrate Why: GW/Drinking H ₂ O #4 Subwatershed: _____ Why: _____ #5 Subwatershed: _____ Why: _____

MISSING ISSUES:
NOV. + prioritize ISSUES

- Areas might come out of issues
- Flooding in all priority areas, how to pick where to implement.
- Connecting areas of concern v. impact
- ag land wasn't a priority but might be where we implement
- focused on resource concerns today
- Socioeconomic concerns - anyone else needs to be at the table in Nov? or for implementation
- one map if possible. Updates from group working in background
- usually circle locations at end but seemed useful.
- Identify purpose + intent at start.
- Send out multiple times

MINNESOTA 2016 Nonpoint Priority Funding Plan:

- Barely Impaired: Restore those impaired waters that are closest to meeting State water quality standards
- Nearly Impaired: Restore those high-quality unimpaired

① CANNON BOTTOMS

- REC
- SEDIMENT (steep slopes)
- TROUT STREAMS (Belle Creek, LCR)
- GW
- FLOODING

② LAKES AREA (S, I, G)

- High REC
- FLOODING
- Protection Lakes/Nearly Barely
- Sediment/Phosphorus

③ WASECA/OWATONNA/FARI/NORTH

- WASMA - Recreation
- Nitrate - Flooding

④ STRAIGHT RIVER HW

- Wetland storage - nearly barely
- Flooding - sed/nitr. trib.

Figure 2-9. Prioritization exercise notes from the Technical Advisory Group/Planning Work Group in October 2017.

The Planning Work Group and the Advisory Committee identified six key areas that have a concentration of restoration and protection priorities (Figure 2-10 and Figure 2-11). These are areas where implementation will address multiple benefits for key resources in need of restoration or protection. It was also acknowledged by the Planning Work Group and Technical Advisory Group that many of these areas represent the headwaters to the Cannon River, Straight River and a multitude of other streams and lakes. Because of their geographic location in the watershed, improvements in these parts of the Planning Area would have benefits to the resources located downstream, in those areas not identified as a high priority at this point in time. It was also recognized that improvements in the priority areas would have benefits to systems downstream of the Cannon River Planning Area such as Lake Pepin and the Mississippi River. The call-out boxes on Figure 2-10 and Figure 2-11 identify the unique features and/or primary concerns and issues that made these areas stand out as higher priority for implementation. The information in the call-out boxes was used to inform the development of issue statements, identification of priority areas, and potential implementation activities needed for each area in later prioritization steps.

Four of the priority areas address issues and concerns related to surface water resources while the last two address priority areas for the groundwater system. These areas include:

Surface Water Priority Areas

1. **Straight River Tributaries** which encompasses the Straight River drainage area at Owatonna.
2. **Lakes Area** which encompasses the Cannon River drainage area at Faribault, five high quality lakes that are fully supporting of aquatic recreation (Roemhildts, Dudley (and Kelly), Fish, and Beaver), and three impaired lakes with summer eutrophication (algae bloom) problems that are closer to achieving the lake aquatic recreation water quality standards (Cedar, Fox, and Hunt) than other impaired lakes. Additionally, the Waseca area lakes are included in this Priority Area because there are lakes of biological significance in the drainage area that provide recreational value and are sensitive to stormwater impacts.
3. **Cannon/Mississippi Bottoms** which matches the boundary established for the Lower Cannon River Lobe and encompasses a majority of the karst area located in the Planning Area and the remaining Tier One trout streams (Little Cannon River, Spring Creek, and Trout Brook).
4. **Large Communities** which represents four of the MS4 communities concerned with issues related to flooding and drinking water quality including Faribault, Northfield, Owatonna, and Waseca. An additional call-out box was provided for Waseca since there are a number of lakes related (surface water) issues identified for this community.

Groundwater Priority Areas

5. **Pollution Sensitivity Area** represents that portion of the Planning Area that has high susceptibility to groundwater, and hence drinking water, contamination.
6. **Groundwater Dominated Lakes** which represents that portion of the Planning Area where groundwater dependent lakes are susceptible to land use changes that impact the quantity and quality of groundwater feeding these resources.

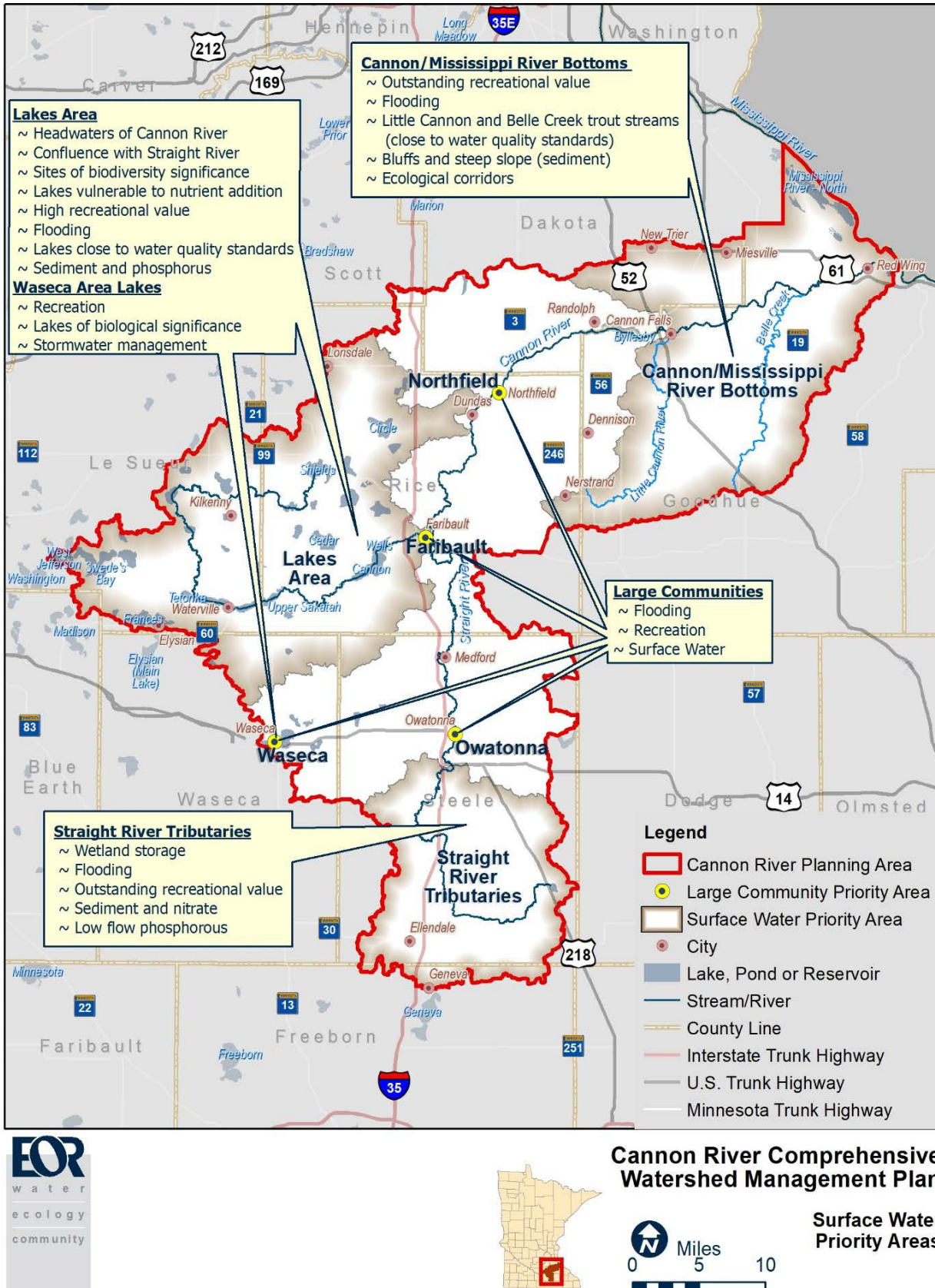
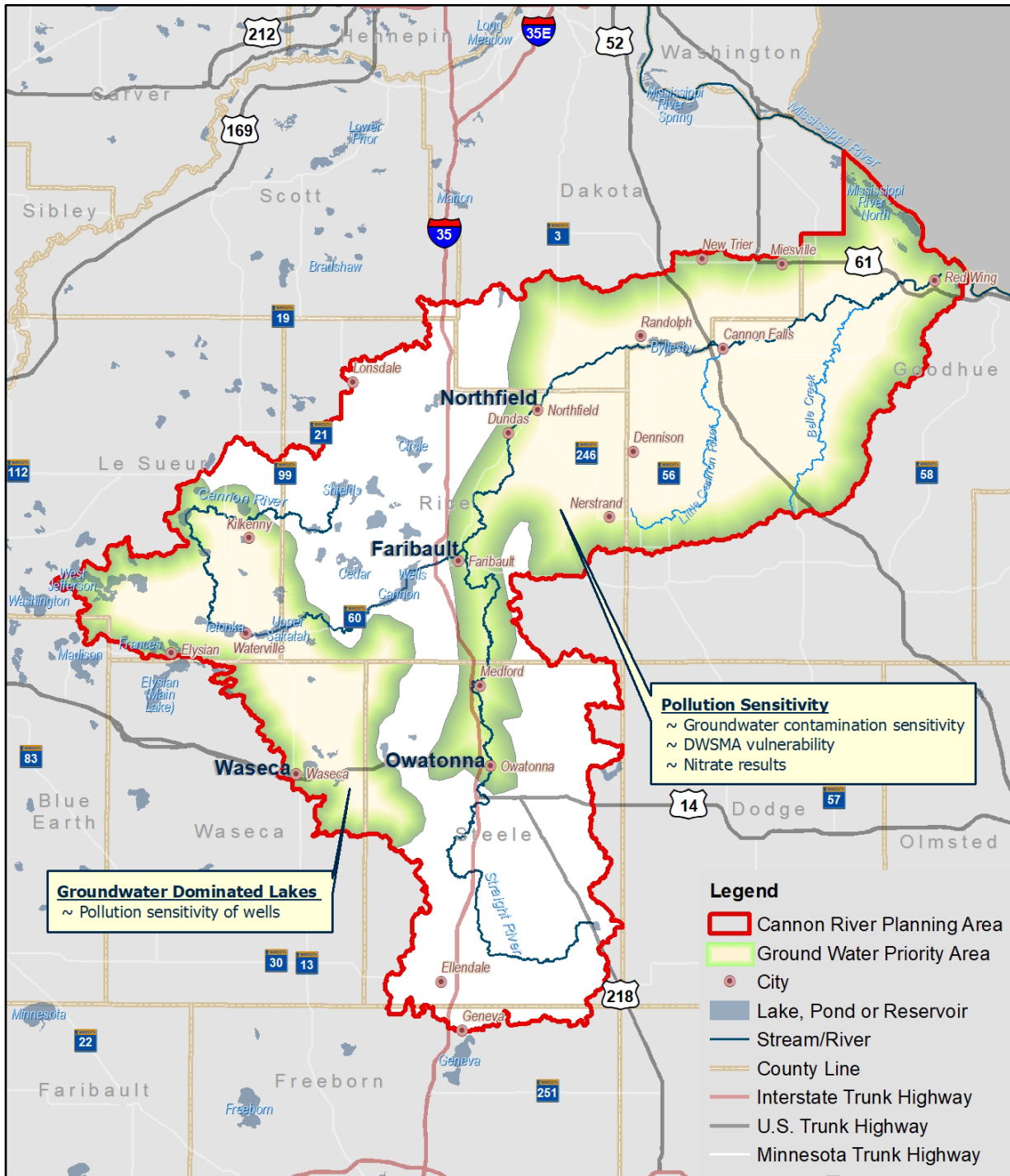


Figure 2-10. Cannon River Comprehensive Watershed Management Plan criteria used to select surface water priority areas.



Cannon River Comprehensive Watershed Management Plan

Ground Water Priority Areas



0 Miles 5

Figure 2-11. Cannon River Comprehensive Watershed Management Plan criteria used to select groundwater priority areas.

Step 5: Draft Issue Statements & Measurable Goals

At the end of the issues identification and prioritization process, the Planning Work Group and the Advisory Committee developed draft issue statements to describe the problems that will be addressed in the Plan. The draft issue statements were refined by iterative feedback from the Planning Work Group and the Technical Advisory Group. The Technical Advisory Group and Planning Work Group presented the draft issue statements and priority area maps to the Policy Committee in January 2018.

Next, the Planning Work Group identified long-term and 10-year measurable goals for each issue. These goals, including the rationale for each goal, are described in detail within Section 3. Implementation activities needed to achieve these goals are listed within each issue category in Section 3, with schedule of implementation and cost estimates identified in the Targeted Implementation Schedule in Section 4.

Step 6: Targeting Areas for Implementation within Resource Drainage Areas

As the Planning Partners assessed their capacity for implementation and developed measurable goals for the issues and resource concerns, they further refined the priority areas by identifying the specific subwatersheds where the work needs to be completed (i.e. the drainage areas to the resources). To ensure that the activities identified in the Targeted Implementation Schedule achieve the goals in the most cost-effective manner, the Planning Partners created an additional series of maps that illustrate where field-scale practices should be located.

The process of prioritizing areas for implementation include the following steps:

- Within the Priority Areas (see Figure 2-10 and Figure 2-11), delineated the drainage area to the high priority resources including the protection lakes, impaired lakes, pollutant-impaired streams (see Figure 3-1, Figure 3-2 and Figure 3-6 in Section 3.1.1 Lakes, Streams and Rivers). For example, Figure 2-12 illustrates the Targeted Implementation Areas (drainage areas) to the high protection resources within the overall Lakes Area.

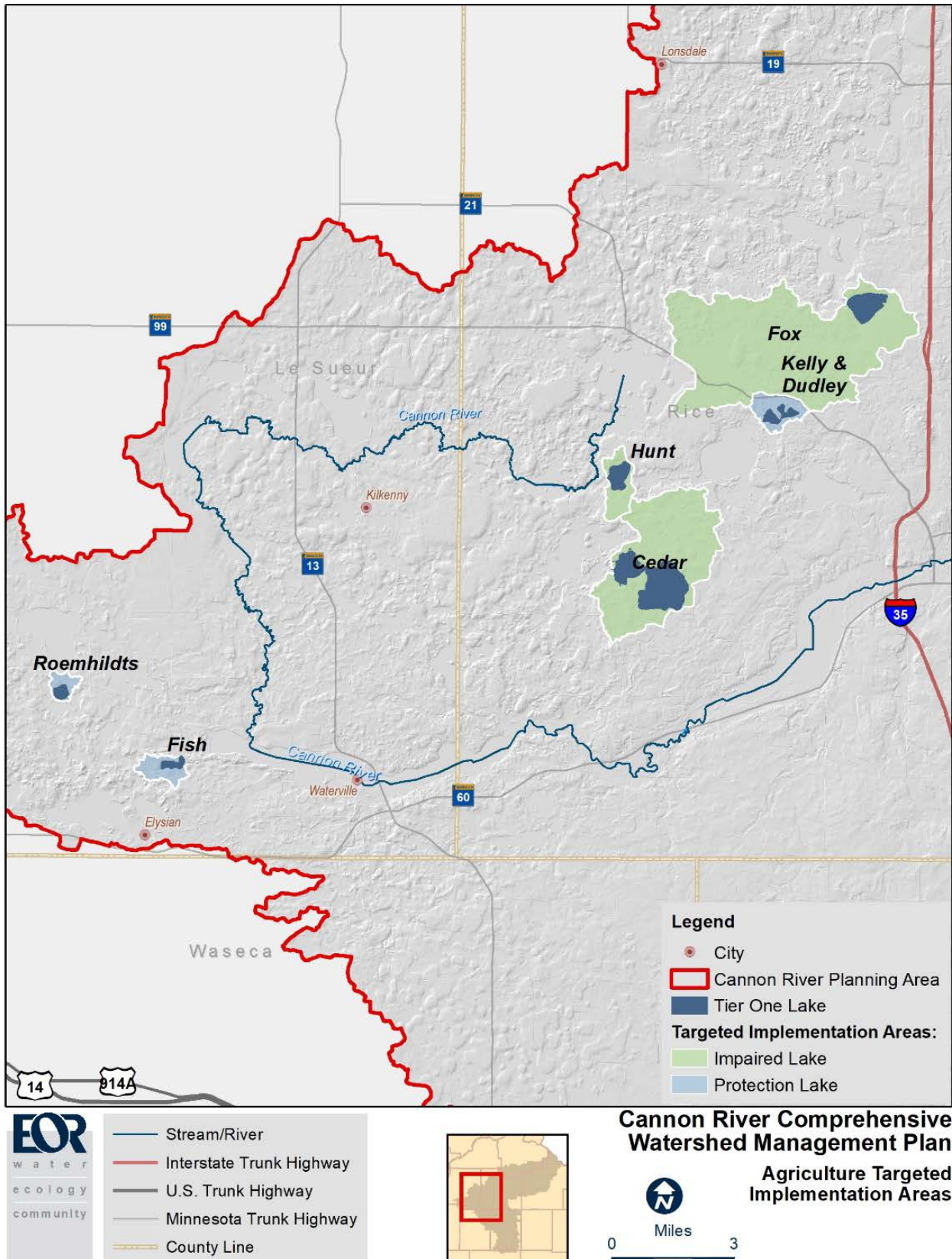


Figure 2-12. Targeted Implementation Areas for Protection Lakes

- Utilized HSPF-SAM to evaluate the pollutant load reductions of implementing agricultural conservation practices (cropland conversion to perennial vegetation, nutrient management, and cover crops; see Section 3.2.1) in the drainage area to the Tier One priority resources. See Appendix D for model scenario inputs and results for the Tier One priority resources.
- Utilized PTMApp to generate a series of maps that identify the most cost-effective fields for implementation of agricultural conservation practices (cropland conversion to perennial vegetation, nutrient management, and cover crops; see Section 3.2.1). (See Figure 3-3 through Figure 3-5, Figure 3-7 through Figure 3-9, and Figure 3-14 through Figure 3-17 in Section 3). For example, Figure 2-13 illustrates the most cost effective areas in the Fox Lake drainage area for the implementation of practices aimed at reducing total phosphorous loads. Note that PTMApp was not available for 3 priority streams: HSPF-SAM was used for Rush and Medford Creeks (Figure 3-18), and neither HSPF-SAM nor PTMApp were available for Lower Vermillion River.

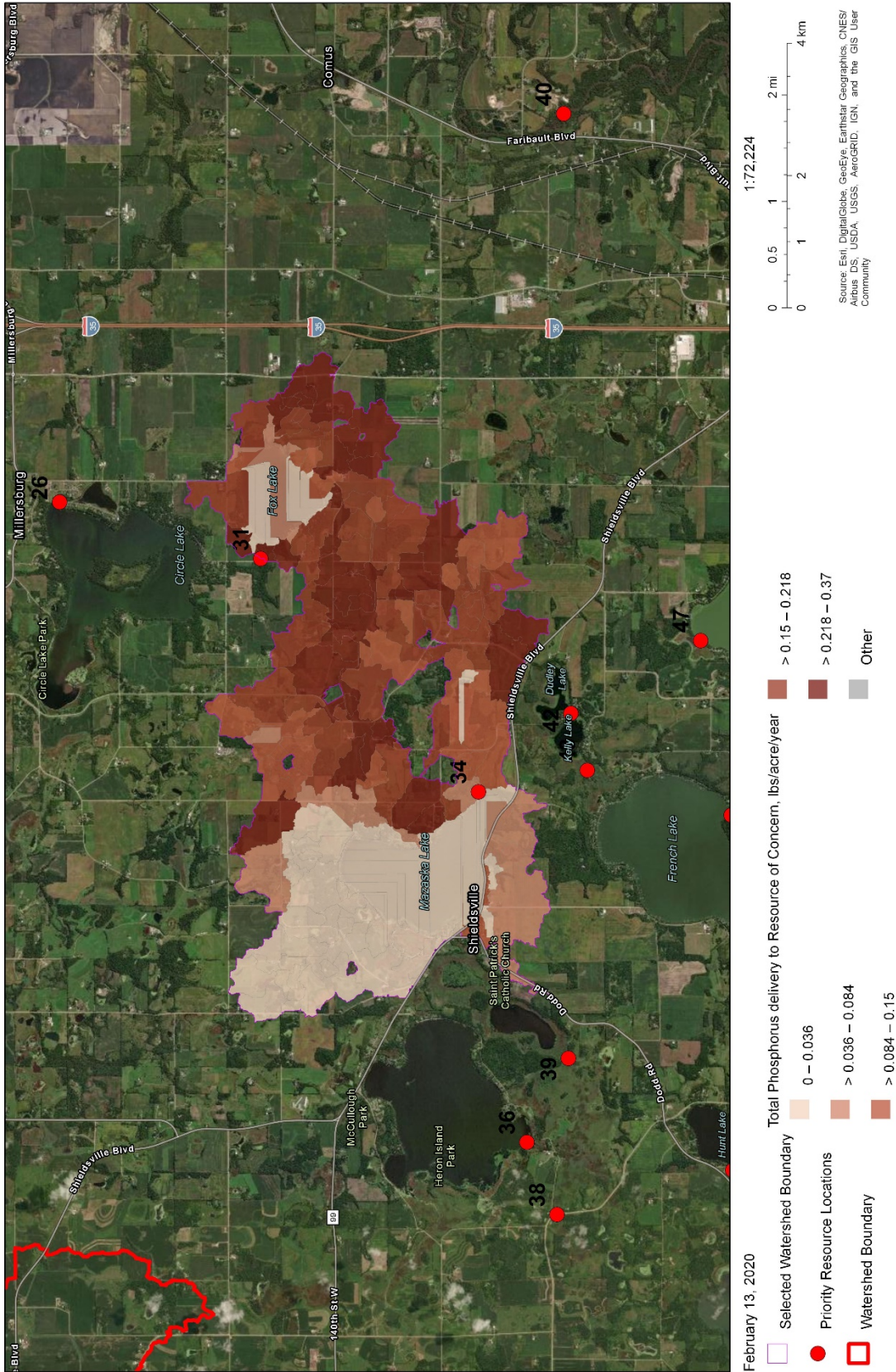


Figure 2-13. Field Scale Implementation Map for Total Phosphorus in the Fox Lake Targeted Implementation Area

How this information will be used by the Cannon River Joint Powers Board during annual work planning is described in Section 6.4.

2.4. PRIORITY ISSUES AND RESOURCES

Watershed concerns are the individual resources, the land uses that impact the resources, or the social and economic factors that influence our ability to manage the watershed. The watershed concerns were grouped into three categories: Resources, Landscape Alterations, or Socioeconomic Factors. For each watershed concern, **priority issues** were identified to be addressed in the Planning Area. The priority issues were sorted by their relative timing for implementation by the Planning Partners:

- **Tier One** represents priority issues to be addressed within the 10-year timeframe of this plan (2020-2029). Issue statements, goals, implementation activities, and a detailed budget and schedule were identified in the plan for these issues (see Section 4 Targeted Implementation Schedule).
- **Tier Two** represents priority issues to be addressed in the next 10-year plan (2030-2039) or as opportunity or funding arises within the timeframe of this Plan (2020-2029). Issue statements and some goals were identified in the plan for Tier Two issues, but no specific implementation activities were identified.
- **Tier Three** represents priority issues to be addressed in some future, undefined period (after 2029). Neither issue statements/goals, nor implementation activities were identified for Tier Three issues.

TIER ONE PRIORITY ISSUES

Tier One represents issues to be addressed within the 10-year timeframe of this plan (2020-2029). Issue statements, goals, implementation activities, and a detailed budget and schedule were identified in the plan for these issues (see Targeted Implementation Schedule and Table 2-2).

Table 2-2. Tier One Priority Issues in the Cannon River Planning Area

Watershed Concern		Tier One Priority Issues	Priority Area	Targeted Implementation Areas	Criteria for Selection (see Section 3)
RESOURCES	Lakes, Streams, and Rivers	Protection Lakes	Lakes Area	Drainage Area to: Beaver, Dudley (and Kelly), Fish, and Roemhildts	Groundwater dominated and meeting state water quality standards
		Impaired Lakes	Lakes Area	Drainage Area to: Cedar, Fox, and Hunt	Closer to meeting lake aquatic recreation water quality standards
		Pollutant Impaired Streams	Cannon/Mississippi River Bottoms Straight River Tributaries Area	Drainage Area to: Belle Creek, Little Cannon River, Trout Brook, Prairie Creek, Rush Creek, Medford Creek, and Lower Vermillion River	Achieve multiple benefits: phosphorus and nitrate reductions, protection of groundwater in sensitive areas, and improving stream fish and macroinvertebrate communities
	Wetlands	Wetland Restoration	Cannon River Planning Area	Upper Cannon HUC10 Chub Creek HUC10	Provide flood mitigation for larger communities
	Groundwater	Drinking Water Protection	Large Communities Groundwater Pollution Sensitivity Area	Communities with moderate or high vulnerabilities; Private well owners in areas of moderate or high pollution sensitivity	Karst formations and highly permeable soils
	Groundwater	Groundwater Dependent Nat. Res. – Protection Lakes	Groundwater Dominated Lakes Area	Groundwater Dependent Protection Lakes: Beaver, Dudley (and Kelly), Fish and Roemhildts	Groundwater dependency
	Monitoring Data	Monitoring Data	Cannon River Planning Area	Cannon River Planning Area	To assess progress towards achieving resource goals for Tier One lakes and streams
LANDSCAPE ALTERATIONS	Agriculture	Agricultural Runoff and Leaching Loss	Lakes Area Cannon/Mississippi River Bottoms Straight River Tributaries Area	Drainage area of Tier One lakes and streams	See criteria for Protection Lakes, Impaired Lakes, and Pollutant Impaired Streams above

	Agriculture (continued)	Soil Health	Lakes Area Cannon/Mississippi River Bottoms Straight River Tributaries Area	Drainage area of Tier One lakes and streams HSPF Top 25% TP and TN subwatersheds	See criteria for Protection Lakes, Impaired Lakes, and Pollutant Impaired Streams above
LANDSCAPE ALTERATIONS (continued)	Development	Flooding of Communities	Large Communities	Contributing drainage area to larger communities Areas identified from H&H model	Communities with known flooding issues
		Shoreland Management	Lakes Area	Natural Environment Lakes	Protection Lakes, Impaired Lakes, and Pollutant Impaired Streams above
		Stormwater Management	Cannon River Planning Area	Non-MS4 communities	Communities where flooding and water quality improvements are needed
		Subsurface Sewage Treatment Systems (SSTS)	Groundwater Pollution Sensitivity Area Groundwater Dominated Lakes Area	Groundwater Pollution Sensitivity Area Groundwater Dominated Lakes Area	See criteria for Drinking Water Protection and Groundwater Dependent Natural Resources above
	Drainage Systems	Drainage System Management	Straight River Tributaries Area Lakes Area	Straight River Tributaries Area Lakes Area	Density of public drainage systems
	Climate Change	Community Resilience to Climate Change	Cannon River Planning Area	Cannon River Planning Area	See criteria for Flooding of Communities above
	SOCIO-ECONOMIC FACTORS	Education and Outreach	Educating Local Land Use Decision Makers	Cannon River Planning Area	Cannon River Planning Area
Citizen Engagement			Cannon River Planning Area	Cannon River Planning Area	n/a
Coordination and Partnerships		Watershed Partnerships	Cannon River Planning Area	Cannon River Planning Area	n/a
		Internal Capacity	Cannon River Planning Area	Cannon River Planning Area	n/a
Recreation and Livability		Recreational Value	Cannon River Planning Area	Cannon River Planning Area	n/a

TIER TWO PRIORITY ISSUES

Tier Two represents issues that are most likely to be addressed in the next 10-year plan (2030-2039), or as opportunity or funding arises within the timeframe of this Plan (2020-2029). Tier Two priority issues are shown in Table 2-3. Issue statements and some goals were identified in the plan for these issues, but no specific implementation activities were identified.

Table 2-3. Tier Two Priority Issues in the Cannon River Planning Area

Watershed Concern		Tier Two Priority Issues	Priority Area
RESOURCES	Streams, Lakes and Rivers	Non-Pollutant Stream Stressors	Cannon River Planning Area
	Wetlands	Wetland Protection & Enhancement	Straight River Tributaries Area Lakes Area
	Groundwater	Groundwater Recharge	Groundwater Pollution Sensitivity Area
		Other Groundwater Dependent Natural Resources (e.g. susceptibility of baseflow to groundwater appropriations)	Cannon River Planning Area
LANDSCAPE ALTERATIONS	Development	Small Community Stormwater Management	Cannon River Planning Area
		Maintenance of Existing Stormwater BMPs	Large Communities
	Drainage Systems	Drainage System Buffers	Straight River Tributaries Area Lakes Area
		Operation and Maintenance	Straight River Tributaries Area Lakes Area

TIER THREE PRIORITY ISSUES

Tier Three represents priority issues to be addressed in some future, undefined period (after 2029). No issue statements, goals, nor implementation activities were identified for these issues (Table 2-4).

Table 2-4. Tier Three Priority Issues in the Cannon River Planning Area

Watershed Concern		Tier Three Priority Issues
RESOURCES	Streams, Lakes and Rivers	Lakes impacted by AIS
		Increasing chloride trends
LANDSCAPE ALTERATIONS	Agriculture	Loss of farmland due to development pressure is a concern to residents in the Planning Area.
	Development	Waste disposal
		Wastewater management (permitted entities; extreme events, combined sewer overflows, and inflow & infiltration), potential reuse opportunities for cooling water, infrastructure for expansion
		Industrial stormwater runoff

3. ISSUES, GOALS AND IMPLEMENTATION ACTIVITIES

After identifying the priority concerns to be addressed in the Cannon River Watershed Management Plan, issue statements were defined, a set of quantifiable goals were established to convey the expected changes in the priority resources during the 10-year timeframe of this plan, and implementation activities were assigned to address the goals. The goals determine the pace of progress for addressing the priority issues, and will be used to demonstrate progress to the public, key stakeholders, and potential funders. Local and regional management plans were used to identify measurable goals and implementation activities supplemented with local knowledge of the specific resource protection and restoration needs. Using existing studies and plans promotes implementation by highlighting previously identified, matching goals by counties, state and federal agencies, and other entities as well as potential project partners.

This section identifies the issues, goals and implementation activities for the Tier One priorities and issues and goals for the Tier Two priorities. The order in which this information is presented follows the same structure provided in previous sections of the Plan: issues are grouped by Watershed Management Component (Resources, Landscape Alterations, and Socioeconomic Factors). For each issue, the following information is provided:

1. **Watershed Concerns:**
The individual resources, the land uses that impact the resources, or the social and economic factors that influence our ability to manage the watershed. The watershed concerns were grouped into three categories: Resources, Landscape Alterations, or Socioeconomic Factors (see definition under Section 2.1). For each watershed concern, there is an introductory paragraph(s) that describe the watershed-wide characterization of the watershed concern (overall issue).
2. **Priority Area Summary:**
Identification of the specific implementation area(s) within the broader priority areas for this issue and a brief description of why this area(s) was identified as a priority for the first 10-year timeframe of the Cannon River Comprehensive Watershed Management Plan.
3. **Issue Statement:**
For each Tier One or Tier Two Priority Issue, the Issue Statement includes a more refined description of each sub-issue as it relates to the priority area(s).
4. **Desired Future Condition (Long-term Goals):**
Statement describing the desired long-term, future condition of a priority resource, regardless of timeframe.
5. **10-Year Measurable Goals:**
The quantifiable change expected in a priority resource after implementing the 10-year plan.
6. **Justification for the Goals**
Explanation of how the Planning Partners established the 10-year goals for the Cannon River Comprehensive Watershed Management Plan.

7. Targeted Implementation Activities:

Implementation activities that will achieve the measurable goal(s). These are countable projects, activities, services, or products that can be tracked as progress towards achieving the goals. Note that some implementation activities address more than one issue and achieve more than one goal. Costs for these implementation activities are listed only once in the implementation table, but a description of the implementation activity is noted under each issue they address in the Plan.

8. Pace of Progress

Summary of how the 10-year goal will be achieved by implementing the corresponding Targeted Implementation Activities.

This same structure will be repeated in the Targeted Implementation Schedule presented in Section 4 of the Cannon River Comprehensive Watershed Management Plan where estimated costs, schedule for implementation, project partners, and measurable outcomes will be provided.



Bank shaping, Butler Creek - photo Goodhue SWCD

3.1. WATERSHED CONCERNS: RESOURCES

3.1.1. Lakes, Streams, and Rivers

The Cannon River Planning Area consists of two primary river systems: the Cannon River and the Straight River. From the South, the Straight River headwaters begin as a fan of smaller streams and ditches, connects with several larger creeks as it flows north, and then joins with the Cannon River in Faribault. The headwaters of the Cannon River begin as the outflow of Shields Lake on the western side of the watershed, flows through alternating chains of streams, ditches and lakes, and then flows east through the Cannon Lake Reservoir before joining with the Straight River in Faribault. The Cannon River then continues to travel east, through the Byllesby Reservoir, and through the bluffs in the Driftless Area near Welch. In addition, the portion of the Lower Vermillion River within Goodhue County and the Mississippi River at the confluence with the Cannon River are included in the Cannon River Planning Area. The Driftless Area has many coldwater springs that feed tributary streams to the Cannon River before it empties into the Mississippi River north of Red Wing. There are 191 lakes at least 10 acres in size (approximately 50 are named), with most of the lakes concentrated in the Upper Cannon River Lobe located in the western portion of the Planning Area.

In 2016, there were 36 lakes and 59 stream reaches that were impaired for recreation or aquatic life uses in the Cannon River Planning Area. Reduction in pollution or improvement in habitat or other physical issues is needed to restore the recreational and aquatic life use functions of these lakes and streams. Pollution sources and stressors to impaired lakes and streams have been identified through Stressor Identification of Biotic Impairments and Total Maximum Daily Load (TMDL) studies including: excess phosphorus, excess turbidity/TSS, excess nitrate, excess ammonia, low dissolved oxygen, lack of stream connectivity/fish passage, lack of physical habitat, and flow alteration.

In addition to restoration efforts, there are five high quality lakes in need of protection. These lakes currently support recreation and aquatic life uses, but need measures in place to maintain or improve the current conditions to ensure these high quality waters do not become degraded in the future.



Cannon River— Cannon River Wilderness Park, Rice County

PRIORITY AREA SUMMARY

Protection Lakes (T1)

Out of five high quality lakes, four (Dudley (and Kelly), Fish, Roemhildts) are located in the Lakes Priority Area, and one (Beaver) is located in the Straight River Tributary Priority Area (see Figure 3-1 and Figure 3-2). Four of the five lakes are groundwater dominated (see Groundwater Dependent Natural Resources – Protection Lakes).

Impaired Lakes (T1)

Most of the impaired lakes with summer eutrophication (algae bloom) problems in the watershed are located in the Lakes Priority Area, including three impaired lakes that are closer to meeting the lake aquatic recreation water quality standards (Cedar, Fox and Hunt; see Figure 3-6) than other impaired lakes. These three lakes have also had preliminary lake phosphorus modeling completed.

Pollutant Impaired Streams (T1)

The impaired streams to be restored targeted as part of the first 10-year plan were identified where implementation in the impaired stream drainage area would achieve multiple benefits: phosphorus and nitrate reductions, protection of groundwater in sensitive areas, and improving stream fish and macroinvertebrate communities. These streams are located in the Straight River Tributary and the Cannon/Mississippi River Bottom Priority Areas. The seven impaired streams to be targeted as part of the first 10-year plan are: Lower Vermillion River, Belle Creek, Little Cannon River, Trout Brook, Prairie Creek, Rush Creek, and Medford Creek (see Figure 3-11 through Figure 3-13).

Non-Pollutant Stream Stressors (T2)

Thirty-four stream reaches in the Cannon River Planning Area were impaired for a lack of biological assemblage in the 2013 MPCA assessment. Given that these resources are located throughout the Planning Area, implementation activities to address the impairments will likely be watershed-wide. Future plan revisions may include a prioritized approach for addressing these impairments. If implementation opportunities arise during the first 10-year plan, biologically impaired streams located within a Surface Water Priority Area will be addressed first (Figure 3-19).



Cannon River, Welch – photo Dakota SWCD

3.1.1-A: PROTECTION LAKES**T1****Issue Statement**

There are five high quality lakes in need of protection: Beaver, Dudley (and Kelly), Fish, and Roemhildts (Figure 3-1 and Figure 3-2). These lakes are all groundwater dependent (except Kelly) with a very small contributing surface drainage area, which has kept total phosphorus loading to these lakes low and preserved their high water quality. While these lakes currently support recreation and do not exhibit a declining trend in water quality, they could become degraded in the future if phosphorus loads increase or there are changes to the groundwater contribution to these lakes. There are existing programs and activities that can be utilized to protect these lakes, but current funding is insufficient and further analysis on the most effective activities is needed. There is a need for additional activities and funding to address this issue.

Desired Future Condition

Maintain or improve water quality (as measured by the growing season average in-lake phosphorus concentration, chlorophyll-a concentration, and Secchi depth) compared to observed conditions reported in Appendix 6.2 of the MPCA 2014 Cannon River Watershed Monitoring and Assessment Report (Table 3-1) by achieving a 12% phosphorous reduction (lb/yr; Table 3-2).

Table 3-1. Observed conditions for Tier One Protection Lakes in the Cannon River Comprehensive Watershed Management Plan (Source: Appendix 6.2 in MPCA 2014 Cannon River Watershed Monitoring and Assessment Report)

Protection Lake	Observed Water Quality Conditions		
	Total Phosphorus (ug/L)	Chlorophyll-a (ug/L)	Secchi Depth (m)
NCHF Deep Lake Standard	<40	<14	>1.4
Beaver (74-0023-00)	22	9	1.4
Dudley (66-0014-00)	28	14	2.2
Fish (40-0051-00)	15	4	4.0
Kelly (66-0014-00)	42	14	2.1
Roemhildts (40-0039-00)	17	6	3.1



10-Year Measurable Goals

Goal 1: *Maintain or improve water quality in the five high quality lakes (Beaver, Dudley (and Kelly), Fish, and Roemhildts) by achieving the 10-year Total Phosphorus Reduction Goals (lb/yr) listed in Table 3-2.*

Table 3-2. Existing Total Phosphorus Loads and Load Reduction Goals for Tier One Protection Lakes in the Cannon River Comprehensive Watershed Management Plan

Protection Lake	Total Phosphorus (TP) Existing Load and Load Reduction Goals					
	WRAPS Existing TP Load (includes watershed and internal sources) [lb/yr]	12% TP Reduction (Long-term Future Condition) Measurable Goal [lb/yr]	Estimated 5-year TP Reduction [lb/yr]	Estimated 10-year TP Reduction (total from Table 3-3)** [lb/yr]	10-year Progress Towards 12% TP Reduction Measurable Goal** [%]	10-year TP Reduction from Existing Load** [%]
Beaver	42	5	2.9	6	114%	14%
Dudley (and Kelly)*	723	87	4.2	87	100%	12%
Fish	46	6	3.5	7	128%	15%
Roemhildts	701	84	2.1	84	100%	12%

* Note that the Dudley and Kelly Lake basins are connected, and the two lake drainage areas were combined into one drainage area to represent that implementation of watershed activities benefit the water quality of both lake basins.

** Lake management plans will be completed by 2024 to identify activities to achieve the remaining phosphorus reductions needed to achieve the measurable goal.

Justification for Goals

The phosphorus reduction goals for the five Tier One Protection Lakes (Beaver, Dudley (and Kelly), Fish, and Roemhildts) were based on the phosphorus reduction goals identified in the 2016 Cannon River WRAPS. These phosphorus reduction goals were based on an evaluation process developed by MPCA and Minnesota Department of Natural Resources (MNDNR) that provides an initial attempt at prioritizing lakes within a WRAPS project. The preliminary TP concentration targets are computed as 25th percentile of the long-term summer mean TP concentration, estimated using the standard deviation of the annual data. A target load and load goal are also estimated. The target load level is an estimate of the load needed to achieve the TP concentration target for the lake. A log-log regression model based on in-lake TP concentration, lake volume, and hydraulic inflow rate was used to estimate the target load. This load target provides a numeric mark to shoot for over the long-term. The load goal is the estimated total phosphorus load (in pounds/year) to meet a 12% load reduction goal for the lake. This goal provides the recommended reduction in the amount of pollution entering a lake (watershed and internal) that watershed partners can reasonably strive to achieve, which should help guide local stewardship practices in the context of a 10-year cycle WRAPS.

Targeted Implementation Activities

Implementation for Protection Lakes will be focused in the drainage areas of the five Tier One Protection Lakes (Beaver, Dudley (and Kelly), Fish, and Roemhildts) as shown in Figure 3-1 and Figure 3-2. These lake drainage areas are located in the Lakes Area Priority Area. Subcatchments with the highest TP delivery will be prioritized for implementation of practices first. PTMApp was used to determine the level of TP delivery from all the subcatchments within the targeted implementation areas to the Tier One impaired lakes (except Beaver Lake; Figure 3-3 through Figure 3-5). Beaver Lake falls within the Straight River Area which is not currently included in PTMApp. The total acreage of subcatchments within the highest of the TP load delivery categories is provided in the right-hand column of Table 3-3.

Selection of project locations within the lake drainage areas will be determined by the Planning Partners during the annual work planning process using the tools and criteria described in Section 6.4 Work Planning. Active watershed management in the Tier One Protection Lake watersheds will be beneficial regardless of the findings of future lake management plans. Watershed pollutant load reductions are needed to maintain the longevity of in-lake management activities for fish and aquatic plants.

The following implementation activities were chosen to achieve the 10-year Protection Lake goals. Conversion of cropland on vulnerable soils and practices that increase organic matter on corn/soybean acres and short season crops were chosen to make progress towards the watershed phosphorus reduction goals until specific phosphorus reductions by source are identified in the lake management plans. Additional phosphorus reduction activities needed to achieve the Protection Lake goals may be identified in the lake management plans from other phosphorus sources/lake water quality drivers, such as: shoreline erosion, septic systems, internal loading, or other in-lake biological processes.

- **3.1.1-A-1:**
Complete lake management plans by 2024 to identify the distribution of the total lake phosphorus load between external and internal phosphorus sources. After completing the lake management plans, the Planning Partners will readjust the phosphorus reduction goals and activities based on the findings. For example, the water quality of a lake may be controlled by fish and/or aquatic plant management, or sediment phosphorus loads may need to be addressed. Plans would focus on in-lake and near-shore management strategies that are not identified through other watershed loading models, such as: shoreline stabilization, shoreline septic system improvements, sediment phosphorus load reduction, aquatic plant management, or in-lake fish management.
- **3.1.1-A-2:**
Implementation of in-lake and near-shore management strategies will occur in the second 5-year period of the Plan (2025-2029) to achieve the 10-year goals. Note that the load reductions associated with in-lake and near shore management activities reported in Table 3-3 represent the maximum reductions expected from these activities.

- **3.1.1-A-3:**
Implement structural practices to treat 5%, or 36 acres, of cropland in the five Tier One Protection Lakes drainage areas.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.1 – Agriculture as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.1-A-1:**
Convert 10% (11 acres total) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in the five Tier One Protection Lakes drainage areas.
- **3.2.1-A-3:**
Implement nutrient management BMPs following U of M guidance on 10% (73 acres total) of cultivated cropland in the five Tier One Protection Lakes drainage areas.
- **3.2.1-B-1:**
Track and monitor cover crops and residue into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project.
- **3.2.1-B-2:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (42 acres total) in the five Tier One Protection Lakes drainage areas.

Pace of Progress

The following table summarizes the estimated load reduction expected from implementation of each activity within the Tier One Protection Lake drainage areas, based on the Cannon River HSPF-SAM (see Appendix D). The total acreage for prioritized targeted implementation (subcatchments with the highest TP load) is provided in the right-hand column of Table 3-3. These values correspond with the highest priority subcatchments represented on Figure 3-3 through Figure 3-5. It should be noted that there is not a figure identifying the prioritized targeted implementation areas for the Beaver Lake drainage area because PTMapp has not been completed for the Straight River drainage area.

Table 3-3. Tier One Protection Lake Total Phosphorus Load Reductions by Activity, lb/yr

Protection Lake	Drainage Area (including lake surface) [acres]	HSPF-SAM Estimated TP Load Reduction for Agricultural Conservation Practices [lb/yr] – see Section 3.2.1						PTMAApp Prioritized Targeted Implementation Areas** (subcatchments with the highest TP load delivery to priority resources)	
		3.1.1-A-2	3.1.1-A-3	3.2.1-A-1	3.2.1-A-3	3.2.1-B-1	3.2.1-B-2	Area [acres]	TP Load Delivered Category [lb/ac/yr]
		Internal Load Mgmt.	Structural Practices on 5% of cultivated cropland (see Table 5 in Appendix D)	Cropland Conversion on Vulnerable Soils (see Table 1 in Appendix D)	Nutrient Management BMPs (see Table 2 in Appendix D)	Track & Monitor Cover Crops	Cover Crops on Corn/ Soybean (see Table 3 in Appendix D)		
Beaver	298	--	2.9	0.6	0.5	n/a	1.8	**	**
Dudley (and Kelly)*	581	78	4.1	1.0	2.9	n/a	0.5	184	0.03-0.08
Fish	433	--	3.2	1.8	1.2	n/a	0.7	230	0.08-0.10
Roemhildts	251	80	1.8	0.2	0.6	n/a	1.6	79	0.05-0.23

'—' denotes that little to no applicable treatment area is found within the drainage area to implement the practice.

* Note that the Dudley and Kelly Lake basins are connected, and the two lake drainage areas were combined into one drainage area to represent that implementation of watershed activities benefit the water quality of both lake basins.

** Subcatchments with the highest TP delivery will be prioritized for implementation of practices first. PTMAApp was used to determine the level of TP delivery from all the subcatchments within the targeted implementation areas to the Tier One impaired lakes (except Beaver Lake; Figure 3-3 through Figure 3-5). Beaver Lake falls within the Straight River Area which is not currently included in PTMAApp. The total acreage of subcatchments within the highest of the TP load delivery categories is provided in the right-hand column of Table 3-3.

n/a = Activity does not achieve a direct reduction in phosphorus but is needed to increase landowner willingness and implementation of other phosphorus reduction practices.



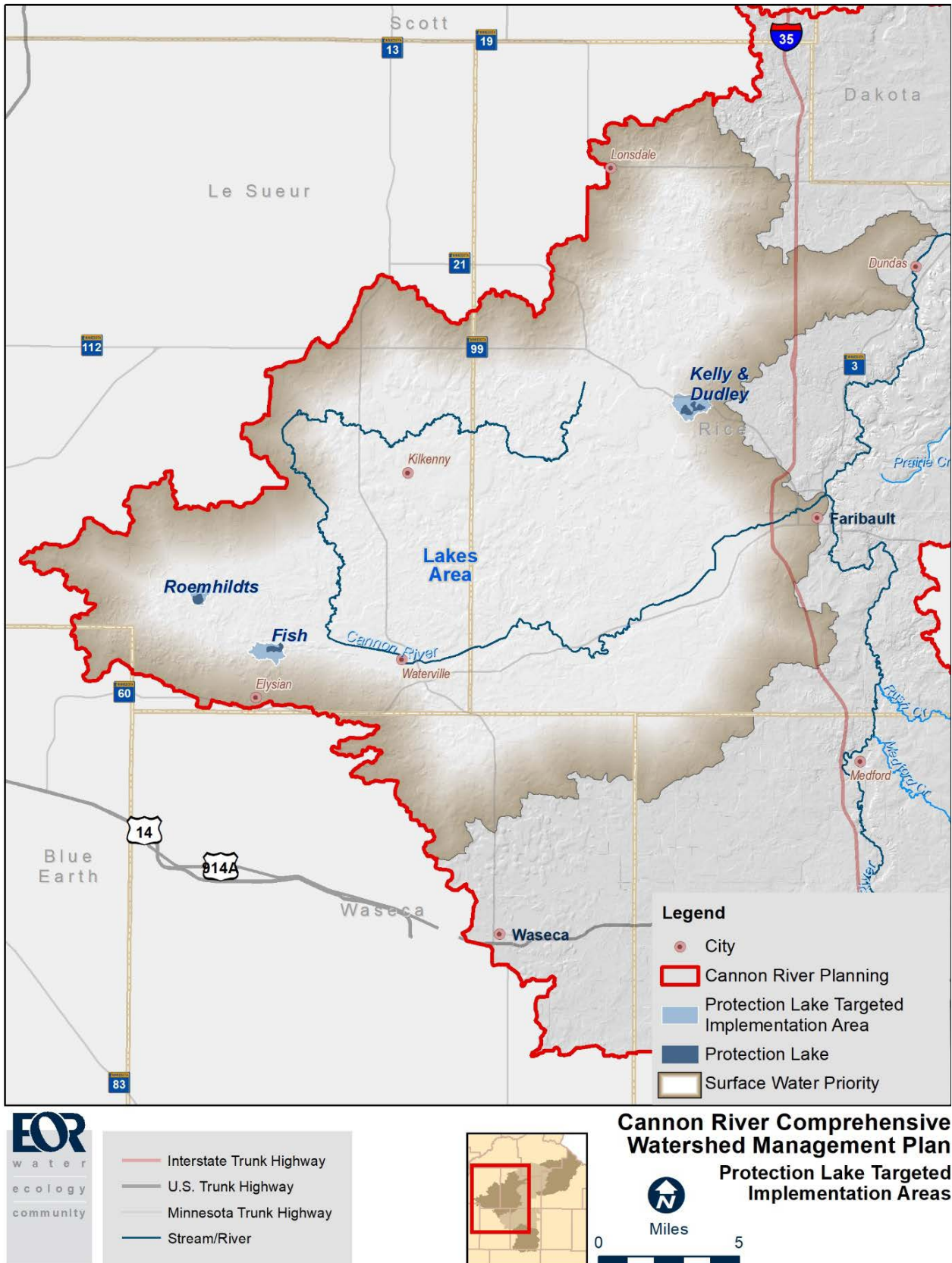


Figure 3-1. Targeted Implementation Areas (shown in blue shading) for Tier One Protection Lakes (Lakes Area)

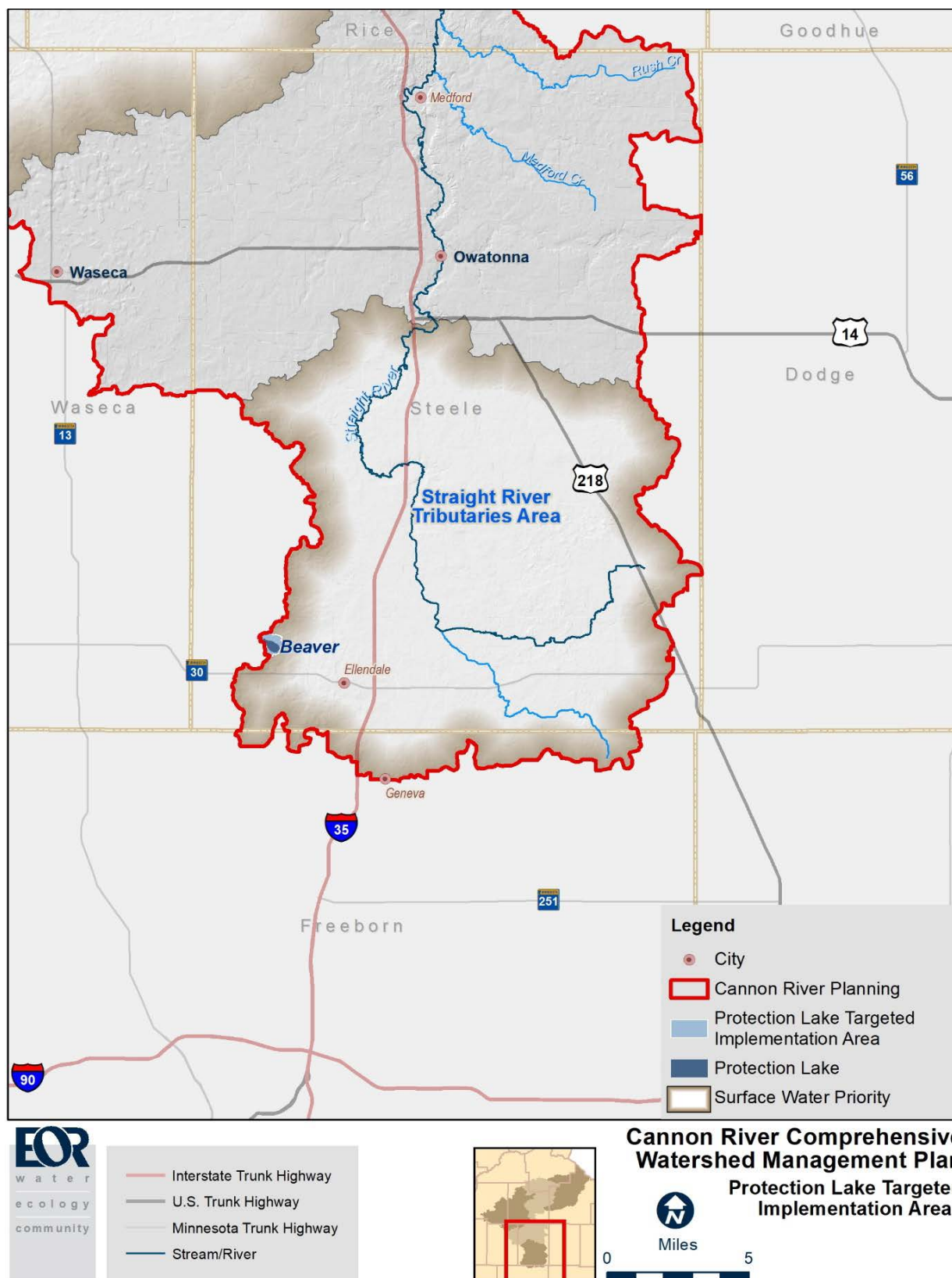


Figure 3-2. Targeted Implementation Areas (shown in blue shading) for Tier One Protection Lakes (Straight River Tributaries Area)

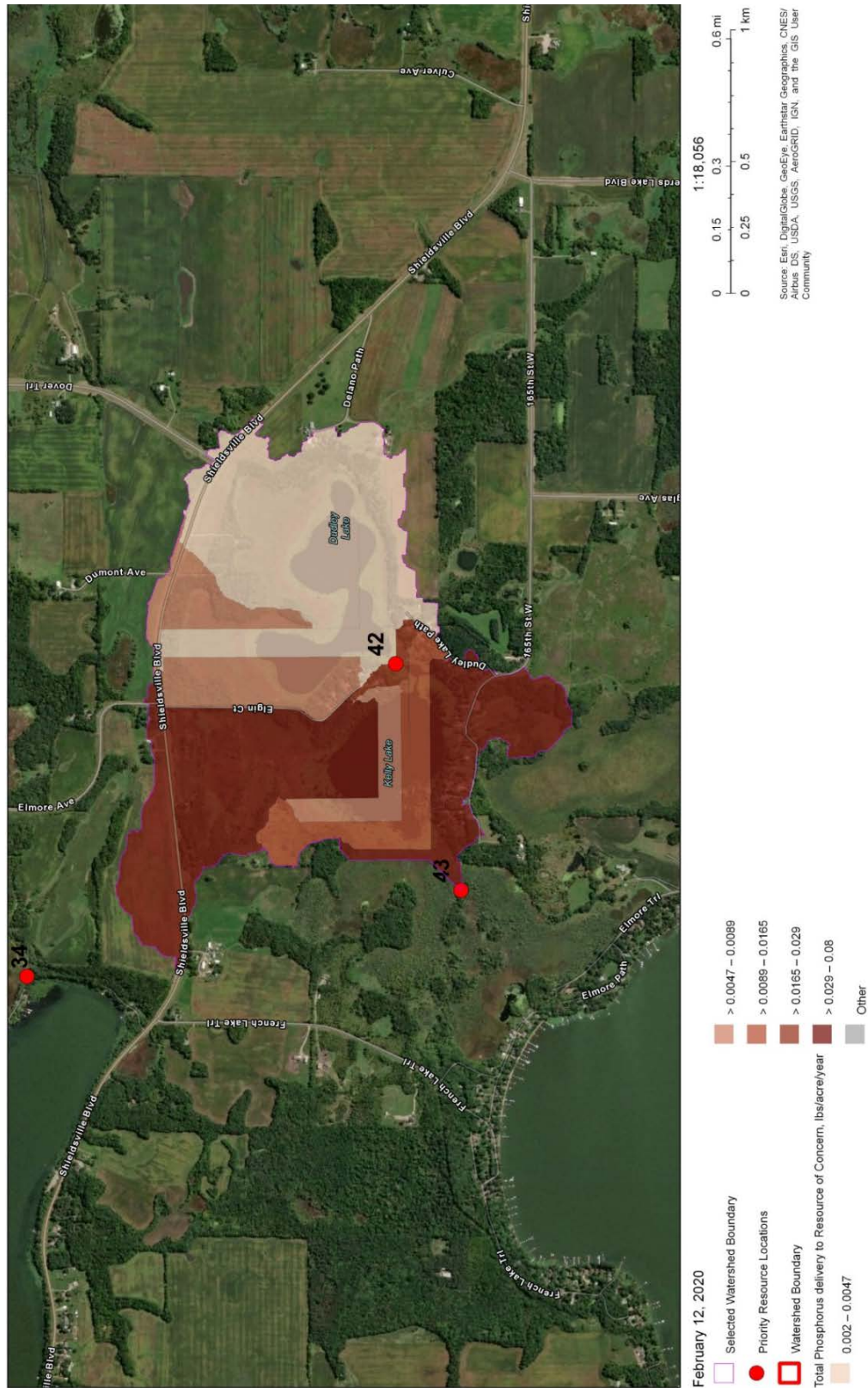


Figure 3-3. Prioritized Targeted Implementation Areas for Dudley (and Kelly) Lake Drainage Area within the Tier One Protection Lakes (Lakes Area): Total Phosphorus Delivered (lbs/acre/year)

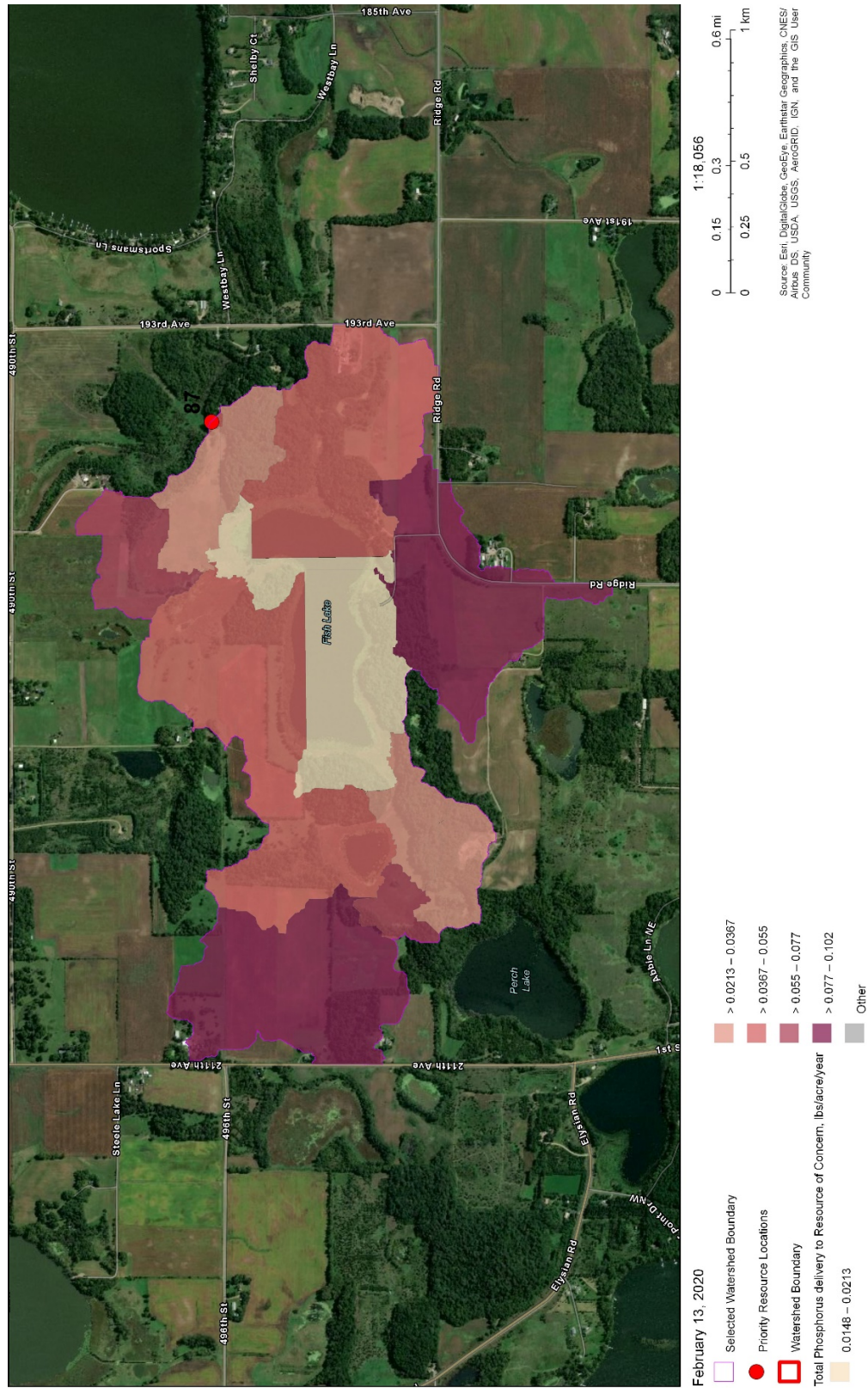


Figure 3-4. Prioritized Targeted Implementation Areas for Fish Lake Drainage Area within the Tier One Protection Lakes (Lakes Area): Total Phosphorus Delivered (lbs/acre/year)

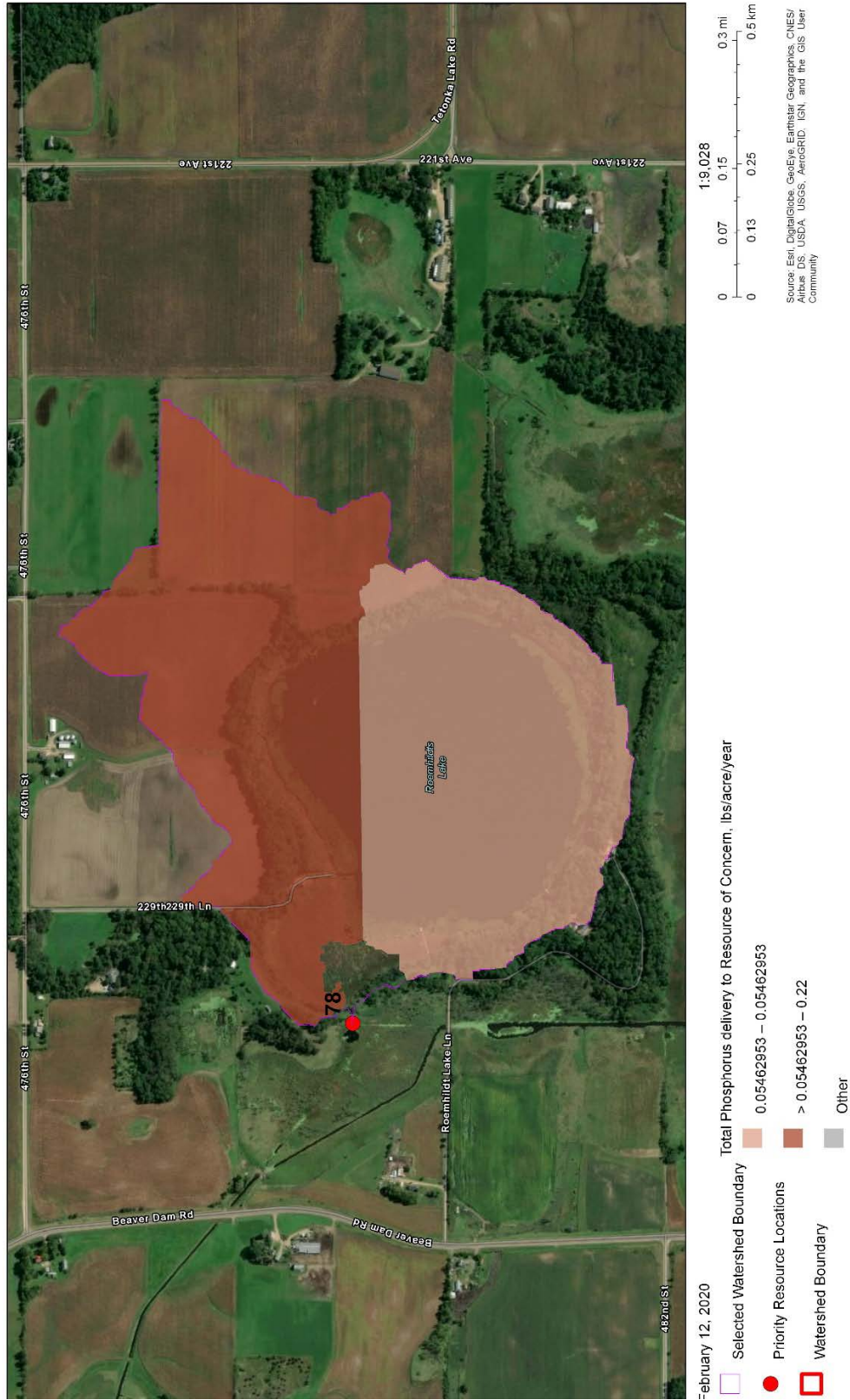


Figure 3-5. Prioritized Targeted Implementation Areas for Roemhildt Lake Drainage Area within the Tier One Protection Lakes (Lakes Area): Total Phosphorus Delivered (lbs/acre/year)

3.1.1-B: IMPAIRED LAKES**T1****Issue Statement**

In 2016, the MPCA identified 36 lakes that did not support aquatic recreation use due to elevated nutrients that cause unsightly algae blooms and make swimming undesirable, or produce toxins that are harmful to livestock, pets and humans. Some lakes are impaired because they receive excess phosphorus from watershed runoff, while other lakes are impaired due to legacy phosphorus (i.e. internal loading). Dissolved oxygen dynamics, fish communities and aquatic plants can all be a part of internal nutrient cycling. A BATHTUB framework was developed for the Upper Cannon Lakes, which provided the basic linkages among the lakes and allowed for development of water and TP budgets for the lakes. However, additional investigation is needed to address the high uncertainty in this initial modeling effort due to several factors: high and variable in-lake TP, extreme shallowness of several lakes, high uncertainty in internal loading estimates, and limited stream TP and flow data. There are existing programs and activities that can be utilized to protect these lakes, but current funding is insufficient and further analysis on the most effective activities is needed. Not all 36 impaired lakes can be addressed in the first 10-year Plan. There is a need for additional activities and funding to address this issue.

