



# Root River ONE WATERSHED, ONE PLAN

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**Root River Planning Partnership**

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# Root River Watershed | ONE WATERSHED, ONE PLAN

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## LIST OF PLAN ABBREVIATIONS

AIS	Aquatic Invasive Species
AUID	Assessment Unit Identification Number
BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
COA	Conservation Opportunity Areas
DEED	Department of Economic Development
DWSMA	Drinking Water Supply Management Area
EAC	Endocrine Active Compounds
EQIP	Environmental Quality Incentives Program
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
HSPF	Hydrologic Simulation Program--Fortran
HUC	Hydrologic Unit Code
IBI	Index of Biotic Integrity
LGU	Local Government Unit
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MGS	Minnesota Geological Survey
MPCA	Minnesota Pollution Control Agency
NRCS	Natural Resources Conservation Service
NO3+NO2	Inorganic Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PTMApp	Prioritize, Target, Measure Application
SEMN WRB	Southeast Minnesota Water Resources Board
SGCN	Species in Greatest Conservation Need
SNA	Scientific and Natural Areas
SSTS	Subsurface Sewage Treatment Systems





SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TNC	The Nature Conservancy
TP	Total Phosphorus
TSS	Total Suspended Solids
TU	Trout Unlimited
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WAN	Wildlife Action Network
WRAPS	Watershed Restoration and Protection Strategy





## PLAN DEFINITIONS

**Action** – A specific, tactical activity that can be conducted, completed, or accomplished to achieve a strategy and gage measurability using the metric. Responsibility for completion, completion timelines, estimated costs, and probable benefits can be associated with each action. Actions inform the development of a targeted implementation schedule.

**Goal** – A statement of intended accomplishment for each priority resource concern. The goal could describe a planning boundary or planning region wide initiative (i.e., region wide education and outreach) or it could describe the intent for a specific location (i.e., a specific stream reach). Goals are meant to be simply stated and achievable, can be quantitative or qualitative, and are meant to be measurable through the implementation of specific strategies and actions to attain a desired outcome. Progress toward the outcome is measured using a defined metric.

**Issue Affecting a Resource Concern** – An issue affecting a resource concern (or simply an “issue”) is defined as a factor, stressor, or difficulty resulting in an adverse consequence for a resource concern. A resource concern can have one or many issues. An issue is a priority issue if it affects a priority resource concern. For instance, nitrate nitrogen causing the contamination of drinking water supply could be a priority issue affecting a priority concern (i.e. drinking water supplies).

**Metric** – A feature, attribute, characteristic, amount, or quantity which, when achieved, is expected to result in describing the amount of progress toward attaining the resource goal.

**Resource** – A resource is defined as a natural, economic, educational, biotic, aesthetic, land, or similar asset. Resources are generally considered something that can be “managed” and are generally broad, such as surface water, groundwater, or education and outreach. A single goal is established for each resource.

**Resource Concern** – A resource concern is defined as a physical, biological, chemical, or geological subset or component of a resource. A priority resource concern is of elevated interest and importance compared to another physical, biological, chemical, or geological subset or component. Resource concerns are typically a refinement of a resource. For example, the resource “groundwater” can be further refined into several components, including public and private drinking water supply, springsheds, and recharge areas. The targeted implementation schedule is preferentially focused on priority resource concerns. One or more strategies are associated with a resource concern.

**Strategy** – A narrative description of an approach or initiative for a specific priority resource concern. The completion of one or more strategies may be necessary to achieve a goal. A strategy is the organizational framework for one or more actions (which are implementable) being undertaken to address and resolve the issues affecting a priority resource concern. A metric which is used to assess progress is associated with each strategy.



## EXECUTIVE SUMMARY

The Root River Watershed One Watershed, One Plan is a coalition of Counties, Soil and Water Conservation Districts, and the Crooked Creek Watershed District within southeast Minnesota. The formation of the coalition signifies an important step in local efforts to manage, restore, and protect water and natural resources in southeastern Minnesota. In order to be an effective entity for the management, restoration, and protection of resources within the Root River plan area, the Root River One Watershed, One Plan developed this pilot One Watershed, One Plan to focus on implementation strategies that are prioritized, targeted, and result in measurable resource improvements. The strategies to maintain, restore, and protect resources within the plan are aimed at achieving lasting conservation, while considering the needs, rights, and interests of the local community, residents and stakeholders.

The Root River plan area is part of the Lower Mississippi River Basin, and is located in the most southeastern corner of Minnesota (**Plan Section 1.2 and 1.3; Pg. 1-1**). Six counties are located within the plan area boundaries. Those counties, and the proportion of each county making up the plan area, include Fillmore (41.8%), Houston (26.2%), Mower (14.5%), Winona (9.7%), Olmsted (7.5%), and Dodge (0.3%). The Root River plan area can generally be divided into broad regions defined as “planning regions.” **Figure ES-1** shows the boundaries for the planning regions within the plan area. The boundaries generally correspond with the United States Geological Survey (USGS) 10-digit Hydrologic Unit Codes (HUCs) from the Watershed Boundary Dataset. Separate planning regions were established for those portions of the plan watershed draining directly to the Mississippi River and south into Iowa.

In recognition that not all identified issues can be addressed in the timeframe of a ten-year plan, planning partners developed a process to reach an agreed-upon list of the watershed issues and priorities that will be addressed within the lifespan of the plan (**Plan Section 2; Pg. 2-1**). Resources, resource concerns, and issues were identified prior to prioritization. Prioritization of resources, resource concerns, and issues was accomplished through soliciting and tabulating preferences expressed by the public, advising committees, and planning partners. Resources based on the expression of preference were then categorized as an A, B, or C priority level. Expectations are that the resource concerns with the “A” and “B” level designations are likely to be implemented concurrently, with “C” level priority designations reviewed annually for implementation. Resource concerns that are “A” level priorities include: Drinking Water Supplies (public and private); Streams and Rivers; Landowner and Producer Engagement in Watershed Management; and Livability (**Plan Section 2.4.1; Pg. 2-14**). Resource concerns that are “B” level priorities include: Surficial-Subsurface Hydrologic Connections; Flooding; Wetlands; Riparian Corridors; Public Knowledge of and Behavior Relative to Water Issues; Drainage System; and Water Retention Systems (**Plan Section 2.4.2; Pg. 2-18**). Resource concerns that are “C” level priorities include: Springsheds; Aquatic Habitat for Fish, Macroinvertebrates, and Aquatic Life; Trout Streams; Areas of Moderate and High Biodiversity; Karst Formations; Connecting Water and the Business Community; Technology, Tools and Existing Capabilities; Rural Environmental Health; Urban Environmental Health; Land Use; and Point Sources (**Plan Section 2.4.3; Pg. 2-26**).

The targeted implementation schedule is intended to address specific issues impacting each “A” or “B” resource concern (**Plan Section 4; Pg. 4-1**). As such, a series of measurable goals were established for each “A” and “B” level resource concerns. Each goal was made “measurable” through implementation of strategies and actions for addressing the issues impacting a priority resource concern and assessing progress through a metric. Defined goals are either quantitative measurable goals (i.e. pollutant load reduction) or reporting measurable goals (i.e. number of outreach contacts made, number of BMPs implemented). These goals, strategies, metrics, and actions for the priority concerns create the foundation for the targeted implementation schedule. As “C” level priority resource concerns are not addressed in the targeted implementation schedule, measurable goals for “C” level priorities were not developed. However, the issues impacting “C” level priority resource concerns will in part be accomplished by working towards other measurable goals for “A” and “B” level priority resource concerns.





Within the targeted implementation schedule (**Plan Section 4.8; Pg. 4-25**), resource concerns are prescribed a set of strategies to address the issues impacting the resource of concern. A set of implementation actions are prescribed in order to accomplish each strategy. Within the implementation table, each action is then described and assigned to a “management category.” Four different management categories are included in the table: 1) field practice, 2) statutory/ordinance, 3) research, and 4) education and outreach. The management category generally relates to the specific initiative which will be used to accomplish the action. Initiatives are focused on a specific resource category, which are used as a means of executing strategies to achieve measurable goals. Each initiative is assigned a source of the funding used to implement and administer the action. These initiatives are presented in **Table ES- 1**, and are further defined and discussed in **Section 5 (Pg. 5-1)**. As local approvals and ordinances are already a component of local government budgets, actions in the statutory/ordinance management category are not assigned a specific initiative. Plan components are summarized in **Figure ES-2**.

**Table ES-1:** Management category and associated incentive based initiative for implementation program

Management Category	Incentive Based Initiative
Field Practice	Groundwater Initiative
	Surface Water Initiative
	Landscape Features Initiative
	Social Capacity Initiative
	Sustainability of Communities Initiative
	Water Resources Infrastructure Initiative
Research	Research Initiative
	Data Development and Management Initiative
Education and Outreach	Education and Outreach Initiative

The targeted implementation schedule also defines the roles and responsibilities for completing each action item within a strategy (**Section 4.5; Pg. 4-15**). The targeted implementation schedule includes strategies and actions intended to be completed by others, including state agencies, federal agencies, and non-governmental organizations. The roles and responsibilities for implementation are identified by assigning a “lead” (local, state, or federal), a “lead entity,” and “partners” to each action. The “lead” designation indicates whether the responsibility for completion of an action is at the local government or some other level (i.e., by a state agency, federal agency or Non-Governmental Organization [NGO] collaborator). The designation of the “lead entity” is the specific agency or local governmental unit responsible for facilitating the action item to its completion. “Partners” are also assigned to each action to recognize collaborative efforts in order to implement some actions within the targeted implementation schedule.

Field practices may address multiple issues impacting priority resource concerns. To facilitate implementation, prescribed field practices within strategies and actions are organized by planning regions within the plan area (**Section 4.9; Pg. 4-38; Table 4-7**). For each planning region the number and type of field practices by treatment group is shown based on issues impacting priority resources in the planning region and based on field practice suitability in the planning region. Field practice treatment groups lump best management practices (BMPs) into categories based on the processes by which they remove sediment, total nitrogen, total phosphorus, and reduce peak discharge. Four different treatment groups are described (i.e., storage, filtration, infiltration, and source reduction). The total cost for the aggregated number of field practices is also shown.



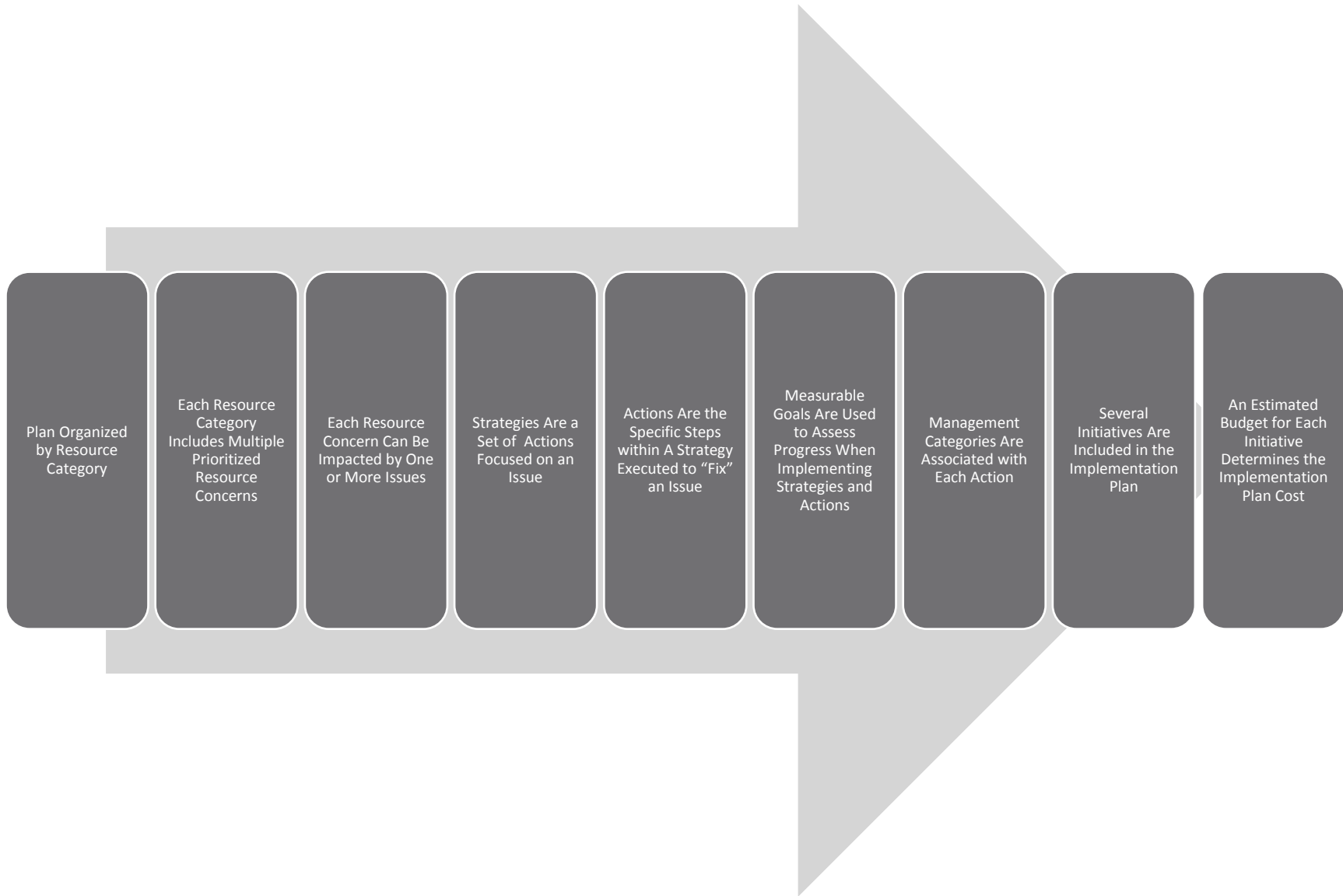
Next, the anticipated progress towards quantitative measurable goals (i.e. pollutant load reduction) made through implementation of the prescribed field practices is assessed. As field practices commonly produce benefits for multiple issues impacting priority resources, all quantitative water quality issues are evaluated: Sediment, Total Nitrogen, Total Phosphorus, and Excess Runoff. Using the Prioritize, Target, and Measure Application (PTMApp), each issue is assigned an existing condition (load or runoff volume), the target measurable goal, and the anticipated load reduction that is generated by the implementation of the prescribed field practices. **Table ES-2** summarizes the field practices for all planning regions within the Root River One Watershed, One Plan Area, separated into the planning regions which drain to the Mississippi River, and the planning regions that drain south into Iowa.

An annual work plan will be developed by the Planning Work Group based on the targeted implementation schedule and any adjustments made through self-assessments (**Section 5.4.4; Pg. 5-33**). The annual work plan will then be presented to the Policy Committee, who will ultimately be responsible for approval. The intent of these annual work plans will be to maintain collaborative progress towards completing the targeted implementation schedule. The framework for prioritizing and aiming to complete the targeted implementation schedule during the annual planning will include a variety of factors and criteria, including, but not limited to:

- Streams that are nearly or barely impaired and have a high probability of staying unimpaired or becoming unimpaired with relatively small protection or restoration efforts;
- Potential for voluntary participation by landowners and residents;
- PTMApp pollutant load reductions;
- Available funding;
- Partnerships;
- Practices/projects ready to implement (overlay these with field practices identified by PTMApp); and
- Opportunities for civic engagement, education and outreach, and research.



Figure ES-2: Components of the Root River One Watershed, One Plan.



**Table ES-2:** Summary of existing loads, target measurable goals, and anticipated load reductions generated by the implementation of the prescribed field practices for the Root River One Watershed, One Plan plan area.

Drainage	Treatment Group Type & Number of BMPs	Cost	Issue	Unit	Existing Conditions	Quantitative Measurable Goal				PTMApp Scenario Reduction	5 year Load Reduction Goal	10 year Load Reduction Goal	10 yr. Progress towards Measurable Goal (%)
						Metric	Amount (%)*	Target Load Reduction	Year				
Drainage to Mississippi River	Storage (244) Filtration (78) Infiltration (3) Source Reduction (812)	\$6,437,605	Sediment	tons/yr	116,416	Annual Load (mass/yr.)	45	52,387	2025	14,488	7,244	14,488	28
			Nutrients: Total Nitrogen	lbs/yr	10,848	Annual Load (mass/yr.)	45	4,882	2040	112	56	112	2
			Nutrients: Total Phosphorus	lbs/yr	134	Annual Load (mass/yr.)	45	60	2025	12	6	12	20
			Excess Runoff: 2 Year	acre feet	71,177	2-Yr. Runoff Volume	25	17,794	2030	N/A	N/A	N/A	N/A
			Excess Runoff: 10 Year	acre feet	167,868	2-Yr. Runoff Volume	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drainage to Upper Iowa River	Storage (44) Filtration (15) Source Reduction (268)	\$1,410,038	Sediment	tons/yr	112,249	Annual Load (mass/yr.)	45	50,512	2025	27,776	13,888	27,776	55
			Nutrients: Total Nitrogen	lbs/yr	32,828	Annual Load (mass/yr.)	45	14,773	2040	3,285	1,642	3,285	22
			Nutrients: Total Phosphorus	lbs/yr	2,024	Annual Load (mass/yr.)	45	911	2025	360	180	360	40
			Excess Runoff: 2 Year	acre feet	7,781	2-Yr. Runoff Volume	25	1,945	2030	N/A	N/A	N/A	N/A
			Excess Runoff: 10 Year	acre feet	17,036	2-Yr. Runoff Volume	N/A	N/A	N/A	N/A	N/A	N/A	N/A

\* Nutrients and Sediment percent reductions related to Minnesota Nutrient Reduction Strategy for Mississippi River Basin (45% reduction of nitrogen by 2040, 45% reduction of phosphorus [surrogate for sediment] by 2025). Excess Runoff percent reductions related to Sediment Reduction Strategy for the Minnesota River Basin and South Metro Mississippi River (25% reduction of two-year peak discharge by 2030).

*This table quantifies the amount of progress that can be made within the Root One Watershed, One Plan area if recommended field practices are implemented within the 10-year life of the watershed plan. This summary includes anticipated reductions for the following: Sediment, Total Nitrogen, Total Phosphorus and Excess Runoff. The top portion of the table refers to the portion of the Root One Watershed, One Plan area that drains directly to the Mississippi River; the lower portion refers to the portion of the planning area that drains south into Iowa.*

*Table Interpretation (top row): The existing amount, or annual load, of sediment reaching the outlet of all planning regions draining to the Mississippi River equals 116,416 tons per year. In order to reach the goal of reducing the existing annual load of sediment by 45% (by year 2025, based on the Minnesota Nutrient Reduction Strategy), the amount of sediment reaching the outlet of all planning regions draining to the Mississippi River needs to be reduced by 52,387 tons per year. If 244 storage practices, 78 filtration practices, 3 infiltration practices, and 812 source reduction practices are implemented within the planning regions draining to the Mississippi River, PTMApp estimates that 14,488 tons/year of sediment can be reduced after 10 years. At the end of the 10-year plan, PTMApp estimates that 28% of the total target load reduction goal of 52,387 tons/year will be reached. PTMApp does not project that the goal of a 45% reduction (by year 2025) will be met unless additional practices and actions are implemented.*





Data derived from the Prioritize, Target, and Measure Application (PTMApp) was used to inform decisions and tables through several stages of the One Watershed, One Plan process (**Figure ES-3**). PTMApp leveraged base products to identify and describe important resources, features, and factors (i.e. socioeconomics) associated with the Root River One Watershed, One Plan area (**Figure ES-3: Describe Your Watershed**), and prioritize resources of concern based on issues impacting them, such as the delivery of pollutant loads to surface water resources of concern (**Figure ES-3: Prioritize Resource Concerns**). PTMApp was then used to identify the magnitude and spatial distribution of potential pollution sources across the landscape (**Figure ES-3: Complete Source Assessment**). Following the source assessment, PTMApp was used to identify locations within the Root River One Watershed, One Plan area that are feasible candidates for implementing practices aimed to address issues impacting resources of concern (**Figure ES-3: Evaluate Practice Feasibility**). From this list of feasible practices, planning partners used PTMApp to select specific practices based on their probable benefits, ranging from pollutants removed to related cost (**Figure ES-3: Estimate Individual Practice WQ Benefits**). Potential locations were then evaluated for their combined effectiveness (**Figure ES-3: Target Preferred Practice Locations**).

The data developed through PTMApp for this plan can continue to be used to develop and refine numerous BMP implementation scenarios. Specific locations to place practices must be targeted based on practical and social factors, and PTMApp data can incorporate additional information to refine the practices targeted (**Figure ES-3: Develop Targeted Implementation Plan**). Use of PTMApp in the Root River plan area was then used to evaluate the combined benefits of implementation scenarios, expressed as the amount of load reduction at the resource location being restored or protected, as compared to a measurable goal (**Figure ES-3: Estimate Benefits/Targeted Implementation Plan**). Lastly, the benefits of the implementation plan were compared to the measurable goals at one or more locations within the Root plan area (**Figure ES-3: Measure: Assess Feasibility of Measurable Goals, Table ES-3**).



Figure ES-3: Use of PTMApp in Root River 1W1P plan development

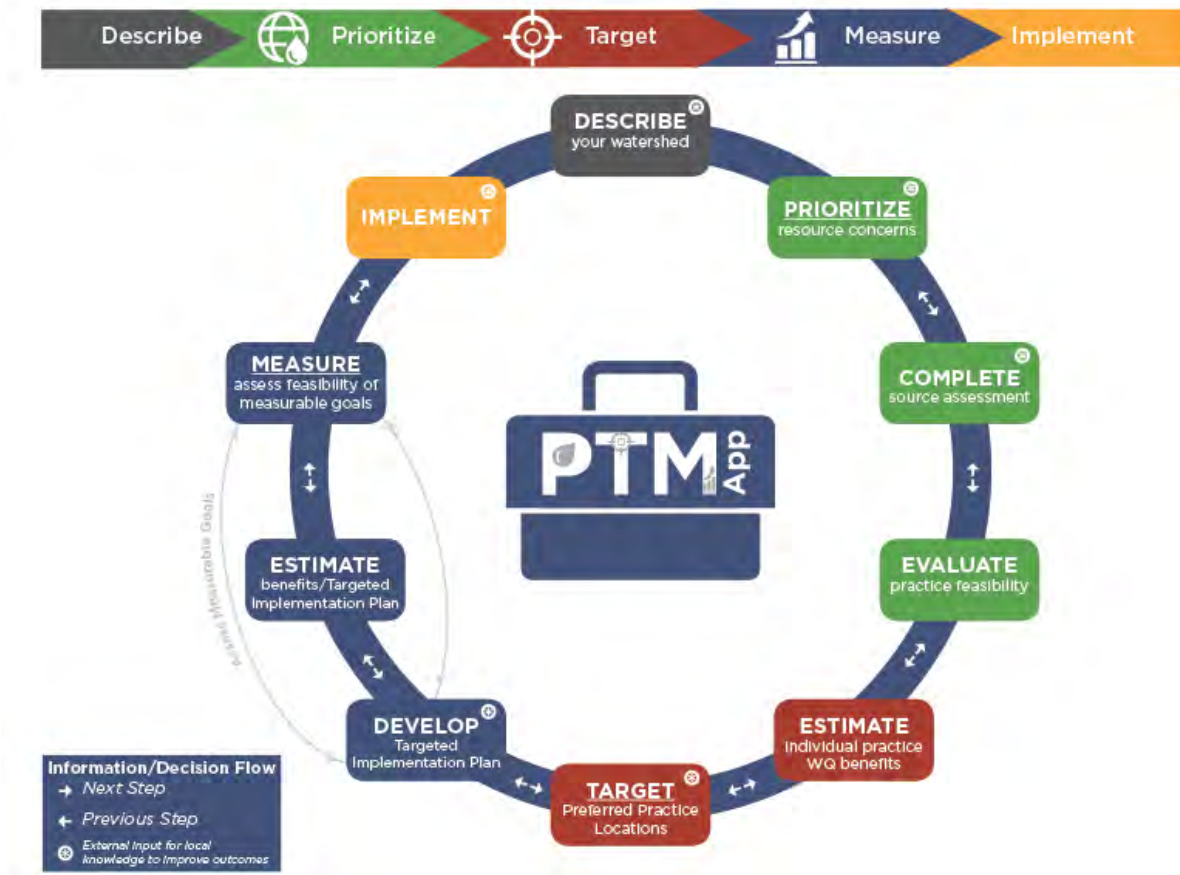


Table ES-3: PTMApp scenario of sediment reduction goal, using the outlet of the South Fork Root River subwatershed as an example.

At Impaired Water	Sediment (tons/yr)	Total Phosphorus (lb/yr)	Total Nitrogen (lb/yr)
Current Estimated Load	69,602	293	4,504
Estimated Load Reduction for Plan	6,440	29	337
Estimated Load with Plan	63,162	264	4,167
Goal (% reduction)	45%	45%	45%
Goal Load Reduction (mass)	31,321	132	2,027
Plan Percent of Goal	21%	22%	16%

Goals are annual values from the Minnesota Nutrient Reduction Strategy for Mississippi River Basin for TP and TN. Sediment percentage equal to TP reduction goal within the Minnesota Nutrient Reduction Strategy for Mississippi River Basin.



Estimated funding needs for implementation of the Root River One Watershed, One Plan for the 10-year lifespan of the plan is provided in **Table ES-4**. This includes the estimated cost of each action addressing “A” and “B” level resource concerns, as classified by management category: 1) field practice, 2) statutory/ordinance, 3) research, and 4) education and outreach. Actions in the statutory/ordinance management category are not assigned an additional cost, as local approvals and ordinances are already a component of local government budgets (**Section 5.4; Pg. 5-30**). Additional funding needs for implementation of this plan are also included within **Table ES-4**, including plan administration and capital improvement projects.

**Table ES- 4: Estimated total funding needs for implementation of the Root River One Watershed, One Plan for the 10-year period.**

Management Category	Total Funding Needs (over 10 years)
Field Practice <sup>1</sup>	\$8,800,000
Statutory Obligations / Ordinances <sup>2</sup>	\$2,000,000
Research <sup>3</sup>	\$1,000,000
Education & Outreach <sup>4</sup>	\$825,000
Additional Expenses	Total Funding Needs (over 10 years)
Plan Administration <sup>5</sup>	\$1,780,000
Capital Improvements (2 during plan period)	\$5,000,000
<b>Total Estimated Funding Needs</b>	<b>\$19,405,000<sup>6</sup></b>

<sup>1</sup> Based on field practice numbers and types in PTMApp using EQIP payment rates. Includes staffing time to implement field practices

<sup>2</sup> Based on estimated costs in existing local government unit budgets

<sup>3</sup> Based on one \$100,000 research project per year

<sup>4</sup> Estimated \$75,000 per year for watershed wide activities plus upfront cost to develop campaigns

<sup>5</sup> Plan administration and coordination staffing estimated at 1.75 full-time equivalent

<sup>6</sup> Plan area is 1.3 million acres. Total estimated funding need corresponds to average of \$14.73 / acre over 10 years

The Root River One Watershed, One Plan parties previously entered into a formal agreement through a Memorandum of Agreement for the purpose of planning the One Watershed, One Plan for the Root River Watershed. The parties have drafted a Joint Powers Agreement for the specific goal of implementing the One Watershed, One Plan for the Root River Watershed (Draft). The drafted Joint Powers Agreement reflects the various roles for plan implementation (**Table ES-5**). Plan implementation will remain centrally administered, wherein the responsibility of administering the water plan is assigned to the Root River Watershed One Watershed, One Plan. Root River Watershed One Watershed, One Plan will continue coordination and cooperation with other governmental units at all levels. Plan partners also expect to continue collaboration with others, including non-governmental organizations.



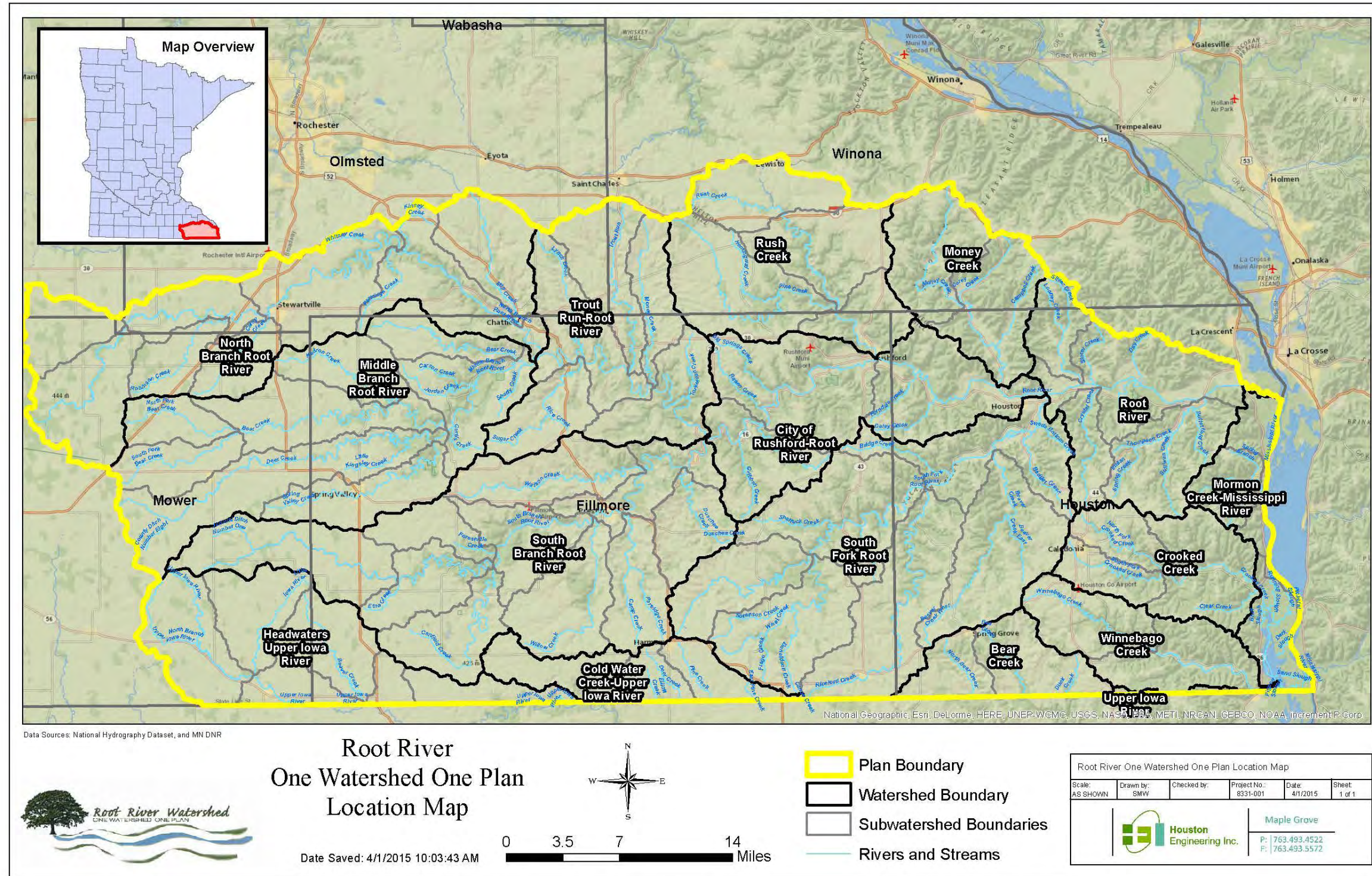
Table ES-5. Anticipated roles for plan implementation to be incorporated into a Joint Powers Agreement.

Committee Name	Primary Implementation Role / Functions
Policy Committee	<ul style="list-style-type: none"> <li>• Local funding commitments for implementation</li> <li>• Approving the annual work plan</li> <li>• Approving annual fiscal reports</li> <li>• Approving annual reports submitted to BWSR</li> <li>• Annual review and confirmation of Planning Work Group priority resource concerns recommendations</li> <li>• Direction to Planning Work Group on addressing emerging issues</li> <li>• Approve plan amendments</li> <li>• Implement county ordinances and state statutory responsibilities separately from plan implementation</li> <li>• Approve grant applications</li> <li>• Approve annual assessment</li> </ul>
Advisory Committee	<ul style="list-style-type: none"> <li>• Review of and input on annual work plan</li> <li>• Identification of collaborative funding opportunities</li> <li>• Recommendations to Planning Work Group on program adjustments</li> <li>• Assist with execution of the targeted implementation schedule</li> </ul>
Planning Work Group	<ul style="list-style-type: none"> <li>• Identify local funding needs for implementation</li> <li>• Prepare the annual work plan</li> <li>• Prepare annual fiscal reports</li> <li>• Prepare annual reports submitted to BWSR</li> <li>• Annual review and confirmation of priority resource concerns</li> <li>• Evaluate and recommend response to emerging issues</li> <li>• Prepare plan amendments</li> <li>• Prepare and submit grant applications</li> <li>• Implement the targeted implementation schedule</li> <li>• Complete annual assessment</li> </ul>





Figure ES-1: Plan area boundary and planning regions (10-digit HUC boundaries).







## 1. INTRODUCTION

### 1.1 PREAMBLE

The Root River Watershed One Watershed, One Plan is a coalition of Counties, Soil and Water Conservation Districts, and the Crooked Creek Watershed District within southeast Minnesota. The formation of the coalition signifies an important step in local efforts to manage, restore, and protect water and natural resources in southeastern Minnesota. The Root River Watershed One Watershed, One Plan prepared this plan to develop implementation strategies that are prioritized and targeted resulting in measurable resource improvements. The development of this plan provides a framework for the Root River Watershed One Watershed, One Plan to be an effective local entity comprised of local government engaged in the management, restoration, and protection of resources within the Root River plan area. This plan is aimed at achieving lasting conservation efforts, while considering the needs, rights, and interests of the local community, residents, and stakeholders.

In 2011, members of the Local Government Water Roundtable (Association of Minnesota Counties, Minnesota Association of Watershed Districts, and Minnesota Association of Soil and Water Conservation Districts) recommended that local governments charged with water management responsibility should organize and develop focused implementation plans on a watershed scale. That recommendation was followed by legislation in 2012 (Minnesota Statutes §103B.101, subd.14), which gave the Board of Water and Soil Resources (BWSR) the authority to develop and implement a comprehensive watershed management planning approach as a means to transform the current system of water plans, largely organized on political boundaries, to one where plans are coordinated and consolidated on a watershed basis. This legislation has come to be known as One Watershed, One Plan<sup>1</sup>. BWSR's vision for One Watershed, One Plan is to align local water planning on major watershed boundaries with state strategies towards prioritized, targeted, and measurable implementation plans. BWSR was granted authorization and funding for local assistance and grants to transition from local water management plans to a watershed management approach.

To transition from county based water management planning to a comprehensive watershed management approach, BWSR accepted nominations in early 2014 to pilot the One Watershed, One Plan program. In June of 2014, the Root River Watershed was selected, along with four other watersheds (Lake Superior North, North Fork Crow River, Red Lake River, and Yellow Medicine River) as a pilot to begin implementing the One Watershed, One Plan program. BWSR hopes to learn from these pilot plans to improve water planning across Minnesota, with the ultimate outcome of an implementable plan meeting the needs of the local community that guides local programs and the construction of on-the-ground projects, resulting in actual improvements in resource quality.

This Root River One Watershed, One Plan pilot plan has been developed under and through a Memorandum of Agreement (**Appendix A**). The Memorandum of Agreement recognizes the need for a partnership to develop an approach for managing water and natural resources within the Root River plan area. The participants partnered through a Joint Powers Agreement under Minnesota Statute Section 471.59.

### 1.2 PLAN AREA

The Root River plan area is part of the Lower Mississippi River Basin within the most southeastern corner of Minnesota. Six counties are located within the plan area boundaries. Those counties, and the proportion of each county making up the plan area, include Fillmore (41.8%), Houston (26.2%), Mower (14.5%), Winona (9.7%), Olmsted (7.5%), and Dodge (0.3%). The plan area includes all of the Root River

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<sup>1</sup> Language derived from BWSR One Watershed, One Plan: An evolution of water planning in Minnesota

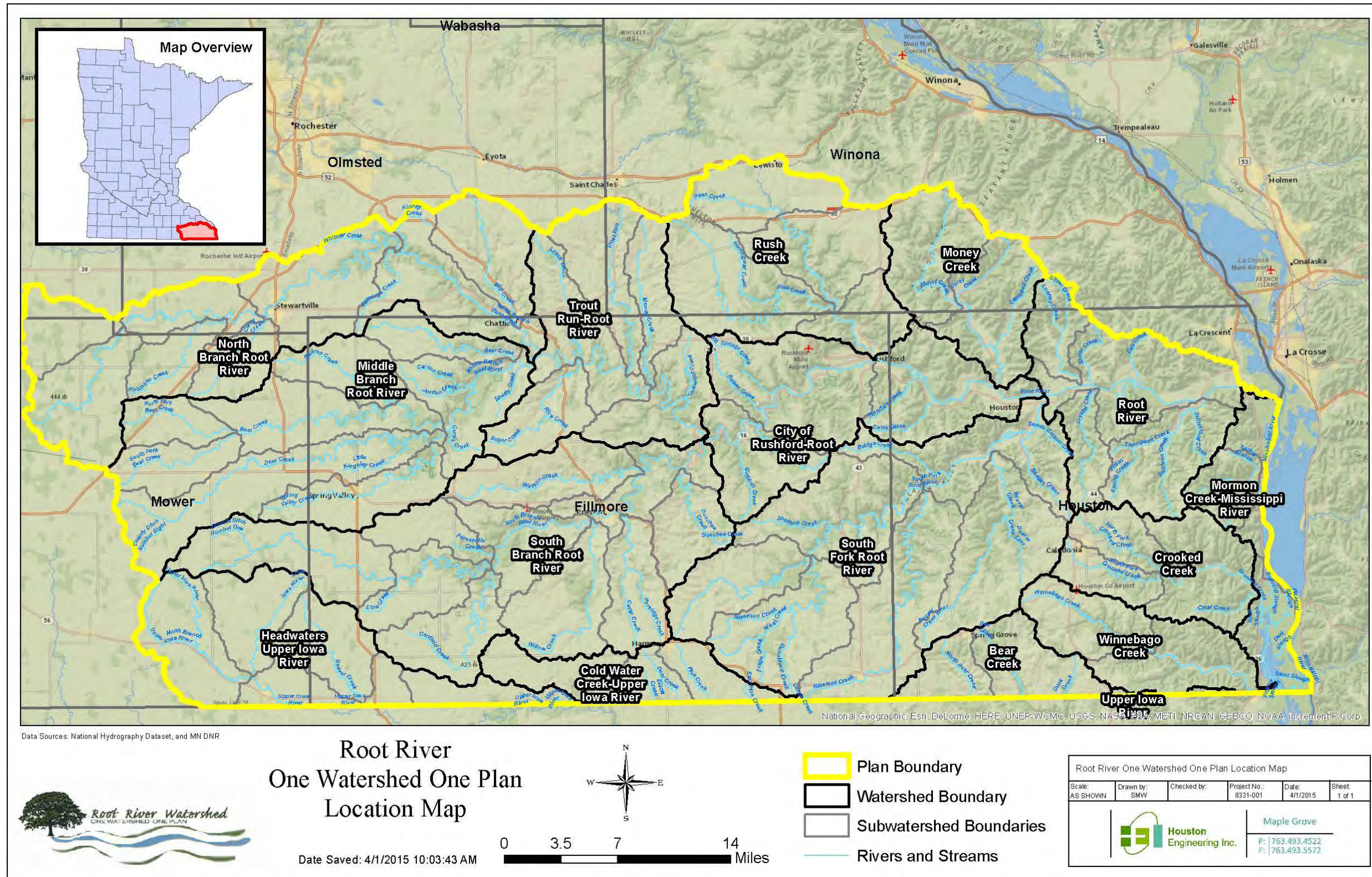


Watershed, in addition to areas that drain directly to the Mississippi River (Minnesota portion of the Mississippi-Reno Watershed) and south into Iowa (Minnesota portion of the Upper Iowa River Watershed). The plan area encompasses a total of 2,059 square miles (1.3 million acres). Approximately 1,659 square miles (1.1 million acres) of the total plan area is located within the Root River Watershed. An estimated 184 square miles (117,448 acres) (Mormon Creek – Mississippi River, Crooked Creek, and Winnebago Creek subwatersheds) of the Root River plan area drains east to the Mississippi River, and an estimated 217 square miles (138,673 acres) flows southerly to the Upper Iowa River (headwaters, Coldwater Creek, and Bear Creek). The plan boundary and the watersheds comprising the plan area are shown in **Figure 1-1**.





Figure 1-1: Plan area boundary and planning regions (10-digit HUC boundaries)





## 1.3 WATERSHED CHARACTERISTICS

The Root River plan area is characterized by productive agricultural land, considerable amounts of habitat for game and nongame wildlife, unique karst topography, and an aesthetically pleasing landscape. The region is unlike any other region within Minnesota. Located in the Driftless Area, the landscape, geology, and hydrogeology (groundwater and its movement and interaction with subsurface geology) provide rich character to this area. Long valleys rimmed with dry prairies and hardwood hills are bisected by trout streams. Much of the plan area was not covered like the rest of the state by the last Wisconsin Glaciation, and thus has remained unglaciated for the last 500,000 years. The result is naturally weathered bluffs with steep bluffs, deep valleys, and rolling hills, enriched with diverse and unique habitats. **Appendix B** provides more detailed information about the characteristics of the watershed within the Root River plan area.

## 1.4 PLAN OVERVIEW

The development of the Root River One Watershed, One Plan is voluntary and is intended to result in a more local, unified, and effective approach to managing resources. A principle of the planning effort is that people, land, and water are connected. This plan includes a targeted implementation schedule, which is prioritized and intended to result in the attainment of measurable goals. Plan development is based on a systematic, watershedwide, science-based approach to resource and watershed management, and has been driven by local water managers and policy makers to address priority resource concerns. This planning effort should be recognized and viewed as a local commitment to managing resources. The plan reflects the local priorities for managing resources and implementing strategies to achieve measurable goals. This plan is consistent with BWSR guidance for a priority concerns plan.

The information contained within this plan came from a compilation of existing local water management plans, studies, reports, summaries and information, modeling, scientific data, and state plans, including limited portions of the draft Watershed Restoration and Protection Strategy (WRAPS) and Total Maximum Daily Load (TMDL) for the Root River Watershed. This plan leverages the existing requirements for county comprehensive local water plans and watershed district plans, and addresses surface and groundwater, water quality and quantity, sustainability, and livability. The targeted implementation schedule includes the use of a broad range of tools, including capital improvements, local controls, and new programs necessary to achieve the goals of the plan. The Root River plan area can generally be divided into broad regions defined as “planning regions.” **Figure 1-1** shows the boundaries for the planning regions within the plan area. The boundaries generally correspond with the United States Geological Survey (USGS) 10-digit Hydrologic Unit Codes (HUCs) from the Watershed Boundary Dataset. Separate planning regions were established for those portions of the plan watershed draining directly to the Mississippi River and south to the Upper Iowa River.

Planning regions are useful to help orient the reader, stakeholders, and users of the plan when discussing and describing the locations of resource concerns and issues. Maps showing the locations of resource concerns within the various planning regions are shown in **Section 2. Analysis and Prioritization of Resources, Concerns and Issues Causing Concern**. The various strategies recommended to achieve the measurable goals comprising the targeted implementation schedule are also referenced to the planning regions.



## 1.5 PLAN PARTNERS AND ROLES IN PLAN DEVELOPMENT

The following plan partners joined together and were selected by BWSR as one of the first to pilot the One Watershed, One Plan in Minnesota:

- The counties of Dodge, Fillmore, Mower, Olmsted, Houston, and Winona (i.e., the Counties), by and through their respective County Board of Commissioners.
- The Dodge, Fillmore, Mower, Olmsted, Root River, and Winona Soil and Water Conservation Districts (i.e., the SWCDs), by and through their respective SWCD Board of Supervisors.
- The Crooked Creek Watershed District, by and through their Board of Managers.

Collectively, the entities are organized as the Root River Watershed One Watershed, One Plan. Through this partnership and in collaboration with other stakeholders, the following groups served during the development of this plan:

- The **Policy Committee** comprised the decision-making authority for the planning process. The committee was composed of one County Commissioner and one SWCD Supervisor appointed from each of the counties in the Root River Watershed, plus a manager from the Crooked Creek Watershed District;
- The **Advisory Committee** served to make recommendations to the Policy Committee regarding the planning process and plan content. The committee was composed of local, state, and federal agency staff, representatives from agricultural and conservation groups, municipalities, and other stakeholder groups; and
- The **Planning Work Group** guided the logistics of the planning process and drafted the plan. The Planning Work Group was composed of local governmental staff from the counties and SWCDs in the watershed.

The Root River Watershed One Watershed, One Plan retained Houston Engineering, Inc. (HEI) to assist with plan development.

Stakeholders within the Root River plan area served an important role during plan development. Plan preparers developed and followed a Stakeholder Involvement Plan (see **Appendix C**) to reasonably ensure an open process for soliciting input and obtaining comments during plan development. **Table 1-1** provides a record of the various meetings conducted during the plan development process. Meeting minutes are included in **Appendix C**.

**Table 1-1.** Summary of meetings completed during plan development.

Meeting Date	Group / Entity
August 6, 2014	Planning Work Group
August 27, 2014	Planning Work Group
September 24, 2014	Planning Work Group
October 22, 2014	Planning Work Group
November 20, 2014	Planning Work Group
December 11, 2014	Planning Work Group
January 21, 2015	Policy Committee
January 21, 2015	Planning Work Group



Meeting Date	Group / Entity
February 13, 2015	Planning Work Group
March 2, 2015	Policy Committee
March 2, 2015	Planning Work Group
March 17, 2015	Planning Work Group
April 6, 2015	Policy Committee
April 6, 2015	Planning Work Group
April 8, 2015	Public Meeting
April 29, 2015	Advisory Committee
May 4, 2015	Policy Committee
May 4, 2015	Planning Work Group
June 3, 2015	Policy Committee
June 3, 2015	Planning Work Group
June 30, 2015	Advisory Committee
July 6, 2015	Policy Committee
July 6, 2015	Planning Work Group
July 20, 2015	Planning Work Group
August 5, 2015	Planning Work Group
August 21, 2015	Advisory Committee
August 21, 2015	Planning Work Group
August 31, 2015	Policy Committee
September 4, 2015	Planning Work Group
October 19, 2015	Advisory Committee
October 19, 2015	Planning Work Group
November 2, 2015	Policy Committee
November 2, 2015	Planning Work Group
November 30, 2015	Policy Committee
November 30, 2015	Planning Work Group
January 4, 2016	Policy Committee
January 4, 2016	Planning Work Group
January 27, 2016	Planning Work Group
February 1, 2016	Planning Work Group
February 16, 2016	Planning Work Group
February 22, 2016	Planning Work Group
February 25, 2016	Planning Work Group
March 7, 2016	Advisory Committee
April 7, 2016	Planning Work Group
April 11, 2016	Policy Committee
April 11, 2016	Planning Work Group
May 17, 2016	Planning Work Group
June 13, 2016	Policy Committee
August 8, 2016	Planning Work Group
September 7, 2016	Public Hearing
September 8, 2016	Public Hearing
September 12, 2016	Planning Work Group



Meeting Date	Group / Entity
September 15, 2016	Planning Work Group
September 26, 2016	Policy Committee
October 17, 2016	Planning Work Group
December 19, 2016	Policy Committee
December 19, 2016	Planning Work Group

Stakeholders and the general public were engaged during the plan development process primarily through public meetings. A public meeting focused on obtaining information and input from the public about the range of resource concerns and issues, and soliciting public preference for the priority concerns. The general public was also represented during the planning process through the involvement of each County Local Water Planning Committee. Local committees provided their perspective to determine which resource concerns were a priority and were solicited for feedback about the strategies and actions comprising the targeted implementation schedule.

The Advisory Committee consisted of staff from the participating SWCDs, the State's main water and/or plan review agencies, trade organizations, nonprofit organizations, and special interest groups in the Root River plan area. Members of the Advisory Committee served to make recommendations on plan content and the planning process, including processes for identifying the range of resource concerns and issues, prioritizing resource concerns, and defining and describing protection strategies. The Advisory Committee also reviewed and recommended content to be included in the targeted implementation schedule. Advisory Committee members were expected to communicate plan related activities to their respective organizations and identify practical concerns during the plan development process. Members also served a role in speaking about the plan within the community and assisting the Policy Committee in ensuring a credible plan development process.

The Policy Committee made all final decisions about the content of the plan and its submittal to and approval by BWSR. The Policy Committee retained ultimate responsibility for plan direction, decisions, and content. The Policy Committee reviewed and approved the draft of the plan outline, information about the priority resource concerns and issues, the targeted implementation schedule, and the final One Watershed, One Plan. Members of the Policy Committee also engaged in constructive discussion and debate about issues addressed by the plan and provided consensus direction to the Planning Work Group on plan development matters. The Policy Committee also reviewed and approved membership of the Advisory Committee.

Responsibility for preparing the plan resided with the Planning Work Group. The Planning Workgroup comprised of local County and SWCD staff provided the logistical and day-to-day decision-making in the planning process. The Planning Work Group included the consultant and other advisors responsible for assembling the draft and final plans. Members of the Planning Work Group were responsible for providing information needed for the planning process, reviewing and approving draft plan related information, and assisting in plan development. It was also the responsibility of the Planning Work Group to identify priority resources, priority concerns, and issues affecting the priority concerns for their specific county.

## 1.6 INCORPORATING COMMENTS INTO THE PLAN

The Stakeholder Involvement Plan (see **Appendix C**) was developed to reasonably ensure an open process for soliciting input and obtaining comments during plan development. Comments that were received from the general public and from the local committees were documented, evaluated, and used to guide adjustments in plan content. For a list of all comments received and response, see **Appendix F**.







## 2 ANALYSIS AND PRIORITIZATION OF RESOURCES, CONCERNS, AND ISSUES CAUSING CONCERN

This plan is a Priority Concerns Implementation Plan as described by *One Watershed, One Plan, Plan Content for Pilot Watersheds* (BWSR September 23, 2014; **Appendix D**). According to BWSR guidance, the analysis and prioritization portion of the plan:

*“...is intended to summarize the process planning partners used to reach understanding of an agreement on the watershed issues and priorities that will be addressed within the lifespan of the plan. Prioritizing is recognition that not all identified issues can be addressed in the timeframe of a ten year plan—some items will be addressed before others.”*

In adherence to this guidance, this plan identifies the following:

- The steps used to consider and prioritize resource concerns and issues;
- A list of the resource concerns and issues considered for prioritization;
- A final list of agreed upon priority resource concerns and issues; and
- The reasons for selecting resource concerns and issues.

The outcome from the plan is a targeted implementation schedule focused on achieving measurable goals associated with the prioritized resource concerns and issues.

### 2.1 DEFINITIONS

Because of the need to establish a common language for communicating information, the following definitions were developed and are used to organize the plan:

- **Resource** – A resource is defined as a natural, economic, educational, biotic, aesthetic, land, or similar asset. Resources are generally considered something that can be “managed” and are generally broad, such as surface water, groundwater, or education and outreach. A single goal is established for each resource.
- **Resource Concern** – A resource concern is defined as a physical, biological, chemical, or geological subset or component of a resource. A priority resource concern is of elevated interest and importance compared to another physical, biological, chemical, or geological subset or component. Resource concerns are typically a refinement of a resource. For example, the resource “groundwater” can be further refined into several components, including public and private drinking water supply, springsheds, and recharge areas. The targeted implementation schedule is preferentially focused on priority resource concerns. One or more strategies are associated with a resource concern.
- **Issue Affecting a Resource Concern** – An issue affecting a resource concern (or simply an “issue”) is defined as a factor, stressor, or difficulty resulting in an adverse consequence for a resource concern. A resource concern can have one or many issues. An issue is a priority issue if it affects a priority resource concern. For instance, nitrate nitrogen causing the contamination of drinking water supply could be a priority issue affecting a priority concern (i.e. drinking water supplies).



## 2.2 IDENTIFYING POTENTIAL RESOURCE CONCERNS AND ISSUES

The process for identifying and describing the resources, resource concerns, and issues affecting a resource concern included gathering and reviewing the following:

- Existing management plans, studies, reports, data, and information, including those within the WRAPS, TMDL, existing county water plans, and similar documents. A list of the information reviewed is included in **Appendix E**;
- Comment letters provided by state and federal agencies (**Appendix F**);
- Input from the general public and members of the Advisory Committee and the Planning Work Group; and
- The knowledge of local water and resource managers, including SWCD, county, and watershed district staff.

Resources, resource concerns, and issues were identified and placed into a preliminary table prior to prioritization. Resource concerns and issues were initially identified and summarized by resource, which formed the basis for organizing both the resource concerns and issues. During the planning process the table and the contents were used to ensure identification of all of the potential concerns and issues. This approach reasonably ensured all potential resource concerns and issues were identified, analyzed, and considered in the prioritization process. **Table 2-1** shows the list of resources, potential resource concerns, and issues affecting a potential resource concern that were considered during plan development.



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
<b>1. Groundwater: Water which is held underground within the pores of rocks and soils and which reaches the ground surface via springs and seeps.</b>				
1. Groundwater	1.1 Drinking Water Supplies (public and private)	Drinking water supplies are water within the subsurface pores of soil and rock (within the aquifer) that are used by humans for drinking water. The susceptibility of the drinking water supply to contamination is driven largely by how quickly and easily water can be transported from the surface to the aquifer and the karst geology of the region.	1.1.1 Water Quality: Elevated levels of nitrate-nitrogen in groundwater reducing suitability as a drinking water supply posing a risk to human health 1.1.2 Water Quality: Elevated E. coli, fecal coliform bacteria, and total coliform bacteria levels in groundwater used for drinking water, thereby posing a risk to human health 1.1.3 Water Quality: Pesticides and fertilizers applied to the land surface in excess of manufacturer recommendations, which enters the drinking water supply posing a health risk to humans 1.1.4 Water Quantity: Diminished rate of aquifer recharge because of poor soil health, an increase in the amount of impervious surface area, and the lack of vegetative cover 1.1.5 Water Quantity: The volume of groundwater available for human use and maintaining the long-term sustainability of the groundwater resource 1.1.6 Water Quality and Quantity: Managing land use for specific areas on the landscape where surface water moves into the aquifer (i.e., Wellhead Protection Area boundary) 1.1.7 Rural residential development and urbanization occurring in locations with sensitive geologic conditions, thereby leading to safety concerns and the placement of practices and infrastructure 1.1.8 Water Quantity; Preparing for and increasing resilience in response to drought.	A
	1.2 Springsheds	Springs are groundwater that comes to the surface and the springshed is the area on the landscape which contributes water to the spring. Springs are visual evidence of where the groundwater comes to the surface	1.2.1 Water Quantity: Adequacy of groundwater recharge to ensure the maintenance of spring flows and the delivery of cold water to streams, creeks, and rivers 1.2.2 Water Quality and Quantity: Defining the specific areas on the landscape where surface water feeds a spring (i.e., springshed boundary) 1.2.3 Water Quality: Elevated levels of nitrate-nitrogen, herbicides, and other chemicals in spring water diminishing water quality 1.2.4 Water Quantity: Maintaining ecological plant communities relying on springs as a water supply source	C
	1.3 Surficial-Subsurface Hydrologic Connections	Surficial areas with subsurface connections are those areas where water is quickly and easily transported to the aquifer and sometimes connected to springs. The surface to subsurface connection is driven by thin soil layers that overlay fractured carbonate bedrock. The presence of sinkholes provides an avenue for water to short circuit soil filtration and enter ground ( <i>continued</i> )	1.3.1 Pesticide, fertilizer, and animal waste practices and the potential impact upon groundwater 1.3.2 Zoning and land use management in the areas with an intimate surface water – ground water connectedness 1.3.3 Rare animal and plant species and unique habitats dependent on the amount and chemical composition of groundwater 1.3.4 Providing recreational opportunities and economic opportunities	B





**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
	1.3 Surficial-Subsurface Hydrologic Connections <i>(continued)</i>	<i>(continued)</i> water supplies. The land surface which contributes to the rapid movement of water and how it is managed influences the amount and quality of water moving into the aquifer.		
<b>2. Surface Water: Water resulting from excess precipitation leaving the landscape and collecting in streams, rivers, creeks, wetlands, lakes and ponds, and from baseflow from groundwater.</b>				
2. Surface Water	2.1 Streams and Rivers	Numerous streams and rivers are found within the Root River One Watershed, One Plan boundary. The water quality within some of these currently supports the beneficial uses of this water, while others do not. Some of these beneficial uses include swimming, fishing, and support of aquatic life, drinking, and irrigation. Some creeks, streams, and rivers need to have the water quality improved (i.e., restored), while others need water quality maintained at or no less than the current level (protected).	<p>2.1.1 Water quantity: Rate, volume, and duration of runoff (i.e., altered hydrology), and the effect on the geomorphic stability of stream and river channels causing sediment deposition into the water bodies</p> <p>2.1.2 Riparian condition: Degradation of aquatic and riparian habitat associated with the physical damage to the banks and beds of creeks, streams, and rivers caused by bluff and bank failure, and lateral movement and loss of lateral connectivity</p> <p>2.1.3 Water quality: Elevated concentrations of suspended solids and sediment from upland sources and streambanks approaching (protection) or exceeding (restoration) water quality standards for aquatic life</p> <p>2.1.4 Water quality: Elevated concentrations of bacteria approaching (protection) or exceeding (restoration) water quality standards for recreational use</p> <p>2.1.5 Water quality: Elevated concentrations of nitrate-nitrogen approaching (protection) or exceeding (restoration) water quality standards for potable uses and for aquatic life</p> <p>2.1.6 Water quality: Reduced concentrations of dissolved oxygen or elevated temperatures approaching (protection) or below (restoration) tolerable levels that may affect aquatic life</p> <p>2.1.7 Water Quantity: Potential changes in the rate, volume, and intensity of runoff as a result of changing weather patterns and intense storms</p>	A



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
2. Surface Water	2.2 Flooding	Flooding is the inundation of land, homes, buildings, and roads. Flooding causes infrastructure damage, economic loss, and has adverse societal consequences in the community. Flooding can also have ecological benefits by maintaining a hydrologic connection between the river and the adjacent (riparian) lands.	<p>2.2.1 Water quantity: The rate, volume, and duration of runoff leading to flooding and flood damages and the loss of productivity of agricultural lands, damage to public infrastructure including the public transportation system, the water conveyance system (including streams and rivers), and buildings and structures</p> <p>2.2.2 Water quantity: Lack of connectedness of water bodies to their floodplains altering baseline ecosystem services</p> <p>2.2.3 Water quantity: Changing climate and weather patterns resulting in higher intensity precipitation events leading to changes in the rate, volume, and duration of runoff</p> <p>2.2.4 Water quantity: Defining the relationship between localized and regional flooding, the locations of flood prone areas, and the increase in tile density on the landscape</p> <p>2.2.5 Developing and maintaining comprehensive analyses and maps showing floodplain boundaries</p>	B
	2.3 Wetlands	Wetlands are frequently saturated lands with multiple potential benefits. The Minnesota Wetland Conservation Act has set the goal of no net loss of wetlands in total acreage and functions. Wetland loss and modification is an ongoing concern and focus of several state and federal agencies, and non-profit organizations.	<p>2.3.1 The historical loss of wetlands and the role they provide within the landscape for storing water, modifying water quality, and providing habitat</p> <p>2.3.2 Providing adequate water supply to wetlands to maintain hydrology and vegetation quality</p> <p>2.3.3 Selecting locations for restoring quality wetlands, while recognizing land owner rights and agricultural operations</p>	B
<b>3. Landscape Features: Visible natural features and characteristics of the landscape, often which are prominent or unique.</b>				
3. Landscape Features	3.1 Riparian Corridors	The riparian area boundary is defined by relatively frequent flooding adjacent to a creek, stream, river or similar water body which may be characterized by perennial vegetation. Preferably the perennial vegetation consists of native plant species. Riparian areas serve important functions including filtering runoff, habitat for fish and wildlife, wildlife migration, and aesthetic enjoyment. Riparian corridors are sometimes subject to regulatory controls (i.e., shoreland ordinance; floodplain requirements).	<p>3.1.1 Presence, width and quality of vegetated areas adjacent to streams and rivers within urban and rural landscapes for filtering surface runoff, providing shading and maintaining surface water temperatures, as a corridor for wildlife movement, and as physical protection barrier from disturbance</p> <p>3.1.2 Placement and number of locations for legal and controlled public access to provide recreational access and opportunities</p> <p>3.1.3 Recognition of land rights and the potential for compensation to landowners for the maintenance and use of riparian corridors</p> <p>3.1.4 Presence of perennial vegetation for filtering surface water runoff and providing shading from solar radiation and elevated surface water temperatures</p>	B







**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
3. Landscape Features (continued)	3.2 Aquatic Habitat for Fish, Macro-invertebrates and Aquatic Life	The pools, riffles, runs and bank overhangs within streams, creeks and rivers, the pooled areas of wetland, and the underwater areas of lakes and backwater areas comprise the livable space for aquatic life. A number of the waterways on the state's Impaired list are listed for impairments to fish, macroinvertebrates, and aquatic life. Frequently, these impairments are a result of degraded aquatic habitat. In addition, the Root River One Watershed, One Plan boundary area contains a number of stream reaches with high quality aquatic habitat.	<p>3.2.1 See 2.1.1 Water quantity: Rate, volume and duration of runoff (i.e., altered hydrology) and the effect on the geomorphic stability of stream and river channels causing sediment deposition into the water bodies</p> <p>3.2.2 See 2.1.2 Riparian condition: Degradation of aquatic and riparian habitat associated with the physical damage to the banks and beds of creeks, streams and rivers caused by bluff and bank failure and lateral movement and loss of lateral connectivity</p> <p>3.2.3 See 2.1.3 Water quality: Elevated concentrations of suspended solids and sediment from upland sources and streambanks approaching (protection) or exceeding (restoration) water quality standards for aquatic life</p> <p>3.2.4 See 2.1.6 Water quality: Reduced concentrations of dissolved oxygen or elevated temperatures approaching (protection) or below (restoration) tolerable levels that may affect aquatic life</p> <p>3.2.5 See 2.2.2 Water quantity: Lack of connectedness of water bodies to their floodplains altering baseline ecosystem services</p> <p>3.2.6 See 2.3.1 The historical loss of wetlands and the role they provide within the landscape for storing water, modifying water quality and providing habitat</p> <p>3.2.7 See 3.1.1 Presence, width and quality of vegetated areas adjacent to streams and rivers within urban and rural landscapes for filtering surface runoff, providing shading and maintaining surface water temperatures, as a corridor for wildlife movement, and as physical protection barrier from disturbance</p> <p>3.2.8 See 3.1.4 Presence of perennial vegetation for filtering surface water runoff and providing shading from solar radiation and elevated surface water temperatures</p>	C