Desired Future Condition

10-year growing season average in-lake phosphorus concentration, chlorophyll-a concentration, and Secchi depth that meet the lake aquatic recreation water quality standards.

Table 3-4. Observed conditions and lake aquatic recreation water quality standards for Tier One Impaired Lakes in the Cannon River Comprehensive Watershed Management Plan (Source: Appendix 6.2 in MPCA 2014 Cannon River Watershed Monitoring and Assessment Report)

Impaired Lake	Observed Water Quality Conditions		
	Total Phosphorus (ug/L)	Chlorophyll-a (ug/L)	Secchi Depth (m)
NCHF Deep Lake Standard	<40	<14	>1.4
Cedar (66-0052-00)	56	28	1.0
Fox (66-0029-00)	88	31	1.3
NCHF Shallow Lake Standard	<60	<20	>2.0
Hunt (66-0047-00)	91	61	1.0



Lake within agricultural land use setting

10-Year Measurable Goals

Goal 1: *Achieve the 10-year Total Phosphorus Reduction Goals (lb/yr) for the Tier One Impaired Lakes listed in Table 3-5.*

Table 3-5. Existing Total Phosphorus Loads and Load Reduction Goals for Tier One Impaired Lakes in the Cannon River Comprehensive Watershed Management Plan

Impaired Lake	Total Phosphorus (TP) Existing Load and Load Reduction Goals					
	TMDL Existing TP Load (includes watershed and internal sources)* [lb/yr]	TMDL TP Reduction needed to Meet Lake Aquatic Recreation Water Quality Standard (Long-term Future Condition) Measurable Goal* [lb/yr]	Estimated 5-year TP Reductions [lb/yr]	Estimated 10-year TP Reductions** (total from Table 3-6) [lb/yr]	10-year Progress Towards TMDL TP Reduction Measurable Goal** [%]	10-year TP Reduction from Existing Load** [%]
Cedar	2,476	930	96	341	37%	14%
Fox	3,922	2,286	221	534	23%	14%
Hunt	899	741	14	606	82%	67%

* Based on the 2017 Cannon River Watershed TMDL.

** Lake management plans will be completed by 2024 to identify activities to achieve the remaining phosphorus reductions needed to achieve the measurable goal.3

Justification for Goals

The phosphorus (P) reduction goals for the three Tier One Impaired Lakes (Cedar, Fox, and Hunt) were based on the phosphorus reduction goals identified in the 2017 Cannon River Watershed TMDL. These phosphorus reduction goals were based on Heiskary and Martin's 2015 working paper on BATHTUB Modeling to Support Watershed Protection and Restoration Strategy Development: Lakes of the Upper Cannon River Watershed. Water and P loading were estimated for four source categories: areal runoff and estimated P by land use category, P loading from concentrated animal units in the watershed, on-site systems from residences on the lakes, and NPDES point source discharges in the watershed. Hunt has 64% of the P unaccounted for when utilizing this estimation method. Heiskary and Martin determined that if external loads were calculated with a high degree of confidence, it would be reasonable to assign the "unaccounted for" portion of the estimated P budget to internal recycling. Hunt is deep enough to stratify but has a very large littoral area which is subject to bottom disturbance from wind and wave action which could allow for this excessive internal loading. Cedar and Fox had better predictions of in-lake P based on watershed P loading estimates.

Implementation Activities

Implementation for Impaired Lakes will be focused in the drainage areas of the three Tier One Impaired Lakes (Cedar, Fox, and Hunt; See Figure 3-6). These lakes are closer to achieving the lake aquatic recreation water quality standards (Cedar, Fox, and Hunt) than other impaired lakes, and also have had preliminary lake phosphorus modeling completed. These lake drainage areas are

located in the Lakes Area Priority Area. Subcatchments with the highest TP delivery will be prioritized for implementation of practices first. PTMApp was used to determine the level of TP delivery from all the subcatchments within the targeted implementation areas to the Tier One impaired lakes (Figure 3-7 through Figure 3-9). The total acreage of subcatchments within the highest of the TP load delivery categories is provided in the right-hand column of Table 3-5.

Selection of project locations within the lake drainage areas will be determined by the Planning Partners during the annual work planning process using the tools and criteria described in Section 6.4. Active watershed management in the Tier One Impaired Lake watersheds will be beneficial regardless of the findings of future lake management plans.

The following implementation activities were chosen to achieve the 10-year Impaired Lake goals. Conversion of cropland on vulnerable soils and practices that increase organic matter on corn/soybean acres and short season crops were the major BMPs selected as part of the 2016 Cannon River WRAPS phosphorus reduction scenario (see Table 14 of the 2016 Cannon River WRAPS) to achieve a 12% total phosphorus reduction at the outlet of the Cannon River Watershed. The same percent implementation of these BMPs were chosen to make progress towards the watershed total phosphorus reduction goals until specific total phosphorus reductions by source are identified in the lake management plans. Additional phosphorus reduction activities needed to achieve the Impaired Lake goals may be identified in the lake management plans from other phosphorus sources/lake water quality drivers, such as: shoreline erosion, septic systems, internal loading, or other in-lake biological processes. For example, Hunt Lake is deep enough to stratify but has a very large littoral area which is subject to bottom disturbance from wind and wave action which could allow for this excessive internal loading.

- **3.1.1-B-1:**

Complete lake management plans by 2024 to identify the distribution of the total lake phosphorus load between external and internal phosphorus sources. Cedar, Fox and Hunt lakes are all part of a Science Museum of Minnesota project designed to improve the accuracy of lake phosphorus budgets in the Upper Cannon watershed that were completed as part of the lake TMDLs study. After completing the lake management plans, the Planning Partners will readjust the phosphorus reduction goals and activities based on the findings. For example, the water quality of a lake may be controlled by fish and/or aquatic plant management, or sediment phosphorus loads may need to be addressed. Plans would focus on in-lake and near-shore management strategies that are not identified through other watershed loading models, such as: shoreline stabilization, shoreline septic system improvements, sediment phosphorus load reduction, aquatic plant management, or in-lake fish management.

- **3.1.1-B-2:**

Implementation of in-lake and near-shore management strategies will occur in the second 5-year period of the Plan (2025-2029) to achieve the 10-year goals. Note that the load reductions associated with in-lake and near shore management activities reported in Table 3-6 represent the maximum reductions expected from these activities.

- **3.1.1-B-3:**
Implement structural practices to treat 30%, or 1,909 acres, of cropland in the three Tier One Impaired Lakes drainage areas.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.1 – Agriculture as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.1-A-1:**
Convert 10% (128 acres total) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in the three Tier One Impaired Lakes drainage areas.
- **3.2.1-A-3:**
Implement nutrient management BMPs following U of M guidance on 10% (636 acres total) of cultivated cropland in the three Tier One Impaired Lakes drainage areas.
- **3.2.1-B-1:**
Track and monitor cover crops and residue into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project.
- **3.2.1-B-2:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (546 acres total) in the three Tier One Impaired Lakes drainage areas.

Pace of Progress

The following table summarizes the estimated load reduction expected from implementation of each activity within the Tier One Impaired Lake drainage areas, based on the Cannon River HSPF-SAM (see Appendix D). The total acreage for targeted implementation (subcatchments with the highest TP load) is provided in the right-hand column of Table 3-6. These values correspond with the highest priority subcatchments represented on Figure 3-7 through Figure 3-9.

Table 3-6. Tier One Impaired Lake Total Phosphorus Load Reductions by Activity, lb/yr

Impaired Lake	Drainage Area (including lake surface) [acres]	HSPF-SAM Estimated TP Load Reduction for Agricultural Conservation Practices [lb/yr] – see Section 3.2.1						PTMApp Prioritized Targeted Implementation Areas** (subcatchments with the highest TP load delivery to priority resources)	
		3.1.1-B-2	3.1.1-B-3	3.2.1-A-1	3.2.1-A-3	3.2.1-B-1	3.2.1-B-2	Area*** [acres]	TP Load Delivered Category [lb/ac/yr]
		Internal Load Mgmt.	Structural Practices on 30% of cultivated cropland (see Table 5 in Appendix D)	Cropland Conversion on Vulnerable Soils (see Table 1 in Appendix D)	Nutrient Management BMPs (see Table 2 in Appendix D)	Track & Monitor Cover Crops	Cover Crops on Corn/Soybean (see Table 3 in Appendix D)		
Cedar	4,684	148	164	13.1	10.3	n/a	5.7	12 588	0.1-0.35 0.06-0.10
Fox	8,720	91	359	18.6	43.4	n/a	22	1,842	0.22-0.37
Hunt	641	579	24	--	1.5	n/a	1.5	20	0.05-0.34

‘—’ denotes that little to no applicable treatment area is found within the drainage area to implement the practice.

n/a = Activity does not achieve a direct reduction in phosphorus but is needed to increase landowner willingness and implementation of other phosphorus reduction practices.

** Subcatchments with the highest TP delivery will be prioritized for implementation of practices first. PTMApp was used to determine the level of TP delivery from all the subcatchments within the targeted implementation areas to the Tier One impaired lakes (Figure 3-3 through Figure 3-5). The total acreage of subcatchments within the highest of the TP load delivery categories is provided in the right-hand column of Table 3-5.

*** Where two values are provided, the top two highest ranked portions of the drainage area (estimated using PTMApp) are included to demonstrate there is viable acreage to meet the goal.



Cannon River, Dundas

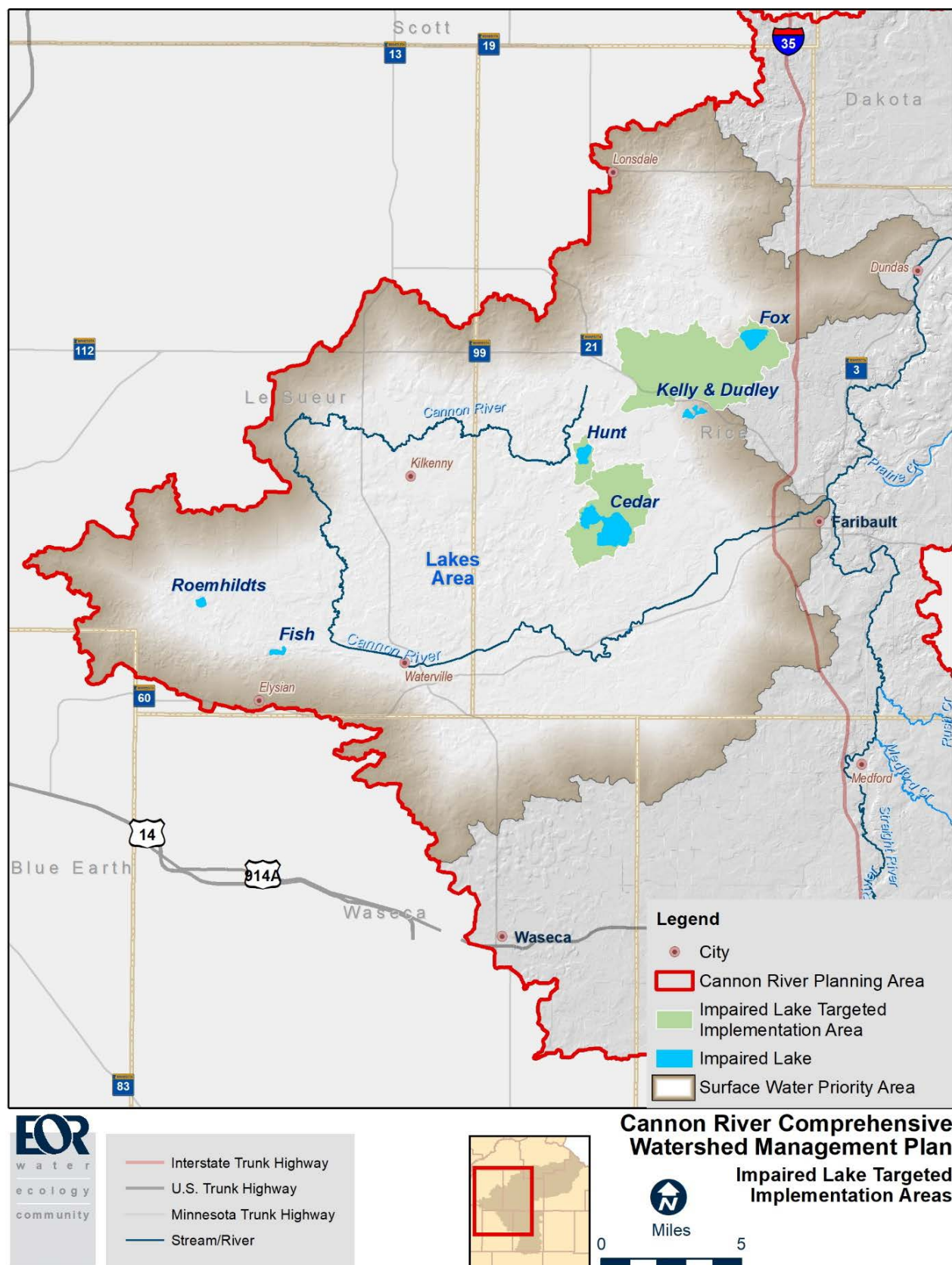


Figure 3-6. Targeted Implementation Areas (shown in green shading) for Tier One Impaired Lakes (Lakes Area)

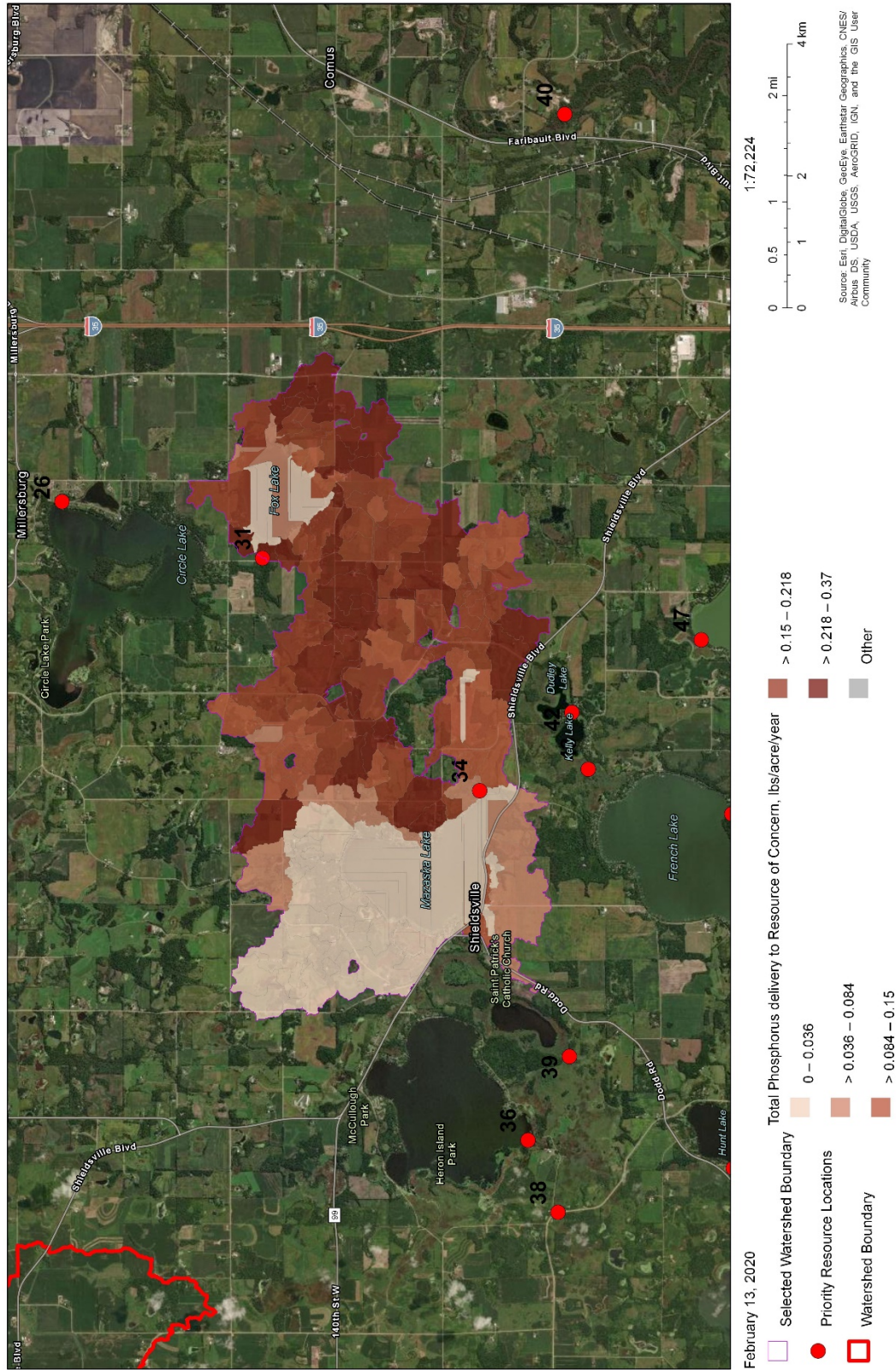


Figure 3-8. Prioritized Targeted Implementation Areas for Fox Lake Drainage Area within the Tier One Impaired Lakes (Lakes Area): Total Phosphorus Delivered (lbs/acre/year)

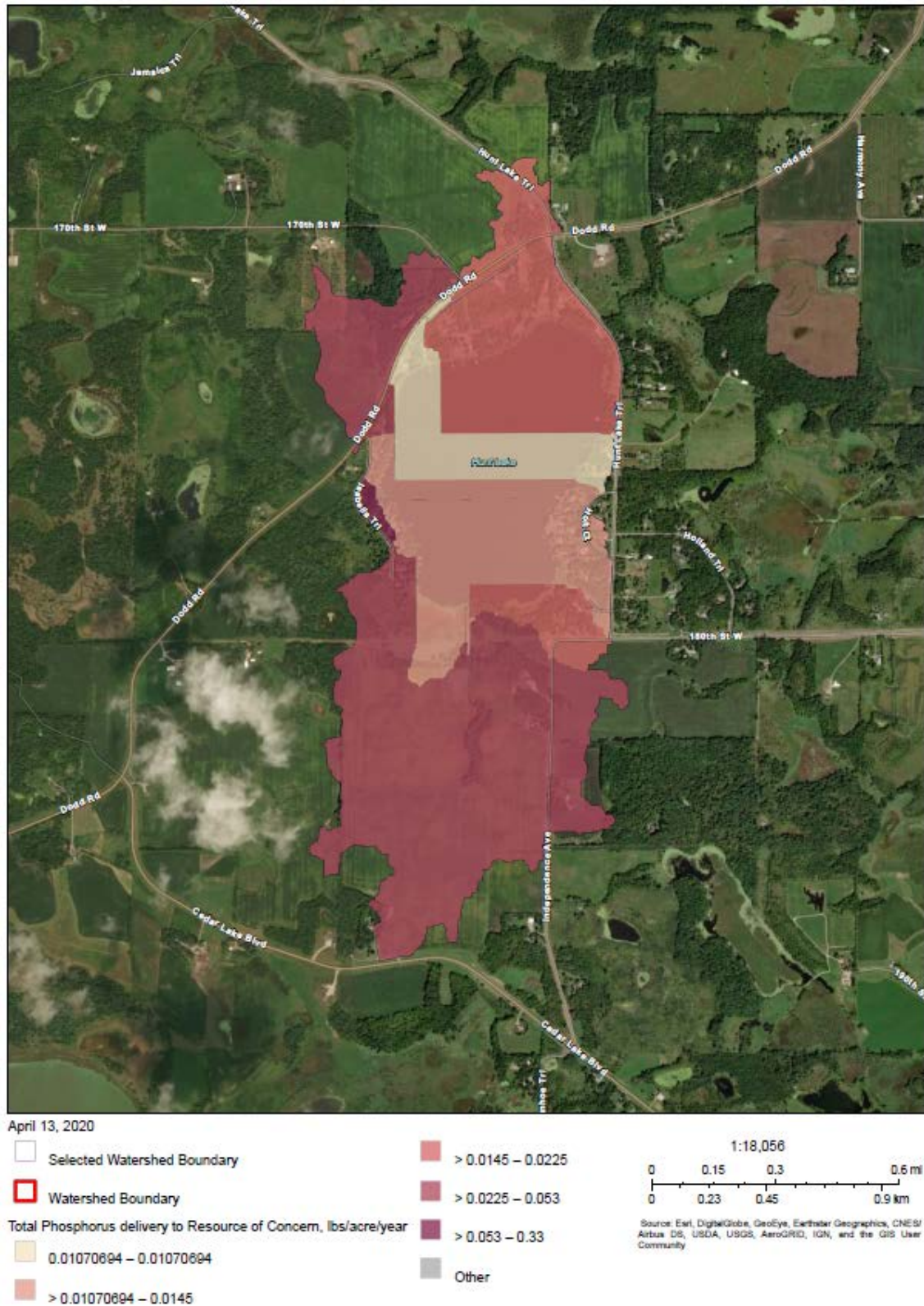


Figure 3-9. Prioritized Targeted Implementation Areas for Hunt Lake Drainage Area within the Tier One Impaired Lakes (Lakes Area): Total Phosphorus Delivered (lbs/acre/year)

3.1.1-C: POLLUTANT IMPAIRED STREAMS**T1****Issue Statement**

There are 59 impaired stream reaches in the Cannon River Planning Area. Bacteria (*E. coli*) counts exceeding the stream aquatic recreation water quality standard were found in rivers and streams across the watershed, including the Straight River, Cannon River, and many smaller streams for a total of 41 impairments. Bacteria issues are widespread not only in the Cannon River watershed, but much of the Lower Mississippi River Basin. The presence of fecal pathogens in surface water is a regional problem in southeast Minnesota (2016 Cannon River WRAPS). Given the regional nature of the problem and the difficulties in prioritizing based on *E. coli* data/impairments, the Planning Partners acknowledge that many of the Best Management Practices included in the Targeted Implementation Schedule will reduce *E. coli* loading to surface and groundwater. Additionally, regional work such as the feedlot and small community wastewater projects have been underway for years in the Planning Area to implement the 2006 Lower Mississippi River Basin Regional Fecal Coliform TMDL. Five of the impaired streams are coldwater, trout streams: Pine Creek, Little Cannon River, Belle Creek, Spring Creek, and Rice Creek (aka Spring Brook).

Fish and macroinvertebrate communities across the watershed are showing a loss of sensitive species due to habitat loss and excess sediment and nitrate. All of the designated trout waters in the Lower Cannon Watershed lobe meet the criteria for the southeast Minnesota coldwater Fish Index of Biotic Integrity, however these streams are also impaired for nitrates, TSS, and/or Macroinvertebrate Index of Biotic Integrity. Changes in land use have the potential to adversely impact cold water fisheries (trout streams) due to increasing nitrate concentrations in groundwater, excess pollutant loads and increased water temperatures from stormwater runoff, and bank destabilization. Trout streams have cold water temperatures due to high connectivity to groundwater.

The impaired streams to be targeted as part of the first 10-year plan were identified where implementation in the impaired stream drainage area would achieve multiple benefits: total phosphorus and nitrate reductions, protection of groundwater in sensitive areas, and improving stream, fish and macroinvertebrate communities (Table 3-7). These streams are located in the Straight River Tributary and the Cannon/Mississippi River Bottom Priority Areas. Note that the HSPF modeled TN and TP yields are only available for the Cannon River Watershed and not the Vermillion River portion of the Planning Area. The seven impaired streams to be restored targeted as part of the first 10-year plan are: Lower Vermillion River, Belle Creek, Little Cannon River, Trout Brook, Prairie Creek, Rush Creek, and Medford Creek.

In the Cannon River watershed's trout stream drainages, there are varying travel times from water on the land surface down to groundwater and on to baseflow in the streams. This can result in very long lags in response time between management changes at the land surface and corresponding changes in ground water quality and trout stream baseflow. As such, nitrate concentrations in streams with groundwater dominated baseflow may not immediately decrease in response to watershed improvements.

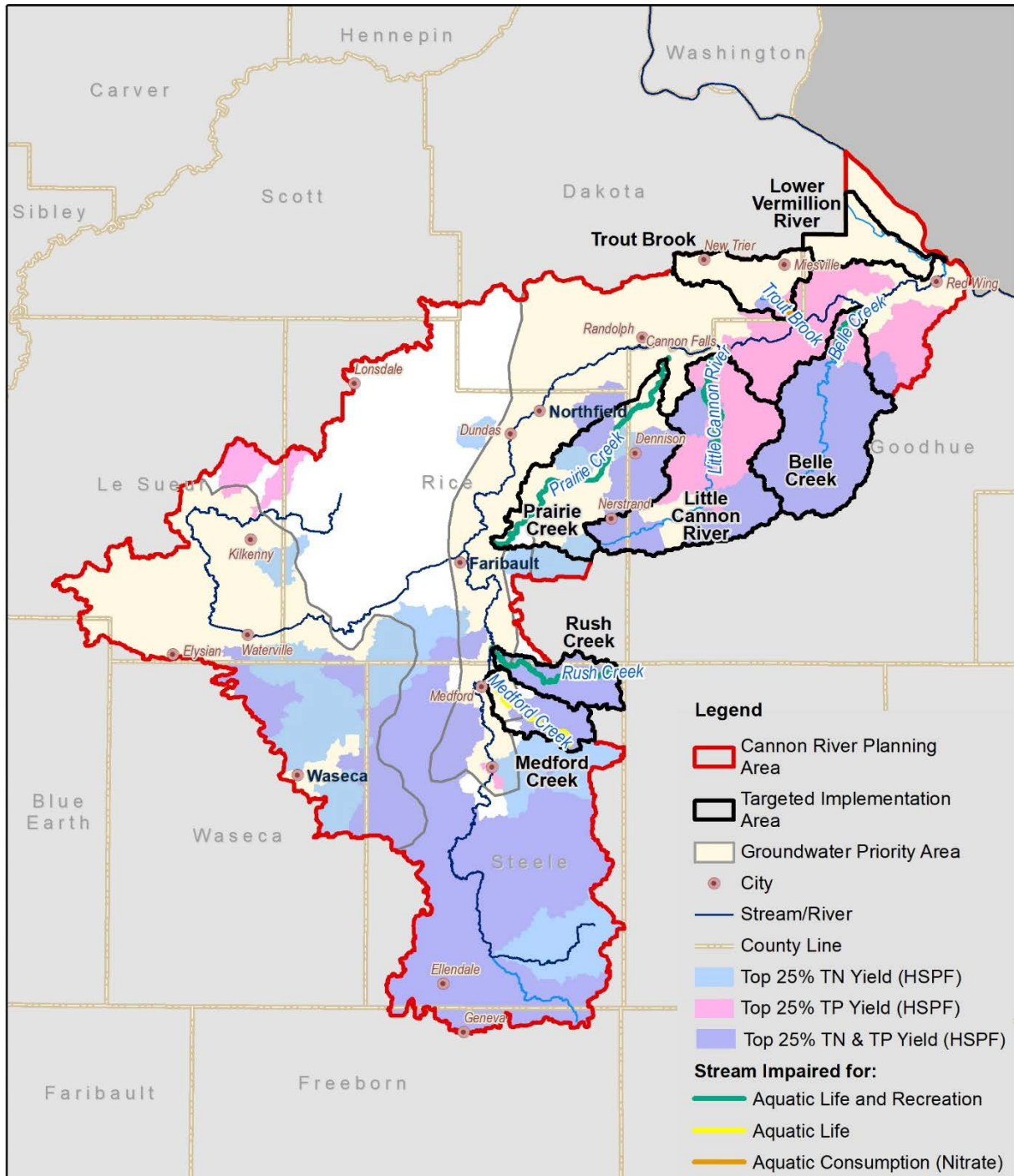
Current funding in existing programs is insufficient for addressing pollutant impaired streams, especially for larger streambank projects and upland storage projects. There is a need for additional funding to address this issue.

Table 3-7. Tier One Impaired Streams

Stream ID (AUID)	Stream Name	Tier One Selection Criteria
07040001-504	Lower Vermillion River	<ul style="list-style-type: none"> Groundwater sensitive area TSS impairment Drains to large river recreation area
07040002-735	Belle Creek	<ul style="list-style-type: none"> Groundwater sensitive area Coldwater trout stream TSS and <i>E. coli</i> impairments Top 25% TN/TP yielding subwatershed Drains to large river recreation area
07040002-526	Little Cannon River	<ul style="list-style-type: none"> Groundwater sensitive area Coldwater trout stream Nitrate, TSS and <i>E. coli</i> impairments Top 25% TN/TP yielding subwatershed Drains to large river recreation area
07040002-567	Trout Brook	<ul style="list-style-type: none"> Groundwater sensitive area Coldwater trout stream Nitrate and TSS impairments Top 25% TN/TP yielding subwatershed
07040002-504	Prairie Creek	<ul style="list-style-type: none"> Groundwater sensitive area M-IBI, TSS and <i>E. coli</i> impairments Top 25% TN/TP yielding subwatershed Drains to large river recreation area
07040002-505	Rush Creek (trib. to Straight River near Faribault)	<ul style="list-style-type: none"> Groundwater sensitive area TSS and <i>E. coli</i> impairments Top 25% TN/TP yielding subwatershed
07040002-547	Medford Creek (trib. to Straight River near Faribault)	<ul style="list-style-type: none"> Groundwater sensitive area F-IBI and M-IBI impairments Top 25% TN/TP yielding subwatershed



Belle Creek, near Welch. Goodhue County, MN



Cannon River Comprehensive Watershed Management Plan

Tier One Stream Selection Criteria



Figure 3-10. Areas with overlapping Tier One Stream selection criteria

Note that the HSPF modeled TN and TP yields are only available for the Cannon River Watershed portion of the Planning Area.

Desired Future Condition

TSS and Nitrate that meet aquatic life and drinking water quality standards in all Tier One impaired streams. TP and TSS reductions in the Cannon River at Welch, MN that achieve the Lake Pepin and South Metro Mississippi River Turbidity TMDL goals (50% reduction).

10-Year Measurable Goals

Goal 1: *Achieve the 10-year Total Suspended Solids Reduction Goals [tons/yr] for the Tier One Impaired Streams listed in Table 3-8.*

Table 3-8. HSPF-SAM Existing TSS Loads and Load Reduction Goals for Tier One Impaired Streams in the Cannon River Comprehensive Watershed Management Plan

Impaired Stream	HSPF-SAM Existing TSS Load and Load Reduction Goals					
	Existing TSS Load [tons/yr]	12% TSS Reduction (Long-term Future Condition) Measurable Goal [tons/yr]	Estimated 5-year TSS Reduction [tons/yr]	Estimated 10-year TSS Reduction (total from Table 3-10) [tons/yr]	10-year Progress Towards 12% TSS Reduction Measurable Goal [%]	10-year TSS Reduction from Existing Load [%]
Lower Vermillion*	1,843	221	253	505	229%	27%
Belle Creek	34,700	4,164	1,072	2,145	52%	6%
Little Cannon River	32,573	3,909	1,357	2,713	69%	8%
Trout Brook	2,376	285	619	1,238	434%	52%
Prairie Creek	8,425	1,011	316	631	62%	7%
Rush Creek	1,939	233	120	240	103%	12%
Medford Creek	595	71	102	203	285%	34%

* The Lower Vermillion River HSPF-SAM was not available at the time of this planning process; therefore, existing load estimates and load reductions for the Lower Vermillion River were based on applying HSPF-SAM yields for the adjacent Trout Brook drainage area over the Lower Vermillion River drainage area. Note that the existing loads and load reduction goals are for the portion of the Lower Vermillion River drainage area located within the Cannon River Planning Area.

Goal 2: *Achieve the 10-year Nitrate Reduction Goals [lb/yr] for the Tier One Impaired Streams listed in Table 3-9.*

Table 3-9. HSPF-SAM Existing Nitrate Loads and Load Reduction Goals for Tier One Impaired Streams in the Cannon River Comprehensive Watershed Management Plan

Impaired Stream	HSPF-SAM Existing Nitrate** Load and Load Reduction Goals					
	Existing Nitrate Load [lb/yr]	20% Nitrate Reduction (Long-term Future Condition) Measurable Goal [lb/yr]	Estimated 5-year Nitrate Reduction [lb/yr]	Estimated 10-year Nitrate Reduction (from Table 3-10) [lb/yr]	10-year Progress Towards 20% Reduction Measurable Goal [%]	10-year Nitrate Reduction from Existing Load [%]
Lower Vermillion*	184,807	36,961	6,504	13,008	35%	7%
Belle Creek	805,249	161,050	29,353	58,705	36%	7%
Little Cannon River	835,565	167,113	33,030	66,061	40%	8%
Trout Brook	238,336	47,667	13,360	26,719	56%	11%
Prairie Creek	687,773	137,555	20,249	40,497	29%	6%
Rush Creek	243,579	48,716	6,560	13,120	27%	5%
Medford Creek	81,227	16,245	5,978	11,956	74%	15%

* The Lower Vermillion River HSPF-SAM was not available at the time of this planning process; therefore, existing load estimates and load reductions for the Lower Vermillion River were based on applying HSPF-SAM yields for the adjacent Trout Brook drainage area over the Lower Vermillion River drainage area. Note that the existing loads and load reduction goals are for the portion of the Lower Vermillion River drainage area located within the Cannon River Planning Area.

**The form of nitrogen that is a concern for drinking water and aquatic life is nitrate, which is one fraction of the total nitrogen in a system. However, existing modeling tools currently are only capable of estimating existing total nitrogen loads and load reductions to resources. Therefore, existing loads and load reduction goals in the plan are reported for total nitrogen, as a proxy for nitrate existing loads and load reduction goals.

Goal 3: *Develop 50 manure management plans, implement 5 feedlot runoff projects, and develop 35 rotational grazing management plans to address sources of bacteria to Tier One Impaired Streams with a bacteria impairment. (Note that the February 2007 Lower Mississippi River Basin Fecal Coliform Implementation Plan does not provide any quantification of bacteria reduction activities needed to achieve the bacteria aquatic recreation water quality standards in the impaired streams, therefore this goal is only intended to make progress towards reducing bacteria to the impaired streams.)*

Justification for Goals

The TSS and nitrate reduction goals for the seven Tier One Impaired Streams are based on the HSPF-SAM reductions (see Appendix D) for the percent implementation of BMPs identified in the 2016 Cannon River WRAPS phosphorus and nitrogen reduction scenarios (see Table 14 and Table 15 of the 2016 Cannon River WRAPS) that collectively achieve a 12% total phosphorus reduction and 20% nitrogen reduction at the outlet of the Cannon River Watershed. Note that the form of nitrogen that is a concern for drinking water and aquatic life is nitrate, which is one fraction of the total nitrogen in a system. However, existing modeling tools currently are only capable of estimating existing total nitrogen loads and load reductions to resources. Therefore, existing loads and load reduction goals in the plan are reported for total nitrogen, as a proxy for nitrate existing loads and load reduction goals.

Percent implementation of BMPs for the WRAPS phosphorus reduction scenario was used in HSPF-SAM to determine the TSS goals.

Implementation Activities

Implementation for Impaired Streams will be focused in the drainage areas of the seven Tier One Impaired Streams (Table 3-7; Figure 3-11 through Figure 3-13). These stream drainage areas are located in the Straight River Tributaries and the Mississippi/Cannon Bottoms Priority Areas.

Subcatchments with the highest TSS delivery will be prioritized for implementation of practices first. PTMApp was used to determine the level of TSS load delivered from all the subcatchments within the targeted implementation areas to the priority resource (except Medford and Rush Creeks; see Figure 3-14 through Figure 3-17). Medford and Rush Creeks fall within the Straight River Area which is not currently included in PTMApp; for these two areas, HSPF-SAM was used to develop TSS load delivered maps (Figure 3-18). The total acreage of subcatchments within the highest of the 5 TSS load delivery categories (shown in Figure 3-14 through Figure 3-18) is provided in the right-hand column of Table 3-10. It should be noted that there is not a figure identifying the prioritized targeted implementation areas for the Lower Vermillion River drainage areas because neither HSPF nor PTMApp has been completed for this area. Selection of project locations within the stream drainage areas will be determined by the Planning Partners during the annual work planning process as described in Section 6.4.

The following implementation activities were chosen to achieve the 10-year Impaired Stream goals. Nutrient management BMPs, conversion of cropland on vulnerable soils, and practices that increase organic matter on corn/soybean acres and short season crops were the major BMPs selected as part of the 2016 Cannon River WRAPS phosphorus and nitrogen reduction scenarios (see Table 14 and Table 15 of the 2016 Cannon River WRAPS) to achieve a 12% total phosphorus reduction and 20% nitrogen reduction at the outlet of the Cannon River Watershed. The same percent implementation of these BMPs were chosen to make progress towards pollutant reductions in the Tier One impaired stream drainage areas, in addition to other priority projects identified by the Planning Partners, to achieve the Impaired Stream 10-year goals.

- **3.1.1-C-1:**
One large stream restoration project (approximately 1,700 feet) which could include bank stabilization, in-channel work or improving floodplain connectivity completed every two years on Tier One impaired streams with known problems. TSS reduction per project to be determined during feasibility and design.
- **3.1.1-C-2:**
Cooperate with researchers and others to determine the routes of nitrogen transport from surface water to groundwater in the Tier One stream subwatershed by sharing data, sitting on advisory committees, and/or co-sponsoring or supporting research grants.
- **3.1.1-C-3:**
Proactively ensure compliance with Soil Loss Ordinance using BMPs, conservation plans, conservation programs, easements, etc. to work towards achieving the Tolerable Soil Loss goals.
- **3.1.1-C-4:**
Develop 5 voluntary Manure Management Plans (<300 AU) per year in shoreland areas of the Tier One stream drainage areas, for a total of 50 MMPs.
- **3.1.1-C-5:**
Implement 5 feedlot runoff control projects in shoreland areas of the Tier One stream drainage areas.
- **3.1.1-C-6:**
Write and implement rotational grazing and livestock exclusion plans on 35 sites within 1,000 feet of a Tier One impaired stream, or a direct tributary to a Tier One impaired stream.
- **3.1.1-C-7:**
Implement structural practices to treat 5%, or 7,803 acres, of cropland in the Tier 1 impaired streams drainage areas.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.1 – Agriculture as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.1-A-1:**
Convert 10% (2,187 acres total) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in the Tier One Impaired Streams drainage areas.
- **3.2.1-A-3:**
Implement nutrient management BMPs following U of M guidance on 10% (15,606 acres total) of cultivated cropland in the Tier One Impaired Streams drainage areas.
- **3.2.1-B-1:**
Track and monitor cover crops and residue into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project.
- **3.2.1-B-2:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (17,920 acres total) in the Tier One Impaired Streams drainage areas.

- **3.2.1-B-3:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 80% of short season crop (corn silage, small grains, peas, and sweet corn) acres (1,168 acres total) in the Tier One Impaired Streams drainage areas.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.3 – Drainage as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.3-A-2:**
Complete conditioned terrain analysis for the Straight River and the Vermillion River Bottom portion of the Planning Area to support completion of the PTMAApp BMP targeting tool that will be used to select practices during the annual work planning process as described in Section 6.4.

Pace of Progress

The following table summarizes the estimated load reductions expected from implementation of each activity within the Tier One Impaired Stream drainage areas based on the Cannon River HSPF-SAM (see Appendix D). The Lower Vermillion River HSPF-SAM was not available at the time of this planning process; therefore, existing load estimates and load reductions for the Lower Vermillion River priority stream were based on applying HSPF-SAM yields for the adjacent Trout Brook drainage area over the Lower Vermillion River drainage area. Actual load reductions to impaired streams based on monitoring data will be assessed by MPCA during the next round of Intensive Watershed Monitoring in the Cannon River and Vermillion River Watersheds.

Table 3-10. Tier One Pollutant Impaired Stream HSPF-SAM Estimated Annual Load Reduction by Activity

Pollutant Impaired Stream	Drainage Area [acres]	3.1.1-C-7		HSPF-SAM Estimated Load Reduction by Activity (see Section 3.2.1 for Agricultural Conservation Practices)								PTMApp Prioritized Targeted Implementation Areas** (subcatchments with the highest TSS load delivery to priority resources)			
				3.2.1-A-1		3.2.1-A-3		3.2.1-B-2		3.2.1-B-3					
		Structural Practices (see Table 5 in Appendix D)		Cropland Conversion on Vulnerable Soils to Perennial (see Table 1 in Appendix D)		Nutrient Management BMPs (see Table 2 in Appendix D)		Cover Crops on Corn/ Soybean (see Table 3 in Appendix D)		Cover Crops on Short-season Crops (see Table 4 in Appendix D)					
		TSS	Nitrate	TSS	Nitrate	TSS	Nitrate	TSS	Nitrate	TSS	Nitrate	TSS	Nitrate	Area ***	Highest Load Delivered Category
		[tons /yr]	[lb /yr]	[tons /yr]	[lb /yr]	[tons /yr]	[lb /yr]	[tons /yr]	[lb /yr]	[tons /yr]	[lb /yr]	[tons/yr]	[lb /yr]	[ac]	[tons/ac/yr]
Lower Vermillion*	14,055	203	n/a	44	3,998	--	4,639	249	4,180	10	192	**	**		
Belle Creek	50,145	682	n/a	169	15,512	--	20,082	1,235	22,182	59	929	322 2,208	7.2-12.2 4.1-7.2		
Little Cannon River	60,819	979	n/a	147	13,473	--	25,633	1,516	25,248	72	1,708	535 2,911	4.0-11.9 1.9-4.0		
Trout Brook	18,126	307	n/a	56	5,148	--	6,350	704	11,821	171	3,401	618 2,359	5.2-10.6 3.0-5.2		
Prairie Creek	51,035	175	n/a	39	7,677	--	15,117	366	16,662	51	1,041	1,387 7,580	2.4-6.4 1.5-2.4		
Rush Creek	14,351	54	n/a	2	407	--	4,657	127	6,920	57	1,135	**	**		
Medford Creek	14,234	48	n/a	3	566	--	4,270	114	6,354	38	765	**	**		

* The Lower Vermillion River HSPF-SAM was not available at the time of this planning process; therefore, existing load estimates and load reductions (except for structural practices) for the Lower Vermillion River were based on applying HSPF-SAM yields for the adjacent Trout Brook drainage area over the Lower Vermillion River drainage area.

‘—’ Nutrient management BMPs are not effective at reducing TSS.

n/a = The 2017 Iowa Nutrient Reduction Strategy and the 2017 Agricultural BMP Handbook for Minnesota do not assign nitrate reductions to WASCOB structural practices (see Appendix D)

** PTMApp was used to determine the level of TSS delivery from all the subcatchments within the targeted implementation areas to the priority resource (except Medford and Rush Creeks; see Figure 3-14 through Figure 3-17). Medford and Rush Creeks fall within the Straight River Area which is not currently included in PTMApp; HSPF-SAM was used to develop TSS delivery maps (Figure 3-18) for these two areas until PTMApp. Subcatchments with the highest TSS delivery will be prioritized for implementation of practices first. The total acreage of subcatchments within the highest of the 5 TSS load delivery categories (shown in Figure 3-14 through Figure 3-18) is provided in the right-hand column of Table 3-10. It should be noted that there is not a figure identifying the prioritized targeted implementation areas for the Lower Vermillion River drainage areas because neither HSPF nor PTMApp has been completed for this area.

*** Where two values are provided, the top two highest ranked portions of the drainage area (estimated using PTMApp) are included to demonstrate there is viable acreage to meet the goal.

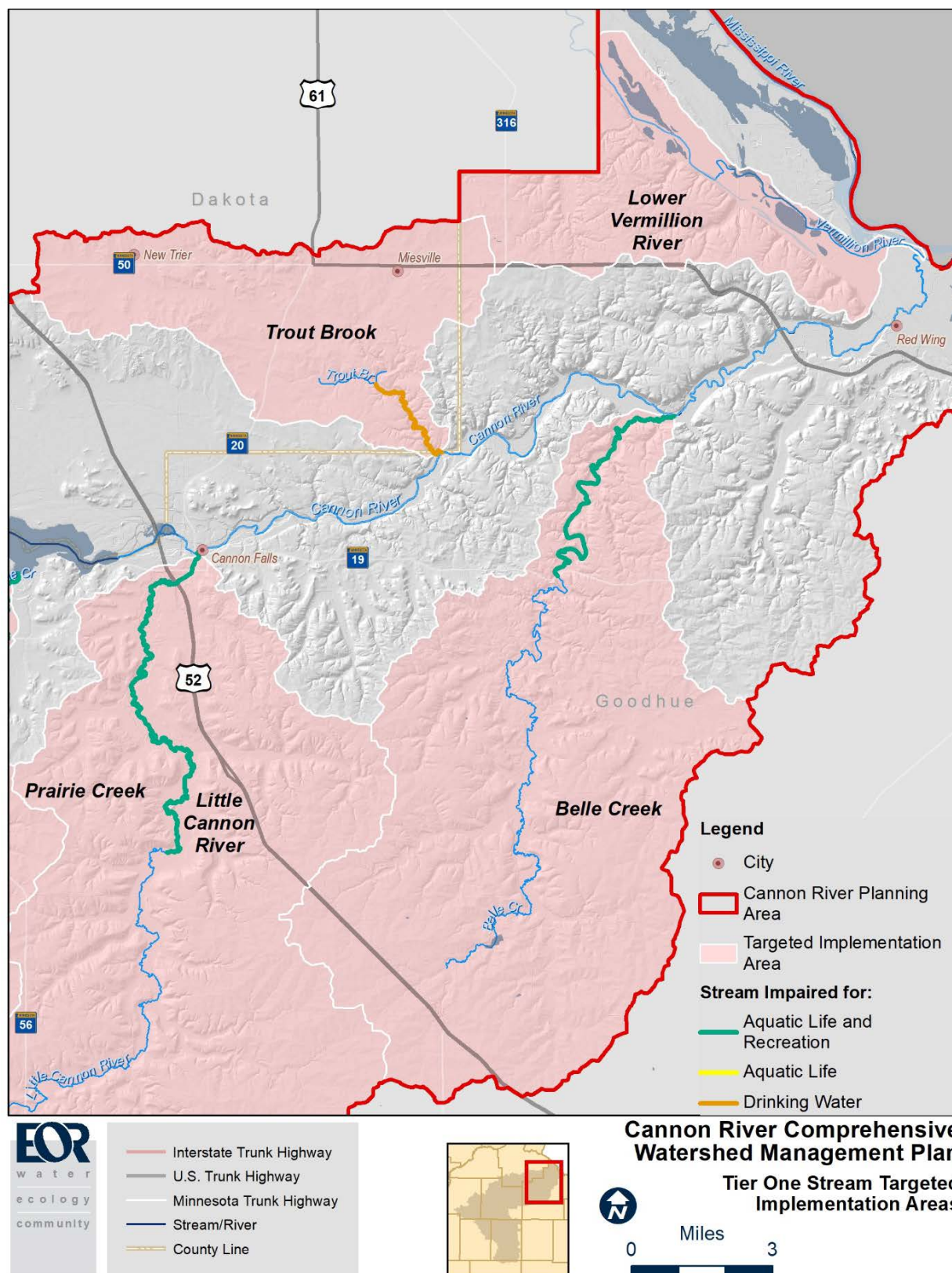


Figure 3-11. Targeted Implementation Areas for Tier One Streams (Lower Vermillion River, Trout Brook, and Belle Creek)

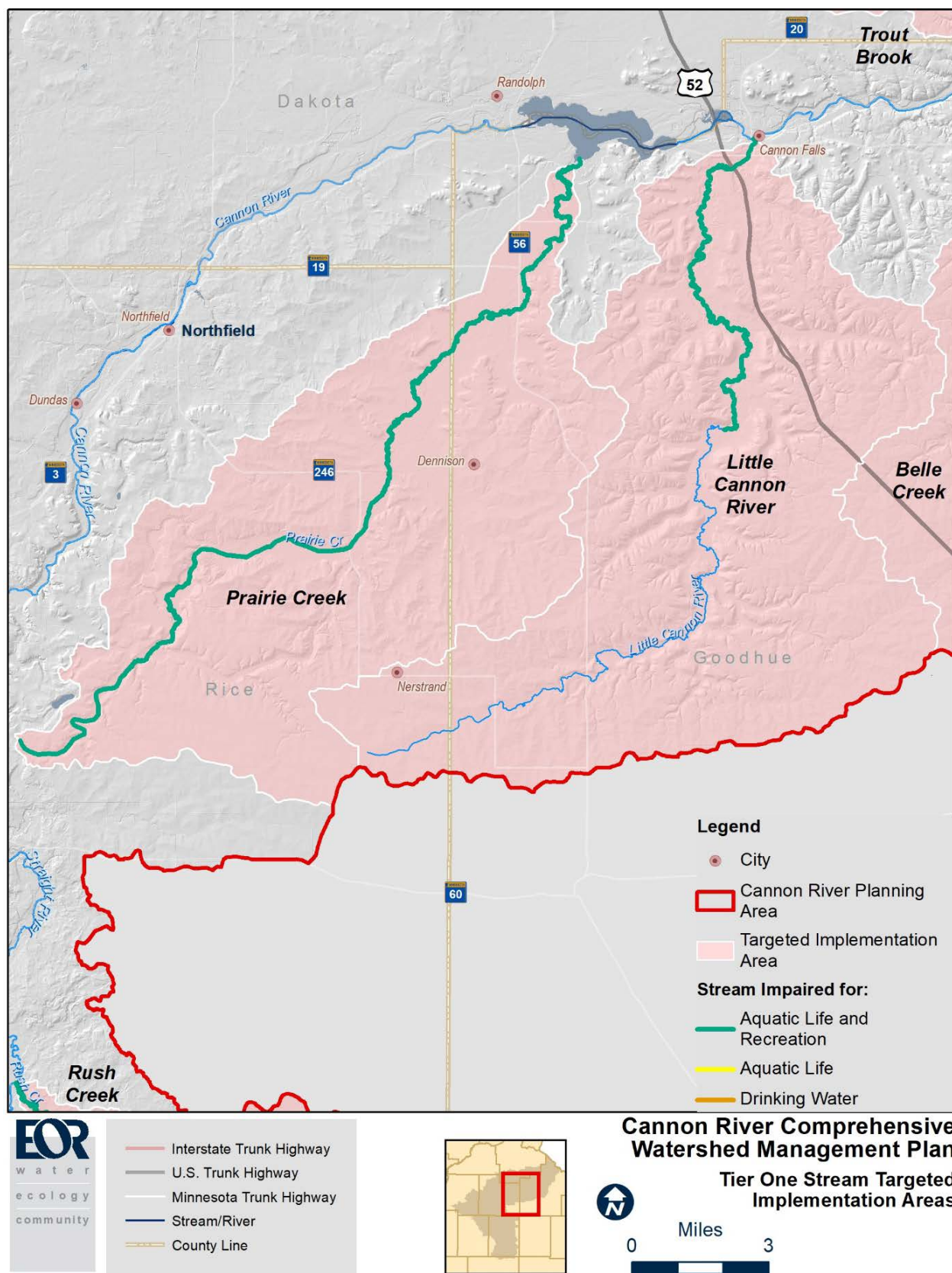


Figure 3-12. Targeted Implementation Areas for Tier One Streams (Little Cannon River and Prairie Creek)