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
3. Landscape Features (continued)	3.3 Trout streams	Trout streams are a type of "special" aquatic habitat, designated by the Minnesota Department of Natural Resources. Miles of designated trout streams exist with the Root River One Watershed, One Plan boundary. Trout streams are important economically, as they are a resource relied upon for recreation and tourism.	<p>3.3.1 See 1.2.3 Water Quality: Elevated levels of nitrate-nitrogen, herbicides and other chemicals in spring water diminishing water quality</p> <p>3.3.2 See 1.3.3 Rare animal and plant species and unique habitats dependent on the amount and chemical composition of groundwater</p> <p>3.3.3 See 2.1.1 Water quantity: Rate, volume and duration of runoff (i.e., altered hydrology) and the effect on the geomorphic stability of stream and river channels causing sediment deposition into the water bodies</p> <p>3.3.4 See 2.1.2 Riparian condition: Degradation of aquatic and riparian habitat associated with the physical damage to the banks and beds of creeks, streams and rivers caused by bluff and bank failure and lateral movement and loss of lateral connectivity</p> <p>3.3.5 See 2.1.3 Water quality: Elevated concentrations of suspended solids and sediment approaching (protection) or exceeding (restoration) water quality standards for aquatic life</p> <p>3.3.6 See 2.1.5 Water quality: Elevated concentrations of nitrate-nitrogen approaching (protection) or exceeding (restoration) water quality standards for potable uses and for aquatic life</p> <p>3.3.7 See 2.1.6 Water quality: Reduced concentrations of dissolved oxygen or elevated temperatures approaching (protection) or below (restoration) tolerable levels that may affect aquatic life</p> <p>3.3.8 See 2.2.2 Water quantity: Lack of connectedness of water bodies to their floodplains altering baseline ecosystem services</p> <p>3.3.9 See 2.3.1 The historical loss of wetlands and the role they provide within the landscape for storing water, modifying water quality and providing habitat</p> <p>3.3.10 See 3.1.1 Presence, width and quality of vegetated areas adjacent to streams and rivers within urban and rural landscapes for filtering surface runoff, providing shading and maintaining surface water temperatures, as a corridor for wildlife movement, and as physical protection barrier from disturbance</p> <p>3.3.11 See 3.1.2 Placement and number of locations for legal and controlled public access to provide recreational access and opportunities</p> <p>3.3.12 See 3.1.3 Recognition of land rights and the potential for compensation to landowners for the maintenance and use of riparian corridors</p> <p>3.3.13 See 3.1.4 Presence of perennial vegetation for filtering surface water runoff and providing shading from solar radiation and elevated surface water temperatures</p> <p>3.3.14 Presence of physical impediments and barriers to the upstream and downstream movement of trout and other fish species, including culverts, bridges, and waterway crossings</p> <p>3.3.15 A fish community representative of a healthy warm or coldwater stream.</p> <p>3.3.16 Maintaining self-propagating native brook trout populations</p> <p>3.3.17 Degradation of stream banks, stream substrate habitat, and water quality caused by barriers which impact sediment transport and restrict flow</p>	C



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
3. Landscape Features (continued)	3.4 Areas of Moderate and High Biodiversity	Many locations within the area, support unique and rare plant and animal species, special assemblages of plants, and or unusual combinations of landscape features, plants and animals. The Minnesota Department of Natural Resources through the Minnesota Biological Survey inventories and maps these areas. Because of their uniqueness, there is a general desire to preserve and protect these locations.	<p>3.4.1 Degradation and fragmentation of native plant communities due to urban/rural developments and changes in land use, especially within riparian areas</p> <p>3.4.2 Presence of invasive species threatening the quality of high biodiversity areas and native plant communities</p> <p>3.4.3 Landowner awareness of the presence and value of native communities and locations exhibiting moderate and high biodiversity</p> <p>3.4.4 Maintaining the hydrologic needs and requirements for unique habitats and areas exhibiting moderate and high biodiversity</p> <p>3.4.5 See 3.1.2 Placement and number of locations for legal and controlled public access to provide recreational access and opportunities</p> <p>3.4.6 See 3.1.3 Recognition of land rights and the need for fair and equitable compensation to landowners for the maintenance and use of riparian corridors</p>	C
	3.5 Karst Formations	Karst formations are a unique geological feature within the Root River One Watershed, One Plan boundary. These formations are basically "holes" in the surficial land surface connected to the underlying subsurface materials. A karst landscape also has sinking streams, caves, and springs which develop from the dissolution of limestone by water. Karst formations are a result of thin soil layers that cover fractured carbonate bedrock. Their occurrence requires special consideration for safety, zoning, and the placement of urban and agricultural best management and conservation practices. Water entering a karst formation quickly enters the subsurface hydrologic cycle.	<p>3.5.1 See 1.1.1 Water Quality: Elevated levels of nitrate-nitrogen in groundwater reducing suitability as a drinking water supply posing a risk to human health</p> <p>3.5.2 See 1.1.2 Water Quality: Elevated E. coli, fecal coliform bacteria, and total coliform bacteria levels in groundwater used for drinking water, thereby posing a risk to human health</p> <p>3.5.3 See 1.1.3 Water Quality: Pesticides and fertilizers applied to the land surface in excess of manufacturer recommendations, which enters the drinking water supply posing a health risk to humans</p> <p>3.5.4 See 1.1.6 Water Quality and Quantity: Managing land use for specific areas on the landscape where surface water moves into the aquifer (i.e., Wellhead Protection Area boundary, springsheds, karst formations)</p> <p>3.5.5 See 1.1.7 Rural residential development and urbanization occurring in locations with sensitive geologic conditions, thereby leading to safety concerns for the placement of practices and infrastructure</p> <p>3.5.6 See 1.2.2 Water Quality and Quantity: Defining the specific areas on the landscape where surface water feeds a spring (i.e., springshed boundary)</p> <p>3.5.7 Susceptibility of water contamination associated with an increased rate of water movement into the groundwater, and to surface waters</p> <p>3.5.8 Unstable surface and subsurface conditions adjacent to karst formations, posing a safety risk when locating urban and rural structures and using the land</p>	C



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
<b>4. Social Capacity: The collective understanding of water related matters within the community and the ability to respond to and resolve water related issues.</b>				
4. Social Capacity	4.1 Public Knowledge of and Behavior Relative to Water Issues	The behavioral changes needed to understand the relationship between daily decisions and the effect on water requires knowledge, beginning at an early age and continuing through adulthood. The necessary behavioral changes are most effective when based upon positive relationships and experiences. These positive relationships are often driven by education and outreach efforts that inform and engage citizens, urban and rural residents, landowners, and farmers to better understand context.	<p>4.1.1 Developing and implementing sound and credible programs about water management focused on the next generation (youth and grade school aged children) to build future water awareness</p> <p>4.1.2 Developing and implementing sound and credible programs intended for general public audiences for gaining an understanding of water related issues and changing behaviors adverse to wise water management</p> <p>4.1.3 Developing and implementing sound and credible programs to gain a better understanding of water issues, the adverse and beneficial consequences of decisions as they relate to water management and necessary behavioral changes, for the residents of urban and rural communities</p> <p>4.1.4 Developing and implementing sound and credible programs to gain a better understanding of water issues, the adverse and beneficial consequences of decisions as they relate to water management and necessary behavioral changes, for local units of government/local offices</p>	B
	4.2 Landowner and Producer Engagement in Water Management	Most land within the Root River One Watershed, One Plan boundary is privately owned. How these lands are managed affects water resources. Some programs focused on implementing practices to improve water quality and reduce the rate and volume of runoff, go unused for a variety of reasons. Understanding, engaging, and communicating with landowners, agricultural producers and those controlling the land resource is needed to facilitate effective water resources management with the plan area. Increased implementation of practices may result from increased capacity and understanding.	<p>4.2.1 Understanding on-farm production decisions about water management and the fiscal and operational implications of conservation practice placement</p> <p>4.2.2 Describing barriers to practice implementation and the fiscal incentives needed to execute voluntary programs related to conservation practices</p> <p>4.2.3 Credibly communicating the value of conservation and being sensitive to areas with geologic features such as karst formations, sinkholes and riparian areas, in regards to their relationships to land use and agricultural practices</p> <p>4.2.4 Developing, implementing and executing sound and credible programs to communicate information about incentive and cost-share programs and their benefits</p> <p>4.2.5 Knowledge about the extents and benefits of existing practices and conservation measures currently implemented</p>	A



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
4. Social Capacity (continued)	4.3 Connecting Water and the Business Community	Businesses use, rely upon and can affect the quantity and quality of water. Private sector businesses are found throughout the planning area. These businesses are an integral part of the watershed.	4.3.1 Collaboration with the business community to raise awareness about the necessity for water resource management and the interrelationship to economic development opportunities 4.3.2 Identifying and describing opportunities for businesses to become engaged in and support water management activities as members of the community 4.3.3 Build partnerships to identify and develop business opportunities which capitalize on the unique water and land resources within the Root River Watershed	C
	4.4 Technology, Tools, and Existing Capabilities	New tools and technology are frequently being developed for use in water resources management. In order to take advantage of these tools, there is often a need to build and maintain the technical capacity to utilize them.	4.4.1 Developing and maintaining the technical capacity to use emerging technologies and tools at the local level 4.4.2 Establishing defensible and agreed upon metrics for describing and communicating measurable goals and the amount of progress toward achieving the goals 4.4.3 Clarity about the coordination of roles and responsibilities among local, state and federal agencies for the delivery of programs focused on managing water resources 4.4.4 Piecemeal approach and lack of long term and consistent funding for water management programs at the local level 4.4.5 Lack of funding for state and federal programs delivered at the local level	C
<b>5. Sustainability of Communities: The endurance, resilience and interconnectedness of systems and processes which support a community, including the economy, culture, politics and ecology.</b>				
5. Sustainability of Communities	5.1 Livability	Numerous societal factors affect the livability of the Root River One Watershed, One Plan area including the ability to make a living (rural and urban economics and equity), and the basic needs for food, shelter and safety. These societal factors have relevance to a person's desire and willingness to live within the area.	5.1.1 Acknowledging the importance of integrated economic, environmental and social policies and practices when managing water resources 5.1.2 Maintaining a community capable of meeting the basic needs of food, shelter, safety and health which includes good water resources 5.1.3 Managing the relationship between the land, soil productivity and water as a sustainable asset 5.1.4 Recognizing the connectedness between the quantity and quality of water and the need for public infrastructure (i.e., water quality and need for surface water treatment) 5.1.6 Understanding the interrelationship between environmental and land condition, the production of food and fiber, and economic opportunities 5.1.7 Recognizing the economic value of environmental assets such as biodiversity, forests, fish and natural resources in decision-making 5.1.7 Cost-share, incentive, and tax break programs that provide economically viable options to promote sustainable agriculture and forest management 5.1.8 Acknowledging the need for economic and social equity in urban and rural areas	A





**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
5. Sustainability of Communities	5.2 Rural Environmental Health	The health of the rural environment is a cornerstone of ensuring a prosperous rural economy. Factors which typify good rural environmental health include using agricultural practices which maintain soil health, the efficient use of fertilizers and pesticides in agricultural operations especially in sensitive environmental settings, and BMPs for managing animal and human wastes. Practices implemented to improve water resources should complement and be consistent with maintaining and enhancing rural environmental health.	5.2.1 The rate and amount of soil loss and the impact on soil productivity and agricultural input costs 5.2.2 Maintaining soil productivity using ordinary methods and means 5.2.3 The use of BMPs for wastes including those from animal operations and humans in a safe and efficient manner	C
	5.3 Urban Environmental Health	A number of cities and municipalities are located within the Root River One Watershed, One Plan area. Factors that typify good urban environmental health include using water judiciously, managing stormwater runoff to prevent downstream flooding and water quality degradation, the efficient use of fertilizers and pesticides, maintaining and protecting natural waterways, and managing wastes in a manner which protects water resources. These factors are important to citizen's quality of life and the maintenance of environmental systems within built environments.	5.3.1 Increases in the amount of impervious surface and the rate, volume and duration of runoff as well as an increase in sediment and nutrient loads 5.3.2 Incorporating natural water features including streams, rivers, and lakes into an urbanizing landscape 5.3.3 Use of fertilizers and pesticides in urban landscapes and their effect on surface water quality 5.3.4 See 5.2.3 The use of BMPs for wastes including those from animal operations and humans in a safe and efficient manner	C
	5.4 Land Use	The land within the Root River One Watershed, One Plan boundary area is used for many different purposes. Some of these purposes include living and working, producing agricultural crops, outdoor recreation, enjoying landscape vistas and timber production. How the land is used affects the desirability and livability of the community and is directly linked to the rate and quality of surface runoff.	5.4.1 Applicability and use of local ordinances, regulations or rules for managing shore land areas meeting statutory obligations 5.4.2. Applicability and desirability of using local ordinances, regulations or rules for: protecting unique habitats, animals and plants; management of karst and sinkhole conditions; riparian resources; and water 5.4.3 Managing statutory obligations related to Individual Sewage Treatment Systems 5.4.4 Managing land use and development processes 5.4.5 Utilization of easements and land acquisition for managing resources 5.4.6 Use of zoning and local land use management tools for resource management	C



**Table 2-1:** Resources, resource concerns, and issues affecting a resource concern for the plan area.

Resource Category	Resource Concern		Potential Issue Affecting a Resource Concern	Priority
	Name	Description	Description	Policy Committee Priority Category
<b>6. Water Resources Infrastructure: The natural and man-made systems important for managing the rate, volume and quality of water.</b>				
<b>6. Water Resources Infrastructure</b>	6.1 Drainage Systems	A number of culverts and bridges under roads, storm sewer systems within urban areas, and tile, ditch, and drainage systems including the creeks, streams, rivers, and natural waterways have a role in safely conveying water. These are important infrastructure features within the Root River watershed.	<p>6.1.1 Consequences of tile drainage systems related to the rate, volume and duration of runoff, local and regional flooding and flood damages, and impacts to stream banks and stream slopes</p> <p>6.1.2 Increasing amounts of impervious surfaces in urban landscapes and managing stormwater to reduce the rate, volume and duration of runoff</p> <p>6.1.3 Presence of conservation practices along public and private drainage systems in rural and urban landscapes, as a means to control the rate of water movement, reduce loads and minimize potential for downstream erosion</p> <p>6.1.4 Designing, constructing and paying for infrastructure to manage water, while considering changing precipitation depths and intensity associated with climate change</p>	B
	6.2 Point Sources	Stormwater discharge pipes, the return of water from industrial operations, and wastewater discharging into rivers are point sources. These discharges can affect the amount and quality of water.	<p>6.2.1 Adequacy and efficiency of using individual sewage treatment systems (ISTSS) for wastewater treatment for private residences and small communities</p> <p>6.2.2 Wastewater treatment needs and costs as function of surface water quality and the relationship to nonpoint source contributions</p> <p>6.2.3 Downstream water quality consequences of discharges from wastewater treatment facilities to waterways</p>	C
	6.3 Water Retention Systems	Ponds, wetlands and surface depressions store water. The design, construction, and management of new and existing water retention systems provides the opportunity to manage water quantity and reduce local and regional flooding, as well as reduce sediment in runoff.	<p>6.3.1 Identifying and maintaining those areas on the landscape which provide critical live flood storage important in minimizing flooding and flood damages</p> <p>6.3.2 Understanding the implications of future development on the need for additional practices to control the rate and volume of runoff from the landscape</p> <p>6.3.3 Using designed storage to manage high peak flows from urban/rural developments</p> <p>6.3.4 Planning, designing, implementing and maintaining stormwater management facilities including storage and complying with evolving stormwater rules and regulations</p> <p>6.3.5 Urban stormwater and construction site erosion management and the contribution to sediment levels in stream, creeks, rivers and lakes</p> <p>6.3.6 Gaining acceptance of low impact development techniques and methods and implementing these practices within urban landscapes</p>	B



## 2.3 PRIORITIZING POTENTIAL RESOURCE CONCERNS AND ISSUES

During plan development, participants followed a thorough and rigorous process to complete the “Analysis and Prioritization of Issues” as required by BWSR guidance. The Policy Committee retained ultimate responsibility for establishing priorities. The priority resource concerns form the basis for developing the targeted implementation schedule. As described in the BWSR guidance, the plan is not expected to address all identified issues.<sup>2</sup> However, the plan should include a brief explanation as to why certain items were rejected as priorities for this planning cycle. No resource concerns were “rejected” within the plan, but rather placed in priority categories. Plan participants reached a general consensus that by addressing the “A” and “B” level resource concerns (see below), many of the “C” level resource concerns would also be addressed.

Potential concerns were prioritized using the following approach:

- The preliminary table of resources, resource concerns, and issues were assembled using the methods described previously in Section 2.2;
- Stakeholders’ preference for those potential resource concerns believed to be a priority were received by:
  - Soliciting input from the public during the public meeting held April 8, 2015. Public meeting attendees, which were residents or landowners in the Root River Watershed, were provided 2 green dots, Non-residents were provided 2 blue dots. These dots were used by each person to indicate preference for the importance of a potential resource concern. One or both dots could be cast for a single potential resource concern or cast across two potential resource concerns. The final rankings represented the public prioritization of the potential resource concerns.
  - Input was solicited from the Advisory Committee, Planning Work Group, and local County Water Plan Committees using the same process described above. Local County Water Plan Committees consisted of the same planning members that were used to develop the Local Water plans. The final rankings represented the Advisory Committee, Planning Work Group, and local County Water Plan Committee prioritization of the potential resource concerns.
- Preferences expressed by the public, the Advisory Committee, the Planning Work Group, and local County Water Plan Committees were tallied and expressed as the percentage of the total by resource.
- Resources based on the expression of preference (i.e., vote) were then preliminarily categorized as an “A,” “B,” and “C” priority. The resource concerns with the largest 1/3 of the percentages were classified as “A” priority, the middle third classified as “B” priority, and the remaining (lowest) one-third “C” priority.
- The Planning Work Group reviewed the preliminary prioritization results and provided a recommendation to the Policy Committee to establish the final prioritization process.
- The preliminary prioritization results were provided to the Policy Committee for final prioritization based on the input received and for use in completing the plan.

All participant groups were considered to have equal weight, regardless of whether the vote was cast by the public or a member of the Advisory Committee or Planning Work Group.

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<sup>2</sup> The BWSR guidance document uses the term issue rather than the definitions used by this plan.



## 2.4 PRIORITY RESOURCE CONCERNS AND ISSUES

The results of the prioritization process are described in this section and shown in **Table 2-1**. While all resource concerns are important and worthy of local management efforts, limited resources for implementing solutions are available. As such, resource concerns were grouped into three levels (“A,” “B,” and “C”), which represent their relative priority.

The intent of this prioritization process is to recognize that not all resource concerns can be addressed within the timeframe of a ten-year plan, and that those items identified as the level “A” and “B” will likely be the focus of initial implementation efforts. However, new information may emerge over the lifespan of this plan that shifts the priority category of a resource concern and therefore implementation efforts. If priorities are adjusted during the lifespan of this plan, changes will be addressed during regularly scheduled work planning (see **Section 5.4.3**).

Because of the integrated nature of water resource management, it is likely that targeted implementation for specific priority resource concerns will also have benefits for other resource concerns. For example, management targeted at protecting and/or improving drinking water supplies will require implementation actions focused on karst formations. In other words, targeted implementation activities should provide multiple benefits across resource concern categories.

Maps were developed where feasible to identify the locations for each resource concern, although not all the resource concerns are easily mapped. These maps show, for example, the actual resource concern locations in the plan area, to increase understanding about where within the planning regions the strategies are focused (i.e., what resources needs to be fixed). More detailed maps showing resource concern locations by planning region can be found within **Appendix H**.

### 2.4.1 “A” LEVEL PRIORITIES

#### 2.4.1.1 DESCRIPTION AND RESOURCE CONCERN LOCATIONS

“A” level resource concerns are considered the initial priority for targeting implementation. These resource concerns received the greatest proportion of preference points during the prioritization process, and were confirmed by the Policy Committee as being the initial priority. Resource concerns that are “A” level priority include:

- Drinking Water Supplies (public and private) (see **Figure 2-1**);
- Streams and Rivers (see **Figure 2-2**);
- Landowner and Producer Engagement in Water Management; and
- Livability (see **Figure 2-3**).

**Table 2-1** provides a description of each resource concerns with “A” level priority designation.

Identifying the locations of the resource concerns on the landscape within the plan area allows for the development of a targeted implementation schedule focused on specific locations. Identifying the locations of the resource concerns on the landscape also allows for identifying the sources and relative importance of various issues (i.e., source of nitrate loads to drinking water supplies) affecting a specific resource concern. Therefore, the specific strategies can be tailored to the locations causing the problem. **Figures 2-1, 2-2, and 2-3** show the locations of the resource concerns designated as “A” level priorities within the plan area, which can be mapped.





Figure 2-1: Drinking water supply resource concern locations within the plan area.

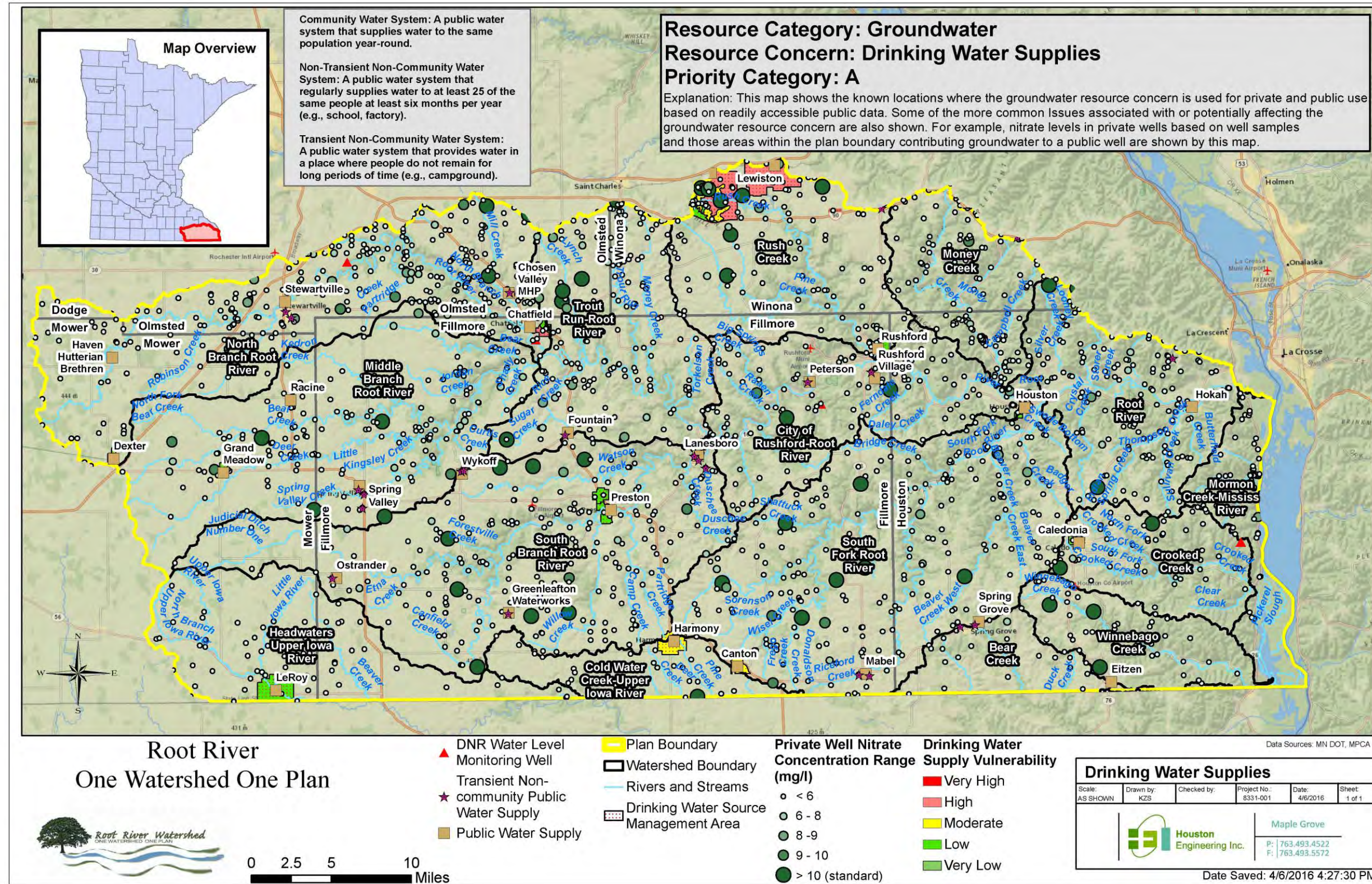




Figure 2-2: Streams and rivers resource concern locations within the plan area.

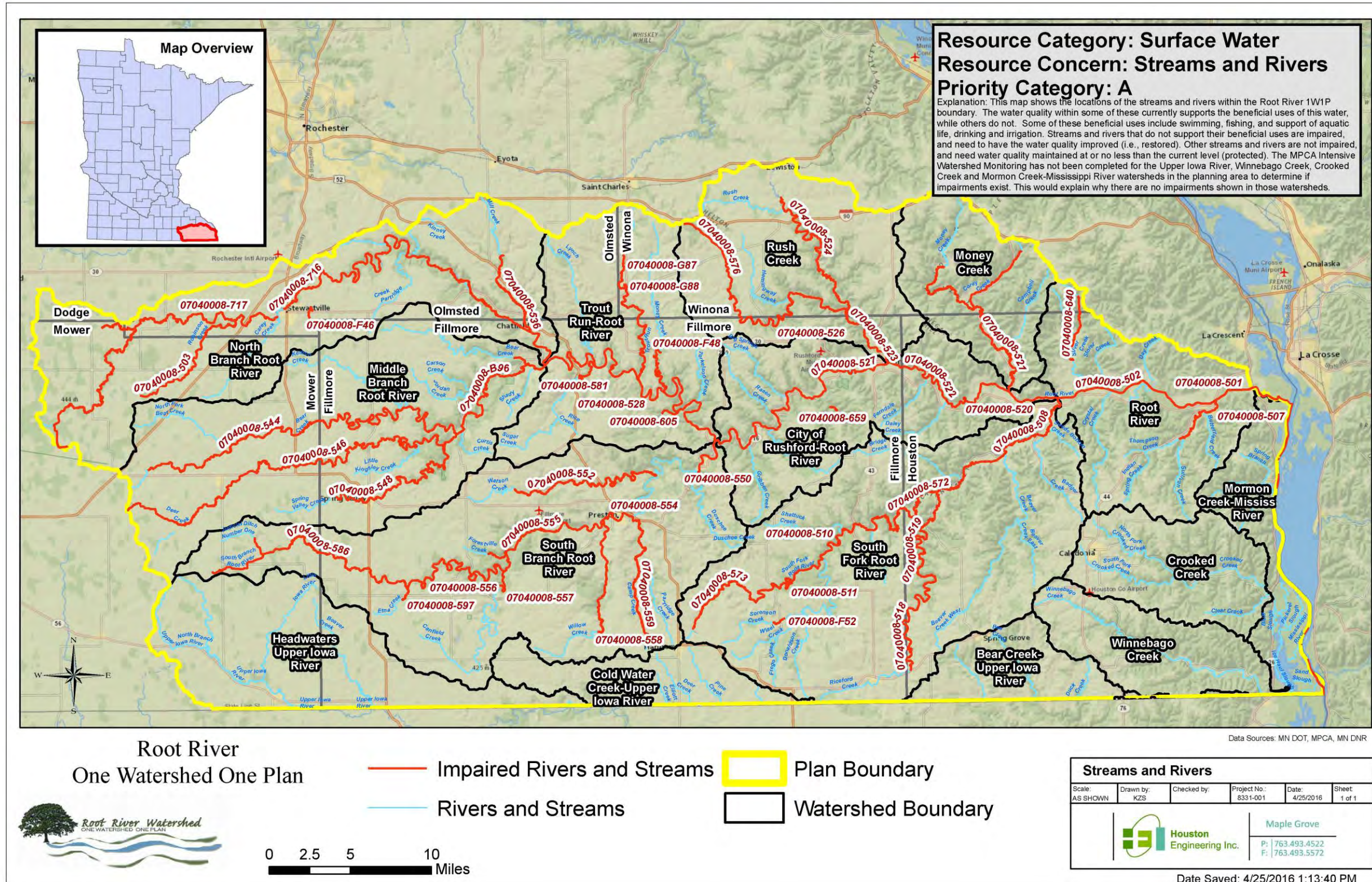
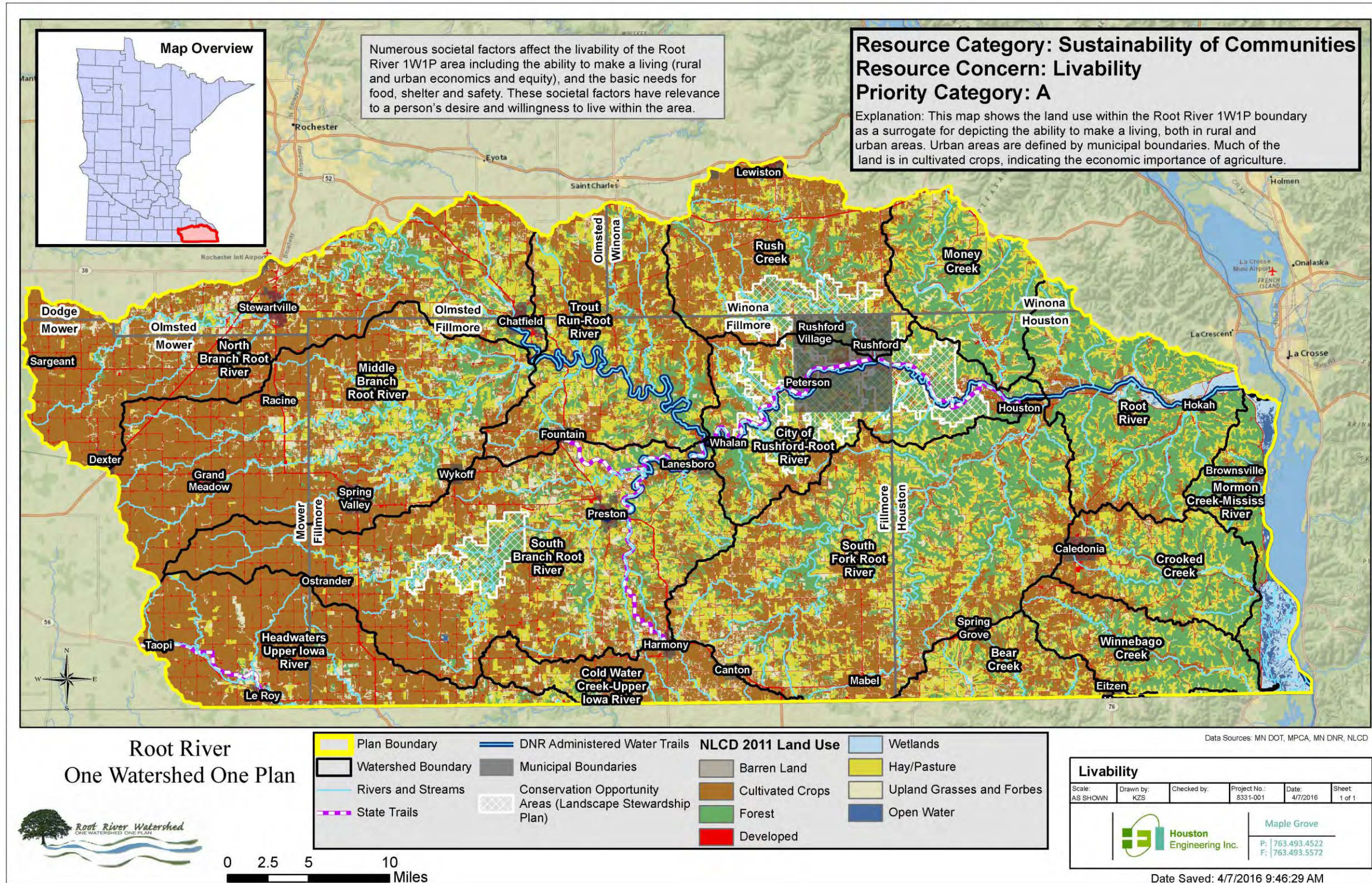




Figure 2-3: Factors characterizing the livability resource concern within the plan area.





### 2.4.1.2 ISSUES AFFECTING “A” LEVEL PRIORITY RESOURCE CONCERNS

Many different issues affect each resource concern (see **Table 2-1**). Each issue is in essence a stressor to the resource. For example, for the drinking water supply and streams and rivers resource concerns, the primary issues affecting these resources are sources of nitrate-nitrogen and sediment and nutrients, respectively. By identifying the sources, strategies describing the measures and actions to address the issues are identified. **Figure 2-4** is an example map that shows the probable sources of total nitrogen leaving the landscape and reaching the planning region outlet. **Appendix I** includes additional maps for total nitrogen, total phosphorus, and sediment. These maps show the locations of the probable sources and relative magnitudes of the issues for drinking water supply and streams and rivers “A” level priority resource concerns (i.e., sediment and nutrients).

## 2.4.2 “B” LEVEL PRIORITIES

### 2.4.2.1 DESCRIPTION AND LANDSCAPE LOCATIONS

“B” level resource concerns are considered the second priority for targeting implementation. These resource concerns received the second highest proportion of preference points during the prioritization process and were confirmed by the Policy Committee as having the second priority. Resource concerns that are “B” level priority include:

- Surficial-Subsurface Hydrologic Connections (see **Figure 2-5**);
- Flooding (see **Figure 2-6**);
- Wetlands (see **Figure 2-7**);
- Riparian Corridors (see **Figure 2-8**);
- Public Knowledge of and Behavior Relative to Water Issues;
- Drainage Systems (see **Figure 2-9**); and
- Water Retention Systems (see **Figure 2-10**).

**Table 2-1** provides a description of each resource concern with “B” level priority designation.

Identifying the locations of the resource concerns on the landscape within the plan area allows for the development of a targeted implementation schedule focused on specific locations on the landscape. Identifying the locations of the resource concerns on the landscape also allows for identifying the sources and relative importance of various issues (i.e., source of nitrate loads to drinking water supplies) affecting a specific resource concern. Therefore, the specific strategies can be tailored to the locations causing the problem.





Figure 2-4: Example map showing the relative magnitude of total nitrogen yields (lb/acre/year) leaving the landscape via surface flow and reaching the most downstream location of a planning region (see Appendix I for additional maps)

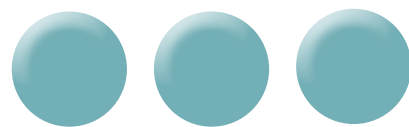
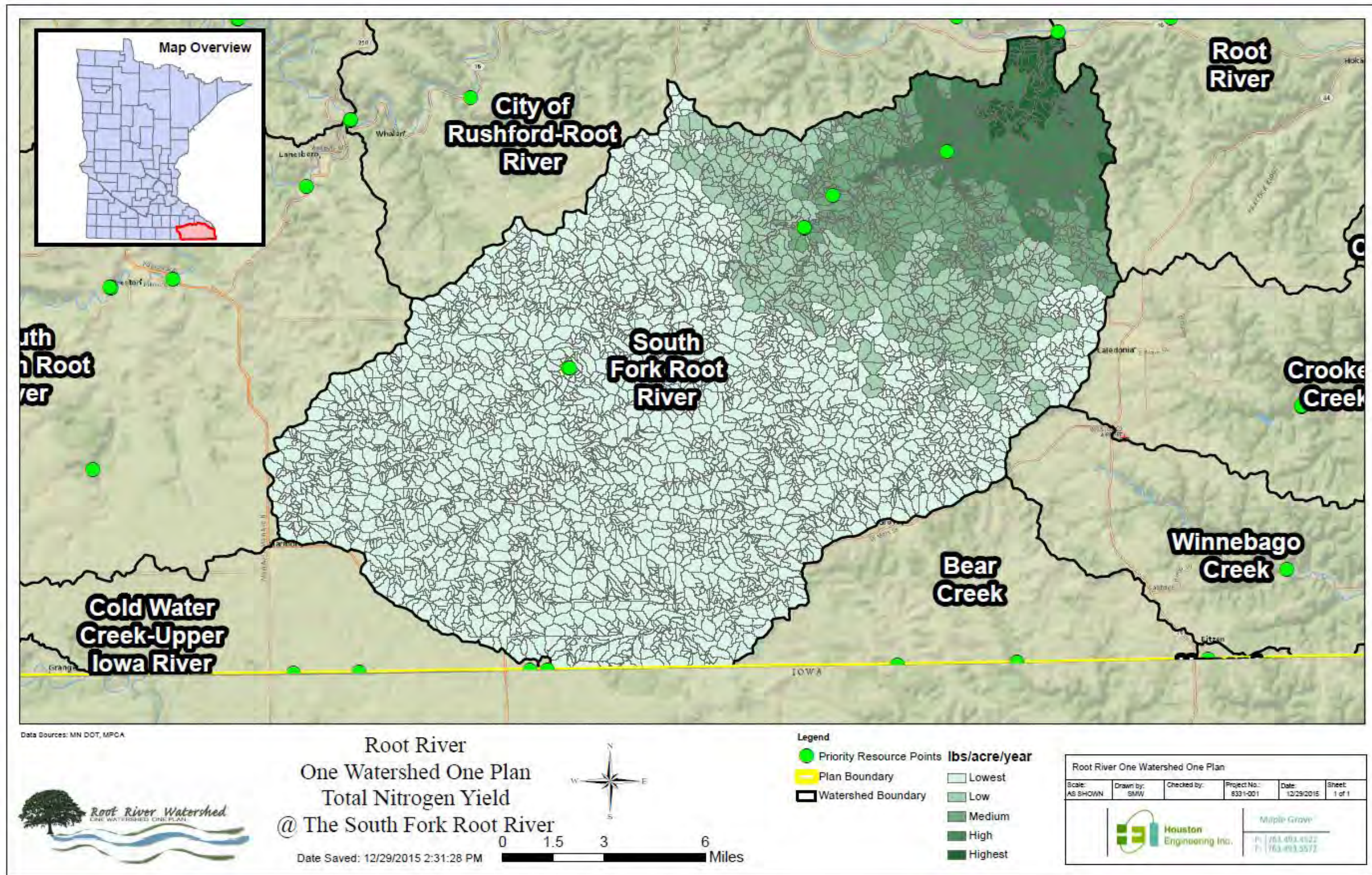




Figure 2-5: Factors which lead to a Surficial-Subsurface Hydrologic Connections within the plan area.

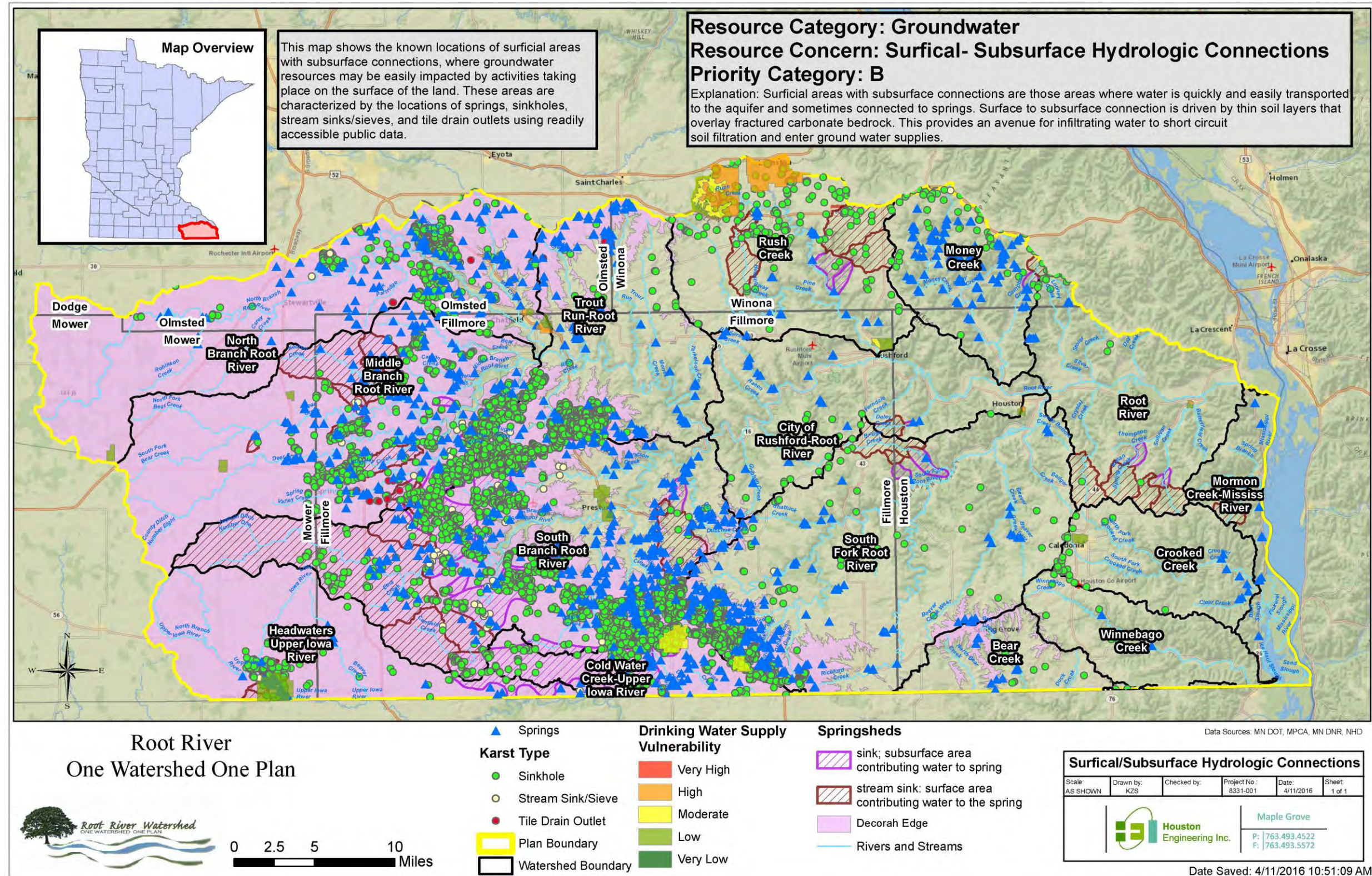




Figure 2-6: Factors and locations subject to flood damages and the flooding resource of concern within the plan area.

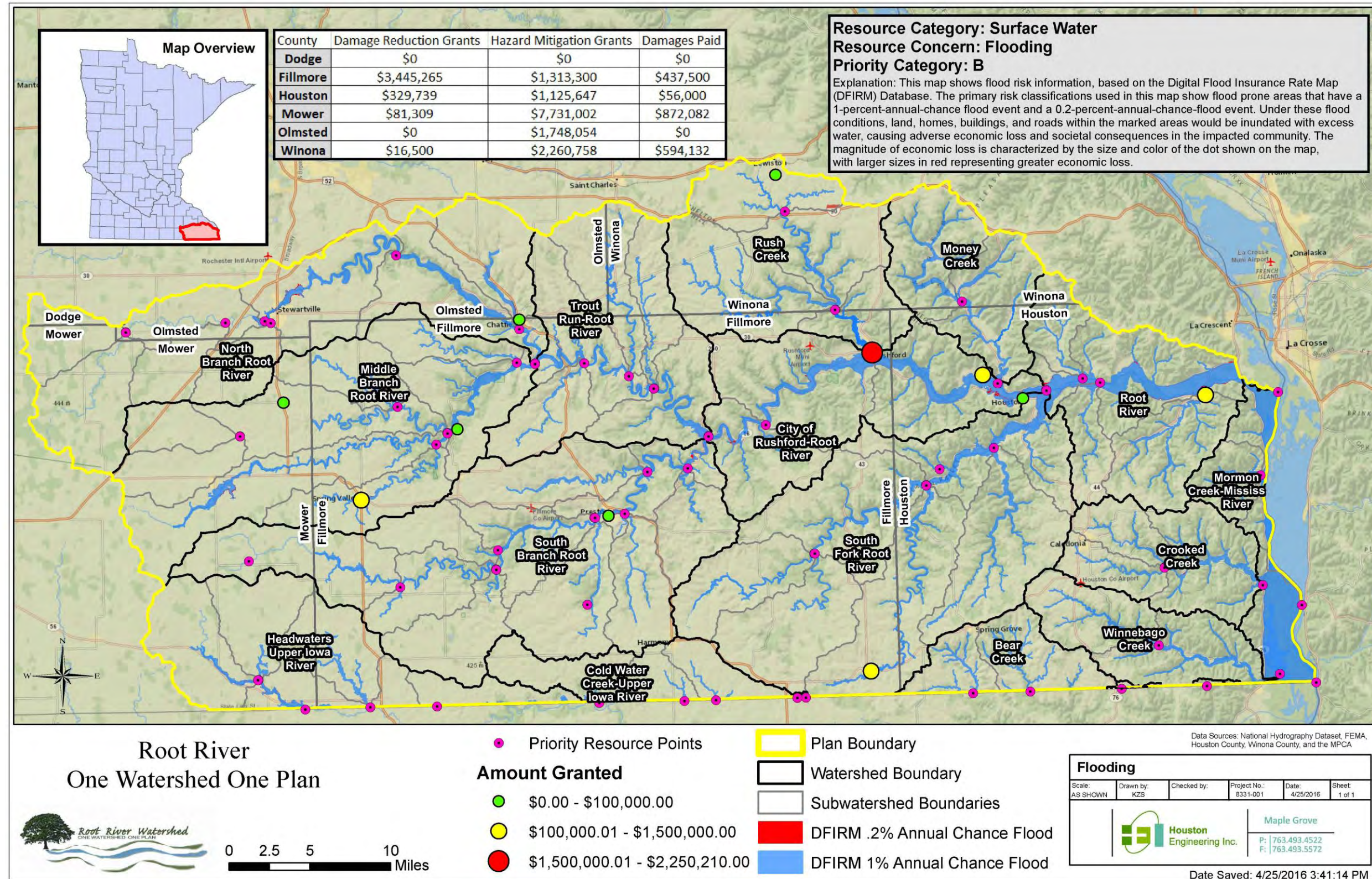




Figure 2-7: The locations of wetlands as a resource of concern within the plan area.

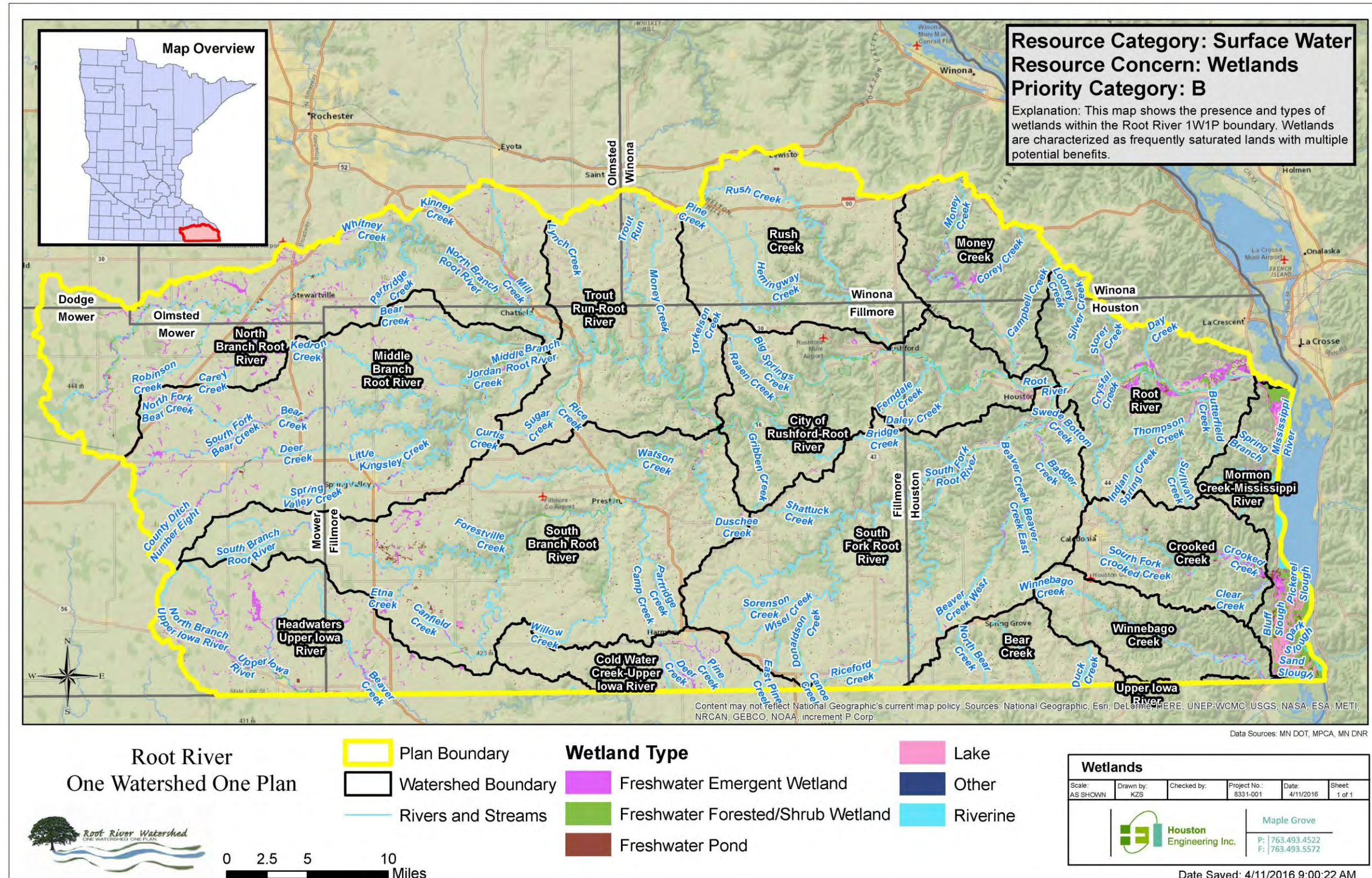




Figure 2-8: Riparian corridor resource of concern within the plan area

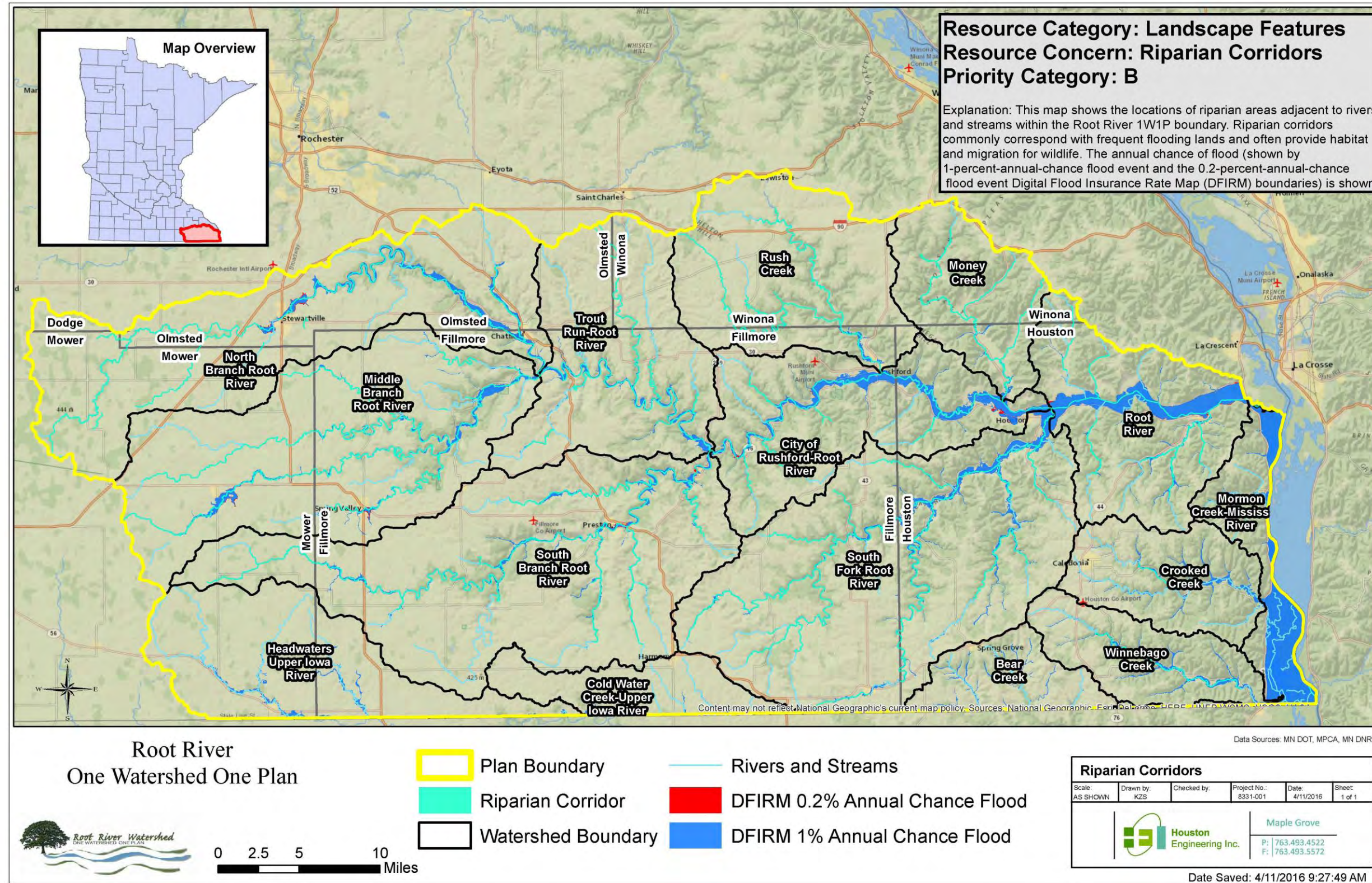




Figure 2-9: The drainage system resource of concern with the plan area.

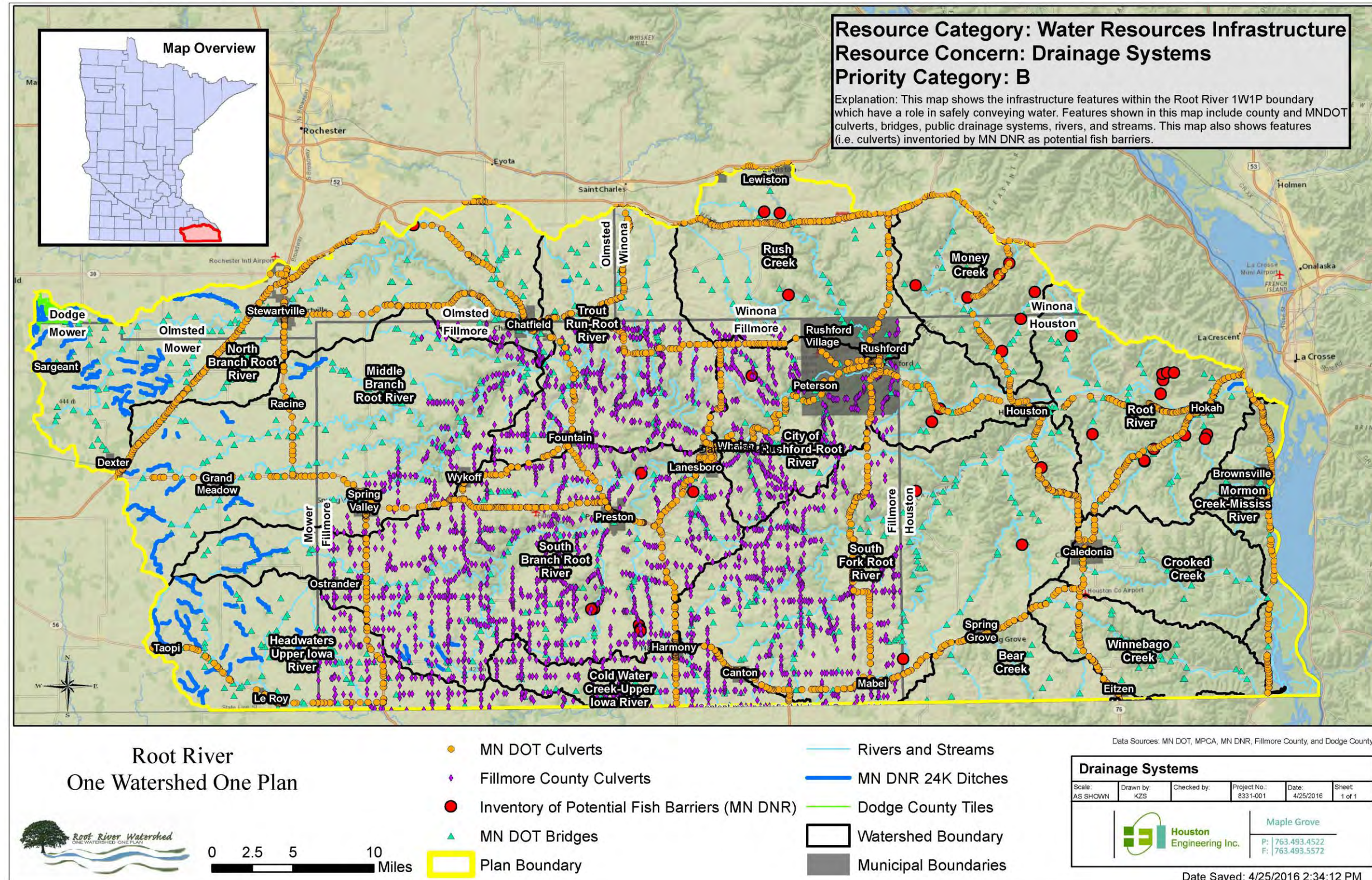
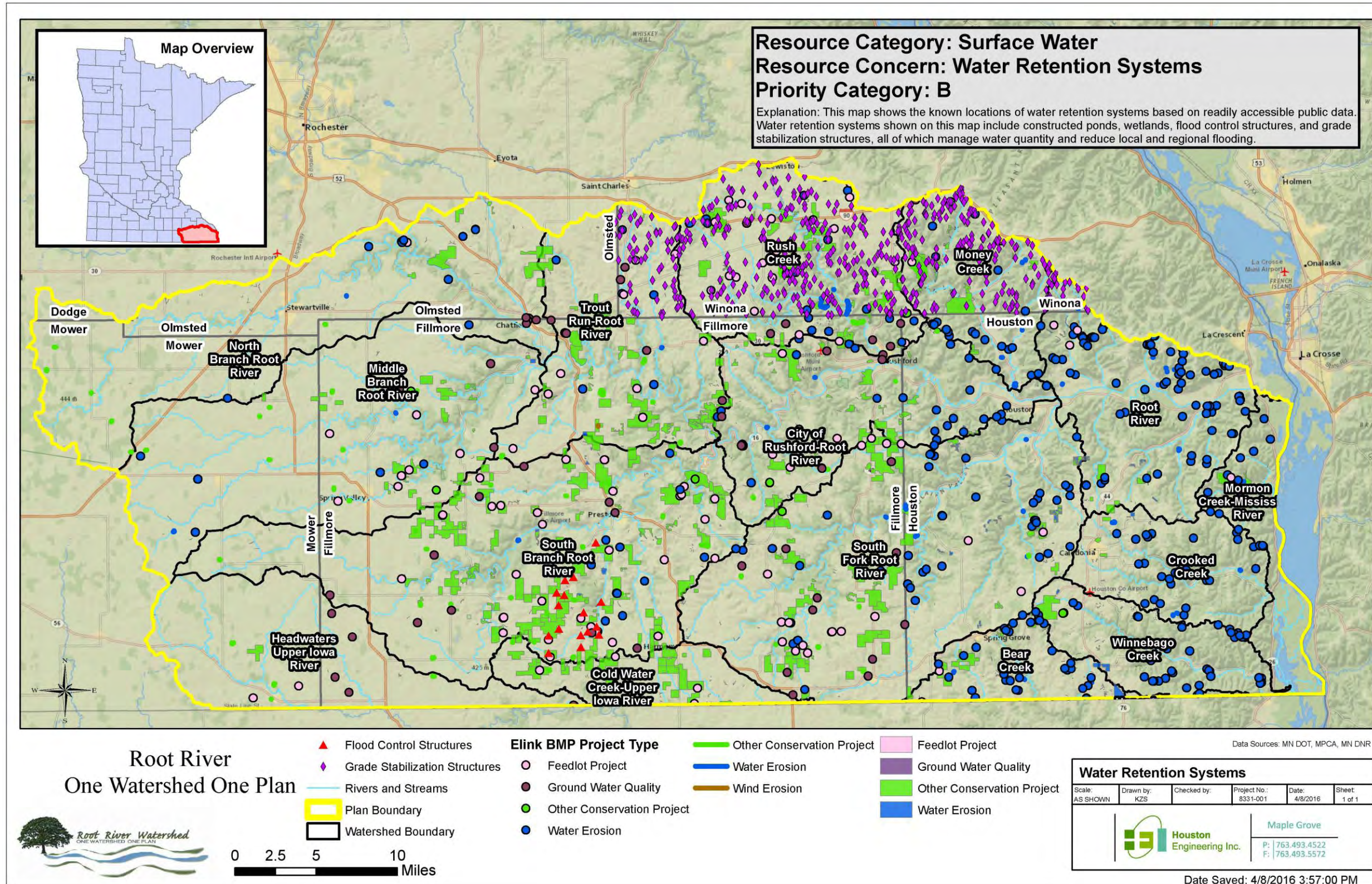




Figure 2-10: The water retention system resource of concern within the plan area.





### 2.4.2.2 ISSUES AFFECTING “B” LEVEL PRIORITY RESOURCE CONCERNS

Many different issues affect each resource concern (see **Table 2-1**). Each issue is in essence a stressor to the resource. By identifying the sources of each issue, strategies describing the measures and actions to address the issues are identified. **Figure 2-11** is an example map that shows the probable sources of runoff water leaving the landscape and reaching the planning region outlet. **Appendix H** includes additional maps for issues for “B” level priority resource concerns.

### 2.4.3 “C” LEVEL PRIORITIES

“C” level resource concerns are considered the lowest priority for targeting implementation. These resource concerns received the lowest proportion of preference points during the prioritization process and were confirmed by the Policy Committee as having the lowest priority. Resource concerns that are “C” level priority include:

- Springsheds (see **Figure 2-12**);
- Aquatic habitat for fish, macroinvertebrates, and aquatic life; (see **Figure 2-13**);
- Trout streams (see **Figure 2-13**);
- Areas of moderate and high biodiversity (see **Figure 2-14**);
- Karst formations (see **Figure 2-15**);
- Connecting water and the business community;
- Technology, tools, and existing capabilities;
- Rural environmental health (see **Figure 2-16**);
- Urban environmental health (see **Figure 2-16**);
- Land use (see **Figure 2-17**); and
- Point sources (see **Figure 2-18**).

**Table 2-1** provides a description of each resource concerns with “C” level priority designation.

Identifying the locations of the resource concerns on the landscape within the plan area allows for the development of a targeted implementation schedule focused on specific locations on the landscape. Identifying the locations of the resource concerns on the landscape also allows for identifying the sources and relative importance of various issues (i.e., source of nitrate load to drinking water supplies) affecting a specific resource concern.





Figure 2-11: Map showing the relative amount of runoff volume at the field scale (catchment) for the 10-year, 24-hour precipitation depth of 4.3 inches. Green point in the upper most portion of the figure it the most downstream location.

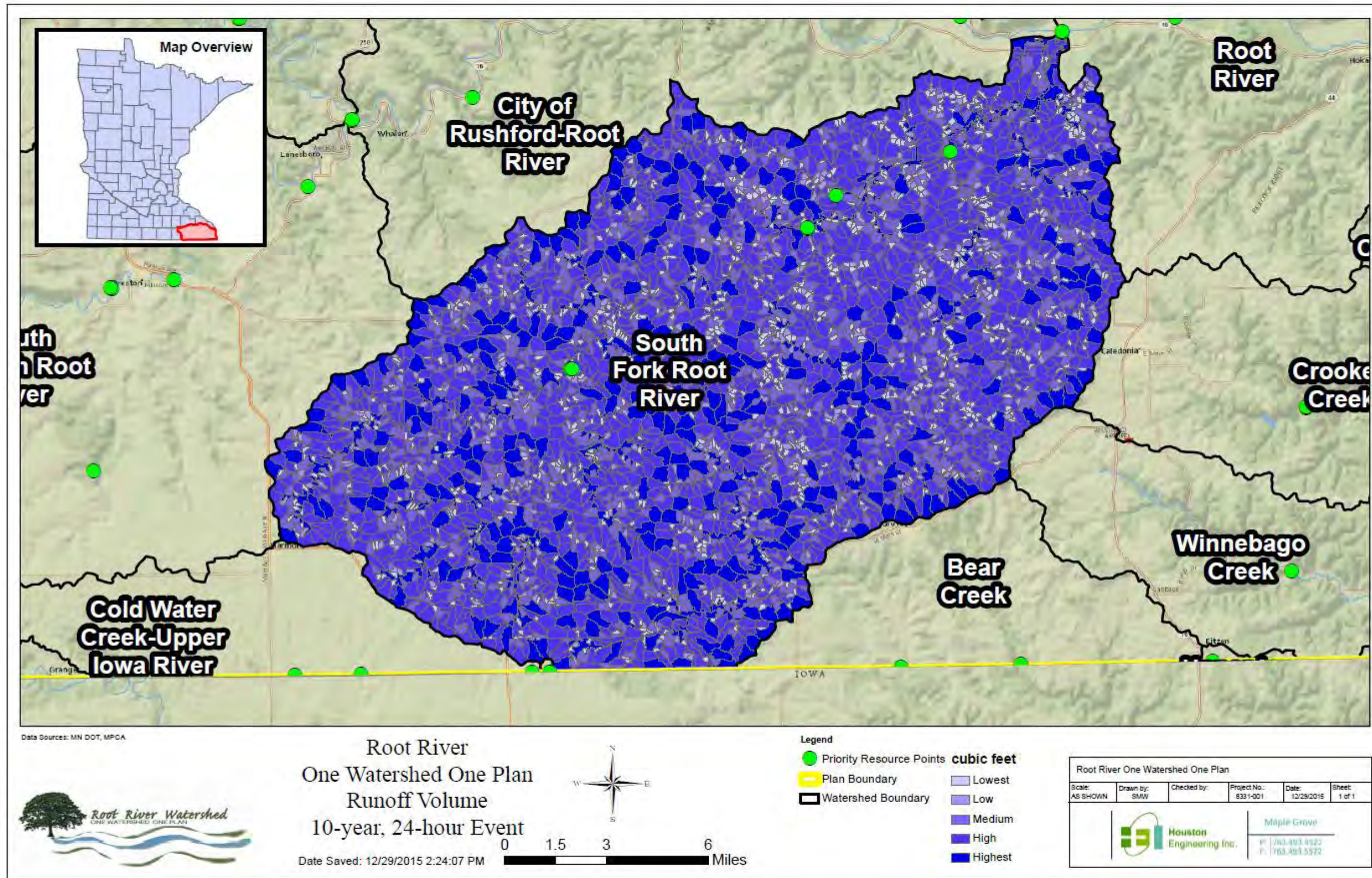




Figure 2-12: Locations of the springshed resource of concern within the plan area.

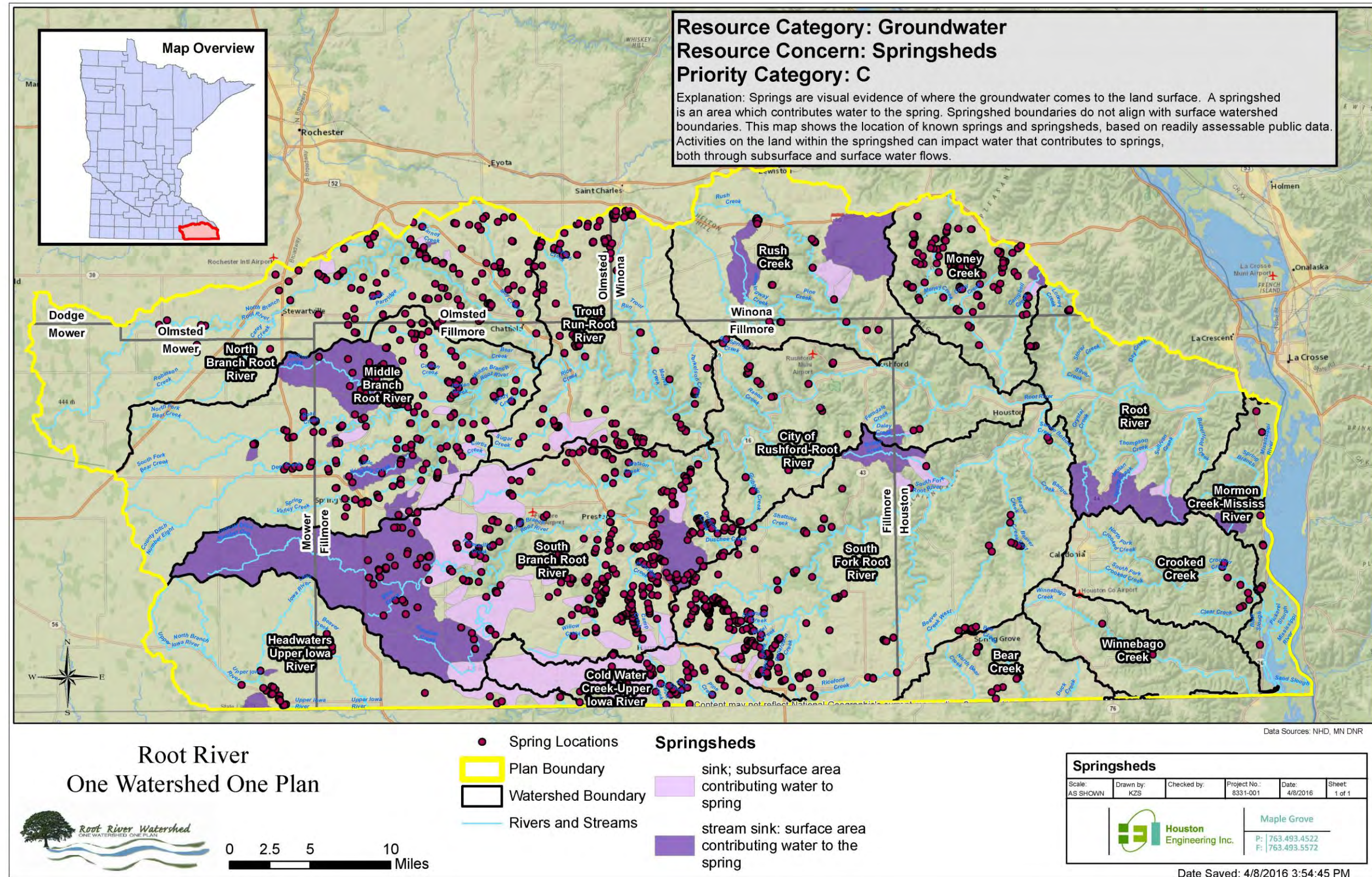




Figure 2-13: Factors affecting the aquatic habitat for fish, macroinvertebrates, and aquatic life resource of concern within the plan area.

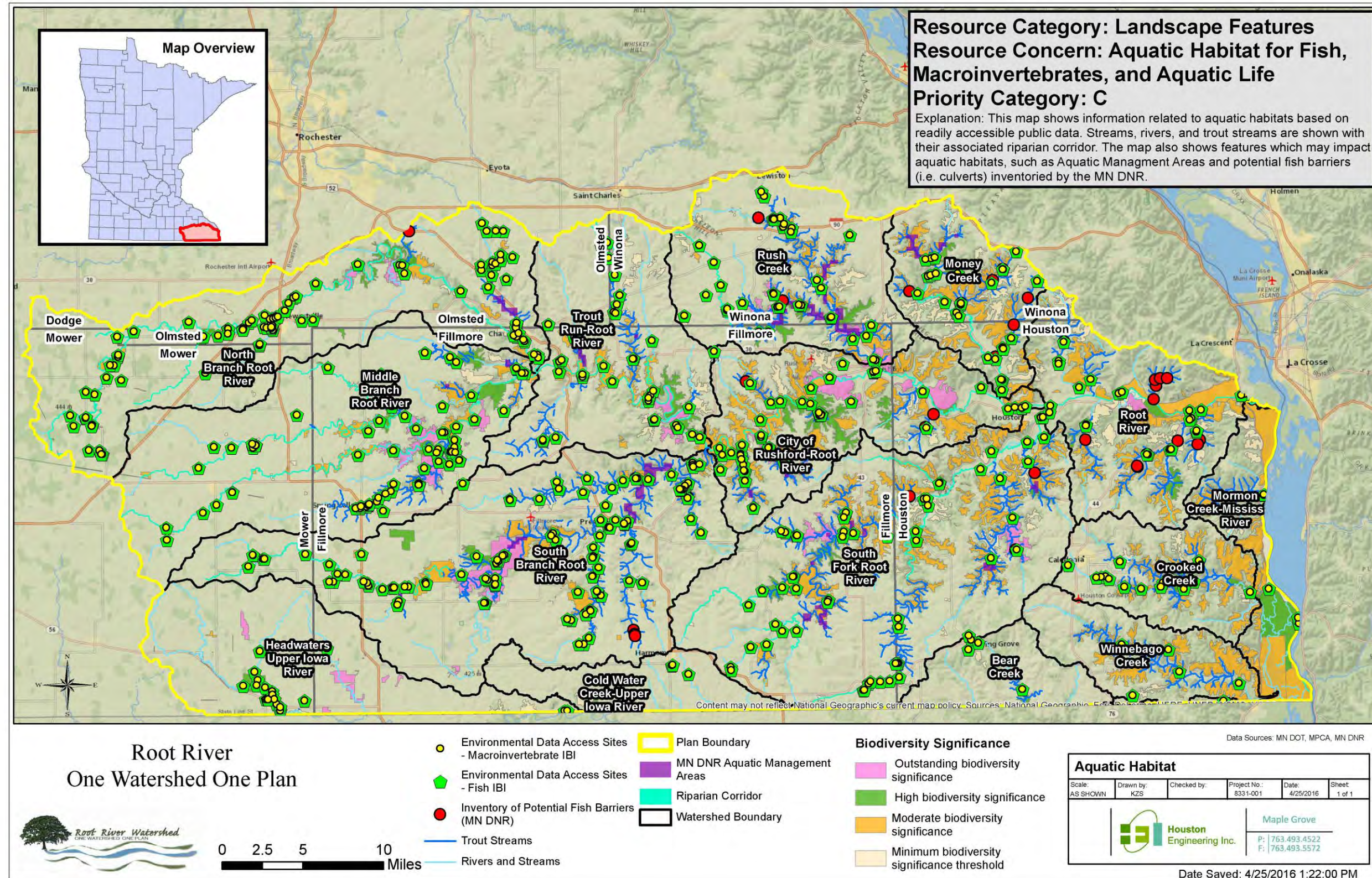




Figure 2-14: Locations showing moderate and high biodiversity resource of concern within the plan area.

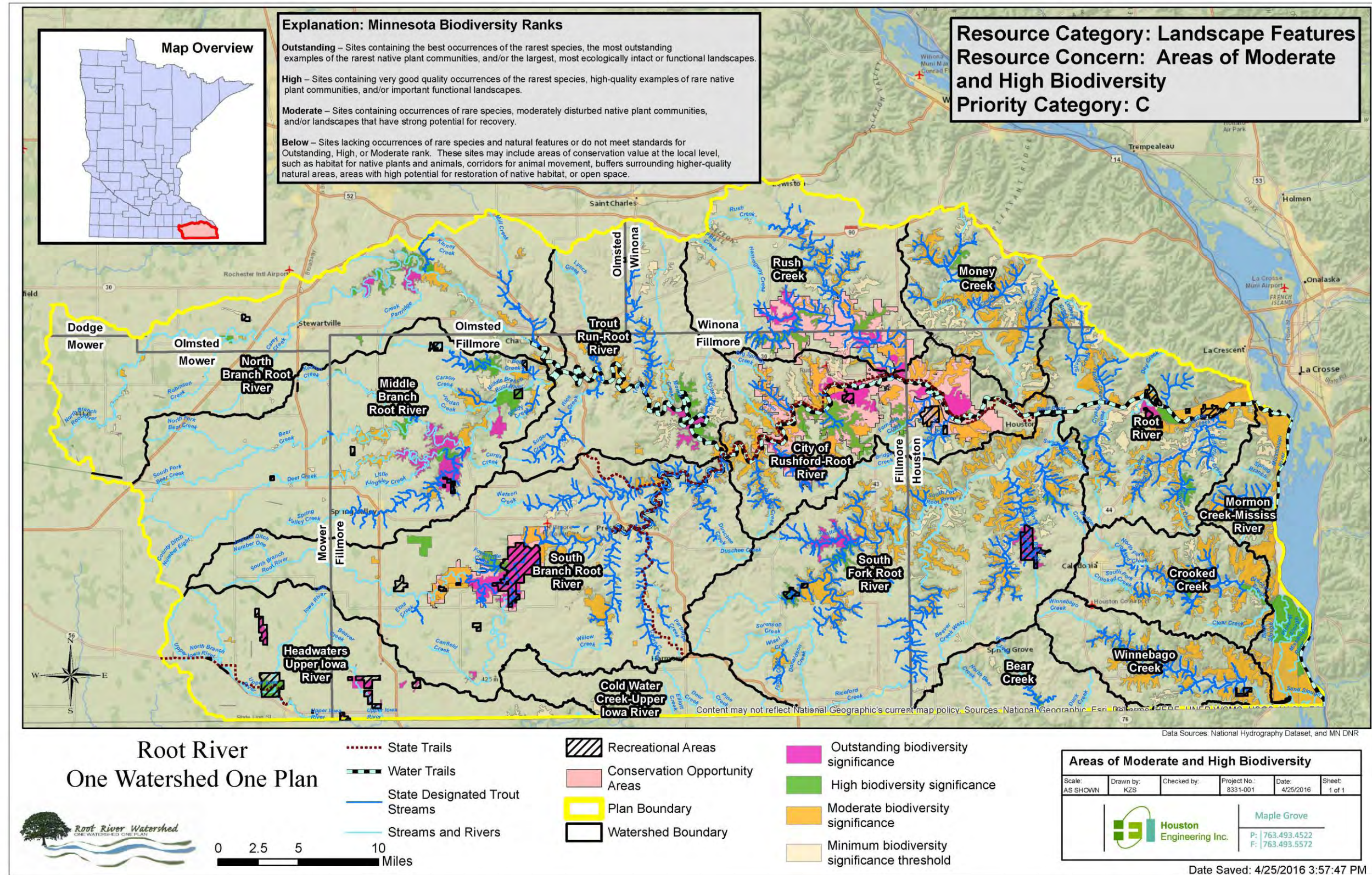




Figure 2-15: Locations showing the karst resource of concern within the plan area.

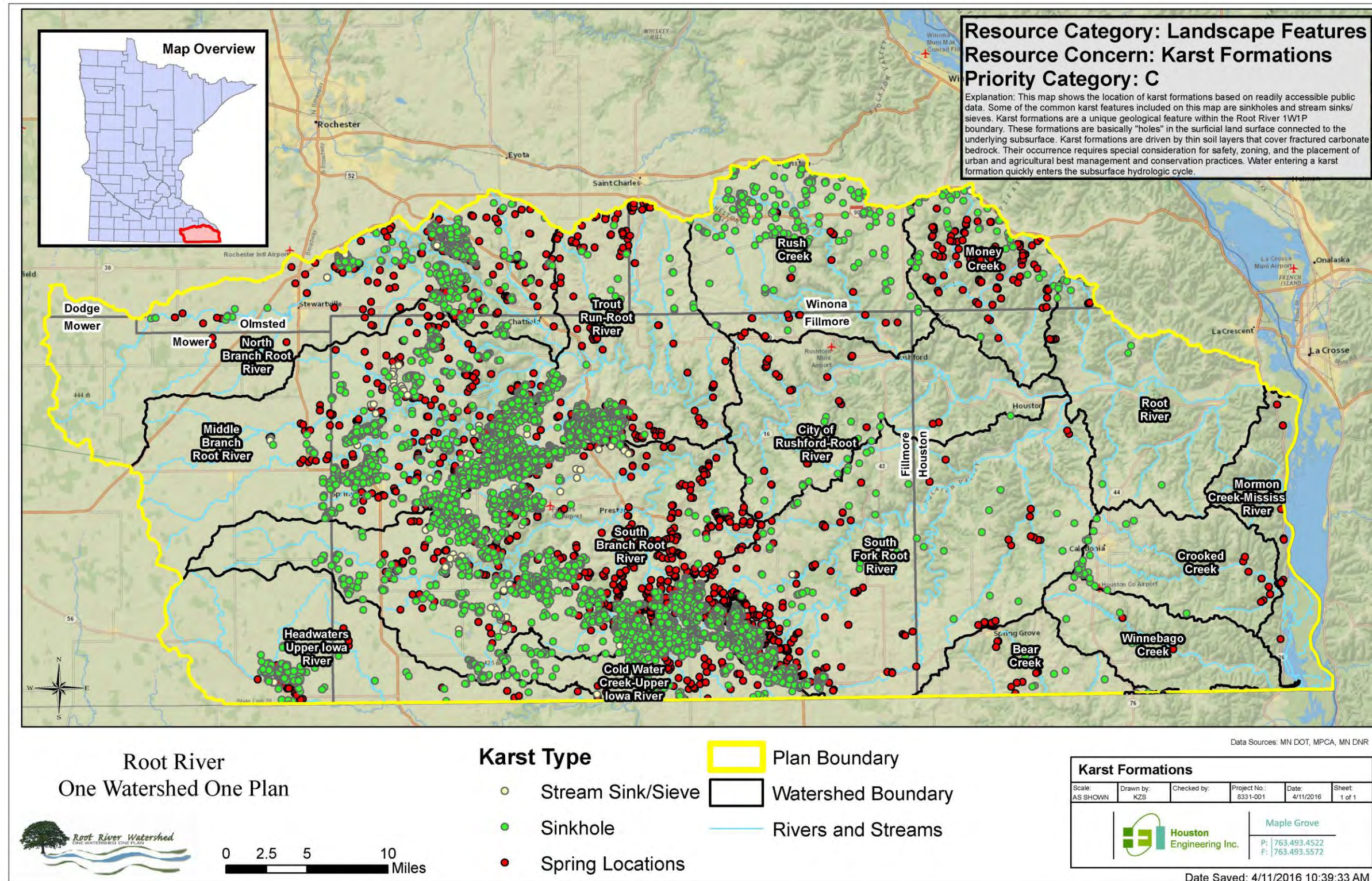




Figure 2-16: Factors related to rural and environmental health resource of concern within the plan area.

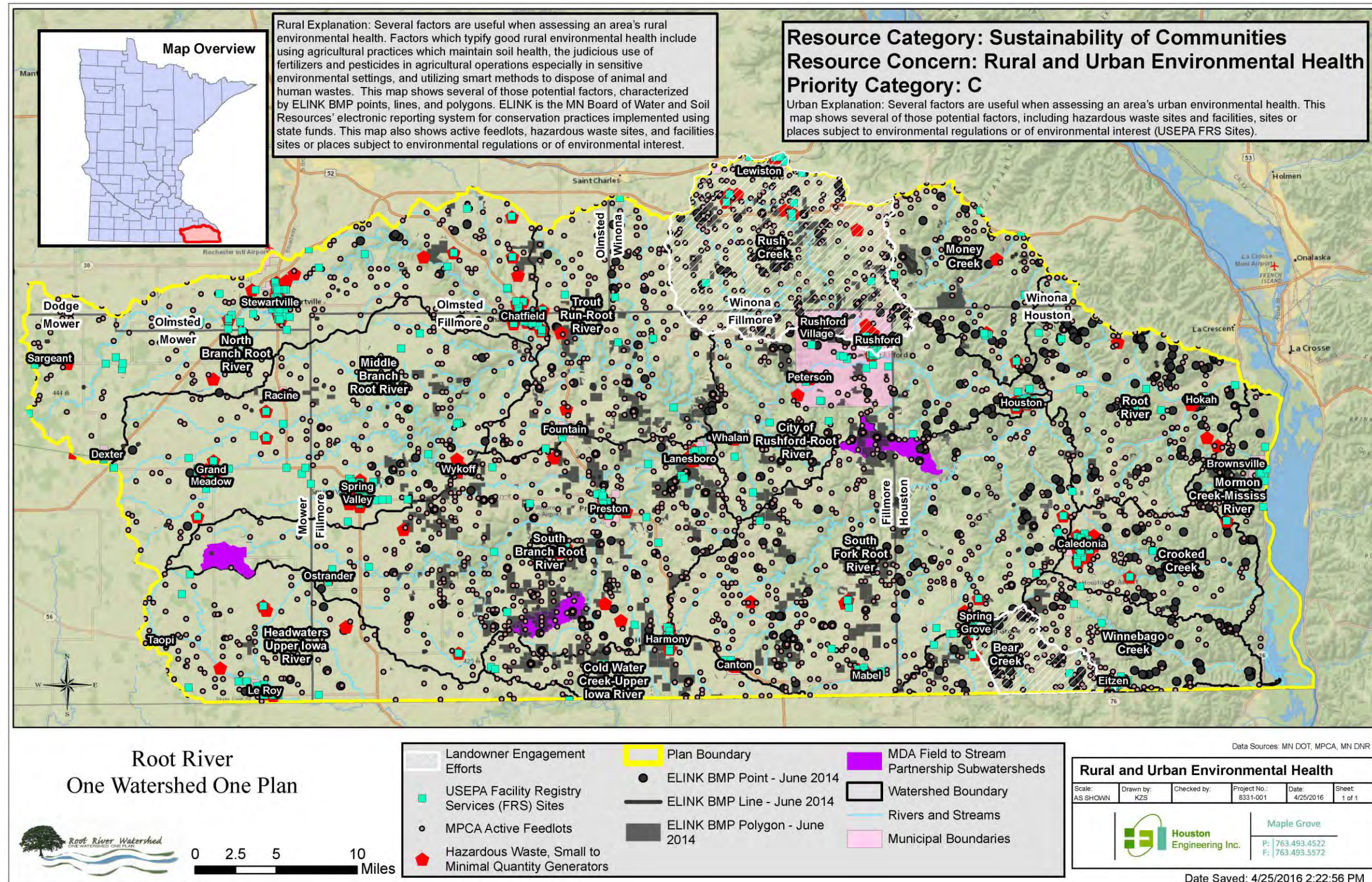




Figure 2-17: Land use resource of concern with the plan area.

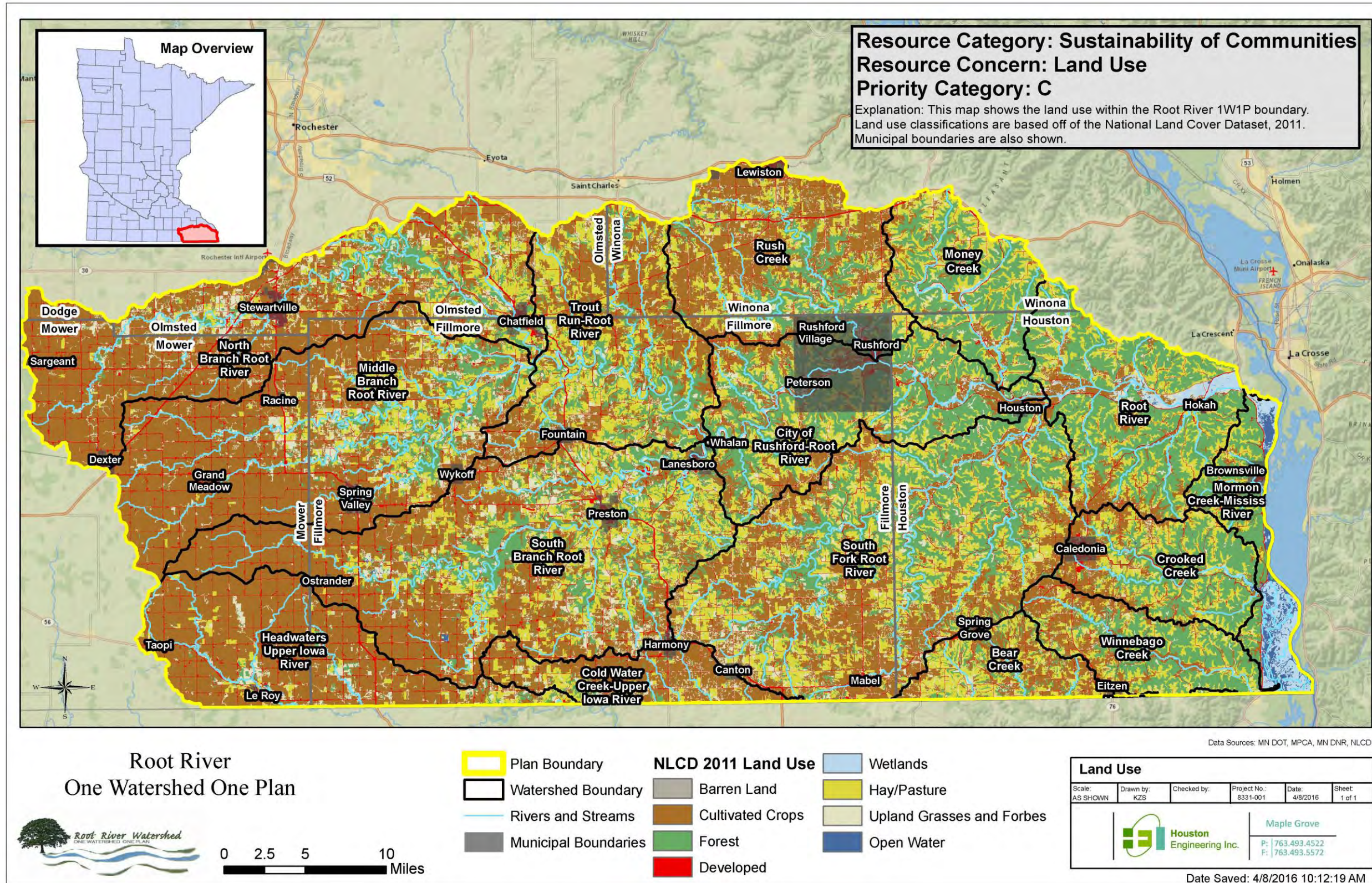
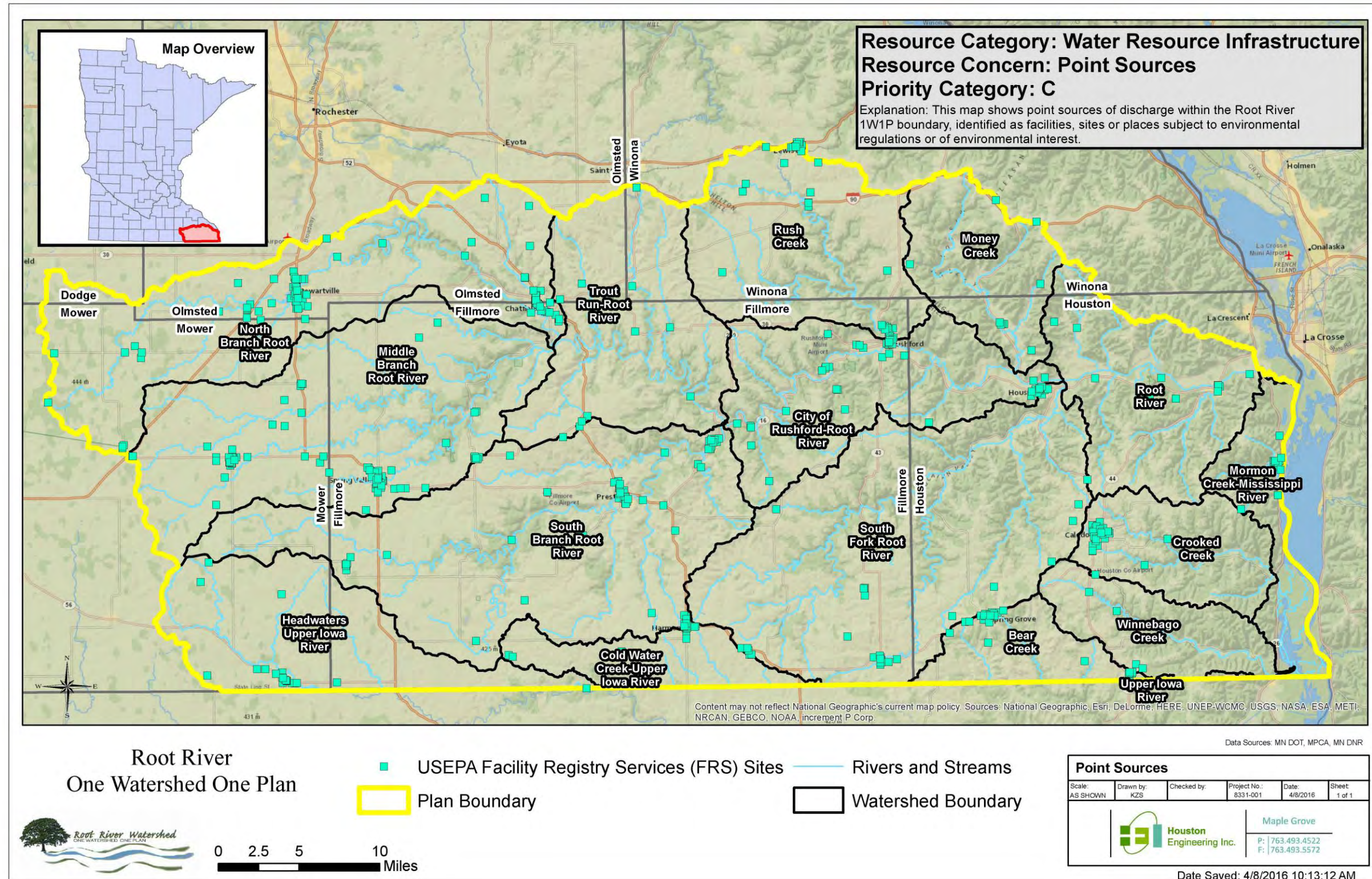




Figure 2-18: Locations of point source resource of concern in plan area.





### 2.4.3.1 ISSUES AFFECTING “C” LEVEL PRIORITY RESOURCE CONCERNS

Many different issues affect each resource concern (see **Table 2-1**). Each issue is in essence a stressor to the resource. By identifying the sources of each issue, strategies describing the measures and actions to address the issues are identified. For “C” level resource concerns, maps showing the locations of the issues were not prepared, as this category is the lowest priority. However, many “C” priorities may be addressed when addressing “A” and “B” level resource concerns.

## 2.5 USE OF PRIORITY CATEGORIES IN PLAN IMPLEMENTATION

Members of the Policy Committee and the Planning Work Group felt strongly that no resource concerns or issues identified during the plan process should be removed from future consideration. This is the reason for establishing resource concern priority categories rather than using a designation such as “highest priority.” Expectations are that the resource concerns with “A” level priority designation are implemented first, followed by those with a “B” level priority designation, and then “C” level priority designation. Many of the issues affecting the resource concerns are interrelated. Implementing a strategy for a resource concern with an “A” level priority designation is likely to be beneficial for a different resource concern with a “C” level priority designation. Therefore, from a practical perspective in terms of improvement in the conditions of resources within the plan area, the priority designations are of less importance.

The plan includes a process to annually assess the priority designation and alter the priorities established within the targeted implementation schedule, based on changing local, state, and federal funding priorities, and the emergence of new issues. The discussion about priority designations will occur during the annual work plan process and is discussed in **Section 5** of the plan.

## 2.6 EMERGING ISSUES

This section presents an assessment of reasonably foreseeable or emerging issues. Emerging issues are those that lack detailed information, are sometimes prominent in the media, and may affect the resources within the Root River Watershed at some time in the future. The assessment of emerging issues has been compiled from a variety of sources including:

1. A review of previous studies, reports, and scientific papers;
2. The collective experience of staff and technical advisors;
3. Specific requests from the members of the Root River One Watershed, One Plan Committees; and
4. A general understanding of resource management trends. A summary of the technical resources reviewed during plan development to identify concerns and issues including emerging issues is shown in **Appendix E**.

The amount of detail used to describe emerging issues varies considerably depending on the source of the information. An emerging issue is described in greater detail when the source of information is a final scientific study or report. The amount of detail can be considerably less when the source of information is firsthand observation or past experience. This varying amount of detail is normal and reflected in the description of emerging issues. Therefore, many of the emerging issues are only generally described to indicate the lack of detailed information.

The identification of emerging issues affects the content of this plan. Typically, specific action items are included within the targeted implementation schedule to provide better clarity about the technical data needed and to establish the necessary direction to address emerging issues. Emerging issues are





expected to be periodically monitored by plan participants, with respect to how they may affect plan implementation.

This section lays out a framework for addressing unanticipated issues that may emerge during the lifespan of the plan. These issues include potential technical matters influencing the priorities established by the plan and the strategies and actions identified within the targeted implementation schedule, potential administrative and fiscal limitations and barriers for implementing the strategies identified within the targeted implementation schedule, and improved water and resource policy to aid with plan implementation.

## 2.6.1 SCIENTIFIC AND TECHNICAL EMERGING ISSUES

### 2.6.1.1 CLIMATE CHANGE AND INFRASTRUCTURE RESILIENCE

According to the US Environmental Protection Agency (EPA), the climate of the earth is changing because human activities are altering the chemical composition of the atmosphere through the buildup of greenhouse gases, primarily carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons. Projections by the Intergovernmental Panel on Climate Change suggest that temperatures in Minnesota could increase by about 4°F (with a range of 2-7°F) in winter, spring, and fall, and by somewhat less in summer. Precipitation is projected to increase by around 15% in winter, summer, and fall, with little change projected for spring.

If the climate warms, ice-cover of lakes and streams may melt earlier. Many lakes and streams in the northern hemisphere already are showing these effects (Magnuson and others, 2000; Hodgkins and James, 2002). Earlier snowmelt runoff would cause streamflows to peak sooner in the spring, leading to baseflow conditions earlier in the year (Dudley and Hodgkins, 2005).

According to the 2003 report on climate change by the Soil and Water Conservation Society (SWCS), total precipitation amounts in the United States and the Great Lakes region of Canada are increasing, as are storm intensities. Precipitation records in the Twin Cities and Rochester area indicate that the annual average precipitation has increased, as shown in the following examples:

- Minneapolis-St. Paul Airport Station – the average annual precipitation has increased from 28.32 inches (1961-1990 average) to 29.41 inches (1971-2000 average), a 3.8% increase (data from the Climatology Working Group website: <http://climate.umn.edu/>)
- St. Paul Station – the average annual precipitation has increased from 30.30 inches (1961-1990 average, from the MnDNR State Climatology Office) to 32.59 inches (1971-2000 average, from the Midwestern Regional Climate Center website: [http://mcc.sws.uiuc.edu/climate\\_midwest/mwclimate\\_data\\_summaries.htm](http://mcc.sws.uiuc.edu/climate_midwest/mwclimate_data_summaries.htm)), a 7.6% increase.
- Rochester Station – the average annual precipitation has increased from 29.68 inches (1961-1990 average) to 31.47 inches (1971-2000 average), a 6.0% increase (data from the Climatology Working Group website: <http://climate.umn.edu/>)

It is important to understand these changes in regional climatic trends because they impact water resources and their management. As noted by the SWCS, increased storm intensities result in increased soil erosion and increased runoff. Also, the MPCA warns that these more frequent, intense precipitation events may increase flooding (<http://www.pca.state.mn.us/hot/globalwarming.html>).

This plan recognizes the potential implications of climate change by encouraging the use of updated design standards for water resource infrastructure, based on National Oceanic and Atmospheric Administration (NOAA) Atlas 14. Plan participants also recognize the importance of this issue when





designating 100-year floodplain boundaries, and the inherent uncertainty in defining the boundary location.

### **2.6.1.2 ENDOCRINE ACTIVE COMPOUNDS**

Some chemicals can mimic the effects of hormones in animals and cause adverse physiologic effects, such as changes to the reproductive system or to the growth and development of an organism. These chemicals are called "endocrine active" compounds (EACs). These compounds do not usually exhibit acute toxicity at the levels normally found in the environment, but instead can alter the normal functioning and growth of the exposed organism at very low concentrations.

In the last decade, national and statewide studies have revealed that many chemicals with known or suggested endocrine-disrupting potential are found in the aquatic environment. These chemicals include pharmaceuticals, personal care products, chemicals associated with wastewater effluent, and a variety of industrial compounds. Apart from the disquieting realization that wastewater chemicals and drugs are detectable in much of our surface water, there is a growing concern that even at low concentrations, chemicals, or mixtures of them, may adversely affect fish, wildlife, ecosystems, and possibly human health.

Plan participants recognize the need to provide public water supplies free from endocrine active compounds. The plan addresses this emerging issue through implementation programs that reduce the volume of water entering groundwater and surface water resources.

### **2.6.1.3 WATER MOVEMENT WITHIN A KARST LANDSCAPE**

The presence of karst presents challenges and complicates the technical details about the movement of water from the land surface, through the subsurface soils and geologic formation, and the connection to groundwater. The presence of karst also affects the fate and transport particularly of dissolved substances like Nitrate-Nitrogen. Recent studies like those completed by Green and Alexander (2014) identifying the contributing drainage areas to springsheds, have greatly improved our understanding of the surface-subsurface water connection. Challenges, however, remain when modeling surface hydrology and water quality using the Hydrologic Simulation Program Fortran (HSPF) as recognized by the Minnesota Pollution Control Agency (undated) and the PTMApp.

The targeted implementation schedule addresses this emerging issue by proposing the implementation of conservation practices on the landscape, focused on retaining water, and therefore substances like sediment and nitrogen carried by the water, on the land and within the soil organic matter. The recommended practices are defensible regardless of the ability to understand the details about the influence of karst on water movement.

### **2.6.1.4 IMPROVING SOIL HEALTH**

A majority of the land in the Root River plan area is farmland. This predominant land use emphasizes the need for good soil health, as healthy soils drive the sustainability of agricultural production. Healthy soils perform several essential functions, including cycling nutrients and regulating water flow. As such, managing to improve soil health may increase its nutrient cycling capacity, providing financial benefits to the producer by reducing the need for extra, synthetic inputs. Additionally, managing for healthy soil may improve organic content of soils, thereby providing water retention benefits.

Managing soils to improve soil health should be a standard practice for all producers, and is addressed throughout the plan by programs that encourage it.





### **2.6.1.5 BUFFERS FOR PUBLIC WATERS AND DRAINAGE SYSTEMS**

Buffer requirements for Minnesota’s rivers, streams, and ditches has been a recent hot topic in the media. Legislation has been enacted requiring a perennial vegetation buffer around all public waters and public drainage systems. The focus for this legislation is improving water quality, as buffers are designed to filter out nutrients and sediments by slowing runoff and trapping sediment.

The water quality benefits of buffers vary, depending on many factors. These factors include landscape position, topography, buffer width, and upstream drainage area. Long-term solutions for water quality need to consider multiple potential solutions. Establishing buffers for waterways is one activity of many that yields documented water quality benefits. The approach used by this plan relative to improving water quality is comprehensive and envisions multiple practices on the landscape, with input from landowner and producers about what works best for them considering their operation and sustainability. This approach is also financially incentive-based. If financial incentives are attractive and fair commensurate with the benefits realized by the landowner, it will work to achieve measurable goals.

This plan recognizes the value that buffers provide to waterways and water quality. It addresses this emerging issue in the targeted implementation schedule, with actions that focus on stream/river bank stabilizations and riparian vegetation.

### **2.6.1.6 INVASIVE SPECIES**

Invasive species are species that are not native to the ecosystem under consideration, and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health. These species are aggressive competitors, threatening the quality of high biodiversity areas and native communities. Invasive species can be aquatic or terrestrial in nature. In Minnesota, present and actively managed aquatic invasive species include, but are not limited to Eurasian watermilfoil, purple loosestrife, zebra mussels, and spiny water fleas. Terrestrial invasive species in Minnesota include common buckthorn, gypsy moth, and white nose syndrome of bats.

One of the real issues addressed by the plan regarding invasive species is how to address fish passage within trout streams. The Minnesota Department of Natural Resources (MnDNR) has identified many potential barriers to fish movement along the Root River. From an ecological perspective, the removal of these barriers is positive to enhance longitudinal connectivity through the river system. However, the same barriers are potentially beneficial because they block the upstream movement of big head carp and other undesirable fish species.

Barriers are a potential management tool to limit the expansion of invasive carp populations and will be considered at strategic locations. Considerations include effectiveness against target species, impacts to native species, and costs. Barriers could be physical, electrical, or acoustic. Determining strategic locations for barriers is important because if a carp is captured or verified in the Root River, there is likely going to be a strong push for management action, typically in the form of a barrier. The Root River is connected to a section of the Mississippi River where invasive carp have been detected. Though the likelihood of an invasive carp being detected in the Root River at this time is very low, it is still a possibility.

This plan recognizes the importance of managing and preventing the spread of both terrestrial and aquatic invasive species. The plan addresses this emerging concern through implementation programs that protect moderate and high biodiversity area resources of concern.

### **2.6.1.7 SILICA SAND MINING**

The primary emerging issue related to silica sand mining from a water resources perspective is the potential consequences associated with water management and the proximity to a designated trout stream. Southeastern and south-central Minnesota have deposits of sand that meet the specifications





required for hydraulic fracturing, or “fracking,” a drilling method used for natural gas and oil wells. The demand for silica sand is being driven by an increased production of domestic oil and gas, in large part within North Dakota. The mining of these sand deposits has been occurring in the plan area for many years, however recent years have seen an increase in activity. Some have expressed concern about the environmental impacts of silica sand mining, processing, and transportation in Minnesota. To address these concerns, the 2013 Minnesota Legislature passed and Governor Mark Dayton signed into legislation several laws related to silica sand mining and associated activities. The primary effect of the legislation is a requirement to prepare an Environmental Assessment Worksheet for silica sand mining operations meeting certain size, storage, and throughput requirements.

Local governments are generally responsible for approving and supervising sand and gravel mining operations through their respective ordinances. For the purposes of this plan, the local governments are expected to continue to administer their respective ordinances and participate in the environmental review process.

## **2.6.2 POLICY AND FUNDING EMERGING ISSUES**

Various policy and funding considerations related to plan implementation are emerging issues. The policy and funding emerging issues identified here are addressed through the execution of specific strategies described by the targeted implementation schedule. These strategies are generally focused on engaging the state agencies and the legislature to make effective and constructive changes to enhance plan implementation.

### **2.6.2.1 FUNDING FOR PLAN IMPLEMENTATION**

Funding is one of the primary constraints on executing the targeted implementation schedule. This plan shows that the ability to execute the strategies within the targeted implementation schedule and achieve the measurable goals, including those common state and federal goals, requires more fiscal and staff resources at the local level than is available to the One Watershed, One Plan. The One Watershed, One Plan is expected to carry more of the responsibility to implement state and federal goals (i.e., attaining state water quality standards). An expectation that the One Watershed, One Plan will achieve these common goals without additional funding seems unreasonable. Because of their connection to landowners, the State envisions that the SWCDs, Counties, and watershed districts are critical partners and the implementing agent as envisioned in WRAPS/TMDL and Clean Water Accountability Act. The targeted implementation schedule in this plan represents a coherent, comprehensive approach to achieving the measurable goals. Raising cost share dollars for state and federal grants is problematic. Relying on competitive grants to achieve the measurable goals seems unreasonable and makes success tenuous. Therefore, block funding on an annual basis is needed. This plan includes strategies to achieve a consistent funding mechanism and reasonably ensure implementation success.

### **2.6.2.2 LAND ASSET MANAGEMENT**

Land assets include land purchased in fee title and easements acquired for resource protection. The process for and fiscal resources to maintain land assets after acquisition needs resolution. Once acquired, these assets need to be managed. A lack of management has the potential to result in the loss of the public benefits for which they were originally acquired. Consideration of the best means of offsetting the loss in the local tax base also needs resolution.

### **2.6.2.3 INTEGRATION BETWEEN ONE WATERSHED, ONE PLAN AND WRAPS PROCESSES**

This plan incorporates the strategies from the WRAPS to reduce nonpoint source loads allocated by the TMDL to achieve water quality standards within the plan area. The plan adds detail to the strategies described by the WRAPS, by including information about the sources of pollutants at the field scale,





establishing new and consistent programs for constructing BMPs, identifying locations for prioritized implementation, and enumerating the anticipated load reduction benefits. Because the One Watershed, One Plan process is new, and the WRAPS/TMDL process is evolving, long-term resolution of their relationship is needed to ensure the most effective use of fiscal and staff resources.

#### **2.6.2.4 CONSERVATION PRACTICE DELIVERY MECHANISM**

An improved means of effectively delivering conservation programs is needed. Both technical and financial resources at the local level to implement conservation programs are limited. Some agricultural policies encourage the agricultural producer to maximize yield, in conflict with other policies.

#### **2.6.2.5 COMMUNITY ATTITUDES, AWARENESS, AND ENGAGEMENT**

Making progress toward achieving the measurable goals within this plan requires successfully engaging those who use and interact with water and modifying their attitudes and behaviors. This plan includes specific tools intended to engage members of the community and modify behavior. These tools include components of the education and outreach initiative and the financial incentive initiatives. The use of local ordinances and administering statutory obligations also have the ability to influence behavior.

#### **2.6.2.6 COLLABORATION BETWEEN AGENCY AND NON-AGENCY ENTITIES**

The responsibility for improving resource conditions within the plan area is increasingly becoming placed on local government. This responsibility often comes in the absence of sufficient funding to implement the necessary efforts. The hand-off of responsibility is also sometimes clouded. This plan addresses the issue of collaboration between agencies and non-agency entities by identifying specific roles and responsibilities within the targeted implementation schedule. The plan also includes strategies to resolve funding issues, including the need for implementation block grants.

### **2.6.3 PROCESS FOR ADDRESSING EMERGING ISSUES AND DATA GAPS**

Inevitably, issues emerge that lack sufficient data, research, or information. While a substantial effort was made to develop a comprehensive list of potential priority resources, resources of concern, and issues affecting resources of concern, it is possible that some issues were missed, or that new issues may emerge during the lifespan of the plan. For example, discovery of a new contaminant or aquatic invasive species within the Root River Watershed One Watershed, One Plan boundary, or a change in the policies or administration of a member local government unit. Should an unanticipated issue emerge during the lifespan of the plan, the issue will be considered and addressed as necessary through annual evaluations (see **Section 5.4.4**) and local work plan (see **Section 5.4.3**) development. If the emerging issues are substantial enough, plan amendments will be considered based on procedures laid out in **Section 5.4.5** of this plan.

Gaps in our technical knowledge continually need to be closed. Rather than delaying planning or implementation activities when these gaps arise, the Root River One Watershed, One Plan will consider these gaps during self-assessments (see **Section 5.4.4**) and develop action(s) to address them on an as-needed basis. These actions(s) could be specific implementation activities, support of additional research or data monitoring and collection, or increased education and outreach. Any gaps documented during the initial plan development are addressed by the “Research Initiative” described within the targeted implementation schedule.







## 3 USING STRATEGIES TO ACHIEVE MEASURABLE GOALS<sup>3</sup>

The *One Watershed, One Plan, Plan Content for Pilot Watersheds* (**Appendix D**) outlines content requirements for drafting a plan through the One Watershed, One Plan pilot program. The BWSR guidance states that the Establishment of Measurable Goals portion of the plan will contain the following elements:

*“Each priority issue<sup>4</sup> must have associated measurable goals for addressing the issue. Some goals will be watershed-wide; however, the majority should be focused on a specific subwatershed, natural resource, or local government. Goals for prevention of future water management problems should also be considered.”*

Based on this guidance, a series of goals were established for each resource, regardless of priority level. These goals were developed using a variety of information sources, which included:

- Goals from existing management plans, studies, reports, data and information, including those within the WRAPS, the TMDL (i.e. load allocations), existing county water plans, and similar documents. A list of the information reviews is included in **Appendix E**;
- The results of analysis performed using PTMApp;
- Available implementation programs and schedules for achieving goals;
- Input received during public meetings;
- Input from Advisory Committee members;
- Input from Policy Committee members; and
- The knowledge of local water and resource managers provided by the Planning Work Group.

### 3.1 DEFINITIONS

This plan defines a “goal” as:

*“A statement of intended accomplishment for each priority resource concern. The goal could describe a planning boundary or planning region wide initiative (i.e., region wide education and outreach) or it could describe the intent for a specific location (i.e., a specific stream reach). Goals are meant to be simply stated and achievable, can be quantitative or qualitative, and are meant to be measurable through the implementation of specific strategies and actions to attain a desired outcome. Progress toward the outcome is measured using a defined metric.”*

A goal is made “measurable” through the implementation of strategies and actions for a priority resource concern and a means of assessing progress (i.e., a metric). This plan defines a “strategy” as:

*“A narrative description of an approach or initiative for a specific priority resource concern. The completion of one or more strategies may be necessary to achieve a goal. A strategy is the organizational framework for one or more actions (which are implementable) being undertaken to*

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<sup>3</sup> BWSR guidance uses the terminology goals and objectives, slightly different language than used by this plan.

<sup>4</sup> An additional reminder seems warranted. The BWSR guidance uses the term “issue” whereas this plan uses the terms resource concern and issue (affecting a resource concern). See *Section 2.1, Definitions*.





*address and resolve the issues affecting a priority resource concern. A metric which is used to assess progress is associated with each strategy.”*

A metric is associated with each measurable goal. Metrics may be qualitative or quantitative in nature and typically pertain to a specific issue affecting the resource concern. For the purposes of this plan, a “metric” is defined as:

*“A feature, attribute, characteristic, amount, or quantity which, when achieved, is expected to result in describing the amount of progress toward attaining the resource goal.”*

Strategies are comprised of one or more actions. Actions are described for each issue impacting a resource concern. Actions may be designed to address multiple issues for multiple resource concerns. For the purposes of this plan, actions generally refer to the initiatives comprising the implementation program in **Section 5**. This plan defined an “action” as:

*“A specific, tactical activity that can be conducted, completed, or accomplished to achieve a strategy and gauge measurability using the metric. Responsibility for completion, completion timelines, estimated costs, and probable benefits can be associated with each action. Actions inform the development of a targeted implementation schedule.”*

These definitions create the foundation for targeted implementation schedule. Goals, strategies, metrics, and actions for the priority concerns are described in the following section. The goals, strategies, and actions are then used in **Section 4** to develop the targeted implementation schedule and assess the amount of progress toward attaining the measurable goals when implemented.

The measurable goals within the plan<sup>5</sup> are described as both “quantitative” and “reporting.” A quantitative goal is generally a specific percent change in the metric (i.e., percentage reduction in the annual load [pounds per year] reaching a specific resource like a lake or river). The reporting goal is linked to the quantitative goal and is the surrogate, which will be used to assess and report progress (i.e., the estimated number of Best Management Practices needed to achieve the quantitative goal). The quantitative goals within this plan are largely based on state goals and are applied locally. Some of these include goals for the reduction in nutrient levels across Minnesota and desired sediment reductions for the Minnesota River, applied to the plan area.

### **3.2 DEFINING RESOURCE CONCERNS SUBJECT TO RESTORATION AND PROTECTION**

The strategies are intended to address the issue(s) affecting the resource. Measurable goals identified within the targeted implementation schedule (see **Section 4**) can be achieved through implemented strategies. Implementing strategies which address the issue(s) affecting the resource concern ensures progress toward achieving the measurable goals.

Each resource concern has one or more strategy to address the issue(s) affecting the resource. Each strategy is comprised of one or more actions. Some actions may benefit more than one strategy, and therefore more than one resource concern. For example, implementing an action which restores a wetland may address issues affecting trout streams, aquatic habitat, areas of moderate, high, and outstanding biodiversity, and more. As some actions have multiple benefits, different strategies may contain the same actions. Strategies and associated actions, when combined with the implementation responsibility, cost, and a schedule, comprise the targeted implementation schedule (see **Section 4**).

Groundwater and surface water resources have been further classified according to the need for restoration or protection. Designation of a resource as restoration or protection is important in aligning

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<sup>5</sup> The plan measurable goals are presented in Section 4.7.



with BWSR's Nonpoint Priority Funding Plan for Clean Water Funding Implementation (<http://www.bwsr.state.mn.us/planning/npfp/NPFP%20Final.pdf>) and Minnesota's Clean Water Roadmap (<http://www.pca.state.mn.us/index.php/view-document.html?gid=21689>).

An agreed upon approach for defining protection and restoration classifications among the State agencies is presently lacking, although efforts are underway within specific agencies. Therefore, definitions were developed for use within this plan, which meet local needs for aligning implementation efforts with state-level funding priorities. The definitions were purposely developed to recognize that some resources should be considered unique and worthy of a protection designation and that sufficient financial or technical resources are unavailable to restore the condition of all resources to some minimum level. The protection and restoration classifications are intended to align with the categories described by the Nonpoint Priority Funding Plan, and be used to categorize and prioritize future requests for Clean Water Funds and the annual work planning process.

### 3.2.1 PROTECTION CLASSIFICATION

A protection classification is assigned to a priority resource concern when the condition currently or during the ten-year duration of this plan:

1. Is better than the minimum condition defined by local, state, or federal environmental standards and criteria (i.e., numeric water quality standards);
2. Is considered “unique” by recognition from a formal local, state, or federal designation (i.e., habitats within a Scientific and Natural Areas; threatened and endangered species);
3. Is a component of the landscape, present in a limited amount, and provides essential ecosystem function and services at the landscape scale; or
4. Is a basic building block necessary for the sustainability and economic viability of the community (i.e., soil health).

Protection is not intended to focus on all resources exceeding some minimum threshold, but rather truly exceptional resources or those resources facing imminent threat of becoming impaired. In this regard, resources that encapsulate several features from the following list will be weighted preferentially for prioritized protection (i.e., strategies which provide multiple benefits).

Based on the definition of “protection,” the following resources of concern could warrant protection:

1. Features, species, or habitats with special legal or administrative recognition including:
  - a. Plant and animal species subject to special protection because of designation as a federally listed threatened and endangered species or a Minnesota Endangered, Threatened, or Special Concern (Minnesota Statutes, Section 84.0895);
  - b. Plant and animal species subject to special protection because of designation as a high conservation value forest, site of biodiversity significance, or Species in Greatest Conservation Need (SGCN), especially within key habitats for the Blufflands subsection. Key habitats include oak savanna, prairie, non-forested wetlands, shoreline-dunes-cliff/talus, river-headwater to large, and river-very large (Mississippi River), which are principally located on private lands. Forested areas also provide important habitat for many SGCN;
  - c. Rare natural features and resources subject to special consideration, including those designated, or those that could qualify as a Scientific & Natural Areas (SNA) or as a calcareous seepage fen as defined within the Minnesota Wetland Conservation Act;





- d. Resources identified as Outstanding Resource Value Waters (Minnesota Rules 7050.0180) which includes DNR designated calcareous fens; and
  - e. Minnesota State Parks, Minnesota Water Trails, County Parks, National Wildlife Refuges and those portions of the Root River with recreational trail access.
2. Features, species, or habitats with unique ecological characteristics including:
- a. Private native prairie bank easements;
  - b. Conservation Opportunity Areas (COA's) identified within the Root River Watershed Landscape Stewardship Plan ([http://www.fillmoreswcd.org/documents/RootRiverLandscapeStewardship\)final\\_5-7-14.pdf](http://www.fillmoreswcd.org/documents/RootRiverLandscapeStewardship)final_5-7-14.pdf));
  - c. Areas with high, medium-high, and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) as identified in the revised 2015-2025 Minnesota's Wildlife Action Plan (MN WAP);
3. Groundwater resources which meet one of the following:
- a. Drinking Water Supply Management Areas as described within records from the Minnesota Department of Health which meet drinking water standards;
  - b. Public and private water supplies where nitrate-nitrogen concentrations are equal to or less than natural background levels, generally defined as 3 mg/l, based on available water chemistry data;
  - c. Groundwater aquifers that exhibit signs or indicators of unsustainable aquifer use, typically manifested in declining long term measured levels; or
  - d. The land surface area contributing water volume to locally notable springs, defined as a spring with a mapped groundwater springshed, or a discharge greater than 1/10th cfs (44.9 gpm). Preference to springs with historical significance is also important.
4. Surface waters primarily rivers and streams<sup>6</sup> meeting one of the following:
- a. Supporting aquatic life, drinking water, or recreational uses. For aquatic life uses, the Index of Biotic Integrity Score (IBI) scores within an Assessment Unit Identification Number (AUID) should also be considered. Over time, if these waters are not subject to protection strategies, they may or may not become impaired. This protection category is subdivided into four subcategories: Above Average Quality, Potential Impairment Risk, Threatened Impairment Risk, and Maintenance.
    - i. **Protection: Above Average Quality** – Surface waters exhibiting Above Average Quality for a water quality parameter are defined as those portions of a river or stream (i.e., AUID) which:
      - 1. Have no impairments and meet the full MPCA assessment methods for determining whether an impairment exists and the 90th percentile (total suspended solids, total phosphorus, inorganic nitrogen) or the geometric mean (*E. coli*) are less than 75% of the numeric standard; or

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<sup>6</sup> This same criteria could apply to backwater lakes of the Mississippi River.



2. Surface waters that do not meet the full MPCA assessment methods (have less than 20 samples, or 5 samples per month for *E. coli*) yet still have a minimum of 5 samples for the AUID (or 3 samples per month for *E. coli*) may also be defined as having Above Average Quality, if no samples exceed the numeric water quality standard for the AUID, and the 90th percentile concentration (geometric mean for *E. coli*) of a water quality parameter is less than 75% of the numeric water quality standard. Surface waters in the plan area exhibiting Above Average Quality are show in **Figure 3-1**.

- ii. **Protection: Potential Impairment Risk** – Surface waters exhibiting Potential Impairment Risk for a water quality parameter are defined as those portions of a river or stream (i.e., Assessment Unit Identification Number) with water quality conditions “near” but not exceeding the numeric water quality standard for a given parameter.
  1. When the data requirements of MPCA assessment methods are met (number of samples is greater than 20, or 5 samples per month for *E. coli*), surface waters in the Potential Impairment Risk subcategory for *E. coli*, inorganic nitrogen, total phosphorus, or total suspended solids are defined by the 90th percentile (geometric mean for *E. coli*) concentration exceeding 75%, but less than 90% of the numeric water quality standard.
  2. When the data requirements of MPCA assessment methods are not met (number of samples is less than 20, but greater than 5; or less than 5 but at least 3 samples per month for *E. coli*), a Potential Impairment Risk is defined as the 90th percentile (geometric mean for *E. coli*) concentration exceeding 75% of the water quality standard, but not exceeding the water quality standard for a given water quality parameter.

Surface waters in the plan area exhibiting Potential Impairment Risk conditions are show in **Figure 3-2**.

- iii. **Protection: Threatened Impairment Risk-** Surface waters exhibiting Threatened Impairment Risk are defined as those portions of a river or stream (i.e., Assessment Unit Identification Number) with water quality conditions “very near” and which periodically exceed numeric standards, but the number of samples are insufficient to meet the MPCA assessment criteria (the number of samples are greater than 20, or greater than 5 per month for *E. coli*). A Threatened Impairment Risk is categorized as:
  1. When the data requirements of MPCA assessment methods are met (number of samples is greater than 20, or 5 samples per month for *E. coli*), the 90th percentile (geometric mean for *E. coli*) concentration exceeding 90%, but less than the numeric water quality standard;
  2. The 90th percentile (or geometric mean for *E. coli*) concentration below 110% of the water quality standard when an Assessment Unit Identification Number has more than 10 samples but less than 20; or





- 3. When the number of samples is less than 10 but greater than 5, a Threatened Impairment Risk is defined as the 90th percentile (or geometric mean for E. coli) concentration less than 120% of the water quality standard. This limits the amount of exceedances to one or two observances.

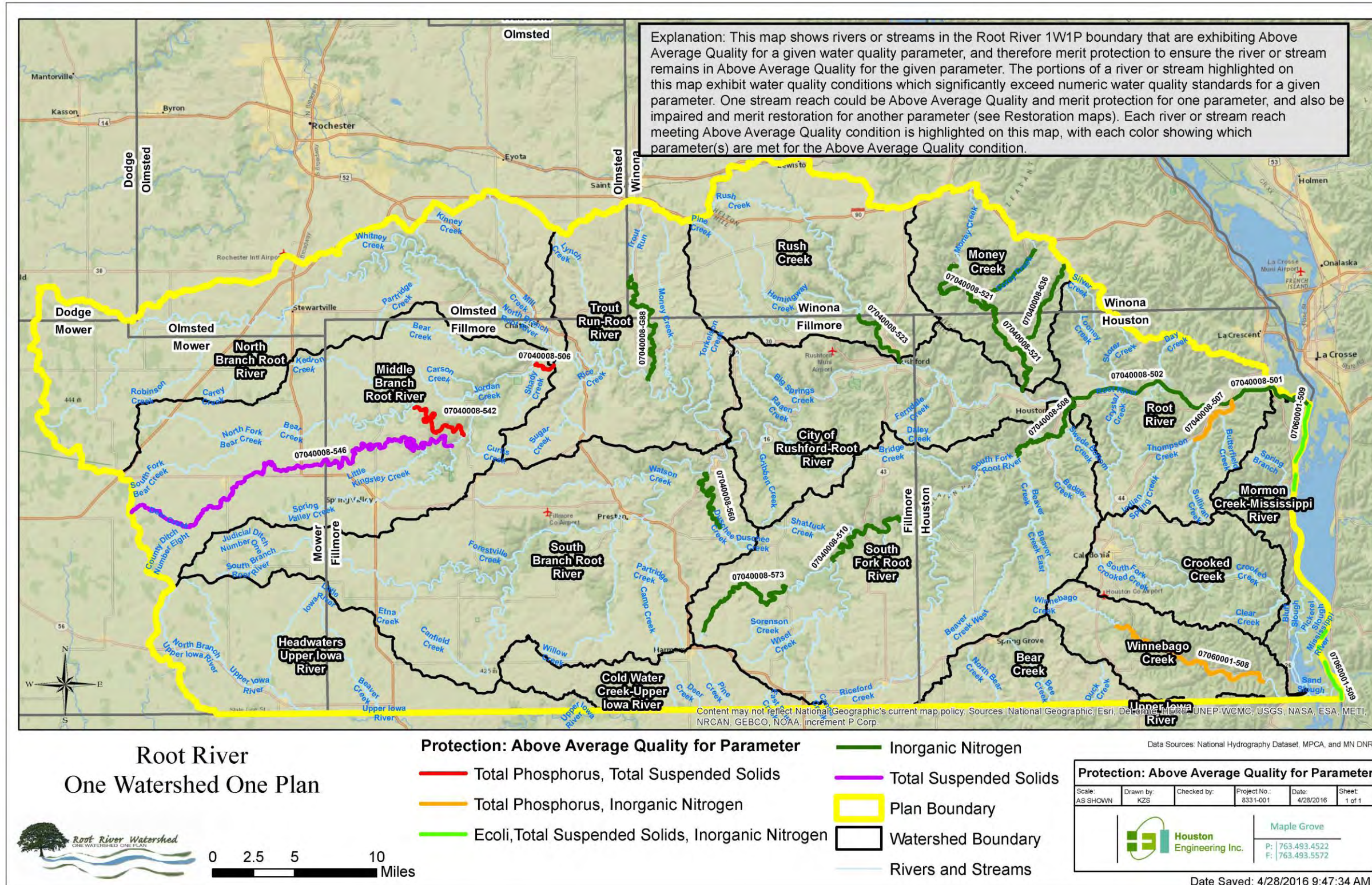
Surface waters in the plan area exhibiting Threatened Impairment Risk conditions are show in **Figure 3-3**.