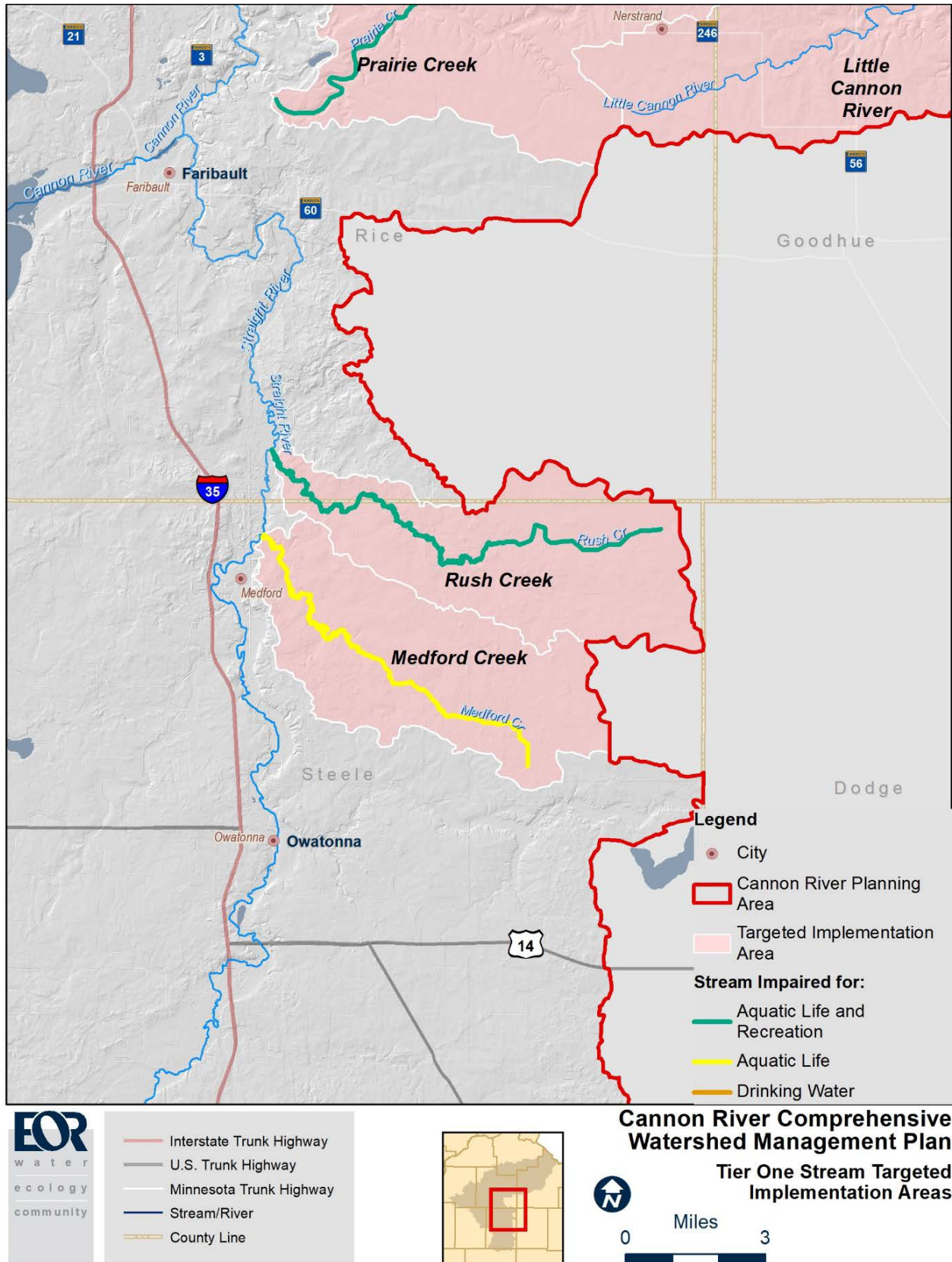


Figure 3-13. Targeted Implementation Areas for Tier One Streams (Rush Creek and Medford Creek)

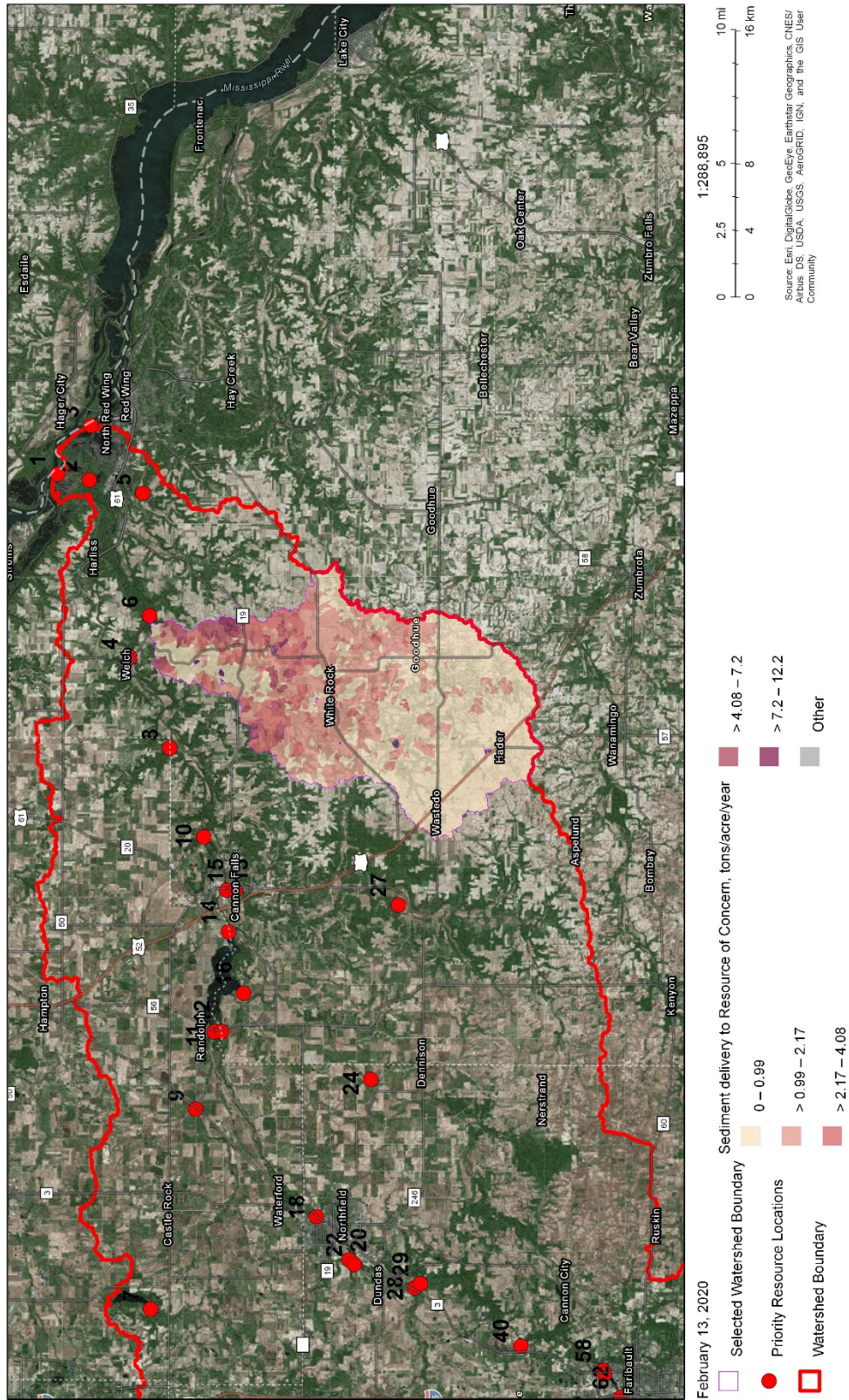


Figure 3-14. Prioritized Targeted Implementation Areas for Belle Creek Drainage Area within the Tier One Stream Area: Total Sediment Delivered (tons/acre/year)

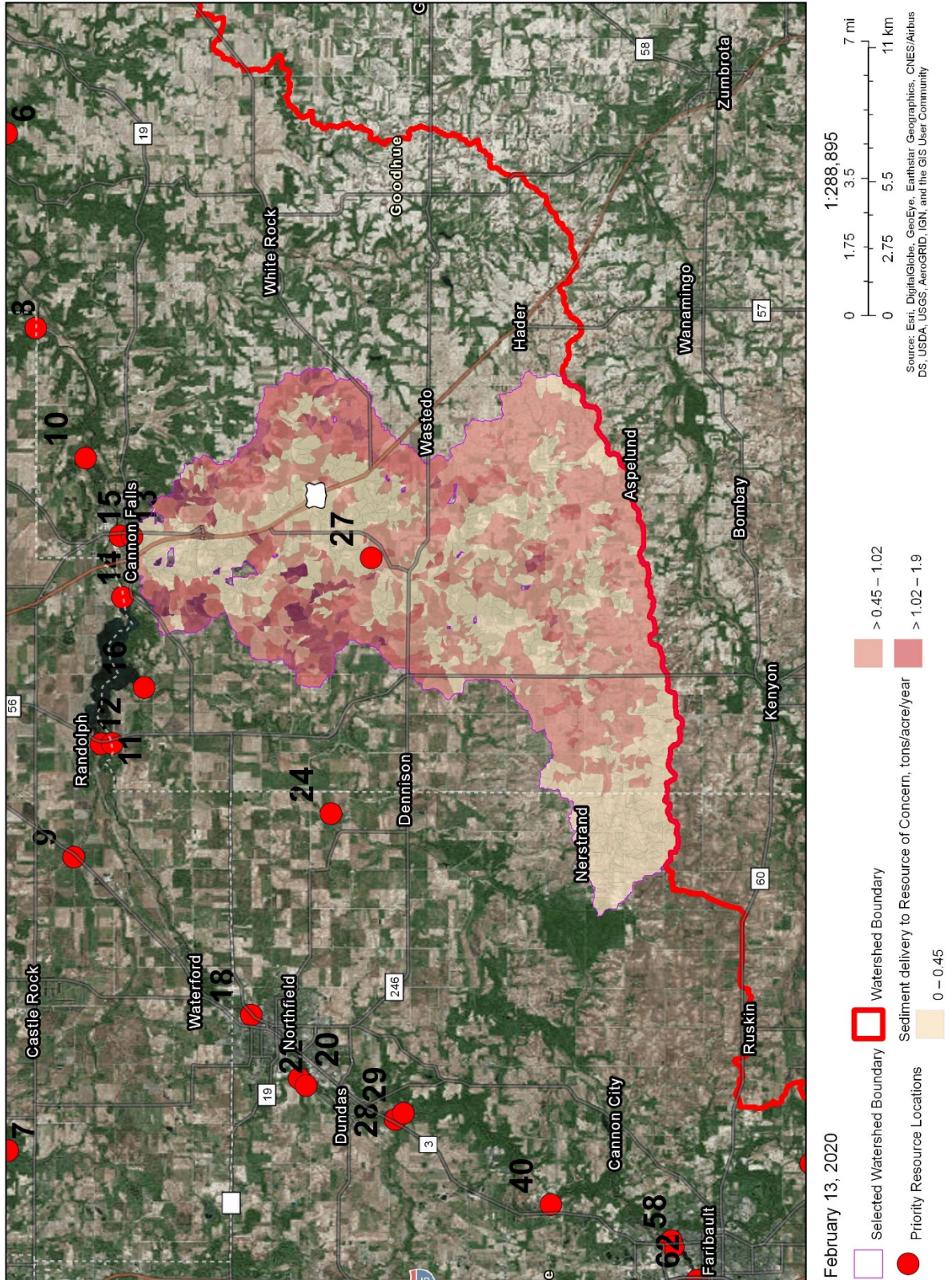


Figure 3-15. Prioritized Targeted Implementation Areas for Little Cannon Drainage Area within the Tier One Stream Area: Total Sediment Delivered (tons/acre/year)

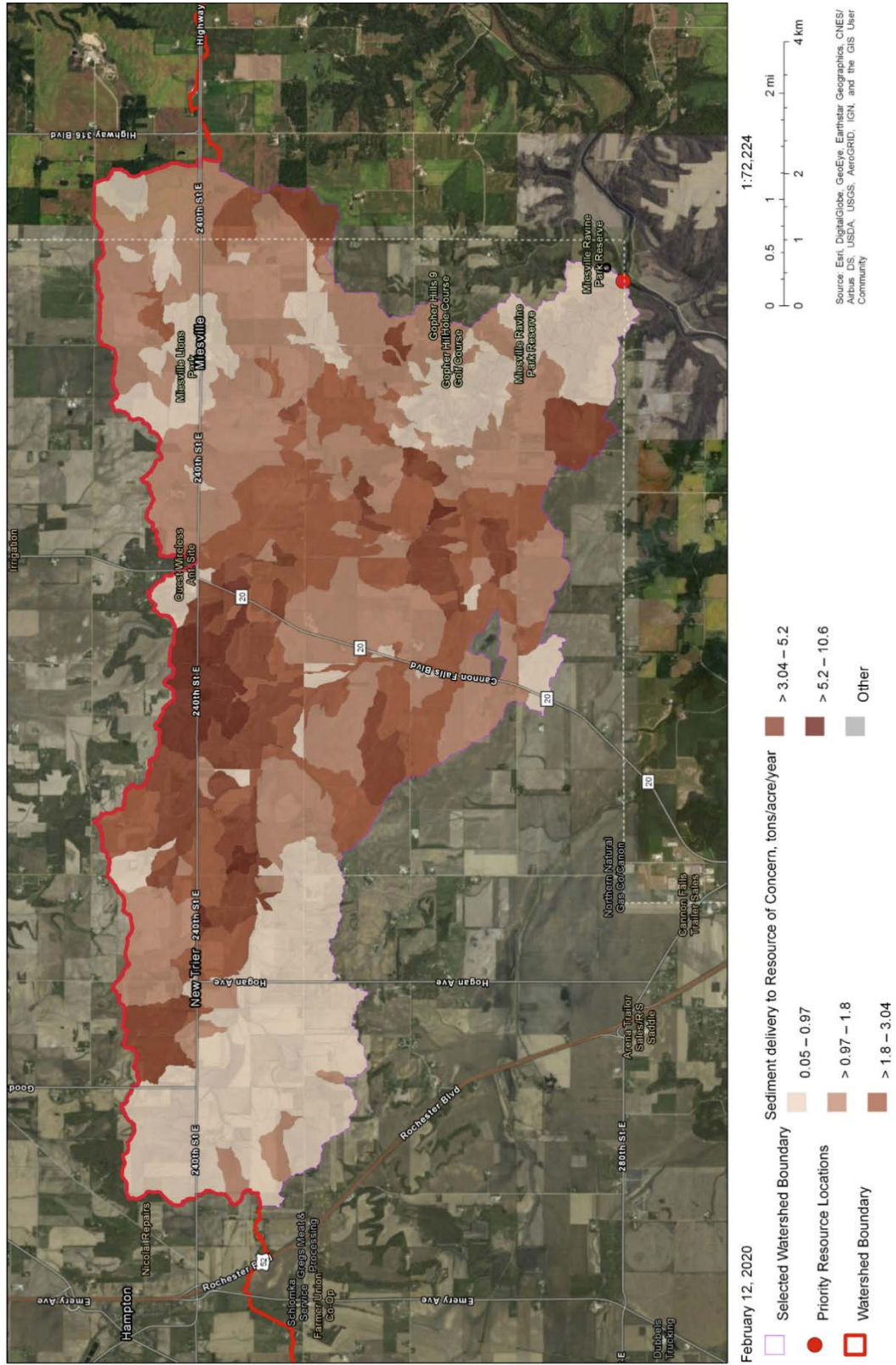


Figure 3-16. Prioritized Targeted Implementation Areas for Trout Brook Drainage Area within the Tier One Stream Area: Total Sediment Delivered (tons/acre/year)

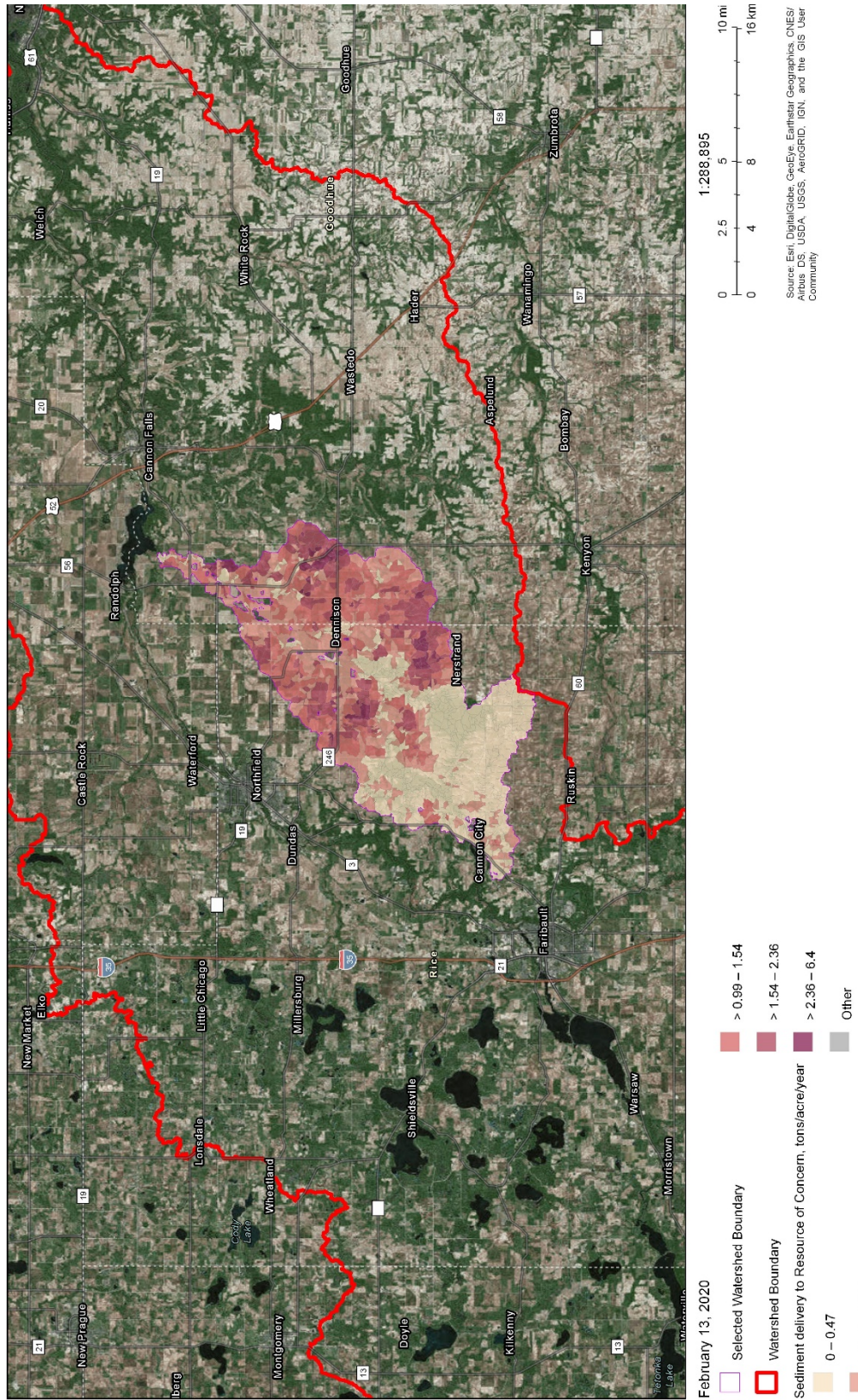


Figure 3-17. Prioritized Targeted Implementation Areas for Prairie Creek Drainage Area within the Tier One Stream Area: Total Sediment Delivered (tons/acre/year)

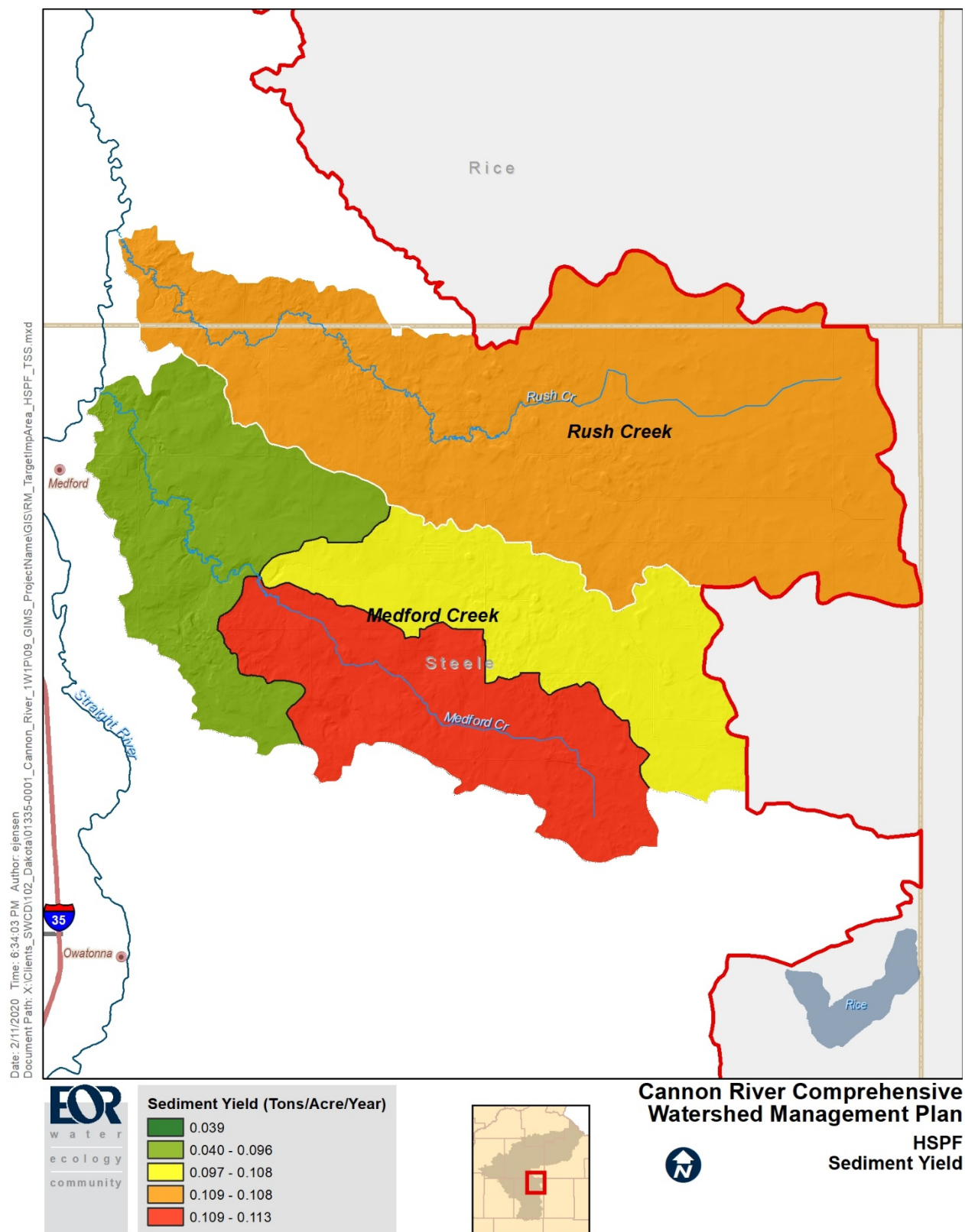


Figure 3-18. Prioritized Targeted Implementation Areas for Rush Creek and Medford Creek Drainage Areas within the Tier One Stream Area

3.1.1-D: NON-POLLUTANT STREAM STRESSORS**T2****Issue Statement**

Stream, fish and macroinvertebrate communities across the watershed are showing a loss of sensitive species due to non-pollutant stressors, such as elevated stream temperature (1 stream), low dissolved oxygen (5 streams), degraded habitat (22 streams), physical connectivity (2 streams) and flow alterations (1 stream). These biological communities are also impacted by pollutant stressors (total phosphorus, nitrate, and total suspended solids). Pollutant reductions needed to achieve goals for Lakes and Streams 3.1.1, Groundwater 3.1.3, and Agriculture 3.1.4 included in the first 10-year plan will also benefit stream biological communities.

Desired Future Condition

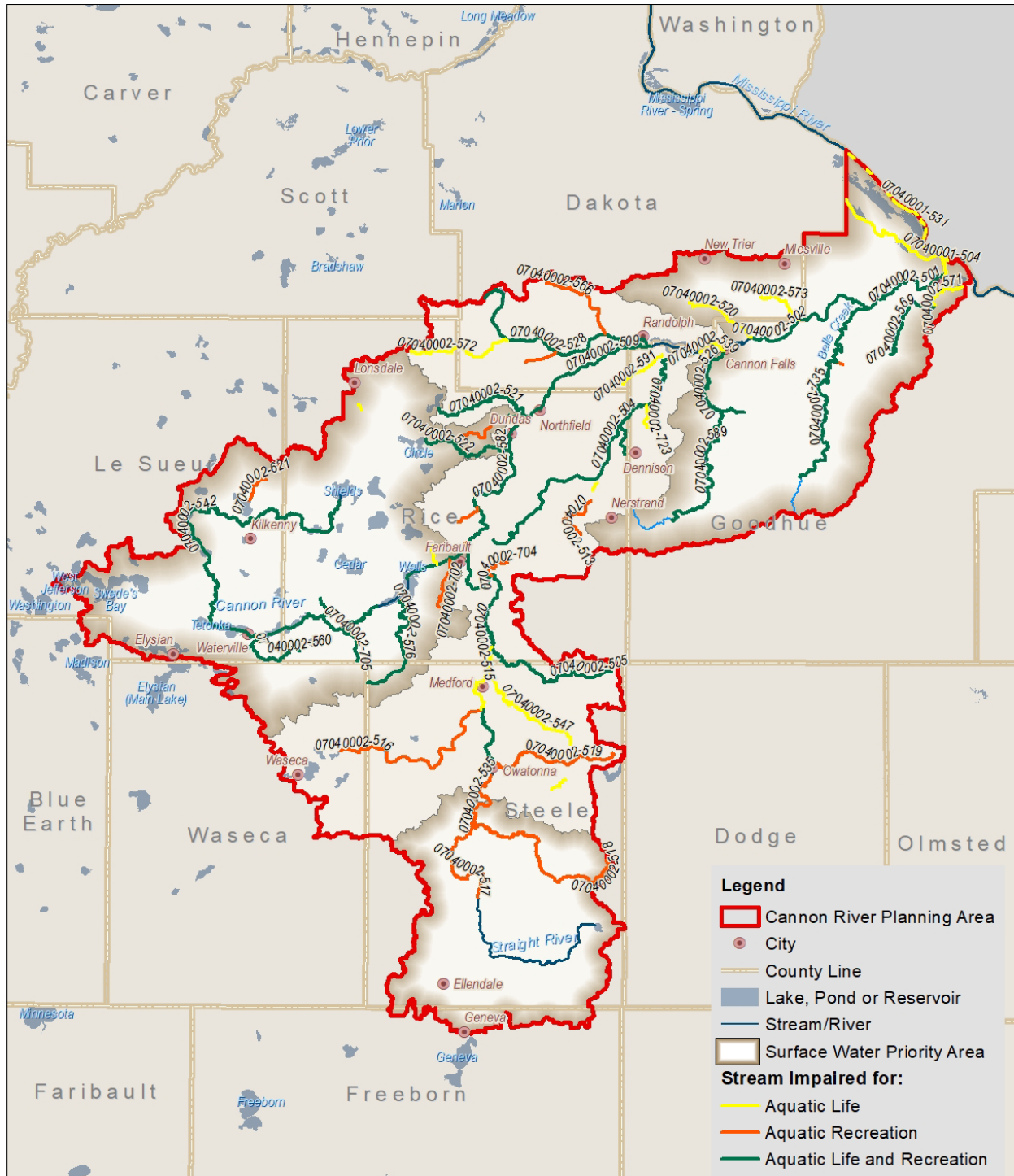
Fish and macroinvertebrate IBI scores that indicate that all stream reaches are supporting of aquatic life.

10-Year Measurable Goals

Goals for this Tier 2 issue to be determined during the next generation (second 10-years) of the Cannon River Comprehensive Watershed Management Plan and will be based on the recommendations included in the 2015 MPCA Stressor Identification Report.



Brook Trout from Miesville Ravine Park – Photo Dakota SCWD



Cannon River Comprehensive Watershed Management Plan

Impaired Streams

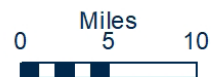


Figure 3-19. Impaired Streams in the Cannon River Planning Area (MPCA 2016)

3.1.2. Wetlands

Wetlands provide many important functions in a watershed, such as nutrient reduction, pollutant filtering, and wildlife habitat. Wetland storage in the planning area promotes groundwater recharge and maintains baseflow in the otherwise, heavily drained agricultural region. The groundwater baseflow is critical for protecting high quality groundwater-fed lakes and trout streams (see Section 3.1.3 – Groundwater).

Approximately 81% of the historic wetlands have been lost in the Cannon River Planning Area with most occurring in the Straight River Lobe. While some efforts to restore wetland acreage have occurred over the last few decades, additional restoration is needed to reduce flooding, improve water quality and provide for groundwater recharge. Wetland restoration projects can be challenging due to the fact that multiple landowners are often connected to the drainage system and they require a significant level of technical and financial assistance.

PRIORITY AREA SUMMARY

Cannon River Planning Area (T1)

Wetlands are important watershed-wide to provide flood mitigation for larger communities. Until a watershed-wide hydrologic & hydraulic model is developed to more accurately characterize how runoff is generated and delivered throughout the system, the targeted implementation areas for wetland restoration will be the Upper Cannon HUC10 and Chub Creek HUC10. Wetland improvements in both of these areas have secondary benefits, such as wildlife habitat, improving lake and stream water quality and groundwater recharge in heavily tiled, agricultural areas.



Cannon River Trout Lily Scientific and Natural Area Environs

3.1.2-A: WETLAND RESTORATION**T1****Issue Statement**

According to the 2016 Cannon River WRAPS report, there has been an estimated loss of about 81% (or 238,000 acres) of the natural wetlands in the Planning Area since pre-settlement, including a wetland complex (greater than 10,000 acres in size) in the headwaters of the Straight River. The Cannon River Comprehensive Watershed Management Plan identified stormwater storage function as the highest valued wetland service because wetlands provide mitigation for property-damaging floods caused by high volumes of stormwater runoff exacerbated by land use alterations and extreme precipitation events. Currently, state and federal programs are utilized for implementing wetland restoration projects, and there are typically limited local dollars available. These programs are competitive, have different priorities than the local priorities, and are underfunded. An increase in project development and implementation dollars is needed.

Desired Future Condition

The number of wetlands needed to provide flood mitigation (per the Long Term Flood Reduction Evaluation) are re-established in the landscape to provide multiple benefits including flood mitigation (storage), stormwater attenuation services, and watershed nitrate reductions.

10-Year Measurable Goals

Goal 1: *Increase wetland area by achieving a net gain of 10%, or 143 acres of restored wetland pool and buffer area treating 2,936 acres of runoff, in the Upper Cannon HUC10 and a net gain of 10%, or 39 acres of restored wetland pool and buffer area treating 1,421 acres of runoff, in the Chub Creek HUC10 based on the Nitrogen BMP Spreadsheet tool within the 10-year timeframe of the plan.*

Table 3-11. Existing Nitrate Loads and Load Reduction Goals for Upper Cannon and Chub Creek HUC10 in the Cannon River Comprehensive Watershed Management Plan

HUC10	Existing Nitrate Load and Load Reduction Goals				
	Existing Nitrate Load * [lb/yr]	20% Nitrate Reduction (Long-term Future Condition) Measurable Goal [lb/yr]	Restored Wetland 5-year Nitrate Reduction Goal [lb/yr]	Restored Wetland 10-year Nitrate Reduction Goal [lb/yr]	Restored Wetland 10-year Progress Towards Measurable Goal
Upper Cannon (-01)	1,585,183	317,037	8,825	17,649	6%
Chub Creek (-04)	389,479	77,896	4,828	9,655	12%

* Based on the HUC 10 existing load estimates from the Cannon River N BMP Spreadsheet

Justification for Goals

The wetland restoration goal was adapted from the level of implementation identified in the 2016 Cannon River WRAPS watershed-wide nitrogen reduction scenario (see Table 15 of the 2016 Cannon River WRAPS) that achieves a 20% nitrogen reduction at the outlet of the Cannon River Watershed. The goal for the 10-year timeframe of the plan is to focus wetland restoration in part of the Planning Area (the Upper Cannon HUC10 and the Chub Creek HUC10) based on the level of implementation identified in the WRAPS nitrogen reduction scenario for the Upper Cannon HUC10

(10% increase). During the 2016 Cannon River WRAPS development process, the local partners decided on the most appropriate places for wetland restoration (Upper Cannon HUC10 and Chub Creek HUC10) and a feasible level of implementation (10%). While the 2016 Cannon River WRAPS Nitrogen BMP scenarios are based on achieving annual load reductions, it is assumed that the wetland restorations will make progress towards increased storage and stormwater attenuation until specific wetland restoration goals are identified as part of the Long-Term Flood Evaluation Study (2.2-A-1) to support achieving the goals related to Flooding of Communities. The increase in wetland area in the Upper Cannon HUC10 and Chub Creek HUC10 will also achieve nitrate reductions (Table 3-11). Note that implementation of restored wetlands in the Upper Cannon HUC10 and Chub Creek HUC10 alone do not achieve a 20% nitrogen reduction at the outlet of the Cannon River Watershed, but are part of the larger strategy identified by the WRAPS to achieve this nitrogen reduction goal.

Implementation Activities

Implementation for Wetland Restoration will be focused in the Upper Cannon HUC10 and Chub Creek HUC10 as identified during the 2016 Cannon River WRAPS development process.

Selection of project locations within the implementation areas will be determined by the Planning Partners during the annual work planning process using the tools and criteria described in Section 6.4.

- **3.1.2-A-1:**

Utilize tools listed in Table 6-2 to identify sites in the priority drainage areas for wetland restoration within the Upper Cannon HUC10 and Chub Creek HUC10 then implement projects to meet the wetland restoration goal.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.2 – Development as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.2-A-1:**

Conduct a Long-Term Flood Evaluation Study (LTFES) to provide Planning Partners with the tools needed to mitigate the effects of flooding in the Cannon River Planning Area and make the communities more resilient. Components of the LTFES would include: development of a hydrologic & hydraulic study; evaluation of existing flows and storage lost due to filling of wetlands, tiling, ditching, and agricultural production; evaluation of existing storm sewer capacity; evaluation of flood reduction strategies (including *non-structural strategies* such as development standards and protecting growth to a higher standard and *structural solutions* such as strategically located storage and rate-control structures to help reduce peak flows) and cost-benefit analysis.

- *The hydrologic & hydraulic study will also evaluate options for addressing water which is diverted from the Le Sueur River to the Cannon River watershed. Results of this modeling evaluation may identify implementation strategies to disconnect this contribution of flow to the Cannon River watershed.*
- *Once the H&H model is completed, the Planning Partners will re-evaluate the wetland restoration goals.*

- 3.2.2-A-2:**
 Implement flood reduction practices within the Planning Area as identified in the Long-Term Flood Evaluation Study. This would include practices such as levees, flood walls, restoration of natural flood plains, wetland restoration, and rate control structures. This would also include managing tile drainage by replacing/retrofitting older, conventional tiling systems with controlled systems or denitrifying bioreactors to decrease chemical and nutrient loss.

Pace of Progress

The following table summarizes the estimated load and flow reduction expected from implementation of wetland restorations on 10% of suitable acres in the Upper Cannon HUC10 and Chub Creek HUC10, based on HSPF-SAM.

Table 3-12. Wetland Restoration HSPF-SAM Estimated Nitrate Load and Flow Reductions

HUC 10	HSPF Reach	Wetland Pool and Buffer Area Restoration Goal	Area Treated by Restored Wetlands	Downstream Water Quality: Nitrogen Reduction	Annual Average Runoff Volume Reduction at outlet of Cannon River (1996-2012)
		[acres]	[acres]	[lb/yr]	[acre-feet]
Upper Cannon (-01)	300	143	2,936	17,649	15,301
Chub Creek (-04)	700	39	1,421	9,655	7,406



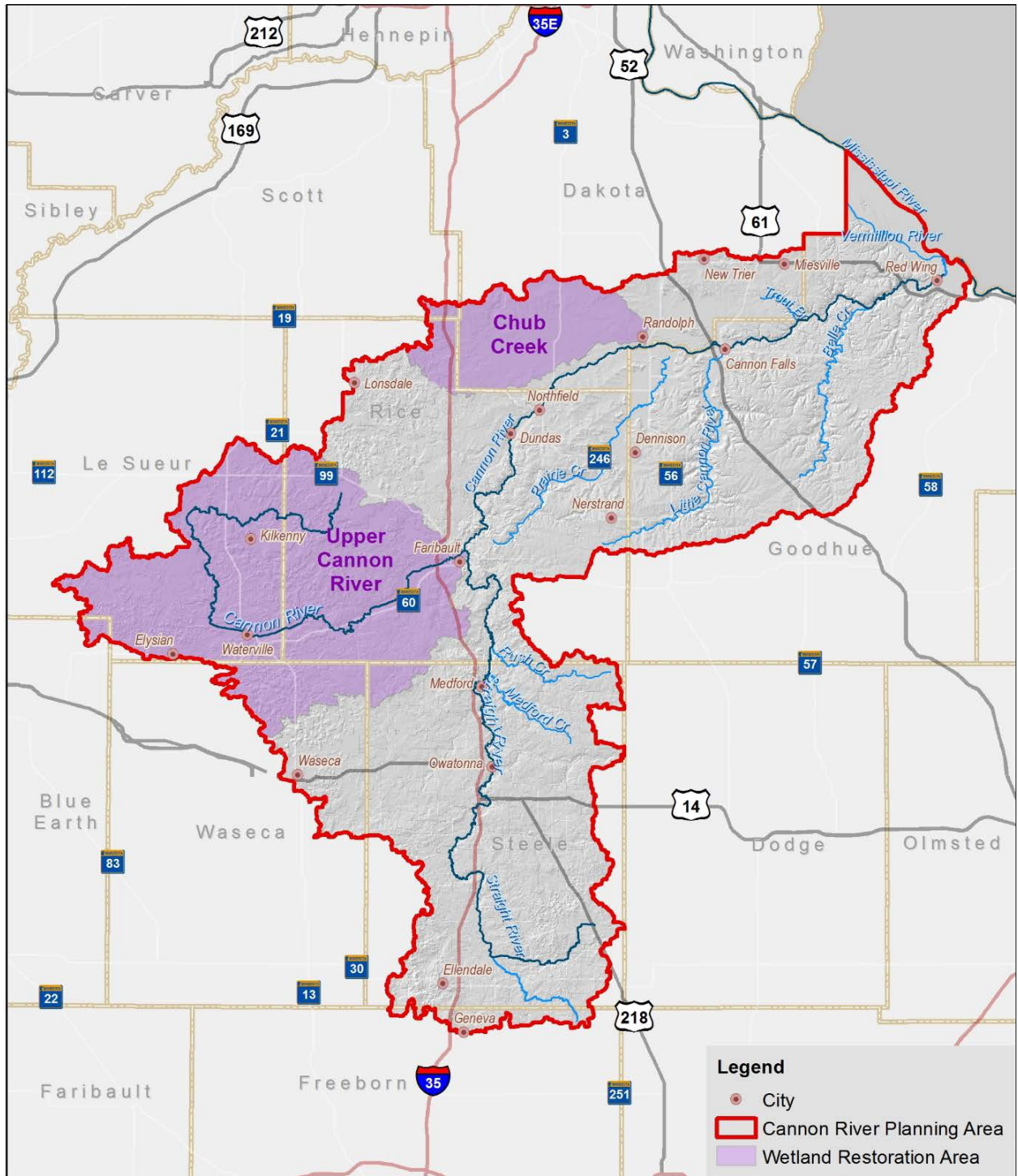


Figure 3-20. Wetland Restoration Targeted Implementation Areas

3.1.2-B: WETLAND PROTECTION AND ENHANCEMENT**T2****Issue Statement**

Existing wetlands deserve protection because they provide a host of services (functions) that are highly valued by society.

Desired Future Condition

Wetlands in the Cannon River Planning Area continue to provide the following services (functions):

- Vegetative Diversity/Integrity
- Maintenance of Characteristic Hydrologic Regime
- Flood/Stormwater/Attenuation
- Downstream Water Quality
- Maintenance of Wetland Water Quality
- Shoreline Protection
- Maintenance of Characteristic Wildlife Habitat Structure
- Maintenance of Characteristic Fish Habitat
- Maintenance of Characteristic Amphibian Habitat
- Aesthetics/ Recreation/ Education/ Cultural
- Commercial Uses
- Groundwater Interaction

10-Year Measurable Goals

Goal 1: *Protect the current acreage of existing wetlands (40,500 acres) by replacing any unavoidable impacts in the watershed and conduct restoration and enhancement projects to elevate the capacity for these wetlands focusing on those that are most highly valued by the public.*



Marsh-marigolds – Cannon River Wilderness Park, Rice County

3.1.3. Groundwater

Groundwater is an important resource for the communities in the Cannon River Planning Area. Groundwater accounts for over 85 percent of the water that is pumped to meet agricultural, industrial, drinking water and other water-use needs. In fact, groundwater accounts for 100 percent of the region's drinking water. There are a number of Community Public Water Supply Wells that have high to moderate potential contaminant risk. Drinking water protection concerns include historic contamination of municipal well fields with trichloroethylene, high nitrate values, and radionuclides and arsenic (which are both naturally occurring). Source: adapted from the MDH 2017 Cannon River GRAPS.

In addition, the Cannon River Planning Area contains a number of groundwater-dependent natural resources including calcareous fens, groundwater fed lakes, designated trout streams and other unique and sensitive native plant communities. Due to the high concentration of karst features in the lower half of the Planning Area, groundwater and groundwater dependent resources are at risk from the introduction of pollutants. Nitrogen is primarily transported to surface waters in the Cannon River Planning Area via groundwater originating from agricultural lands, including leaching loss to groundwater and leaching loss to tiles. For example, for the townships tested (15) in Dakota County, overall more than 10% of privately owned and operated wells were equal to or greater than the drinking water standard of 10 mg/L for nitrate. As a result, it is important to make sure that adequate supplies of high quality groundwater remain available for residents and businesses of the region as well as for some of the region's natural resources. Source: MDA.



Cannon River Trout Lily Scientific and Natural Area Environs

PRIORITY AREA SUMMARY

(Refer to Groundwater Priority Area in Figure 2-11)

Drinking Water Protection (T1)

Drinking water protection was identified as a priority for all of the residents of the Cannon River Planning Area. Specifically, communities with moderate or high vulnerabilities and private well owners in areas of moderate or high pollution sensitivity are of particular concern due to the karst formations and highly permeable soils. These areas, which are captured by both of the groundwater priority areas, require a higher level of management to protect drinking water supplies.

Groundwater Dependent Natural Resources – Protection Lakes (T1)

Of the five protection lakes located in the Groundwater Dominated Lakes Area, four are groundwater dependent (Beaver, Dudley (and Kelly), Fish and Roemhildts). Maintaining the quantity and quality of groundwater to these resources will be a critical protection strategy for these lakes recognizing that the groundwatershed is likely larger than the drainage area (subwatershed) to the resources.

Groundwater Recharge (T2)

Prioritize the protection of local recharge areas that contribute to important regional aquifers and are located in sensitive areas, as shown on the Groundwater Priority Area map (Figure 2-11) as the Groundwater Pollution Sensitivity Area (based on information in the MDH 2017 Cannon River GRAPS).

Other Groundwater Dependent Natural Resources (T2)

The Cannon River Planning Area is home to a number of other high quality groundwater dependent natural resources that are not already addressed in a previous issue, including additional trout streams, groundwater dependent lakes, and calcareous fens. These groundwater dependent natural resources are distributed throughout the Planning Area. As a result, maintaining the quantity and quality of groundwater to these resources is a watershed-wide issue (e.g., assessing baseflow susceptibility to groundwater appropriations).



Wetland – Cannon River Wilderness Park, Rice County

3.1.3-A: DRINKING WATER PROTECTION**T1****Issue Statement**

Groundwater is the source of all drinking water in the Cannon River Planning Area. Public water suppliers provide 70% of the population's drinking water from over 200 different wells; 87 of these wells are located in highly vulnerable settings. Of these public water suppliers, 20 are larger municipal communities serving a large portion of the population. These systems are tested for over 100 contaminants, are responsible to provide treatment, and must implement an approved Wellhead Protection Plan.

Thirty percent of the residents of the Cannon River Planning Area rely on a private well for the water they drink. However, because no public entity is responsible for water testing or management of a private well after drilling is completed, these well owners have the sole responsibility for the health and safety of their drinking water.

Contaminants of concern for all drinking water can be human sourced or naturally occurring. For example, nitrate affects large regions in the Cannon River Planning Area where concentrations are increasing due to human activities such as agriculture, industry and domestic effluents. While other contaminants of concern include arsenic and radium, which occurs naturally as a trace component in rocks and sediment and is a concern in isolated areas. Aquifer vulnerability determines the level of management required to protect a drinking water supply and provides an opportunity to target implementation practices in accordance with the level of risk different land uses pose.

In general, there are dollars available for activities such as well sealing, but most counties in the Planning Area have not historically designated funds for well sealing and other drinking water protection activities. Coordination with partners is vital for implementation but requires time and resources. Funding is needed in order to maximize partnerships and implementation of drinking water protection activities.

Desired Future Condition

Aquifers that provide drinking water are protected from surface contamination and provide safe and adequate drinking water for public and private wells without the use of expensive equipment. Natural sources of drinking water contaminants are minimized with management or treatment to meet or exceed drinking water standards.

10-Year Measurable Goals

- Goal 1:** *Protect public drinking water quality by providing the following support to public water suppliers in areas of high and moderate vulnerability: education and outreach for source water protection and technical assistance for conservation practices in areas outside of the supplier's jurisdictional boundary.*
- Goal 2:** *To prevent future increase in groundwater nitrate levels, identify the most vulnerable public water supply systems (i.e. those expected to exceed 10 ppm in the next 10 years) for targeted implementation by conducting nitrate-nitrogen trends on the following four public water supply systems: Geneva, Faribault, Northfield and Red Wing.*

- Goal 3:** *Protect drinking water quality of private wells by providing the following assistance in areas of high and moderate vulnerability: access to well testing programs and education about drinking water quality.*
- Goal 4:** *To prevent future increase in groundwater nitrate levels, install 25 source control (well sealing) or cover crops/perennial vegetation conversion projects per year in areas where contaminants can easily get to existing private wells, land use exceeds 60% row crop agriculture and nitrate-nitrogen concentrations greater than 5.0 ppm in the wells. Some progress towards achieving this goal will be made through implementation of activities for the Agricultural Runoff and Soil Health goals.*

Justification for Goals

Goals for public water suppliers are based on information collected by the Minnesota Department of Health. During the plan development process, MDH called multiple public water suppliers to ask how the Cannon River Comprehensive Watershed Management Plan could support their efforts. The number one response from those contacted was to help public water suppliers meet the education and outreach requirements of their Source Water Protection Plans and the Safe Drinking Water Act. In addition, the public water suppliers indicated that they could also use technical assistance on conservation practices located outside of their jurisdictional boundaries but within the Drinking Water Supply Management Area (DWSMA).

To better target conservation practices in areas susceptible to nitrate contamination, MDH reviewed groundwater quality data to identify those public water supply systems that met or exceeded the criteria of 3 ppm or those that had unusual spikes of nitrates (understanding that 3 ppm is the value considered to be human influenced above natural background levels). Based on the current data, it appears that the communities of Geneva, Faribault, Northfield and Red Wing are vulnerable. Conducting nitrate-nitrogen trends in these areas will help the Planning Partners target where implementation should take place. By completing these trend analyses in the first five years of the Plan gives Planning Partners time to target practices during the annual work planning process and the mid-term evaluation. Nitrate-nitrogen trends should be conducted on other public water supply systems as needed in the in the last 5 years of the Plan to provide the information needed to identify vulnerable systems for the next Comprehensive Watershed Management Plan process.

The goals for private systems is to provide support to homeowners who may not have access to resources to ensure they have safe drinking water. One way to identify private wells that have elevated nitrates, Planning Partners will host annual well screening clinics throughout the Planning Area. This information will be used by Planning Partners to target conservation practices in these high vulnerability areas during the annual work planning process. The identification of 25 source control or cover crops/perennial vegetation conversion projects annually was determined by the Planning Partners as what they have the capacity to achieve on an annual basis. By conducting routine well screening clinics in the same locations, MDH and the Planning Partners may be able to collect enough volunteer information to establish trends on specific wells to inform how land use practices impact nitrate concentrations in the groundwater system.

Implementation Activities

Implementation for Drinking Water Protection will be focused in communities with moderate or high vulnerabilities and private well owners in areas of moderate or high pollution sensitivity.

- **3.1.3-A-1:**
Serve on existing wellhead protection plan teams for all public water suppliers with Moderate and Highly Vulnerable DWSMAs to assist with planning and implementation activities that address land use concerns. There are 13 DWSMAs in the Planning Area of which four are moderate to high vulnerability (Cannon Falls, Randolph, Northfield, and Faribault).
- **3.1.3-A-2:**
Assist the public water suppliers with the development of educational materials tailored to each community for distribution at public events including BMPs for fertilizer and pesticide application in developed areas. Examples include printed materials, groundwater models for schools and hazardous waste collection events.
- **3.1.3-A-3:**
In areas within an existing DWSMA, but outside of the city jurisdiction, assist with well location and inventory, and sealing of unused wells that pose a risk to the public water supply wells.
- **3.1.3-A-4:**
Host 2 well testing or screening clinics per year for private well owners. Provide nitrate test results and/or water testing kits, and information on best practices for well maintenance and water quality.
- **3.1.3-A-5:**
Create tailored outreach/information packets for homeowners in priority areas that provides education on drinking water quality, maintenance of private wells and septic systems, and BMPs for homeowners. Create a centralized web page that members can link to for public access.
- **3.1.3-A-6:**
Request nitrate–nitrogen trend analysis from MDH for the 4 communities identified by 2025. Evaluate and identify potential upward trends in other public water supply systems in the last five years of the Plan so priority areas can be identified for the next Comprehensive Watershed Management Plan process.
- **3.1.3-A-7:**
Educate and protect 'edge' recharge areas like Decorah Shale edge where groundwater easily moves past confining shale layers and areas often are wooded and steep.
- **3.1.3-A-8:**
Create a Planning Area well sealing program and prioritization process, implemented by each County, for residents who wish to voluntarily seal wells using a priority process. Start by conducting an unused-well inventory by mailing a homeowner survey asking people if they have an unused well on their property that they would like assistance sealing.
- **3.1.3-A-9:**
In cultivated cropland within a delineated DWSMA in the Planning Area (5,282 acres), provide landowners and operators access to funding and technical assistance for BMPs that reduce the loss of nutrients, pathogens, and chemicals to groundwater. Examples include

filter strips, nutrient management, and soil health practices such as cover crops and perennial vegetation.

Pace of Progress

- Assumed a total of 1,500 wells in vulnerable settings. Send education materials to 30 percent of the people in areas of moderate and high pollution sensitivity.
- Hold 1-2 well screening clinics per county per year and distribute 20 test kits per event.
- Conduct nitrate-nitrogen trend analysis in first five years and conduct additional trend analyses in the last five years as needed.

3.1.3-B: GROUNDWATER DEPENDENT NATURAL RESOURCES – PROTECTION LAKES T1

Issue Statement

Land-altering activities have the potential to impact groundwater resources as well as groundwater dependent natural resources. Without proper land-use and water resource management, the following impacts may occur: reduced groundwater recharge, reduced groundwater quality, and alterations to the functions and values of groundwater dependent natural resources. This is of particular concern to the protection lakes, many of which have been identified as being groundwater dependent. While there are currently a variety of programs that address this concern and overlap with agricultural leaching concerns, additional funding is needed for implementation in priority areas.

Desired Future Condition

Groundwater-dependent protection lakes located in the Cannon River Planning Area will have adequate supply of high quality groundwater.

10-Year Measurable Goals

- Goal 1:** *Maintain the quality of the protection lakes by understanding the baseline of groundwater quality established between 2022 and 2025.*
- Goal 2:** *Maintain the quantity of groundwater to the protection lakes by understanding the baseline of groundwater quantity established between 2022 and 2025.*

Justification for Goals

Maintaining the quality and quantity of groundwater to groundwater dependent Tier 1 Protection Lakes was identified by the Planning Partner as the goal because currently the quality of these lakes is high due in large part to the good quality of groundwater flowing to these lakes. These lakes also tend to have smaller watersheds and less impactful land uses.

Implementation Activities

Implementation for Groundwater Dependent Natural Resources will be focused in the drainage area to the groundwater dependent Tier 1 Protection Lakes (Beaver, Dudley (and Kelly), Fish and Roemhildts). The following implementation activities were chosen to achieve the goals because

baseline groundwater quality and quantity conditions to these lakes needs be established in order to determine if the quality and quantity of groundwater to the lakes changes in the future. In addition, there is a need for some level of implementation of surface BMPs that both increase the volume and quality of recharge to groundwater flow to the lakes (i.e., cropland conversion to perennial vegetation) in order to ensure that the quality and quantity of groundwater to the lakes is maintained in the future.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.1.4 – Monitoring Data as well as in the Targeted Implementation Schedule under Resources:

- **3.1.4-A-1:**
Develop a surface water and groundwater monitoring program in coordination with state-led monitoring efforts to establish baseline conditions, determine success of Plan, and support modeling efforts for the entire Cannon River Planning Area by working with partners to address state needs as well as local needs. Development of the monitoring program will be completed within the first two years of the Plan, and new monitoring and data collection activities as identified in the monitoring program will start in 2021. See Section 5.5: Data Collection and Monitoring for existing monitoring program gaps. To address Groundwater Dependent Natural Resource goals, the monitoring program should include, but not be limited to:
 - 1) *Coordinate with MNDNR, MDA and MPCA to add an observation well network around the groundwater dependent protection lakes (Beaver, Dudley (and Kelly), Fish and Roemhildts) to determine existing groundwater quality and quantity and develop trends.*

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.1 – Agriculture as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.1-A-1:**
Convert 10% (2,325 acres total or 232.5 acres per year) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in Tier One lakes and stream drainage areas.

Pace of Progress

Measuring progress towards achieving the Groundwater Dependent Natural Resource goals will be based on developing an understanding of the existing groundwater quality and quantity to the groundwater dependent Tier 1 Protection Lakes: Beaver, Dudley (and Kelly), Fish and Roemhildts through the development of a surface water and groundwater monitoring plan by 2020, and annual monitoring and data collection activities completed as identified in the monitoring program starting in 2021. In addition, protection of existing groundwater quality will be achieved through converting 10% of cropland on vulnerable soils to perennial cropland or perennial vegetation in the drainage areas to the groundwater dependent Tier 1 Protection Lakes: Beaver, Dudley (and Kelly), Fish and Roemhildts within the first 10-years.

3.1.3-C: GROUNDWATER RECHARGE**T2****Issue Statement**

A significant portion of the Planning Area has karst features which make for more direct connections to the groundwater system. Protecting the groundwater from land-use activities that have the potential to introduce contaminants to the groundwater system will be important for drinking water as recharge to karst aquifers bypasses the filtering typically provided by soils. In a karst setting, groundwater flows through conduits so that there is little opportunity for filtration or sorption of contaminants. Over time, maintaining an adequate supply of groundwater may be an issue as continued development creates additional water supply needs while reducing the infiltration capacity of the landscape. Lack of monitoring wells creates a data gap for water level trends.

Desired Future Condition

Groundwater recharge is protected from surface contaminants and maximized where water quality is the highest. Filtration of runoff is implemented in highly sensitive areas.

10-Year Measurable Goals

- Goal 1:** *Protect groundwater quality by educating landowners about surface water-groundwater connections in a karst setting.*
- Goal 2:** *Protect groundwater quality by ensuring septic systems are compliant and BMPs for karst settings are being utilized.*
- Goal 3:** *Promote water use conservation in the Pollution Sensitivity Area by reducing the amount of groundwater withdrawn from the system and promoting the infiltration of high quality water.*

3.1.3-D: OTHER GROUNDWATER DEPENDENT NATURAL RESOURCES**T2****Issue Statement**

Land-altering activities have the potential to impact groundwater resources as well as groundwater dependent natural resources. Without proper land-use and water resource management, the following impacts may occur: reduced groundwater recharge, reduced baseflow to the resources (as a result of groundwater appropriations), reduced groundwater quality, and alterations to the functions and values of groundwater dependent natural resources. This is of particular concern for the calcareous fens and trout streams, which rely on a steady stream of cold, high quality baseflow. While there are currently a variety of programs that address this concern (e.g. MNDNR's water appropriation permit program), additional funding is needed for implementation in priority areas.

Desired Future Condition

All groundwater-dependent resources, including trout streams, groundwater dependent lakes, and calcareous fens, located in the Cannon River Planning Area will have adequate supply of high quality groundwater.

10-Year Measurable Goals

Goal 1: *Maintain the quality and quantity of groundwater to groundwater-dependent resources such as trout streams, groundwater dependent lakes, and calcareous fens.*

3.1.4. Monitoring Data

Monitoring and research data are needed to understand the watershed, evaluate issues, and determine appropriate watershed-management approaches to addressing the restoration and protection needs. In addition, long-term monitoring provides the Planning Partners with the information needed to demonstrate performance toward meeting the goals of the Comprehensive Watershed Management Plan.

MPCA conducts surface water monitoring in the Cannon River Watershed (CRW) according to the Intensive Watershed Monitoring (IWM) framework. The IWM framework utilizes a nested watershed design allowing the aggregation of watersheds from a coarse to a fine scale. The foundation of this comprehensive approach is the 80 major watersheds within Minnesota. Streams are segmented by HUC. IWM occurs in each major watershed once every 10 years. The Cannon River Watershed Monitoring and Assessment Report provides detailed discussion of IWM and how it will be applied going forward (it will be repeated in the Cannon River Watershed in 2021). Watershed Pollutant Load Monitoring in the Cannon River at Welch (S000-003), Cannon River at Morristown (S003-487), Straight River near Faribault (S003-557), and Cannon River at Northfield (S001-582) is on-going and will be used to track reductions in TSS, nitrogen and total phosphorus loads in the Cannon River Watershed; these sites are instrumented and gauged to track flow volumes, and are intensively monitored by the MPCA staff and partners.

Local monitoring efforts also provides valuable data for use in model development and calibration. For example, the volunteer precipitation observation programs collects local precipitation data from volunteers working through their Soil and Water Conservation Districts. Lake associations conduct monitoring to better understand changes and impacts at the local lakeshed scale. Volunteer monitoring of water clarity in lakes and streams (i.e. Citizen Lake Monitoring and Citizen Stream Monitoring Programs) provides ongoing records useful in trend analysis.

A detailed description of existing monitoring programs, monitoring program gaps, and local priorities for the Plan Partnership are included in Section 5.5: Data Collection and Monitoring.

PRIORITY AREA SUMMARY

Monitoring Data (T1)

There is an existing watershed monitoring framework (IWM, Watershed Pollutant Load Monitoring Program), but future plan revisions may include frequent monitoring in priority watersheds to assess progress towards achieving resource goals for Tier One lakes and streams.

3.1.4-A: MONITORING DATA**T1****Issue Statement**

While there is an existing watershed monitoring framework (MPCA Intensive Watershed Monitoring, Watershed Pollutant Load Monitoring Program, volunteer monitoring programs) being implemented, there are gaps in baseline information that make the establishment of restoration and protection goals for surface water and groundwater resources difficult (see Section 5.5: Data Collection and Monitoring). While long-term monitoring data currently exists for many resources in the Cannon River Planning Area, this monitoring needs to continue in the future and there may be some gaps that need to be filled in order to assess progress towards achieving the resource goals established in this Plan. For example, MPCA will continue Intensive Watershed Monitoring (IWM) in the CRW (2021), but the number of sites and monitoring will be more targeted and reduced compared to 2011. Further, the IWM approach does not currently provide for high-frequency or small-scale monitoring. Additionally, the Cannon River Watershed Groundwater Restoration and Protection Strategies Report highlighted the lack of groundwater monitoring data in the western portion (Lakes Area) of the watershed. Planning Partners also recognized the need for local BMP performance (effectiveness monitoring) data to support education and outreach goals. Finally, while there is local funding available for volunteer monitoring efforts, these resources are not being utilized: existing volunteer monitoring programs (CLMP, CSMP, CAMP and WHEP) are not generating the participation by volunteers as intended.

Desired Future Condition

Long-term water quality trends in the Planning Area's priority lakes and streams to assess progress towards achieving resource goals. Long-term groundwater quality and quantity to assess drinking water quality and baseflow contributions to groundwater dependent natural resources.