- iv. **Protection: Maintenance** – those fully supporting Assessment Unit Identification Number (AUID) which are not i), ii), or iii) above.
- b. Which have not been assessed for attainment of water quality standards; or
- c. Trout Streams, including the upland drainage area, their tributaries, and headwater springs that provide flow and temperature characteristics to support water quality and habitat for all of the following characteristics:
  - i. Nativestrat brook trout (*Salvelinus fontinalis*) populations characterized by the presence of more than two year classes of brook trout, and the ecological flora and fauna which represents and describes the unique Paleozoic Plateau Ecological Section (also known as the driftless area) habitat; and
  - ii. Above Average Quality at all times, including temperatures not exceeding 68 degrees F.





Figure 3-1. Surface waters exhibiting Above Average Quality for a given water quality parameter, and therefore merit protection..



Explanation: This map shows rivers or streams in the Root River 1W1P boundary that are exhibiting Above Average Quality for a given water quality parameter, and therefore merit protection to ensure the river or stream remains in Above Average Quality for the given parameter. The portions of a river or stream highlighted on this map exhibit water quality conditions which significantly exceed numeric water quality standards for a given parameter. One stream reach could be Above Average Quality and merit protection for one parameter, and also be impaired and merit restoration for another parameter (see Restoration maps). Each river or stream reach meeting Above Average Quality condition is highlighted on this map, with each color showing which parameter(s) are met for the Above Average Quality condition.





Figure 3-2. Surface waters exhibiting Potential Impairment Risk for a given water quality parameter, and therefore merit protection.

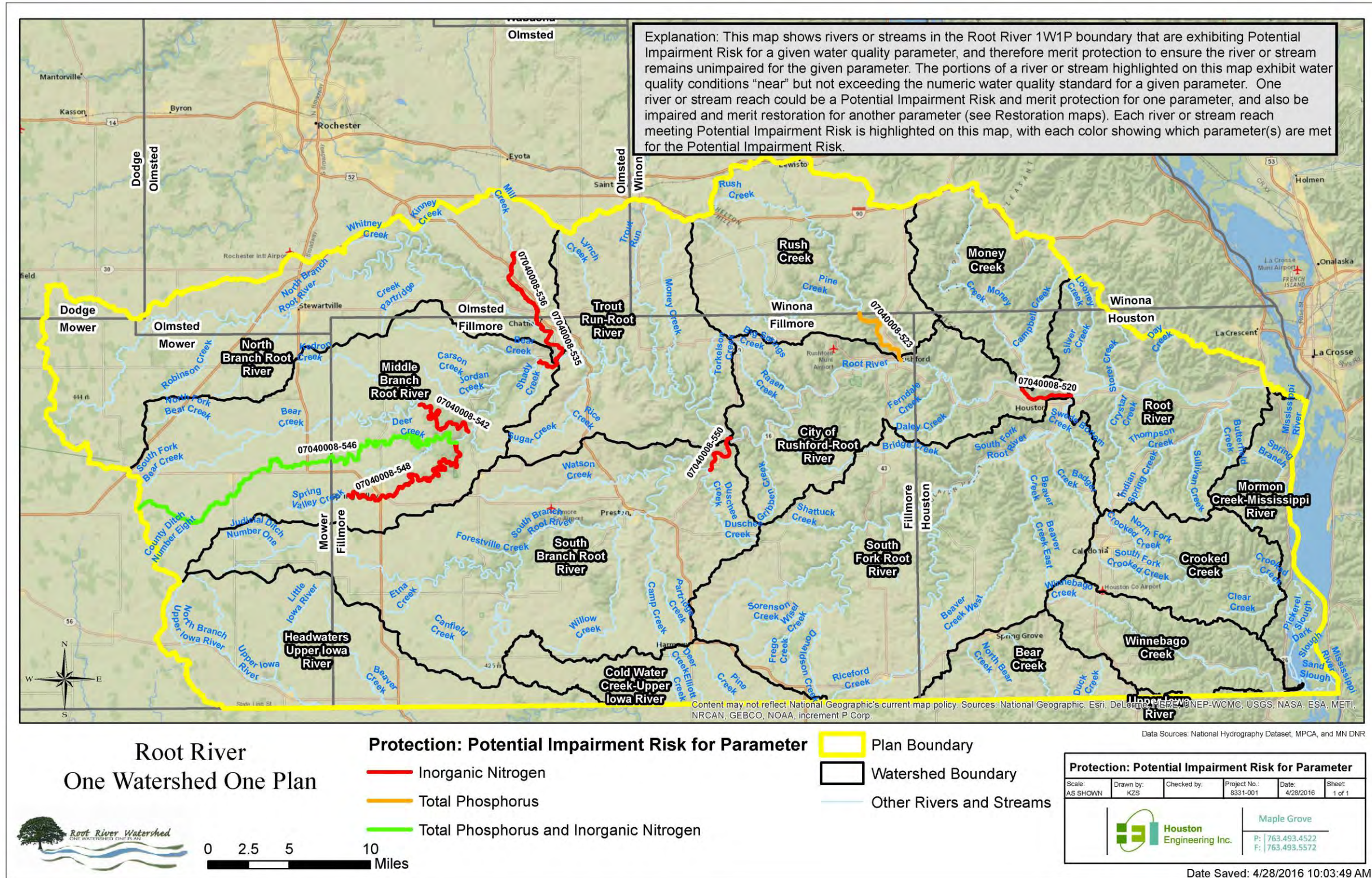
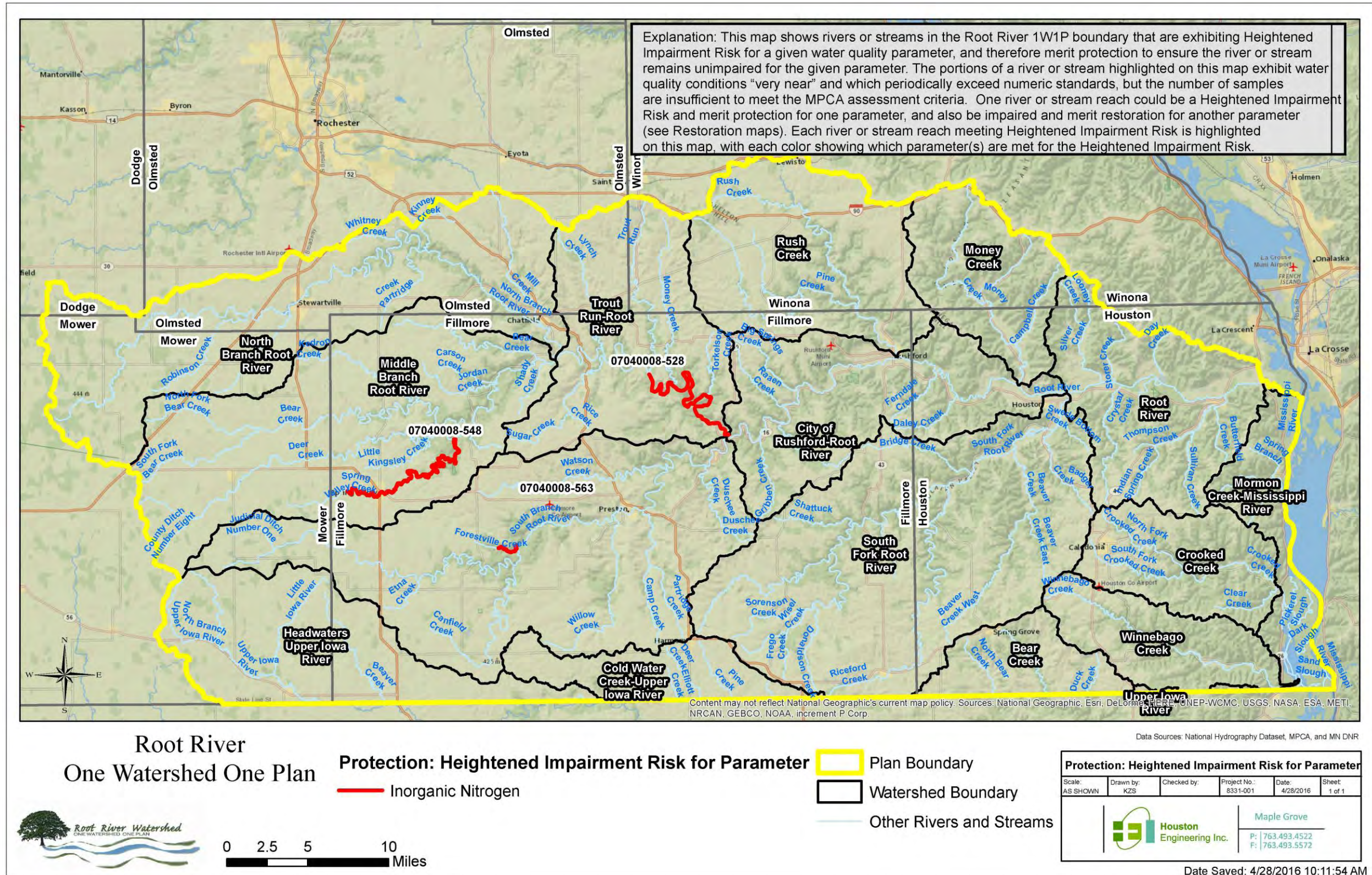
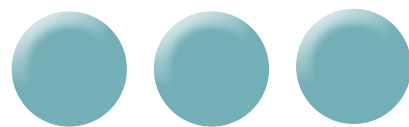




Figure 3-3. Surface waters exhibiting Heightened Impairment Risk for a given water quality parameter, and therefore merit protection.



Explanation: This map shows rivers or streams in the Root River 1W1P boundary that are exhibiting Heightened Impairment Risk for a given water quality parameter, and therefore merit protection to ensure the river or stream remains unimpaired for the given parameter. The portions of a river or stream highlighted on this map exhibit water quality conditions "very near" and which periodically exceed numeric standards, but the number of samples are insufficient to meet the MPCA assessment criteria. One river or stream reach could be a Heightened Impairment Risk and merit protection for one parameter, and also be impaired and merit restoration for another parameter (see Restoration maps). Each river or stream reach meeting Heightened Impairment Risk is highlighted on this map, with each color showing which parameter(s) are met for the Heightened Impairment Risk.





### 3.2.2 RESTORATION CLASSIFICATION

A restoration classification means improving a priority resource concern when the current condition:

1. Is poorer than the minimum condition defined by local, state, or federal environmental standards and criteria (i.e., fails to meet numeric water quality standards);
2. Is considered “unique” by recognition from a formal local, state, or federal designation (i.e., habitats within Scientific and Natural Areas) and is currently degraded;
3. Is a component of the landscape, present in a limited amount, and is providing an amount of essential ecosystem functional. Also services below the needed amount at the landscape scale and provides vital connections to existing intact ecosystems (restoring habitat fragmentation); or
4. Is a basic building block necessary for the sustainability and economic viability of the community (i.e., soil health) and no longer provides these functions.

A variety of resources are subject to restoration. However, the definitions pertain primarily to surface and ground water condition. Based on the definition of “restoration,” those resources of concern warranting a restoration classification fail to achieve some minimum threshold condition. Example minimum threshold conditions include failure to achieve a water quality standard or a condition considered degraded or unstable such as areas of accelerated stream bank erosion. Restoration classifications are divided into the following categories:

1. **Restoration: Low Restoration Effort** is defined as a degraded condition near the designated minimum threshold for a given parameter. An example is a portion of a river or stream where the numeric standard is exceeded (and therefore is “impaired”), but with restoration has a high probability of attaining the numeric water quality standard for the parameter. Surface waters are defined as a Low Restoration Effort if more than five samples are collected, of which no more than 25% of the samples exceed the water quality standard. Surface waters may also be in the Low Restoration Effort category if the 90th percentile of the samples (five or more required) is within 125% of the water quality standard. Surface waters within the plan area which are in the Low Restoration Effort category are show in **Figure 3-4**.
2. **Restoration: High Restoration Effort** are degraded and are no longer near the designated threshold for a given parameter. These surface waters have a lower probability of attaining the numeric water quality standard and may require a large effort to attain water quality compliance. High Restoration Effort surface waters are impaired, with the 90th percentile of at least five samples exceeding 125% of the water quality standard. Impaired waters are also defined in the High Restoration Effort category if more than 25% of samples (five or more required) exceed the water quality standard. Surface waters within the plan area which are in the High Restoration Effort category are shown in **Figure 3-5**.

The restoration definitions pertain primarily to surface water condition. With regard to groundwater, the State has recommended restoration should be considered when groundwater concentrations exceed a nitrate-nitrogen concentration of three mg/l. Due to the wide spread of groundwater contamination in the Upper Carbonate aquifer, this plan recognizes that groundwater protection is a better use of state funds. Therefore, groundwater restoration projects will consider a cost benefit analysis to determine systematically the pros and cons of completing groundwater restorations before being pursued.





Figure 3-4. Surface waters classified as Restoration: Low Restoration Effort by water quality parameter.

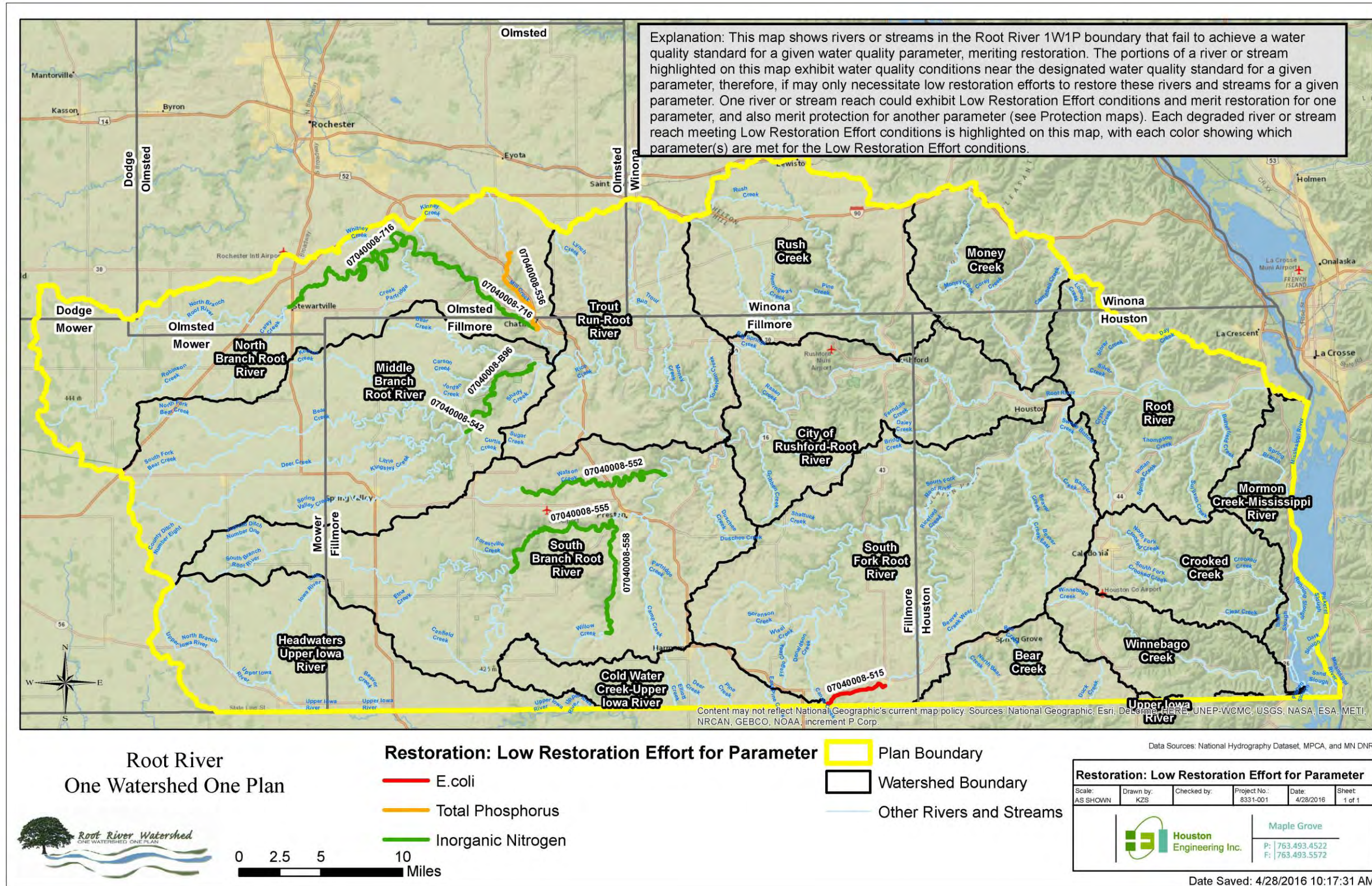
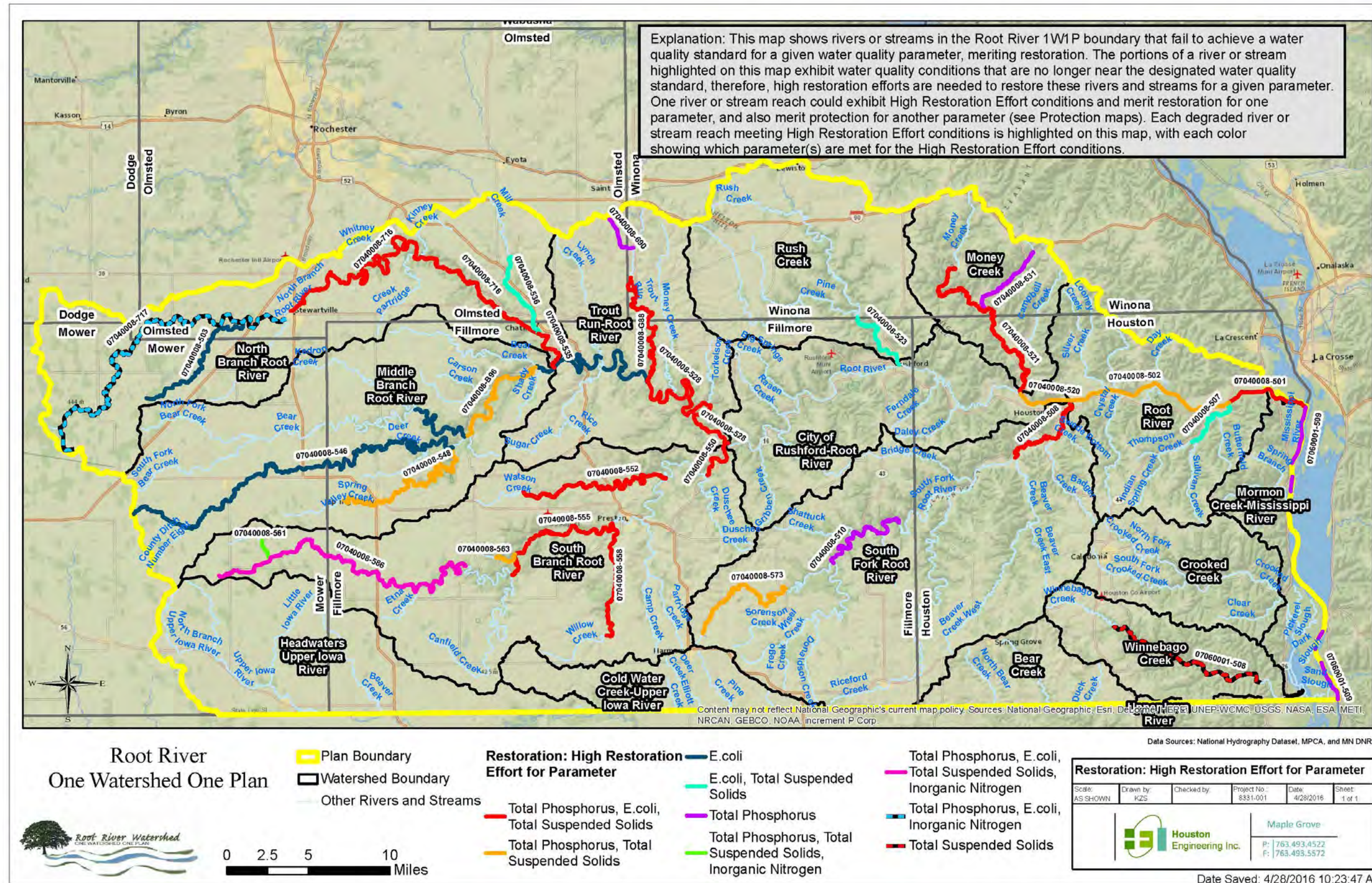




Figure 3-5. Surface waters classified as Restoration: High Restoration Effort by water quality parameter





## 3.3 STRATEGIES AND ACTIONS BY RESOURCE AND RESOURCE CONCERN

The strategies and actions are organized by resource and resource concern. The strategies and actions represent the steps needed to achieve the measurable goals and are the framework for the targeted implementation strategy. As some strategies and associated actions have multiple benefits, strategies may benefit more than one resource concern.

Expectations are that the strategies and actions will be accomplished through the use of the implementation program, described within **Section 5**. For example, many of the actions are focused on the implementation of best management practices on the landscape. These can be accomplished by using the types of assistance described in **Section 5.1** and the financial incentives provided by the initiatives described in **Section 5.1.1**. Other actions are focused on the administration of statutory responsibilities and ordinances described in **Section 5.5**. Data gaps can be filled through execution of the research initiative (**Section 5.1.3.1**) and engaging landowners, operators, and residents through the education and outreach initiative (**Section 5.1.3.2**). The measurable goals for each resource concern are presented in **Section 4** within the targeted implementation schedule.

### 3.3.1 GROUNDWATER (GW)

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*Vision: Manage groundwater to maintain or improve the quality and quantity of drinking water supplies and the linkage between surface and subsurface hydrologic systems.*

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#### 3.3.1.1 RESOURCE CONCERN: DRINKING WATER SUPPLIES

**Strategy GW-1: Manage ground water quality to achieve the Safe Drinking Water Act nitrate-nitrogen standard by managing nitrate-nitrogen loading within areas contributing to groundwater recharge.**

**Action GW-1.1:** Implement BMPs that manage surface runoff within Drinking Water Supply Management Areas (DWSMAs), Source Water Protection Areas, and areas of high vulnerability to groundwater recharge such as sinkholes.

**Action GW-1.2:** Seal abandoned and unused wells, particularly those wells which may impact public or private drinking water supplies, such as those found within DWSMAs.

**Action GW-1.3:** Develop nitrogen fertilizer management plans for agricultural producers for locations that are vulnerable to groundwater contamination from nitrates, which follow BMP recommendations.

**Action GW-1.4:** Complete the delineation and mapping of DWSMAs and the boundaries of Well Head Protection Areas.

**Action GW-1.5:** Use existing land use and zoning ordinances to manage possible sources of nitrate contamination (i.e., subsurface sewage treatment systems, manure management, land development).

**Action GW-1.6:** Provide financial and technical assistance for monitoring nitrate levels in private wells.

**Action GW-1.7:** Continue research to define sinkhole locations, map springsheds in plan area, model and monitor groundwater, and monitor basic flow.

**Action GW-1.8:** Provide educational and financial assistance to bring Subsurface Sewage Treatment Systems (SSTS) into compliance to reduce nitrogen loading from small, unsewered communities and homes with inadequate wastewater treatment.

**Action GW-1.9:** Implement BMPs within priority locations which reduce vertical movement of nitrate into groundwater.







**Strategy GW-2: Properly manage sources of human and animal waste and protect water supply wells to minimize the introduction of microbial contamination to drinking water supplies.**

**Action GW-2.1:** Implement BMPs that treat surface runoff within DWSMAs, Source Water Protection Areas, and springshed contributing drainage areas.

**Action GW-2.2:** Seal abandoned and unused wells, particularly those wells which may impact public or private drinking water supplies, such as those found within DWSMAs.

**Action GW-2.3:** Develop manure/nutrient management plans, which follow BMP recommendations, for agricultural producers with land application locations that are vulnerable to groundwater contamination from bacteria.

**Action GW-2.4:** Construct animal waste management systems and manage water using runoff control measures in accordance with accepted design standards and practice.

**Action GW-2.5:** Identify, replace, or repair failing and deficient subsurface sewage treatment systems.

**Action GW-2.6:** Use existing land use and zoning ordinances to manage potential risk factors from the disposal of wastes and the application of manure near sinkholes.

**Action GW-2.7:** Maintain compliance with National Point Discharge Elimination System (NPDES) Permits for point sources.

**Strategy GW-3: Maintain groundwater quality by managing pesticide and other contaminant loading in areas contributing to groundwater recharge.**

**Action GW-3.1:** Implement BMPs that treat runoff within DWSMAs, Source Water Protection Areas, and springshed contributing drainage areas.

**Action GW-3.2:** Implement BMPs that treat or prevent runoff to karst features.

**Action GW-3.3:** Promote the development of pesticide management plans for land application locations that are vulnerable to surface water and groundwater contamination from pesticides, which follow manufacturer recommendations.

**Action GW-3.4:** Maintain and improve soil health as a means of increasing soil organic matter and managing pesticide releases to groundwater.

**Action GW-3.5:** Encourage the use of precision agriculture as means of efficient application of pesticides.

**Action GW-3.6:** Implement an education/outreach campaign for the responsible use and disposal of pesticides.

**Action GW-3.7:** Implement an education/outreach campaign to reduce the risk to groundwater from contaminants such as chloride, VOCs, heavy metals, pharmaceuticals, etc.

**Action GW-3.8:** Monitor groundwater for pesticides and/or other contaminants.

**Strategy GW-4: Maintain sustainable supply of groundwater for water users and water dependent resources.**

**Action GW-4.1:** Develop and evaluate additional ground water data including long-term trends in water levels, aquifer safe yields, and appropriation and permitting trends, to identify and describe whether a problem currently exists.

**Action GW-4.2:** Continue to support through the permit review process the Department of Natural Resources, Water Appropriation Permit Program, to manage groundwater supply and evaluate historical and projected future permitted uses and demand.





**Action GW 4-3:** Encourage watershed residents through educational and outreach efforts to adopt conservation and water reuse practices, such as capturing stormwater for irrigation.

**Action GW-4.4:** Implement BMPs in urban and rural areas that promote infiltration and groundwater recharge, such as soil health improvements through increased organic content of soils.

**Action GW-4.5:** Install additional, strategically located long-term groundwater observation wells in cooperation with the Minnesota Department of Natural Resources, to monitor water levels.

### 3.3.1.2 RESOURCE CONCERN: SPRINGSHEDS

**Strategy GW-5: Maintain sustainable supply of groundwater to ensure the support of flora and fauna dependent on spring flow, such as wetlands, calcareous fens, and trout streams.**

**Action GW-5.1:** Develop and evaluate additional ground water data including long-term trends in water levels, aquifer safe yields, and appropriation and permitting trends, to identify and describe whether a problem currently exists.

**Action GW-5.2:** Continue support through permit review of the Department of Natural Resources, Water Appropriation Permit Program, to manage groundwater supply and evaluate historical and projected future permitted uses and demand.

**Action GW-5.3:** Implement BMPs in urban and rural areas that promote infiltration and groundwater recharge, such as soil health improvements through increased organic content of soils.

**Action GW-5.4:** Install additional, strategically located long-term groundwater observation wells in cooperation with the Minnesota Department of Natural Resources to monitor water levels.

**Action GW-5.5:** Continue research to define sinkhole locations and map springsheds in plan area.

**Action GW-5.6:** Correlate springshed mapping and IBI scores to target water infiltration BMPs with critical trout habitat.

The following strategies and associated actions are **also applicable**:

- **Strategy GW-1:** Manage ground water quality to achieve the Safe Drinking Water Act nitrate-nitrogen standard by managing nitrate-nitrogen loading within areas contributing to groundwater recharge.
- **Strategy GW-3:** Maintain groundwater quality by managing pesticide and other contaminant loading in areas contributing to groundwater recharge.

### 3.3.1.3 RESOURCE CONCERN: SURFICIAL-SUBSURFACE HYDROLOGIC CONNECTIONS

**Strategy GW-6: Manage land use and/or minimize development in geologically-sensitive areas with high groundwater-surface water interaction.**

**Action GW-6.1:** Promote programs and BMPs for activities on or near karst areas to protect water quality and promote safety.

**Action GW-6.2:** Administer applicable bluffland protection zoning ordinances to control certain land uses and restrict vegetative alterations within bluff areas.

The following strategies and associated actions are **also applicable**:

- **Strategy GW-1:** Manage ground water quality to achieve the Safe Drinking Water Act nitrate-nitrogen standard by managing nitrate-nitrogen loading within areas contributing to groundwater recharge.
- **Strategy GW-3:** Maintain groundwater quality by managing pesticide and other contaminant loading in areas contributing to groundwater recharge.
- **Strategy GW-5:** Maintain sustainable supply of groundwater to ensure the support of flora and fauna dependent on spring flow, such as wetlands, calcareous fens, and trout streams.





## 3.3.2 SURFACE WATER (SW)

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*Vision: Manage surface waters to maintain or improve the quality and quantity of surface water supplies and obtain or maintain their beneficial uses.*

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### 3.3.2.1 RESOURCE CONCERN: STREAMS AND RIVERS

**Strategy SW-1: Manage for stream stability by achieving non-point, point, and in-channel sources of sediment in equilibrium with the runoff peak discharge, runoff volume, runoff depth, and runoff duration.**

**Action SW-1.1:** Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.

**Action SW-1.2:** Set peak discharge, volume reduction goals, and sediment load goals to achieve stable geomorphologic conditions.

**Action SW-1.3:** Quantify the volume reduction of improved soil health.

**Action SW-1.4:** Increase water and sediment storage and infiltration within priority locations.

**Action SW-1.5:** Define basic geomorphic characteristics for stable reaches including bank full discharge, channel cross sectional area, slope, and bed composition.

**Action SW-1.6:** Inventory the locations and cause of unstable stream and river reaches and prioritize them for implementing fixes.

**Action SW-1.7:** Promote BMPs that enhance hydrologic storage by increasing upland perennial native vegetation in areas that provide connections to expand riparian access. These actions also provide benefits to restoring stream stability and equilibrium where it is found to be impaired.

**Action SW-1.8:** Complete restoration projects that provide multiple benefits, such as enhanced hydrologic function, while also providing connectivity benefits for aquatic and terrestrial habitats.

**Strategy SW-2: Restore connectivity within riparian corridors, floodplains and to upstream and downstream portions of streams.**

**Action SW-2.1:** Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.

**Action SW-2.2:** Determine the location and value of existing barriers relevant to fish management and aquatic invasive species (AIS) control.

**Action SW-2.3:** Reduce agricultural damages for lands inundated by 10-year or more frequent flood events by encouraging alternative agricultural practices.

**Action SW-2.4:** Stabilize and/or restore degraded sections of stream and river reaches to reduce bank failure and mass wasting that complement upstream BMPs.

**Action SW-2.5:** Prepare and maintain formal maps to define the boundary of the riparian area adjacent to perennial streams and rivers, as a means to focus the implementation of incentive based initiatives.

**Action SW-2.6:** Implement BMPs within riparian areas that improve connectivity within riparian corridors and floodplains.





### Strategy SW-3: Protect healthy and diverse aquatic biological communities by maintaining low levels of sediment.

**Action SW-3.1:** Maintain soil loss tolerance at a level equal to or less than an amount considered sustainable from a soil health and fertility perspective from urban and rural lands.

**Action SW-3.2:** Facilitate agricultural producer implementation of BMPs which are focused on and maintain soil health, such as tillage and residue management, nutrient and manure management, crop rotation methods, and the use of cover crops.

**Action SW-3.3:** Complete sufficiently detailed sediment mass balances for affected reaches, which identify the relative magnitude of sediment source leading to impairments.

**Action SW-3.4:** Implement the State of MN soil loss ordinance to protect soil health and sustainability.

**Action SW-3.5:** Implement BMPs that reduce sediment loading within waterbodies by treating surface runoff to ditches, streams, and rivers, and by stabilizing gullies and gully heads.

**Action SW-3.6:** Implement water and sediment storage BMPs in priority locations to reduce the capacity of streams and rivers to generate and transport sediment by storing water to manage the rate, volume, and duration of runoff.

**Action SW-3.7:** Stabilize and or restore degraded sections of stream and river reaches to reduce bank failure and sediment deposition into waterbodies.

**Action SW-3.8:** Encourage stormwater sediment reduction in rural subdivisions and urban areas.

### Strategy SW-4: Protect aquatic recreation by reducing E. coli concentrations.

**Action SW-4.1:** Implement BMPs that treat surface runoff within priority locations.

**Action SW-4.2:** Implement BMPs within priority locations that promote soil health, thereby increasing water retention and decreasing surface runoff.

**Action SW-4.3:** Encourage the development and implementation of manure/nutrient management plans, which follow BMP recommendations, for agricultural producers with land application locations that are vulnerable to surface water contamination from pathogenic bacteria.

**Action SW-4.4:** Construct animal waste management systems and runoff control measures for animal feeding operations in accordance with design standards and practice.

**Action SW-4.5:** Identify and repair or replace failing and noncompliant subsurface sewage treatment systems.

**Action SW-4.6:** Use existing land use and zoning ordinances to manage potential risk factors including possible sources of pathogenic bacterial contamination (i.e., subsurface sewage treatment systems, manure management, land development, concentrated livestock access to streams).

**Action SW-4.7:** Encourage implementation of BMPs that reduce stormwater runoff as a source of pathogenic bacteria.

**Action SW-4.8:** Use managed and rotational grazing methods to manage animal wastes.

**Action SW-4.9:** Maintain compliance with National Point Discharge Elimination System Permits for point sources.

**Action SW-4.10:** Construct animal waste storage systems that allow land application consistent with an approved manure / nutrient management plan.







**Strategy SW-5: Reduce overall nitrate-nitrogen concentrations by managing delivery and loading to surface waters.**

**Action SW-5.1:** Implement BMPs within priority locations that reduce nitrate-nitrogen loading to waterbodies by treating surface and shallow sub-surface runoff before entering ditches and streams.

**Action SW-5.2:** Implement storage BMPs within priority locations which reduce delivery of nitrate-nitrogen runoff to surface waters.

**Action SW-5.3:** Implement BMPs within priority locations that promote soil health, thereby increasing water retention and decreasing surface runoff.

**Action SW-5.4:** Develop and implement nutrient management plans for agricultural producers for locations that are vulnerable to groundwater contamination from nitrates, which follow BMP recommendations.

**Action SW-5.5:** Provide educational and financial assistance to bring SSTS into compliance to reduce nitrogen loading from small, unsewered communities and homes with inadequate wastewater treatment.

**Action SW-5.6:** Implement feedlot runoff controls that reduce nitrogen loading of waterbodies by treating or reducing runoff of contaminated water.

**Action SW-5.7:** Use existing land use and zoning ordinances to manage potential risk factors including possible sources of nitrate contamination (i.e., subsurface sewage treatment systems, manure management, land development).

**Action SW-5.8:** Construct animal waste storage systems that allow land application of manure consistent with an approved nutrient management plan.

**Action SW-5.9:** Implement BMPs within priority locations which reduce vertical movement of nitrate into groundwater.

**Strategy SW-6: Reduce overall total phosphorus concentrations by managing delivery and loading to surface waters.**

**Action SW-6.1:** Implement BMPs within priority locations that reduce phosphorus loading to waterbodies by treating surface and shallow sub-surface runoff before entering ditches and streams.

**Action SW-6.2:** Implement storage within priority locations which reduce delivery of phosphorus runoff to surface waters.

**Action SW-6.3:** Implement BMPs within priority locations that promote soil health, thereby increasing water retention and decreasing surface runoff.

**Action SW-6.4:** Encourage the development and implementation of nutrient management plans for agricultural producers.

**Action SW-6.5:** Provide educational and financial assistance to bring SSTS into compliance to reduce nutrient loading from small, unsewered communities and homes with inadequate wastewater treatment.

**Action SW-6.6:** Implement feedlot runoff controls that reduce nutrient loading of waterbodies by treating or reducing runoff of contaminated water.

**Action SW-6.7:** Use existing land use and zoning ordinances to manage potential risk factors including possible sources of nutrient contamination (i.e., subsurface sewage treatment systems, manure management, land development).

**Action SW-6.8:** Implement BMPs to reduce phosphorus runoff in rural subdivisions and urban areas.



**Action SW-6.9:** Construct animal waste storage systems that allow land application of manure consistent with an approved nutrient management plan.

**Action SW-6.10:** Maintain compliance with wastewater treatment plant point source permit requirements.

**Strategy SW-7: Protect aquatic biological communities by maintaining appropriate levels of dissolved oxygen and temperature.**

**Action SW-7.1:** Implement BMPs that provide perennial vegetative cover within the riparian corridor to decrease bank erosion, increase stream shading, and reduce water temperature.

**Action SW-7.2:** Implement BMPs within priority locations that reduce the flow of runoff to streams and rivers including surface water storage BMPs.

**Action SW-7.3:** Encourage the development and implementation of nutrient management plans for agricultural producers, which follow BMP recommendations to reduce algae growth.

**Action SW-7.4:** Restore degraded sections of stream and river reaches to increase habitat for the aquatic biological community.

The following strategies and associated actions are **also applicable:**

- **Strategy SW-3: Protect healthy and diverse aquatic biological communities by maintaining low levels of sediment.**

### 3.3.2.2 RESOURCE CONCERN: FLOODING

**Strategy SW-8: Minimize damages to agricultural crops and land as a result of flooding.**

**Action SW-8.1:** Define, develop, and maintain an agricultural flood prone map.

**Action SW-8.2:** Use various programs to provide land owners with economically viable alternatives for use of land in flood prone areas.

**Action SW-8.3:** Maintain public infrastructure including culverts, bridges, and drainage systems to provide drainage at the anticipated level of service to minimize flood damage to public, private, and agricultural lands both upland and downstream of the managed systems.

**Action SW-8.4:** Implement practices that provide a minimum 10-year level of protection for agricultural lands, including upland and floodplain storage projects.

**Action SW-8.5:** Complete hydrologic analyses for the installation of new and improved subsurface tile systems which reasonably ensure adequate tile system function.

**Action SW-8.6:** Implement practices (i.e. increasing perennial cover in headwater catchments) that increase hydrologic storage and stability throughout the landscape, including upland areas high in the watershed to reduce flooding.

**Strategy SW-9: Minimize damages to infrastructure including roads, buildings, homes, and residences as a result of flooding.**

**Action SW-9.1:** Publish and make available the most current floodplain maps.

**Action SW-9.2:** Use the floodplain management ordinance and land use and zoning approvals to minimize the likelihood of future flood damages.

**Action SW-9.3:** Evaluate the need for, develop, and implement capital improvement projects to address areas currently subject to damage.

**Action SW-9.4:** Use proper hydrologic and hydraulic design standards for road crossings to provide flood protection, while considering fish passage and environmental needs.





**Action SW-9.5:** Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.

**Action SW-9.6:** Set peak discharge, volume reduction goals, and sediment load goals to achieve stable geomorphologic conditions.

**Action SW-9.7:** Quantify the runoff volume reduction benefits of improved soil health.

### 3.3.2.3 RESOURCE CONCERN: WETLANDS

**Strategy SW-10: Increase acreage of quality wetlands, characterized by capacity to store excess water, improve water quality, and increase habitat for wildlife.**

**Action SW-10.1:** Implement and enforce applicable county ordinances and the Wetland Conservation Act (WCA) to retain wetland quantity, function, and value.

**Action SW-10.2:** Promote BMPs which enhance, restore, or create wetlands and provide hydrologic storage in the upland portions of the watershed.

**Action SW-10.3:** Locate and identify all calcareous fens not yet on the DNR Commissioner's List.

### 3.3.3 LANDSCAPE FEATURES (LF)

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***Vision:** Manage landscape features to maintain or improve the water resources of the Root River One Watershed, One Plan boundary area.*

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#### 3.3.3.1 RESOURCE CONCERN: RIPARIAN CORRIDORS

**Strategy LF-1: Manage riparian corridors to protect and enhance ecological functions, characterized by capacity to filter surface runoff and sub-surface lateral flow, provide stream shading, act as a corridor for wildlife, provide recreational opportunities, build resilience to disturbance, and support aquatic life.**

**Action LF-1.1:** Define areas subject to frequent flooding as the minimum riparian area to be managed on all rivers and streams. For public waters and public ditches, the minimum area identified as frequently flooded will be targeted for additional BMP implementation.

**Action LF-1.2:** Identify and field-verify areas where additional riparian buffers or alternative practices are needed.

**Action LF-1.3:** Implement perennial vegetative BMPs in riparian areas, promote lateral connectivity to the floodplain, provide financial opportunity to landowners from non-productive riparian land, adhere to mandated shoreland and state buffer law requirements, and utilize alternative practices as needed that support the function of healthy riparian corridors.

**Action LF-1.4:** Provide educational materials, consultations, and workshops to landowners and agricultural producers about riparian BMPs, including compensation and incentive programs for land adjacent to streams.

**Action LF-1.5:** Implement managed and rotational grazing methods and animal access control BMPs.

**Action LF-1.6:** Identify land areas suitable for recreational opportunities, such as trout fishing and public water access.

**Action LF-1.7:** Provide education and outreach materials about trespass regulations and their relation to public access and stream fishing regulations.



**Action LF-1.8:** Provide education and outreach materials online and in print depicting a map of stream public access points by county to optimize public accessibility.

**Action LF-1.9:** Provide input to and complete mapping of other waters potentially subject to buffer requirements.

### **3.3.3.2 RESOURCE CONCERN: AQUATIC HABITAT FOR FISH, MACROINVERTEBRATES, AND AQUATIC LIFE**

**Strategy LF-2: Manage riparian corridors to support healthy and diverse aquatic biological communities and quality aquatic habitat.**

**Action LF-2.1:** Implement BMPs that provide perennial and woody native vegetative cover within the riparian corridor.

The following strategies and associated actions are **also applicable**:

- **Strategy SW-3:** Protect healthy and diverse aquatic biological communities by maintaining low levels of sediment that balances sediment transport critical for naturally developing adequate pool and riffle topography to support a diverse fishery.
- **Strategy SW-7:** Protect aquatic biological communities by maintaining appropriate levels of dissolved oxygen and temperature.
- **Strategy SW-10:** Increase acreage of quality wetlands, characterized by capacity to store excess water, improve water quality, and increase habitat for wildlife.
- **Strategy LF-1:** Manage riparian corridors to protect and enhance ecological functions, characterized by capacity to filter surface runoff and sub-surface lateral flow, provide stream shading, act as a corridor for wildlife, provide recreational opportunities, build resilience to disturbance, and support aquatic life.

### **3.3.3.3 RESOURCE CONCERN: TROUT STREAMS**

**Strategy LF-3: Manage designated trout streams, with mostly self-sustaining trout populations.**

**Action LF-3.1:** Determine the location and value of existing fish barriers relevant to trout fisheries management and AIS control.

**Action LF-3.2:** Identify stream reaches with self-sustaining brook trout populations, and implement practices to manage these reaches.

**Action LF-3.3:** Identify stream reaches with self-sustaining brown trout populations and implement practices to manage those reaches.

**Action LF-3.4:** Identify stream reaches where stocking of rainbow trout yearlings provide the public with a put-take angling opportunity and implement practices to manage these reaches.

**Action LF-3.5:** Identify stream reaches where stocking of rainbow trout fingerlings provide multiple year classes to anglers and implement practices to manage those reaches.

The following strategies and associated actions are **also applicable**:

- **Strategy GW-5:** Maintain sustainable supply of groundwater to ensure the support of flora and fauna dependent on spring flow, such as wetlands, calcareous fens, and trout streams, are conserved.
- **Strategy SW-3:** Protect healthy and diverse aquatic biological communities by maintaining low levels of suspended sediment that balances sediment transport adequate for natural development of riffle and pool dimensions that are optimal for the stream classification.
- **Strategy LF-2:** Manage riparian corridors to support healthy and diverse aquatic biological communities and quality aquatic habitat with properly connected floodplains.





#### 3.3.3.4 RESOURCE CONCERN: AREAS OF MODERATE AND HIGH BIODIVERSITY

**Strategy LF-4: Maintain habitat corridors and large blocks of native habitat by managing land use, including minimizing development.**

**Action LF-4.1:** Administer zoning regulations that encourage development practices which preserve and enhance natural areas. Higher priority should be given to areas where high, medium-high, and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) are located.

**Action LF-4.2:** Implement BMPs to manage native plant and animal communities, such as forestland, prairies, wetlands, oak savannahs, etc.

**Action LF-4.3:** Identify parcels adjacent to areas of moderate and higher biodiversity and/or areas of high, medium-high, and medium SGCN wildlife and habitat scores within the WAN and promote BMPs to protect and enhance biodiversity.

**Action LF-4.4:** Promote protection of lands identified as areas of moderate, high, and outstanding biodiversity and/or areas of high, medium-high, and medium SGCN wildlife and habitat scores within the WAN through such programs as acquisition, property tax credits, and easements.

**Strategy LF-5: Maintain the quality of high biodiversity areas and native plant communities by minimizing the introduction and spread of invasive species.**

**Action LF-5.1:** Perform education and outreach initiatives targeted to general public / landowners in moderate and high biodiversity areas about threats of invasive species, and ways to prevent / control them.

**Action LF-5.2:** Perform education and outreach initiatives targeted to landowners in moderate and high biodiversity areas and/or areas of high, medium-high and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) about landowner benefits of natives, and potential downfalls of invasives.

**Action LF-5.3:** Pursue funding, such as Cooperative Weed Management Areas and aquatic and terrestrial invasive species grants to provide technical and financial assistance to control/manage invasive species within and contributing to quality habitats for terrestrial and aquatic species.

**Action LF-5.4:** Maintain current and historical GIS records of invasive species using the MnDNR database.

#### 3.3.3.5 RESOURCE CONCERN: KARST FORMATIONS

**Strategy LF-6: Manage land use on or adjacent to karst formations to maintain or improve the water resources of these unique geologic features.**

**Action LF-6.1:** Develop and maintain a karst feature data base capable of producing maps for the plan area.

**Action LF-6.2:** Implement BMPs in areas that help protect the natural features, such as caves, sinkholes, springs, and algal talus slopes, associated with karst geology.

**Action LF-6.3:** Promote and implement programs and incentives including, but not limited to RIM, ACEP, CRP, wetland banking, and tax credits.



### 3.3.4 SOCIAL CAPACITY (SC)

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*Vision: Broaden the collective understanding of water issues and build a robust and resilient system for maintaining and improving water resources*

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#### 3.3.4.1 RESOURCE CONCERN: PUBLIC KNOWLEDGE

**Strategy SC-1: Support progress towards measurable water quality goals by encouraging behavioral changes from area youth, residents, landowners, operators, local government units, and elected members through positive and impactful education and outreach experiences.**

**Action SC-1.1:** Provide school presentations and other educational efforts tailored to youth.

**Action SC-1.2:** Provide and distribute educational materials through various multi-media methods about local water management, the impacts of decisions, and actions the public can take to make a difference.

**Action SC-1.3:** Host meetings for the public regarding monitoring results and assessments from Root River Watershed One Watershed, One Plan monitoring activities.

**Action SC-1.4:** Host annual meetings for local government officials about the condition of water resources, progress made, and results and assessments from Root River Watershed One Watershed, One Plan monitoring activities.

**Action SC-1.5:** Seek out opportunities and entities to do more cooperative education and outreach activities.

#### 3.3.4.2 RESOURCE CONCERN: LANDOWNER AND PRODUCER ENGAGEMENT IN WATER MANAGEMENT

**Strategy SC-2: Increase adoption of BMPs by increasing engagement and communication with local landowners/agricultural producers, to increase understanding of on-farm production issues, identify solutions to overcome fiscal and operational hurdles to conservation practice implementation, and communicate the benefits of implementation activities.**

**Action SC-2.1:** Develop a standard methodology for landowner/agricultural producer meetings, including the creation of maps showing existing BMPs that will provide a feedback loop for measuring the strategy.

**Action SC-2.2:** Provide cooperative education efforts and demonstration projects to promote agricultural BMP's including, but not limited to, nutrient management, conservation tillage, buffers, soil testing, pesticide application, etc.

**Action SC-2.3:** Develop new techniques to promote conservation efforts, such as administering a local certification training program or partnering with agribusiness retailers to recommend appropriate BMPs.

**Action SC-2.4:** Provide one-on-one consultations with landowners and agricultural producers about agricultural BMPs, field productivity benefits of BMPs, and available financial incentive options for funding them.

**Action SC-2.5:** Continue to develop and maintain a database inventory of existing BMPs with associated costs of implementation.

**Action SC-2.6:** Support and encourage farmer led initiatives, such as Farmer Led Councils, farmer mentor lists, and local advisory committees, that promote conservation through peer based outreach and performance based incentives.

**Action SC-2.7:** Develop a comprehensive civic engagement plan.





### 3.3.4.3 RESOURCE CONCERN: CONNECTING WATER AND THE BUSINESS COMMUNITY

**Strategy SC-3:** Increase the role local businesses play in water management through awareness about water issues, participation in community events, and a greater understanding of the economic impacts of water quality and quantity.

**Action SC-3.1:** Identify and document types of benefits that businesses derive from the use of water resources.

**Action SC-3.2:** Provide and distribute educational materials through various multi-media methods about local water management, the impacts of business decisions, and the economic value of water quality and quantity.

**Action SC-3.3:** Convene a conference tailored to the local business community, in partnership with local organizations such as Chamber of Commerce, Economic Development Authority, business associations, and local businesses/employers, to learn about local water issues and network with other businesses that capitalize on water and land resources.

**Action SC-3.4:** Solicit participation from local business for volunteer and sponsorship opportunities.

### 3.3.4.4 RESOURCE CONCERN: TECHNOLOGY, TOOLS, AND EXISTING CAPABILITIES

**Strategy SC-4:** Enhance staff technical capacity, the coordination of roles and responsibilities, and financial sustainability for efficient plan implementation.

**Action SC-4.1:** Encourage local governmental unit staff, local agency staff, and certified crop advisors to attend trainings on newly developed technology and tools relevant to water resource management.

**Action SC-4.2:** Develop a database for sharing and maintaining water resource management data, including local GIS data layers and local monitoring data.

**Action SC-4.3:** Collaborate and coordinate with participating local government units through shared services for plan implementation.

**Action SC-4.4:** Identify and prioritize opportunities to secure long-term and consistent funds through grants, partnerships, and other sources.

**Strategy SC-5:** Adapt to emerging issues, such as the discovery of new contaminants and new invasive species, or a change in policies or administration of a member local government unit.

**Action SC-5.1:** Identify and address emerging issues during the plan's annual evaluation and local work plan development.

**Action SC-5.2:** Consider a plan amendment, if necessary, due to an emerging issue.

## 3.3.5 SUSTAINABILITY OF COMMUNITIES (SUST)

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*Vision: Improve or maintain communities' cultural, economic, natural, and water resources.*

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### 3.3.5.1 RESOURCE CONCERN: LIVABILITY

**Strategy SUST-1:** Promote decisions which enhance the livability of a community, characterized by a healthy environment, access to recreational and economic opportunities, high public safety, and financial stability.

**Action SUST-1.1:** Solicit stakeholder input about plan activities from a diverse, interdisciplinary group that includes local planning and zoning staff in order to integrate the economic, environmental, and social policies into water resource management.



**Action SUST-1.2:** Develop public outreach and education initiatives and implementation programs dedicated to preventing urban and rural point and nonpoint water pollution to avoid more costly restoration projects in the future.

**Action SUST-1.3:** Promote initiatives to improve wastewater management practices.

**Action SUST-1.4:** Identify opportunities to fund sustainable forest management, prairie, wetland, and other natural area preservation and restoration through grants and partnerships.

**Action SUST-1.5:** Coordinate with public and private entities to protect and enhance wildlife habitat, fisheries habitat, riparian corridors, and vegetative habitat, through programs such as easements and acquisition.

### **3.3.5.2 RESOURCE CONCERN: RURAL ENVIRONMENTAL HEALTH**

**Strategy SUST-2: Promote the sustainability of the rural community characterized by a healthy environment, high land productivity and financial stability through enhancing soil health, managing nutrient applications, and providing BMP incentives to landowners and agricultural producers.**

**Action SUST-2.1:** Tailor recommended BMPs to each field based on the economic and environmental capacity of each area of a field, such as precision agriculture.

**Action SUST-2.2:** Encourage rental agreements that allow long-term practices to build soil health or that include conservation language.

**Action SUST-2.3:** Develop nutrient and manure management plans for agricultural producers which follow BMP recommendations to build soil health and maximize efficiency.

**Action SUST-2.4:** Encourage BMPs, such as conservation tillage, cover crops, crop rotation, managed pasture and grazing, and animal waste management within priority locations that promote soil health and improve organic content of soils.

**Action SUST-2.5:** Promote education and financial incentives for solid and hazardous waste disposal to reduce chemical and nutrient contamination of water.

**Action SUST-2.6:** Create awareness of existing regulations, rules, and ordinances pertaining to proper waste disposal.

**Action SUST-2.7:** Provide educational materials, consultations, and workshops to landowners and agricultural producers about BMPs, including compensation and incentive programs for marginal and sensitive lands.

**Action SUST-2.8:** Promote programs that recognize and/or provide incentives to landowners for the multiple benefits resulting from implementation of BMPs, including improved water quality, resilience against flood damage, and protected/enhanced wildlife habitat and biodiversity.

**Action SUST-2.9:** Promote the natural meandering of streams to decrease stream velocity for reducing flood impacts and enhance recreational and fish and wildlife habitat value.

### **3.3.5.3 RESOURCE CONCERN: URBAN ENVIRONMENTAL HEALTH**


**Strategy SUST-3: Promote the sustainability of the urban community characterized by financial stability and a healthy, safe environment by maintaining and building upon urban infrastructure regulating water, managing pollutant sources, and treating pollutants in surface water.**

**Action SUST-3.1:** Inspect, maintain, and improve the integrity of existing urban structures that route and treat stormwater runoff to prevent downstream stream erosion and flooding and improve water quality.

**Action SUST-3.2:** Inventory and assess need for additional urban infrastructure to prevent downstream flooding and water quality degradation from storm events.







**Action SUST-3.3:** Promote the natural meandering of streams to decrease stream velocity for reducing flood impacts and enhance recreational and fish and wildlife habitat value.

**Action SUST-3.4:** Promote increased public access to natural features such as streams, wetlands, and rivers.

**Action SUST-3.5:** Promote urban BMPs for lawn and managed green spaces (parks, golf courses) that include soil testing and proper use, amount, method, and timing of fertilizer/pesticide application.

**Action SUST-3.6:** Implement urban BMPs that reduce the delivery of sediment, nutrients, and pesticide loads to surface water by treating runoff through infiltration, filtration, and uptake.

**Action SUST-3.7:** Provide technical and financial assistance to bring SSTS into compliance to reduce improper waste disposal from small, unsewered communities, and homes with inadequate wastewater treatment.

**Action SUST-3.8:** Promote education and financial incentives for solid and hazardous waste disposal to reduce chemical and nutrient contamination of water.

**Action SUST-3.9:** Assess capacity to productively reuse stormwater runoff.

#### **3.3.5.4 RESOURCE CONCERN: LAND USE**

**Strategy SUST-4: Improve community livability through managing land uses to support different purposes, including living, working, producing agricultural crops, outdoor recreation, enjoying landscape views, and timber production.**

**Action SUST-4.1:** Meet all statutory requirements of the State of Minnesota (MN Rules 6120.250- 3900) which regulate the subdivision, use, and development of shorelands of public waters, in addition to the Buffer and Soil Erosion Legislation.

**Action SUST-4.2:** Administer zoning regulations that encourage growth near urban areas to preserve natural areas and large habitat blocks.

**Action SUST-4.3:** Promote programs and BMPs that restrict activities on or near karst features to protect water quality and promote safety.

**Action SUST-4.4:** Administer Minnesota Rules Chapter 7080 through 7083 to manage SSTS and protect surface and ground water quality.

**Action SUST-4.5:** Comply with all applicable rules and regulations to promote the protection of cultural and historic resources reflective of Native American heritage and early pioneer settlements.

**Action SUST-4.6:** Administer applicable bluffland protection zoning ordinances to control certain land uses and restrict vegetative alterations within bluff areas.

**Action SUST-4.7:** Administer Minnesota Statutes Chapter 103F Soil Erosion Law to minimize loss of soil and productivity.

**Action SUST-4.8:** Administer the Wetland Conservation Act (WCA) to retain wetland quantity, function, and value.



### 3.3.6 WATER RESOURCES INFRASTRUCTURE (WI)

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*Vision: Maintain or improve the natural and man-made systems used for managing the rate, volume and quality of water in the Root River One Watershed, One Plan Area.*

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#### 3.3.6.1 RESOURCE CONCERN: DRAINAGE SYSTEMS

**Strategy WI-1: Evaluate the design of private tile drainage systems and promote those systems that can have beneficial effects on the rate, volume, and duration of runoff without negatively impacting surface and groundwater resources.**

**Action WI-1.1:** Develop and maintain an inventory and map of known field tile drainage locations in the plan area.

**Action WI-1.2:** Implement drainage management BMPs to control ground water elevation, reduce water volume yield, and remove pollutants from tile discharge prior to entering surface waters.

**Action WI-1.3:** Support research that characterizes the quantity and quality of tile drainage and its impacts on recharge to local groundwater aquifers. Encourage projects that monitor the outfalls of select agricultural tile lines to better understand effects on ecosystem functions.

**Strategy WI-2: Minimize the rate of water movement, pollutant loads, and potential for downstream erosion with conservation practices within the benefit area of public drainage systems as defined by MN Statute 103E and open private drainage systems.**

**Action WI-2.1:** Implement BMPs that provide perennial vegetative cover within the riparian corridor to increase stream roughness and decrease bank erosion.

**Action WI-2.2:** Implement BMPs that provide volume reduction and/or storage within priority locations.

**Action WI-2.3:** Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.

**Action WI-2.4:** Set peak discharge, volume reduction goals and sediment load goals to achieve stable geomorphologic conditions.

**Strategy WI-3: Increase public safety and infrastructure resilience to changing precipitation trends by designing and constructing infrastructure utilizing Atlas 14.**

**Action WI-3.1:** Plan for and implement updates for existing public infrastructure based on anticipated changes in weather patterns and rainfall intensity due to global climate change.

**Action WI-3.2:** Pursue funding to support construction of new BMPs and enhancement of existing BMPs to expand storm water management capacity.

**Action WI-3.3:** Work with landowners and drainage authorities to install two-stage ditch systems for multiple benefits including improved drainage and ditch bank stability and sediment transport, increased habitat (i.e., riffle and pool habitat in low flows), and pollutant removal of nitrogen.

#### 3.3.6.2 RESOURCE CONCERN: POINT SOURCES

**Strategy WI-4: Protect surface water quality by evaluating the adequacy and efficiency of Subsurface Sewage Treatment Systems (SSTs) for wastewater treatment in private residences and small communities.**

**Action WI-4.1:** Provide technical and financial assistance to bring SSTs into compliance to reduce improper waste disposal from small, unsewered communities, and homes with inadequate wastewater treatment, in particular those that are Imminent Public Health Threats.





**Strategy WI-5: Protect surface water quality by managing pollutant loads in water discharging from stormwater, industrial operations, and wastewater discharge pipes to surface waters.**

**Action WI-5.1:** Maintain compliance with National Point Discharge Elimination System (NPDES) Permits for point sources.

**3.3.6.3 RESOURCE CONCERN: WATER RETENTION SYSTEMS**

**Strategy WI-6: Manage high peak flows from rural and urban sources using designed water retention systems, only if land use changes and BMPs can't adequately address flooding problems.**

**Action WI-6.1:** Identify and field-verify areas where GIS land cover information indicates the need for temporary flood storage, including the potential temporary storage of floodwaters using the transportation system and using best available hydrology data.

**Action WI-6.2:** Inventory and assess existing flood storage practices on landscape.

**Action WI-6.3:** Repair and maintain storage capacity of existing landscape flood storage practices.

**Action WI-6.4:** Implement additional flood storage practice BMPs within prioritized areas.

**Action WI-6.5:** Implement permanent plantings, preferably natives, to increase infiltration.

**Action WI-6.6:** Implement BMPs such as wetland restorations and/or step pools.

**Strategy WI-7: Minimize contribution of nutrient and sediment levels delivered to streams and water storage areas as a result of urban stormwater and construction site erosion.**

**Action WI-7.1:** Encourage the use of BMPs on active construction sites to reduce amount of erosion. Refer to MN Rule Chapter 7090 Storm water regulatory program for guidance for activities that do not fall under permitting requirements or are in non-MS4 communities.

**Action WI-7.2:** Encourage the use of post construction BMPs that decrease compaction of soil in active construction sites.

**Action WI-7.3:** Encourage and implement BMPs that treat urban stormwater discharge.

**Strategy WI-8: Manage water quantity through low impact development techniques and methods through planning, designing, implementing, and maintaining stormwater management facilities and storage.**

**Action WI-8.1:** Promote local, county, and development proposals that incorporate Low Impact Design or Minimum Impact Design technologies.

**Action WI-8.2:** Promote incorporation of Low Impact Design strategies into local zoning ordinances.

**Action WI-8.3:** Review and update local regulations that address storm water erosion and runoff control, grading plan approval, and grading drainage standards.





## 4 TARGETED IMPLEMENTATION SCHEDULE

### 4.1 PURPOSE AND CONTENT

Each plan must include a targeted implementation schedule intended to achieve some portion or all of the plan's measurable goals for the planning period. The targeted implementation schedule contains:

- 1. A brief description of each strategy and the corresponding actions;*
- 2. The location(s) (i.e., targeting) where the action will occur;*
- 3. The roles and the responsible government unit for implementing the action;*
- 4. An estimate of cost and potential sources of funding for implementing the action;*
- 5. An estimate of when the implementation will occur within the 10 year timeframe of the plan; and*
- 6. How the progress toward completion of the action will be measured.*

This plan section presents the targeted implementation schedule. The measurable goals are expected to be achieved by following the targeted implementation schedule, utilizing the various incentive based initiatives and programs at a rate depending upon the necessary funding as described within **Section 5**, Implementation Program.

The targeted implementation schedule serves as the implementation road map and establishes the schedule for achieving the measurable goals for each "A" or "B" level resource concern (see **Section 2.2. Identifying Potential Resource Concerns and Issues**). The targeted implementation schedule is really nothing more than a "to do" list describing the foreseeable actions to implement the plan. The targeted implementation schedule is comprised of strategies and actions<sup>7</sup> intended to address specific issues impacting each "A" or "B" level resource concern as presented in **Section 3**. Each strategy is comprised of one or more actions. These strategies and actions, when combined with the locations for implementation, the means of measuring progress (i.e., the metric), the implementation responsibility, the probable cost, and a timeframe for implementation, comprise the targeted implementation schedule.

Strategies and their associated actions are identified, described, and organized by resource category within the targeted implementation schedule. The strategies and associated actions were developed to address specific issues impacting priority resource concerns. This means that for all issues impacting water quality, strategies and actions were developed to address priority resource concerns that fall into either surface water or groundwater resource categories. To differentiate between actions taken to address issues impacting groundwater resource concerns and surface water resource concerns, the targeted implementation schedule organizes strategies and associated actions by resource category (i.e., groundwater, surface water).


Geo-spatial water quality products were produced using the Prioritize, Target, and Measure Application (PTMApp). This tool was selected, in consultation with the Board of Water and Soil Resources (BWSR), as a component of the decision to use the Root River as one of the pilot areas for the One Watershed, One Plan. Specifically, the BWSR had interest in applying PTMApp as a "test case" in order to assess the

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<sup>7</sup> Terms used within this plan are defined within Section 3.1, Definitions. Terms defined include goal, measurable goal, metric, strategy and action. The terms resource, resource concern and issue affecting a resource concern are defined in Section 2.1, Definitions.







value of the tool for completing large scale watershed plans. BWSR provided direction to rely on existing data to utilize the PTMApp application, and to rely on a “low level” of hydrologic conditioning as part of the test case.


The underlying theory, algorithms, and application of PTMApp is described by the documentation on the PTMApp website (<http://ptmapp.rrbdin.org/User/Documentation>). PTMApp requires several inputs, including a hydro-conditioned Digital Elevation Model (hDEM). The level of effort to create the hDEM depends on the business needs, and specifically the spatial scale needed for the resulting products. Because of the guidance from BWSR to largely utilize existing data and the lack of fiscal resources, the hydro-conditioning processes utilized the high resolution National Hydrography Dataset flowlines burned into the bare earth digital elevation. The planning scale for the Root River One Watershed, One Plan is the 12-digit and 10-digit hydrologic unit code scales. Therefore, the conditioning processes utilized the high resolution National Hydrography Dataset flowlines burned into the bare earth digital elevation. This is appropriate for the planning scale analysis and is consistent with the need for a first ever demonstration of the use of PTMApp in a comprehensive water planning context. The implications of this level of conditioning is that some surface water boundaries at the local field scale may be inaccurate. However, at the 12-digit and 10-digit hydrologic unit code scales the contributing drainage area should be reasonably accurate.

The geo-spatial water quality products created through the use of PTMApp are specific to surface water hydrology. However, karst influences water movement within the plan area. Predominant hydrologic influence maps (to be discussed in **Section 4.4**) should be used to qualify the geo-spatial products created through PTMApp. Specifically, the source assessment and practice locations products created through the use of PTMApp should be overlaid with the predominant hydrologic influence maps to provide a relative sense of whether groundwater or surface water will receive the load and the benefits realized by practices.

The Planning Work Group used the potential BMP locations generated within PTMApp to develop a prioritized and targeted implementation approach for improving surface and ground water quality. Sediment and nitrogen are two of the most prominent issues affecting the priority resource concerns of ground water quality and surface water quality. Therefore, when developing the implementation approach the PWG “selected” filters for those BMPs in each planning region, with the greatest reductions in the annual sediment load delivered to the planning region outlet (regional scale) **and** the greatest total nitrogen load reduction reaching the catchment outlet (i.e., local scale). The PWG reduced the total number of BMPs identified as potential locations by PTMApp, to these “best” 100 BMPs within each planning region. The sediment and total nitrogen annual load reduction benefits of these practices were then evaluated as if they were all implemented within the plan area. The locations of the BMPs within each planning region are shown within **Appendix I** and comprise the “targeted implementation approach.” The plan therefore, provides a best estimate of the numbers, types, and approximate locations for BMPs on the landscape, and how much progress towards the measurable goals is possible. The specific locations of practices will be refined during implementation. Use of the financial incentive initiatives described within **Section 5.1.1 Field Practices Management Category**, is expected to be used to implement the practices and is the basis for the funding needs identified for field practices within **Table 5.7**. The implementation approach is also the basis for the estimated annual load reductions presented in **Table 4-5** and **Table 4-7**.

**Improvements in surface and groundwater quality will require time. Typically, the amount of time required to “see” improvements is long, and similar in magnitude to something called the “mass residence time.” The time scale is typically decades.**





PTMApp was not programmed to analyze bacterial issues impacting surface and groundwater resource categories. For this reason, bacteria was not included in PTMApp assessment. All sediment and nutrient (total nitrogen and total phosphorus) PTMApp products and data within the plan area were delivered to the Root River One Watershed, One Plan as part of the Root River One Watershed, One Plan project. It is the expectation that the delivered products and data will be further refined for project implementation. An example of how the PTMApp products can be used in the future to continue to inform the targeted implementation schedule is provided next in **Section 4.2**.

## **4.2 USING PTMAPP RESULTS FOR PLANNING AND IMPLEMENTING BEST MANAGEMENT PRACTICES**

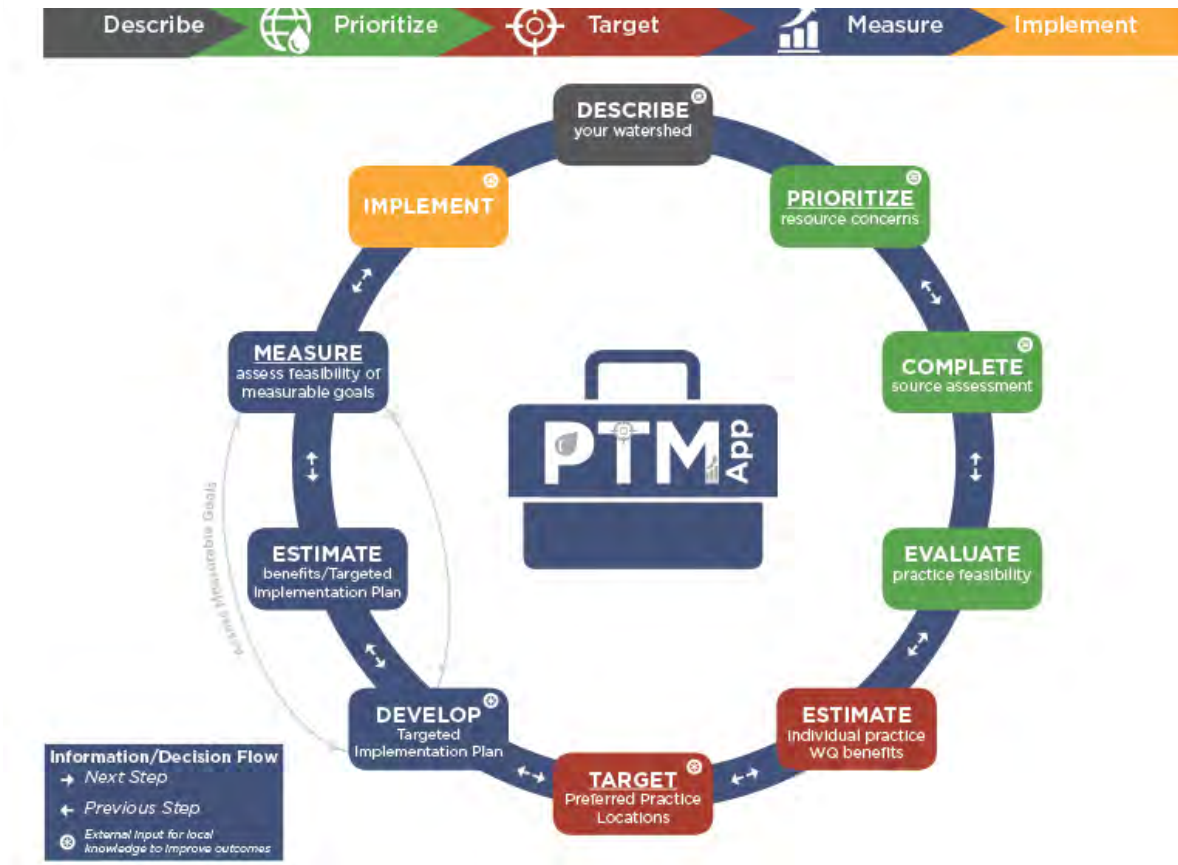
The products from PTMApp can be used for a number of water quality related business decisions (**Figure 4-1**). The development, usefulness, and value of each of the products for each business decisions were guided by a panel of water quality staff from Local Governmental Units (LGUs), including Soil and Water Conservation Districts, Watershed Districts, and County Water Planning. The business decisions are generally common tasks undertaken as part of daily work to prioritize and target the locations of projects and practices that provide measurable water quality benefits. One or several business decisions may be combined as part of developing a watershed plan (i.e., a One Watershed, One Plan), creating an implementation strategy for an annual work plan, refining the Watershed Restoration and Protection Strategies (WRAPS) implementation approach, and assembling grant funding requests (i.e., accelerated implementation grants).

This plan section demonstrates the use of PTMApp outputs for developing products that can be used for the various water quality business decisions (**Figure 4-1**). **As an example, the demonstration uses data for the South Fork Root River, but is applicable to any location within the plan area.** The data developed through PTMApp for this plan can continue to be used to develop and refine numerous BMP implementation scenarios, which is likely to occur during implementation. As such, the purpose of this example is to illustrate how the business decisions in **Figure 4-1** can be implemented, so that they can be repeated to address additional resource management priorities.





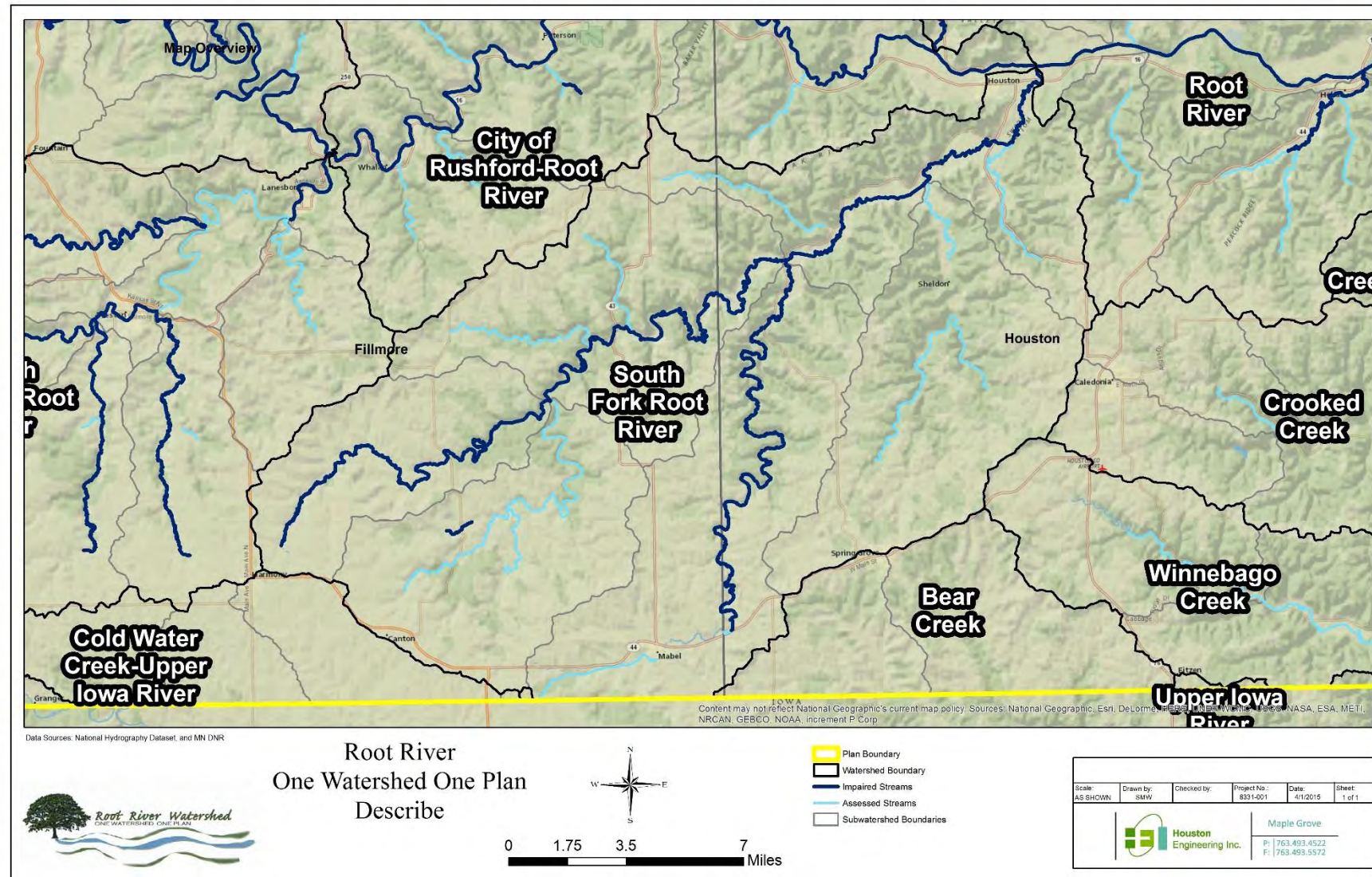
Figure 4-1: Business workflows addressed by PTMApp Desktop.



## DESCRIBE YOUR WATERSHED- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

Describe your watershed is the process of identifying and describing important resources, features, and factors (i.e. socioeconomics) associated with your watershed. PTMApp provides base products consisting of publicly available statewide data that are set to the boundary of your watershed. These data include watershed boundaries of different scales, the water quality condition of streams and lakes, the locations of impaired streams and lakes, ecological regions, and water monitoring locations. This information is intended to simplify the process of gathering and summarizing some of the common information needs associated with watershed management and planning. **Figure 4-2** shows an example for the South Fork Root River where assessed and impaired streams are displayed based upon current geospatial data from the Minnesota Pollution Control Agency. These data can help to visualize and summarize the number of impaired waters and assessed waters within the study area.

Figure 4-2. Assessed and impaired streams draining to the outlet of the South Fork Root River.

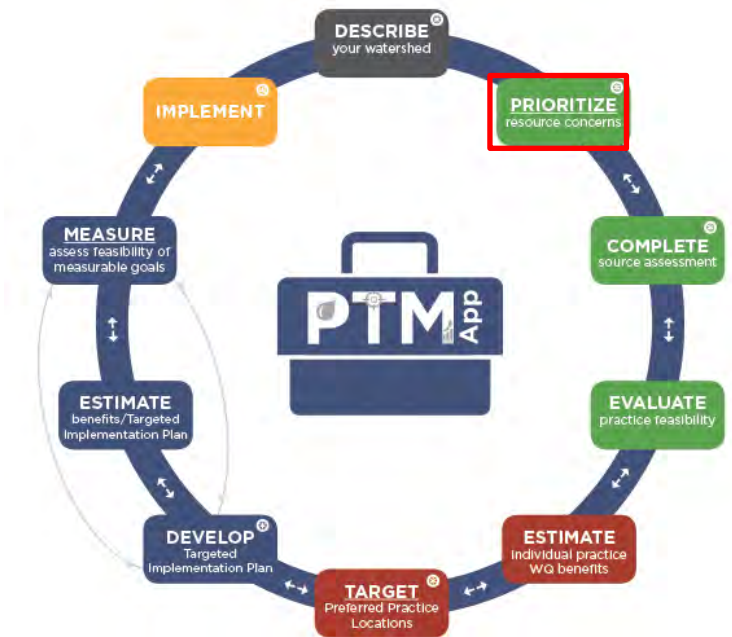
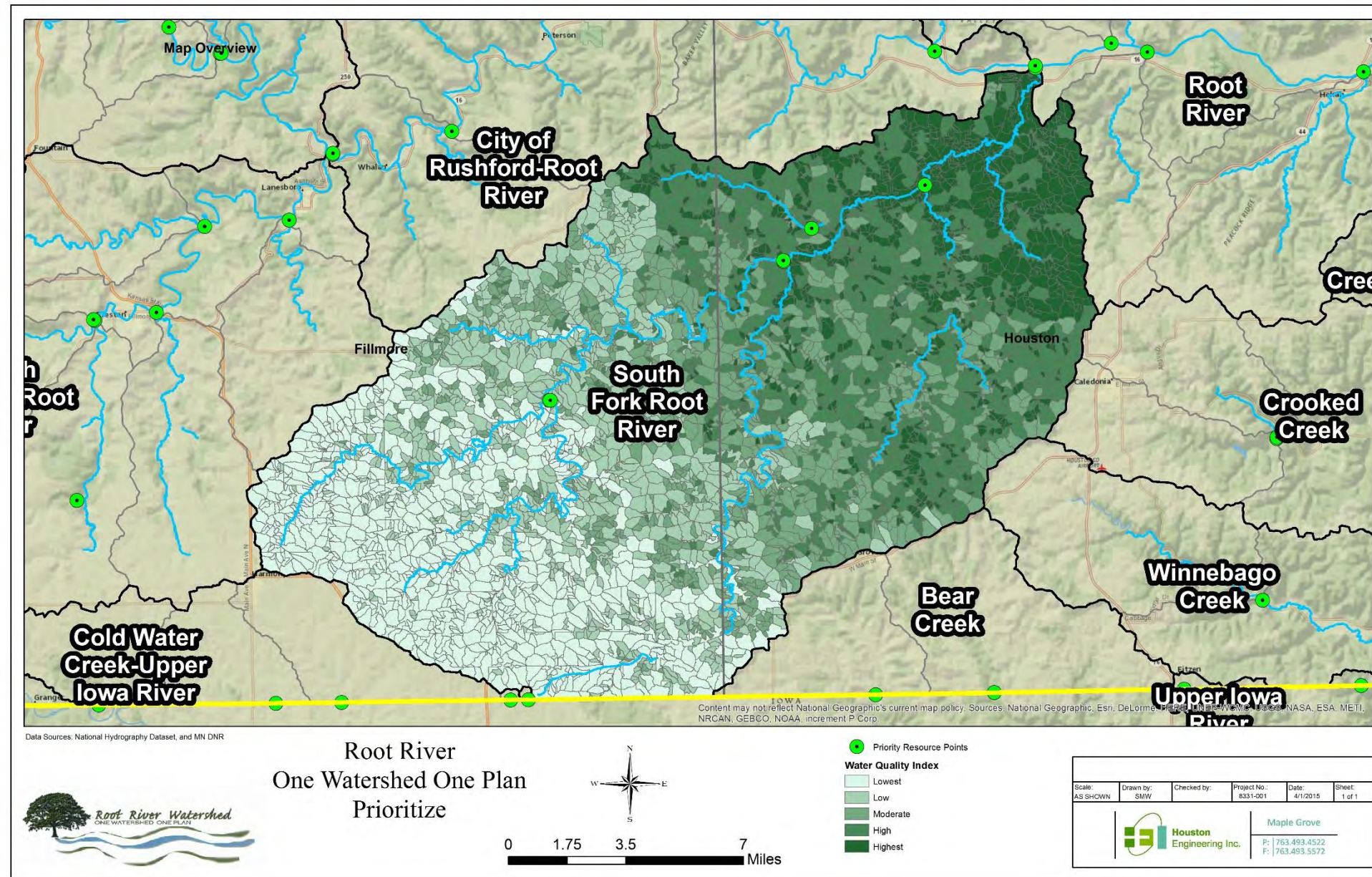




## PRIORITIZE RESOURCE CONCERNS- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

Prioritizing resource concerns is the process by which practitioners establish the relative importance of resources within some area. Surface water quality is a common potential resource concern included in prioritization processes. Products from PTMApp can be used in conjunction with other information, such as Hydrologic Simulation-Fortran Program (HSPF) model and zonation results, to aid in the process of prioritizing resource concerns. For example, PTMApp products can be used to show the relative contributions of sediment and nutrients to some downstream location of interest, at the field or catchment scale. One of the products is called a “water quality index” and shows the combined contribution of sediment and nutrients to the outlet of the South Fork Root River (**Figure 4-3**). These ranks can be useful in identifying the sources of sediment and nutrients that reach a downstream lake or stream, locations where practices and management actions are needed, and as input to other processes including zonation to identify priority resource concern locations.

**Figure 4-3.** Water quality index (50% sediment and 50% nutrients) for sediment, total nitrogen, and total phosphorus delivered to the outlet of the South Fork Root River.

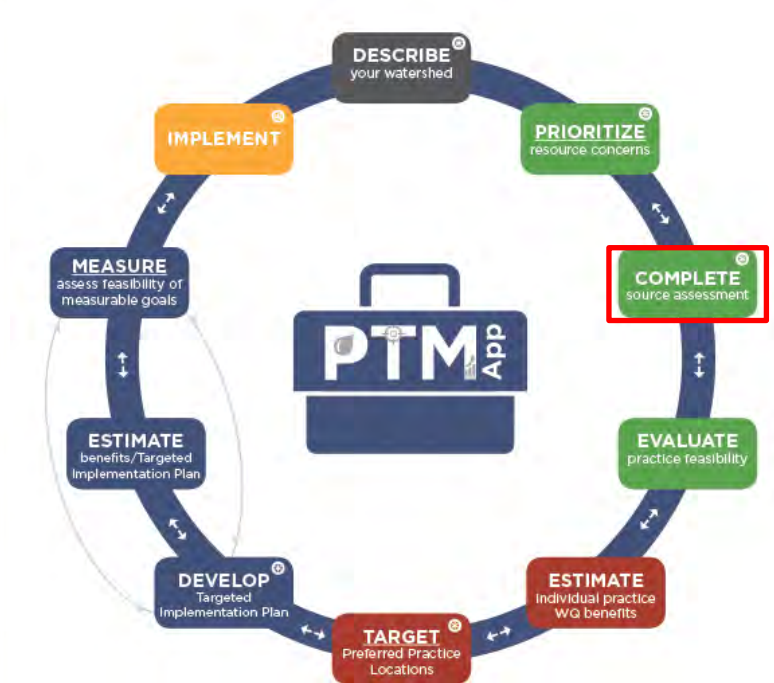
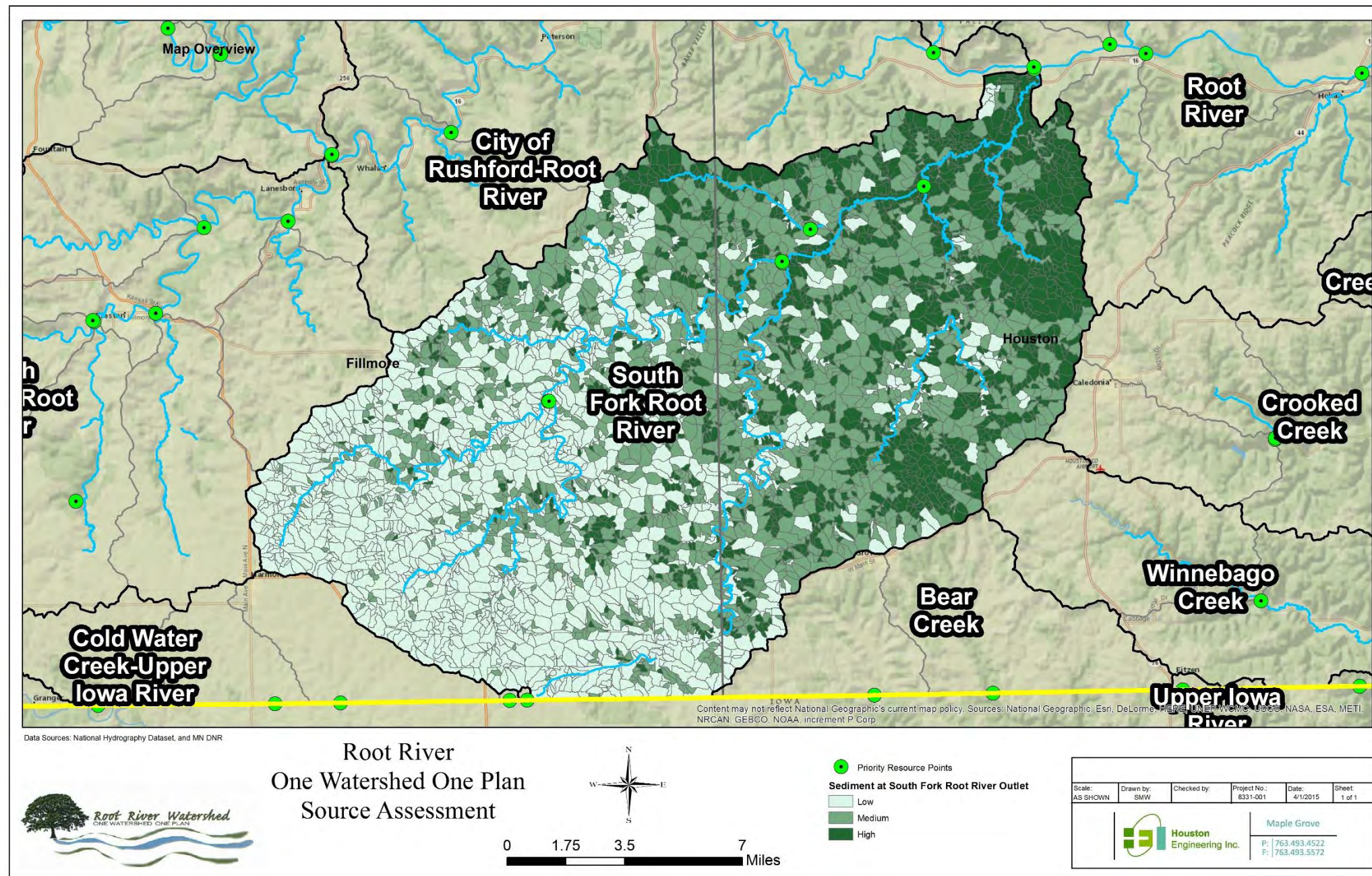




## COMPLETE SOURCE ASSESSMENT- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

The source assessment identifies the magnitude and spatial distribution of potential pollution sources across the landscape. PTMApp creates three source assessment products, for example, load (i.e., pounds per year) and yields (i.e., pounds per acre per year) leaving the landscape, delivered to a waterway, and delivered to a downstream resource (i.e., lake or river reach) you are interested in managing. By completing a source assessment, an understanding of how various parts of the watershed affect a resource is obtained and possible BMP locations are identified. The sediment yields delivered from various catchments to the outlet of South Fork Root River are shown in **Figure 4-4**. Similar products can be developed for TN and TP for any priority resource point or location. The results indicate that the highest areas of sediment loading to the outlet of South Fork Root River are within lower portion of the watershed (dark green). For strategies aimed at reducing sediment delivered to the outlet of South Fork Root River, the "High" sediment yield areas would provide ideal locations to consider for targeting practices. However, we first must evaluate the feasibility of implementing BMPs in those areas. In other words, the highest loading (sediment, TN, or TP) areas on the landscape, might have limited opportunities for implementing a practice to address the issue because of other factors including poor soils, steep slopes, or high groundwater.

**Figure 4-4.** South Fork Root River source assessment for sediment yield delivered to the outlet of South Fork Root River. Total Nitrogen and Total Phosphorus were also assessed (not shown in map).

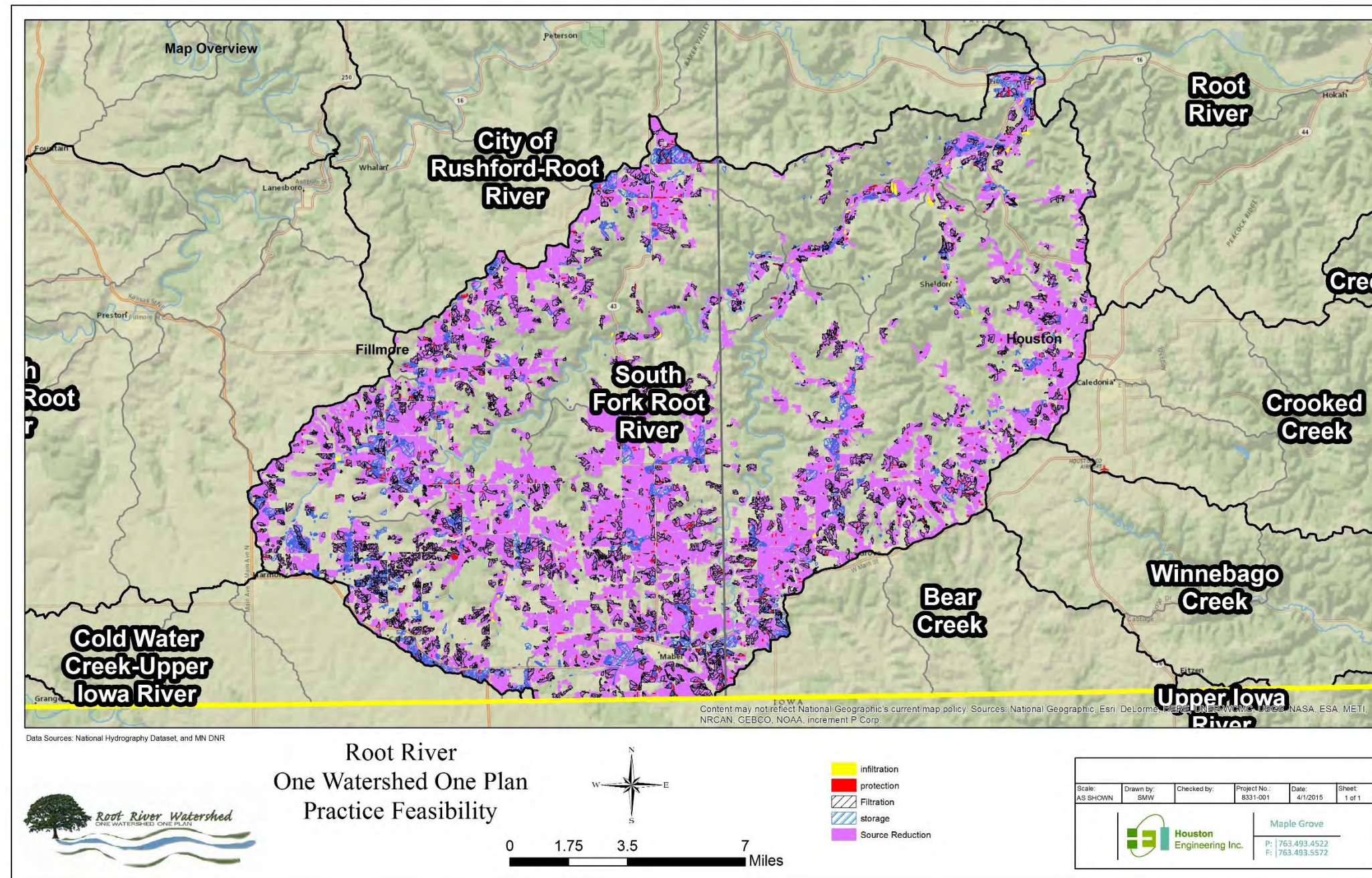




## EVALUATE PRACTICE FEASIBILITY- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

The feasibility of placing a BMP on the landscape depends on several factors. These factors include the size of the contributing drainage area, the land slope, the rate and amount of runoff, and local topography. Practice feasibility is based solely on technical factors largely based on field office technical guides developed by the NRCS and excludes social factors like the desire by landowners to implement practices. Locations shown as “feasible” are candidates for implementing practices and require further technical evaluation to confirm feasibility. The potential opportunities for BMPs within the South Fork Root River watershed are shown in **Figure 4-5**. The opportunities are displayed by how the practice functions, which are called treatment groups. It’s important to recognize these are only potential locations. Local knowledge is still needed to refine the locations to identify a realistic set of targeted practices. These BMP opportunities can be combined with the source assessment information (above) to estimate the “measurable” water quality benefits for implementing the practices.

**Figure 4-5.** Potential opportunities for BMPs within the South Fork Root River watershed.

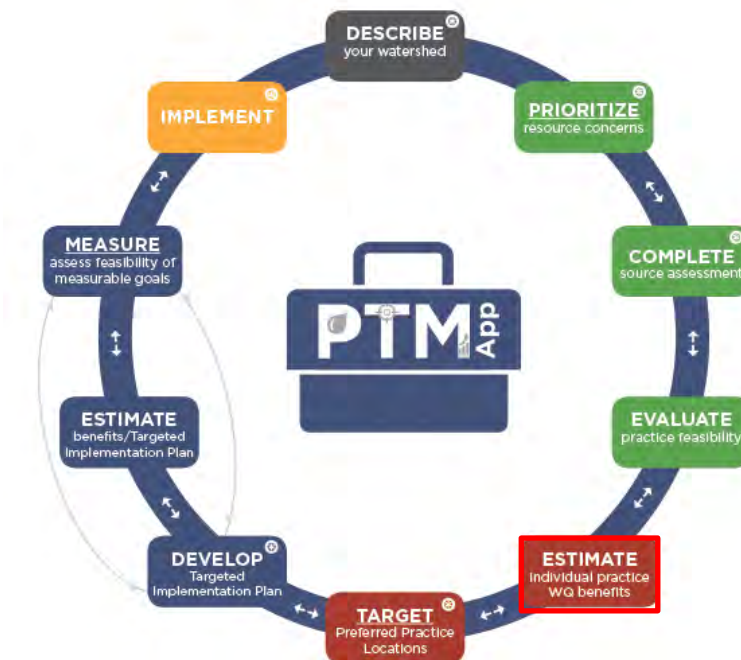
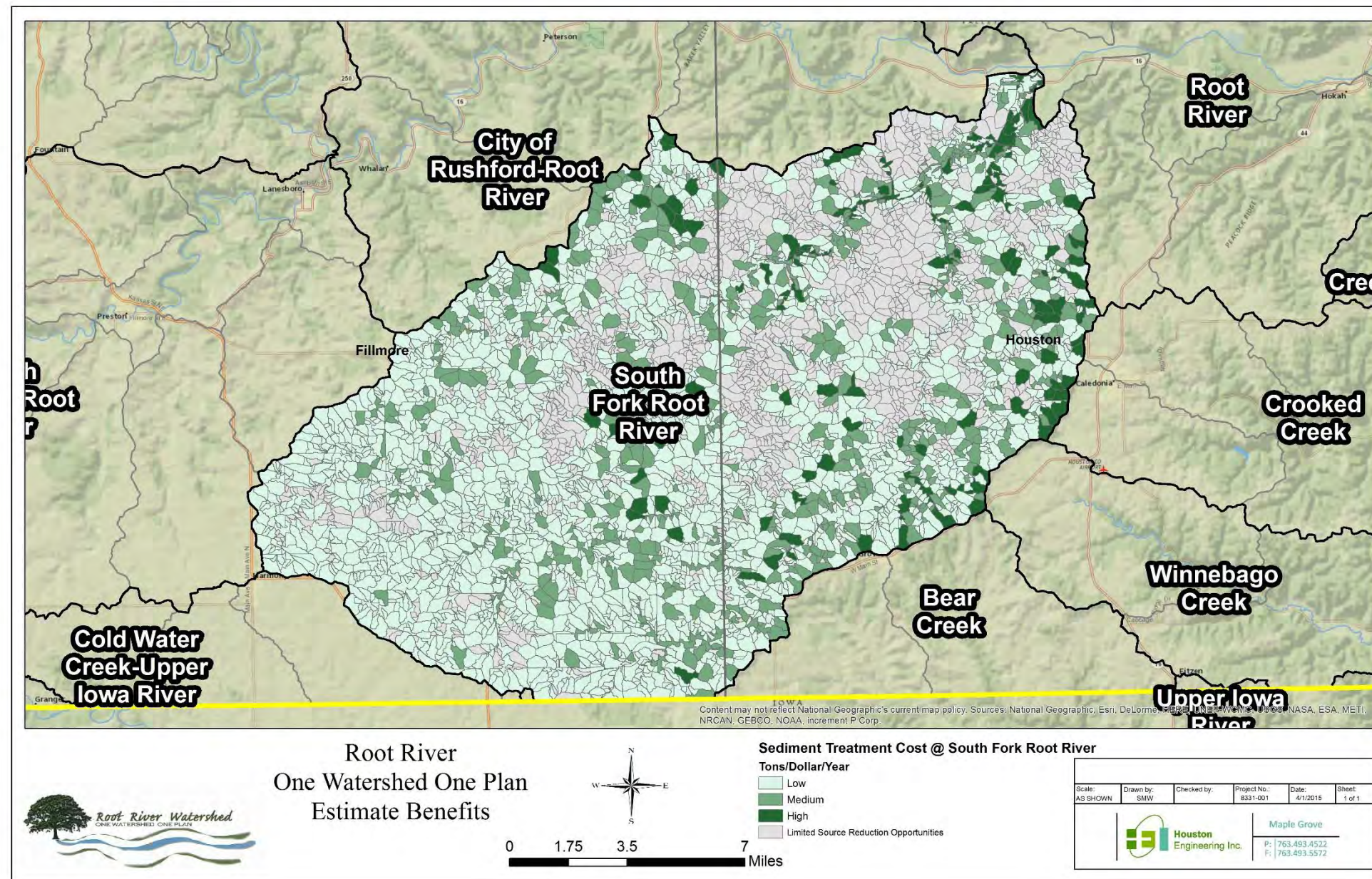




## ESTIMATE WATER QUALITY BENEFITS- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

One of the means of selecting specific practices for implementation is based on their estimated benefits. The estimated benefits of a practice can be described by either the amount of a parameter (like sediment or phosphorus) removed, or the cost to remove one unit of the parameter (i.e., dollars per pound of phosphorus annually reduced). The PTMApp products provide information about practice benefits at the location of the practice or the downstream resource, which might be a specific lake or portion of a river. The estimated benefits at a lake or river are typically more valuable from a decision making perspective than the local benefits. The treatment cost, tons/year/dollar spent, of reducing sediment to the outlet of the South Fork Root River using source reduction practices are shown in **Figure 4-6**. The areas providing the largest “bang for the buck” are in the High category (dark green). The most cost-effective areas for sediment reductions do not correspond exactly to the highest source load areas (see **Figure 4-4**). These results can be used to target practice locations to implement BMPs that provide the most cost-effective avenue to make progress towards local, state, and regional water quality management goals.

**Figure 4-6.** The treatment cost (tons/year/dollar spent) of reducing sediment delivered to the outlet of the South Fork Root River Watershed. Similar products can be developed for total nitrogen and total phosphorus.

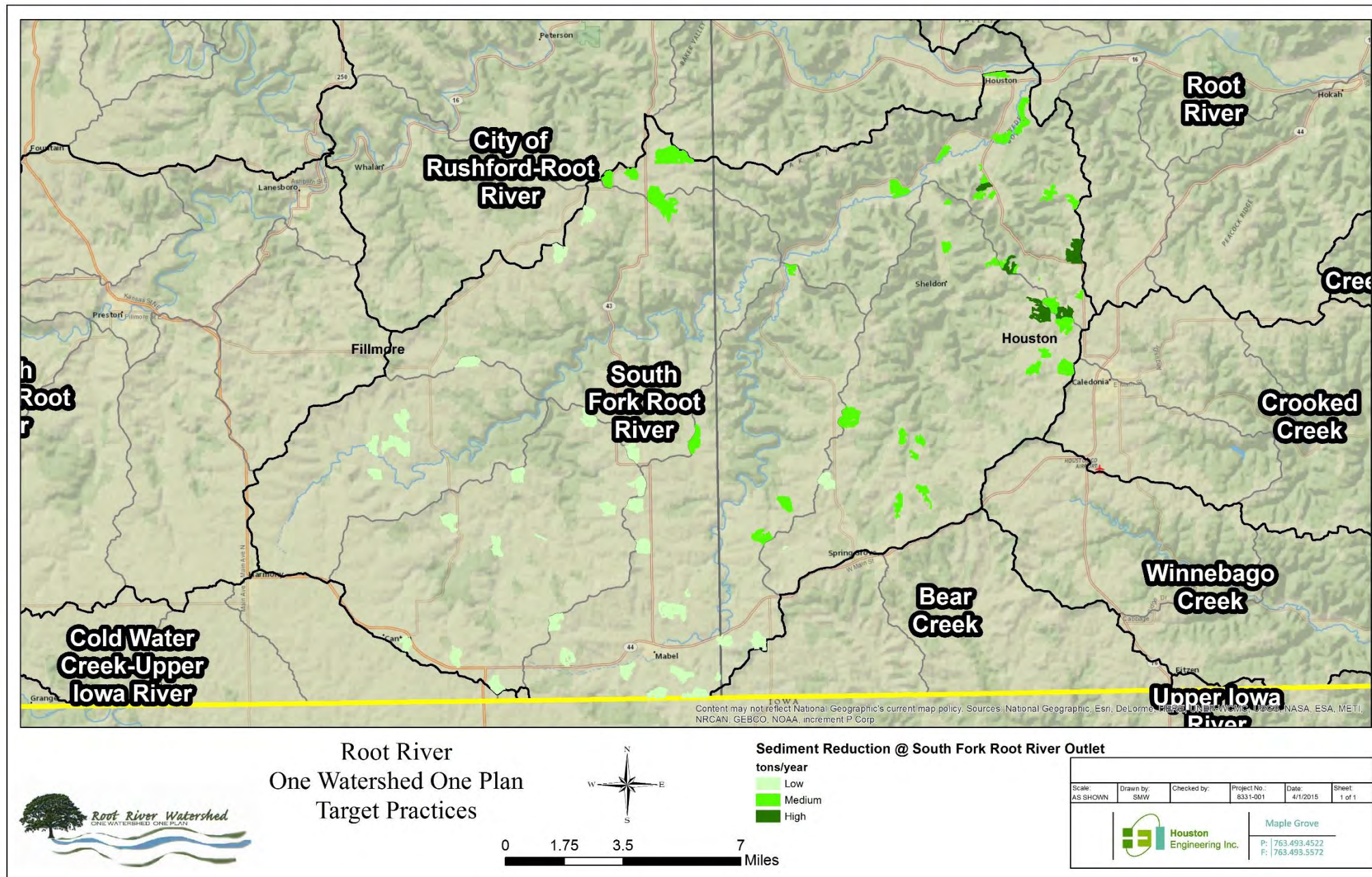




## TARGET PREFERRED PRACTICE LOCATIONS- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

Once possible BMP locations are identified based upon technical feasibility, the potential locations need to be assembled into an implementation approach to evaluate their combined effectiveness. The range of BMP locations based solely on technical feasibility is reduced by applying conditions like a minimum practice size requirement, minimum treatment effectiveness, or minimum cost effectiveness. The BMPs targeted for the South Fork Root River Watershed for this example are shown in **Figure 4-7**. The implementation scenario focused on targeting practices that provided the greatest reduction of sediment at the outlet of the South Fork Root River and the greatest Total Nitrogen reductions leaving a catchment and reaching a waterway. This business decision requires the user to query and use the data generated by PTMApp. It is intended to provide feasible locations for implementing practices that will provide measurable water quality improvements for local priority resources. However, there are a number of factors that might influence the practices which end up being implemented such as, existing practices already in place or willingness of the landowner to participate. The inclusion of such factors is discussed in the next business decision, Develop Targeted Implementation Plan.

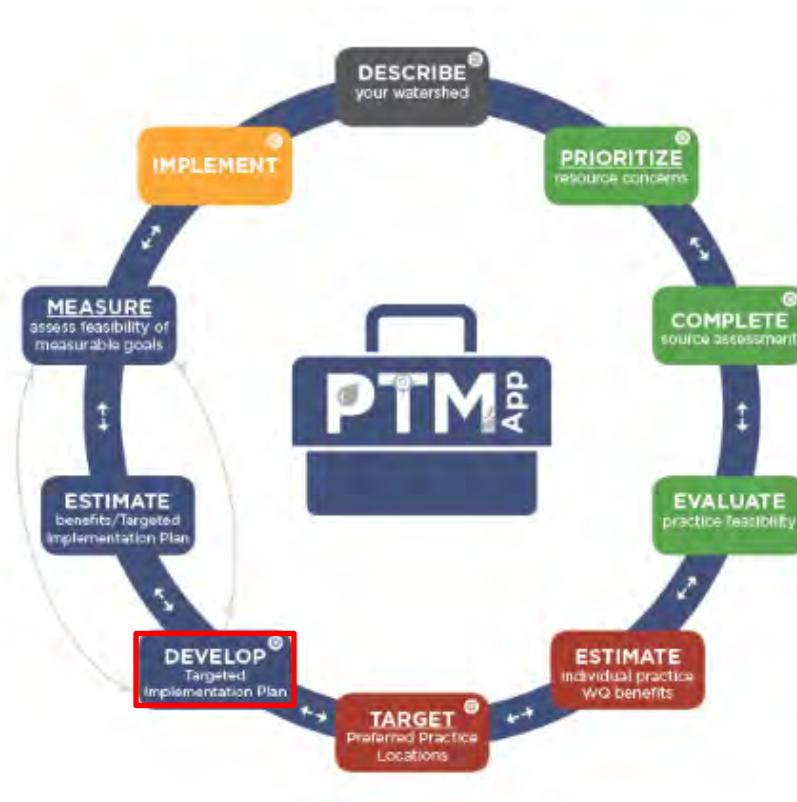
**Figure 4-7:** Practices targeted for implementation in the South Fork Root River Watershed.





## DEVELOP TARGETED IMPLEMENTATION PLAN- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

Specific locations to place practices need to be targeted based on other factors, including practical and social factors. Examples of practical factors include landowner acceptance of specific types of practices and landowner willingness to place a practice on a field. Additional information can be incorporated to refine the practices targeted based on PTMApp data (i.e. drainage area treated). It's likely that many areas in watersheds might already have a BMP implemented, lack landowners who are willing to participate in additional BMPs, or have benefits outside of water quality (water quantity, wildlife habitat, aquatic habitat, etc.) that adjust the targeted locations for BMPs.





## BENEFITS OF A TARGETED IMPLEMENTATION PLAN- SOUTH FORK ROOT RIVER PTMAPP EXAMPLE

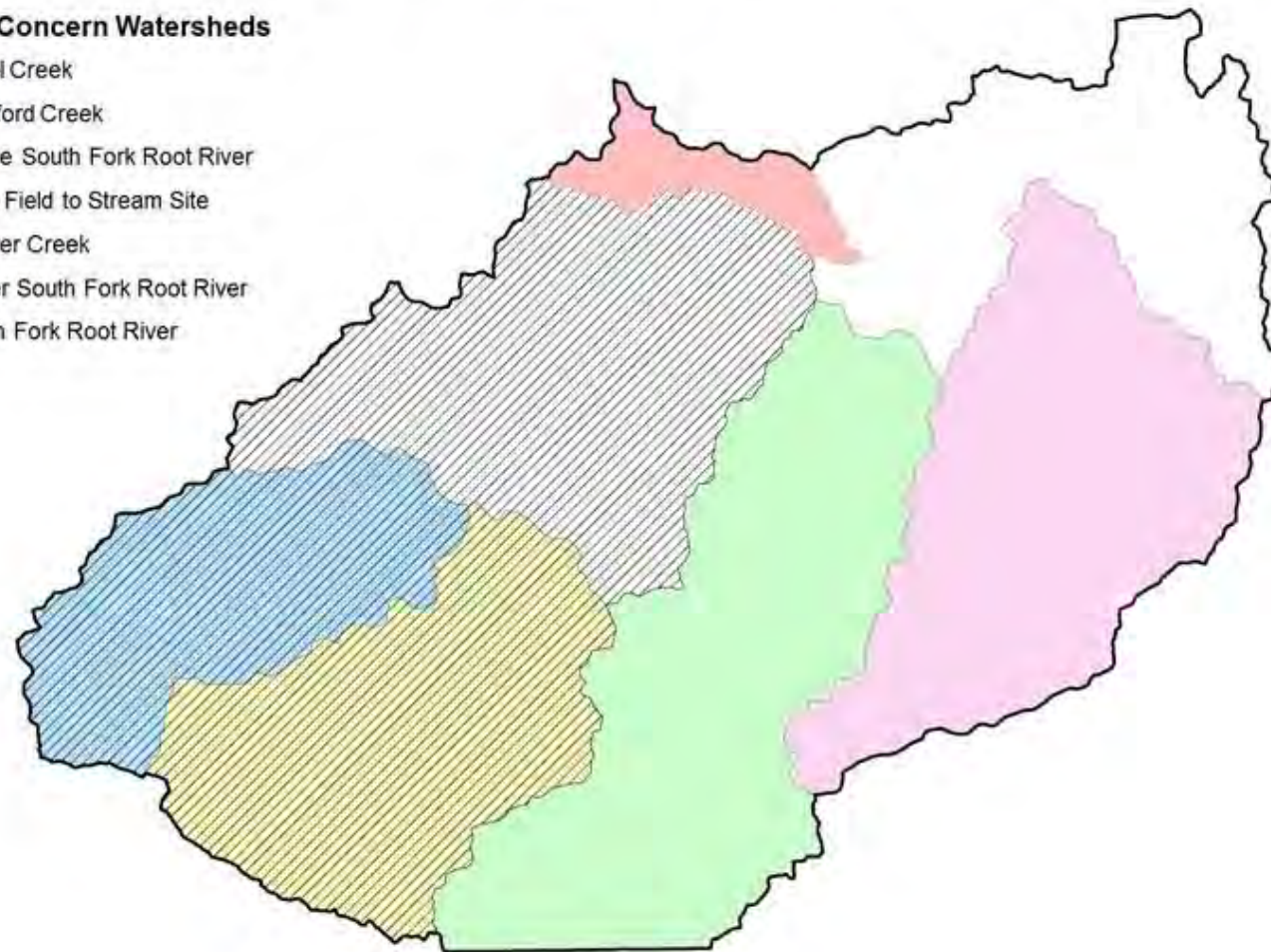
The combined benefits expressed as the amount of load reduction at the resource location being restored or protected can be compared to a measurable goal. The measurable goal may be the load reduction necessary to reach the loading capacity for an impaired surface water or the existing load. Because the benefits of one or more practices depends on the amount of distance between the practice and the lake or river, practice benefits are a function of their position within and size of the watershed. Practice benefits tend to decline moving downstream as the drainage area increases. Although a practice may be intended to restore or protect the closest lake or river reach, benefits are also realized further downstream. The combined benefits of many practices can be used to assess the effectiveness of the targeted implementation plan. The annual load reduction estimates for TN, TP, and sediment based on the targeted practices in this example are shown in **Figure 4-8**. The load reductions are estimated at each priority resource point within the South Fork Root River Watershed and can be used to assess progress towards and feasibility of a measurable water quality goal. This information can be used directly within a targeted implementation plan.

Figure 4-8. Sediment, TP, and TN reductions based upon targeted practices used in this example for the South Fork Root River Watershed.

Resource Concern	Original	Remaining	Reduction	Original	Remaining	Reduction	Original	Remaining	Reduction
	Sediment Load, tons/year			TP Load, lbs/year			TN Load, lbs/year		
Wisel Creek	44,327	42,244	2,083	205	189	16	3,479	3,391	89
Riceford Creek	37,720	36,241	1,479	232	225	6	3,508	3,472	36
Middle South Fork Root River	43,117	41,361	1,757	231	229	2	3,532	3,521	11
MDA Field to Stream Site	11,674	10,076	1,598	99	98	2	1,517	1,493	23
Beaver Creek	38,973	36,108	2,865	171	167	3	2,937	2,918	18
Upper South Fork Root River	28,928	27,328	1,600	227	224	3	3,768	3,751	16
South For Root River	69,602	63,162	6,440	293	264	29	4,504	4,167	337

### Resource Concern Watersheds

- Wisel Creek
- Riceford Creek
- Middle South Fork Root River
- MDA Field to Stream Site
- Beaver Creek
- Upper South Fork Root River
- South Fork Root River



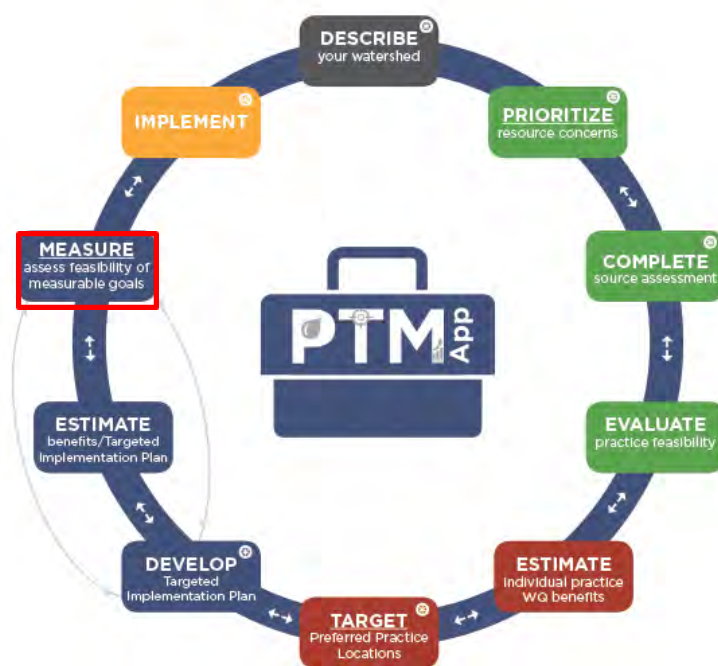
## ASSESS FEASIBILITY OF MEASURABLE GOALS- SOUTH FORK ROOT RIVERPTMAPP EXAMPLE

A measurable goal may be the load reduction needed to restore a lake or river reach or a maximum load to protect a resource. The benefits of the implementation plan can be compared to the measurable goals at one or more locations. The estimated benefits of the targeted implementation plan can be compared to water quality goals from watershed, state, or regional strategies, such as those found in the States Nutrient Reduction Strategy or the Root River Watershed WRAPS. The results of this project suggest that implementing the practices used in this targeted example would provide a 21% reduction in sediment in 10 years for the South Fork Root River set by the Root River Watershed One Watershed, One Plan (**Table 4-1**).


**Table 4-1:** Example for the South Fork of the Root river, demonstrating how PTMApp results can be used to assess the ability to achieve measurable goals.

At Impaired Water	Sediment (tons/yr)	Total Phos. (lb/yr)	Total Nitrogen (lb/yr)
Current Estimated Load	69,602	293	4,504
Estimated Load Reduction for Plan	6,440	29	337
Estimated Load with Plan	63,162	264	4,167
Goal (% reduction)	45%	45%	45%
Goal Load Reduction (mass)	31,321	132	2,027
Plan Percent of Goal	21%	22%	16%

Goals are annual values from the Minnesota Nutrient Reduction Strategy for Mississippi River Basin for TP and TN. Sediment percentage equal to TP reduction goal within the Minnesota Nutrient Reduction Strategy for Mississippi River Basin.







Information provided in the targeted implementation schedule is expected to be used to develop an annual work plan, reaffirm the budget needed, and to support budget requests to the state through BWSR's Biennial Budget Request (BBR). As this plan envisions collaborative implementation, annual work plan efforts and the BBR may be developed based on the targeted implementation schedule. Annual work planning and the BBR is discussed further in **Section 5**.

### 4.3 PLAN LOCAL FOCUS

Because of the nature of the Root River One Watershed, One Plan area, this plan and the targeted implementation schedule is admittedly focused on rural areas and issues, including the amount nonpoint source runoff and the consequences to surface and ground waters. Land within the plan area is predominantly used for agricultural production, so a rural focus is to be expected. However, there are many communities including Preston, Chatfield, Rushford, Stewartville, Spring Valley, Houston, Lanesboro, Hokah, and Mabel within the plan area. The residents of these communities also affect and impact water resources. The land within these communities generates runoff and pollutants and affect resources located within the plan boundary. The targeted implementation schedule and the implementation program described within **Section 5** are equally applicable to urban and rural landscapes within the plan boundary. Despite the recognized inclination towards activities defined within rural areas, the targeted implementation schedule is not exclusive of urban pollutant sources and management practices, and recognizes that urban areas also contribute to issues affecting priority resource concerns. The various incentive based initiatives and campaigns (**Section 5.1**) used to provide financial incentives for projects can be used in both rural and urban settings.

This plan purposely recognizes the need for a vibrant, sustainable community by establishing social capacity and sustainability of communities as resource categories. Sustainability resource concerns include a community livability, rural environmental health, and urban environmental health. "Livability" is ranked as an "A" level resource concern, reinforcing the need for recognition of the societal factors of providing basic needs for food, shelter, and safety; recognizing the integrated nature of economic, environmental and societal policies affecting water; and managing the land as a sustainable asset. The "Sustainability of Communities" resource category includes both rural and urban environmental health priority resource concerns.

While the best available data and information have been used to develop this plan, no plan is perfect. There are several limitations with this plan and recognizing these limitations is important because they can influence the implementation approach. There is a lack of knowledge specific to the plan area about the amount of runoff reduction needed to obtain geomorphically stable creeks and river channels and the corresponding reduction in sediment loads. The analysis of measurable goals for sediment reduction is therefore focused on the use of practices on the land surface, but fails to recognize other methods for reducing sediment like stream restoration or upstream storage. Although every effort has been made to address the complex hydrogeology with the plan boundary, additional future work is needed. The concern is implementing best management practices in locations where the benefits to a resource are not realized. Designating the predominant hydrologic influence for areas on the landscape is an initial attempt to qualitatively address this concern, and is discussed next. As new technical information becomes available, the technical information within the plan will need to be refined and improved to reflect the most up-to-date knowledge and adjust the targeted implementation schedule.



## 4.4 GEOGRAPHIC FOCUS AND CATEGORIZING PREDOMINANT HYDROLOGIC INFLUENCE

The targeted implementation schedule is further organized by location with the plan area in order to facilitate implementation by plan participants; i.e., the specific areas for the implementation of practices and the measurable goals are identified for each planning region, defined as the 10-digit Hydrologic Unit Code (HUC) Boundary. A 10-digit HUC is a watershed generally ranging in size from 62.5 to 390.6 square miles and comprised of many smaller subwatersheds (see **Figure 1-1**). Subwatersheds are further subdivided into catchments. Catchments represent the contributing drainage areas at a scale of roughly an agricultural producer's field.

The maps included in this plan can be used to guide execution of the targeted implementation schedule which involve the construction of best management practices (BMPs). Maps<sup>8</sup> (see **Section 2**) show the locations for the priority resource concerns, within each planning region. These resources are intended to be restored or protected by the strategies and actions comprising the targeted implementation schedule. Surface waters and ground waters are affected by several issues; i.e., excessive amount of sediment and nutrients in the water. This plan includes maps showing the estimated amount of sediment, total phosphorus and total nitrogen for catchments within each planning region (**Figure 4-4**).

As a planning guide to aid in identifying potential locations to place best management practices based on landscape characteristics, technical feasibility and design considerations, the targeted implementation schedule also includes maps which show possible locations to implement best management practices (**Figure 4-5**). The potential practice locations included and evaluated in this plan are shown in **Appendix I**. These locations were identified based on a qualitative analysis of where on the landscape the sources of sediment and nutrients are likely greatest. When combined with maps showing potential BMP locations based on design suitability and practice benefits, these maps can be used to develop and refine implementation at any geographic scale.

The movement of water and pollutants within the plan boundary is complex. Water movement is complex because of the challenging hydrogeology, including the presence of karst formations. A relatively small amount of time is required for surface water runoff to move through the ground and reach groundwater at some locations. For strategies intended to accomplish measurable goals for resources within the surface water and ground water categories, recognition of the complex movement of water is important. Some means of qualitatively characterizing the sources of sediment and nutrients and whether benefits will accrue to groundwater, surface water or both groundwater and surface water is needed. This plan includes the categorization of catchments within each planning region, by defining the "predominant hydrologic influence". Catchments are qualitatively categorized based on several technical factors and criteria (see **Appendix J** for a description of the methods) as: 1) predominantly surface water; 2) predominately groundwater; or 3) both surface and ground water hydrologic influence. These maps are intended to be useful for guiding implementation and serve to qualitatively describe whether sediment and nutrients leaving the landscape reach surface or groundwater, and the resources where the benefits of implementing BMPs may be realized.

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<sup>8</sup> These maps are generally based on readily available state and federal geographic information system data. Other data pertaining to each resource concern may exist.





## 4.5 IMPLEMENTATION ROLES AND RESPONSIBILITIES

The targeted implementation schedule defines the roles and responsibilities for completing each action item within a strategy. The targeted implementation schedule includes strategies and actions intended to be completed by others, including state agencies, federal agencies and non-governmental organizations. Plan preparers believed including the strategies and actions to be completed by others in the plan is important, to recognize and guide the work of others and clarify the local role. The roles and responsibilities for implementation are identified by assigning a “lead” (local, state, or federal), a “lead entity,” and “partners” to each action.

The “lead” designation indicates whether the responsibility for completion of an action is at the local government or some other level (i.e., by a state agency, federal agency or Non-Governmental Organization (NGO) collaborator). The designation of the “lead entity” is the specific agency or local governmental unit responsible for facilitating the action item to its completion. “Partners” are also assigned to each action to recognize collaborative efforts in order to implement some actions within the targeted implementation schedule. The Planning Work Group initially assigned the lead, lead entity, and partner designations based on technical competency and ability, consistency with the mission and perceived availability of fiscal resources. These designations were then reviewed and agreed upon by the Advisory Committee and Policy Committee for inclusion into the targeted implementation schedule. The targeted implementation schedule has been adjusted to reflect the anticipated combined local, state, federal, NGO fiscal and technical commitments. In order to execute the strategies and actions described within the plan, all participants will need to exercise considerable intergovernmental and NGO coordination and cooperation.

## 4.6 IMPORTANCE OF WORK COMPLETED BY OTHERS

Success in addressing the priority concerns within the plan area cannot be achieved solely by local government and requires the participation of state agencies, federal agencies, NGOs, and those residing within and beyond the plan boundary. A great deal of work has been done by other organizations within the plan area, by NGOs, state agencies, federal agencies, and others. Much of this work has been used in developing this plan and additional research is needed to close science gaps. The state has invested in the completion of multiple studies, reports, and strategies which are pertinent to the plan area. This investment has generated valuable information, which has been heavily leveraged in the development of this plan. **Table 4-2** summarizes the resulting state documents and how they have been considered and incorporated into the plan. One report that was not completed in time to be used in writing this plan but will be valuable in prioritizing and targeting efforts is the Root River Sediment Budget completed by Patrick Belmont, Toby Dogwiler, and Karthik Kumarasamy in May 2016. The study connected a wide variety of analyses that explain key factors governing sediment dynamics in the Root River watershed indicating that recent (i.e. over the past few decades) agricultural soil erosion and streambank erosion are both prominent sediment sources.

There are considerable similarities between the priority resource concerns established by this plan and the priorities, goals, and objectives of NGOs, state agencies and federal agencies. This plan represents an opportunity to clarify roles and facilitate the cooperation and the streamlining of implementation efforts to get work done by multiple organizations within the plan area. Although this plan largely reflects local priorities, in no way is the plan intended to supplant or replace in any way the importance of efforts of other organizations with somewhat differing but complementary goals and objectives. The work of other organizations is expected to continue during plan implementation and into the future, and is reflected within the targeted implementation schedule. The Root River One Watershed, One Plan will continue to



foster an environment that enhances cooperation and coordination with other organizations to the maximum extent possible throughout the implementation of the plan (**Section 5.3.2**).