10-Year Measurable Goals

Goal 1: *Address gaps in data of baseline conditions (e.g. groundwater and other priority resources) and assess progress towards achieving resource goals for Tier One resources by developing a surface water and groundwater monitoring program in coordination with state-led monitoring efforts.*

Justification for Goals

During the plan development process, local representatives as well as state agencies identified gaps in the monitoring data. For example, MPCA will continue Intensive Watershed Monitoring (IWM) in the CRW (2021), but the number of sites and monitoring will be more targeted and reduced compared to 2011. Further, the IWM approach does not currently provide for high-frequency or small-scale monitoring. Additionally, the Cannon River Watershed Groundwater Restoration and Protection Strategies Report highlighted the lack of groundwater monitoring data in the western portion (Lakes Area) of the watershed. In addition to gaps in the collection of monitoring data, the Planning Partners also identified a gap in the coordination of monitoring efforts. There needs to be a better summary of data collection spatially as well as temporally by all entities who have collected data in the watershed. This data is needed to (1) measure progress towards meeting the

resource goals, (2) support local buy-in on proven practices and (3) help refine priority areas over the next 10 years.

Implementation Activities

Implementation for Monitoring Data will be throughout the Planning Area.

- **3.1.4-A-1:**

Develop a surface water and groundwater monitoring program in coordination with state-led monitoring efforts to establish baseline conditions, determine success of Plan, and support modeling efforts for the entire Cannon River Planning Area by working with partners to address state needs as well as local needs. Development of the monitoring program will be completed within the first two years of the Plan, and new monitoring and data collection activities as identified in the monitoring program will start in 2021. See Section 5.5: Data Collection and Monitoring for existing monitoring program gaps. The monitoring program should include, but not be limited to:

- 1) *Continue to collect baseline information on base flow of groundwater to Tier One trout streams: Belle Creek, Little Cannon, and Trout Brook.*
- 2) *Coordinate with non-LGU partners and MPCA's Citizen Lake Monitoring Program to have citizen's monitor Tier One lakes annually with secchi, and review progress towards meeting total phosphorus load reduction goals.*
- 3) *Collect TSS, TP, and nitrate samples twice per month in the Tier One impaired streams to develop a long-term monitoring record.*
- 4) *Coordinate with MNDNR, MDA and MPCA to add an observation well network around the groundwater dependent protection lakes (Beaver, Dudley (and Kelly), Fish and Roemhildts) to determine existing groundwater quality and quantity and develop trends.*
- 5) *In conjunction with state agencies, develop a data management system or process to store and analyze all of the data.*

- **3.1.4-A-2:**

Implement the surface water and groundwater monitoring program.

Pace of Progress

Pace of progress for Monitoring Data will be measured by having a fully developed surface water and groundwater monitoring plan by 2021, and annual monitoring and data collection activities completed as identified in the monitoring program starting in 2022.



Construction elevation checks on basin – Photo Dakota SWCD

3.2. WATERSHED CONCERNS: LANDSCAPE ALTERATIONS

3.2.1. Agriculture

The health of the rural environment has a strong influence on the quality of watershed resources in the Cannon River Planning Area. The amount of water, nutrients and sediment that run off the rural landscape or leach into the groundwater system depends on the intensity of land uses, such as cropland, pasture, forest, or wetlands. Excess sediment and nutrients can leave the landscape due to untreated agricultural runoff, untreated feedlot runoff, erosion, and overgrazing. Approximately 90 percent of the Cannon River Planning Area is considered rural with 51 percent of the landscape dedicated to agricultural production. Improving sustainable agricultural production is important to the health of the rural economy, the rural environment, and the watershed as a whole.

Since the early 1900s, many wetlands have been drained, stream courses have been straightened, and tile lines have been laid in order to increase the amount of land that could be cultivated in the Cannon River Planning Area. However, these actions also greatly changed the hydrology of the watershed which has led to increased bank erosion, increased flooding, turbidity impairments, excess sedimentation, and reduced habitat quality in many streams throughout the watershed.

Based on the Minnesota Land Cover Classification and Impervious Surface Area GIS layer (2013 update - Version 2), agriculture is the most dominant land use (471,400 acres or 51% of the planning area), consisting of cropland (444,400 acres) and rangeland (27,000 acres). According to the 2016 Cannon River WRAPS, cropland is used predominantly for growing corn and soybeans. In addition there are 657 registered feedlots, of which, 49 are Concentrated Animal Feedlot Operations (CAFO). There are 114 facilities that have Open Lot Agreements (OLA), of which, 24 are located in shoreland. A total of 100 facilities are located within shoreland in the Cannon River Watershed.



PRIORITY AREA SUMMARY

Agricultural Runoff and Leaching Loss (T1)

Due to the widespread nature of agricultural impacts throughout the Cannon River Planning Area, implementation on agricultural land will be focused in the first 10-years of the plan within the drainage areas of the Tier One lakes and streams identified in Section 3.1.1 (Figure 3-21 through Figure 3-24). Agricultural practices with phosphorus reduction benefits will be focused within the drainage area of Tier One lakes: three impaired lakes that are currently very close to meeting state lake aquatic recreation water quality standards, and five high quality protection lakes. Agricultural practices with nitrogen reduction benefits will be focused within the drainage area of the Tier One impaired streams. These streams were chosen based on multiple, overlapping issues: HSPF top 25% TN and TP yield subwatersheds, coldwater trout streams, multiple stream impairments, and within the Groundwater Priority Area.

Soil Health (T1)

Implementation of practices that improve soil health in the first 10-years of the plan will be focused on the drainage areas of the Tier One lakes: three impaired lakes that are currently very close to meeting state lake aquatic recreation water quality standards, and five high quality protection lakes; and the drainage areas of the Tier One impaired streams (Figure 3-21 through Figure 3-24). These streams were chosen based on multiple, overlapping issues: HSPF top 25% TN and TP yield subwatersheds, coldwater trout streams, multiple stream impairments, and within the Groundwater Priority Area.



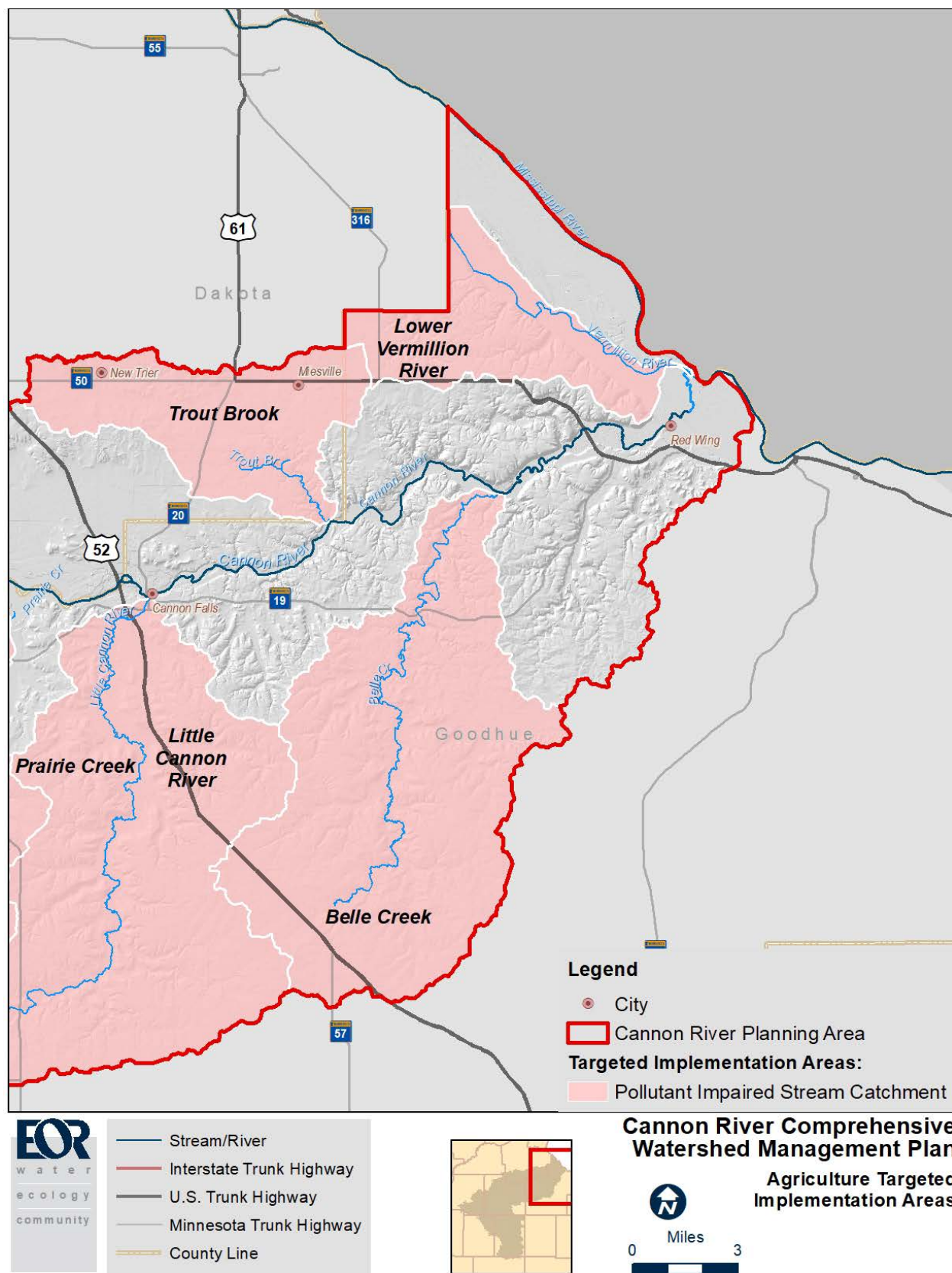


Figure 3-21. Agriculture Targeted Implementation Areas (Lower Vermillion River, Trout Brook, and Belle Creek)

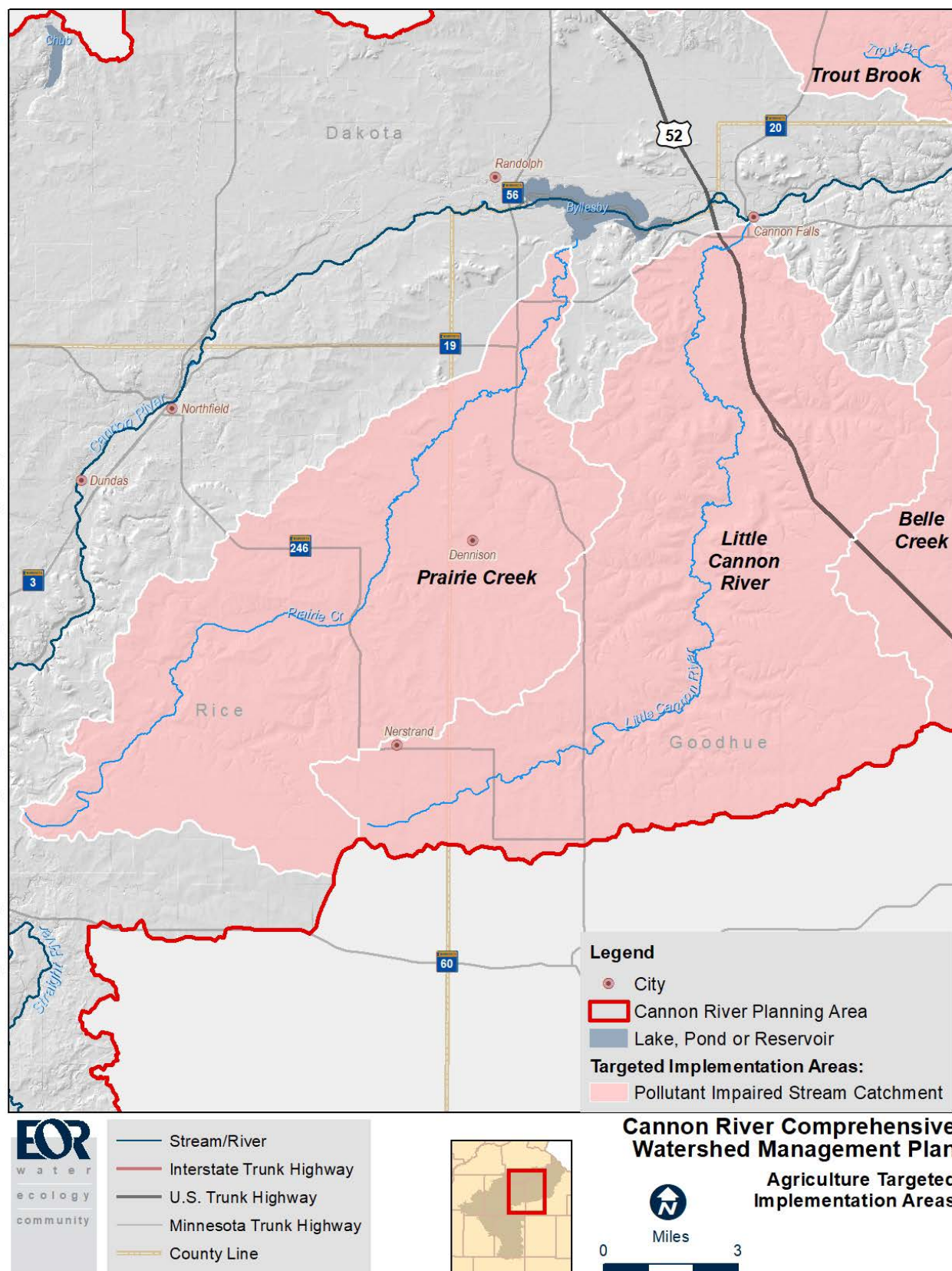


Figure 3-22. Agriculture Targeted Implementation Areas (Little Cannon River and Prairie Creek)

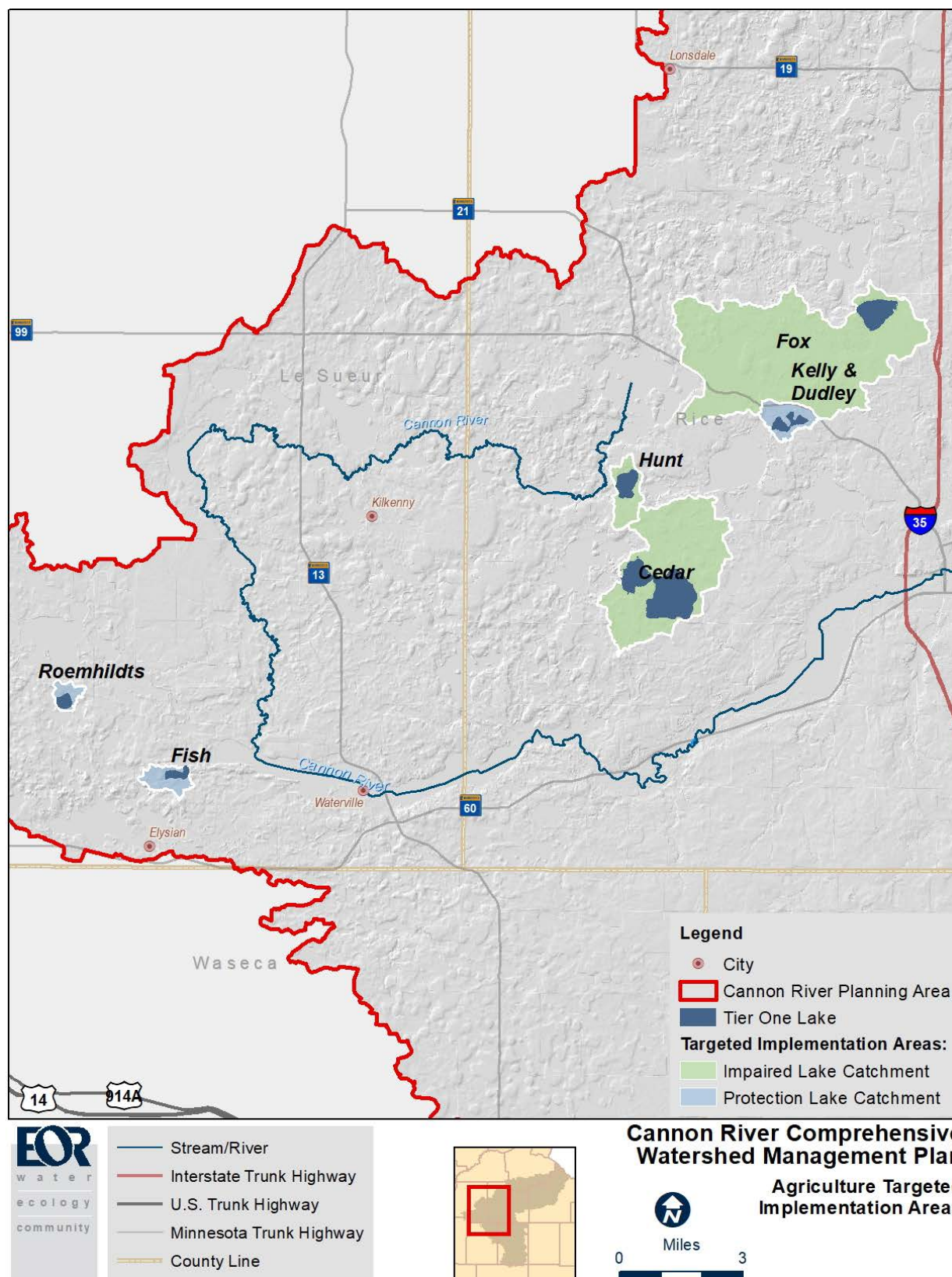


Figure 3-23. Agriculture Targeted Implementation Areas (Fox, Dudley (and Kelly), Hunt, Cedar, Fish, and Roemhildts Lakes)

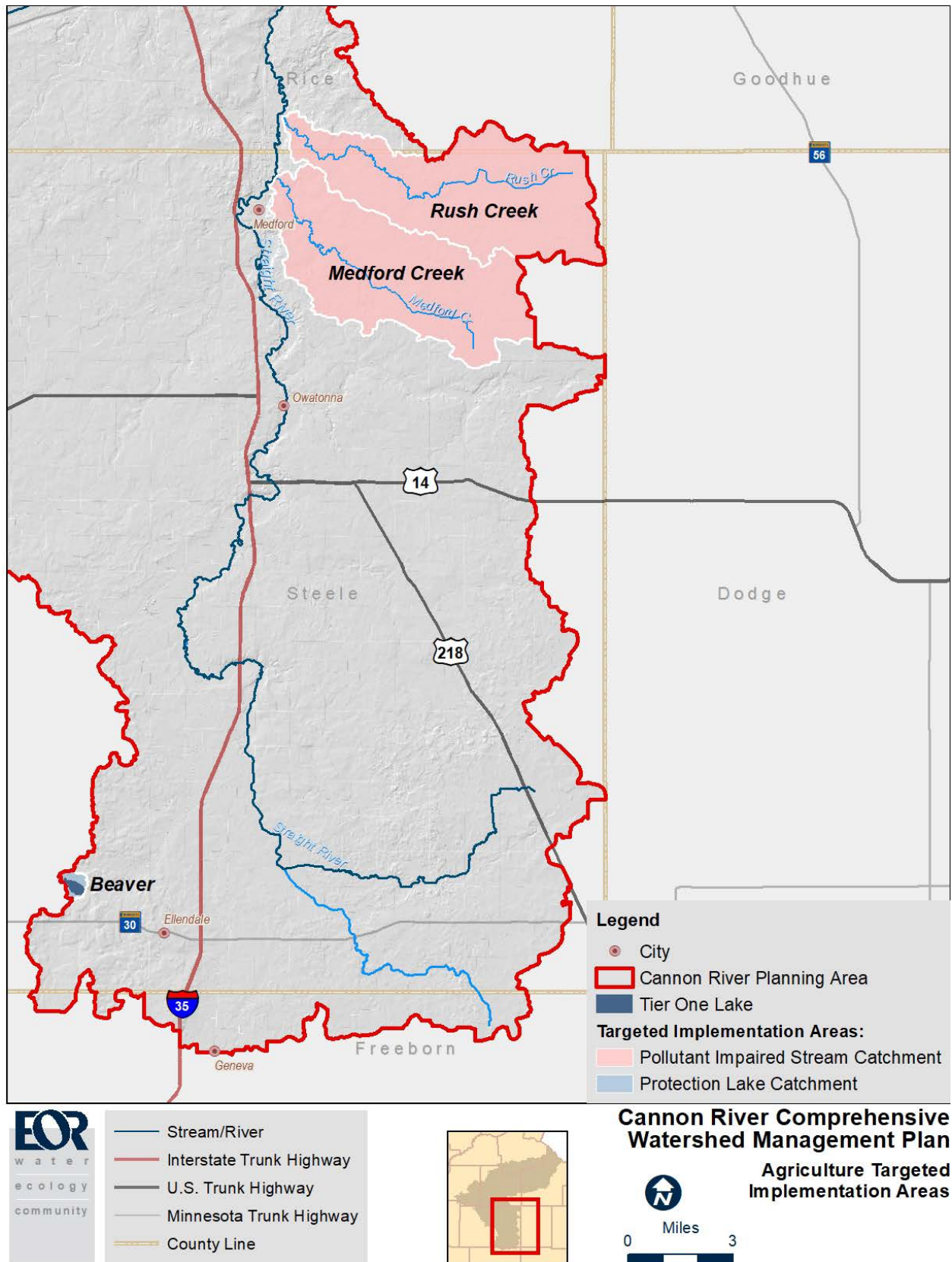


Figure 3-24. Agriculture Targeted Implementation Areas (Rush Creek, Medford Creek, and Beaver Lake)

3.2.1-A: AGRICULTURAL RUNOFF AND LEACHING LOSS**T1****Issue Statement**

The application of manure and fertilizer contributes to surface water and groundwater pollution in the Cannon River Planning Area. This pollution can result from improper application (rate, location, source and timing), and the natural susceptibility of manure movement or loss based on site conditions. The Cannon River HSPF model predicted that nutrient loss from cultivated lands accounts for 87% of the total nitrogen load and 89% of the total phosphorus load to surface water resources, highlighting the need for agricultural conservation and BMPs to reduce phosphorus and nitrogen pollution. Moreover, the MPCA 2013 Nitrogen in Minnesota Surface Waters and the 2014 Minnesota Nutrient Reduction Strategy reports state that cropland nitrogen losses through agricultural tile drainage (23%) and agricultural groundwater (57%, vertical leaching losses from cropland down to local groundwater) make up the majority of nitrogen sources in the Lower Mississippi River Basin in Minnesota. It is important to note that the majority of nitrogen losses from cultivated lands is delivered vertically through the soil and not as overland runoff.

While there are currently a variety of programs that address this concern (e.g., EQIP, CREP), additional funding is needed for implementation in priority areas. Partner sources of funding can be unreliable and may have different priority concerns and areas for implementation.

Desired Future Condition

Agricultural runoff and leaching loss will not impair surface waters and groundwater with nitrogen and phosphorus pollution. The phosphorus and nitrogen reductions needed from agricultural runoff for the benefit of water quality will be based on achieving the 2014 Minnesota Nutrient Reduction Strategy goals of 12 percent reduction in phosphorus pollution by 2025 and 45 percent reduction in nitrogen pollution by 2050 from baseline conditions (mid-1990's) from cropland through improved agricultural practices management by producers, or achieving individual impaired resource phosphorus and nitrogen watershed runoff reduction goals as identified in a local Total Maximum Daily Load study. A summary of completed TMDLs in the Planning Area can be found in the Cannon River and Vermillion River WRAPS report. These goals may be modified in the future as other state initiatives are completed.

10-Year Measurable Goals

Goal 1: *Achieve the 10-year Total Phosphorus Reduction Goals listed in Table 3-13 (130 lb/yr) in the Tier One Protection and Impaired Lake drainage areas over the next 10 years (by 2029).*



Farmer in field - Northfield, MN

Table 3-13. Existing Total Phosphorus (TP) Loads and HSPF-SAM TP Load Reductions for Tier One Lakes in the Cannon River Comprehensive Watershed Management Plan (**Note:** This is from Implementation of Agricultural Conservation Practices; see Tables 3-2 and 3-5 for resource-specific goals)

Tier One Lake	Existing Total Phosphorus (TP) Load and HSPF-SAM TP Estimated Load Reductions from Implementation of Agricultural Conservation Practices Only					
	WRAPS/TMDL Existing Load (includes watershed and internal sources) (from Table 3-2 and Table 3-5) [lb/yr]	12%/TMDL Reduction (Long-term Future Condition) Measurable Goal (from Table 3-2 and Table 3-5) [lb/yr]	HSPF-SAM Estimated 5-year TP Reduction from Ag BMPs [lb/yr]	HSPF-SAM Estimated 10-year TP Reduction from Ag BMPs** (total from Table 3-15) [lb/yr]	10-year Progress Towards 12%/TMDL Measurable Goal from Ag BMPs Only** [%]	10-year Total Phosphorus Reduction from Existing Load from Ag BMPs Only ** [%]
Beaver	42	5	1.4	2.9	57%	7%
Dudley (and Kelly)*	723	87	2.2	4.4	5%	1%
Fish	46	6	1.9	3.8	69%	8%
Roemhildts	701	84	1.2	2.4	3%	0.3%
Cedar	2,476	930	15	29	3%	1%
Fox	3,922	2286	42	84	4%	2%
Hunt	899	741	1.5	3.0	0.4%	0.3%
TOTAL	8,809	4,138	65	130		

* Note that the Dudley and Kelly Lake basins are connected, and the two lake drainage areas were combined into one drainage area to represent that implementation of watershed activities benefit the water quality of both lake basins.

** Reductions from Agricultural Conservation Practices alone to the Tier One lakes are modest because most of the load reductions needed for the lakes to meet their goals will come from in-lake management activities identified in the lake management plans, which will be developed within the first 5 years of this Plan. The additional reductions excepted from in-lake management activities are included in the Protection and Impaired Lake Load Reduction Goal tables included in Section 3.3.1-A and 3.3.1-B (Table 3-2 and Table 3-5). However, agricultural conservation practices are still important to implement in the lake drainage areas to protect the water quality of the Tier One Resources and prevent future degradation.

Goal 2: Achieve the 10-year Nitrate Reduction Goals listed in Table 3-14 (230,067 lb/yr) in the Tier One Impaired Stream drainage areas over the next 10 years (by 2029).

Table 3-14. Existing Nitrate Loads and HSPF-SAM Nitrate Load Reductions for Tier One Lakes in the Cannon River Comprehensive Watershed Management Plan (**Note:** This is from Implementation of Agricultural Conservation Practices; see Table 3-9 for resource-specific goals)

Impaired Stream	Existing Nitrate Loads and HSPF-SAM Nitrate** Estimated Load Reductions from Implementation of Agricultural Conservation Practices Only					
	HSPF Existing Nitrate Load (from Table 3-9) [lb/yr]	20% Nitrate Reduction (Long-term Future Measurable Goal (from Table 3-9) [lb/yr]	Estimated 5-year Nitrate Reductions from Ag BMPs [lb/yr]	Estimated 10-year Nitrate Reductions from Ag BMPs (total from Table 3-16) [lb/yr]	10-year Progress Towards 20% Nitrate Reduction Measurable Goal from Ag BMPs only [%]	10-year Nitrate Reduction from Existing Load from Ag BMPs only [%]
Lower Vermillion*	184,807	36,961	6,504	13,008	35%	7%
Belle Creek	805,249	161,050	29,353	58,705	36%	7%
Little Cannon River	835,565	167,113	33,030	66,061	40%	8%
Trout Brook	238,336	47,667	13,360	26,719	56%	11%
Prairie Creek	687,773	137,555	20,249	40,497	29%	6%
Rush Creek	243,579	48,716	6,560	13,120	27%	5%
Medford Creek	81,227	16,245	5,978	11,956	74%	15%
TOTAL	3,076,537	615,307	115,034	230,067		

* The Lower Vermillion River HSPF-SAM was not available at the time of this planning process; therefore, existing load estimates and load reductions for the Lower Vermillion River were based on applying HSPF-SAM yields for the adjacent Trout Brook drainage area over the Lower Vermillion River drainage area. Note that the existing loads and load reduction goals are for the portion of the Lower Vermillion River drainage area located within the Cannon River Planning Area.

**The form of nitrogen that is a concern for drinking water and aquatic life is nitrate, which is one fraction of the total nitrogen in a system. However, existing modeling tools currently are only capable of estimating existing total nitrogen loads and load reductions to resources. Therefore, existing loads and load reduction goals in the plan are reported for total nitrogen, as a proxy for nitrate existing loads and load reduction goals.

Justification for Goals

The watershed total phosphorus reduction goals for the Tier One impaired lake drainage areas and the watershed nitrogen reduction goals for the Tier One impaired stream drainage areas are based on the 2016 Cannon River WRAPS phosphorus and nitrogen reduction scenarios for implementation of agricultural conservation practices (see Table 14 and Table 15 of the 2016 Cannon River WRAPS) that achieve a 12% total phosphorus reduction and 20% nitrogen reduction at the outlet of the Cannon River Watershed. Note that the form of nitrogen that is a concern for drinking water and aquatic life is nitrate, which is one fraction of the total nitrogen in a system. However, existing modeling tools currently are only capable of estimating existing total nitrogen

loads and load reductions to resources. Therefore, existing loads and load reduction goals in the plan are reported for total nitrogen, as a proxy for nitrate existing loads and load reduction goals.

The same level of BMP implementation of agricultural conservation practices was chosen for the Tier One impaired lake and stream drainage areas to achieve a similar watershed pollutant reduction. The agricultural runoff load reduction goals from implementation of agricultural conservation practices support the Protection Lakes, Impaired Lakes, and Pollutant Impaired Stream goals, but additional implementation activities are needed to meet the lake and stream goals which are listed in Section 3.1.1-A through 3.1.1-C.

Implementation Activities

Implementation for Agricultural Runoff and Leaching Loss will be focused in the drainage areas of the Tier One Impaired Lakes and Streams (Figure 3-21 through Figure 3-24). These lake and stream drainage areas are located in the Lakes, Straight River Tributaries, and the Mississippi/Cannon Bottoms Priority Areas.

Subcatchments with the highest pollutant delivery will be prioritized for implementation of practices first. PTMApp was used to determine the level of pollutant loads delivered from all the subcatchments within the targeted implementation areas to the priority resource (except Beaver Lake, Medford Creek and Rush Creeks; see Figure 3-3 through Figure 3-5, Figure 3-7 through Figure 3-9, and Figure 3-14 through Figure 3-17). Beaver Lake, Medford Creek and Rush Creeks fall within the Straight River Area which is not currently included in PTMApp; for these two areas, HSPF-SAM was used to develop pollutant load delivered maps (Figure 3-18). It should be noted that there is not a figure identifying the prioritized targeted implementation areas for the Lower Vermillion River drainage areas because neither HSPF nor PTMApp has been completed for this area. Selection of project locations within the stream drainage areas will be determined by the Planning Partners during the annual work planning process as described in Section 6.4.

The following implementation activities were chosen to achieve the 10-year Agricultural Runoff goals. Nutrient management BMPs, conversion of cropland on vulnerable soils, and practices that increase organic matter on corn/soybean acres and short season crops were the major BMPs selected as part of the 2016 Cannon River WRAPS phosphorus and nitrogen reduction scenarios (see Table 14 and Table 15 of the 2016 Cannon River WRAPS) to achieve a 12% total phosphorus reduction and 20% nitrogen reduction at the outlet of the Cannon River Watershed. The same percent implementation of these BMPs were chosen to make progress towards pollutant reductions in the Tier One impaired lake and stream drainage areas, in addition to other priority projects identified by the Planning Partners, to achieve the Agricultural Runoff and Leaching Loss 10-year goals.

- **3.2.1-A-1:**
Convert 10% (2,325 acres total or 232.5 acres per year) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in all Tier One lake and stream drainage areas.
- **3.2.1-A-2:**
Monitor BMPs to demonstrate economic benefits (to farmers) of locally implemented conservation practices (e.g., by partnering with Discovery Farms and other on-farm demonstration programs).

- **3.2.1-A-3:**
Implement nutrient management BMPs following U of M guidance on 10% (16,315 acres total or 1,631.5 acres per year) of cultivated cropland in all Tier One lake and stream drainage areas.
- **3.2.1-A-4:**
Create a stable funding source to increase local capacity and implement agricultural BMPs by evaluating other funding sources from NGOs (e.g. Trout Unlimited, Pheasants Forever, Ducks Unlimited, the McKnight Foundation, or the Fishers & Farmers Partnership) and private sector companies (e.g. agribusinesses).

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.2.1 – Agriculture: Soil Health as well as in the Targeted Implementation Schedule under Landscape Alterations:

- **3.2.1-B-2:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (18,508 acres total or 1,850.8 acres per year) in the Tier One Lake and Stream drainage areas.
- **3.2.1-B-3:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 80% of short season crop (corn silage, small grains, peas, and sweet corn) acres (1,192 acres total, 119.2 acres per year) in the Tier One Lake and Stream drainage areas.

Pace of Progress

The following tables summarize the estimated total phosphorus (Table 3-15) and nitrate (Table 3-16) reductions expected from implementation of each activity in the Tier One Impaired Lake (Table 3-15) and Tier One Impaired Stream (Table 3-16) drainage areas, based on HSPF-SAM (see Appendix D). Note that phosphorus is the pollutant of concern for the impaired lakes, and nitrate is the pollutant of concern for the impaired streams.

Table 3-15. Agricultural Runoff and Leaching Loss HSPF-SAM Estimated Phosphorus Load Reductions by Activity to Tier One Lakes

Tier One Lake	HSPF-SAM Phosphorus Load Reduction by Activity [lb/yr] from Implementation of Agricultural Conservation Practices Only					
	3.2.1-A-1	3.2.1-A-2	3.2.1-A-3	3.2.1-A-4	3.2.1-B-2	3.2.1-B-3
	Cropland Conversion on Vulnerable Soils (see Table 1 in Appendix D)	Monitor BMPs	Nutrient Management BMPs (see Table 2 in Appendix D)	Create Stable Funding	Cover Crops on Corn/Soybean (see Table 3 in Appendix D)	Cover Crops on Short-season Crops (see Table 4 in Appendix D)
Beaver	0.6	n/a	0.5	n/a	1.8	--
Dudley (and Kelly)*	1.0	n/a	2.9	n/a	0.5	--
Fish	1.8	n/a	1.2	n/a	0.7	--
Roemhildts	0.2	n/a	0.6	n/a	1.6	--
Cedar	13.1	n/a	10.3	n/a	5.7	--
Fox	18.6	n/a	43.4	n/a	22	--
Hunt	0.0	n/a	1.5	n/a	1.5	--

* Note that the Dudley and Kelly Lake basins are connected, and the two lake drainage areas were combined into one drainage area to represent that implementation of watershed activities benefit the water quality of both lake basins.

n/a = Activity does not achieve a direct reduction in phosphorus but is needed to increase landowner willingness and implementation of other phosphorus reduction practices

'—' denotes that little to no applicable treatment area is found within the drainage area to implement the practice.

Table 3-16. Agricultural Runoff and Leaching Loss HSPF-SAM Estimated Nitrate Load Reductions by Activity to Tier One Streams

Tier One Stream	HSPF-SAM Nitrate Load Reduction by Activity [lb/yr] from Implementation of Agricultural Conservation Practices Only					
	3.2.1-A-1	3.2.1-A-2	3.2.1-A-3	3.2.1-A-4	3.2.1-B-2	3.2.1-B-3
	Cropland Conversion on Vulnerable Soils (see Table 1 in Appendix D)	Monitor BMPs	Nutrient Management BMPs (see Table 2 in Appendix D)	Create Stable Funding	Cover Crops on Corn/ Soybean (see Table 3 in Appendix D)	Cover Crops on Short-season Crops (see Table 4 in Appendix D)
Lower Vermillion*	3,998	n/a	4,639	n/a	4,180	192
Belle Creek	15,512	n/a	20,082	n/a	22,182	929
Little Cannon River	13,473	n/a	25,633	n/a	25,248	1,708
Trout Brook	5,148	n/a	6,350	n/a	11,821	3,401
Prairie Creek	7,677	n/a	15,117	n/a	16,662	1,041
Rush Creek	407	n/a	4,657	n/a	6,920	1,135
Medford Creek	566	n/a	4,270	n/a	6,354	765

* The Lower Vermillion River HSPF-SAM was not available at the time of this planning process; therefore, existing load estimates and load reductions for the Lower Vermillion River were based on applying HSPF-SAM yields for the adjacent Trout Brook drainage area over the Lower Vermillion River drainage area.

n/a = Activity does not achieve a direct reduction in nitrate but is needed to increase landowner willingness and implementation of other nitrate reduction practices

3.2.1-B: SOIL HEALTH

T1

Issue Statement

Soil health is typically measured by the amount of organic matter in the soil, but can also be measured based on soil water capacity, bulk density, infiltration capacity, chemical properties, and biological organisms. Soil organic matter is necessary for storing water, increasing water infiltration, preventing compaction, and breaking down pesticides and other pollutants. Soil health can be degraded due to some types of agricultural practices (such as conventional tillage, cash crop monocultures, and soil compaction from large equipment) which limits the role soil plays in clean water and groundwater recharge. Increased soil organic matter will improve the quality of surface water and groundwater, decrease runoff and flooding, and sustain long-term crop yields from the land. The study of soil health is an emerging field in agricultural science, therefore, it is expected that recommended goals and implementation activities for improving soil health will advance considerably during the 10-year timeframe of the Plan. Many SWCDs and partners have prioritized

funding for programs that implement activities to address this concern. However, continued and sufficient funding for these programs is needed.

Desired Future Condition

Improved soil health with increased soil organic matter content in all cropped soils. Research suggests that an increase in soil organic matter in sand and loam from 0.5 to 3.0 percent more than doubled the available water capacity of the soils (Hudson 1994).

10-Year Measurable Goals

- Goal 1:** *Improve soil health by implementing practices that increase organic matter (such as cover crops, tillage management, and nutrient management) on 15% of corn and soybean acres (69,719 acres) and 80% of short-season crop acres (24,507 acres) watershed-wide. Practices should be implemented first within the Tier One lake and stream drainage areas (18,508 corn/soybean acres and 1,192 short-season crop acres).*
- Goal 2:** *Create cultural change by establishing a core Soil Health Team that can disseminate research, conduct demonstrations and provide outreach that will shift the standard thoughts and practices in the watershed.*

Justification for Goals

Acres of implemented practices that are known to increase organic matter will be used as a proxy for improved soil health in the Planning Area. In addition, an active, regularly meeting Soil Health Team will be used as a proxy for creating cultural change in the Planning Area.

Implementation Activities

Implementation of practices that improve soil health in the first 10-years of the plan will be focused on the drainage areas of the Tier One lakes: three impaired lakes that are currently very close to meeting state lake aquatic recreation water quality standards, and five high quality protection lakes; and the drainage areas of the Tier One impaired streams (Figure 3-21 through Figure 3-24).

- **3.2.1-B-1:**
Track and monitor cover crops and residue into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project.
- **3.2.1-B-2:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (or 69,719 acres) watershed-wide (2016 Cannon River WRAPS).
- **3.2.1-B-3:**
Implement practices that increase organic matter (such as cover crops and tillage management) on 80% of short season crop (corn silage, small grains, peas, and sweet corn) acres (or 24,507 acres) watershed-wide (2016 Cannon River WRAPS).
- **3.2.1-B-4:**
Develop a Soil Health Team that will achieve the following:
 - *Monitor multiple farms over time already implementing soil health practices that increase organic matter (such as cover crops, tillage management, and nutrient management) to demonstrate how soil health practices increase organic matter.*

- *Develop or identify an existing (such as from the new State Soil Health office) long-term education curriculum for farmers with multiple levels of training to move beyond cost-share to cultural change.*
- *Establish demonstration sites for practices that increase organic matter (such as cover crops, tillage management, and nutrient management) over a range of agricultural conditions (soil types, crop rotations, topography) within the Planning Area to address site-specific questions and concerns for implementing these practices by farmers. For example, canning crop areas, flat areas, and highly productive areas in Goodhue County.*
- *In conjunction with the new State Soil Health Office, develop ways to measure progress.*

Pace of Progress

Pace of progress towards achieving improved soil health will be based on tracking and monitoring cover crops and residue using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project, and number of meetings or participation with Soil Health Teams.

References

Hudson, B. D. (1994). Soil organic matter and available water capacity. *Journal of Soil and Water Conservation*, 49(2), 189-194.



3.2.2. Development

Approximately 10 percent of the Cannon River Planning Area is considered urban. The health of the urban environment has a significant impact on the quality of the natural resources in the Cannon River Planning Area. Urban landscapes tend to have high levels of point source pollution from municipal and industrial wastewater, and high levels of nonpoint source pollution due to altered drainage patterns, volume, timing, and chemical composition of stormwater runoff. A number of the communities in the Planning Area are also subject to flooding during extreme precipitation events. As these communities grow, it will be important to consider the impacts future land use decisions have on the surface water and groundwater resources. Improving stormwater management and developing community-based solutions that have multiple benefits are important to residents and users of the Cannon River Planning Area's quality of life and the environmental systems within the built environment.

PRIORITY AREA SUMMARY

Flooding of Communities (T1)

Flooding of larger communities is a priority within the 10-year timeframe of this Comprehensive Watershed Management Plan. Until a watershed-wide hydrologic & hydraulic model is developed to more accurately characterize how runoff is generated and delivered throughout the system, implementation strategies to address flooding will take place in the contributing drainage area to these larger communities.

Shoreland Management (T1)

Shoreland management is a priority in the Lakes Area to protect the high quality lakes and provide treatment for impaired resources.

Stormwater Management (T1)

The adoption of stormwater and erosion and sediment control ordinances is a priority for all non-MS4 communities in the Cannon River Planning Area while the need for stormwater retrofits is a priority for the larger communities where flooding and water quality improvements are needed.

Subsurface Sewage Treatment Systems (T1)

Areas of concern for SSTS design and maintenance are the Groundwater Priority Areas Pollution Sensitivity and Groundwater Dominated Lakes.

Small Community Stormwater Management (T2)

Small communities are distributed throughout the Planning Area. As a result, stormwater management of small communities is a watershed-wide issue.

Maintenance of Existing Stormwater BMPs (T2)

The large communities within the Planning Area are most likely to operate and maintain existing stormwater BMPs. As a result, the area of concern for maintenance of existing stormwater BMPs is Large Communities.

3.2.2-A: FLOODING OF COMMUNITIES**T1****Issue Statement**

The hydrology of the watershed has been altered due to actions such as straightening stream channels, ditching, tiling, draining or filling of wetlands or depressional areas, and adding impervious surfaces. These land use changes have a number of impacts including a net increase in flows moving through the watershed and more extensive flooding events. These land use alterations, as well as changes in precipitation patterns and more extreme events, are increasing the frequency and magnitude of flooding experienced by communities in the Cannon River Planning Area.

Implementation of activities addressing this concern often requires coordination among multiple partners over many years and are high dollar projects. There is currently no designated funding. Funding will be needed for planning and installation in order to address this concern.

Desired Future Condition

There is minimal flooding in the Cannon River Planning Area as a result of adopting a watershed management approach that seeks to mimic pre-development (before land use change) conditions. By understanding pre-development hydrology and hydraulics of the watershed there is adequate storage capacity upstream of communities, stormwater management requirements that mimic pre-development conditions are in place, and stormwater infrastructure and flood-proofing minimizes flood-related damages in urban portions of the watershed.

10-Year Measurable Goals

Goal 1: *Decrease the rate and volume of water that contributes to flooding of downstream communities to limit property damage and protect public safety by establishing water storage goals based on the results of the Long-Term Flood Evaluation Study which will be conducted in the first five years of the Plan. In the interim, the 10-year Volume Reduction Goal in the Cannon River at Welch is 35,733 acre-feet. This interim goal will be updated by the Planning Partners after completion of the Long-Term Flood Evaluation Study.*

Goal 2: *Maintain the Belle Creek Watershed District's PL-566 structures to prevent downstream flooding of Belle Creek and the Cannon River and protect public safety and manage the drainage area to PL-566 to minimize maintenance requirements into the future by installing three voluntary BMPs in the contributing drainage area within the 10-year timeframe of the Plan.*

NOTE: *Additional flood reduction goals can be found under Wetlands (storage), Agriculture (soil health), Public and Private Drainage Systems (storage) and Climate Change (resiliency).*

Justification for Goals

During the planning process, the Planning Partners identified flooding of large communities as a priority issue but there lacked a detailed flood evaluation study to target practices to address peak flow rates and volume reduction. The model development may be broken up into phases and built for upstream communities first, which benefit flooding concerns of downstream communities as well.

An interim flood reduction goal was established using BWSR's simplified spreadsheet to determine the volumetric storage needed to retain a certain depth of runoff over the planning area. The runoff depth used to establish the storage goal was determined using HSPF to predict how much storage would be achieved through implementation of the activities identified in the Comprehensive Watershed Management Plan. The runoff depth, and hence the goal, was based on HSPF predicted average, annual volume reduction for implementation of practices that increase organic matter (such as cover crops and tillage management) on 80% of short season crop (corn silage, small grains, peas, and sweet corn) acres (or 24,507 acres) watershed-wide (2016 Cannon River WRAPS) and 15% of corn/soybean acres (or 69,719 acres) watershed-wide (2016 Cannon River WRAPS). While the HSPF model included other agricultural runoff and soil health implementation activities included in the Targeted Implementation Schedule (e.g., nutrient management), the storage benefits of these practices was relatively minor compared to cover crops. It is likely that the combination of all the practices identified in the Targeted Implementation Schedule would achieve the estimated water storage goal of 35,733 acre-feet which is equivalent to retaining 0.5 inches of runoff over the entire Planning Area. Ultimately, the storage goal is less than 35,733 acre-feet since it was established using the drainage area to the USGS flow station on the Cannon River at Welch, MN (equivalent to 0.5 inches over 1,340 square miles).

Once the Long-Term Flood Evaluation Study is complete, the Planning Partners will reevaluate the goals and implementation activities for Flooding of Communities, Wetland Restoration and Drainage Systems.

Implementation Activities

Implementation for Flooding of Communities will be focused on the Large Communities in the Cannon River Planning Area.

- **3.2.2-A-1:**

Conduct a Long-Term Flood Evaluation Study (LTFES) to provide Planning Partners with the tools needed to mitigate the effects of flooding in the Cannon River Planning Area and make the communities more resilient. Components of the LTFES would include: development of a hydrologic & hydraulic study; evaluation of existing flows and storage lost due to filling of wetlands, tiling, ditching, and agricultural production; evaluation of existing storm sewer capacity; evaluation of flood reduction strategies (including *non-structural strategies* such as development standards and protecting growth to a higher standard and *structural solutions* such as strategically located storage and rate-control structures to help reduce peak flows) and cost-benefit analysis.

- *The hydrologic & hydraulic study will also evaluate options for addressing water which is diverted from the Le Sueur River to the Cannon River watershed. Results of this modeling evaluation may identify implementation strategies to disconnect this contribution of flow to the Cannon River watershed.*

- **3.2.2-A-2:**

Implement flood reduction practices within the Planning Area as identified in the Long-Term Flood Evaluation Study. This would include practices such as levees, flood walls, restoration of natural flood plains, wetland restoration, and rate control structures. This would also include managing tile drainage by replacing/retrofitting older, conventional tiling systems with controlled systems or denitrifying bioreactors to decrease chemical and nutrient loss.

- **3.2.2-A-3:**
Utilize past and current assessment and prioritization efforts in Etter Creek Watershed (a tributary to the Lower Vermillion River) in coordination with the Vermillion River Joint Powers Organization in an effort to install voluntary BMPs providing upland storage which help achieve volume reduction goals for the Cannon River (see 3.2.2-A: Flooding of Communities).

Pace of Progress

Measuring progress toward achieving the Flooding of Communities goals will be based on completing a Long-Term Flood Evaluation Study within the first five years, implementation of practices identified in the Long-Term Flood Evaluation Study over the next five years, and installation of 6 voluntary BMPs in the Etter Creek Watershed within the first 10-years.

3.2.2-B: SHORELAND MANAGEMENT

T1

Issue Statement

Shorelands typically contain important habitat and erodible soils. As a result, many of these areas are highly sensitive to development. Conversion of seasonal to year-round dwellings, developments and resorts have the potential to adversely impact shoreland and the adjacent waterbody. Counties currently operate programs with state and local dollars; however local dollars vary greatly across the planning area. Consistent funding is needed to address this issue.

Desired Future Condition

Citizens of the Cannon River Planning Area manage and maintain shorelands to protect clean water, canoeable streams, and the natural scenic beauty of native shoreline habitats. Each county has the resources needed to implement an effective shoreland management program that helps protect these valuable shoreland resources for generations to come.

10-Year Measurable Goals

- Goal 1:** *Establish a baseline of existing natural shoreline conditions and achieve no net loss (from baseline conditions) of existing natural shoreline on 10 Natural Environment Lakes, which provides water quality benefits as a result of its rich diversity of plants, animals and microorganisms.*
- Goal 2:** *Add one mile of natural shoreline in the Lakes Area by end of 10-year timeframe of plan.*
- Goal 3:** *Improve landuse decisions related to shoreland management by providing information that compares and analyzes local government decisions and their impacts to water quality.*



Geese on restored wetland – Photo Rice SWCD

Justification for Goals

There is not a general rule one can apply to estimate the amount of water quality treatment expected from shoreline restoration projects. While there are specific water quality benefits of shoreline restoration work (e.g. runoff reduction, filtration, and increased infiltration), the amount of treatment is unique to the project based on landscape setting, contributing drainage area, and pollutant load. As a result, the Planning Partners set a goal based on local knowledge of what can realistically be accomplished for shoreline improvements, assuming approximately 2 shoreline restoration projects per year that average 200-300 feet of shoreline, or 5,000 feet (approximately 1 mile). The 10 Natural Environment Lakes (as identified by the counties) in the Lakes Area that the Planning Partners identified for natural shoreline gain and rationale for selection are listed below. Note that Goal 1 is focused on Natural Environment Lakes while Goal 2 is focused on all lakes within the Lakes Area Surface Water Priority Area.

1. **Roemhildts** (Le Sueur; 40-0039-00; 1.5 shoreline miles): listed as 1 of the 5 protection lakes in the 1W1P plan, high water quality, and is groundwater fed.
2. **Fish** (Le Sueur; 40-0051-00; 3.2 shoreline miles): listed as 1 of the 5 protection lakes in the 1W1P plan, high water quality, and is groundwater fed.
3. **Dora** (Le Sueur; 40-0010-00; 6.1 shoreline miles): listed as impaired for nutrients, strong connectivity to surface water (river and/or ditch), strong presence of wetlands bordering the lake, WMA is adjacent to the lake, popular area for recreation, development relatively low, currently agricultural landuse surrounding lake.
4. **Mabel** (Le Sueur; 40-0011-00; 2.6 shoreline miles): listed as impaired for nutrients, strong connectivity to surface water (river and/or ditch), strong presence of wetlands bordering the lake, popular area for recreation, development relatively low, currently agricultural landuse surrounding lake
5. **Diamond** (Le Sueur; 40-0013-00; 5.1 shoreline miles): not listed as impaired, entire lake surrounded by wetlands which helps with City of Kilkenny flood mitigation and stormwater treatment, most of land surrounding the lake is owned by the MNDNR, lake is part of a WMA, popular area for recreation, no development on lake, currently agricultural landuse surrounding lake, very close proximity to Kilkenny

6. **Sabre** (Le Sueur; 40-0014-00; 2.7 shoreline miles): listed as impaired for nutrients, strong connectivity to surface water (river and/or ditch), presence of wetlands bordering the lake, recreation opportunities, development relatively low, currently agricultural land use surrounding lake.
7. **Tustin** (Le Sueur; 40-0061-00; 3.4 shoreline miles): listed as impaired for nutrients, strong connectivity to surface water (river and/or ditch), strong presence of wetlands bordering the lake, area for recreation, WMA adjacent to lake, some development, most of lake is within city limits of Elysian.
8. **Sprague** (Rice; 66-0045-00; 2.9 shoreline miles): listed as impaired for nutrients, close to meeting lake aquatic recreation water quality standards, priority concern in Rice County Water Plan, lake TSI Phosphorous 65 and TSI Phosphorous Goal <63, minimal lakeshore development, and heavy agricultural presence surrounding lake.
9. **Lower Sakatah** (Rice; 66-0044-00; 6.2 shoreline miles): impaired for aquatic consumption and recreation has an approved TMDL for Hg-F (mercury in fish tissue) and nutrients, sits on the main stem of the Cannon River, high recreation value due to proximity to Sakatah State Park, and future development potential (currently minimal).
10. **Toner's** (Waseca; 81-0058-00; 2.7 shoreline miles): shallow lake listed as impaired for nutrients, a county park is located on the lake shoreline, and there is also development pressure on this lake.

Implementation Activities

Implementation for Shoreland Management will be focused in the Lakes Priority Area.

- **3.2.2-B-1:**
Conduct inventory of existing natural shoreline quantity and quality on 10 natural environment lakes (Roemhildts, Fish, Dora, Mabel, Diamond, Sabre, and Tustin in Le Sueur County; Sprague and Lower Sakatah in Rice County; and Toners in Waseca County) within first two years, including:
 - *An inventory and evaluation of shoreland buffer, vegetation management, and other standards contained in local shoreland ordinances.*
 - *Review shoreland areas to determine whether storm water runoff is discharging through a buffer system or artificial wetland.*
 - *Identify where active development pressure is occurring in the Lakes Area and target those areas with priority implementation activities.*
- **3.2.2-B-2:**
Promote an increase in acres of sensitive shoreland, bluffs and steep slopes preserved by connecting local landowners with conservation groups and explore creating an easement program in the future.
- **3.2.2-B-3:**
Protect or restore native riparian vegetation by implementing a native vegetation buffer on 2 private lakeshore properties per year in the Lakes Area.
- **3.2.2-B-4:**
Review local shoreland ordinances, the permitting process, and ongoing enforcement to ensure resource protection needs are met by hosting a shoreland management summit with

County staff every 3 years. Develop a summary report after the summit that indicates what was accomplished and what actions will be taken as a result of the summit.

- **3.2.2-B-5:**
Promote voluntary actions for buffer establishment along SWCD adopted “other watercourses” maps/inventories for the protection or improvement of water quality.
- **3.2.2-B-6:**
Track the number of variances and conditional use permits granted annually for impervious surface reduction, quantity of earth work, tile intakes, rainwater harvesting, BMP implementation, and shoreline losses to identify any shoreline losses that might affect achieving a net gain of one mile of natural shoreline by the end of the 10-year timeframe of the plan.

Pace of Progress

Implement two shoreline improvement projects annually over the 10-year timeframe of the Plan. Conduct periodic evaluations of Natural Environment Lakes to ensure no net loss and track the number of shoreline improvement projects to achieve a shoreline gain.

To measure improvements in landuse decisions relative to shoreland management, Planning Partners will compare and analyze variances and conditional use permits granted annually to what has been approved in the past.

3.2.2-C: STORMWATER MANAGEMENT

T1

Issue Statement

Polluted stormwater runoff is often transported to municipal separate storm sewer systems (MS4) and ultimately discharged to local rivers, streams and lakes without treatment. EPA’s Stormwater Phase II Rule establishes a MS4 stormwater management program that is intended to improve the Nation’s waterways by reducing the quantity of pollutants that stormwater transports into storm sewer systems during storm events. The lack of stormwater management, regulations, and construction inspections in non-MS4 communities has an adverse impact on surface water resources in the Planning Area. Of the 21 cities in the Cannon River Planning Area, only five are MS4 communities (Faribault, Northfield, Owatonna, Red Wing and Waseca). The remaining cities and townships need to adopt stormwater management requirements to protect the surface water and groundwater resources in the Cannon River Planning Area. These smaller communities lack the staffing, funds or the resources to develop or implement ordinances and a permitting program.

Desired Future Condition

Each community has adopted stormwater management and erosion and sediment control ordinances to provide for public safety and resource protection needs and has an effective permitting program in place.

10-Year Measurable Goals

- Goal 1:** *Promote the adoption of stormwater management and erosion control standards in all of the communities, including MS4 communities.*

Goal 2: *Partner with cities and individual landowners to retrofit voluntary stormwater practices and improve maintenance activities in developed areas (i.e. older neighborhoods).*

Justification for Goals

Communities in the Planning Area regulate stormwater in a variety of ways; some communities have extensive stormwater ordinances while others regulate stormwater through general development standards (e.g. as part of the subdivision ordinance). The Planning Partners recognize that communities should consider a separate stormwater ordinance to meet the community's (and the Planning Area's) goals for water resource protection. Needs expressed by the communities during the plan development process indicate that this is a reasonable goal for the timeframe of the Plan.

Implementation Activities

Implementation for Stormwater Management will be focused in all non-MS4 communities in the Cannon River Planning Area.

- **3.2.2-C-1:**
Encourage Minimal Impact Design Standards (MIDS) Adoption by all non-MS4 communities in the Cannon River Planning Area by hosting joint workshops for city council and town board members. These workshops would cover Stormwater 101 (the problems we face from mistakes of the past and the impacts to receiving waters), integrating stormwater management practices to policy through effective stormwater ordinances, adapting the MIDS Community Assistance ordinance package to meet local needs and developing the structure (program) to effectively implement the policy including: administration, plan review, inspections and enforcement).
- **3.2.2-C-2:**
Utilize the Long-Term Flood Evaluation Study to determine the level of protection required in all of the communities (including MS4 communities) for the infrastructure system, public safety, and resource management needs.
- **3.2.2-C-3:**
Utilize existing cost-share programs to assist citizens, businesses and local units of government with the design and implementation of stormwater retrofit projects to improve water quality treatment and reduce the volume of water being delivered to downstream waterbodies.

Pace of Progress

Each of the non-MS4 communities will adopt a stormwater ordinance in the next 10 years.

3.2.2-D: SUBSURFACE SEWAGE TREATMENT SYSTEMS (SSTS)

T1

Issue Statement

Non-compliant or failing septic systems pose a threat to public health and natural resources. The WRAPS, produced by the MPCA, indicates that 21 percent of the SSTS systems in Goodhue, Rice, Steele and Waseca counties are Failing to Protect Groundwater (FTPGW) and 21 percent are posing an Imminent Threat to Public Health and Safety (ITPHS). Replacement of a failing septic system can be costly and an unexpected expense for residents.

Desired Future Condition

Risk to public health and safety is minimized because all septic systems are in compliance with current state standards.

10-Year Measurable Goals

- Goal 1:** *To protect high quality lakes in the Groundwater Pollution Sensitivity Area and the Groundwater Dominated Lakes Area, identify and address water quality problems stemming from inadequate wastewater treatment systems in four lake systems.*
- Goal 2:** *Work to create uniformity within existing SSTs programs across the Cannon River Planning Area to ensure consistency in implementation and enforcement.*

Justification for the Goals

During the plan development process, it was clear that some counties were playing a more active role in SSTs management than others. For example, Le Sueur County has taken an active role in determining the compliance status of septic systems in many of its lake systems having recently completed the Jefferson-German Septic Inventory Project as well as the Frances, Rays, Sakatah, and Tetonka Septic Inventory Project. The need to create more uniformity within existing septic programs was identified as a gap that needs to be addressed by the Planning Partners moving forward.

On a related note, there is a need to conduct SSTs inventories and address non-compliance issues on many of the shoreland areas of the lakes in the Cannon River Planning Area. Planning Partners chose not to identify the specific lakes beyond Volney-Gorman because they recognize that conducting septic inventories depends on a majority of shore owner participation and municipal and county support. Prioritization of the lake systems for inventories will be determined through the annual work planning process.

Implementation Activities

Implementation for SSTs will be focused in the Groundwater Priority Areas: Pollution Sensitivity and Groundwater Dominated Lakes.

- **3.2.2-D-1:**
Conduct SSTs inventory and address non-compliance issues on four lake systems located in the Groundwater Pollution Sensitivity Area and Groundwater Dominated Lakes Area, starting with Volney-Gorman.
- **3.2.2-D-2:**
Inventory existing programs to identify programmatic gaps across the Cannon River Planning Area and develop solutions to fill the gaps.