**Table 4-2:** State documents and relation to the plan.

Organization	Document Name	Use in the Plan
Minnesota Department of Agriculture	Minnesota Nitrogen Fertilizer Management Plan	• Strategies for nitrogen management and reduction
Minnesota Department of Health	Volunteer Nitrate Monitoring Network Study	• Nitrate groundwater levels
Minnesota Pollution Control Agency	The Minnesota Nutrient Reduction Strategy	• Strategies for nutrient reduction • Benchmarks used as surrogate for nutrient reduction goals
Minnesota Pollution Control Agency	Root River Watershed Monitoring and Assessment Report	• Monitoring data • Condition of surface waters
Minnesota Pollution Control Agency	Root River Watershed Stressor ID Report	• Biotic community and diversity
Minnesota Pollution Control Agency	Root River Watershed Total Maximum Daily Load	• Load Allocations
Minnesota Pollution Control Agency	Root River Watershed Restoration and Protection Strategy (WRAPS)	• Issues impacting water quality resources of concern • Strategies addressing issues

State water policy officials envisioned a synergy between a plan developed through the One Watershed, One Plan effort and the outcomes and strategies described by a completed Watershed Restoration and Protection Strategy (WRAPS).<sup>9</sup> Both the WRAPS and this plan identify issues impacting water quality resources of concern. The WRAPS describes general strategies to improve water quality within each of the planning regions. This plan incorporates the strategies identified within the WRAPS, but adds detail about the sources of pollutants, identifies potential locations for prioritized implementation, identifies a catchment’s predominant hydrologic influence, establishes new and consistent programs for funding the construction of BMPs, describes the anticipated load reduction benefits, and estimates the fiscal resources for implementation. However, this refinement is still not perfect. Long-term resolution of the relationship between the One Watershed, One Plan and the WRAPS will determine most efficient use of fiscal and staff resources. Additionally, further technological information and advances will continue to refine the strategies identified in the plan.

## 4.7 PLAN MEASURABLE GOALS

The measurable goals definition is introduced in **Section 3.1 Definitions**, as a preface to describing the strategies and actions comprising the targeted implementation schedule. Measurable goals are organized by priority resource concern. As shown in **Table 4-3**, there are several issues which affect each priority resource concern. **Table 4-3** identifies the issues affecting the priority resource concerns and the strategies being implemented to address those issues. Use of the issues table facilitates developing strategies which affect multiple resource concerns. One issue (such as nitrogen) may affect multiple priority resource concerns (Drinking Water Supplies, Streams and Rivers, Trout Streams) and grouping strategies by issue reduces redundancy within plan measurable goals.

<sup>9</sup> The draft WRAPS and TMDL for the plan area were relied upon for the completion of this plan. Specifics of the plan may need to be revised when these documents are issued as final.





**Table 4-3:** Issues impacting resource concerns and the strategies used to address the issue (summarized from Section 2).

Issue	Strategies (see Section 3)	Resource Concern	Priority Level
<b>Sediment</b>	SW3 - Sediment	Streams and Rivers	A
	SW3 - Sediment	Aquatic Habitat for Fish, Macroinvertebrates, and Aquatic Life	C
	SW3 - Sediment	Trout Streams	C
	SW10 - Wetlands	Wetlands	B
<b>Nutrients</b>	GW1- Nitrate-nitrogen	Drinking Water Supplies	A
	GW1- Nitrate-nitrogen	Springsheds	C
	GW1- Nitrate-nitrogen	Karst Formations	C
	GW1- Nitrate-nitrogen	Surficial-Subsurface Hydrologic Connections	B
	SW5- Nitrate-nitrogen	Streams and Rivers	A
	SW6- Total phosphorus	Streams and Rivers	A
<b>Pesticides</b>	GW3- Pesticides	Karst Formations	C
	GW3- Pesticides	Springsheds	C
	GW3- Pesticides	Drinking Water Supplies	A
	GW3- Pesticides	Surficial-Subsurface Hydrologic Connections	B
<b>Bacteria</b>	GW2- Total coliform	Drinking Water Supplies	A
	GW2- Total coliform	Karst Formations	C
	SW4 - E. coli	Streams and Rivers	A
<b>Excess Runoff</b>	GW4- Supply	Drinking Water Supplies	A
	GW5- Supply	Springsheds	C
	GW5- Supply	Surficial-Subsurface Hydrologic Connections	B
	GW5- Supply	Trout Streams	C
	GW6- Landuse / Runoff	Surficial-Subsurface Hydrologic Connections	B
	SW1- Stream Stability	Streams and Rivers	A
	SW2- Riparian Condition	Streams and Rivers	A
	SW7 - Dissolved Oxygen/Temperature	Streams and Rivers	A
	SW8 - Flooding	Flooding	B
	SW9 - Flooding	Flooding	B
	LF1- Riparian Vegetation	Riparian Corridors	B
	WI1- Drainage Design	Drainage Systems	B
	WI2- Drainage BMPs	Drainage Systems	B
	WI3- Infrastructure Development	Drainage Systems	B
	WI6- Water Retention	Water Retention Systems	B
	WI7- Stormwater / Construction Erosion	Water Retention Systems	B
WI8- Low Impact Development	Water Retention Systems	B	
<b>Habitat</b>	LF2- Aquatic Habitat	Aquatic Habitat for Fish, Macroinvertebrates, and Aquatic Life	C
	LF2- Aquatic Habitat	Trout Streams	C




**Table 4-3:** Issues impacting resource concerns and the strategies used to address the issue (summarized from Section 2).

Issue	Strategies (see Section 3)	Resource Concern	Priority Level
	LF3- Trout Streams	Trout Streams	C
	LF4- Habitat	Areas of Moderate and High Biodiversity	C
	LF5- Plant Communities	Areas of Moderate and High Biodiversity	C
	LF6- Karst Formations	Areas of Moderate and High Biodiversity	C
<b>Social Capacity</b>	SC1- Public Education / Outreach	Public Knowledge	B
	SC2- Engaged Landowner and Producers	Landowner and Producer Engagement	A
	SC3- Business Role	Water and Business Community	C
	SC4- Staff Capacity / Admin	Technology, Tools, and Existing Capabilities	C
	SC5- Emerging Issues	Technology, Tools, and Existing Capabilities	C
<b>Sustainability</b>	SUST1- Livability of Community	Livability	A
	SUST2- Rural sustainability	Rural Environmental Health	C
	SUST3- Urban sustainability	Urban Environmental Health	C
	SUST4- Managed Land Use	Land Use	C
<b>Point Sources</b>	WI4- SSTS Adequacy	Point Sources	C
	WI5- Wastewater Discharge	Point Sources	C

GW= Groundwater; SW = Surface Water; LF = Landscape Features; SC = Social Capacity; SUST = Sustainability of Communities; WI = Water Resources Inventory








A goal is made measurable through the execution of strategies and actions, which are designed to address a specific issue, measure progress through a metric, and attain a desired outcome. This plan presents two types of measurable goals: quantitative measurable goals, and reporting measurable goals. Each priority resource concern has a reporting measurable goal associated with it. Planning partners use metrics to track progress towards a reporting measurable goal through a defined metric (**Table 4-4**). Reporting measurable goals are set at the planning region (10-digit HUC) scale. Some resource categories, such as groundwater and surface water, also have a quantitative measurable goal associated with them. Metrics within quantitative measurable goals are used to track progress towards a more quantitative, technical goal, such as a target load reduction in sediment, nutrients, or runoff. Quantitative measurable goals are also set at the planning region level, therefore, progress made towards the attainment of quantitative measurable goals is tracked at the most downstream location within the planning region (i.e. 10-digit HUC pour point).

As stated, quantitative measurable goals for ground water and surface water are based on a target load reduction goals in sediment, nutrients, and runoff. Therefore, the metric to measure progress towards the quantitative measurable goals for groundwater and surface water is annual pollutant load and discharge (**Table 4-4**). The implementation of best management practices addressing sediment, nutrient, and runoff issues impacting groundwater and surface water makes progress towards quantitative measurable goals for ground and surface water. Therefore, the metric for measuring progress towards the reporting measurable goal is the number of BMPs implemented within a planning region. To demonstrate how quantitative and reporting measurable goals were developed within the plan, two examples will be given; i.e., quantitative and reporting measurable goals developed for groundwater and quantitative and reporting measurable goals developed for surface water.

The primary pollutant issue impacting groundwater resources is nitrogen. Therefore, the quantitative measurable goal for the resource concern drinking water supply (within the ground water resource category) is based upon a target load reduction for nitrogen. The target load reduction goal is based off of the statewide Minnesota Nutrient Reduction Strategy (MPCA 2014). The Minnesota Nutrient Reduction Strategy provisional target date for reaching the target load reductions for nitrogen (45% reduction from baseline load) is 2040, therefore, while progress is anticipated to be made, the target load reduction goal is not anticipated to be accomplished throughout the 10-year lifespan of this plan. Progress towards the target load reduction goal is made through implementing a number of best management practices on the landscape at the locations where water preferentially tends to move to an aquifer used for public supply (i.e., catchments with a predominant hydrologic influence category of ground water). Therefore, the number of BMPs implemented within a planning region each year is the metric for the reporting measurable goal. Practices identified for implementation are preferentially selected in part based on the total nitrogen reduction at the field or catchment scale.

Sediment and nutrients (both total phosphorus and total nitrogen) are the primary issues affecting surface waters within the plan area. Quantitative measurable goals for surface waters are also guided by target load reduction goals. The Minnesota Nutrient Reduction Strategy again provides the target load reduction goals for both total phosphorus and total nitrogen. As sediment and total phosphorus sources and management strategies are so closely related, the target load reduction for total phosphorus is also used as the target load reduction for sediment. Progress towards the total nitrogen target load reduction goal is accomplished through the implementation of best management practices with a predominant hydrologic influence category of surface water, or surface water and groundwater. Progress towards the total phosphorus and sediment target load reduction goal is accomplished through the implementation of best management practices in suitable locations throughout the planning region. Therefore, the number of BMPs implemented within a planning region each year is the metric for the reporting measurable goal.



Excess runoff is another primary issue affecting surface waters within the Root River One Watershed, One Plan plan area. Quantitative measurable goals for this issue impacting surface waters is guided by a reduction in the two year peak discharge. The Sediment Reduction Strategy although developed for the Minnesota River Basin, is used within this plan as a surrogate to guide the target two year peak discharge reduction quantitative goal for excess runoff (MPCA 2015). A priority initiative for this strategy is to reduce peak streamflow magnitude and duration. Progress towards the two-year peak discharge reduction goal is accomplished through the implementation of best management practices designed to store upland waters. Therefore, the number of BMPs implemented within a planning region each year is the metric for the reporting measurable goal.

Some surface waters within the plan area actually achieve the water quality standards established by the Minnesota Pollution Control Agency. When water quality standards are met, quantitative measurable goals are established either based upon a no net increase in the existing annual average sediment and nutrient concentration for the planning region, or based off of the goals within the statewide Minnesota Nutrient Reduction Strategy.

In addition to tracking numbers of implemented best management practices, progress towards the surface water quantitative measurable goals can be assessed through the use of the PTMApp results. The Planning Work Group defined a preliminary implementation approach, which consisted of more than 1,000 best management practices constructed within the plan boundary. The practice locations were based on achieving the maximum nitrogen load reduction locally within a catchment and the maximum sediment load reduction within a planning region. The PTMApp considered these best management practices to estimate the probable load reductions at the most downstream location within the planning region (i.e. 10-digit HUC pour point) and intervening locations. PTMApp does not evaluate the effect of existing practices in the estimate of probable load reductions, due to a lack of knowledge of the water quality benefits they currently provide.

Other resource concerns within a resources category (i.e. social capacity, sustainability of communities) do not have quantitative, technical goals, such as a target load reduction associated with them, and therefore solely have reporting measurable goals. These reporting measurable goals have more of an education and outreach focus and are expressed as completing a certain number of events or activities. While some strategies have numeric metrics associated with them (i.e. number of contacts made, number of demonstration projects) the end goal is more descriptive than for the surface water and groundwater quantitative measurable goals.

**Table 4-4** summarizes both quantitative and reporting measurable goals for the plan. Goals are organized by resource category and priority resource concern. There are several issues which affect each associated priority resource concern. Each individual issue has an individual measurable goal (quantitative and/or reporting) associated with it. Reporting metrics are not exclusive to those listed in **Table 4-4**. Other metrics may also be used for reporting purposes, including but not limited to: attitude and behavioral study results; fish and macroinvertebrate Index of Biotic Integrity (IBI); number of conservation plans completed; acres of residue management; number of farmer led councils; number of Discovery Farms; number of acres meeting University of Minnesota recommendations; number of trout stream accesses; number of Conservation Reserve Program acres lost or gained; length of stream reach stable vs. unstable; dollar amount of flood damages; water table elevations; amount of funding received; staff retention and technical capacity; and number of forest stewardship plans.





**Table 4-4:** Description of the measurable goals for “A” and “B” Level Resource Concerns. Load reduction goals apply to the most downstream location within a planning region (i.e. 10-digit HUC pour point). See **Table 4-5** for estimated benefits within planning region and at impaired water locations.

Resource Category	Priority Resource Concern	Priority Level	Issue	Measurable Goal							
				Quantitative Measurable Goal				Reporting Measurable Goal			
				Metric	Amount	Year	Explanation	Metric	Amount	Year	Explanation
Groundwater	Drinking Water Supplies	A	Nutrients: Total Nitrogen	Annual Load (mass/yr.)	45%	2040	Minnesota Nutrient Reduction Strategy for Mississippi River Basin: Nitrogen reduction goal	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of ground water
			Pesticides	Annual Load (mass/yr.)	45%	2040	Approach for Drinking Water Supplies- Nutrients: Total Nitrogen	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of ground water
			Bacteria	Number of wells having drinking water samples that have positive test for E. coli	No water supply wells test positive for E. coli	2026	Developed for this plan based on MDH recommendations	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of ground water
	Springsheds	C	Nutrients: Total Nitrogen	<i>"C" Level Resource Concern: Accomplished through other measurable goals</i>				<i>"C" Level Resource Concern: Accomplished through other measurable goals</i>			
			Pesticides	<i>"C" Level Resource Concern: Accomplished through other measurable goals</i>				<i>"C" Level Resource Concern: Accomplished through other measurable goals</i>			
	Surficial – Subsurface Hydrologic Connections	B	Nutrients: Total Nitrogen	Annual Load (mass/yr.)	45%	2040	Minnesota Nutrient Reduction Strategy for Mississippi River Basin: Nitrogen reduction goal	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of ground water
Pesticides			Annual Load (mass/yr.)	45%	2040	Approach for Drinking Water Supplies- Nutrients: Total Nitrogen	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of ground water	
Surface Water	Streams and Rivers	A	Sediment	Annual Load (mass/yr.)	45%	2025	Surrogate: Minnesota Nutrient Reduction Strategy for Mississippi River Basin: Phosphorus reduction goal	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
			Nutrients: Total Nitrogen	Annual Load (mass/yr.)	45%	2040	Minnesota Nutrient Reduction Strategy for Mississippi River Basin: Nitrogen reduction goal	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
			Nutrients: Total Phosphorus	Annual Load (mass/yr.)	45%	2025	Minnesota Nutrient Reduction Strategy for Mississippi River Basin: Phosphorus reduction goal	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
			Bacteria	E.coli (billions of organisms per day)	Not estimated	N/A	Existing E. coli load estimates unavailable to compare to load capacity.	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
			Excess Runoff	2-Yr. Peak Discharge	25%	2030	Sediment Reduction Strategy for reducing two year peak discharge by 25% by 2030 - volume for the 2-year, 24-hour runoff event used as a temporary surrogate for peak discharge.	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
	Flooding	B	Excess Runoff	2-Yr. Peak Discharge	25%	2030	Sediment Reduction Strategy for reducing two year peak discharge by 25% by 2030 - volume for the 2-year, 24-hour runoff event used as a temporary surrogate for peak discharge	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
	Wetlands	B	Excess Runoff	Proportion of 2-Yr. Peak Discharge	5%	2030	Accomplished through Sediment Reduction Strategy - 5% of the 25% reduction in excess runoff for the 2-Yr Peak Discharge achieved through storage and habitat provided by wetland restorations	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater



**Table 4-4:** Description of the measurable goals for “A” and “B” Level Resource Concerns. Load reduction goals apply to the most downstream location within a planning region (i.e. 10-digit HUC pour point). See **Table 4-5** for estimated benefits within planning region and at impaired water locations.

Resource Category	Priority Resource Concern	Priority Level	Issue	Measurable Goal							
				Quantitative Measurable Goal				Reporting Measurable Goal			
				Metric	Amount	Year	Explanation	Metric	Amount	Year	Explanation
Landscape Features	Riparian Corridors	B	Excess Runoff	Area Subject to Flood Damages Occurring Within Riparian Area	< 5%	2026	Developed for this plan. Reduce flood damages to riparian areas for the 100-Yr flood event, through the use of appropriate land uses, permanent vegetation and habitat creation.	Number of BMPs / yr.	10% of practices* in each planning region annually	2026	Focus on catchments with predominant hydrologic influence of surface water, or surface water and groundwater
	Aquatic Habitat for Fish, Macroinvertebrates and Aquatic Life	C	Habitat	"C" Level Resource Concern: Accomplished through other measurable goals				"C" Level Resource Concern: Accomplished through other measurable goals			
	Trout Streams	C	Habitat	"C" Level Resource Concern: Accomplished through other measurable goals				"C" Level Resource Concern: Accomplished through other measurable goals			
	Area of Moderate and High Biodiversity	C	Habitat	"C" Level Resource Concern: Accomplished through other measurable goals				"C" Level Resource Concern: Accomplished through other measurable goals			
	Karst Formations	C	Habitat	"C" Level Resource Concern: Accomplished through other measurable goals				"C" Level Resource Concern: Accomplished through other measurable goals			
Social Capacity	Public Knowledge of and Behavior Relative to Water Issues	B	Social Capacity	N/A: See Reporting Measurable Goal				No. of Public Engage and Outreach Events	6 per year per SWCD	2026	Developed for this plan.
	Landowner and Producer Engagement	A	Social Capacity					Proportion of Engaged Landowners Using Initiatives	75%	2026	Developed for this plan. Use the proportion of landowners engaged through this initiative which use the financial incentives initiative to implement practices as an index of effectiveness. Target 100 landowners per year.
	Connecting Water and Business Community	C	Social Capacity					"C" Level Resource Concern: Accomplished through other measurable goals			
	Technology, Tools and Existing Capabilities	C	Social Capacity					"C" Level Resource Concern: Accomplished through other measurable goals			
Sustainability of Communities	Livability	A	Sustainability	N/A: See Reporting Measurable Goal				Annual Satisfaction Survey	75% positive response	2026	Developed for this plan. Annual survey of residents.
	Rural Environmental Health	C	Sustainability					"C" Level Resource Concern: Accomplished through other measurable goals			
	Urban Environmental Health	C	Sustainability					"C" Level Resource Concern: Accomplished through other measurable goals			
	Land Use	C	Sustainability					"C" Level Resource Concern: Accomplished through other measurable goals			
Water Resources Infrastructure	Drainage Systems	B	Water Resources Infrastructure	N/A: See Reporting Measurable Goal				No. of Infrastructure Failures at Road Crossings	<1%	2026	Developed for this plan. Use no. of road failures as an index
	Point Sources	C	Water Resources Infrastructure					"C" Level Resource Concern: Accomplished through other measurable goals			






**Table 4-4:** Description of the measurable goals for “A” and “B” Level Resource Concerns. Load reduction goals apply to the most downstream location within a planning region (i.e. 10-digit HUC pour point). See **Table 4-5** for estimated benefits within planning region and at impaired water locations.

Resource Category	Priority Resource Concern	Priority Level	Issue	Measurable Goal							
				Quantitative Measurable Goal				Reporting Measurable Goal			
				Metric	Amount	Year	Explanation	Metric	Amount	Year	Explanation
Water Resources Infrastructure (continued)	Water Retention Systems	B	Water Resources Infrastructure	N/A: See Reporting Measurable Goal				Area Subject to Flood Damages Occurring Within Riparian Area	< 5%	2026	Developed for this plan. Reduce flood damages to riparian areas for the 100-Yr flood event, through the use of storage if appropriate, upstream of flood damage locations

\* As defined per planning region in the Field Practices Table, Table 4-7

This table identifies each of the six resource categories (i.e. Groundwater), the priority resource concern within each resource category and specific Issues (i.e. pollutants) that are affecting each resource concern. Reading the table, left to right, each resource category is subdivided into priority resource concerns. For example, the resource category “Groundwater” has three resource concerns, “Drinking Water Supplies”, “Springsheds”, and Surficial-Subsurface Hydrologic Connections”. Each resource concern is given a priority level, either “A”, “B”, or “C”. “A” level resource concerns will be addressed first by the LGUs within the scope of plan implementation activities, “C” level resource concerns will in part be accomplished through other measurable goals. Drinking Water Supplies is identified as an “A” level resource concern and three Issues are impacting Drinking Water Supplies: Nutrients, Pesticides and Bacteria. Based on the Minnesota Nutrient Reduction Strategy, nitrogen needs to be reduced by 45% by 2040. To make progress towards this goal, 10% of the practices defined by an implementation approach need to be implemented per year in each planning region.





As shown in **Table 4-4**, measurable goals were developed for select priority resource concerns. The targeted implementation schedule is intended to address specific issues impacting each “A” or “B” level resource concern as presented in Section 3. For this reason, measurable goals were not developed for “C” level resource concerns. However, the issues impacting “C” level resources concerns will in part be accomplished through other measurable goals. For example, “pesticides” is an issue impacting the Drinking Water Supplies resource concern. Strategies and actions which are tailored to address groundwater nitrate-nitrogen contamination will also address pesticide contamination of groundwater resources.

**Table 4-3** excludes measurable goals for bacteria, which impact surface water resources throughout the plan area. No measurable goals were adopted for this issue due to a lack of bacteria “existing loads” data to compare to the load capacity and estimate the load reduction necessary. The Revised Regional Total Maximum Daily Load Evaluation of Fecal Coliform Bacteria Impairments in the Lower Mississippi River Basin in Minnesota (MPCA 2006) report was reviewed for data on local bacteria existing loads. However, the TMDL calculations in the report are based on Load Duration Curves, with no existing loads computed or presented. The measurable goals and the targeted implementation schedule will be adjusted as data becomes available within the plan area. However, practices implemented to address sediment and nutrients are expected to reduce bacteria loads.

Load allocations (the nonpoint source amount) were developed for impaired AUIDs within the Root River plan area and presented in the TMDL study (**Table 4-5**). A load allocation is the proportion of the load capacity that a waterbody can receive from nonpoint sources like agricultural runoff and still meet water quality standards. Load allocations provide valuable data for sediment, bacteria, and nitrate loading within the Root River plan area. The measurable goals for sediment and nutrients are expressed as the amount for a planning region, rather than for each impaired stream reach. The complexity of developing the targeted implementation schedule for each impaired reach is one of the reasons planning regions were used. Expectation is that achieving load reductions within each planning regional also will achieve load reductions at the impaired stream locations. The anticipated load reductions associated with implementing practices is presented in **Table 4-5**. Load allocations are often developed for five different flow regimes, representing the long term hydrologic condition. To simplify, the load allocation for the median flow regime (from a load duration curve) is compared to the existing annual estimated load derived from PTMApp, and the anticipated load reduction accomplished through the implementation of prescribed best management practices, as discussed in **Section 4.8**. PTMApp does not include bacteria as a parameter. Nor were existing load estimates available. Therefore, no existing annual estimated bacteria load or anticipated bacteria load reduction is included in **Table 4-5**.





**Table 4-5:** Estimated annual nonpoint source pollutant load reductions at impaired stream reaches (by Assessment Unit Identification number – AUID) resulting from the implementation of Best Management Practices within each Planning Region (see Table 4.7 for type and numbers of practices by planning region; Best Management Practice locations comprising the implementation approach are included in Appendix I; see Section 4.1 for a description of the prioritized and targeted implementation approach).

AUID	Nearest Priority Resource Point	Sediment						E.coli			Nitrate				Notes		
		Load Allocation				Existing Load at Priority Point (tons/year)	PTMApp Scenario Load Reduction at Priority Point (tons/year)	Load Allocation	Existing Load at Priority Point (billions of organisms per day)	Required Load Reduction at Priority Point (billions of organisms per day)	Load Allocation		Existing Load at Priority Point (lbs/year)	PTMApp Scenario Load Reduction at Priority Point (lbs/year)			
		TSS (lbs/day)	TSS (tons/year)	Suspended Sediment Concentration (lbs/day)	Suspended Sediment Concentration (tons/year)						Nitrate (lbs/day)	Nitrate (lbs/year)					
07040008-501	27	11	2	48	9	28,928	1,600	ND	Yet to be estimated using existing monitoring data or other tools.	Yet to be estimated using existing monitoring data or other tools.	ND	ND	3,768	16	None		
07040008-502	0	11	2	48	9	ND	ND	ND			ND	ND	ND	ND	ND	ND	No viable option
07040008-507	26	ND	ND	ND	ND	3,466	367	1			ND	ND	ND	6,555	66	None	
07040008-520	24	107	20	273	50	14,417	250	ND			ND	ND	ND	1,838	1	None	
07040008-522	20	107	20	273	50	33,753	5,393	ND			ND	ND	ND	3,908	8	Point downstream of confluence	
07040008-527	13	107	20	273	50	116,416	14,488	ND			ND	ND	ND	10,848	112	None	
07040008-G88	18	ND	ND	ND	ND	91,089	8,501	95			ND	ND	ND	3,198	54	None	
07040008-528	34	45	8	140	26	43,117	1,757	ND			ND	ND	ND	3,532	11	None	
07040008-534	0	ND	ND	ND	ND	ND	ND	690			ND	ND	ND	ND	ND	ND	No viable option
07040008-506	17	ND	ND	ND	ND	34,214	7,730	385			ND	ND	ND	5,010	175	None	
07040008-548	36	ND	ND	ND	ND	11,674	1,598	48			ND	ND	ND	1,517	23	None	
07040008-542	30	ND	ND	ND	ND	45,556	129	168			ND	ND	ND	3,543	0	None	
07040008-546	31	ND	ND	ND	ND	43,957	581	96			ND	ND	ND	3,619	0	Poor approximation, downstream of confluence	
07040008-535	15	ND	ND	ND	ND	17,473	2,333	302			ND	ND	ND	9,282	259	None	
07040008-536	11	ND	ND	ND	ND	1,134	207	1			ND	ND	ND	1,479	259	None	
07040008-716	2	19	3	73	13	12,254	2,707	ND			ND	ND	ND	9,761	654	Poor approximation, point upstream	
07040008-717	6	8	1	37	7	26,744	7,127	ND			ND	ND	ND	10,335	1,129	None	
07040008-523	12	ND	ND	ND	ND	1,270	0	213			ND	ND	ND	869	0	None	
07040008-508	25	28	5	98	18	15,344	950	491			ND	ND	ND	1,025	21	None	
07040008-509	25	28	5	98	18	15,344	950	ND			ND	ND	ND	1,025	21	Poor approximation, point downstream	
07040008-573	51	0	0	4	1	69,602	6,440	ND			ND	ND	ND	4,504	337	Poor approximation, point downstream	
07040008-550	35	3	1	18	3	10,990	1,042	459			ND	ND	ND	4,065	237	None	
07040008-552	39	0	0	4	1	38,973	2,865	50			867	316481	2,937	18	None		
07040008-554	44	3	1	19	3	7,593	340	ND			ND	ND	ND	3,968	5	Poor approximation, point upstream	
07040008-555	48	2	0	12	2	11,675	146	ND			3420	1248420	3,402	4	None		
07040008-556	49	1	0	7	1	159,195	15,109	ND			ND	ND	ND	9,388	436	None	
07040008-557	50	ND	ND	ND	ND	26,177	2,218	ND			885	323116	4,377	623	None		
07040008-558	45	ND	ND	ND	ND	23,208	1,107	66			1160	423261	2,833	16	None		
07040008-562	53	ND	ND	ND	ND	83,121	7,629	ND			172	62696	3,280	57	None		
07040008-563	46	ND	ND	ND	ND	15,351	144	24			426	155468	1,704	0	None		

ND = No Data  
 Existing practices not considered. Goals based on median flow regime. Nitrate loads calculated for stream reaches impaired for drinking water use (exceed 10 mg/L).  
 Achieving load reductions within each planning region is expected to also achieve load reductions at the impaired stream locations  
 Practices to reduce sediment and nutrients are expected to reduce bacteria loads

*Table Interpretation: Impaired AUID 07040008-573 is located nearest to PTMApp priority resource point #51 (the outlet of the South Fork Root River 10-digit HUC planning region). The load allocation (as developed by the TMDL study) for total suspended solids for AUID 07040008-573 is 1 ton/yr, meaning the stream reach can receive 1 ton/yr. from nonpoint sources like agricultural runoff and still meet water quality standards. The total existing sediment load from all sources reaching the outlet of the South Fork Root River planning region is 69,602 tons/yr. If the field practices implementation scenario presented in Table 4-7 (23 storage practices, 1 filtration practice, and 79 source reduction practices) is implemented within the South Fork Root River planning region, PTMApp estimates that 6,440 tons/year of sediment can be reduced at the outlet of the planning region.*



## 4.8 PRACTICAL CONSIDERATIONS FOR ACHIEVING THE MEASURABLE GOALS

The targeted implementation schedule includes strategies and actions, which when implemented, generate progress towards achieving a measurable goal. Although many actions will be implemented through the roadmap provided by the targeted implementation schedule, it is also understood that actions will occur outside of the list of prescribed actions. For example, an agricultural producer may complete nutrient management plans, residue management plans, or soil health initiatives outside of the context of the plan to improve business practices. These actions will make progress towards measurable goals, especially those goals associated with groundwater (i.e. MN Nitrogen Fertilizer Management Plan goals) and surface water (i.e. MN Nutrient Reduction Strategy goals) resource categories. However, these actions will not claim any credit for generating progress towards achieving measurable goals as estimated through PTMApp.

Some of the measurable goals, specifically those for sediment and nutrient reductions for surface waters, are not attained within the period of time addressed by this plan (**Table 4-6** below). An estimated investment of \$8.8 million is needed to implement practices during the next 10 years. This investment shows considerable progress toward, but falls short of attaining the measurable goals. Therefore, the targeted implementation schedule establishes interim goals for the implementation of practices intended to achieve consistent progress toward the measurable goal. **Table 4-6** shows the measurable goals for sediment and nutrient reduction expressed as an estimated annual load reduction compared to the estimated reduction with implementation of best management practices for each planning region. The analysis shows that even with the proposed fiscal investment and implementation of all of the practices, attaining these measurable goals is challenging. This suggests additional discussion is needed about the practicality of achieving these goals with the current level of fiscal investment.

## 4.9 IMPLEMENTATION TABLE AND ESTIMATED FUNDING NEEDS

The implementation table (**Table 4-6**) identifies the strategies and actions introduced in **Section 3**. Within the implementation table, each action is described and assigned to a “management category.” The management category generally relates to the specific initiative or campaign which will be used to accomplish the action. Four different management categories are included in the table: 1) field practice; 2) statutory/ordinance; 3) research; and 4) education and outreach. Initiatives or campaigns are focused on a specific resource category, which are used as a means of executing strategies to achieve measurable goals. Each initiative or campaign is assigned a source of the funding used to implement and administer the action. The implementation table identifies if existing budgets are sufficient for funding the described action, or if additional funding through initiative or campaigns are required. A detailed description of initiatives, campaigns and their funding sources are provided in **Section 5.1**, Incentive Based Initiatives.

Each action is assigned a designated lead role (local, state, or federal), lead entity, partner entity/entities, a start date, and an end date. A role as lead means an entity is assuming the responsibility to move the action forward, working with others to complete the action. Designation as lead does not imply sole responsibility for completing the action. Listed partner entities are not all-inclusive. Due to the complexity of field practices and their ability to address multiple issues impacting priority resource concerns, the costs, start date, and end date for field practices are included in the separated field practices table (**Table 4-7**).





**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
<b>Resource Category: Groundwater - Water which is held underground within the pores of rocks and soils and which reaches the ground surface.</b>											
<b>Resource Category Goal - Manage groundwater to maintain or improve the quality and quantity of drinking water supplies and the linkage between surface and subsurface hydrologic systems.</b>											
<b>Drinking Water Supplies (public and private)</b>	A	GW1- Nitrate-nitrogen	GW-1.1	Implement BMPs that manage surface runoff within Drinking Water Supply Management Areas (DWSMAs), Source Water Protection Areas, and areas of high vulnerability to groundwater recharge such as sinkholes.	Field Practice	Local	SWCD	MDA, County, Cities, NRCS	See Field Practices Table (Table 4-7)		
			GW-1.2	Seal abandoned and unused wells, particularly those wells which may impact public or private drinking water supplies, such as those found within DWSMAs.	Field Practice	Local	SWCD / County	MDA, MDH, NRCS	See Field Practices Table (Table 4-7)		
			GW-1.3	Develop nitrogen fertilizer management plans for agricultural producers for locations that are vulnerable to groundwater contamination from nitrates, which follow Best Management Practice recommendations	Field Practice	Local	SWCD	NRCS, Crop advisors	See Field Practices Table (Table 4-7)		
			GW-1.4	Complete the delineation and mapping of DWSMAs and the boundaries of Well Head Protection Areas.	Research	State	MDH	N/A	Existing Budget	Ongoing or Current Program	
			GW-1.5	Use existing land use and zoning ordinances to manage possible sources of nitrate contamination (i.e., subsurface sewage treatment systems; manure management; land development).	Statutory/Ordinance	Local	County/City	N/A	Existing Budget	Ongoing or Current Program	
			GW-1.6	Provide financial and technical assistance for the monitoring of nitrate levels in private wells.	Research	State / Local	MDA / County	SWCD	Existing Budget	Ongoing or Current Program	
			GW-1.7	Continue research to define sinkhole locations, map springsheds in plan area, model and monitor groundwater, and monitor basic flow.	Research	State	DNR	MGS, MDH, SWCD	See Table 4-8	Ongoing or Current Program	
			GW-1.8	Provide educational and financial assistance to bring SSTS into compliance to reduce nitrogen loading from small, unsewered communities and homes with inadequate wastewater treatment.	Field Practice	Local	County	SWCD, MPCA, MDA, SEMN WRB	See Field Practices Table (Table 4-7)		
			GW-1.9	Implement BMPs within priority locations which reduce vertical movement of nitrate into groundwater.	Field Practice	Local	SWCD	NRCS, Extension, Joint Powers TSA	See Field Practices Table (Table 4-7)		
		GW2- Total coliform	GW-2.1	Implement BMPs that treat surface runoff within DWSMAs, Source Water Protection Areas, and springshed contributing drainage areas.	Field Practice	Local	SWCD	County, Cities, NRCS	See Field Practices Table (Table 4-7)		
			GW-2.2	Seal abandoned and unused wells, particularly those wells which may impact public or private drinking water supplies, such as those found within DWSMAs.	Field Practice	Local	SWCD / County	MDA, MDH, NRCS	See GW-1.2		
			GW-2.3	Develop manure/nutrient management plans, which follow Best Management Practice recommendations, for agricultural producers with land application locations that are vulnerable to groundwater contamination from bacteria.	Field Practice	Local	SWCD	NRCS, Crop advisors	See Field Practices Table (Table 4-7)		
			GW-2.4	Construct animal waste management systems and manage water using runoff control measures in accordance with accepted design standards and practice.	Field Practice	Local	SWCD	NRCS, County	See Field Practices Table (Table 4-7)		
			GW-2.5	Identify, replace, or repair failing and deficient subsurface sewage treatment systems.	Statutory/Ordinance	Local	County	SWCD, MPCA, MDA, SEMN WRB	See GW-1.9		
			GW-2.6	Use existing land use and zoning ordinances to manage potential risk factors from the disposal of wastes and the application of manure near sinkholes.	Statutory/Ordinance	Local	County	SWCD, NRCS	Existing Budget	Ongoing or Current Program	
			GW-2.7	Maintain compliance with National Point Discharge Elimination System (NPDES) Permits for point sources.	Statutory/Ordinance	State	MPCA	N/A	Existing Budget	Ongoing or Current Program	
		GW-3.1	Implement BMPs that treat runoff within DWSMAs, Source Water Protection Areas, and springshed contributing drainage areas.	Field Practice	Local	SWCD	County, MDA, NRCS, Crop advisors, Cities	See Field Practices Table (Table 4-7)			



**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date		
Drinking Water Supplies (public and private) (continued)	A	GW3- Pesticides	GW-3.2	Implement BMPs that treat or prevent runoff to karst features.	Field Practice	Local	SWCD	County, NRCS, Certified crop advisors	See Field Practices Table (Table 4-7)				
			GW-3.3	Promote the development of pesticide management plans for land application locations that are vulnerable to surface water and groundwater contamination from pesticides, which follow manufacturer recommendations.	Field Practice	Local	SWCD	NRCS, Crop advisors	See Field Practices Table (Table 4-7)				
		GW3- Pesticides (continued)	GW-3.4	Maintain and improve soil health as a means of increasing soil organic matter and managing pesticide releases to groundwater.	Field Practice	Local	SWCD	NRCS, Extension Service, Crop advisors	See Field Practices Table (Table 4-7)				
			GW-3.5	Encourage the use of precision agriculture as means of efficient application of pesticides.	Field Practice	Local	SWCD	NRCS, Extension Service, Crop advisors, SWCD, MDA	See Field Practices Table (Table 4-7)				
			GW-3.6	Implement an education/outreach campaign for the responsible use and disposal of pesticides.	Education & Outreach	Local	County / City	MDA, SWCD	See Table 4-8	Ongoing or Current Program			
			GW-3.7	Implement an education/outreach campaign to reduce the risk to groundwater from contaminants such as chloride, VOCs, heavy metals, pharmaceuticals, etc.	Education & Outreach	Local	County / City	MPCA	See Table 4-8	Ongoing or Current Program			
			GW-3.8	Monitor groundwater for pesticides and/or other contaminants.	Research	State	MDA	MPCA	Existing Budget	Ongoing or Current Program			
			GW4- Supply	GW-4.1	Develop and evaluate additional ground water data including long term trends in water levels, aquifer safe yields, and appropriation and permitting trends, to identify and describe whether a problem currently exists.	Research	State	DNR	SWCD	Existing Budget	Ongoing or Current Program		
		GW-4.2		Continue to support through the permit review process the Department of Natural Resources, Water Appropriation Permit Program, to manage groundwater supply and evaluate historical and projected future permitted uses and demand.	Statutory/Ordinance	Local	SWCD / County	DNR	Existing Budget	Ongoing or Current Program			
		GW-4.3		Encourage watershed residents through educational and outreach efforts to adopt conservation and water reuse practices, such as capturing stormwater for irrigation.	Education & Outreach	Local	SWCD / County	SWCD, Cities, Extension	See Table 4-8	Ongoing or Current Program			
		GW-4.4		Implement BMPs in urban and rural areas that promote infiltration and groundwater recharge, such as soil health improvements through increased organic content of soils.	Field Practice	Local	SWCD	City, NRCS	See Field Practices Table (Table 4-7)				
		GW-4.5		Install additional, strategically located long-term groundwater observation wells in cooperation with the Minnesota Department of Natural Resources, to monitor water levels.	Research	State	DNR	MGS	Existing Budget	Ongoing or Current Program			
		Springsheds	C	GW5- Supply	GW-5.1	Develop and evaluate additional ground water data including long term trends in water levels, aquifer safe yields, and appropriation and permitting trends, to identify and describe whether a problem currently exists.	"C" Level Resource Concern: Addressed through other actions.						
					GW-5.2	Continue support through permit review of the Department of Natural Resources, Water Appropriation Permit Program, to manage groundwater supply and evaluate historical and projected future permitted uses and demand.							
GW-5.3	Implement BMPs in urban and rural areas that promote infiltration and groundwater recharge, such as soil health improvements through increased organic content of soils.												
GW-5.4	Install additional, strategically located long-term groundwater observation wells in cooperation with the Minnesota Department of Natural Resources, to monitor water levels.												
GW-5.5	Continue research to define sinkhole locations and map springsheds in plan area.												
GW-5.6	Correlate springshed mapping and IBI scores to target water infiltration BMPs with critical trout habitat.												
Surficial-Subsurface Hydrologic Connections	B	GW6- Land use / Runoff	GW-6.1	Promote programs and BMPs for activities on or near karst areas to protect water quality and promote safety.	Field Practice	Local	SWCD	County, NRCS, Certified crop advisors	See Field Practices Table (Table 4-7)				
			GW-6.2	Administer applicable bluffland protection zoning ordinances to control certain land uses and restrict vegetative alterations within bluff areas.	Statutory/Ordinance	Local	County	City	Existing Budget	Ongoing or Current Program			





**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date	
Resource Category: Surface Water - Water resulting from excess precipitation leaving the landscape and collecting in streams, rivers, creeks, wetlands, lakes and ponds												
Resource Category Goal - Manage surface waters to maintain or improve the quality and quantity of surface water supplies and obtain or maintain their beneficial uses.												
Streams and Rivers	A	SW1- Stream Stability	SW-1.1	Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.	Research	State	DNR	MPCA, One Watershed, One Plan PWG, USGS	Existing Budget	Ongoing or Current Program		
			SW-1.2	Set peak discharge, volume reduction goals and sediment load goals to achieve stable geomorphologic conditions.	Research	State	MPCA	DNR	Existing Budget	Ongoing or Current Program		
			SW-1.3	Quantify the volume reduction of improved soil health.	Research	State	MDA	Extension, BWSR, U of M	Existing Budget	Ongoing or Current Program		
			SW-1.4	Increase water and sediment storage and infiltration within priority locations.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)			
			SW-1.5	Define basic geomorphic characteristics for stable reaches including bank full discharge, channel cross sectional area, slope, and bed composition.	Research	State	DNR	N/A	Existing Budget	Ongoing or Current Program		
			SW-1.6	Inventory the locations and cause of unstable stream and river reaches and prioritize them for implementing fixes.	Research	Local	SWCD	DNR	See Table 4-8	Ongoing or Current Program		
			SW-1.7	Promote BMPs that enhance hydrologic storage by increasing upland perennial native vegetation in areas that provide connections to expand riparian access. These actions also provide benefits to restoring stream stability and equilibrium where it is found to be impaired.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)			
			SW-1.8	Complete restoration projects that provide multiple benefits, such as enhanced hydrologic function, while also providing connectivity benefits for aquatic and terrestrial habitats.	Field Practice	Local	SWCD	NRCS, DNR, TU, USFWS, non-profits	See Field Practices Table (Table 4-7)			
		SW2- Riparian Condition	SW-2.1	Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.	Research	State	DNR	USGS, FEMA, NOAA	See SW-1.1			
			SW-2.2	Determine the location and value of existing barriers relevant to fish management and aquatic invasive species (AIS) control.	Research	State	DNR	County, SWCD, U of M	Existing Budget	Ongoing or Current Program		
			SW-2.3	Reduce agricultural damages for lands inundated by 10-year or more frequent flood events by encouraging alternative agricultural practices.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)			
			SW-2.4	Stabilize and/or restore degraded sections of stream and river reaches to reduce bank failure and mass wasting that complement upstream BMPs.	Field Practice	Local	SWCD	County, NRCS, DNR, TU, USFWS, non-profits	See SW-1.8			
			SW-2.5	Prepare and maintain formal maps to define the boundary of the riparian area adjacent to perennial streams and rivers, as a means to focus the implementation of incentive based initiatives.	Research	Local	SWCD	County, DNR, TNC, MDA	Existing Budget	Ongoing or Current Program		
			SW-2.6	Implement BMPs within riparian areas that improve connectivity within riparian corridors and floodplains.	Field Practice	Local	SWCD	DNR, NRCS, TU, TNC	See Field Practices Table (Table 4-7)			
		SW3 – Sediment	SW-3.1	Maintain soil loss tolerance at a level equal to or less than an amount considered sustainable from a soil health and fertility perspective from urban and rural lands.	Field Practice	Local	SWCD	NRCS, Cities	See Field Practices Table (Table 4-7)			
			SW-3.2	Facilitate agricultural producer implementation of BMPs which are focused on and maintain soil health, such as tillage and residue management, nutrient and manure management, crop rotation methods, and the use of cover crops.	Field Practice	Local	SWCD	Extension, NRCS	See Field Practices Table (Table 4-7)			
			SW-3.3	Complete sufficiently detailed sediment mass balances for affected reaches, which identify the relative magnitude of sediment source leading to impairments.	Research	State	MPCA	MDA	Existing Budget	Ongoing or Current Program		



**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
Streams and Rivers (continued)	A	SW3 – Sediment (continued)	SW-3.4	Implement the State of MN soil loss ordinance to protect soil health and sustainability.	Statutory/Ordinance	Local	SWCD	County	Existing Budget	Ongoing or Current Program	
			SW-3.5	Implement BMPs that reduce sediment loading within waterbodies by treating surface runoff to ditches, streams, and rivers and by stabilizing gullies and gully heads.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)		
			SW-3.6	Implement water and sediment storage BMPs in priority locations to reduce the capacity of streams and rivers to generate and transport sediment by storing water to manage the rate, volume, and duration of runoff.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)		
			SW-3.7	Stabilize and or restore degraded sections of stream and river reaches to reduce bank failure and sediment deposition into waterbodies.	Field Practice	Local	SWCD	NRCS, DNR, TU, USFWS, non-profits	See SW-1.8		
			SW-3.8	Encourage stormwater sediment reduction in rural subdivisions and urban areas.	Field Practice	Local	County / City	MPCA, SWCD	See Field Practices Table (Table 4-7)		
		SW4 - E. coli	SW-4.1	Implement BMPs that treat surface runoff within priority locations.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)		
			SW-4.2	Implement BMPs within priority locations that promote soil health, thereby increasing water retention and decreasing surface runoff.	Field Practice	Local	SWCD	Extension, NRCS	See Field Practices Table (Table 4-7)		
			SW-4.3	Encourage the development and implementation of manure / nutrient management plans, which follow Best Management Practice recommendations, for agricultural producers with land application locations that are vulnerable to surface water contamination from pathogenic bacteria.	Field Practice	Local	SWCD	Extension, NRCS, Joint Powers TSA, MPCA	See Field Practices Table (Table 4-7)		
			SW-4.4	Construct animal waste management systems and runoff control measures for animal feeding operations in accordance with design standards and practice.	Field Practice	Local	SWCD / County	Joint Powers TSA, NRCS, MPCA, SEMN WRB, DEED	See Field Practices Table (Table 4-7)		
			SW-4.5	Identify and repair or replace failing and noncompliant subsurface sewage treatment systems.	Statutory/Ordinance	Local	County	SWCD, MPCA, FSA-Rural Development, SEMN WRB	Existing Budget	Ongoing or Current Program	
			SW-4.6	Use existing land use and zoning ordinances to manage potential risk factors including possible sources of pathogenic bacterial contamination (i.e., subsurface sewage treatment systems; manure management; land development, concentrated livestock access to streams).	Statutory/Ordinance	Local	County	SWCD, MPCA	Existing Budget	Ongoing or Current Program	
			SW-4.7	Encourage implementation of BMPs that reduce stormwater runoff as a source of pathogenic bacteria.	Field Practice	Local	City	DEED	See Field Practices Table (Table 4-7)		
			SW-4.8	Use managed and rotational grazing methods to manage animal wastes.	Field Practice	Local	SWCD	NRCS, Extension, Joint Powers TSA	See Field Practices Table (Table 4-7)		
			SW-4.9	Maintain compliance with National Point Discharge Elimination System Permits for point sources.	Statutory/Ordinance	State	MPCA	County, City	Existing Budget	Ongoing or Current Program	
			SW-4.10	Construct animal waste storage systems that allow land application consistent with an approved manure / nutrient management plan.	Field Practice	Local	SWCD / County	Joint Powers TSA, NRCS, MPCA, SE WRB, DEED	See Field Practices Table (Table 4-7)		
		SW5- Nitrate-nitrogen	SW-5.1	Implement BMPs within priority locations that reduce nitrate-nitrogen loading to waterbodies by treating surface and shallow subsurface runoff before entering ditches and streams.	Field Practice	Local	SWCD	MDA, NRCS, Extension	See Field Practices Table (Table 4-7)		
			SW-5.2	Implement storage BMPs within priority locations which reduce delivery of nitrate-nitrogen runoff to surface waters.	Field Practice	Local	SWCD	NRCS, County, Watershed	See Field Practices Table (Table 4-7)		
			SW-5.3	Implement BMPs within priority locations that promote soil health, thereby increasing water retention and decreasing surface runoff.	Field Practice	Local	SWCD	NRCS, Extension, Joint Powers TSA	See Field Practices Table (Table 4-7)		
			SW-5.4	Encourage the development and implementation of nutrient management plans for agricultural producers for locations that are vulnerable to groundwater contamination from nitrates, which follow BMP recommendations.	Field Practice	Local	SWCD	U of M, NRCS, Joint Powers TSA, MDA	See Field Practices Table (Table 4-7)		





**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date		
Streams and Rivers (continued)	A	SW5- Nitrate-nitrogen (continued)	SW-5.5	Provide educational and financial assistance to bring SSTS into compliance to reduce nitrogen loading from small, unsewered communities and homes with inadequate wastewater treatment.	Statutory/Ordinance	Local	County	City, MPCA, SWCD, SEMN WRB, DEED	See SW-4.5				
			SW-5.6	Implement feedlot runoff controls that reduce nitrogen loading of waterbodies by treating or reducing runoff of contaminated water.	Field Practice	Local	SWCD / County	NRCS, Joint Powers TSA, SEMN WRB	See Field Practices Table (Table 4-7)				
			SW-5.7	Use existing land use and zoning ordinances to manage potential risk factors including possible sources of nitrate contamination (i.e., subsurface sewage treatment systems; manure management; land development).	Statutory/Ordinance	Local	County	City, SWCD, MPCA	See SW-4.6				
			SW-5.8	Construct animal waste storage systems that allow land application of manure consistent with an approved nutrient management plan.	Field Practice	Local	SWCD / County	Joint Powers TSA, NRCS, MPCA, SE WRB, DEED	See Field Practices Table (Table 4-7)				
		SW6- Total phosphorus	SW-6.1	Implement BMPs within priority locations that reduce phosphorus loading to waterbodies by treating surface and shallow sub-surface runoff before entering ditches and streams.	Field Practice	Local	SWCD	MDA, NRCS	See Field Practices Table (Table 4-7)				
			SW-6.2	Implement storage within priority locations which reduce delivery of phosphorus runoff to surface waters.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)				
			SW-6.3	Implement BMPs within priority locations that promote soil health, thereby increasing water retention and decreasing surface runoff.	Field Practice	Local	SWCD	NRCS, Joint Powers TSA, Extension	See Field Practices Table (Table 4-7)				
			SW-6.4	Encourage the development and implementation of nutrient management plans for agricultural producers.	Field Practice	Local	SWCD	U of M, NRCS, Joint Powers TSA, MDA	See Field Practices Table (Table 4-7)				
			SW-6.5	Provide educational and financial assistance to bring SSTS into compliance to reduce nutrient loading from small, unsewered communities and homes with inadequate wastewater treatment.	Statutory/Ordinance	Local	County	City, SWCD, MPCA, SWMN WRB, DEED	See SW-4.5				
			SW-6.6	Implement feedlot runoff controls that reduce nutrient loading of waterbodies by treating or reducing runoff of contaminated water.	Field Practice	Local	SWCD	NRCS, Joint Powers TSA, SEMN WRB	See Field Practices Table (Table 4-7)				
			SW-6.7	Use existing land use and zoning ordinances to manage potential risk factors including possible sources of nutrient contamination (i.e., subsurface sewage treatment systems; manure management; land development).	Statutory/Ordinance	Local	County	City	See SW-4.6				
			SW-6.8	Implement BMPs to reduce phosphorus runoff in rural subdivisions and urban areas.	Field Practice	Local	City	SWCD, County	See Field Practices Table (Table 4-7)				
			SW-6.9	Construct animal waste storage systems that allow land application of manure consistent with an approved nutrient management plan.	Field Practice	Local	SWCD / County	Joint Powers TSA, NRCS, MPCA, SE WRB, DEED	See Field Practices Table (Table 4-7)				
			SW-6.10	Maintain compliance with wastewater treatment plant point source permit requirements.	Statutory/Ordinance	State	MPCA	City, County	Existing Budget	Ongoing or Current Program			
		SW7 - Dissolved Oxygen/Temperature	SW-7.1	Implement BMPs that provide perennial vegetative cover within the riparian corridor to decrease bank erosion, increase stream shading, and reduce water temperature.	Field Practice	Local	SWCD	DNR, NRCS, TU, Joint Powers TSA	See Field Practices Table (Table 4-7)				
			SW-7.2	Implement BMPs within priority locations that reduce the flow of runoff to streams and rivers including surface water storage BMPs.	Field Practice	Local	SWCD	NRCS, TU, Joint Powers TSA	See Field Practices Table (Table 4-7)				
			SW-7.3	Encourage the development and implementation of nutrient management plans for agricultural producers, which follow BMP recommendations to reduce algae growth.	Field Practice	Local	SWCD	U of M, NRCS, Joint Powers TSA, MDA	See Field Practices Table (Table 4-7)				
			SW-7.4	Restore degraded sections of stream and river reaches to increase habitat for the aquatic biological community.	Field Practice	State	DNR	NRCS, TU, USFWS, non-profits, SWCD	See SW-1.8				
		Flooding	B		SW-8.1	Define, develop, and maintain an agricultural flood prone map.	Research	Local	SWCD	County	See Table 4-8	Ongoing or Current Program	



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Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
Flooding (continued)	B	SW8 - Flooding (Landscape Impacts)	SW-8.2	Use various programs to provide land owners with economically viable alternatives for use of land in flood prone areas.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)		
			SW-8.3	Maintain public infrastructure including culverts, bridges and drainage systems to provide drainage at the anticipated level of service to minimize flood damage to public, private, and agricultural lands both upland and downstream of the managed systems.	Statutory/Ordinance	Local	County	Townships, Joint Powers TSA, NRCS, SWCD	Existing Budget	Ongoing or Current Program	
			SW-8.4	Implement practices that provide a minimum 10-year level of protection for agricultural lands, including upland and floodplain storage projects.	Field Practice	Local	SWCD	NRCS, Watershed District	See Field Practices Table (Table 4-7)		
			SW-8.5	Complete hydrologic analyses for the installation of new and improved subsurface tile systems which reasonably ensure adequate tile system function.	Research	State	MDA	SWCD	Existing Budget	Ongoing or Current Program	
			SW-8.6	Implement practices (i.e. increasing perennial cover in headwater catchments) that increase hydrologic storage and stability throughout the landscape, including upland areas high in the watershed to reduce flooding.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)		
		SW-9.1	Publish and make available the most current floodplain maps.	Statutory/Ordinance	State / Federal	DNR / FEMA	County, SWCD	Existing Budget	Ongoing or Current Program		
		SW-9.2	Use the floodplain management ordinance and land use and zoning approvals to minimize the likelihood of future flood damages.	Statutory/Ordinance	Local	County	City, DNR	Existing Budget	Ongoing or Current Program		
		SW-9.3	Evaluate the need for, develop, and implement capital improvement projects to address areas currently subject to damage.	Field Practice	Local	County / Watershed / City	NRCS, DNR, SWCD	See Field Practices Table (Table 4-7)			
		SW-9.4	Use proper hydrologic and hydraulic design standards for road crossings to provide flood protection, while considering fish passage and environmental needs.	Field Practice	Local	County	MnDOT, USFWS, US Corps of Engineers, DNR, City, TWPS	See Field Practices Table (Table 4-7)			
		SW-9.5	Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.	Research	State	DNR	MPCA, One Watershed, One Plan PWG, USGS	See SW-1.1			
		SW-9.6	Set peak discharge, volume reduction goals and sediment load goals to achieve stable geomorphologic conditions.	Research	State	MPCA	DNR	See SW-1.2			
		SW-9.7	Quantify the runoff volume reduction benefits of improved soil health.	Research	State	MDA	Extension, BWSR, U of M	See SW-1.3			
		Wetlands	B	SW10- Wetlands	SW-10.1	Implement and enforce applicable county ordinances and the Wetland Conservation Act (WCA) to retain wetland quantity, function, and value.	Statutory/Ordinance	Local	County	SWCD, City, DNR, BWSR	Existing Budget
SW-10.2	Promote BMPs which enhance, restore, or create wetlands and provide hydrologic storage in the upland portions of the watershed.				Field Practice	Local	SWCD	DNR, NRCS, USFWS, BWSR, TNC	See Field Practices Table (Table 4-7)		
SW-10.3	Locate and identify all calcareous fens not yet on the DNR Commissioner's List.				Research	State	DNR	BWSR, SWCD	Existing Budget	Ongoing or Current Program	
<b>Resource Category: Landscape Features - Visible natural features and characteristics of the landscape, often which are prominent or unique.</b>											
<b>Resource Category Goal - Manage landscape features to maintain or improve the water resources of the Root River One Watershed, One Plan boundary area.</b>											
Riparian Corridors	B	LF1- Riparian Vegetation	LF-1.1	Define areas subject to frequent flooding as the minimum riparian area to be managed on all rivers and streams. For public waters and public ditches, the minimum area identified as frequently flooded will be targeted for additional BMP implementation.	Field Practice	Local	SWCD	County, DNR, TNC, NRCS, FSA	See Field Practices Table (Table 4-7)		
			LF-1.2	Identify and field-verify areas where additional riparian buffers or alternative practices are needed.	Research	Local	SWCD	County, BWSR	Existing Budget	Ongoing or Current Program	





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Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
Riparian Corridors (continued)	B	LF1- Riparian Vegetation (continued)	LF-1.3	Implement perennial vegetative BMPs in riparian areas, promote lateral connectivity to the floodplain, provide financial opportunity to landowners from non-productive riparian land, adhere to mandated shoreland and state buffer law requirements, and utilize alternative practices as needed that support the function of healthy riparian corridors.	Field Practice	Local	SWCD	County, NRCS, FSA, BWSR	See Field Practices Table (Table 4-7)		
			LF-1.4	Provide educational materials, consultations, and workshops to landowners and agricultural producers about riparian BMPs, including compensation and incentive programs for land adjacent to streams.	Education & Outreach	Local	SWCD	County, Extension	See Table 4-8	Ongoing or Current Program	
			LF-1.5	Implement managed and rotational grazing methods and animal access control BMPs.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)		
			LF-1.6	Identify land areas suitable for recreational opportunities, such as trout fishing and public water access.	Research	State	DNR	TU	Existing Budget	Ongoing or Current Program	
			LF-1.7	Provide education and outreach materials about trespass regulations and their relation to public access and stream fishing regulations.	Education & Outreach	State	DNR	TU	Existing Budget	Ongoing or Current Program	
			LF-1.8	Provide education and outreach materials online and in print depicting a map of stream public access points by county to optimize public accessibility.	Education & Outreach	State	DNR	County, USFWS	Existing Budget	Ongoing or Current Program	
			LF-1.9	Provide input to and complete mapping of other waters potentially subject to buffer requirements.	Statutory/Ordinance	Local	SWCD	County, DNR, Watershed District, Cities	Existing Budget	Ongoing or Current Program	
Aquatic Habitat for Fish, Macroinvertebrates, and Aquatic Life	C	LF2- Aquatic Habitat	LF-2.1	Implement BMPs that provide perennial and woody native vegetative cover within the riparian corridor.	"C" Level Resource Concern: Addressed through other actions.						
Trout Streams	C	LF3- Trout Streams	LF-3.1	Determine the location and value of existing fish barriers relevant to trout fisheries management and AIS control.	"C" Level Resource Concern: Addressed through other actions.						
			LF-3.2	Identify stream reaches with self-sustaining brook trout populations, and implement practices to manage these reaches.							
			LF-3.3	Identify stream reaches with self-sustaining brown trout populations and implement practices to manage those reaches.							
			LF-3.4	Identify stream reaches where stocking of rainbow trout yearlings provide the public with a put-take angling opportunity and implement practices to manage these reaches.							
			LF-3.5	Identify stream reaches where stocking of rainbow trout fingerlings provide multiple year classes to anglers and implement practices to manage those reaches.							
Areas of Moderate and High Biodiversity	C	LF4- Habitat	LF-4.1	Administer zoning regulations that encourage development practices which preserve and enhance natural areas. Higher priority should be given to areas where high, medium-high and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) are located.	"C" Level Resource Concern: Addressed through other actions.						
			LF-4.2	Implement BMPs to manage native plant and animal communities, such as forestland, prairies, wetlands, oak savannahs, etc.							
			LF-4.3	Identify parcels adjacent to areas of moderate and higher biodiversity and/or areas of high, medium-high and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) and promote BMPs to protect and enhance biodiversity.							