Pace of Progress

Conducting the programmatic gap analysis within the first three years of the Plan, conducting the four SSTs inventories and plan for addressing non-complaint systems.

3.2.2-E: SMALL COMMUNITY STORMWATER MANAGEMENT**T2****Issue Statement**

A number of the smaller, growing communities and communities in the rural portion of the Planning Area were developed without taking stormwater management into consideration. Land use changes in the contributing drainage area to these communities, aging and failing infrastructure and increased precipitation patterns point to a need to retrofit smaller communities with stormwater BMPs.

Desired Future Condition

The rural communities of the Planning Area are more sustainable in terms of their water systems. They have the financial and technical assistance needed to properly plan for water and wastewater utilities as well as stormwater management.

10-Year Measurable Goals

- Goal 1:** *Utilize the Hydrologic & Hydraulic Model of the Cannon River Planning Area to prioritize stormwater management retrofit needs in the smaller, more rural communities.*

3.2.2-F: MAINTENANCE OF EXISTING STORMWATER BMPS**T2****Issue Statement**

As more and more communities adopt stormwater management requirements, local stormwater managers have concerns about the long term maintenance implications of these requirements. For new development, stormwater management practices designed to meet stormwater management requirements are owned and operated by a Homeowners Association (HOA). Since the cities are ultimately responsible for flows directly entering municipal stormsewer systems, there are concerns with the ability of HOA's to manage these stormwater management facilities.

Desired Future Condition

HOAs in the Cannon River Planning Area have the knowledge, funding and staff needed to properly operate and maintain the stormwater management facilities located on their properties.

Measurable Goals

- Goal 1:** *Identify the HOA land holdings to develop a list of HOAs in the Planning Area and make connections with these HOAs by conducting educational meetings and inviting them to partner on projects.*



Stormwater BMP/Basin

3.2.3. Drainage Systems

There are a number of drainage systems in the Cannon River Planning Area that provide important stormwater conveyance and subsurface drainage services that support agricultural production (see Section 1.9 of Appendix A: *Land and Water Resource Inventory* for more information on the planning area's public drainage system). The public drainage systems are managed by the individual counties on behalf of the private properties receiving drainage benefits from the system. Public drainage systems are not publicly owned they are publicly-administered, privately owned. This means that public drainage systems are on private property or serve private parties (benefitted properties) but are maintained by the public drainage authority which is typically a county or a watershed district. Implementation of projects on the public drainage system requires coordination with benefitted properties and often involves public proceedings under the Minnesota Drainage Code M.S. 103E. In the Cannon River Planning Area, public drainage systems are often associated with public waters regulated by MNDNR (e.g. streams, rivers, lakes and wetlands) that creates another layer of complexity to implementation of projects.

Maintenance of the public drainage system is required to provide continued service to the benefitted properties that are typically assessed for any necessary maintenance or repairs. Benefitted property owners also frequently connect private drainage systems including both open ditches and subsurface tile lines to public ditches. These lawfully connected private drainage systems are paid for and managed by the individual landowner. Conducting a redetermination of benefitted properties is often necessary when changes to the drainage system are proposed.

Subsurface perforated tile lines are very common throughout the arable lands within the planning area, with pattern tile systems becoming more prevalent. Drain tile systems remove excess water from agricultural land and can thereby increase yields. In some cases, these systems function as efficient nitrogen conduits from the soil column to aquatic resources. Rapidly removing water from the soil column can also reduce groundwater recharge depending upon underlying soil types. Recent advances in drainage water management provide producers an opportunity to control the release of excess water and limit the transport of nitrogen downstream. This ability to retain water in the tile systems may reduce crop stress by providing the mechanisms to manage water levels and reduces volume of water routed to downgradient drainage systems that may be aging or undersized to handle current precipitation events.

PRIORITY AREA SUMMARY

The artificial drainage system is concentrated in the western and southern portions of the Planning Area. The Straight River Area and the Lakes Area have the highest density of public drainage systems.

3.2.3-A: DRAINAGE SYSTEM MANAGEMENT**T1****Issue Statement**

While drainage systems were installed to remove excess water and lower the water table for agricultural production and/or development, there may be unintended consequences to the hydrologic system including changes in peak flow, water quantity, water quality and groundwater recharge. In addition, existing drainage systems and/or aging infrastructure may not be sized to handle volume and rate changes that cause localized flooding issues. The existing ditch fund structure of assessing those benefitted may or may not work for implementing activities identified in the Plan. Additional funding sources will be needed to address plan priorities.

Desired Future Condition

Drainage systems, administered in accordance with MS Chapter 103E, will provide the drainage necessary to support the agricultural industry and protect property from flooding without causing impacts to aquatic resources stemming from hydrologic alteration and excessive nutrient loading. The condition and capacity of the existing drainage system will be understood such that drainage enhancement projects can be implemented with a full understanding of benefits, costs and consequences.

10-Year Measurable Goals

- Goal 1:** *Reduce runoff volumes, peak flow rates and erosion of agricultural lands by implementing multi-benefit drainage management projects within the benefit area of public drainage systems as defined by Minnesota Statute 103E and open drainage systems.*
- Goal 2:** *Expand local knowledge and confidence in multi-benefit drainage management practices.*

Justification for Goals

Throughout the Plan development process, Planning Partners had frequent conversations about how intertwined drainage systems are with other priority issues identified in the watershed (e.g. water quality, flooding, wetland protection, etc.). The Planning Partners acknowledged the need for multipurpose drainage system management to address the range of issues and decided “Drainage Management” was better represented in the Comprehensive Watershed Management Plan as a standalone issue with its own goals and implementation activities rather than distributing amongst other issues. A special workgroup meeting was held to further discuss issues related to drainage management. The meeting was well attended with key representatives from BWSR, SWCDs, County Drainage Authorities and County staff responsible for maintaining the public drainage systems. Meaningful dialog focused on drainage system needs and the complexity of stakeholders involved including the Drainage Authority, regulatory agencies and Benefitted Property Owners. Ultimately, the group collaborated to develop goals and activities that provide the most benefit to the resources of the watershed and that could feasibly be implemented within the 10-year timeframe of the Plan.

Implementation Activities

Implementation for Drainage System Management will be focused in the Straight River Priority Area and the Lakes Priority Area, which have the highest density of public drainage systems.

- **3.2.3-A-1:**
Define the needs of and conduct an inventory of potential opportunities for multi-benefit improvements within the entire public drainage system to better define the drainage system, inform project implementation and facilitate the development of a hydrologic & hydraulic model of the Planning Area (e.g. pipe sizing, elevations, flow direction, drainage divides, etc.).
- **3.2.3-A-2:**
Complete conditioned terrain analysis for the Straight River and Lower Vermillion portion of the Planning Area to support completion of the PTMApp BMP targeting tool that will be used to select practices during the annual work planning process as described in Section 6.4.
- **3.2.3-A-3:**
Conduct modernization of drainage records (convert profiles to known elevation datum; update benefitted parcels mapping, etc.).
- **3.2.3-A-4:**
Facilitate web access to publicly available drainage system records.
- **3.2.3-A-5:**
Identify hotspots for project implementation by using PTMApp or consulting with ditch inspectors and reviewing drainage reports. In particular, drainage systems that have begun to remeander that could be maintained for water quality benefits. Implement priority ditch projects.
- **3.2.3-A-6:**
Conduct annual meetings with all drainage authorities in the Planning Area to provide the group an update on each entity's drainage system management program and to discuss advancements in drainage science.
- **3.2.3-A-7:**
Create four multi-benefit drainage management (MDM) plans with a focus on drainage systems located within the Lakes Area and the Straight River Area that provide both private drainage benefits and public water management benefits in conjunction with benefitted property owners and other stakeholders.
- **3.2.3-A-8:**
Implement five multi-benefit drainage projects in the Lakes Area and Straight River Area over the 10-year timeframe of the Plan to reduce runoff volume, peak flows and erosion of agricultural lands.
- **3.2.3-A-9:**
Reduce excessive peak discharge within drainage systems of the Lakes Area and Straight River Area through implementation of five water and sediment control basins, 2-stage channel designs, culvert sizing or other methods that reduce flooding potential downstream. Strategically locate and/or prioritize these structures where historical wetlands were located. Consider off-channel structures and avoid placing the structures on perennial flowing streams and ditches.

- **3.2.3-A-10:**

Host co-op workshops in the priority areas to illustrate the level of effort involved in planning, design and implementation of multi-purpose and multi-benefit drainage management. Identify local agricultural producers who have already installed multipurpose drainage management practices and ask them to share how they manage water and drainage in their fields during an annual drainage field tour and workshop. Highlight new demonstration projects in the Planning Area by including them on annual drainage field tour and workshop, publishing news articles and featuring at the local soil and water conservation district or NRCS office. Include information that promotes the effectiveness of these projects in reducing runoff volume and peak flows (to reduce flood damage), erosion of agricultural lands (to protect productivity) and in improving water quality, wildlife habitat and resiliency.

Pace of Progress

Progress towards the goals will be measured as follows:

- By the number of projects implemented over the life of the plan. For implementation of multi-benefit drainage systems or peak discharge reduction projects on private lands, progress will be dependent on several factors, including: the number of landowners involved, understanding of benefit and cost consequences, and willingness of landowners to convert agricultural land to a conservation purpose.
- By gathering baseline knowledge/comfort level with MDM practices and any changes during the 10 year plan.



Dry streambed within agricultural land use – Goodhue, County

3.2.3-B: DRAINAGE SYSTEM BUFFERS**T2****Issue Statement**

There is a lack of functioning buffers on private drainage systems.

Desired Future Condition

All drainage systems will have buffers appropriate for filtering runoff prior to entering surface water resources. Buffers are sized according to the drainage area they support and riparian conditions.

10-Year Measurable Goals

Goal 1: *Enhance treatment of runoff and drainage water on private drainage systems by providing technical and financial assistance to landowners for treatment measures such as filter strips and buffers.*

3.2.3-C: OPERATION AND MAINTENANCE**T2****Issue Statement**

Many of the public drainage systems which are managed by the drainage authorities are not routinely maintained and lack an operation plan. Some drainage systems have accumulated so much sediment that they have begun to remeander, mimicking a more natural stream hydrology. These drainage systems could be maintained as remeandered streams for the benefit of water quality, if acceptable by landowners.

Desired Future Condition

All public drainage systems that are important for managing excess water are maintained regularly as described in an operation plan.

10-Year Measurable Goals

Goal 1: *Inventory all public drainage systems and develop an Operation and Maintenance Plan for all systems that provide a drainage function.*



Grassed waterway in agricultural field – Dakota County

3.2.4. Climate Change

Changes in climate and the frequency of severe storm events and droughts may have economic, ecological, and human health impacts in the Cannon River Planning Area. Average annual precipitation in Southeastern MN has been 14 percent wetter over the last 20 years than it was over the last century, and the average annual precipitation by decade has been higher for the last three decades than it has been for any decade since the 1890's (MNDNR State Climatology Office). In recent years, communities in the Cannon River Planning Area have flooded on multiple occasions. Flooding frequency is now so regular along the Cannon River that communities expect the river to flood in some fashion almost annually. The Cannon River Planning Area was subject to severe storms and flooding in the fall of 2016. Governor Mark Dayton requested a major disaster declaration for Individual Assistance for four counties, Public Assistance for nine counties and Hazard Mitigation statewide. This declaration made Public Assistance available for emergency work and the repair or replacement of facilities in Goodhue, Le Sueur, Rice, Steele and Waseca Counties. It also provided individual assistance for 1,144 residences impacted by the disaster. Updated USDA plant-hardiness zone mapping efforts indicate that warmer winters have shifted the Twin Cities and surrounding communities into a new zone. While this shift in hardiness has advantages in terms of longer growing seasons and productivity it also has implications for the spread of invasive species, higher irrigation demands, increased water loss due to higher evaporation, and changes in recharge. A number of these factors may play a role in groundwater availability in the future.

PRIORITY AREA SUMMARY

Climate change is a regional meteorological phenomenon, and should be addressed watershed-wide.



Cattails in winter - MN

3.2.4-A: COMMUNITY RESILIENCE TO CLIMATE CHANGE**T1****Issue Statement**

Rising global temperatures have been accompanied by changes in weather and climate. As a result, many areas are seeing changes in precipitation patterns including more floods, droughts and/or intense precipitation events, and a shift in vegetation patterns. A trend analysis of local climate data indicates that the Cannon River Planning Area is experiencing changes in precipitation and temperature which presents challenges to watershed management decision-making.

Desired Future Condition

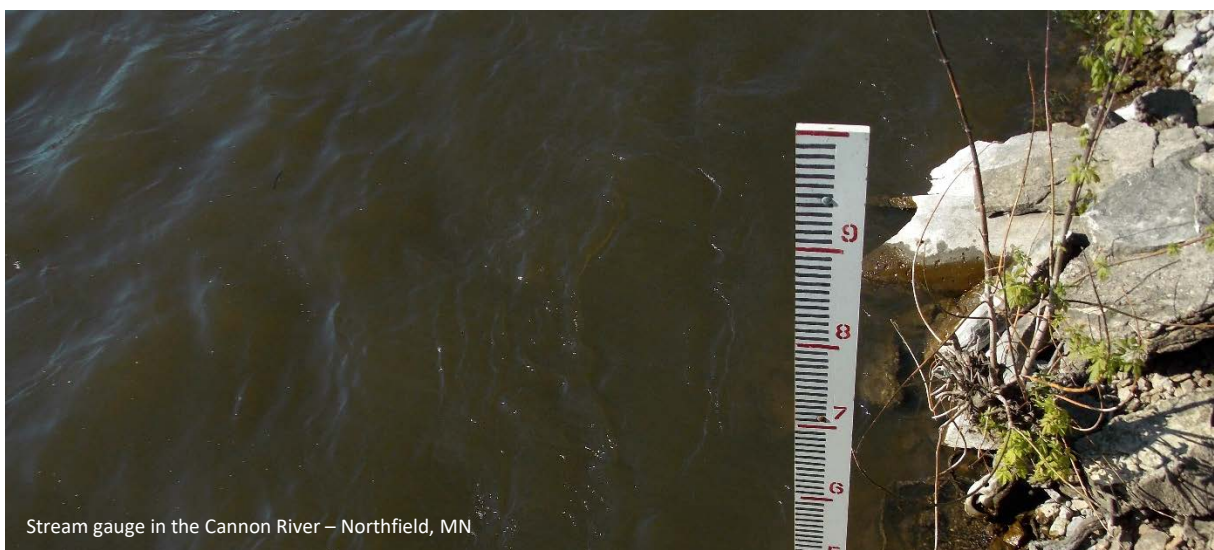
Communities in the Cannon River Planning Area are more sustainable in the future: they have developed resilience to reduce the risks inherent in a changing climate and take advantage of opportunities which enhance environmental, social and economic well-being. The needs of present and future generations are met.

10-Year Measurable Goals

- Goal 1:** *Build climate literacy amongst Planning Partners so they can successfully carry out their work in an era of rapidly changing climatic conditions.*
- Goal 2:** *Evaluate the impact of climate change on the watershed's resources and infrastructure to identify potential flooding issues.*
- Goal 3:** *Increase resiliency of the Cannon River Planning Area by collaborating on five structural or non-structural projects designed to increase resiliency.*

Justification for the Goals

Many of the communities in the Cannon River Planning Area are experiencing flooding as a result of extreme precipitation events and climate change. Goals to address these impacts are intended to establish baseline conditions by assessing vulnerabilities and climate literacy amongst Planning Partners. While this baseline condition is being established, the Planning Partners intend to further increase resiliency by partnering on projects that increase the resiliency of communities.



Stream gauge in the Cannon River – Northfield, MN

Implementation Activities

Implementation for Community Resilience to Climate Change will be throughout the Planning Area.

- **3.2.4-A-1:**
Conduct climate training and education needs assessment.
- **3.2.4-A-2:**
Have at least one policy or staff member attend a climate change related workshop per year (e.g., Minnesota Climate Adaptation Annual Conference).
- **3.2.4-A-3:**
Partner with small communities to conduct a vulnerability assessment following completion of the Long-Term Flood Evaluation Study, one community per year for 5 years.
- **3.2.4-A-4:**
Partner on the implementation of projects designed to increase resiliency and improve water quality in those communities that have conducted a vulnerability assessment and/or are a Minnesota GreenStep City.
- **3.2.4-A-5:**
Establish or participate in a Climate Change Team that meets annually to promote monitoring, research, and modeling to predict impacts of climate change in the Planning Area.

Pace of Progress

Within the 10-year timeframe of the Plan, Planning Partners will have completed a vulnerability assessment of the watershed as well as established the climate literacy of Planning Partners so this information can be used to inform the Education and Outreach Plan as well as enhance implementation activities by considering design components which provide for resiliency.



Vermillion River- flooded public water access parking area

3.3. WATERSHED CONCERNS: SOCIOECONOMIC FACTORS

Human interaction with the environment causes complex, often substantial impacts that affect the entire watershed. Watershed management can address human-environment interactions by reviewing legal systems, promoting best management practices, encouraging natural resource-conscious land use decisions and alterations and promoting stewardship.

PRIORITY AREA SUMMARY

Education and Outreach (T1)

Environmental education, water resource awareness, and watershed stewardship should be promoted throughout the entire Cannon River Planning Area. These efforts should target all ages, races, and socio-economic statuses.

Coordination and Partnerships (T1)

Watershed management efforts are most successful when stakeholders develop robust, coordinated collaborations that exploit synergies, leverage efficiencies, work through peer-to-peer relationships, and create multiple incentives to actively manage the watershed's water and natural resources.

Recreation and Livability (T1)

A significant portion of the Cannon River is designated as a State Wild and Scenic River. The many tributary creeks, streams, rivers, lakes, trails and parks located throughout the watershed provide abundant opportunities for outdoor recreation and enhance livability. Community livability, tourism and the outdoor recreation economy is dependent upon the quality of the Cannon River Planning Area's water and natural resources.

3.3.1. Education and Outreach

There are numerous stakeholder groups in the Cannon River Planning Area. Engaging these groups in watershed management would promote stewardship and assist in meeting the goals of the Comprehensive Watershed Management Plan. Watershed management programs and projects should provide opportunities to gather and share information, engage stakeholders in the planning and design of restoration and protection activities, promote watershed stewardship, and educate stakeholders on issues critical to protecting and conserving the Cannon River Planning Area.



Outdoor education days – Photo Goodhue SWCD

3.3.1-A: EDUCATING LOCAL LAND USE DECISION MAKERS**T1****Issue Statement**

Decision makers with land-use authority are tasked with making decisions that can have impacts on water quality, such as approving a conditional use permit or granting variances to zoning ordinances. If decision makers had a better understanding of watershed management, they would understand how land-use decisions affect the watershed and its resources.

Desired Future Condition

Local governments, including elected officials and staff, have a basic understanding of watershed management and the Cannon River Comprehensive Watershed Management Plan, which facilitates more sustainable land use decisions, which support the goals of the Plan.

10-Year Measurable Goals

Goal 1: *Provide information annually to locally elected and appointed decision-makers to strengthen leadership and make better-informed land use decisions as they relate to potential water quality and water quantity impacts.*

Justification for Goals

Achieving the goals of the Cannon River Comprehensive Watershed Management Plan requires the participation of local government entities; particularly those with landuse decision-making authority. Continuing to provide current information on the impacts landuse changes have on the Planning Area's resources ensures decision-makers have the information they need to make defensible, balanced decisions.

Implementation Activities

Implementation for Educating Local Land Use Decision Makers will be throughout the Planning Area.

- **3.3.1-A-1:**
Encourage attendance at training sessions for 12 individuals per year on ordinances, development planning strategies, and development techniques that protect natural resources and benefit water quality. Frequency of outreach should coordinate with the election cycle and be prioritized based on the water management responsibilities of locally elected and appointed decision-makers.
- **3.3.1-A-2:**
Annually lead one community conversation between elected decision makers and the community on stormwater management BMPs that focuses more on brainstorming and solution development.
- **3.3.1-A-3:**
Host biannual (every other year) field day or tour for locally elected and appointed decision-makers, or their appointed citizen advisory committee. Rotate the location of this annual field day throughout the Cannon River Watershed Planning Area.

Pace of Progress

Tracking performance in achieving this goal can be measured by ensuring the implementation activities identified above have been completed but more importantly, it should be measured by social change. Ultimately, the goal is to inform local officials so they can make better-informed land use decisions as they relate to potential water quality and water quantity impacts. The Planning

Partners will use multiple indicators of success to assess improvements in land-use decision-making by conducting surveys and tracking the number of variances or conditional-use permits granted as well as new programs or positions created in response to this issue.

3.3.1-B: CITIZEN ENGAGEMENT

T1

Issue Statement

Maintaining or restoring the health of natural resources requires significant watershed management. This management includes important roles for citizens in terms of changing behaviors, shaping policy, protecting and restoring local waterbodies, and taking part in community-based opportunities. To promote this stewardship, citizens in the Planning Area need to improve water literacy and promote a basic understanding of watershed management. Many SWCDs, counties and partners have programs to provide citizen engagement opportunities but additional funding is needed to provide this education on a watershed-wide scale.

Desired Future Condition

Citizens understand and value the watershed's resources, actively conserve watershed resources, and participate in the implementation of the Cannon River Comprehensive Watershed Management Plan by volunteering, being watershed stewards and advocating for more sustainable land use decision-making.

10-Year Measurable Goals

- Goal 1:** *Create a more uniform education and outreach program amongst Planning Partners that leverages the efforts of others working in the Cannon River Planning Area.*
- Goal 2:** *Increase the adoption of BMPs and conservation practices by 10% across the Planning Area to help achieve the goals in this Plan.*
- Goal 3:** *Increase the use of volunteers to implement projects, expand existing volunteer programs, and have committed volunteers for water quality monitoring on all priority lakes and streams.*

Justification of Goals

The results of a multi-year outreach approach to evaluate the effects of outreach on the adoption of conservation practices was reported in the Journal of Soil and Water Conservation in 2010¹. This study reported an increase of up to 25% for the adoption of farming practices (e.g. no-till, strip-till, fall tillage), up to 50% for changes in the use of nitrogen forms, information sources and application methods, and up to 40% on the use of conservation practices (e.g. grassed waterways, stream buffers, terraces, contour farming, conservation tillage). The goal of 10% represents



Soil health field day – Photo Rice SWCD

¹ Effects of outreach on the awareness and adoption of conservation practices by farmers in two agricultural watersheds of the Mackinaw River, Illinois. A.M. Lemke, T.T. Lindenbaum, W.L. Perry, M.E. Herbert, T.H. Bear, and J.R. Herkert. Journal of Soil and Water Conservation SEPT/OCT 2010 – Vol. 65, No. 5.

the change Planning Partners can expect to see across the board with substantial dedication of time and resources by local conservation agencies.

Implementation Activities

Implementation for Citizen Engagement will be throughout the Planning Area.

- **3.3.1-B-1:**
Develop an education and outreach plan for the Cannon River Planning Area to focus on building relationships and trust in an effort to promote voluntary action. This plan will take a regional approach and identify partnerships, recognize existing efforts, past successes, and will be implemented in conjunction with other entities.
- **3.3.1-B-2:**
Inform absentee landowners that the health of their land and local natural resources is part of an absentee owner's long-term investment. Create and communicate explicit guidance in flyer with property tax assessment for (1) incorporating conservation practices into farm lease agreements, (2) alternative drainage demonstration projects, and (3) improved conservation drainage systems in their fields.
- **3.3.1-B-3:**
Educate homeowners and lake associations through news releases, workshops, presentations to organizations and one-on-one communications on: (1) shoreland property and the need to restore shoreline to a more natural state; (2) septic improvements and maintenance; (3) benefits of conservation and working lands easements; (4) BMP installation and implementation
- **3.3.1-B-4:**
Host periodic educational workshops for design and construction professionals including (1) licensed Septic Professionals; (2) drainage contractors; (3) design engineers; and (4) landscaping professionals.
- **3.3.1-B-5:**
Develop educational opportunities to encourage stewardship and increase awareness of the interconnected nature of land, surface water, and groundwater through (1) curriculum development and (2) hosting classroom presentations and outdoor education.
- **3.3.1-B-6:**
Develop and install one demonstration project per year to highlight stormwater management practices, Low Impact Development (LID), Green Infrastructure, natural resources protection methods, and resource stewardship.
- **3.3.1-B-7:**
Promote volunteer network by recruiting additional volunteers for the citizen monitoring program, hosting one river cleanup project and one land stewardship project per year.
- **3.3.1-B-8:**
Develop an Annual Recognition Program to recognize citizen efforts and leaders in the communities in water resource and natural resource protection.
- **3.3.1-B-9:**
Conduct surveys "before" and "after" targeted outreach to measure the influences of outreach on residents, local landowners, and farmers to better understand implementation issues, fiscal and operational barriers, communicate the benefits of implementation and measure adoption rates over time.

Pace of Progress

The Planning Partners will track adoption rates over time using local conservation district databases and local knowledge of adoption rates of in-field conservation practices.

3.3.2. Coordination and Partnership

Watershed management efforts are most successful when stakeholders develop robust, coordinated collaborations that exploit synergies, leverage efficiencies, work through peer-to-peer relationships, and create multiple incentives to actively manage the watershed's water and natural resources.

Many local, regional, and state public and private entities have a vested interest in water resource management and the protection of our water resources and natural environment. Although the source of interest may differ, many of these entities often have overlapping or common goals.



Cover crop interseed demonstration – Photo Rice SWCD



Water Conversation, Waterville – Photo Dakota SWCD

3.3.2-A: PLANNING AREA PARTNERSHIPS**T1****Issue Statement**

There is a diverse group of stakeholders who are either directly or indirectly involved in watershed management in the Planning Area. The Farm to Stream report by Freshwater Society provides a summary of the FarmWise Program that was conducted locally. The report highlights the need for investing in relationships and partnerships to improve watershed health. Opportunities for existing and new partnerships need to be enhanced and utilized in the Cannon River Planning Area.

Desired Future Condition

Stakeholders across the watershed and from a diverse background, develop robust partnerships that build on synergies, leverage efficiencies, use peer-to-peer relationships, and facilitate incentives to actively manage the watershed's water and natural resources.

10-Year Measurable Goals

Goal 1: *Strengthen and expand collaborative relationships and partnerships.*

Justification for the Goals

During the early stages of the plan development process, the Planning Partners identified a diverse group of stakeholders who are either directly or indirectly involved in watershed management. These stakeholders include commodity groups, farm-related organizations, environmental organizations, government agencies and organizations, research organizations, sportsman groups, tourism groups and other non-profit organizations. The Farm to Stream report by Freshwater Society provides a summary of the FarmWise program that was conducted in three subwatersheds of the Cannon River between 2011 and 2013. The report highlights the need for investing in relationship and partnerships. Participants in the program expressed that trust is a critical component influencing adoption of conservation practices. Recognizing that partnerships can help to accomplish more than what might be possible working alone, the Planning Partners identified the need to explore and cultivate watershed partnerships to achieve the goals of the Comprehensive Watershed Management Plan.

Implementation Activities

Implementation for Planning Area Partnerships will be throughout the Planning Area.

- **3.3.2-A-1:**
Encourage the Cannon River Watershed Partnership and MS4 cities to continue participating on the Cannon River Technical Advisory Group during plan implementation.
- **3.3.2-A-2:**
Invite stakeholder groups to an annual meeting to explore shared visions and goals for watershed management. Identify opportunities to create partnerships for education and outreach, project implementation, and monitoring and data collection.

Implementation activities that achieve progress towards this issue/goals but also address other issues/goals found in Section 3.3.1 – Education and Outreach: Citizen Engagement as well as in the Targeted Implementation Schedule under Socioeconomic Factors:

- **3.3.1-B-1:**
Develop an education and outreach plan for the Cannon River Planning Area that defines the need for partnerships, evaluates potential partnerships, recognizes existing efforts and past successes, is implemented in conjunction with other entities, and takes a Planning Area wide approach.

Pace of Progress

The Planning Partners will use multiple indicators of success to assess watershed partnerships by measuring the following: the number of plans and projects being implemented by the partnership, the number of cooperative activities engaged in by stakeholders, the number of partnerships over time and a change in attitude of certain stakeholder groups over time as a result of partnerships (e.g. by conducting routine in-person interview and electronic surveys).

3.3.2-B: INTERNAL CAPACITY

T1

Issue Statement

To ensure the successful implementation of the Cannon River Comprehensive Watershed Management Plan there is a need to evaluate and address internal capacity and planning coordination, including sharing of staff, programs and resources.

Desired Future Condition

Organization that can most efficiently implement projects and programs of the Cannon River Comprehensive Watershed Management Plan.

10-Year Measurable Goals

Goal 1: *Create an organization that effectively meets the goals and objectives of the Cannon River Watershed Management Plan.*

Justification for the Goals

Once the Cannon River Comprehensive Watershed Management Plan is approved, the task of creating a functional organization will begin. The Planning Partners recognize that their ability to implement the plan effectively depends upon its capacity, its internal environment as well as its external environment. This is supported by findings in the Farm to Stream Report that number of staff and depth of knowledge among many staff is necessary so that departure of one key staff does not derail efforts. Ultimately, development of the organization will evolve over time and require taking an adaptive management approach.

Implementation Activities

Implementation for Internal Capacity will be throughout the Planning Area.

- **3.3.2-B-1:**
Develop and maintain a Cannon River Comprehensive Watershed Management Plan website.
- **3.3.2-B-2:**
Establish a regular meeting schedule, for the lifespan of the Plan, of a working group comprised of members of the Cannon River 1W1P Policy and Advisory Committees, joined

by County and SWCD staff, to track progress of the Plan, make modifications, discuss and identify alternative sources of funding for both staff and project resources, and assess effectiveness toward Plan implementation.

- **3.3.2-B-3:**
Prioritize SWCD staff getting Job Approval Authority (JAA) or certifications to increase the capacity of SWCDs to provide technical assistance for conservation practices and to improve effective engagement (i.e. social capacity training).
- **3.3.2-B-4:**
Assess each LGU's strengths and weaknesses for implementation to identify gaps and strengthen technical capacity through training of existing staff, adding staff, or utilizing municipal staff and others for implementing projects making funds available for 12 individuals to receive training annually.
- **3.3.2-B-5:**
Provide staff training in outreach and communication to more effectively communicate with locally elected and appointed decision-makers, landowners, crop consultants, private well owners, and conservation partners.
- **3.3.2-B-6:**
Meet with member Boards to provide biannual (every other) updates on accomplishments and water quality trends.

Pace of Progress

Monitoring and evaluating the organization's capacity to effectively implement the Cannon River Comprehensive Plan will occur during the annual evaluation as well as during the Partnership Assessment as described in Section 6.5.2. During the Partnership Assessment, members will assess their own and the other partners' participation in this Plan. The Assessment will consist of a questionnaire that the Members can complete to examine the strengths and weakness of the partnership. Results from the assessment will be used to guide the Plan Partners and stakeholders in improved decision-making and participation in implementation activities.



2018 Envirothon – Photo Rice SWCD

3.3.3. Recreation and Livability

A significant portion of the Cannon River is designated as a State Wild and Scenic River. The many tributary creeks, streams, rivers, lakes, trails (e.g. Mill Town State Trail) and parks (e.g. Nerstrand Big Woods State Park and Sakatah Lake State Park) located throughout the Planning Area provide abundant opportunities for outdoor recreation and enhance livability. Community livability, tourism and the outdoor recreation economy is dependent upon the quality of the land and water resources in the Cannon River Planning Area.

Additionally, the Cannon River Planning Area includes two regional parks in Dakota County: Lake Byllesby Regional Park and Miesville Ravine Park Preserve, both of which the Metropolitan Council has made a substantial investment in through its park implementing powers. These parks offer opportunities for public recreation on the Cannon River and its tributaries. Improvement of water quality in the watershed would likely have a positive impact on the parks, whether by improving fisheries and wildlife, by reducing risks to public health, and by improving river aesthetics.



RV camping at Lake Byllesby Park

3.3.3-A: RECREATIONAL VALUE**T1****Issue Statement**

There is a need to maintain existing and create new high-quality recreational opportunities in the Planning Area that balance the restoration and protection of the resources. Additionally, there is a need to improve environmental stewardship to ensure people recreating in the Planning Area are caring for the resources they are using for recreational purposes.

Desired Future Condition

Parks and recreation opportunities improve overall quality of life and make communities livable and desirable for businesses and homeowners. The parks and recreation areas in the Cannon River Planning Area are exceptional: people can swim, fish, and recreate without worry. Green space connections with trails make it possible for everyone to use and enjoy the parks and recreate. Public recreation opportunities are enhanced by promoting clean water, connecting habitat, and preventing invasive species. Public recreation opportunities have moved beyond clean water and include important wildlife and habitat areas.

10-Year Measurable Goals

Goal 1: *Increase recreational opportunities in the Cannon River Planning Area by improving access and protecting, preserving and enhancing natural resources and recreational opportunities.*

Justification for the Goals

Recognizing that one of the benefits of a healthy watershed is safe and healthy outdoor recreational opportunities, the Planning Partners established a goal that aligns with other goals for water quality improvement, education and outreach and improved stewardship. This goal further aligns with the social values expressed during the water conversations held over the course of the plan development process.

Implementation Activities

Implementation for Recreation and Livability will be throughout the Planning Area.

- **3.3.3-A-1:**
Communicate location and explanation of water quality impairments that may affect recreational opportunities or quality of experience.
- **3.3.3-A-2:**
Assess existing access to the Planning Area's surface water resources and work with state agencies to address the number and quality of access points.
- **3.3.3-A-3:**
Annually review the availability of land adjacent to water resources which can be acquired or opened to the public in order to increase access to water recreation.

Pace of Progress

Within the 10-year timeframe of the Plan, Planning Partners will have inventoried the quantity and quality of existing access points in coordination with the partners identified in the Targeted Implementation Schedule. In addition, the Planning Partners intend to increase the number of access points through partnerships (see Targeted Implementation Schedule).

3.4. LOCAL PRIORITIES

Local priorities are specific actions or initiatives that are unique to a particular LGU, but have not been identified as priorities for the Cannon River Comprehensive Watershed Management Plan. Local priorities have been included in the Cannon River Comprehensive Watershed Management Plan so local governments can address those items that they intend to accomplish at the local level, independent of the Plan Partners. The identification of local priorities allows local governments to continue serving constituents outside of the priority areas. This section identifies the local priorities of the watershed management organizations and the counties and SWCDs located in the Planning Area.

3.4.1. Water Management Organizations

There are two Water Management Organizations located in the Cannon River 1W1P Planning Area: the Belle Creek Watershed District (BCWD), and the North Cannon River Watershed Management Organization (NCRWMO). Only the Belle Creek Watershed District intends to satisfy their statutory watershed management planning duties with this Comprehensive Watershed Management Plan. The NCRWMO will participate on the Cannon River Watershed Joint Powers Board (CRWJPB) but continue to operate under their current watershed management plan. The following two sections describe the entities' watershed management plans requirements, and their Local Priorities.

BELLE CREEK WATERSHED DISTRICT

The Belle Creek Watershed District (BCWD) was formed in 1968 to oversee construction of flood prevention structures funded under the Watershed Protection and Flood Prevention Act (PL-566) and to conduct ongoing maintenance of these structures. In 1970 the appointed BCWD members adopted an Overall Plan which focused on issues of flooding and water resources. The mission statement of the BCWD is *"to maintain the productivity of the soil by conservancy and restoring soil fertility through the practical application of erosion control and land use practices so as to promote the general welfare and security of the families within the district."* These overall objectives remain in place today, however the focus of the BCWD is to protect the infrastructure in place while continuing to improve the water quality and quantity within the Belle Creek Watershed District.

More specifics on the local priorities of the BCWD are provided in Section 4.4.1 of the Plan. Specifically, the Belle Creek Watershed District's 2020-2029 Implementation Plan and Capital Improvement Program is contained in Section 4 *Targeted Implementation Schedule*.

NORTH CANNON RIVER WATERSHED MANAGEMENT ORGANIZATION

The North Cannon River Watershed Management Organization (NCRWMO) was established in 1983 as a result of the Metropolitan Surface Water Management Act to address concerns related to water quality in the watershed's streams and lakes. The mission statement of the NCRWMO is *"Managing groundwater and surface water to prevent property damage, maintain hydrologic balance, and protect water quality for the safety and enjoyment of citizens and the*

preservation and enhancement of wildlife habitat through collaboration among member communities.”

More specifics on the local priorities of the NCRWMO can be found in the North Cannon River Watershed Management Organization’s 2013-2023 Watershed Management Plan.

3.4.2. Counties and Soil & Water Conservation Districts (SWCD)

The six partnering counties and Soil and Water Conservation Districts (SWCDs) located in the Cannon River Planning Area serve many critical functions in watershed management, the most important of which is cultivating relationships with landowners in an effort to promote stewardship and construct BMPs. Each of these local units of government intends to continue implementing programmatic activities much as they do today. For example, each of the counties and SWCDs intend to continue addressing the following local priorities throughout the Cannon River Planning Area over the 10-year timeframe of the Cannon River Comprehensive Watershed Management Plan. It should be noted that items identified in the following tables are not intended to represent an all-inclusive list.

Dakota County & SWCD

Table 3-17. Local Priorities for Dakota County and SWCD

Local Priorities
Protect and restore surface water quality
Protect and restore groundwater quality and supply
Reduce flood impacts
Conduct water monitoring
Increase public awareness of water resource goals
Restore habitats and improve soil health

Goodhue County & SWCD

Table 3-18. Local Priorities for Goodhue County and SWCD

Local Priorities
No-Till Drill Program
SWCD Tree Program
Conservation Cost-Share Program
Surface & Groundwater Monitoring
Technical Assistance on Conservation Projects

Le Sueur County & SWCD

Table 3-19. Local Priorities for Le Sueur County and SWCD

Local Priorities
Tree Program
No Till Drill Program
Water Monitoring: <i>Test well water (phosphorous and nitrates) based off of landowner request</i>
Implement BMPs on shoreland properties to address erosion and runoff issues
<i>AIS: Inspections from sheriff departments and Lake Associations, removal efforts of Eurasian Water Milfoil, and education and outreach efforts with K-12</i>
<i>Restoration on Lake Volney: BMPs implementation on agricultural lands (e.g. wetland enhancements/restoration, sediment control basins)</i>
<i>German-Jefferson Chain-of-Lakes Septic Inventory and Feasibility Assessments: Determined septic systems that were compliant, non-compliant, and imminent threat to public health. Septic systems need to stay in constant compliance and be maintained.</i>
<i>Francis, Rays, Sakatah, Tetonka (FRST) Septic Inventory and Feasibility Assessments: Determined septic systems that were compliant, non-compliant, and imminent threat to public health. Septic systems need to stay in constant compliance and be maintained.</i>

Steele County & SWCD

Table 3-20. Local Priorities for Steele County and SWCD

Local Priorities
Private Well Water Testing Program
Surface Water Monitoring Program
Abandoned Well Sealing Program
Septic System Management
Commercial Animal Waste Technician Education
Pesticide and Commercial Applicators License Testing
Administer and Enforce Local Ordinances
Flood Prevention and Mitigation
Permanent Easements on Marginal Cropland
Native Prairie Restoration
Soil Health
Tree Program
Public Outreach + Education

Rice County & SWCD

Table 3-21. Local Priorities for Rice County and SWCD

Local Priorities
Working with landowners in the Fox Lake watershed to complete projects focusing on highly erosive land and feedlot improvements
Work with organizations and landowners interested in protecting and preserving sensitive land
Continue working with Friends of the Cannon River Wilderness Area and install erosion and sediment control BMPs at the park
Work with Circle Lake Association and Circle Lake Improvement District on projects to reduce sediment
Work with the City of Faribault on implementing projects identified in the Spring Park Subwatershed Analysis
Reduce runoff within the ravines at Falls Creek Park
Work with community partners within Northfield, Lonsdale, and Faribault to implement urban BMPs within the cities

Waseca County & SWCD

Table 3-22. Local Priorities for Waseca County and SWCD

Local Priorities
Clear Lake is a significant tourist attraction in Waseca County and the south central part of the State. Continue to address water quality concerns and maintain a strong working relationship with the lake association. Continue financial support of the lake associations.
Unsewered communities
Stormwater
Soil health promotion
Education
Incentives
Promotion and incentives for perennial vegetation and habitat
Tree and plant sale
Education, technical assistance, and financial assistance for conservation practices

4. TARGETED IMPLEMENTATION SCHEDULE

This section describes the Targeted Implementation Schedule which identifies when and where specific actions will be implemented within the Cannon River Planning Area to achieve the desired goals for the 10-year timeframe of the Plan. The Targeted Implementation Schedule includes both structural and programmatic elements recognizing that effective watershed management needs to address the root causes and drivers of environmental impacts, not just the symptoms, in order to achieve long-term solutions.

The inclusion of an action in the Targeted Implementation Schedule is a statement of intent by the Planning Partners. Implementation rests on further CRWJPB decisions to budget for and fund the action which will be made in response to routine evaluation of performance in achieving the goals of this Plan. Similarly, over the period of 10 years, as priorities evolve and new concerns emerge or new approaches are developed, the Planning Partners may choose to undertake an action not included in the Targeted Implementation Schedule. The listing of actions in the Targeted Implementation Schedule is not intended to exclude other actions that are consistent with the issues, goals and policies identified in Section 3.0. In such cases, undertaking an action not explicitly identified in the Targeted Implementation Schedule may require amending the Plan as described in Section 6.0 *Plan Administration and Coordination*.

4.1. TARGETED IMPLEMENTATION PLAN STRUCTURE

The Targeted Implementation Schedule of the Cannon River Comprehensive Watershed Management Plan is presented in Table 4-2 through Table 4-4 that includes the following items:

- Implementation activities for the Tier 1 issues and concerns (actions)
- Link to the corresponding priority concern(s) and goal(s)
- Location targeting where action will occur
- Estimated cost
- Estimated time when implementation of the activity will occur within the 10-year timeframe of the Plan
- Project lead and project partners
- Description of how outcomes of the action will be measured

Following the structure set forth in previous sections of the Plan, the Targeted Implementation Schedule is broken into three individual watershed management components: Resource Concerns (Table 4-2), Landscape Alteration Concerns (Table 4-3), and Socioeconomic Factors (Table 4-4). Annual totals for all three tables are presented first in Table 4-1. A breakdown of all implementation activities by program is provided in Section 5.7 Targeted Implementation Schedule by Program (see Table 5-8).

Table 4-1. Budget Summary Table
Note that many of the implementation activities identified for Landscape Alterations and Socioeconomic Factors also address Resource Concerns and the Tier One priority resources

Watershed Concern		Issues		Budget Summary Table								
				2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$
Plan Administration		\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$250,000
Operation & Maintenance (PL Structures)		\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$100,000
Resources												
Lakes, Streams, and Rivers	Protection Lakes	\$7,100	\$7,100	\$7,100	\$7,100	\$7,100	\$2,100	\$2,100	\$2,100	\$2,100	\$2,100	\$46,000
	Impaired Lakes	\$114,500	\$119,500	\$119,500	\$119,500	\$114,500	\$114,500	\$114,500	\$114,500	\$114,500	\$114,500	\$1,160,000
	Pollutant Impaired Streams	\$492,600	\$792,600	\$492,600	\$812,600	\$512,600	\$812,600	\$512,600	\$807,600	\$507,600	\$807,600	\$6,551,000
	Monitoring Data	\$8,000	\$8,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$816,000
Wetlands	Wetland Restoration	\$30,000	\$100,000	\$5,000	\$100,000	\$5,000	\$100,000	\$5,000	\$5,000	\$5,000	\$5,000	\$360,000
Groundwater	Drinking Water Protection	\$333,000	\$321,000	\$321,000	\$321,000	\$320,200	\$320,200	\$320,200	\$320,200	\$320,200	\$320,200	\$3,217,200
	Groundwater Dependent Natural Resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Resources Total		\$985,200	\$1,348,200	\$1,045,200	\$1,460,200	\$1,059,400	\$1,449,400	\$1,054,400	\$1,349,400	\$1,049,400	\$1,349,400	\$12,150,200
Landscape Alterations												
Agriculture	Agricultural Runoff and Leaching Loss	\$1,008,100	\$985,100	\$985,100	\$985,100	\$985,100	\$985,100	\$985,100	\$985,100	\$985,100	\$985,100	\$9,874,000
	Soil Health	\$68,700	\$68,700	\$68,700	\$68,700	\$68,700	\$68,700	\$68,700	\$68,700	\$68,700	\$68,700	\$687,000
Development	Flooding of Communities	\$0	\$40,000	\$250,000	\$540,000	\$250,000	\$290,000	\$0	\$250,000	\$0	\$250,000	\$1,870,000
	Shoreland Management	\$50,700	\$55,700	\$15,500	\$15,500	\$23,000	\$18,000	\$18,000	\$20,500	\$15,500	\$15,500	\$274,900
	Stormwater Management	\$0	\$250,000	\$0	\$250,000	\$50,000	\$295,000	\$20,000	\$270,000	\$20,000	\$270,000	\$1,425,000
	Subsurface Sewage Treatment Systems	\$200,000	\$0	\$0	\$20,000	\$200,000	\$0	\$0	\$0	\$200,000	\$0	\$620,000
Drainage Systems	Drainage System Management	\$253,000	\$291,200	\$166,200	\$141,200	\$141,200	\$141,200	\$141,200	\$141,200	\$141,200	\$141,200	\$1,698,800
Climate Change	Community Resiliency to Climate Change	\$2,800	\$2,800	\$7,800	\$2,800	\$2,800	\$72,800	\$72,800	\$72,800	\$72,800	\$72,800	\$383,000
Landscape Alterations Total		\$1,583,300	\$1,693,500	\$1,493,300	\$2,023,300	\$1,720,800	\$1,870,800	\$1,305,800	\$1,808,300	\$1,503,300	\$1,803,300	\$16,805,700
Socioeconomic Factors												
Education and Outreach	Educating Local Land Use Decision Makers	\$5,000	\$10,000	\$5,000	\$10,000	\$5,000	\$10,000	\$5,000	\$10,000	\$5,000	\$10,000	\$75,000
	Citizen Engagement	\$58,500	\$59,000	\$43,500	\$49,000	\$43,500	\$49,000	\$43,500	\$49,000	\$43,500	\$49,000	\$487,500
Coordination and Partnerships	Planning Area Partnerships	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$24,000
	Internal Capacity	\$23,900	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400	\$207,500
Recreation	Recreational Value	\$2,500	\$5,000	\$2,500	\$5,000	\$2,500	\$7,500	\$2,500	\$5,000	\$2,500	\$5,000	\$40,000
Socioeconomic Factors Total		\$92,300	\$96,800	\$73,800	\$86,800	\$73,800	\$89,300	\$73,800	\$86,800	\$73,800	\$86,800	\$834,000
Planning Area Total		\$2,695,800	\$3,173,500	\$2,647,300	\$3,605,300	\$2,889,000	\$3,444,500	\$2,469,000	\$3,279,500	\$2,661,500	\$3,274,500	\$30,139,900

* Differences in totals due to rounding.
Note: Total estimated funding needs in Table 4-1 match the total estimated funding needs in Table 5-8.

4.1.1. Resources Targeted Implementation Table

Pollutant load reductions to Tier One priority resources achieved by implementation activities are bolded and highlighted in blue in the Activity Outcome Measurability column.

Table 4-2. Resources Targeted Implementation Table (2020-2029)
Note that many of the implementation activities identified for Landscape Alterations and Socioeconomic Factors also address Resources and the Tier One priority resources

RESOURCES TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Protection Lakes	3.1.1-A-1	Complete lake management plans to identify phosphorus sources.	--	Maintain or improve water quality in the five high quality lakes (Beaver, Dudley (and Kelly), Fish, and Roemhildts)	Drainage Area to: Beaver, Dudley (and Kelly), Fish, and Roemhildts (Figure 3-1, Figure 3-2)	5,000 ¹	5,000 ¹	5,000 ¹	5,000 ¹	5,000 ¹	-	-	-	-	-	25,000 ¹	X	X	X					MPCA, Lake Association, SWCDs	Approved lake management plans for Dudley (and Kelly), Fish, Roemhildts and Beaver Lake	
Protection Lakes	3.1.1-A-2	Implementation of in-lake and near-shore management strategies	--			-	-	-	-	-	Annual costs to be determined upon completion of the lake management plans (ID 3.1.1-A-1)						TBD	X	X	X					MPCA, Lake Association, SWCDs	Implementation of in-lake and near-shore management strategies identified in lake management plans
Protection Lakes	3.1.1-A-3	Implement structural practices to treat 5%, or 36 acres, of cropland	--			2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	21,600	X	X	X						SWCDs, NRCS	36 acres of cropland treated by structural practices 12 lbs of phosphorus reduced per year
Impaired Lakes	3.1.1-B-1	Complete lake management plans to identify phosphorus sources.	--	Achieve the 10-year Total Phosphorus Reduction Goals (lb/yr) for the Tier One Impaired Lakes listed in Table 3-5.	Drainage Area to: Cedar, Fox, and Hunt (Figure 3-6)	-	5,000 ¹	5,000 ¹	5,000 ¹	-	-	-	-	-	-	15,000		X						MPCA, Lake Association, SWCDs	Approved lake management plans for Cedar, Fox and Hunt Lakes	
Impaired Lakes	3.1.1-B-2	Implementation of in-lake and near-shore management strategies	--			-	-	-	-	-	Annual costs to be determined upon completion of the lake management plans (ID 3.1.1-B-1)						TBD		X						MPCA, Lake Association, SWCDs	Implementation of in-lake and near-shore management strategies identified in lake management plans
Impaired Lakes	3.1.1-B-3	Implement structural practices to treat 30%, or 1,909 acres, of cropland	--			114,540	114,540	114,540	114,540	114,540	114,540	114,540	114,540	114,540	114,540	1,145,400		X							SWCDs, NRCS	1,909 acres of cropland treated by structural practices 547 lbs of phosphorus reduced per year

RESOURCES TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead							Project Partners	Activity Outcome Measurability		
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD			NCWMO	
Pollutant Impaired Streams	3.1.1-C-1	One large stream restoration project (approximately 1,700 feet) which could include bank stabilization, in-channel work or improving floodplain connectivity completed every two years on Tier One impaired streams with known problems.	--	Achieve the 10-year Total Suspended Solids Reduction Goals [tons/yr] for the Tier One Impaired Streams listed in Table 3-8.	Drainage Area to: Belle Creek, Little Cannon River, Trout Brook, Prairie Creek, Rush Creek, Medford Creek, and Lower Vermillion River (Figure 3-11 through Figure 3-13)	-	250,000	-	250,000	-	250,000	-	250,000	-	250,000	1,250,000		X	X	X	X				SWCDs, MNDNR, Trout Unlimited, LCCMR	5 streambank stabilization projects ~1,700 feet per project. Sediment reduction per project to be determined during feasibility and design.	
Pollutant Impaired Streams	3.1.1-C-2	Cooperate with researchers and others to determine the routes of nitrogen transport from surface water to groundwater in the Tier One stream subwatershed by sharing data, sitting on advisory committees, and/or co-sponsoring or supporting research grants.	Groundwater	Achieve the 10-year Nitrate Reduction Goals [lb/yr] for the Tier One Impaired Streams listed in Table 3-9.		5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	50,000		X	X		X				MPCA, MNDNR, Universities, PWG, MDA	PWG members serve on existing or newly formed nitrogen committees (e.g. MDA Local Advisory Team (LAT) or more informal groups); 2 submitted grants
Pollutant Impaired Stream	3.1.1-C-3	Proactively ensure compliance with Soil Loss Ordinance using BMPs, conservation plans, conservation programs, easements, etc. to work towards achieving the Tolerable Soil Loss goals.	Agricultural Runoff and Leaching Loss	Develop 50 manure management plans, implement 5 feedlot runoff projects, and develop 35 rotational grazing management plans to address sources of bacteria to Tier One Impaired Streams with a bacteria impairment.	Drainage area of seven impaired streams: Lower Vermillion River, Belle Creek, Little Cannon River, Trout Brook, Prairie Creek, Rush Creek, and Medford Creek (Figure 3-11 through Figure 3-13)	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	120,000	X	X	X		X				NA	Track compliance with Soil Loss Ordinance	
Pollutant Impaired Streams	3.1.1-C-4	Develop 5 voluntary Manure Management Plans (<300 AU) per year in shoreland areas of the Tier One stream drainage areas.	Agricultural Runoff and Leaching Loss			2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	25,000	X	X	X		X				NRCS, BWSR, MPCA	50 Manure Management Plans
Pollutant Impaired Streams	3.1.1-C-5	Implement 5 feedlot runoff control projects in shoreland areas of the Tier One stream drainage areas	Agricultural Runoff and Leaching Loss			-	50,000	-	50,000	-	50,000	-	50,000	-	50,000	250,000			X	X		X				SWCDs, MPCA	5 feedlot runoff control projects
Pollutant Impaired Streams	3.1.1-C-6	Write and implement rotational grazing and livestock exclusion plans on 35 sites within 1,000 feet of a Tier One impaired stream, or a direct tributary to a Tier One impaired stream.	Agricultural Runoff and Leaching Loss			5,000	5,000	5,000	25,000	25,000	25,000	25,000	20,000	20,000	20,000	175,000		X	X	X	X	X				SWCDs, NRCS, BWSR, MDA	35 rotational grazing plans written and implemented
Pollutant Impaired Streams	3.1.1-C-7	Implement structural practices to treat 5%, or 7,803 acres, of cropland in the Tier 1 impaired streams drainage areas.	Agricultural Runoff and Leaching Loss	TSS load reductions in the impaired stream watersheds		468,180	468,180	468,180	468,180	468,180	468,180	468,180	468,180	468,180	468,180	468,180	4,681,800		X	X	X	X	X			SWCDs, NRCS, MNDNR, Trout Unlimited	7,803 acres of cropland treated by structural practices 2,447 tons of sediment reduced per year

RESOURCES TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead							Project Partners	Activity Outcome Measurability		
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD			NCWMO	
Wetland Restoration	3.1.2-A-1	Utilize PTMAApp or other tools to identify sites in the priority drainage areas for wetland restoration within the Upper Cannon HUC10 and Chub Creek HUC10 then implement projects to meet the wetland restoration goal.	Flooding of Communities; Groundwater Recharge; Lakes, Streams and Rivers	Increase wetland area by achieving a net gain of 10%, or 143 acres of restored wetland pool and buffer area treating 2,936 acres of runoff, in the Upper Cannon HUC10 and a net gain of 10%, or 39 acres of restored wetland pool and buffer area treating 1,421 acres of runoff, in the Chub Creek HUC10 based on the Nitrogen BMP Spreadsheet tool.	Upper Cannon HUC10 Chub Creek HUC10 (Figure 49 in the 2016 Cannon River WRAPS)	30,000	100,000	5,000	100,000	5,000	100,000	5,000	5,000	5,000	5,000	360,000	X	X	X	X					SWCDs, NRCS, BWSR, MNDNR	List of PTMAApp identified priority sites, net gain of 182 acres of wetlands restored. 27,304 lb of nitrate reduced per year; 22,707 acre-feet of volume reduced per year.	
Drinking Water Protection	3.1.3-A-1	Serve on wellhead protection plan teams for all public water suppliers with Moderate and Highly Vulnerable DWSMAs to assist with planning and implementation activities that address land use concerns.	--	To protect drinking water quality from pollutant contamination, partner with public water suppliers by providing annual education/outreach opportunities to all communities with MDH approved Wellhead Protection Plans, and BMP technical assistance for all moderate and high vulnerable public water suppliers by serving on wellhead protection plan teams.	Communities with moderate or high vulnerabilities (Figure 12 from the 2017 GRAPS)	500	500	500	500	500	500	500	500	500	500	5,000		X		X	X				MDH, MRWA, CRWP, LGUs, Public Water Suppliers, MDA	4 meetings attended/yr, # and type of changes implemented	
Drinking Water Protection	3.1.3-A-2	Assist the public water suppliers to develop educational materials tailored to each community for distribution and public events including Best Management Practices for fertilizer and pesticide application in developed areas. Examples include printed materials, groundwater models for schools and hazardous waste collection events.	--			5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	55,000	X	X	X	X	X	X		X	MDH, MRWA, CRWP, LGUs, SE MN Water Resource Board, Public Water Suppliers, MDA	# of educational events or materials created, # of outreach materials distributed, # of activities & events, # of households, business or land treated, # of demo sites installed
Drinking Water Protection	3.1.3-A-3	In areas within an existing DWSMA, but outside of the city jurisdiction, assist with well location and inventory, and sealing of unused wells that pose a risk to the public water supply wells.	--			10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	105,000	X	X	X	X	X	X			Counties, MDH, Public Water Suppliers	10 inventoried DWSMAs, 20 wells sealed	
Drinking Water Protection	3.1.3-A-4	Host 2 well testing or screening clinics per year for private well owners. Provide nitrate test results and/or water testing kits, and information on best practices for well maintenance and water quality.	--	To protect drinking water quality from pollutant contamination in areas of moderate or high pollution sensitivity, provide all private well owners access to well testing programs	Private well owners in areas of moderate or high pollution sensitivity (Figure 10 from the 2017 GRAPS)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	30,000	X	X	X	X	X	X			MDH, MDA, CRWP	2 clinics hosted/year; 40 test kits distributed/yr, 40 participants; 40 samples collected	
Drinking Water Protection	3.1.3-A-5	Create tailored outreach/information packets for homeowners in priority areas that provides education on drinking water quality, maintenance of private wells and septic systems, and BMPs for homeowners. Create a centralized web page that members can link to for public access.	--	Protect drinking water quality from pollutant contamination		8,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	44,000	X	X	X	X	X	X			BWSR, MDH, MDA, LGUs, CRWP	Drinking Water Protection page provided on Cannon River 1W1P and/or Cannon River Watershed Partnership website, 50 mailings/yr	

RESOURCES TARGETED IMPLEMENTATION TABLE (2020-2029)																									
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead							Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD		
Drinking Water Protection	3.1.3-A-6	Request nitrate–nitrogen trend analysis from MDH for public water suppliers that meet the criteria listed in Goal #3. Identify systems at risk based on routine sampling for Safe Drinking Water Act compliance, focusing on small municipal and non-municipal public water suppliers with limited resources.	Groundwater Recharge	To prevent future increase in groundwater nitrate levels, partner with public water suppliers and state partners to determine nitrate-nitrogen trends for all public systems with average concentrations greater than or equal to 3 ppm over the last ten years	Large Communities (Figure 2-10) Groundwater Pollution Sensitivity Area (Figure 2-11)	800	800	800	800	-	-	-	-	-	-	3,200		X	X		X			LGUs (Counties, Cities, Townships, SWCD, WD), Non-LGU partners (CRWP), MDH Hydrologist/ SWP Planner	4 systems with nitrate trend analysis completed
Drinking Water Protection	3.1.3-A-7	Educate & protect 'edge' recharge areas like Decorah Shale edge where groundwater easily moves past confining shale layers. Areas often are wooded and steep, where development is now occurring	Groundwater Recharge	Prevent future increase in groundwater nitrate levels	Groundwater Pollution Sensitivity Area (Figure 2-11)	8,000	-	-	-	-	-	-	-	-	-	8,000	X		X					Counties, WMO, WD, MNDNR, Cities, Townships, CRWP	Create with Land Use regulators, incorporate protection language in local zoning ordinances. Develop map layer showing where edge is present.
Drinking Water Protection	3.1.3-A-8	Create a Planning Area well sealing program and prioritization process, implemented by each County, for residents who wish to voluntarily seal wells using a priority process. Start by conducting an unused-well inventory by mailing a homeowner survey asking people if they have an unused well on their property that they would like assistance sealing.	--	Prevent future increase in groundwater nitrate levels	Groundwater Pollution Sensitivity Area (Figure 2-11)	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	300,000	X	X	X	X	X	X		MDH, BWSR	Unused-well inventory completed, 120 abandoned wells sealed in the Planning Area
Drinking Water Protection	3.1.3-A-9	In cultivated cropland within a delineated DWSMA in the Planning Area (5,282 acres), provide landowners and operators access to funding and technical assistance for BMPs that reduce the loss of nutrients, pathogens, and chemicals to groundwater. Examples include filter strips, nutrient management, and soil health practices such as cover crops and perennial vegetation.	Agricultural Runoff and Leaching Loss	Prevent future increase in groundwater nitrate levels	Groundwater Pollution Sensitivity Area (Figure 2-11)	266,709	266,709	266,709	266,709	266,709	266,709	266,709	266,709	266,709	266,709	2,667,093	X	X	X		X			SWCDs, NRCS, MDA, Cities	Funding and technical assistance for BMPs on 5,282 cropland acres in delineated DWSMAs
Monitoring Data	3.1.4-A-1	Develop a surface water and groundwater monitoring program in coordination with state-led monitoring efforts to establish baseline conditions, determine success of Plan and support modeling efforts for the entire Cannon River Planning Area working with partners to address state needs as well as local needs.	Protection Lakes; Impaired Lakes; Pollutant Impaired Streams; Groundwater Dependent Natural	Develop a surface water and groundwater monitoring program within the first two years of the Plan in coordination with state-led monitoring efforts to establish baseline watershed conditions, and to assess progress towards	Cannon River Planning Area	8,000 ¹	8,000 ¹	-	-	-	-	-	-	-	-	16,000 ¹	X	X	X	X	X	X		MPCA, MNDNR, BWSR, MDH, MGS	Surface water and groundwater monitoring program

RESOURCES TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implementation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead							Project Partners	Activity Outcome Measurability		
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD			NCWMO	
Monitoring Data	3.1.4-A-2	Implement the monitoring program	Resources; Drinking Water Protection	achieving resource goals for Tier One lakes and streams.		-	-	100,000 ¹	100,000 ¹	100,000 ¹	100,000 ¹	100,000 ¹	100,000 ¹	100,000 ¹	100,000 ¹	100,000 ¹	800,000 ¹	X	X	X	X	X	X			MPCA, MNDNR, BWSR, MDH, MGS	Monitoring data collected annually per the stipulations of the monitoring program

¹ Activities are currently not eligible for Watershed Based Implementation Funds and costs are planned through CRWJPB membership dues, lake association contributions or other local and other state sources.