**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
Areas of Moderate and High Biodiversity (continued)	C	LF4- Habitat (continued)	LF-4.4	Promote protection of lands identified as areas of moderate, high, and outstanding biodiversity and/or areas of high, medium-high and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) through such programs as acquisition, property tax credits and easements.							
			LF-5.1	Perform education and outreach initiatives targeted to general public / landowners in moderate and high biodiversity areas about threats of invasive species, and ways to prevent / control them.							
		LF5- Plant Communities	LF-5.2	Perform education and outreach initiatives targeted to landowners in moderate and high biodiversity areas and/or areas of high, medium-high and medium Species of Greatest Conservation Need (SGCN) wildlife and habitat scores within the Wildlife Action Network (WAN) about landowner benefits of natives, and potential downfalls of invasives.							
			LF-5.3	Pursue funding, such as Cooperative Weed Management Areas and aquatic and terrestrial invasive species grants to provide technical and financial assistance to control/manage invasive species within and contributing to quality habitats for terrestrial and aquatic species.							
			LF-5.4	Maintain current and historical GIS records of invasive species using the MNDNR database.							
Karst Formations	C	LF6- Karst Formations	LF-6.1	Develop and maintain a karst feature data base capable of producing maps for the plan area.							
			LF-6.2	Implement BMPs in areas that help protect the natural features, such as caves, sinkholes, springs and algific talus slopes, associated with karst geology.							
			LF-6.3	Promote and implement programs and incentives including, but not limited to RIM, ACEP, CRP, wetland banking and tax credits.							
Resource Category: Social Capacity - The collective understanding of water related matters within the community and the ability to respond to and resolve water related issues.											
Resource Category Goal - Broaden the collective understanding of water issues and build a robust and resilient system for maintaining and improving water resources.											
Public Knowledge of and Behavior Relative to Water Issues	B	SC1- Public Education / Outreach	SC-1.1	Provide school presentations and other educational efforts tailored to youth.	Education & Outreach	Local	SWCD	Extension, County, School Districts	See Table 4-8		Ongoing or Current Program
			SC-1.2	Provide and distribute educational materials through various multi-media methods about local water management, the impacts of decisions, and actions the public can take to make a difference.	Education & Outreach	Local	SWCD	Extension, County, City, DNR	See Table 4-8		Ongoing or Current Program
			SC-1.3	Host meetings for the public regarding monitoring results and assessments from Root River Watershed One Watershed, One Plan monitoring activities.	Education & Outreach	Local	SWCD / County / Watershed District	One Watershed, One Plan PWG, DNR, MPCA, MDH, MDA	See Table 4-8		Ongoing or Current Program
			SC-1.4	Host annual meetings for local government officials about the condition of water resources, progress made, and results and assessments from Root River Watershed One Watershed, One Plan monitoring activities.	Education & Outreach	Local	SWCD / County / Watershed District	One Watershed, One Plan PWG, DNR, MPCA, MDH, MDA	See Table 4-8		Ongoing or Current Program
			SC-1.5	Seek out opportunities and entities to do more cooperative education and outreach activities.	Education & Outreach	Local	SWCD / County / Watershed District	One Watershed, One Plan PWG, DNR, MPCA, MDH, MDA	See Table 4-8		Ongoing or Current Program
Landowner and Producer Engagement in Water Management	A	SC2- Engaged Landowner and Producers	SC-2.1	Develop a standard methodology for landowner/agricultural producer meetings, including the creation of maps showing existing BMPs that will provide a feedback loop for measuring the strategy.	Research	Local	SWCD / County / Watershed District	Extension, MPCA, MDA, DNR, MDH	See Table 4-8		Ongoing or Current Program
			SC-2.2	Provide cooperative education efforts and demonstration projects to promote agricultural BMP's including, but not limited to: nutrient management, conservation tillage, buffers, soil testing, pesticide application, etc.	Education & Outreach	Local	SWCD	Extension, NRCS, County, MDA, Crop advisors	See Table 4-8		Ongoing or Current Program





**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
Landowner and Producer Engagement in Water Management (continued)	A	SC2- Engaged Landowner and Producers (continued)	SC-2.3	Develop new techniques to promote conservation efforts, such as administering a local certification training program or partnering with agribusiness retailers to recommend appropriate BMPs.	Research	State	MDA	Extension	Existing Budget	Ongoing or Current Program	
			SC-2.4	Provide one-on-one consultations with landowners and agricultural producers about agricultural BMPs, field productivity benefits of BMPs, and available financial incentive options for funding them.	Education & Outreach	Local	SWCD	Extension, County, MDA, Crop advisors	See Table 4-8	Ongoing or Current Program	
			SC-2.5	Continue to develop and maintain a database inventory of existing BMPs with associated costs of implementation.	Research	Local	SWCD	One Watershed, One Plan PWG, BWSR	See Table 4-8	Ongoing or Current Program	
			SC-2.6	Support and encourage farmer led initiatives, such as Farmer Led Councils, farmer mentor lists, and local advisory committees, that promote conservation through peer based outreach and performance based incentives.	Education & Outreach	Local	SWCD / County / Watershed District	MDA, MPCA, Extension	See Table 4-8	Ongoing or Current Program	
			SC-2.7	Develop a comprehensive civic engagement plan.	Education & Outreach	Local	SWCD / County / Watershed District	Extension, MPCA, MDA, DNR, MDH, NRCS, Crop advisors	See Table 4-8	Ongoing or Current Program	
Water and Business Community	C	SC3- Business Role	SC-3.1	Identify and document types of benefits that businesses derive from the use of water resources.	"C" Level Resource Concern: Addressed through other actions.						
			SC-3.2	Provide and distribute educational materials through various multi-media methods about local water management, the impacts of business decisions, and the economic value of water quality and quantity.							
			SC-3.3	Convene a conference tailored to the local business community, in partnership with local organizations such as, Chamber of Commerce, Economic Development Authority and business associations, local businesses/employers, to learn about local water issues and network with other businesses that capitalize on water and land resources.							
			SC-3.4	Solicit participation from local business for volunteer and sponsorship opportunities.							
Technology, Tools, and Existing Capabilities	C	SC4- Staff Capacity / Admin	SC-4.1	Encourage local governmental unit staff, local agency staff, and certified crop advisors to attend trainings on newly developed technology and tools relevant to water resource management.	"C" Level Resource Concern: Addressed through other actions.						
			SC-4.2	Develop a database for sharing and maintaining water resource management data, including local GIS data layers and local monitoring data.							
			SC-4.3	Collaborate and coordinate with participating local government units through shared services for plan implementation.							
			SC-4.4	Identify and prioritize opportunities to secure long-term and consistent funds through grants, partnerships, and other sources.							
	SC5- Emerging Issues	SC-5.1	Identify and address emerging issues during the Plan's annual evaluation and local work plan development.	"C" Level Resource Concern: Addressed through other actions.							
		SC-5.2	Consider a plan amendment, if necessary, due to an emerging issue.								
<b>Resource Category: Sustainability of Communities - The endurance, resilience and interconnectedness of systems and processes which support a community, including the economy, culture, politics and ecology.</b>											
<b>Resource Category Goal - Improve or maintain communities' cultural, economic, natural, and water resources.</b>											
Livability	A	SUST1- Livability of Community	SUST-1.1	Solicit stakeholder input about plan activities from a diverse, interdisciplinary group that includes local planning and zoning staff in order to integrate the economic, environmental and social policies into water resource management.	Education & Outreach	Local	LGUs	Extension	See Table 4-8	Ongoing or Current Program	



**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date	
Livability (continued)	A	SUST1- Livability of Community (continued)	SUST-1.2	Develop public outreach and education initiatives and implementation programs dedicated to preventing urban and rural point and nonpoint water pollution to avoid more costly restoration projects in the future.	Education & Outreach	Local	SWCD / County	MDH, Cities, Extension, MPCA, MDA, nonprofits	See Table 4-8	Ongoing or Current Program		
			SUST-1.3	Promote initiatives to improve wastewater management practices.	Education & Outreach	Local	City / County	SWCD, MPCA, SEMN WRB	See Table 4-8	Ongoing or Current Program		
			SUST-1.4	Identify opportunities to fund sustainable forest management, prairie, wetland and other natural area preservation and restoration through grants and partnerships.	Research	Local	SWCD	DNR, TNC, U of M, NRCS, USFWS	See Table 4-8	Ongoing or Current Program		
			SUST-1.5	Coordinate with public and private entities to protect and enhance wildlife habitat, fisheries habitat, riparian corridors, and vegetative habitat, through programs such as easements and acquisition.	Research	Local	SWCD	DNR, TNC, NRCS, USFWS	See Table 4-8	Ongoing or Current Program		
Rural Environmental Health	C	SUST2- Rural Sustainability	SUST-2.1	Tailor recommended BMPs to each field based on the economic and environmental capacity of each area of a field, such as precision agriculture.						"C" Level Resource Concern: Addressed through other actions.		
			SUST-2.2	Encourage rental agreements that allow long-term practices to build soil health or that include conservation language.								
			SUST-2.3	Develop nutrient and manure management plans for agricultural producers which follow BMP recommendations to build soil health and maximize efficiency.								
			SUST-2.4	Encourage BMPs, such as conservation tillage, cover crops, crop rotation, managed pasture and grazing and animal waste management within priority locations that promote soil health and improve organic content of soils.								
			SUST-2.5	Promote education and financial incentives for solid and hazardous waste disposal to reduce chemical and nutrient contamination of water.								
			SUST-2.6	Create awareness of existing regulations, rules, and ordinances pertaining to proper waste disposal.								
			SUST-2.7	Provide educational materials, consultations, and workshops to landowners and agricultural producers about BMPs, including compensation and incentive programs for marginal and sensitive lands.								
			SUST-2.8	Promote programs that recognize and/or provide incentives to landowners for the multiple benefits resulting from implementation of BMPs, including improved water quality, resilience against flood damage, and protected/enhanced wildlife habitat and biodiversity.								
			SUST-2.9	Promote the natural meandering of streams to decrease stream velocity for reducing flood impacts and enhance recreational and fish and wildlife habitat value.								
Urban Environmental Health	C	SUST3- Urban Sustainability	SUST-3.1	Inspect, maintain and improve the integrity of existing urban structures that route and treat stormwater runoff to prevent downstream stream erosion and flooding and improve water quality.						"C" Level Resource Concern: Addressed through other actions.		
			SUST-3.2	Inventory and assess need for additional urban infrastructure to prevent downstream flooding and water quality degradation from storm events.								
			SUST-3.3	Promote the natural meandering of streams to decrease stream velocity for reducing flood impacts and enhance recreational and fish and wildlife habitat value.								
			SUST-3.4	Promote increased public access to natural features such as streams, wetlands and rivers.								
			SUST-3.5	Promote urban BMPs for lawn and managed green spaces (parks, golf courses) that include soil testing and proper use, amount, method and timing of fertilizer/pesticide application.								





**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date	
Urban Environmental Health (continued)	C	SUST3- Urban Sustainability (continued)	SUST-3.6	Implement urban BMPs that reduce the delivery of sediment, nutrients, and pesticide loads to surface water by treating runoff through infiltration, filtration, and uptake.	"C" Level Resource Concern: Addressed through other actions.							
			SUST-3.7	Provide technical and financial assistance to bring SSTS into compliance to reduce improper waste disposal from small, unsewered communities and homes with inadequate wastewater treatment.								
			SUST-3.8	Promote education and financial incentives for solid and hazardous waste disposal to reduce chemical and nutrient contamination of water.								
			SUST-3.9	Assess capacity to productively reuse stormwater runoff.								
Land Use	C	SUST4- Managed Land Use	SUST-4.1	Meet all statutory requirements of the State of Minnesota (MN Rules 6120.250- 3900) which regulate the subdivision, use, and development of shorelands of public waters, in addition to the Buffer and Soil Erosion Legislation.								
			SUST-4.2	Administer zoning regulations that encourage growth near urban areas to preserve natural areas and large habitat blocks.								
			SUST-4.3	Promote programs and BMPs that restrict activities on or near karst features to protect water quality and promote safety.								
			SUST-4.4	Administer Minnesota Rules Chapter 7080 through 7083 to manage SSTS and protect surface and ground water quality.								
			SUST-4.5	Comply with all applicable rules and regulations to promote the protection of cultural and historic resources reflective of Native American heritage and early pioneer settlements.								
			SUST-4.6	Administer applicable bluffland protection zoning ordinances to control certain land uses and restrict vegetative alterations within bluff areas.								
			SUST-4.7	Administer Minnesota Statutes Chapter 103F Soil Erosion Law to minimize loss of soil and productivity.								
			SUST-4.8	Administer the Wetland Conservation Act (WCA) to retain wetland quantity, function, and value.								
Resource Category: Water Resources Infrastructure - The natural and man-made systems important for managing the rate, volume and quality of water.												
Resource Category Goal - Maintain or improve the natural and man-made systems used for managing the rate, volume and quality of water in the Root River One Watershed, One Plan Area.												
Drainage Systems	B	WI1- Drainage Design	WI-1.1	Develop and maintain an inventory and map of known field tile drainage locations in the plan area.	Research	Local	SWCD	N/A	See Table 4-8	2017-2021		
			WI-1.2	Implement drainage management BMPs to control ground water elevation, reduce water volume yield, and remove pollutants from tile discharge prior to entering surface waters.	Field Practice	Local	SWCD	MDA, NRCS	See Field Practices Table (Table 4-7)			
			WI-1.3	Support research that characterizes the quantity and quality of tile drainage and its impacts on recharge to local groundwater aquifers. Encourage projects that monitor the outfalls of select agricultural tile lines to better understand effects on ecosystem functions.	Research	State	MDA	SWCD, U of M, USGS, colleges and universities	Existing Budget	Ongoing or Current Program		
		WI2- Drainage BMPs	WI-2.1	Implement BMPs that provide perennial vegetative cover within the riparian corridor to increase stream roughness, and decrease bank erosion.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)			
			WI-2.2	Implement BMPs that provide volume reduction and/or storage within priority locations.	Field Practice	Local	SWCD	NRCS	See Field Practices Table (Table 4-7)			
			WI-2.3	Develop a comprehensive hydrologic and hydraulic model for culvert and bridge design to determine timing and magnitude of peak discharge of existing conditions, the duration of discharge, and base flow conditions.	Research	State	DNR	MPCA, One Watershed, One Plan PWG, USGS	See SW-1.1			




**Table 4-6:** Root River One Watershed, One Plan implementation table of actions addressing priority resource categories and concerns, with implementation roles, cost, and timeline.

Resource Concern	Resource Concern Priority Level	Strategy	Action	Action Description	Management Category	Lead	Lead Entity	Partners	Cost per Year	Start Date	End Date
Drainage Systems (continued)	B	WI3- Infrastructure Development	WI-2.4	Set peak discharge, volume reduction goals and sediment load goals to achieve stable geomorphologic conditions.	Research	State	MPCA	DNR	See SW-1.2		
			WI-3.1	Plan for and implement updates for existing public infrastructure based on anticipated changes in weather patterns and rainfall intensity due to global climate change.	Research	Local	County / City / MnDOT	TWPS, SWCDs	Existing Budget	Ongoing or Current Program	
			WI-3.2	Pursue funding to support construction of new BMPs and enhancement of existing BMPs to expand storm water management capacity.	Research	Local	County / City	SWCD, MPCA	Existing Budget	Ongoing or Current Program	
			WI-3.3	Work with landowners and drainage authorities to install two-stage ditch systems for multiple benefits including improved drainage and ditch bank stability and sediment transport, increased habitat (i.e., riffle and pool habitat in low flows) and pollutant removal of nitrogen.	Field Practice	Local	SWCD	County	See Field Practices Table (Table 4-7)		
Point Sources	C	WI4- SSTS Adequacy	WI-4.1	Provide technical and financial assistance to bring SSTSs into compliance to reduce improper waste disposal from small, unsewered communities and homes with inadequate wastewater treatment, in particular those that are Imminent Public Health Threats.	"C" Level Resource Concern: Addressed through other actions.						
		WI5- Wastewater Discharge	WI-5.1	Maintain compliance with National Point Discharge Elimination System (NPDES) Permits for point sources.	"C" Level Resource Concern: Addressed through other actions.						
Water Retention Systems	B	WI6- Water Retention	WI-6.1	Identify and field-verify areas where GIS land cover information indicates the need for temporary flood storage, including the potential temporary storage of floodwaters using the transportation system and using best available hydrology data.	Research	Local	SWCD / County / Watershed District	MnDOT, DNR, TWPS, Cities	See Table 4-8	Ongoing or Current Program	
			WI-6.2	Inventory and assess existing flood storage practices on landscape.	Research	Local	SWCD / County / Watershed District	MnDOT, DNR, TWPS, Cities	See WI-6.1		
			WI-6.3	Repair and maintain storage capacity of existing landscape flood storage practices.	Field Practice	Local	SWCD / County / Watershed District	NRCS, TWPS, Cities	See Field Practices Table (Table 4-7)		
			WI-6.4	Implement additional flood storage practice BMPs within prioritized areas.	Field Practice	Local	SWCD / County / Watershed District	NRCS, TWPS, Cities	See Field Practices Table (Table 4-7)		
			WI-6.5	Implement permanent plantings, preferably natives, to increase infiltration.	Field Practice	Local	SWCD	NRCS, DNR, USFWS, nonprofits	See Field Practices Table (Table 4-7)		
			WI-6.6	Implement BMPs such as wetland restorations and/or step pools.	Field Practice	Local	SWCD	NRCS, DNR, BWSR	See Field Practices Table (Table 4-7)		
		WI7- Stormwater / Construction Erosion	WI-7.1	Encourage the use of BMPs on active construction sites to reduce amount of erosion. Refer to MN Rule Chapter 7090 Storm water regulatory program for guidance for activities that do not fall under permitting requirements or are in non-MS4 communities.	Statutory/Ordinance	Local	County / City	SWCD, MPCA	Existing Budget	Ongoing or Current Program	
			WI-7.2	Encourage the use of post construction BMPs that decrease compaction of soil in active construction sites.	Field Practice	Local	County / City	SWCD, MPCA	See Field Practices Table (Table 4-7)		
			WI-7.3	Encourage and implement BMPs that treat urban stormwater discharge.	Field Practice	Local	City	MPCA, SWCD	See Field Practices Table (Table 4-7)		
		WI8- Low Impact Development	WI-8.1	Promote local, county and development proposals that incorporate Low Impact Design or Minimum Impact Design technologies.	Statutory/Ordinance	Local	City / County	SWCD, MPCA	Existing Budget	Ongoing or Current Program	
			WI-8.2	Promote incorporation of Low Impact Design strategies into local zoning ordinances.	Statutory/Ordinance	Local	TWPS / City / County	SWCD, MPCA	Existing Budget	Ongoing or Current Program	
			WI-8.3	Review and update local regulations that address storm water erosion and runoff control, grading plan approval, and grading drainage standards.	Statutory/Ordinance	Local	TWPS / City / County	SWCD, MPCA	Existing Budget	Ongoing or Current Program	

BWSR = Board of Water and Soil Resources; DNR = Department of Natural Resources; MDA = Minnesota Department of Agriculture; MPCA = Minnesota Pollution Control Agency; NRCS = Natural Resources Conservation Service; USFWS = U.S. Fish and Wildlife Service; TU = Trout Unlimited; Extension = University of Minnesota Extension Services; MGS = Minnesota Geological Survey; MnDOT = Minnesota Department of Transportation; One Watershed, One Plan PWG = One Watershed, One Plan Planning Work Group; USGS = U.S. Geological Survey; TNC = The Nature Conservancy; FEMA = Federal Emergency Management Agency; SEMN WRB = Southeast Minnesota Water Resources Board, TWPS = Townships; FSA = Farm Service Agency, NOAA = National Oceanic and Atmospheric Administration; DEED = Department of Employment and Economic Development







**Table 4-7** shows the number of field practices and the estimated cost by planning region. The table represents the preliminary practice implementation approach developed by the Planning Work Group. The practice implementation approach represents an initial effort to identify the benefits of practices and is presented as a guide, showing the potential value of practices. The 100 practices within each planning region comprising the practice implementation approach were selected by the Planning Work Group to provide the greatest total nitrogen reduction locally at the catchment scale (to protect and improve groundwater) and the greatest sediment reduction for the most downstream location in a planning region (as a metric for regional surface water quality). The locations of specific practices will differ as a result of several factors including landowner willingness to participate.

To facilitate implementation, the field practices table is organized by planning regions within the plan area. For each planning region the number and type of field practices by treatment group, based on issues impacting priority resources in the planning region and based on field practice suitability in the planning region is shown. Field practice treatment groups lump BMPs into categories based on the processes by which they remove sediment, total nitrogen, total phosphorus, and reduce peak discharge. Four different treatment groups are provided within the field practices table; i.e., storage, filtration, infiltration, and source reduction, as determined feasible by PTMApp. The total cost for the aggregated number of field practices is also shown. PTMApp estimates the cost of implementing BMPs for each treatment group (with the exception of storage) based upon 2014 U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) payment rates, and are based upon a per unit area basis. Due to perceived elevated costs associated with EQIP storage BMPs, costs for storage treatment groups is derived from storage projects funded and implemented through Red River Watershed Management Board. Local planners also have the option to override the default cost value based on local experience.

The field practices table then assigns anticipated progress towards measurable water quality goals which can be made through implementation of the prescribed field practices. As field practices commonly produce benefits for multiple issues impacting priority resources, all quantitative water quality issues are included within the field practices table: Sediment, Total Nitrogen, Total Phosphorus, and Excess Runoff. Each issue is then given an existing condition, the target measurable goal, and the anticipated reduction (load or volume) that is generated by the implementation of the prescribed field practices. The anticipated reduction at the planning region outlet is inclusive of all prescribed practices implemented upstream. Each planning region is also assigned a targeted start date and end date to implement the prescribed practices. The data that is populated within the field practices table is informed by **Section 3** and PTMApp products. Instances in which PTMApp indicates that the measurable goals are met within the 10-year lifespan of the plan are highlighted in blue, indicating the potential to achieve measurable goals through the implementation of actions within the Root River plan area.

The framework for prioritizing and targeting to complete the targeted implementation schedule during the annual planning will include a variety of factors and criteria, including, but not limited to:

- Streams that are nearly or barely impaired and have a high probability of staying unimpaired or becoming unimpaired with relatively small protection or restoration efforts;
- Potential for voluntary participation by landowners and residents;
- PTMApp pollutant load reductions;
- Available funding;
- Partnerships;
- Practices/ projects ready to implement (overlay these with field practices identified by PTMApp); and
- Opportunities for civic engagement, education and outreach, and research.



**Table 4-7:** PTMAApp estimated reductions over the 10 year life of this plan and the percent progress towards the overall reduction goals.

HUC 10 Name	HUC 10 ID	Treatment Group Type & Number of BMPs	Cost	Issue	Unit	Existing Condition	Quantitative Measurable Goal (QMG)				Reporting Measurable Goal		PTMAApp Scenario Reduction	5 year Reduction Goal	10 year Reduction Goal	10 yr. Progress towards QMG (%)	Start Date	End Date
							Metric	Amount (%)	Target Load Reduction	Year	Metric	Amount (Number of BMPs / yr.)						
Bear Creek	706000205	Storage (23) Source Reduction (77)	\$461,185	Sediment	tons/yr	50,926	Annual Load (mass/yr.)	45	22,917	2025	Number of BMPs / yr.	10 / yr.	15,685	7,842	15,685	68	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	9,018	Annual Load (mass/yr.)	45	4,058	2040			926	463	926	23		
				Nutrients: Total Phosphorus	lbs/yr	562	Annual Load (mass/yr.)	45	253	2025			105	52	105	41		
				Excess Runoff: 2 Year	acre feet	1,049	2-Yr. Runoff Volume	25	262	2030			527	264	527	201		
				Excess Runoff: 10 Year	acre feet	2,477	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Canoe Creek	706000203	Storage (1) Filtration (2) Source Reduction (4)	\$4,912	Sediment	tons/yr	350	Annual Load (mass/yr.)	45	157	2025	Number of BMPs / yr.	3.5 / yr.	261	130	261	166	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	482	Annual Load (mass/yr.)	45	217	2040			197	99	197	91		
				Nutrients: Total Phosphorus	lbs/yr	27	Annual Load (mass/yr.)	45	12	2025			20	10	20	162		
				Excess Runoff: 2 Year	acre feet	4	2-Yr. Runoff Volume	25	1	2030			2	1	2	183		
				Excess Runoff: 10 Year	acre feet	11	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
City of Rushford - Root River	704000807	Storage (20) Filtration (21) Infiltration (2) Source Reduction (47)	\$711,243	Sediment	tons/yr	122,615	Annual Load (mass/yr.)	45	55,177	2025	Number of BMPs / yr.	9 / yr.	10,615	5,307	10,615	19	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	7,068	Annual Load (mass/yr.)	45	3,181	2040			1,621	811	1,621	51		
				Nutrients: Total Phosphorus	lbs/yr	437	Annual Load (mass/yr.)	45	197	2025			125	63	125	64		
				Excess Runoff: 2 Year	acre feet	50,256	2-Yr. Runoff Volume	25	12,564	2030			4,343	2,172	4,343	35		
				Excess Runoff: 10 Year	acre feet	117,017	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Cold Water Creek-Upper Iowa River	706000202	Storage (12) Source Reduction (88)	\$479,638	Sediment	tons/yr	26,744	Annual Load (mass/yr.)	45	12,035	2025	Number of BMPs / yr.	10 / yr.	7,127	3,563	7,127	59	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	10,335	Annual Load (mass/yr.)	45	4,651	2040			1,129	564	1,129	24		
				Nutrients: Total Phosphorus	lbs/yr	611	Annual Load (mass/yr.)	45	275	2025			139	70	139	51		





**Table 4-7:** PTMAApp estimated reductions over the 10 year life of this plan and the percent progress towards the overall reduction goals.

HUC 10 Name	HUC 10 ID	Treatment Group Type & Number of BMPs	Cost	Issue	Unit	Existing Condition	Quantitative Measurable Goal (QMG)				Reporting Measurable Goal		PTMAApp Scenario Reduction	5 year Reduction Goal	10 year Reduction Goal	10 yr. Progress towards QMG (%)	Start Date	End Date
							Metric	Amount (%)	Target Load Reduction	Year	Metric	Amount (Number of BMPs / yr.)						
				Excess Runoff: 2 Year	acre feet	951	2-Yr. Runoff Volume	25	238	2030			143	72	143	60		
				Excess Runoff: 10 Year	acre feet	2,187	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Crooked Creek	706000102	Storage (23) Source Reduction (81)	\$416,518	Sediment	tons/yr	33,753	Annual Load (mass/yr.)	45	15,189	2025	Number of BMPs / yr.	10.4 / yr.	5,393	2,697	5,393	36	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	3,908	Annual Load (mass/yr.)	45	1,758	2040			8	4	8	0		
				Nutrients: Total Phosphorus	lbs/yr	230	Annual Load (mass/yr.)	45	104	2025			1	1	1	1		
				Excess Runoff: 2 Year	acre feet	2,342	2-Yr. Runoff Volume	25	585	2030			433	217	433	74		
				Excess Runoff: 10 Year	acre feet	5,781	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Headwaters Upper Iowa River	706000201	Storage (9) Filtration (5) Source Reduction (86)	\$462,979	Sediment	tons/yr	33,444	Annual Load (mass/yr.)	45	15,050	2025	Number of BMPs / yr.	10 / yr.	4,757	2,378	4,757	32	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	11,996	Annual Load (mass/yr.)	45	5,398	2040			971	486	971	18		
				Nutrients: Total Phosphorus	lbs/yr	742	Annual Load (mass/yr.)	45	334	2025			85	43	85	26		
				Excess Runoff: 2 Year	acre feet	5,755	2-Yr. Runoff Volume	25	1,439	2030			256	128	256	18		
				Excess Runoff: 10 Year	acre feet	12,307	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Middle Branch Root River	704000802	Storage (15) Filtration (2) Source Reduction (85)	\$482,822	Sediment	tons/yr	48,655	Annual Load (mass/yr.)	45	21,895	2025	Number of BMPs / yr.	10.2 / yr.	6,990	3,495	6,990	32	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	7,813	Annual Load (mass/yr.)	45	3,516	2040			383	191	383	11		
				Nutrients: Total Phosphorus	lbs/yr	455	Annual Load (mass/yr.)	45	205	2025			51	26	51	25		
				Excess Runoff: 2 Year	acre feet	10,897	2-Yr. Runoff Volume	25	2,724	2030			321	161	321	12		
				Excess Runoff: 10 Year	acre feet	24,438	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Money Creek	704000806	Storage (28) Filtration (6)	\$376,375	Sediment	tons/yr	30,972	Annual Load (mass/yr.)	45	13,938	2025	Number of BMPs / yr.	10.2 / yr.	3,933	1,966	3,933	28	Year 1	Year 10



**Table 4-7:** PTMAApp estimated reductions over the 10 year life of this plan and the percent progress towards the overall reduction goals.

HUC 10 Name	HUC 10 ID	Treatment Group Type & Number of BMPs	Cost	Issue	Unit	Existing Condition	Quantitative Measurable Goal (QMG)				Reporting Measurable Goal		PTMAApp Scenario Reduction	5 year Reduction Goal	10 year Reduction Goal	10 yr. Progress towards QMG (%)	Start Date	End Date
							Metric	Amount (%)	Target Load Reduction	Year	Metric	Amount (Number of BMPs / yr.)						
		Source Reduction (68)		Nutrients: Total Nitrogen	lbs/yr	3,092	Annual Load (mass/yr.)	45	1,391	2040			523	261	523	38		
				Nutrients: Total Phosphorus	lbs/yr	202	Annual Load (mass/yr.)	45	91	2025			51	26	51	56		
				Excess Runoff: 2 Year	acre feet	2,643	2-Yr. Runoff Volume	25	661	2030			422	211	422	64		
				Excess Runoff: 10 Year	acre feet	6,462	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Mormon Creek-Mississippi River	706000105	Storage (17) Filtration (2) Source Reduction (68)	\$137,224	Sediment	tons/yr	116,416	Annual Load (mass/yr.)	45	52,387	2025	Number of BMPs / yr.	8.7 / yr.	14,488	7,244	14,488	28	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	10,848	Annual Load (mass/yr.)	45	4,882	2040			112	56	112	2		
				Nutrients: Total Phosphorus	lbs/yr	134	Annual Load (mass/yr.)	45	60	2025			12	6	12	20		
				Excess Runoff: 2 Year	acre feet	71,177	2-Yr. Runoff Volume	25	17,794	2030			6,431	3,216	6,431	36		
				Excess Runoff: 10 Year	acre feet	167,868	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
North Branch Root River	704000801	Storage (16) Filtration (6) Source Reduction (79)	\$440,279	Sediment	tons/yr	32,511	Annual Load (mass/yr.)	45	14,630	2025	Number of BMPs / yr.	10.1 / yr.	4,155	2,077	4,155	28	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	3,770	Annual Load (mass/yr.)	45	1,696	2040			391	196	391	23		
				Nutrients: Total Phosphorus	lbs/yr	289	Annual Load (mass/yr.)	45	130	2025			29	15	29	23		
				Excess Runoff: 2 Year	acre feet	11,014	2-Yr. Runoff Volume	25	2,753	2030			332	166	332	12		
				Excess Runoff: 10 Year	acre feet	24,311	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Root River	704000809	Storage (19) Filtration (14) Source Reduction (70)	\$378,148	Sediment	tons/yr	159,195	Annual Load (mass/yr.)	45	71,638	2025	Number of BMPs / yr.	10.3 / yr.	15,109	7,554	15,109	21	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	9,388	Annual Load (mass/yr.)	45	4,225	2040			436	218	436	10		
				Nutrients: Total Phosphorus	lbs/yr	467	Annual Load (mass/yr.)	45	210	2025			46	23	46	22		
				Excess Runoff: 2 Year	acre feet	64,014	2-Yr. Runoff Volume	25	16,003	2030			5,478	2,739	5,478	34		





**Table 4-7:** PTMAApp estimated reductions over the 10 year life of this plan and the percent progress towards the overall reduction goals.

HUC 10 Name	HUC 10 ID	Treatment Group Type & Number of BMPs	Cost	Issue	Unit	Existing Condition	Quantitative Measurable Goal (QMG)				Reporting Measurable Goal		PTMAApp Scenario Reduction	5 year Reduction Goal	10 year Reduction Goal	10 yr. Progress towards QMG (%)	Start Date	End Date
							Metric	Amount (%)	Target Load Reduction	Year	Metric	Amount (Number of BMPs / yr.)						
				Excess Runoff: 10 Year	acre feet	151,037	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Rush Creek	704000805	Storage (29) Filtration (20) Source Reduction (56)	\$1,219,900	Sediment	tons/yr	64,464	Annual Load (mass/yr.)	45	29,009	2025	Number of BMPs / yr.	10.5 / yr.					Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	4,717	Annual Load (mass/yr.)	45	2,123	2040								
				Nutrients: Total Phosphorus	lbs/yr	458	Annual Load (mass/yr.)	45	206	2025								
				Excess Runoff: 2 Year	acre feet	4,804	2-Yr. Runoff Volume	25	1,201	2030								
				Excess Runoff: 10 Year	acre feet	11,656	2-Yr. Runoff Volume	N/A	N/A	N/A								
South Branch Root River	704000804	Storage (20) Filtration (4) Infiltration (1) Source Reduction (76)	\$683,183	Sediment	tons/yr	75,463	Annual Load (mass/yr.)	45	33,958	2025	Number of BMPs / yr.	10.1 / yr.					Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	4,126	Annual Load (mass/yr.)	45	1,857	2040								
				Nutrients: Total Phosphorus	lbs/yr	320	Annual Load (mass/yr.)	45	144	2025								
				Excess Runoff: 2 Year	acre feet	11,585	2-Yr. Runoff Volume	25	2,896	2030								
				Excess Runoff: 10 Year	acre feet	26,929	2-Yr. Runoff Volume	N/A	N/A	N/A								
South Fork Root River	704000808	Storage (23) Filtration (1) Source Reduction (79)	\$712,080	Sediment	tons/yr	69,602	Annual Load (mass/yr.)	45	31,321	2025	Number of BMPs / yr.	10.3 / yr.					Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	4,504	Annual Load (mass/yr.)	45	2,027	2040								
				Nutrients: Total Phosphorus	lbs/yr	293	Annual Load (mass/yr.)	45	132	2025								
				Excess Runoff: 2 Year	acre feet	9,911	2-Yr. Runoff Volume	25	2,478	2030								
				Excess Runoff: 10 Year	acre feet	24,282	2-Yr. Runoff Volume	N/A	N/A	N/A								
Trout Run-Root River	704000803	Storage (19) Source Reduction (80)	\$507,367	Sediment	tons/yr	78,738	Annual Load (mass/yr.)	45	35,432	2025	Number of BMPs / yr.	9.9 / yr.					Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	6,439	Annual Load (mass/yr.)	45	2,898	2040								



Table 4-7: PTMAApp estimated reductions over the 10 year life of this plan and the percent progress towards the overall reduction goals.																		
HUC 10 Name	HUC 10 ID	Treatment Group Type & Number of BMPs	Cost	Issue	Unit	Existing Condition	Quantitative Measurable Goal (QMG)				Reporting Measurable Goal		PTMAApp Scenario Reduction	5 year Reduction Goal	10 year Reduction Goal	10 yr. Progress towards QMG (%)	Start Date	End Date
							Metric	Amount (%)	Target Load Reduction	Year	Metric	Amount (Number of BMPs / yr.)						
				Nutrients: Total Phosphorus	lbs/yr	393	Annual Load (mass/yr.)	45	177	2025			36	18	36	21		
				Excess Runoff: 2 Year	acre feet	27,292	2-Yr. Runoff Volume	25	6,823	2030			1,137	569	1,137	17		
				Excess Runoff: 10 Year	acre feet	61,650	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Upper Iowa River	706000206	Filtration (10) Source Reduction (17)	\$6,235	Sediment	tons/yr	1,134	Annual Load (mass/yr.)	45	510	2025	Number of BMPs / yr.	2.7 / yr.	207	104	207	41	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	1,479	Annual Load (mass/yr.)	45	666	2040			259	130	259	39		
				Nutrients: Total Phosphorus	lbs/yr	109	Annual Load (mass/yr.)	45	49	2025			30	15	30	62		
				Excess Runoff: 2 Year	acre feet	27	2-Yr. Runoff Volume	25	7	2030			-	-	-	-		
				Excess Runoff: 10 Year	acre feet	66	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		
Winnebago Creek	706000104	Storage (14) Source Reduction (89)	\$367,554	Sediment	tons/yr	27,642	Annual Load (mass/yr.)	45	12,439	2025	Number of BMPs / yr.	10.3 / yr.	4,993	2,496	4,993	40	Year 1	Year 10
				Nutrients: Total Nitrogen	lbs/yr	1,628	Annual Load (mass/yr.)	45	732	2040			14	7	14	2		
				Nutrients: Total Phosphorus	lbs/yr	84	Annual Load (mass/yr.)	45	38	2025			3	1	3	7		
				Excess Runoff: 2 Year	acre feet	2,051	2-Yr. Runoff Volume	25	513	2030			363	182	363	71		
				Excess Runoff: 10 Year	acre feet	5,077	2-Yr. Runoff Volume	N/A	N/A	N/A			N/A	N/A	N/A	N/A		


Legend: Blue cells indicate achievement of the measurable goal within the 10-year plan duration.

Estimated number of practices, cost and progress toward achieving the quantitative measurable goals by planning region, based on implementing the “most effective” best management practices to achieve local (field scale) nitrogen and planning regional sediment annual load reductions. Estimates developed using the Prioritize, Target and Measure Application (PTMAApp). Best Management Practice locations comprising the prioritized and targeted and implementation approach are included in Appendix I; see Section 4.1 for a description of the prioritized and targeted implementation approach.

Table Interpretation (top row): In Bear Creek planning region, 23 storage practices and 77 source reduction practices will cost an estimated \$461,185. Upon implementation of those 100 practices and practices upstream, PTMAApp estimates that sediment load reduction will be reduced by 15,685 tons/yr at the outlet of Bear Creek planning region. This sediment load reduction corresponds to 68% of the target load reduction goal of 22,917 tons/yr, based on the Minnesota Nutrient Reduction Strategy.







Estimated funding needs for implementation of the Root River One Watershed, One Plan for the 10-year lifespan of the plan is provided in **Table 4-8**. This includes the estimated cost of each action addressing “A” and “B” level resource concern, as classified by management category within **Table 4-6**: 1) field practice; 2) statutory/ordinance; 3) research; and 4) education and outreach. Additional funding needs for implementation of this plan are also included within **Table 4-8**, including plan administration and capital improvement projects.

The total estimated cost for actions in the field practice management category is a summation the total estimated costs for all field practices within each planning region. Total costs for field practices by planning region are provided in **Table 4-7**, based on field practice numbers and types in PTMApp using EQIP payment rates. This sums to \$7.8 million. An additional one million dollars was also added to the 10-year estimated cost for actions in the field practices management category, to account for additional staff time need to guide and accomplish project implementation. The one million dollars assumes the addition of 1.5 full time equivalents to provide technical support for practice implementation.

The estimated total cost for implementing actions in the statutory obligations/ordinances management category is based on an approximation of existing expenditures. Total estimated implementation cost is derived from estimated costs in existing local government unit budgets for statutory obligations/ordinances actions, totaling \$2 million over ten years.

The funding for actions addressing “A” and “B” level resource of concerns within the research management category are guided by the Research Initiative and the Data Development and Management Initiative as established in **Section 5.1.2**. As shown in **Table 4-7**, some research management category actions within the implementation table are already a component of local government budgets, and therefore, do not have additional costs assigned to them. The remaining research management category actions that are not components of existing budgets are assigned additional costs. The total estimated cost for implementing actions addressing “A” and “B” level resource of concerns within the research management category is one million dollars for ten years, based on implementing one \$100,000 research project per year.

The funding of actions in the education and outreach management category are guided by the Public Knowledge and Awareness Campaign, the Landowner and Producer Engagement Campaign, and the Water and the Business Community Campaign (**Section 5.1.3**). Watershed-wide activities guided by these three campaigns are estimated to cost \$75,000 per year. Included in the estimated education and outreach management category total cost is the anticipated cost to create and administer the broad Education and Outreach Initiative (**Section 5.1.3**), the umbrella initiative for all three campaigns.

Plan administration is an additional funding need separate from management categories, which is needed for successful implementation of the plan. An estimated \$1.78 million for the 10-year period is included in this additional expense to account for the equivalent of a 1.75 full-time employee.

A capital improvement is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features, excluding those items incentivized through the initiatives described in **Section 5.1**. Capital improvements are beyond the “normal” financial means of the Root River, One Watershed, One Plan and therefore require external state and federal funding. **Table 4-8** provides estimated costs for implementing two capital improvements during the 10-year lifespan of the plan, totaling an estimated \$5 million. Capital improvements are discussed further in **Section 5.2**.



**Table 4-8:** Estimated total funding needs for implementation of the Root River One Watershed, One Plan for the 10-year period.

Management Category	Total Funding Needs (over 10 years)
Field Practice <sup>1</sup>	\$8,800,000
Statutory Obligations / Ordinances <sup>2</sup>	\$2,000,000
Research <sup>3</sup>	\$1,000,000
Education & Outreach <sup>4</sup>	\$825,000
Additional Expenses	Total Funding Needs (over 10 years)
Plan Administration <sup>5</sup>	\$1,780,000
Capital Improvements (2 during plan period)	\$5,000,000
<b>Total Estimated Funding Needs</b>	<b>\$19,405,000</b>

<sup>1</sup> Based on field practice numbers and types in PTMApp using EQIP payment rates. Includes staffing time to implement field practices

<sup>2</sup> Based on estimated costs in existing local government unit budgets

<sup>3</sup> Based on one \$100,000 research project per year

<sup>4</sup> Estimated \$75,000 per year for watershed wide activities plus upfront cost to develop campaigns

<sup>5</sup> Plan administration and coordination staffing estimated at 1.75 full-time equivalent







## 5 IMPLEMENTATION PROGRAM

### 5.1 INCENTIVE BASED INITIATIVES

Incentive based initiatives are a key component of the targeted implementation schedule presented in **Section 4**. Incentive based initiatives are used as the funding mechanism to implement strategies and actions to achieve the measurable goals. Incentive based initiatives are common across the Root River One Watershed, One Plan boundary, therefore there will be a single plan administering entity for incentive based initiatives. However, implementation of actions funded through these initiatives will be done at the local level. Incentive based initiatives described in this section of the plan are conceptual in nature, and will be refined during implementation by developing guidance. These initiatives generally describe where funds will be utilized to accomplish which strategy and action of the targeted implementation schedule.

As presented in the **Section 4** targeted implementation schedule, each action is described and assigned to a “management category.” Four different management categories are included in the targeted implementation schedule: 1) field practice; 2) research; 3) education and outreach; and 4) statutory / ordinances. Total costs for implementation of each management category is presented in **Table 4-8**. The management category generally relates to the specific initiative which will be used to accomplish the action. These initiatives are presented in **Table 5-1**, and are further defined and discussed in **Section 5**. As local approvals and ordinances are already a component of local government budgets, actions in the statutory/ordinance management category are not assigned a specific initiative, and are instead discussed in **Section 5.5**.

**Table 5-1:** Management category and associated incentive based initiative for implementation program

Management Category	Incentive Based Initiative
Field Practice	Groundwater Initiative
	Surface Water Initiative
	Landscape Features Initiative
	Social Capacity Initiative
	Sustainability of Communities Initiative
	Water Resources Infrastructure Initiative
Research	Research Initiative
	Data Development and Management Initiative
Education and Outreach	Education and Outreach Initiative

The incentive based initiatives described in **Section 5.1** of this plan envision the use of a variety of types of assistance. By providing assistance, landowners are incentivized to use the various initiatives, with the result being movement toward achieving the measurable goals.

Financial incentives provide financial assistance for the material and labor costs necessary to install BMPs in both rural and urban landscapes. The financial incentive is provided in the form of a cash payment to the initiative participant upon certification of project completion. A match or cost share by the participant in the form of a cash or in-kind services is required to receive the incentive.

Technical assistance is a form of financial assistance at no cost to the participant. Technical assistance may be provided through a SWCD, a County, a watershed district, or other agencies and conservation groups (Minnesota Department of Natural Resources, National Resource Conservation Service, United



States Fish and Wildlife Service, Trout Unlimited (TU)), within the plan area. The assistance often includes design support, installation guidance or similar advice. Technical staff with appropriate expertise, skills, and training for their assigned role(s) may be designated to assist in project implementation.

A reduction or exemption from property taxes is a type of financial incentive. The reduction or exemption is provided on the condition that the land receiving the exemption or reduction is subject to certain conditions, which is monitored by SWCD or agency staff. A tax exemption is the type of financial assistance often used to incentivize the conversion of low productivity or low profitability land back to another use. Land owners with qualifying parcels of land may be eligible for enrollment in these tax exemption programs.

A conservation easement is a set of restrictions a landowner voluntarily places on his or her property in order to preserve its conservation values. Landowners may receive compensation in return for this restricted use. The easement is recorded on the deed to the land, and depending on the agreement, may be perpetual or limited in duration. The landowner retains ownership of the land and the responsibility for maintenance and upkeep, paying applicable real estate taxes, and other obligations associated with ownership.

Land acquisition refers to the voluntary transfer of land either through fee title purchase or a perpetual easement of a property. These property acquisitions commonly occur for flood protection projects and may also be used as a tool for protecting unique resources.

The financial incentives provided through these initiatives do not require compliance with federal design standards. Rather that amount of cost share can be adjusted to a lesser amount for reduced design standards thereby recognizing a different risk of failure.

### 5.1.1 FIELD PRACTICES MANAGEMENT CATEGORY

Within the targeted implementation schedule, actions assigned as a field practices management category utilize the implementation of best management practices (BMPs) to accomplish a strategy and make progress towards a measurable goal. The field practices management category relates to several specific initiatives which will be used to either implement, or gear efforts toward the implementation of, best management practices. Initiatives are designed to relate to resource categories within the plan, and include the Groundwater Initiative, Surface Water Initiative, Landscape Features Initiative, Social Capacity Initiative, Sustainability of Communities Initiative, and the Water Resources Infrastructure Initiative.

The following descriptions of each initiative includes a summary of the purpose and the type of assistance provided (i.e., cost share, tax incentive). The field practices table (**Table 4-7**) shows preliminary locations for the implementation of best management practices within each planning region whose cost share relies on these initiatives. **Table 5-2** shows examples of eligible practices for each of the initiatives. A description of the various funding sources is presented in **Section 5.4.2.2**.

#### 5.1.1.1 GROUNDWATER INITIATIVE

The Groundwater Initiative provides cost share funds for the implementation of practices for protecting (as described in 3.2.1, Protection Classification) and restoring (as described in 3.2.2 Restoration Classification) the quality and quantity of groundwater. This initiative is focused on rectifying the issues affecting the drinking water supply, spring shed and surficial – subsurface hydrologic connection resource concerns as described in **Table 2-1** and shown graphically within **Section 3**.

Eligible field practices for the Groundwater Initiative include, but are not limited to those shown in **Table 5-2**. Any type of assistance (financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) can be used to provide the financial incentive.





### 5.1.1.2 SURFACE WATER INITIATIVE

The Surface Water Initiative provides cost share funds for the implementation of practices to protect (as described in 3.2.1, Protection Classification) and restore (as described in 3.2.2 Restoration Classification) the quality to achieve their beneficial uses. This initiative is focused on rectifying the issues affecting the streams and rivers, flooding and wetland resource concerns as described in **Table 2-1** and shown graphically within **Section 3**. This initiative can also be used to cost share buffers required under the new buffer law.

Eligible field practices for the Surface Water Initiative include, but are not limited to those shown in **Table 5-2**. Any type of assistance (financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) can be used to provide the financial incentive.

### 5.1.1.3 LANDSCAPE FEATURES INITIATIVE

The Landscape Features Initiative provides funding to maintain or improve the condition natural features and characteristics of the landscape, which are prominent or unique. This initiative is focused on rectifying the issues affecting the riparian corridor, aquatic habitat, trout stream, biodiversity, and karst features as described in **Table 2-1** and shown graphically within **Section 3**.

Eligible field practices for the Landscape Features Initiative include, but are not limited to those shown in **Table 5-2**. Actions funded under the Landscape Features Initiative are not exclusive to field practices shown in **Table 5-2**, and may include funding perennial vegetation establishments, management easements, and other actions geared towards improving natural landscape features and characteristics. Any type of assistance (financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) can be used to provide the financial incentive.

### 5.1.1.4 SOCIAL CAPACITY INITIATIVE

The Social Capacity Initiative funds actions geared toward the implementation of best management practices, facilitated by a broadened collective understanding of water issues within the community. This initiative is focused on rectifying the issues affecting the public knowledge and behavior, landowner and producer engagement, business community and tools and technology resource concerns as described in **Table 2-1**, and shown graphically within **Section 3**.


Actions funded through the Social Capacity Initiative are intended to increase implementation of field practices by improving the knowledge base, including but not limited to those shown in **Table 5-2**. Cost share can be provided to fund workshops, meetings, seminars and similar activities, sponsored by others, which are focused on increasing capacity and understanding to implement practices.

Any type of assistance (financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) can be used to provide the financial incentive.

### 5.1.1.5 SUSTAINABILITY OF COMMUNITIES INITIATIVE

The Sustainability of Communities Initiative funds actions geared toward the implementation of best management practices to improve the endurance, resiliency, and interconnectedness of water systems and process within the community, including the economy, culture, and ecology of the community. This initiative is primarily focused on rectifying the issues affecting the livability, rural environmental health, urban environmental health, and land use resource concerns as described in **Table 2-1**, and shown graphically within **Section 3**.





Actions funded through the Sustainability of Communities Initiative are intended to increase implementation of field practices including, but are not limited to those shown in **Table 5-2**. Cost share can be provided to fund workshops, meetings, seminars and similar activities, sponsored by others, which are focused on increasing sustainability (i.e., soil health).

Any type of assistance (financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) can be used to provide the financial incentive.

#### **5.1.1.6 WATER RESOURCES INFRASTRUCTURE INITIATIVE**

The Water Resources Infrastructure Initiative is a cost share program which funds the implementation of practices to maintain or improve the natural and man-made systems used for managing the rate and volume of water in the plan area. This initiative is primarily focused on rectifying the issues affecting the drainage system, point sources and water retention system resource concerns as described in Table 2, and shown graphically within Section 3.

Eligible field practices for the Water Resources Infrastructure Initiative include, but are not limited to those shown in **Table 5-1**. Any type of assistance (financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) can be used to provide the financial incentive.





**Table 5-2:** Examples of field practice management category actions eligible for funding by initiative (not intended to contain all actions).

Action (see Targeted Implementation Schedule)	Groundwater Initiative			Surface Water Initiative			Landscape Features Initiative					Social Capacity Initiative				Sustainability of Communities Initiative				Water Resources Infrastructure Initiative		
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
Roof Runoff Management				x				x	x			x	x	x				x				
Streambank and Shoreline Protection				x	x		x	x	x			x	x	x		x		x	x	x		
Rain Gardens	x	x	x	x	x			x	x		x	x	x					x				
Grassed Waterways and Swales				x				x	x			x	x	x								
Alternative Tile Intakes				x	x			x	x			x	x	x	x						x	
Grade Stabilization Structures				x				x	x			x	x	x								
Prescribed Grazing	x			x			x	x	x			x	x	x			x					
Tree / Shrub Establishment	x			x	x			x	x			x	x	x								
Riparian Forest Buffers				x	x		x	x	x	x		x	x	x		x			x	x		
Riparian Herbaceous Cover				x	x		x	x	x			x	x	x		x			x	x		
Channel Bed & Stream Channel Stabilization				x	x		x	x	x			x	x	x		x				x		
Streambank and Habitat Improvement and Management				x	x		x	x	x			x	x	x		x			x	x		



**Table 5-2:** Examples of field practice management category actions eligible for funding by initiative (not intended to contain all actions).

Action (see Targeted Implementation Schedule)	Groundwater Initiative			Surface Water Initiative			Landscape Features Initiative					Social Capacity Initiative				Sustainability of Communities Initiative				Water Resources Infrastructure Initiative		
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
Hayable Buffer Practice	x			x			x	x	x			x	x	x								
Pest Management	x	x	x	x				x	x		x	x	x	x		x	x					
Filter Strips				x				x	x			x	x	x								
Karst Sinkhole Treatment	x	x	x								x	x	x	x								
Nutrient Management	x	x	x	x				x	x		x	x	x	x		x						
Cover Crops	x	x	x	x	x			x	x		x	x	x	x		x						
Well Decommissioning	x	x	x								x	x	x	x								
Wetland Construction / Restoration / Creation				x	x	x		x	x			x	x	x		x			x	x		x
Drainage Water Management				x	x			x	x			x	x	x					x			
Denitrifying Bioreactor	x			x	x			x	x			x	x	x								
Water and Sediment Control Basins				x	x			x	x			x	x	x				x	x			x
Structures for Water Control				x	x			x	x			x	x	x					x			
Terraces				x				x	x			x	x	x								
Push-Up Pond Practice				x	x			x	x			x	x	x				x	x			
Conservation Tillage Practices	x	x	x	x	x			x	x		x	x	x	x		x						





**Table 5-2:** Examples of field practice management category actions eligible for funding by initiative (not intended to contain all actions).

Action (see Targeted Implementation Schedule)	Groundwater Initiative			Surface Water Initiative			Landscape Features Initiative					Social Capacity Initiative				Sustainability of Communities Initiative				Water Resources Infrastructure Initiative		
	Drinking Water	Springsheds	Subficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
Conservation Crop Rotation	x	x	x	x	x			x	x		x	x	x			x						
Septic System Upgrades	x			x							x	x	x				x				x	
Feedlot Runoff Practices	x			x				x	x		x	x	x									
Waste Storage Facility	x			x				x	x		x	x	x									
Upland Wildlife Habitat Management				x	x			x	x	x	x	x	x		x				x			
Critical Area Planting				x				x	x		x	x	x						x			
Restoration and Management of Rare or Declining Habitats				x	x			x	x	x	x	x	x		x				x			
CSP Precision Agriculture Practices	x	x	x								x	x	x	x								
Construction Erosion Control				x				x	x		x	x	x									x
Contour Farming				x	x			x	x		x	x	x									
Contour Buffer Strips				x	x			x	x		x	x	x									
Field Borders				x	x			x	x		x	x	x									
Contour Stripcropping				x	x			x	x		x	x	x									
Milkhouse Waste Treatment				x				x	x		x	x	x									





**Table 5-2:** Examples of field practice management category actions eligible for funding by initiative (not intended to contain all actions).

Action (see Targeted Implementation Schedule)	Groundwater Initiative		Surface Water Initiative			Landscape Features Initiative					Social Capacity Initiative				Sustainability of Communities Initiative			Water Resources Infrastructure Initiative				
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
Windbreak / Shelterbelt				x				x	x			x	x	x								
Prescribed Burning										x		x	x									
Forest Stand Improvement				x				x	x	x		x	x	x								
<b>Assumptions:</b> <ul style="list-style-type: none"> <li>• Each practice installed increases public and producer knowledge and engagement in water issues and water management</li> <li>• Practices which address springsheds also address surficial-subsurface hydrologic connections and karst formations</li> <li>• Landowners are considered part of the "Business Community"</li> <li>• New, innovative field practices identified as utilizing technology and tools</li> </ul>																						





## 5.1.2 RESEARCH MANAGEMENT CATEGORY

Within the targeted implementation schedule, actions assigned as a “research” management category utilize research and/or investigation activities to address issues impacting a resource of concern. Implementation of actions in the research management category therefore make progress towards accomplishing a strategy and progressing towards a measurable goal. Two initiatives relate to the research management category: the Research Initiative and the Data Development and Management Initiative. As the targeted implementation schedule is intended to address specific issues impacting each “A” or “B” resource of concern, the Research Initiative and the Data Development and Management Initiatives focus on funding actions addressing issues impacting “A” or “B” resources of concern.

The following descriptions of each initiative includes a summary of the purpose and the type of assistance provided (i.e., cost share, tax incentive). **Table 5-3** and **Table 5-4** show examples of eligible actions for each of the initiatives. A description of the various funding sources is presented in **Section 5.4.2.2**.

### 5.1.2.1 RESEARCH INITIATIVE

The Research Initiative funds research and/or investigation activities which are needed to close knowledge gaps necessary to implement this plan. Closing these knowledge gaps allows for the conceptualization of tailored, science-based implementation strategies aimed to progress resources towards stated goals.

Eligible activities for the Research Initiative include, but are not limited to developing flood prone maps, creating an inventory of brook trout spawning areas, creating an inventory of sinkholes and springsheds, understanding the fate and transport of nitrate nitrogen and mapping DWSMAs and WPAs. Examples of eligible Research Initiative activities as they relate to priority resource categories and concerns are provided in **Table 5-3**.



**Table 5-3:** Examples of eligible research initiative activities by resource category and priority resource concern. This list is not intended to contain all options, but examples of practices and their components.

Action (see Targeted Implementation Schedule)	Groundwater			Surface Water			Landscape Features					Social Capacity				Sustainability of Communities				Water Resources Infrastructure		
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat for Fish, Macro-invertebrates, and Aquatic Life	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
<b>Research Initiative</b>																						
Define altered hydrology and natural hydrograph				x	x	x	x	x	x							x	x	x		x		
Inventory sinkholes/springsheds	x	x	x								x					x	x	x	x			
Inventory riparian land adjacent to perennial streams and rivers				x	x		x	x	x							x	x	x	x			
Inventory presence of perennial riparian buffers or suitable alternatives				x	x		x	x	x							x	x	x	x			
Inventory brook trout spawning areas				x																		
Inventory sediment sources and complete sediment mass balances for affected reaches				x												x						
Develop flood prone maps					x		x	x	x							x	x	x				
Inventory SSTs	x			x												x	x		x		x	





**Table 5-3:** Examples of eligible research initiative activities by resource category and priority resource concern. This list is not intended to contain all options, but examples of practices and their components.

Action (see Targeted Implementation Schedule)	Groundwater			Surface Water			Landscape Features				Social Capacity				Sustainability of Communities				Water Resources Infrastructure			
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat for Fish, Macro-invertebrates, and Aquatic Life	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
<b>Research Initiative</b>																						
Inventory existing water / land businesses												x	x	x								
Inventory existing field practices					x							x	x	x			x					
Inventory flood storage locations				x	x	x		x	x						x	x	x					x
Map DWSMAs and WPAs	x	x													x	x	x	x				
Identify / inventory funding sources	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Inventory and assess fish barriers				x				x	x													
Inventory and map field tile drainage					x								x	x	x	x				x		
Inventory and assess infrastructure that treats/ routes water					x								x	x	x		x			x	x	
Promote Low Impact Design strategies														x	x		x	x				x
Increase public accessibility to natural resources				x		x	x	x	x	x	x	x	x	x	x		x					



### 5.1.2.2 DATA DEVELOPMENT AND MANAGEMENT INITIATIVE

Plan participants have and will continue to invest in the development and assembly of data and information. A large portion of these data and information is water quality monitoring data. A number of water quality monitoring efforts have been completed by several agencies and universities within the Root River One Watershed, One Plan plan area. Water quality data needs to be collected and compiled in a way that provides statistical relevancy. Providing statistical relevancy with water quality data is guided by a two-phase data analysis process. The first phase involves data collection, compilation, standardization and review of historic reports. The second phase involves a statistical analysis to determine trends where sufficient data are available and to determine gaps. The second phase of this effort also includes analyzing the spatial distribution of data and completing statistical analyses and long term trend analyses where sufficient data and period of record is allowed. Results of the data analysis process can identify where data gaps exist, and where new and continued water quality monitoring is needed.

During implementation, the Data Development and Management Initiative will build upon the data and information processes already established by plan participants. The Data Development and Management Initiative consists of two different campaigns: 1) Technology, Tools, and Existing Capabilities, and 2) Water Quality Monitoring Campaign. These two campaigns are both operated through the sharing of services. However, activities will be locally-administered and implemented, with individual local entities operating as the fiscal agent. These campaigns will be funded through local dollars.

#### 5.1.2.2.1 TECHNOLOGY, TOOLS, AND EXISTING CAPABILITES CAMPAIGN

The primary purpose of the Technology, Tools, and Existing Capabilities Campaign is to build and maintain technical capacity in order to fully utilize new technology and tools for water resource management. The intended audience for this campaign is SWCD staff members.

Probable activities of this campaign include attending trainings on newly developed technology and tools, developing a database for shared resource monitoring data, and maintaining GIS data layers created by plan partners. Example activities of the Technology, Tools, and Existing Capabilities Campaign in relation to resource categories and resource concerns are shown in **Table 5-4**.

#### 5.1.2.2.2 WATER QUALITY MONITORING CAMPAIGN


The Water Quality Monitoring Campaign is dedicated to enhancing and maintaining the monitoring network in the Root River plan area, in order to capture and document measurable water quality changes resulting from watershed implementation activities. Plan partners have a robust surface and ground water monitoring network in place that continues to be refined.

There are two long-term surface water monitoring efforts in the Root River Watershed. The Root River Watershed Pollutant Load Monitoring Network (WPLMN) provides year-round monitoring data from five monitoring sites located on the main stem and main tributaries of the Root River. These sites are located in the Middle Branch subwatershed at County 5 bridge (city of Fillmore), North Branch subwatershed at County 21 bridge, the South Branch subwatershed in Lanesboro, the Main Branch subwatershed at Hwy 76 bridge in Houston, and the South Fork subwatershed at Hwy 16 bridge east of Houston. Monitoring data collected for the Root River WPLMN consists of stream flow data collected by USGS and the MnDNR, and water quality data collected by the MPCA. Additional long-term monitoring data is available from the Upper Iowa River Alliance sampling, where three sites in Mower County have been monitored for about ten years.

Intensive surface water monitoring stations were established in the plan area as part of MPCA's 2008 Root River Watershed Intensive Monitoring Program. These stations consist of stream, biological, and lake monitoring components. The Citizen Stream Monitoring Program is also a component of MPCA's watershed monitoring approach, which gains valuable long-term data which can be used to evaluate trends. The MPCA also awarded Surface Water Assessment Grants (SWAG) to local entities in the plan







area for monitoring lake and stream water quality. Two of the SWAG sites are located in the Upper Iowa River Watershed, and four sites are in Houston County, located in the Upper Iowa River, Mississippi River (Reno) and Mississippi River (La Crescent) watersheds. Monitoring data collected at the SWAG sites will be used for MPCA Intensive Watershed Monitoring to collect baseline data for the WRAPS.

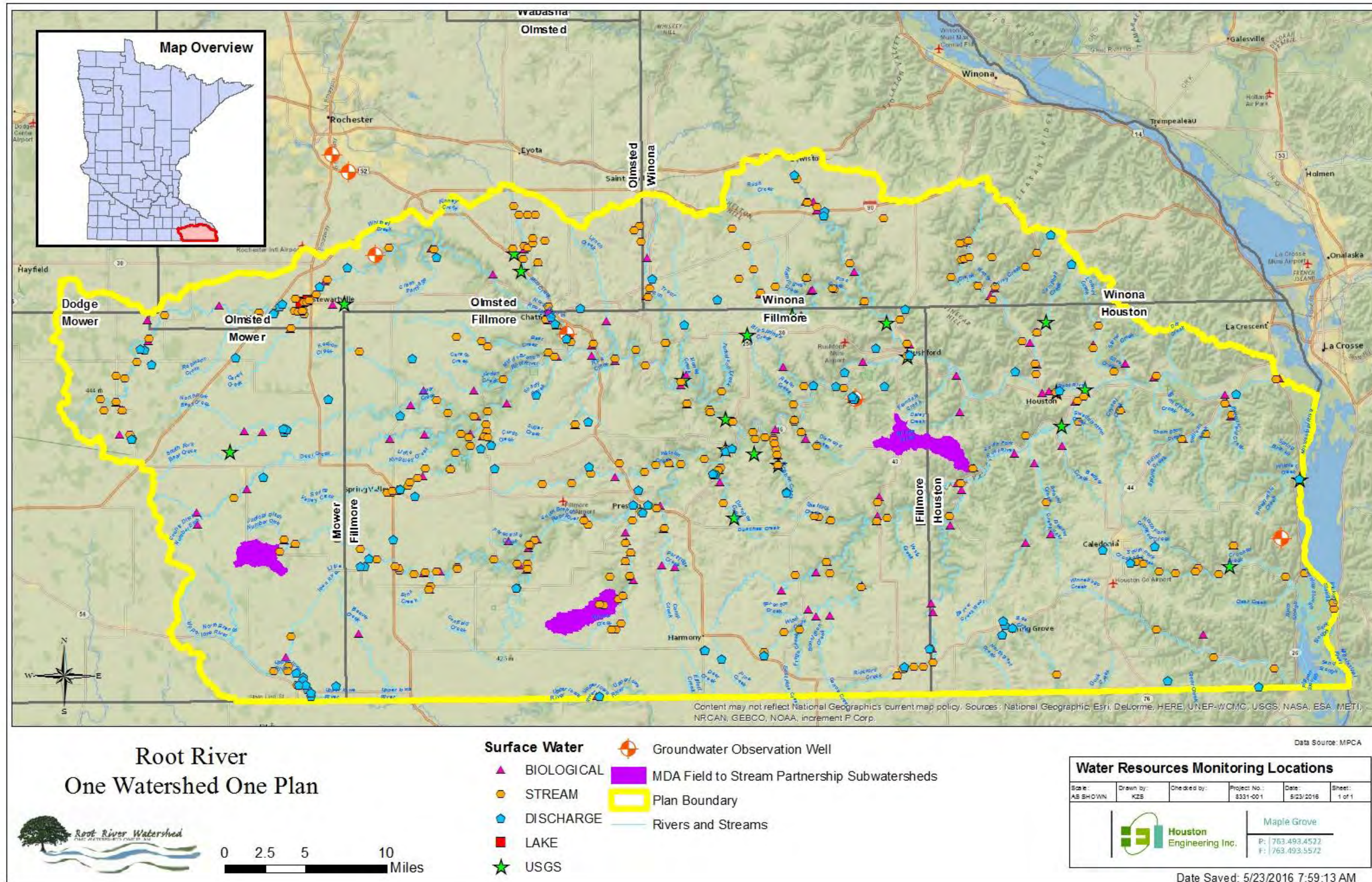
Other existing surface water monitoring sites in the plan area are operated by the MnDNR, the USGS, and the Root River Field to Stream Partnership. The MnDNR operates three monitoring locations on the main stem of the Root River, purposed for stream and biological assessments. There are also flow monitoring stations operated by the USGS, some of which are continuous. Four additional edge-of-field and three in-stream monitoring stations are located at the outlets of three small subwatersheds in the plan area. These stations are part of the Root River Field to Stream Partnership, a partnership formed in 2009 by agricultural businesses, state agencies, producers and landowners to determine sediment and nutrient exports and sources. Activities at these monitoring stations include continuous monitoring, autosamplers, and bi-weekly grab samples (plus events) from March to November.