² Activity is currently not eligible for Watershed Based Implementation Funds and costs are under consideration for funding through FEMA and the DNR. These two agencies prioritized the Cannon River Watershed in 2018 to start the Discovery process, which is a prerequisite to obtain FEMA funds for developing a Risk MAP project.

4.1.2. Landscape Alterations Targeted Implementation Table

Pollutant load reductions to Tier One priority resources achieved by implementation activities are bolded and highlighted in blue in the Activity Outcome Measurability column.

Table 4-3. Landscape Alterations Targeted Implementation Table (2020-2029)

Note that many of the implementation activities identified for Landscape Alterations and Socioeconomic Factors also address Resources and the Tier One priority resources

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																									
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead							Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD		
Agricultural Runoff and Leaching Loss	3.2.1-A-1	Convert 10% (2,325 acres total or 232.5 acres per year) of cropland on vulnerable soils (NRCS land capability class IV) to perennial cropland or perennial vegetation in all Tier One lake and stream drainage areas.	Protection Lakes; Impaired Lakes; Pollutant Impaired Streams; Groundwater Dependent Protection Lakes	Achieve the 10-year Total Phosphorus Reduction Goals listed in Table 3-13 (130 lb/yr) in the Tier One Protection and Impaired Lake drainage areas over the next 10 years (by 2029)	Drainage area of Tier One lakes and streams (Figure 3-21 through Figure 3-24)	926,100	926,100	926,100	926,100	926,100	926,100	926,100	926,100	926,100	926,100	9,261,000	X	X	X		X			SWCDs, NRCS, CRWP	2,325 acres of cropland on vulnerable soils converted to perennial vegetation. 35 lb TP/yr for Tier One lakes; 46,781 lb N/yr and 460 ton sediment/yr for Tier One streams
Agricultural Runoff and Leaching Loss	3.2.1-A-2	Monitor BMPs to demonstrate economic benefits (to farmers) of locally implemented conservation practices (e.g., by partnering with Discovery Farms).	--	Achieve the 10-year Nitrate Reduction Goals listed in Table 3-14 (230,067 lb/yr) in the Tier One Impaired Stream drainage		33,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	123,000	X	X	X		X			SWCDs, NRCS, U of M Extension, Discovery Farms, MDA, CRWP	Partner annually with Discovery Farm BMP monitoring or use same monitoring format

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Agricultural Runoff and Leaching Loss	3.2.1-A-3	Implement nutrient management BMPs following U of M guidance on 10% (16,315 acres total or 1,631.5 acres per year) of cultivated cropland in all Tier One lake and stream drainage areas.	--	areas over the next 10 years (by 2029).		46,600	46,600	46,600	46,600	46,600	46,600	46,600	46,600	46,600	46,600	466,000	X	X	X		X				SWCDs, NRCS, Farm Co-ops	Nutrient management BMPs on 16,315 acres of cropland. 60 lb TP/yr for Tier One lakes; 80,748 lb N/yr for Tier One streams
Agricultural Runoff and Leaching Loss	3.2.1-A-4	Create a stable funding source to increase local capacity and implement agricultural BMPs by evaluating other funding sources from NGOs (e.g. Trout Unlimited, Pheasants Forever, Ducks Unlimited, the McKnight Foundation, or the Fishers & Farmers Partnership) and private sector companies (e.g. agribusinesses).	--			2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	24,000	X	X	X	X	X	X			SWCD, CRWP	Explored and documented additional sources of funding each year; Discussed annually during work planning
Soil Health	3.2.1-B-1	Track and monitor cover crops and residue into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project.	Protection Lakes, Impaired Lakes, Pollutant Impaired Streams	Improve soil health by implementing practices that increase organic matter (such as cover crops, tillage management, and nutrient management) on 15% of corn and soybean acres (69,719 acres) and 80% of short-season crop acres (24,507 acres) watershed-wide.	Drainage area of Tier One lakes and streams (Figure 3-21 through Figure 3-24) HSPF Top 25% TP and TN subwatersheds	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	48,000	X	X	X		X				U of M, BWSR, CRWP	Annual summary of cover crops in Planning Area (e.g., new acres, acres removed)
Soil Health	3.2.1-B-2	Implement practices that increase organic matter (such as cover crops and tillage management) on 15% of corn/soybean acres (18,508 acres total or 1,851 acres per year) in the Tier One Lake and Stream drainage areas.	Groundwater Recharge; Protection Lakes, Impaired Lakes, Pollutant Impaired Streams			51,600	51,600	51,600	51,600	51,600	51,600	51,600	51,600	51,600	51,600	516,000	X	X	X		X				NRCS, BWSR, MDA, CRWP	Cover crops on 18,508 acres of corn/soybean. 34 lb TP/yr for Tier One lakes; 93,367 lb N/yr and 4,311 ton sediment/yr for Tier One streams

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability	
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO			
Soil Health	3.2.1-B-3	Implement practices that increase organic matter (such as cover crops and tillage management) on 80% of short season crop (corn silage, small grains, peas, and sweet corn) acres (1,192 acres total, 119 acres per year) in the Tier One Lake and Stream drainage areas.	Groundwater Recharge; Protection Lakes, Impaired Lakes, Pollutant Impaired Streams	Practices should be implemented first within the Tier One lake and stream drainage areas (18,508 corn/soybean acres and 1,192 short-season crop acres).		2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	23,400	X	X	X		X					NRCS, BWSR, MDA, CRWP	Cover crops on 1,192 acres of short-season crops. 9,171 lb N/yr and 457 ton sediment/yr for Tier One streams
Soil Health	3.2.1-B-4	Develop a Soil Health Team	--	To improve soil health, establish a Soil Health Team to promote the monitoring, research, demonstration and outreach of practices that increase soil health	Cannon River Planning Area	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	X	X	X	X	X	X				NRCS, BWSR, MDA, CRWP	Two Soil Health Team meetings per year
Flooding of Communities	3.2.2-A-1	Conduct a Long-Term Flood Evaluation Study (LTFES) to provide Planning Partners with the tools needed to mitigate the effects of flooding in the Cannon River Planning Area and make the communities more resilient	--	Decrease the rate and volume of water that contributes to flooding of downstream communities to limit property damage and protect public safety	Contributing drainage area to larger communities (Figure 2-10)	-	-	250,000 ²	250,000 ²	250,000 ²	-	-	-	-	-	750,000 ²	X	X	X	X	X	X	X		USGS, MNDNR, MGS, Met. Council, Cities, TWPs, CRWP	LTFES, Risk Map	
Flooding of Communities	3.2.2-A-2	Implement flood reduction practices within the Planning Area as identified in the Long-Term Flood Evaluation Study.	--		Contributing drainage area to larger communities (Figure 2-10) Areas identified from H&H model	-	-	-	250,000	-	250,000	-	250,000	-	250,000	1,000,000	X	X	X	X	X	X	X		MNDNR, citites, townships, CRWP	4 flood reduction practices, 35,733 acre-feet 10-year volume reduction in the Cannon River at Welch.	
Flooding of Communities	3.2.2-A-3	Utilize past and current assessment and prioritization efforts in Etter Creek Watershed (a tributary to the Lower Vermillion River) in coordination with the Vermillion River Joint Powers Organization in an effort to install voluntary BMPs providing upland storage which help achieve volume reduction goals for the Cannon River	Pollutant Impaired Streams		Contributing drainage area to larger communities (Figure 2-10)	-	40,000	-	40,000	-	40,000	-	-	-	-	120,000					X				VRWJPO	Installation of 6 BMPs in the Etter Creek Watershed	

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Shoreland Management	3.2.2-B-1	Conduct inventory of existing natural shoreline quantity and quality on 10 natural environment lakes (Roemhildts, Fish, Dora, Mabel, Diamond, Sabre, and Tustin in Le Sueur County; Sprague and Lower Sakatah in Rice County; and Toners in Waseca County) within first two years.	--	Establish a baseline of existing natural shoreline conditions and achieve no net loss (from baseline conditions) of existing natural shoreline on 10 Natural Environment Lakes	Roemhildts, Fish, Dora, Mabel, Diamond, Sabre, and Tustin in Le Sueur County; Sprague and Lower Sakatah in Rice County; and Toners in Waseca County	35,250	35,250	-	-	-	-	-	-	-	-	70,500	X	X				X			SWCDs, MNDNR	10 shoreline inventories
Shoreland Management	3.2.2-B-2	Promote an increase in acres of sensitive shoreland, bluffs and steep slopes preserved by connecting local landowners with conservation groups and explore creating an easement program in the future.	--	To protect high quality lakes in the Lakes Area, achieve a natural shoreline gain from 2018	Lakes Area (Figure 2-10)	500	500	500	500	500	500	500	500	500	500	5,000	X	X				X			Minnesota Land Trust, CRWP, NRCS, BWSR	10 conversations per year; strategy developed on an easement program or documentation as to why an easement program is not feasible.
Shoreland Management	3.2.2-B-3	Protect or restore native riparian vegetation by implementing a native vegetation buffer on 2 private lakeshore properties per year in the Lakes Area.	--		Lakes Area (Figure 2-10)	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000	X	X				X			Lake associations, Homeowner associations, MNDNR, NRCS, CRWP	Installation of shoreland buffers on 2 lakeshore properties per year (~1 mile total)
Shoreland Management	3.2.2-B-4	Review local shoreland ordinances, the permitting process, and ongoing enforcement to ensure resource protection needs are met by hosting a shoreland management summit with County staff every 3 years.	--	To protect high quality lakes in the Lakes Area, provide education to counties, cities and townships to help communities make well informed shoreland management decisions and to reduce the number of variances and conditional use permits granted annually	Lakes Area (Figure 2-10)	-	5,000	-	-	5,000	-	-	5,000	-	-	15,000	X	X				X			MNDNR	1 County staff summit every 3 years
Shoreland Management	3.2.2-B-5	Promote voluntary actions for buffer establishment along SWCD adopted “other watercourses” maps/inventories for the protection or improvement of water quality.	--		Lakes Area (Figure 2-10)	-	-	-	-	2,500	2,500	2,500	-	-	-	7,500	X	X				X			SWCDs, CRWP	3 workshops with public to promote establishment of buffers
Shoreland Management	3.2.2-B-6	Track the number of variances and conditional use permits granted annually.	--		Lakes Area (Figure 2-10)	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X			Counties	Annually reporting of variances and/or conditional use permits

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Stormwater Management	3.2.2-C-1	Encourage Minimal Impact Design Standards (MIDS) Adoption by all non-MS4 communities in the Cannon River Planning Area	--	Address the effects of altered hydrology in the watershed, promote the adoption of ordinances in all of the communities (including MS4 communities)	Non-MS4 communities	-	-	-	-	50,000	25,000	-	-	-	-	75,000	X	X	X	X	X	X			MPCA, cities, townships	MIDS workshops with all non-MS4 communities
Stormwater Management	3.2.2-C-2	Utilize the Long-Term Flood Evaluation Study to determine the level of protection required in all of the communities (including MS4 communities) for the infrastructure system, public safety, and resource management needs.	Flooding of Communities		Large Communities	-	-	-	-	-	20,000	20,000	20,000	20,000	20,000	100,000	X	X	X	X	X	X			Cities, TWPs, SWCDs	Recommendat ions for flood protection practices for 10 communities (2 per year)
Stormwater Management	3.2.2-C-3	Utilize existing cost-share programs to assist citizens, businesses and local units of government with the design and implementation of stormwater retrofit projects and maintenance activities to improve water quality treatment and reduce the volume of water being delivered to downstream waterbodies.	Lakes, Streams and Rivers, Flooding of Communities	Partner with cities and individual landowners to retrofit voluntary stormwater practices and improve maintenance activities in developed areas (i.e. older neighborhoods).	Large Communities and Non-MS4 communities	-	250,000	-	250,000	-	250,000	-	250,000	-	250,000	1,250,000	X	X	X	X	X	X			Cities, SWCDs	Implement 3 projects/year or 30 projects over 10 years
Subsurface Sewage Treatment Systems	3.2.2-D-1	Conduct SSTS inventory on Volney and Gorman, and two other lakes in the Groundwater Dominated Lakes Area.	Groundwater Dependent Protection Lakes	Protect high quality lakes in the Groundwater Pollution Sensitivity Area and the Groundwater Dominated Lakes Area (Figure 2-11)	Groundwater Pollution Sensitivity Area and the Groundwater Dominated Lakes Area (Figure 2-11)	200,000	-	-	-	200,000	-	-	-	200,000	-	600,000	X	X	X	X	X	X			SWCDs, Counties, Lake Associations, CRWP	SSTS on four lake systems
Subsurface Sewage Treatment Systems	3.2.2-D-2	Inventory existing programs to identify programmatic gaps across the Cannon River Planning Area and develop solutions to fill the gaps	Lakes, Streams, and Rivers			-	-	-	20,000	-	-	-	-	-	20,000	X	X	X	X	X	X			SWCDs, Counties, CRWP	4 workshops; Existing program inventory and solutions to fill gap	
Drainage System Management	3.2.3-A-1	Define the needs of and conduct an inventory to better define the drainage system and facilitate the development of a hydrologic & hydraulic (H & H) model in the future	Flooding of Communities	To address the effects of altered hydrology in the watershed (flooding and resource water quality and hydrology	Straight River Tributaries Area Lakes Area (Figure 2-10)	25,000	25,000	25,000	-	-	-	-	-	-	-	75,000	X	X	X	X	X	X			BWSR, County Drainage Authorities, CRWP	Inventory of drainage systems in the Planning Area

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability	
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO			
Drainage System Management	3.2.3-A-2	Complete conditioned terrain analysis for the Straight River and the Vermillion River Bottom portion of the Planning Area.	Resource Concerns	concerns), complete an inventory of potential opportunities for multi-benefit improvements within the entire public drainage system by 2024 to inform project implementation and ultimately a hydrologic and hydraulic model of the Planning Area.		60,000	-	-	-	-	-	-	-	-	-	60,000		X	X	X	X				SWCDs, VRWJPO	Conditioned terrain analysis for Straight River and Vermillion River Bottom	
Drainage System Management	3.2.3-A-3	Conduct modernization of drainage records (convert profiles to known elevation datum; update benefitted parcels mapping, etc.).	--			25,000	25,000	-	-	-	-	-	-	-	-	50,000	X	X	X			X				BWSR, Counties	Modernized drainage records in the Planning Area
Drainage System Management	3.2.3-A-4	Facilitate web access to publicly available drainage system records.	--			2,000	200	200	200	200	200	200	200	200	200	3,800	X	X	X			X				Counties	Web access to publicly available drainage system records
Drainage System Management	3.2.3-A-5	Identify hotspots for project implementation by using PTMApp or consulting with ditch inspectors and reviewing drainage reports.	--			15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000	X	X	X			X				BWSR, Counties	List of priority ditch projects; # ditch projects
Drainage System Management	3.2.3-A-6	Conduct annual meetings with all drainage authorities in the Planning Area to provide the group an update on each entity’s drainage system management program and to discuss advancements in drainage science.	--	To address the effects of altered hydrology in the watershed (flooding and resource water quality and hydrology concerns), develop a program that educates and incentivizes multi-benefit drainage management projects	Straight River Tributaries Area Lakes Area (Figure 2-10)	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000	X	X	X			X			MNDNR, BWSR, CRWP	Annual meeting with drainage authorities	
Drainage System Management	3.2.3-A-7	Create multi-benefit drainage management (MDM) plans that provide both private drainage benefits and public water management benefits in conjunction with benefitted property owners and other stakeholders.	--	To address the effects of altered hydrology in the watershed (flooding and resource water quality and hydrology concerns), create four multi-benefit drainage management plans	Straight River Tributaries Area Lakes Area (Figure 2-10)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000	X	X	X			X			Counties	4 MDM plans		

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Drainage System Management	3.2.3-A-8	Implement five multi-benefit drainage projects in the Lakes Area and Straight River Area over the 10-year timeframe of the Plan to reduce runoff volume, peak flows and erosion of agricultural lands.	--	To address the effects of altered hydrology in the watershed (flooding and resource water quality and hydrology concerns), implement multi-benefit drainage demonstration projects	Straight River Tributaries Area Lakes Area (Figure 2-10)	100,000	-	100,000	-	100,000	-	100,000	-	100,000	-	500,000	X	X	X			X			Counties, BWSR, MNDNR, NRCS	At least 5 BMPs implemented
Drainage System Management	3.2.3-A-9	Reduce excessive peak discharge within drainage systems of the Lakes Area and Straight River Area through implementation of five water and sediment control basins, 2-stage channel designs, culvert sizing or other methods that reduce flooding potential downstream. Strategically locate and/or prioritize these structures where historical wetlands were located. Consider off-channel structures and avoid placing the structures on perennial flowing streams and ditches.	Flooding of Communities			-	200,000	-	100,000	-	100,000	-	100,000	-	100,000	600,000	X	X	X			X			Counties, BWSR, MNDNR, NRCS	1 project every 2 years minimum
Drainage System Management	3.2.3-A-10	Host co-op workshops in the priority areas regarding multi-purpose and multi-benefit drainage management.	--	To address the effects of altered hydrology in the watershed (flooding and resource water quality and hydrology concerns), develop a program that educates and incentivizes multi-benefit drainage management projects	Straight River Tributaries Area Lakes Area (Figure 2-10)	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	40,000	X	X	X			X			CRWP	2 co-op workshops per year
Community Resilience to Climate Change	3.2.4-A-1	Conduct climate training and education needs assessment.	Flooding of Communities, Stormwater Management, Agricultural Runoff	Evaluate the impact of climate change on the watershed's resources and infrastructure to identify potential flooding issues.	All communities	-	-	5,000	-	-	-	-	-	-	-	5,000	X	X	X	X	X	X			CRWP, U of M Extension	Survey of five representative communities in the Planning Area and needs assessment summary

LANDSCAPE ALTERATIONS TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Community Resilience to Climate Change	3.2.4-A-2	Have at least one policy or staff members to attend an intensive seminar or workshops per year	Flooding of Communities, Stormwater Management, Agricultural Runoff	Build climate literacy amongst Planning Partners so they can successfully carry out their work in an era of rapidly changing climatic conditions.	All communities	400	400	400	400	400	400	400	400	400	400	4,000	X	X	X	X	X	X			SWCDs, Counties, CRWP	Attendance at climate-related conference per year
Community Resilience to Climate Change	3.2.4-A-3	Partner with small communities to conduct a vulnerability assessment following completion of the Long-Term Flood Evaluation Study, one community per year for 5 years.	Flooding of Communities, Stormwater Management	To increase the resiliency of resources and communities to climate change, establish a Climate Change Team that meets annually to promote monitoring, research, and modeling to predict impacts of climate change in the Planning Area.	All communities	-	-	-	-	-	20,000	20,000	20,000	20,000	20,000	100,000	X	X	X	X	X	X			SWCDs, Counties, CRWP, Met Council, communities	Vulnerability assessment for 1 community per year for five years
Community Resilience to Climate Change	3.2.4-A-4	Partner on the implementation of projects designed to increase resiliency and improve water quality in those communities that have conducted a vulnerability assessment and/or are a Minnesota GreenStep City.	Flooding of Communities, Stormwater Management	Increase the resiliency of the Cannon River Planning Area by adapting to climate change (e.g. adopting the most recent NOAA Atlas and other climatic data to ensure that design standards are kept current with the most recent climate data)	All communities	-	-	-	-	-	50,000	50,000	50,000	50,000	50,000	250,000	X	X	X	X	X	X			Cities, TWPs, CRWP	Partner on 5 projects
Community Resilience to Climate Change	3.2.4-A-5	Establish or participate in a Climate Change Team that meets annually to promote monitoring, research, and modeling to predict impacts of climate change in the Planning Area.	Flooding of Communities, Stormwater Management	Build climate literacy amongst Planning Partners so they can successfully carry out their work in an era of rapidly changing climatic conditions.	All communities	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	24,000		X		X	X				SWCDs, CRWP	Participation by one local representative on climate change team that meets annually

4.1.3. Socioeconomic Factors Targeted Implementation Table

Table 4-4. Socioeconomic Factors Targeted Implementation Table (2020-2029)

Note that many of the implementation activities identified for Landscape Alterations and Socioeconomic Factors also address Resources and the Tier One priority resources

SOCIOECONOMIC FACTORS TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability	
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO			
Educating Local Land Use Decision Makers	3.3.1-A-1	Encourage attendance by local decision-makers at training sessions hosted by Stormwater U on ordinances, development planning strategies, and development techniques that protect natural resources and benefit water quality (shoreland management, etc.).	SSTS, Shoreland Management. Stormwater Management	Provide information to locally elected and appointed decision-makers who have a role in addressing the relationship between land use and natural resource protection about watershed management /stormwater management	Cannon River Planning Area	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	30,000	X	X	X	X	X	X			U of M Extension, CRWP, communities	12 training participants per year
Educating Local Land Use Decision Makers	3.3.1-A-2	Annually lead one community conversation on stormwater management BMPs that focuses more on brainstorming and solution development.	Flooding of Communities, Pollutant Impaired Streams		Cannon River Planning Area	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000	X	X	X	X	X	X			SWCDs. CRWP, U of M Extension	Annual community conversation
Educating Local Land Use Decision Makers	3.3.1-A-3	Host biannual (every other) field day or tour for locally elected and appointed decision-makers, or their appointed citizen advisory committee. Rotate the location of this annual field day throughout the Cannon River Watershed Planning Area.	Agricultural Runoff		Cannon River Planning Area	-	5,000	-	5,000	-	5,000	-	5,000	-	5,000	25,000	X	X	X	X	X	X			CRWP, SWCDs, U of M Extension, Counties, Cities, TWPs	5 field days or tours with locally elected and appointed decision makers	
Citizen Engagement	3.3.1-B-1	Develop an education and outreach plan for the Cannon River Planning Area that identifies partnerships, recognizes existing efforts, past successes, is implemented in conjunction with other entities, and takes a regional approach.	All	Develop an education and outreach plan within the first two years of Plan adoption	Cannon River Planning Area	10,000 ¹	10,000 ¹	-	-	-	-	-	-	-	-	20,000 ¹	X	X	X	X	X	X			CRWP, U of M, cities, CLID	Development of a plan that will be implemented	
Citizen Engagement	3.3.1-B-2	Inform absentee landowners that the health of their land and local natural resources is part of an absentee owner’s long-term investment. Create and communicate explicit guidance in flyer with property tax assessment.	Agricultural Runoff and Leaching Loss, Drainage System Management, Flooding of Communities	[see column-text next page] ↓	Cannon River Planning Area	5,000	-	2,500	-	2,500	-	2,500	-	2,500	-	15,000	X	X	X		X				UMN Ext, CRWP	Develop and print flyer with property tax assessments for all Planning Area residents every other year	

¹ Activities are currently not eligible for Watershed Based Implementation Funds and costs are planned through CRWJPB membership dues, lake association contributions or other local and other state sources.

² Activity is currently not eligible for Watershed Based Implementation Funds and costs are planned through FEMA and the DNR. These two agencies prioritized the Cannon River Watershed in 2018 to start the Discovery process, which is a prerequisite to obtain FEMA funds for developing a Risk MAP project.

SOCIOECONOMIC FACTORS TARGETED IMPLEMENTATION TABLE (2020-2029)																												
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead							Project Partners	Activity Outcome Measurability			
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD			NCWMO		
Citizen Engagement	3.3.1-B-3	Educate homeowners and lake associations through news releases, workshops, presentations to organizations and one-on-one communications on: (1) shoreland property and the need to restore shoreline to a more natural state; (2) septic improvements and maintenance; (3) benefits of conservation and working lands easements; (4) BMP installation and implementation.	Shoreland Management	To better protect surface water and groundwater resources utilize the education and outreach plan to increase adoption of BMPs by increasing engagement and communication with residents, local landowners and agricultural producers to better understand implementation issues, fiscal and operational barriers, removing barriers, and communicate the benefits of implementation.	Cannon River Planning Area	5,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	27,500	X	X	X	X	X	X			MNDNR, CLID, CRWP	4 news releases, 1 workshop, and 5 presentations to organizations per year	
Citizen Engagement	3.3.1-B-4	Host periodic educational workshops for design and construction professionals including (1) licensed Septic Professionals; (2) drainage contractors; (3) design engineers; and (4) landscaping professionals.	Subsurface Sewage Treatment Systems		Cannon River Planning Area	-	8,000	-	8,000	-	8,000	-	8,000	-	8,000	-	8,000	40,000	X	X	X	X	X	X			U of M Extension, Counties, CRWP, CLID	Workshop every other year
Citizen Engagement	3.3.1-B-5	Develop educational opportunities to encourage stewardship and increase awareness of the interconnected nature of land, surface water, and groundwater through (1) curriculum development and (2) hosting classroom presentations and outdoor education.	All		Cannon River Planning Area	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	50,000	X	X	X	X	X	X			MNDNR, CLID, CRWP	2 classroom presentations per year
Citizen Engagement	3.3.1-B-6	Develop and install one demonstration project per year to highlight stormwater management practices, Low Impact Development (LID), Green Infrastructure, natural resources protection methods, and resource stewardship.	All		Cannon River Planning Area	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000	X	X	X	X	X	X			SWCDs, CRWP, Cities, CLID	One demonstration project per year
Citizen Engagement	3.3.1-B-7	Promote volunteer network by recruiting additional volunteers for the citizen monitoring program, hosting one river cleanup project and one land stewardship project per year.	All	Increase the use of volunteers and utilize existing volunteers to implement projects and programs	Cannon River Planning Area	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	50,000	X	X	X	X	X	X			SWCD, CRWP, MPCA, area colleges	One river clean up project and one land stewardship project per year	
Citizen Engagement	3.3.1-B-8	Develop an Annual Recognition Program to recognize citizen efforts and leaders in the communities in water resource and natural resource protection.	All		Cannon River Planning Area	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	30,000	X	X	X	X	X	X			SWCDs, CRWP	Highlight project/site on field tour	

SOCIOECONOMIC FACTORS TARGETED IMPLEMENTATION TABLE (2020-2029)																											
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability	
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO			
Citizen Engagement	3.3.1-B-9	Conduct surveys “before” and “after” targeted outreach to measure the influences of outreach on residents, local landowners, and farmers to better understand implementation issues, fiscal and operational barriers, communicate the benefits of implementation and measure adoption rates over time.	All	Increase the adoption of BMPs and conservation practices by 10% across the Planning Area to help achieve the goals in this Plan.	Cannon River Planning Area	500	500	500	500	500	500	500	500	500	500	500	5,000	X	X	X	X	X	X			SWCDs, CRWP	Utilize a tool (e.g. Mentimeter) to gauge engagement and change in understanding per event
Planning Area Partnerships	3.3.2-A-1	Encourage the Cannon River Watershed Partnership and MS4 cities to continue participating on the Cannon River Technical Advisory Group during plan implementation	All	Strengthen and expand collaborative relationships and partnerships	Cannon River Planning Area	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	12,000	X	X	X	X	X	X			SWCDs, Counties, CRWP	Phone calls and invitations to TAG meetings
Planning Area Partnerships	3.3.2-A-2	Invite stakeholder groups to an annual meeting to explore shared visions and goals for watershed management. Identify opportunities to create partnerships for education and outreach, project implementation, and monitoring and data collection.	All	Strengthen and expand collaborative relationships and partnerships	Cannon River Planning Area	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	12,000	X	X	X	X	X	X			SWCDs, Counties, CLID, CRWP	One annual meeting with stakeholder groups
Internal Capacity	3.3.2-B-1	Develop and maintain Cannon River Comprehensive Watershed Management Plan website.	Planning Area Partnerships	Promote transparency within the organization by creating a Cannon River Comprehensive Watershed Management Plan website that keeps the public informed of the activities of the JPA.	Cannon River Planning Area	5,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	18,500	X	X	X	X	X	X			SWCDs, CRWP	Create website/web-page and annually maintain website
Internal Capacity	3.3.2-B-2	Establish a regular meeting schedule, for the lifespan of the Plan, of a working group comprised of members of the Cannon River 1W1P Policy and Advisory Committees, joined by County and SWCD staff, to track progress of the Plan, make modifications, discuss and identify alternative sources of funding for both staff and project resources, and assess effectiveness toward Plan implementation.	--	Support progress towards achieving the goals of the Cannon River Comprehensive Watershed Management Plan by assessing each LGU’s strengths and weaknesses for implementation to identify gaps and strengthen technical capacity through training of existing staff, adding staff, or utilizing municipal staff and others for implementing projects	Cannon River Planning Area	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	50,000	X	X	X	X	X	X			SWCDs, Counties	4 meetings per year	
Internal Capacity	3.3.2-B-3	Prioritize SWCD staff getting Job Approval Authority (JAA) or certifications to increase the capacity of SWCDs to provide technical assistance for conservation practices.	--		Cannon River Planning Area	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	25,000	X	X	X	X	X	X			BWSR, NRCS	12 staff receiving review per year	

SOCIOECONOMIC FACTORS TARGETED IMPLEMENTATION TABLE (2020-2029)																										
Priority Concern	ID	Implementation Activity	Related Concern	10-Year Measurable Goals	Targeted Implement-ation Area	Schedule for the Next 10 Years (2020-2029)											Local Project Lead								Project Partners	Activity Outcome Measurability
						2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$	10-Yr Project Cost	Le Sueur	Rice	Steele	Dakota	Goodhue	Waseca	BCWD	NCWMO		
Internal Capacity	3.3.2-B-4	Assess each LGU’s strengths and weaknesses for implementation to identify gaps and strengthen technical capacity through training of existing staff, adding staff, or utilizing municipal staff and others for implementing projects making funds available for 12 individuals to receive training annually.	--	Support progress towards achieving the goals of the Cannon River Comprehensive Watershed Management Plan by assessing each LGU’s strengths and weaknesses for implementation to identify gaps and strengthen technical capacity through training of existing staff, adding staff, or utilizing municipal staff and others for implementing projects	Cannon River Planning Area	6,000	6,000	6,000	6,000	6,000	6,000	,6000	6,000	6,000	6,000	60,000	X	X	X	X	X	X			SWCDs, Counties	Annual training for 12 individuals
Internal Capacity	3.3.2-B-5	Provide staff training in outreach and communication to more effectively communicate with locally elected and appointed decision-makers, landowners, crop consultants, private well owners, and conservation partners.	--		Cannon River Planning Area	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	30,000	X	X	X	X	X	X			SWCDs, Counties, CRWP	12 participants per year
Internal Capacity	3.3.2-B-6	Meet with member Boards to provide biannual (every other) updates on accomplishments and water quality trends.	--		Cannon River Planning Area	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	24,000	X	X	X	X	X	X			CRWP	Biannual updates to SWCD and County boards every other year
Recreational Value	3.3.3-A-1	Communicate location and explanation of water quality impairments that may affect recreational opportunities or quality of experience.	--	Improve environmental stewardship through recreation by increasing the general public’s recreational capacity within natural environments and water resources through the assessment of public access points in the Planning Area and annually reviewing opportunities.	Cannon River Planning Area	–	2,500	–	2,500	–	2,500	–	2,500	–	2,500	12,500	X	X	X	X	X	X			MPCA, CRWP, River recreation groups	Post or links on website, brochures distributed
Recreational Value	3.3.3-A-2	Assess existing access to the Planning Area’s surface water resources and work with state agencies to address the number and quality of access points.	--		Cannon River Planning Area	–	–	–	–	–	2,500	–	–	–	–	2,500	X	X	X	X	X	X			MNDNR, CRWP	Summary of access points and list of potential improvements
Recreational Value	3.3.3-A-3	Annually review the availability of land adjacent to water resources which can be acquired or opened to the public in order to increase access to water recreation.	--		Cannon River Planning Area	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	25,000	X	X	X	X	X	X			LCCMR, LSOHC, MNDNR, Non-profits (CRWP, TNC, TPL, etc.)	Host annual meeting and list of potential locations

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4.2. PRIORITIZATION OF PROGRAMS AND PROJECTS

As the Planning Partners evaluated the implementation activities identified during the plan development process, the following criteria were applied in determining which of the activities should be eliminated, implemented first or implemented later in the 10-year timeframe of the Plan:

- **Existing/Ongoing Activity**
 - Is the implementation activity something that is currently being performed uniformly by the counties/SWCDs in the Planning Area? If not (not currently funded), is it a local priority (not to be included in the Targeted Implementation Schedule) or a Plan priority (to be included in the Targeted Implementation Schedule)?
- **Suitable Entity**
 - Is the Cannon River JPB the most appropriate entity to implement the activity in question or is another entity more appropriate (e.g. state agency)?
- **Priority Areas**
 - Does the action address the issue(s) and goal(s) of the priority resources and areas described in Section 1.0 *Analysis and Prioritization of Issues and Resource Concerns*?
- **Planning Area**
 - Does the action address issue(s) and goal(s) that were determined to be a priority for the entire Planning Area and are necessary for successful, future implementation at a local scale (e.g., Education and Outreach, well sealing, Long-Term Flood Evaluation Study)?
- **Address a Gap in the Knowledge Base**
 - Does the implementation activity enhance the Planning Partners’ understanding of the resource protection and/or restoration needs thereby allowing the Cannon River JPB to make more effective management decisions?
- **Recommendation from the Civic Engagement Process**
 - Priority was given to those projects that were recommended by citizens of the Planning Area involved in the water conversations.
- **Allocation of Resources**
 - The Targeted Implementation Schedule distributes the annual budget to its various programs with an emphasis on “shovel-ready” water quality improvement projects.
- **Funding**
 - Priority was given to those actions that are not currently funded by the counties/SWCDs at a level needed to achieve the goal(s) of the Plan.

4.2.1. Identification of Roles and Responsibilities towards Implementation

The Planning Partners will work under the direction of the Cannon River Watershed Joint Powers Board after their formation to develop policies and guidelines that will be used to address the Targeted Implementation Schedule. It is anticipated that this will include the adoption of cost share policies to define how and when funding will be used towards the measurable goals within the Planning Area. See Section 6.4 on criteria that may be used for project selection. It is also anticipated that certain roles and decision authorities will be delegated to staff to allow for efficient plan implementation.

It is not anticipated that the CRWJPB will have a role in approving landowner contracts to install landowner projects; that role and responsibility will belong to an individual Planning Partner where the project is being installed or implemented.

Vital to effective Plan implementation will be the need to develop a fiscal and administrative process that can account for resources expended and accomplishments completed. Similar to the Plan development process, it is anticipated that once the CRWJPB is formed, a fiscal agent and an administrator will be identified and their roles defined. An expected role of the administrator will be to manage a reporting system whereas each Planning Partner or outside consultant will identify their accomplishments towards the Targeted Implementation Schedule. The Joint Powers Board will have the responsibility to ensure that resources and accomplishments are being directed towards implementation activities identified and sufficient level of effort towards the measurable goals are being made.

As the Planning Partners move forward with implementing the Comprehensive Watershed Management Plan, they will be making decisions about who will be responsible for completing the various steps that go into installing individual projects or implementing various activities identified in Table 4-2, Table 4-3, and Table 4-4. It is anticipated that a variety of options will be considered during the life of the Plan to determine methods on how targeted implementation activities will best be accomplished. Consideration will be given to contracting for services, using existing Plan Partner staff, hiring staff through an identified Plan Partner, or using a retainer agreement for services.

To assist with the process of identifying roles and responsibilities towards implementation, a workload analysis will be completed by the Planning Partners in conjunction with the short-term work plan and budgeting effort (biennial or triennial work plan). The purpose of the workload analysis will be to

1. Refine the anticipated hours and costs to complete individual implementation activities based on actual fund availability;
2. Consider whether the implementation activity is either on-going or involves a limited duration;
3. Assess capacity among Plan Partner staff; and
4. Evaluate capacity and willingness of other Federal, State or local partners to assist with implementation.

Conducting this workload analysis will allow the Plan Partners to have a strategic plan for both staffing and contracting needs and will be used to account for changing demands in the actual pace of progress towards goals and implementation activities.

4.3. ACCOUNTING FOR LOCAL FUNDS

It is understood that funding for implementation of the Plan will come from a variety of local, state and federal sources. One of the final steps in the development of the Targeted Implementation Schedule was to estimate current water management expenditures for the Cannon River Planning Area in order to set a baseline of activity. To conduct this estimate, each local unit of government was asked to identify how much locally generated money (funds derived from the ad valorem levies, fees, services, or donations from citizens, local organizations, or local chapters of national organizations)

they accounted for in one year in order to project what is expected to be used within the Planning Area in future years. Dollars were organized by program type. If a program was a county wide program, the dollars were prorated to only reflect the percentage of land area within the Cannon River Watershed Planning Area. If a program already reflected the Cannon River Planning Area one hundred percent of the program dollars were accounted for. Since the accounting activity only looked at 2017, some programs have no state or local dollars even though the planning entities may have dollars in these programs in past or future years. After completing this activity, the issue statements were updated to reflect any programmatic or funding gaps. A summary of estimated funds for the Planning Area in 2017 is provided in Table 4-5.

Federal dollars are included in the table in order to reflect the contributions of our federal partners to the Cannon River Watershed Planning Area. These dollars could have reflected multiple federal sources implemented by the local units of government, but upon completion of the exercise local units of government only reflected dollars that they had some role in. Therefore the federal dollars are primarily USDA-NRCS Environmental Quality Incentives Program (EQIP) dollars implemented in the Cannon River Watershed Planning Area. Some local units of government have utilized Environmental Protection Agency (EPA) dollars in past years, but are not included as none had dollars in 2017. Use of EPA funds could be an opportunity for local units of government or the CRWJPB in future years.



Belle Creek

Table 4-5. Estimated Water Management Activity Funds Allocated in the Planning Area in 2017

Source	State Dollars in 2017	Local Dollars in 2017
BWSR Clean Water Funds - Buffer	\$104,330	\$4,755
BWSR Clean Water Funds - Competitive	\$77,853	\$29,064
BWSR Clean Water Funds - Local Capacity	\$310,556	\$30,266
BWSR Cooperative Weed Management Area	\$0	\$0
BWSR CREP Implementation	\$2,779	\$0
BWSR Easement Delivery	\$12,435	\$4,041
BWSR State Cost Share Program	\$42,386	\$11,031
BWSR WCA	\$57,364	\$52,607
County - AIS	\$170,232	\$0
County -Drainage	\$9,840	\$1,093,307
County -Feedlots	\$89,975	\$95,056
County -Shoreland	\$9,846	\$47,414
County -SSTS	\$61,813	\$110,941
County to SWCDs	\$0	\$528,794
County-Water Planning	\$31,478	\$101,460
Fees for Services and Products	\$0	\$51,870
MDA MAWQCP	\$0	\$0
MPCA - grants	\$0	\$0
Municipalities - Stormwater	\$300,000	\$2,126,148
Non-Profit Dollars	\$0	\$2,238
Non-Profit Dollars - Watershed Wide	\$0	\$9,750
Other Non-state Grants	\$0	\$0
Other Non-state Generated Dollars	\$0	\$15,600
Regional Agencies	\$0	\$27,800
Watershed Districts	\$0	\$2,500
Watershed Management Organizations	\$0	\$6,000
Well Sealing	\$0	\$0
Totals	\$1,280,888	\$4,350,601
Total State and Local Dollars	\$5,631,489	
Total State and Local plus \$559,338 in Federal Dollars	\$6,190,827*	

* Existing State and Local Dollars in this table will be allocated to ongoing activities in the Planning Area. These funds don't replace the total dollars needed to fund the Targeted Implementation Schedule.

As Table 4-5 indicates, there is approximately \$6,000,000 currently being allocated to water management activities in the Cannon River Planning Area. These existing state and local dollars will be allocated to ongoing activities in the Planning Area. Additional funds will need to be secured by the Planning Partners to implement the activities identified in the Targeted Implementation Schedule. Based on the average annual cost of actions identified in the Targeted Implementation Schedule, it is estimated that the Cannon River Comprehensive Watershed Management Plan could increase the level of watershed management work being done in the Planning Area by 50% over the next ten years.

4.4. WATERSHED MANAGEMENT ENTITIES

There are two Water Management Organizations located in the Cannon River 1W1P Planning Area: the Belle Creek Watershed District (BCWD), and the North Cannon River Watershed Management Organization (NCRWMO). Only the Belle Creek Watershed District intends to satisfy their statutory watershed management planning duties with this Comprehensive Watershed Management Plan. The following section describe the BCWD's watershed management plans requirements and its Local Priorities.

4.4.1. Belle Creek Watershed District

The Belle Creek Watershed District is 52,790 acres in size and covers portions of Cannon Falls, Vasa, Belle Creek, Minneola, Leon, Wanamingo, and Featherstone townships in Goodhue County. From the upper portions of the watershed near Hader, Belle Creek flows north to the confluence with the Cannon River just east of Welch Village and drops nearly 550 feet on its path. This watershed has gently rolling hills in the upland portions transitioning to extremely steep forested bluffs near Vasa and north.

In the spring and fall of 1961 numerous damaging flood events took place in the Belle Creek Watershed. The Goodhue County SWCD, County Board, and local citizens took it upon themselves to investigate possible solutions to these devastating floods. The Watershed Protection and Flood Prevention Act (PL-566) was authorized in 1954 by the federal government to help protect and improve water resources and land management in watersheds below 250,000 acres in size. In 1963 the Goodhue County SWCD and the County Board of Commissioners filed a joint application for these PL-566 funds. The Belle Creek Watershed District (BCWD) was formed in 1968 following federal guidance stating that a local government unit is preferred to assist with the project. The BCWD was formed to oversee construction of the flood prevention structures and be able to conduct maintenance on them in the future. In 1970 the appointed BCWD members adopted an Overall Plan which focused on the issues of flooding and water resources. The mission statement of the BCWD is *"to maintain the productivity of the soil by conservancy and restoring soil fertility through the practical application of erosion control and land use practices so as to promote the general welfare and security of the families within the district."* These overall objectives remain in place today however the focus of the BCWD is to protect the infrastructure in place while continuing to improve the water quality and quantity within the Belle Creek Watershed District.

In 1974 the first of six large earthen dams were constructed to help with downstream flooding. Five of the six dams have large (several acre) pool areas above the structures, the sixth is operated as a dry structure.

In 2011 The Goodhue SWCD assisted the BCWD with a Watershed Management Plan Revision. This revision focuses on the core duties of the BCWD and laid out a 5 year plan for implementing action items above and beyond the ‘maintenance mode’ current situation. The 5 year implementation plan approach is a guidance document for implementing the highest priority items in the watershed. Accomplishments since the 2011 Belle Creek Watershed District Plan was adopted include:

- Existing watershed structure maintenance: Majority of BCWD funds were spent on outlet repair of structure R4 in 2016, and a sinkhole repair which opened up in the spillway of S3 in 2014. Routine activities listed in the 2011 BCWD Plan include debris removal and vegetative maintenance which were implemented each year. These activities were hired out by local contractors. The maintenance topic will continue to be the key objective of the District.
- Education: Each year the BCWD allows 6th Grade Field Day to take place on Structure R-2. The field day is geared toward teaching students about conservation, land use, wildlife, and water quality. Many surrounding schools attend this field day each September.
- Permits: No permits were reviewed or issued since the past plan revision. BCWD does not choose to have permit authority on land use changes in the watershed.

BCWD Board is comprised of three members, which are appointed by the Goodhue County Commissioners and serve 3-year terms. The Goodhue County Commissioners make these appointments at their first regularly scheduled Board meeting in January as needed.

Existing programs that the BCWD administers are somewhat limited. The main focus of the BCWD is to maintain the existing impoundment structures. However, in an effort to extend the life of the six existing structures, the BCWD has adopted a local cost-share policy for new grade stabilization structures and water and sediment control basins. These practices must be located within the drainage areas of BCWD impoundments to be eligible for these local cost-share dollars.

The BCWD sets its annual levy yearly in September in accordance with 103D.901. Typically, the BCWD Board sets the levy around \$20,000. This can change slightly depending on known upcoming projects that may need additional financial or technical support. Expenditures each year are mainly attributed to aggregate damage insurance, structure upkeep, maintenance and repairs. The yearly budget reflects the goals of the BCWD to be able to fund routine maintenance duties, implement additional watershed plan items, as well as maintain a sound fund balance for major structural repair when needed. The impoundment structures that the BCWD maintains were built in the late 1970's and early 1980's and have an estimated lifespan of 50 years. Large structural repairs are on the horizon and the BCWD want to be financially prepared for such occurrences.

Table 4-6. BCWD Annual Budgets for 10-Year Period

Year	Levy	Expenses
2018	\$ 27,000	-
2017	\$ 21,908	\$ 21,531
2016	\$ 22,206	\$ 14,445
2015	\$ 19,866	\$ 17,201
2014	\$ 19,423	\$ 27,439
2013	\$ 19,517	\$ 9,466
2012	\$ 19,336	\$ 16,589
2011	\$ 9,292	\$ 9,243
2010	\$ 9,459	\$ 13,324
2009	\$ 9,250	\$ 9,428
2008	\$ 9,018	\$ 9,078

The BCWD local priorities continue to focus on the maintenance and protection of their impoundment structures in the most efficient method possible. These efficiency concepts as well as other local erosion control efforts are identified in the 2011 BCWD Implementation Plan and should be emphasized moving forward by local parties involved. A special importance should be placed on the following top 5 action items within the implementation plan over the next 10 years of the Cannon 1W1P:

1. Take action on maintenance recommendation by agency partners
2. Assess sediment volume in all BCWD structures
3. Provide local cost-share for rate/volume control in the BCWD
4. Increase prescribed grazing acres on BCWD land and private lands
5. Increase cover crop and reduced tillage acres in the BCWD

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Table 4-7. Belle Creek Watershed District 2020-2029 Implementation Plan and Capital Improvement Program

ID	Implementation Activity	Issue/ Concern	Goal	Implementati on Location	Schedule for the Next 10 Years (2020-2029)										10-Yr Project Cost \$	Source of Cost Information	Project Lead	Project Partners	Activity Outcome Measurability
					2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$					
1.A.1	Restore existing water and sediment control structures (638/410) and other impoundment structures that are failing and/or sediment laden to assist with volume control.	Maintaining Existing Structures	Continue to control flood waters by maintaining structural integrity	BCWD	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$75,000	SWCD (c/s 1 impoundment improvement ea. year)	BCWD	SWCD/ NRCS	1 impoundment improvement yearly
1.A.2	Provide Cost Share incentives to landowners involved in implementing conservation practices that reduce p flow to a BCWD structure.	Maintaining Existing Structures	Continue to control flood waters by maintaining structural integrity	BCWD	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$100,000	SWCD (c/s 1 new impoundment ea. year)	BCWD	SWCD/ NRCS	Provide financial and technical assistance for 1 retention BMP/yr.
1.A.3	Assess the amount of sediment in BC structures and seek funding for removal when/if needed. (a) Funding sources such as the Clean Water Fund, NRCS and/or federal special funding opportunities, Watershed Management Organization funding possibilities and levy possibilities.	Maintaining Existing Structures	Continue to control flood waters by maintaining structural integrity	BCWD	\$3,000		\$3,000		\$3,000		\$3,000		\$3,000		\$15,000	Completed 1 basin sediment study in 2017 for about \$2500 in staff time. 6 basins total	BCWD	SWCD/ NRCS	Calculate sediment volumes on R-1, R-2, R-5, R-9 and S-3 (as shown in the implementation table)
1.A.4	Yearly review and act on BCWD infrastructure maintenance and improvement recommendations as documented by NRCS, MNDNR and the SWCD reports.	Maintaining Existing Structures	Continue to control flood waters by maintaining structural integrity	BCWD	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$10,000	time to coordinate listed items in early project list	BCWD	SWCD/ NRCS/ MNDNR	Annual inspections with partnering agencies
1.B.1	Implement managed rotational grazing plans on impoundment structures that have adjacent pasture land to reduce woody vegetation growth and reduce long-term maintenance costs.	Grazing Management on/adjacent/above BCWD structures.	Continue to control flood waters by maintaining structural integrity	On BCWD Property	\$5,000		\$5,000		\$5,000		\$5,000		\$5,000		\$25,000	SWCD- C/s fencing and developing grazing plans on the 5 remaining structures	BCWD	SWCD/ NRCS	Implement rotational grazing on 4 of 6 structures (not R-4 or R-2)
1.B.3	Provide technical and financial assistance for landowners interested in conducting rotational grazing on/near structures S-3 and R-2.	Grazing Management on/adjacent/above BCWD structures.	Continue to control flood waters by maintaining structural integrity	On BCWD Property	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$20,000	2,000 per year for assisting adjacent landowners in grazing plan development and implementation	BCWD	SWCD/ NRCS	Implement new grazing management plans on Structures S-3 and R-2
1.B.4	Implement routine inspection of grazing sites to assure a healthy and sustainable stand of vegetation.	Grazing Management on/adjacent/above BCWD structures.	Continue to control flood waters by maintaining structural integrity	On BCWD Property	\$200	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$3,800	~10 hours/yr to inspect and make recommendations to plan	BCWD	SWCD/ NRCS	report of yearly inspections
1.C.1	Utilize mechanical and chemical methods of woody vegetation removal when necessary on an annual basis.	Mechanical and Chemical removal of woody vegetation	Continue to control flood waters by maintaining structural integrity	On BCWD Property	\$10,000	\$10,000	\$10,000	\$10,000	\$8,000	\$8,000	\$6,000	\$6,000	\$6,000	\$6,000	\$80,000	based on past yearly expenses. w/more managed grazing =<funds on mechanical methods	BCWD	SWCD	Satisfy NRCS/SWCD recommendations for maintenance activities
1.D.1	Utilize relevant elevation data and mapping software to assist with locating conservation sites.	Create additional upland storage by increasing perennial vegetation and installing conservation practices along field edges, head cuts, eroded gullies, and sizing of culverts	Continue to control flood waters by maintaining structural integrity	BCWD	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$5,000	utilize SWCD GIS software and resources ea./year - 8hrs to id sites for that year	BCWD	SWCD	Identify 1 BMP site per year

ID	Implementation Activity	Issue/ Concern	Goal	Implementati on Location	Schedule for the Next 10 Years (2020-2029)										10-Yr Project Cost \$	Source of Cost Information	Project Lead	Project Partners	Activity Outcome Measurability
					2020 \$	2021 \$	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$	2027 \$	2028 \$	2029 \$					
2.A.1	Promote with education efforts & incentives use of cover crop practices that leave fields green over winter.	Reduce erosion rates on agricultural fields by implementing conservation practices and reducing surface runoff volume	Erosion Control	BCWD		\$7,000	\$7,000	\$7,000							\$21,000	c/s @ \$35/ac -200 acres	BCWD	SWCD/ NRCS	Increase cover crop acres by 10% annually for 3 years (currently hard to track, but likely 2,000 acres of cover crop in BCWD in 2017)
2.B.1	Provide T/A needed to carry out controlled grazing within stream riparian corridor.	Managing streambank erosion on the Belle Creek and tributaries	Erosion Control	BCWD	\$2,500		\$2,500		\$2,500		\$2,500		\$2,500		\$12,500	estimated cost for plan development equip document <80ac	BCWD	SWCD/ NRCS	Implement 1 riparian grazing plan every other year
2.B.2	Continue to remove sediment and debris from drainage structures as needed.	Managing streambank erosion on the Belle Creek and tributaries	Erosion Control	BCWD	\$1,000	\$1,000		\$1,000	\$1,000			\$1,000	\$1,000		\$6,000	critical area planting set max rate \$1,000/project <50% c/s	BCWD	SWCD	Satisfy NRCS/SWCD recommendations for maintenance activities
2.B.4	Seek funding sources and provide local technical assistance to restore eroding streambanks.	Managing streambank erosion on the Belle Creek and tributaries	Erosion Control	BCWD	\$2,000	\$2,000	\$2,000		\$2,000		\$2,000		\$2,000		\$12,000	40hrs/yr for developing stream design/fixes	BCWD	SWCD/ NRCS, MNDNR	organize/implement 6 streambank projects in 10years
2.B.5	Utilize rip rap where necessary, but focus on bioengineering practices to help reduce erosion rates on cut banks and eroding bluffs.	Managing streambank erosion on the Belle Creek and tributaries	Erosion Control	BCWD		\$3,000		\$3,000		\$3,000		\$3,000		\$3,000	\$15,000	\$3,000/project c/s for low-cost design approach	BCWD	SWCD, MNDNR	install 1 low-cost fix every other year
3.A.3	Conduct outreach efforts with local/state/federal agencies to help promote the proper use of herbicides and pesticides from agricultural activities and market no fall application of anhydrous ammonia (without Nitrogen Stabilizer).	Improve the quality of surface and ground water within the Belle Creek Watershed by informing and educating BCWD residence on the proper disposal of sanitary waste.	Water Quality Improvement	BCWD		\$750		\$750		\$750		\$750		\$750	\$3,750	10hr/yr and outreach materials	BCWD	NRCS/ Co-ops, MDA/SWCD	No fall nitrogen application without stabilizer
4.A.1	Partner with the Goodhue SWCD and Goodhue County, and other state/federal agencies, to generate educational materials for Belle Creek Watershed landowners.	Provide the general public with pertinent information related to the history and workings of the Belle Creek Watershed District	Outreach	BCWD			\$2,000			\$500					\$2,500	\$10/brochure - 200 brochures. Outreach event \$500	BCWD	SWCD, Goodhue County, NRCS	Host 2 outreach events and host annual 6 th grand field days at R-2
4.A.2	Partner with the Goodhue SWCD for posting information related to the BCWD on the Goodhue SWCD website. www.goodhueswcd.org.	Provide the general public with pertinent information related to the history and workings of the Belle Creek Watershed District	Outreach	BCWD	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$1,000	\$100/yr for swcd to keep website uptodate for BCWD	BCWD	SWCD	Annually
4.A.3	With assistance from Goodhue SWCD generate a yearly newsletter to all landowners within the BCWD.	Provide the general public with pertinent information related to the history and workings of the Belle Creek Watershed District	Outreach	BCWD	\$2,800	\$2,800	\$2,800	\$2,800	\$2,800	\$2,800	\$2,800	\$2,800	\$2,800	\$2,800	\$28,000	700 landowners/ \$4 to develop & send newsletter	BCWD	SWCD	Reach 700 landowners each yr

4.4.2. North Cannon River Watershed Management Organization

The NCRWMO was created in 1983 as a result of the Metropolitan Surface Water Management Act that was enacted in 1982. The act has been recodified as Minnesota Statute 103B and in 1992 the Board of Water and Soil Resources developed rules for Watershed Plan contents, known as Minnesota Administrative Rule 8410. As a result of this legislation the purpose of the NCRWMO shall be to:

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

The NCRWMO is a government unit formed through a joint powers agreement (JPA) signed by eight townships and three small cities in southern Dakota County. The eleven member communities are Castle Rock Township, Douglas Township, Eureka Township, Greenvale Township, Hampton Township, Randolph Township, Sciota Township, Waterford Township, city of Miesville, city of New Trier, and the city of Randolph. The NCRWMO does not include a small portion of the City of Northfield that extends into southern Dakota County because a formal exemption contained in the Metropolitan Surface Water Management Act; Minnesota Statute 473.121, subdivision 2 excludes the City of Northfield.

The NCRWMO's Board of Managers is comprised of one representative appointed from each of the eleven communities in the joint powers agreement. While developing their 3rd generation Watershed Management Plan the NCRWMO adopted a mission statement to help guide the formation of goals and policies. The mission statement of the NCRWMO is *"Managing groundwater and surface water to prevent property damage, maintain hydrologic balance, and protect water quality for the safety and enjoyment of citizens and the preservation and enhancement of wildlife habitat through collaboration among member communities."*

The NCRWMO covers approximately 150 square miles and has an approximate population of 5,000. The area includes the sub-watersheds of Chub Creek, Trout Brook, and Pine Creek, and the Cannon River from Northfield to Lake Byllesby. The NCRWMO is predominantly rural in nature with agriculture as its primary landuse. Concerns in the watershed are primarily centered on poor water quality in its creeks and lakes, and increased water quantity from drainage activities. High nitrates in Trout Brook and Pine Creek, high bacteria levels in Chub

Creek, high sediment levels in Trout Brook, and high nutrients in Lake Byllesby impact the quality of fish and wildlife habitat, aesthetics, and aquatic recreation.

The 3rd generation NCRWMO Watershed Management Plan was approved by BWSR in August 2013 and adopted by the NCRWMO Board in November 2013. Dakota County SWCD was contracted to assist the NCRWMO with Plan development. The Plan was developed with input from the NCRWMO Board of Managers and a Planning Advisory Committee (PAC). The PAC consisted of representative from agencies and organizations, residents of the member communities, and liaisons from the NCRWMO Board of Managers. During the planning process goals, strategies and policies were developed to address the watershed concerns. While the goals are broad, further details are reflected in the implementation plan.

Surface Water Quality Goal:

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

Surface Water Quantity Goal:

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

Soil Erosion and Sedimentation Goal:

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

Groundwater Goal:

To protect groundwater quality and quantity. Strategies include providing cost share to install best management practices; and cooperating with and receiving groundwater information and data from other entities. A policy requires communities to review mining ordinances with regards to protection of groundwater resources.

Wetlands Goal:

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

Wildlife, Habitat and Recreation Goal:

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

Education and Outreach Goal:

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

Administration Goal:

To fulfill statutory requirements of Minnesota Administrative Rule Chapter 8410 and effectively and efficiently perform the strategies of this Watershed Management Plan. Strategies include cultivating and maintaining partnerships with agencies and organizations for collaboration; fulfilling the requirements of a watershed management organization; and evaluating implementation of strategies and policies identified in this Plan.

The NCRWMO does not act as a permitting agency. Instead, the NCRWMO requires member communities to enforce ordinances related to water quality and report their actions to the NCRWMO. For example, in 2005 the NCRWMO developed a model ordinance for erosion control and stormwater management. They hosted a series of workshops and presentations to member Boards were conducted. By 2008 all members had adopted the model erosion control and stormwater ordinance. The responsibility of the NCRWMO is to ensure that the goals are pursued through the strategies and policies laid out in the implementation plan. The responsibilities of the member communities are (see next page):

1. Member communities shall adopt and enforce ordinances as strict as or stricter than Dakota County Ordinance 113 regarding the installation and maintenance of subsurface sewage treatment systems (SSTS) or will delegate the SSTS ordinance enforcement to Dakota County.
2. Member communities will annually report to the NCRWMO information on how and when their required storm water control ordinance is enforced on developments greater than one acre.
3. Member communities will annually report to the NCRWMO data on how and when their required ordinance on stormwater management for land disturbances is enforced in their communities.
4. Member communities will annually report to the NCRWMO information on how and when their required ordinance on erosion control during land disturbances is enforced in their communities.
5. Member communities will annually report to the NCRWMO on their activities to enforce erosion control standards for new and renewing tax relief programs participants.
6. Member communities will annually report to the NCRWMO on their activities to enforce road right-of-way setback requirements.
7. Member communities shall review the appropriateness of their existing mining ordinances with regards to protection of surface and groundwater resources. If none is adopted, community shall consider adopting a mining ordinance.
8. Member communities shall post maps of the Wetland and Watercourse Inventory and Assessment or future inventories in their respective town halls.
9. Member communities will continue to work with the Dakota County SWCD for WCA coordination.
10. Member communities shall report to the NCRWMO on their implementation of all policies stated above.

Member communities having land use planning and regulatory responsibility are required by Minnesota Rules 8410 to prepare a local water management plan, which can be included as part of a comprehensive plan. Before a township or city adopts its local water management plan, it must be submitted to the NCRWMO for its review. The local plan must also be submitted to the Metropolitan Council and Dakota County for a 45-day review. Within 60 days of receipt of the local plan, the NCRWMO will review the local plan for conformance with the WMO plan. The NCRWMO will take into consideration any comments received from the Metropolitan Council and Dakota County. The NCRWMO will approve or disapprove all or part of the local plan within the 60-day timeframe, unless the city or township agrees to an extension. If the NCRWMO does not complete its review, or fails to approve/disapprove the plan within the allotted time, and an extension was not granted, the local plan will be considered approved (MN Rules 8410.0170, Subd. 12 and MN Statutes 103B.235, Subd. 3 and 3a).

The NCRWMO adopts an annual budget, and this determines the level of membership dues needed for the year. The largest budget item is administrative services, followed by water quality monitoring, cost share dollars and education. The NCRWMO does not have any programs, rather they have historically entered into a JPA with the Dakota County SWCD in order to carry out many of the activities in their budget. The NCRWMO joint powers agreement does allow for the establishment of a capital improvement fund for each improvement project ordered by the Board. However, this option is not currently used by the NCRWMO, nor do they intend to establish capital improvements within the timeframe of the Cannon River Comprehensive Management Plan. If the Board were to use this option they would follow procedures set forth in Minnesota Statute 103B.

Table 4-8. NCRWMO Annual Budgets for Five-Year Period

Year	Budget	Expenses
2018	\$36,015	NA
2017	\$33,641	\$27,762
2016	\$29,141	\$19,944
2015	\$30,441	\$23,907
2014	\$31,933	\$24,137

The NCRWMO has identified many partners and relies on collaboration and grants in order to accomplish the goals, strategies and policies identified. Member dues are collected but are only used to fund the core activities. The core activities of the NCRWMO include:

1. Monitoring water quality and quantity
2. Providing cost share funding and grant match funding to install best management practices,
3. Providing information and education to landowners and agricultural producers on best practices
4. Evaluating the implementation of best practices and enforcement of related ordinances throughout the watershed.

The NCRWMO has been involved throughout the planning process for the Cannon River Watershed Comprehensive Management Plan. A delegate from the NCRWMO Board of Managers serves on the Policy Committee and Managers have attended the Water Conversations. Participation in the Cannon River 1W1P allows both the NCRWMO and the Cannon River Planning Partners to align their implementation activities and further their goals.

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Table 4-9. North Cannon River Watershed Management Organization 2020-2023 Implementation Plan and Capital Improvement Program

ID	Implementation Activity	Issue/Concern	Goal	Implementation Location	Schedule for the Next 10 Years (2020-2023)				4-yr Project Cost	Source of Cost Information	Project Lead	Project Partners	Activity Outcome Measurability
					2020	2021	2022	2023					
					\$	\$	\$	\$	\$				
1.1	Monitor water quality at Chub Cr. Permanent Station	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$3,265	\$3,265	\$3,265	\$3,265	\$13,060	Water Monitoring Staff Estimate	NCRWMO	SWCD, County Parks, MPCA, Met Council, MNDNR, USGS	Annual data and trend data published in annual report
1.2	Conduct DO assessments in key streams	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Water Monitoring Staff Estimate	NCRWMO	SWCD, County Parks, MPCA, Met Council, MNDNR, USGS	Data published in annual report in years when conducted
1.3	Analyze nitrates in Trout Brook springs	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	Trout Brook Sub-Watershed	\$ -	\$ -	\$ -	\$ -	\$ -	Water Monitoring Staff Estimate in consult with UMN	NCRWMO	SWCD, County Parks, UMN, MGS	Annual data and trend data published in annual report
1.4	Participate in other water quality studies as needed	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	Unknown needs				\$ -	-	NCRWMO	SWCD, County Parks, MPCA, Met Council, MNDNR, USGS, UMN, MDA, MGS	Number of meetings attended
1.5	Provide grant match and cost share for water quality BMPs	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	See “Cost Share and Grant Match Fund” below				\$ -	-	NCRWMO	SWCD, NRCS	Number of projects and a factsheet with pollution reductions for each project
1.6	Collaborate with communities to help identify buffer priorities	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	All Member Communities, BWSR, MNDNR	List or map of prioritiy areas
1.7	Re-examine possible buffer requirements for all watercourses	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County, BWSR, MNDNR	Map or BuffCAT file
1.8	Advocate w/ County to fund buffers on watercourses upstream from DNR streams	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County, BWSR, MNDNR	Number of meetings attended or materials developed
1.9	Advocate for improved wastewater system in City of Randolph	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	Randolph	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County, Randolph, CRWP	Number of meetings attended or materials developed
1.10	Seek producers interested in Discovery Farms participation	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	MAWRC	Outreach materials developed or list of interested producers
1.11	Advocate w/ County to investigate old dumps and other pollution sources	Surface Water Quality	To protect and improve the waters quality of streams, rivers, and lakes such that each waterbody is “fully supporting” for its use designations according to MN State Standards.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County, MPCA	Number of meetings attended or materials developed
2.1	Monitor water quantity at Chub Cr. Permanent Station	Surface Water Quantity	To decrease the rates and volume of water that may contribute to flooding or non-point source pollution from overland runoff and subsurface drainage and dewatering activities.	NCRWMO	\$3,650	\$3,650	\$3,650	\$3,650	\$14,600	Water Monitoring Staff Estimate	NCRWMO	SWCD, MNDNR, USGS	Annual data and trend data published in annual report
2.2	Provide grant match and cost share for BMPs that reduce rate and volume of runoff	Surface Water Quantity	To decrease the rates and volume of water that may contribute to flooding or non-point source pollution from overland runoff and subsurface drainage and dewatering activities.	NCRWMO	See “Cost Share and Grant Match Fund” below					-	NCRWMO	SWCD, NRCS	Number of projects and a factsheet with pollution reductions for each project
2.3	Investigate methods to collect data on tile lines	Surface Water Quantity	To decrease the rates and volume of water that may contribute to flooding or non-point source pollution from overland runoff and subsurface drainage and dewatering activities.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	MAWRC, MPCA, UMN, MDA	Strategy for implementing tile monitoring or documentation on why it is not feasible.
2.4	Disseminate info on conservation drainage BMPs	Surface Water Quantity	To decrease the rates and volume of water that may contribute to flooding or non-point source pollution from overland runoff and subsurface drainage and dewatering activities.	NCRWMO	\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	NRCS, BWSR, Private Drainage Companies	Number of materials distributed or producers interested

ID	Implementation Activity	Issue/Concern	Goal	Implementation Location	Schedule for the Next 10 Years (2020-2023)				4-yr Project Cost	Source of Cost Information	Project Lead	Project Partners	Activity Outcome Measurability
					2020	2021	2022	2023					
					\$	\$	\$	\$	\$				
3.1	Provide grant match and cost share for erosion control BMPs	Soil Erosion and Sedimentation	To reduce soil erosion and sedimentation throughout the watershed.		See “Cost Share and Grant Match Fund” below				\$ -	-	NCRWMO	SWCD, NRCS	Number of projects and a factsheet with pollution reductions for each project
3.2	Develop model ordinance to enforce erosion control on tax relief property	Soil Erosion and Sedimentation	To reduce soil erosion and sedimentation throughout the watershed.		\$ -	\$ -	\$ -	\$ -	\$ -	-	NCRWMO	SWCD	Ordinance adopted
3.3	Develop model ordinance to enforce road right-of-way setback requirements	Soil Erosion and Sedimentation	To reduce soil erosion and sedimentation throughout the watershed.		\$ -	\$ -	\$ -	\$ -	\$ -	-	NCRWMO	SWCD, County	Ordinance adopted
3.2	Receive data on sediment load reductions due to BMPs installed	Soil Erosion and Sedimentation	To reduce soil erosion and sedimentation throughout the watershed.		\$ -	\$70	\$ -	\$70	\$140	Administrative Staff Time	NCRWMO	SWCD	Coordinate and calculate reductions with Cannon River Watershed Comprehensive Plan and utilize PTMapp
3.3	Seek producers interested in Discovery Farms participation	Soil Erosion and Sedimentation	To reduce soil erosion and sedimentation throughout the watershed.		Show in Surface Water Quality Activity 1.1				\$ -	-	NCRWMO	SWCD, MAWRC	Number of materials distributed or producers interested
4.1	Cooperate w/ agencies to update nitrogen fertilizer rates; disseminate recommendations	Groundwater	To protect groundwater quality and quantity.		\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	SWCD, MDA, UMN Extension, Local Agronomists	Number of materials distributed, number of research plots supported, or participation in groups such as MDA NFMP Local Advisory Team
4.2	Cooperate w/ researchers on nitrogen transport in Trout Br.	Groundwater	To protect groundwater quality and quantity.		Unknown needs and timing				\$ -	-	NCRWMO	UMN, SWCD, County Parks	Information on research activities will be published in the annual report
4.3	Provide grant match and cost share for nutrient management practices	Groundwater	To protect groundwater quality and quantity.		See “Cost Share and Grant Match Fund” below				\$ -	-	NCRWMO	SWCD, NRCS	Number of plans written and BMPs implemented
4.4	Track Groundwater quantity and quality through reports by others	Groundwater	To protect groundwater quality and quantity.		No costs anticipated				\$ -	-	NCRWMO	SWCD, MNDNR, MDA, UMN, County	Updates provided at Board of Manager meetings, data published in annual report
5.1	Review WCA applications	Wetlands	To protect wetlands from destruction or deterioration and to restore wetlands where possible.		No costs anticipated				\$ -	-	NCRWMO	SWCD, BWSR	Coordination with Local Authority
5.2	Provide grant match and cost share funding for wetland restoration projects	Wetlands	To protect wetlands from destruction or deterioration and to restore wetlands where possible.		See “Cost Share and Grant Match Fund” below				\$ -	-	NCRWMO	SWCD, NRCS, BWSR	Number of projects installed
6.1	Advocate w/ MDNR and others to develop Chub Lake WMA Management Plan	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	MNDNR	Written Lake Management Plan
6.2	Advocate w/ County to continue land conservation programs	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		\$ -	\$ -	\$70	\$ -	\$70	Administrative Staff Time	NCRWMO	County, SWCD	Number of meetings attended or written forms of support
6.3	Provide grant match and cost share to install shoreline BMPs	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		See “Cost Share and Grant Match Fund” below				\$ -	-	NCRWMO	SWCD, NRCS, MNDNR	Number of projects and a factsheet with pollution reductions for each project
6.4	Provide a forum or assist w/ improved cooperation for Trout Brook Habitat management	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	SWCD, County Parks, Trout Unlimited	Number of meetings hosted or attended

ID	Implementation Activity	Issue/Concern	Goal	Implementation Location	Schedule for the Next 10 Years (2020-2023)				4-yr Project Cost	Source of Cost Information	Project Lead	Project Partners	Activity Outcome Measurability
					2020	2021	2022	2023					
					\$	\$	\$	\$	\$				
6.5	Review Byllesby Dam status; advocate for research on effects of dam operations on wildlife	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County, MNDNR	Number of meeting hosted or attended
6.6	Review information on implementing Lk Byllesby TMDL	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		No costs anticipated				\$ -	-	NCRWMO	MPCA	Report provided at a Board of Managers meeting or published in the annual report
6.7	Advocate w/ City of Randolph to adopt shoreland and floodplain ordinance	Wildlife, Habitat and Recreation	To promote the protection and restoration of high quality natural areas throughout the watershed including wetlands, woodlands, prairies, and riparian corridors for improvement of water-based recreation, fish and wildlife habitat, and water quality.		\$ -	\$ -	\$ -	\$ -	\$ -	-	NCRWMO	County, SWCD	Adopted shoreland and floodplain ordinance
7.1	Promote/encourage volunteer water monitoring	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		No costs anticipated				\$ -	Administrative Staff Time	NCRWMO	SWCD, MPCA, MNDNR, Met Council	Number of materials distributed or volunteers gained
7.2	Maintain updated website	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		\$775	\$775	\$775	\$775	\$3,100	Administrative Staff Time	NCRWMO	SWCD	Generate website analytics
7.3	Develop annual report and plan	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		\$1,750	\$1,750	\$1,750	\$1,750	\$7,000	Administrative Staff Time	NCRWMO	SWCD	Produce and distribute an annual report and plan
7.4	Provide education and partner w/ others; find funding to educate and engage agricultural producers	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		\$500	\$500	\$500	\$500	\$2,000	Administrative Staff Time	NCRWMO	SWCD, MDA, UMN Extension, CRWP	Number of partnerships formed or grant dollars received
7.5	Disseminate updated nitrogen fertilizer application recommendations	Education and Outreach	To increase the awareness of water resources and practices needed for their improvement or protection among all sectors of the community.		Shown in Groundwater Activity 4.1				\$ -	-	NCRWMO	SWCD, MDA, UMN Extension, Local Agronomists	Number of materials distributed, number of research plots supported, or participation in groups such as MDA NFMP Local Advisory Team
7.6	Use technical and citizen advisory committees as needed	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		No costs anticipated				\$ -	-	NCRWMO	All Partners	Number and reason for use of committees
7.7	Request that County install stream signs on county roads	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County	Number of signs installed
7.8	Advocate & partner w/ County to install interpretive signs at County Parks	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		\$ -	\$ -	\$ -	\$ -	\$ -	Administrative Staff Time	NCRWMO	County	Number of signs installed
7.9	Maintain online directory of water/natural resource jurisdictions/organizations	Education and Outreach	To increase the awareness of water resources & practices needed for their improvement or protection among all sectors of the community.		Costs included in Education and Outreach Activity 7.2				\$ -	Administrative Staff Time	NCRWMO	All Partners	Directory is developed
8.1	Cultivate partnerships with agencies/organizations	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		Costs included in General Administration Activity 8.5				\$ -	-	NCRWMO	All Partners	Number of new partnerships formed or maintained
8.2	Fulfill BWSR performance requirements	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		Included in “ General Administration” and Education and Outreach Activities 7.2 and 7.3				\$ -	-	NCRWMO	SWCD	Meet PRAP standards
8.3	Amend plan, as needed, to avoid duplication	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		Costs included in General Administration Activity 8.5				\$ -	-	NCRWMO	SWCD, BWSR	Plan 183mended when needed
8.4	Evaluate implementation of strategies and policies	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		Costs included in General Administration Activity 8.5				\$ -	-	NCRWMO	SWCD	Reporting tool and report card generated
8.5	General Administration + Audit	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		\$10,300	\$10,300	\$10,300	\$10,300	\$41,200	Historic and Anticipated Cost Average	NCRWMO	SWCD	-

ID	Implementation Activity	Issue/Concern	Goal	Implementation Location	Schedule for the Next 10 Years (2020-2023)				4-yr Project Cost	Source of Cost Information	Project Lead	Project Partners	Activity Outcome Measurability
					2020	2021	2022	2023					
					\$	\$	\$	\$					
8.6	Build Reserves for Watershed Plan Update	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		\$1,500	\$1,500	\$1,500	\$1,500	\$6,000	Historic and Anticipated Cost Average	NCRWMO	SWCD	-
8.7	Cost Share and Grant Match Fund	Administration	To fulfill statutory requirements and effectively and efficiently perform the strategies of this Watershed Management Plan.		\$4,000	\$4,000	\$4,000	\$4,000	\$16,000	Historic and Anticipated Cost Average	NCRWMO	SWCD	-
Yearly Totals					\$25,740	\$25,810	\$25,810	\$25,810	\$103,170				

5. PLAN IMPLEMENTATION PROGRAMS

This portion of the plan describes the programs that will support implementation of the Cannon River Comprehensive Watershed Management Plan. The programs described below form the current baseline of watershed management in the Cannon River Planning Area and are the tools and systems that will be used to implement the actions identified in the targeted implementation schedule. These programs include: incentive programs, operations and maintenance programs, a capital improvement program, regulatory and enforcement programs, data collection and monitoring, and outreach and engagement programs.

Currently, the counties, soil and water conservation districts, WD and WMO administer their programs individually. Over time, as the Cannon River Comprehensive Watershed Management Plan is implemented, it may make sense to better coordinate these programs within the Planning Area to improve efficiency, cost-savings, and benefits to the watershed's resources and constituents.

Within each program section, there is a description of the program(s), the types of activities that currently occur within the program, and a brief summary of how the program supports the priority issues and targeted areas for restoration and protection. During the plan development process, the Planning Partners reviewed the various program elements offered by the counties and the SWCDs to compare how they are being implemented across the Planning Area. A table summarizing this information is included in the following program sections: incentive programs; capital improvements; operation and maintenance; regulation and enforcement; data collection and monitoring; and information, outreach, and education. This exercise identified a number of programmatic gaps that have been discussed throughout the planning process: starting with the development of the Land and Water Resource Inventory, through the development of issue statements and measurable goals and finally during the accounting of local funds. The Targeted Implementation Schedule includes implementation activities to address these gaps within the 10-year timeframe of the plan.

At this point in time, the Planning Partners do not see the need to develop any new planning-area wide programs for implementation of this Plan. Rather, they intend to use existing programs for implementation of the Plan and have identified implementation activities that will identify the changes needed to improve programmatic coordination and continuity across the planning area.



Cannon Valley Trail Marker - Photo EOR

5.1. INCENTIVE PROGRAMS

Incentive programs are formal programs used to encourage participation in certain activities or programs. Various mechanisms can be used for conducting incentive programs, including technical and/or financial assistance or providing other benefits for enrolling in programs. Financial incentives may be used to encourage landowners to install or adopt land management practices that improve or protect water quality. This section describes the local incentive programs that the Cannon River CWMP Planning Partners will use to achieve the goals in the Plan.

In order to achieve the goals of the Comprehensive Watershed Management Plan, the SWCDs in the Planning Area intend to evaluate ranking criteria of current incentive programs that will assign higher priority to potential projects located in the Priority Area(s) and targeted drainage areas identified in this Plan which is described in more detail in Section 6.4.1 Project Selection Process.

Cost-Share Programs

A cost-share program is where the costs for erosion control, sedimentation control, or water quality improvements are shared between the landowner and a funding agency. Numerous cost-share programs are available at the local, state, and federal level. Cost-share programs often provide funding for structural practices (e.g. sediment control structures or controlled drainage practices) or nonstructural practices (e.g. cover crops, no-till equipment rental). Landowners seeking cost-share assistance should contact their local SWCD office to obtain information on available programs.

Low-Interest Loans

Low- or no-interest loans provide financing at below-market rates, and are often combined with flexible repayment terms. Low- or no-interest loans can be based on a “revolving” scheme where the repayments are then redistributed to new loan recipients. Low interest loans may be available for livestock waste-management system updates, septic system replacement, small community wastewater-treatment systems, or other projects.

Regulatory Assistance Programs

Regulatory assistance programs often require landowners to achieve certain standards (i.e. water quality, buffer widths, etc.) in return for (1) certainty that the standard will not change for a defined period, (2) recognition of participation, and (3) priority for other financial and technical assistance. An example of regulatory assistance is the Minnesota Agricultural Water Quality Certification program.

Conservation Easements

Conservation easements are voluntary legal agreements that are made by a landowner and a qualified agent of a non-profit organization. These easements permanently conserve targeted resources to prevent land uses that are incompatible with the long-term health of the watershed while keeping land in private ownership. Conservation easements are available through state and local government agencies as well as several non-profit organizations such as The Nature Conservancy and the Minnesota Land Trust. Conservation easements are recorded on property deeds and inspected regularly to ensure that the provisions of the easement agreement are maintained.

The Cannon River CWMP partners recognize the value in taking a comprehensive, long-term approach to land conservation by working with willing landowners and partners to protect and restore important land throughout the watershed. Landowners interested in protecting and restoring their land are encouraged to contact their County's Land Conservation Program staff to discuss options and opportunities.

Land Acquisition

The Cannon River CWMP partners recognize the value in taking a comprehensive, long-term approach to land conservation by working with willing landowners and partners to protect and restore important land throughout the watershed. Counties in the planning area may work with other public entities, such as the Minnesota Department of Natural Resources and cities, to acquire lands outside of the County park and regional system. This protected land would then be eligible for a combination of state grant and County grant-match funding to restore and enhance natural resources.

Several examples of incentive programs that would be used by the Cannon River CWMP Planning Partners to address priority issues in targeted areas are highlighted on following page.



Cowling Arboretum - Photo EOR

RESOURCE CONCERNS:**PROTECTION LAKES & IMPAIRED STREAMS**

- **Agricultural Structural BMP Cost-Share Program:** All SWCDs in the planning area offer cost-share for structural BMPs. Program name, funding amounts, rates and policies may vary.
- **Agricultural BMP Loan Program:** Program through the Minnesota Department of Agriculture (MDA) that provides low-interest loans to landowners or homeowners. Applicants work with the local SWCD to ensure eligibility and then through their lender.
- **Land Conservation Program:** Program through the Minnesota Department of Agriculture (MDA) that provides low-interest loans to landowners or homeowners. Applicants work with the local SWCD to ensure eligibility and then through their lender.
- **Pollinator Habitat:** Many of the SWCDs in the planning area offer technical and financial assistance to property owners to restore native vegetation and increase habitat for pollinators.

WETLAND RESTORATION

- **Wetland Restoration Program:** Most SWCDs in the planning area utilize state programs, including Reinvest In Minnesota (RIM) and wetland banking. SWCDs also utilize federal programs such as Conservation Reserve Program (CRP) and Agricultural Conservation Easement Program (ACEP).

DRINKING WATER PROTECTION

- **Wellhead Protection:** Funding may be available to acquire conservation easements in vulnerable wellhead areas to permanently protect wellhead areas from potentially harmful land management practices.
- **Septic System Replacement:** Low-interest loans for septic system replacement may be available for qualified, low-income homeowners.
- **Nitrate Testing:** Many of the SWCDs in the planning area offer free nitrate testing to residents.
- **Abandoned Well Sealing Program:** Program policies vary by County/SWCD, however most are able to offer well sealing.

LANDSCAPE ALTERATIONS CONCERNS:**AGRICULTURAL RUNOFF AND LEACHING LOSS & SOIL HEALTH**

- **Agricultural Water Quality Certification Program:** Producers who are certified for this program are provided regulatory certainty for up to 10 years and receive priority financial and technical assistance. Certified producers can also use their certified status to promote their business as valuing water quality.
- **No-Till Drill Rental Program:** Some SWCDs have more drill rental options than others, however majority have a drill rental program that enables landowners to implement the practices that protect water quality.

SHORELAND MANAGEMENT

- **Shoreland Restoration:** Maintaining a healthy, natural shoreline with an abundance of diverse plants is one of the most important ways shoreland owners can protect and improve water quality. Technical and financial assistance may be available to landowners who want to restore the shore.

FLOODING OF COMMUNITIES

- **Stormwater Management:** Technical and financial assistance is available to treat and reduce the impact of stormwater runoff into lakes, stream, and wetlands.
- **Rain Barrels:** Rain barrels that capture rainwater can reduce runoff and benefit lawns and rain gardens.

5.1.1. Existing Incentive Programs

The following table summarizes the various incentive programs offered by the counties (see columns labeled “C”) and SWCDs (see columns labeled “S”) in the Cannon River Planning Area. This table also includes incentive programs offered by the North Cannon River Watershed Management Organization as well as the Belle Creek Watershed District.

Table 5-1. Existing Incentive Programs offered by the counties, SWCDs, NCRWMO and BCWD

Program	Dakota		Goodhue		Le Sueur		Steele		Rice		Waseca		NCR WMO	BCWD
	C	S	C	S	C	S	C	S	C	S	C	S		
Local Easements	X													
Stormwater / Urban BMP Cost-Share		X								X		X		
RIM/Federal Easements		X		X		X		X		X		X		
Pollinator Support	X	X		X				X				X		
Shoreland Restoration Cost-Share		X			X					X		X		
Tree Sales Program				X		X		X				X		
Walk-In Access Program						X		X		X		X		
Wetland Restoration Program	X					X	X			X				
Agriculture BMP Loan Program		X		X		X	X			X	X			
Abandoned Well Sealing Cost-Share	X			X	X		X				X*	X		
Agricultural Structural BMP Cost-Share		X		X		X		X		X		X		
Agricultural Non-Structural BMP Incentives		X		X		X		X		X		X		
No-Till Drill Rental Program		X		X		X		X		X				
Septic Loan Program	X				X				X		X			
Minnesota Agricultural WQ Cert. Program (MAWQCP)		X		X		X		X		X		X		

* Through Ag BMP Loan Program (MN Dept. of Agriculture)

5.1.2. Programmatic Gaps for Comprehensive Watershed Management Plan Implementation

In general, there are dollars available for incentive programs however participation in the programs varies across the planning area. Coordination with partners is vital to ensure consistency in funding and implementation but requires time and resources. Funding is needed in order to maximize partnerships and implementation of drinking water protection activities in particular.

Gaps in incentive programs include wetland-focused programs, zoning incentives, agricultural conservation easement programs, and or incentives for achieving or exceeding regulatory programs. The need to make programmatic changes in the future to address these gaps will be evaluated during annual work planning.

5.2. CAPITAL IMPROVEMENTS

For the purposes of this Plan, the Planning Partners have defined capital improvements as larger, non-reoccurring expenditures for the construction, repair, retrofit or increased utility or function of physical facilities, infrastructure or environmental features. Capital improvements are beyond the typical financial means of the Planning Partners and therefore require external funding.

Capital improvement projects are often completed in cooperation with multiple entities including counties, SWCDs, watershed management organizations, cities/townships, state agencies and private landowners.

The first step in the implementation of capital improvements to address water quality, water quantity and other issues identified in the Comprehensive Watershed Management Plan is the performance of studies to identify those capital projects most likely to address the identified concern and achieve the desired benefit(s). Projects will be chosen using multiple prioritization factors such as project feasibility, cost-benefit analysis, landowner cooperation, and available financing. In many cases, ownership of these improvements and on-going operations and maintenance responsibilities reside with the landowner.

Additional discussion are needed among Plan Partners to develop the specific process for implementing capital projects. Specifically, members of the Policy Committee or the Planning Work Group's individual and representative Boards are expected to discuss the means and methods for funding new capital improvements, with potential funding partners, before an implementation timeline can be established. Capital improvement projects completed through this Plan will be operated and maintained by the sponsoring organization.

As part of the regular review of the Cannon River Comprehensive Watershed Management Plan's progress described in Section 6.5.1, Planning Partners will review the status of any capital projects as part of its annual work planning.

5.2.1. Drainage

The public drainage systems within the planning area are managed by drainage authorities on behalf of the landowners receiving benefit from the drainage system. The individual county governments serve as the drainage authority for the public drainage features within their jurisdiction. These drainage systems, typically open ditches or in some cases underground tiles, were established to enhance agricultural production on lands frequently too wet to produce crops. The cost for original establishment of the public drainage system and subsequent improvements is borne by the benefitted properties within the area tributary to the ditch. The drainage authority acts on behalf of all the benefitted property owners to assess fees for the level of drainage benefit each landowner receives. Chapter 103E of the Minnesota Statutes, known as the Minnesota Drainage Law or Drainage Code, provides the regulatory framework for managing the public drainage systems. A summary of the public drainage system and the entities responsible for managing these systems is provided in Table 5-2 on the following page.



Table 5-2. Summary of Public Drainage System

County	Public Drainage System(s)	Drainage Authority
Dakota	County Ditch #1 (Pine Creek)	Dakota County
	County Ditch #2 (Part of North Branch, Chub Creek System)	
Goodhue	Judicial Ditch #1	Goodhue County Public Works Dept.
Le Sueur	County Ditch #9	Le Sueur County Administrator (SWCD is Ditch Inspector)
	County Ditch #15	
	County Ditch #36	
	County Ditch #40	
	County Ditch #46	
	County Ditch #57	
	County Ditch #59	
	County Ditch #63	
	County Ditch #68	
	Judicial Ditch #5 Rice	
	Judicial Ditch #15BE	
	Judicial Ditch #38	
Rice	County Ditch #4 – Devil Creek	Rice County Board of Commissioners (SWCD is Ditch Inspector)
	County Ditch #7	
	County Ditch #9	
	County Ditch #17	
	County Ditch #20	
	County Ditch #23 – Prairie Creek	
	County Ditch #30 – Wolf Creek	
	County Ditch #32A	
	County Ditch #33	
	Judicial Ditch #6 – Mud Creek	
Steele	County Ditch #1E	Steele County <i>Exception is Judicial Ditches shared with other counties</i>
	County Ditch #1W	
	County Ditch #2	
	County Ditch #5	
	County Ditch #22	
	County Ditch #25	
	County Ditch #27	
	Judicial Ditch #1	
	Judicial Ditch #2	
	Judicial Ditch #6	
	Judicial Ditch #7	
	Judicial Ditch #12	
	Judicial Ditch #24	
Waseca	County Ditch #18 & 48	Waseca County Board of Commissioners
	County Ditch #22	
	County Ditch #46	
	County Ditch #15-1	
	Judicial Ditch #1	
	Judicial Ditch #24	

Several programs that the Cannon River CWMP Planning Partners could use to address issues related to drainage management in targeted areas include:

LANDSCAPE ALTERATIONS CONCERNS:

DRAINAGE MANAGEMENT SYSTEMS

- A number of the incentive programs described in Section 5.1 can be used to implement structural and non-structural off-system BMPs which can provide significant benefits downslope to the drainage system.
- The Belle Creek Watershed District's cost-share policy for new grade stabilization structures and water and sediment control basins will benefit downstream waterbodies by addressing localized erosion and sediment control issues.
- The Buffer and Soil Loss legislation described in Section 5.4 requires buffers on public waters and drainage systems. This legislation requires perennial vegetation to an average of 50 feet with a minimum 30 feet on public waters and 16.5 feet for public drainage systems.
- The Cannon River CWMP Planning Partners intend to conduct annual meetings with all drainage authorities in the Planning Area to:
 - Share updates on each entity's drainage system management program;
 - Evaluate opportunities for multi-benefit improvements;
 - Ensure future drainage projects are not inconsistent with the goals of the plan;
 - Review comments on ditch improvements (e.g. from MNDNR) to ensure follow-up on water quality practices on the public drainage system are being contemplated for implementation;
 - Discuss advancements in drainage science.

5.2.2. Capital Improvement Programs for Watershed Districts

Under Minnesota Statutes 103B and 103D, the Belle Creek Watershed District (BCWD) and the North Cannon Watershed Management Organization have the authority to develop and implement a Capital Improvement Program.

The BCWD was formed to oversee construction of the flood prevention structures and be able to conduct maintenance on them in the future. The BCWD maintains a 5-year CIP that sets forth the schedule, timing, estimated cost, project lead and partners for the maintenance and restoration of the six flood prevention structures located in the Planning Area. Funding for the on-going operation and maintenance of these flood control structures comes from the BCWD's annual levy which is established in accordance with Minnesota Statutes, Chapter 103D.901.

There are no new capital improvement projects identified in the Targeted Implementation Schedule. All of the BMPs identified at this point in time are projects that could be funded through existing incentive programs. The CRJPB will continue to evaluate the need for a Capital Improvement Program and may need to consider an assessment process to levy funds for these larger capital projects. Counties, cities, townships and the BCWD will maintain existing Capital Improvement Programs and partner on the implementation of projects identified in the Cannon River Comprehensive Watershed Management Plan.

5.2.3. Permanent Protection

The Planning Partners recognize the need for permanent land protection to meet the resource needs and achieve the goals of the Cannon River Comprehensive Watershed Management Plan. These permanent protection measures are necessary to ensure conservation areas are protected in perpetuity, in an undisturbed, natural state. Additionally, permanent protection measures are needed to ensure that projects, designed to meet the goals of the Plan, are operated and maintained at an effective performance level.

Permanent protection over an area of land is typically provided via an easement. An easement is a limited right of use that one entity has on someone else's property. The type of easement needed to ensure conservation areas are permanently protected in the Planning Area is a conservation easement. The Planning Partners' role in acquiring conservation easements would likely entail connecting private landowners to existing county programs so that the landowner could enter into a binding agreement to preserve the property. Under an existing program, the county would hold the easement and be responsible for enforcing its conditions. The land-use restrictions placed on the property would remain in place even if the property changes ownership.

Permanent protection over a project would work in a similar fashion. Typically, stormwater management projects and best management practices (BMPs), whether regional facilities or located on an individual property, are protected by a drainage or utility easement. These easements are needed for draining water (stormwater runoff) and installing utilities such as water, sewer and storm sewer lines, gas lines, and buried phone, electric, and cable lines. They are also needed to ensure that access is provided for ongoing maintenance of the BMPs. These easements are usually created when a property is developed and are typically located along border lot lines. However, some properties contain easements that are not placed in these typical locations. Easements can also serve as protective buffers for environmentally sensitive areas such as lakes, streams, and wetlands. Like conservation easements, these easements would remain in place if the property changes ownership. In this case, the Planning Partners would not have a role in the acquisition of a drainage and utility easement or recorded buffer as these requirements typically fall under existing city or county ordinance.

The specific programs implemented by the counties and SWCD's for the permanent land protection necessary to achieve the goals for the priority areas are described in Section 5.1.

5.3. OPERATION AND MAINTENANCE

Municipal and county governments, as well as watershed management entities are responsible for inspecting, operating and maintaining stormwater infrastructure projects, public works, facilities, and natural and artificial watercourses completed or owned by the county, municipality or watershed management entity.

Operations and maintenance of any capital improvement implemented through this Plan will be the responsibility of the landowner where the practice is installed, unless an alternative agreement is made. After construction of a project, the responsible party will perform regular inspections and maintenance to ensure the project functions at its design capacity over its intended life expectancy. Operation and Maintenance plans must be prepared before construction and should include the expected activities, timing of activities, and inspection schedule. In addition, the Operation and Maintenance plan should include the procedural activities that will take place in the event inspections determine that maintenance is required or if required maintenance has not been performed, including potential penalties or enforcement actions. Minnesota State Rules Chapter 8400.1700 and 8400.1750 outline the program requirements for the projects funded through state cost-share programs.

This plan includes funding requests to maintain previously constructed PL 566 projects within the Planning Area. The Belle Creek Watershed District (BCWD) was formed in 1968 to oversee construction of flood prevention structures with federal funding provided by The Watershed Protection and Flood Prevention Act of 1954 (PL-566). There are six PL 566 structures for which the BCWD is responsible for operations and maintenance. Maintenance activities for the structures include annual tours to assess the needs of each structure (e.g. vegetative growth, structural integrity, maintenance access). These needs are addressed as part of the BCWD's routine maintenance program. Additionally, the BCWD relies on the NRCS or consultants to conduct sediment surveys of the structures to assess storage capacity and the need for more clean-out.

While there are numerous public works/facilities (e.g. bridges, culverts, dams, wastewater treatment facilities) located in the Cannon River Planning Area, the counties and cities have the Operation and Maintenance Programs in place to ensure that this infrastructure is operating as designed. Additionally, each county's drainage management program addresses the on-going Operation and Maintenance needs of the public drainage system as described in Section 5.2.1.

Several examples of Operation and Maintenance programs that would be used by the Cannon River CWMP Planning Partners to address priority issues in targeted areas are highlighted on the following page.

RESOURCE CONCERNS:**LAKES, STREAMS AND RIVERS**

- **Pollution Prevention/Good Housekeeping for Municipal Operations:** MS4 communities are required to maintain and implement a Stormwater Pollution Prevention Program (SWPPP) for its MS4 area. A number of Planning Partners have limited MS4 area, which includes County road right-of-way in the urban area. Under this program, County Transportation Departments manage street sweeping, road salt application, and other maintenance activities.
- **Stormwater Facility Maintenance:** MS4 communities are required to maintain and implement a Stormwater Pollution Prevention Program (SWPPP) for its MS4 area. A number of Planning Partners have limited MS4 area, which includes County road right-of-way in the urban area.
- **Illicit Discharge Enforcement:** MS4 communities are required to implement an illicit discharge detection and elimination program. Some Planning Partners have limited MS4 area, which includes County road right-of-way in the urban area.

LANDSCAPE ALTERATIONS CONCERNS:**DRAINAGE MANAGEMENT SYSTEMS**

- **Ditch Inspection:** Drainage Law requires regular inspection of drainage systems to ascertain the need for repair/maintenance. Inspections are performed by an appointed inspection committee or drainage inspector (see Table 5-2).

FLOODING OF COMMUNITIES

- **Flood Control Structure Maintenance:** The Belle Creek Watershed District will continue to operate and maintain the six PL 566 structures located in the watershed.

SOCIOECONOMIC FACTORS:**EDUCATING LOCAL LANDUSE DECISION MAKERS**

- The Cannon River CWMP Planning Partners have identified the need to encourage training for non-MS4 communities to improve maintenance activities for their stormwater infrastructure, public works/facilities and natural and artificial watercourses.



Agricultural field flooding/spring melt
along Belle Creek – Photo EOR

5.3.1. Existing Operation and Maintenance Programs

The following table summarizes the various elements of the operation and maintenance programs offered by the counties (see columns labeled “C”) and SWCDs (see columns labeled “S”) in the Cannon River Planning Area. This table also includes incentive programs offered by the North Cannon River Watershed Management Organization as well as the Belle Creek Watershed District.

Table 5-3. Existing Operation and Maintenance Programs by county, SWCD, NCRWMO and BCWD

Program	Dakota		Goodhue		Le Sueur		Steele		Rice		Waseca		NCR WMO	BCWD
	C	S	C	S	C	S	C	S	C	S	C	S		
Ditch inspection	X		X			X		X		X	X			
Street Sweeping	X													
Illicit Discharge Enforcement	X						X				X			
Stormwater facility maintenance														
Flood Control Structure Maintenance														X

5.4. REGULATION AND ENFORCEMENT

This section describes local regulatory systems and responsibilities. Many of the Planning Area’s priority concerns can be addressed, at least partially, through local regulations and policies, especially zoning and other land use ordinances. At a minimum, local regulations and policies will limit (if not address) impacts related to future land use change in the Planning Area. A key aspect of successfully addressing impacts related to future land use changes is ensuring consistent requirements and enforcement of land use management controls across the Planning Area. A summary of local land use controls and ordinances is provided in Table 5-4. The Planning Partners identified the need to improve consistency in regulations and enforcement across the Planning Area. As a result, a number of implementation activities have been identified to address improvements to shoreland management and stormwater management.

This plan calls for local authorities (counties) to maintain local regulatory controls, and certain land management practices, as well as improved coordination by the Planning Partners of regulatory activities to reduce impacts from land use changes and increased groundwater demands. The Cannon River Joint Powers Board (CRJPB) does not intend to develop, or enforce any of its own regulations or policies. Instead, the Planning Partners will coordinate enforcement with local governmental authorities.

5.4.1. County Regulation

Minnesota statutes administered by the Planning Partners are described below. The responsibility for implementing these authorities will remain with the respective counties. There are multiple types of state law and local ordinances in the Cannon River Planning Area:



Cannon River Signage - Photo EOR

- Subsurface Sewage Treatment Systems
- Wetland Conservation Act
- Shoreland Management
- Floodplain Management
- Feedlot Management
- Buffer Management
- Soil Loss
- Well and Water Supply Management
- Wild and Scenic Rivers Regulations
- Zoning

The following subsections on the next page provide detail regarding the landuse controls that are most related to watershed management:

Subsurface Sewage Treatment Systems (SSTS) Program:

These regulations cover subsurface sewage treatment systems, also known as septic tanks or drain fields. The major goals of SSTS programs are to protect the public health and the environment through effective, modern treatment of domestic sewage from residences or other small-scale establishments. SSTS regulations are based on the following state laws:

1. Minimum technical standards for individual and mid-size SSTS (Chapter 7080 and 7081);
2. A framework for local administration of SSTS programs (Chapter 7082) and;
3. Statewide licensing and certification of SSTS professionals, SSTS product review and registration, and establishment of the SSTS Advisory Committee (Chapter 7083).

Wetland Conservation Act (WCA)

The Wetland Conservation Act was designed to maintain and protect Minnesota's wetlands and the benefits they provide, and reach the goal of no-net-loss of wetlands. The Wetland Conservation Act requires any proposal to drain, fill, or excavate to meet one of three outcomes: 1) avoid all wetland disturbances; 2) minimize any impact on the wetland; and, 3) replace any lost wetland acres, functions, and values. Certain wetland activities are exempt from the act, exempting projects with minimal impact or projects located on land where certain land uses are present from regulation. The Wetland Conservation Act is administered under Minnesota Administrative Rules, Chapter 8420, Wetland Conservation.

Shoreland Management Ordinances

Minnesota state law (Minn. Rules §§ 6120.2500 – 6120.3900) delegates authority to regulate shorelands to LGUs. Shorelands include both river and lake shore areas. This authority includes regulating the subdivision, use, and development of shorelands along public waters

to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. Local governments enforce this statute with a land use ordinance requiring a 50 foot buffer around public waters. These ordinances are the backbone of land use controls to protect and provide orderly development of Minnesota's shorelands.

Floodplain Management

Floodplain zoning regulations are designed to guide development in the flood plain consistent with the possibility of floods threat. The goal of the ordinance is to minimize loss of life and property, disruption of commerce and governmental services, extraordinary public expenditure for public protection and relief, and interruption of transportation and communication, all of which adversely affect the public health, safety, and general welfare. Risk Mapping, Assessment, and Planning (Risk MAP) is a Federal Emergency Management Agency (FEMA) program that helps communities identify, assess, and reduce their flood risk. By combining quality engineering with updated flood hazard data, FEMA provides accurate and easy-to-use information to enhance local mitigation plans, improve community outreach, and increase local awareness to flood hazards. The LGUs will participate and share any information about data that may be available that could be utilized to more accurately map flood risk.

Feedlots

The Minnesota Pollution Control Agency established rules for local governments to manage feedlot in Minn. Rules § 7020. Counties may be delegated by the MPCA to administer the program for feedlots that are not required to have a state or federal operating permit. The feedlot rule regulates the collection, transportation, storage, processing and disposal of animal manure and livestock processing activities, and provides assistance to counties and the livestock industry. The rules apply to all aspects of livestock production areas including the location, design, construction, operation and management of feedlots, feed storage, stormwater runoff and manure handling facilities. Most of the counties participating in the Cannon River 1W1P provide feedlot regulatory oversight and technical assistance programs, and maintain a feedlot inventory. Dakota County relinquished the responsibility for management of feedlots to the MPCA.

Buffer Management

In 2015, the Minnesota legislature enacted the Buffer and Soil Loss Legislation (Minnesota Statute 2014, section 103B.101), commonly referred to as the Minnesota Buffer Law. This law requires a 50-foot average, 30-foot minimum width, continuous buffer of perennial vegetation around all public waters. Additionally, a 16.5-foot minimum width continuous buffer of perennial vegetation is mandatory along all public drainage systems. All counties within the Planning Area elected jurisdiction to enforce the buffer law. Currently, the Counties enforce buffer laws in the Cannon River Watershed. Landowners may also collaborate with the SWCD to determine if alternative practices designed to protect water quality may be used. These buffers will help filter out phosphorus, nitrogen and sediment. The deadline for implementation for buffers on public waters was November 1, 2017. The

deadline for public ditches was November 1, 2018. The law provides flexibility for landowners to install alternative practices with equivalent water quality benefits that are based on the Natural Resources Conservation Service Field Office Technical Guide.

Dakota County has a local ordinance that is more restrictive than the Minnesota Buffer Law which does not allow for averaging or the use of alternative practices.

Soil Loss

Soil erosion, and the nutrients it carries with it, is a significant environmental pollutant in the nation and in the State of Minnesota. Enacted in 1984, the Minnesota Soil Loss law (Minn. Stat. § 103F.401 - 103F.455) set broad public policy regarding excessive soil loss. The law states “[a] person may not cause, conduct, contract for, or authorize an activity that causes excessive soil loss.” Excessive soil loss is defined as soil loss that is greater than the soil loss limits allowed by local regulations on a particular soil type. The soil loss limit is the amount of soil loss from water or wind erosion, expressed in tons per acre per year. The law is crafted differently than other State environmental laws, such as shorelands, floodplains, wetlands, and feedlots, in that its adoption and enforcement by local authorities (e.g. county, city, town) is not required. Instead the law encourages each local authority that has planning and zoning authority to adopt a soil loss ordinance. All counties in the planning area implement Minnesota’s state soil loss law. For example, Goodhue County’s soil loss ordinance can be found in Section 11, subdivision 5 of the [County’s Zoning Ordinance](#).

Well and Water Supply Management

Regulations for well construction, repair and sealing are meant to protect groundwater and the environment and to promote the health, safety and general welfare of the public. These regulations address: proper location and construction of wells; well modification and reconstruction; operation, maintenance and repair; permanent sealing; and annual maintenance permitting. MDH has delegated well programs to the following counties for administration and enforcement: Dakota, Goodhue, Le Sueur and Waseca.

Wild and Scenic Rivers Regulations

That portion of the Cannon River from the northern city limits of Faribault (the common border of the SE1/4 and the NE ¼ of Section 19, T110N-R20W) to its confluence with the Mississippi River is designated a component of the Minnesota wild, scenic, and recreational rivers system. The local zoning authorities (including Dakota, Goodhue, and Rice counties and the cities of Cannon Falls, Dundas, Northfield and Red Wing) administer the wild and scenic rivers ordinance in accordance with the provisions of Minnesota Rules Chapter 6105 Subsection 0220 to 0250.

Zoning

County zoning and subdivision ordinance controls promote the public health, safety and general welfare of the public; protect agricultural land from urban sprawl; and provide a basis for the orderly development of land resources.

5.4.2. Enforcement

In many cases, the counties maintain the regulatory program while enforcement activities are delegated to the Soil and Water Conservation Districts. As Table 5-4 illustrates, the SWCDs are responsible for enforcing the following regulatory programs: Buffer Management, Feedlots, Shoreland Management, Soil Loss and the Wetland Conservation Act (WCA).

5.4.3. Watershed District Regulation

Belle Creek Watershed District

The Belle Creek Watershed District has rules and regulations pertaining to the orderly use and conservation of the waters of the district (see Appendix G for a copy of the BCWD Rules).

The BCWD Board annually reviews the need for Rule enforcement within the District. The current focus of the BCWD Board is to concentrate efforts on repair and maintenance of the existing structures in their watershed. No rules are needed to achieve these tasks. This addresses 103D.405 Subd.1 (6) *“an analysis of the effectiveness of the watershed district's rules and permits in achieving its water management objectives in the watershed district.”* The water management objectives in the watershed district are to protect the PL-566 infrastructure in place and continuing to improve the water quality and quantity within the Belle Creek Watershed District. BCWD maintenance objectives have been achieved each year without the need for rules or permits. If for some reason the BCWD are unable to attain these objectives in the future, the Board will likely institute permitting program to do so.

North Cannon River Watershed Management Organization

The North Cannon River Watershed Management Organization has an erosion control and stormwater management ordinance that requires land disturbance activities to comply with Township minimum standards for permit requirements, plan reviews, erosion control, stormwater management and buffers.

5.4.4. Comprehensive Land Use Plans

The Metropolitan Council requires all metropolitan counties, cities and townships to have a comprehensive plan, and determines the basic information that plans must cover. Dakota County is the only county in the Planning Area required to develop a Comprehensive Land Use Plan. In addition to Dakota County, the following townships and communities are also required to develop Comprehensive Land Use Plans: Castle Rock Township, Douglas Township, Eureka Township, Elko, Greenvale Township, Hampton Township, Miesville, New Trier, Randolph, Sciota Township, and Waterford Township. All Comprehensive Plan updates were required to be submitted for review by December 31, 2018. All cities, counties and townships within the seven-county metropolitan region must prepare a comprehensive plan and update that plan as needed every 10 years.

5.4.5. Existing Regulatory Programs

The following table summarizes the various regulatory programs offered by the counties (see columns labeled “C”) and SWCDs (see columns labeled “S”) in the Cannon River Planning Area. This

table also includes incentive programs offered by the North Cannon River Watershed Management Organization as well as the Belle Creek Watershed District.

Table 5-4. Existing Regulatory Programs offered by the counties, SWCDs, NCRWMO and BCWD

Program	Dakota		Goodhue		Le Sueur		Steele		Rice		Waseca		NCR WMO	BCWD
	C	S	C	S	C	S	C	S	C	S	C	S		
Buffers	X	X	X		X	D	X		X		X			
Erosion Control & Stormwater Management	X	X		X	X			X	X		X		X	X
Feedlot Ordinance			X	D	X		X		X		X			
Shoreland Ordinance	X		X		X		X		X		X			
Soil Loss Ordinance			X											
Subsurface Sewage Treatment System Program	X		X		X		X		X		X			
Wetland Conservation Act Authority		X		D		D		X		D	X			
Well Quality Ordinance	X				X									
Well Program				D										
Wild & Scenic Rivers Regulations	X		X						X					
Zoning Ordinance			X		X		X		X		X			

Note: Cells with a “D” identify which entity has been delegated the authority for the regulatory program.

5.5. DATA COLLECTION AND MONITORING

A critical component of watershed management is understanding resource conditions and trends. Data obtained through research and monitoring programs provide the information needed to make science-based management decisions. This section of the plan: 1) presents information on current monitoring and data collection efforts, 2) identifies needs for additional data collection, 3) describes how the data will be used to assess and evaluate plan progress, and 4) addresses the collection, analysis and sharing of locally collected data.

5.5.1. Existing Monitoring Efforts

This section summarizes the existing monitoring and data collection efforts being conducted in the Cannon River Planning Area.

Lakes

- Minnesota Department of Natural Resources conducts fish and aquatic plant surveys on many lakes (survey data can be accessed through the DNR LakeFinder website).
- Minnesota Pollution Control Agency coordinates volunteer monitoring of water clarity in lakes through the Citizen Lake Monitoring Program. Volunteers are currently monitoring 48 lakes in the Cannon River Planning Area, including all 8 Tier One lakes

(Beaver, Cedar, Fish, Fox, Hunt, Dudley (and Kelly), and Roemhildts; See Appendix D of the 2016 Cannon River WRAPS).

- Minnesota Pollution Control Agency conducts a two-year intensive watershed monitoring effort for chemical and biological parameters every 10 years on a large number of lakes throughout the Planning Area (45 lakes were sampled in 2011-2012).

Monitoring data results for lakes in the Cannon River Planning Area are presented in the Cannon River Watershed Monitoring and Assessment Report (<https://www.pca.state.mn.us/sites/default/files/wq-ws3-0704002b.pdf>) and the Vermillion River Watershed Monitoring and Assessment Report (<https://www.pca.state.mn.us/sites/default/files/wq-ws3-07040001c.pdf>). MPCA lake data can be accessed through the MPCA EDA: Surface Water Data website.

Rivers and Streams

- Minnesota Department of Natural Resources collects fish, temperature and dissolved oxygen data from the coldwater streams in the area.
- Minnesota Pollution Control Agency conducts a two-year intensive watershed monitoring effort for chemical and biological parameters every 10 years on a large number of streams throughout the watershed (72 stream reaches were sampled in 2011-2012), and collects annual stream pollutant load monitoring data at four stream locations in the Cannon River Planning Area (Watershed Pollutant Load Monitoring Network website, <https://www.pca.state.mn.us/water/watershed-pollutant-load-monitoring-network>):
 - *Cannon River at Morristown, CSAH16 (S003-487 in the upper Cannon lobe)*
 - *Straight River near Faribault (S003-557 in the Straight River lobe)*
 - *Cannon River at Northfield, 2nd Street West (S001-582 in the middle Cannon lobe)*
 - *Cannon River at Welch (S000-003, in the lower Cannon lobe)*
- Monitoring data results for streams in the Cannon River Planning Area are available in the Cannon River Watershed Monitoring and Assessment Report (<https://www.pca.state.mn.us/sites/default/files/wq-ws3-0704002b.pdf>) and the Vermillion River Watershed Monitoring and Assessment Report (<https://www.pca.state.mn.us/sites/default/files/wq-ws3-07040001c.pdf>). MPCA stream data can be accessed through the MPCA EDA: Surface Water Data website.
- Minnesota Pollution Control Agency coordinates volunteer monitoring of water clarity in streams through the Citizen Stream Monitoring Program.
- The University of Minnesota and the Minnesota Geological Survey are evaluating the sources of high nitrates in trout streams in the Cannon River watershed.
- Metropolitan Council has a long-term, annual flow and water quality monitoring location on the Cannon River at Welch, which has been summarized through 2012 in the 2014 Comprehensive Water Quality Assessment of Select Metropolitan Area Streams: Cannon River report (<https://metro council.org/Wastewater-Water/Services/Water-Quality-Management/Stream-Monitoring-Assessment/Mississippi-River-Tributary-Streams-Assessment/Miss-River-Trib-Assessment-Reports/CANNON-RIVER-SECTION.aspx>).

- United States Geological Survey collects daily streamflow from 6 stations in the Cannon River Watershed (<https://waterdata.usgs.gov/nwis/rt>):
 - *Straight River near Faribault, MN (05353800)*
 - *Cannon River at Co. Hwy 29 below Faribault, MN (05354500)*
 - *Cannon River at Northfield, MN (05355024)*
 - *Chub Creek at Co. Hwy 47 above Randolph, MN (0355038)*
 - *Cannon River at 9th St. Bridge in Cannon Falls, MN (05355092)*
 - *Cannon River at Welch, MN (05355200)*

Wetlands

- Dakota County coordinates the Wetland Health Evaluation Program (WHEP) to protect and improve local wetlands. Through the program, volunteers are trained and work as part of a community-based team to collect data on wetland plants and macroinvertebrates using sampling methods and evaluation metrics development by the MPCA. The North Cannon River Watershed Management Organization also takes part in this program.
- The Minnesota Pollution Control Agency (MPCA) also monitors wetland quality through statewide and regional random surveys. The MPCA measures the overall quality of Minnesota's wetlands by studying a limited number of wetlands at randomly selected locations. Surveys are repeated periodically to estimate trends and determine if wetland quality is being maintained.

Groundwater

Multiple organizations are involved in monitoring groundwater quality and quantity. Groundwater monitoring data is being collected by the Minnesota Department of Agriculture, the Minnesota Department of Health, the Minnesota Pollution Control Agency, and the Minnesota Department of Natural Resources. Additional monitoring is provided at the local level by the Soil and Water Conservation Districts (SWCDs). A brief summary of these monitoring programs is provided below:

- Minnesota Pollution Control Agency samples groundwater quality for a suite of over 100 chemicals, including nutrients, metals, anions, cations, and volatile organic compounds from three ambient monitoring wells in the Cannon River Watershed. See Figure 21 from the 2017 Cannon River Groundwater Restoration and Protection Strategy report).
http://www.health.state.mn.us/divs/eh/water/dwp_cwl/localimplem/grapscrw.pdf.
- Minnesota Department of Natural Resources maintains a statewide groundwater level monitoring program using observation wells for the purpose of assessing the status of groundwater resources. Within the Cannon River Watershed, a few wells have water-level records extending back twenty or more years. However, many of the observation wells were recently installed (within the past year or two) making trend analysis difficult. See Figure 25 from the 2017 Cannon River Groundwater Restoration and Protection Strategy report.
http://www.health.state.mn.us/divs/eh/water/dwp_cwl/localimplem/grapscrw.pdf.
- Minnesota Department of Health monitors groundwater wells and public water supply systems for a suite of contaminants. Minnesota's public water supply systems are tested

on a regular basis for bacteria, nitrate and other inorganic chemicals, radiological elements, and up to 118 different industrial chemicals and pesticides. The exact list of contaminants—and the testing schedule—vary from one system to another.

Minnesota Department of Agriculture began a Township Testing Program (<http://www.mda.state.mn.us/township-testing-program>) to offer private well owners nitrate testing in townships with heavy row crop agriculture and vulnerable groundwater. Many townships in Dakota, Rice, Steele, Waseca and Goodhue Counties were identified for testing between 2013 and 2019. Minnesota Department of Agriculture also monitors a groundwater spring in the Spring Creek subwatershed (see the 2016 Cannon River WRAPS).

Climatic Conditions

- Each of the counties has a rain gauge network to monitor numerous sites throughout the Planning Area. From April through October, volunteers submit rainfall information to the SWCDs to be utilized by the State Climatology Office.

Conservation Practices

A database of conservation projects has been developed by Dakota County. The Conservation Projects Map showcases conservation projects across the county that the Dakota SWCD has assisted Dakota County landowners in installing on their property.

Monitoring of conservation practices and innovative agricultural practices is being conducted by the CRWP. A brief summary of these programs is provided below:

- MDA Sustainable Ag Demonstration project to plant 15 acres of Kernza. The effects of late season grazing on the future grain production of the perennial wheat Kernza will be studied for 3 years on two farms.
- Farmers Protecting Rice Creek: 6-8 farmers will plant cover crops on about 25% of the Rice Creek subwatershed (~1000 acres) for 3 consecutive years. Water from drainage tiles and the stream will be monitored for nitrates, phosphorus and sediment and then compared between fields with cover crops and controls. Fish and macroinvertebrates as well as water quality in the stream will also be monitored over the period and compared to 2012 measurements.
- Minnesota Pollution Control Agency keeps track of the number of non-point BMPs implemented in each Major Watershed since 2004 and any reported nitrogen, phosphorus, and sediment reduction estimates (<https://www.pca.state.mn.us/best-management-practices-implemented-watershed>) from the following programs:
 - *United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS)*
 - Environmental Quality Incentives Program (EQIP)
 - *Minnesota Board of Water & Soil Resources (BWSR)*
 - Disaster Recovery Assistance Program
 - Clean Water Fund Grants
 - State Conservation Cost-Share
 - Natural Resources Block Grant (NRBG)
 - Others programs as reported in the eLINK tracking system

- *Minnesota Department of Agriculture (MDA)*
 - Agriculture Best Management Practices Loan Program (AgBMP)
- *Minnesota Pollution Control Agency (MPCA)*
 - Federal Clean Water Act Section 319 Program (Section 319)

The following table summarizes the various data collection and monitoring programs offered by the counties (see columns labeled “C”) and SWCDs (see columns labeled “S”) in the Cannon River Planning Area. This table also includes incentive programs offered by the North Cannon River Watershed Management Organization as well as the Belle Creek Watershed District.