Monitoring efforts also support tracking groundwater trends in the Root River plan area. As part of the Southeast Minnesota WRAPS Nitrogen planning efforts, the MPCA previously operated three continuous nitrate monitoring stations at the Lanesboro Fish Hatchery. Additionally, a Volunteer Nitrate Monitoring Network was established in 2008, providing a network of private wells which are monitored once a year for nitrate concentrations, and will continue indefinitely. Winona State University has also been subcontracted to maintain and sample fifty lysimeters in various locations within the watershed planning area. Additional groundwater observation wells are distributed throughout the plan area.

The intended audience for the Water Quality Monitoring Campaign is staff members within the Root River plan area that may participate in monitoring activities, which may include state and federal agencies, counties, SWCDs, watershed districts, non-profits, and educational institutions. The Root River One Watershed, One Plan intends to monitor, capture, and document measurable water quality changes resulting from implementation activities by leveraging the existing long-term monitoring sites already in-place (**Figure 5-1**). Probable activities of this monitoring campaign include, but are not limited to, developing a database for shared resource monitoring data, conducting additional intensive monitoring efforts, and evaluating monitoring data results. Example activities of the Water Quality Monitoring Campaign in relation to priority resource categories and concerns are shown in **Table 5-4**.



Figure 5-1: Monitoring locations in the Root River One Watershed, One Plan plan area.





**Table 5-4:** Examples of eligible Data Development and Management Initiative activities by resource and resource concern. This list is not intended to contain all options, but examples of activities and their components.

Action (see Targeted Implementation Schedule)	Groundwater			Surface Water			Landscape Features					Social Capacity				Sustainability of Communities				Water Resources Infrastructure				
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat for Fish, Macro-invertebrates, and Aquatic Life	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems		
<b>Data Development and Management Initiative: Technology, Tools, and Existing Capabilities Campaign</b>																								
Develop new "vehicles" for implementation															x	x	x	x	x	x	x			
Maintain records of invasive species				x		x	x	x	x								x	x						
Local staff training															x	x	x	x	x					
Develop comprehensive hydrologic and hydraulic model				x	x		x														x			x
Develop water resources database															x									
Perform roles- share services															x			x	x	x				
<b>Data Development and Management Initiative: Water Quality Monitoring Campaign</b>																								
Monitor groundwater quality and quantity	x	x	x	x	x	x	x	x	x	x					x	x	x	x			x	x	x	
Monitor surface water quality and quantity	x	x	x	x	x	x	x	x	x	x					x	x	x	x			x	x	x	



### 5.1.3 EDUCATION AND OUTREACH MANAGEMENT CATEGORY

Within the targeted implementation schedule, actions assigned as an “education and outreach” management category utilize education and outreach activities to address issues impacting a resource of concern. Implementation of actions in the education and outreach management category therefore make progress towards accomplishing a strategy and progressing towards a measurable goal. The Education and Outreach Initiative is the only incentive based initiative in this management category.

The following description of the Education and Outreach Initiative includes a summary of the purpose and the type of assistance provided (i.e., cost share, tax incentive). **Table 5-5** shows examples of eligible actions for this initiative. A description of the various funding sources is presented in **Section 5.4.2.2**.

#### 5.1.3.1 EDUCATION AND OUTREACH INITIATIVE

This plan recognizes the value of public education, outreach, and citizen involvement in creating public ownership of an implementation schedule, and local solutions to address the plan area’s water issues. As such, the Root River Watershed One Watershed, One Plan included the public early in the One Watershed, One Plan planning process to influence plan development. At the initial public meeting, local citizens shared knowledge and provided input about a range of resource concerns and issues. Input from the initial meeting was also used to guide identification of the priority resource concern. Through a second meeting the public provided feedback about the appropriateness of the strategies and actions comprising the targeted implementation schedule.

During plan implementation, the Education and Outreach Initiative will build upon the public involvement foundation created during the initial planning phases. The Education and Outreach Initiative consists of three different campaigns: 1) Public Knowledge and Awareness, 2) Landowner and Producer Engagement, and 3) Water and the Business Community. These three campaigns are tailored to different audiences, in order to accomplish their own independent purpose. All three of the Education and Outreach Initiative campaigns are operated through Root River Watershed One Watershed, One Plan sharing of services. Expectations are that template education and outreach materials will be developed for use and delivery within each county. The campaigns will be locally administered and implemented, with individual local entities operating as their own respective fiscal agent.

##### 5.1.3.1.1 PUBLIC KNOWLEDGE AND AWARENESS CAMPAIGN

The primary purpose of the Public Knowledge and Awareness Campaign is to create positive and impactful education and outreach experiences for members of the public, in order to encourage behavioral changes that support progress towards measurable water quality goals. The intended audience for this campaign is broad, and includes citizens and urban and rural residents.

There are numerous public education and outreach activities currently occurring in the plan area. Many of these activities are tailored to youth, including presentations about water quality, annual Conservation Field Days, annual Forestry Field Days, annual Envirothons, annual Ag in the Classroom presentations, county fair booth displays, and a Southeast Minnesota karst exhibit at Eagle Bluff Environmental Learning Center. Planning partners within the plan area provide regular educational activities throughout the year to benefit community residents. These activities include, but are not limited to nitrate testing clinics, subsurface sewage treatment system workshops, and one-on-one consultations with landowners.

Several activities are included as part the Public Knowledge and Awareness Campaign, such as the development of educational materials, newsletters, annual reports, coordination of volunteer activities, and public speaking events to raise awareness and gain a better understanding of the consequences of individual decisions on water management. Also included are general media campaigns, citizen and local government unit surveys, and municipal training. The relationship between the Public Knowledge and Awareness Campaign activities and priority resource categories and concerns are provided in **Table 5-5**.





### 5.1.3.1.2 **LANDOWNER AND PRODUCER ENGAGEMENT CAMPAIGN**

The Landowner and Producer Campaign is tailored to a narrower audience than the Public Knowledge and Awareness Campaign: i.e., landowners and agricultural producers in the plan area. The purpose of the Landowner and Producer Engagement Campaign is to understand, engage, and communicate with local landowners and agricultural producers to increase capacity and understanding of water issues and the benefits of BMPs, ultimately leading to increased adoption of best management practices.

There are many education and outreach activities already occurring in the area tailored to landowners. One component of effective civic engagement includes promoting the establishment of farmer-led councils. Farmer-led Councils create opportunities for repeated interactions among farmers in multiple social arenas and provides opportunities for farmers to learn from each other. One farmer led council currently exists in the Root River Watershed One Watershed, One Plan area; i.e., the Rush-Pine Creek Farmer Led Council. Farmer Advisory Councils have also been established in the plan area to address nitrate issues by township and encourage the adoption of nitrogen fertilizer management plans. Other education and outreach activities tailored to landowners include field days and workshops dedicated to topics such as using cover crops, constructing agricultural waste systems, improving soil health, completing side inlet design, and adopting forest management practices. There are also local opportunities to observe on-farm demonstrations promoting varying management strategies, such as nutrient application and cover crop practices. Promotional information about these activities is broadly distributed through local websites and social media.

The Landowner and Producer Engagement Campaign will build upon the existing landowner education and outreach activities occurring in the Root River plan area. Two probable avenues for continuing and progressing engagement with landowners throughout plan implementation: one avenue in which an individual from the public sector engages a landowner, and one avenue in which an individual from the private sector engages a landowner.

Landowners and producers in the Root River One Watershed, One Plan area have access to educational, technical, and financial assistance through public entities for the implementation of management practices to protect or restore priority resource concerns. Examples of these public entities include the landowner/producer's respective local County staff, Soil and Water Conservation District staff, or NRCS staff. Staff members in these public entities perform many activities with landowners and producers in the plan area, including designing targeted implementation activities that are tailored to each specific landowner/producer, while guiding landowners/producers through funding options.

Landowners and agricultural producers may also rely on private sector resources, such as crop advisors, as their primary source of information about farming practices. Crop advisors may include agronomists from co-ops, fertilizer salespersons, seed dealers, and private consultants, and may provide information to landowners and producers about their soils, the variable rates to apply seeds, and so forth. Thus, crop advisors may have already gained valuable landowner trust and extensive data about the farmer's land, and therefore may be the most efficient means to initiate planning for water quality management activities with the respective landowner or agricultural producer. Several probable activities can accomplish the objective of this campaign through the private sector. Crop advisors may invite landowners/producers to meetings with water quality experts, therefore exposing the landowner/producer to water quality information through a third party. Crop advisors may also receive training to receive a local certification for conceptualizing and prescribing targeted BMPs at the field level, based on knowledge of the landowner/producer's soil, field practices, financial capabilities, and impacts to the defined priority water resource of concern.

The relationship between activities in the Landowner and Producer Engagement Campaign and priority resource categories and concerns are provided in **Table 5-5**.



#### 5.1.3.1.3 *WATER AND THE BUSINESS COMMUNITY CAMPAIGN*

The primary purpose of the Water and the Business Community Campaign is to integrate the local private businesses with the goals of the Root River Watershed One Watershed, One Plan, in order to raise awareness about water management, the role businesses play in water management, and the impacts water quality and quantity have on local economic development. As such, the intended audience for this campaign is the private businesses within the Root River plan area.

Probable activities include, but are not limited to the development of educational materials, annual reports, and public speaking events to raise water awareness, gain an understanding of water issues, and gain a better understanding on the consequences of business decisions on water management. The relationship between the Water and the Business Community Campaign activities and priority resource categories and concerns are provided in **Table 5-5**.





**Table 5-5:** The relationship between Education and Outreach Initiative activities, resource and resource concern.

Action (see Targeted Implementation Schedule)	Groundwater			Surface Water			Landscape Features					Social Capacity				Sustainability of Communities				Water Resources Infrastructure		
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat for Fish, Macro- invertebrates, and Aquatic Life	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Management	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
<b>Education and Outreach Initiative: Public Knowledge and Awareness Campaign</b>																						
Education and Outreach- Tailored to Youth												x										
Education and Outreach- Tailored to General Public	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Education and Outreach - Tailored to Governmental Officials													x			x						
<b>Education and Outreach Initiative: Landowner and Producer Engagement Campaign</b>																						
Education and Outreach - Tailored to Landowners	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x			x
<b>Education and Outreach Initiative: Water and the Business Community</b>																						
Education and Outreach - Tailored to Business Community	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x			x

Assumption:

- Landowners are considered part of the "Business Community"



## 5.2 CAPITAL IMPROVEMENTS

A capital improvement is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features, excluding those items incentivized through the initiatives described in **Section 5.1**. Capital improvements are beyond the “normal” financial means of the Root River One Watershed, One Plan and therefore require external state and federal funding.

Capital improvements have been completed in the plan area, generally through the Natural Resources Conservation Service Public Law 566 (PL 566) program. A brief summary of previously completed capital improvements are provided here. Also included are other potential funding for focused watershed efforts. **Table 5-6** shows proposed capital improvements. Additional discussions are needed among plan participants to develop the specific process for implementing capital improvements. Specifically, members of the Policy Committee are expected to discuss the means and methods for funding new capital improvements, with potential funding partners, before an implementation timeline can be established.

**Bear Creek PL 566** – The Bear Creek portion of the Upper Iowa Watershed within portions of Fillmore and Houston County is currently under a PL-566 Small Watershed Assistance plan, to address flooding and surface water quality concerns. Nearly \$2,000,000 has been spent within the Bear Creek watershed. Partners include the Natural Resources Conservation Service, Houston County, the Root River Soil and Water Conservation District, the Winneshiek County Soil and Water Conservation District (Iowa), and the Iowa Department of Natural Resources.

The construction of small flood control dams, as well as erosion and sediment control practices, and other land treatment measures is the focus of this project. Some of these practices include terraces, livestock watering systems, tree plantings, and crop residue management. Practices applied within the Minnesota portion of Bear Creek include small dams, and terraces.

**Crooked Creek PL 566** – Crooked Creek is a tributary within the Upper Mississippi – Reno Watershed, draining directly to the Mississippi River, within Houston County. The nearly 70 square mile watershed extends from just west of the City of Caledonia easterly to the Mississippi River at Reno, Minnesota. The Crooked Creek Watershed District was established on December 1<sup>st</sup>, 1959 for the purpose of carrying out this PL 566. Authorization for construction to begin was granted to the Watershed Board on March 14, 1961.


Accomplishments include 75% upland treatment on cropland. An estimated 16,077 acres of the 44,560 acre watershed is now being controlled by one or more of the seven floodwater retention structures installed through PL 566. Stream bank restoration work along the North Fork of Crooked Creek and the main branch of Crooked Creek is completed through the cooperation of the Minnesota Department of Natural Resources.

The uncontrolled run-off which previously caused extensive damage to roads, bridges and private property has significantly been reduced over much of the watershed, but the recent flood events of August 2007, June 2008 and September 2010 clearly illustrate that this watershed is not exempt from flood damage and that additional conservation efforts are needed. New projects being targeted include the construction of a least two flood retention structures along with increased upland treatment on cropland. Additional capital improvement projects elsewhere in the watershed will involve the City of Caledonia to focus on erosion control and sediment delivery.

**Upper North Branch Root River Watershed PL 566** – A Resource Protection plan was developed for the Upper North Branch of the Root River by the Soil Conservation Service (now NRCS) in 1992. The report recommended the implementation of Alternative No. 3, which included the land treatment of 7,410 acres of cropland, and the installation of three sediment basins. The land treatment component included 7,000 acres of conservation tillage systems, 16 miles of terraces, 1,500 acres of contour farming on non-







terraced acres, 38 acres of grassed waterways or culverts, 5 grade stabilization structures, 80 acres of livestock exclusion, and 60 acres of filter strips. The total estimated installation cost was \$2.06 million. The intent of the project included increasing the life of Lake Florence in the City of Stewartville from 30 to 54 years. This project was never implemented.

**Winnebago Creek Watershed PL 566** – Winnebago Creek is a tributary within the Upper Mississippi – Reno Watershed draining directly to the Mississippi River, within Houston County. Flash flooding is a major problem within the watershed. An application for small watershed assistance was denied because of an unfavorable benefit – cost ratio. The watershed plan contemplated installing 7 to 9 flood control structures to reduce peak discharges, along with the installation of riparian buffers in key areas to reduce cropland losses, improve water quality, provide wildlife habitat and fish habitat. Preliminary engineering for the flood control structures, including site selection, hydrologic analysis, and preliminary survey is complete.

**Carey Creek**- The northeastern portion of Mower County is drained by Carey Creek, which flows into Olmsted County. Goals of the Carey Creek project are to accomplish long term restoration and enhancement of the Carey Creek reach. Features of this project include streambank restoration, floodplain reconnection for water quality improvement and habitat development. Cost for this project is estimated at \$900,000.

**East Willow Creek Watershed** – East Willow Creek is a tributary of the Root River, draining a 37.5 square mile area of Fillmore County. A watershed protection plan for East Willow Creek was written in 1954 under authority of the U.S. Department of Agriculture Appropriation Act of 1954. The act provided for a pilot program of watershed protection to be initiated in 65 small watersheds through the United States.


Construction of the project which began in 1954 and was completed in 1959, included land treatment measures, small dams for flood protection and land stabilization and the “improvement” of waterways. The investment in all works improvements installed total \$392,407. Components of the project included 6 flood water retarding structures; 156 grade stabilization structures; more than 13,000 acres of land adjustment; more than 5,000 acres of strip cropping; waterway development; pasture seeding and farm planning. The waterway and stream channel improvements were not implemented.

Four of the 6 flood water retarding structures were rehabilitated in 1984 and are still under a maintenance agreement with NRCS. The remaining structures have exceeded their 50 years life cycle, have filled with sediment and need rehabilitation.

**Mississippi River Basin Initiative** - Through the Mississippi River Basin Healthy Watersheds Initiative (MRBI), the Natural Resources Conservation Service and partners work with producers and landowners to implement voluntary conservation practices that improve water quality, restore wetlands, enhance wildlife habitat and sustain agricultural profitability in the Mississippi River Basin. The NRCS has identified the Mississippi River Basin as a top priority due to water quality concerns, primarily related to the effects of nutrient loading on the health of local water bodies and, eventually, the Gulf of Mexico. The 13-state Initiative builds on the cooperative work of NRCS and its conservation partners in the basin, and offers agricultural producers in priority watersheds the opportunity for voluntary technical and financial assistance. The participating States are Arkansas, Kentucky, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Ohio, South Dakota, Tennessee and Wisconsin.

Recent investments have occurred in several watersheds within the plan area. These watersheds include Upper South Fork Root River, Rush – Pine Creek watershed and the Watson Creek watershed. Funding levels for the Upper South Fork Root River Watershed, Watson Creek Watershed, and Rush-Pine Creek Watersheds were \$428,000, \$362,000, and \$1,128,000. Project types implemented in 2010 include storage systems for agricultural waste, nutrient management plans, and the construction of grade stabilization structures. Dollars (\$1.5 to \$2.4 million per year) were also available through the Lower Root





Wetland Reserve Program to fund easements within floodplain areas to reduce flooding in the Hokah area. In 2010, 84.1 acres of easement were acquired at a cost of \$136,000. In 2015, MRBI funding was awarded to the Lower South Fork Root River (\$1,232,612), Willow Creek (\$1,100,199) and Headwaters South Branch Root River (\$330,000) for practices targeted to critical source areas identified through the MDA Field to Stream Partnership. Implementation is beginning in 2016.

**Root River One Watershed Best Management Best Management Practice Implementation Initiative**

- The Root River One Watershed One Plan Best Management Practice Implementation Initiative provides funding to implement Best Management Practices (approximate numbers and locations) as described by the preliminary implementation approach to achieve the plan measurable goals for sediment, total nitrogen and total phosphorus reductions. An estimated \$2,000,000 annually is needed for practice implementation within the plan area. .





**Table 5-6: Potential capital improvement projects in the Root River One Watershed, One Plan plan area.**

<b>Bear Creek Water Storage Structures and Land Treatment</b>	Development and construction of upstream storage areas within the Upper Iowa Watershed within portions of Fillmore and Houston Counties	Upper Iowa PL 566	Planning Level Analysis	\$2,000,000
<b>Crooked Creek Public Use Area Development and Watershed Restoration</b>	Development and construction of additional water storage areas and public use area development associated with the structures constructed through the Crooked Creek PL 566 within the 70 square mile watershed	Crooked Creek PL 566 Small Watershed Assistance Program documents and Crooked Creek Watershed District Management plan	Planning Level Analysis	\$2,000,000
<b>Upper North Branch Root River Watershed Water Quality Improvement Project</b>	Implementation of land treatment and sediment control basin upstream of the City of Stewartville	Resource Protection plan (NRCS PL 566) developed by the Natural Resources Conservation Service in 1992. Original cost estimate of \$2.06 million	Planning Level Analysis. Funding Request Denied	\$2,000,000
<b>Winnebago Creek Watershed Storage Project</b>	Installation of multiple storage projects and riparian buffers to reduce flooding and improve water quality and habitat, within the Winnebago Creek tributary of the Mississippi - Reno Watershed	Root River SWCD 2008 Hazard Mitigation Grant. Original request for \$1.05 million.	Engineering design completed for some structures.	\$2,000,000
<b>Carey Creek</b>	Long term restoration and enhancement of the Carey Creek reach. Features of this project include streambank restoration, floodplain reconnection for water quality improvement and habitat development.	Mower County	Funding Needed	\$900,000
<b>East Willow Creek Flood Control Structure Maintenance</b>	Sediment removal and rehabilitation of east Willow Creek sediment control basins constructed in the 1960's.	Watershed Program Evaluation study (pre-dated PL 566 program) completed by the Natural Resources Conservation Service.	Funding Needed	\$250,000 - \$500,000
<b>City of Mabel Upstream Storage</b>	Development and implementation of up to 2,000 acre feet of storage upstream of the City of Mabel to reduce flooding and flood damages	Information from Prioritize, Target and Measure Application (this plan).	Concept	\$2,500,000





**Table 5-6: Potential capital improvement projects in the Root River One Watershed, One Plan plan area.**

<b>South Fork Root River Water Storage Structures</b>	Development and implementation of storage within the South Fork of the Root River	Fillmore County Water Plan	Planning Level Analysis	\$2,000,000
<b>Root River One Watershed One Plan Best Management Practice Implementation</b>	Practice implementation to achieve the measurable goals within this plan	One Watershed One Plan Document	Concept	\$2,000,000 annually

\*Estimated cost based on best available information at the present time or based on probable number of practices annually implemented.





### 5.2.1.1 DRAINAGE

No capital improvement projects related to drainage are anticipated within the plan boundary.

### 5.2.1.2 OPERATION AND MAINTENANCE

Capital improvement projects completed through this plan will be operated and maintained by the sponsoring organization. This plan includes funding requests to maintain previously constructed PL 566 projects within the plan area.

## 5.3 FUNDING

This section describes how the plan will be funded. **Table 5-7** shows the sources of funding that will be used to implement and administer the programs.

Plan participants expect to pursue grant opportunities collaboratively, based on the targeted implementation schedule (see **Section 4**). This plan includes a number of initiatives and campaigns, which comprise a portion of the Implementation Program (see **Section 5.1**), which are tied to actions in the implementation schedule. The sources of funding that will be used to implement these initiatives are described in this section.

This plan sets an ambitious implementation schedule. Local, state, federal, and other funding sources will not be sufficient to meet the targeted implementation schedule. As such, the success of implementing the plan will depend on collaboratively sought competitive state, federal, and private grant dollars. As an alternative to reliance on competitive grants, this plan envisions successful legislation to allow for block grant dollars for plan implementation.

**Table 5-8** shows the most commonly used programs and grants for implementing the incentive based initiatives described by this plan and used within the targeted implementation schedule to achieve the measurable goals. These funding grants and programs are cross-referenced to this plan's initiatives, thereby showing potential sources of revenue for implementation.



**Table 5-7:** Management categories, additional expenses, and funding sources (annual and for the 10 year lifespan of the plan) for implementing the One Watershed, One Plan.

Management Category or Additional Expense	Local		State		Collaborative Grants <sup>9</sup>		Federal		Non-governmental Organizations		All Sources		Rationale
	Annual	Total	Annual	Total	Annual	Total	Annual <sup>5</sup>	Total	Annual <sup>5</sup>	Total	Annual	Total	
Field Practice	\$100,000 <sup>1</sup>	\$1,000,000	-	-	\$780,000 <sup>2</sup>	\$7,800,000	TBD (match federal)	TBD (match federal)	-	-	\$880,000	\$8,800,000	Similar to current spending.
Statutory Obligations and Ordinances	Existing Budget <sup>3</sup>		\$200,000 <sup>4</sup>	\$2,000,000	-	-			-	-	\$200,000	\$2,000,000	Existing expenditure at local level not estimated.
Research	\$10,000 <sup>5</sup>	\$100,000	\$90,000 <sup>6</sup>	\$900,000	-	-			-	-	\$100,000	\$1,000,000	Assuming 10% local match
Education & Outreach	\$7,500 <sup>7</sup>	\$75,000	-	-	\$75,000	\$750,000			-	-	\$82,500	\$825,000	Assuming most is existing budget
Plan Administration	\$18,000 <sup>8</sup>	\$180,000	-	-	\$160,000	\$1,600,000			-	-	\$178,000	\$1,780,000	Approximately 11% of total.
Capital Improvements	\$50,000 <sup>10</sup>	\$500,000	-	-	\$450,000	\$4,500,000			-	-	\$500,000	\$5,000,000	Assuming 10% local match; 2 projects during plan life.
<b>Total</b>	<b>\$185,500</b>	<b>\$1,855,000</b>	<b>\$290,000</b>	<b>\$2,900,000</b>	<b>\$1,465,000</b>	<b>\$14,650,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,940,500</b>	<b>\$19,405,000</b>	

<sup>1</sup> Local field practice amount based on current amount for all counties.

<sup>2</sup> Field practice funds include 20% in excess of expected construction costs for design and construction management.

<sup>3</sup> Assumes local fiscal support of local implementation of statutory obligations and ordinances remains unchanged.

<sup>4</sup> State funds for statutory obligations and ordinances are Board of Water and Soil Resources grant dollars for implementing Shoreland Ordinance, Subsurface Sewage Treatment System and Wetland Conservation Act programs

<sup>5</sup> Efforts will be made to leverage local and state expenditures with matching federal and non-governmental organization funds.

<sup>6</sup> Research budget reflects one study per year of \$100,000, with 10% of the cost matched locally. Assume money provided to state agencies to cost share.

<sup>7</sup> Education and outreach funds assumed to be from collaborative grants, either competitive or non-competitive with 10% local match. An initial investment of \$100,000 by the State for developing a uniform education and outreach program to be delivered by respective plan participants.

<sup>8</sup> Local plan administration budget similar to current local expenditures by individual counties. Total estimated cost assumes approximately 11% of total dollar amount of funds administered.

<sup>9</sup> Collaborative grant assumed to be provided to the Root River One Watershed, One Plan as one or more non-competitive implementation block grants.

<sup>10</sup> Capital projects- assume two large investment projects during 10-yr plan period with 10% local match.





**Table 5-7:** Incentive based initiatives and related funding sources. *Note: This table is not intended to contain all funding sources, but instead, examples of funding opportunities and their primary relation to incentive based initiatives.*

Source	Organization	Program/ Grant Name	Primary Assistance Type	Field Practices Management Category						Research Management Category		Education and Outreach Management Category
				Groundwater Initiative	Surface Water Initiative	Landscape Features Initiative	Social Capacity Initiative	Sustainability of Communities Initiative	Water Resources Infrastructure Initiative	Research Initiative	Data Development and Management Initiative	Education and Outreach Initiative
Federal	NRCS	Conservation Innovation Grant (CIG)	Financial	x	x	x						
		Conservation Stewardship Program (CSP)	Financial / Technical	x	x	x						
		Environmental Quality Incentives Program (EQIP)	Financial / Technical	x	x	x		x	x			
		Agricultural Conservation Easement Program (ACEP)	Easement		x			x				
	FSA	Conservation Reserve Program (CRP)	Easement		x	x						
		Conservation Reserve Enhancement Program (CREP)	Easement		x	x						
		Farmable Wetlands Program (FWP)	Easement		x							
		Grasslands Reserve Program (GRP)	Easement		x	x						
	FSA/ USDA / NRWA	Source Water Protection Program (SWPP)	Technical				x					
	USFWS	Partners for Fish and Wildlife Program (PFW)	Financial / Technical		x	x						
	PCA	Federal Clean Water Act Section 319 Grants	Financial	x	x	x				x		
	FEMA	Hazard Mitigation Grant Program (HMGP)	Financial		x	x		x				
		Pre-Disaster Mitigation (PDM)	Financial		x	x		x				
		Flood Mitigation Assistance (FMA)	Financial		x	x		x				
Risk Mapping, Assessment, and Planning		Technical		x	x		x	x				
EPA	Water Pollution Control Program Grants (Section 106)	Financial				x						
	State Revolving Fund (SRF)	Loan					x	x				
	Drinking Water State Revolving Fund (DWSRF)	Loan					x	x				
State	DNR	Aquatic Invasive Species Control Grant Program	Financial / Technical		x	x						
		Conservation Partners Legacy Grant Program	Financial		x	x						
		Pheasant Habitat Improvement Program (PHIP)	Financial		x	x						
		Flood Hazard Mitigation Grant Assistance	Financial		x		x		x			
		Forest Stewardship Program	Technical			x						
		Reinvest in Minnesota (RIM)	Financial / Easement		x	x						
		Aquatic Management Area Program	Easement		x	x		x				
		Wetland Tax Exemption Program	Financial		x	x						
	BWSR	Clean Water Fund Grants	Financial	x	x	x	x	x	x	x	x	x
		Erosion Control and Management Program	Financial	x	x	x						
		SWCD Local Capacity Services	Financial	x	x	x	x	x	x	x	x	x
		Natural Resources Block Grant	Financial	x	x	x			x			
Reinvest in Minnesota (RIM) Reserve Services		Financial	x	x	x							
MPCA	Surface Water Assessment Grants (SWAG)	Financial		x		x						



Source	Organization	Program/ Grant Name	Primary Assistance Type	Field Practices Management Category						Research Management Category		Education and Outreach Management Category
				Groundwater Initiative	Surface Water Initiative	Landscape Features Initiative	Social Capacity Initiative	Sustainability of Communities Initiative	Water Resources Infrastructure Initiative	Research Initiative	Data Development and Management Initiative	Education and Outreach Initiative
		Clean Water Partnership	Financial	x	x	x						
	MDH	Source Water Protection Grant Program	Financial	x	x		x		x			
	MDA	Agriculture Best Management Practices (BMP) Loan Program	Financial	x	x	x			x			
Other	Trout Unlimited	Trout Unlimited: Embrace-A-Stream	Financial		x	x						
	McKnight Foundation	McKnight Foundation: Mississippi River Initiative	Financial	x	x	x	x					
	Fishers & Farmers Partnership	Fishers and Farmers Program	Financial	x	x		x	x				x

\*Disclaimer: This is not an all-inclusive list of funding opportunities, but instead, provides examples of funding opportunities and their primary relation to Root River One Watershed, One Plan Financial Incentive Programs.

Refer to State of Minnesota Grants Manual ([www.grants.state.mn.us](http://www.grants.state.mn.us))





### 5.3.1 LOCAL FUNDING

The annual amount of funding needed for plan implementation from local sources is \$185,500 annually and \$1,855,000 for the ten-year plan life cycle. Local revenue is defined as money derived from either the local property tax base or in-kind services of any personnel funded from the local tax base. Local funding excludes general operating funds obtained from BWSR, counties, fees for service and grants or partnership agreements with the federal government or other conservation organizations.

These funds will be used for locally focused initiatives where opportunities for state and federal funding are lacking because of misalignment of an initiatives purpose with state or federal objectives. These funds will also be used for matching grants.

### 5.3.2 STATE FUNDING

The annual amount of funding needed for plan implementation from state sources is \$290,000 annually and \$2,900,000 for the ten-year plan life cycle. State funding includes all funds derived from the State tax base. This also includes all state grant applications (i.e., accelerated implementation grants, targeted watershed demonstration program grants, state easement programs, etc.) and would include state funded block grants if they become available. State funding excludes general operating funds obtained from BWSR, counties, fees for service and grants or partnership agreements with the federal government or other conservation organizations.

### 5.3.3 FEDERAL FUNDING SOURCES

Federal funding includes all funds derived from the Federal tax base. For example, this includes programs such as the Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), and Conservation Innovation Grants (CIG). Federal funding excludes general operating funds obtained from BWSR, counties, fees for service and grants or partnership agreements with state government or other conservation organizations.

Where the purpose of an initiative or campaign aligns with the objectives of various federal agencies, these dollars will be used to help fund the initiatives and campaigns described by this plan. This plan identifies eligible activities (**Tables 5-2 – 5-5**) and potential federal funding opportunities (**Table 5-8**) for each initiative.

Currently, the Root River One Watershed, One Plan has no funding from federal sources for plan implementation, however, funds from federal sources will be sought during implementation of the plan.

### 5.3.4 OTHER FUNDING SOURCES INCLUDING NON-GOVERNMENTAL ORGANIZATIONS

Several non-governmental funding sources may be used to fund the Root River One Watershed, One Plan targeted implementation schedule. For example, Trout Unlimited's Embrace-A-Stream grant program, the McKnight Foundation's Mississippi River Initiative, or the Fishers & Farmers Partnership would be potential funding sources that differ from the other categories. Innovative water projects have also been implemented through collaboration with The Nature Conservancy, including construction of infiltration ponds and bioreactors.

This category of funding excludes general operating funds obtained from BWSR, counties, fees for service, local funding sources, and grants or partnership agreements with the state or federal government or other conservation organizations.



Currently, the Root River One Watershed, One Plan has no funding from other funding sources (including non-governmental organizations) for plan implementation, however, these funds will be sought during implementation of the plan.

### 5.3.5 COLLABORATIVE GRANTS

The annual amount of funding needed for plan implementation from collaborative grants is \$1,465,000 annually and \$14,650,000 for the ten-year plan life cycle. The Root River Watershed One Watershed, One Plan will apply as an entity for collaborative grants, which may be competitive or non-competitive. The assumption is that future base support for implementation will be provided to the Root River One Watershed, One Plan as one or more non-competitive implementation block 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.

## 5.4 PLAN ADMINISTRATION & COORDINATION

### 5.4.1 DECISION-MAKING AND STAFFING

The Root River One Watershed, One Plan planning partners previously entered into a formal agreement through a Memorandum of Agreement for the purpose of planning the One Watershed, One Plan for the Root River Watershed (**Appendix A**). The parties have drafted a Joint Powers Agreement for the specific goal of implementing the One Watershed, One Plan for the Root River Watershed (**Draft, Appendix K**). The Joint Powers Agreement will be used as the structure for plan implementation and reflects the various roles for plan implementation. Plan implementation will remain centrally-administered, wherein the responsibility of administering the water plan is assigned to the Root River Watershed One Watershed, One Plan. The Fillmore County SWCD will remain responsible for administration on a daily basis on behalf of the Root River Watershed One Watershed, One Plan .

The Fillmore County SWCD, on behalf of the Planning Work Group and the Policy Committee, will become responsible for completing the annual work planning process and completing and submitting annual reports. The central fiscal agent on behalf of the Root River Watershed One Watershed, One Plan will remain the Winona County SWCD. Expectations are that the roles of the Policy Committee, Planning Work Group, and Advisory Committee will shift and change focus. **Table 5-8** shows the probable roles and functions related to plan implementation, for consideration in developing a Joint Powers Agreement. The legal name of the entity will remain Root River Watershed One Watershed, One Plan .

To fully implement the plan and meet the measurable goals based on statewide strategies, it would be necessary to have at least two staff for purposes of implementing the One Watershed, One Plan. The roles of these dedicated staff members will be plan administration, coordination, and guiding field practice implementation.

Shared services are common throughout the 11 southeastern Minnesota counties, some of which serve the Root River One Watershed, One Plan planning area. These include three SE MN Technical Support JPB engineering staff, two nutrient management specialists, a soil health technician, and two wastewater specialists. Discussions are in the works for a shared Wetland Conservation Act Specialist among three counties, two of which are in the Root River One Watershed, One Plan planning area. These can serve as models for future shared services in the One Watershed, One Plan planning area.





## 5.4.2 COLLABORATION

### 5.4.2.1 COLLABORATION WITH OTHER UNITS OF GOVERNMENT

The Root River Watershed One Watershed, One Plan will continue coordination and cooperation with other governmental units at all levels. This cooperation and coordination is both horizontal and vertical. Vertical coordination between the Root River Watershed One Watershed, One Plan and agencies such as BWSR, US Army Corps of Engineers, MnDNR, and the MPCA are mandated through legislative and permit requirements. Horizontal cooperation between Root River Watershed One Watershed, One Plan and comparable units of government such as municipalities, township boards, county boards, and other water management authorities are a practical necessity to facilitate watershed wide activities.

The Root River Watershed One Watershed, One Plan will exercise intergovernmental coordination and cooperation as an absolute necessity for it to perform its required functions. The Root River Watershed One Watershed, One Plan will continue to foster an environment that enhances coordination and cooperation to the maximum extent possible throughout the implementation of this plan.

A variety of plans, goals, objectives, directions, and strategies have been developed by other agencies for resource management within the plan area. Local (public), state, and federal state agency input has been utilized and/or considered throughout the development of this plan. The priority concerns table (see **Table 2-1**) used as a compilation, organizational, and prioritization tool, was initially drafted incorporating local and state plans and reports for the plan area. Also, the BWSR, MPCA, Minnesota Department of Agriculture, Minnesota Department of Health, and the MnDNR submitted comment letters for the Root River Watershed One Watershed, One Plan (provided as **Appendix F**). These comments and themes in agency letters were assessed and considered extent possible, while recognizing that the One Watershed, One Plans are to be driven by the participating local governments.

**Table 5-9: Anticipated roles for plan implementation.**

Committee Name	Primary Implementation Role / Functions
Policy Committee	<ul style="list-style-type: none"> <li>• Local funding commitments for implementation</li> <li>• Approving the annual work plan</li> <li>• Approving annual fiscal reports</li> <li>• Approving annual reports submitted to BWSR</li> <li>• Annual review and confirmation of Planning Work Group priority resource concerns recommendations</li> <li>• Direction to Planning Work Group on addressing emerging issues</li> <li>• Approve plan amendments</li> <li>• Implement county ordinances and state statutory responsibilities separately from plan implementation</li> <li>• Approve grant applications</li> <li>• Approve annual assessment</li> </ul>



**Table 5-9: Anticipated roles for plan implementation.**

Advisory Committee	<ul style="list-style-type: none"> <li>• Review of and input on annual work plan</li> <li>• Identification of collaborative funding opportunities</li> <li>• Recommendations to Planning Work Group on program adjustments</li> <li>• Assist with execution of the targeted implementation schedule</li> </ul>
Planning Work Group	<ul style="list-style-type: none"> <li>• Identify local funding needs for implementation</li> <li>• Prepare the annual work plan</li> <li>• Prepare annual fiscal reports</li> <li>• Prepare annual reports submitted to BWSR</li> <li>• Annual review and confirmation of priority resource concerns</li> <li>• Evaluate and recommend response to emerging issues</li> <li>• Prepare plan amendments</li> <li>• Prepare and submit grant applications</li> <li>• Implement the targeted implementation schedule</li> <li>• Complete annual assessment</li> </ul>

The Root River Watershed One Watershed, One Plan has identified that agency goals, objectives, directions, and strategies are generally, compatible with the content of this plan. The implementation strategies and goals were predominantly defined through a collaborative effort. However, some agency goals, objectives, directions, and strategies for resource management within the plan area have not been selected as a priority resource concern. The responsibility for achieving the goals associated with those priorities considered “C” level priorities remains with the respective agency or organization.

The Root River Watershed One Watershed, One Plan will act as the lead for the implementation of this plan’s identified priority concerns. Due to local funding, technological, and other capacities, the lower ranked resource concern that were not prioritized are encouraged to be implemented with agency-led efforts, including but not limited to funding. The Root River Watershed One Watershed, One Plan will continue to cooperate and collaborate with other governmental units, at all levels, but may retain a cooperator or facilitator role with implementation of addressing resource concerns that were not prioritized by the Root River Watershed One Watershed One plan as an “A” level priority.

**5.4.2.2 COLLABORATION WITH OTHERS**

Plan partners expect to continue collaboration with others, including non-governmental organizations, while implementing this plan. The Nature Conservancy is working through the Great Rivers Partnership to protect and restore the Mississippi River and working in the Root River Watershed. Through collaboration between The Nature Conservancy, innovative water projects are being implemented. Through The Nature Conservancy, infiltration ponds and bioreactors have been constructed.

Trout Unlimited is also active within the plan area. Trout Unlimited is working to rehabilitate and improve portions of the South Branch of the Root River, downstream of the City of Preston. Trout Unlimited received a \$400,000 grant from the Lessard-Sams Outdoor Heritage Committee in 2014 for assisting with this work. Stream rehabilitation includes tree removal, clean-up of concrete and debris, bank stabilization, and the construction of multiple improved and handicap access points and installation of in-stream habitat improvements.





Two existing Joint Powers Boards are available as resources and for the purposes of collaborating on plan implementation. The Soil and Water Conservation District Technical Service Area 7 is capable of providing technical support for the implementation of best management practices. The Southeast Minnesota Water Resources Board is a local entity whose mission is to help sustain the quality of life in the nine counties of Southeastern Minnesota, including the counties involved in this planning effort. Their mission is to improve and protect the water resources within their boundary, through coordination of local water planning efforts. Expectations are that the Southeast Minnesota Water Resources Board will collaborate during plan implementation.

### **5.4.3 WORK PLANNING**

This plan envisions collaborative implementation. Therefore, annual work planning is envisioned to align the resource concern priority, the availability of funds, and the roles and responsibilities for implementation.

#### **5.4.3.1 LOCAL PURPOSE**

An annual work plan will be developed by the Planning Work Group based on the targeted implementation schedule and any adjustments made through self-assessments (see Section 5.4.4) and practical considerations. The annual work plan is expected to be adjusted each year, based on the availability of funding received from BWSR and other state and federal agencies to implement the plan, the number of staff available to complete the work, schedule adjustments to implement cooperative projects with partners, and the urgency associated with responding to local needs. The annual work plan will then be presented to the Policy Committee, who will ultimately be responsible for approval. The intent of these annual work plans will be to maintain collaborative progress towards completing the targeted implementation schedule.

#### **5.4.3.2 STATE PURPOSE**

The Planning Work Group will collaboratively develop, review, and submit a Biennial Budget Request (BBR) from this plan to BWSR. This BBR will be submitted to and ultimately approved by the Policy Committee prior to submittal to BWSR. The BBR will be developed based on the targeted implementation schedule and any adjustments made through self-assessments (see Section 5.4.4).

### **5.4.4 ASSESSMENT AND EVALUATION**

#### **5.4.4.1 ANNUAL EVALUATION**

Each year the Planning Work Group will provide the Policy Committee with an annual update on the progress of the plan's implementation in accordance with BWSR's Level 1 performance standards. During this annual review process, feedback will be solicited from the Local Planning Committees and the Advisory Committee. This feedback will be presented to the Policy Committee to set the coming year's priorities for achieving the plan's goals and to decide on the direction for grant submittals. In addition, this feedback will be documented and incorporated into Biennial Evaluations and Five Year Evaluations.

#### **5.4.4.2 BIENNIAL BUDGET REQUEST**

To better predict and maximize water-related State and grant funding demand, BWSR has adopted a Biennial Budget Request (BBR) program. The BBR is intended to utilize local water management priorities to drive state appropriation requests. The Root River Watershed One Watershed, One Plan intends to pursue block grant requests and other funding based on the BBR to meet goals and plan implementation schedules.



### 5.4.4.3 FIVE-YEAR EVALUATION

This plan has a ten-year life cycle beginning in 2016. Over the course of the plan life cycle, progress towards reaching goals and completing the implementation schedule may vary. In addition, new issues may emerge and/or new monitoring data, models, or research may become available. As such, in 2021 a five-year evaluation will be undertaken to determine if the current course of actions is sufficient to reach the goals of the plan, or if a change in the course of actions is necessary. The five year evaluation will consider the applicability of information within the Watershed Restoration and Protection Strategy and information about the sources<sup>10</sup> of sediment from the MDA Clean Water Fund Research Root River Sediment Budget Project. Specific information needed from the WRAPS include the existing annual loads and the load reductions needed to attain numeric standards. The implementation plan within this document is consistent with the draft WRAPS implementation strategy available at the time of plan preparation.

### 5.4.4.4 REPORTING

Local governmental units (LGUs) have a number of annual reporting requirements. A number of these reporting requirements will remain a responsibility of the LGUs (**Table 5-10**). However, reporting related to grants and programs (see **Section 5.3**) developed collaboratively and administered under this plan will be reported by the Planning Work Group. In addition to annual reports, the Planning Working Group will also develop an annual State of the Watershed Report. This report will document progress toward reaching goals and completing the targeted implementation schedule, and will describe any new emerging issues or priorities. The information needed to annually update the State of the Watershed Report will be developed through the annual evaluation process.

**Table 5-10:** Examples of annual LGU reporting responsibilities.

Report	Local Governmental Unit Responsibility
Annual Report	Root River Watershed One Watershed, One Plan
Ditch Buffer Strip Annual Report	Drainage Authority
Farm Bill Assistance Report	SWCD
Financial Reports	Root River Watershed One Watershed, One Plan
Technical Approval Authority (TAA)	SWCD
Website Compliance: (Checklist)	All Grantees
WCA Annual Report	All WCA LGUs
Feedlot Report	All Feedlot LGUs

### 5.4.5 PLAN AMENDMENT PROCESS

This plan extends through 2026. Revision of the plan may be needed through an amendment prior to the plan update if significant changes emerge in the priorities, goals, policies, administrative procedures, or plan implementation programs. Revision may also be needed if issues emerge that are

<sup>10</sup> See

<http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjGobGHm7XOAhWFKyYKHYixCF4QFggcMAA&url=http%3A%2F%2Fwww.mda.state.mn.us%2Fprotecting%2Fcleanwaterfund%2Fresearch%2Fsedimentrootriver.aspx&usq=AQjCNHCLLv7EbZmF9jvZEJDZscvwCKdDw>.





not addressed in the plan.

All amendments to this plan will follow the procedures set forth in this section. This plan will remain in full effect until an amendment is completed and approved by the Policy Committee and if necessary by BWSR. Plan amendments may be proposed by any agency, person, city or county to the Policy Committee, but only the Policy Committee can initiate the amendment process. All recommended plan amendments must be submitted to the Policy Committee along with a statement of the problem and need, the rationale for the amendment, and an estimate of the cost to complete the amendment.

Preparers of this plan recognize it may need to be periodically amended to remain useful as a long-term planning tool. However, the structure and intent of this plan is to provide flexibility to respond to short-term emerging issues and opportunities. The Policy Committee will review and revise its long range work plan and/or implementation programs through the annual budget and Annual Work Plan.

Technical information (especially water quality data) will require frequent updating, such as when new site-specific data is generated by state, federal, and regional agencies, counties, cities, or individuals. Generally these technical updates and studies are considered part of the normal course of operations consistent with the intent of this plan and not a trigger for a plan amendment. However, when the technical information results in a policy that is a significant change of direction from the plan, or the implementation of a projects or implementation programs, a plan amendment may be required.

#### **5.4.5.1 CRITERIA AND FORMAT FOR AN AMENDMENT**

Plan participants recognize the large work effort required to manage water-related issues. The plan provides the framework to implement this work by identifying priority resource concerns, issues impacting priority resource concerns, measurable goals, strategies and action items. A plan amendment will not be required for the following situations:

- The estimated cost of a non-capital improvement project action item is significantly different than the cost shown in the long range work plan or within this plan;
- The increase in the estimated cost of a capital improvement project is less than 30% of the cost shown in the plan OR the cost adjusted for inflation, whichever is greater;
- The addition or deletion of strategies, action items, programs, initiatives or projects, as long as these are generally consistent with the goals this plan, are not capital improvement projects as defined by this plan (nor is contemplated by an initiative), and will be proposed, discussed and adopted as part of the annual budgeting process which involves public input.

Plan amendments will be prepared in the following format and unless the entire plan is re-printed, all adopted amendments must be printed in the form of replacement pages for the plan, each page of which must:

- Show deleted text as stricken and new text as underlined for draft amendments being considered;
- Be renumbered as appropriate; and
- Include the effective date of the amendment.

The Policy Committee 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 Fillmore County Soil and Water Conservation District website ([www.fillmoreswcd.org](http://www.fillmoreswcd.org)). Printed copies



will be made available upon written request, and printed at the cost of the requester.

#### 5.4.5.2 GENERAL PLAN AMENDMENTS

If the Policy Committee in consultation with BWSR decide that a plan amendment is needed, the Planning Work Group will complete the amendment as follows:

- Submit the proposed amendment to the all cities, townships, counties, watershed districts and soil and water conservation districts within the plan boundary, the state review agencies (the MnDNR, MPCA, Minnesota Department of Agriculture, and MDH), and BWSR for a 60-day review;
- Respond in writing to address comments provided submitted by the reviewers;
- Hold a public hearing on the proposed amendment;
- Submit the final revised amendment, with the written comments received and the comment responses, a record of the public hearing and a summary of the changes incorporated into the plan to BWSR for approval.

At the discretion of the Policy Committee, drafts of proposed general 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 that is not described by the plan;
- Establishment of a water management district(s) to collect revenues and pay for projects initiated through MS 103B.231, MS 103D.601, 605, 611 or 730. To use this funding method, MS 103D.729 requires that the (Planning Work Group equivalent) prepare an amendment to its plan;
- 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.

#### 5.4.6 FORMAL AGREEMENTS

The Root River Watershed One Watershed, One Plan (One Watershed, One Plan) is a coalition of Counties, Soil and Water Conservation Districts, and the Crooked Creek Watershed District within southeast Minnesota. The Root River One Watershed, One Plan parties previously entered into a formal agreement through a Memorandum of Agreement for the purpose of planning the One Watershed, One Plan for the Root River Watershed (**Appendix A**). The parties have drafted a Joint Powers Agreement for the specific goal of implementing the One Watershed, One Plan for the Root River Watershed (**Draft, Appendix K**).

### 5.5 LOCAL APPROVALS AND ORDINANCES

Many of the issues affecting the resource concerns can be addressed in part through the administration of statutory responsibilities and ordinances. **Table 5-11** shows the relationship between statutory obligations and ordinances administered by the County's and their ability to affect a resource concern. Additional descriptions of the administration of statutory responsibilities and local ordinances is described within this section of the plan.





**Table 5-11:** Comparison of existing ordinances to resource concerns by resource.

Action (see Targeted Implementation Schedule)	Groundwater Initiative			Surface Water Initiative			Landscape Features Initiative				Social Capacity Initiative				Sustainability of Communities Initiative			Water Resources Infrastructure Initiative				
	Drinking Water	Springsheds	Surficial-subsurface Hydrologic Connections	Streams and Rivers	Flooding	Wetlands	Riparian Corridors	Aquatic Habitat for Fish, Macro-invertebrates, and Aquatic Life	Trout Streams	Areas of Moderate and High Biodiversity	Karst Formations	Public Knowledge of and Behavior Relative to Water Issues	Landowner and Producer Engagement in Water Mgmt.	Connecting Water and the Business Community	Technology, Tools, and Existing Capabilities	Livability	Rural Environmental Health	Urban Environmental Health	Land Use	Drainage Systems	Point Sources	Water Retention Systems
Bluffland Protection			x	x			x	x	x										x			
Wetland Conservation Act				x	x	x		x	x										x			
Zoning / Land Use Planning									x										x			
Shoreland Management				x	x		x	x	x										x			
Feedlots	x	x		x																		
Individual subsurface sewage treatment systems (SSTS)	x	x		x															x			
Archeological Sites																			x			
Soil Erosion				x				x	x										x			x
Floodplain Management					x											x	x					
Solid Waste Management																x						
NPDES Compliance	x			x																		



## 5.5.1 ADMINISTRATION OF STATUTORY RESPONSIBILITIES

The State Statutes administered by the counties involved in this plan are described below. **Table 5-12** shows the counties which have and administer each statute. The responsibility for implementing these programs will remain with the respective counties.

### 5.5.1.1 WETLAND CONSERVATION ACT (WCA)

The Minnesota Legislature passed the Wetland Conservation Act of 1991 which is intended to result in “no net loss” of wetlands through filling, draining, excavating, or converting wetlands to other uses. Local government units (LGUs) are responsible for administering, regulating, and educating landowners on WCA.

### 5.5.1.2 SHORELAND MANAGEMENT

The Minnesota Legislature has delegated responsibility to LGUs to regulate 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. This statute is administered and enforced as a zoning ordinance requiring a 50 foot buffer around public waters.

### 5.5.1.3 FLOODPLAIN MANAGEMENT

Floodplain zoning regulations are intended to guide development in the flood plain consistent with the magnitude of the flood threat, in order 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.

### 5.5.1.4 INDIVIDUAL SUBSURFACE SEWAGE TREATMENT SYSTEMS (SSTS)

Counties participating in the One Watershed, One Plan administer Minnesota Rules Chapter 7080 through 7083 for individual SSTS. The program provides technical assistance, education, plan review, and inspections to protect water quality, prevent and control water borne diseases, and prevent or eliminate nuisance conditions.

### 5.5.1.5 MUNICIPAL WASTEWATER TREATMENT FACILITIES

Municipal wastewater treatment facilities are found throughout the One Watershed, One Plan boundary. The Minnesota Pollution Control Agency regulates and monitors municipal wastewater treatment facilities.

### 5.5.1.6 SOLID WASTE MANAGEMENT

Counties participating in the One Watershed, One Plan operate solid waste management systems as direct by Minnesota Statutes Chapters 115A and 400. These programs may include:

- Waste reduction and waste education programs;
- Curbside recycling and publicly-owned and operated recycling center;
- Yard waste composting sites; and
- Regional hazardous waste management facility.





### **5.5.1.7 WELL MANAGEMENT**

The Minnesota Department of Health (MDH) Well Management Program administers Minnesota Rules Chapter 4725 that sets standards for wellhead protection planning. Cities within the One Watershed, One Plan have completed or will be completing wellhead protection plans. The most recent listing of completed wellhead protection plans can be obtained from MDH. In addition to wellhead protection plans, two counties (Olmsted and Winona) participating in the One Watershed, One Plan have also been delegated water, monitoring and dewatering well programs.

### **5.5.1.8 FEEDLOTS**

Feedlot rules, regulations, and programs were established under MN Rules 7020 and is administered through the Minnesota Pollution Control Agency. Counties participating in the One Watershed, One Plan provide feedlot technical assistance programs and maintain a feedlot inventory.

### **5.5.1.9 HAZARD MANAGEMENT**

Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, codified at 42 USC Sections 5121 et seq. Hazard Mitigation Planning, 44 CR Part 201, established criteria for state and local hazard mitigation planning. Counties participating in the One Watershed, One Plan have developed hazard mitigation plans as a result of DMA 2000.

### **5.5.1.10 BUFFER LEGISLATION**

Legislation signed into law in June 2015 requires the establishment of buffers along certain waterways. The law requires buffer widths with: 1) an average of 50 feet, and a minimum of 30 feet on public waters; 2) a minimum of 16.5 feet on public drainage systems; and 3) buffer recommendations for other water as determined by SWCDs. The SWCDs will be relied upon for implementation of the buffer legislation. The SWCD is likely to provide technical assistance and provide guidance about financial assistance options. Landowners also have the option of working with their SWCD to determine if other alternative practices aimed at protecting water quality can be used, rather than a buffer.

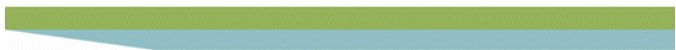


**Table 5-12: Specific statues administered by the counties participating in the One Watershed, One Plan.**

Ordinance or Statute Name	Dodge	Fillmore	Mower	Olmsted	Houston	Winona
Wetland Conservation Act	x	x	x	MN.8420/ Olmsted Co Code of Ordinances, Chpt 3700	x	Section 11.5 Natural Features Overlay Districts - Wetlands
Shoreland management	x	Section 612	x	Zoning Ord Article IX, sect. 9.10	x	Section 11.3 Natural Features Overlay Districts - Shoreland
Floodplain management	x	Section 610	x	Zoning Ord Article IX, sect. 9.00-9.08	x	Section 11.4 Natural Features Overlay District - Floodplain
Individual Sewage Treatment Systems (ISTS)	x	x	x	Ord – Chpt 3400/MN rules 7080	x	Section 6.14 Subsurface Sewage Treatment (SSTS) Permit Chapter 13 Subsurface Sewage Treatment Systems (SSTS)
Municipal Wastewater Treatment Facilities	x			City of Rochester (Not affecting Root R One Watershed, One Plan)		
Solid Waste Management	x	x		Code of Ords-Chpt 3500	x	Winona County Solid Waste Management ordinance
Well Management				Code of Ords-Chpt 3200 resolution 91-169		Winona County has delegated authority from the State
Hazard Management				Hazard Mitigation Plan <sup>†</sup>		Winona County Hazard Mitigation plan updated 2013
Feedlots	x	x	x	Zoning ord-Article X, sect 10.26, Conditional Use sect. 4.02	x	Section 6.12 (Feedlot Permit) Chapter 8 Livestock Feedlots
Aggregate Management		Section 721 Section 736		Zoning ord-Article X, sect 10.24, Conditional Use 4.02	Section 27	Section 9.10 Extraction Pits/Land Alterations Section 9.11 Subsurface Mineral Exploration
Soil Erosion		x	x	Zoning Ord Article X, sect 10.20		Section 9.15 Soil Erosion and Sediment Control
Bluffland Protection		Section 613 Section 614 (Decorah Shale)		Addressed through Shoreland Ordinance	x	Section 11.6 Natural Features Overlay Districts – Steep Slopes/Bluffs







**Table 5-12: Specific statues administered by the counties participating in the One Watershed, One Plan.**

Fuels and Hazardous Materials Storage and Transportation						Section 9.1.15 Bulk Storage (Liquid) Section 9.3.6 Fuel Supply and Storage
Forestland Management		Section 9*		Managed through zoning ordinance		Section 6.9 Commercial Timber Harvesting Permits Section 9.15.3 Timber Harvesting Standards Section 9.16 Woodland Preservation Section 9.17 Woodland Preservation Performance Standards
Preservation of Natural Drainage Ways		Section 717				
Karst		Section 722 Sinkhole Dumping Abatement				Section 11.7 Natural Features Overlay Districts – Karst Features
Tile Drainage		Section 724				
Extraction of Water for Water Bottling Purposes		Section 736				
Archaeological Sites						Section 11.8 Natural Features Overlay Districts – Archaeological Sites and Burial Grounds
Environmental Review						Chapter 7 (Environmental Review – General procedures for the Minnesota Environmental Review Program)
Land Use	x	x	x	Managed through zoning ordinance	x	Chapter 10: Zoning Districts

\* Section 9 of the Soil Erosion Control Ordinance as follows: "Land occupiers who use wooded land for pasture must ensure that proper management is used to prevent accelerated erosion or sedimentation due to over grazing or cattle paths. Fillmore SWCD and NRCS are available for help with pasture management to prevent or control soil erosion. Form 1026 from NRCS is required if woods or pasture are to be converted to other uses. The land occupier must have an erosion control plan, if needed, completed form 1026, and approval from the Fillmore SWCD and/or NRC prior to clearing or converting woodland area." Also references in Shoreland section 612.11.3 and Blufflands 613.08

\*Olmsted Co Hazard Mitigation Plan: This plan has been prepared in accordance with the requirements set forth in Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, codified at 42 USC Sections 5121 et seq. Hazard Mitigation Planning, 44 CFR Part 201, established criteria for State and local hazard mitigation planning as authorized by DMA 2000. The Minnesota Department of Homeland Security and Emergency Management (MN HSEM) and the Federal Emergency Management Agency provided guidance documents and other resources that were instructive in establishing the planning process, the plan scope and content, and assessment methods. This plan has been prepared under the direction of the Olmsted County Board of Commissioners and covers all of Olmsted County.



## 5.5.2 LOCAL REGULATION AND ORDINANCES

Local ordinances are used by all of the counties in the Root River plan area to address issues specific to their county. **Table 5-12** also shows the counties which have ordinances related to managing water and resources. The responsibility for implementing these ordinances will remain with the respective counties.

### 5.5.2.1 BLUFFLAND PROTECTION

Counties in plan area have bluffland protection overlay districts and policies within their zoning ordinances to control certain land uses and restrict vegetative alterations within bluff areas. These districts and policies are in place to control soil erosion and protect the aesthetic and natural value of blufflands.

### 5.5.2.2 SOIL EROSION

Some counties participating in this plan have erosion control regulations within their zoning ordinances that address construction and storm water plans. The State of Minnesota also requires permits through the National Pollutant Discharge Elimination System (NPDES) for all construction on development sites of one acre or more in size.

### 5.5.2.3 FORESTLAND MANAGEMENT

Both Fillmore and Olmsted Counties manage forests and woodland activities. Olmsted County supports ongoing programs, projects, and planning efforts on forestland in the region. Fillmore County requires assurance of proper grazing in wooded land and gaining permits / approval for conversion of 10,000 square feet or more of woodland area to another use.

### 5.5.2.4 AGGREGATE MANAGEMENT

Individual counties manage the development of and extraction of aggregate resources through local zoning and ordinances. County government will remain responsible for this process.

### 5.5.2.5 FUELS AND HAZARDOUS MATERIALS STORAGE AND TRANSPORTATION

Both Olmsted and Winona County have responsibilities for the storage and transportation of fuels and hazardous materials. Both Counties have programs in place for the disposal of household and business hazardous waste.

### 5.5.2.6 PRESERVATION OF NATURAL DRAINAGE WAYS

Fillmore County has a zoning ordinance to make every effort to retain the natural drainage systems in the county, including existing wetlands and ponds.

### 5.5.2.7 KARST

Both Fillmore and Winona Counties have programs that restrict activities on top of karst sinkhole features.

### 5.5.2.8 TILE DRAINAGE

Fillmore County has a zoning ordinance that permits the drainage of tile lines into country road right of way provided the following criteria are met:

- The outlet will be made into the back slope of the road ditch at a ninety (90) degree angle to the road for a minimum distance of forty (40) feet.





- No tile shall be placed closer than forty (40) feet to the right of way, except for outlets or inlets placed perpendicular to the right of way.
- Outlets will only be permitted within one hundred (100) feet of a centerline culvert or a township or county road approach culvert.

#### **5.5.2.9 EXTRACTION OF WATER FOR WATER BOTTLING PURPOSES**

Fillmore County has an ordinance that requires any person wishing to extract water for a water bottling business to obtain a Conditional Use Permit.

#### **5.5.2.10 ARCHAEOLOGICAL SITES**

Winona County has a diversity of cultural and historic resources commonly associated with the varied terrain of the Upper Midwest, which are often reflective of Native American heritage and early pioneer settlements. Winona County has local ordinances in place as a mean to preserve such archaeological assets.

#### **5.5.2.11 ENVIRONMENTAL REVIEW**

Winona County has been granted the ability to conduct Environmental Reviews for the Minnesota Environmental Review Program. This program is intended to determine whether projects have or may have the potential for significant environmental effects and should undergo special Environmental Review procedures.

#### **5.5.2.12 LAND USE**

Each of the counties is responsible for land use planning, which is administered through local zoning ordinances. Implementing the land use planning and local zoning ordinances at the local level is an ongoing effort which will help achieve the plan measurable goals. Potential new ordinances were considered during plan development. Specifically, the Policy Committee discussed concepts about whether a new ordinance specific to the protection karst formations was needed. Rather than implementing a new ordinance, the Policy Committee placed emphasis on the use of financial incentives to cost share practices.

### **5.5.3 RULES AND REGULATIONS**

There is only one watershed district in the Root River Watershed One Watershed, One Plan planning boundary: the Crooked Creek Watershed District. The Crooked Creek Watershed District is in the southeastern portion of the plan area, located entirely within Houston County. The District hires an employee of the Root River SWCD on a contract basis to execute these maintenance duties. The primary focus of the Crooked Creek Watershed District has been to provide flood control for the watershed district through the maintenance of four large earthen dams along with the upstream conservation practices implemented to maintain the structure longevity. The District has accomplished this original mission and remains in place to provide maintenance for these structures. The Crooked Creek Watershed District is considering the implementation of at least two additional flood retention structures along with upland treatment on cropland. These capital projects are included in this plan.

The Crooked Creek Watershed District does not have a system of rules and regulations for the management of water within the watershed district. No additional (new) rules or regulations specific to water management will be implemented by the plan participants, including within the Crooked Creek Watershed District. Rather the need for new and implementation of existing rules and regulations will continue through the respective counties.







*Root River Watershed*  
ONE WATERSHED. ONE PLAN



***Prepared for:***  
Root River Planning  
Partnership

***Prepared by:***  
Houston Engineering, Inc.