Table 5-5. Existing Data Collection & Monitoring Programs offered by the counties, SWCDs, NCRWMO and BCWD

	Dakota		Goodhue		Le Sueur		Steele		Rice		Waseca		NCR WMO	BCWD
Program	C	S	C	S	C	S	C	S	C	S	C	S		
Precipitation Monitoring		X		X		X		X			X			
Surface Water Monitoring		X		X			X				X		X	
Ambient Well	X			X										
GIS Inventory of Wells & Septic Systems	X			X			X							
Well Water Testing	X		X	X			X							
Wetland Health Evaluation	X												X	

5.5.2. Future Monitoring Considerations

This section identifies gaps in the monitoring data. The Planning Partners and state agencies recognize that these gaps need to be addressed in order to establish baseline conditions and to track performance over time. While many of these gaps are addressed in the Targeted Implementation Schedule, other significant gaps are included here:

- The MDH 2017 Cannon River GRAPS noted gaps in the collection of the following groundwater data:
 - *Data over a multiple decade period of record needed to assess trends in groundwater elevations.*
 - *Lack of groundwater monitoring data in the western portion (Lakes Area) of the watershed.*
- MPCA will continue Intensive Watershed Monitoring in the CRW (2021), but the number of sites and monitoring will be more targeted and reduced compared to 2011. Further, this approach does not currently provide for high-frequency or small-scale monitoring.
- There is a lack of local BMP performance (effectiveness monitoring) data being collected in the Planning Area.
- While there is local funding available for volunteer monitoring efforts, these resources are not being utilized. Existing volunteer monitoring programs (CLMP, CSMP, CAMP and WHEP) aren't generating the participation by volunteers as intended.

- The quality and quantity of data needed to construct and calibrate a hydrologic and hydraulic model of the watershed (or portions thereof) for a Long-Term Flood Evaluation Study was not assessed as part of the plan development process. Data evaluation and the collection of additional data was included in the estimate for implementation activity 3.2.2-A-1.
- Characterization of monitoring efforts in the Cannon River Planning Area extends beyond the entities who participated in the plan development process. For example, United State Geologic Survey (USGS), Minnesota Geologic Survey (MGS), University of Minnesota for groundwater components, MDA hydrologists for springs/groundwater, and the Minnesota Agricultural Water Resource Center (MAWRC) for edge-of-field monitoring.
- Existing monitoring data, for the entire Planning Area, not centrally located, summarized and disseminated.

Planning Partners determined the need to develop a comprehensive monitoring plan for the Cannon River Planning Area to: collect baseline information for priority resources lacking this information, to identify gaps in data collection and monitoring, to build long-term data sets to track performance in meeting goals, to provide support for continued collection of baseline monitoring data by state agencies, and to supplement modeling activities identified in the Targeted Implementation Schedule. Implementation activities to address these needs are included in the Targeted Implementation Schedule.

5.5.3. Assessment of Plan Progress

In the short-term, implementation of activities and measuring progress toward goals will be tracked by project type as described in Table 6-1. In the long-term, the Planning Partners will use monitoring data to assess trends in water quality improvement and reduced flooding. It should be recognized that there are other factors which will confound the direct relationship between watershed implementation with changes in resource trends such as climate change, land-use patterns and drainage management.

Table 5-6 identifies the information available to evaluate progress toward the Plan's goals as well as any new monitoring needed to improve understanding of baseline conditions or assess particular resources.



Trout Brook stream bank restoration – Photo Dakota SWCD

Table 5-6. Existing Monitoring Data

Tier One Resources	Biology	Water Quality	Water Quantity
Protection & Impaired Lakes	Fish and Aquatic Plant Surveys	Total Phosphorus, Chlorophyll-a, and Secchi Depth	Lake Levels
Beaver (74-0023-00)	Y	All 2008, 2011 & 2012	Y
Dudley (66-0014-00)	Y	All 2011 & 2012, Annual Secchi	N
Fish (40-0051-00)	Y	All 2011 & 2012, Annual Secchi	N
Kelly (66-0015-00)	Plant only	Annual Secchi	N
Roemhildts (40-0039-00)	Y	All 2008-2010	N
Cedar (66-0052-00)	Y	All 2016 & 2017, Annual Secchi	N
Fox (66-0029-00)	Y	Annual Secchi	Y
Hunt (66-0047-00)	Y	All 2004-2008	N
Pollutant Impaired Streams (07040002-XXX)	Fish and Macroinvertebrate Community Surveys	Total Phosphorus and Total Suspended Solids Concentrations	Continuous Daily Stream Flows
Lower Vermillion River (07040001-504)	Y	Both 2004 & 2006; TSS 2008-2010	Y
Belle Creek (-735)	Y	2009-2012	Gap: implement continuous flow gauging
Little Cannon River (-526)	Y	Y	Y
Trout Brook (-567)	Y	2010 & 2014	Gap: implement continuous flow gauging
Prairie Creek (-504)	Y	2009, 2010, 2011, 2014	
Rush Creek (trib. to Straight River near Faribault, -505)	Y	2008-2009	
Medford Creek (trib. to Straight River nr Faribault, 547)	Y	2013-2014	
Groundwater	N/A	Arsenic, nitrate and manganese concentrations	Groundwater Levels
Drinking Water (private and public wells)	N/A	Nitrate-nitrogen concentrations	Some
Surface Water/Groundwater Interactions	N/A	Gap: develop groundwater monitoring program	Gap: develop groundwater monitoring program
Flooding of Communities	N/A	N/A	Annual and Peak Stream Flows
Cannon River	N/A	N/A	Y
Straight River	N/A	N/A	Y
Shoreland Mgmt. (on Natural Environment Lakes)	Shoreline Surveys	Total Phosphorus, Chlorophyll-a, and Secchi Depth	Lake Levels
Roemhildts (40-0039-00)	Gap: conduct shoreline inventories	All 2008-2010	N
Fish (40-0051-00)		All 2011 & 2012, Annual Secchi	N
Dora (40-0010-00)		All 2007-2008	N
Mabel (40-0011-00)		All 2007-2008	N
Diamond (40-0013-00)		All 2007-2008	N
Sabre (40-0014-00)		All 2007-2008	N
Tustin (40-0061-00)		All 2007-2008	Y
Sprague (66-0045-00)		All 2010-2011	N
Lower Sakatah (66-0044-00)		All 2007 & 2011	N
Toner's (81-0058-00)		All 2008 & 2010	N

5.5.4. Data Collection, Analysis and Sharing Locally Collected Data

The Planning Partners and other entities involved in data collection are committed to performing periodic analysis of the data for quality control purposes (monthly) and to evaluate trends (every 5 years). The Planning Partners are also committed to continuing to collect data in a manner that is consistent with state compatibility guidelines and will submit locally collected data to the appropriate state agency for entry into public databases (e.g. Environmental Quality Information System, EQulS).

5.6. INFORMATION, OUTREACH, AND EDUCATION PROGRAMS

Public Participation and Engagement programs utilize education and outreach to address issues impacting a priority concern and make progress towards a measurable goal. The underlying goals are to raise awareness of water resources, and to encourage behavior that benefits the watershed. There are a number of entities conducting information, outreach and education programs in the Planning Area including the Cannon River Watershed Partnership (CRWP), Farmamerica, Red Wing Environmental Learning Center and River Bend Nature Center. The Planning Partners understand that they must coordinate education and outreach campaigns and activities to create awareness to motivate the voluntary participation needed to achieve watershed goals. As such, one of the first activities to be conducted by the Planning Partners is the development of a comprehensive education and outreach plan that takes a watershed-wide approach, recognizes existing efforts and is implemented in conjunction with other entities.

All of the educational programming taking place in the Cannon River Planning Area supports the priority issues and goals of the Plan. Once the Planning Partners create the education and outreach plan, programming can be developed for specific target audiences based on the goals for the priority areas.

5.6.1. Youth Education Efforts

Envirothon

An outdoor learning competition for high school students in grades 9 through 12. One of the state's largest education initiatives. The program is coordinated by the Soil and Water Conservation Districts (SWCDs).

Outdoor Field Days

Outdoor field days are a way of educating elementary and junior high school students about the environment (e.g. Conservation Tours). This program is coordinated by the SWCDs.

5.6.2. Community Engagement Programs

Environmental experiences often engage people and create an intention to act and/or change behavior. The SWCD's and a number of other entities are involved in community engagement programs designed to inform the public about watershed management related topics and engage in conversations about how the public interacts with the landscape and its resources. There are a number of routine community engagement activities taking place in the Cannon River Planning Area including:

Stormwater Education

CRWP has contracts with both the City of Northfield and the City of Faribault to provide the stormwater education for their Stormwater Pollution Prevention Plans (SWPPPs). Projects include storm drain stenciling projects, a stormwater poster contest, a rain-garden workshop, educational booths at community events, and newspaper articles.

Cannon River Watershed-Wide CleanUP

CRWP coordinates site leaders and provides equipment for ten CleanUP sites across the watershed.

Environmental Film Festival

CRWP works with a film festival curator to get film submissions, attract sponsors, and host a film festival in Northfield (and possible other locations).

We Are Water

CRWP coordinated a year of clean water activities in Northfield in 2019. Activities included scheduling meetings, working with partners to coordinate projects, and hosting events for the public.

Educational Pop-Up Banners

CRWP has created four “pop-up” banners with educational information about clean water issues.

319 Lake Stories Projects

CRWP interviews lake residents, hosts community meetings to discuss water issues and looks for local clean water solutions to feature for the 319 Lake Stories Project.

5.6.3. Conservation Programs

There are a number of activities designed to inform and engage the public in conservation programs. Examples include the following:

Outreach for Trust for Public Land and Great River Greening

Landowners in the watershed receive information about opportunities to sell their land and have it be permanently protected from future development and restored to natural habitat. This information is provided by the SWCDs as well as the CRWP.

Outreach for Minnesota Land Trust

Landowners in the watershed receive information about conservation easements and working grassland easements. This information is provided by the SWCDs as well as the CRWP.

Cover Crop Trial at FarmAmerica

Cover crop planting strategies will be demonstrated and compared on 15 acres for 5 years and viewed by more than 3,000 visitors annually.

Conservation Field Day

Farm field day is held in the Faribault Drinking Water Supply Management Area to demonstrate cover cropping strategies and discuss conservation benefits to groundwater quality with area farmers.

5.6.4. Social Media Programs

Social Media platforms have become powerful tools for the dissemination and discussion of news, engagement, and the coordination of stakeholders. Many of the counties and SWCDs utilize their websites to share news, provide educational information, announce events and highlight projects. These entities are also using Facebook, Twitter, Linked In, Instagram, You Tube, and Next Door as other venues to share information about their projects and programs with a broader audience.

5.6.5. Existing Education and Outreach Programs

The following table summarizes the various education and outreach programs offered by the counties (see columns labeled “C”) and SWCDs (see columns labeled “S”) in the Cannon River Planning Area. This table also includes incentive programs offered by the North Cannon River Watershed Management Organization as well as the Belle Creek Watershed District.

Table 5-7. Existing Education and Outreach Programs offered by the counties, SWCDs, NCRWMO and BCWD

Program	Dakota		Goodhue		Le Sueur		Steele		Rice		Waseca		NCR WMO	BCWD
	C	S	C	S	C	S	C	S	C	S	C	S		
Aquatic Invasive Species Plan	X		X		X		X		X		X			
Awards Program				X		X		X						
Farmer Forum							X				X			
K-12 Education (e.g. Envirothon, field trips)	X	X		X				X		X				
Landscaping for Clean Water		X										X		
Local Advisory Team for Nitrogen Fertilizer Management Plan		X					X							
Household Waste Management Program (e.g. Take it to the Box, Waste Pesticide Collection Program)	X		X		X		X		X					
Outdoor Education Days (e.g. Conservation Tours)		X		X			X	X						
Social Media Program		X		X				X						
Tours and Demonstrations		X		X			X	X				X		

5.7. TARGETED IMPLEMENTATION SCHEDULE BY PROGRAM

This section of the Plan illustrates how the various programs will be used to implement the Targeted Implementation Schedule over the next 10 years. As Figure 5-1 through Figure 5-3 illustrate, a bulk of the proposed work will be implemented through the SWCDs Incentive Programs. This highlights what is commonly understood about rural watershed management; it hinges on voluntary landowner participation to implement projects. This is different than more metropolitan watershed management organizations that own, operate and maintain projects because of the urban nature of the watershed where land is limited and there is less opportunity to treat pollutants at its source. Additionally the types of BMPs utilized in an urban setting are often more complex with greater operation and maintenance requirements necessitating the need for a single owner and operator.

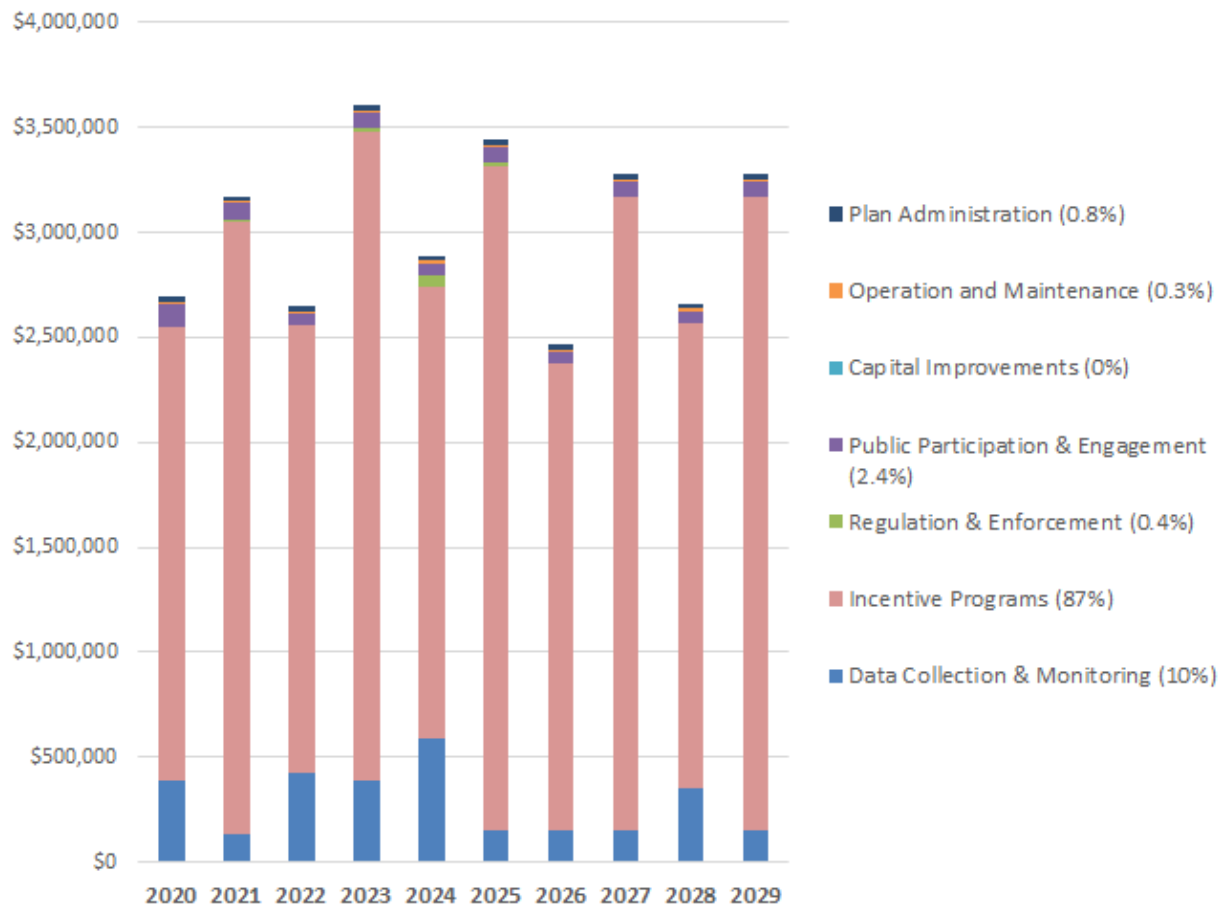


Figure 5-1. Annual breakdown of Targeted Implementation Schedule by Program

Figure 5-2 and Figure 5-3 illustrate how the various programs will be used to implement the Targeted Implementation Schedule in 5-year increments. Again, the majority of the work is anticipated to be funded through the Incentive Program with 83% of the proposed activities falling in this category in the first 5 years and 90% falling in this category in the last 5 years of the Plan. A number of feasibility studies are scheduled for implementation in the first 5-years of the Cannon River Comprehensive Watershed Management Plan which may inform change during the five-year evaluation process.

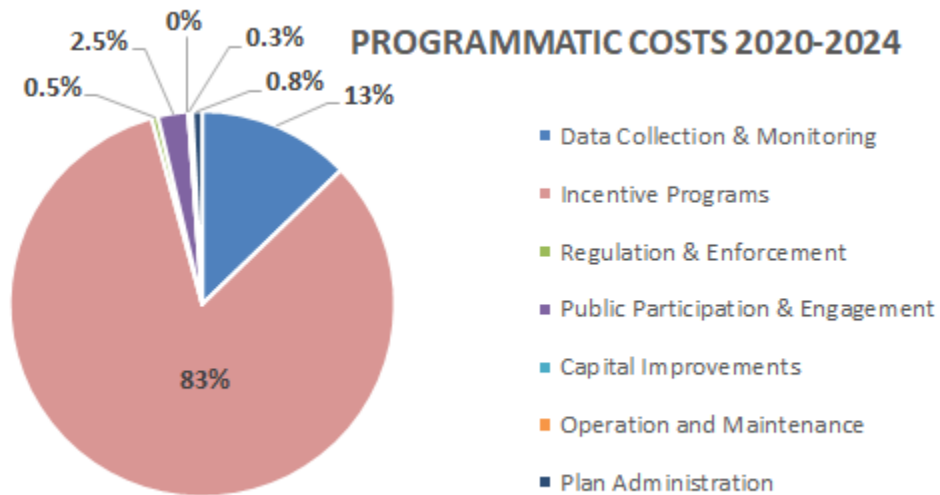


Figure 5-2. Break-down of programmatic costs for the first 5-year period

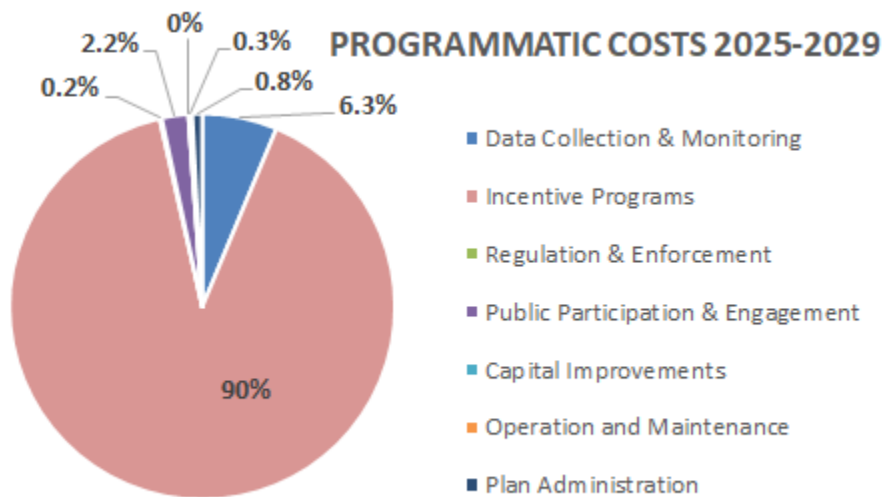


Figure 5-3. Break-down of programmatic costs for the second 5-year period

Estimated funding needs for implementation of the Cannon River Comprehensive Watershed Management Plan is provided in Table 5-8. This includes the estimated cost of each implementation activity addressing the Resource Concerns, Landscape Alterations and Socioeconomic Concerns identified as a Tier 1 Priority in this Plan (see Section 3.0). At this point in time, additional funding needs for Plan Administration are included in the Table but will be covered by membership dues paid to the CRJPB.

Table 5-8. Estimated total funding needs for implementation of the Cannon River Comprehensive Watershed Management Plan over the 10-year timeframe of the Plan. Note that these are the costs per programs for all implementation activities.

Program Category	Funding Needs for activities included in Targeted Implementation Schedule
Incentive Programs	\$25,091,500
<i>Resource Concerns</i>	\$11,128,600
<i>Landscape Alterations</i>	\$13,558,400
<i>Socioeconomic Factors</i>	\$404,500
Capital Improvements	\$0
Operation and Maintenance	\$100,000
Regulation and Enforcement	\$110,000
Data Collection and Monitoring	\$3,870,100
Public Participation and Engagement	\$718,300
Additional Expenses – Plan Administration	\$250,000
Total Estimated Funding Needs	\$30,139,900*

Note: Total estimated funding needs in Table 5-8 match the total estimated funding needs in Table 4-1.



Raingarden layout – Photo Dakota SWCD

6. PLAN ADMINISTRATION AND COORDINATION

This section describes how the Targeted Implementation Schedule (Section 4) and the Plan Implementation Programs (Section 5) will be coordinated between the Counties, the SWCDs, and the other water management entities in the Cannon River Planning Area.

6.1. DECISION-MAKING AND STAFFING

Prior to State approval and local adoption of the Cannon River One Watershed One Plan, the Counties, SWCDs, and the WD and WMO are anticipated to sign a Joint Powers Agreement (JPA) that will create a Cannon River Watershed Joint Powers Board (CRWJPB). The CRWJPB will provide for a watershed based entity within the Cannon River Planning Area and provide the ability for both JPA members and land occupiers to address issues on a watershed scale rather than by individual geographical areas of each local unit of government.

The CRWJPB will not have land use authority or taxing authority. Those authorities will be maintained by individual local units of government. However, the CRWJPB will have decision making authority for pursuing and managing federal or state grant opportunities, allocating local funding sources as identified within the JPA, and implementing the Plan. The CRWJPB will be the responsible entity for adopting the Plan, making amendments as needed and for measuring results over its 10-year life.

The CRWJPB will include one representative from each local unit of government that executes the JPA. Once a JPA is signed, the CRWJPB will adopt bylaws and other administrative documents necessary to operate and fulfill the mission of implementing a plan based on a major watershed boundary. These administrative documents will identify a JPA member or members to serve as the day-to-day administrator and fiscal agent for the CRWJPB. During this startup period, it is anticipated that the Minnesota Counties Intergovernmental Trust and County attorneys will be consulted as necessary.

The JPA does not authorize the CRWJPB to hire staff. Rather, staff needed to implement the Plan will be employees of an individual member to the JPA or contracted. As a new entity, the CRWJPB will have the ability to enter into contracts with outside consultants and organizations for services. The CRWJPB will meet regularly throughout the ten-year life of the Plan but no less than twice annually. It is anticipated that more frequent meetings will be needed during the initial years of the Plan and as the CRWJPB becomes operational.

Through the JPA, the CRWJPB will have the authority to develop various committees within their bylaws. It is anticipated that a Technical Advisory Group (TAG) will continue and assist member staff with prioritizing work tasks, measuring results and providing recommendations to the CRWJPB. Participants on the TAG will be similar to stakeholders that were part of the TAG under the Memorandum of Agreement for Plan development, including the following state agencies: MDH, MDA, MNDNR, MPCA, and BWSR. Additionally, the cities and the CRWP will be invited to participate. Their ongoing role for plan implementation is noted in the Targeted Implementation Schedule under “Project Partners”. While the Cannon River Comprehensive Watershed Management Plan has identified that agency goals, objectives and strategies are generally compatible with the content of

this Plan, there may be some agency goals, objectives and strategies for resource management within the Planning Area that have not been identified as a priority concern. The responsibility for achieving the goals associated with those potential concerns remains with the respective agency or organization.

6.1.1. Coordination of Shared Services

At the beginning of this Plan’s development, no formal agreements existed for sharing services. However, the Planning Partners recognize the importance and potential benefits of coordinating shared service for this plan, including reporting, data management and distribution, financial coordination, and Plan administration and implementation. In an effort to enhance effectiveness, the Planning Partners will leverage opportunities for collaboration and use of shared-services. Opportunities for coordinated services include reporting on progress in meeting Plan goals; obtaining, administering, and reporting for grants; monitoring outcomes; engaging and educating stakeholders; and implementing activities. These shared services may be accomplished through contract of service, joint powers agreement, or another such cooperative agreement when formal contracting is appropriate.

It is anticipated that federal and state agencies provide in-kind staff assistance to carry out the implementation activities identified within this Plan and not only provide or oversee program funds. These shared and coordinated services among federal and state agency staff, while not required to be identified within this Plan, will be discussed throughout the 10-year life of the plan through the Technical Advisory Group (TAG) and are considered critical to meeting the goals of the Plan. For example, BWSR staff may be needed to coordinate and develop plans for wetland restoration projects under State easement programs or provide necessary job approval authority and training. In addition, coordination with USDA staff to leverage federal programs and services will be necessary to meet the goals of the Plan.

It is also recognized that current organizational structures are not fully aligned with the 1W1P program. For example, for SWCDs there are three different technical service areas (TSAs) that provide engineering services within the Planning Area. How these engineering services can be shared or coordinated among the TSAs will be evaluated and coordinated throughout the life of the plan.

6.2. COLLABORATION WITH OTHER UNITS OF GOVERNMENT

The Cannon River Planning Partners will continue to seek opportunities to coordinate and collaborate with other units of government, including cities, townships, federal and state agencies. Programs administered by other units of government including the Board of Water and Soil Resources (BWSR), Department of Natural Resources (DNR), MN Department of Agriculture (MDA), MN Department of Health (MDH), MN Pollution Control Agency (MPCA), US Fish and Wildlife Service (USFWS), and Farm Service Agency are important resources in watershed management. Governmental units that are not part of the formal joint power’s agreement may be asked to participate in implementation activities where those activities are relevant to their own goals and mission.

It is too premature to fully detail or know exactly how collaboration with other units of government will develop over the course of Plan implementation, or if there will be a willingness to cooperate at the local level. State agencies, larger MS4 cities and the Prairie Island Indian Community have been invited and will continue to be invited to participate in TAG meetings. These meetings will be used to discuss priorities and to evaluate water quality improvement opportunities as identified in the Targeted Implementation Schedule. Metropolitan Council, which is a regional agency specific to the 7-County Metropolitan Area, has also been invited and participated in TAG meetings during Plan development. Since this Plan is the first in the State of Minnesota that encompasses both metro and non-metro areas alike, more details and information will be needed from the State on what role this regional agency will have over non-metro land areas as Plan implementation begins.

Partnerships and collaboration are expected to take various forms, including but not limited to, providing matching funds or in-kind services for grant applications, sharing of staff or other resources, and collaborating on project administration and implementation. While many of these partnerships are identified in the Targeted Implementation Schedule, new partnerships are expected to evolve over the course of the next 10-years. For example, the CRWJPB may consider entering into a joint powers agreement with cities to accomplish shared goals.

It will also be important that coordination continue among the entities that are already collaborating. A variety of state and federal agencies provide financial and technical assistance through various programs that will be beneficial to use and promote. For example, the NRCS provides both technical and financial resources to the agricultural community within the Planning Area. Continued support and collaboration with the NRCS is expected to continue but efforts to obtain the level of detail needed to identify their accomplishments within the Planning Area will be necessary to accurately measure results. It is unknown whether the information that will be needed from the NRCS to accurately measure results will fall under their Data Practices Act requirements. It is also anticipated that more effort will be given to aligning the NRCS local work group meetings with Plan priorities that subsequently could assist with a Regional Conservation Partnership Program or similar federal grant.

The units of government identified in this section are not inclusive. Other units of government may be asked to partner and assist as the Plan is implemented. For example, flood storage activities may require analysis by the MNDOT if public roads under their jurisdiction are involved. There are numerous examples where other units of government might need to be involved with Plan implementation and asked to collaborate.

6.2.1. Collaboration with Non-Governmental Organizations

The Planning Partners expect to utilize existing relationships with non-governmental organizations and build new partnerships with non-governmental organizations when opportunities that align with the goals of the Comprehensive Watershed Management Plan present themselves. Current and potential future partnerships include, but are not limited to, the Cannon River Watershed Partnership, MN Land Trust, Pheasants Forever, Ducks Unlimited, University of Minnesota Extension, local sporting groups, local service clubs, Lake Associations, Corn Growers, Soybean Growers, Farm Bureau, Farmers Union and others.

6.3. FUNDING

The following sections discuss funding needs, and potential funding sources, including local, state, and federal sources. This breakdown by funding source was accomplished by assigning the predominant funding source (Federal, State, Local, or Other) to each implementation activity in the Targeted Implementation Schedule and determining the totals by category. For example, implementation of agricultural practices are largely funded through the Federal EQIP Program and were therefore assigned Federal dollars. The Planning Partners expect to pursue grant opportunities collaboratively to fund implementation of the Targeted Implementation Schedule. Dependent upon individual project partners, other sources of funding may be evaluated as well. The annual amount of funding needed to implement the Targeted Implementation Schedule is on average \$3,013,990 and \$30,139,900 for the ten-year plan life cycle. The following table identifies the estimated funding need by the sources further described in this section of the Plan.

Table 6-1. Description of estimated funding need by source.

Funding Source	Resource Concerns	Landscape Alterations	Socioeconomic Factors	Administration and O&M	Totals
Federal	\$4,114,000	\$5,872,000	\$0	\$0	\$9,986,000
State	\$6,921,200	\$10,162,700	\$422,000	\$175,000	\$17,680,900
Local	\$299,000	\$624,000	\$281,000	\$175,000	\$1,379,000
Other	\$816,000	\$147,000	\$131,000	\$0	\$1,094,000
Totals	\$12,150,200	\$16,805,700	\$834,000	\$350,000	\$30,139,900

6.3.1. Local

Local funds are defined as any locally generated money. These can be derived from a variety of sources, including tax levies, fees, services and in-kind services, or donations from citizens, local organizations, or local chapters of national organizations. Local funding excludes general operating funds obtained by counties from BWSR, and grants or partnership agreements with the federal government or other conservation organizations. While these funds are typically used for locally focused initiatives where opportunities for state and federal funding are unavailable because of misalignment of initiative purpose and state or federal objectives, they will also be considered for matching grants or cost-sharing of projects or permanent protection efforts.

The current local funding levels will not be adequate to implement the Plan in addition to achieving existing activities. Although local funds are committed to implementation, the largest funding sources are expected to be State and Federal sources. Existing program funding will be evaluated to determine if realignment under the planned implementation activities will allow for greater leverage and therefore an increased ability to meet Plan goals. There are various state laws that have provisions for both counties and watershed districts to generate additional revenue under the provisions of 103B and 103Das outlined in the Local Funding Authorities Table developed by BWSR (see Appendix E). These opportunities will be explored as the Plan moves forward and as the Planning Partners provide direction to

increase local funding capacity. This Plan also creates an avenue for investment by non-governmental organizations (NGOs) and perhaps private agribusiness interested in supporting Plan implementation.

The total estimate of local funds needed for plan implementation over the 10-year timeframe of the plan is \$1,379,000.

6.3.2. State Funding

State funding includes all funds derived from existing block grants, regulatory programs or base cost share grants and program implementation. State funding excludes general operating funds obtained from BWSR, counties, service fees, and grants or partnership agreements with the federal government or other conservation organizations.

The total estimate of state funds needed for plan implementation over the 10-year timeframe of the plan is \$17,680,900.

6.3.3. Federal Funding

Federal funding includes all funds derived from the Federal government. For example, this includes programs such as the Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), and Conservation Innovation Grants (CIG). The Environmental Protection Agency also has Section 319 funds which are often used to improve water quality.

Federal agencies need to be more effectively engaged to facilitate frequent access to federal resources for implementation. Opportunities may exist to leverage state dollars through various federal cost share programs. Where an initiative or project aligns with the objectives of various federal agencies, federal dollars will be sought to help fund the initiatives or projects described by this plan.

The total estimate of federal funds needed for plan implementation over the 10-year timeframe of the plan is \$9,986,000.

6.3.4. Other Funding Sources

The Planning Partners will apply as an entity for collaborative grants, which may be competitive or non-competitive. The assumption is that future support for implementation will be provided to the Planning Partners as one or more non-competitive implementation grants. Where the purpose of an initiative aligns with the objectives of various state, local, non-profit, or private programs, these dollars will be used to help fund the initiatives described by this Plan. As an alternative to reliance on competitive grants, this Plan envisions successful legislation allowing grant dollars to be used for implementation of programs and activities.

Funding from NGOs may provide technical assistance and fiscal resources to implement the Plan's Targeted Implementation Schedule. For example, Trout Unlimited, Pheasants Forever, Ducks Unlimited, the McKnight Foundation, or the Fishers & Farmers Partnership offer a variety of technical assistance, grants, and partnership opportunities. This Plan should be

provided to all NGOs as a means of exploring opportunities to fund specific aspects of the Targeted Implementation Schedule.

Private sector companies, including agribusinesses, are often overlooked as a potential source of implementation funding. Many agribusiness companies are working to improve water quality, others provide technical or financial support for implementing management and structural water quality BMPs. Most often this is through [Field to Market: The Alliance for Sustainable Agriculture](#). Finally, this Plan could be used to explore private sector funding, especially whether the estimated water quality benefits have monetary value.

This category of funding excludes general operating funds obtained from BWSR, counties, service fees, local funding sources, and grants or partnership agreements with the state or federal government or other conservation organizations.

The total estimate of funds needed from other sources for plan implementation over the 10-year timeframe of the plan is \$1,094,000.

6.4. WORK PLANNING

To implement this Plan, while also coordinating and advising with the Planning Partners, comprehensive work planning will be completed on a biennial or triennial basis with annual adjustments made as needed to accommodate unforeseen or opportunistic situations. The Planning Partners will develop and approve the work plans under advisement of the TAG.

The initial work plan will pursue activities identified for year 2020, 2021, and 2022 of the Targeted Implementation Schedule. Each work plan thereafter will be based on progress made toward goals and new initiatives aimed at either maintaining or accelerating progress in targeted sub-watersheds. The work plans will be developed based on the targeted implementation plan as well as other initiatives and programs that support efforts to achieve plan goals. Staff and financial resource availability will be considered. Feedback and guidance received will be integrated into the work plan. The work plan will indicate each local government's responsibilities and staff capacity to accomplish plan goals and identified outside consultant or contractual needs.

When feasible, the work plan will be coordinated with other agency plans, projects, and timelines. The TAG will be asked to participate in these discussions and provide input on budgeting activities associated with the work plan development.

6.4.1. Project Selection Process

The Planning Partners will work under the direction of the Cannon River Watershed Joint Powers Board after their formation to develop policies or processes that will guide project selection. The CRWJPB may consider using the following methods:

- Policy Development – Adoption of cost share policies or agreements to direct how funds will be encumbered and distributed. The CRWJPB will consider adopting cost sharing policies on an annual basis to direct how funds will be distributed.
- Cost-Share Rates – Through policy development, set the cost-share percentage or flat rates higher in targeted implementation areas.

- Flowchart for Application Processing – Create a visual diagram of how an application would be processed through local Boards and check points with the CRWJPB if any are required based upon policies adopted.

Targeted implementation areas will require development of outreach materials to identify the purpose of local government involvement and to engage landowners in pursuit of voluntary conservation. Ultimately, landowner outreach and site reviews will be the best method for project selection within targeted areas. Once a landowner supports voluntary conservation efforts, BMP design tools will be used to further refine appropriateness of the BMP at the field scale.

The Planning Partners recognize that there are various tools to identify potential project locations within targeted implementation areas and that each individual tool has strengths and weaknesses in targeting. A summary of targeting tools considered the most appropriate for each project type is included in Table 6-2. Projects for agricultural runoff and leaching loss identified from targeting tools will be chosen within the applicable land use/crop type areas in the Tier One resource targeted implementation areas. See example for the Fox Lake Targeted Implementation Area of applicable land use/crop type areas for implementation in Figure 6-1 and Figure 6-2.

In addition to tools, the Planning Partners may take the following into consideration when selecting specific project locations. Use of an application process to score and rank cost share opportunities from landowners or applicants. The scoring and ranking will consider the location of the project as it relates to prioritized targeted implementation areas, the targeted pollutant, estimated pollution reduction if quantifiable, preliminary cost estimate, installation timing and total amount of cost share funds being requested. These are items that could be incorporated into an application ranking process:

- *Higher priority will be placed first on implementation activities within a targeted implementation area, then on implementation activities within a broader priority area, and finally watershed-wide implementation activities.*
- *Leverage momentum in a targeted area to achieve a higher rate of implementation and make more progress toward the measurable goals (if the opportunity presents itself).*
- *Cost-benefit of installing the project compared with reduction estimates for pollutants of concern.*
- *Feasibility of installing a project or implementing a practice.*
- *Alternative sources of funding that can be leveraged.*
- *Innovative approaches that can lead to the advancement of watershed management.*
- *BMPs that provide stacked functions and/or multiple benefits.*
- *Landowner compliance with current state regulations or local ordinances such as the state buffer law, wetland conservation act, septic system compliance or feedlot regulations.*
- *Installation of multiple practices and willingness to achieve whole farm conservation planning efforts.*
- *Landowner or operator participation in other programs such as Minnesota Agricultural Water Quality Certification Program or Field to Market.*

Table 6-2. Targeting and Measuring Tools by Project Type

Issue	Project Type	Targeting Methodology		Measuring Tool	
		Priority Area Scale	Field Scale	Priority Area Scale	Field Scale
3.1.1-A: Protection Lakes	Pending lake management plans	TBD	BATHTUB MIDS/WinSLAMM/P8	BATHTUB MIDS/WinSLAMM/P8	
3.1.1-B: Impaired Lakes	Shoreline erosion	GIS Terrain Analysis/SPI	Shoreline inventories		BWSR calculator
3.2.2-B: Shoreland Management	Septic system maintenance and education	Septic system inventories		U of M Estimator for individual SSTs, and Design Estimates for cluster systems.	
3.1.2-A: Wetland Restoration	Wetland restorations	Areas with the highest PTMApp pollutant loads delivered to priority resources will be targeted for implementation first. PTMApp needs to be completed for the Straight River and the Lower Vermillion River areas. Upon completion of the SWMM model, it can be used to target wetland restoration.	Results from PTMApp will be ground-truthed by local staff to verify whether the PTMApp identified locations include an existing practice and to verify site-specific feasibility and flow network. PTMApp relies on the quality of the hydroconditioned DEM model. Because the model is constructed at the HUC8 scale, there may be many missing culverts/road crossings at the field scale.	Annual progress towards measurable goals from source reduction practices will be based on the number of implementation acres as specified in Appendix D . The cumulative pollutant and flow reduction of all projects within a Priority Area will be based on inputting implemented practices in the existing HSPF-SAM model for the Cannon River Watershed. Once the Vermillion River Watershed HSPF model is completed by MPCA, implemented practices can be tracked in the Lower Vermillion River Priority Area.	The pollutant reduction of each individual project will be based on Design Estimates for some structural BMPs and PTMApp reduction assumptions for source reduction and other structural practices included in the PTMApp tool.
3.1.1-C: Pollutant Impaired Streams	Nutrient management				
	Perennial cropland conversion				
	Cover crops				
3.2.1-A: Agricultural Runoff and Leaching Loss 3.2.1-B: Soil Health	Structural BMPs				
3.2.2-A: Flooding of Communities	Flood reduction practices	A HEC-RAS model will be used to target practices that impact the river system and flood stage/plain, and a SWMM model will be used to target practices within contributing stormwater or ditch drainage systems.			
3.2.3-A: Drainage System Management	Multi-benefit drainage practices	A Multi-benefit Drainage Management (MDM) Plan will be used to investigate water control structures, two-stage ditch locations, and tile downsizing within a ditch system. As part of the MDM Plan, ACPF will be used to identify fields for Drainage Water Management, saturated buffers, grassed waterways, and filter strips.			

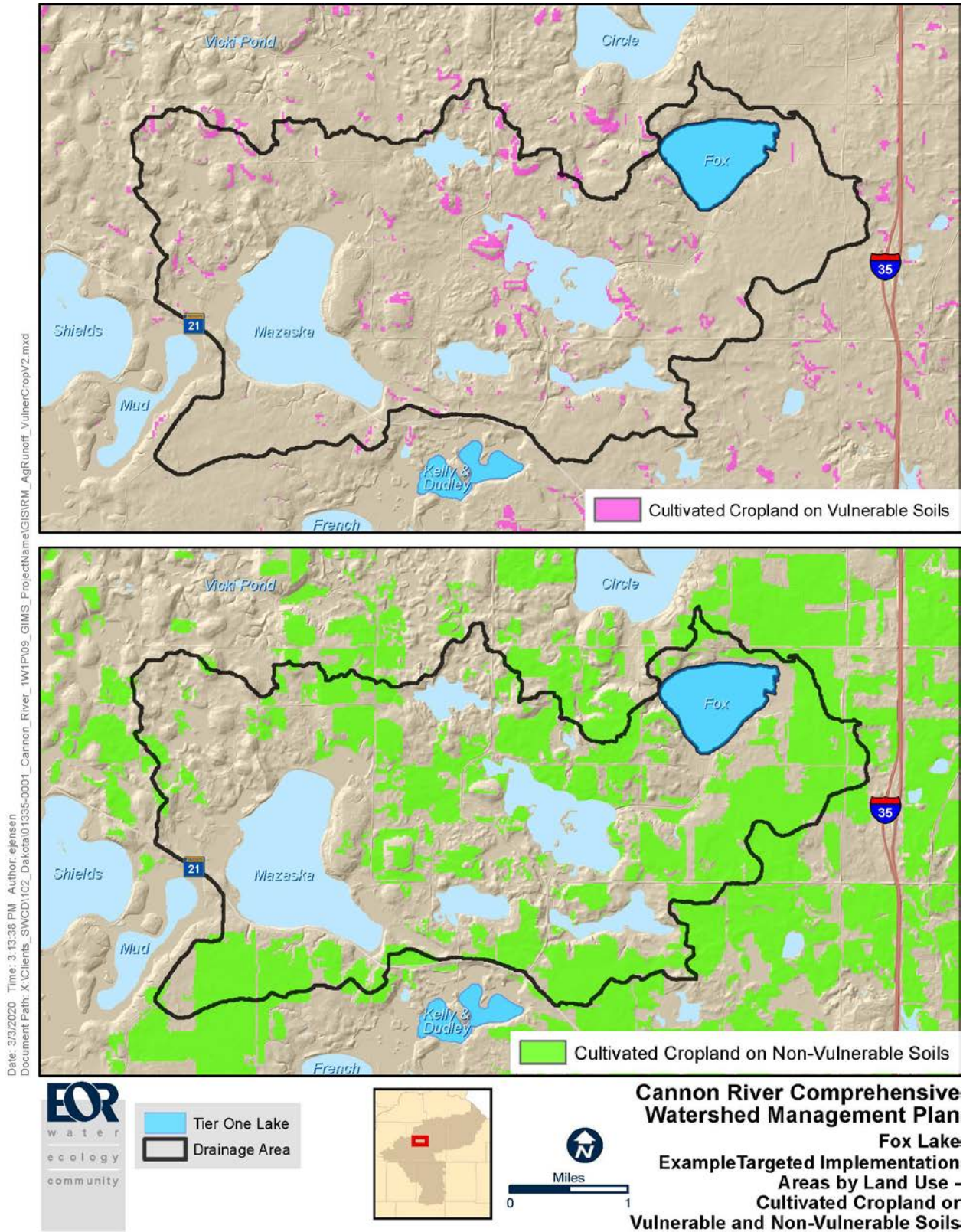


Figure 6-1. Example Tier One Impaired Lake (Fox) Targeted Implementation Areas by Land Use – Cultivated Cropland on Vulnerable and Non-Vulnerable Soils

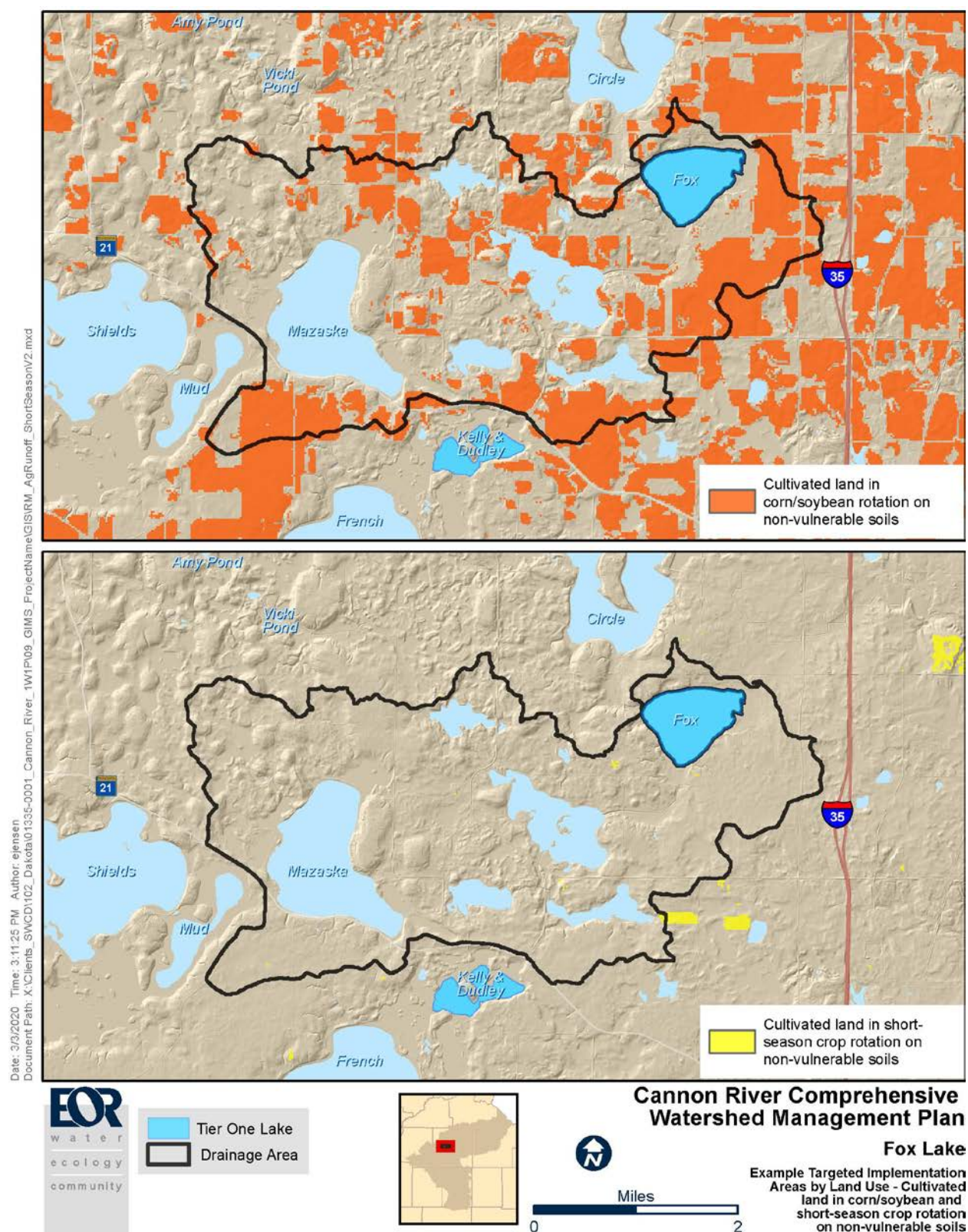


Figure 6-2. Example Tier One Impaired Lake (Fox) Targeted Implementation Areas by Land Use – Cultivated land in corn/soybean and short-season crop rotation on non-vulnerable soils

6.4.2. Funding Request

Funds are currently used for work towards protecting land and surface and ground water quality, board and staff leadership in local and regional planning, project identification, outreach, publishing annual plans and other reports, budgets, and education and technical support for property owners. The counties utilize general funding to support work related to shoreland, SSTS, stormwater, wetland, and other local ordinances. Natural Resource Block Grant (NRBG) funds are used by counties and SWCDs for local water plan implementation, completing administrative duties, and assisting with the Wetland Conservation Act (WCA). Existing grant funds are dedicated to providing technical assistance and financial incentives for erosion control and other natural resource projects on private property.

Additional work and staffing time will be supported through successful grant awards from, but not limited to: MPCA, MNDNR, MDA, BWSR and USDA. Moving forward, Planning Partners will consider utilizing Clean Water Fund dollars as a funding source to complete action items within this Plan. In order to ensure competitiveness within this funding pool, the Plan Partners will ensure that their proposed project aligns with high-level state priorities, key implementation items, and NFPF criteria prior to submitting a grant application.

6.5. ASSESSMENT AND EVALUATION

Assessment and evaluation of the implementation activities within the Plan are critical in tracking progress. Progress reports, submitted quarterly, semi-annually, and/or annually, to various funding sources will provide a record of project performance and how funds were utilized. Progress reporting will also occur through the BWSR eLINK system. County monitoring and enforcement records will provide progress reports on implementation activities involving SSTS, well sealing, and land use ordinance changes. A system for tracking and reporting activities internally and at the local level will be developed as State grant opportunities to implement the Plan become available. For example, the Planning Partners will continue to use HSPF-SAM to track performance towards achieving the goals. By entering the number of practices implemented annually into a spreadsheet tool created during the plan development process, the Planning Partners can calculate progress towards the goals. The tables in Appendix D are part of a spreadsheet planning tool that has been created for the Planning Partners to track annual progress towards their goals. There are additional columns in this tool where the actual number of implementation acres for each practice can be input and another column that calculates the load reduction achieved from these implementation acres.

6.5.1. Annual Evaluation

The purpose of the annual evaluation will be to assess progress towards each of the Plans stated goals. Recognizing that all entities are implementing activities to address local priorities (beyond those identified in the Targeted Implementation Schedule), the annual evaluation will include a review of additional activities to see if progress toward meeting plan goals is being made more quickly. The TAC members will be asked to participate and provide feedback in these annual meetings. The purpose of the meetings will be to revisit the priorities and focus areas, guide budgeting documents, advise on possible actions to be completed in the upcoming year, and relay the results of the annual evaluation to respective

Boards of the JPA. The Plan Partners will revisit priorities and focus areas, discuss and consider new data or findings that could be integrated into the Plan, and discuss areas of possible collaboration on future projects and funding. This annual evaluation will also include a discussion of the need for amendments to the Plan. The method for tracking progress toward Plan goals will be determined after adoption of the Plan and could include one or more of the following: spreadsheet, map based database, published annual report or meeting summary. Load reduction estimates from the tools used to identify practices will be used to track progress toward goals. Reduction conversions will be made across tool platforms.

Additional evaluation will occur through separate annual planning documents of each participating local government unit, eLINK reporting, funding source documentation and reporting, and review of related resolutions passed by individual Boards of the JPA. This information will also be used in the development of annual reports completed by participating local government units.

6.5.2. Partnership Assessment

At the five-year evaluation, members will assess their own and the other partners' participation in this Plan. Assessing the partnership will improve the coordination of implementation activities while capitalizing on the support and perspectives of different individuals and organizations, their corresponding skills and collaboration across the watershed, and the potential pooling of information technology, administrative, or financial resources. The Assessment will consist of a questionnaire that the Members can complete to examine the strengths and weakness of the partnership. Results from the assessment will be used to guide the Plan Partners and stakeholders in improved decision-making and participation in implementation activities.

6.5.3. Five Year Evaluation

After five-years of Plan implementation, the Plan Partners will conduct an evaluation. A summary of information collected through annual evaluation meetings will be reviewed to assess plan progress. Any necessary Plan revisions will be discussed and included as appropriate. The five-year evaluation will also enable the Plan Partners to assess whether any new information, including data and the findings from completed projects such as the Long Term Flood Evaluation Study, should be included in the Plan to improve prioritization, targeting, or measurability. Amendments to the Plan may be made if appropriate or necessary. The Plan Partners will be the responsible authority to recommend and pursue Plan amendments and distributing the updated Plan to BWSR for final approval and adoption.

6.5.4. Reporting

Each SWCD and County is required to complete annual grant, website, and financial reporting to BWSR in order to maintain eligibility for BWSR grant funding. Once the Cannon River Watershed Joint Powers Board is established, it too will be subject to the same reporting requirements. Annual reporting requirements for BWSR funding will be administered according to BWSR's Grant Administration Manual. Funding administration requirements include (but are not limited to):

- Annual eLINK grant reporting.
- Annual website reporting to include items listed in the reporting section of the Grants Administration Manual, including grant reports and SWCD specific organizational information.
- Financial Statements including combined balance sheets, income statements, budgetary comparison statements, notes on any financial statements, and Management's discussion and analysis.

The Counties and the SWCDs submit these reports to BWSR annually. There are also annual reporting requirements for other state funding agencies and for technical assistance from the USDA-NRCS. Internally, annual reports provide the Counties, SWCDs, and the WMO and WD with the information from which to assess progress towards goals and evaluate staff and District performance.

6.6. PLAN AMENDMENTS

This plan is intended to guide the activities of Plan Partners through 2029. As with all long-term plans, revision of this Plan may be necessary if significant changes occur in the priorities, goals, policies, administrative procedures, or Plan implementation programs. New, previously unaddressed issues may also arise that may require Plan revisions. Similarly, local priorities and issues (see Section 3.4) may also change, necessitating revision of those topics. This Plan will remain in full effect until a revision is approved by BWSR.

All amendments to this plan will follow the procedures set forth below. This plan will remain in full effect until a revision is approved by BWSR. Plan amendments may be proposed by anyone: an agency, a landowner, a city or county, or the Watershed District or Watershed Management Organization. All recommended plan amendments must be submitted to the CRWJPB along with a statement of the problem or issue, the rationale for the amendment, proposed solutions to address the stated problem or issue, and an estimate of the cost to complete the amendment.

The Cannon River Planning Partners recognize periodic amendments may be necessary to maintain the usefulness of this Plan as a long-term vision and tool. However, the structure and intent of this Plan is to provide flexibility to respond to short-term emerging issues and opportunities. The CRWJPB will review and revise its long-range work plan and/or implementation programs through the annual budgeting process, and annual and 5-year evaluations.

Information collected from data collection and monitoring programs—especially water quality data—will require frequent updating. This technical information will be considered part of the normal course of operations consistent with the intent of this plan and will not trigger a plan amendment. However, when technical information suggests a policy change that is significantly different than the plan is necessary, a plan amendment may be required.

6.6.1. Criteria and Format for an Amendment

Managing water-related issues is a complex process. This Plan provides a framework to guide work by identifying priority concerns, issues impacting priority concerns, measurable goals, strategies, and action items. The following situations do not require an amendment:

- *Any activity implemented through the “normal” statutory authorities of an LGU, unless the activity is deemed contrary to the intent and purpose of this plan by the CRWJPB;*
- *The implementation of a non-capital improvement project action item where the estimated cost is different than the cost shown in the long-range work plan in this plan;*
- *The addition or removal of action items, programs, initiatives, or projects, which are (1) consistent with the goals of this plan, (2) not capital improvement projects as defined by this plan, or (3) will be proposed, discussed, and adopted as part of the annual budgeting process which involves public input.*

Plan amendment criteria includes the following:

- *Any LGU can propose an amendment.*
- *The costs for the plan amendment are covered by the LGU who proposes the amendment unless the CRWJPB decides to split costs because there is mutual benefit among multiple partners.*
- *The CRWJPB decides to move forward with the amendment through a resolution with a majority vote.*
- *The CRWJPB holds a public hearing.*
- *Majority vote of the CRWJPB is required to submit the revised plan to BWSR for review and approval. This does not require prior approval by each individual LGU.*

If the CRWJPB or BWSR decides that a plan amendment is needed, the CRWJPB will follow a process similar to the County and Watershed District plan amendment processes:

Step 1: Consult - CRWJPB consults with the BWSR Board Conservationist to review the water plan amendment process. Determine the extent of the amendment and review process and the correlated level of effort needed. Extensive amendments typically take 18 months to complete. Set a due date for amendment completion and work backward to develop an internal timeline. Discuss the participants who will be involved with the amendment review and the level of involvement, which depends on the nature of the amendment.

Step 2: Self-Assessment and Develop Proposed Amendment - CRWJPB performs self-assessment to evaluate progress on current plan. This should include a review of Performance Review and Assistance Program (PRAP) reports and other related information. CRWJPB reviews current plan sections and develops a list of sections to amend, noting areas where information is missing or out of date. Review state reports/plans for the area where the amendment is proposed, such as Groundwater Restoration and Protection Strategies (GRAPS) and Watershed Restoration and Protections Strategies (WRAPS), for possible inclusion into the plan. The BWSR website contains information on how to use the WRAPS reports in water plans. At the discretion of the CRWJPB, drafts of proposed plan amendments may be sent to all plan review authorities for input before beginning the formal review process. Examples of situations where a plan amendment may be required include the following:

- *Addition of a capital improvement project that is not described by the plan;*
- *Addition or modification of a Watershed Management Organization; and*

- *Addition of new programs or other initiatives that have the potential to create significant financial impacts or controversy when inconsistent with the issues, goals, and policies.*

Step 3: Submit Petition - CRWJPB submits a petition to the BWSR. The petition to amend the water plan can be in the form of a letter or memo to the BWSR Board Conservationist. The petition may be submitted electronically. The petition should contain background on the water plan, the purpose(s) for the amendment, and a general summary of the amendment (areas of the plan that will be amended and scope of the amendment if known). The petition should include the proposed amendment, the date of the public hearing, and a copy of the signed resolution passed by the CRWJPB indicating the intent to amend the water plan. The Resolution to Amend template is located on the BWSR website. BWSR Board Conservationist consults with the BWSR Regional Manager, other BWSR staff, and board members and provides feedback to the CRWJPB regarding the petition and proposed amendment.

Step 4: Notify - The CRWJPB will maintain a distribution list for copies of the plan and, within 30 days of adopting an amendment, distribute copies of the amendment to the distribution list. Generally, electronic copies of the amendment will be provided or documents made available for public access on the Cannon River Watershed website as it becomes available. Printed copies will be made available upon written request and printed at the cost of the requester.

6.6.2. General Amendments

If a general plan amendment is determined to be necessary, the CRWJPB will follow the plan amendment process, which is the same as the plan review process. The plan amendment process is as follows:

1. Submit a copy of the proposed amendment to all cities, counties, townships and water management authorities within the Cannon River Planning Area, BWSR, and the state review agencies (MNDNR, MPCA, MDA, MDH, BWSR, Metropolitan Council, and EQB) for a 60-day review;
2. Respond in writing to any concerns raised by the reviewers;
3. Hold a public hearing on the proposed amendment;
4. Submit the revised amendment to the state review agencies and BWSR for a 45-day review; and
5. Submit the final, revised amendment to BWSR for approval.

At the discretion of the Plan Partners, drafts of proposed plan amendments may be sent to all plan review authorities for input before beginning the formal review process. Examples of situations where a plan amendment may be required include:

- *Addition of a capital improvement project not described by the plan.*
- *Creation of a water management district.*
- *New initiatives, policies, or programs that appear to be inconsistent with the issues, goals, and policies that have the potential to create significant financial impact or public controversy.*

6.7. ORGANIZATIONAL STRUCTURES OR FORMAL AGREEMENTS

The Cannon River 1W1P Partnership was a coalition of Counties, Soil and Water Conservation Districts, a Watershed District (WD), and a Watershed Management Organization (WMO) in south central Minnesota. The successes of past individual and collaborative actions have built the momentum to develop this watershed plan.

A JPA for the purpose of implementing this Plan has been drafted. The legal name defined under this JPA will be the Cannon River Watershed Joint Powers Board (CRWJPB). A copy of the Draft Joint Powers Agreement being considered is attached as Appendix F.